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Regional Sustainability Planning  
by Metropolitan Planning Organizations

by Elisa Sirkka Barbour

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*Abstract*

Regional Sustainability Planning by Metropolitan Planning Organizations

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Doctor of Philosophy in City and Regional Planning

University of California, Berkeley

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In recent decades, many Metropolitan Planning Organizations (MPOs) – federally mandated transportation planning agencies in urban areas with populations of 50,000 or more – have become active sustainability planners, integrating their regional transportation plans with land use strategies, and addressing wider impacts upon the regional economy, social equity, and natural environment. MPOs have taken up this stance to address mandated responsibilities that have widened over time, such as for addressing air quality problems and incorporating public and stakeholder input, and as a re-interpretation of their main traditional responsibility, namely to manage transport mobility within regions. Facing a tightening vise of environmental and fiscal constraints, these MPOs have focused on improving accessibility, rather than mobility, through coordinated transport-land use strategies to improve “location efficiency,” for example, through promoting infill, mixed-use development located near transit stations. Because this approach requires closer coordination of land use and transportation planning than traditionally pursued, these MPOs have become more activist agencies in working with local governments and their land use policymaking authority. Their work provides a basis for slow but steady advancement of a new sustainability paradigm for transport policy.

MPOs, however, face a severe disjuncture between the forces compelling them to advance sustainability goals, on the one hand, and institutional barriers that severely inhibit their ability to accomplish them, on the other. Long-standing governing arrangements in the US federal system sever authority over the elements of growth management that many MPOs now seek to integrate more fully. Constituted mainly as voluntary associations of local governments, MPOs lack independent authority; they control few resources autonomously, and provide instead a coordinating role for long-range transportation investment planning.

In spite of the obstacles, some MPOs are experimenting with institutional innovations to integrate transportation and land use planning more effectively, providing a major contribution to sustainability policymaking, which depends on developing new and effective modes of governance for public goods management across all sectors of the economy, including for transportation and land use. Thus, MPOs are at the center of both opportunities and obstacles for advancing sustainable planning practices in the US.

This dissertation evaluates how conflicting dynamics of path dependent institutional arrangements for growth management affect sustainability planning by MPOs. It provides a historical institutionalist account of the evolving role and planning strategies of MPOs since their inception in the 1970s, considering why and how some MPOs have begun to address sustainability concerns, and the opportunities and obstacles they face. It theorizes MPO planning practices in connection to concepts from the sustainability planning literature(s), in order to identify characteristics that distinguish MPO sustainability planning from more traditional practice. Using operational measures

developed for the purpose, the incidence of sustainability planning by large MPOs across the US is assessed, and factors capable of predicting which MPOs take up sustainability planning techniques are evaluated. Then, findings from an in-depth case study of MPO planning in California are presented – a state where the largest MPOs have been sustainability leaders for more than a decade, and where the state government has recently adopted policy measures to support their efforts. Ultimately, prospects for MPO sustainability planning in California, and by extension elsewhere, are seen to depend substantially upon policy support from the state level, because state governments control land use authority under the US Constitution, and they shape the laws and programs – from fiscal policies such as redevelopment and taxing authority, to planning requirements, affordable housing programs, transit operating funds, and more – that frame local land use decisions more than any other level of government. However, as the California case study shows, striking the right balance between state-level and regional authority for managing “smart growth” programs can be problematic.

The work contributes to urban planning and sustainability literatures, because little in-depth attention has been paid by scholars to MPOs as sustainability planners. This lack of attention is unfortunate because the regional scale is critical in sustainability planning, given the many inter-connections among policies for the built environment that play out at that scale. At the same time, because this dissertation focuses especially on MPO institutional and decision-making dynamics, the research makes a contribution to literatures on federalism, multi-level governance, and policy formation and change. In particular, the research addresses questions raised by scholars in those fields about how collaborative governance in multi-level frameworks can help support sustainability.

*I thank my parents for encouraging me to care about sustainability and collective action to make a better world. Thanks also to Celia, Heather, and Tanya for moral support, and to Rick for years of dialogue about American political values. Thanks to my advisor, Betty Deakin, for fostering my interest in MPOs as political animals, and for asking great questions. And finally, thanks to Dan Chatman for modeling excellence in scholarship and teaching, and to Michael Teitz for his mentorship and humanist perspective.*

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# CHAPTER 1. INTRODUCTION AND SUMMARY

*Policies determine politics.*

*- Theodore Lowi (1972, p.299)*

## 1.1 Setting the stage: Regional sustainability planning

This dissertation is about sustainability planning at the metropolitan regional scale, more specifically, about the work of Metropolitan Planning Organizations (MPOs), federally mandated transportation planning agencies in urban areas with populations of 50,000 or more. There are more than 400 MPOs in the US, with 48 serving regions with populations over one million. The work of these large MPOs is the focus of this research. During the past two decades, many of them have become active sustainability planners, integrating transportation with land use planning, and addressing wider impacts upon the regional economy, social equity, and natural environment. MPOs have taken up this stance to address mandated responsibilities that have widened over time, and also as a re-interpretation of their main traditional responsibility, namely to manage transport mobility within regions, in light of changing conditions in built-up urban areas.

The work of sustainability-oriented MPOs deserves attention, because the regional scale is critical for sustainability planning, and MPO processes provide an effective venue for activism to reconfigure long-entrenched, unsustainable habits and practices related to the built environment. At the regional scale, MPOs are central players in planning for growth and development, also called “growth management,” which can be conceived as planning for infrastructure, land use, and the natural environment. The regional scale is critical for considering growth management, because many policies affecting the built environment play out and interact regionally, for example, at the scale of housing markets, labor markets, and associated commute-sheds. MPOs, more than any other institutions in the current landscape of American federalism, provide an opening for creative dialogue, bargaining, political mobilization, and institutional experimentation to articulate and advance the collective “regional good” in regard to development policy.

This is a provocative claim, because MPOs are generally considered to be weak institutions, and rightly so. Constituted, for the most part, as voluntary associations of local governments, MPOs lack independent authority, acting instead as an interface between the federal, state, and local governments, coordinating their transportation investments within a regional framework. MPOs control few resources autonomously, and their voluntary governance structure means they are prone to endless collective action dilemmas tracing to fragmentation of authority over key elements of growth management in the US federal system. In particular, MPOs do not control land use, which in most of the US has been delegated by state governments to localities (to cities, and, for unincorporated areas, to county governments). The federal and state systems for allocating transportation funds only reinforces geographic and policy fragmentation, for example by allocating roadway funds on a jurisdictional, rather than performance basis, and allocating transit funds separately, across multiple transit agencies in large metropolitan areas.

Given these constraints, why are many MPOs adopting ambitious goals for promoting sustainable development, and why should we think they could succeed in achieving them? “Sustainability,” or “sustainable development,” can be considered a normative stance on development trajectories that calls for integrating policies, when possible, to support environmental, equity, and economic goals (the “3 E’s”) simultaneously, across both temporal and geographic scales, and, when policy goals conflict, to face trade-offs squarely without sacrificing environmental and equity standards.

The turn to sustainability planning emerged from within the path-dependent, cyclical planning process that MPOs are required to conduct (called “continuing, cooperative, and comprehensive” or “3-C’s”). This federally mandated long-range planning process has evolved over time to accommodate new issues, interests, and requirements that reflect changing social expectations for transportation, such as for meeting air quality standards, and for incorporating stakeholder and public involvement – and most recently, in some states, for addressing climate policy goals. In this manner, the 3-Cs process has proved to be an effective vehicle for enabling, though not mandating, sustainability planning.

Facing a tightening vise of environmental and fiscal constraints, some MPOs have re-framed their traditional focus on mobility to focus instead on enhancing accessibility through coordinated transport-land use strategies aimed at improving “location efficiency” (for example, through promoting infill, mixed-use development located near transit stations). Their work provides a basis for slow but steady advancement of key elements in a new sustainability paradigm for transport policymaking. Because this approach requires closer coordination of land use and transportation planning than traditionally pursued, these MPOs have become more activist agencies in working with local governments and their land use policymaking authority, as well as other stakeholders.

Thus, MPOs’ turn toward sustainability planning is seen to be a product of institutional “layering” of new mandates, as well as recognition of limits of traditional strategies in light of shifting conditions. However, MPOs face a severe disjuncture between the forces compelling them to advance sustainability goals, on the one hand, and institutional barriers that severely inhibit their ability to accomplish them, on the other. Long-standing governing arrangements in the US federal system sever authority over the elements of growth management that many MPOs now seek to integrate more fully. MPOs themselves mirror these fractures in authority, given their lack of control over land use policy and lack of autonomous fiscal and regulatory authority. As a result, MPOs exhibit ongoing tensions and contradictions in defining and achieving collective goals and responsibilities, especially where land use is concerned. An example of this disjuncture is the finding, from the case study research conducted for this dissertation in California’s four largest metropolitan areas, that regional plan goals for land use are increasingly diverging from current expectations as expressed in adopted local land use plans. This gap between goals for the future and current realities has prompted challenges from stakeholders in the planning process about feasibility of plan implementation; these challenges are pushing forward a statewide conversation about the need for more resources to support sustainable development.

In spite of the obstacles, some MPOs are experimenting with institutional innovations to integrate transportation and land use planning more effectively, and thereby contributing significantly to sustainability policymaking, which depends on developing new and effective modes of governance for public goods management across all sectors of the economy, including for transportation and land use. An example of institutional innovation is found in the San Francisco Bay Area MPO’s last regional plan, which dedicates hundreds of millions of dollars annually to local projects in targeted growth zones, contingent upon local efforts to advance affordable housing production and adopt smart growth policies. Meanwhile, the same MPO eliminated any measure of congestion delay from its adopted plan performance measures, and devoted nine out of every ten dollars in the plan to upkeep of existing facilities rather than expansion. For an MPO to de-prioritize congestion management (its traditional mandated responsibility), as well as facilities expansion, while also establishing a program to promote affordable, more compact housing near transit, signals an

emerging new sustainability oriented regional planning paradigm. This institutional innovation can help in reintegrating planning practice across longstanding barriers.

Conflicts, some of them very intense, emerged among stakeholders in the Bay Area process in response to the MPO's plan and the new program just described. For example, four lawsuits were filed, one by the regional Building Industry Association, another by environmentalists, and two more by Tea Party groups outraged by perceived "Soviet-style" intrusion into local land use control. Many more stakeholders raised challenging questions about plan feasibility, pointing to perceived implementation gaps. Although often frustrating at the time, these conflicts are ultimately salutary, pointing to a widening circle of engagement and interest in the regional planning process. The MPO process became a "ground for struggle" on important concerns about the region's shared future.

Thus, MPOs are at the center of both opportunities and obstacles for advancing sustainable planning practices in the US. This dissertation evaluates how conflicting dynamics of path dependent institutional arrangements for growth management affect sustainability planning by MPOs. It provides a historical institutionalist account of the evolving role and planning strategies of MPOs since their inception in the 1970s, considering why and how some MPOs began to address sustainability concerns by the 2000s, and the opportunities and obstacles they face. It theorizes MPO planning practices in connection to concepts from the sustainability planning literature(s), in order to identify characteristics that distinguish MPO sustainability planning from more traditional practice. In doing so, it also addresses questions about democratic accountability, implementation deficits, and dynamics of endogenous change from within existing governing arrangements.

Using operational measures developed for the purpose, the incidence of sustainability planning by large MPOs across the US is assessed, and factors capable of predicting which MPOs take up sustainability planning techniques are evaluated. Then, findings from an in-depth case study of MPO planning in California are presented – a state where the largest MPOs have been sustainability leaders for more than a decade, and where the state government has recently adopted policy measures to support their efforts. Ultimately, prospects for MPO sustainability planning in California, and by extension elsewhere, are seen to depend substantially upon policy support from the state level, because state governments control land use authority under the US Constitution, and they shape the laws and programs – from fiscal policies such as redevelopment and taxing authority, to planning requirements, affordable housing programs, transit operating funds, and more – that frame local land use decisions more than any other level of government. However, as the California case study shows, striking the right balance between state-level and regional authority for managing "smart growth" programs can be problematic.

The topic of MPO sustainability planning can be placed most directly within the literatures on sustainable transport, sustainability planning more generally, and regionalism and regional planning. However, little in-depth attention has been paid by scholars to MPOs as sustainability planners. This may be partly because this role is new for MPOs, and also because much of the literature on sustainability planning considers environmental topics more narrowly defined. In the urban planning literature, sustainability planning is most often considered at the city level, rather than by regional agencies. The lack of attention to regional sustainability planning is unfortunate because the regional scale is critical, given the many inter-connections among policies for the built environment that play out at that scale. Considering sustainability planning at the city scale alone misses a fundamental aspect of sustainability, namely recognition of the interplay of policies across city boundaries within urban regions. Therefore, an in-depth study of MPO sustainability planning provides a significant contribution to the literatures on urban planning and sustainability.

At the same time, the emphasis placed in this dissertation on MPO institutional and decision-making dynamics makes the research a contribution to literatures on federalism, multi-level governance, and policy formation and change. In particular, the research addresses questions from those literatures about how collaborative governance in multi-level frameworks can help support sustainability. Some of the relevant questions are long-standing, such as how to overcome entrenched institutional fractures and collective action dilemmas in federal systems. But others are front and center in current debates about how to assemble effective policy “packages” in multi-level governing frameworks that no longer rely on top-down, “command-and-control” principles.

MPO sustainability planning raises salient questions about democratic performance accountability because MPO decision processes are based on stakeholder deliberation and appointed board membership, rather than more traditional legislative procedures. From the traditional top-down perspective on governance and associated rational models of the policy process, democratic accountability depends on elected representatives adopting policies which are then executed by administrative agencies. Policy implementation, in this model, flows linearly from policy formation. However, in keeping with recent literature on “bottom up” and multilevel policymaking, this dissertation considers policy formation and implementation as co-constitutive and multi-directional across levels of government, and over time. This formulation matches characteristics of MPO planning, which is an iterative, cyclical process guided by federal procedural mandates (and a few performance mandates) but which leaves open much room for MPOs to determine goals and objectives. The path-dependent MPO planning process is seen as having evolved in response to the interaction of successive “layers” of federal mandates imposed over time, which cumulatively serve to accommodate, though not to require, sustainability planning by MPOs. Democratic accountability is theorized as depending on performance accountability (output legitimacy) as well as robust stakeholder engagement (input legitimacy).

From the multi-level and multidirectional perspective, implementation measures are seen to map “backwards” to influence policy (re)formation as much as forwards from initial policy guidelines. For example, technical advances taken up by MPOs for required modeling of air quality impacts of their plans enabled them to subsequently expand the range of other performance objectives they could choose to address, and then recursively this process informed state-level policymaking (such as in California and Oregon) where new requirements have been established for MPOs to model and achieve greenhouse gas (GHG) reductions in their plans. At the same time, implementation accountability for MPO sustainability planning is seen to map “upwards” from the MPO level, rather than just downwards from federal and state policy guidance. In particular, MPOs cannot be expected to achieve ambitious sustainability goals, such as for reducing GHGs (as they are now required to do in California) without substantial support from the state government to align its wider framework of fiscal, planning, and funding policies and programs to support MPO objectives.

The research employs mixed methods to consider MPO sustainability planning from multiple perspectives, including historical institutional analysis of the evolving role and practices of MPOs since their inception, quantitative empirical analysis of current MPO planning practices across the nation, and an in-depth case study of the interplay of policymaking at different scales in California during the past decade. Methods employed include assessment of MPO plans and related documents, other public information, and interviews with 35 MPO planners, interest group stakeholders, and state policymakers in California.

The research is informed by various literatures, to support theorizing and analysis that is both wide and deep. Consideration of MPO decision-making dynamics is informed by political theories from

historical institutionalist and institutional collective action schools of thought, as well as theories about federalism, multi-level governance, advocacy coalitions, and policy change, implementation, and instrumentation. The historical assessment of MPOs' role and practices is also informed by literature on regionalism, transport planning history, MPOs, and environmental policies pertaining to air quality and environmental review of development projects. Consideration of MPO "smart growth" strategies, and their motivations, rationale, prospects, and limitations, is informed by literature on sustainable transport, transport finance, land use-transport interactions, and transit-oriented development. Sustainability processes of MPOs are assessed in relation to theory on sustainability planning and governance.

## **1.2 Overview and summary of chapters**

The next chapter provides a historical and theoretical framework for understanding the role and strategies of MPOs. It places governance and institutional dynamics at the heart of understanding the evolving role of MPOs. The establishment of MPO planning processes, starting in the 1960s, and then their eventual turn to sustainability planning by the 1990s, are seen to be responses to governance dilemmas. The establishment of MPOs is depicted as a response to a governance dilemma that arose in the years following World War II, namely the greater difficulty in coordinating planning concerns at the regional scale in the wake of the sharp rise in numbers of municipal incorporations during the suburbanization boom, which also coincided with centralization of federal and state highway-building efforts. To coordinate transportation and environmental planning with localities, the federal and state governments established new policies and administrative entities to carry them out, including MPOs. Created to act as an intergovernmental coordination interface, MPOs were constructed to lack independent authority. Meanwhile, land use was left a local prerogative.

Chapter 2 then turns to considering a second inflection point in growth management which occurred during the 1990s, when the post-war planning system seemed to have come up against its own limitations. Federal reforms were adopted which set the stage for MPO sustainability planning, providing MPOs with greater authority for programming investments, but also greater responsibility for air quality management. With negative consequences of suburban "sprawl" development coming to roost, MPOs faced increasing challenges in planning for mobility in urban areas. Tighter air quality and funding constraints, and rising traffic congestion, led MPOs to emphasize location efficiency and "demand management" – reducing demand for transport rather than increasing capacity (supply) – to address their responsibilities. In their periodically updated long-range (20+ year) regional transportation plans (RTPs), MPOs turned to land use strategies, such as transit-oriented development, as a means to support efficient transport. However, institutional barriers to integrated planning now presented a new governance dilemma for MPOs to overcome.

By the 2000s, many MPOs had begun to adopt a new paradigm for interpreting their responsibilities – that of advancing sustainable development. Chapter 3 discusses theory and methods for evaluating this shift in practice, considering the elements of the new approach in light of literature on sustainable transport, sustainability environmental assessment, and sustainability planning. The MPOs' long-range mandated planning process is seen to match some of the basic characteristics cited in the literature for idealized sustainability planning, because of its cyclical, iterative (recursive) nature, its requirements for addressing multiple planning factors related to the economy, environment, and equity, and its requirements for incorporating public and stakeholder input. The chapter presents operational measures developed for empirical analysis, utilized for the research presented in subsequent chapters, for assessing the incidence and dynamics of MPO sustainability



planning. The chapter also considers MPO sustainability planning in connection to questions about effective governance and policymaking raised in literatures on historical institutionalism and policy formation, change, and implementation.

Key identifying characteristics of MPO sustainability planning, posited in Chapter 3, include:

- a) Adoption by an MPO of sustainability oriented performance objectives and operational measures for evaluating plan options that extend beyond mobility goals to address accessibility, mode share, and 3 E's impacts;
- b) Use of scenario planning and other methods (such as project-level, rather than scenario-level analysis) to assess plan options for transportation and land use in regard to adopted performance measures;
- c) Active engagement of diverse stakeholders at all stages of the planning process, including assessment of plan scenarios (projects and programs for inclusion in the final plan);
- d) Selection of a final plan scenario that optimizes transport and location efficiency attributes, and identifies equity and environmental "guidrails" (i.e. performance targets);
- e) Allocation of funds in the plan budget to favor transit and non-motorized modes instead of roadways, and to favor "fix-it-first," or in other words, upkeep of existing facilities, rather than new roadway construction;
- f) Institutional innovation in establishing programs to encourage local land uses favorable to regional plan objectives for transport and location efficiency; and
- g) Recursive monitoring and evaluation of plan progress and decision-making procedures.

Sustainability planning requires that MPOs "make a leap" to use the full toolbox of techniques they have developed to comply with various federal requirements, so as to orient their planning to achieving sustainability outcomes. Only the full package of characteristics identified above is considered to indicate a truly robust sustainability planning process. All these attributes are evaluated in the California case study, but a more limited set (excluding c, d, and g) is utilized for analysis presented in Chapter 4 of the incidence of sustainability planning by the largest US MPOs.

As delineated in Chapter 4, most large US MPOs are found to be engaging in some aspect of sustainability planning, with their activity seen as lying along a continuum, rather than on-or-off. For example, three-quarters of the largest 20 MPOs are found to have utilized, in their most recent RTPs, performance measures for accessibility and vehicle miles traveled per capita, to compare projected impacts of plan alternatives. However, half or fewer of the MPOs use performance measures for land use, equity, or environmental impacts (other than air quality).

The most extensive investigation was conducted of scenario analysis by MPOs, considered in this dissertation to be the most direct operational indicator of whether an MPO has taken up sustainability planning techniques. A study of scenario analysis is conducted for the largest 48 MPOs in the US (those with populations above 1 million, an important cut-off point in federal performance planning requirements). In scenario analysis, MPOs evaluate projected performance attributes of the package of transport and land use components (the scenario) adopted for the regional plan. Various alternative scenarios may be developed for study. The assessment indicates that most (88%) of the 48 largest MPOs conducted some form of scenario analysis for at least one of their most recent two RTPs. However, only about half (56%) conducted *budget-constrained* scenario analysis, in order to test *alternatives for possible plan adoption*. Only 29% tested both land use and transport options. MPOs that are constituted as Councils of Governments (a.k.a. COGs, which are forums for local government interaction) or free-standing entities are found to be more

likely to have conducted budget-constrained scenario analysis, as are MPOs in regions out of attainment of federal air quality standards. MPOs in the West and Northeastern parts of the US are also found to be pursuing budget-constrained scenario analysis more so than MPOs in other regions. Additionally, an assessment of implementation techniques indicates that 15 of the largest 25 MPOs have established incentive grant programs to reward local TOD projects and plans that support regional goals.

Because the dissertation emphasizes governance dynamics, the MPOs' governing structures are also investigated in Chapter 4, with MPO governing board structures distinguished according to whether they favor local or state-level officials, and whether voting power is proportionate to population. Most of the largest 48 MPOs are found to have governing boards favoring local government representation, with 62% making decisions on a "one-government, one-vote" basis. The other 38% have put provisions in place to approximate population-proportional voting, either through district representation (votes allocated to groups of cities and counties), or through provisions allowing for population-weighted voting. The chapter also presents results of a "d-statistic" employed to evaluate the degree to which MPO governing board structures deviate from population-proportional voting distribution, and whether the deviations favor core urban or suburban locations. Among the largest MPOs, most are found to have voting structures that favor suburban localities over urban ones.

Governance characteristics of MPOs are tested, along with other data measures for key economic, social, political, and policy-related characteristics that distinguish MPOs and their regions, in a logistic regression to determine factors most closely associated with the likelihood that an MPO has chosen to conduct budget-constrained scenario analysis in which both transportation and land use alternatives were varied. The factors found to be most predictive, after controlling for all others, include regional location, with MPOs in the Southeast, Southwest, and Midwest determined to be less likely than MPOs elsewhere to have done so. In addition, wealthier regions, measured in terms of average household incomes, were more likely to have done so, and, counter-intuitively, also regions with lower levels of traffic delay. In addition, MPOs in states that impose plan consistency requirements between regional and local plans were more likely to have done so.

Chapter 5 then presents findings from an in-depth case study of MPO planning in California, providing insights on both bottom-up MPO sustainability planning, as well as state-level efforts to support MPOs. The research focuses on California's four largest MPOs, namely in the Los Angeles, San Francisco Bay, Sacramento, and San Diego regions, which have been national leaders among MPO sustainability planners. Their activism reflects a number of factors, including the greater authority allocated in California to MPOs, compared to other states, and growth and development conditions in these regions. Their sustainability planning efforts provide models of innovation possibilities for MPOs elsewhere, especially in states willing to provide MPOs with a substantial role in allocating transportation funds. The importance of the four MPOs' efforts can be seen in California legislation adopted in 2008 (discussed below) that explicitly systematized and extended the four MPOs' planning approach statewide, while adding a GHG reduction performance mandate.

As a sample, the four MPOs studied form a logical set, considered, for example, to be a peer group by California state-level agencies in various programs and policy requirements established in recent years. Given the single-state context of this case study (holding the state policy framework constant), variation in patterns of planning practice among the four MPOs can be considered vis-a-vis factors such as size of region, stage (age) of development of the transport network, MPO organizational structure, and regional political leanings.

The case studies in Chapter 5 also provide insight into state government influence on MPO sustainability planning. In particular, the dissertation assesses implementation of California's Senate Bill (SB) 375, adopted in 2008, which explicitly calls for MPOs to conduct sustainability planning processes of the sort already being pursued by the four large MPOs, as a means to support state climate policy goals. SB 375 establishes a new performance mandate for RTPs, namely that the plans demonstrate the capacity to reduce greenhouse gas emissions by a mandated amount over their duration. SB 375 also aligns another existing regional planning process with RTPs, namely the state's mandated "fair share" housing policy, called the Regional Housing Needs Assessment (RHNA) process, California's method for ensuring that localities facilitate adequate housing for all income levels. RHNA calls on MPOs to allocate to each locality within their regions its fair share of regional housing need for all income levels, which the localities must accommodate through appropriate zoning. In this manner, SB 375 connects planning for transport and land use (housing).

The passage of SB 375 can be considered a natural experiment, allowing for consideration of how this sort of law affected the MPOs' bottom-up efforts. While SB 375 imposes a performance mandate to induce efficient development patterns, and calls for better planning integration, the law otherwise generally leaves status quo planning arrangements intact, in particular local control of land use (a.k.a. "home rule"). Its passage provides an opportunity to study how and whether state-mandated climate performance standards affect MPO plans and practices – a pertinent question given that the most recent federal surface transportation legislation (called MAP-21) calls for performance planning by MPOs, and also given that other states have contemplated and even passed similar legislation. The SB 375 model is especially pertinent for US states seeking to guide MPO performance planning for efficient development, without directly challenging local home rule.

The research considers and compares pre-SB 375 to post-SB 375 plans for the four large MPOs, so as to evaluate how and whether the law has altered their planning practices. It considers sustainability planning challenges and accomplishments across the key stages (components) of the planning process outlined above, adding additional analysis of: development of plan goals and framing narratives; stakeholder engagement patterns; land use projections processes; and modeled plan performance results for measures of location and transport efficiency.

Each of the four post-SB 375 plans provides a framing narrative of the "regional good" to be accomplished through the plan, in relation to sustainability goals, but the narratives differ depending on regional conditions and priorities, and comparison is instructive. SB 375's performance mandates proved to be highly constraining in only one region, namely the San Francisco Bay Area, which is already more location-efficient and has a more well-developed transit network than the others, meaning that capacity-enhancing strategies are less useful in "pushing the needle" further on transport efficiency. As a result, this MPO went furthest to advance location-efficiency through policies calling for more compact growth, rather than relying on transport investments to meet plan goals. However, this approach also proved harder to sell to local government stakeholders than traditional "win-win" mobility-enhancing measures promoted in the Southern California regional plans. This outcome accords with theory on institutional collective action dilemmas that predicts "win-win" strategies will be much easier to adopt on a collaborative basis than strategies creating new winners and losers. Many local governments in the Bay Area do not seek new infill housing development nor do they want to be told they must do so to support an amorphous "regional good."

In the San Francisco Bay Area, major inter-stakeholder conflicts emerged in regard to land use and housing issues, reflecting different interests corresponding to the "3 E's." For example, while local governments resisted perceived incursions into their home rule authority over land use, equity-

focused stakeholder groups prodded the MPO to address potential threats of displacement from gentrification of inner-city neighborhoods near transit. Meanwhile, homebuilders pushed local governments to remove low-density zoning restrictions, and environmentalists stressed GHG reduction. The conflicts that emerged were sometimes intense, but stakeholder pressure is seen to have been essential in prodding MPO action to reconcile housing objectives, and to institute innovative policies and programs connecting transit and housing strategies. This finding indicates that the performance parameters of SB 375 helped induce an ultimately productive deliberation process to achieve collective action goals.

The analysis determines that the MPO plans developed after SB 375 demonstrate significant but generally not dramatic advances, compared to pre-SB 375 plans, in promoting location efficiency and transport efficiency. Projected performance is found to be more ambitious in post-SB 375 plans for three key metrics of location and transport efficiency, namely increase in multi-family housing share and non-auto mode share, and reduction in vehicle miles traveled (VMT) per capita. Post-SB 375 plans also emphasize sustainability in their budget allocations, by spending, in general, more for transit than highways and roads, and for “fix-it-first,” an indicator of support for existing neighborhoods. For the latter measure, the spending share is higher post-SB 375 than pre-SB 375.

Lack of consistency in performance measurement prohibited further comparisons of this sort across the MPO regions and plan years. This shortcoming points to a substantial transparency problem for conducting comparative research to evaluate and compare plan outputs, such as undertaken for this project. Lack of measurement consistency is a very serious procedural concern for advancing sustainability planning by MPOs, whose practices should not just be considered in isolated regional contexts. While MPO autonomy produces benefits such as institutional innovation, it also entails downsides, such as inconsistency in performance measurement.

The finding that sustainability objectives are being advanced surely but only slowly under SB 375 should not be surprising or disheartening, because the law builds upon and aligns existing processes, more than replacing them. SB 375 adds only the newest layer in the long series of planning mandates that cumulatively have prompted sustainability planning by California MPOs, reinforcing environmental performance expectations, while also making an explicit link to housing policy (through the RHNA consistency requirement).

In the MPO regions that adopted the most ambitious post-SB 375 plans, particularly the Bay Area, a widening gap between plan goals and means for achieving them became evident. Stakeholders challenged plan feasibility. Meanwhile, in other regions, in particular the San Diego area, stakeholders challenged the MPOs for being too laissez-faire in accepting “business as usual” transport and land use patterns. Observed differences across the regions in the patterns of stakeholder engagement and conflict are seen to reflect four key variables and their interaction: size of region; history of MPO approach to stakeholder engagement and trust-building; autonomous revenue-raising ability; and the degree to which SB 375 mandates proved to be constraining. Each MPO is seen to have come up against constraining barriers to smart growth policymaking, with stakeholders pushing the MPO to contend with them.

Since 2012, the California state government has taken steps to address the SB 375 “implementation gap” through adopting some new policies and programs explicitly aimed at supporting the law’s goals. One of the new policies calls for revising the state’s environmental review requirements applied to development project proposals, so as to replace the requirement for assessing traffic congestion impacts with a new requirement to assess each project’s impact on VMT. The other state

program directs 20% of California's ongoing funds from its new greenhouse gas cap-and-trade program, to provide incentive grants for local projects that combine affordable housing with transit and active transportation enhancements. The case study chapter assesses early-stage implementation of these state programs, to consider how and whether they work to support MPO goals. The analysis points to considerable ongoing challenges in linking transportation and land use, as well as in aligning state, regional, and local plans, priorities, and technical analytical capacities.

Ultimately, the dissertation concludes that success for SB 375 and for the MPOs' own bottom-up sustainability planning depends most importantly upon continuing stakeholder engagement, as well as expanded state-level policy support – with these outcomes naturally inter-connected. The marked increase in stakeholder engagement post-SB 375 can be seen as the greatest success of the law to-date, with one measure being the number of comment letters submitted for each of the four MPOs' plans, which at least doubled compared to the prior plan cycle. Stakeholder debates that emerged during the regional plan processes have recently been elevated to the state-level stage, as implementing provisions of the two new programs mentioned above are being deliberated. Challenges from stakeholders, even when (maybe especially when) highly contentious, point to a healthy deliberation process underway, because sustainability planning is about mobilizing key sectors to support sustainability, and facing trade-offs and shortcomings in current arrangements, not just achieving easy "win-win" strategies. The continuing debates help to underscore what is still missing for SB 375 to succeed, and what the state government needs to do about it.

Pulling together findings from different chapters, the dissertation ends with certain overarching conclusions. The research confirms the value of a certain recipe of policy elements for inducing MPO sustainability planning, namely combining mandated performance parameters with resources for meeting them, in the context of iterative (re-visited) plan deadlines. This combination creates value for the regional good to be advanced, provides resources to achieve it and induce cooperation for that purpose, and focuses action on meeting short-term deadlines for achieving long-term goals in iterative, recursive steps. This recipe was the secret to success of federal policy reforms in the early 1990s that set the stage for MPO sustainability planning by providing MPOs with more autonomy and also more responsibilities. This recipe can also be seen as operative in explaining the Bay Area's institutional innovations and emphasis on location efficiency in its post-SB 375 plan. The Bay Area MPO was induced to emphasize location efficiency because of the constraining nature of the SB 375 mandates, but it was able to implement its innovative programs to reward supportive local land use policies and projects in part because this MPO controls substantially more regionally-derived resources than the others, deriving from bridge toll revenue.

The question of ensuring adequate resources for implementation has been the Achilles heel of MPO sustainability planning. Even as fiscal constraint (lack of adequate funding for identified needs) has been one factor prodding MPOs to "make do with less" through efficiency strategies, this condition also hampers MPO implementation capacity. The resource constraint – also known as the "implementation gap" – points to the importance of "upwards-mapping" implementation responsibility, namely through state-level and federal support for MPO smart growth strategies.

Need for resources emerged as a salient concern in regard to SB 375, which some MPOs characterized as an "unfunded mandate" when the law was adopted. More recently, in discussions about the new state programs, some MPOs have been very indignant about not being provided a stronger implementation role and more direct control over state cap-and-trade funds. SB 375 has raised these thorny implementation debates for two reasons. First, it takes the logical, but also problematic step of calling for land use-transportation planning integration. On the one hand, this

step builds upon the practices of the large MPOs themselves, and so SB 375 can be seen as an incremental policy change. But on the other hand, in explicitly calling for land use-transportation planning coordination, SB 375 asks MPOs to do something they have inadequate ability to execute, given their lack of land use control and fiscal and regulatory authority. Thus, SB 375 implementation is a state-level responsibility at least as much as an MPO-level responsibility.

However, the question of how the state government should best support SB 375 implementation is a thorny one. Given its legal authority over local land use planning and fiscal rules, the state government alone can fully ensure that local land use policies support regional goals. Disputes between the MPOs and state agencies over the new state programs reveal, however, a fundamental, unresolved disagreement about whether the state should empower MPOs to control resources, or whether the state government should retain control. From the MPOs' perspective, they need to gain resources to "empower their plans" – to create inducements for local action conducive to regional strategies. However, from the state agencies' perspective, the imperative to apply uniform program criteria statewide mitigates against simply devolving funds and administration to the MPOs, given their differing planning capacities and priorities. Following this logic, the state programs are being established to support project-level, rather than plan-level strategies, thereby only indirectly supporting the MPO's regional strategies. Thus, the findings presented here underscore the need for careful integration of policymaking and execution at different levels of government, to support sustainability planning. However, they also underscore the difficulties inherent in power-sharing arrangements among levels of government. Furthermore, the expanding role of California MPOs in decision-making, not just planning coordination, underscores the importance of considering how to ensure democratic accountability in collaborative processes.

These concerns bring the dissertation back to issues explored from the start, namely how to pursue planning integration in the face of deeply entrenched institutional divides built into the American system for managing growth and development – most especially having to do with managing land use. Regional sustainability planning is conceived in this research as fundamentally a governance challenge, namely for creating institutional capacity to engender and foster deliberative and democratic processes for defining and achieving the "regional good." If, as some sustainability scholars contend, sustainability is about changing society "from within," then surely governance aspects are central concerns. California is seen to be grappling with these concerns under SB 375, with a healthy but sometimes conflictual process underway, but also with much remaining to be accomplished and resolved.

## **CHAPTER 2. HISTORY OF MPOS AND THEIR GOVERNANCE CHALLENGES**

### **2.1 Introduction: MPOs and marble cake federalism**

Transportation planning in the United States has long been a classic example of “marble cake” federalism, in which authority for planning and implementation is shared among levels of government from the national (federal) to the state and local levels (Wachs, 2004). Metropolitan Planning Organizations (MPOs) exemplify this blended character, as from their inception, they have been expected to provide a venue for integrating federal, state, and local transportation plans and priorities. This characteristic makes MPOs a useful focus for studying multi-level and collaborative governance.

MPOs have been considered to be weak institutions, since, almost without exception, they lack independent authority, structured instead as an interface between local governments, single-purpose districts (e.g. transit agencies), and state and federal agencies (Goldman and Deakin, 2000). MPOs have been a politically palatable means for coordinating transportation investment at the regional scale, without abridging state- or local-level authority. MPO governing boards are generally dominated by appointed local officials, and in many US states, departments of transportation dominate transportation funding decisions and minimize the MPO role.

However, over time, and especially in states such as California that have empowered MPOs, many MPOs have become more assertive, activist organizations, advocating “sustainable development,” and calling for multipurpose, multilevel policy coordination. In part this shift reflects changing priorities at the nexus of federal, state, and local concerns for transport policy. Federal policy reforms in the early 1990s altered the MPO role, providing them with more decision-making authority but also more responsibility for air quality attainment. More recently, some states such as California have adopted ambitious climate policies and have turned to MPOs as a logical venue to help advance state objectives. But the turn to sustainability planning by MPOs can also be viewed as an effort on their own part to re-interpret their traditional responsibilities, in particular for coordinating mobility plans for metropolitan regions, in light of changing conditions. Facing fiscal and environmental constraints, the “mobility paradigm” was seen to have reached its limit in many urban areas by the 1990s, and MPOs began to emphasize the need for more efficient transport, linked to supportive land use policies. This new orientation pushed MPOs to seek to work more closely with local governments, who control land use authority in most parts of the US.

This chapter provides a historical institutional account of the reasons why MPOs turned toward sustainability planning, first tracing the history of their establishment in the post-WWII era as a response to governance challenges for managing growth and development that were posed by suburbanization. A second inflection point in growth management dynamics is then identified, starting in the 1990s, after the national highway system was completed. Accumulating planning challenges caused policymakers to reassess priorities and to seek to contend with a new governance dilemma – the need to reintegrate now fractured centers of authority. The turn to “integrated transport-land use planning” by some MPOs, evident by the 2000s, is considered as a response to new federal mandates and accumulating challenges in carrying out traditional responsibilities.

The chapter utilizes concepts and findings from research on urban politics, transportation planning history, and transportation-land use interactions, as well as theories on the policy process from historical institutionalist and institutional collective action perspectives.

## **2.2 The evolution of US land use governance: How suburbanization altered governance**

Suburban development during the post-WWII economic boom altered the governance landscape of metropolitan areas dramatically, a situation that led to establishment of MPOs and which accounts for many challenges they face today. Understanding land use governance is foundational for evaluating MPO opportunities and challenges.

### ***Fragmentation of local government in the post-WW II boom years***

Historical accounts of post-WWII suburbanization highlight multiple contributing factors. Construction of the 41,000-mile federal highway system, which started in earnest with passage of the 1956 Interstate Highway Act, served to link central cities to their hinterlands, opening up new areas for development (Jackson, 1985). Meanwhile, federal mortgage insurance policies introduced as part of the New Deal facilitated mass production of affordable single-family homes on large suburban tracts made accessible by new highways. Truck transport also played a big role, as manufacturing firms began moving to outlying areas to take advantage of cheaper land and to utilize the nation's new highways as a primary means for moving goods to market. Socio-demographic and consumer technological shifts also promoted suburbanization, as rising incomes accompanied the "baby boom" and the advent of mass automobility during the period.

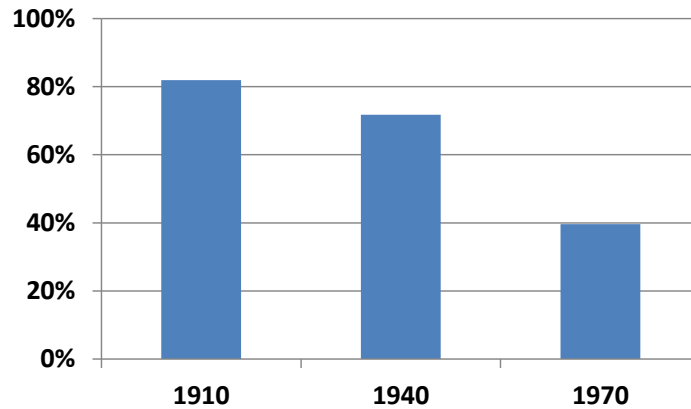
These factors helped turn formerly densely settled central cities "inside out" as both jobs and homes increasingly shifted to lower-density outlying areas (Muller, 2004). An aspect of the story told less frequently is the shift in the governance landscape toward greater fragmentation associated with the suburbanization boom. State incorporation laws interacted with local planning innovations to help facilitate the governance transition during the period. Suburban municipal incorporations were aided by permissive state incorporation laws, and by innovative service provision arrangements developed by small municipalities to provide police, fire protection, utilities, and other services through contracting out with county governments or by establishing multi-jurisdictional special service districts for those purposes (Jackson, 1985).

The shift in the governance landscape toward greater fragmentation was dramatic in scope. In 1910, central cities had been the dominant players in urban planning, comprising more than four-fifths of the urbanized area population in the ten largest metropolitan regions (as of 1970) (Figure 2.1). Legally speaking, local governments are "creatures of the state," whose authority in the US derives from the states' "police power" under the US Constitution to regulate health, safety, and welfare. However, during the Progressive Era at the turn of the 20<sup>th</sup> Century, states enacted so-called "home rule" reforms that provided municipalities (cities, towns, and townships) with more autonomy over their own affairs, including land use, and to raise funds for local infrastructure.

These reforms helped suburban communities to incorporate (in those states with unincorporated territory) and/or made central city annexation less advantageous, ultimately undermining the power of central cities. The central city share had diminished somewhat by 1940, but a far more dramatic shift occurred during the post-war period to 1970 – the years of the suburbanization boom. By 1970 the share living in the central cities had dropped to less than half (40%) (Figure 2.1), indicating that the political balance of power was shifting toward suburban areas.



**Figure 2.1 Percent of urbanized area population living in major central cities in the ten largest US metro areas in 1910, 1940, and 1970**

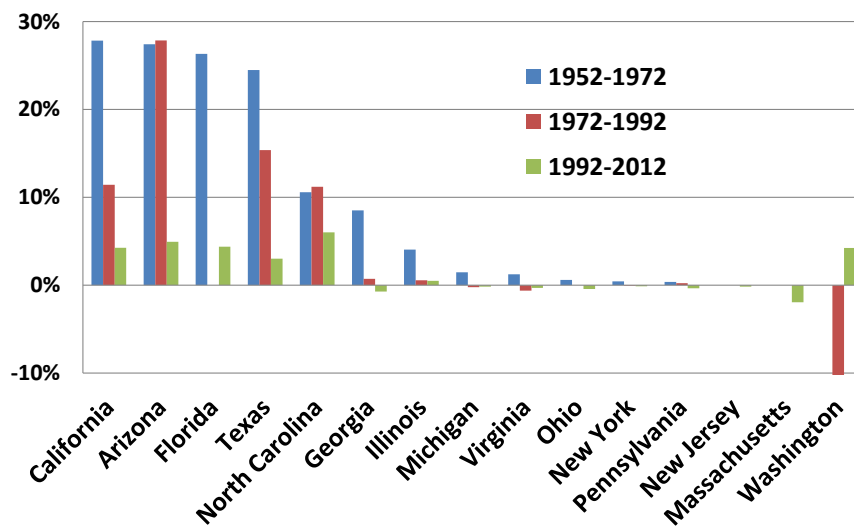


Sources: US Census, [www.peakbagger.com](http://www.peakbagger.com)

Notes: Largest metro areas and corresponding central cities in 1970 = New York, Los Angeles, Chicago, Philadelphia, Boston, St. Louis, Pittsburgh, San Francisco, Detroit, and Washington D.C. Data for 1910 excludes Washington D.C. Urbanized area populations are from <http://www.peakbagger.com/pbgeog/histmetropop.aspx>

California led the nation in its rate of municipal incorporation during the post-war era, but rates were high in many other states as well, especially in the western US (Figure 2.2). In long-settled eastern and Midwestern states, already incorporated outlying communities in metro areas began to fill in (grow in population) during the same period.

**Figure 2.2 Municipal incorporation growth rates for 15 most populous US states, 1952 to 2012**



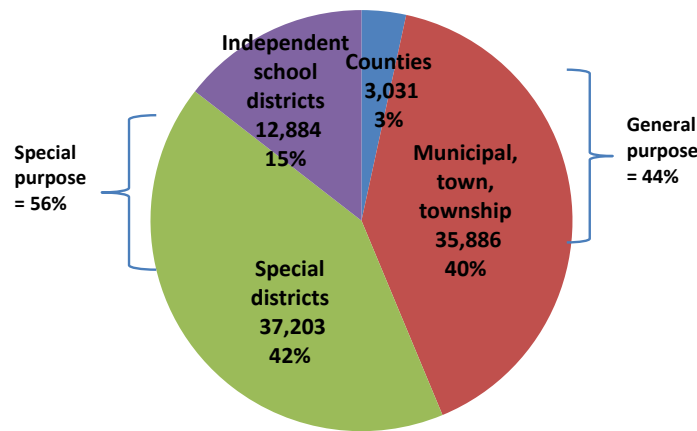
Source: Incorporation data from *Governing Magazine*

Motivations for suburban incorporation included warding off annexation attempts by central cities, keeping tax rates low, controlling land use policies such as exclusion of multi-unit housing, and controlling morals (for example, restricting sale of liquor) (Jackson, 1985). These motivations relate to what Oliver Williams termed “lifestyle services” that localities generally seek to control close to home, including land use and school-related choices in particular (Williams, 1967; Howell-Moroney, 2008).

This post-war governance and development pattern led to planning challenges requiring cross-jurisdictional coordination to resolve, as well as opportunities for achieving scale economies through inter-jurisdictional cooperation. Localities established multiple single-purpose functional agencies through “joint powers” authorities or other mechanisms, to provide what Williams called “maintenance services,” including sewer, sanitation, water, police, and fire protection. Localities were much less hesitant to enter into joint governing arrangements for these “maintenance services” than to cede control of land use.

Single-purpose special districts became the most common form of local government in the US and continue to be the fastest-growing (Foster, 2011). In 2012 there were 37,203 special districts compared to 35,886 municipalities (cities, towns, and townships) (US Census of Governments) (Figure 2.3). With over 80,000 local government entities in the US today (including special districts, school districts, counties and municipalities), the US federal system is highly fragmented, containing the highest number of local governments per capita among industrialized federalist democracies (Fisher, 2007).

**Figure 2.3 Local government entities in the US, 2012**



Source: US Census of Governments

***Effects of local government fragmentation and competition***

Whether or not the fragmentation in local governance that emerged after World War II is a boon or curse has long been a matter of debate among scholars. Debates have centered on the utility of functional special districts, and on the consequences of inter-local competition among municipalities in multi-nucleated settings.

Scholars from the public choice school advocate establishment of single-purpose functional agencies, such as special districts, for the sake of efficiency. Wallace Oates (1972) contributed a “correspondence principle” for determining the optimal scale for government control of service provision; it should match the scale of benefit from the goods provided, but no larger, such that costs are internalized (producing no externalities, or unpriced “spillover” effects). In this frame, service concerns with economies of scale exceeding the size of a local jurisdiction might best be handled through voluntary cooperative agreements or the establishment of single-purpose special districts (Ostrom, et al., 1961; Parks and Oakerson, 1993). Other observers have been less sanguine about the benefits of special district arrangements, however, noting that many have been subject to “political capture” by interest groups (particularly land developers), and to inefficiencies from lack of coordination and transparency (Miller, 1981; Burns, 1994).

A similar debate addressed impacts of municipal fragmentation and competition in the multi-nucleated local government context that emerged in US metro areas after World War II. Charles Tiebout’s famous 1956 formulation in his article “A pure theory of local expenditures,” widely considered the “touchstone” of local government economics (Fischel, 2006, p.8), theorized that efficiency gains are available from competition among local governments as providers of public goods (non-divisible, non-rivalrous goods). Noting that local governments are subject to influences that parallel private goods markets, namely shopping and competition, he theorized that prospective community residents can vote with their feet; mobility across jurisdictions constitutes a preference-revealing device to promote efficiency in public goods provision. Many of Tiebout’s model assumptions are unrealistic, such as perfect mobility and information among prospective residents, and sufficient variety among jurisdictions to match all consumer preferences. Nevertheless, some evidence supports Tiebout’s contention that citizens “vote with their feet,” including evidence of tax rates and local amenities being capitalized into house values, and of higher rates of local government fragmentation (a.k.a. choice) corresponding to more homogenous tastes for public goods within communities (Gruber, 2011). Additionally, polycentric (more fragmented) government has been associated with lower property taxes and costs of public services, such as policing (Dowding et al. (1994) and Epple and Nechyba (2004) review such studies).

Scholars of urban politics and planning have generally concurred with Tiebout’s essential point that inter-local competition influences policy choices, but many are less sanguine about the results. Paul Peterson’s influential *City Limits* (1981) extended the Tiebout model to the political domain, arguing that city leaders enjoy little real discretion in policy choices because they must respond to larger economic forces. Inter-jurisdictional competition, he argued, forces local leaders to prioritize developmental rather than distributive policies – for example, policies to attract jobs or commercial establishments. This assessment harkens back to principles of public finance articulated by Richard Musgrave (1959) who identified three economic functions for government – stabilization, redistribution, and allocation. With states and localities characterized by greater inter-jurisdictional mobility and diversity than the nation as a whole, local governments are widely considered to have limited capacity to achieve the first two goals (Fisher, 2007; Rosen and Gayer, 2008).

David Harvey (1989) made a claim similar to Peterson’s but from a Marxian perspective, arguing that urbanization forms the “rational landscape” within which capital accumulation proceeds. Territorially based class alliances arise, says Harvey, to coordinate investment in the built environment and social reproduction (labor support systems and fixed assets such as large-scale infrastructure), relatively immobile aspects of the production process which are also considered pre-

conditions for capital accumulation. These governing alliances render each urban region or job center a quasi-competitive unit within the global geographic division of labor.

Other urban theorists have provided less deterministic accounts for the behavior of local elected officials than Peterson or Harvey. Clarence Stone (1989) argued that growth policy is contingent, not deterministic; public and private elites must forge effective working alliances to define and implement stable policy agendas, a.k.a. “growth regimes.” Logan and Molotch (1987) similarly focused on construction of local political “growth machines” by “place-dependent” local monied interests (namely those with the most to gain monetarily from local land development).

### *The role of land use in inter-city competition*

Land development and regulation is central in politics of growth and development and inter-local competition. Land use can be a prominent fiscal tool for localities. Some scholars have focused on techniques that benefit downtown “growth machine” interests, sometimes at the expense of residents, such as designation of redevelopment districts in which investment is leveraged through tax increment financing (ibid). Land use is also associated with tax competition, for example in efforts to lure “big box” retail stores through inducements such as tax write-offs. Scholars contend that tax competition increased among localities following the demise of federal urban policy in the 1970s. However, little research has determined actual responsiveness of firms to locational differences in tax rates (Glaeser, 2001; Rosen and Gayer, 2008; Wallace, 2008).

Land use is also implicated in the political economy of suburban incorporations and the prerogatives of homeowners. Tracing back to Tiebout’s model, some followers reasoned that self-interested communities are likely to seek to exclude residents who could otherwise escape paying their “fair share” of local taxes for services received, for example, if they paid lower taxes by purchasing a lower-price (e.g. smaller) house in the community. With these dynamics in mind, Hamilton (1975) postulated that land regulation—exclusionary zoning in particular, such as to restrict compact multi-unit housing—is key to achieving a stable equilibrium. Developing this logic further, but with less sanguine implications, Fischel (2001) argues that homeowners often become “homevoters” who adopt self-interested land use restrictions that interfere with optimal market equilibrium (efficient land use as “highest and best use”) as well as with social equity—outcomes not contemplated by Tiebout.

Whether local governments are motivated more by downtown businesses, residential homeowners, or other stakeholder interests depends in part on the type of community. Reviewing research on regulatory patterns in different types of cities (central vs. suburban), McDonald and McMillen (2004) conclude that suburban regulatory approaches are most likely to favor homeowner interests; their research shows land use restrictions are tighter in wealthier, whiter suburbs in fast-growing areas.

Intra-urban political dynamics have grown more complicated in recent decades due to the transformation of the urban landscape into a more complex, polynucleated form. Lang and Nelson (2007) contend that a “new metropolis” has emerged, as half of Americans now reside in outlying counties, along with more than half of office employment. Greater economic and demographic disparities distinguish suburbs from one another than from central cities. Outlying so-called suburban counties are now urban “in function, but not in form” (ibid, p. 383). Difficulty in distinguishing the center from the periphery renders old urban-vs-suburban political formulations problematic. A recent “re-urbanization” trend, characterized by renewed residential market interest

in many formerly declining central cities, further complicates the picture. Elizabeth Strom (2008) found a recent shift in the composition of downtown business interests in large American central cities from retail and financial services to real estate, which she contends is rendering the “downtown versus the neighborhoods” dichotomy increasingly obsolete.

In the current context, atomistic conceptions of central city growth regimes may be outdated. Strom (2008) argues that “changes in land use and urban political geography would seem to presage fundamental changes in the urban political economy, but students of urban politics have not yet begun to grapple with their implications” (p. 39). Lang and Nelson (2007) investigated exurban “boomburb” politics, concluding that boomburb regimes are “governed lightly in the public realm and precisely in the private sphere” due to heavy reliance on privatized forms of governance including homeowner associations and business improvement districts (p. 633). Other authors have called attention to deteriorating conditions in many inner-ring suburbs, contending that these “overlooked spaces” may shape new political positioning and coalition-building (Orfield, 2002; Lee and Green Leigh, 2005).

In any case, research on urban politics and policy since World War II points to land use as tightly implicated with fiscal concerns and, in the case of residential suburbs, with “lifestyle services” associated with the cherished prerogative of local home rule. Keith Ihlanfeldt notes that, “There is consensus across studies that fiscal considerations frequently motivate restrictive land use regulations” (Ihlanfeldt 2004, p. 275).

### ***The role of zoning in inter-city competition***

Zoning, often considered the quintessential local land use regulation, is a prominent tool for localities to achieve fiscal and “lifestyle” benefits. More than 91% of jurisdictions in the 50 largest US metropolitan areas have zoning ordinances (Pendall et al., 2006). A substantial share of jurisdictions appear to exercise exclusionary zoning, with nearly one quarter of local governments in major US metro areas having set low-density zoning constraints (maximum permitted residential density at less than 4 dwellings per acre) (Pendall et al., 2006). At the other end of the spectrum, about one-tenth of jurisdictions allow densities of greater than 30 units per acre; these jurisdictions contain about half of the metro area population.

The essence of zoning has been to separate land use types, including historically, to exclude multi-family housing from prime residential areas. First implemented in the US in the 1910s, zoning was aimed at segregating land uses deemed incompatible (O’Sullivan, 2009). Affirmed by the US Supreme Court in 1926 in *Village of Euclid et al. v. Ambler Realty Company*, municipal zoning was validated as a means to exclude multifamily housing, equated by the justices with a “nuisance.” A half-century later, the Supreme Court reaffirmed zoning to protect suburban character in *Village of Belle Terre et al. v. Boraas et al.* (1974), a decision that upheld zoning to preserve neighborhoods with wide yards, few people, limited traffic, and “family values and the blessing of quiet seclusion.”

These legal cases underscore the predisposition of the courts to uphold zoning as means to protect private property rights and values (Light, 1999; O’Sullivan, 2009). While the courts have traced the fundamental legal basis of zoning to the states’ police power, calling for zoning “in accordance with a comprehensive plan,” the courts also generally have held that this requirement is met where a zoning law (ordinance) exists, which is considered the putative end-product of a planning process (Light, 1999). Thus, say some scholars, the courts equate zoning power more closely with “bottom-up” property rights than “top-down” state intervention (ibid).

Thus, zoning is closely connected with fiscal federalism, home rule, and “lifestyle services.” In considering this connection, various scholars have concluded that the prevailing framework of property rights and local land use practice reflects a bias toward “localism” and private ownership. For example, Alan Altshuler (1999) finds a “perverse” local bias in this inter-connection, because public means and ideologies justify and facilitate collective behavior to enhance private interests of local homeowners and businesses. He notes that many current social problems can be traced to fragmentation in local government and/or policy “paralysis” regarding urban issues, but these outcomes are facilitated by the legal framework which fundamentally favors localized private interests. Jonathan Levine (2006) adopts a similar stance in arguing that the commonplace tendency to equate local zoning decisions with “the will of the people” and *thus also* with market preferences obscures the fact that by restricting densities, zoning decisions often interfere with optimal market outcomes (“highest and best use”).

Various empirical studies point to inequities and inefficiency associated with local government fragmentation and restrictive zoning. Some studies indicate exclusionary motives for zoning may be present, for example, in demonstrating income- and race-based exclusionary outcomes (Levine, 1999; Quigley et al., 2004; Pendall, 2000). Various studies also indicate that restrictive local “growth control” policies including low-density zoning are associated with higher housing prices in jurisdictions (Glaeser and Gyourko, 2002; Glaeser et al., 2005; Nelson et al., 2002; Pendall et al., 2006; Quigley and Rosenthal, 2005; Quigley, 2007) and also lower overall density in regions (Pendall, 1999; Pendall et al., 2006). Other studies demonstrate an association between governmental fragmentation by region and more sprawl development (Carruthers, 2003; Fulton et al., 2001; Dye and McGuire, 2000). In turn, sprawl has been associated with higher costs for infrastructure and services, and higher energy use (Carruthers and Ulfarsson, 2003; Burchell et al., 2005; Ewing et al., 2008).

### ***Local bias in metropolitan-area governance***

The proliferation of municipalities in post-war America introduced a powerful structural hurdle to managing land use in a cooperative way across metropolitan regions. Fragmented control of land use produces externalities and spillovers (unpriced side-effects of decisions and interactions that affect third parties not party to the original decision) which should be viewed as *government failures* – the product of institutional arrangements privileging local interests (and some local interests in particular) above others.

In a hierarchical system, governments operating at a larger scale can “capture” externalities generated by smaller-scale governments, and address them through ameliorative policies; for example, the federal or state governments can take action to redress inequities caused by exclusionary zoning and its effects, or to mitigate habitat loss associated with sprawl development that threatens endangered species. Indeed, many state and federal policies have such intentions. But it has been hard politically for the federal and even state governments in the US to adopt policies seen as interfering with local government autonomy over land use. As a result, in a context of highly fragmented local government, “latent” majorities favoring various regionally-oriented policy goals related to land use lack venues for political expression and representation in the absence of governments operating at that scale (Lewis, 1996).

David Lowery underscores this critical issue of scale in considering how private interests are aggregated into public decisions in the US, and how localism relates to the democratic process:

The first function of jurisdictional boundaries is how they create, modify, and facilitate the articulation of the content of citizen self-interest and then structure the resolution of conflicts....fragmentation does more than simply reflect and then institutionally protect preferences for separation; it engenders and then reinforces them (Lowery, 2000, p. 57).

The fragmentation of land use governance has turned it into a good managed by multiple self-interested communities rather than collectively managed. Policies that address regional, rather than local consequences of land use decisions must overcome the “local bias” built into the system.

The next section considers the system for transportation governance developed during the post-war period, one characterized by greater centralization at the state and federal levels than was the case for land use. Were the state and federal governments able to overcome “local bias” in metropolitan transportation finance and planning?

### **2.3 Transportation and air quality governance in the post-war era**

The post-war economic boom unleashed pent-up demand for new housing and infrastructure to support it. The federal role in transportation was expanded significantly with passage of the 1956 Interstate Highway Act, launching construction of the interstate system of highways. The 1954 national highway plan can be viewed as a premiere example of centralized national policymaking, with President Eisenhower (after whom the system is named) noting at the time that the system constituted the largest public works project in human history.

To finance the highway system, a national gas tax was established; these user fees have provided the financial foundation for national transportation spending ever since. State highway departments had led federally-assisted, rural highway building in prior decades, and they continued to manage highway-building in urban areas, as federal funds became available for the purpose (Brown, 2006; Sciara, 2015). With states offered federal funds on a 9-to-1 matching basis, the finance system ensured that a uniform vision of highway development was executed throughout the nation, with design standards that sometimes pre-empted local priorities and plans (Taylor, 2004). Limited access highways helped to physically connect downtowns to outlying suburbs, but they also served to disconnect the system from the fine-grained pattern of land use in “interstices” between downtowns and outlying communities (Muller, 2004).

Concerns quickly arose, however, about negative consequences of suburban development. Urban interstate construction soon prompted a backlash, as many cities witnessed destruction of existing neighborhoods (Altshuler and Luberoff, 2003; Brown, 2006; DiMento and Ellis, 2013). Concerns also arose about other negative consequences of suburbanization, including deterioration of inner-city areas that had been “left behind,” loss of open space, and worsening air pollution. In this period of tumultuous change in the urban landscape, federal policymakers actively sought means to shape development patterns, including through introducing planning coordination mechanisms to integrate local with federal and state-level plans and priorities.

#### ***Establishment of MPOs***

The post-war optimism that fueled the highway-building program also undergirded federal activism in other policy areas related to urban development in the post-war years, from support for building public works such as sewers, to open space preservation, to inner-city “urban renewal” programs. The genesis of MPOs traces to federal efforts during this period to strengthen planning functions in and across communities in metropolitan areas. At one and the same time, this federal approach

sought to incorporate local perspectives in distributing grants-in-aid, while also elevating and instituting a regional planning framework for inter-governmental dialogue in increasingly fragmented urban areas. Voluntary efforts among local governments in some urban areas to address cross-jurisdictional concerns for transportation and air quality had proved inadequate to the task during the immediate post-war years (Pincetl, 2003; Wachs and Dill, 1999).

The national Housing Act of 1954 ushered in a new era of federal support for comprehensive planning, by conditioning federal aid for urban renewal and low-rent public housing on community planning requirements. To receive funds, a locality had to prepare a comprehensive plan for community development, and Section 701 of the law authorized planning funds to aid small communities in doing so. It also provided funds for preparation of metropolitan, regional, state, and interstate level plans (Brooks, 1988). Credited by many with having provided the practical basis for institutionalization of the planning profession in the US, the 701 program, by the time of its termination in 1981, had allocated more than \$1 billion to assist local planning for multiple purposes, including for transportation, housing, open space, and environmental quality (Brooks, 1988; Feiss 1985).

Comprehensive planning was further promoted in Section 204 of the Demonstration Cities and Metropolitan Development (Model Cities) Act of 1966, as well as the Intergovernmental Cooperation Act of 1968, both of which led to the issuance of Circular A-95 by the US Office of Management and Budget in 1969. Circular A-95 required review by area-wide regional planning agencies of all local proposals for federal aid for development programs, leading to rapid establishment of regional “clearinghouses” in metropolitan areas across the country to provide the required review. A-95 review requirements, initially applied to 50 federal programs, were expanded to cover more than 200 by the late 1970s (Stam, 1980). By then, more than three-quarters of funding for regional planning agencies came from federal sources (McDowell, 1980). Early emphasis on public works, housing and land use planning was expanded to address social service, human resources, educational, fiscal, and other programs and planning components.

A-95 review provided the institutional basis for establishment of regional planning bodies in metropolitan areas across the US, most often constituted as regional planning commissions or voluntary Councils of Governments, according to state-imposed criteria (Stam, 1980; Vestal, 1970). These regional entities formed the basis for designation of Metropolitan Planning Organizations (MPOs) in the 1970s. The 1962 Highway Act, specifically in Section 134 and subsequent regulations, had made federal transportation spending in urban areas contingent on a transportation planning process that was “continuing, cooperative and comprehensive” (“3-C’s”) in character, and that involved the state and local communities (Sciara, 2015). The 1973 Highway Act made the organizational requirements more specific by requiring that, in order to receive federal transportation funds, states must establish MPOs in urban areas with populations of 50,000 or more, and provide planning funds to them (Solof, 1998). According to federal policy, MPOs were to be comprised of “principal elected officials” in the regions.

Federal policy called for MPOs to develop, on a cyclical, iterative basis, long-range (20+-year) regional transportation plans (RTPs), and associated planning work programs and short-range investment plans, for projects slated to receive federal funds. Since most projects are funded from multiple sources (state, local, and sometimes regional, in addition to federal), the RTP was intended to serve as an overall strategic plan for transportation in the region. Policy guidance also prescribed informational components for comprehensive plans during the period, to include assessing regional economic activity; the direction of land use changes and growth; and capacity of the transportation



system, especially roadways, to meet current and future travel demand. The federal government sought to encourage adoption of techniques of transportation modeling that could provide an empirical basis for designing region-wide transportation systems rather than relying on local project advocacy (Edner and McDowell, 2002). Regional planners began to systematize data-analytical methods to estimate transportation demand in metropolitan areas.

In their early years, however, MPOs played a largely subordinate role, providing input to state-directed transportation plans for metro areas. MPOs provided technical data and advice, but their long-range plans were typically “toothless” lists of desired projects, given that state-level agencies had the final authority to select projects from the MPO lists for funding (Lewis, 1996).

By the 1980s, the heyday of federal support for comprehensive planning had wound down, as President Reagan terminated A-95 review requirements as well as the 701 program. Among the few surviving federally-enforced regional planning functions was the MPO role, although resources were severely curtailed. The institutional legacy of MPOs still traces to the earlier period, however, and to the compromises adopted then by the federal government in attempting to strengthen comprehensive planning. More specifically, the A-95 approach had sought to advance “value-neutral” rational-procedural planning coordination, in calling for consultation and review of local projects and proposals across localities and policy domains within regions, but without stipulating performance criteria against which local projects should be gauged. Few regions developed comprehensive plans, leading to criticisms about lack of effective standards for A-95 review (Russo, 1982; Mogulof, 1971; Stam, 1980). Furthermore, in leaving the governance attributes of regional planning bodies for states to decide, while also advocating the voluntary COG model, the federal government sought to allay concerns about intruding into local home rule authority, but it also set the stage for the collective action dilemmas the MPOs have faced ever since.

MPOs’ governance structure (with few exceptions) has lacked independent authority; MPOs act instead as an interface between established local governments, single-purpose districts (e.g. transit agencies), and state and federal agencies (Goldman and Deakin, 2000). About half of MPOs are constituted as Councils of Governments (COGs), with governing boards composed of local officials and which generally operate on a one-government, one-vote basis (Foster, 2011). Other MPO governing structures include state-authorized independent commissions or state- or locally-run agencies.

The COG/MPO structure, predominant in large metro areas, integrates (somewhat) the two principal types of governance arrangements described by Hooghe and Marks (2003) as most prevalent in multi-level governing systems such as the US, namely, on the one hand, general-purpose territorial authority of elected governments (in this case local governments, namely cities and counties), and on the other, single-purpose governance agencies attuned to policy needs across a functional network (transportation, in this case). The COG governance structure resembles a loosely affiliated Congress of local governments that meets to coordinate and ratify plans for allocating federal and state funds in a mutually agreed-upon manner. However, MPOs are also accountable for executing state and federal mandates—a principal/agent relationship. MPOs must balance these roles, and thus, have been since their inception an example of the sort of “networked” and “multi-scalar” forms of governance that many commentators contend are now becoming popular for addressing complex social concerns (Hajer, 2003; Jessop, 2004; Jones and Macleod, 2004; Skelcher et al., 2005; Hooghe and Marks, 2003).

The MPO structure has been a politically palatable means for concerting local government cooperation without abrogating local authority over land use and locally-controlled transport funds. But although this structure helps ensure that MPOs can work to reconcile federal, state, and local needs and priorities, it also has meant that MPOs, especially in multi-county areas, often lack concerted means to develop plans and programs with a distinct regional performance focus (Wachs, 2004; Taylor, 2004). COG/MPOs have struggled to adopt a regionally-oriented performance focus because their governance and funding structures encourage a “lowest common denominator” or “logrolling” approach to devising regional plans (ibid). Some states, such as California, explicitly delegate planning responsibility to county-level agencies in some regions, such as the Los Angeles area. In other states, state transportation agencies exert a strong role, providing little discretion to MPOs (Sciara and Wachs, 2007).

### ***The importance of geographic equity in transportation funding***

The tendency for MPOs to pursue a “logrolling” approach to aggregating transport projects in their regional plans is closely connected to the funding structure for transportation put in place starting after WWII. Although the federal highway program was implemented by a centralized, technocratic bureaucracy, the program also reflected and reinforced a decentralized approach to funding, consistent with patterns of democratic decision-making in the US federal system. Although various business interests (including central city businesses, auto manufacturers, and trucking firms) did form key constituencies in the coalition that gained passage of the 1956 highway system legislation, the program represented not so much a clientelist capture by private interests, as a strong example of “majoritarian” politics in which “geographic equity,” including at the local level, has been the basis for enduring political support (Dilger, 2003).

For many decades, most federal and state transportation funds have been allocated based on “geographic equity”—in other words, on the basis of population (a.k.a. voters) and/or jurisdictions (a.k.a. elected officials), rather than on assessment of need or program performance (Taylor, 2004). State funding formulas often reinforce this approach. For example, California – a state with relatively strong MPOs—still allocates its sub-state funds according to a “north-south split” which is then further divided into county shares based on population and highway lane-miles. In some metro areas, including Los Angeles, programming authority is delegated by state statute to county agencies rather than the MPO. The result is that the transportation funding system makes it harder to produce plans with a regional focus, especially in multi-county regions.

The importance of geographic equity in the planning and funding process “can hardly be over-emphasized” (ibid, p. 301). Its dominance means that other forms of equity, such as social equity, are de-emphasized. Even when public backlash emerged against highway-building by the 1970s, and federal funds were increased for transit expansion, the emphasis on transportation supply for suburban areas continued. With transit funds allocated based on population, a substantial disparity emerged, measured on the basis of ridership, between denser, older, central cities and other jurisdictions (ibid). Combined with the system’s emphasis on capital expansion, the result has been that transit funding, like highway funding, has been geared toward suburban commuter lines regardless of cost-efficiency or impacts on service in high ridership areas.

Federal transportation funding reflects the increasing dominance of suburban voters in the American system. Most federal transportation funds have been highway-oriented, and directed to capital expansion rather than maintenance or operations (Taylor, 2004). The political bargain struck to gain support for the highway system endured through to its completion in the early 1990s –

through protests from social equity and environmental activists, multiple cost overruns and time delays, and neo-liberal attacks starting in the 1980s.

This enduring consensus suggests that US federalism can form a basis for strong and lasting coalitions for public works investment, but also that enduring support comes at a price, which Robert Dilger (2003) refers to as the “path of least resistance.” Consensus-based transportation politics in the US system emphasizes geographic equity rather than economic or environmental efficiency, or vertical (outcome-based) social equity goals.

Since completion of the highway system, the transportation finance system has maintained an orientation toward geographic equity, capital expansion, and the needs of suburban areas and downtown business interests (Taylor, 2004). MAP-21, the most recent re-authorization of federal surface transportation legislation, passed in 2012, directs about 93 percent of federal surface transportation funds for roadways to states and localities in formula grants, using factors such as a state’s aggregate vehicle miles traveled, lane miles, and the amount of federal gas and vehicle taxes collected, and, for transit, based on population, population density, and bus passenger miles, among other variables (Pew Charitable Trusts, 2014). Only 7 percent of federal funding flows through competitive grants and other programs that don’t rely on such formulas. Over 90% of highway program funding under MAP-21 is under the control of the state departments of transportation, a method that undermines the ability of regional agencies to exercise a strong and independent role in program decisions, and which tends to favor highways over transit, because state departments of transportation have favored highways more than have regional agencies. While the federal and state governments dedicated the majority of their funds to highways in 2011 (81%, for each), local funding was split more evenly between highways and transit (with 61% for highways) (ibid). MAP-21 encourages new highway construction by requiring states to provide only five percent of the total cost; transit projects, by comparison, are being matched at close to 50 percent by local taxpayers.

### ***Air quality management: the second regional regime***

Air quality management is a second major policy area in which the federal government stepped in during the post-WWII era to establish a regional planning regime. It has become closely connected to transportation (since cars are a major source of pollutants), and the governance approach adopted in this policy area provides a contrast to the transportation planning and funding system (Wachs and Dill, 1999).

The backlash against highway building and suburban “sprawl” that emerged by the 1960s and 1970s was in part due to environmental consequences. The federal Clean Air Act (CAA), as amended in 1970, directed the Environmental Protection Agency to establish emissions standards for air pollutants shown to be a risk to public health, to be achieved through controls on industry, businesses, and motorized vehicles. Authority for implementation and enforcement was given to the states, which were required to compile State Implementation Plans (SIPs) demonstrating how the standards would be met in “non-attainment” areas. The EPA was charged with approving the SIPs and could step in to impose a federal plan or to enforce standards if a state failed to act.

The CAA recognized air quality as a regional problem in need of an institutional solution; the newly formed Environmental Protection Agency was required to designate Air Quality Control Regions (AQCRs) based on factors including jurisdictional boundaries, urban-industrial concentrations, and atmospheric areas (Wachs and Dill, 1999). To implement regional plans and policies to feed into SIPs, some states, including Massachusetts and California, established new air quality management

districts (AQMDs), while others facilitated joint operation of existing programs by combined local agencies. Governance of AQMDs varies, but, similar to MPOs, AQMD boards are generally composed of local elected officials, appointed by designated localities. AQMD funds are derived from various sources, including permit and emission fees, penalties, state and federal grants, and motor vehicle registration surcharges (ibid).

The CAA could be deemed a success in reducing air pollution, given that total emissions from the regulated pollutants fell by more than half from 1970 to 2005, a period during which the nation's population grew by 40%, energy consumption by 47%, GDP by 187%, and VMT by 171% (Mazmanian and Kraft, 2009). The USEPA estimates that the benefits to the environment and health from the CAA have outweighed dollar costs of enforcement by 30 to 1 (USEPA, 2011).

However, the law also came under criticism on various fronts, and implementation techniques were altered over time (ibid). During the first decade or so, top-down "command-and-control" regulatory techniques had predominated, primarily through "end-of-pipe" regulations, such as requirements for scrubbers on smokestacks. In regard to transportation, the original CAA contemplated Transportation Control Measures (TCMs) as a means for reducing emissions, through measures such as parking surcharges or gasoline rationing. Federal administrators subsequently forced some states to adopt TCMs in their SIPs.

However, early efforts under the CAA to reduce air pollution from automobiles by reducing VMT were soon deemed to have "failed completely" (Yarne, 2000, p. 848). The top-down, command-and-control approach met with resistance from regulated businesses and state and local governments. Some economists pointed to higher transactions costs (due to more cumbersome compliance requirements and adversarial methods of enforcement), and less flexibility in implementation, in command-and-control compared to market-based techniques such as tradable permits (Fiorino, 2009; Mazmanian and Kraft, 2009). Some environmentalists reinforced these critiques, faulting command-and-control for reinforcing siloed and remedial rather than preventative, integrated approaches to solving problems (Mazmanian and Kraft, 2009).

In response to these negative reactions to command-and-control, the federal and state governments altered implementation approaches through CAA amendments in 1977 that shifted greater implementation responsibility to the states, and eliminated land use or "indirect source" measures (on sources that could "attract" vehicular traffic, such as sprawling land uses) as a possible component of any SIP. Amendments in 1990 encouraged use of trading regimes and more collaborative strategies engaging multiple parties (ibid). Some regions, such as the Los Angeles area, implemented emissions permit trading regimes as a result.

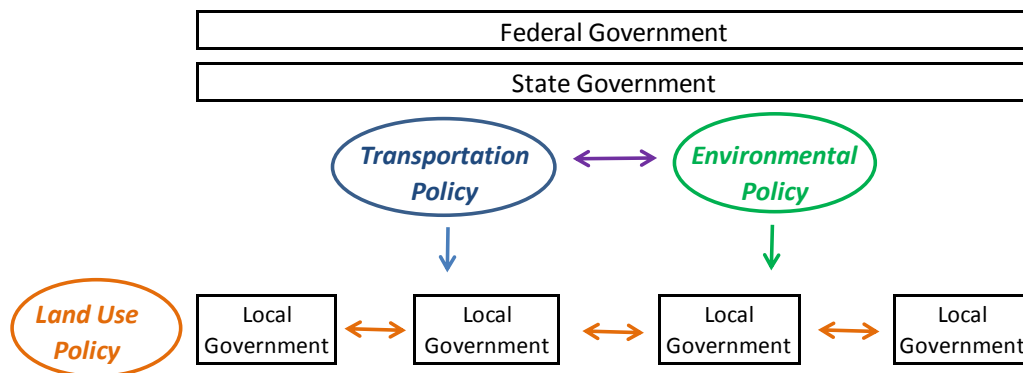
The shifting approach to air quality regulation reflected growing concerns about how to address mobile emissions sources, such as automobiles. Although notable success had been achieved in reducing emissions from stationary "direct" sources, the largest remaining emissions sources were more intractable; most remaining emissions came from "non-point" sources, in particular, mobile sources like automobiles. In the Los Angeles air basin, for example, 30% of air pollution originates from manufacturing facilities and products, and 70% from mobile sources (ibid, 2009). Command-and-control policies had worked well in reducing mobile-source emissions through mandated improvements to vehicle technologies and cleaner fuels, reducing per mile emissions by about 90% since passage of the CAA (Stone, 2003). However, on a total emissions basis, these accomplishments were being undermined by rising VMT, which had more than doubled since 1970 (Yarne, 2000).

Thus, federal air quality management in the early years forms a contrast to transportation planning, in that standards were implemented, at first, more like a “stick” than a “carrot.” The stick worked well for micro-managing point sources, but proved infeasible in dealing with diffuse consumer behavior such as driving. Backing off from a command-and-control approach, federal regulators also sought a way to better integrate air quality and transportation planning, so they would not work at cross-purposes. In addition, they sought to devolve implementation techniques to utilize more collaborative multi-level strategies that might help them avoid political conflicts. One available strategy was to work through MPOs. In the early 1990s, reforms to surface transportation legislation and the Clean Air Act were adopted to strengthen MPO responsibilities for air quality management (described in more detail below).

#### 2.4 Planning disjunctures in the post-war model: The transportation-land use-air quality disconnection

The post-war planning system for urban areas, described above, is characterized by fundamental institutional fractures that inhibit management of urban growth and development in a holistic fashion. The system is fragmented vertically, with different levels of government dominating separate policy areas, and horizontally, with functional agencies often failing to coordinate, and with multiple local governments making decisions independently within metro areas (Figure 2.4).

**Figure 2.4 Vertical and horizontal disjunctures in the post-war planning system for growth and development**



Horizontal fragmentation in the governance of land use increased with the proliferation of new municipalities that coincided with the suburbanization boom, already described. As Rolf Pendall notes, “the US does not have a unified land use policy, nor does it even have fifty state-level policy systems; rather it has nearly as many land use policies as it does general purpose local governments, of which there are between 20,000 and 30,000...nowhere is federalism as strong as in the local control of land use” (Pendall 2004, p. 81).

Second, the federal and state governments reinforced horizontal fragmentation in the planning system when they took on a more concerted role in transportation— an ironic outcome given the intent to enhance coordination capacity. Reflecting “log-rolling” characteristics of the US federal system of government, the emphasis on geographic equity built into transportation funding mirrors the fragmentation in land use governance prevalent in metro areas. In both cases, policy decision structures treat jurisdictions as if they were separate islands, rather than as parts of polycentric,

networked metro regions. In this manner the post-war transportation planning system reinforces horizontal fragmentation and corresponding inefficiencies and externalities.

Federal and state transportation and air quality policies also introduced vertical disjunctures in growth management, because control of land use remained a local prerogative, while policy approaches for transportation and air quality had been elevated to the regional scale but they were not always closely coordinated. The establishment of MPOs, transit districts, and air districts as single-function agencies produces barriers to coordination that sometimes undermine, in practice, the efficiency gains predicted by fiscal federalist principles (Foster, 2011).

By severing transportation and air quality from land use planning, the post-war system made it harder to address inter-connections, spillover effects, and externalities between transportation, land use, and environmental effects. The planning system fails to internalize the costs, benefits, and trade-offs of myriad local land use policies and transportation-land use interactions that play out regionally. Localities, for example, face few disincentives to enacting locally beneficial policies that create externalities for neighboring communities, such as from low-density zoning that creates more highway traffic by pushing development to the urban edge, or siting traffic-attracting retail stores near their borders with neighboring cities. Similarly, localities may not care to adopt policies that produce regional benefits if they impose local costs, such as, for example, permitting infill development that increases local traffic congestion and various local service costs, even if it improves transit ridership, job accessibility, and reduces congestion and air pollutants measured regionally. Local governments may accede to residents' opposition to siting new development near transit stations, for these reasons. Similarly, regional transit operators may not coordinate decisions with one another, nor with local land use planners, because high "transactions costs" undermine coordinated efforts.

These missed opportunities and regional-local conflicts are examples of what institutional economists call "collective action dilemmas." From the perspective of a utility-maximizing rational actor focused on local costs and benefits of policy choices, regional cooperation in managing public goods may seem disadvantageous. Yet individually rational behavior can produce collectively irrational (non-optimal) outcomes, when wider consequences and externalities are considered.

Richard Feiock describes these challenges of institutional collective action (ICA) in urban areas:

Fragmentation of policy making among multiple governmental units ...can promote competition and innovation, but it also imposes inefficiencies, as decisions by one governmental unit impose positive and negative externalities on others. Costs and conflicts from fragmentation are acute in metropolitan areas because authority is fragmented horizontally among competing local governments as well as vertically among overlapping specialized federal, state, and local agencies. Institutional collective action (ICA) problems arise directly from the delegation of service responsibilities to a multitude of local governments and authorities. Fragmentation creates diseconomies of scale, positive and negative externalities, and common property resource problems. (Feiock, 2009, p. 357)

In general, voluntary collective action arrangements among autonomous actors are expected to emerge easily only in "win-win" situations, where all actors expect to benefit (Steinacker, 2004, 2009; Feiock, 2009). Even when the potential for aggregate gains of cooperation are large, conflict over their distribution can prevent policy change, as allocation of joint gains is affected by asymmetries among players in preferences and political strengths. Situations involving negative

externalities – the negative impacts of transactions upon third parties not involved in the transactions – are generally considered to be the hardest to address through voluntary techniques, because they are often perceived to be zero-sum conflicts, producing new winners and losers. Intergovernmental externalities pose what Feiock (2009) calls a cooperation dilemma rather than a coordination dilemma because solving the problem may benefit those adversely affected but not the externality generators.

Local land use policymaking produces such externalities, and therefore is prone to collective action dilemmas. As Gerber and Gibson assert, “Regional policies intended to reduce negative externalities redistribute the costs and benefits of activities within a region, and include such policies as land use planning and zoning, conservation, and environmental improvement. In political economy terms, they are zero-sum, and their primary goal is redistributive” (2005, p. 6).

### ***MPOs and collective action***

MPOs are expected to bridge local, state, and federal priorities and plans. However, their governing structure, especially when coincident with Council of Governments (COGs) is oriented to protecting local concerns, as they are essentially voluntary associations of elected public officials, whose collective responses to regional problems generally depend on bargaining and other mechanisms of voluntary, collective choice (Feiock and Scholz, 2009; Gerber and Gibson, 2005). In other words, even when working to achieve federally mandated responsibilities, MPOs must contend with forces of competition and barriers to collective action among member governments, and their decision-making process depends ultimately on self-organizing.

Margaret Weir came to a similar conclusion in comparing MPO activities in the Los Angeles and Chicago areas, noting that, “Collaboration is not enough... In contemporary metropolitan politics... a key element of the political task is to ensure that higher levels of government enforce provisions that enhance network effectiveness and promote more inclusive local action... Without multilevel political capacities, the new ideas and incipient alliances that emerge from regional collaborations can be easily undermined from below or from above” (Weir et al., 2009, pps. 455, 460, and 485).

Given the collective action challenges of MPOs, it is easy to see why their main role for decades has been as coordinators of regional transportation investments. Regional transportation investment fits squarely into the ICA categories of achieving economies of scale and/or other positive externalities, as roadway and transit networks are often regional in scope and scale, making it hard for localities to manage and integrate needs and priorities on a purely informal basis. Furthermore, the federal and state governments have ensured that MPOs act as brokers, coordinating the provision of billions of dollars, making it costly for localities not to participate in decision making.

These dynamics help explain why, in the first decades after their establishment, MPOs mainly worked to compile lists of project proposals rather than developing concerted, strategic plans with a regional performance focus (Lewis, 1996). They also kept their hands off local land use. In developing their long-range plans, MPOs would model transportation demand in a manner that did not directly challenge local governments, and projected land use patterns formed an *input* rather than a *variable* for deliberation in MPO models of transportation needs (Wachs and Dill, 1999).

In keeping with the wider approach to transportation planning at the federal and state levels during the period, the role of MPOs was seen as mainly technical, helping to supply the necessary

infrastructure – highways, in particular – needed to accommodate mobility needs in a supposedly value-neutral fashion that has been dubbed “predict and provide” (ibid). Therefore, in spite of the considerable influence of the national highway system upon development patterns in the post-WWII years (in particular by enhancing accessibility of suburban areas to central city jobs), local land use choices can be seen as having come to dominate MPO investment planning once suburban development had become extensive.

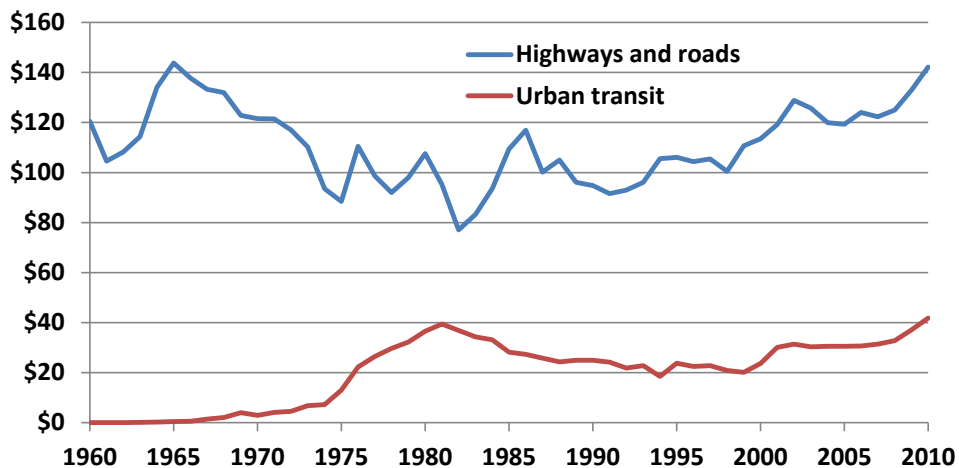
Adopting an assertive multi-purpose planning role presents a far more challenging proposition for MPOs, given these collective action dilemmas, and especially when incorporating land use policymaking. Coordinated strategies that orient land use to support regional transportation objectives require MPOs to convince local government stakeholders that regional benefits outweigh local costs. Following Feiock, such an approach might be facilitated by imposing a performance mandate, causing MPO stakeholders to seek to cooperate to achieve it. The federal or state government might condition receipt of desirable regional funds upon achievement of the performance mandate, for example, as motivation for compliance. This approach was adopted by the federal government starting in the 1990s to more closely connect MPO transportation to air quality (see below), suggesting recognition of these collective action dilemmas.

## 2.5 The post-highway era in transportation planning

### *Cracks in the planning system*

The governance system described above came up against limits of its own making by the 1980s. Concerns about the transportation system arose especially in relation to fiscal and environmental sustainability (Weiner, 2008). Fiscal concerns reflected the inability of the Highway Trust Fund, the nation’s primary funding source for surface transportation, to keep up with funding needs. After peaking in the 1960s, federal revenues available for highways began to decline on a per capita basis (Figure 2.5). Increasing fuel and vehicle efficiency meant fewer dollars in gas tax revenue were being collected per mile driven.

**Figure 2.5 Annual federal funds to state and local governments, for highways and urban transit, per capita, 1960 to 2010 (2010 \$)**

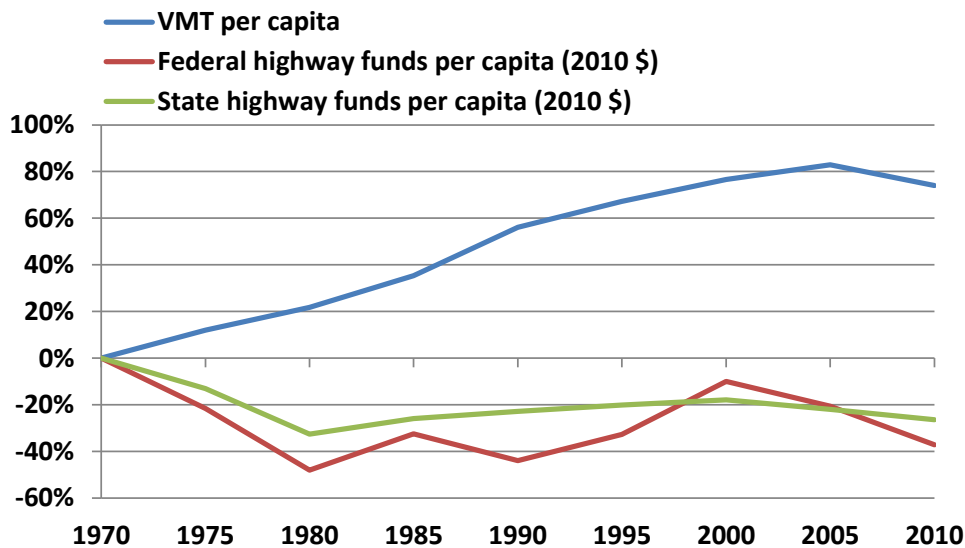


Sources: US Census (population) Bureau of Labor Statistics (CPI-U); US Office of Management and Budget, Budget of the US Government: Historical Tables, Table 12.3



Meanwhile, VMT was rising faster than population, and much faster than highway funds at either the federal or state level (Figure 2.6). Rising VMT worsened traffic congestion, drawing public ire. Wear-and-tear on roadways increased backlogs for maintenance and rehabilitation, but construction and maintenance costs of roadways were rising much faster than inflation, due to higher design standards, and higher costs for materials, land acquisition and environmental mitigation (Taylor, 2004). This combination of factors produced a tightening vise of funding constraints, one that has recently reached crisis levels, with forecasts of looming bankruptcy of the Highway Trust Fund in the face of anti-tax sentiment that has so far precluded increasing the gas tax.

**Figure 2.6 Growth in vehicle miles traveled, and in federal and state funds for highway purposes, per capita, from 1970 to 2010**



Sources: US Census (population) Bureau of Labor Statistics (CPI-U); Federal Highway Administration Highway Statistics Series, Tables HF 210 (1970 to 1995), and HF 10 (2000, 2005, 2010).

Even if funds had been available, however, optimism about improving mobility and relieving traffic congestion through building new roadway capacity had been tempered by the 1980s by awareness of “induced demand” effects – the tendency for new transport network capacity to be quickly consumed through “triple convergence,” as travelers switch modes, routes, and time of travel to take advantage (Downs, 1992; Taylor, 2002). These factors suggested that improving mobility, the traditional task of transportation planners, was reaching limits of effectiveness through traditional approaches.

Meanwhile, concerns about environmental impacts of transportation were also rising. As discussed above, regulators had grown increasingly concerned about how to mitigate “non-point” sources of air pollution, including automobiles, which in many areas had become the largest remaining sources of criteria pollutants. Top-down command-and-control techniques had proved successful in improving vehicle and fuel technology, but rising VMT threatened to undermine these achievements. By 1988, 101 urban areas were “out of attainment” for national ambient air quality standards for ozone, and 44 areas had failed to meet standards for carbon monoxide (Weiner, 2008). A new approach was needed to deal with diffuse consumer behavior such as driving.

More recently, environmental concerns have expanded to include transportation's role in contributing to greenhouse gases (GHGs) that produce climate change. Transportation emissions accounted for 27% of total GHG emissions in the US in 2013, second only to the electricity sector (USEPA, 2013). To stabilize GHGs, scientists have called on governments in developed countries to reduce these emissions on the order of 80% by 2050 (Greene and Plotkin, 2011). Meeting that goal presents a substantial challenge in the transportation sector because of persistently rising travel demand (rising VMT) in many areas. For the past three decades, transportation energy consumption and associated GHG emissions grew most rapidly among all end use sectors in the US (ibid). Even in other developed countries that have made much stronger commitments to reducing GHGs than the US, transportation emissions represent the "Achilles heel" of climate policy, with emissions growing more rapidly from this source than most others (Carlarne, 2010).

The growth rate in GHGs from the transport sector is projected to slow in the US in the next two decades, reflecting the effect of new corporate average fuel economy (CAFE) standards (Greene and Plotkin, 2011). Nevertheless, stricter CAFE standards are not expected to bring transport GHG emissions down on par with the very steep reduction levels called for by climate scientists; other measures will be needed if the transport sector is to achieve reductions of that magnitude. For these reasons, the transport sector presents a fundamental test case for sustainable development, in that rising transport demand is a reflection of economic growth, but to the degree that technological solutions are inadequate for reducing GHGs, planners face substantial challenges in reconciling competing objectives.

In urban areas by the 1980s, other concerns were also rising about consequences of suburban development and highway-building, which drew attention to the "transportation-land use connection." Planners were decrying inefficiencies and negative social consequences of low-density "sprawl" development, and calling for attention to improving "livability" of urban neighborhoods and revitalizing downtowns, such as by creating walkable streets with attractive mixed uses, and providing for urban greenspace (Calthorpe, 1993; Duany et al., 2001). Concerns were also rising about housing affordability and supply in many places, drawing attention to equity impacts of housing and zoning policies.

By the 2000s, market demand for infill, transit-proximate development would begin to grow noticeably, due in part to demographic shifts favoring more compact housing patterns (Nelson, 2006; Leinberger, 2010). In this context, many planners have sought to advance "smart growth" policies to strengthen livable, affordable, walkable, neighborhoods, and to overcome barriers to infill development, such as difficulty in assembling land parcels and supplying infrastructure to support higher development densities in older urban core areas.

### ***Transportation planning in transition***

Thus, by the 1980s, two tightening public constraints in particular—environmental and fiscal—had drawn attention to the need for efficiency in transportation, and this issue was being linked to land use. "Sustainability" takes on a dual meaning in this context – both financial and environmental. With the national highway system all but complete, attention began shifting away from efficient administration of engineering projects to efficient and equitable use of the existing system by travelers.

Transportation planners began to focus on "managing demand" for transportation and enhancing accessibility to destinations, rather than just increasing supply of transport facilities to enhance

mobility (Weiner, 2008). Demand-side approaches include land use measures to facilitate compact development near transit, investments in transit capacity (if they provide viable alternatives to solo driving, capable of pulling travelers away from single-occupancy vehicles into more efficient modes), support for carpooling, carsharing, and capacity for non-motorized modes, and pricing strategies that aim to make driving less cost-competitive compared to other modes, such as VMT or carbon taxes and fees, congestion pricing, High-Occupancy-Toll (HOT) lanes, and parking management.

Something of a debate emerged among planning scholars about the relative merits of different demand-side strategies. Many transportation scholars and activists have long argued for the merits of better pricing policies, as a market-based solution to improving efficiency in transport systems (Wachs, 2003). According to this argument, other demand-side policies may exert limited influence in changing travel behaviors in the absence of pricing policies that force transportation users to pay full costs of their choice to drive. Driving in the US is “over-supplied,” because drivers do not face full social costs of their choice to drive (especially to drive alone) (ibid). Mark Delucchi, for example, estimates that tax and fee payments by automobile users in the US would need to increase by three times or more to cover full costs of driving, including costs for use of facilities (e.g. maintenance and repair), and external costs (external to individual drivers) such as air pollution, congestion, and health care costs (Delucchi, 2007).

Governments in the US have not sought to impose so-called “Pigouvian” taxes or fees aimed at correcting the market failures of non-priced externalities associated with driving, such as those estimated by Delucchi. Indeed, it is more accurate to contend that public policy in the US subsidizes driving compared to other transport modes, for example by imposing minimum parking requirements as standard practice for new development in most jurisdictions, commonly set to reflect peak period occupancy rates in low-density areas, thus failing to take into account lower trip generation rates from compact, transit-proximate development (Shoup, 2005). Furthermore, parking space is usually provided free of charge to drivers, thus constituting a substantial unpriced benefit. It is telling that one market in which transit competes successfully is among commuters to downtown areas who face parking charges at their destinations (Taylor, 2004). New approaches to parking management advocated to address these concerns include substituting parking maximums for minimums in densely developed, transit-proximate areas, unbundling parking from home purchases, and implementing variable parking pricing to manage demand.

Pivougian pricing policies, such as those described above, could help level the playing field between driving and other, more environmentally efficient modes, but these policies are politically difficult to enact in the US, the world’s most auto-dependent nation, whose residents have come to believe that driving and “free” parking is a right. The system of transportation finance has moved not closer, but further away from a user fee approach to raising revenue. Although federal gas taxes were originally intended to be user fees (since the revenue is earmarked for the Highway Trust Fund), their value has eroded steadily over time due to gains in fuel efficiency and failure to index gas taxes to inflation (Taylor, 2004). Transportation finance has shifted to greater use of revenue sources such as locally generated general sales taxes that further erode the efficiency effects of a user fee approach (Goldman, 2007).

In a context in which driving is under-priced, demand-side strategies such as transit expansion and infill development near transit are harder to implement to achieve optimal benefits (Cervero and Landis, 1995). Starting in the 1960s, federal aid for transit system expansion was provided (Figure 2.5), and new commuter and light rail systems were built in places such as the San Francisco Bay

and Washington, DC areas. However, ridership was often disappointing, and cost over-runs were prevalent (Pickrell, 1992). Most transit systems operating today require substantial operating subsidies (Parry and Small, 2008), and many systems have faced challenges in trying to balance potential revenue gains from raising passenger fares against associated ridership losses.

In part, ongoing difficulties in transit system financial solvency across the US reflect the fact that transit has been seen as a mode of last resort, one upon which many low-income households depend. Transit service provision has been viewed as a social equity issue, deserving of public subsidy. However, the question of determining optimal subsidy levels for transit is challenging, even setting aside social equity issues.

These questions point to the challenges of considering policy goals and objectives for transportation, given that it is a blended public and private good, with various external and collective, as well as internal and privately financed, costs and benefits. In applying cost-benefit analysis to transit project proposals, questions arise, for example, about how to account for positive externalities – positive benefits that accrue to the public from transit that are not internalized within decisions of transit riders. So for example, transit service may reduce automobile traffic congestion, producing substantial benefits for economic productivity based on reducing time spent in travel (ibid). Transit may also contribute to the ability to achieve agglomeration economies in dense downtown business districts (agglomeration economies are positive externalities to firms, deriving from proximity to other firms) (Chatman and Noland, 2014). As traffic congestion rises beyond optimal levels in metropolitan business districts, transit may become an effective alternative, providing access and thus enabling further densification of employment. Transit can also provide environmental benefits, compared to automobiles, but often only when transit systems are used at near to full capacity (Pucher, 2004). This combination of factors has led some scholars to contend that more, not less public subsidy for many transit systems would increase social welfare (Parry and Small, 2008).

Expansion of travel mobility options has been associated with economic growth in most nations. However, as the US highway system neared completion by the 1980s, traffic congestion also began to rise to unmanageable levels in many metro areas, along with associated environmental pressures. The calculus of the “mobility paradigm” that had guided decision-making during the highway building era began to waver. Consensus among policymakers on guiding principles for transport investment began to erode.

### ***Accessibility, not mobility: outlines of a new transportation planning paradigm***

In this context, the work of various scholars and practitioners to promote the concept of accessibility as a guiding principle for transportation planning began to gain more adherents. The accessibility concept provides a useful lens for considering how transportation policy goals are being re-evaluated (Handy and Niemeier, 1997; Boarnet, 2011). Many scholars frame accessibility goals in relation to public as well as private benefits and costs, and normative as well as positive measures (Straatemeier, 2008; Paez et al., 2012).

Using basic utility theory, travel is considered a “derived demand,” with the goal of travel postulated as the ability to reach desirable destinations with ease; in this framework, travel itself constitutes a cost, and reducing travel costs (both monetary and time-related) is advantageous. Scholars argued that the goal of accessibility to desired destinations should be disconnected from the means of increasing mobility (speed of travel). In particular, they questioned the apparently

implicit assumption that mobility enhancements should be the main goal of transport policy, to be achieved through roadway widening. Indeed, effects of “induced demand” suggest that accessibility between two given locations might be worsened in the long run through roadway widening, if greater dispersion of land uses followed (Ferreira and Te Brommelstroet, 2012).

Accessibility can be measured in various ways; the most common measures include cumulative opportunity measures (calculating the number of opportunities available within a given time constraint), gravity measures (which weight available opportunities by distance), and utility measures (more complicated measures of social welfare using output from more complete travel models) (Paez et al., 2012). Accessibility can be decomposed into distance and speed aspects of travel between desirable locations (Levine et al., 2012).

In recent decades, planners have increasingly emphasized the benefits of proximity and connectivity, rather than speed of travel. Proximity and connectivity might be enhanced through local and regional strategies to coordinate transport and land use, for example, even if more compact development patterns also reduce travel speeds. Some research confirms that shorter travel distances in high-density urban areas contribute more to overall accessibility than do higher speeds in low-density urban areas (ibid). Meanwhile, scholars concerned about social equity aspects of transportation policy also draw attention to accessibility concerns, such as differential access to job locations, among population groups and neighborhoods distinguished by their demographic and socioeconomic characteristics (Martens et al., 2012).

Emphasizing accessibility as a goal for transportation policy inevitably draws attention to land use patterns and policy. Accessibility as a goal or objective implicitly highlights the connections between desirable land uses and ease of travel between them. For this reason, research began to proliferate about the “transportation-land use connection.” Studies have assessed, for example, the elasticity of demand for trips by car versus other modes, and for VMT, in connection to various aspects of land use that have been called “D” characteristics, including density, diversity (mix of uses), design (such as street amenities and connectivity), distance to a transit stop, and destination (in particular, network connectivity).

Overall, studies have found that most land use characteristics, when considered individually, show small associations with travel behavior, compared to socioeconomic characteristics of individuals (Ewing and Cervero, 2010). Transit use often rises markedly for residents living close to stations, but the built environment factor generally found to have the strongest association with vehicle distance travelled is destination accessibility (ibid). For transit, destination accessibility depends on the presence of highly interconnected networks.

The influence of land use factors on transport should be considered not just in relation to isolated cross-sectional effects in space or time, however. While the influence of any single land use characteristic upon travel behavior may be small, considered in isolation, the combined effect of various land use factors could be more significant (ibid). Efforts to significantly change the built environment in targeted areas can substantially alter travel patterns there, suggesting that policy impacts could accumulate (see discussion in Van Wee and Handy, 2014). Land use patterns take decades to change on the ground, and can be hard to reverse; therefore sustained policy direction is required to achieve benefits, but they could be cumulatively substantial (Boarnet, 2010).

Widening the lens further, land use can be considered a useful component in a suite of strategies that collectively could reduce demand for driving synergistically – by more than the sum of effects

of the strategies considered individually. To reduce VMT, a combination of “push” and “pull” strategies is often advocated, such as by applying pricing approaches to reduce the cost-attractiveness of driving, in combination with transit expansion strategies that provide attractive alternatives to driving (Banister, 2008). Land use policymaking fits into this equation also, for example to promote TOD near transit stops and along transit corridors, to reduce “free” parking provision near transit, and to help improve regional transit accessibility such as by facilitating more efficient feeder routes and links to other modes, such as through “first-mile last-mile” pedestrian and bicycle amenities (Salon et al., 2012).

Concern about climate change has served to reinforce the message that a combination of demand-side policy measures is needed for environmental purposes. On the one hand, analysis of policy options to reduce GHGs from transportation has pointed to the importance of improving technology (supply-side as opposed to demand-side measures), such as through improvements to vehicle and fuel efficiency. There is widespread agreement that these technological options may hold out the most potential for reducing GHGs in the medium term (within 15-20 years) (Greene and Plotkin, 2011; Burbank, 2009; USDOT, 2010). However, cost reductions will be important for hybrid or more advanced drivetrains to become mainstream (Greene and Plotkin, 2011). Various analysts conclude that some combination of high fuel prices, fuel economy standards, government subsidies, greater-than-expected reductions in technology costs, and shifts in consumer attitudes will be needed for the 2035 fleet to gain large numbers of vehicles with more than advanced conventional drivetrains (Greene and Plotkin, 2011, Burbank, 2009; USDOT, 2010). High-mitigation scenarios based on technological change alone are projected to be very costly, requiring rapid technological progress and decarbonized electricity or hydrogen (Greene and Plotkin, 2011).

Many climate policy analysts stress the importance of adding demand-side measures to the transportation policy mix, to reduce spiraling VMT, and because of high projected costs of achieving carbon-neutral transportation technology (Burbank, 2009; Cambridge Systematics, 2009; Greene and Plotkin, 2011; USDOT, 2010). Research on the potential for GHG reduction underscores the importance of synergistic benefits from interactive demand-side strategies that may offer greater benefits when combined (Boarnet, 2010; Burbank, 2009; Greene and Plotkin, 2011; Rodier, 2009).

These analyses may help put to rest debates about the relative merits of pricing and planning strategies for reducing driving and associated emissions; the importance of co-benefits and synergistic effects among policies suggests that what is needed is a combination. Different levels of government may be better suited to implement some demand-side strategies than others, however, suggesting that the best outcomes require effort at all levels. For example, the federal and state governments are the appropriate levels for adopting large-scale technology-forcing policies, such as CAFÉ standards for vehicle efficiency, and for broad-based taxation like gas taxes. Meanwhile, the local and regional scales are appropriate for fine-tuning coordinated strategies for transit and TOD, although the federal and state governments could support such efforts, such as by funding transit and TOD projects.

### ***Implementation challenges for linking land use and transportation***

Transit-oriented development (TOD) strategies represent a desire to realize synergies between transportation and land use planning, and have thus been a hallmark for smart growth advocates. Especially as market demand has increased for more compact, transit-proximate homes during the past decade, planners have sought to facilitate more infill housing. However, TOD poses a

challenge for planners, reflecting the institutional disconnections built into the planning system. Barriers include community resistance in some locales, difficulty in assembling land parcels, and providing necessary infrastructure (such as sewer lines) to support new housing in older communities. TOD remains a niche real estate market that requires significant effort to succeed (CTOD/Living Cities, 2011). TOD that actively seeks to create or preserve a mix of incomes faces even harder challenges, because as market interest in compact housing rises, price pressures work against maintaining affordability.

TOD is more costly, complex, and difficult to finance than other development (ibid). Implementation requires coordinated, multi-sector approaches that bridge public-private, city/transit agency, and inter-governmental divides (federal/state/regional/local) (ibid). Most TOD projects require subsidy to succeed, even when market interest is present. Disjointed interests and practices of various stakeholders can undermine success. For example, transit finance is dominated by government sources, such as the federal News Starts program, that allocate funds competitively based on low risk and low cost. This perspective does not match the imperatives of the real estate market, which seeks to balance risk with reward. Reflecting this mismatch, many transit agencies, in response to federal criteria for transit funding, tend to favor low-cost locations for siting new rail stations; low-cost land, however, indicates lack of market interest in new development (ibid).

Timelines for new transit and TOD implementation also do not match well, with TOD real estate projects often taking on the order of three years to complete, compared to ten or more years for transit projects. Speculators may drive up land prices in the meantime. Community priorities may also misalign with market realities; for example, community-designed TOD guidelines may appear unattractive to private lenders, in regard to factors such as land acquisition, site phasing, environmental clean-up, or mixed-use requirements. The real estate industry does not foster a culture of “patient capital” conducive to the complexities of TOD planning (Leinberger, 2007).

Given these institutional challenges of TOD, coordination is key to success. Newman argues that four strategic planning tools are necessary, and must be aligned through mechanisms at multiple levels of government (state, regional, and local): a strategic policy framework identifying growth centers where development should be located; a strategic policy framework linking those centers with rapid transit; a statutory planning base of mandated development densities and appropriate design in each designated center; and a public-private funding mechanism linking TOD development to transit expansion (Newman, 2009). These principles prove useful in considering recent efforts in California, discussed in the case study chapter, to advance a state funding framework to support TOD.

### ***A critical turning point***

To summarize the preceding sections, as construction of the national highway system began winding down in the 1970s and 1980s, the post-WW II consensus on goals and objectives of federal transportation policy also unraveled. Attention shifted to considering consequences, such as rising air pollution and more complicated patterns of congestion associated with suburbanization of jobs, but addressing these concerns appeared to require a re-thinking of earlier assumptions, strategies, and techniques. The beginning of a new paradigm for transportation goals and objectives was discernible, but it would take decades for central ideas and operational strategies to coalesce.

In the context of discussions about how to address national transportation needs with declining real purchasing power from gas tax revenues, devolution of decision-making authority appeared

advantageous to federal policymakers. Fiscal and environmental constraint underscored the need to improve transport efficiency, but many promising demand-management strategies are politically controversial, such as imposing taxes on driving, or challenging low-density zoning constraints. Furthermore, in the context of this more challenging and contested policy terrain, metro areas faced different needs and priorities, and many promising strategies required fine-tuned approaches.

In this context, policymakers chose a devolution strategy, allowing for consensus-building at a more localized scale to address the complex planning challenges that had emerged. Devolution also aligned with ideas being advocated by smart growth advocates, who were calling for more localized strategies to link transport and land use planning, such as TOD at the neighborhood or transit corridor scale. Meanwhile, growing concern about the need to reduce VMT and associated air pollution also drew attention to the need for regional planning, the scale at which transport investments might best be analyzed and coordinated in regard to these wider-than-local impacts.

In this context, the federal government took steps to devolve more planning authority to MPOs by enlarging their autonomy and responsibilities. These federal actions, discussed in the following section, paved the way for MPO sustainability planning to emerge.

## **2.6 Federal legislation and the enhanced role of regional plans in the post-highway era**

The passage in 1991 of the Intermodal Surface Transportation Efficiency Act (ISTEA) is widely seen as a turning point in US transportation policy, responding to the changes described above. Compared to prior transportation policy re-authorizations, the law made a number of changes that shifted federal policy from an overt bias toward highway building. A number of the changes affected MPOs.

ISTEA (and successor legislation) required MPOs to take the lead in developing long-range transportation investment plans for metropolitan areas. Flexibility for programming funds across modal categories was increased to promote more direct comparisons of costs and benefits of options such as transit or highway expansion, and funds for both transit and highways were increased. A range of policy “factors” was identified for MPO plans to address, including equity, energy conservation and efficient use and maintenance of facilities along with tradition mobility goals. MPO investment plans were also required to be “fiscally constrained,” or in other words, to be based on realistic funding prospects. This measure gave the plans new weight with local governments (Goldman and Deakin, 2000).

These reforms provided the COG/MPOs with a new carrot—coordinating the programming of billions of dollars in transportation investments. ISTEA provided MPOs more autonomy over certain funding categories and more flexibility in allocating the funds across modes (ibid). MPO plans would now be subject to more pressure from stakeholders regarding how to balance funds among different priorities (e.g. transit vs. highways).

At the same time, ISTEA contained a stick for MPOs, as it forged a closer link with air quality planning. ISTEA, coupled with amendments to the Clean Air Act passed in 1990, required MPO plans to demonstrate “conformity” to regional air quality standards, effectively establishing a “pollution budget” in nonattainment areas. MPO regions that fail to meet the requirements risk losing federal transportation funds. While similar provisions had been in place as of 1977, the 1990 CAA amendments and ISTEA put more teeth into conformity requirements, for example by



assigning federal agencies an “affirmative responsibility” for enforcement, and expanding sanctions to address failure to implement any provision in mandated attainment plans (Weiner, 2008).

Concern about rising traffic congestion and persistent air quality problems also led Congress to create a new MPO program linking these issues (Yarne, 2000). ISTEA created a special category of funds (Congestion Management and Air Quality, or CMAQ, funds) to be directed to air quality non-attainment areas for projects to reduce automobile-generated air pollution. MPOs in areas with populations over 200,000 also were required to develop a Congestion Management Process (CMP).

The new conformity provisions pushed MPOs to direct more attention to air quality impacts (Howitt and Altshuler, 1999; Yarne, 2000). The requirements have not worked substantially to improve air pollution levels beyond previous trends, however (Stone, 2003; Williams, 2001). The political costs of implementing aggressive measures, such as for land use policy changes, have been prohibitive, while enforcement of conformity requirements has also been somewhat lax. The costs of non-compliance to MPOs and states have been low; although more than 60 regions experienced lapses in conformity from 1997 to 2004, federal administrators subjected none to any major constraint on transportation funds, and only a few were required even to change RTPs (McCarthy, 2004). Deadlines for attainment were extended (ibid).

However, conformity requirements can be seen as having been far more influential when considered in terms of their effects on MPO planning processes – their institutional legacy (Howitt and Altshuler, 1999). One effect has been the improvement of techniques by MPOs for projecting potential emissions from transport investments (Savonis, 2000), a practice subsequently put to use by many MPOs in modeling climate impacts and other policy effects. Conformity requirements have also prompted MPOs to emphasize strategies for reducing emissions by reducing VMT, including better coordination of transportation and land use (Howitt and Altshuler, 1999; Wolf and Fenwick, 2003). Some MPOs have achieved conformity only by developing new strategies to promote compact development (Wolf and Fenwick, 2003).

### ***The role of federal mandates in prompting a new approach to RTPs***

By the 2000s, many MPOs were pursuing a new approach to RTP development reflecting the provisions of ISTEA and the CAA, as well as the MPOs’ own ingenuity in responding to a tightening vise of fiscal and environmental constraint. The approach is called “blueprint planning” in California,<sup>1</sup> and “integrated transport-land use planning,” or other terminology elsewhere (such as “visioning processes”). It seeks to more closely connect transportation and land use planning, combining greater outreach to local governments and other stakeholders with enhanced technical modeling of plan “scenario” alternatives (packages of project and program options), with the goal of gaining consensus on a “preferred plan scenario” for regional development patterns, to be adopted in the RTP. Bartholomew and Ewing (2009) counted 20 such “transportation-land use integrated planning processes” undertaken at the regional level in the US in the mid-2000s, to model plan scenarios for reducing VMT (they counted more such processes undertaken at smaller scales, e.g. at the county level).

In these processes, MPOs often identify multiple objectives for analysis, such as for improving job accessibility, and various identified environmental, economic, and equity impacts, with the aim of analyzing co-benefits and trade-offs of scenario options in relation to desired objectives. MPOs that

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<sup>1</sup> The “blueprint” moniker has been employed in California since 2005, when the state government established the Regional Blueprint Planning Program to encourage adoption of the approach statewide.

pursue this approach have often adopted final plan scenarios calling for more compact growth than in modeled “business as usual” trends scenarios (Barbour and Teitz, 2006). Because MPOs do not control land use, pursuing strategies to induce compact, infill growth necessitates that MPOs work more closely with local governments than in the past. Thus, the new approach to RTP planning has turned many MPOs into more activist organizations than in their traditional practice.

The goal of this dissertation is to determine whether and why this new approach to RTP planning can be considered to be “sustainability planning,” and to investigate how many large MPOs are using a sustainability-oriented approach. In doing so, the next sections consider MPO planning in relation to literature on sustainability planning and sustainable transport, to develop theory and methods for evaluating RTPs for this purpose.

This section first considers in more depth how the new approach to developing RTPs being pursued by many MPOs by the 2000s, called here “transportation-land use integrated planning,” relates to federal mandates, and the role those mandates have played in prompting MPOs to adopt it. Although many MPOs are definitely using their own ingenuity to develop new strategies, the substantial role of federal policy in prompting the shift should be recognized. Considering the range of mandates that set parameters for RTPs, it becomes clear that these mandates have encouraged “transportation-land use integrated planning,” thereby enabling, though not requiring, a sustainability orientation.

In considering how federal mandates have affected MPO strategies, it is useful first to summarize basic characteristics and legal expectations of RTPs. Regional transportation plans (RTPs) are 20+-year long-range investment and policy plans adopted by MPOs on a cyclical, iterative basis, at least every five years (or every four years, in air quality non-attainment regions). The plans must identify and include all projects and programs slated to receive federal transportation funds over the plan duration; because most projects are funded from multiple sources (state, regional, and/or local funding, as well as federal), the RTP provides a strategic, long-term framework for transport investment choices in each region.

The plans are iterative because many funded projects take years to complete, and so each successive RTP already contains many “committed” projects, and the marginal “discretionary,” or uncommitted, revenue available for programming by the MPO in each plan generally forms only a relatively small share. The plans are iterative also because their development is quite complex and extensive, so many MPOs begin developing their next plan almost immediately after adopting their last one. Although MPOs are required to develop other documents for federal review (including a short-range plan, a work program, and a public participation plan), the RTP is “arguably the most important and most public statement of the MPO’s intentions and of the basis for these intentions, and it is thus an appropriate object of analysis” (Handy, 2008, p. 114). RTPs and associated documents, posted on MPO websites, often run to many thousands of pages long.

The turn toward “integrated transportation-land use planning” by some MPOs emerged from within the mandates of the iterative RTP process. Clearly, the reforms in ISTEA and the CAA amendments, described above, helped prompt the new approach, by providing MPOs with a stronger role and more resources for developing concerted regional plans, and by imposing a performance constraint in the form of stiffer air quality conformity requirements.

Conformity requirements also induced technical improvements that provide the basis for scenario modeling, in prodding MPOs to improve their capacity to model projected performance of adopted

plans in relation to air quality standards. Large MPOs in particular have been transitioning from use of traditional “4-step models” for estimating travel demand (which simulate trip generation, distribution, mode choice, and route assignment using aggregate data by travel zone) to instead using disaggregate so-called “activity-based” and “tour-based” models that are better able to capture fine-grained aspects of travel such as trip chains, coordinated travel among household members, and the availability of time windows in activity scheduling (Waddell, 2011).<sup>2</sup>

These advanced models provide improved sensitivity for testing smart growth and demand management strategies, as well as effects of facility investments on “induced travel” (re-routing of latent travel demand from other routes, modes, or times of day, upon expansion of a given facility such as a new roadway). Some MPOs have also worked to improve their land use modeling capacity by using disaggregated models, which, when integrated with activity-based transportation models, allow for more sensitive analysis at the person-by-person trip level of activities such as bike and walk trips (ibid). These land use models predict behavior at a fine-grained level, such as by using market and regulatory information stored at a parcel level, for simulating economic behavior of developers and homeowners.

MPO scenario modeling has been influenced by other federal mandates in addition to air quality conformity and ISTEA provisions (Figure 2.7). In particular, the National Environmental Policy Act (NEPA), passed in 1969, requires analysis of environmental impacts of proposed development projects, including for transportation. The law requires evaluation of project alternatives, an aspect that has helped foster MPO processes for evaluating plan scenario alternatives.

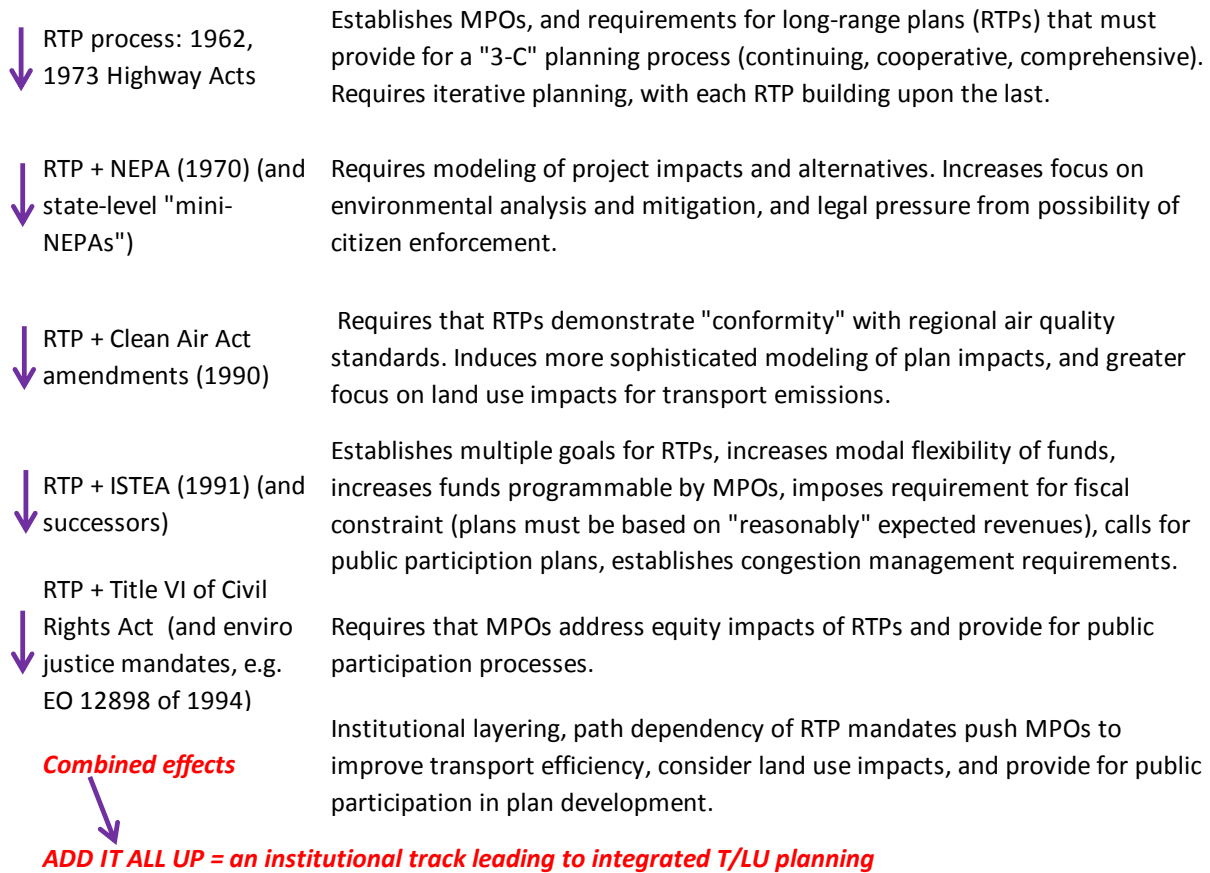
Many states subsequently passed “mini-NEPAs,” which in some cases pose stiffer requirements than the federal mandate. For example, the California Environmental Quality Act (CEQA) applies to plans, not just projects, and it requires mitigation, if feasible, of negative environmental impacts deemed “significant” in environmental review. As will be demonstrated in following chapters, CEQA has played an important role in pushing California MPOs to develop technical capacity for scenario planning, and to address environmental objectives, as part of the RTP process. One reason is that it has also provided a venue for stakeholders to hold MPOs accountable, through citizen-initiated litigation. And it currently plays an important role in emerging strategies for developing integrated state-regional-local approaches to sustainability planning in California.

MPO planning processes have also been influenced by procedural mandates for incorporating public participation. Building upon citizen participation requirements of NEPA, ISTEA required that MPOs adopt a formal public involvement process (Weiner, 2008). Subsequently, the Federal Highway Administration and Federal Transit Administration also developed guidance. MPOs were required to involve “all affected parties” in an open, collaborative, and cooperative process for developing regional plans (ibid). In response, many MPOs formed “citizen advisory committees,” and some added a board seat (voting or ex officio) for a citizen representative (Sciara, 2015). More generally, by strengthening the role of MPOs and calling on their plans to address social, economic, and environmental impacts, ISTEA encouraged a wider set of stakeholders to become engaged in the process (ibid).

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<sup>2</sup> In activity-based models, some steps in a typical four-step model may be allocated to several distinct sub-models such as for estimating location choice, auto ownership, free parking eligibility, daily activity patterns, and tours and trips. The models use population synthesizers to support more sophisticated agent-based travel behavior simulation, such as coordinated travel and activity scheduling. They attempt to simulate behavior of individual households and persons in an environment described by input land development patterns and transportation projects and policies, simulating full day activity and travel schedules for persons.

**Figure 2.7 The path-dependent RTP process:  
Federal and state policy mandates promoting T/LU integrated planning**



Environmental justice mandates added another layer to public participation requirements, calling on MPOs to analyze and address equity impacts. In 1994, President Clinton issued Executive Order 12898, amplifying requirements stemming from the Civil Rights Act of 1964, which prohibited discrimination in provision of benefits on the basis of race, color, or national origin for any program or activity receiving federal financial assistance. Agencies receiving federal funds were required to address environmental justice concerns under the NEPA process, by analyzing plans and projects in regard to health, economic, and social impacts on minority and low-income communities. As a result, MPOs conduct environmental justice analyses as part of their RTPs, comparing various plan aspects, such as expenditures on transit, for the general population compared to geographic areas of concern (e.g. low-income neighborhoods) and for groups of concern (e.g. low-income households). Some critics contend the methods are often too blunt of an instrument, as averages can hide more nuanced variation (Bills et al., 2012).

The interactive and cumulative effects of the *layering* of these different mandates onto the iterative, cyclical RTP process helped ensure it would become more participatory and performance-oriented. Technically, the mandates pushed the process toward assessment and comparison of projected performance of alternative plan options (for projects and programs) against performance measures of interest, especially for air quality, but also for other economic, social, and environmental

planning “factors,” as called for under ISTEA. Meanwhile, air quality conformity mandates also propelled greater interest by MPOs in integrated transport-land use strategies capable of reducing polluting emissions. Furthermore, growing interest among environmentalists and social equity advocates in smart growth brought new non-governmental organizations into RTP processes, and MPOs were expected to accommodate their input.

## **2.7 Conclusion**

This chapter provided a historical account of the emergence of MPOs as a response to a governance dilemma that arose during the post-WWII suburbanization era, as the proliferating numbers of new municipalities in metro regions, combined with political consensus favoring centralized construction of the national highway system, served to split apart the policy areas of transportation and land use in terms of their locus of control. MPOs were established to help bridge levels of government in American “marble cake” federalism for transport policy purposes. This policy system gave rise to various negative consequences, which by the time the highway system was completed in the 1990s, had served to unravel the policy consensus of the highway building era, namely to improve mobility by expanding roadway capacity. Transportation planners and activists began articulating the outlines of a new set of principles for guiding policy choices, aimed especially at enhancing accessibility and livability through various demand-side techniques aimed at reducing demand for driving.

These smart growth strategies pose a new governance dilemma, however, especially to the degree that they depend on more integrated planning for transportation and land use, given the fractures built into the growth management system by this time. New mandates layered into the path-dependent RTP process devolved more planning authority and responsibilities to MPOs, but not enough to overcome fundamental institutional constraints on their power, or collective action dilemmas they face in trying to re-integrate fractured centers of authority. By the 2000s, a new form of RTP planning emerged among some MPOs that attempts to more closely coordinate transportation and land use planning, and in some cases adopts an explicit focus on sustainability objectives. How to determine whether this new approach constitutes sustainability planning is the subject of the next chapter.

## **CHAPTER 3. MPOS AS SUSTAINABILITY PLANNERS: THEORY AND METHODS OF EVALUATION**

Recent RTPs adopted by the largest MPOs in the US indicate that many claim to be pursuing sustainability objectives. But what is sustainability planning, in relation to MPOs? Does the new approach to RTP development adopted by some MPOs by the 2000s, called “integrated transport-land use planning” in the previous chapter, constitute sustainability planning? How do we know?

This chapter considers these questions, first by reviewing concepts from the literature on sustainability planning and governance, as well as sustainable transport, in connection to MPOs and their planning strategies, and then using this theoretical basis to operationalize research methods for identifying sustainability-oriented RTPs and related processes. The chapter concludes with a theoretical assessment of the role of state governments in addressing RTP implementation challenges.

### **3.1 MPOs and sustainability planning**

#### *Precepts of sustainable development*

“Sustainability” and “sustainable development” (here considered synonymous) have become commonplace terms, although no precise, agreed-upon definition exists. Most scholars trace the popularization of the concepts to the Brundtland Commission report prepared for the U.N. World Commission on Environment and Development in 1987 (Brundtland Commission, 1987). In academic and planning discourse, the terms are often construed as denoting a normative approach to policymaking that seeks to enhance economic well-being, environmental quality, and social equity simultaneously – the “3 E’s” – in an integrated way across temporal and geographic scales (Meadowcroft, 2007). Sustainable development asserts the value of reconciling 3 E’s goals and objectives, through achieving “co-benefits” when possible through planning coordination, and by facing trade-offs when not.

Sustainability is discussed in the planning literature in relation to both process and outcomes, or what Fritz Scharpf called “input legitimacy” and “output legitimacy” (Scharpf, 1999). Scholars underscore the difficulty in clearly distinguishing ends and means of sustainability planning, however, in a manner easily translatable to the traditional rationalist policymaking model, in which goals are first agreed upon, then linearly translated to objectives, and then to implementing mechanisms. Instead, scholars stress that goals and objectives of sustainability planning are not easily determined, given how entrenched and ubiquitous unsustainable patterns and habits of resource use have become, and how contested are views on how to define sustainability objectives. As a result, no simple set of policy prescriptions could ever be easily identified and adopted, according to this view (Meadowcroft, 2007; Jordan, 2008).

The sustainability concept is considered inherently open to interpretation, similar to other complex concepts such as “justice” and “equality” (Meadowcroft, 2007). In fact, the wide appeal of the concept is attributed in part to the wide range of explicit or implicit definitions that have emerged (Ramani et al., 2011). Scholars note a spectrum of definitions in use ranging from “weak” conceptions that prioritize achieving co-benefits for efficiency reasons, and that are open to accommodating some substitution of natural capital for economic purposes, to “strong” definitions on the other end of the scale that call for imposing hard limits on any degradation of natural capital (ibid; Owens and Cowell, 2011).

The Brundtland report gained favor in part because it underscored the potential for achieving 3 E's co-benefits (Jordan, 2008). However, the question of how to balance or trade off objectives if and when they conflict, rather than complement one another, leaves room for debate. According to some observers, weak sustainability objectives may provide cover for "ecostate modernization" efforts to improve economic efficiency in ways that only conveniently happen to align with environmental objectives, at least up to a point, such as in the case of "demand management" transportation strategies that help to reduce polluting emissions, but which are adopted by policymakers with the primary goal of improving economic productivity (While et al., 2010). Situations of this sort raise critical questions about how to identify and weight priorities. Meanwhile, debates about "weak" versus "strong" sustainability have generally touched mainly on the interplay of environmental and economic considerations, leaving equity concerns as secondary.

The inherent ambiguity of sustainability objectives points to the importance of effective processes for decision making. Consensus-building is considered an essential element, as is action at multiple levels of government and across multiple sectors of the economy as well as social and policy domains (Bulkeley and Betsill, Lange et al., 2013). Essentially, many scholars argue that sustainability requires a profound transformation of social practices, attitudes, and institutional behaviors across public and private sector institutions, as well as among individuals – in other words, for society as a whole to transform itself from *within*.

These views underscore the connection of sustainability planning with governance concerns. Sustainability is posited as centrally concerned with governance for public goods, writ large (Jordan, 2008; Lange et al., 2013). Not coincidentally, climate change concerns have arisen alongside globalization of the economy in recent decades, drawing attention to the inexorable inter-connections of behaviors at every scale, from the individual to the global.

This section provides a theoretical basis for evaluating whether an RTP and its associated planning procedures are sustainability-oriented, first in connection to decision making and learning processes, and second, in connection to objectives and performance measures. The discussion makes use of concepts from the literatures on sustainability planning and governance, and sustainable transport. It also places these questions within a wider framework of issues and concerns about multi-level governance, policy change, and democratic accountability.

### ***Sustainability planning processes***

Attributes of idealized sustainability planning processes have been theorized drawing on literatures from fields including adaptive management for ecosystem health, social learning, socio-technical regime transitions, and from study of techniques-in-use such as environmental impact assessment (EIA) and sustainability impact assessment (SIA) (Meadowcroft, 2007; Folke et al., 2005; Lange et al., 2013; Voss et al., 2006; Owens and Cowell, 2011; Pahl-Wostl, 2009). Common themes include the need for experimental, participatory, adaptive, reflective and continually updated long-range planning processes to match the complexity and uncertainty (the "wicked" challenges) associated with altering unsustainable but ingrained practices, attitudes, and patterns of behavior.

From this perspective, sustainability planning should be a crucible in which diverse stakeholders engage in long-term, reflexive deliberation of goals and objectives, and experiment with implementation methods, subjecting both ends and means to continual revision and review. Techniques advocated by scholars include vision development, "backcasting" of transition pathways, experimentation with promising programs and projects, support for innovation "niches,"

and recursive monitoring followed by evaluation and revision (Kemp et al., 2005; Banister and Hickman, 2013). At the level of government “steering” and institution-building, methods to strengthen inter-governmental planning coordination, to foster innovation “niches,” and to develop and implement multi-faceted “planning packages” are emphasized (Meadowcroft, 2007; Sorensen and Torfing, 2009).

These ideas borrow from the rising tide of scholarship on “governance,” which is seen to have replaced “government” as a better concept for understanding current state-society relations (Treib et al., 2007; Lange et al., 2013). Like sustainability, the governance concept can be ambiguous in the literature, as it is cast sometimes as a normative concept, other times as an empirical one, and yet elsewhere as a theoretical frame (Jordan, 2008; Lange et al., 2013). The term is said to characterize the way state-society relations have shifted since the 1980s, with the rise of a globalized economy coinciding with the retreat in regulatory assertiveness by many national-scale governments. Top-down, “command-and-control” regulatory regimes have been scaled back in many nations and sectors and increasingly replaced with looser, multi-level, public-private “collaborative” approaches for achieving public policy goals, utilizing “soft” techniques such as negotiated rule-making, incentive grants to encourage desired outcomes, and administration devolved to lower levels of government using performance guidelines for compliance purposes, rather than strict specification of implementation measures (Lascoumes and Le Gales, 2007). The devolution of more authority to MPOs under ISTEA serves as an example of this trend.

Concepts prevalent in the governance literature that are echoed by sustainability scholars include, in particular, the purported value, in an increasingly complex social world, of collaborative, multi-party, and multi-level planning and policymaking. Deliberative processes are purported to be useful for promoting “social learning” about benefits of collective action, rather than just resorting to bargaining or power relations as the basis for policy making (Muro and Jeffrey, 2008; Pahl-Wostl, 2009; Lange et al., 2013; Sorensen and Torfing, 2011). Scholars stress the importance of so-called “double-loop” or “triple-loop” learning, meaning re-evaluation of ends, not just methods or calibration of tool settings (single-loop learning) (Hall, 1993; Argyris and Schon, 1996; Pahl-Wostl, 2009). Purported forms of evidence for determining whether social learning has occurred in policy communities include adopted changes in institutions, programs, policies, and/or core beliefs of interested stakeholders (Bennett and Howlett, 1992).

Other scholars critique normative assumptions built in to these characterizations of governance trends favoring collaborative, deliberative forums for decision-making. They argue that by replacing traditional forms of democratic representation with more amorphous, less publicly transparent arrangements, public accountability can be undermined (Sorensen and Torfing, 2009; Pierre, 2009). However, some scholars counter that public accountability in networked, collaborative policymaking arrangements can be enhanced through applying clear, stipulated standards and requirements for demonstrating performance and diverse stakeholder engagement (Sorensen and Torfing, 2009).

The question of how sustainability planning processes might lead to policy change is informed by considering the broader literature on sources of policy change. In general, scholars of the policy process have traditionally been more interested in explaining how and why policy regimes persist, rather than change (Mahoney and Thelen, 2010). Prominent theoretical frameworks include the Advocacy Coalition Framework, which argues that policy stakeholders, organized into advocacy coalitions pertaining to policy systems and subsystems, negotiate policy arrangements reflecting compromises among salient interests and perspectives (Sabatier, 1988). Another prominent



framework is the Institutional Collective Action framework put forward by Elinor Ostrom and followers, which argues for considering three levels of rules-in-use that set conditions within which stakeholders negotiate objectives, namely the constitutional level (legal framework allocating authority and responsibility), the directive level (setting rules for collective action), and the implementation level (setting technical and procedural rules for implementation) (Ostrom, 2009).

These frameworks are oriented to understanding how policy regimes stabilize and equilibrate, and as such they generally have posited sources of policy change as mainly exogenous, in the form of shocks or accumulating “negative feedback” emanating from changes in the external environment that serve to disable the policy regime’s capacity to respond to original goals and objectives effectively (Hall, 1993). In attempting to re-equilibrate, stakeholders adopt responses that vary depending on the perceived degree of threat to the stability of the policy regime. In a widely cited formulation, Hall argued that “first-order” change occurs when policymakers view challenges as minor and only requiring adjustments to “settings” of policy instruments, such as levels of service provided to policy beneficiaries. However, when policymakers deem problems to require more than just adjustments to given tools, and instead a modification of appropriate tools for attaining the original policy goals, this situation leads to “second-order change.” When exogenous challenges to a policy regime are considered so severe that stakeholders reframe the original goals, the situation calls for “third order change.” In this case, if a policy regime collapses and is replaced by a new configuration of pertinent goals as well as means to achieve them, a “punctuated equilibrium” may be said to have occurred, in which one long-standing policy regime (or “paradigm”) is replaced by another (Baumgartner and Jones, 2010).

Recently, some scholars have drawn attention to the need to better theorize endogenous and gradual sources of third-order policy change, rather than mainly exogenous and rapid ones (Howlett and Cashore, 2009; Weaver, 2010). The possibility of gradual alteration of a policy paradigm, from within, is contemplated. This focus is particularly useful in considering sustainability planning, given the need to change pervasive and complex patterns of unsustainable practices at multiple scales. Furthermore, the possibility of a gradual, rather than abrupt, paradigm transition seems quite pertinent for thinking about sustainable transport, since while it may be argued that the transportation policy regime in the US experienced a breakdown in its existing “mobility paradigm” starting in the 1990s, with the end of the highway-building era, the policy system since then has not undergone a wholesale and rapid shift to a new, re-equilibrating paradigm. On the contrary, improving mobility has remained a central performance expectation expressed in federal transportation legislation, even under ISTEA and successor legislation, and even though MPOs have been asked to address other “factors” in their plan-making in addition to congestion reduction and mobility.

Mahoney and Thelen (2010) have theorized endogenous sources of policy change from a historical institutionalist perspective, in a manner helpful for thinking about MPOs and RTP processes. Historical institutionalists focus in particular on understanding how historically embedded institutions, defined not just as formal organizations but also as entrenched rules, norms, and habits of practice, mediate interest formation (Hall and Taylor, 1996). They point to “path dependency” in institutional configurations as an important constraining factor on policy formation and implementation (Pierson, 2000). Institutions, once established, are held to persist over time due to “feedback” dynamics described above, as the institutions serve to provide “positive feedback” (a.k.a. “increasing returns”) to powerful stakeholders in the form of desired resources or other benefits.

Mahoney and Thelen contend that endogenous policy changes may occur depending on the way that policy regime stakeholders with different distributions of power and access to resources respond to changing external circumstances. In one type of process, policy *layering* may be said to occur, if stakeholders add new policy elements to an institutional package so as to “tweak” the impacts or re-direct them as much as possible in intended directions.

This layering concept works especially well for considering the path-dependent RTP process. The interaction of NEPA, ISTEA, and the CAA amendments in influencing MPO planning approaches, discussed earlier, can be seen as reflecting layering effects. Some scholars criticize layering as likely to produce conflicting and inconsistent demands, but others note that layering may enable policy regimes to adapt to meet new priorities or conditions (Howlett and Rayner, 2007).

Mahoney and Thelen theorize that a more deliberate source of policy change may occur through “conversion,” if stakeholders explicitly reformulate goals within the parameters of a given policy frame. Is conversion of this sort occurring within the institutional framework of the RTP process?

### ***Does the RTP process support sustainability?***

The question at stake for this dissertation is whether MPOs collectively or individually can use the RTP process to achieve policy conversion, of the sort described by Thelen and Mahoney, toward achieving sustainability. It is clear that the institutional structure of the RTP process matches many of the idealized attributes of sustainability planning described above, in particular in its iterative, cyclical nature for updating RTPs, in its environmental performance constraint for meeting air quality standards, and in its requirements for stakeholder engagement and for environmental and equity impact analysis.

From the start, the RTP process was set up to provide a venue – an institutional vehicle – for formulating and iteratively re-considering development policy within regions, at least for transportation. The mandates that have been layered onto the RTP process have nudged it toward accommodating a sustainability orientation. This is seen, for example, in the ISTEA requirement that MPOs must consider planning factors that touch on the “3 E’s” (although much room is left for interpretation by the individual MPOs). The RTP process also meets the sustainability criterion of addressing multiple scales in space and time, by aligning federal, state, regional, and local plans and priorities in a long-range, continuous planning framework.

The established parameters for the RTP process thus can be seen to be broadly compatible with sustainability planning. But although they *enable* the RTP process to accommodate sustainability objectives and choices, they do not require it. In keeping with governance trends favoring devolution and flexibility, MPOs have been given much latitude to select specific goals and performance objectives for their RTPs (with the exception of achieving air quality conformity). The RTP process is seen to be highly contingent, in that different MPOs can use it for different purposes, and different patterns of state intervention can also influence MPO planning capacity (for example in assigning or pre-empting MPO responsibilities and powers).

The RTP framework can easily accommodate “ecostate modernization” objectives, in which an MPO may pay lip service to sustainability goals but actually emphasize traditional objectives such as congestion management, albeit in a fashion accommodating demand management techniques (Krueger and Gibbs, 2008; While et al., 2010). The procedural requirements for environmental review under NEPA guarantee almost nothing in the way of substantive outcomes. It is entirely

questionable whether these requirements actually work in favor of environmental goals much at all. NEPA requires only that RTPs evaluate and make public the projected environmental impacts from proposed projects, but not that these impacts be mitigated, for example.

Public participation requirements as well provide no guarantee of a high-quality process for deliberation and social learning. Most MPOs that hold public workshops as part of their RTP processes list cumulative attendance numbers in the hundreds, or at most in the few thousands, making it clear that the RTP process does not engage more than a miniscule portion of the public at large. Even if it does attract participation and visibility, MPO decision-making is not based on traditional democratic representation in the form of public election of governing board members (voters do, of course, elect the local officials who are appointed by their municipalities to serve on MPO boards).

Because of these shortcomings in regard to traditional expectations for democratic accountability, the quality of “elite” stakeholder engagement – by representatives of diverse stakeholder interest groups – becomes especially critical in evaluating effectiveness of RTP processes. Not only should we expect diverse stakeholders to be engaged in all stages of plan-making, but MPO staff should actively seek their input and incorporate it into plan outputs. The entire plan process should be transparent and coherent, with plan stages and key decision points clearly framed and articulated, giving stakeholders plenty of time to provide input and engage in open debate, and ensuring that connections between stages are traceable and accountable. No part of the process should appear as a “black box” to interested stakeholders.

With stakeholders, MPO staff need to work to articulate the “regional good” to be achieved through the plan, and help stakeholders achieve a collective understanding of trade-offs and potential co-benefits in choosing among plan options. Careful consideration of performance measures and targets to select for plan evaluation purposes is a critical step, as is consideration of how to weight different performance objectives (for example whether some environmental and equity objectives should be considered hard constraints not subject to bargaining away). Finally, plan monitoring and recursive assessment of lessons learned from one plan cycle to the next is critical in ensuring that social learning occurs.

In working with stakeholders, MPOs need to hone a balancing act between technical and political/discursive methods for examining and choosing among plan options. The often arcane technical processes in RTP development, including scenario evaluation, need to be translated to stakeholders in terms conducive to informed deliberation and debate. In this fashion, effective scenario modeling processes are seen to require far more than just technical capacity. Scenario modeling can provoke frustration, because the “black box” modeling procedures are hard for lay observers to understand, both in technical and practical terms, given the hundreds of policy and project options that an adopted RTP contains.

To be effectively engaged, stakeholders need to understand both how and why scenario alternatives are *designed* to include certain specific project and policy alternatives, and then how they are *evaluated*, using the MPO’s modeling techniques for projecting land use and transport demand. Stakeholders need to be persuaded that scenario design is *legitimate*, in other words that the range of designed scenarios reflects a set of realistic alternative pathways for future development in the region that are not limited just to reflecting powerful interests (Albert, 2013). Furthermore, they need to be convinced that the modeling results are *plausible*, based on assumptions and methods expected to produce reliably accurate, if not perfectly predictive, results.

Finally, stakeholders need to be closely engaged in developing plan implementation measures. Integrated land use and transport strategies in particular require that MPOs work closely with local planners and officials, not just individually but collectively, to consider land use policies to support regional benefits, while also recognizing local costs and priorities, which may need to be addressed.

Plan implementation needs to be considered in a much wider frame than just the region, however. Given MPOs' lack of regulatory and fiscal authority, and the collective action dilemmas built into their governing structure, fundamental questions arise about whether MPOs as institutions can possibly be expected to substantially alter outcomes on the ground. Even if MPOs were re-constituted as general-purpose governments for urban regions, with elected leaders and taxing powers, they still would find it hard to dramatically change transportation and land use patterns, at least in the short run, given the multitude of other forces that influence those outcomes in urban areas. With no independent financing authority and few sub-allocated funds under their direct control, and lacking land use authority and direct control over transit agency decisions, MPOs are severely hampered in developing fully integrated policies – not to mention being constrained by dwindling federal and state funds for transportation, and lack of federal and state policy attention to smart growth and climate action goals.

So the question of whether the RTP process promotes sustainability or is even capable of doing so, either in general terms or for a specific MPO, is hardly a simple one. On the one hand, the layered procedural mandates of the RTP process can be seen as conducive to sustainability planning. On the other hand, the wider “constitutional” rules (using Ostrom’s concept) in which MPOs operate mitigate against their ability to achieve substantial policy gains.

The final section of this chapter takes up the question of how to theorize the role of state governments in addressing RTP implementation challenges. Here it is useful to reiterate that given the devolution of goal-setting and program and policy choices for RTPs to the MPO level, their sustainability orientation is likely to be highly contingent not just on state-level policy factors, such as the power awarded to MPOs for programming investments and for raising regional-level revenue, but also on localized factors, such as histories of engagement by non-governmental stakeholder groups, size of region (and therefore manageability of planning relationships), planning relationships among localities, including urban-suburban tensions, political leanings, economic challenges, and even MPO technical capacity for modeling complex transport-land use interactions.

Even without strong federal or state support, and in spite of the obstacles, some MPOs have made significant strides on their own as institutional innovators in improving planning integration for transportation, land use, and the environment, as well as in aligning equity, economic, and environmental goals and objectives at the regional scale (the California case study provides examples of how this can be done). While MPOs' influence on development outcomes may be small for any given RTP, it can be cumulatively more influential over time. Over time, MPOs might be able to accomplish a “slow paradigm change” through a process that could be called “goal-oriented incrementalism” (Kemp et al., 2005; Cashore and Howlett, 2007).

Whether this “slow paradigm change” occurs depends in large part on the mobilization of stakeholders. Because the RTP process can accommodate sustainability planning, it provides a potential *venue for political activism* in support of sustainability, with outcomes that potentially matter, in the sense of influencing growth and development within regions, especially over time (Owens and Cowell, 2011). In the American political landscape, few other opportunities are available to engage in meaningful planning processes to affect wider-than-local sustainability

outcomes. The RTP process can be a space of contestation for activists seeking to mobilize change, with considerable effect, as the California case study shows.

The potential for institutional innovation and experimentation in regional governance is perhaps MPOs' greatest strength in sustainability planning. Given the importance attached by sustainability scholars to governance aspects of so-called "sustainability transitions," this capacity can be seen to be critical. Considering the landscape of American federalism, MPOs are among the best suited institutional venues for consensus-building, political mobilizing, negotiation, and experimentation with integrated planning and policymaking for growth and development, in a manner that incorporates and synthesizes local knowledge with planning practice at a wider scale.

### ***Sustainability objectives for RTPs***

Sustainability oriented RTPs must be judged not only in relation to planning processes but also outcomes. The research for this dissertation does not attempt to evaluate actual outcomes on the ground, however – in other words, changes in land use or transportation patterns that directly result from RTP projects and programs. Assessing those changes is a very difficult proposition, at best, given the multiple factors that influence development patterns. Instead, this research assesses plan outputs – projects and programs adopted for funding and implementation in RTPs, and their projected impacts on plan performance, as modeled by the MPOs. (Note that performance assessment of plan impacts usually entails modeling projected outcomes, but modeled results do not constitute any guarantee of outcomes on the ground). This section considers performance objectives and indicators identified in the literature on sustainable transport as being associated with achieving sustainability outcomes.

There is currently no widely recognized, standard set of sustainable transportation objectives or indicators in the US (Zheng et al., 2013). However, scholars concur on certain primary objectives, in particular, to improve accessibility in an equitable manner while reducing environmental impacts. Specific objectives cited in the literature (and noted earlier) include improving "location efficiency" and access to destinations – for example, through closer proximity of homes and jobs, and greater use of transit and non-motorized modes – rather than prioritizing roadway mobility objectives, such as improving roadway transport speeds (Banister, 2008; Handy, 2008; Santos et al., 2010; Ramani et al., 2011). To achieve accessibility goals, synergistic demand side strategies are recommended, including transit service expansion linked to supportive land use measures (e.g. zoning) to facilitate compact development near transit, as well as support for carpooling and non-motorized modes, and pricing techniques that make solo driving less competitive compared to other modes. In addition, the literature endorses "fix-it-first," or in other words, an emphasis on maintenance and rehabilitation of existing assets rather than expansion, to maximize the value of past investments in existing communities and stretch limited resources (Kahn and Levinson, 2011).

Scholars who analyze sustainable transport indicators also stress the importance of identifying objectives and associated indicators for plan evaluation that address 3 E's impacts (e.g. Zheng et al., 2013). These performance indicators could include, for example, projected improvements in regional economic productivity derived from accessibility improvements, improvements in equitable transport access and housing affordability achieved under the plan for SES groups and neighborhoods of concern, and improved environmental outcomes such as reduced conversion of greenfield land (open space, natural habitat, or agricultural land) to urban uses, and reduction in travel-related GHGs.

The right mix of objectives and indicators is open to debate. Some recent scholarship has underscored basic principles to be followed, including the importance of first identifying a full set of plan objectives before considering associated performance measures, and of emphasizing measures of outcome rather than output. After evaluating multiple sustainability indicator frameworks and composite indices, Zheng and co-authors (2013) identified the following important criteria to emulate:

- Relevance to sustainability: the index must reveal the health of a complete system, which includes issues of economy, environment, and society.
- Policy relevance: the index must have a clear relevance to policy issues and identify the changes that need to be addressed by policy-makers to facilitate progress in the direction of sustainability.
- Understandable and useable: the index must be easily understood by the general public so that it can be used to make informed community decisions.
- Clear in content and transparent in structure: users of an index should be able to identify how the final value is calculated.
- Forward-looking and possess a long-range view in the ability to measure progress towards, or away from, sustainability: this can be done through the use of targets or thresholds as reference points to measure sustainability progress.
- Comparative: the index should allow for comparisons to be made between communities.
- Appropriate to scale: the index should be measured at the appropriate spatial and temporal scales.
- Technically measurable: the index should be reproducible and at a reasonable cost.
- Feasible: based on reliable and timely information from valid data sources; in order for this to happen, data must be available and accessible.

For a guidance report commissioned by the National Cooperative Highway Research Program, Ramani and co-authors (2011) developed the following set of ideal goals for transport plans, for translation to appropriate performance measures for use in plan evaluation:

- Functional goals:
  - Provide a safe transportation system for users and the general public;
  - Provide a transportation system that offers accessibility that allows people to fulfill at least their basic needs;
  - Provide options that allow affordable and equitable transportation opportunities for all sections of society;
  - Ensure that the transportation system’s functionality and efficiency are maintained and enhanced;
  - Ensure that the system is secure from, ready for, and resilient to threats from all hazards;
  - Ensure that the transportation system’s development and operations support economic development and prosperity; and
  - Ensure the economic feasibility of transportation investments over time.
- Impact goals:
  - Protect and enhance environmental and ecological systems while developing and operating transportation systems;
  - Reduce waste generated by transportation-related activities;

- Reduce the use of nonrenewable resources and promote the use of renewable replacements; and
- Reduce transportation-related emissions of air pollutants and greenhouse gases.

Zheng and co-authors (2013) developed another typology:

- Elements of the environmental domain:
  - Minimize consumption of non-renewable and renewable resources for transportation;
  - Transportation and place-making system is designed to maximize land use efficiency;
  - Minimize transportation and place-making system's impact on ecological systems; and
  - Limit transportation-related waste and noise pollution.
- Elements of the social domain:
  - Transportation system meets access needs in a way that is consistent with human health and safety;
  - Planning and management of the transportation system incorporates different levels of government and community input;
  - Transportation and place-making system promotes social interaction and social equity; and
  - Transportation and place-making system meets basic access needs of all individuals.
- Elements of the economic domain:
  - Transportation is affordable for individuals;
  - Transportation system is efficient for movement of people and goods;
  - Transportation system is locally self-sufficient; and
  - Transportation system does not contribute to economic vulnerability of society.

The 3 E's framework (also sometimes called the "triple bottom line") has attributes that some scholars consider essential for sustainability planning, including its multi-criteria and comprehensive orientation, implicitly raising the question of how to balance or weight multiple objectives (Pei et al., 2010). However, the 3 E's approach also has drawbacks, including the lack of any explicit representation of relationships among objectives, or means for addressing trade-offs. In addition, indicators of progress may be double counted because intermediary effects are sometimes measured rather than ultimate effects (ibid). Indicators can also be hard to categorize into 3 E's impacts, since many are cross-cutting.

The question of whether and how an MPO weights adopted objectives in terms of priority, and in particular, environmental and equity objectives vis-a-vis economic ones, is critical to consider (Hacking and Guthrie, 2008; Morrison-Saunders and Pope, 2013). If MPOs simply identify multiple performance indicators and model plan scenarios in terms of the direction of indicators, they may be able to identify a plan scenario that improves outcomes compared to the "business-as-usual base case," but they will not understand which objectives have been or should be prioritized. It is unlikely that a scenario can be designed to optimize all indicators selected; often there are trade-offs involved. Indicators are measured in different units, so how to compare a scenario projected to achieve a small improvement in one indicator against another scenario projected to achieve a larger improvement in another indicator, if no basis has been established for comparison or for prioritizing among them?

For these reasons, identifying targets for desired performance, rather than just indicators of direction, is an important step in sustainability planning (ibid). Additionally, adopting equity and environmental targets that act as constraining performance parameters for plan choices helps in moving from a “soft” to a “hard” sustainability approach. This argument, however, begs the question of what environmental and equity parameters could or should be set.

While the right basis for establishing environmental and equity parameters is far from simple to determine, it is important to note that RTP processes can identify environmental and equity performance guiderails. The California case study provides evidence of how this can be done, as a new state law sets over-arching mandated parameters for equity and the environment for MPOs to achieve in RTPs – specifically, mandates for reducing GHGs and for promoting affordable housing.

A technique increasingly being employed, especially in Europe, to address the challenge of comparing modeled impacts for non-commensurable performance measures is Multi-Criteria Decision Making (MCDM) (Hacking and Guthrie, 2008; Zheng et al., 2013). This method first calls for normalizing individual performance measures, so as to facilitate more of an apples-to-apples comparison among them. This step is taken to remove the scale effects of different units of measurement without changing the relative distances between observations. Indicators can then also be grouped into sustainability categories and weighted in various ways, to facilitate comparisons of aggregate utility across different plan scenario alternatives, with utility calculated most often as the sum of modeled performance values on all individual measures utilized. The MCDM approach is employed in the California case study research to investigate the potential usefulness of this approach for the MPO processes.

The next section describes the research methodology used for empirical analysis in this dissertation. Utilizing the theoretical basis just presented for determining whether RTP processes and objectives can be deemed to promote sustainability, operational measures were developed. Specific methods for conducting empirical evaluation of RTPs and related processes are described.

### **3.2 Research methodology: Measures and methods for evaluating MPO sustainability planning**

How to determine and measure whether an RTP process and output is sustainability-oriented? For this research, quantitative and qualitative operational measures were developed to assess plans and processes based on concepts and research findings discussed above. The choice of operational measures was also informed by reading the most recent RTPs adopted by the 48 largest US MPOs, as well as prior in-depth research by the author on RTP processes in California (Barbour and Teitz, 2006; Barbour and Deakin, 2012).

As noted earlier, this research does not attempt to evaluate actual outcomes on the ground, focusing instead on assessing plan processes and outputs as described in RTPs. Principal plan components considered include adopted performance objectives and measures, scenario planning techniques, plan performance evaluation results, and projects and programs adopted for funding. Mixed methods were employed, with mainly quantitative analysis used to assess RTPs by the largest US MPOs, and additional qualitative analysis applied in the California case study, to consider such factors as stakeholder engagement (evaluated through reading stakeholder comment letters and other public documents such as website commentary and stakeholder-initiated lawsuits). The case study research also benefited from 35 interviews conducted with MPO staff persons, local planners,



state agency observers, and non-governmental stakeholders representing environmental, smart growth, and equity perspectives.

### ***Elements/components of RTPs***

A reading of RTPs across the US indicates that the plans can be decomposed into the following stages or components (many of which overlap):

1. Establishing goals and associated objectives
2. Analyzing current development conditions and associated challenges in the region
3. Engaging with stakeholders and the public (e.g. through public workshops, stakeholder committees, and on-line tools for gathering input)
4. Developing projections for population, housing, and job growth, for use in modeling of projected transport demand and travel patterns associated with implementing various project and program options (and associated polluting emissions) for the plan
5. Developing and adopting performance measures and targets, and associated metrics, for analysis of plan options
6. Designing plan “scenarios” – packages of transportation projects and programs, and also sometimes alternative land use patterns – for analysis
7. Modeling projected performance attributes of plan, project, and policy options against adopted performance metrics
8. Adopting a plan “preferred scenario” – a fiscally constrained list of projects to be funded, and an associated projection of land use patterns for the region, for the plan’s duration
9. Identifying “reasonably expected” funding sources for the plan
10. Designing and adopting implementation measures (policies and programs) to achieve plan goals; identifying implementation challenges and strategies
11. Evaluating the plan’s environmental impacts and identifying mitigation measures (in states requiring mitigation, such as California)
12. Monitoring of progress

Not all MPOs or RTPs address all these elements. One way to distinguish RTPs and MPO approaches is based on whether they do. For example, an RTP that contains no discussion of a performance evaluation process for selecting projects and programs can be deemed to be opaque in this regard, signaling that the decision process for this RTP is less transparent than for an RTP that does discuss adopted performance goals and objectives, and their rationale, along with plan performance evaluation methods and results, in relation to adopted goals and performance metrics. Similarly, an RTP that only discusses transportation conditions and projects, and that contains no discussion of goals, objectives, or strategies related to land use, and no scenario evaluation of land use alternatives, can be deemed to be transport-focused, rather than oriented to integrating transport and land use strategies.

Honing in on elements of plans that can indicate sustainability orientation, the assessment deems four components as key, relating to both “input legitimacy” (process-related aspects and their effectiveness), and “output legitimacy” (plan results in connection to intended goals and objectives). The four aspects/components of RTPs chosen for primary focus are:

- 1) Adopted performance goals and objectives;
- 2) Stakeholder engagement patterns and processes;

- 3) Techniques for analyzing projected performance of plan options, in particular, whether and how scenario planning is undertaken; and
- 4) Adopted implementation strategies, including budget allocations for key categories of investment, and also for more precise strategies aimed at encouraging local land use projects and policymaking to support regional plan goals.

***Plan performance goals and measures: operationalizing evaluation***

The ***first main plan element*** used to distinguish a sustainability-oriented approach to RTP development is the ***plan goals and performance measures*** adopted for an RTP. The distinction between traditional and sustainability oriented performance objectives and measures is derived from the literature on sustainable transport indicators discussed and cited earlier. A sustainability-oriented RTP is deemed to be one that includes presentation and discussion of adopted performance objectives and associated evaluation metrics for 1) measuring and seeking to improve accessibility (e.g. the number of jobs accessible via nearby transit), not just mobility (e.g. reducing traffic congestion), and 2) measuring and seeking to improve location efficiency, such as by achieving more compact, transit-proximate development, and 3) measuring and seeking to improve impacts related to all of the 3 E's, such as for fostering more affordable infill development, for limiting expansion of the "urban footprint," for improving housing affordability for groups and neighborhoods of concern, and for measuring improved economic productivity in the region through reductions in travel costs.

Operational measure #1: Does the RTP include adopted performance objectives and specific measures, utilized for plan evaluation, that 1) address accessibility impacts; 2) address location efficiency, and; 3) address all three E's in some fashion?

The most recent RTPs produced by the 20 largest US MPOs were evaluated using this operational measure. For the California case study, more extensive analysis of plan goals and performance measures was also employed. For both adopted goals and performance measures in the two most recent RTPs adopted by the four California MPOs, all indicators were grouped into the following categories:

- Transportation system
  - Traditional performance measures
    - Mobility (speed and delay on highways and roads)
    - Mobility specifically for trucks, goods movement
  - Sustainability-oriented performance measures
    - Efficiency
      - VMT
      - Reliability
      - System preservation – state of good repair
      - Transit productivity
    - Accessibility
      - Destinations accessible within a given time or distance
      - Share of homes, jobs near transit service
    - Alternative modes
      - Non-SOV mobility
      - Mode share, shift to non-SOV

- Safety, security
  - Financial viability
    - Cost-benefit assessment of transport investments
    - User costs
- Land use
  - Compact growth, TOD
  - Housing affordability and supply (choice)
  - Jobs-housing balance and mixed use
- Economic development
  - Contribution to gross Regional Product
  - Impact on jobs and income
- Environment
  - GHGs
  - Land consumption/biodiversity/water quality/waste
  - Energy use
- Social equity
  - Transportation and housing affordability by income group and neighborhood
  - Equal distribution of costs and benefits of transport investments
  - Environmental justice (avoid disproportionate effects of transport emissions by neighborhood)
  - Displacement and gentrification/income de-segregation
- Quality of life
  - Air quality
  - Walkability/bikeability
  - Design, street amenities
  - Health improvements

This typology was used to help elucidate plan priorities and how they differ across the four California MPOs, by applying the typology to each RTP's adopted goals and performance measures. While the typology is informed by literature on sustainability indicators, it is, by nature, a matter of judgment because there is no commonly accepted method for determining sustainability criteria for transportation, with the exception of the widespread belief that an exclusive performance emphasis on improving mobility may undermine sustainability because of lack of focus on location efficiency (see e.g. Handy, 2008).<sup>3</sup> The effort to categorize performance measures is further complicated by the fact that many MPO measures are cross-cutting (they could be deemed to address multiple goals). The typology was then also used to consider published results from scenario evaluation processes.

Another qualitative technique employed in the California case study was to compare narrative framing of plan goals in the context of identified regional challenges. This technique proved to be very useful in honing in on differences in the way the four MPOs presented regional challenges and opportunities, and what sort of collective action was needed to address them.

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<sup>3</sup> The categorization of performance goals and measures is informed by EPA (2011); Zietsman et al (2011); Sustainable Transportation Indicators Subcommittee of the Transportation Research Board (2008); Zheng et al., 2013; and Ramani et al (2011). However, the typology developed here does not exactly match any of these sources.

### ***Stakeholder engagement: operationalizing evaluation***

The ***second key element*** to consider in distinguishing a sustainability-oriented RTP process is ***level and quality of stakeholder engagement***. This aspect of plan development was assessed for the California case study only.

In sustainability-oriented processes, MPOs are induced to become effective facilitators of stakeholder engagement, not from idealism, but because outreach to local government planners and officials, in particular, is necessary to gain support for integrated transportation-land use strategies. MPOs cannot easily develop ambitious but achievable land use policy objectives for consideration without consulting with localities. Moreover, fine-grained transport-land use integrated strategies, such as siting TOD near transit service (at stations and along corridors) so as to optimize regional accessibility, require long-term collaborative efforts, not just brief consultation by MPOs with localities about desired land use patterns. Such strategies can be enhanced by MPOs working not just with local planners and officials but also with non-governmental stakeholder groups, such as affordable housing builders, community groups, and smart growth advocacy groups.

Fundamentally, integrated T-LU strategies require that MPOs gain local buy-in, which may be inhibited by collective action dilemmas, structural barriers (e.g. lack of federal or local support for TOD projects), institutional disjunctures, and distrust or relational distance among potential partners, along the lines discussed earlier in the chapter. MPOs could (and some do) choose to model projected land use patterns based only on assumed market factors, but the degree to which the results veer away from land uses accommodated in adopted local land use plans signals a gap between wished-for outcomes, and current reality on the ground.

Feasibility of land use alternatives depends, at least in part, on what local communities seek to induce; what is feasible depends in part on what is desirable. Thus, current local willingness to change land use policies is a relevant indicator. Feasibility also may depend on the provision of resources to help localities willing but unable to accommodate infill, for example if they lack adequate local infrastructure. For this reason, sustainability-oriented RTP processes depend on MPOs becoming more active in seeking and providing resources and other strategies to induce supportive local land uses. Clearly, sustainability-oriented MPOs must become more activist organizations than the technocratic agencies they traditionally were in the past.

Measuring quality of stakeholder engagement to accomplish these goals is not easy, however, based solely on reading of an RTP. All MPOs must develop public participation plans, the quality of which has sometimes been criticized (Karner and Niemeier, 2013). The mere mention of public workshops, telephone surveys, or other participation tools does not provide much indication of the quality of stakeholder engagement. For this reason, a simple quantitative operational measure was not employed for this topical area in the assessment of RTPs by the 48 largest MPOs. Instead, more qualitative techniques were employed for evaluation in the California case study. The mixed methods employed are not easily reduced to a simple metric.

Operational measure(s) # 2: For the California case study, mixed methods were employed for evaluating quality of MPO stakeholder engagement processes with the basic outcomes assessed including whether or not stakeholder input increased over time, whether and how stakeholder input affected plan outputs, and whether stakeholders expressed satisfaction or dissatisfaction with the process and outputs.

The methods included conducting 35 interviews with MPO stakeholders, staff, and state agency administrators in the summer of 2015; examining comment letters submitted to the MPO by stakeholders at different stages of the plan process, for both the MPOs' most recent adopted RTP and its past, prior adopted RTP, to assess whether the opinions and number of letters changed in comparing comments for the different plans; and examining whether the structure of the planning process (e.g. established advisory committee structure), and decisions described in the plans and related documents, signal incorporation of stakeholder input at multiple stages.

Signs not just of collaboration, but also conflict, were evaluated (e.g. stakeholder lawsuits). This research did not automatically assume that conflicts reflect low-quality processes. On the contrary, based on case-by-case evaluation, the research sought to evaluate in some depth how “agonistic” as well as copacetic processes can *both* reflect either high- and/or low-quality stakeholder engagement.

Using these techniques, different patterns of stakeholder engagement and levels of conflict were observed across the four regions. Key variables that proved useful in interpreting the findings included size of region, level of constraint imposed by mandatory RTP performance requirements, histories of stakeholder trust and cooperation, and resource constraints.

### ***Scenario design and evaluation: operationalizing evaluation***

***The third key element*** or step in the integrated planning approach has been ***scenario evaluation***. Scenarios, in this context, are “stories about the future...scenario development (or scenario “analysis” or “planning”) is a systematic method for thinking creatively about dynamic, complex and uncertain futures, and identifying strategies to prepare for a range of possible outcomes” (Reed et al. 2013). More specifically, through scenario evaluation, the MPOs model the projected performance impacts of alternate packages of transport and land use policy options, called scenarios, against selected performance indicators of interest. By designing and evaluating scenario alternatives, MPOs can consider trade-offs and potential co-benefits among plan options, and assess how to optimize performance of a “preferred plan scenario” for adoption. The scenario modeling process can, in short, facilitate consideration of potential consequences of decisions.

In the past, the main intent of this phase of the RTP process was to model transport program/project alternatives in connection to mobility needs and air quality impacts (for conformity purposes), in order to serve a projected land use pattern extrapolated from existing trends and local land use plans, taken largely as given (Wachs and Dill, 1999). The new, more integrated approach ***turns land use*** as well as transport elements of the package into a ***variable element*** for comparison purposes. The process models transport policy and program options, in combination with ***land use alternatives***, so as to optimize and match benefits of transport and land use choices simultaneously. For MPOs utilizing this approach, a main goal has been to encourage official adoption of T/LU scenarios that accommodate more compact development patterns, more spending for transit and non-motorized modes, and other smart growth strategies so as to achieve sustainability objectives better than in modeled projected “business as usual” or “continuing trends” scenarios.

This new approach to scenario planning entails a learning curve both technically and politically for MPOs. Considering technical capacity, many MPOs, as discussed earlier, have sought to develop more sophisticated methods, including transitioning from use of traditional “4-step models” for estimating travel demand to instead using disaggregate so-called “activity-based” and “tour-based” models that are better able to capture fine-grained aspects of travel such as trip chains, coordinated travel among household members, and the availability of time windows in activity scheduling.

As noted earlier, effective scenario modeling processes require more than just technical skills, however. Stakeholders need to understand both how and why scenario alternatives are *designed* to include certain specific project and policy alternatives, and then how they are *evaluated*, using the MPO's techniques for modeling projected land use and transport demand. Two key aspects of the process have been stressed, namely perceived *legitimacy*, in other words whether the range of designed scenarios is perceived as reflecting a set of realistic alternative pathways for future development in the region not limited just to reflecting powerful interests, and *plausibility*, in other words whether modeling results are considered to be based on assumptions and methods expected to produce reliably accurate, if not perfectly predictive, results (Albert, 2013).

Concerns about whether and to what degree an MPO's land use projections veer away from existing adopted local land use plans, discussed above in connection to stakeholder engagement, also relate to issues of legitimacy and plausibility of modeled land use scenarios. Land use projections are expected by law to be realistic forecasts, but as such, they must incorporate predictions of policy as well as market impacts, and the MPOs and local government stakeholders themselves help to determine policy effects. This aspect of the process opens room for debate about what is possible in terms of pushing smart growth strategies for land use, with the answer depending at least partly on what is desirable among localities.

As the California case study demonstrates in more detail, these factors mean that MPOs' land use projections are open to criticism from different directions, namely, from one direction, that their plans and projections may be too *laissez-faire* by failing to take advantage of increased market interest in infill development, and from the other direction, that their adopted projections might be too ambitious to be realized. This debate lies at the heart of sustainability planning, with normative questions necessarily blending with rational/ scientific discussions about realistic development patterns. The debate also draws attention to questions about plan feasibility in regard to adequacy of implementation methods, such as to support infill. MPOs thus face significant challenges in balancing technical criteria with political negotiation, and in engaging stakeholders and marshalling resources effectively in the process.

Operational measure #3: Does the RTP include discussion of a scenario planning approach and modeled performance results? If so, what factors were varied across scenarios (transportation inputs only; transportation and land use inputs; land use inputs only)? Were the scenarios fiscally constrained?

Scenarios designed to vary both transport and land use inputs signal an MPO's interest in integrating transport and land use policymaking. Fiscally constrained scenarios indicate that the modeling results could be used as input for plan decision-making (because the scenarios are designed to represent potentially adoptable final scenarios). These two dimensions were used to assess scenario design by the 48 largest US MPOs.

For the California case study, more in-depth analysis was used to determine if final, adopted land use projections veer away from "business as usual" patterns as contemplated in existing local plans. If so, this situation indicates that the MPO is aiming for a more ambitious land use outcome over the duration of its plan than contemplated in current plans (adoption of such a land use alternative stands in contrast to an MPO's choice to model a merely *hypothetical* land use alternative for education purposes only).

Evaluation of scenario analysis was undertaken for all 48 US MPOs with regional populations of one million or more (a cut-off pertinent to federal requirements for MPO performance planning for congestion and air quality).<sup>4</sup> Determining whether an MPO conducted *revenue-constrained* scenario analysis is considered in this research to be the strongest signal that an MPO has adopted techniques of sustainability planning, and so the most extensive investigation was conducted for this operational measure, in the incidence analysis of large US MPOs.

Why do MPOs undertake scenario performance assessment? Presumably to maximize performance of the adopted plan scenario compared to current trends or prior plans. To investigate this question, research was conducted for the California case study to evaluate each MPO's final adopted plan scenario considered among its modeled scenario alternatives for its most recent plan, and then also compared across the four MPOs and across plan cycles for each MPO.

For this evaluation, the typology of performance measures, listed above, was used to consider published results from scenario performance evaluation processes. The goal was first to identify which attributes each MPO prioritized in its final, adopted plan scenario for its most recent plan. A Multicriteria Decisionmaking (MCDM) technique (discussed earlier) was used for assessing one set of plan alternatives, namely in the San Francisco Bay Area process, to see how and whether the technique helped in discerning and comparing performance results across modeled scenarios.

Modeled performance results were then compared across the four MPO regions, and across plan cycles, by studying published results from the last two adopted RTPs for each of the four MPOs. Results are presented for four key metrics of location and transport efficiency, namely per capita GHG emissions, multi-family housing share, reduction in vehicle miles traveled (VMT) per capita, and non-auto mode share.

Although intensive effort was directed to expanding the set of indicators for comparison, this undertaking was hampered severely by lack of consistency in performance measurement not just between the MPOs, but even between plan years for a given MPO. The number of performance indicators that could be compared across time and regions for the four MPOs studied is very small – limited, in a consistent way, to only the indicators presented in the case study findings.

This shortcoming points to serious transparency problems for further research of this sort, as efforts to compare plan outputs are substantially hampered by consistency issues. Even basic budget categories, such as for transit versus highway and road spending, are not defined consistently. Federal and state policymakers should encourage or even mandate consistent metrics and definitions be used for a limited set of critical measures, so as to facilitate more effective evaluation.

### ***Implementation methods: operationalizing evaluation***

The *fourth important element* of sustainability-oriented RTP processes is *implementation* – adoption of funded programs and measures to ensure that the plan objectives are realized on the ground. Implementation techniques are crucial to effective RTP planning, especially when preferred

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<sup>4</sup> Under recent surface transportation legislation (MAP-21), each MPO serving an area with a population over 1 million that is in non-attainment or maintenance of federal air quality regulations is required to develop a Congestion Mitigation and Air Quality Program (CMAQ) Program Performance Plan. This plan must include data on baseline traffic congestion and vehicle emissions, describe progress made toward performance targets, and describe how projects funded through the CMAQ program will make progress toward performance targets. also requires MPOs with the same population cut-off (1 million).

scenarios for future development diverge significantly from currently adopted local plans, and/or when substantial barriers inhibit sustainability strategies, such as for achieving TOD/transit/active transport strategies in desired locations. These barriers, described earlier in relation to TOD, include lack of funding for local infrastructure needed to support new development, difficulty in assembling land parcels, costly regulatory requirements such as for environmental review, and difficulty in providing seamless and coordinated transit service across separate providers.

A basic method for assessing plan implementation outputs is to evaluate budget allocations. Certain broad distinctions are useful to assess. First, plan budgets can be assessed in regard to the shares of funding allocated to transit, on the one hand, versus highways and roads, on the other, as well as for funds allocated to “smart growth” strategies such as providing amenities for active transportation and to support land use strategies. (Note that by law, MPOs cannot fund residential or commercial development projects directly; their funds must go to transportation projects. However, some MPOs employ creative fund-swapping mechanisms to incentivize local land use strategies).

Another funding approach associated with sustainable transport is “fix-it-first,” meaning an emphasis on maintenance and rehabilitation of existing assets rather than expanded roadway capacity, which can help maximize the value of past investments, and stretch limited resources while focusing them on existing communities (Kahn and Levinson, 2011). Thus, a second useful categorization of plan funding is to distinguish the shares allocated for maintenance and operations (M&O) and rehabilitation (a.k.a. fix-it-first) versus the shares allocated for facilities expansion.

As noted, one strong finding from this research was the near impossibility of conducting simple comparisons of budget allocations across MPOs or even plan years for given MPOs. Findings presented in the research reflect the MPOs’ own data aggregations, which are not always consistent.

Operational measure # 4: Compare adopted plan budget allocations for funding shares allocated to transit versus highways and roads and for fix-it-first (maintenance, operations, and rehabilitation of existing facilities) versus the shares allocated for capital facilities expansion. If possible, assess and compare funding for smart growth programs such as active transportation amenities and land use incentive strategies.

Finally, it is important to consider whether an MPO is pursuing innovative implementation methods for inducing supportive land use policies and projects. As argued in the preceding chapter, MPOs are well positioned to experiment with institutional innovations to “cross the great transportation-land use planning divide.” Some MPOs have put in place programs that provide incentive grants to localities for projects supportive of regional plan goals.

This research project honed in on the question of whether the largest 25 US MPOs have established such programs, as evidence of their concrete commitment to institutional innovation aimed at strengthening transport-land use planning coordination.

Operational measure # 5: Has the MPO established an ongoing program to provide incentive grants (and are conditions attached) to reward local land use projects supportive of the regional plan?

For the California case study, the investigation of institutional innovations was more extensive. A number of programs for crossing the transportation-land use planning divide are identified and considered in relation to their instrumentation methods (e.g. incentive grant programs, mandatory performance requirements imposed as conditions for receipt of funding, technical assistance and



strategic plan-making, and creation of ongoing funding sources for loans to support local projects). “Inside” strategies to promote compact growth are distinguished from “outside” strategies that curtail growth at the urban fringe.

### ***Methods for national incidence analysis***

The next chapter presents results on the incidence of sustainability planning by the largest MPOs across the nation using metrics described above for this purpose. Operational measures are utilized for both descriptive statistics and for regression analysis. Additional methods, described in more detail in the chapter, are employed to investigate MPO governing structures, which are categorized by organizational type, and according to whether they favor local or state-level officials, and whether voting power is proportionate to population. The chapter also presents results of a “d-statistic” employed to evaluate the degree to which MPO governing board structures deviate from population-proportional voting distribution, and whether the deviations favor core urban or suburban locations.

### **3.3 The role of state policymaking in supporting MPO sustainability planning**

MPO sustainability planning cannot be considered in a vacuum, as though MPOs operate as autonomous, general-purpose governments. Instead, they embody the multi-level concept now common in the governance literature. MPO sustainability planning should be considered within a wider framework of inter-governmental relations.

Dynamics of local government interaction within the MPO framework were discussed earlier as demonstrating collective action dilemmas posed by the essentially voluntary COG/MPO governing structure. But MPOs are also “agents of the state” in implementing federal and state mandates for RTPs, and this hybrid role causes tensions. In particular, when MPOs seek to develop concerted strategies to achieve mandated regional performance objectives, they may be hampered by collective action barriers hard to overcome without resources or regulatory authority at their disposal.

These institutional constraints point to a number of implications. First, MPOs with greater access to resources, for example revenue-raising authority (such as from bridge tolls), are likely to be able to develop more concerted strategies. Few MPOs have such authority, however (Sciara and Wachs, 2007). MPOs are caught between state and local funding priorities. In 2011, 40% of funds raised for transportation in the US were raised by state governments, and 36% locally, through mechanisms such as county level sales taxes passed for transportation purposes (Pew Charitable Trust, 2014). Two-thirds of US states have enabled such “local option” taxes (Goldman and Wachs, 2003).

Second, federal and state policies can be critical in influencing whether MPOs design and implement policies and programs with a regional performance focus. Access to federal dollars provides the carrot leading stakeholders to engage in the regional planning process, and those resources can be leveraged to strengthen MPO sustainability planning. The influence of ISTEA and the 1990 CAA amendments has already been described, in this regard. The combination of a larger carrot (more funding discretion under ISTEA) and a harder stick (stiffer conformity requirements under the CAA) pushed MPOs toward integrated transportation-land use planning, as previously discussed.

State governments could adopt a similar approach of combining performance requirements with more funding for MPOs; the California case study provides an example. However, many state

departments of transportation have been reluctant to share power with MPOs, signaling that the federal role remains important, in spite of dwindling revenues. Indeed, the latest incarnation of federal surface transportation legislation adopted in 2012, called MAP-21, calls for states to develop performance targets in conjunction with MPOs; however, the identified focus areas reflect traditional priorities, namely: pavement condition and performance on the interstate and national highway system (NHS), bridge condition on the NHS, fatalities and serious injuries on all public roads, traffic congestion, on-road mobile source emissions, and freight movement on the interstate system.

The state role is particularly influential because of state governments' legal authority over land use, and their associated authority to impose planning requirements on localities, along with the myriad fiscal rules that delimit local governments' revenue-raising abilities and that influence land use preferences (such as incentives for localities to "chase" retail stores, in states where sales tax revenue is returned to localities on a "situs" basis, and disincentives against multi-unit affordable housing development in states where property tax revenue is constrained, making such development more likely to be deemed a "fiscal loser" in terms of local service costs versus revenue obtained).

A few states have imposed consistency requirements between regional and local development plans, including Oregon, Washington, New Jersey, California (under SB 375) and Georgia. However, substantively, consistency requirements might not produce much more than active MPO-local consultation could accomplish. Some scholars emphasize the importance of considering state "persuasive capacity" in addition to consistency requirements, in significantly influencing growth management outcomes (Burby et al., 1997; Howell-Moroney, 2007). Howell-Moroney (2007) rated state growth management systems containing only regional-local plan consistency mandates as "moderately strong"; he asserts that "strong" systems must also include supplementary policies ("persuasive capacity") to influence local action and reinforce regional performance objectives, including: mandated designation of growth boundaries; concurrency requirements for ensuring adequate infrastructure provision for new development; affordable housing requirements or incentives such as mandated provision of density bonuses and inclusionary housing provisions; special tax or financing tools to support desired development options; critical areas ordinances; and support for mass transit and transit-oriented development (Howell-Moroney, 2007; also see Dierwechter, 2008). Howell-Moroney found that only "strong" state programs were associated with significant, increasing reductions in the amount of land devoted to urban uses across eight time periods, but for "weak" and "moderate" programs, the effect was either insignificant or worked in the other direction.

Thus, another important way for state governments to support MPO sustainability planning is to ensure that the wider framework of policies affecting local land use choices is conducive to transport and location efficiency and to equity goals. Indeed, given MPOs' lack of autonomous power, their voluntary collaborative planning process can only be expected to achieve smart growth and sustainability goals if the wider framework of state and federal policies influencing local land use and transportation policy choices is also conducive to those goals. To state this claim even more forcefully, effective implementation of MPO sustainability planning is at least as much a state-level responsibility as an MPO-level responsibility, given the strong role of state governments in influencing local land use choices.

However, even when state governments do adopt policies to support local smart growth efforts, they may not always align with MPO priorities. State legislatures may hesitate to devolve rulemaking authority for allocating state funds to the regional level, especially for land use purposes. The

California case study confirms this finding, where state incentive grant programs for local smart growth projects are controlled centrally, to ensure uniform application of guidelines statewide. These programs indirectly support MPO sustainability goals, but they do not directly strengthen the MPOs' hand in influencing land use choices.

This discussion points to complex inter-connections among policymaking at different levels that must be aligned for strong and enduring sustainability outcomes to emerge. This complexity is addressed in recent literature on policy formation and implementation, which underscores Theodore Lowi's famous dictum that "policies determine politics" (Lowi, 1972). Rather than see implementation as the final, neutral execution stage in a rationalist policy model, in which goals and objectives are first spelled out by legislative bodies, and then implemented in a linear fashion by administrative agencies, some scholars stress that policies tend to be modified through all policy stages, including implementation, depending especially on the perspectives and ability of administering agencies to interpret (and re-interpret) original policy goals and mandates (Hill and Hupe, 2008; Howlett and Cashore, 2009; Kassim and Legales, 2010). From this view, policies are seen to be complex interactions of multiple goals, objectives, and instruments, with all elements incorporating aspects of ends and means (Howlett and Cashore, 2009). Analyzing policies thus requires "backwards-mapping" of implementation effects as much as "forwards-mapping" from goals to outcomes.

The concept of backwards mapping matches well some observations made earlier about emerging practices in MPO planning. For example, in regard to technical modeling, advances made in response to air quality conformity requirements were then subsequently put to use by many MPOs for modeling a wider set of performance measures than air quality alone. In turn, MPOs' technical advances provided a practical basis for states including California and Oregon to formulate systematic requirements for MPOs to model and achieve targeted GHG reductions for RTPs. In this fashion, an iterative process occurred in which policy formation influenced implementation and then back again.

Backwards mapping and ends-means interaction are relevant not just in considering technical and procedural practices. The very nature of RTP requirements makes it hard to disentangle means from ends. For example, the latitude given to MPOs for defining plan goals means that policy formation is not centrally controlled at the federal level and then executed at the regional level. Instead, policy formation can be considered to be co-produced at multiple levels. And importantly, given the critical role of federal and state policies and programs in ensuring effective implementation of MPO sustainability objectives (as outlined above), implementation can be seen to be recursive, requiring "upwards-mapping" to higher levels of government if it is to succeed. Effective implementation of MPO sustainability planning is at least as much a state-level and federal-level as an MPO-level responsibility. If the federal and state governments fail to address implementation capacity deficits faced by MPOs for achieving ambitious sustainability agendas, then it can be deduced that they do not intend for MPOs to succeed; it is not reasonable to expect MPOs, on their own, to overcome existing institutional limitations.

## **CHAPTER FOUR: INCIDENCE OF MPO SUSTAINABILITY PLANNING IN LARGE US METROPOLITAN AREAS**

This chapter presents results of empirical investigation of MPOs and their long-range transportation plans (RTPs) in the nation's largest metropolitan areas. The goal is to assess whether the MPOs have adopted key elements of sustainability planning as defined in the preceding chapter, namely, a) the use of performance measures that extend beyond mobility goals to address accessibility and 3 E's impacts; b) the use of scenario analysis to investigate transportation-land use interactions and plan options; c) the adoption of budget allocations favoring transit and non-motorized modes, as well as "fix-it-first," and d) the adoption of implementation programs that reward local land use projects oriented to support regional plan goals.

Before evaluating these aspects of RTPs, the chapter begins by considering basic governance characteristics of large MPOs and their regions. Governing structures of MPOs are considered in regard to organizational type (form of incorporation), and the composition of governing boards, for the 48 largest regions (those with populations of 1 million or more, subject to performance requirements exceeding those for smaller MPOs, as described in the previous chapter). These governance attributes are later utilized in a regression analysis, along with other political, social, and economic characteristics that distinguish MPO regions, to determine which factors are most closely associated with MPOs' choice to pursue integrated transportation-land use scenario planning, considered in this research to be the best measure of whether an MPO is pursuing sustainability planning.

### **4.1 Basic characteristics of large US MPOs and their regions**

MPOs in the US operate in metropolitan areas that sometimes contain hundreds of local governments (Table 4.1). In only a handful of the largest 20 regions does the central city population comprise more than one-third of the regional population. This situation indicates that most MPOs must manage multiple and complex relationships with many suburban as well as urban localities.

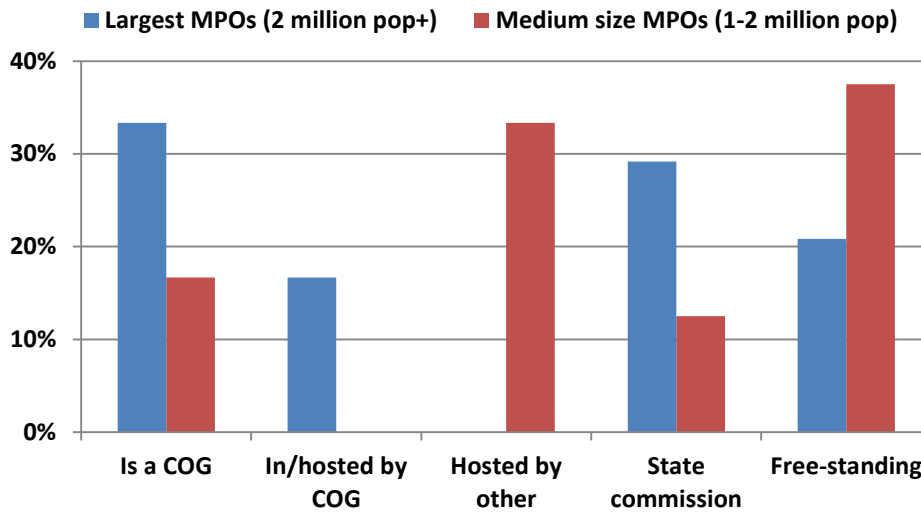
To evaluate MPO organizational arrangements, an in-depth assessment was conducted of MPO authorizing by-laws, composition of governing boards, and voting rules for the 48 largest US MPOs. This assessment points to three important governance characteristics that distinguish MPOs from one another. One governance factor is organizational type, reflecting the basic legal arrangements of MPO incorporation, which can be distinguished as follows: MPOs coincident with a Council of Governments (COG – a voluntary forum for local governments); MPOs constituted as state commissions (as prescribed, often in a systematic fashion, through state legislation); MPOs hosted by a COG (e.g. acting as a committee of the COG, which means the MPO and other COG functions and governing structure may be treated somewhat distinctly); MPOs hosted by other agencies (e.g. county governments), and "free-standing" MPOs (independent agencies constituted through a Joint Powers Agreement among localities and/or authorized through state legislation). (See Table 4.5 for a listing of all 48 MPOs, their primary cities, populations, COG/non-COG organizational type, and scenario evaluation practices.)

Figure 4.1 categorizes the 48 largest US MPOs by their organizational type, and indicates that the largest MPOs are more likely to be coincident with COGs or hosted within a COG, while mid-size MPOs (in regions with populations between 1 and 2 million) are more likely to be free-standing or hosted by another agency (often a county agency).

**Table 4.1 MPOs and local governments in 20 largest US metropolitan regions**

<b>MPO</b>	<b>State</b>	<b>Major city</b>	<b>2010 MPO area population (millions)</b>	<b>Central city pop as share of region pop</b>	<b>No. of cities, towns &amp; townships</b>	<b>No. of counties</b>
Southern California Association of Governments (SCAG)	CA	Los Angeles	18.1	21%	191	6
New York Metropolitan Transportation Council (NYMTC)	NY	New York	12.4	66%	183	6
The Chicago Metropolitan Agency for Planning (CMAP)	IL	Chicago	8.4	32%	284	7
Metropolitan Transportation Commission (MTC)	CA	San Francisco	7.2	11%	101	9
North Jersey Transportation Planning Authority (NJTPA)	NJ	Newark	6.6	4%	384	13
North Central Texas COG (NCTCOG)	TX	Dallas	6.4	19%	122	5+
Houston-Galveston Area Council (H-GAC)	TX	Houston	5.9	36%	118	13
Delaware Valley Regional Planning Commission (DVRPC)	PA, NJ	Philadelphia	5.6	27%	353	9
National Capital Region Transportation Planning Board (TPB)	DC, MD, VA	Washington	5.0	12%	13	8
Atlanta Regional Commission (ARC)	GA	Atlanta	4.8	9%	77	10
Southeast Michigan COG (SEMCOG)	MI	Detroit	4.7	15%	137	7
Maricopa Association of Governments (MAG)	AZ	Phoenix	3.9	37%	25	1
Puget Sound Regional Council (PSRC)	WA	Seattle	3.7	16%	72	4
Boston Region MPO	MA	Boston	3.2	20%	101	na
San Diego Association of Governments (SANDAG)	CA	San Diego	3.1	42%	18	1
Denver Regional COG (DRCOG)	CO	Denver	3.0	20%	52	10
Metropolitan Council	MN	Minn-St. Paul	2.8	13%	142	7
Southwestern Pennsylvania Commission (SPC)	PA	Pittsburgh	2.6	12%	286	10
East-West Gateway Council of Government (EWGCOG)	MO, IL	St. Louis	2.3	14%	196	7
Baltimore Regional Transportation Board (BRTB)	MD, DC	Baltimore	2.0	30%	13	5

**Figure 4.1 Organizational structure of 48 largest US MPOs**



Source: On-line information on MPO websites about organizational structure

MPOs in the West and Northwest are most likely to be COGs, while MPOs in the Northeast are most likely to be state commissions or free-standing (Table 4.2). MPOs in the other regions are more equally distributed by type.

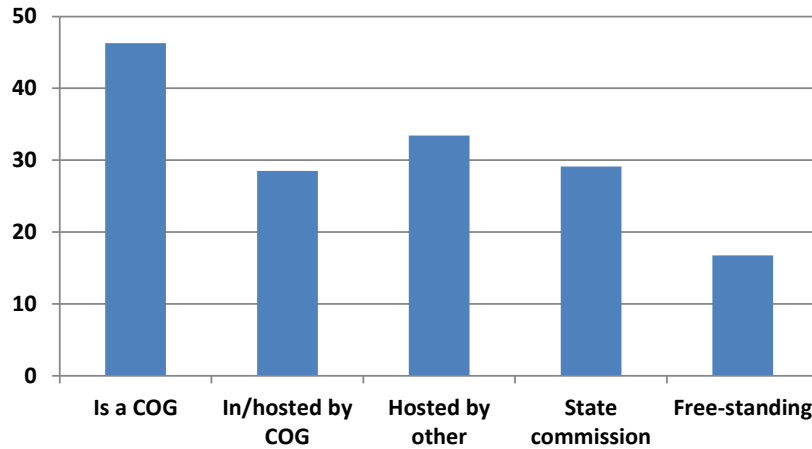
**Table 4.2 Organizational structure of 48 largest US MPOs by region**

% of MPOs by type	Region in the US						Total
	NE	SE	MW	Plains	SW	W/NW	
COG	0%	0%	36%	100%	17%	67%	25%
Hosted by COG	13%	7%	0%	0%	33%	0%	8%
Hosted by other	0%	36%	27%	0%	0%	0%	17%
State commission	38%	14%	36%	0%	17%	0%	21%
Free-standing	50%	43%	0%	0%	33%	33%	29%
Total	100%	100%	100%	100%	100%	100%	100%

Source: Author's calculations

Another important governance factor is the composition of MPO governing boards (which are sometimes hosted within other agencies, as noted above). One aspect is the number of voting members designated on MPO boards of directors, with the number ranging from 7 to 116 among the 48 MPOs studied. The number of board seats tends to be higher for COG/MPOs than for other types; free-standing MPOs tend to have the smallest number of board seats (Figure 4.2).

**Figure 4.2 Average number of governing board members by MPO organizational type, for the 48 largest US MPOs**

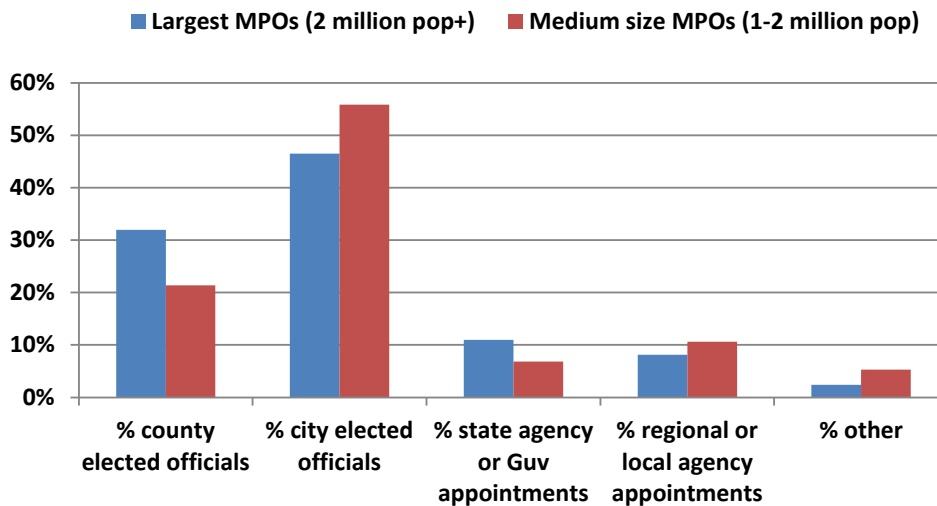


Source: On-line information on MPO websites about organizational structure and by-laws

MPOs also vary in the composition of board members, in terms of the constituencies they represent. Except in the case of Portland, Oregon’s METRO Board, MPO boards are not popularly elected bodies – not elected by voters. Instead, voting “seats” on MPO boards are allocated to specific entities, as specified in MPO by-laws (e.g. to city and county governments, regional agencies, appointees of the governor, or other designations). The MPO board members are generally appointed by the sending body (e.g. the designated city council or county boards of supervisors). Most MPO governing boards also include seats for representatives of regional transport agencies, such as transit, toll road, or airport authorities.

MPO governing boards tend to be dominated by local elected officials, especially from cities (Figure 4.3). The largest MPOs are more likely to have designated board seats for county and state-appointed officials than the medium-sized MPOs.

**Figure 4.3 Average share of governing board members by affiliation, for the 48 largest US MPOs**



A third important distinguishing characteristic of MPO governance arrangements has to do with whether and how they seek to provide an equitable distribution of board seats based on population of the jurisdictions represented by board members (a.k.a. population proportionality). The majority of MPO boards (58% of the larger MPOs, and 65% of the mid-size MPOs) make decisions on a “one-member, one-vote” (in other words, one-government, one-vote) basis. However, a substantial number (38% overall) of MPOs have adopted provisions to help ensure population-based representation (proportionality). Of these, a fairly small share of MPOs (13% of the larger MPOs, and 4% of the mid-size MPOs) have adopted district-based board structures with votes allocated to city- and county-based districts (to cities and/or counties, or groups of them) of approximately equal population size. A larger number of MPOs (29% of the large MPOs, and 30% of the mid-size MPOs) have established provisions for population-weighted voting – for the weighting of votes by the board (for some MPOs, all board votes, but more commonly, for any given decision upon request (invocation) by a board member), according to the population of the jurisdiction(s) represented by each member.

The “skewness” of board structures (the degree to which the prescribed allocation of seats on the board diverges from population proportionality) can be measured using a “D-statistic” which is calculated as follows:  $D = (1/2) \sum |s_i - p_i|$ , where  $s_i$  is the percentage of votes on the MPO governing board allocated to each population unit  $i$  represented on the board, and  $p_i$  is the percentage of total population held by that unit. The resulting index  $D$ , which ranges from 0 to 100, measures the overall deviation of the MPO from proportional representation of its population (from Lewis and Sprague, 1997).<sup>5</sup>

Although the D-statistic is simple in concept – measuring the degree to which votes on the board diverge from population proportionality – its calculation gets complicated for board votes allocated to “layered” (a.k.a. “nested”) jurisdictions – for example, to cities with MPO board seats that are located in counties also allocated board seats, and with both located in regional agency jurisdictions, such as for multi-county transit districts. In calculating the statistic here, votes are allocated to each sub-portion of the region with a designated board seat, such that the board votes allocated to larger entities (e.g. a county government containing cities also allocated board seats) are apportioned among the sub-entities (e.g. the cities within that county that hold board seats) based on the proportion of the larger entity’s population comprised by the sub-entity.

In addition to calculating the D-statistic for each MPO region as a whole for this analysis, the measure was also calculated only for central cities and/or counties. When possible, Census-designated “primary cities” were identified, and the measure was applied to those primary cities with designated MPO board seats. For MPOs that do not designate seats for cities, but only (or mainly) for counties, the county containing the metropolitan area’s central city was identified, if the majority of that county’s population resides in Census-designated primary cities.

Applying the d-statistic to the voting structure of the largest ten MPOs reveals a substantial degree of deviation (skewness) from population proportionality (Table 4.3). In more than half of these MPOs, the skewness favors suburban, rather than central city and/or county locales (with a negative value indicating under-representation).

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<sup>5</sup> Note that the overall d-statistic halves the absolute value of the sum of individual units’ deviation from population proportionality, in order to avoid double-counting. However, in the measure of deviation (skewness) for central cities and/or counties represented on the MPO board (see Table 4.3), the measure of  $s_i - p_i$  is simply summed.



**Table 4.3 D-statistic measuring population proportionality of MPO governing board representation, for the ten largest MPOs**

MPO	Governing body	Balance: D-statistic	
		Total	Central cities or county
Southern California Association of Governments (SCAG)	Regional Council	0.14	-0.10
New York Metropolitan Transportation Council (NYMTC) <sup>a</sup>	Board of Directors	0.29	-0.29
The Chicago Metropolitan Agency for Planning (CMAP) <sup>b</sup>	Trans Policy Committee	0.12	-0.11
Metropolitan Transportation Commission (MTC) <sup>c</sup>	Bd of Commissioners	0.25	-0.04
North Jersey Transportation Planning Authority (NJTPA) <sup>d</sup>	Board of Trustees	0.20	0.08
North Central Texas COG (NCTCOG) <sup>e</sup>	Reg Trans Council	0.09	0.04
Houston-Galveston Area Council (H-GAC) <sup>f</sup>	Trans Policy Council	0.33	-0.05
Delaware Valley Regional Planning Commission (DVRPC) <sup>g</sup>	Board of Directors	0.27	-0.03
National Capital Region Transportation Planning Board (TPB) <sup>h</sup>	Trans Planning Board	0.29	0.07
Atlanta Regional Commission (ARC) <sup>i</sup>	Board of Directors	0.32	0.04

Note: For SCAG, the central cities/county statistic is for Census-designated principal cities. For superscripts as noted, the cities/county statistic is for: a) Manhattan; b) Cook County cities (60% of Cook County population resides in principal cities); c) San Francisco, Oakland, and San Jose; d) Newark and Jersey City; e) Arlington, Dallas, Denton, Fort Worth, Irving, Plano, and Richardson; f) Houston, Baytown, and Sugarland; g) Philadelphia, Trenton, and Camden; h) Washington, DC, Arlington County, Virginia, and cities of Alexandria, Virginia, and Rockville, Frederick, and Gaithersburg in Maryland; i) Atlanta.

Source: Author's calculations from information in MPO by-laws; US Census population data.

## 4.2 Assessing sustainability planning elements and their use in practice

As discussed in the preceding chapters, the basic techniques of MPO sustainability planning defined for purposes of this research include:

- a) Adoption by an MPO of sustainability oriented performance objectives and operational measures for evaluating plan options;
- b) Engagement with diverse stakeholders in plan development and implementation;

- c) Use of scenario planning and other methods (such as project-level, rather than scenario-level analysis) to assess plan options in regard to adopted performance measures;
- d) Selection of a final plan scenario that maximizes transport and location efficiency attributes, as well as equity and environmental protection impacts;
- e) Allocation of funds in the plan budget to favor transit and non-motorized modes instead of roadways, and to favor “fix-it-first” rather than new roadway capacity construction;
- f) Institutional innovation in establishing programs to encourage local land uses favorable to regional plan objectives for transport and location efficiency; and
- g) Recursive monitoring and evaluation of plan progress.

Only the California case study (next chapter) considers all these aspects in close detail. The analysis in this chapter addresses four of the aspects above, excluding c), d), f), and g). This analysis thereby considers whether MPOs have *adopted the techniques* of sustainability planning more so than whether they have put them to use to significantly advance sustainability outcomes.

Analysis of RTPs by the largest MPOs in the US indicates that most incorporate some of these cited elements, and a few incorporate most of them, but none incorporates all. As discussed in Chapter 2, the series of federal mandates that have been “layered” into the RTP process over time serve to enable but not require sustainability planning by MPOs, and MPOs can choose to pursue more traditional goals and objectives through the process. Sustainability planning requires that MPOs “make a leap” to use the full toolbox of techniques they have developed to comply with federal requirements to orient their planning to sustainability outcomes and processes. In the results presented here, MPOs are seen to fall along a spectrum in employing these identified aspects of sustainability planning. However, this research considers that only adoption of the full *combination of the elements cited above* – the full package – constitutes robust sustainability planning practice.

Most MPOs incorporate at least some of these identified elements, taken in response to federal requirements – the “layering” of mandates described in Chapter 2 (depicted Figure 2.7). For example, the most commonly adopted elements include discussion of projected plan impacts on air quality, as required for conformity analysis, and of congestion and delay, as required for congestion management plans. A common way that MPOs present results of this performance analysis derives from NEPA requirements, namely to compare current conditions for a given performance indicator to projected conditions by the end of the plan’s duration, assuming the plan is implemented, and also to compare them both to a hypothetical “no-build” scenario that assumes the plan is not implemented; comparing projected plan impacts to the projected impacts of the “no build” scenario provides a way to gauge plan benefits. Another common element in RTPs is to compare projected plan impacts for different socioeconomic and racial/ethnic groups, and for identified geographic areas of concern compared to other areas in the region, to test for disparate plan impacts as a way to comply with federal requirements for conducting environmental justice analysis. Finally, another common element in recent RTPs is to assess performance on indicators now required for evaluation under the most recent federal transportation legislation, namely MAP-21.<sup>6</sup>

In spite of these common patterns, RTPs vary considerably in their approach to performance assessment, and few put together the full “package” outlined above. For example, even though

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<sup>6</sup> As noted in the previous chapter, these performance elements required for evaluation under MAP-21 include pavement condition and performance on the interstate and national highway system (NHS), bridge condition on the NHS, fatalities and serious injuries on all public roads, traffic congestion, on-road mobile source emissions, and freight movement on the interstate system.

recent RTPs increasingly include assessment of the required MAP-21 factors, many MPOs assess current conditions only and not projected plan performance on these factors.

Similarly, although most MPOs include some form of scenario analysis, very few use scenario analysis to carefully examine land use as well as transport plan alternatives, so as to hone in on the best-performing “package” of matched land use and transport elements. Instead, most MPOs use scenario analysis mainly for other purposes, including to compare plan to no-build scenarios (often, for congestion analysis and environmental review purposes), or for assessing how different funding levels for desired programs and investments would impact projected plan performance.

Many MPOs are also found to have conducted so-called “visioning” exercises that evaluate projected impacts of altering future land use patterns in the region, for example through testing projected plan impacts for a series of “Goldilocks” land use scenarios that range from lowest-density “business as usual” patterns on one end, to a medium-density pattern in the middle, and finally a high density pattern on the other end. However, these “Goldilocks” scenario exercises are often found to be mainly educational/hypothetical in purpose, because the adopted regional plan does not modify its land use projections to match a tested scenario (see previous chapter for a discussion of the land use projections process).

Although some MPOs have “made the leap” to utilize nearly all aspects of sustainability planning techniques described above, there is one element – the seventh one listed above, namely recursive monitoring of plan/planning performance – which no MPO studied has fully embraced. Most MPOs include some monitoring of current conditions on indicators of interest in their RTPs, but monitoring current conditions is not the same thing as evaluating plan performance in moving towards goals.

Assessing plan performance requires use of measures and techniques for post facto evaluation of plan progress, for example, to consider whether the funds allocated to adopted programs and projects have in fact been spent on schedule as anticipated, and whether trends in the region on key performance metrics defined in the plans match the actual pattern observed in the region on those indicators. Furthermore, plan evaluation should focus on more than performance objectives and plan impacts and also on the decision process itself. RTPs should include a discussion of efforts to evaluate process effectiveness during the previous planning cycle, and steps taken to build upon successes and address ongoing challenges and identified shortcomings.

### **4.3 Performance measures in use**

Performance measures in use are evaluated here for the most recent RTPs of the 20 largest US MPOs. Only measures used for plan performance analysis are considered; in other words, if performance measures were used just for considering current conditions, or some other topic not directly focused on evaluating the projected performance of the plan over its duration, if implemented, then the measures were not considered for this research. Air quality performance is also not considered, because it is required for conformity analysis purposes.

The most common performance measures in use among the twenty largest US MPOs are for evaluating congestion (delay) (Table 4.4); 80% of the top 20 MPOs include performance analysis of this type (one MPO, namely SEMCOG in the Detroit region, did not present plan performance analysis in its most recent RTP, and three other MPOs did not include measures of delay, namely

the Metropolitan Transportation Commission in the San Francisco Bay Area, the Boston Area MPO, and the Southwestern Pennsylvania Commission in the Pittsburgh area).

Accessibility and VMT per capita measures are also common. (VMT per capita may be considered as relating to accessibility, but it is distinguished from accessibility measures that evaluate number of jobs or other destinations accessible within a certain time frame, sometimes by mode). About half of MPOs employ measures of 3 E’s impacts, while a slightly lower share (40%) employs measures of safety and land use impacts.

**Table 4.4 Performance measures used for plan evaluation in most recent RTPs of 20 largest US MPOs**

Congestion/ delay	80%	Safety	40%
Accessibility	75%	Land use	40%
VMT per capita	78%	Economy impacts	55%
Mode share	50%	Environmental impacts (besides air quality)	50%
Good repair	50%	Equity impacts (not in separate EJ analysis)	45%

Sources: see references section for listing of RTPs; SCAG, RTP Table 5.1; CMAP, RTP Preferred Regional Scenario, at <http://www.cmap.illinois.gov/about/2040/supporting-materials/process-archive/scenario-evaluation/preferred-regional-scenario>, and 2040 Plan Update and Indicators Appendix; MTC, RTP Table 1; NJTPA, 2035 RTP, Chapter 5 "baseline scenario" section, p. 58, Table 5-1; NCTCOG Mobility 2035 – 2013 Update, Exhibit 7.1, and in 2014 Update, Exhibits 7.1 and 3.25; H-GAC, RTP 2040 p. 5; DVRPC, RTP Figure 16, p. 27; TPB, RTP performance analysis appendix, and scenario analysis report; ARC, RTP Performance measures report, and Appendix C-2, Plan performance data; MAG, RTP Table 20-3; PSRC, RTP Appendix P; BRMPO, RTP Figure 2.3; SANDAG, RTP Table 2.2; Met Council, RTP pp. 12-19; DRCOG, RTP Table 6, p. 53; BRTB, RTP pp. 2-4 to 2-6; SPC, RTP Section 4; EWGCG, RTP Table 2.

#### 4.4 Incidence of integrated transportation-land use scenario planning

Scenario analysis techniques are examined more extensively here (for more MPOs) than other MPO practices, because these techniques are considered critical indicators, for purposes of this research, of the extent to which an MPO has pursued concerted sustainability planning. Most large MPOs in the US (88% of the largest 48 MPOs) conducted some form of scenario analysis for at least one of their most recent two RTPs. However, MPOs conduct scenario analysis for multiple purposes, including some that address federal requirements, such as utilizing plan-versus-no-build scenario comparisons for purposes of demonstrating air quality conformity and congestion management capacity. Some also conduct scenario analysis for educational reasons (e.g. in so-called “visioning” exercises) to consider the potential impacts of pursuing compact growth patterns. For planning purposes, MPOs also sometimes model scenarios with varying levels of investments, to consider what impacts might occur if more revenue should be forthcoming, over the duration of the plan.

MPOs that have “made the leap” in using scenario analysis for concerted sustainability planning purposes are going beyond just using scenario analysis for hypothetical or educational purposes, or

for plan-versus-no-build scenario comparisons, and instead are modeling different transport and land use “packages” (a.k.a. scenarios) *to inform the plan decision process*. In other words, they are using the tools of scenario analysis to help inform choices among land use and transport options for ultimate selection and adoption of a “preferred plan scenario” from among the options, so as to optimize desired performance objectives. Thus, one way to identify MPOs that are pursuing concerted sustainability planning is to determine which ones use this sort of scenario analysis.

One way to identify decision-oriented scenario analysis is to note whether an MPO’s scenario analysis utilizes a constrained budget total across designed scenario alternatives that are tested. This budget constraint indicates that alternatives are being considered as options for the final plan (which must be fiscally constrained). Within this budget constraint, MPOs sometimes test only transport alternatives (e.g. heavy-transit versus heavy-roadway investments), and sometimes only land use alternatives (e.g. “current trends” versus higher-density compact growth), and sometimes both together. In the latter case, MPOs are going furthest to integrate transportation and land use planning, recognizing that transport and land use alternatives interact to affect performance outcomes of interest. Therefore, MPOs that test budget-constrained scenarios and that *vary both transport and land use* can be seen as the most advanced sustainability-oriented scenario planners.

Among the 48 largest US MPOs, more than half (57%) conducted budget-constrained scenario analysis as part of the planning process for at least one of their last two RTPs (Table 4.5).<sup>7</sup> In other words, half of the largest US MPOs are using this key tool of sustainability oriented planning for their most recent plans. For these MPOs, a common pattern was to test land use alternatives only, in seeking to develop a more compact growth scenario for plan adoption (Figure 4.4). However, an even larger share tested integrated land use and transport alternative scenarios (29% of all the 48 largest MPOs, and 52% of those who tested revenue-constrained scenarios).

MPOs that conducted budget-constrained scenario planning were more likely to be located in the West/Northwest, Northeast, and Midwest regions than other parts of the US (Figure 4.5).

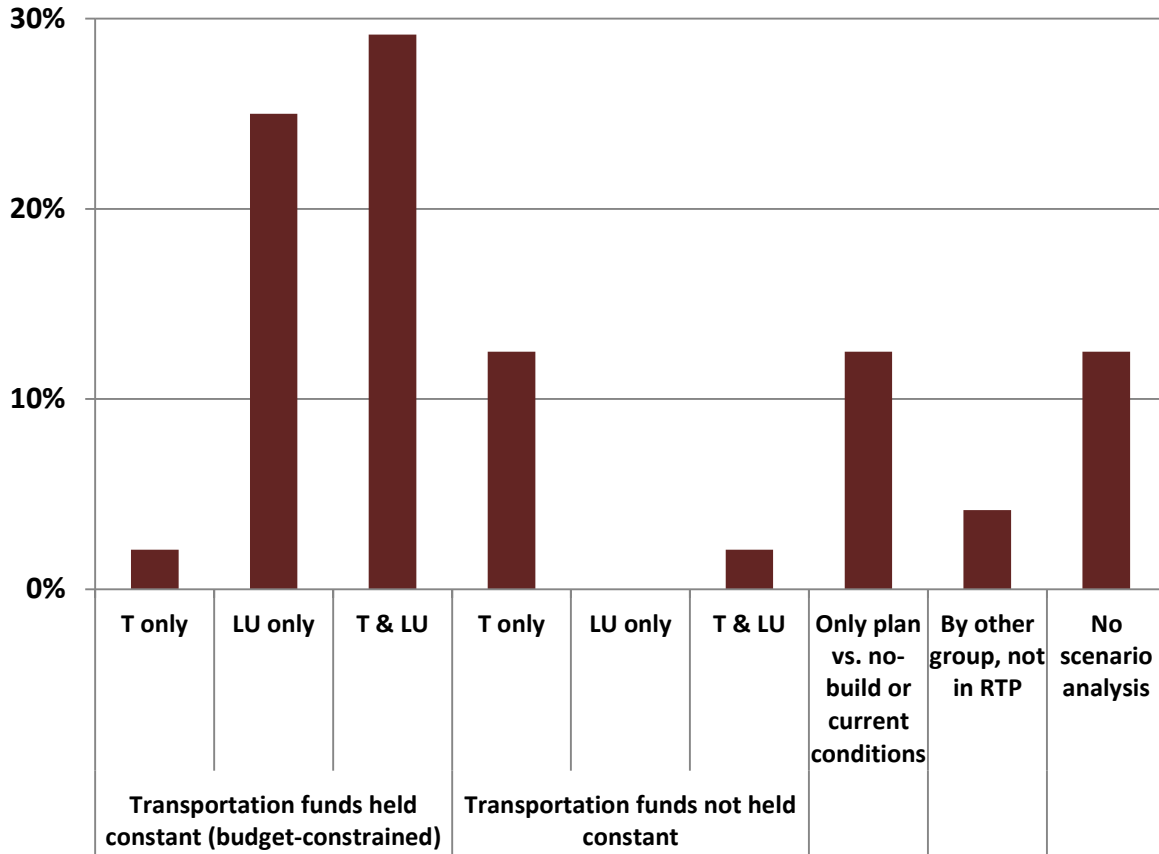
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<sup>7</sup> The data shows results analyzed from RTPs that were completed as of December, 2015. If the MPO conducted scenario analysis in both of its last two RTPs, the type of analysis conducted for the most recent RTP is noted here, unless the MPO systematically iterates land use and transportation modeling between successive RTPs, and selects among alternatives for each; in the latter case the MPO is designated as conducting both transportation and land use scenario analysis. If an MPO conducted more than one type of scenario analysis in an RTP, then the revenue-constrained version is represented. If an MPO develops scenarios in narrative form but does not model projected performance impacts of scenarios (in other words, if narrative scenarios are used just for discussion purposes with no performance modeling), then the MPO is designated as not having conducted scenario analysis. If an MPO adopted a land use scenario developed by another organization, through scenario alternatives analysis (for example, by a COG, or in a regional “visioning process”), then this land use modeling is represented as part of the MPO’s RTP.

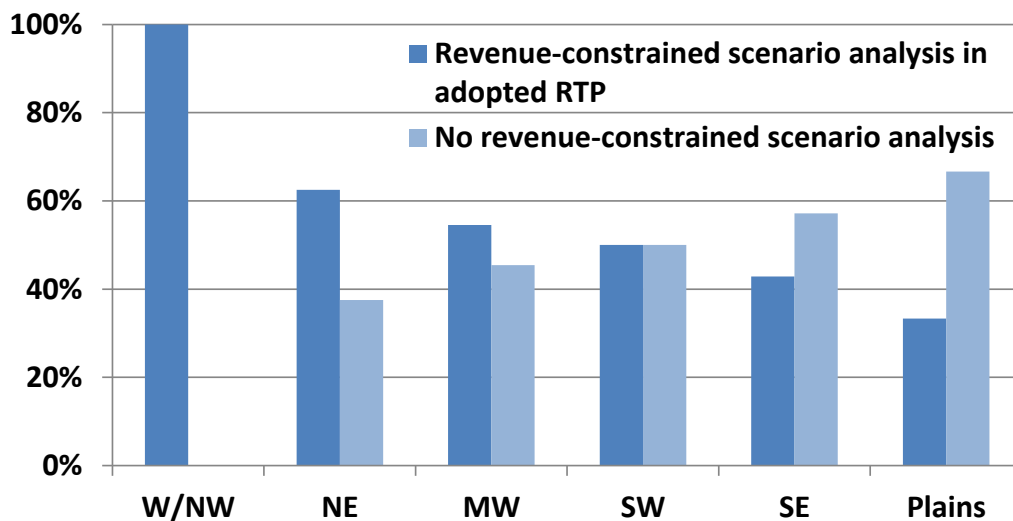
**Table 4.5 Scenario planning by the largest 48 MPOs**

MPO	State	Major city	MPO pop 2010 (millions)	COG or COG-hosted	Revenue-constrained scenario analysis	
					Any	T&LU both varied
Southern California Association of Governments (SCAG)	CA	Los Angeles	18.1	x	x	x
NY Metropolitan Transportation Council (NYMTC)	NY	New York	12.4			
The Chicago Metropolitan Agency for Planning (CMAP)	IL	Chicago	8.4		x	x
Metropolitan Transportation Commission (MTC)	CA	Oakland	7.2		x	x
North Jersey Transportation Planning Authority (NJTPA)	NJ	Newark	6.6			
North Central Texas COG (NCTCOG)	TX	Dallas	6.4	x		
Houston-Galveston Area Council (H-GAC)	TX	Houston	5.9	x	x	
Delaware Valley Regional Planning Commission (DVRPC)	PA, NJ	Philadelphia	5.6		x	
National Capital Region Transportation Planning Board	DC, MD, VA	Washington	5.0	x	x	x
Atlanta Regional Commission (ARC)	GA	Atlanta	4.8		x	
Southeast Michigan COG (SEMCOG)	MI	Detroit	4.7	x	x	
Maricopa Association of Governments (MAG)	AZ	Phoenix	3.9	x		
Puget Sound Regional Council	WA	Seattle	3.7	x	x	x
Boston Region MPO	MA	Boston	3.2		x	x
San Diego Association of Governments (SANDAG)	CA	San Diego	3.1	x	x	x
Metropolitan Council	MN	Minn-St. Paul	2.8			
Denver Regional COG (DRCOG)	CO	Denver	2.8	x		
Baltimore Regional Transportation Board (BRTB)	MD, DC	Baltimore	2.7	x		
Southwestern Pennsylvania Commission (SPC)	PA	Pittsburgh	2.6		x	x
East-West Gateway Council of Government (EWGCOG)	MO, IL	St. Louis	2.6	x	x	x
Miami-Dade MPO	FL	Miami	2.5			
Sacramento Area COG (SACOG)	CA	Sacramento	2.3	x	x	x
Northeast Ohio Areawide Coordinating Agency (NOACA)	OH	Cleveland	2.1			
Southeastern Wisconsin Regional Planning Commission	WI	Milwaukee	2.0		x	x
Ohio-Indiana-Kentucky Regional Council of Governments	OH, KY, IN	Cincinnati	2.0	x		
Reg. Transportation Commission of Southern Nevada	NV	Las Vegas	2.0			
Mid-America Regional Council (MARC)	MO, KS	Kansas City	1.9	x	x	
METROPLAN Orlando	FL	Orlando	1.8		x	
Alamo Area MPO	TX	San Antonio	1.8		x	
Broward MPO (BCMPO)	FL	Ft Lauderdale	1.7			
Hampton Roads Transportation Planning Organization	VA	Chesapeake	1.6			
Capital Area MPO (CAMPO)	TX	Austin	1.6		x	
Wasatch Front Regional Council (WFRC)	UT	Salt Lake City	1.6	x	x	x
Indianapolis MPO	IN	Indianapolis	1.5		x	
METRO	OR	Portland	1.5		x	x
Mid-Ohio Regional Planning Commission (MORPC)	OH	Columbus	1.4			
Nashville Area MPO	TN	Nashville	1.4			
Palm Beach MPO	FL	W Palm Beach	1.3			
North Florida Transportation Planning Organization	FL	Jacksonville	1.3		x	
Hillsborough County MPO	FL	Tampa	1.2		x	
Association of Central Oklahoma Governments (ACOG)	OK	Oklahoma City	1.1	x		
Greater Buffalo-Niagara Regional Transn Council	NY	Buffalo	1.1		x	
Charlotte Regional Transportation Planning Organization	NC	Charlotte	1.1			
Memphis Urban Area MPO	TN, MS	Memphis	1.1		x	
Capital Area MPO (CAMPO)	NC	Raleigh	1.1		x	x
Louisville Area MPO	KY, IN	Louisville	1.1			
Regional Planning Commission (RPC)	LA	New Orleans	1.1			
State Planning Council (SPC)	RI	Providence	1.1			

**Figure 4.4 Incidence of scenario analysis by type of analysis, in last two RTPs, for 48 largest US MPOs**



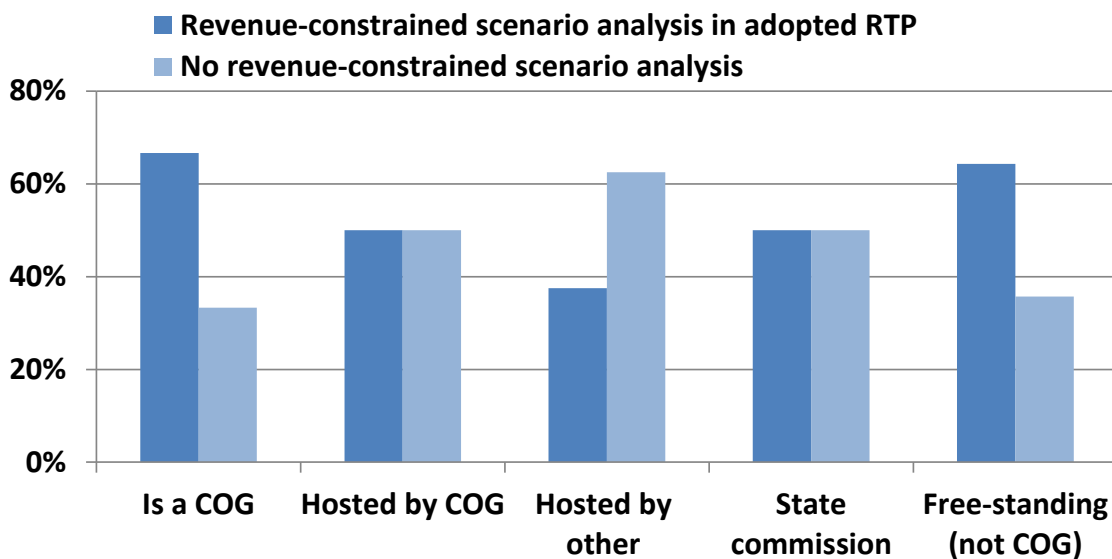
**Figure 4.5 Incidence of revenue-constrained scenario analysis in last two RTPs, for 48 largest US MPOs by region**



MPOs that conducted budget-constrained scenario planning were more likely to be joint COG/MPOs or free-standing (constituted as independent entities through state legislation) than other types (Figure 4.6), and also to be located in regions out of attainment or in maintenance status for the national 8-hour ozone air quality standard (Figure 4.7). The finding on air quality status supports the contention in this dissertation that conformity requirements have pushed MPOs toward sustainability planning, although the difference in outcomes between MPOs in attainment and non-attainment regions is slight. The finding on MPO organizational type is harder to explain, as it is not intuitively obvious why a COG/MPO would be more likely to undertake sustainability planning. This finding may not reflect the organizational structure of the MPO, but rather other factors that coincide with the likelihood of an MPO being constructed as a joint COG/MPO or free-standing.<sup>8</sup>

To tease out which factors can best predict the likelihood that an MPO has pursued budget-constrained scenario planning, it is useful to turn to regression analysis.

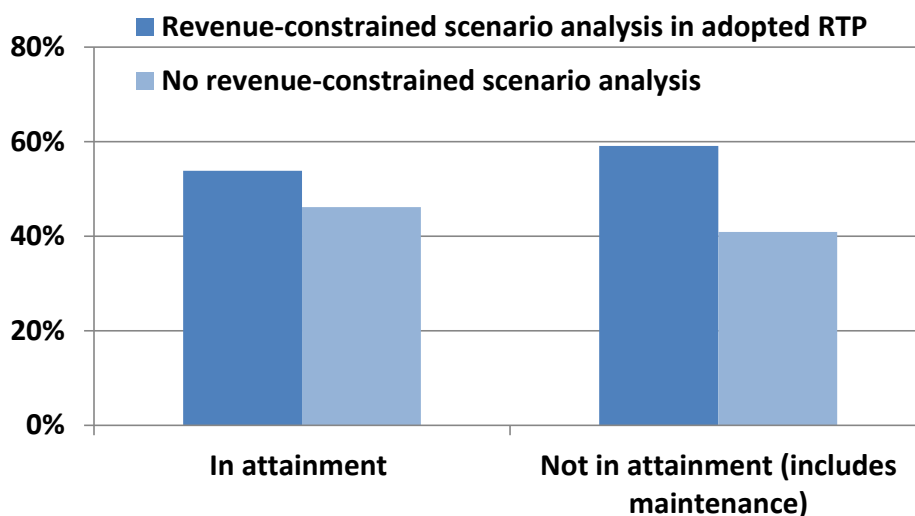
**Figure 4.6 Incidence of revenue-constrained scenario analysis by organizational type, for 48 largest US MPOs**



<sup>8</sup> Earlier iterations of this analysis, conducted in 2013 and 2014, determined that fewer MPOs had undertaken revenue-constrained scenario analysis, and fewer also had undertaken revenue-constrained scenario analysis in which both transportation and land use were varied. In other words, over the past few years, more and more MPOs have been adopting these techniques. This action can be partly attributed to language included in MAP-21 that encourages, though does not require, scenario planning; MPOs that develop scenarios are encouraged to consider investment strategies, distribution of population and employment, transportation system performance measures, and estimated costs and potential revenues. In the earlier analyses conducted for this research (with results reflecting pre-MAP21 conditions), COG/MPO status and air quality non-attainment status were found to be more strongly associated with an MPO having conducted revenue-constrained scenario analysis than in the final results presented above. This finding of a shift over time in the importance of these two factors indicates the factors were stronger predictors of whether MPOs were early adopters of these techniques, but that over recent years, these two factors have become less important as predictors.



**Figure 4.7 Incidence of revenue-constrained scenario analysis by attainment status for national 8-hour ozone standard, for 48 largest US MPOs**



Logistic regression analysis permits evaluation of which, if any, factors of interest are strongly associated with the likelihood that an MPO has conducted revenue-constrained scenario evaluation, while controlling simultaneously for the influence of the other variables (Table 4.6). A range of variables was tested, including governance-related, political, and socioeconomic factors that distinguish regions. The results indicate that, after controlling for the other variables, MPOs in fast-growing regions were most likely to have conducted revenue-constrained scenario planning. However, counter-intuitively, regions which experienced the greatest increase in traffic congestion over the previous decade were less likely to have done so. MPO regions with the highest annual traffic congestion (delay) rates per auto commuter in 2007 were located in the West/Northwest and Northeast regions, while MPO regions that experienced the greatest increase in this metric from 1997 to 2007 were located in the Northeast and Southwest.

The factors most predictive of whether an MPO has conducted integrated transportation-land use revenue-constrained scenario planning are somewhat similar (second regression). Regional location figures as a more important factor in this regression, with MPOs in the Southeast, Southwest, and Midwest determined to be less likely than MPOs elsewhere to have done so. Wealthier regions, measured in terms of average household incomes, were more likely to have done so, as were regions with lower levels of traffic delay. In addition, MPOs in states that impose plan consistency requirements between regional and local plans were more likely to have done so.

**Table 4.6 Logistic regression results: MPO choice to undertake revenue-restricted scenario analysis as a function of characteristics of MPOs and regions**

<i>Dependent variable: Has/has not done:</i>	Revenue-constrained scenario analysis				Revenue-constrained, with both T & LU varied			
	Odds ratio	Standard error	z	Prob> z	Odds ratio	Standard error	z	Prob> z
<b>Independent variables:</b>								
<b>Organizational structure</b>								
Is a COG	1.47	1.76	0.32	0.75	0.02	0.05	-1.27	0.21
Is free-standing (Omitted = all other governance types)	2.56	2.82	0.85	0.39	0.10	0.25	-0.90	0.37
<b>Governance structure (Board of Directors)</b>								
"State-heavy" board structure: 31% or more of Board votes go to state agency representatives or appointees of the governor (= top quartile on this measure; omitted= MPOs with boards dominated by local officials)	3.66	4.41	1.08	0.28	375.76	1791	1.24	0.21
<b>State planning consistency requirements</b>								
for regional and local plans***	13.57	28.54	1.24	0.22	10410	56279	1.71	0.09 *
<b>Region</b>								
Southeast and Southwest	0.14	0.23	-1.19	0.24	1E-06	1E-05	-1.77	0.08 *
Midwest (omitted = Northeast and West Coast)	0.04	0.07	-2.02	0.04 **	8E-05	4E-04	-1.80	0.07 *
<b>Region size and economic position</b>								
MPO region population in 2010	1.00	0.00	1.18	0.24	1.00	0.00	0.39	0.70
Population growth rate 2000 to 2010	1.13	0.09	1.60	0.11 *	0.86	0.12	-1.08	0.28
Mean household income	1.00	0.00	-1.07	0.29	1.00	0.00	1.78	0.08 *
<b>Mobility</b>								
Yearly hours of delay per auto commuter 2007	1.01	0.06	0.11	0.91	0.68	0.15	-1.74	0.08 *
Change in above, 1997 to 2007	0.79	0.07	-2.62	0.01 **	0.51	0.21	-1.64	0.10 *
<b>Environment</b>								
Non-attainment (includes maintenance) for 8-hour ozone standard	0.90	0.89	-0.11	0.91	149.82	653.87	1.15	0.25
<b>Demography and social equity</b>								
Non-white and Hispanic population share, 2010	1.02	0.05	0.40	0.69	1.30	0.28	1.19	0.23
Percent point difference between share of households with annual income <\$25,000 in the region's central city and in entire region	1.09	0.10	0.94	0.35	0.58	0.23	-1.38	0.17
<b>Political leaning</b>								
Share of votes cast in 2012 presidential election for Pres. Obama	1.10	0.08	1.27	0.20	0.87	0.17	-0.69	0.49
<b>Regression statistics</b>								
Constant	0.47	1.90	-0.19	0.85	0.00	0.00	-1.02	0.31
N= 48	LR chi2(15) =19.92 Prob > chi2 = 0.1748 Pseudo R2 = 0.3028				LR chi2(11) =36.60 Prob > chi2 = 0.0014 Pseudo R2 = 0.6315			

\* prob<0.15 \*\* prob<0.05 \*\*\*Includes New Jersey, California, Oregon, and Washington

Sources: Population and race/ethnicity data from 2010 US Decennial Census; Household income data from 5-year ACS Estimates, 2011; Presidential election data from politico.com; Commuter delay (congestion) data from Texas Transportation Institute, *2012 Mobility Report*; Air quality attainment data from US EPA.

## **4.5 Plan implementation**

### ***MPO budget allocations***

Among the 10 largest US MPOs, most are spending more for transit than roadways, and for “fix-it-first” rather than facilities expansion (Table 4.7). The data presented here reflects the MPOs’ own data aggregations; it is important to note that no standardized method for aggregating budget data by the MPOs has been established, making such comparisons difficult to conduct with precision. These funding allocations in RTPs cannot be understood to reflect autonomous choices by MPO governing boards, given that MPOs control few funds directly, and instead compile and coordinate projects funded from multiple sources.

The source of funds in MPO plans carries implications for MPOs’ “room to maneuver.” Federal and state funds are often directed to specific modes and may come with strings attached (such as competitive performance requirements that apply to New Starts transit project funding). In contrast, locally raised funds, such as from sales tax measures put before voters by local governments, may provide greater autonomy for multi-modal program and project choices, but they entail their own “strings attached,” in the form of political compromises on projects designated for funding, that may be needed to secure voter approval.

On average, the largest MPOs in the US obtain most of their funds from local sources, although the pattern varies considerably (Table 4.8). The San Francisco Bay Area MPO is seen to derive the largest share of funds from local sources among the MPOs studied. The large share reflects the Bay Area MPO’s control over funds from regional bridge tolls, a significant source of revenue providing this MPO with greater autonomy over funds than the others. (Note that data from the two large Texas MPOs is not included here because they did not present this data in their most recent RTPs.)

### ***MPO incentive grants for local action to support regional plans***

A number of MPOs have developed programs and strategies to induce local policy action and projects that support objectives of the regional plan, in particular, transit-oriented development (TOD) plans and projects. Among the largest 25 MPOs, 15 were found to have established such programs. Many are small in scale, for example allocating a few million dollars a year to fund transit station area plans or demonstration projects.

Others are more ambitious. The Metropolitan Transportation Commission (MTC) – the San Francisco Bay Area’s MPO – was the first to put this sort of program in place during the 1990s (see California case study chapter for more detail), and MTC’s program is also the most extensive, now allocating nearly \$100 million annually for projects in targeted growth zones near transit stations, and conditioning the funds upon local adoption of smart growth and affordable housing policies.

Other extensive programs of this sort include the Atlanta Regional Commission’s Livable Communities Initiative (LCI), which has allocated close to \$200 million in planning and implementation grants since its inception in 1999. ARC prioritizes funding of transportation projects that result from LCI studies. Another notable program is the Minneapolis-St. Paul MPO’s Livable Communities Demonstration Account (LCDA) grant program, which provides \$14 million annually for basic and place-making infrastructure and site acquisition for development projects. The program is funded by regional property tax revenue, enabling greater flexibility in the use of funds than in programs using federal transportation dollars. The program criteria for awarding funds include local affordable housing effort.

**Table 4.7 Budget allocations of the largest 10 US MPOs in their most recent RTPs**

	M&O, rehabilitation		Capital (facilities) expansion		Total M&O/rehab	Total transit
	Roads, bridges, bike/ped, freight	Transit	Roads, bridges, bike/ped, freight	Transit		
Southern California Association of Governments (SCAG)	30%	29%	18%	22%	59%	51%
New York Metropolitan Transportation Council (NYMTC)	37%	56%	2%	5%	93%	61%
The Chicago Metropolitan Agency for Planning (CMAP)	50%	39%		11%	89%	39%
Metropolitan Transportation Commission (MTC)	33%	55%	5%	7%	88%	62%
North Jersey Transportation Planning Authority (NJTPA)	48%	39%	2%	11%	87%	50%
North Central Texas COG (NCTCOG)	25%	18%	41%	17%	43%	35%
Houston-Galveston Area Council (H-GAC)		79%		21%	79%	na
Delaware Valley Regional Planning Commission (DVRPC)	60%	32%	3%	5%	92%	37%
National Capital Region Transportation Planning Board (TPB)	30%	53%	11%	6%	83%	59%
Atlanta Regional Commission (ARC)	35%	39%	19%	7%	74%	46%

Sources: latest RTPs of MPOs listed, see References, special section; SCAG, RTP Table 1; NYMTC, Table 9; CMAP, Table 1 in financial plan; MTC, RTP EIR, Table 1.2-10; NJTPA, Table 5.2; NCTCOG, Exhibit 8.1; HGAC, Figure 4; DVRPC, Table 6; TPB, financial info at <http://www.mwco.org/clrp/elements/financial/default.asp>; ARC, Table 5.4, financial chapter.

## 4.6 Conclusion

The largest US MPOs are seen to be transitioning, in many cases, to using techniques and methods of sustainability planning. A significant finding is that more than half (56%) of the 48 largest MPOs conducted decision-oriented (budget-constrained) scenario analysis as part of their most recent planning processes, with 29% of all the MPOs testing integrated land use and transport alternative scenarios. Another significant finding is that among the largest 25 MPOs, 15 have put in place incentive grant programs to reward local TOD projects and plans that support regional plan goals. Given the range of practices observed, it is more accurate to think of MPOs as falling on a spectrum in their implementation of sustainability planning techniques and methods, rather than constituting clearly defined groups.

**Table 4.8 Funding sources for the 10 largest US MPOs in their most recent RTPs**

	Federal	State	Local/ regional
Southern California Association of Governments (SCAG)	22%	25%	53%
New York Metropolitan Transportation Council (NYMTC)	40%	8%	52%
The Chicago Metropolitan Agency for Planning (CMAP)	14%	40%	45%
Metropolitan Transportation Commission (MTC)	12%	16%	72%
North Jersey Transportation Planning Authority (NJTPA)	42%	58%	0%
Delaware Valley Regional Planning Commission (DVRPC)	65%	33%	2%
National Capital Region Transportation Planning Board (TPB)	16%	40%	44%
Atlanta Regional Commission (ARC)	38%	11%	51%
Average (across MPOs, not funds)	31%	29%	40%

Sources: latest RTPs of MPOs listed, see References, special section; SCAG, RTP Figure 1; NYMTC, Table 9 and 10; CMAP, Table 10 in financial plan; MTC, Figure 1; NJTPA, Table 5.2; DVRPC, Table 7; TPB, financial info at <http://www.mwcog.org/clrp/elements/financial/default.asp>; ARC, Table 5.4, financial chapter.

In considering factors associated with adoption of sustainability planning methods, the chapter noted a few in particular that are institutional in nature – COG or free-standing governance structure, regional location, air quality attainment status, and presence of state planning consistency requirements for regional and local plans. Region of the US and air quality status can both be considered to be institutional factors because region is associated with various cultural proclivities and may also influence policy diffusion among neighboring MPOs, and because regional air quality status translates to different requirements for MPO planning. MPOs in the West and Northeastern parts of the US are found to be pursuing sustainability planning more so than in other regions, as are MPOs in regions out of attainment with air quality standards, although this latter bivariate association washes out in the multi-variate logistic regression analysis.

It is instructive that many of the factors determined in this analysis to be most predictive of an MPO’s choice to pursue sustainability planning methods are institutional and political, rather than socioeconomic. The socio-economic factor that proves to be most predictive is incidence of commuter delay, although the sign (direction) of this association is counter-intuitive.

## **CHAPTER FIVE: REGIONAL SUSTAINABILITY PLANNING IN CALIFORNIA**

California's four largest MPOs – in the Los Angeles, San Francisco Bay, Sacramento, and San Diego regions – have been sustainability planning leaders for more than a decade. Compared to most other states, California provides greater authority to its MPOs for programming transportation investments. California is doubly unique because of passage in 2008 of Senate Bill (SB) 375, which calls on MPOs to develop integrated plans for transportation and land use capable of achieving mandated reductions in greenhouse gas (GHG) emissions. These conditions make the four large California MPOs an excellent sample for a case study, both of “bottom-up” MPO sustainability planning and of the impact of a new state law intended to strengthen their efforts.

SB 375 has gained widespread attention as the “nation’s first law to combat greenhouse gas emissions by reducing sprawl” (Office of the Governor, 2008). It builds explicitly upon the sustainability planning processes developed by the state’s four largest MPOs, adding a performance constraint in the form of mandated GHG emissions reductions targets, and consistency requirements between RTPs and regional plans for housing supply developed under the state’s “fair share” housing law.

With the first round of regional plans conducted under the provisions of SB 375 now complete, the adoption of this law provides a natural experiment, enabling evaluation of how and whether state-mandated climate performance standards affect MPO plans and practices – a pertinent question given that the most recent federal surface transportation legislation (called MAP-21) calls for a new performance planning framework for MPOs, and also given that other states have contemplated and even passed similar legislation. At the same time, SB 375 explicitly upholds local governments’ land use authority, specifying that localities face no legal obligation to alter their land use policies to conform to regional plans under the law. Therefore, the SB 375 model is especially pertinent for consideration by other US states seeking to guide MPO performance planning for efficient development, without directly challenging local home rule.

The four MPOs studied form a logical set, as they are considered by state agencies to be a peer group in various programs and policy guidelines from recent years. Given the single-state context of this case study (holding the state policy framework constant at each given point in time), variation in patterns of planning practices among the four MPOs can be considered vis-a-vis factors such as size of region, stage (age) of development of the transport network, especially for transit, MPO organizational structure, and regional political leanings. Additionally, the impact of SB 375 can be discerned in regard to its interaction with each MPO region’s particular situation and circumstances.

The research considers and compares pre-SB 375 to post-SB 375 plans for the four large MPOs, to evaluate how and whether the law has altered their planning practices. It considers sustainability planning challenges and accomplishments across a number of key stages (components) of the RTP planning process, including: development of plan goals, framing narratives, and performance objectives (measures); stakeholder engagement patterns; processes for developing and adopting key plan elements, in particular land use projections and scenario evaluation of transport projects and programs; plan performance results for location efficiency measures; and implementation strategies, including budget allocations and projected performance for “crossing the great transportation-land use divide” by encouraging local land uses that support regional plan goals.

## 5.1 “Blueprint planning” by the four large MPOs

By the 2000s, the four large California MPOs (along with many other MPOs nationally) had adopted a style of RTP development called “blueprint planning” by state policymakers (a.k.a. “integrated transportation-land use planning”), which aimed to more closely coordinate transportation with land use (Barbour and Teitz, 2006). Traditionally, in their RTPs, the MPOs had tended to gear transportation projects to serve land uses projected from recent trends, and within the framework of existing local General Plans (local comprehensive plans), taken as given. Working within tightening fiscal and environmental constraints, the MPOs had become less willing to take local land uses as given, as they sought to operationalize land use strategies to help foster more efficient transport and thereby achieve their mandated responsibilities for reducing air pollution and traffic congestion.

There are *four main ways* in which the four large MPOs began to change their RTP processes, in the blueprint approach, so as to better integrate planning for transport and land use. The first is in *how they developed their plan goals and performance measures*. The MPOs developed performance objectives not just for transport but increasingly also for land use, such as for limiting conversion of greenfield land to urban use, and fostering more compact infill development. They introduced performance measures for accessibility (e.g. the number of jobs accessible via nearby transit), in addition to traditional mobility measures, and they added goals and objectives addressing 3 E’s impacts, such as for equitable transport access for low-income neighborhoods versus other neighborhoods, housing affordability, GHG emissions, development footprint, impact on floodplains and agricultural lands, and cost-benefit and economic productivity estimations.

The second key element was *enhanced stakeholder outreach*. Given that local governments, not MPOs, control land use decisions, the desire to coordinate land use and transport policies necessarily turned the MPOs into more activist, outreach-oriented agencies, as they sought to engage more closely with local planners and elected officials in order to coordinate land use policies with RTP goals. Through techniques including establishment of ongoing stakeholder advisory committees and organized public workshops, the MPOs attempted to gain input for determining a “preferred” development pathway for each region.

The third key element was *integrated transport-land use scenario evaluation*. Through scenario evaluation, the MPOs model and compare the projected impact of various alternate packages of transport and land use policy options, called scenarios, against their selected performance indicators of interest. The new approach *turned land use as well as transport* elements of each scenario package into *variable elements* for comparison, rather than taking land use as a given input, based on existing local General Plans modified with economic (market) assumptions deemed appropriate by the MPO. This new approach aimed to determine which land use *alternatives*, in combination with transport program options, could optimize multiple benefits simultaneously. The result was that final adopted TLU plan scenarios generally called for more compact development patterns, more spending for transit and non-motorized modes, and other smart growth strategies than in the modeled “business as usual” or “continuing trends” scenarios.

The final key element of the new approach was more *integrated transport-land use implementation strategies* – adoption of programs and measures to ensure that the plan objectives are realized on the ground. By law, the adopted MPO land use scenario for the plan must be considered to be a realistic forecast. This means that regions seeking to alter the course of “business as usual” development patterns must commit in their plan to implement policy changes identified as necessary for realizing

plan goals. Thus, to alter “business as usual” trends, implementation techniques are crucial, especially when preferred scenarios for future development diverge sharply from currently adopted local plans, and/or when substantial barriers inhibit infill development in desired locations. These barriers to infill may include lack of funding for infrastructure needed to support new development, difficulty in assembling parcels, and costly regulatory requirements such as for environmental review.

The four MPOs adopted a range of strategies to support more compact land uses conducive to plan goals. Both “inside strategies” and “outside strategies” were pursued, in other words, in the first case, programs to strengthen compact growth and efficient transport patterns in the urban core, and in the second, to help contain sprawl and leapfrog development in greenfields and at the urban fringe. A combination of both types of strategies is useful for promoting efficient development patterns in regions.

All four MPOs adopted incentive grant programs for local infill projects supportive of regional goals, funded at up to \$10 million annually (Sciara and Handy, 2013). Because MPOs cannot directly fund land use projects (only transportation projects), some instituted creative fund-swapping mechanisms to allow them provide support for TOD. The Metropolitan Transportation Commission (MTC), the San Francisco Bay Area MPO, went furthest in pursuing an assertive strategy to induce transit-supportive land use. Its Resolution 3434 Regional Transit Expansion Program, adopted in 2001, established transit expansion objectives totaling \$11.8 billion, and associated goals for improving cost-effectiveness by conditioning new transit expansion upon supportive land use. MTC adopted an associated TOD Policy in 2005, establishing corridor-level thresholds for minimum levels of development around transit stations, and providing assistance for local station area plans to meet the thresholds (for more detail, see the section of this chapter on plan implementation).

Meanwhile, the San Diego Association of Governments (SANDAG), that region’s MPO, developed a particularly notable “outside strategy” in the form of its TransNet Environmental Mitigation Program (EMP). Funded through TransNet, the county’s half-cent transportation sales tax measure extended by voters in 2004 for 40 years, the EMP dedicates about \$850 million toward creation of permanent multi-species habitat preserves that serve as a de facto urban growth boundary for the region (see the plan implementation section for more detail).

In the mid-2000s, the state of California began to officially support blueprint planning by MPOs, assisting development of eight such plans statewide, including one in the 8-county San Joaquin Valley. In 2008, with passage of SB 375, the blueprint approach became official state policy for RTP development.<sup>9</sup>

## **5.2 How does Senate Bill 375 promote sustainable development?**

SB 375 was adopted to help achieve California’s climate policy goals, embodied in Assembly Bill (AB) 32 of 2006, calling for statewide reduction of GHGs to 1990 levels by 2020. SB 375 is the

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<sup>9</sup> By 2004, the MPOs in the four largest regions had each adopted a blueprint (see Barbour and Teitz, 2006). From 2005 to 2011, the state provided over \$21 million for blueprint planning (from Caltrans, *Regional Blueprint Grant Awards, 2005 to 2011*, at <http://calblueprint.dot.ca.gov/>). With this support, plans were also adopted by the Shasta and San Luis Obispo County MPOs, the multicounty Monterey Bay Area MPO, and a consortium of the eight MPOs in the San Joaquin (“Central”) Valley, which includes Fresno, Kings, Kern, Madera, Merced, San Joaquin, Stanislaus, and Tulare Counties.



state's demand-side strategy for reducing GHGs from transportation. The California Air Resources Board (CARB), the agency charged with implementing AB 32, considers supply-side approaches, namely for improving vehicle and fuel efficiency, to hold the greatest potential for reducing GHGs from passenger vehicles in the short term; they account for 86% of CARB's targeted reductions in the transportation sector by 2020 (CARB, 2011).<sup>10</sup> However, CARB also deems the strategies embodied in SB 375 to be essential for achieving the state's climate goals in the long run (past 2020); by helping reduce vehicle miles traveled (VMT) and vehicle use, SB 375 is intended to help ensure that VMT growth does not overwhelm GHG benefits resulting from technology strategies alone (CARB, 2008, p. C-55-57).

### ***Basics of SB 375***

SB 375 establishes a GHG reduction mandate for RTPs to achieve through “changed land use patterns and improved transportation”<sup>11</sup> – in other words, through better planning coordination and investment strategies. Procedurally, the heart of SB 375 is the requirement that each MPO develop and implement a Sustainable Communities Strategy (SCS) as part of its periodically updated long-range (20+ year) Regional Transportation Plan (RTP). The SCS is a projected “development pattern...integrated with the transportation network, and other transportation measures and policies,”<sup>12</sup> that is designed to achieve specific GHG reduction targets set by CARB.<sup>13</sup>

SB 375 also aims to improve planning processes, technically and procedurally. The law added to public and stakeholder outreach requirements for MPOs. It also called for new state guidelines (adopted in 2010) defining standards for MPOs' technical modeling capacity to ensure effective evaluation of land use and transport interactions, modal splits, maintenance and rehabilitation needs, and accessibility and equity measures, among other factors, so as to “assess the effects of policy choices, such as residential development patterns, expanded transit service and accessibility, the walkability of communities, and the use of economic incentives and disincentives.”<sup>14</sup>

SB 375 also improves planning integration by creating a new consistency requirement between RTPs and the Regional Housing Needs Assessment (RHNA) process, California's “fair share” method for ensuring that localities facilitate adequate housing for all income levels. SB 375 thereby links “smart growth” goals for efficient development to social equity goals for affordable housing. Councils of Government (COGs), which in California coincide with MPOs in most cases, administer RHNA plans, periodically allocating to each local jurisdiction its “fair share” of

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<sup>10</sup> This calculation is based on projected GHG emissions reductions by 2020 from the following policy measures outlined in CARB's 2008 *Scoping Plan*: Pavley vehicle efficiency standards, Advanced Clean Car measures (called Pavley II in the *Scoping Plan*), the Low Carbon Fuel Standard, regional transportation-related GHG targets (SB 375), and additional vehicle efficiency measures, including tire pressure regulation and low-friction oil programs (CARB, 2011). CARB revised its emissions reduction projections for these policy measures in 2011 to account for effects of the economic downturn and measure-specific regulations, developed since the release of the *Scoping Plan* (ibid); this calculation is based on the revised estimates.

<sup>11</sup> SB 375 §1[c]

<sup>12</sup> California Government Code §65080[b][2][B][vii]

<sup>13</sup> The SCS mandate is not as tough as it first appears, however, because an SCS is designated as a regional development scenario designed, in combination with transport policies and programs, to reduce GHGs from automobiles and light trucks, “if there is a feasible way to do so”(California Government Code §65080 [b] [2] [B] [vii]). “Feasible” is broadly defined, using the same definition currently found in CEQA (California Government Code §65080.01[c]). If an MPO proves unable to develop an SCS capable of achieving the mandated GHG targets, then it must develop an Alternative Planning Strategy to demonstrate what further policies and programs would be needed to do so.

<sup>14</sup> Senate Bill 375 §1[g]

projected regional housing need, to be accommodated through appropriate zoning measures. SB 375 aligns RTP and RHNA schedules, calls for consistent results, and stiffens local compliance requirements. Finally, SB 375 also requires that each RTP/SCS accommodate enough housing for all projected population and workforce growth in the region over the plan's duration.

Collectively, these provisions promote sustainable transport and planning integration. SB 375's "demand-side" approach, aimed at reducing the need to drive, aligns with scholarship discussed earlier on sustainable transport emphasizing "location efficiency" and accessibility objectives. In calling on MPOs to consider multiple "smart growth" strategies, SB 375 also aligns with research discussed earlier on reducing GHGs from transportation, recommending that synergistic demand side strategies be pursued, in addition to strategies for improving vehicle technologies.

SB 375 also endorses a sustainability-oriented approach to the planning process. The iterative, cyclical basis of RTP development matches criteria in the literature on sustainability planning, calling for experimental, adaptive, reflective and continually updated plans, developed through learning processes engaging multiple stakeholders. SB 375 adds requirements for MPOs to hold outreach workshops in every county, in which results of scenario modeling are to be presented, to allow participants to consider plan options.

### ***SB 375 as a new layer in the path-dependent RTP process: Evolution, not revolution***

In evaluating SB 375 implementation, it is important to consider how the law builds upon prior practices, in order to better understand both its strengths and its limitations. SB 375 did not radically alter existing processes, so much as it aimed to better coordinate and align them. The law's central premise is not only the GHG reduction mandate, but also the procedural expectation for collaborative land use and transport planning, which is encouraged through the required alignment of RTPs with RHNA. The law's mandated technical evaluation and public participation processes build explicitly upon blueprint planning. Even SB 375's GHG reduction mandate builds upon prior practice developed in the blueprint planning processes. Finally, even the SCS requirement is not a wholly new RTP element, but instead a re-framing of the long-standing requirement that MPOs develop projections for population and housing growth for each RTP.

Considered this way, SB 375 is only one more layer in the long line of planning mandates that have cumulatively pushed MPOs toward a sustainability orientation (see Figure 2.7). SB 375 reinforces the overarching environmental performance constraint that was originally introduced with air quality conformity requirements, adding a statewide collective action element because of the need to hammer out "fair share" expectations for regional effort in reducing GHGs. SB 375 takes the additional important step of aligning transportation and affordable housing plans at the regional scale, through the RTP-RHNA consistency mandate. This mandate helps ensure that plans under SB 375 address not only environmental, but equity concerns, for land use as well as transportation – thereby making SB 375 a law that directly promotes MPO sustainability planning.

With SB 375, the RTP process in California becomes an even more concerted framework for deliberating sustainability. Figure 5.1 depicts the RTP process as a "crucible," portraying some of the myriad state and federal laws, interest group actors and other stakeholders, and issues, concerns, ideas and values that come into play in the RTP decision process.

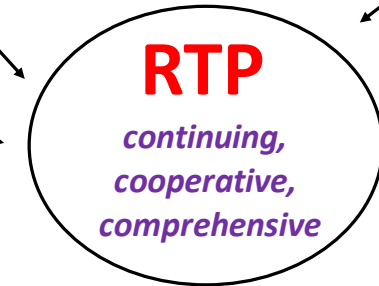
**Figure 5.1 RTPs as a venue for sustainability planning in California**

**Policy issues and mandates**

- Growth concerns
  - Housing - supply and price
  - Infrastructure - capacity constraints (congestion), state of repair
  - Environment: climate, air and water quality
  - Loss of open space, ag land
  - Fiscal restraint
  - Livability
- Related mandates (California)
  - ISTEA+, CAA
  - NEPA/CEQA
  - Fair share housing (RHNA)
  - Fair Housing Act, CRA Title XI
  - AB 32, SB 375
  - ESA, CWA
  - Local General Plans
  - Local fiscal policy (e.g. Prop 13, redevt)
  - Public participation mandates
- Related policy topics
  - Economic development
  - Education
  - Environmental justice
  - Gentrification/displacement
  - Health
  - Energy systems
  - Water supply/quality, flood control

**Actors (and their interests)**

- Local governments
- Regional agencies (e.g. transit, AQMDs)
- State agencies /depts (e.g. Caltrans, HCD, ARB)
- Federal agencies/depts (e.g. FHWA, FTA, EPA, DOT)
- Organized stakeholders (e.g. homebuilders, business leaders, environmental, housing, equity activists)
- Organized opponents: Tea Party
- Community groups
- Public opinion
- Media



**Ideas and values**

- Home rule – local control of land use
- Property rights
- Sustainable development, 3 E's
- Social equity
- Quality of life

However, not surprisingly, the institutional challenges of SB 375 implementation are substantial, since the law builds upon existing practices more than radically changing them. The primary direct incentive in SB 375 to encourage local cooperation to support SCS objectives is streamlined environmental review under the California Environmental Quality Act (CEQA) for infill projects consistent with SCSs or APSs.<sup>15</sup> However, some observers have predicted that the CEQA provisions are too narrow to induce much change (Rose, 2011). Furthermore, passage of SB 375 coincided with state-level policy choices that worked against SB 375 implementation capacity, namely multibillion-dollar cuts to the state budget for local transit operating funds, and elimination in 2012 of redevelopment authority for local governments. Redevelopment, based on use of tax-increment financing, had provided local governments with over \$5 billion in tax revenue annually (LAO, 2012). Redevelopment authority was the main tool localities used for downtown renovation projects, as well as for funding affordable housing, with a 20% set-aside required for this purpose.

<sup>15</sup> Under CEQA, public agencies must evaluate and require mitigation, if feasible, of significant adverse effects of proposed development projects and plans. SB 375 provides that development projects deemed consistent with an approved SCS or APS can avoid certain CEQA requirements, including the need to assess growth-inducing impacts and project-specific or cumulative impacts from cars and light-duty truck trips on global warming. In addition, infill projects that meet certain, stricter criteria are eligible for more extensive streamlining, up to and including total exemption from CEQA review. See the discussion on SACOG’s CEQA streamlining checklist, in the section of this chapter on implementations programs, for more detail.

These implementation challenges prompted some observers to contend that SB 375 is fundamentally a weak law. Like most other mandates layered into the RTP process, SB 375 is mainly a procedural planning law that relies upon the traditional, essentially voluntary collaborative RTP planning process, while adding a new set of performance and planning consistency constraints. The core expectation of SB 375, that MPOs should be able to coordinate transportation and land use planning to achieve more efficient development patterns, can only be expected to succeed if the wider framework of state (and federal) policies influencing local land use and transportation policy choices is also conducive to SB 375 goals. Lack of state support for infill projects and associated infrastructure needs led some MPOs to call SB 375 an “unfunded mandate,” upon its passage.

Recently, new state policies and programs have been enacted to support SB 375, including the Affordable Housing and Sustainable Communities (AHSC) program, directed to receive 20% of state greenhouse gas cap-and-trade auction funds to support local affordable housing projects linked to transport enhancements, and passage of a new state law (Senate Bill 743) which eliminates the need for mitigating congestion impacts of infill projects. These new state programs are evaluated at the end of this chapter.

In spite of the new programs, California’s MPOs remain on the horns of a continuing dilemma, seeking to pursue more holistic planning to achieve mandated responsibilities, but lacking significant means to do so. In SB 375, the state turned to MPOs as the logical venue for strengthening planning integration at the regional scale, but to be politically palatable, SB 375 also reiterated the state’s adherence to home rule principles, thereby leaving intact the structural divisions in growth management authority, and associated collective action dilemmas, that make holistic planning difficult.

Based on this discussion, some hypotheses can be derived about what could be expected for SB 375’s influence on RTP planning by the four large MPOs:

- First, to the degree that SB 375 performance mandates are constraining (i.e. challenging) for each MPO (namely the mandates for GHG reduction and “no spillover” housing needed outside the region), SB 375 can be expected to prod MPOs to advance techniques to improve transport and location efficiency, including extending institutional innovations to incentivize supportive local land uses, if transport strategies, on their own, prove incapable of achieving plan objectives;
- Second, if the SB 375 mandates are not constraining, planning practice may not change dramatically with SB 375, because, a) the law builds upon existing practice; b) it provides few resources for implementation; and c) it is hard in any case to “shift the needle” rapidly in altering development patterns in built-up urban areas;
- Third, to the degree that the SB 375 mandates are not constraining, MPOs are likely to stress transport-related gains in their regional plans, and to avoid directly challenging local land use prerogatives;
- Fourth, concerns about plan implementation and feasibility are likely to arise, given the voluntary, collaborative approach of the RTP planning structure, and the lack of resources for directly supporting implementation of SB 375; and
- Fifth, given the few means afforded for SB 375 implementation, MPOs are likely to advocate stronger state policy measures for this purpose, again especially to the degree that SB 375 mandates are constraining.

With these hypotheses in mind, the paper now turns to evaluating progress toward sustainability in post-SB 375 regional plans by the four large California MPOs.

### **5.3 Setting GHG reduction targets: institution-building and collective action**

The first stage in regional planning under SB 375 was setting regional targets for GHG reductions. In 2009, CARB conducted a lively, sometimes contentious year-long consultation process with the MPOs and other stakeholders, in order to establish the targets for each MPO in the state (Barbour and Deakin, 2012). Notable achievements of the process included establishing the performance metric for regional targets (percent per capita reductions against the baseline year of 2005), and joint fact-finding by the four large MPOs to produce data for comparison of current development conditions and policy options (RTAC, 2009).

The data produced for the process by the four MPOs was notable because it was a rare instance in which they provided comparable information, using the same metrics. Unfortunately, this practice did not continue once the MPOs turned to producing their plans under SB 375 (which do not follow the same precise schedule in terms of plan start and end dates). Instead, the MPOs returned to their normal course of developing individualized objectives and metrics, which allows for flexibility and creativity among MPOs, but also inhibits making comparisons.

The four MPOs' data on current development patterns indicated that the San Francisco Bay Area is the most location-efficient, with the highest per capita transit seat miles and the lowest share of low-density, single-family homes among the four regions (ibid). Bay Area planners noted that existing smart growth policies helped account for the region's lower per capita CO<sub>2</sub> levels compared to the others. Meanwhile, plan expenditures for the two Southern California MPOs (the Southern California Association of Governments, or SCAG, in the Los Angeles area, and the San Diego Association of Governments, or SANDAG), emphasized new roadway capacity, including managed highway lanes, more than the two the northernmost MPOs (the Metropolitan Transportation Commission, or MTC, and the Sacramento Area Council of Governments, or SACOG).

The four MPOs' modeling results for the target-setting process were also innovative in their analytical focus; they established four policy categories within which each MPO selected specific new policy measures to evaluate, namely: transportation demand management (TDM) and system management (TSM) measures; transportation system improvements; land use measures; and pricing measures (Heminger et al., 2010). They then modeled different policy scenarios emphasizing each policy type to project GHG impacts. Scenarios for expanding system capacity or improving system efficiency (TSM) were projected, in general, to offer fewer GHG benefits than pricing or land use scenarios. Hybrid scenarios, including aggressive land use and pricing, appeared most promising. This pattern conforms to research cited earlier on synergistic benefits of combining policies.

The target-setting process was an admirable exercise in institution building, as there is no commonly agreed-upon standard for determining a metropolitan region's "fair share" of GHG reductions. Culminating the process, in 2010, CARB adopted official reduction targets for each MPO region for 2020 and 2035. In spite of some vociferous protests from Los Angeles area stakeholders, CARB set fairly comparable targets for each of the four large regions, of between 13% and 16% in per capita GHG reductions by 2035.

### **5.4 Evaluating regional transportation plans under SB 375**

To evaluate regional planning under SB 375, planning processes and outputs were compared across the four MPO regions for the first RTPs adopted post-SB 375 (SANDAG, 2011; SCAG, 2012;

SACOG, 2012; MTC, 2013, see special section in References). Some comparisons are also made with each MPO's last adopted RTP before SB 375. The findings are based on evaluation of the written record, namely plan documents available on the MPOs' plan web pages, and other associated documents (e.g. stakeholder-initiated lawsuits and commentary on the plans), as well as information gained from 35 interviews with MPO staff persons, local planners, non-governmental stakeholders involved in the plan processes (in particular, form environmental and equity stakeholder groups), and state agency staff persons knowledgeable about the SB 375 process.

### ***Plan goals and performance objectives***

All four MPOs adopted multiple goals and objectives for their post-SB 375 plans, extending well beyond traditional concerns for mobility, system safety, and reliability, to encompass accessibility, land use (e.g. housing density), and 3 E's impacts. The two southern California MPOs feature transportation goals more prominently than the two northern California MPOs (Table A.1, in the appendix). Post-SB 375 plans did not differ substantially from pre-SB 375 plans in the performance goals and objectives used, with a few notable exceptions discussed below.

MPO performance measurement is something of an art form. One difference among post-SB 375 plans is simply in the number of performance measures used, ranging from 15 for the San Francisco Bay Area plan developed by MTC and the Association of Bay Area Governments (the regional COG), to 60 for SACOG's plan. The two southern California MPOs featured transportation measures more prominently than the others; four-fifths of SANDAG's main measures were transport-focused (Table 5.1, A2).

SCAG emphasized economic measures the most, with one-quarter of its main measures assessing economic costs and benefits. Especially innovative in SCAG's post-SB 375 plan were its estimates of plan "co-benefits," including for economic productivity, local fiscal costs and revenues, and household residential energy and water use, an approach that likely helped gain support from potentially skeptical stakeholders.<sup>16</sup>

Meanwhile, SACOG utilized land use measures the most, reflecting higher projected population growth rates compared to the other regions, and associated concern with development patterns. This interest also manifested in assessment of impacts on habitat lands, floodplains, and agricultural land. Prior to SB 375, SACOG had developed its RTP separately from its land use-oriented blueprint plan, so one change post-SB 375 was to integrate these efforts.

Unique among the MPOs, MTC utilized a concise set of goals/measures taking the form of numeric *targets*, rather than just *indicators*. Based on previous discussion in Chapter 3, this step should be recognized as significant in moving MTC's process toward a stronger sustainability orientation. In another dramatic departure from traditional practice, MTC chose to forego measures related to reducing congestion. Instead, MTC's primary travel objectives were to reduce VMT, emissions, and auto mode share. This choice is dramatic because congestion management is a traditional main focus and mandated responsibility for MPOs.

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<sup>16</sup> SCAG's estimation of plan impacts on Gross Regional Product considered job creation impacts of direct investment in transportation infrastructure, and also additional efficiency gains in terms of worker and business productivity. For the latter, network benefits were estimated to summarize economic competitiveness impacts from improvements to the transportation system flowing from reduced commuting, accessibility, and transport costs. Additional amenity benefits were estimated to reflect the impact of measurable quality of life changes or increased consumer spending power that results from lower transportation costs. The modeled results indicated that the network benefits would result in an annual average of 512,000 jobs in the SCAG region during the 2011–2035 time period, compared to a "no-project" scenario.

**Table 5.1 MPO performance measures by type**

	MTC	SCAG	SANDAG	SACOG	
<b>Transportation</b>	<b>40%</b>	<b>59%</b>	<b>80%</b>	<b>52%</b>	
<b>Traditional</b>	<b>0%</b>	<b>21%</b>	<b>22%</b>	<b>7%</b>	
Mobility and delay for autos, highways & roads		15%	18%	7%	
Mobility and delay for trucks, goods movement		6%	4%		
<b>Sustainability-oriented</b>	<b>40%</b>	<b>38%</b>	<b>58%</b>	<b>45%</b>	
Efficiency	7%				
VMT			4%	17%	
System preservation - state of good repair	20%	6%	8%		
Transit productivity			4%	8%	
Accessibility					
Destinations within a given time or distance		18%	8%	2%	
Share of homes/jobs near transit			8%		
Alternate modes					
Non-SOV mobility		3%	14%		
Mode share, shift to non-SOV	7%		4%	17%	
Safety and security	7%	6%		2%	
Financial viability					
Cost-benefit of transport investments		6%	4%		
User costs			4%		
<b>Land use</b>	<b>3%</b>	<b>6%</b>	<b>0%</b>	<b>23%</b>	
Compact growth, TOD		6%		12%	
Housing affordability and supply	3%			3%	
Jobs-housing balance, mixed use				8%	
<b>Economy</b>	<b>7%</b>	<b>18%</b>	<b>12%</b>	<b>0%</b>	
Contribution to Gross Regional Product	7%	6%	4%		
Impact on jobs and income		12%	8%		
<b>Environment</b>	<b>13%</b>	<b>12%</b>	<b>4%</b>	<b>18%</b>	
GHGs	7%	6%	4%	3%	
Land consumption/habitat/water	7%	6%		15%	
<b>Social equity</b>	<b>17%</b>	<b>0%</b>	<b>0%</b>	<b>2%</b>	
Transportation and housing affordability by	7%	<i>evaluated elsewhere</i>			
Environmental justice (pollution)	7%	<i>in RTP</i>		2%	
Displacement and gentrification	3%				
<b>Quality of life</b>	<b>20%</b>	<b>6%</b>	<b>4%</b>	<b>5%</b>	
Air quality	13%	6%	4%		
Walkability/bikability	7%			3%	
Design, street amenities				2%	
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	
	n=	15	17	25	60

Sources: Author's calculations from current RTPs; MTC RTP Table 1; SCAG RTP Table 5.1; SANDAG RTP Table 2.2; SACOG Appendix G-6.

SACOG also moved away from a traditional approach to measuring congestion, by introducing an innovative measure of “optimal use levels” for roadways, taken to be utilization levels at moderate or tolerable levels of congestion.<sup>17</sup> In taking these steps away from traditional congestion and delay measurement, MTC and SACOG were addressing the breakdown of the traditional “mobility paradigm,” a serious concern for any MPO, but perhaps especially those promoting compact growth, because more concentrated development can lead to more, and not less, localized traffic congestion in core urban areas. As noted, MTC managed the congestion issue by *omitting* any measures of delay and congestion from its primary plan performance analysis. Meanwhile, SCAG and SANDAG took the opposite route, presenting delay and congestion (mobility) measures prominently, which worked in their favor because the positive results for plan performance they achieved (discussed below) helped them “sell” their plans on congestion relief.<sup>18</sup>

**Assessing current conditions**

The plans link their goals and measures to framing narratives that connect desired pathways with current conditions. Common, intersecting themes included: the need for planning integration to promote sustainability; the need to “do more with less” financially; and the emergence of demographic and market shifts expected to favor compact, transit-oriented housing.

One common trend has been slowing population growth. Most population growth during the time frames of the RTPs is projected to be comprised of births over deaths rather than in-migration, underscoring that new housing is needed to accommodate the children of current residents. Among the regions, the Sacramento area is projected to grow most rapidly (Table 5.2), which helps explain why the region’s plan assesses housing type by community location so extensively.

**Table 5.2 Population growth projections in most recent RTPs**

	Period of plan	Base population in millions	Growth increment in millions	% change	Annual % change (average)	Extrapolated % change base year to 2035
MTC	2010-2040	7.2	2.1	30%	1.0%	24%
SCAG	2010-2035	18	4.0	22%	0.9%	22%
SANDAG	2008-2050	3.1	1.3	40%	1.0%	25%
SACOG	2008–2035	2.2	0.9	39%	1.5%	39%

Source: Most recent RTPs of the 4 MPOs

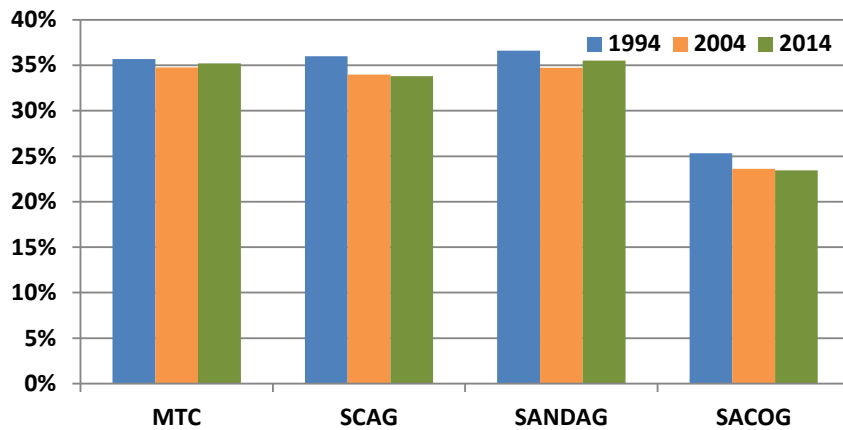
<sup>17</sup> Overall efficiency of roadways was measured as the percent of total travel at optimal levels of use based on roadway segment volume-to-capacity (V/C) ratios. For general purpose freeways, V/C ratios between 0.95 and 1.05 (i.e., from 5 percent below to 5 percent above the normal capacity) were defined as optimal. For HOV lanes, the optimal utilization level was set at 0.50 to 0.85. For arterial and expressway roadways, a wider range of optimal utilization was specified: 0.85 to 1.15. For local and collector streets, with the most varied use patterns, the optimal use level was set at a maximum V/C ratio of 0.75, or 75 percent of normal capacity.

<sup>18</sup> The four MPOs all expanded their equity analyses for their RTP/SCSs, compared to previous plans, in response to both stakeholder pressure and new federal guidelines. They presented equity performance results, often very extensive, separately from other performance measures and results in the RTPs; their equity measures are not included in Table 5.1 for that reason. This research does not include a thorough evaluation of equity performance assessment by the four MPOs, although MTC’s and SCAG’s methods and results were compared. These two MPOs’ methods mirror their general priorities and approach, in that MTC’s analysis is place-based (considering so-called “communities of concern”) while SCAG’s focuses more heavily on economic impacts, generally at a more aggregate level. In both cases, the equity impacts of the regional plan were determined to be generally positive or minimal. But also in both cases, the methods were still something of a blunt instrument, in that results are presented generally as averages either for geographic areas (e.g. communities of concern) or for groups of concern (e.g. low-income households) (Bills et al., 2012).



A second common theme in the RTPs is discussion of demographic and market trends that appear to support more compact development patterns. The relative shares of single-family and multi-family housing units in the four regions have remained remarkably steady for the past two decades (Figure 5.2). However, the MPOs highlight certain trends that should favor higher rates of multi-unit housing construction in the future, including the aging of the population, growing racial and ethnic diversity, and greater demand for transit-proximate housing among younger homebuyers.

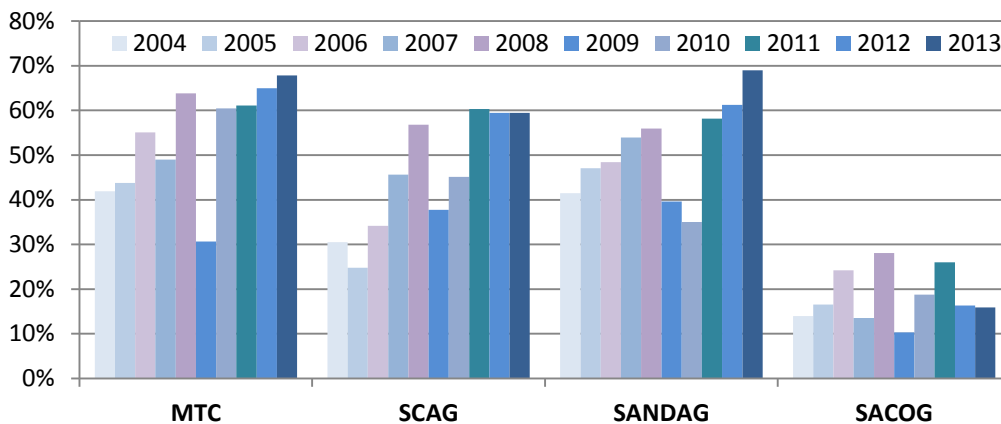
**Figure 5.2 Multi-unit housing as share of all housing by MPO region**



Source: California Department of Finance, Tables E-8 and E-5

The MPOs note that building permits for multi-unit housing have been rising in share vis-à-vis single-family unit housing. Multi-unit residential construction has risen in share to over half of all permits annually in three of the four regions (Figure 5.3).

**Figure 5.3 Multi-unit residential building permits as a share of all building permits by MPO region**



Source: US Census Bureau, Housing starts data

The MPOs point to other contextual trends that do not bode as well for achieving more compact development and other plan goals. In particular, they all complain about consequences of revenue shortfalls, particularly curtailments in transit service and multi-billion dollar shortfalls for needed rehabilitation of aging transportation assets. This situation helps explain why the MPOs emphasize cost efficiency and “fix-it-first,” emphasizing maintenance and rehabilitation of existing assets.

### ***Framing narratives***

A comparison of framing narratives is instructive in considering how each MPO defines the “common regional good” to be achieved, in relation current conditions. MTC’s narrative emphasized location efficiency, calling for a “more focused future” through integrated transportation and land use planning, to address current imbalances in the location of jobs and housing causing long commutes. The plan describes its primary mechanism for planning integration as the designation of some areas where development should be targeted, and others where it should be avoided. The plan notes that “local governments have identified Priority Development Areas (PDAs) and Priority Conservation Areas (PCAs), and these form the implementing framework for *Plan Bay Area*. PDAs are areas where new development will support... a pedestrian-friendly environment served by transit... [while] PCAs are regionally significant open spaces... for long-term protection” (MTC RTP, 2013, p.2).

MTC then linked the PDA/PCA approach to transport investments to create “the first truly integrated land use and transportation plan for the region” (ibid, p. 10). The “overriding priority” for plan investment is fix-it-first, to maintain existing assets in the region’s core (ibid, p.13). The plan introduction also highlights the MPO’s new One Bay Area Grant (OBAG) Program, which aims to better integrate transportation investments with land use by conditioning certain funds on allocation to PDAs and rewarding jurisdictions that support housing growth in PDAs (the program is described later in more detail).

Background documents for the RTP blame the spatial mismatch between jobs and housing on “infrastructure, market, and *regulatory* constraints to housing production” (emphasis added) in older, central parts of the region, to which certain negative outcomes are attributed such as rising traffic congestion, increased travel times and costs for many commuters, and rising housing prices.<sup>19</sup> In pointing to regulatory constraints as a cause of housing affordability woes, MTC suggests that low-density zoning by growth-resistant localities may be constraining the market. As MTC and ABAG developed programs and policies to implement their RTP/SCS, from their RHNA allocation method to their PDA strategy (both discussed later), this theme would be reinforced.

SCAG’s plan similarly notes that suburban growth, particularly in the Inland Empire counties of Riverside and San Bernardino, has caused an imbalance of jobs and housing in the region, which “poses a serious transportation and air quality challenge” (SCAG RTP, p.17). However, in talking about solutions, SCAG’s framing narrative, like its goals and performance measures, focuses more on transportation than land use. Mobility problems are foregrounded due to an overriding concern with traffic congestion as a looming threat – both economic and environmental. With the region a global hub for goods transfer, goods movement is characterized as a double-edged sword, both undergirding the regional economy but also worsening congestion and associated air pollution.

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<sup>19</sup> MTC, *Regional Policy Background Papers – July 2013, Housing the Workforce in the Bay Area*, p. 3, at [http://planbayarea.org/pdf/policy\\_background\\_papers/Housing\\_the\\_Workforce\\_Policy\\_Background\\_Paper\\_July\\_2013.pdf](http://planbayarea.org/pdf/policy_background_papers/Housing_the_Workforce_Policy_Background_Paper_July_2013.pdf)

SCAG's plan paints a picture of near-crisis in terms of polluting emissions associated with rising traffic and congestion levels. Air quality challenges are pressing, as the region still has some of the worst air quality in the nation, in particular, the highest concentration of ozone and particulate matter (PM 2.5). SCAG's RTP notes that reductions in oxide of nitrogen (NOx) emissions (one of the precursors to ozone, a.k.a. smog) of approximately two-thirds will be needed in the South Coast Air Basin by 2023 and three-quarters by 2030 – a very daunting challenge given that 2030 emissions forecasted from just three sources—ships, trains, and aircraft—would lead to ozone levels near the federal standard. With most sources, including cars and factories, already highly controlled, the RTP notes that attainment of ozone standards will require broad deployment of zero- and near-zero emission technologies for freight movement. On this basis, SCAG's RTP portrays freight transport efficiency as critical to solving inter-connected concerns in the region, to improve the economy as well as the environment.

SCAG characterizes its RTP/SCS as an economic development tool, noting that, “Never before have the crucial linkages and interrelationships between the economy, the regional transportation system, and land use been as important...for the first time, the 2012–2035 RTP/SCS includes a significant consideration of the economic impacts...considering not only the economic and job creation impacts...but also the efficiency gains in terms of worker and business productivity and goods movement” (SCAG RTP, 2012, p. 1). The RTP's \$524 billion of planned investment is characterized as an infrastructure jobs program that will improve goods movement and air quality.

Like SCAG's plan, SACOG's framing narrative emphasizes the need to ameliorate several persistent, worrisome mobility trends, including rising VMT and congestion. The RTP connects fiscal belt-tightening to improvements in these indicators through strategies to address roadway bottlenecks and “right-size” some surface street improvements, and by concentrating transit resources on high-capacity corridors with ridership potential. In this fashion, SACOG turned the economic recession into an opportunity to “make more with less,” underscoring the sustainability nexus between fiscal and transport efficiency.

Meanwhile, SANDAG's “vision” for its RTP is perhaps the most traditional among the four. Like SCAG's RTP, SANDAG's plan highlights congested commutes as the primary problem to be addressed in the plan, because the region's residents “want an improved transportation system” (SANDAG RTP, 2011, p. 1-2). This framing leads to discussion of plan goals for improving mobility, enhancing transportation “choice,” and providing more livable, walkable, and compact neighborhoods. The predominant theme of alleviating congestion problems, set out in the introductory narrative, would prove to be a bone of contention with smart growth advocates during SANDAG's planning process (discussed below). In contrast, SCAG stakeholders did not challenge that regional plan's focus on congestion reduction as much, in part because SCAG's plan included significant new funds for transit and non-motorized modes, especially in Los Angeles County, where voters passed Measure R in 2008, a 30-year transportation sales tax measure expected to raise \$40 billion, most of which will be devoted to transit.

The RTPs' framing narratives thus provide contrasting depictions of regional priorities and the “common good” to be advanced. SCAG emphasized economic benefits of mobility, while also noting environmental implications. SACOG highlighted the link between fiscal and transport efficiency. In contrast, MTC posits housing provision, location efficiency, and integrated planning as more central themes. But just as SCAG's economic focus carries environmental implications, MTC/ABAG's location efficiency concerns carry economic overtones, which MTC underscores by describing regional business leaders' worries about housing affordability and the need to reduce local regulatory barriers to housing production (MTC RTP, 2013, p. 3).

Infill housing figured more prominently in MTC’s plan partly due to challenges that arose in achieving the SB 375 performance mandates (for GHG reduction and no “spillover growth”), causing the MPO to prioritize location efficiency (these challenges are described in more detail below). In contrast, the other MPOs emphasized transportation measures and their benefits, helping to allay concerns about perceived intrusion into local land use authority. SCAG, in particular, depicted severe transportation-related threats, for which the RTP could provide a solution to benefit all, without directly challenging local land use. Focusing more concertedly on land use, MTC/ABAG’s planning process proved to be more contentious, because re-directing land use policies to address regional rather than local priorities threatens some status quo interests. These patterns of stakeholder response are described in more detail below.

### ***Stakeholder engagement and patterns of conflict***

Stakeholder engagement increased substantially after SB 375 with one indication being the number of comment letters submitted on the plans, which at least doubled for each MPO for its post-SB 375 plan compared to its prior, pre-SB 375 plan. The scrutiny by stakeholders was sometimes intense, and became especially conflictual in two regions – the San Diego and San Francisco Bay Areas. The different patterns of conflict can be related to four key factors and their interaction: size of region; the histories of non-governmental stakeholder engagement in plan deliberations; the degree to which SB 375 performance mandates and associated climate performance policies posed a binding constraint for each MPO’s plan; and the degree to which plan resources were available for innovative strategies.

In certain basic respects, the MPOs’ outreach efforts were similar, because they all followed SB 375 requirements for holding public outreach workshops for local officials, planners, and the public.<sup>20</sup> The MPOs first held planning sessions for local officials and planners, to gather local data as the starting point for developing plan scenarios. Then they also held county-level public outreach workshops to present scenario alternatives and gain public feedback, as well as utilizing other techniques such as administering surveys, focus groups, and telephone polls.<sup>21</sup>

The main traditional stakeholder groups are also similar in each region, comprising, in particular, local government members of the MPOs, and representatives of environmental, smart growth, social equity, and business organizations (including homebuilders). However, the processes and histories for incorporating stakeholder input differ by region, reflecting institutional structures of the MPOs and different levels of organization and activism by stakeholder groups, among other factors.

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<sup>20</sup> SB 375 calls for MPOs to conduct at least two informational meetings on the SCS in each county for county supervisors and city council members, as well as “outreach efforts to encourage the active participation of a broad range of stakeholder groups,” and workshops in each county to “provide the public with the information and tools necessary to provide a clear understanding of the issues and policy choices.”

<sup>21</sup> MTC conducted 19 public workshops that attracted nearly 2,000 residents, distributed and collected 1,600 surveys, conducted 21 focus groups, and conducted three statistically valid telephone polls. SCAG held 13 planning sessions with local officials and planners, garnering nearly 90 percent participation, and then held 18 public outreach workshops, attended by over 700. SANDAG held a preliminary informational meeting attended by all jurisdictions within the region, and then held five sub-regional public workshops and two county-wide public hearings, with attendance by more than 160. SANDAG staff also made nearly 200 presentations at business and community organizations, and conducted a public opinion survey. SACOG met with staff from each member jurisdiction early in the process; then the SACOG Planners Committee, made up of the planning directors or designees from each member jurisdiction, facilitated coordination of the unfolding process. SACOG held sixteen focus groups, nine county-level workshops attracting 572 participants, and staff participated in over 130 meetings in the region.

The two smaller regions (the Sacramento and San Diego regions) have been able to more easily facilitate deliberations with local planners and officials, because of more manageable numbers of localities. The LA and San Francisco Bay MPO regions contain 191 cities and 101 cities, respectively, along with multiple county-level agencies that exert substantial influence over transportation funding, programming, and planning outcomes. In the LA region, by law, state and federal capital funds are programmed not by SCAG, but by “county transportation commissions.” County-level transportation agencies also exert a powerful role in the Bay Area, for example as managers of multi-year county sales tax measures passed by voters for transportation purposes. Multiple transit agencies also operate in the two large regions, further complicating institutional relationships.

By contrast, the mid-size regions are less institutionally complex. The SACOG region includes six counties but only 22 cities. The SANDAG region is the most institutionally manageable, with a single county and only 18 cities, one of which contains nearly half the region’s population. With many fewer local jurisdictions to work with, the MPOs in the two smaller regions can more easily facilitate planning coordination, because they can more easily bring local planners together in one room. This difference in institutional complexity helps explain why survey results have shown that local planning directors in the two mid-size regions rate their regional planning process as more effective, and are considerably more apt to be engaged in it, than local planning directors in the two largest regions (Barbour and Deakin, 2012).

The RTP processes have long included occasional conflicts among stakeholders in seeking to reconcile diverse interests. As the California MPOs adopted the more outreach-oriented blueprint approach, they increasingly developed more organized processes of “elite stakeholder” engagement, instituting advisory committees, for example, to disseminate information, gain input, and facilitate negotiation. Disputes were sometimes reconciled through the courts after plan adoption left certain stakeholder groups dissatisfied.

Stakeholder groups have been especially active in the San Francisco Bay and San Diego regions, where environmental and smart growth activists have applied organized pressure on the MPOs for many years. This level of organization reflects left-leaning political attitudes prevalent in the Bay Area, and well-organized environmental activism in the San Diego region that arose to address development pressure on natural resource areas, in particular, endangered habitat. The Los Angeles and Sacramento regions have had less history of aggressive stakeholder pressure on the MPOs. In the LA area, this situation reflects the region’s vast size; many environmental and smart growth groups focus on sub-regional concerns as a result.<sup>22</sup>

The sense of confidence and trust in the MPO is especially strong in the Sacramento area, where, facing rapid change and associated problems such as for air quality, SACOG has been able to promote a collective shift toward smarter growth through close engagement with its stakeholders in its institutionally manageable context. SACOG receives wide praise from local government stakeholders and others (including environmental and social equity organizations) for its efforts to engage them in long-term, in-depth discussion through means such as advisory committees. In addition, the agency’s careful data analytical work for performance assessment has instilled trust.

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<sup>22</sup> LA Streetsblog, for example, admits that, “Streetsblog hardly covers the Southern California Association of Governments (SCAG), even though the regional plan it puts out is incredibly important in determining which projects receive federal funds and which ones don’t” (from Damien Newton, “As SCAG talks environmental justice, Tea Party group hones in on E.D.,” *LA Streetsblog*, April 21, 2015, at <http://la.streetsblog.org/category/agency-watch/scag/>).

But SACOG’s winning combination of relationship-building with careful performance analysis did not just emerge randomly; instead, the agency’s nationally recognized blueprint process, upon which its post-SB 375 plan builds, was launched in the aftermath of a threatened air quality non-conformity finding in the late 1990s, which propelled the MPO to adopt a more concerted approach to regional coordination and cooperation. This observation underscores the importance of a constraining regional performance mandate in fostering collective action.

However, smaller size and greater institutional manageability provided no automatic guarantee of a stress-free planning process under SB 375. In particular, the process became very contested in the San Diego area, one of the two smaller regions studied, and the most institutionally coherent of them all. The San Diego MPO encountered a severe backlash from environmental stakeholders when they noticed backsliding in projected post-SB 375 GHG emissions in SANDAG’s SCS/RTP. The MPO had chosen to prepare its RTP/SCS to extend to the year 2050, to match the timeframe of Transnet, the county’s forty-year transportation sales tax measure which took effect in 2008. The projected transport-related GHG emissions modeled for the plan showed backsliding after 2035 (i.e. post-SB 375), in the form of a declining rate of GHG efficiency improvements. Governor Arnold Schwarzenegger had signed Executive Order S-3-05 in 2005, calling for GHG reductions in the state by 2050 to 80% below 1990 levels, to match the levels recommended by climate scientists for developed nations. Environmental stakeholders used this executive order as the basis to sue SANDAG on the environmental performance of its plan; the lawsuit is currently being considered by the state Supreme Court.

This outcome points to the importance of the third key factor helpful in explaining levels of conflict across the regions, namely the degree to which the SB 375 performance mandates, and associated climate performance policies (including Executive Order S-3-05), were constraining. Performance mandates not only provide stakeholders with means to hold MPOs accountable for meeting collective action goals, they also create a parameter within which tensions among stakeholders may come up to the surface. This situation was especially noticeable in the Bay Area process.

In early plan performance modeling, the Bay Area MPO found that it would be challenging to meet the two new performance mandates imposed by SB 375 (the GHG reduction target, and the mandate to house all projected workforce growth within the region, i.e. with no “spillover”). Questions about meeting the “no spillover growth” mandate became especially contested and confusing, as the two regional agencies (MTC and the Association of Bay Area Governments, or ABAG, the region’s Council of Governments) revised their estimate of total projected regional population growth – a basic initial input into the plan development process – a number of times during the course of the planning cycle (these events are described further below). The challenges led to battles among stakeholders, in attempting to reconcile the need for location efficiency with demand for accommodating new housing supply, along with equity concerns about gentrification and displacement threats. In other words, housing policy, both in regard to supply and location, as well as equity impacts, became central issues of contestation in the Bay Area planning process.

The large size of the Bay Area meant that consensus among localities across the diverse region was hard to negotiate. One reflection of diversity of viewpoints was a new and aggressive form of activism, namely mobilization of opposition by Tea Party and property rights activists, coming especially from suburban locales. These activists mobilized turn-out in the hundreds for MTC/ABAG’s public workshops and public hearings, where they vocally expressed opposition to the imposition of “stack-and-pack” housing upon unwilling localities, the “rigged” nature of public workshops, and the questionable validity of “black box” agency-produced data (Frick, 2013). While “normal antagonism” among MPO stakeholders has characterized the political give-and-take of

RTP processes for years, the Tea Party's challenge was of a different order. Rather than negotiate for concrete policy demands, Tea Party opposition presented instead a frontal assault upon the legitimacy of the RTP process itself, as activists contended it was undemocratic because the regional agencies (MTC and ABAG) are not elected bodies, and are out of touch with local needs and priorities.

MTC's assertive stance favoring compact growth in its plan, adopted to meet SB 375 performance mandates, helps explain the Tea Party opposition. The Bay Area plan funnels more than two-thirds of housing and job growth to PDAs, but even more importantly, the plan connects both rewards and penalties, through its RHNA allocation method and OBAG program, to these growth zones. (These aspects of the plan are described in more detail below.) Even though the suburban communities where most of the Tea Party activists reside were not asked to take on the bulk of new compact housing development called for in the Bay Area plan, the MPO's assertive stance touched a nerve, and many suburban communities did not feel they could "buy in."<sup>23</sup>

In the larger LA region, suburban communities also raised concerns about intrusion into local land use, but the MPO took pains to reassure them that local plans would be honored (see upcoming sections). While the LA area MPO mediated concerns through outreach and reassurance to localities, in the Bay Area the MPO's approach was more widely perceived as imposing regional collective action prerogatives upon unwilling localities. This perception was evident in the reaction of many Tea Party activists to the title of the Bay Area RTP, dubbed "Plan Bay Area," and its new "One Bay Area" grant program; many activists countered that "we are *not* one Bay Area."

The conflicts in the Bay Area reflect an additional, fourth, factor that helps explain diverging patterns in stakeholder engagement across the regions. Among the four MPOs studied, MTC has the largest amount of "discretionary" revenue at its disposal, in particular because the agency levies bridge tolls, unlike the others, and can use revenue from this source not needed for bridge maintenance for other purposes (Sciara and Wachs, 2007). For its post-SB 375 plan, MTC considered 20% of programmed funds to be discretionary (MTC RTP, 2012, p. 12). This greater level of discretionary revenue allows MTC more leeway for funding smart growth initiatives like the new OBAG program and Climate Initiatives, described in more detail below. As a result, the agency is also more subject to contestation from stakeholders about expenditure of these funds.

A comparison of the conflicts in the San Diego and San Francisco Bay regions points to some further insights. As noted, both regions have longstanding histories of assertive stakeholder engagement from environmentalist groups. Conflict over the San Diego plan was much more polarized in a strictly binary way, however, than in the Bay Area. In the San Diego area, the conflicts were about the regional plan not being ambitious enough. As the first SCS/RTP to be completed after passage of SB 375, the San Diego area plan gained intense scrutiny statewide – evidence that SB 375 has engendered a statewide conversation about sustainability planning.

Environmental and smart growth organizations in the San Diego region were joined by many from outside, in pushing the MPO to take a stronger line on improving location efficiency and non-auto mode capacity (Rose et al., 2011). These stakeholders were concerned about a perceived laissez-faire attitude from the SANDAG board of directors in adhering to existing local land use policies, as well to prior commitments for highway expansion projects outlined in the county's Transnet sales tax ordinance, now perceived to be outdated after passage of SB 375 (discussed later in more detail). Opinions were further polarized when, after environmental and smart growth groups lobbied

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<sup>23</sup> See e.g. Kelly O'Mara, "Marin cities rebel against regional planning," *SF Public Press*, July 2, 2012, at <http://sfpublicpress.org/news/2012-06/marin-cities-rebel-against-regional-planning>.

SANDAG to model their preferred policies in the scenario evaluation process, SANDAG rejected their scenarios as infeasible (discussed later in more detail).

Bay Area conflicts, by contrast, did not take on the same binary MPO-versus-stakeholder quality, but instead reflected a diversity of opinion coming from many directions, with stakeholders openly challenging each other as much as the MPO governing board or staff. One clear indication of this multi-way tension was that lawsuits were filed on the plan by a diverse set of stakeholders – specifically, the Building Industry Association, a set of environmental groups, and property rights activists, with social equity activists also threatening to sue. These lawsuits (discussed later) were settled out of court with the traditional stakeholder groups, when MTC and ABAG committed to adopt specific strategies advocated by the plaintiffs, in other words, through “normal antagonism.” The negotiated outcomes reflect more pragmatic, if still contentious, working relationships in the Bay Area, at least between the MPO and the more traditional and long-engaged stakeholder groups, namely the environmentalist, smart growth, and homebuilder lobbies (and not the Tea Party and property rights advocates, who were new to the process post-SB 375).

An important institutional step taken by the Bay Area MPO deserves notice in regard to the dynamics of stakeholder engagement that emerged in the region’s planning process. In designing the new One Bay Area Grant program (described in more detail below), the MPO devolved its administration to county transportation agencies, seen as being closer to localities and thus more easily able to mediate negotiations at a smaller scale. Advantages and disadvantages of this approach are discussed later in more detail.

Thus, outreach and participation strategies under SB 375 generally built upon established procedures and histories of stakeholder engagement, including “normal antagonism,” but gained more intense scrutiny and sometimes became more conflicted under SB 375. Bay Area dynamics, in particular, point to a larger ongoing challenge: how to effectively engage the public in regional decision-making in the absence of democratically elected regional bodies. In this regard, although highly conflictual, the Tea Party assault is likely to be salutary in the long run, in raising questions about how to democratize the RTP process. Shutting the whole process down, however, as many Tea Partiers advocated, is not likely to be the best way forward.

### ***Land use projections***

For each RTP, MPOs must develop “growth projections” for jobs, then population and households, and then housing units, to be distributed by location. The projections, in turn, form a key input for evaluating the impacts of potential transport investment and policy choices. The SCS requirement in SB 375 applies to the land use projections component, adding new performance requirements (for GHG reduction and “no spillover” growth) and plan consistency requirements (for integrating the RTP with RHNA). The SCS element of the planning process brought to light tensions in reconciling sustainability-oriented aspects of RTP planning with the institutional blockages that hamper MPO implementation strategies.

SB 375 added three new stipulations, complicating the MPOs’ task and creating certain tensions. Two of the stipulations favor compact growth, namely the performance mandates for GHG reduction and “no spillover growth,” or, in other words, the requirement that the plan accommodate adequate housing in the region for all projected workforce growth.

These mandates severely constrained only one MPO, however, namely, in the Bay Area, where early performance modeling indicated that the plan might not meet either mandate. Already more built-out and compact than the other regions, the Bay Area has seen decades of work to promote



infill housing, protect open space, and increase transit network capacity. These factors make it harder to “push the needle” further on GHG reduction through policy-induced shifts. Meanwhile, the “no spillover” mandate was constraining because the historically drawn borders of the MPO territory no longer contain the metro region’s growth, a problem not faced by the other MPOs.

The third new requirement for SCSs, namely for RTP-RHNA consistency, does not automatically favor compact growth strategies. On the contrary, tensions arose, especially in the Bay Area, between smart growth goals of SB 375 and income de-segregation goals of RHNA. The following section considers these tensions, and the subsequent section considers how and whether growth projections in the four plans included more compact growth than pre-SB 375 plans.

### Integrating RTPs with RHNA

The new RTP-RHNA consistency requirement in SB 375 proved to be a test case for whether and how MPOs would undertake transportation and land use planning integration and also address social equity concerns. This new consistency requirement brought out underlying tensions between SB 375’s smart growth goals and RHNA’s social equity goals for income de-segregation and provision of affordable housing. RHNA has traditionally been aimed at promoting income de-segregation in suburban locations by requiring they accommodate more multi-unit housing. But as SB 375 now works to induce more infill development in inner-city areas, a number of concerns arise. First, can the traditional RHNA objective of de-segregating suburbs be preserved, if most growth is now directed to inner-city core areas? Second, how should the potential threat of gentrification and displacement in inner-city areas be addressed?

Under the Regional Housing Needs Assessment (RHNA) process, each MPO/COG must allocate a state-supervised numerical target for projected regional housing need for a specified range of all income categories among all the local jurisdictions in the region.<sup>24</sup> With passage of SB 375, each MPO’s officially adopted population and housing projections must be aligned with RHNA allocations. In this manner, SB 375 in effect creates a consistency requirement in regional and local plans for land use, housing, and transportation purposes. SB 375 also stiffened enforcement provisions for RHNA compliance, thereby making the RTP-RHNA connection more salient to local governments, many of whom had ignored RHNA compliance in the past (by, for example, allowing housing elements of their General Plans to become out-of-date).

However, the traditional technique for implementing RHNA does not mesh well with smart growth strategies under SB 375. Under RHNA, fair share requirements can be implemented through local zoning that meets state-established default density standards, as a proxy for affordability.<sup>25</sup> This approach operates on the assumption that more compact, multi-unit housing is likely to be more affordable. SB 375 calls this logic into question, however. With market trends expected to align with policy efforts to support infill, threats of displacement may worsen.

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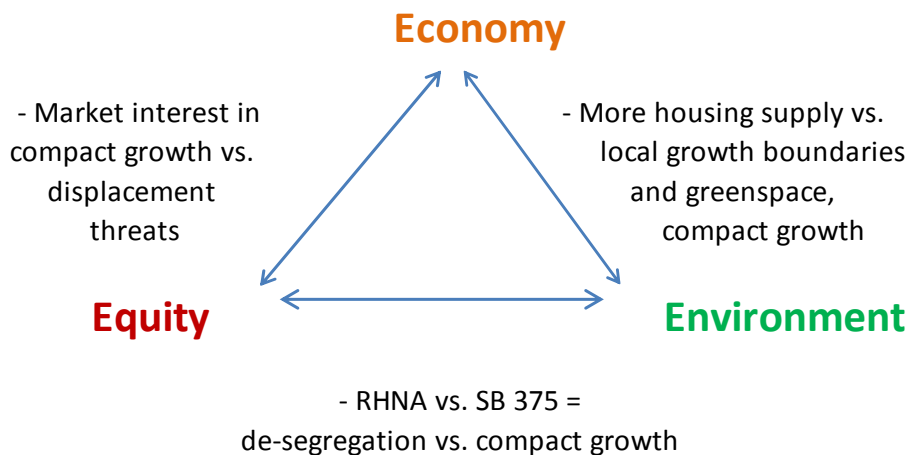
<sup>24</sup> More specifically, since 1980, Councils of Government in California (COGs), which are mostly coincident with the MPOs, have been required by state law to complete the RHNA process on a cyclical basis in consultation with the California Department of Housing and Community Development (HCD), in order to determine and allocate to local jurisdictions the region’s housing needs by income category. MPOs receive a total housing unit number for growth during the planning period from HCD, which they are required to distribute to local jurisdictions within the region according to four income categories – very low, low, moderate, and above moderate. Localities must then zone for adequate housing to accommodate their RHNA allocation.

<sup>25</sup> HCD requirements are at [http://www.hcd.ca.gov/hpd/Default\\_2010census\\_update.pdf](http://www.hcd.ca.gov/hpd/Default_2010census_update.pdf). Cities with populations under 25,000 can use a land inventory residential density standard of at least 20 units an acre to accommodate lower income households in their housing elements, while cities with populations greater than 25,000 must use a default density of at least 30 units per acre.

The planning process in the high-cost Bay Area reflected these concerns, as debates arose about gentrification and displacement threats. Unique among the four MPOs, MTC/ABAG developed and applied a measure of displacement threat in its plan analysis.<sup>26</sup> Debates also arose about how to balance state, regional, and local authority in designating growth zones. MTC/ABAG had asked localities to designate growth zones (the so-called PDAs), but equity advocates questioned whether allowing local designation of growth areas effectively abrogated state-imposed RHNA criteria.<sup>27</sup> This issue points to conflicts in state law and policy goals that may hamper MPO strategies.

With Bay Area business leaders concerned about increasing housing supply not just in infill zones, and environmentalists concerned about preserving greenspace within, not just outside, the region, the stage was set for multi-way stakeholder conflicts on housing issues, reflecting tensions among the “3 E’s” (Figure 5.4 shows some of the tensions). As noted earlier, each of these three key stakeholder interest groups either filed, or threatened to file, a lawsuit to advance its priorities.

**Figure 5.4 Tensions among 3 E’s in Bay Area housing debates**



The legal challenges were settled out of court, resulting in new planning commitments from MTC and ABAG to address stakeholder concerns. In response to social equity stakeholders, MTC and ABAG took steps to address housing affordability, such as by incorporating affordable housing performance into the RHNA allocation method and OBAG Program. In response to the environmentalists’ lawsuit, the agencies agreed to do more careful GHG analysis, as well as PDA

<sup>26</sup> MTC identified concentrations of overburdened renters in traffic analysis zones (TAZs) where greater than 15% of housing units are occupied by renters paying more than 50% of their income on housing. TAZs that met these thresholds and were also projected to grow by more than 30% by 2035 (above the regional average of 27%) were considered at risk of increased displacement pressure. The analysis indicated that 30% to 40% of overburdened renters in identified “communities of concern” are at risk, compared to 7% to 10% elsewhere. Evaluation of the final adopted plan indicated that its focused-growth approach increased projected displacement potential by approximately two-thirds, compared to the “no project” alternative reviewed under CEQA. However, this effect, while adverse, was not estimated to be much higher for communities of concern (68%) than the remainder of the region (67%). See *Plan Bay Area Equity Analysis Report*, at [http://planbayarea.org/pdf/final\\_supplemental\\_reports/FINAL\\_PBA\\_Equity\\_Analysis\\_Report.pdf](http://planbayarea.org/pdf/final_supplemental_reports/FINAL_PBA_Equity_Analysis_Report.pdf).

<sup>27</sup> See letters on this dispute at:

[http://www.publicadvocates.org/sites/default/files/library/hcd\\_letter\\_to\\_abag\\_re\\_legal\\_inadequacy\\_of\\_rhna\\_allocation\\_methodology\\_6-21-13.pdf](http://www.publicadvocates.org/sites/default/files/library/hcd_letter_to_abag_re_legal_inadequacy_of_rhna_allocation_methodology_6-21-13.pdf);

[http://www.publicadvocates.org/sites/default/files/library/letter\\_from\\_hud\\_to\\_the\\_association\\_of\\_bay\\_area\\_governments\\_4.9.13.pdf](http://www.publicadvocates.org/sites/default/files/library/letter_from_hud_to_the_association_of_bay_area_governments_4.9.13.pdf); [http://www.publicadvocates.org/sites/default/files/library/abag\\_rhna\\_comment\\_letter\\_7-16-12.pdf](http://www.publicadvocates.org/sites/default/files/library/abag_rhna_comment_letter_7-16-12.pdf)

feasibility analysis, for the next planning cycle.<sup>28</sup> In response to the lawsuit filed by the Building Industry Association, the agencies agreed to do more rigorous feasibility analysis of permitting in PDAs, and to more strictly adhere to the “no spillover” mandate, in the next planning cycle (the RTP/SCS had allowed for an increase in absolute spillover development, though not in the rate).<sup>29</sup>

Among the four plans studied, the Bay Area’s took the strongest steps to integrate housing production and smart growth criteria into its RHNA allocation method.<sup>30</sup> The other three MPOs’ approaches were less interventionist. For example, SCAG’s methodology did not contain explicit smart growth criteria like ABAG/MTC’s, nor seek to reward housing production; it also applied only a 110% adjustment factor by income category to each locality’s existing income shares, compared to ABAG/MTC’s 175% adjustment factor. Rather than push localities hard to zone for more infill or address displacement threats, SCAG’s plan took a different stance, portraying a hoped-for shift to more concentrated development in the region as inevitable (“natural”), due to current and expected market patterns, and noting that, “[the higher] projected housing densities [in the RTP/SCS] will help the region accommodate the projected housing needs at all income levels over the life of the RTP, especially at the lower-income categories” (SCAG RTP, 2012, p.129).

Thus, SB 375 brought out tensions between smart growth, economic, and equity goals especially in relation to housing issues, and especially in the Bay Area, where the housing challenge is acute. While all the MPOs portrayed a possible win-win-win situation in which market trends favoring infill might coincide with SB 375 goals for location efficiency, as well as affordable housing goals under RHNA, this apparent win-win-win combination actually papers over some serious concerns about integrating equity into the smart growth equation. To the contrary, these goals may conflict, especially when state mandates (RHNA and SB 375) pull MPOs in different directions.

Conflicts among sustainability goals (tensions among the 3 “E’s”) are a normal part of sustainability planning, and the RTP-RHNA consistency mandate brought underlying tensions up to the surface, thereby providing an opportunity to squarely address trade-offs. However, the job of an innovative MPO like MTC is made harder when conflicts between state laws render innovative strategies to integrate transportation and land use planning legally questionable, as in the case of the PDA strategy.

The PDA approach is a notable institutional innovation for improving regional-local planning integration; if localities designate PDAs themselves, their commitment to regional plan implementation on-the-ground may well increase. Conflicts about legality of the Bay Area’s PDA strategy in connection to RHNA point to an unresolved integration dilemma, as well as to difficulty in reconciling state, regional, and local priorities. The state may need to consider how better to reconcile these concerns, such as through efforts to help localities provide and retain affordable housing in transit zones (recent state efforts along these lines are discussed below).

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<sup>28</sup> The settlement is at: <http://www.cbecal.org/wp-content/uploads/2014/06/Settlement-CBE-vs-ABAG-6-18-14.pdf>

<sup>29</sup> The BIA’s pleading is at <http://www.mydocsonline.com/pub/hbancstaff/BIA%20v%20ABAG%20MTC.pdf>. The settlement agreement is at <http://planbayarea.org/file10181.html>.

<sup>30</sup> MTC/ABAG (officially, just ABAG) incorporated smart growth factors into its RHNA allocation rules using three primary elements: 1) a “sustainability” component, by which 70% of new housing was distributed among PDAs; 2) a “fair share” component, by which more housing was allocated to jurisdictions with strong transit networks, many jobs, or poor affordable housing permitting performance; and 3) an “income allocation” factor, aimed at income desegregation, by which, for each jurisdiction, the difference between the regional proportion of households for each income category and the jurisdiction’s proportion for the same category was multiplied by 175 percent.

### Integrating policy action with projections

A quote from SACOG’s RTP articulates the balancing act required of MPOs in developing population, employment, and land use projections for RTPs:

SACOG strives to [develop its land use and growth projections] with two seemingly contradictory goals in mind: using increasingly sophisticated tools to improve the accuracy of its 25-year projections, while writing a plan that recognizes the fact that open market and policy/regulatory forces inevitably will shape the future in ways that are not possible to completely predict or control (SACOG RTP, 2012, p.27).

By law, MPO land use projections must be realistic forecasts of future development patterns,<sup>31</sup> but what constitutes a realistic forecast is not a simple question. Traditionally, in developing projections, MPOs were more likely to take land uses specified in local plans as a given (Rose, 2011). However, MPO projections are not constrained to represent only development patterns envisioned in adopted local General Plans (comprehensive plans), for three reasons. First, local plans do not always extend in time for as long as RTPs; second, MPOs can apply their own, documented assumptions for projecting future development; and third, General Plans cumulatively might accommodate more development than regional projections deem realistic, allowing the MPO to allocate projected location of development according to market and policy factors.

This wedge of uncertainty – the MPOs’ “room to maneuver” in determining growth projections that veer away from existing General Plans – opens room for debate. All the RTPs underscore that demographic patterns and market trends are combining to support demand for urban infill housing. However, some local governments may nevertheless be unwilling or unable to support infill. Stakeholders may disagree about feasibility of compact growth from various angles, including market feasibility, infrastructure needs (and available supports), and community acceptance. These factors mean that even the most technically rigorous process for developing projections becomes politicized, given that stakeholders, particularly localities, help *determine* whether development patterns are realistic.

A key strategy utilized by all four MPOs to connect regional and local objectives has been to designate community or “place” types. These designations provide “a tool for local-regional exchange to identify places and policies for sustainable development,”<sup>32</sup> and at the same time, for MPO technical modelers to use in developing regional land use projections. The MPOs define a range of different place types, such as regional centers, city centers, suburban centers, transit town centers, and rural communities. The distinctions between types are typically based on existing and targeted numbers of housing units and jobs, net density ranges, type of transit, mix of land uses, retail characteristics, and may include various other planning aspects such as design guidelines and Floor Area Ratios (FARs) for new development.

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<sup>31</sup> The state and federal governments call for the growth and land use projections to reflect “recent” and “reasonable” planning assumptions. More specifically, the California Transportation Commission’s 2010 *RTP Guidelines* (2010, p.129) allow that “planning assumptions can be different than historical trends or existing plans and boundaries” but only provided that these assumptions are reasonable, consistent, and well-documented. Meanwhile, federal law requires that MPOs “utilize the most recent planning assumptions, considering local general plans and other factors” (Rose, 2011). MPO plan scenarios also must be “financially constrained,” that is, reflecting investment choices based on funds that can be “reasonably” expected to be forthcoming during the plan’s duration. Combined, the mandates mean that the MPO must be able to justify why its land use projections and planned transport investments, and associated performance metrics, are credible.

<sup>32</sup> See p.13 of MTC, *Initial Vision Scenario*, March, 2011, at [http://www.planbayarea.org/pdf/Initial\\_Vision\\_Scenario\\_Report.pdf](http://www.planbayarea.org/pdf/Initial_Vision_Scenario_Report.pdf)

An important question is whether MPOs use place type distinctions mainly just for modeling purposes, or also in a more explicit and direct fashion for negotiating with localities about policy action. Among the four MPOs, MTC/ABAG pursued the latter approach most actively, asking local governments to designate PDAs and PCAs, and then directing housing growth and transportation resources toward the PDAs through its RHNA allocation method and the OBAG program. PDAs thereby form a strategic link for crossing the institutional divide between transport and land use planning authority.<sup>33</sup>

MTC and ABAG have pursued the PDA strategy in earnest since 2008 with the advent of the two agencies' FOCUS program. Local governments were asked to identify PDAs and also Priority Conservation Areas (PCAs) in reference to seven designated place types. The approximately 170 PDAs that have been designated range in size from as little as 30 acres to several thousand. PCAs, in turn, comprise over 100 "regionally significant open spaces for which there exists broad consensus for long-term protection but nearer-term development pressure" (MTC RTP, 2013, p.45).

The PDAs and PCAs "form the implementing framework for Plan Bay Area" and "the basis for the...SCS," according to the RTP/SCS (MTC RTP, 2013, p.2). Various MTC/ABAG policies and programs utilize the PDA framework, including the RHNA allocation method and the new OBAG program (described later). In this manner, MTC and ABAG seek to work with willing jurisdictions to direct growth. In doing so, the RTP notes that, "In some cases, the growth distribution challenged certain communities with particularly rich transit options to grow in a more compact form than called for in their general plans...additional units were distributed to key job centers and locations along the core transit network."<sup>34</sup> Meanwhile, according to the plan, "Emphasizing higher levels of growth in these [PDA] locations means that many neighborhoods, particularly established single-family home neighborhoods, will see minimal future change" (MTC RTP, 2013, p.3).

MTC/ABAG's final adopted SCS calls for very compact growth, directing 78 percent of new housing, and 62 percent of new jobs to PDAs (MTC RTP, 2013, p. 57). Among the four MPOs, MTC/ABAG projects the sharpest increase in multi-unit housing, as a share of all housing, over the plan's duration (Figure 5.6). Various stakeholders questioned the feasibility of the adopted land use pattern.<sup>35</sup> In response, MTC commissioned a study on the "readiness" of a sample of 20 PDAs to accommodate the plan's projected residential development (Economic & Planning Systems, Inc., 2013). The report concluded that although the PDAs contain physical capacity for 92 percent of allocated development, they are "ready" to accommodate only 62 percent after considering other potential barriers.

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<sup>33</sup> PDAs must be served by at least one transit stop or station, be supported by local plans to provide a wider range of housing options, and include amenities and services in a pedestrian-friendly environment.

<sup>34</sup> The strategy for locating new housing began with local plans at the county, city, and PDA levels. Housing growth in each place was then adjusted to reflect additional factors. Based on level of transit service and estimated VMT per household, housing growth was adjusted up or down by as much as 25%. Then, growth was further adjusted by as much as 10% based on three additional factors: projected employment by 2040; low-wage workers commuting in from outside each place; and housing value. More housing growth was directed to locations where the transit system can be utilized more efficiently, where workers can be better connected to jobs, and where residents can access high-quality services. RHNA was also factored in, through a minimum housing growth threshold set for each jurisdiction at 40% of its household formation growth. See p. 39 in MTC, *Plan Bay Area: Draft Forecast of Jobs, Population and Housing*, at [http://planbayarea.org/pdf/final\\_supplemental\\_reports/FINAL\\_PBA\\_Forecast\\_of\\_Jobs\\_Population\\_and\\_Housing.pdf](http://planbayarea.org/pdf/final_supplemental_reports/FINAL_PBA_Forecast_of_Jobs_Population_and_Housing.pdf). Also see MTC RTP, p. 44, and *Plan Bay Area: Final Forecast of Jobs, Population and Housing*, at [http://planbayarea.org/pdf/final\\_supplemental\\_reports/FINAL\\_PBA\\_Forecast\\_of\\_Jobs\\_Population\\_and\\_Housing.pdf](http://planbayarea.org/pdf/final_supplemental_reports/FINAL_PBA_Forecast_of_Jobs_Population_and_Housing.pdf).

<sup>35</sup> See comment letters at <http://planbayarea.org/plan-bay-area/plan-elements/environmental-impact-report.html>

The question of infill feasibility is informed by recent survey results from the Governor’s Office of Planning and Research, in which more than two-thirds (69%) of responding localities in the four regions studied for this report indicated they are pursuing infill strategies, but they also pointed to persistent barriers, including, in particular, lack of adequate infrastructure and transit funding, and parcel assembly problems. Neighborhood opposition and lack of developer interest – often cited as obstacles to infill – pose less of a barrier than these other public policy-related concerns.<sup>36</sup>

MTC interpreted the findings of its commissioned report on infill feasibility in PDAs as indicating that “the proposed Plan, on average, requires a relatively minor amount of rezoning and related land use policy changes in order to accommodate the densities envisioned.”<sup>37</sup> In this fashion, MTC turned the question of feasibility back upon its stakeholders, noting that, “the land use portion of the proposed Plan will only be implemented insofar as local jurisdictions act upon the Plan’s policies and recommendations.”<sup>38</sup>

Meanwhile, in the other regions where less aggressive policy actions were being pursued, some smart growth stakeholders presented the flip-side challenge, in questioning whether the MPO’s projections were ambitious enough in forecasting potential compact growth. SCAG’s approach to developing land use projections was less assertive than MTC/ABAG’s in calling for compact growth. SCAG used place types mainly for modeling purposes, noting in its RTP that, “SCAG developed a simplified series of Community Types to represent the various land use categories contained in the region’s many General Plans...In most cases, current adopted local General Plans do not go out as far in time as the plan’s horizon year of 2035. Thus, in developing the overall land use development pattern, SCAG identified strategic opportunity areas within city and county boundaries to *logically continue* recent development trends to 2035” [emphasis added] (SCAG RTP, 2012, p.124).

The land use projections adopted for SCAG’s RTP/SCS did “shift additional households from the periphery into the urbanized core... an additional 50,000 households by 2035, per consultation with the local jurisdictions” (SCAG RTP, p. 130). SCAG identified High-Quality Transit Areas (HQTAs),<sup>39</sup> where growth was directed “according to the jurisdiction’s land use plans...thus...not all such areas are targeted for growth and/or land use changes” (SCAG RTP, 2012, p.131).

The adopted projections assume that 51% of new housing developed between 2008 and 2035 will be within HQTAs, and 53% of new employment growth, “compared with 39 and 48 percent, respectively, in 2008” (SCAG RTP, 2012, p. 131). While in 2008, 45% of total households lived in multifamily units, the RTP/SCS projects that over the plan’s duration to 2035, 68% of new homes built in the region will be multifamily units. However, SCAG emphasizes the role of market forces, not local policies, in producing the more compact pattern, noting that, “in most cases, this shift in housing type...will occur *naturally* in the marketplace as developers shift to products in high demand [emphasis added]” (SCAG RTP, 2012, p. 129).

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<sup>36</sup> Author’s calculations based on data from Governor’s Office of Planning and Research, *Annual Planning Survey Results, 2012*, available at [http://www.opr.ca.gov/s\\_publications.php](http://www.opr.ca.gov/s_publications.php). Also see Barbour and Deakin (2012) for discussion of similar results found in a survey of California planning directors conducted in 2011, namely that the top cited obstacles to SB 375 implementation were lack of transit and infrastructure funding, lack of funds for planning, and public opposition to increasing charges for driving.

<sup>37</sup> See p. 3.1-1 in MTC, *Master Responses*, at [http://planbayarea.org/pdf/FEIR/FEIR\\_3\\_1\\_Master\\_Responses.pdf](http://planbayarea.org/pdf/FEIR/FEIR_3_1_Master_Responses.pdf)

<sup>38</sup> *ibid*, p. 3.1-3.

<sup>39</sup> HQTAs are “walkable transit villages” within one-half mile of a well-served transit stop, and transit corridors with minimum 15-minute or less service frequency during peak commute hours.

In spite of this more soft-footed approach, the feasibility (a.k.a. credibility) of SCAG's land use projections was also brought into question, just as in the Bay Area. Many localities that provided comment letters on the proposed plan argued that SCAG's preferred scenario did not match their own adopted local plans.<sup>40</sup> The main complaint presented in the comment letters was value-based, however, challenging SCAG to reaffirm its respect for local control of land use. In response, SCAG emphatically reassured localities that its land use analysis was undertaken "for purposes of modeling performance only, and the growth and land use assumptions for the RTP/SCS are to be adopted at the jurisdictional level."<sup>41</sup>

Like MTC, SANDAG has pursued a PDA strategy, developing a Smart Growth Concept Map (SGCM) in 2006 in conjunction with its RTP, which identified nearly 200 existing, planned, and potential Smart Growth Areas (SGAs) throughout the region, with at least one in each jurisdiction. The SGAs are associated with seven place types identified by housing and employment density and transit service thresholds. Local planning directors were asked to identify areas in their jurisdictions that matched the characteristics of the identified place types, and to recommend updates.

The Smart Growth Concept Map "illustrates a preferred planning concept for the region based on smart growth principles and is the framework for prioritizing public land use and transportation investments in the region" (SANDAG prior RTP, 2007, p. 5-3). The SGCM place types were incorporated into the point structure for SANDAG's transportation project evaluation criteria for its prior RTP, and to identify locations for Smart Growth Incentive Program funding from TransNet. However, the SGCM was not a prominent feature of SANDAG's 2011 post-SB 375 RTP/SCS, because an update was scheduled to occur in conjunction with an upcoming revision to the agency's Regional Comprehensive Plan.

SANDAG's land use pattern was "based on current general plans, as well as assumptions about 2050 growth provided by local governments based on current planning policies."<sup>42</sup> Although SANDAG included a "stretch" capacity in developing its land use projections, which extend in time beyond the length of most existing local plans, SANDAG did not experiment with land use alternatives in testing plan scenario alternatives for its RTP. Instead, SANDAG held its land use pattern constant, indicating that transport, rather than land use, options were the main consideration for the RTP/SCS (scenario modeling is discussed in more detail later). This choice irked some observers who noted that SANDAG was therefore unable to investigate and take advantage of land use-transportation interactions in its scenario modeling for the plan.

SANDAG's projections for its RTP show a significant increase in multifamily housing units (84% of future residential growth), with 80% percent of residential development projected to occur as infill (on redeveloped land). The density of new development is expected to increase, reflecting recent policy changes to local plans.<sup>43</sup> The number of homes within one half-mile of public transit services is projected to rise from 45% in 2008 to 64% in 2050, and 79% of all housing and 86% of all jobs will be within areas targeted for transit improvements.

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<sup>40</sup> See *Comments Submitted on the RTP/SCS*, at <http://rtpscs.scag.ca.gov/Pages/Proposed-Final-2012-2035-RTP-SCS.aspx#CL>

<sup>41</sup> See SCAG, *Comments and Responses to 2012-2035 RTP*, at [http://rtpscs.scag.ca.gov/Documents/2012/pfinal/2012pfRTP\\_CommentsResponses.pdf](http://rtpscs.scag.ca.gov/Documents/2012/pfinal/2012pfRTP_CommentsResponses.pdf).

<sup>42</sup> See page 63 in SANDAG, *Final Environmental Impact Report Appendix G: Public Comments and Responses*, October 2011, available at <http://www.sandag.org/uploads/2050RTP/F2050RTPEIRG.pdf>.

<sup>43</sup> See page 10 in SANDAG, *Technical Appendix 9: Additional Sustainable Communities Strategy Background Material*, available at <http://www.sandag.org/uploads/2050RTP/F2050RTPTA9.pdf>.

SACOG's land use pattern, like SANDAG's, builds on commitments and concepts developed for its last Blueprint. However, unlike SANDAG, SACOG modeled three land use alternatives for its RTP/SCS, and, based on feedback from public workshops and meetings with localities, selected a denser land use pattern than in its prior RTP. Like the other MPOs, SACOG notes that its housing projections sometimes include projected growth in areas or at levels not included in currently adopted local General Plans.

SACOG's RTP utilized five community types according to which "local land use plans were divided" for modeling purposes (SACOG, 2012, p.vi). The plan allocates 81% of projected new employment and 57% of new housing to the more central "Established Communities" and "Center and Corridor Communities" in the region. While SACOG did not use these community types as part of a PDA strategy, it took a different route with a similar effect, designating Transit Priority Areas (TPAs) to coincide with the definition of areas in which Transit Priority Projects under SB 375 are eligible for CEQA regulatory streamlining benefits.<sup>44</sup> Then SACOG developed a method (described later) for assisting localities in determining the specific streamlining options available for different project types in these areas. SACOG's RTP notes, however, that various barriers inhibit TOD in TPAs, including local plans and zoning codes that may not allow the desired densities, parking standards that negatively impact the economic viability of TOD, community opposition to affordable housing, and lack of adequate transit funding.

While in 2008, 14% of housing units and 27% of jobs were in areas that meet the definition of TPAs, by 2035, the MTP/SCS puts 38% of new dwelling units and 39% of new jobs within TPAs. In 2008, 35% of homes in the region were single-family small-lot or attached, but by 2035 the share is projected to increase to 71% (SACOG RTP, 2012, Table 3.8). The projected population increase of nearly 40% from 2008 to 2035 is accommodated on a 7% increase in the development footprint.

Summing up the land use projections phase under the provisions of SB 375, it is clear that the MPOs face challenges in balancing technical and science-related tools and methods with political negotiation and consensus-building. Land use projections are intended to be a realistic forecast of projected trends, not a utopian fantasy, but as such, they must incorporate predictions of policy activity and its effects, which the MPOs themselves and their local government stakeholders help to determine. This dual aspect of the projections process opens up room for debate about what is "possible," with the answer based at least partly on what is "desirable" to communities. This debate lies at the heart of sustainability planning, and normative questions must enter into rational discussions about realistic future development patterns, because the planners and stakeholders themselves will influence outcomes.

Issues of credibility and feasibility of the developed projections thus also take on a double-edged character. On the one hand, projected land use patterns that stick close to what can be accommodated within existing General Plans can be challenged for failing to maximize on the potential for infill, for example if market potential exists but local policy supports and incentives are lacking. In this case, the continuation of "sprawl" patterns may become a self-fulfilling prophecy if plans are not designed to address barriers to tapping that potential. On the other hand, development scenarios that veer significantly away from current local plans open themselves up to challenges on grounds of whether they are feasible, which in turn, draws attention to the need for adequate implementation measures to induce the desired changes.

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<sup>44</sup> These areas must be within one-half mile of a major transit stop (existing or planned light rail, street car, or train station) or an existing or planned high-quality transit corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.



The right approach to managing the “wedge of uncertainty” surely requires a balance between the two extremes of laissez-faire, on the one hand, and utopian fantasies, on the other. Stakeholders will defect from plan engagement if they don’t feel their priorities, needs, and prerogatives are respected. MPOs must pursue ongoing, active engagement with local governments to adopt “ambitious but achievable” objectives for land uses to support plan goals. Federal and state support will be needed to ensure that localities have the wherewithal to implement infill strategies.

#### In-commuting and the prohibition against spillover development

SB 375 contains a new and, for some MPOs, potentially challenging land use-related requirement, namely that SCS/RTPs must “identify areas within the region sufficient to house all the population of the region, including all economic segments of the population...taking into account net migration into the region, population growth, household formation and employment growth.” This prescription means MPOs must plan for enough housing within the region to accommodate the entire projected future workforce, without “spillover” to adjacent areas. The requirement, in effect, calls for within-region jobs-housing balance (JHB).

This new regional JHB mandate responds to longstanding concerns from the business community about a “housing affordability crisis” in California, and more specifically, in the Bay Area. Homebuilders supported this requirement in SB 375 so as to prod local governments and MPOs to remove regulatory barriers to new housing. For environmentalists, by contrast, the regional JHB requirement is not always a top priority; indeed, some environmental groups work actively to protect open space *between localities* within regions from development, a strategy that could exacerbate spillover development unless local growth is accommodated in urban centers and not greenfields within MPO regional boundaries.

For two MPOs, namely SCAG and SACOG, the JHB requirement did not present much of a challenge, because these MPO regions include substantial undeveloped land (the concern in these regions is about how to build within the region, not whether growth will spill outside). But for MTC/ABAG and SANDAG, regions in which substantial spillover development has already taken place for many years, this new requirement posed more of a challenge.

SANDAG was able to deal with the challenge more successfully than ABAG/MTC in its RTP/SCS. SANDAG’s plan accommodates in-commuting, but at a stable level – no higher than current numbers during the duration of the plan. The RTP/SCS notes that recent changes to local general plans accommodate a significant increase in residential capacity region-wide.

MTC/ABAG struggled less successfully to meet the new requirement. ABAG (the agency that develops the official land use projections for the RTP) adopted a final housing/land use forecast that allowed for an absolute increase in in-commuting, though no increase in the rate.<sup>45</sup> The Bay Area plan was directly challenged on this basis by the Bay Area Building Industry Association (BIA), in a lawsuit filed in August, 2013. The suit charged that ABAG, for political reasons, reduced the total number of new housing units in the plan from an original 902,000 to 660,000, and that MTC/ABAG also rejected a BIA-inspired land use scenario to accommodate 770,000 new units (described in more detail in the section on scenario planning). The suit alleged that the SCS/RTP “fails to solve the Bay Area’s bad habit of exporting its housing needs to outlying areas, condemning more of its workforce to lengthy commutes... After initially recognizing the clear mandate of SB 375, [MTC and ABAG] abandoned their duties, giving in to the Bay Area’s longstanding resistance to housing,

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<sup>45</sup> MTC, *Plan Bay Area: Forecast of Jobs, Population, & Housing*, p.8, at [http://planbayarea.org/pdf/final\\_supplemental\\_reports/FINAL\\_PBA\\_Forecast\\_of\\_Jobs\\_Population\\_and\\_Housing.pdf](http://planbayarea.org/pdf/final_supplemental_reports/FINAL_PBA_Forecast_of_Jobs_Population_and_Housing.pdf)

and instead adopted a plan that perpetuates the Bay Area's role as an exporter of housing... while turning a blind eye to the adverse environmental impacts."<sup>46</sup> The lawsuit also charged that targeting 80 percent of all future housing growth to PDAs, at an average density of 80 units per acre, was "patently unrealistic," as was targeting almost 50 percent of new housing units to just three cities.<sup>47</sup>

The lawsuit was settled in February, 2014, with an agreement among the parties to modify procedures in future RTP/SCSs for forecasting job growth and housing demand, assessing the feasibility of planned developments, and monitoring progress. In addition, MTC and ABAG agreed that, for future plans, they would adopt a regional housing control total that assumes no increase in in-commuters over the baseline year and is not based on historical building permit numbers; provide for "robust" monitoring of regional development patterns, including tracking permits issued inside PDAs; conduct feasibility analysis in consultation with stakeholders; and conduct a more open process on developing the methodology.<sup>48</sup>

The BIA lawsuit highlights challenges for integrating SB 375 and RHNA that are additional to the equity concerns raised by affordable housing advocates, noted earlier. The BIA's primary concern is to facilitate more homebuilding according to market logic. Therefore, the group calls attention to regulatory barriers to housing development such as local zoning ordinances that constrain permitted densities, or burdensome and unpredictable environmental review requirements that raise costs, or other factors that inhibit market feasibility. Constraints on housing supply affect the economic productivity of the region. According to Steven Levy, of the Center for Continuing Study of the California Economy – ABAG's main economic consultant for developing its jobs projections – "the region could capture another 110,000 jobs of the total national growth. However, the total job growth is constrained by our ability to produce housing."<sup>49</sup>

Adding new housing in a built-out region like the Bay Area presents a conundrum of conflicting goals, interests, and trade-offs, which MPOs must balance: add housing at the edge of existing communities, and they lose their cherished greenbelts; add it into the urban core, but that requires addressing high costs of infill development; or allow new housing to spill over the MPO jurisdictional boundaries, which also carries ramifications, such as for increasing traffic congestion on major commute routes, but which may be politically expedient in crafting consensus at least among local governments and locally oriented environmentalists within the region. For MPOs, it is useful politically, in order to gain local government support for a growth concentration strategy, to reassure localities that many or most of them will not be pressured to alter their community character. These factors may help explain why MTC and ABAG were more willing to concede to tighter limits on housing growth in non-PDA areas, as well as a lower regional housing total, than the BIA would have preferred.

At the same time, MTC/ABAG's problems in meeting the regional jobs-housing balance requirement can also be seen as an unfortunate artifact of the historical drawing of MPO jurisdictional boundaries, which occurred many decades ago. In some regions, such as the Bay Area, these boundaries no longer adequately encompass the extent of regional development. The boundaries that US Census now uses for designating the San Francisco Bay metropolitan region

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<sup>46</sup> The lawsuit is available at <http://www.mydocsonline.com/pub/hbancstaff/BIA%20v%20ABAG%20MTC.pdf>. The settlement agreement is at <http://planbayarea.org/file10181.html>.

<sup>47</sup> The BIA's pleading is available at <http://www.mydocsonline.com/pub/hbancstaff/BIA%20v%20ABAG%20MTC.pdf>

<sup>48</sup> See the BIA press release and settlement agreement at <http://www.biabayarea.org/governmental-affairs/weekly-governmental-affairs-update/2014-weekly-reports/bia-reaches-settlement-agreement-on-plan-bay-area-lawsuit/>

<sup>49</sup> See page 8 of MTC, *Plan Bay Area: Draft Jobs-Housing Connection Scenario*, March, 2012, available at [http://planbayarea.org/pdf/SCS\\_PREFERRED\\_Scenario\\_Jobs\\_Housing\\_Connection\\_3-9-12.pdf](http://planbayarea.org/pdf/SCS_PREFERRED_Scenario_Jobs_Housing_Connection_3-9-12.pdf)

extend beyond MTC/ABAG jurisdictional boundaries, for example. It may be time for the state to reconsider MPO boundaries in light of these patterns, rather than penalize some MPO/COGs based on these historical artifacts.

### Conclusion

In the Bay Area, a number of factors converged to make housing a central focus for debating sustainability goals. Certain factors help explain the intensity of the debates, including the degree of build-out of the region, the political diversity of communities, and level of activism by stakeholders of all stripes. The sustainability concept is often presented in terms of achieving co-benefits, in other words, win-win solutions, but the Bay Area housing conflicts reflected tensions among the 3 E's. The alignment of RTPs and RHNA, along with the new performance mandates for GHG reduction and regional JHB, brought all these conflicts into relief. Although the other MPOs did not face the conflicts to the same degree, they must face the same underlying tensions eventually.

For MTC and ABAG, the GHG reduction mandate necessitated a growth concentration strategy; this priority goal helped ensure that the agencies would be willing to compromise with local governments when necessary to gain their support for the PDA strategy. But in turn, this position brought the regional agencies into conflict with the BIA, because the agencies' compromises with local governments militated against a strict construction of the regional JHB mandate that business leaders had won in SB 375. Given the resolution of the BIA lawsuit, committing the agencies to a stricter construction of the JHB requirement in the next planning round, the upcoming RTP/SCS process may be even more contentious than the last.

### ***Scenario modeling***

Scenario modeling has become a central element for development of RTPs. By designing and evaluating alternative packages of land use and transportation policies and programs (a.k.a. scenarios), the MPOs can consider trade-offs and potential co-benefits of plan elements, to select a "preferred plan scenario" for adoption. SB 375 explicitly calls for scenario modeling results to be presented in public workshops.

With the advent of blueprint-style RTP planning in California, *both* land use and transportation policies and projects were made variable, rendering scenario planning more challenging technically and politically. MPOs sought to evaluate land use and transport interactions with multiple performance measures in mind. As MPOs started using scenario processes to support decision-making about land use and not just transportation, multiple interests and priorities, as well as technical variables, had to be reconciled. Like the projections process, scenario design skates a delicate balance in combining scientific reasoning and measurement, with normative deliberation and political negotiation. This section considers MPO approaches to scenario design.

### Technical aspects of scenario design

Prodded by new state RTP guidelines, and supported through recent state grants, California's MPOs have been improving their technical capacities for scenario modeling. The four large MPOs are transitioning from using traditional 4-step models for estimating travel demand to instead using disaggregate "activity-based" and "tour-based" models better able to capture fine-grained aspects of travel and which provide improved sensitivity for testing various smart growth and demand management strategies, as well as effects of "induced travel." The MPOs have also worked to improve their land use modeling capacity, which, when integrated with activity-based transportation models, allows for more sensitive analysis at the person-by-person trip level of activities such as bike and walk trips.

These modeling improvements are in line with RTP guidelines issued in 2010 by the California Transportation Commission, which direct large MPOs in the state to employ enhanced modeling capabilities and validation procedures. As the agency responsible for overseeing implementation of SB 375, the Air Resources Board (CARB) has evaluated each MPO's modeling techniques used for its most recent RTP/SCS; these reports are available at <http://www.arb.ca.gov/cc/sb375/sb375.htm>.

For their RTP/SCSs, MTC and SACOG transitioned to using activity-based travel demand models (MTC's is called a "partial" activity-based model). MTC and ABAG also worked to develop a spatially explicit economic and land use model, which uses market and regulatory information stored at a parcel level for simulating economic behavior of developers. Meanwhile, SCAG and SANDAG continued to use 4-step models, but they are also transitioning. Like MTC, the other three MPOs are also developing new, more integrated and comprehensive land use models.

### Political aspects of scenario design

There is more than a technical track at stake in effective scenario modeling practice, however. The advent of blueprint planning made MPO scenario planning more complicated politically, as well as technically. Stakeholder engagement is a challenging but also critical aspect of the scenario modeling and evaluation process, to ensure commitment and trust in deliberating among plan options. Therefore, alongside the technical track, MPOs must also become effective facilitators, and identify ways to combine quantitative with qualitative methods for evaluating plan options.

As one scholar, Jeroen P. van der Sluijs, noted:

It is not necessary for stakeholders to become expert in the operation of an [integrated assessment model, or IAM]. Their principle use in a participatory context is their problem structuring quality... Their usefulness as a source of information should not be one of providing the facts... but rather their heuristic function: the IAM should foster the creative generation and exploration of rival problem definitions, accommodating the entire spectrum of perspectives and values of the stakeholders (2002, p.141).

The scenario design stage is critical for gaining trust and engagement from stakeholders. It must be approached in a way that ensures stakeholders that designed scenario alternatives are legitimate, and the evaluation process is useful. Legitimacy refers to whether the range of scenarios tested is seen to represent realistic alternative pathways reflecting a range of values and priorities, not limited only to priorities of the powerful (Albert, 2013).

The best way to design scenarios is hardly obvious, however. As the four large MPOs adopted blueprint planning starting in the 1990s, they began to test scenarios for more compact land use patterns. A common approach was to design a "Goldilocks" range of three scenarios starting, at one end, with a "business as usual" scenario extrapolating land development patterns and matching transport investments based on current local plans and trends, and then a second scenario based on a somewhat more compact land use pattern, and finally a third scenario with a very compact land use pattern not necessarily matching capacity in current local General Plans. These "Goldilocks" scenario alternatives had instructional value about potential benefits of compact growth, and they began to form the basis for "policy-based projections" adopted by the MPOs that included more compact growth than in the "business as usual" scenarios.

Rather than simply lump together land use and transport investment alternatives into stand-alone scenarios, another useful approach is more deliberately analytical, aiming to isolate the effect of key strategies separately (e.g. effects of altering land uses, pricing policies, modal investments, and the like). This analytical approach was the basis for the four MPOs' joint fact finding effort undertaken

for the SB 375 target-setting process, described earlier. MTC also pursued such an approach in its last pre-SB 375 RTP, but post-SB 375 the agency faced more urgent concerns, namely achieving the SB 375 mandates.

Under SB 375, scenario planning has become an even more central aspect of plan decision-making. The MPOs all conducted multiple rounds of scenario modeling for their most recent RTPs, iteratively working to define and select a “preferred scenario” for the adopted plan. Scenario modeling also became more contested because the adopted scenario constitutes the vehicle for demonstrating compliance with SB 375’s performance mandates (for GHG reduction and regional JHB), as well consistency with RHNA and air quality mandates. This framework links local land use plans more closely with state climate, housing, and federal air policy goals, but in the process, also draws more scrutiny from stakeholders regarding credibility and legitimacy of scenario design.

#### Scenario design by the four MPOs under SB 375

The MPOs all conducted multiple rounds of scenario modeling for their RTP/SCSs, and the processes drew scrutiny from stakeholders. Three of the four MPOs developed scenarios in which both land use and transport elements were varied, attempting to project interactions. (SANDAG modeled only transport modal emphases, holding land use constant; SANDAG has iteratively modeled land use and transport policy options in updating its Regional Comprehensive Plan and RTPs separately.)

MTC/ABAG conducted three rounds of scenario analysis. The extensive process reflected the agencies’ difficulty in meeting the two SB 375 mandates, which proved challenging in the Bay Area case. The first round of modeling tested two scenarios, one representing “Current Regional Plans,” and the other an “Initial Vision Scenario,” with an important distinction between them being the growth totals; the “Initial Vision Scenario” incorporated 902,000 new housing units and 1.2 million new jobs, while the “Current Regional Plans” scenario incorporated 634,000 housing units and 1.1 million new jobs, a continuation of the region’s historical pattern of allowing housing growth to “spill over” the MPO region boundaries. This large difference in housing totals signaled a major challenge for MTC/ABAG.

In its next round, MTC and ABAG developed a suite of five scenarios, with varying levels of compactness and housing totals. Two included an “unconstrained” growth total representing the original defined regional housing need. Three other scenarios included a substantially lower household total (770,000 housing units), reflecting “lower 2010 household and population counts (Census 2010), lower employment growth than previous forecasts, and reasonable assumptions on market trends, local and regional policies, and infrastructure.”<sup>50</sup> These three scenarios were tested against the adopted performance targets, and against five social equity measures.

Modeled performance results indicated that no scenario would meet the state-mandated GHG reduction goal, and so in developing its preferred scenario, MTC’s attention was directed especially to including additional climate policy initiatives to ensure it could meet the GHG target.

MTC/ABAG conducted a third round of scenario modeling and analysis for its Environmental Impact Report (EIR), required under the California Environmental Quality Act (CEQA). Scenario modeling for EIRs is standard practice for California MPOs, and might be said, along with modeling for air quality conformity purposes, to have been the genesis of scenario planning efforts

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<sup>50</sup> From *Sustainable Communities Strategy: Alternative Land Use Scenarios*, p.4, available at [http://www.planbayarea.org/pdf/alternative/SCS\\_Alternative\\_Scenarios\\_Aug\\_2011.pdf](http://www.planbayarea.org/pdf/alternative/SCS_Alternative_Scenarios_Aug_2011.pdf)

in general.<sup>51</sup> However, EIR analysis has generally been a “back of the book” procedure, undertaken only after the final plan scenario has been adopted, and, in many cases, with environmental impacts described in narrative form in a fashion not clearly translating to decision-making inputs.

For MTC and ABAG, the EIR process turned into an extension of stakeholder debates that had emerged during the previous modeling stages. For its EIR, MTC took the unusual step of modeling two scenarios reflecting priorities of stakeholder organizations, in addition to the conventional comparison of the proposed plan and “no project” scenarios (and also an enhanced transit focus scenario). Allowing stakeholders “behind the curtain” and assisting them in modeling scenarios that meet legal requirements (e.g. for financial constraint) can help in improving legitimacy and trust. However, MTC and ABAG took this step only at a late stage in response to challenges. MPOs may be well advised to work more closely with stakeholders earlier in the process to ensure that scenarios are viewed as legitimate.

More specifically, MTC modeled an “Enhanced Network of Communities” scenario, advanced by business leaders and homebuilders, which provided for more housing and a more dispersed growth pattern than the proposed plan. An additional “Environment, Equity, and Jobs” (EEJ) scenario was designed and modeled, to reflect proposals presented by Public Advocates, Urban Habitat, and TransForm – Bay Area smart growth and social equity advocacy organizations – to maximize affordable housing in “high-opportunity” areas through incentives and housing subsidies. The EEJ scenario supported suburban growth through increased transit service to historically disadvantaged communities, funded by a potential Vehicle Miles Traveled (VMT) tax and higher bridge tolls. The scenario alternative also directed more housing to non-PDA areas than in the adopted plan scenario, in keeping with the advocacy groups’ desire to promote de-segregation goals of RHNA.

MTC’s choice to model the two stakeholder-designed scenarios was an unusual step for any MPO, taken to address their concerns about credibility and legitimacy of the process. As MTC noted about public workshops conducted in 2011, “Some questioned the basic population, jobs and climate change forecasts that inform the goals for the plan; others were concerned that local decision-making for community and economic development were being undermined in favor of a regional governance structure. These tensions persisted throughout the public workshop process, and indeed throughout the remainder of the Plan Bay Area process.”<sup>52</sup>

The regional Building Industry Association (BIA), in particular, argued that the regional agencies’ scenarios were not credible, objecting vehemently, as noted earlier, to reductions in projected housing growth that were applied by ABAG and MTC across successive phases of scenario modeling. The agencies’ final adopted land use scenario accommodated only 660,000 housing units, substantially less than the nearly 1 million that had originally been projected as necessary to accommodate regional housing “need.” Noting that the agencies also varied their jobs-to-housing ratios used for developing different scenarios, and arguing that the new growth allocated to PDAs was “infeasible and unrealistic,” the BIA called the whole projections and scenario modeling

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<sup>51</sup> Under CEQA, the MPOs are required to evaluate environmental impacts of their plans against a “no project” alternative, representing projected outcomes if the plan were not implemented, and also to model the plan in relation to a range of other “reasonable” alternatives. Under CEQA, feasible mitigation measures must be identified by the lead agency to address adverse environmental impacts, or the agency can issue a “statement of overriding considerations” explaining why mitigation measures are not feasible.

<sup>52</sup> From p. 27 of MTC, *Public Outreach and Participation Program, Volume 2: Phase Two: Initial Vision Scenario (2011)*, released in 2013, available at [http://planbayarea.org/pdf/final\\_supplemental\\_reports/FINAL\\_PBA\\_Public\\_Outreach\\_and\\_Participation\\_Program\\_v2-phase\\_2.pdf](http://planbayarea.org/pdf/final_supplemental_reports/FINAL_PBA_Public_Outreach_and_Participation_Program_v2-phase_2.pdf)

process “a return to the ‘paper planning’ regime of the past” in which the regional agencies “represent[ed] to the public that they were maximizing Bay Area job growth (politically popular) while minimizing the need for the region to plan for more housing (politically unpopular)—essentially conditioning the public that the region can have its cake and eat it, too.”<sup>53</sup> The “Enhanced Network of Communities” scenario endorsed by the BIA included 778,000 housing units and a more dispersed development pattern than the other tested scenarios.

To these objections, MTC countered that, “the distribution of housing units in the Draft Plan...in some cases...assumes changes in local conditions over the next three decades, and is not constrained by existing zoning. This approach was a key element of creating a distribution of jobs and housing growth that achieved the region’s greenhouse gas emissions reduction target... [however,] the land use portion of the proposed Plan will only be implemented insofar as local jurisdictions act upon the Plan’s policies and recommendations.”<sup>54</sup> In other words, MTC and ABAG made use of the “wedge of uncertainty” inherent in the projections process to develop a preferred scenario that could meet the SB 375 GHG reduction target, but the feasibility of the plan scenario depends upon local government choices.

Turning to consideration of scenario modeling in Southern California, SCAG’s approach to scenario modeling was geared to enhance public outreach. SCAG hired the design firm Calthorpe Associates to model four scenarios intended for a series of 18 public workshops, held in 2011.<sup>55</sup> As the scenarios were tested against a number of metrics, a clear improvement in impacts was observed from Scenario 1 (business as usual) to Scenario 4 (most compact growth, most investment in transit). Polling results from the workshops indicated a preference for job and housing growth in mixed-use areas, and for investments to increase travel mode choice.

However, in spite of widespread satisfaction expressed with SCAG’s outreach process, when it came time to translate workshop results into more refined scenarios and analysis for selection of a preferred scenario, SCAG’s RTP process became much less transparent. The RTP notes only that a series of alternative scenarios were developed and evaluated based on feedback from the workshops and other input, and that “out of this evaluation, a preferred alternative was selected” (SCAG RTP, 2012 p. 34). No performance modeling results are presented in the plan for second-stage alternatives; the plan presents performance results only for the final adopted plan scenario versus base year conditions, and against the “no project” scenario required to be modeled for the EIR.

In other words, at the crucial stage where final plan decisions were made, SCAG’s process became opaque. Certainly, every MPO relies on technical expertise and back-room bargaining at that stage, but sustainability planning depends on more open and deliberative evaluation. Thus, SCAG’s publicly presented scenario results appear to have been intended mainly as an educational tool for the purpose of the early-phase public workshops. The final scenario was developed more internally. As noted earlier, SCAG took pains in its planning process to reassure localities that any divergence from existing local plans was done “only for modeling purposes.” But while this laissez-faire approach may have been reassuring, it likely will also come at the expense of gaining traction for

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<sup>53</sup> See BIA letter, on pp. 34-46, in *Organization Comments, Chapter 3: Comments and Responses on Draft EIR*, at [http://planbayarea.org/pdf/FEIR/FEIR\\_3\\_4\\_Organization\\_Comments\\_UPDATE.pdf](http://planbayarea.org/pdf/FEIR/FEIR_3_4_Organization_Comments_UPDATE.pdf).

<sup>54</sup> MTC Master Responses, p. 3.1-3, available at [http://planbayarea.org/pdf/FEIR/FEIR\\_3\\_1\\_Master\\_Responses.pdf](http://planbayarea.org/pdf/FEIR/FEIR_3_1_Master_Responses.pdf)

<sup>55</sup> The scenarios varied in how they addressed development location, community/ neighborhood design, housing options and mix, and transportation investments. Performance attributes modeled for the scenarios included projected impact on: land consumed; local infrastructure costs, including capital infrastructure costs, operations and maintenance costs, and local revenues; VMT; fuel consumption; household costs; GHGs; building energy use; water consumption; and respiratory health impacts.

new policies to ensure that compact land uses come to pass. This hands-off approach was reinforced during the scenario modeling stage. In other words, SCAG addressed stakeholder concerns by minimizing the salience of the process for stakeholders, at least in regard to land use.

As the first SCS/RTP adopted under SB 375, SANDAG’s plan received intense scrutiny, and its scenario design and modeling process was one aspect that received substantial criticism. As noted, the agency adopted a longer timeframe than the other MPOs for its RTP/SCS – to 2050 – in order to encompass spending allocations from TransNet, the county’s half-cent sales tax measure for transportation. This longer time frame proved to be a stumbling block for SANDAG, however, due to widespread concern that arose among environmental and smart growth stakeholders about a projected decline in per capita GHG reductions after 2035. (The adopted plan met its state-mandated target under SB 375 for reducing per capita GHGs by 13% by 2035, but after that, modeling indicated that per capita GHG reductions would diminish to 10% by 2050.)

Observers were concerned that the projected “backsliding” on GHG reductions contradicted the intent and objectives of SB 375 and the state’s wider climate policies. This concern led stakeholders to scrutinize SANDAG’s scenario modeling. SANDAG designed its scenario alternatives to reflect transport modal emphases, but not land use alternatives. For its first round of modeling for the RTP/SCS, SANDAG developed scenarios called Transit Emphasis, Rail/Freight Emphasis, and Highway Emphasis, as well as a Fusion scenario including new transit services and highway improvements (bottleneck relief and new lanes). Later, SANDAG developed its preferred scenario, called the Hybrid Scenario, to include projects from each of the first four.

Modeled performance for SANDAG’s scenarios showed very little difference between scenarios, however. Some stakeholders traced this pattern to SANDAG’s determination of limited “discretionary” funds in its RTP. SANDAG had considered only about 3% of plan funds to be discretionary, in other words, not already committed to specific projects. The reason for the small size of the discretionary share traces in part to the passage of TransNet. TransNet funds, which amount to about \$250 million a year, comprise about one-quarter of local funding in the RTP, and a higher share of capital funding for new projects.<sup>56</sup> Specific project allocations were spelled out in the original TransNet voter ballot measure, and although SANDAG might be able to re-deploy the funds somewhat before the measure expires in 2048, taking such action, especially in the short term, would be politically difficult.<sup>57</sup> TransNet provides SANDAG with revenues for transit, not just highway projects, but transit spending in the plan is weighted toward the latter years.<sup>58</sup>

The “lock-in” of TransNet funds in the RTP caused much consternation for smart growth stakeholders, who complained, for example, that “forty years of planned highway expansions, new local roads and arterials are not being reconsidered for long term climate impacts as part of the SB 375 planning process.”<sup>59</sup> Most of the highway expenditures included in SANDAG’s RTP/SCS are

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<sup>56</sup> From Table 5.1 in SANDAG RTP (2011). Also see E. Rose, A. Bernstein, and S. Cohen (2011), *San Diego and SB 375: Lessons from California’s First Sustainable Communities Strategy*, at <http://www.transformca.org/sites/default/files/San%20Diego%20and%20SB%20375.pdf>

<sup>57</sup> *ibid.* Also see A. Eaken and J. Horner (2012), *A Bold Plan for Sustainable California Communities: A Report on the Implementation of Senate Bill 375*, available at <http://www.nrdc.org/globalwarming/sb375/implementation-report/files/implementation-report.pdf>

<sup>58</sup> See Table 5.2 in SANDAG’s RTP (2011).

<sup>59</sup> See letter from California PanEthnic Health Network on page 21 of SANDAG, *Draft 2050 Regional Transportation Plan/Sustainable Communities Strategy Public Comments and Responses*, at [http://www.sandag.org/uploads/projectid/projectid\\_349\\_13661.pdf](http://www.sandag.org/uploads/projectid/projectid_349_13661.pdf)



intended for managed lanes that will accommodate transit and carpools; nevertheless, many stakeholders still worried that the highway investments early in the plan would induce sprawl.

In a fashion similar to what occurred in the Bay Area, some stakeholders attempted to convince SANDAG to model their own preferred alternatives for the EIR phase. Specifically, two groups – Save Our Forest and Ranchlands and the Cleveland National Forest Foundation – put forward the 50-10 Transit Plan, calling for 50 years of transit infrastructure to be constructed within a 10-year period; meanwhile, Move San Diego put forward the FAST plan, aimed at attracting “choice riders” to transit by increasing local “rapid” bus connections. SANDAG declined to model these two alternative scenarios, contending that they were not “feasible” (a requirement for CEQA modeling) because they only advanced a plan for a portion of the regional transport network (namely for transit).<sup>60</sup> In addition, SANDAG deemed the 50-10 Plan to be legally as well as economically infeasible because it was not “revenue constrained,” in other words, based on reasonable revenue projections. SANDAG explained that restrictions on how funds can be used prevent major shifts in funding from highway projects to transit, and that the annual allocation of most funds from the state cannot be advanced, further limiting flexibility.<sup>61</sup>

Thus, in the San Diego and Bay Area regions, a similar conflict emerged by the end of the plan process, in which stakeholders pressured the MPO to allow them “behind the curtain” to model their own preferred scenarios. In both cases, this demand presented a challenge to, and also a potential way to resolve, questions about the legitimacy of the MPOs’ scenario modeling. The results were ultimately less contentious in the Bay Area case, to the degree that the MPO agreed to facilitate modeling of the stakeholder scenarios. Even when disgruntled stakeholders chose to sue, the disputes were settled out of court.

In the San Diego region, the failure to model the stakeholder scenarios formed one bone of contention in the lawsuit filed against the plan’s EIR in 2011 by the Cleveland National Forest Foundation and the Center for Biological Diversity (later joined by the State Attorney General’s Office and the Sierra Club). The lawsuit mainly addresses the concern about “backsliding” on GHG reductions projected in the plan after 2035, and the state Supreme Court has elected to settle only on that issue. However, the lawsuit bears mention here, as it touches upon the question of legitimacy of SANDAG’s scenario design process.

Both the initial and then appellate court decisions in the suit against SANDAG came out in favor of the plaintiffs. In a somewhat remarkable finding, the appellate court ruling contended that, among other failures, SANDAG had not modeled a reasonable range of project alternatives, by failing to model an alternative that would reduce total VMT. Instead, the ruling contended, “it appears the project alternatives [a.k.a. scenarios] focused primarily on congestion relief.”<sup>62</sup> What is remarkable about the appellate court ruling is that while it disputed the legitimacy of SANDAG’s scenario modeling choices, in contending that they were aimed mainly at congestion relief, no direct evidence was cited in support of the claim.

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<sup>60</sup> See SANDAG, Master Response #17, starting at page G-43 in *Final Environmental Impact Report Appendix G: Public Comments and Responses*, October 2011, available at <http://www.sandag.org/uploads/2050RTP/F2050RTPEIRG.pdf>

<sup>61</sup> For its EIR, SANDAG modeled six alternatives in addition to the proposed plan and a “no project” scenario, which attempted to address the concerns that had been raised by stakeholders. Like SCAG, however, SANDAG presented the performance evaluation of its EIR scenarios mainly in detailed narrative form, without tables of quantified measures of performance results.

<sup>62</sup> See page 31 in the appellate court ruling, available at <http://www.courts.ca.gov/opinions/documents/D063288.PDF>

This situation points to a disturbing lack of clarity in regard to what constitutes legitimate scenario modeling of alternatives by MPOs under SB 375. From SANDAG’s perspective, it is boxed in by TransNet, a ballot initiative that gained the required two-thirds vote of the people. To simply disregard the provisions of TransNet would be undemocratic. But stakeholders are also legitimately concerned about being boxed in by TransNet’s 40-year prescriptions. With 20 of California’s 58 counties having adopted so-called “self-help” voter-approved sales tax measures for transportation, similar to TransNet, major questions arise in connection to whether the county measures support SB 375 objectives, and what an MPO and its stakeholders can do if they do not.

Ultimately, as part of final adoption of the RTP/SCS, the SANDAG Board of Directors approved some additional measures to address stakeholder concerns, namely, that the agency would: 1) evaluate alternative land use scenarios as part of the upcoming update to its Regional Comprehensive Plan (RCP), to attempt to address the “backsliding” of GHG levels between years 2035-2050; 2) develop an early action program for projects in the Regional Bicycle Plan; 3) plan for a broader Active Transportation program, including Safe Routes to School and Safe Routes to Transit, within the next two years; 4) develop a regional transit-oriented development policy for the 2050 SCS; 5) continue to improve the agency’s travel demand models, including making the activity-based models currently under development “open source” and available for the next RTP update; and 6) develop a regional complete streets policy within the next two years.<sup>63</sup> These sort of concessions reflect the “normal antagonism” process of stakeholder advocacy in play; however, the highly contested quality of the environmentalists’ lawsuit against SANDAG reflects a more deeply antagonistic landscape present among MPO stakeholders in the region.

Compared to the other three MPOs, SACOG’s scenario planning process was remarkably transparent and straightforward. SACOG initially developed three scenarios, which, from the outset, were intended to suffice for all phases of the modeling process. This meant that SACOG’s scenario evaluation process was integrated and more consistent from beginning to end than for the other MPOs, and also fed transparently into decision-making. On the other hand, for that reason, SACOG’s series of scenarios was somewhat more limited than the other MPOs.

All three of SACOG’s initial scenarios were built from the same regional employment, population and housing growth projections and the same transportation budget, financially constrained in accordance with federal regulations. Land use was considered first and then a customized transportation system was designed to match.<sup>64</sup> Scenario 1 represented “no project” for purposes of CEQA review, while Scenario 2 incorporated more compact housing reflecting recent trends. Scenario 3 responded to a desire by the SACOG Board of Directors to analyze how to maximize transit ridership. To achieve this performance, land use assumptions were selected that were considered to be too compact to be feasible; this scenario, in other words, was aspirational.<sup>65</sup>

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<sup>63</sup> See [http://www.sandag.org/uploads/projectid/projectid\\_349\\_18981.pdf](http://www.sandag.org/uploads/projectid/projectid_349_18981.pdf)

<sup>64</sup> Land use was varied in the amount of compact development, measured as housing product mix and location, and the amount of mixed-use development. Transportation variables included the location, intensity, and type of transit service, the amount, location, and type of investment in complete streets projects, the extent and location of roadway and other projects to alleviate major bottlenecks and congestion points, and the level of investment in Blueprint-supportive programs and transportation system management strategies, including technology and demand management programs.

<sup>65</sup> Scenario 1 had the smallest share of new compact housing (60%) while Scenario 3 had the highest (75%). Scenario 1 was oriented to roadway investment, while Scenario 2 included more focus on relieving existing bottlenecks and increased funding for transit service, road operations, and bicycle and pedestrian infrastructure. Scenario 3 was oriented to transit, increasing transit service (vehicle service hours) by 127 % from 2008. The scenario transportation budgets ranged from a low of \$34.6 billion in Scenario 1 to a high of \$36.1 billion in Scenario 3, reflecting variation in the

Results of the first round of performance modeling for these scenarios were presented at nine county-level workshops, in which modeled results were presented for the travel outcomes that could be expected for each scenario, including percentage of travel by mode, VMT per household, VMT in congestion, transit share of commute trips, and other statistics. After that, in response to strong support for Alternative 3, SACOG developed its final preferred scenario to “fall between Alternative 2 and Alternative 3 in terms of the amount of new compact housing (71%), the amount of growth in TPAs, and the compactness of the development footprint...[as well as] transit service, BRT, streetcar, and light rail investment.” Then SACOG also modeled the same three initial scenarios, in addition to the preferred scenario, for its EIR.

### Conclusion

Basic practice among the four MPOs has evolved in recent years to include three rounds of scenario modeling and analysis – an initial “test stage” in which MPOs evaluate new policy measures, investments, and land use patterns in comparison to “current trends” (which generally means provisions of the prior adopted RTP coupled with updated population and land use numbers). Then, a second round of modeling helps the MPO hone in on the “preferred scenario” for adoption in the draft plan. Using either first and/or second round results, the MPOs conduct outreach efforts, hosting a “road show” of workshops across the region to gain input from stakeholders and the public. In some cases, the road show can seem more educational than transparently connected to further planning deliberations. Eventually, a preferred scenario is developed, which generally tends to fall somewhere in the middle of the tested series (“just right,” said Goldilocks) and/or includes elements of all tested scenarios. The final modeling stage is for EIR analysis, when alternatives analysis is required for CEQA and NEPA, and also for air quality conformity. This EIR modeling, which occurs *after* a preferred plan scenario has been selected, has become an especially contested space in which stakeholders challenge the proposed plan.

RTP modeling is intended to produce realistic projections for transport and land use, but, as discussed, MPOs have wiggle room in forecasting plan outcomes, as compared to existing local plans, which creates a gray area between current and future conditions. The gray area has become a battle ground for stakeholders to contest the normative direction of the regional plans, which have become more salient to a wide variety of stakeholders, because of the potential for MPO action to impinge on “business as usual” patterns for transport policy decision-making and also for land use. The insertion of normative debate and deliberation into what was once a technocratic, behind-the-scenes forecasting process is presenting new challenges, as more intense scrutiny brings questions about legitimacy and credibility of MPO projections. This situation should not be feared because it reflects the engagement of stakeholders in the process – engagement that is needed if ambitious plans are to take root and translate to implementation.

Key challenges include, first, how to develop a transparent, understandable modeling process for stakeholders to engage in, and second, how to incorporate stakeholder scenarios, while also respecting legal and practical constraints. MPOs should work to develop more concerted and organized approaches for co-developing scenarios with stakeholder groups – to bring them behind the curtain – from early on in the process, rather than only at the end after disputes have erupted. One technique might be for MPOs to hammer out a set of constraining performance parameters with stakeholders early in the process, and then work with them to develop and model preferred scenarios within the parameters. This approach would concentrate debates about legitimacy upon

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transit fare box recovery rate that ranged from 31 % in Scenario 1 to 52 % in Scenario 3. The assumption of higher percentage of transit fares recovered in Scenario 3 resulted from a high share of transit-supportive land uses.

determining the shared parameters. Then, stakeholders could compare scenario performance results based on an agreed-upon set of constraints.

Finally, questions about how MPOs define “committed” versus “uncommitted” projects, and discretionary versus committed revenues, should be clarified. The lock-in of funding from county sales tax measures is an especially thorny issue in this regard.

### ***Results of plan performance evaluation***

This section presents and discusses quantitative results of scenario modeling by the four MPOs. Results are shown, to the degree possible, for performance modeling of the final adopted scenario compared to alternative scenarios considered for plan adoption, and also to the plan base year (start year) representing current conditions, as well as to the “no project” alternative required for evaluation in the plan’s Environmental Impact Report under CEQA. The “no project” alternative, sometimes referred to as the “business as usual” scenario, depicts outcomes projected to occur over the time frame of the plan, if the program and policy elements of the preferred scenario were not to be implemented. It can be seen as a basis for measuring the benefits of the plan. Given that each successive RTP by the four MPOs in question, over recent years, has moved toward smart growth strategies, “business as usual” is not an altogether accurate term; rather, each successive RTP plan, in comparison to its modeled “no project” alternative, indicates the MPO’s incremental progress (or lack of progress) in achieving regional objectives.

The results compiled here provide an indication of how systematically each MPO presents its findings. Three key elements can help establish a clear framework for guiding stakeholders through the multi-phase evaluation process: first, to clearly map relevant performance measures onto plan goals, and second, to apply the selected performance measures consistently across all phases of the modeling process, and third, to design scenarios that are comprehensive in their scope – reflecting a range of strategies for addressing “ambitious but achievable” performance goals, taking into account differing priorities of stakeholders.

In regard to these criteria, MTC best lived up to the standard of applying consistent measures across all phases of scenario modeling, because of its concise set of primary performance targets that capture goals and performance objectives across all phases. For this reason, MTC’s results presented here show consistent and concise performance measurement applied across multiple rounds of scenario evaluation. In regard to scenario design, SACOG best lived up to the criterion of simplifying and streamlining scenario construction across phases, using the same set of scenarios throughout the multi-phase process, and aligning its initial “business as usual” scenario with its “no project” scenario required under CEQA. For this reason, the results from SACOG’s work depict a single set of scenarios evaluated using different performance measures across all phases. For SACOG, results are shown only from the EIR evaluation phase, because that is when the final plan scenario was officially compared to “no project.”

### **What’s the point of scenario planning?**

In considering the performance results from the MPOs’ scenario processes, the first observation that strikes many observers is how little difference exists between modeled results for plan impacts between the proposed plan and “no project,” and between the plan and other scenario alternatives – often amounting to less than a single percent point on any given performance indicator. This pattern raises questions including, why should that be so, and also why do stakeholders get so consternated about vanishingly small differences in modeled performance results between scenarios. What does scenario analysis really accomplish? Perhaps, only to achieve a pretense of being scientific and

objective, considering that margins of error for projected performance results are not even published, and they may well exceed the differences demonstrated between any given modeled outcomes across the scenarios.

There are a number of possible explanations for small differences observed in performance results between MPO scenarios. One is the small share of revenue in any given RTP considered discretionary by the MPOs, which depends on factors including the amount of funds the MPO controls itself (generally small), and the MPO's definition of "committed" funds for purposes of the RTP. MTC changed its definition in 2011, to expand its discretionary authority to re-program funds, in particular for transit.<sup>66</sup> But even MTC considered only 20% of its forecast revenues to be discretionary for its RTP/SCS.

A second reason that MPOs find it hard to "push the needle" in plan performance is because of the difficulty in altering, at the margin, land use and transportation patterns in large, well-developed urban areas such as those in California. Regions with well-developed transport network capacity, and expecting slowing growth rates during the plan's duration, may find it especially hard to achieve more than marginal shifts in plan performance. MTC's RTP/SCS underscores this assertion. With the bulk of the region's future residential and commercial buildings in year 2040 already constructed today, new growth, according to the RTP/SCS, needs to be highly focused and transit-oriented in order to significantly "shift the needle." Similarly, with almost all of the region's roads and most of the region's year 2040 transit infrastructure already built, maintenance of these facilities only preserves the status quo (by preventing even worse conditions for users) but does not move the region towards achievement of targeted GHG reductions.

A third potential explanation for small performance gains in RTPs is lack of assertiveness from MPO governing boards to alter "business as usual" allocations of funds for transport projects and land uses to support plan goals. While factors affecting feasibility of smart growth objectives are not all entirely under MPOs' control, MPO stakeholder choices – especially local government stakeholders – may still be highly influential.

The benefits of scenario planning can be located not just in immediate outcomes, but in cumulative social learning. An open process geared to performance improvement can help prevent back-room deal-making and political tug-of-war from entirely dominating decision outcomes. For example, a performance framework can help establish (to some degree) a level playing field for comparing projects across modes and purposes. Effective performance management should enable communities to engage in productive deliberation about common futures, with results that may accumulate over time.

#### Performance modeling results for individual MPOs

The goal in the first stage of evaluation of modeled performance results was to try to determine, for each MPO, which performance objectives were prioritized in selecting among its modeled plan

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<sup>66</sup> MTC adopted a policy in 2011 that doubled the amount of funding considered discretionary. The new policy changed the definition of "committed funds" from "transportation funds for operations and maintenance as programmed in the current Transportation Improvement Program [TIP], specified by law, or defined by MTC policy" to funding "directed to a specific entity or for a specific purpose as mandated by statute or by the administering agency." The TIP is a cyclically updated short-range transportation expenditure plan tied to the RTP. The sources that were "de-committed" by the new policy were mainly devoted to transit. In addition, MTC narrowed the definition of "committed projects" from those included in the TIP to projects that have completed an environmental impact report. Under MTC's new approach, even projects slated for funding in county transportation sales tax measures are subject to performance review. See Rose (2011) for more information on MPO funding constraints.

scenario alternatives. This was easier to determine for some MPOs more than others. When possible, results are also considered for each final adopted plan scenario in comparison to the “no project” scenario modeled for each MPO’s EIR; this comparison provides a measure of plan benefit.

MTC’s performance modeling results, shown in Appendix Table A3, reveal immediately the agency’s challenge in attaining its SB 375-mandated GHG reduction targets. None of the initial tested scenarios met the region’s 2035 target under SB 375. This situation led MTC to identify the need to further concentrate growth when developing the final preferred scenario, and to improve the transportation strategy by removing low-performing projects through a project performance evaluation process (described below).

In addition, to attain its SB 375 target, MTC added \$630 million in plan funding for a new Climate Initiatives program, which includes eight components to further reduce GHGs: a clean vehicles feebate program; vehicle buyback and plug-in electric vehicle purchase incentives; construction of a regional electric vehicle charger network; a smart-driving education campaign; expansion of car-sharing services; vanpool incentives; a commuter benefit ordinance; and climate initiative innovative grants. With these additional strategies, the final modeled plan scenario achieved its 2035 GHG reduction target. In the performance results, the final plan scenario is seen to outperform all the other EIR modeled scenarios in this aspect, including even the “Environment, Equity, and Jobs” (EEJ) scenario designed by a coalition of environmental and social equity activist groups.

In comparison to the other scenarios modeled for the EIR, MTC’s preferred plan scenario outperformed *only* in regard to reducing GHGs, however, indicating that this objective was paramount.<sup>67</sup> Reflecting the diverse priorities of the EEJ coalition, its scenario outperformed all others on a variety of targets, which led Earthjustice, the Sierra Club, and Communities for a Better Environment to sue MTC and ABAG over the plan and EIR, contending that the EEJ scenario should have been adopted because it was deemed to be the environmentally superior alternative overall. This lawsuit, settled out of court in 2014, resulted in new planning commitments from MTC and ABAG. Thus, like the BIA lawsuit, the environmentalists’ lawsuit indicates how stakeholders can use the legal system to advance their agendas, and gain concrete procedural or program-related gains for the *next* RTP planning cycle, through negotiating with the MPO to settle out of court.

One of the commitments made by MTC and ABAG to settle the lawsuit is to provide “a clear and transparent analysis of the greenhouse gas emissions associated with the updated Plan Bay Area [i.e. in the next planning cycle], including land use-related emissions, and a separate showing of on-road transportation emissions.”<sup>68</sup> This is an interesting provision, because it could improve stakeholder understanding about how different elements of the plan can produce benefits for the region. Additional commitments include conducting an extensive update of the PDA feasibility analysis for the next SCS/RTP, and examining how freight movement affects health.

Not surprisingly, the EIR scenario developed by the regional Building Industry Association outperformed the other scenarios in its capacity to house additional household growth in the region. However, due to its more dispersed land use pattern, the BIA scenario also underperformed on all other performance measures with the exception of decreasing distressed lane miles.

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<sup>67</sup> Compared to “no project,” the preferred scenario also performs particularly well in reducing GHGs, and in containing growth within existing urban development and growth boundaries (all scenarios performed equally well on this measure, though, because it was an imposed performance constraint.) The plan scenario also performs well in decreasing per capita VMT, improving local road conditions, and reducing transit assets beyond their useful life.

<sup>68</sup> See the settlement agreement at <http://www.cbecal.org/wp-content/uploads/2014/06/Settlement-CBE-vs-ABAG-6-18-14.pdf>

SCAG's performance results are not presented as systematically as the other MPOs', especially for its later rounds of modeling. For example, in the RTP, SCAG shows only how the proposed plan scenario compares to "base year" and "baseline" (equivalent to "no project") scenarios, as required for the EIR. And rather than present the results quantitatively in concise tables, like the other three MPOs, SCAG presents results in narrative form or using graphs, making analysis more difficult.

SCAG's performance results, summarized in Table A4, indicate that the SCS/RTP scenario demonstrates some significant projected performance gains, compared to current conditions and also the "no project" scenario, including for GHGs, housing and job growth in High Quality Transit Areas (HQTAs), and urban footprint.<sup>69</sup> However, accessibility measures for average distance of trips show little or no improvement. Mobility is improved dramatically, as person delay per capita is halved under the plan, compared to "no project," and lowered even compared to current conditions by one-quarter. Truck delay is similarly reduced under the plan compared to "no project," although it does not decline compared to current conditions.

Projected economic benefits of SCAG's plan are substantial, including creation of 174,500 jobs annually from transportation expenditures and associated indirect and induced jobs, and an additional 354,000 projected new jobs annually from improved economic competitiveness due to congestion reduction and other regional amenities. The benefit-cost ratio – the return on every dollar invested – is pegged at \$2.90. The plan is expected to produce savings of \$6 billion in local government infrastructure costs (for capital expansion and M&O spending) compared to "no project," and significantly higher revenues per acre (by 41%). Average household costs for housing and driving are projected to be 16% lower under the plan compared to "no project."

SANDAG's scenario modeling results, shown in Table A5, confirm the observation of stakeholders that the modeled scenario alternatives were very similar in their projected outcomes. The results also indicate why some stakeholders accused SANDAG of prioritizing congestion relief. The plan reduces the projected increase in congested VMT under "no project" by nearly half, although not to below current conditions. A number of other performance indicators show minimal or no change, however, including travel speeds, time, and VMT. Nevertheless, the plan also projects some notable improvements over current and "no project" conditions, including doubling of transit accessibility (measured as the share of trips accessible within 15 and 30 minutes by mode), doubling of transit passenger miles per capita, and doubling of the transit mode share to work. Economic gains, compared to "no project," are projected to include an annual 35,600 jobs, and annual impact on Gross Regional Product of \$4.4 billion.

SACOG's performance results (shown in Table A6) show a shift toward smarter growth under the adopted plan. Transit vehicle service hours increase twice as rapidly under the plan as compared to "no project." Growth of new homes is shifted substantially to "center and corridor" communities – by half again as much as under "no project." Gross acres of new development are nearly halved, compared to "no project." Household-generated per capita VMT (not the same measure as shown in Table 5.6) is reduced by 9% compared to current conditions, but only slightly, compared to "no project." Congestion increases, compared to "no project," although not above current levels. The share of non-auto person trips increases twice as rapidly under the plan as "no project."

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<sup>69</sup> The plan reduces per capita GHGs more than three times as rapidly as under "no project." In terms of location efficiency, housing growth in High Quality Transit Areas (HQTAs) under the plan is projected to be more than twice as rapid as under the "no project" scenario, and job growth nearly twice as rapid. The amount of greenfield land consumed for new development is halved under the plan compared to "no project."

These results tend to confirm prior analysis of MPO priorities, indicating, for example, that MTC prioritized GHG reductions. Compared to the other plans, SCAG's and SANDAG's plans demonstrate significant projected congestion relief. However, the two plans also demonstrate other improvements, including significant GHG and urban footprint improvements, in SCAG's case, and significant transit accessibility gains, in SANDAG's. SACOG's results show significant improvement in minimizing urban footprint and improving transit use.

#### Multi-criteria decision-making analysis

To consider how MPOs might enhance discussion of scenario modeling results with stakeholders, this section presents results from a Multi-criteria Decision-making (MCDM) technique that is utilized to compare performance across scenario alternatives in which multiple criteria of interest are at stake. These results are presented as a heuristic – a technique that MPOs may find useful for their scenario processes.

In considering multiple sustainability objectives in relation to multiple scenario alternatives, it quickly becomes very difficult to disentangle the various pros, cons, and trade-offs between scenarios. It is difficult, for example, to compare performance gains for different objectives measured in different units of analysis (e.g. a 5% increase in total hours spent walking or biking compared to a 3% increase in average travel speed).

Ultimately, these choices are normative, but certain techniques facilitate multi-criteria decision-making in contexts such as scenario planning. Multi-attribute Utility Theory (MAUT) provides a basis for comparing performance results across alternatives considered in processes in which multiple criteria of interest, often with conflicting outcomes or attributes, are at stake. As a specific method, Multi-criteria Decision-making (MCDM), which relies on MAUT, has become an established tool to assist decision-making (Jeon et al., 2010). By normalizing performance scores across multiple attributes of interest – in other words, by converting all scores to a range between a minimum of zero to a maximum of one – MCDM permits a closer approximation of apples-to-apples comparison of the relative benefits (or dis-benefits) of a decision scenario measured across multiple performance measures.

Normalized scores are first calculated for each performance measure across all scenarios being tested (a horizontal process for each performance measure, across all scenarios). Then the normalized scores for all performance measures are summed (vertically) for each individual scenario, to compute a total score for each scenario. If desired, weighting can be applied to the performance measures, to distinguish their relative importance in the total index. Called the “weighted sum” technique, this process is intended to indicate the relative utility of each given scenario compared to all the others. See Appendix B for a more detailed explanation of the method.

The MCDM technique is used here to “deconstruct” MTC's decision process, by comparing the modeled scenarios in regard to MTC's performance measures of interest, and then by considering which attributes of the agency's final selected “preferred” scenario are maximized compared to the foregone alternatives. To facilitate this analysis, the same sustainability categories developed for evaluating MPO performance measures earlier are used here, namely: traditional and “sustainable” transportation measures; land use impacts; economic impacts; environmental impacts; social equity impacts; and quality of life impacts. Each category is then weighted equally to provide a sense of which types of performance objectives are maximized in the adopted, preferred scenario.

The results, shown in Table 5.3, corroborate earlier findings. MTC's preferred plan scenario is seen to maximize environmental attributes, in particular (specifically, GHG reduction, but the



environmental category also includes the goal to constrain growth within defined local growth boundaries in the region). The BIA scenario is seen to maximize economic and land use goals (specifically, for the latter, the goal to house projected household growth within the region). The EEJ scenario is seen to maximize equity and quality of life goals (the latter including air quality), compared to the other scenarios. Actually, the EEJ scenario also excelled at achieving every transport objective except one, compared to the other scenarios (see Table A7 for individual MCDM scores for each performance measure, calculated separately). The one measure on which the EEJ scenario scored very poorly is in decreasing distressed highway lane miles, and the EEJ scenario's poor performance on this measure pulled its total transportation score down as a result. Different weighting schemes would produce different results; in fact, the MCDM analysis highlights how the EEJ scenario maximized other scenario benefits at the expense of decreasing distressed highway lane miles.

**Table 5.3 MTC's EIR scenario performance results, presented as multi-attribute criteria scores**

	Attribute scores summed by category (see Table A7)					Weight (to equalize scores by category)	Attribute scores equalized by category				
	No Project	PLAN	Transit Priority Focus	Enhanced Network of Communities	Environment, Equity, and Jobs		No Project	PLAN	Transit Priority Focus	Enhanced Network of Communities	Environment, Equity, and Jobs
Total score	8.83	12.23	11.80	12.65	12.96		4.04	5.28	4.95	5.39	5.67
Transportation											
Sustainable	3.92	5.82	5.76	6.36	6.21	0.14	0.56	0.83	0.82	0.91	0.89
Land use	0.85	0.85	0.85	1.00	0.85	1.00	0.85	0.85	0.85	1.00	0.85
Economic	0.96	0.97	0.96	1.00	0.96	1.00	0.96	0.97	0.96	1.00	0.96
Environmental	0.97	2.00	1.89	1.89	1.94	0.50	0.49	1.00	0.94	0.94	0.97
Equity	0.25	0.67	0.40	0.67	1.00	1.00	0.25	0.67	0.40	0.67	1.00
Quality of life	1.88	1.93	1.94	1.74	2.00	0.50	0.94	0.97	0.97	0.87	1.00

Source: See Table A7

Most of MTC's modeled scenarios performed poorly in reducing housing and transportation costs for working-class Bay Area residents, showing instead significant increases in H+T costs. According to the RTP/SCS, the primary driver of this result was continued projected growth in housing costs. This result represents, according to the plan, one of the greatest regional challenges that must be addressed over the coming years.

***Comparing plan performance across regions and plan cycles***

This section presents results from an effort to compare key performance indicators across the four RTP/SCSs, and longitudinally, across pre-SB 375 and post-SB 375 RTPs by the four MPOs. To further support longitudinal comparison, public use data on trends during the past decade were also compiled for this set of indicators.

Unfortunately, the number of indicators for which it was possible to develop this cross-MPO, cross-time comparison was *very* limited (it was possible in a consistent way only for three indicators,

namely multi-unit vs. single-unit housing share, VMT per capita, and mode share). Not only do the MPOs use different performance indicators, but they also often do not measure the same indicator in precisely the same fashion. Even basic budget categories for presenting aggregate investment choices are not defined the same way across the MPOs (such as for capital investment versus maintenance and operations). Furthermore, the data is not easily accessible within the lengthy plan documents associated with an RTP (including scores of associated appendices). Across successive planning cycles, even for a given MPO, measurement is often not consistent.

This situation points to serious transparency problem, as efforts to gauge progress under SB 375 are substantially hampered by lack of consistency in performance measurement not just between the MPOs, but even between plan years for a given MPO. Even basic budget categories are not defined consistently. State policymakers should encourage or even mandate consistent measures and definitions for a limited set of critical measures, so as to facilitate more effective evaluation.

Information is first presented on current conditions and recent trends for key indicators, followed by evaluation of RTP data for the same indicators. As a reminder, the start and end years of the four current plans are as follows: for MTC, from 2010 to 2040; for SACOG, from 2010 to 2035; for SANDAG, from 2008 to 2050; and for SACOG, from 2008 to 2035. For the sake of comparability, mid-term results for 2035 are presented from SANDAG’s most recent plan, rather than to 2050.

The first performance result to consider for the MPOs is how well their plans met the state-mandated GHG reduction targets.<sup>70</sup> All the MPOs met or exceeded their CARB-mandated targets to comply with SB 375 for per capita GHG reduction by 2020 and 2035 (Table 5.4).

**Table 5.4 Projected CO2-equivalent emissions reductions in the four RTPs, for SB 375 vehicle classes**

	MTC				SCAG			SANDAG				SACOG		
	2005	2020	2035	Plan year (2040)	2005	2020	2035 (plan year)	2005	2020	2035	Plan year (2050)	2005	2020	2035 (plan year)
GHGs per capita (modeled CO2e, lbs per day per capita)	20.5	18.3	17.1	16.8	23.9	21.9	20.5	26.0	22.4	22.6	23.5	23.0	20.8	19.7
Percent difference from 2005, including off-model reductions		-10%	-16%	-18%		-8%	-16%		-14%	-13%	-10%		-10%	-16%
CARB (SB 375) mandated reduction		-7%	-15%			-8%	-13%		-7%	-13%			-7%	-16%

Notes: SCAG and SACOG present results for final GHG reductions that include "off-model" factors.

Sources: MTC EIR, *Chapter 2.5: Climate Change and Greenhouse Gases*, Table 2.5-7; SCAG EIR, *Report 3.6: Greenhouse Gas Emissions*, Table 3.6-5; SANDAG RTP, Table 3.7; SACOG RTP, Table 7.8.

The GHG emissions reduction gains in SANDAG’s plans are substantial, compared to current conditions (remembering that SANDAG’s plan extends further than the other plans, to 2050). But the gains are minimal, compared to “no project” (see Table 5.5). Compared to “no project,” SANDAG’s plan achieves less than half the gains of MTC’s and SCAG’s plans, although more than SACOG’s.

<sup>70</sup> SB 375 requires that GHG emissions modeling (more precisely, carbon dioxide equivalent) be presented for 2005, 2020, and 2035 – start and end years that do not precisely coincide with RTP start and end years.

**Table 5.5 Per capita CO2 emissions reduction projections in the four RTP/SCSs**

	Percent change from base year (current) to plan year, no project	Percent change from base year (current) to plan year, with plan	Percent point difference between shift from base year, for no project vs. plan
MTC	-8%	-18%	-0.10
SCAG	-4%	-14%	-0.10
SANDAG*	-29%	-33%	-0.04
SACOG	-14%	-16%	-0.02

Sources: for MTC, from Table 10, in *Final Plan Bay Area Performance Assessment Report*; for SCAG, from EIR, Table 3.6-5; for SANDAG, from RTP, *Technical Appendix Three*; and for SACOG, from EIR, Table 18.2. Also see the underlying data used here in Tables A3-A6.

\* Note: for SANDAG, results are for all vehicle types; for the other three MPOs, results are for SB 375 vehicle types. For SCAG, base year is 2005.

Table 5.6 presents a similar comparison of results for per capita daily VMT reductions in the four plans. With VMT reduction being one of the primary goals of SB 375, this metric is useful as an indicator of transport efficiency. The results show that VMT reduction does not correlate too well with CO2 emissions reductions in the plans. On an annualized basis, SACOG’s plan achieves the greatest reduction, followed closely by MTC’s and SCAG’s plans, and further behind, by SANDAG’s. Compared to “no project,” however, the four plans each show a similar improvement.

**Table 5.6. Per capita VMT reduction projections in the four RTP/SCSs**

	Base year	Plan year	Base year VMT	VMT in plan year, no project	VMT in plan year, with plan	% diff- erence plan from base year	Annualized % change plan from base year	% diff- erence plan from no project
MTC	2010	2040	20.8	20.7	19.6	-6%	-0.19%	-5%
SCAG	2010	2035	24.5	24.7	23.3	-5%	-0.19%	-5%
SANDAG	2008	2050	25.6	26.7	25.2	-2%	-0.04%	-6%
SACOG	2008	2035	25.8	not presented	24.1	-7%	-0.24%	na

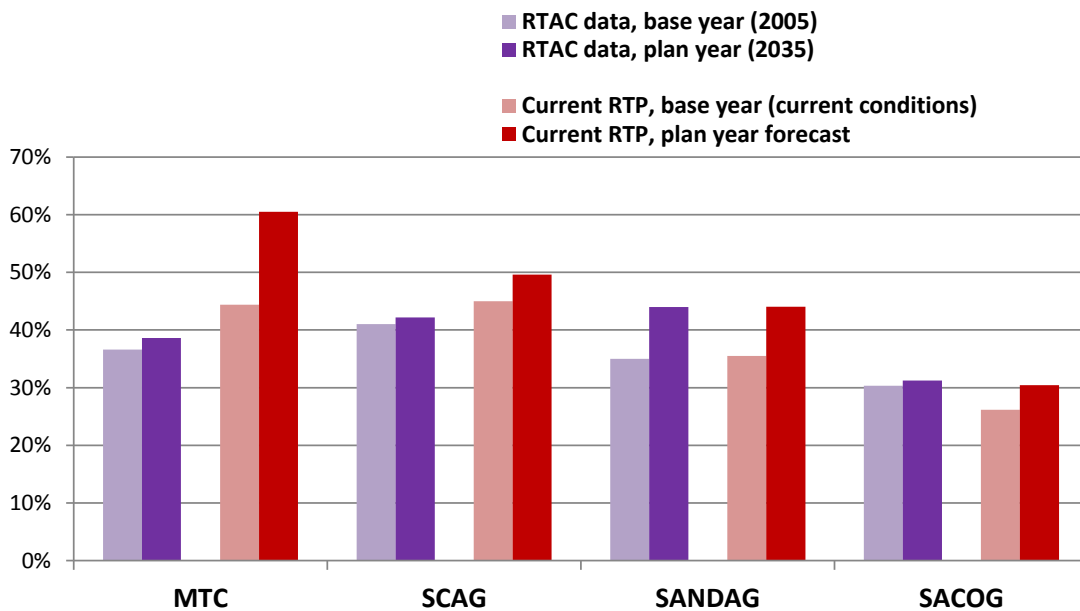
Sources: MTC EIR Table 3.1-12; SCAG EIR Table 3.12-13, with per capita estimated using population estimates from EIR Table 3.10-8; SANDAG RTP, *Technical Appendix Three*, Table TA 3.1; SACOG RTP, Table 5b.2

Notes: For MTC and SACOG, results are for weekday average VMT. For SACOG, daily household-generated VMT is 3% lower under the plan compared to no project, based on data from EIR Table 18.2. Household-generated VMT is only one component of total VMT.

Figure 5.5 shows performance data on mix of housing types from the MPOs’ last two RTPs. In this case, for pre-SB 375 projections, the data is taken from the information compiled for the target-setting process by the four large MPOs (called “RTAC” data because it was produced for the SB 375 Regional Targets Advisory Committee process in 2010). For SB 375 consistency purposes, the RTAC data was modeled for a start year of 2005 and an end year of 2035.

The comparison of housing mix projections in the pre-SB 375 and post SB-375 plans indicates that the MPOs are projecting higher shares of attached and multi-family housing in their current plans than in the RTAC data. The difference is especially marked for MTC, which projects an increase in multi-family or attached housing share that is 16 percent points higher. This provides a strong indication of the importance in MTC’s plan of more compact growth patterns.

**Figure 5.5 Multi-family and attached housing share estimates in current and most recent prior RTPs**



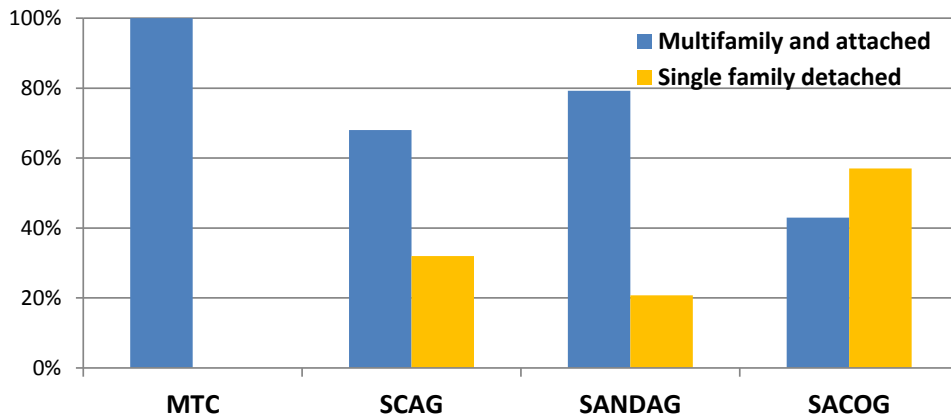
Sources: For most recent RTP, for MTC, from EIR Table 2.3-2, and for SCAG, from commentary on page 129 in RTP and Table 6 in growth forecast appendix, and for SANDAG, from RTP, Table 3.2, and for SACOG, from EIR Chapter 12, Table 12-10; for RTAC data on previous RTPs, from Heminger et al., 2010.

Note: SANDAG results for most recent RTP are to 2035.

MTC’s dramatic projection for the shift in housing types in the Bay Area region is underscored when comparing the four MPOs’ projections for growth in new housing over the duration of their RTP/SCSs (Figure 5.6). MTC projects that all new housing will be multi-family or attached, with this calculation reflecting an estimated current over-supply of single-family units of 170,000.<sup>71</sup>

<sup>71</sup> See page 2.3-5 in MTC’s EIR land use appendix.

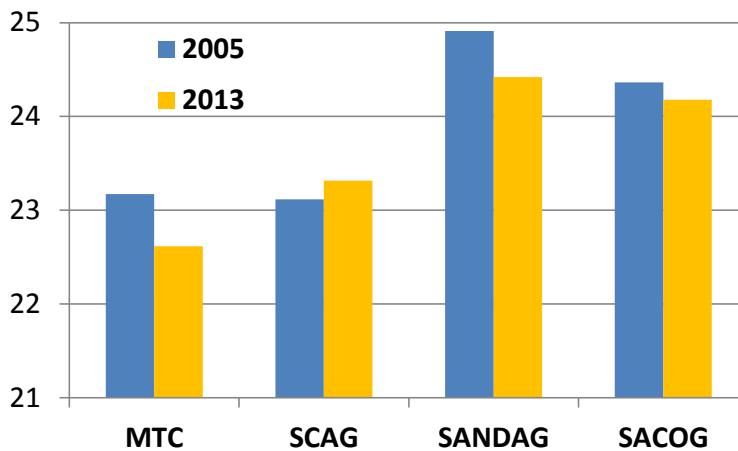
**Figure 5.6 Multi-family and attached housing as share of new housing growth, estimated in current RTPs**



Sources: Same as above for Figure 5.5.  
 Note: SANDAG results for most recent RTP are to 2035.

Figure 5.7 shows the trend over the past decade in daily VMT per capita for the four regions. According to the Caltrans data, daily VMT per capita dropped in all the regions from 2005 to 2013, except in the Los Angeles area. The San Diego region has higher per capita VMT than the others, followed by the Sacramento area. The Bay Area has the lowest daily per capita VMT, about 7% lower than in the San Diego region.

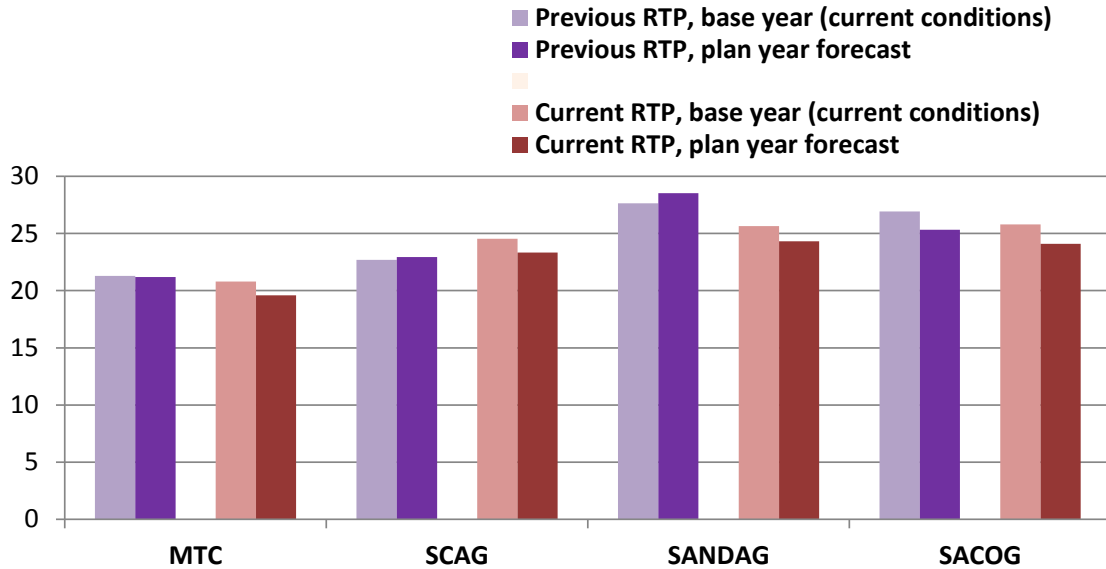
**Figure 5.7 Trend in daily VMT per capita by region**



Source: Caltrans Public Roads Data" reports at <http://dot.ca.gov/hq/tsip/hpms/datalibrary.php>

Data from the RTPs confirms the same pattern seen above in the Caltrans data, with VMT per capita estimated to have declined in all regions except the Los Angeles area (Figure 5.8) over the past two RTP cycles. Of course, this time period encompasses the recent national economic downturn, and so it is unclear whether the trend is secular or cyclical.

**Figure 5.8 Total daily per capita VMT estimates in current and most recent prior RTPs**



Sources: for MTC, for current RTP, from EIR Table 2.2-5, and for previous RTP, from EIR Table 2.1-16; for SCAG, for current RTP, from EIR Table 3.12-13, calculated as per capita with population numbers from EIR Table 3.10-8, and for previous RTP, from EIR Table 3.14-11 and population numbers from Tables 3.11-1 and 3.11-12; for SANDAG, for current RTP, from Table TA 3.1 in goals and performance measurement report, and for prior RTP, from Table TA 4.1 in goals and performance measurement report; and for SACOG, for current RTP, from Table 5b.2 in main RTP, and for prior RTP, from Table 4-12 in main RTP, constructed per capita using population data from Table 2 in Appendix D2. Notes: MTC and SACOG results for weekday VMT. SANDAG results for most recent RTP are to 2035.

The projections for per capita VMT indicate that the most recent, post-SB 375 plans are geared to achieve greater reductions over the course of the plans than in the previous plans, for all four MPOs. Particularly notable is the turn-around in SANDAG’s projections, which include a significant projected decline in per capita VMT over the duration of the most recent plan, in comparison to the projected rise in this measure in the last prior RTP. (The results presented for SANDAG in the graph are to 2035, but SANDAG’s projections to 2050 also include a decline in per capita VMT relative to current conditions).

Quantifying this finding, SANDAG’s plan projects an 8 percent point downward shift in per capita VMT when comparing “plan year” results in the pre-SB 375 to the post-SB 375 plan (Table 5.7). Again, the results for SANDAG are to 2035; after then, SANDAG’s plan shows “backsliding” by 2050, as per capita VMT is projected to rise between 2035 and 2050, although still remaining below current levels.

**Table 5.7 Total daily per capita VMT estimates, in current and most recent prior RTPs**

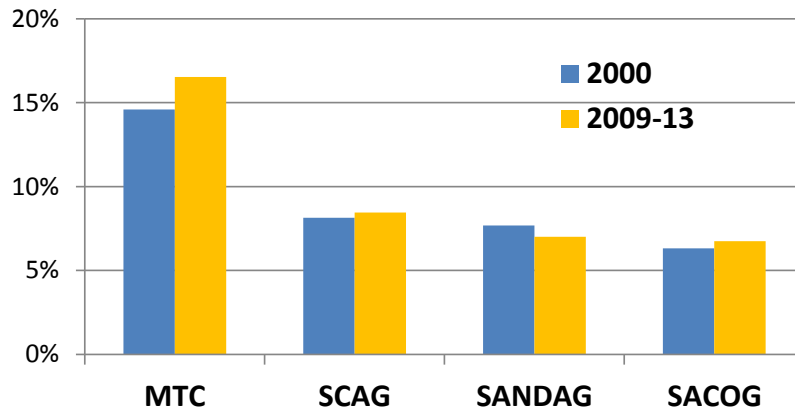
	Previous RTP, base year (current conditions)	Previous RTP, plan year forecast	Current RTP, base year (current conditions)	Current RTP, plan year forecast	% difference, projected future conditions under plan compared to current conditions, for prior RTP	% difference, projected future conditions under plan compared to current conditions, for most recent RTP	Percent point difference between current plan projected change and previous plan projected change
MTC	21.3	21.2	20.8	19.6	-0.5%	-5.8%	-0.05
SCAG	22.7	22.9	24.5	23.3	1.0%	-4.9%	-0.06
SANDAG	27.7	28.5	25.6	24.3	3.2%	-5.2%	-0.08
SACOG	26.9	25.3	25.8	24.1	-5.9%	-6.6%	-0.01

Sources: Same as above for Figure 5.7

Note: SANDAG results for most recent RTP are to 2035.

Another useful metric of location and transport efficiency is non-auto commute mode share. Since 2000, this share has increased in all the regions except San Diego (Figure 5.9).

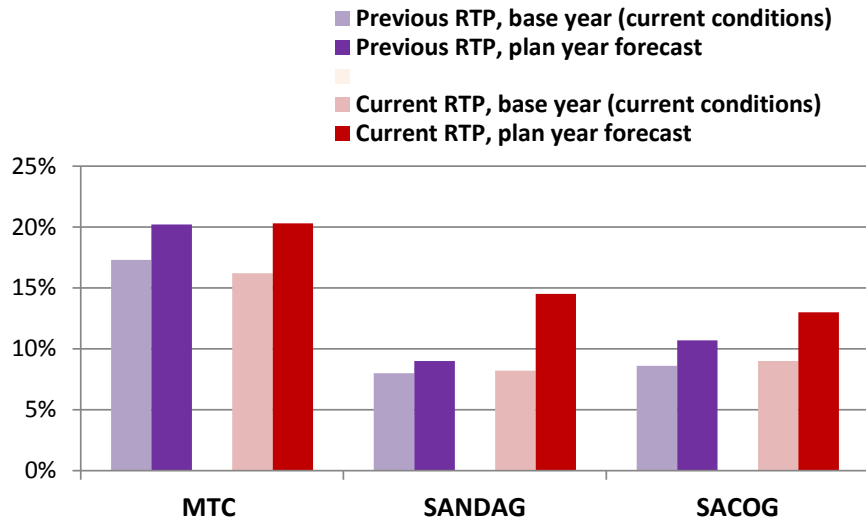
**Figure 5.9 Trend in non-auto commute mode share by MPO region**



Sources: For 2000, from US Census Bureau, decennial Census, and for 2009-2013, from US Census Bureau, 5-year American Community Survey

Similar to the patterns seen in the previous indicators evaluated, the MPOs project increases in non-auto mode shares over the life of their current plans that are significantly higher than the increases they projected in their pre-SB 375 plans (Figure 5.10). SANDAG’s projected performance improvement on this measure is, once again, especially notable. SCAG did not present projections for this measure.

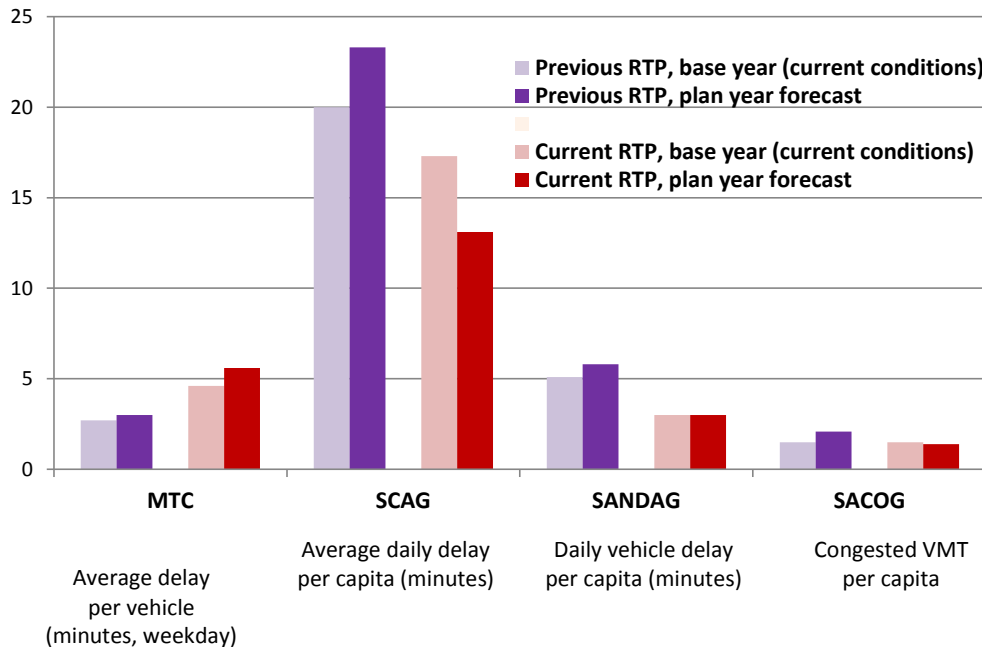
**Figure 5.10 Non-auto mode share estimates in current and most recent prior RTPs**



Sources: For MTC, current RTP data from EIR Table 2.1-13, and prior RTP data from Table E1, *Travel Forecasts Data Summary*; for SANDAG, current RTP data from Table TA 3.1 in goals and performance measurement report, and for prior RTP, from Table TA 4.1 in same; and for SACOG, from Table 18.2 in EIR alternatives analysis report, and for prior RTP, from Tables 4-8 and 4-9 in main RTP. Note: Data is for all trips, except for SANDAG, with data for peak period commute. SANDAG results are to 2035.

Finally, performance results are shown for congestion from the RTPs, although the data are not comparable (Figure 5.11). The findings are best taken as an indication, rather than a precise measure, of performance patterns across the RTPs.

**Figure 5.11 Congestion estimates in current and most recent prior RTPs**



Sources: For MTC, current RTP data from EIR Table 2.1-12, and prior RTP data from EIR Table 2.3-2; ; for SCAG, current RTP data from Table A11, highways and arterials appendix, and for prior RTP, from Tables 3 and 17 in same; for SANDAG, current RTP data from EIR Tables 4.16-14 and 4.16-16, and for prior RTP, from Table TA 4.1 in goals and performance measurement report; and for SACOG, from RTP Tables 5b.6 and 5b.7, and for prior RTP, from current RTP Table 5b.6. Note: SANDAG results are to 2035.



The data show declining congestion, in terms of current conditions, between the two RTP cycles for all regions except the Bay Area. For projected congestion in the plan year, the data show an increase or a flat line except in the Los Angeles region, where a significant decline in congestion is projected. The graph depicts clearly why SCAG was able to sell the merits of its plan on the basis of relieving traffic congestion.

### Conclusion

This presentation of performance results indicates that the four MPOs' most recent, post-SB 375 plans aim to enhance smart growth performance more than their previous, pre-SB 375 plans, if only incrementally. This should be encouraging to anyone concerned that SB 375 would not alter plan goals and ambitions. That projected plan performance post-SB 375 has not proved to be dramatically better than pre-SB 375 should not surprise or disappoint, however, because SB 375 builds upon existing MPO processes. In addition, "shifting the needle" – trying to alter development patterns and impacts – in built-out urban regions is a long-term proposition.

One question that arises in regard to the plan projections is how and whether the economic downturn of recent years affects the results. One indication comes from SANDAG's explanation for the "backsliding" in projected performance after 2035, for critical measures including per capita CO2 and VMT reduction, SANDAG indicated that economic conditions are the main driver. If near-term performance gains mainly reflect the slowing of the economy, then it may be all the more important for the MPOs to evaluate plan strategies that are robust to economic shifts.

SANDAG explained:

The early gains in GHG reductions [in the RTP/SCS] are the results of a slow economic recovery while significant investments are being in the regional transportation network....At the same time, due to economic conditions, fewer residents are working and residents who are working are making less income. As such, fewer workers are driving alone and more workers are carpooling or taking public transit. By 2035 and 2050, the economy catches up and more workers begin driving again.<sup>72</sup>

This evaluation also brings to light a significant concern about data comparability and transparency. Any serious effort to compare estimates of current conditions and projected plan benefits across the MPO regions, and across subsequent planning cycles, is substantially hampered by lack of consistency in performance measurement not just between the MPOs, but even between plan years for a given MPO. The data collected here was scattered across multiple thousands of pages of material contained in each RTP and EIR, making it laborious to even try to compile such comparisons. This situation is very undermining to efforts by stakeholders and policymakers who seek to assess and understand plan achievements, potential benefits, and obstacles.

It is not conducive to performance management under SB 375 that this degree of inconsistency and lack of transparency be allowed to continue. The Air Resources Board, as the SB 375 oversight agency, in conjunction with other agencies as appropriate, and with the MPOs themselves, should work to define a set of performance indicators and measurement specifications that all MPOs will employ to produce information that can be readily compared across plans. Essentially, this recommendation calls for the same sort of effort that was undertaken for the report compiled by the four MPOs for the SB 375 target-setting process to be produced on a regular and ongoing basis. Conscientious implementation of SB 375 necessitates that this step be taken.

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<sup>72</sup> See *Draft 2050 Regional Transportation Plan/Sustainable Communities Strategy Public Comments and Responses* (stated in multiple locations), available at [http://www.sandag.org/uploads/projectid/projectid\\_349\\_13661.pdf](http://www.sandag.org/uploads/projectid/projectid_349_13661.pdf)

## *Project-level assessment*

The four MPOs have begun a new practice in recent RTPs – crafting careful project assessment procedures (as opposed to scenario assessment procedures). In other words, the MPOs apply performance criteria to evaluate individual investment projects (or project types) rather than just packages of projects and programs (i.e. scenarios). These procedures hold much potential as useful tools for stakeholders seeking to “get inside the black box.”

MTC’s project-level evaluation process constitutes a notable best practice because of the care taken to present results clearly to help stakeholders understand the implications. The project-level evaluation proved necessary when MTC’s initial scenario testing showed that the plan might not achieve mandated GHG reductions under SB 375. Despite examining numerous scenarios with varying land use and transportation combinations, relatively similar results had emerged for many of the performance targets when analyzing packages of similar projects (e.g. rail efficiency), which obscured key differences between projects within the packages.

MTC’s project evaluation method, applied to “uncommitted” projects,<sup>73</sup> combined a quantitative benefit-cost ratio to measure cost-effectiveness with a qualitative “targets” score to peg how well the project helps achieve the plan performance targets. The qualitative measure was applied to 180 individual projects and the quantitative cost-benefit measure to 90 large-scale capital projects with total costs exceeding \$50 million and/or with regional impacts. An additional 700 smaller projects were grouped into nine categories based on mode, purpose, and functional class and then evaluated to receive a target score by category.<sup>74</sup>

MTC’s graphical representation of project performance assessment by major category of investment, shown below, is one of the most striking performance measurement innovations in the four post-SB 375 RTPs – striking because of how clearly it depicts the trade-offs in investments among different types of projects. According to the RTP, the project-based assessment enabled staff to develop a preferred scenario to support plan targets, acting as a “crucial link” between scenario-level and target-level analyses. Based on the project review, high-performing projects were prioritized for plan funding, and low-performing projects (with a benefit-cost ratio less than 1 or an “adverse” score on the targets assessment) had to submit to a second-round review in which sponsors were required to provide a compelling case for the project’s inclusion in the plan.<sup>75</sup>

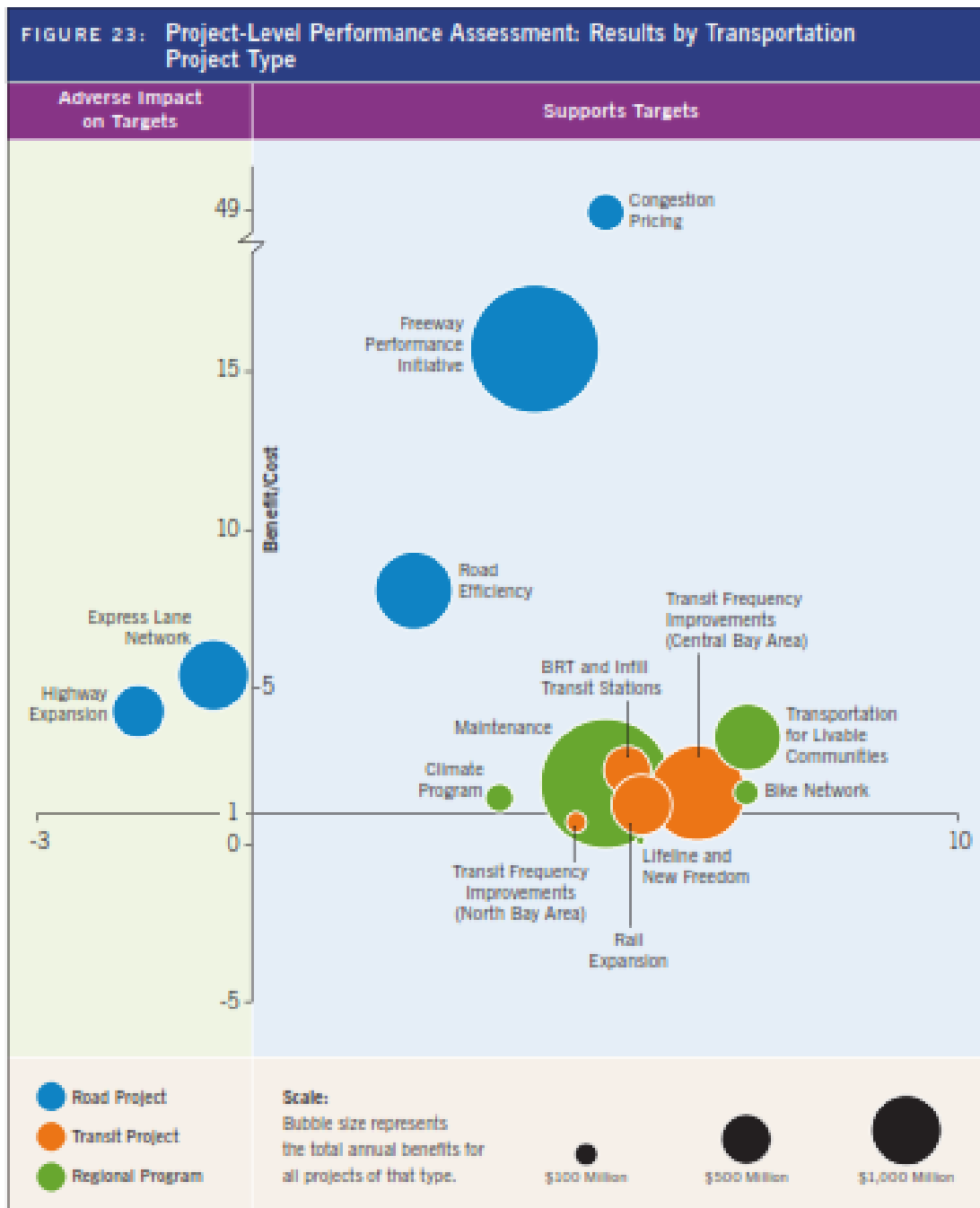
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<sup>73</sup> Uncommitted projects were defined as any project with less than 100% local funding and without a certified Environmental Impact Report (EIR) or Record of Decision (ROD) for Environmental Impact Statement (EIS), and also without full funding plan.

<sup>74</sup> The benefit-cost assessment used for MTC’s project assessment was determined using the agency’s travel model, and included, on the cost side, measures of capital costs and net operating and maintenance (O&M) costs, and on the benefit side of the ledger, travel time (including recurring & non-recurring delay), travel cost (auto operating/ownership, parking), collisions (fatalities, injuries, property damage), emissions, health impacts due to active transport, and noise. The qualitative targets assessment measured impacts on climate, adequate housing, particulate matter, collisions, active transportation, open space, equitable access, economic vitality, non-auto mode share/VMT, and state of good repair.

<sup>75</sup> For its project-based evaluation, MTC also evaluated regional programs, such as its Climate Initiatives, Lifeline Program, and Freeway Performance Initiative. Many of these programs lack capacity improvements that could be evaluated using a regional travel demand model, and so an alternative method was developed to capture benefits in one of two ways: 1) the estimated VMT reduced by the projects, or 2) the estimated nominal benefit(s) of the project captured in a benefit-cost ratio. Each major transportation project was also mapped in connection to social equity, first to determine whether it was located within a Community of Concern or Community Air Risk Evaluation (CARE) area, and next, to determine whether it provides transport access to neighborhood residents, and finally, whether it provides adequate housing, levels of particulate matter emissions, and low-income housing-plus-transportation affordability.

The results show that pricing strategies offer the best all-around results on both dimensions – benefit-cost, and meeting plan goals. But transit and bike projects earned the highest scores on the plan goal axis, not considering cost-benefit criteria.



Source: MTC's RTP, p. 115

**Plan budget allocations and investments**

Plan investments were compared according to large categories considered pertinent to sustainability objectives, in particular distinguishing funds for new capital expansion projects from funds allocated for rehabilitation, maintenance, or operation of existing facilities, and distinguishing expenditure on transit from expenditure on highways and roads.<sup>76</sup> After evaluating this allocation data, this section briefly comments on MPO investment strategies, to highlight some best practices and concerns.

All four MPOs shifted toward investment in M&O and rehab, and away from investment in new facilities capital expansion, in their current RTP/SCSs as compared to their previous plans (Table 5.8). SANDAG’s shift in funding allocations was most dramatic. Each of the MPOs is now spending half or more of its RTP budget on M&O and rehab (Figure 5.12). MTC is spending nearly nine of every ten dollars on M&O and rehab, reflecting the region’s relatively older roadway and especially transit system compared to the other regions.

**Table 5.8 MPO budget allocations in most recent adopted RTPs**

	MTC		SCAG		SANDAG			SACOG	
	Prior RTP	Current RTP	Prior RTP	Current RTP	Prior RTP	Current RTP to 2040	Current RTP to 2050	Prior RTP	Current RTP
Highways, roads, goods movement									
Expansion	5%	5%	25%	18%	47%	23%	21%	23%	21%
M&O*, rehab, system mgt	30%	33%	23%	30%	21%	30%	27%	43%	47%
Transit									
Expansion	14%	7%	18%	22%	16%	21%	27%	10%	10%
M&O*, rehab, system mgt	51%	55%	35%	29%	16%	27%	26%	24%	22%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%

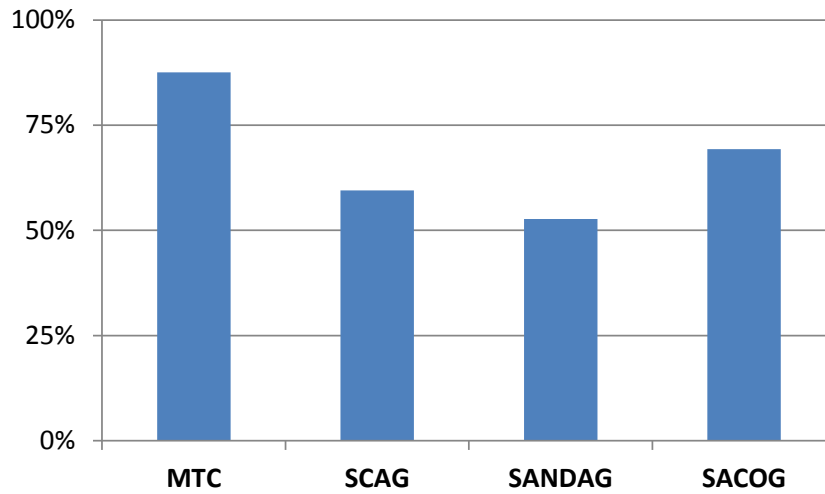
\* M&O = Maintenance and operations

Sources: MTC RTP EIR, Table 1.2-10 (shows expenditures in current and prior plan); SCAG RTP Table 1, prior RTP Table 6; SANDAG RTP Table 5.2, prior RTP Table 4.3; SACOG RTP Table 4.1, prior RTP Table 2.1.

Notes: TDM, TSM, active transportation, and goods movement improvements are included in roadway rehab and system management category. Airport and maritime expenditures, as well as debt service, are excluded. Passenger high-speed rail is included with transit expansion. For SACOG's most recent prior RTP, the proportional shares of transit M&O versus expansion funds are estimated based on shares in the current RTP.

<sup>76</sup> Even more so than for performance indicators, efforts to compare budget allocations across RTPs by different MPOs, and across planning cycles for a single MPO, are fraught with inconsistencies in how funds are categorized. For that reason, these findings need to be treated with caution. These findings are very close to those in Figure 15 in MTC’s RTP, which presents the same funding breakdown, but only for the most recent RTP/SCSs (whereas this analysis also compares the investment patterns across current and previous planning cycles).

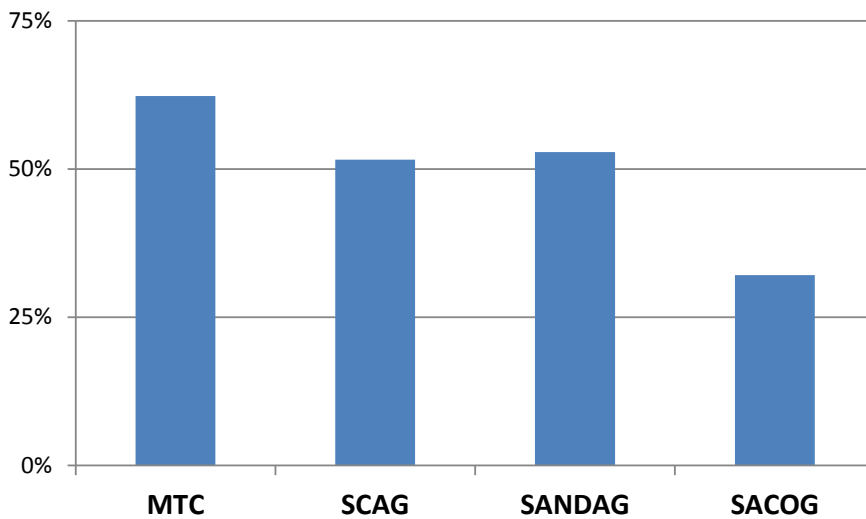
**Figure 5.12 Share of most recent RTP budgets allocated for maintenance, operations, and rehabilitation**



Sources: See sources and notes for Table 5.8 above.

Most of the MPOs are also spending more for transit than streets and roads (Figure 5.13). SACOG's share is lowest, at about one-third. Again, comparing the pre-SB 375 RTPs to post-SB 375 RTPs, SANDAG's funding distribution shifted most substantially over the period.

**Figure 5.13 Share of most recent RTP budgets allocated for transit**



Sources: See sources and notes for Table 5.8 above.

## Funding constraints and opportunities

This section compares funding approaches briefly to highlight a few constraints and opportunities. MTC's greater revenue-raising capacity, compared to the other MPOs, has already been noted. MTC will increase its revenues in coming years through construction of an express lane network. In 2011, MTC gained state approval to add 270 miles of express lanes to "form a seamless system...throughout the region" (MTC RTP, p. 83). Otherwise known as high-occupancy toll (HOT) lanes, express lanes allow solo drivers to pay a fee to use the lane, while carpools and buses may use the lanes free of charge. About half the new lanes would be converted from existing carpool lanes or high-occupancy vehicle (HOV) lanes, and the other half would be created by widening freeways; this latter strategy has been controversial among some stakeholders.

A significant concern about spending in SCAG's plan, raised by stakeholders, was the choice to identify a large sum in "new revenue sources and innovative financing strategies" that are not currently in place or available.<sup>77</sup> The plan identifies core revenues, in the amount of \$305 billion, as committed or historically-available funds, and then identifies an additional \$226 billion as new funding likely to materialize, including more than \$110 billion pegged to come from enactment of a "mileage-based" fee, in addition to new tolls and other user fees. The new mileage-based fee, equivalent to a tripling of the gas tax, would require state or federal action, because the RTP expressly ruled out a previously considered regional gas tax or fee.

The plan assumes that these new revenues will materialize to fund projects necessary for the RTP to meet the region's greenhouse gas and air quality reduction mandates. Many of these projects are not slated for funding in the county plans that feed into the RTP. The new funds would increase substantially the share of all SCAG revenues from state and federal sources. Many stakeholders have questioned how realistic these funding provisions are.

Thus, SCAG, like MTC, found itself in a position of needing to significantly ramp up smart growth strategies to meet state and federal mandates. With more limited control over discretionary funds than most of the state's other MPOs, SCAG is looking elsewhere for the wherewithal to accomplish its goals. MTC, in contrast, configured its programs to try to induce change from localities within its jurisdiction, but SCAG did not take that confrontational route. If the federal and state government ante up with the proposed funding, then SCAG could exert more influence in determining outcomes. But if that does not happen, SCAG's aspirational plan could be scuttled by overly-optimistic funding expectations that fail to pan out. SCAG's approach to its funding dilemmas points to the challenge faced by MPOs in achieving SB 375 goals without independent funding authority or other regulatory powers to enable MPOs to induce more action on the ground.

SANDAG's plan includes substantial new investments in both roadways and transit, funded at least partially through the county's TransNet sales tax measure. However, as noted previously, the plan's transit spending is weighted toward the latter half of its duration, with some projects still requiring federal approval or support to begin implementation. Meanwhile, the first two decades of the forty year plan foresee full build-out of the proposed 2030 highway network.

Thus, SANDAG finds itself in an ironic situation, which forms a contrast to SCAG's situation. Having increased local resources for plan implementation through TransNet, SANDAG is now constrained by the measure's provisions (passed, incidentally, before adoption of AB 32 or SB 375).

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<sup>77</sup> See e.g. plan comment letters from the cities of Burbank, Brea, and Los Angeles, and LA County Metro (MTA), at <http://rtpscs.scag.ca.gov/Pages/Proposed-Final-2012-2035-RTP-SCS.aspx#CL>; [http://rtpscs.scag.ca.gov/Documents/peir/2012/pfinal/2012pfPEIR\\_AppendixH\\_CommentLetters.pdf](http://rtpscs.scag.ca.gov/Documents/peir/2012/pfinal/2012pfPEIR_AppendixH_CommentLetters.pdf)

In other words, the SANDAG board of directors is now constrained in implementing smart growth-oriented goals.

In July 2011, SANDAG agreed to modifications to its I-5 North Coast corridor expansion project. Funding previously allocated to construction of two of eight proposed new general purpose lanes was redistributed instead to advance phasing of a light rail trolley project, and for supplementing the Safe Routes to Transit program, regional rail grade separations, and the Smart Growth Incentive Program. This outcome responds to stakeholder pressure to achieve smart growth goals.

SACOG approached the question of how to address fiscal limitations differently than SCAG or SANDAG. Facing a projected reduction in revenues of nearly 13 percent compared to its previous plan, due largely to slower anticipated growth, the plan set about “rightsizing” investments and shifting toward efficiency strategies. For example, the plan emphasizes operational improvements over new roadway capacity, and reduces or delays road widening projects. “Complete streets” projects have also replaced new roadway investments; over 30 percent of projects in the plan contain complete streets elements.<sup>78</sup>

High-quality (frequent) bus service in the region is increased from 14 percent currently to 45 percent in 2035, which is expected to improve transit productivity, and then, in a virtuous cycle, also result in higher transit operating costs recovered from user fares. In turn, the projected additional revenues gained from user fees allow for further transit investments. As a result of these strategies, transit, bike and walking trips are projected to increase per capita by one-third.

### Conclusion

This discussion of funding allocations and strategies in the RTPs points to different ways that the four MPOs are addressing fiscal constraints, in a fashion reflecting their varying circumstances. MTC is concerting its discretionary dollars to accelerate smart growth and climate programs, while building new roadway capacity that will bring in revenue but will also cause induced demand.

Meanwhile SCAG is reaching out for resources to expand programs, and in the process to expand its traditionally limited role at the “30,000-foot level” of the huge Los Angeles region. But unless dramatic political change occurs nationally, SCAG must hope that the state government comes to its aid. For that to occur, SCAG will need to convince other SB 375 stakeholders, and the public, to support the funding provisions sketched out in SCAG’s plan. Pricing strategies have long been advocated by economists as one of the most effective ways, theoretically, to induce more efficient choices by consumers for both housing and transport. If SCAG becomes an active and assertive organizer of support for new pricing policies statewide, that could propel this MPO into a new leadership position.

SANDAG’s situation forms a pointed contrast to SCAG’s, since it highlights how local funding strategies can fail to provide a panacea for fiscal constraint, at least when the tide shifts in terms of state performance expectations. With TransNet, SANDAG substituted voter constraint for funding constraint, and now seems to have boxed itself in somewhat, since the 40-year tax measure was tailored before the mandates of AB 32 and SB 375 kicked in. SANDAG’s RTP/SCS planning process gained statewide attention not only because it was the first out the door under SB 375, but also because SANDAG’s efforts to address these concerns may provide a test case for other MPOs thinking about how to align county sales tax measure projects with SB 375 goals.

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<sup>78</sup> This information is based on ARB’s technical reports, available at <http://www.arb.ca.gov/cc/sb375/sb375.htm>

Finally, SACOG forged a path that other MPOs should emulate, by “right-sizing” its plan. Rather than simply make do with less, SACOG devised a convincing strategy for turning fiscal constraint into an opportunity for optimizing efficiency gains. In doing so, the agency has highlighted co-benefits between a smart economic and a smart environmental strategy for the region.

### ***Implementation programs***

This section considers a sample of RTP/SCS implementation programs that are highlighted as best practices. In particular, programs are described that strengthen performance management and transportation-land use planning connections. Strategies are identified whereby MPOs seek to tie rewards (incentives) to projects and planning practices that reflect sustainability objectives. Many of these programs pre-date SB 375.

“Inside strategies” and “outside strategies” are distinguished, in other words, in the first case, programs to strengthen compact growth and efficient transport patterns in the urban core, and in the second case, programs that help contain sprawl and leapfrog development in greenfields and at the urban fringe. A combination of these strategies is important to promote efficient development.

#### Inside strategies

A series of inter-connected programs and policies adopted by MTC and ABAG are first described, which together aim to strengthen transit and TOD, and their planning inter-connections, so as to support compact growth.

#### *MTC’s Transit Oriented Development (TOD) Policy and Resolution 3434*

Among California MPOs (and others nationally), MTC’s Resolution 3434 and TOD Policy, adopted in the early 2000s, represent a strong effort to link transit and land use by conditioning transit expansion funds on supportive land use. MTC adopted Resolution 3434, its Regional Transit Expansion Program, in 2001, establishing transit expansion objectives totaling \$11.8 billion, and associated goals for improving cost-effectiveness by conditioning new transit expansion upon supportive land use. MTC then adopted its Transit Oriented Development (TOD) Policy in 2005 to support redevelopment of communities around the new transit lines and stations.<sup>79</sup>

The three key elements of the regional TOD policy are: first, corridor-level thresholds that quantify appropriate minimum levels of development around transit stations along new corridors; second, assistance from MTC for local station area plans that address land use changes, station access needs, circulation improvements, parking policies, pedestrian friendly design, and other TOD elements; and third, corridor working groups that bring together county-level Congestion Management Agencies (CMAs), city and county planning staff, transit agencies, and other stakeholders. Each transit extension project seeking Resolution 3434 funding must determine corridor-level development thresholds, which may vary by transit mode, in the form of minimum numbers of housing units. Each project must demonstrate that the thresholds for the corridor are met through existing development and adopted station area plans that commit local jurisdictions to a level of housing that meets the threshold.

#### *MTC’s Transit Sustainability Project, Transit Performance Initiative, and Transit Core Capacity Challenge*

The passage of SB 375 in 2008 coincided with the onset of the economic recession, which led to reductions in funds for transit operations. These factors prompted MTC to direct attention to

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<sup>79</sup> For more information about these programs, see the web page at [http://www.mtc.ca.gov/planning/smart\\_growth/tod/](http://www.mtc.ca.gov/planning/smart_growth/tod/)



improving transit productivity. MTC launched the Transit Sustainability Project in 2010, a two-year study of means to improve transit service, ridership, financial stability, and productivity. MTC's prior RTP had identified region-wide transit capital and operating budget shortfalls of \$17 billion and \$8 billion, respectively, over the next twenty-five years.<sup>80</sup> MTC also sought to support its compact growth strategy by strengthening transit service, so as to be able to meet its GHG targets and other plan performance objectives.

The study recommended combining investment to improve performance in major transit corridors, with incentives to reward agencies that achieve performance improvements in ridership and service productivity. A performance goal was established for a 5% reduction in operating cost per service hour, per passenger, or passenger mile, for the largest seven transit agencies over the next five years. The Transit Performance Initiative was then adopted to provide \$30 million for service improvements on major bus and light rail corridors, and \$20 million to reward operators who achieve ridership increases and productivity improvements over the prior year, from funds previously distributed by formula to operators.

In 2013, MTC built upon the approach by approving a \$7 billion Core Capacity Challenge Grant, focusing on the region's three largest transit operators, which carry over 80% of the region's passengers as well as more than three-quarters of its minority and low-income passengers. This program leverages regional discretionary funds and local contributions to accelerate funding for fleet replacement projects, and establishes a regional advocacy position to lobby for new federal funding for enhancement projects. The participating operators are required to meet the performance objectives of the Transit Sustainability Project.

Two other San Francisco Bay Area programs, described below, show the MPO strengthening the land use side of the equation, to create a stronger TOD-transit link and support affordable TOD.

#### *Transit-Oriented Affordable Housing (TOAH) Fund*

In 2011, MTC made a \$10 million anchor investment to establish the Transit-Oriented Affordable Housing (TOAH) Fund, a new revolving loan fund for affordable housing developers to finance land acquisition near rail and bus lines that is hoped to raise \$90 million.

#### *MTC/ABAG's One Bay Area Grant (OBAG) program*

MTC's and ABAG's One Bay Area Grant (OBAG) program was the most ambitious institutional advance among the four MPOs studied, adopted in the wake of SB 375. The program's roots trace back nearly two decades, as an evolution of MTC's Transportation for Livable Communities (TLC) Program, which was and still is an incentive grant program to fund local projects supportive of regional plan goals. The other three MPOs have also adopted such incentive grant programs, however, due to its relatively high level of funding compared to the others, and the institutional connections that OBAG establishes with the region's PDA strategy and RHNA requirements, the OBAG program represents the most extensive MPO effort considered in this research to incentivize local action in support of multiple facets of a regional plan.

The four-year, \$320 million OBAG program is a new funding approach to better integrate the region's transportation and land use strategies.<sup>81</sup> Funding is targeted toward influencing local land-use and housing policies by rewarding jurisdictions that achieve RHNA objectives for affordable

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<sup>80</sup> See the project web page at <http://www.mtc.ca.gov/planning/tsp/> for more information.

<sup>81</sup> For more information, see the program web page at <http://www.mtc.ca.gov/funding/onebayarea/>

housing and that support growth in PDAs. In addition, the program also includes a pilot for supporting open space preservation in Priority Conservation Areas (PCAs).

OBAG devolves authority for programming the funds to the nine county-level Congestion Management Agencies (CMAs) in the region. It establishes program commitments and policies for investing roughly \$320 million over the current four-year RTIP period (FYs 2012-13 through 2015-16), for federal funds authorized through the current surface transportation law, MAP-21. OBAG provides the CMAs with greater flexibility for certain investment categories that MTC had administered in the past, for example by allowing flexibility in spending across TLC, bicycle and pedestrian improvements, local streets and roads preservation, fund Safe Routes to School (SR2S), and planning activities. CMAs can also fund Priority Conservation Area projects.

However, in exchange for this greater role and flexibility in allocating funds, the CMAs also must follow new constraints on which jurisdictions get funding and for what purposes. The CMAs in larger counties (Alameda, Contra Costa, San Mateo, San Francisco, and Santa Clara) must direct at least 70% of their OBAG investments to the locally designated PDAs. For the less populated North Bay counties (Marin, Napa, Solano, and Sonoma) the threshold is 50%. A project lying outside the limits of a PDA may count towards the minimum, provided that it directly connects to or provides proximate access to a PDA. The counties are expected to have an open decision process to justify projects that geographically fall outside of a PDA.

In addition, to be eligible to receive OBAG funds, jurisdictions need to be in compliance with certain requirements, including that they have adopted a complete streets resolution, and that they have an adopted General Plan housing element that has been certified by the State Department of Housing and Community Development for RHNA compliance in the current cycle. In response to pressure from social equity organizations, MTC also directed the CMAs to consider strategies for the production of affordable housing, and complete an inventory of existing and planned housing units by income category in PDAs and identify affordable housing policies currently enacted for those respective jurisdictions. MTC aims to link the release of future cycle funding (after FY 2015–16) to the implementation of affordable housing policies.

The distribution formula to counties of OBAG funds also rewards housing production. It is based on the following factors: population (50%), past housing production (12.5% for total units, and 12.5% for low-income) and future housing commitments (12.5% for total units, and 12.5% for low-income). This formula means that counties as a whole are rewarded for jurisdictions' housing efforts, but CMAs can still program projects to individual jurisdictions as they see fit, within the program constraints. Eligible projects include streets and roads improvements, bike and pedestrian improvements, and safe routes to school improvements.<sup>82</sup>

During development of the OBAG program, various stakeholders raised questions whether the CMAs – county-level transportation agencies that administer programs such as county sales tax

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<sup>82</sup> Each CMA may program OBAG funds to projects in six transportation improvement categories: local Streets and Roads Preservation; Bicycle and Pedestrian Improvement; Transportation for Livable Communities; Safe Routes to School; Priority Conservation Areas; and CMA Planning Activities. Transportation for Livable Communities (TLC) projects – the predecessor to OBAG – support community-based transportation projects in downtown areas, commercial cores, high density neighborhoods, and transit corridors, to enhance their amenities and promote alternative transportation modes. General project categories include station area improvements; station access pocket parks; bicycle parking; complete streets improvements; transportation demand management projects; connectivity projects for high-density development near transit; density incentive projects; streetscape projects; incentives for TOD strategies in PDAs; and non-transportation infrastructure improvements that include density bonuses, sewer upgrades, land banking or site assembly (these projects require funding exchanges to address federal funding eligibility limitations).

measures – are in a good position to administer funds intended mainly to influence land use. Smart growth and social equity stakeholders argued that, in order to protect program goals, funding criteria should be applied at the level of individual cities, rather than at the CMA (county) level. In response, MTC and ABAG required that CMAs analyze local housing policies, and encourage attention to housing production in awarding funds. Regional smart growth activists who more traditionally had focused their attention mainly on MTC activities began to pressure the CMAs to include housing production in their criteria for awarding funds.

These debates point to how, with OBAG, MTC shifted the center of gravity for the funds in question, relinquishing some control at the regional level but also building in new institutional expectations for collaborative planning at the county level through the CMAs. This devolution was politically practical, given the resistance that MTC had encountered from many localities to its concentrated growth strategies. Shifting some authority to fund supportive land uses closer to home may ameliorate concerns about intrusion into local choices and prerogatives. At the same time, the OBAG strategy may work to strengthen the transportation-land use planning relationship by connecting CMAs more closely to local planning concerns. A question still in play, however, is whether the institutional devolution will also serve to connect the CMAs more closely to regional concerns about land use patterns – or more specifically, to the goals and objectives in the regional plan. Another, related question that deserves scrutiny is how and whether the CMAs are administering county sales tax measures in relation to RTP/SCS goals and objectives.

In their “OBAG Report Card” issued in 2014, MTC and ABAG assessed first-year performance. The report noted a number of mostly positive outcomes from the first round of funding, in terms of meeting program goals and expectations.<sup>83</sup> Each county exceeded its respective PDA investment targets, and 80% of regional funding, on average, was directed to projects within PDAs or in proximate access. Comparing investments from the same fund categories before and after the introduction of OBAG, the report found that post-OBAG, a significantly larger number of TLC projects were multi-modal; that the TLC share rose roughly 130% compared to the previous funding cycle, while the local streets and road rehabilitation share decreased 28%; that the average TLC project size increased 40%; and that all funded TLC projects were located in or proximate to PDAs. Furthermore, nearly 60% of the funded projects included bicycle or pedestrian oriented elements.

On the other hand, the report presented less positive findings about the connection between OBAG funding and housing production. The analysis noted a variance at the individual jurisdiction level between OBAG investment decisions by CMAs and the OBAG distribution formula’s specifications for housing shares (which as noted, are not stipulated to be applied at the individual jurisdiction level but rather at the county level). According to the report, this finding indicates that CMA project selection was based on other factors than housing shares, such as presence of PDAs, availability of ready-to-go projects, and delayed commitments for local streets and roads funds.

Thus, with OBAG, MTC and ABAG continued their pattern of institutionalizing new ways to try to make a stronger connection between transportation and land use goals and objectives. Various programs and policies described in this research work to create an integrated approach, including the PDA strategy, the RHNA allocation formula, the Sustainable Transport Initiative, and TOAH, in addition to OBAG.

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<sup>83</sup> See the report at <http://www.abag.ca.gov/abag/events/agendas/o021414a-Item%2005,%20OBAG%20Report%20Card.pdf>

### *SACOG's CEQA checklist*

Alone among the MPOs, SACOG made a concerted effort to assist localities in taking advantage of CEQA streamlining options offered under SB 375. SB 375 offers local agencies three levels of streamlining, depending on the type of project. Infill projects that are deemed by the lead agency in question (the locality, in the case of a permit for an infill project within its jurisdiction) to be “consistent” with an SCS or APS, can “tier” off the regional plan, in other words, avoid the need for certain elements of CEQA review, in this case, specifically, for assessing “growth-inducing impacts” and project-specific or cumulative impacts (and a lower-density alternative) in relation to global warming effects from cars and light-duty truck trips. A narrower set of infill project types (called “transit priority projects” or TPPs in SB 375) are eligible for further streamlining, and an even narrower set for total exemption from CEQA review.<sup>84</sup> The fairly strict criteria led some observers to contend that the provisions may not induce much change (Rose, 2011).

Of the four regional plans studied, only SACOG's does more than inform (remind) localities about these CEQA provisions under SB 375. That is lamentable because the question of how a local agency can determine “consistency” with the regional plan, for the purposes of utilizing the CEQA options, has not been ironed out. SB 375 defines the term as “consistency with the use designation, density, building intensity, and applicable policies for the project area of an SCS or APS.”

In the absence of a clearly defined legal standard, the lead permitting agency has the discretion to make the determination of consistency, but in such cases, to avoid the threat of lawsuits, most localities look to standards or methods that have proved to be acceptable in common practice and through the courts. If and when a locality is confused about making such a determination, it might feel less inclined to make use of the streamlining options.

In terms of connecting MPO analysis to project-level review, few MPOs, let alone localities, have capacity to model regional implications of single local development projects. Some method is needed to make the “consistency” determination work in practice, and that is what SACOG set out to accomplish in conjunction with its RTP/SCS. SACOG identified five transit priority areas for thorough environmental plan analysis, to explore how to establish a basis for complete CEQA exemption of covered projects. In addition, SACOG provides extensive on-line information about the streamlining options, along with an innovative “checklist” that walks a user through how to determine whether a particular project qualifies as a TPP, and also whether it can be deemed “consistent” the RTP/SCS based on attributes such as planned density in relation to SACOG's defined standards for different community types.<sup>85</sup>

This simple but sophisticated tool developed by SACOG makes it possible to “cross the great divide” between regional and local plans and priorities, and to enable localities to take advantage of the major incentive provided in SB 375 for inducing local support for regional plan goals. Other MPOs should follow suit.

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<sup>84</sup> The criteria for a TPP eligible for CEQA exemption include consistency with an SCS or ACS, location within one-half mile of a major transit station or “high-quality” transit corridor (with fixed-route bus service providing peak service at least every 15 minutes), at least 50 percent residential use, at a minimum density of 20 residential units per acre but no more than 200 units on no more than eight acres, and which meets specified energy efficiency and water usage standards that exceed required levels, and meets either a specified affordable housing standard or a specified open space standard (Government Code §21155.1).

<sup>85</sup> For more information, see SACOG's CEQA implementation webpage at <http://sacog.org/mtpscscs/implementation/>

## Outside strategies

Two “outside” strategies by MPOs are highlighted that serve to help contain urban growth within well-defined borders, so as to reduce sprawl and leapfrog development. Both were initiated before passage of SB 375, but they will help ensure its success.

### *SACOG’s Rural-Urban Connections Strategy (RUCS)*

First, SACOG’s Rural-Urban Connections Strategy (RUCS) aims to improve the viability of the area’s agricultural economy, by facilitating goods movement while conserving land and habitat quality.<sup>86</sup> The program provides technical assistance and support strategies to improve means of moving agricultural commodities from the region’s rural areas to its urban areas. By increasing capacity in the region’s goods consolidation and distribution system, local production of foods that are currently brought in from outside the region can also be increased.

To implement the RUCS strategy, SACOG assembled ongoing working groups around core topic areas, to collaborate with rural stakeholders, businesses, and public agencies to develop strategies for economic development of agricultural and rural economies, as well as resource conservation and recreation amenities. Another key aspect is development of a Geographic Information System (GIS)-based tool to assess agricultural production in the region. This mapping tool will eventually be integrated into the land use model that SACOG uses for urban land analysis.

### *SANDAG’s TransNet Environmental Mitigation Program*

The second program highlighted is SANDAG’s TransNet Environmental Mitigation Program (EMP), which dedicates about \$850 million toward creation of permanent multi-species habitat preserves that serve as a de facto urban growth boundary for the region.<sup>87</sup> Funded through TransNet, the program goes beyond traditional mitigation for transportation projects by directing funds for habitat acquisition, management, and monitoring activities to help implement the Multiple Species Conservation Program and the Multiple Habitat Conservation Program in the county. Through the EMP Working Group, SANDAG coordinates with local, state, and federal agencies, as well as nonprofit groups to manage, monitor, and acquire land.

The program is notable not only because it utilizes regionally generated transportation revenue to help protect endangered species through preserving multi-species habitat (innovative enough!). Making use of “value capture,” the EMP accelerates transportation project delivery through ensuring reliable funding and lower costs for required mitigation in advance of projects. SANDAG leverages the value of land banked early for future mitigation needs. Pegging the economic benefit of advance land purchases, compared to estimated later costs, at \$200 million over the duration of TransNet, SANDAG included this figure in the Transnet budget for use for other purposes. The EMP has, so far, acquired more than 3,400 acres of habitat, and has supported scientific research, land management, and restoration efforts.

The EMP has, so far, acquired more than 3,400 acres of habitat around the San Diego region at a cost of about \$106 million. In addition, the program has supported scientific research and regional collaboration on land management, restoration of habitat damaged by fire, joint use of resources, promotion of best management practices, and strategies for long-term funding. Other efforts funded by the EMP include installation of steel barriers to keep illegal off-road vehicles from infringing on

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<sup>86</sup> See more about the RUCS project at <http://www.sacog.org/rucs/>

<sup>87</sup> See more about the EMP program, including the fact sheet from which much of this information is culled, at <http://www.sandag.org/index.asp?projectid=263&fuseaction=projects.detail>

vernal pools; mapping of the dwindling habitat for threatened and endangered species; removal of exotic weeds from endangered species habitat; field research on determining whether species should be listed as endangered; and the construction of two mountain-top platforms to serve as nesting sites for golden eagles. If and when San Diego area drivers notice an eagle circling above the roadway, they may be able to thank TransNet, in part, for the privilege.

### Conclusion

The programs highlighted here establish on-the-ground planning connections between transportation, land use, and environmental protection. Many of them pre-dated SB 375, but they help support its implementation. They provide evidence of the four MPOs' continuing capacity for institutional innovation to "cross the great divides" of fragmented authority for growth management. The programs work through leveraging performance mandates that promote sustainability, while at the same time providing or enabling rewards for interested stakeholders. Many also rely on innovative funding mechanisms.

SB 375 induced dramatic institutional innovation only in one region, however – the Bay Area. MTC/ABAG's OBAG program is an evolution of the agencies' decades-old incentive grant programs, but it ramps up the effort considerably. OBAG is notable due to its high level of funding but also the institutional connections established with other plan elements, in particular the PDA strategy and RHNA requirements. With OBAG, MTC and ABAG have put in place an institutional framework to integrate regional and local plans and projects, as well as transport agencies (the CMAs) and localities. Through these institutional connections, MTC and ABAG may be able to tie together the threads of policymaking for growth management in the wide region. But it remains to be seen how and whether the performance focus of the OBAG program will be maintained and strengthened, in the face of continuing pressure to accede to home rule prerogatives.

### ***Performance monitoring***

In comment letters issued during the RTP/SCS planning processes, many stakeholders raised concerns about the lack of MPO monitoring procedures for evaluating plan performance. While all the MPOs have developed methods for tracking indicators of regional progress, none has developed a systematic approach to monitoring plan progress from one cycle to the next. The issue of monitoring should be taken up by MPOs and state agencies, including in particular the Air Resources Board as the oversight agency for SB 375.

Determining useful indicators for considering development trends in a region is not the same thing as determining useful indicators of plan performance. Assessing plan performance requires use of measures and techniques for post facto evaluation of plan progress, not just indicators of current trends, or even just forward-looking performance analysis employed for scenario modeling in developing a new plan. For example, a basic measure for tracking plan progress is to consider whether the funds allocated to various programs and projects in adopted plans are being spent as anticipated. Another approach, similar to the data evaluation in this research, would be to trace whether the projected incremental trend in regional performance on key metrics defined in the plans matches the actual pattern observed. When the actual trend on an indicator such as VMT does not match plan projections, a course change may be needed.

None of the RTPs contain any systematic presentation of such an evaluation. Even though the plans extensively evaluate current conditions and recent trends, that is not the same thing as assessing plan performance, in regard to accuracy of plan predictions for subsequent performance outcomes,

or for the implementation schedule of plan program elements. MPOs should not treat RTPs as though each plan starts from a blank slate in this regard.

Essentially, the issue here is the degree to which the RTP plan process fosters cyclical learning, experimentation, and adaptation of the sort advocated by scholars of sustainability planning. MPOs and RTPs now are a venue for identifying regional collective goods strategies pertaining to urban development. Therefore it is essential that MPOs and concerned state agencies direct attention to these questions about how to systematically learn from past plan decisions and outcomes.

Finally, plan monitoring also must include evaluating more than physical conditions in the region, to also include evaluation of plan decision processes. The plans developed under SB 375 showed evidence of stakeholder conflicts that might have been addressed earlier in the game, such as through strategies for modeling stakeholder-led scenarios, so as not to allow controversies and disputes among stakeholders to fester and then explode only late in the game. MPOs surely do learn from past successes and failures in organizing stakeholder engagement, but the lessons are not processed systematically, for example, through explicit evaluation from one plan cycle to the next. RTP planning has become a venue for sustainability planning and learning, but for this venue to operate successfully will require monitoring not just of performance objectives and plan impacts but also of performance of the decision process itself. RTP/SCSs should include a discussion of lessons learned about process effectiveness during the previous planning cycle, and steps taken to build upon successes and address ongoing challenges and identified shortcomings.

### **5.5 State programs to support SB 375**

Two new state-level programs deserve attention as efforts to support SB 375. These programs show the state government finally stepping up to provide significant support for SB 375, but they also show ongoing institutional/governance challenges for integrating transportation and land use.

#### ***Senate Bill 743***

First, Senate Bill (SB) 743, enacted in 2013, changes the connection between CEQA and infill projects, by changing how environmental impacts from transportation are addressed under CEQA. The law and its implementing regulations (being developed by the Governor's Office of Planning and Research, or OPR) eliminate traffic delay (congestion) as an environmental impact that must be evaluated and, if significant, mitigated under CEQA, substituting instead the requirement for analyzing VMT impacts of projects and plans.<sup>88</sup>

SB 743 is intended to remedy a perceived conflict between existing CEQA practice and the state's climate policy goals as well as SB 375. Conventional traffic mitigation techniques have been criticized as unsupportive of infill, transit, and non-motorized travel modes. More specifically, the traditional method, to evaluate automobile delay as expressed in "level-of-service" (LOS) standards, a categorical measure of traffic flow, has often induced lead agencies to adopt mitigation measures such as widening of roads or adding new turn lanes or traffic signals – measures which likely induce more vehicle trips, while also negatively impacting pedestrians, bicyclists, and transit.

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<sup>88</sup> The law directed the Governor's Office of Planning and Research (OPR) to establish alternative means for determining transportation impacts within TPAs, and at wider scale at OPR's discretion. OPR released preliminary draft guidelines in August 2014 that would apply statewide, not just to TPAs. The guidelines specify that evaluation of traffic impacts under CEQA should be based on vehicle miles traveled (VMT). See <http://bit.ly/1AAkiQ5>

Importantly, SB 743 alters the scale at which traffic impacts are considered from the level of particular intersections to the “amount and distance that a project might cause people to drive.” Under the new law, a development project located in a “transit priority area,” (an area within one-half mile of a major transit stop or high quality transit corridor), may be considered to have no significant impact under CEQA, and similarly a project that re-directs trips compared to existing conditions; in contrast, a project resulting in VMT greater than the “regional average for that type” may be deemed to have significant effects. Per capita VMT is to be determined utilizing “area-wide” analysis that extends “beyond the lead agency’s political boundaries.” These aspects of SB 743 will be important in re-orienting CEQA traffic analysis from localized effects to wider-scale impacts, but they are also likely to be challenging because localities have generally analyzed traffic impacts only within their borders, and have developed modeling capacity mainly for that purpose.

SB 743 also seeks to better link project-level analysis to plan-level analyses, for example by stipulating that a “land use plan” consistent with an SCS under SB 375 may generally be considered to have less than significant transportation impacts. A complete exemption from CEQA review is also available for certain types of projects that are: within TPAs; undertaken to implement, and consistent with, a specific plan for which environmental review has been completed; and consistent with an approved SCS.

SB 743 could help to address long-standing complaints about CEQA, including that it promotes piecemeal, localized, end-of-the-pipeline analysis, undermining wider-scale environmental strategies (e.g., Landis et al., 1995). But the challenges of the transition to VMT analysis are substantial. OPR is already many months behind in releasing a final draft of the implementing regulations. Stakeholders have raised multiple concerns, some to do with tools available for estimating VMT effects (such as about their accuracy, consistency, and cost), and others to do with recommended thresholds for determining significant effects (for example about validity of no-significance thresholds based solely on proximity to transit, and validity of regional averages or other wide-scale metrics).<sup>89</sup>

Some of the thorniest questions have to do with connecting project-level review and regional plans and analysis, for example regarding lack of clarity in the determination of “consistency” with an SCS, and concern about the validity of this standard, and the undetermined role of regional agencies and plans in helping determine these matters. Other more purely political and legal concerns include the potential for litigation under CEQA from VMT impacts analysis, the willingness of the public to accept VMT mitigation, and the complaint that without LOS, local agencies will lose a significant basis for extracting mitigation from prospective developers that they currently enjoy.

These concerns about SB 743 implementation show how difficult a transition from an auto-oriented to an infill-oriented growth planning regime will be. While none of the concerns that have been raised are insurmountable, they also point to technical, legal, political, and policy challenges that may take decades to fully iron out. In particular, making an effective link between project-level and plan-level, especially regional plan-level, analysis represents a promising but also very challenging aspect. Thus, SB 743 shows a promising path forward even as it also highlights the obstacles.

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<sup>89</sup> See comment letters to OPR at [http://www.opr.ca.gov/docs/SB743\\_PublicComments\\_INDEX.pdf](http://www.opr.ca.gov/docs/SB743_PublicComments_INDEX.pdf). See two videos of OPR public hearings at [http://www.opr.ca.gov/s\\_sb743.php](http://www.opr.ca.gov/s_sb743.php)



### ***The Affordable Housing and Sustainable Communities (AHSC) Program***

The second state program enacted recently and specifically to support SB 375 is the new Affordable Housing and Sustainable Communities (AHSC) Program, which will receive 20% of funds from the state's cap-and-trade program on an ongoing basis starting this fiscal year. The program is administered by the Strategic Growth Council, an inter-agency state committee that oversees various efforts to improve air and water quality, transportation, and affordable housing. The AHSC program is a path-breaking approach to support TOD and make an on-the-ground connection between transportation and land use planning, by funding local projects that link affordable housing with transportation improvements.

In 2012, California became the first state in the nation to implement a cap-and-trade program as part of its climate policy efforts. This market-based regulatory framework creates requirements for GHG reductions from energy sectors, generating proceeds that can be reinvested in other climate change prevention efforts. The California Air Resources Board (ARB) was authorized to begin issuing tradable GHG emissions permits, to be auctioned at market rates, creating a revenue stream that must be used to further the goals of AB 32. The California Legislative Analyst's Office estimates that auction proceeds will likely range from \$2 billion to \$11 billion annually in the early years, and from \$3 billion to \$22 billion annually thereafter (Taylor, 2012).

Senate Bill 862, passed in 2014, establishes long-term funding commitments for 60% of cap-and-trade funds, starting in FY 2015-16; 25% will go to high-speed rail, 20% to the AHSC Program, 10% to the Transit and Intercity Rail Capital Program, and 5% to the Low Carbon Transit Operations Program. The remaining 40% percent is subject to annual appropriations.

The AHSC program is path-breaking in explicitly connecting affordable housing, compact growth, and transport efficiency objectives. It aims to reduce GHGs through competitive grants for infill and transport projects that support a long list of objectives, including improving air quality, conditions in disadvantaged communities, affordable housing, public health, transport connectivity and accessibility, options for non-auto mobility, and protecting agricultural lands. An eligible project must demonstrate that it will achieve a reduction in GHGs, support implementation of an adopted or draft SCS or other regional plan (in non-MPO areas) to reduce greenhouse gas emissions.

The affordability component enters in because the enabling legislation (SB 862) specified that half of the funds must be spent on "housing opportunities for lower income households" and, as a separate requirement, that half must benefit disadvantaged communities. Eligible uses of the AHSC funds include: affordable housing and TOD, transit, active transportation, complete streets, farmland conservation, planning to implement SCSs, and other programs and projects designed to limit GHGs by reducing car travel.

The first year of the AHSC program in 2014-15, funded at \$130 million, provoked intense debates, raising similar concerns as SB 743 has done about how to make the transportation-land use planning link work in practice. Given recent budget cuts to many state programs during the recession years, the sudden availability of billions of dollars in new annual cap-and-trade proceeds naturally sparked a wide-spread response. Stakeholder lobbying campaigns were launched to influence program design, for example, by a coalition representing transport and environmental groups, on the one hand, and another representing affordable housing and smart growth groups. After multiple rounds of public workshops, and opportunities for receiving stakeholder input, the SGC released guidelines for the first year of AHSC program funding in late 2014.

The program criteria remain highly contested, with the guidelines still being revised for the upcoming cycle. Stakeholders have presented challenges on multiple fronts, including about the validity (accuracy) of results using the tool employed for estimating GHG impacts of proposed projects, the complexity and rigidity of application requirements, and the appropriate balance of program goals in the performance criteria established for eligible projects. Stakeholder complaints and comments reflect multiple tensions between objectives, including how to balance geographic equity versus competitive performance, planning versus construction, urban versus suburban and rural conditions, housing versus transport, first-dollar versus last-dollar funding, GHG reduction versus other co-benefits, private versus public grant recipients, and short versus long-run emissions reductions.<sup>90</sup> As the director of OPR noted, “Everybody needs to recognize that it’s not going to come out perfectly...there are endless balances. Each time we allocate funds in different ways there are winners and losers” (Stephens, 2015).

The concerns that have emerged about aligning housing and transport objectives reflect the program’s innovative character, posing the same sort of institutional and technical challenges raised by SB 743 in attempting new forms of planning integration, such as between project-level assessment and wider-scale analyses. However, the tensions also reflect political conflicts about which objectives to prioritize. Transportation advocates complain that the AHSC criteria favor affordable housing projects more than transport strategies, noting, for example, that the criteria adopted on project-readiness, funding caps, funding match requirements (leverage), and environmental review are all more conducive to affordable housing projects than transport projects.<sup>91</sup> Indeed, 26 of the 28 projects funded during the program’s initial round featured affordable housing. Given entrenched differences in funding sources, timelines, scale of activity, status of lead agencies (e.g. public vs. private), and planning procedures for housing and transportation, some stakeholders recommend separating them in the AHSC program design.

Many transport advocates have also been frustrated that the SGC has not provided MPOs with a stronger role in administering the program. They expected or hoped that the program would buttress SCS/RTPs by providing explicit support for priority projects defined in the regional plans, thereby enhancing the clout of the plans in the eyes of local government stakeholders. As one stakeholder group (the Natural Resources Defense Council) noted in a comment letter:

AHSC provides a unique opportunity for the state to support the leadership of MPOs and to provide funding for SB 375 implementation. If we do not take advantage of this opportunity, it will be difficult for regions to implement the currently adopted RTP/SCSs. And, in result of this, it will only be more difficult to rationalize increasing the regional targets to more accurately reflect California’s climate goals (NRDC letter, 7-31-2015, see document cited in previous footnote, at page 72 et seq.).

But the objective of delegating AHSC administrative authority to MPOs clashed with state policymakers’ desire to establish uniform criteria and disperse funds under state control.<sup>92</sup> It also clashed with affordable housing advocates’ desire to secure replacement for at least some of the funds lost for affordable housing through the demise of redevelopment in the state.

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<sup>90</sup> See comments at [http://www.sgc.ca.gov/docs/AHSC\\_July\\_Public\\_Comments\\_through\\_July\\_31\\_2015.pdf](http://www.sgc.ca.gov/docs/AHSC_July_Public_Comments_through_July_31_2015.pdf). Multiple earlier rounds of comment letters are no longer available at the SGC AHSC program website.

<sup>91</sup> See e.g. comment letters from AC Transit, Riverside County transportation agencies, Samtrans, CalCOG, MTC, SBCAG, SCAG, AMBAG, San Joaquin Valley Regional Planning Agencies, LA Metro, Move LA, NRDC, City of West Sacramento.

<sup>92</sup> Various cities also expressed concern about devolving control to MPOs; see e.g. letters from Los Angeles, Fresno.

Thus, the AHSC program provides an innovative approach to funding affordable, transit-oriented housing, but like SB 743, it still lacks tools and methods for connecting project-level to plan-level analysis and priorities. In addition to the lack of a strong role for MPOs and connection to SCS/RTPs, the program also fails to condition funds upon local government policies conducive to SB 375, such as adoption of complete streets or affordable housing and anti-displacement policies.

Discussion about the AHSC program criteria has become a hotbed of intense stakeholder debate, somewhat similar to the SCS/RTP process in the Bay Area, but elevated to the state-level stage. As in the Bay Area planning process, the conflicts about the AHSC program are salutary, reflecting deliberation and debate on how to reconcile 3 E's goals and objectives in managing growth and development. Moreover, the AHSC program has done more than just highlight conflicts about sustainability; it also fosters and underscores co-benefits. One example is a concerted research effort undertaken by equity activists to provide data and methods to the process for determining GHG benefits of housing affordability (Choi, 2015). Another benefit already evident has been the fostering of new and deeper inter-agency collaboration, for example between transit agencies and local governments. As one comment letter states (from LA Metro, the county's transportation agency), "We believe the AHSC program has great potential as a transformative agent not only in funding effective and innovative projects, but also in catalyzing collaboration and integration. We know that this will be a long term effort that will evolve over time."

## **5.6 Conclusion**

This evaluation of post-SB 375 plans points to significant, if not dramatic, advances in achieving sustainability objectives. Incremental shifts are to be expected, given the long time frames needed to alter development patterns in urban regions. That perspective, however, also underscores why time cannot be wasted in promoting efficient development to support state climate policy goals.

In one way, the planning process has changed more substantially under SB 375. Decision processes have become more contested, with diverse participants challenging MPOs from various directions. The plans gained scrutiny across the state, as SB 375 is now viewed as a shared responsibility, signaling that SB 375 is prompting a collective action outlook. The rise in stakeholder engagement, although sometimes contentious, is salutary in signaling a widening circle of interested observers and participants.

Both transport and land use choices sometimes drew fire. The Bay Area MPO's compact growth scenario raised questions about feasibility and perceived intrusion into land use policymaking. It is notable that the most dramatic institutional innovation that emerged post-SB 375 for integrating transport and land use planning, namely the OBAG program, was undertaken in the MPO region most constrained by the SB 375 mandates, signaling the importance of performance constraints in pushing stakeholders to overcome traditional barriers. In other regions, stakeholders challenged the SCSs for not being ambitious enough. Concerns were voiced in the often arcane scenario design and evaluation phases; these disputes might have been more effectively managed had MPOs worked earlier in the process to develop and model stakeholder-defined scenarios.

The gap between aspirations and current reality provides room for debates about feasibility and legitimacy of plan scenarios, reflecting different views on what is desirable, with many stakeholders able themselves to influence outcomes. However, debates about feasibility also hinge upon adequacy of implementation strategies; therefore, innovative programs such as OBAG deserve attention. All the plans foresee market and demographic shifts favoring compact growth, but the

question of whether effective local policy action will follow still remains. MPO investments will surely influence land use outcomes, but they provide no guarantee of local policy change.

Questions raised by stakeholders about plan feasibility point to a healthy deliberation process underway; sustainability planning is about facing challenges and trade-offs, not just seeking easy win-win strategies. Ultimately, given MPOs' limited resources and authority, the state and federal governments must take on larger roles if outcomes are to change substantially. SB 743 and the AHSC program are steps in that direction, and the intense scrutiny and debate about the program criteria signal that SB 375 has prompted the sort of multilevel and multi-way interactions that sustainability scholars point to as necessary. The challenges being experienced by state agencies in implementing SB 743 and the AHSC program, however, indicate that entrenched institutional barriers between transportation and land use planning continue to impede progress, even though healthy discussion is underway about how to overcome them. SB 375 helped prompt these new state programs, leading stakeholders to engage in an ever-wider state-region-local set of discussions about the law's implementation. The key to continuing progress will be sustained stakeholder engagement in the coming years at all levels of government.

## CHAPTER 6. CONCLUSION

### 6.1 Overarching conclusions: the governance challenges of regional sustainability planning

This dissertation has theorized and evaluated MPO sustainability planning. Most large MPOs in the US are seen to be pursuing some sustainability planning techniques, although their efforts should be viewed as falling upon a continuum rather than on-off. However, even the most sustainability-oriented MPOs, such as MTC in the San Francisco Bay Area, do not fulfill all idealized characteristics of sustainability planning noted by scholars, and operationalized for this research (described in Chapter 3). MTC, for example, uses sustainability performance targets, but not as strict parameters for plan choices. And no MPO studied conducts a concerted and open (published) plan performance evaluation process, in the recursive way deemed essential by scholars, where lessons learned from the previous plan cycle, as well as benchmarked progress toward plan performance goals, are evaluated and appraised in a deliberate and open forum. It is a tall order to expect any government organization to subject its process to open critique in such a fashion, but democratic accountability in networked, collaborative decision structures dictates that such efforts be undertaken.

This research confirms the value of a certain recipe of policy elements for inducing MPO sustainability planning, namely combining mandated performance parameters with resources for meeting them, in the context of iterative (re-visited) plan deadlines. This combination creates value for the regional good to be advanced, provides resources to achieve it and to induce cooperation for that purpose, and focuses action on meeting short-term deadlines for achieving long-term goals in iterative steps.

The importance of performance parameters for creating a focus for regional sustainability planning is evident in the research findings presented here. Air quality conformity requirements have been important, for example, in inducing MPOs to improve their technical modeling capacity for assessing plan impacts, and prodding them to focus on transport efficiency to meet pollution “budgets” for their plans, which in turn pushed them to integrate land use strategies. SB 375 picked up the same approach, making use of the modeling capacity the large California MPOs had developed for air quality conformity purposes, and directing that capacity to help support the state’s climate policy goals. By adding the requirement for RHNA-RTP consistency to its GHG and “no spillover growth” performance mandates, SB 375 is the first law nationally to explicitly put together sustainability criteria for MPOs to follow; in doing so, it adds a new layer to MPO mandates that also builds upon their own bottom-up innovations.

The importance of a performance constraint was also evident in the four California MPOs’ experience under SB 375, in which all four MPOs came up against challenging barriers, reflecting their different circumstances and priorities. The performance mandates of SB 375 proved to be most constraining for the San Francisco Bay Area MPO, helping to explain why it developed a more ambitious plan than the others, especially in regards to location efficiency – calling for more compact growth than the others, targeted to zones near transit. This MPO also went furthest in pushing forward institutional innovation to link land use and transportation objectives, particularly through its innovative One Bay Area Grant (OBAG) program, which conditions nearly \$100 million a year in funds, some of them formerly subvented to localities without strings attached, on expenditure in targeted growth zones in localities with adopted smart growth and affordable housing policies. OBAG was not built from scratch, however, building instead upon the MPO’s prior programs, providing an example of the interaction of SB 375 with a region’s own bottom-up efforts.

The Bay Area MPO experienced a greater challenge in meeting the SB 375 mandates than the other three MPOs studied, ironically, because of the region's already greater location efficiency and more extensive transit network, which made it harder to "push the needle" through capacity expansion. If the state legislature tightens GHG constraints for the years after 2035 (the final year for which SB 375 targets were developed), the other MPOs will also face similar challenges in years to come.

The Los Angeles area MPO had to contend with its relatively limited autonomously-controlled resources, compared to the others (given state law that sub-allocates planning authority to county-level agencies in this region). One result was the LA area MPO's inclusion of an ambitious (perhaps overly optimistic) financial assumption its plan, namely that the state will pass a vehicle miles traveled fee that will increase resources for the region. The MPO subsequently sought approval from the state legislature for a pilot project for the VMT fee approach, signaling greater activism from this MPO in pushing for state-level support for smart growth and sustainable transport.

Meanwhile, the San Diego area MPO was challenged sharply by smart growth activists from across the state when its post-SB 375 plan projected "backsliding" on GHG reductions after 2035. The stakeholders were concerned about new highway capacity investments contained in the plan, which might induce more driving and exacerbate sprawl. The MPO countered that its investments are "locked in" by a 40-year voter-approved countywide transportation sales tax measure. When stakeholders challenged the MPO to do more within limits of the measure, and when the MPO declined to model stakeholder-designed plan scenarios for that purpose, incensed activists sued the MPO; the dispute will be heard by the California Supreme Court.

The Sacramento MPO, finding itself having to "do more with less" in the way of financial resources for its post-SB 375 plan, turned the constraint into an opportunity to "rightsize" some highway investments, gaining stakeholder recognition for the "regional good" of joint cost-cutting strategies. The MPO also directed more than two-thirds of its investments to maintenance, operations, and rehabilitation of facilities in existing communities, hoping to signal a commitment to infill growth. In this manner, the MPO underscored the connection between fiscal efficiency and transport efficiency. However, the MPO did not pursue an assertive compact growth strategy, depending instead on localities' efforts. With a faster projected growth rate and lower-density development patterns in this region compared to the others, more concerted strategies may be needed to ensure that infill development is prioritized.

In this fashion, SB 375 performance mandates prodded all four MPOs to contend with barriers for advancing smart growth strategies. The value of a performance constraint for regional planning is not hard to understand. Given the collective action dilemmas inherent in voluntary collaborative governing arrangements, political scientists have long argued that performance mandates from higher levels of government may be needed in some policy areas, such as for redistributive policies, to overcome inter-local competition effects when wider-than-local policies entail regional benefits but (perceived) local costs (see Chapter 2). Land use is one such policy area, jealously guarded as a local government prerogative in part because land use policymaking serves homeowner values, which often translate to those homeowners imposing negative externalities on other jurisdictions and the region as a whole. Collectivizing land use policymaking, however, is a challenging proposition at best.

Environmental policies can also be redistributive, calling, for example, for protecting environmental quality at wider scales in time and space, and for other species, than polluters themselves may feel immediately concerned about. Cap-and-trade programs, for example, utilize a performance

parameter to internalize (create) a recognized price (value) for a collective good that was previously unpriced (unvalued). Cap-and-trade programs work by pricing the right to pollute, an activity previously considered to be “free.” By putting a price on the right to pollute, within a tightening performance constraint for reducing GHGs, California’s cap-and-trade program intends to raise billions of dollars annually, most of which will be directed to improving the built environment, including through high-speed rail, transit, and smart growth programs (including the AHSC program).

An outcome-oriented performance constraint also has the value of leaving means of implementation to be determined in locally appropriate ways. Keeping the focus on monitoring outcomes rather than outputs or procedural requirements is one way to introduce accountability into deliberative and collaborative forms of governance.

Another way to build in accountability is through use of deadlines, so that even as MPOs may not attain their performance targets, such as for air quality, in the short run, their interim progress toward goals can be monitored and adjusted. Performance constraints and interim deadlines for evaluation of progress orient the planning process to accommodate and encourage innovation through experimentation and adjustment over time – attributes considered by scholars of sustainability planning to be critical for success.

However, in promoting effective regional sustainability planning, policymakers need to consider more than performance constraints, but also how resources can be directed to achieving the objectives. The combination of performance constraints with allocation of resources for meeting them was the key to effectiveness of federal legislation adopted in the early 1990s that prodded MPOs toward a sustainability orientation. More specifically, the combination of ISTEA and the CAA amendments provided MPOs with a bigger carrot and a tougher stick, providing them with both greater autonomy and performance responsibility for promoting transport efficiency. The importance of autonomous MPO control of resources can also be seen in the San Francisco Bay Area MPO’s ability to fund its innovative programs through regionally controlled revenues.

The question of providing adequate resources for implementation has been salient in regard to SB 375, deemed when adopted to be an “unfunded mandate” by some of the MPOs, given the law’s ambitions compared to the MPOs’ lack of fiscal and regulatory authority for carrying them out. In discussions about the new state-directed AHSC program, some MPOs were quite indignant about not being provided a stronger role in implementing the program; state-MPO relations on the question of developing implementation capacity and authority are seen to be critical to effective implementation of SB 375 moving forward.

SB 375 has raised these thorny implementation concerns for two reasons. First, it takes the logical, but also problematic step of calling for land use-transportation planning integration. On the one hand, this step builds upon the practices of the large MPOs themselves, and so SB 375 can be seen as an incremental policy change. But on the other hand, in explicitly calling for land use-transportation planning coordination, SB 375 implies that MPOs can overcome the entrenched divisions in authority for these planning areas, which in fact they cannot easily do on their own. For that reason, it is important for MPOs and their stakeholders to keep up pressure on the state government to align its policies and programs to support SB 375. Effective implementation of SB 375 is a state-level responsibility at least as much as an MPO-level responsibility.

However, the question of how the state government should best support SB 375 implementation is a thorny one. With its legal authority over land use policymaking, the state government alone can fully ensure that local land use policies support regional plan goals. The new state programs discussed earlier, namely SB 743 and the AHSC program, take steps to do so.

The disputes between the MPOs and state agencies over the initiation of the AHSC program reveal, however, that a fundamental and unresolved question remains at stake, namely whether the state should empower the MPOs themselves to disburse funds to support TOD, or whether the state government should retain control of such funding and its allocation. The MPOs' displeasure with the criteria adopted by the SGC for the first year of the AHSC program – namely that the Strategic Growth Council (SGC) did not provide MPOs with a substantial role in administering program funds or in selecting project award winners – reveals this underlying rift in opinion about how the state government should strengthen SB 375 implementation.

From the MPOs' perspective, they need to gain resources to “empower their plans” – to enable them to create inducements for local compliance with regional strategies and policies conducive to RTP/SCS goals. The MPOs' stance in regard to the AHSC program criteria was to seek greater autonomy over program funding to reward local land use projects conducive to the fine-grained and localized strategies needed to support their regional plans.

In contrast, the SGC's decision to retain control at the state level over AHSC program criteria and administration reveals a different logic at work. From the state government's perspective, the imperative to apply uniform program criteria statewide mitigated against simply devolving funds to the MPOs, given their differing planning capacities, priorities, and conditions. Instead, the SGC is pursuing a project-level, rather than plan-level strategy through the AHSC program for supporting TOD. The AHSC program creates a state-local link to support TOD which only indirectly supports the MPO's regional plans and strategies.

Thus, the question of how to strengthen the MPOs' hand in “empowering their plans,” especially in connection to land use and TOD goals, has surfaced as a central, unresolved issue in SB 375 implementation. This conundrum points to the difficulty of “upwards mapping” implementation capacity from the region back up to the state level. In line with the policy literature on “bottom up” and multidirectional processes of policy-making, the findings presented here underscore the need for careful integration of policymaking and execution at different levels of government, to support sustainability planning. However, they also underscore the difficulties inherent in power-sharing arrangements among levels of government.

These issues bring the dissertation back to concerns raised at the start, namely how to pursue sustainability planning in the face of deeply entrenched institutional divides built into the American system for managing growth and development – most especially having to do with managing land use policy. The lessons learned from SB 375 implementation to-date point to the law's success in engendering a vibrant playing field for advancing deliberations on sustainability– building upon the four large MPOs' prior efforts. The role of stakeholder advocacy is seen to have been central in pushing the MPOs, and now the state government, to refine techniques and strategies for furthering SB 375 goals. But current conflicts over the AHSC program also point to significant challenges, especially institutional ones, which remain unresolved.

Coming full circle, this dissertation ends with the same concerns with which it began. Regional sustainability planning was conceived in this research as fundamentally a governance challenge,



namely for creating institutional capacity to engender and foster deliberative and democratic processes for defining and achieving the “regional good.” In line with precepts put forward by scholars, this research conceives of sustainability planning as a process for changing society “from within,” requiring that a transformation of development patterns be engendered through existing institutional processes, in which new goals are articulated, and new means (new institutional processes) are devised for accomplishing them. California is seen to be grappling with these concerns under SB 375, with a healthy but sometimes conflictual process underway, but also with much more remaining to be accomplished.

## **6.2 Directions for future research**

This research has addressed a lacuna in contemporary scholarship noted by many authors coming from different vantage points in the intersecting literatures on contemporary governance patterns, sustainability transitions, urban politics, and policy formation and implementation – namely the need for more empirical research on the effect of different governance arrangements (especially multi-level arrangements) on patterns of policy formation and execution.

A few quotes from scholars on these governance concerns can stand in for the rest. First, from a scholar of urban politics and governance:

Multilevel accounts are needed that can nest urban political analysis not just within the global economy but also within polities, economics, and social relations at the national and regional levels. As the growing transnational dimensions of urban politics have become clearer, so has the need to grapple more fully with the nexus between cities and these intermediate-level influences... Theory building must take up the challenge of connecting urban politics and policy not just to the global economy but also to processes at other levels within nations. Researchers must develop analytical approaches and research designs to sort out the complexity and multiple pathways of causal relations among these levels (Sellers, 2005, pp. 424, 441).

And from some scholars of sustainability governance:

There are various claims on the merits of certain governance modes with regard to sustainable development. However, there is a lack of empirical evidence for these claims... Current thinking in sustainability governance literature clearly reflects the corresponding background assumption that the forms of governance matter for outcomes. Yet studies exploring linkages between governance modes and (un)sustainable outcomes are rare... When the notion of sustainable development is taken seriously... the direct sustainability assessment of macro-level governance outcomes represents an enormously ambitious undertaking. Sustainable development represents a complex challenge with a multitude of interdependencies and calls for considering numerous environmental and socioeconomic goals in different sectors across multiple temporal scales... We argue that there is an alternative to exploring outcomes directly, namely investigating governance outputs and their impacts (goals agreed upon by actors and their according collective actions) in order to derive insights... [thereby] one can scrutinize whether certain modes of governance are better suited to lead to sustainable outcomes (Lange et al., 2013, pps. 419-420)

The research in this dissertation follows the route recommended by Lange and his co-authors, in evaluating governance outputs as a means of considering governance forms expected to promote

more sustainable planning outcomes on the ground. If, as sustainability scholars argue, sustainability planning is as much about promoting a durable and innovative process, as it is about focusing on specific outcomes achieved at any point in time, then governance aspects of sustainability planning must be considered as a central concern.

More work is needed to extend the sort of research undertaken for this dissertation. Directly extrapolating from the same goals and research focus presented here, more comparative case study research is needed for MPOs and their RTPs considered across state boundaries, so as to evaluate how and whether MPO sustainability planning varies in regions experiencing different conditions, from their population and economic growth patterns, to their political make-up, to the context of state policies in which the MPOs operate.

The state policy context can be hypothesized to significantly affect MPOs' ability to promote sustainability outcomes, and the particular mechanisms by which state policy affects regional planning outcomes deserves closer scrutiny. Relevant aspects of state policy include policies directly affecting MPOs, such as regarding their governing frameworks and jurisdictional extent, and the autonomy and responsibility they are afforded for programming transport investments, and for raising revenues regionally. Additionally, consistency requirements between state, regional, and local plans may be hypothesized to play a significant role, given the observed importance of the alignment of RTPs with RHNA under SB 375 in bringing housing issues much more onto the table (at least in some regions) in devising the RTP/SCS.

Important questions include whether and how state-imposed planning consistency requirements between regional and local plans work to improve sustainability outcomes, or whether other state policies can be considered even more important. In considering the policy context in which MPOs operate, a wider framework than just those policies directly affecting MPOs must be brought into the picture. In particular, state policies affecting local government planning and fiscal realities should be an important focus of research; this framework includes tax and fiscal policies, as well as incentive funding and regulatory programs that reward or require local support for affordable housing production.

Widening the lens further, MPO sustainability planning in the US should be compared to regional planning strategies in other nations, where the national policy framework also differs in its intent and effects. Although this dissertation takes regional planning as the starting place, other scholarship on multi-level governance for sustainability could compare how states and/or nations are working to assemble effective policy packages integrating capacities for iterative policy formation and implementation at different levels.

Other research extending the goals and focus of my dissertation might narrow, rather than widen the lens to examine intra-regional planning dynamics more intensively. In some California regions, such as the San Francisco Bay Area, ambitious MPO strategies for inducing compact growth led to stakeholder conflicts, as some suburban jurisdictions resisted perceived MPO intrusion into local land use policymaking. These housing-related tensions that have arisen in regional planning processes under Senate Bill 375 point to potentially useful areas for new research. One focus would be to compare and contrast housing-related goals across urban, suburban, and rural communities, in connection to regional plan goals for transport and location efficiency. Ultimately, an important institutional question is how and whether MPOs can create more effective regional bargaining platforms for localities to reconcile and integrate local and regional goals and priorities for transport and housing.

Other research might consider technical and procedural aspects of MPO sustainability planning. For example, case study research would be useful to explore how MPO sustainability planners are utilizing scenario analysis for integrating technical and political strategies to enhance stakeholder input and consensus-building. Similarly, research to investigate the role and perceptions of stakeholder activists in influencing MPO planning processes is vitally needed, given the demonstrated importance of this activism, in the California case study, in advancing SB 375 implementation and in bringing 3 E's goals (and sometimes conflicts among them) to the fore.

Finally, research should consider how MPOs, and regional planning agencies in other nations, work to articulate and achieve conceptions of the "regional good." The California case study highlighted how the four MPOs each developed a narrative for articulating the regional good to be achieved by the post-SB 375 plans, and how some of the narratives were more oriented to "eco-state modernization" (e.g. to promoting economic benefits through congestion relief) than others.

Research on defining and promoting the regional good and associated collective action challenges and opportunities might include the following. Evaluation of MPO methods for measuring regional productivity gains (such as through enhanced regional agglomeration economies) to be achieved through transport and land use efficiency would be useful. The goals, methods, and outputs of these modeling efforts should be evaluated and compared, so as to help MPOs develop best practice standards and to understand how planning coordination can impact regional economic performance.

Research to investigate not just co-benefits but also trade-offs among local and regional sustainability goals and objectives is needed. An example is to investigate the potential double-edged sword of congestion relief strategies considered vital for economic as well as environmental reasons in many regions, but for which strategies may not always prove to be simple "win-wins." For example, some system management strategies may reduce greenhouse gases and other harmful vehicular emissions in the short run (such as through reduced idling) but also serve to induce more auto travel in the long run through so-called "induced demand" effects from enhancing roadway capacity.

Attempts to more closely coordinate transport and housing policy goals in regional contexts have brought similar tensions and trade-offs to the surface, as, for example, social equity stakeholders are now pushing MPOs to address displacement threats from gentrification induced by compact growth strategies in built-up urban zones. As localities and MPOs work to strengthen their capacity for sustainability planning, it will be important to trace how and whether they face policy trade-offs squarely, rather than just emphasizing easy-to-achieve "win-win" co-benefits.

Finally, more research is needed to understand institutional barriers for achieving TOD-transit integrated strategies, and how states and MPOs can work to help overcome these barriers in practice.

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**APPENDIX A. Detailed tables of  
California MPO goals and performance  
measures**

**Table A1. Plan goals and guiding principles for most recent RTPs of the 4 largest MPOs**

**Codes for plan goals and performance measures**

- T **Trans system:** M: Mobility (tr:transit sov: SOV cp:carpool bw:bike/walk h:highways/roads GM:trucks, goods movement) A-td: Accessibility, time or distance to destinations A-tr: Accessibility to transit service TP: Transit productivity R: Reliability GR: State of good repair, and operational improvements S: Safety and security MS: Mode share CB: Cost-benefit UC: User costs
- LU **Land use:** HS: Housing affordability and supply CG: Compact growth JHB: Jobs-housing balance MX: Mixed use
- EC **Economic:** J: Jobs and income GP: Gross regional product
- ENV **Enviro:** GHG: GHGs L: Land consumption (habitat, water) En: Energy use/efficiency
- EQ **Equity:** THA: Housing and transport affordability for low-income individuals and neighborhoods of concern ED: Equal distribution of costs and benefits across neighborhoods and income groups D: Avoid displacement EJ: Environmental justice (avoid disproportionate effects of pollution)
- QoL **Quality of Life:** AQ: Air quality WB: Walkability/bikability D: Design H: Health

Code1	Code2	SCAG RTP: Table 1.1, RTP/SCS Goals
EC	J, GP	Align the plan investments and policies with improving regional economic development and competitiveness
T	M, A, GM	Maximize mobility and accessibility for all people and goods in the region
T	S, R	Ensure travel safety and reliability for all people and goods in the region
T	GR	Preserve and ensure a sustainable regional transportation system
T	E	Maximize the productivity of our transportation system
QoL	AQ,WB,H	Protect the environment and health of our residents by improving air quality and encouraging active transportation (non-motorized modes such as bicycling and walking)
ENV	En	Actively encourage and create incentives for energy efficiency, where possible
LU	CG	Encourage land use and growth patterns that facilitate transit and non-motorized transportation
T	S	Maximize the security of the regional transportation system through improved system monitoring, rapid recovery planning, and coordination with other security agencies

**SCAG RTP: Table 1.2, RTP/SCS Policies**

Performance focus	Transportation investments shall be based on SCAG’s adopted regional performance indicators.
Fix-it-first	Ensuring safety, adequate maintenance, and efficiency of operations on the existing multimodal transportation system should be the highest RTP/SCS priorities for any incremental funding in the region.
Local control	RTP/SCS land use and growth strategies in the RTP/SCS will respect local input and advance smart growth initiatives.
TDM priority	Transportation demand management (TDM) and non-motorized transportation will be focus areas, subject to Policy 1
HOV priority	HOV gap closures that significantly increase transit and rideshare usage will be supported and encouraged, subject to Policy 1
Monitoring priority	Monitoring progress on all aspects of the Plan, including the timely implementation of projects, programs, and strategies, will be an important and integral component of the Plan

Table A1 cont.

**MTC RTP: Table 1, Adopted Plan Bay Area Performance Targets**

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		<b>Required targets</b>
		Climate Protection
ENV	GHG	Target #1: Reduce per-capita CO2 emissions from cars and light-duty trucks by 15 percent.
		Adequate Housing
LU	HS, D	Target #2: House 100 percent of the region’s projected population growth by income level without displacing current low income residents.
		<b>Voluntary targets</b>
		Healthy and Safe Communities
QoL	AQ	Target #3a: Reduce premature deaths from exposure to fine particulates (P2.5) by 10 %.
QoL	AQ	Target #3b: Reduce coarse particulate emissions (PM10) by 30 percent.
EQ	EJ	Target #3c: Achieve greater reductions in highly impacted areas.
		Reduce Injuries and Fatalities from Collisions
T	S	Target #4: Reduce by 50 percent the number of injuries and fatalities from all collisions
		Active Transport
QoL	WB	Target #5: Increase the average daily time walking or biking per person for transportation by 70 percent (for an average of 15 minutes per person per day).
		Open Space and Agricultural Land
ENV	L	Target #6: Direct all non-agricultural development within the year 2010 urban footprint (existing urban development and urban growth boundaries).
		Equitable Access
EQ	THA	Target #7: Decrease by 10 percentage points (to 56 percent, from 66 percent) the share of low-income and lower-middle income residents’ household income consumed by transportation and housing.
		Economic Vitality
EC	GP	Target #8: Increase gross regional product (GRP) by 110 percent — an average annual growth rate of approximately 2 percent (in current dollars).
		Transportation System Effectiveness
T	MS	Target #9a: Increase non-auto mode share by 10 percentage points (to 26 percent of trips).
T	VMT	Target #9b: Decrease automobile vehicle miles traveled (VMT) per capita by 10 percent.
T	GR	Target #10a: Increase local road pavement condition index (PCI) to 75 or better
T	GR	Target #10b: Decrease distressed lane-miles of state highways to less than 10 percent of total lane-miles.
T	GR	Target #10c: Reduce the share of transit assets past their useful life to 0 percent.

**SANDAG RTP: Plan Goals, Table 2.1**

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		<b>Quality of Travel &amp; Livability</b>
T	M, E, UC	Mobility: The transportation system should provide the general public and those who move goods with convenient travel options. The system also should operate in a way that maximizes productivity. It should reduce the time it takes to travel and the costs associated with travel.
T	R	Reliability: The transportation system should be reliable. Travelers should expect relatively consistent travel times, from day to day, for the same trip and mode of transportation.
T	S, GR	System Preservation & Safety: The transportation system should be well maintained to protect the public’s investments in transportation. It also is critical to ensure a safe regional transportation system.

**Table A1 cont.****Sustainability**

EQ	ED	<b>Social Equity:</b> The transportation system should be designed to provide an equitable level of transportation services to all segments of the population.
ENV	TC, HC, L, En	<b>Healthy Environment:</b> The transportation system should promote environmental sustainability and foster efficient development patterns that optimize travel, housing, and employment choices. The system should encourage growth away from rural areas and closer to existing and planned development.
EC	GP	<b>Prosperous Economy:</b> The transportation system should play a significant role in raising the region's standard of living.

**SACOG RTP: MTP/SCS Guiding Principles (p. iv)**

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LU	HS, CG, MS	<b>Smart Land Use:</b> Design a transportation system to support good growth patterns, including increased housing and transportation options, focusing more growth inward and improving the economic viability of rural areas.
ENV	AQ, L	<b>Environmental Quality and Sustainability:</b> Minimize direct and indirect transportation impacts on the environment for cleaner air and natural resource protection.
T	CB, GR	<b>Financial Stewardship:</b> Manage resources for a transportation system that delivers cost-effective results and is feasible to construct and maintain.
EC	E, GM	<b>Economic Vitality:</b> Efficiently connect people to jobs and get goods to market.
T	A, M, GM	<b>Access and Mobility:</b> Improve opportunities for businesses and citizens to easily access goods, jobs, services and housing.
EQ	ED	<b>Equity and Choice:</b> Provide real, viable travel choices for all people throughout our diverse region.

**Table A2. Adopted performance measures from most recent RTPs of the four largest MPOs**

<u>Codes for plan goals and performance measures</u>	
T	<b>Trans system:</b> M: Mobility (tr:transit sov: SOV cp:carpool bw:bike/walk h:highways/roads GM:trucks, goods movement) A-td: Accessibility, time or distance to destinations A-tr: Accessibility to transit service TP: Transit productivity R: Reliability GR: State of good repair, and operational improvements S: Safety and security MS: Mode share CB: Cost-benefit UC: User costs
LU	<b>Land use:</b> HS: Housing affordability and supply CG: Compact growth JHB: Jobs-housing balance MX: Mixed use
EC	<b>Economic:</b> J: Jobs and income GP: Gross regional product
ENV	<b>Enviro:</b> GHG: GHGs L: Land consumption (habitat, water) En: Energy use/efficiency
EQ	<b>Equity:</b> THA: Housing and transport affordability for low-income individuals and neighborhoods of concern ED: Equal distribution of costs and benefits across neighborhoods and income groups D: Avoid displacement EJ: Environmental justice (avoid disproportionate effects of pollution)
QoL	<b>Quality of Life:</b> AQ: Air quality WB: Walkability/bikability D: Design H: Health

**MTC RTP: Table 1. Adopted Plan Bay Area Performance Targets**

<b>Required targets</b>	
Climate Protection	
ENV	GHG Target #1: Reduce per-capita CO2 emissions from cars and light-duty trucks by 15 percent.
Adequate Housing	
LU	HS, D Target #2: House 100 percent of the region’s projected population growth by income level without displacing current low income residents.
<b>Voluntary targets</b>	
Healthy and Safe Communities	
QoL	AQ Target #3a: Reduce premature deaths from exposure to fine particulates (P2.5) by 10 percent.
QoL	AQ Target #3b: Reduce coarse particulate emissions (PM10) by 30 percent.
EQ	EJ Target #3c: Achieve greater reductions in highly impacted areas.
Reduce Injuries and Fatalities from Collisions	
T	S Target #4: Reduce by 50 percent the number of injuries and fatalities from all collisions
Active Transport	
QoL	WB Target #5: Increase the average daily time walking or biking per person for transportation by 70 percent
Open Space and Agricultural Land	
ENV	L Target #6: Direct all non-agricultural development within the year 2010 urban footprint (existing urban development and urban growth boundaries).
Equitable Access	
EQ	THA Target #7: Decrease by 10 percentage points (to 56 percent, from 66 percent) the share of low-income and lower-middle income residents’ household income consumed by transportation and housing.
Economic Vitality	
EC	GP Target #8: Increase gross regional product (GRP) by 110 percent — an average annual growth rate of approximately 2 percent (in current dollars).
Transportation System Effectiveness	
T	MS Target #9a: Increase non-auto mode share by 10 percentage points (to 26 percent of trips).
T	VMT Target #9b: Decrease automobile vehicle miles traveled (VMT) per capita by 10 percent.
T	GR Target #10a: Increase local road pavement condition index (PCI) to 75 or better
T	GR Target #10b: Decrease distressed land miles of state highways to less than 10 percent of total.
T	GR Target #10c: Reduce the share of transit assets past their useful life to 0 percent.



**Table A2 (cont.). SCAG RTP Table 5.1 Adopted Performance Measures**

Location Efficiency		
LU	CG	Share of growth in high-quality transit areas
Env	L	Land consumption
T	A	Average distance for work or non-work trips
T	A	Percent of work trips less than 3 miles
T	A	Work trip length distribution
Mobility and Accessibility		
T	M	Person delay per capita
T	M-h	Person delay by facility type (mixed flow, HOV, arterials)
T	M-GM	Truck delay by facility type (highway, arterials)
T	M-sov,tr	Travel time distribution for transit, SOV, HOV for work and non-work trips
Safety and Health		
T	S	Collision/accident rates by severity by mode
QoL	AQ	Criteria pollutants emissions
Environmental Quality		
Env	GHG, AQ	Criteria pollutant and greenhouse gas emissions
Economic Wellbeing		
EC	J	Additional jobs supported by improving competitiveness (REMI model)
EC	J	Additional jobs supported by transportation investment (REMI model)
EC	GP	Net contribution to gross regional product (REMI model)
Investment Effectiveness		
T	CB	Benefit/cost ratio
System Sustainability		
T	GR	Cost per capita to preserve multimodal system to current and state of good repair conditions
Social equity		
See equity measures table.		

**SANDAG Performance Measures, Table 2.2**

System Preservation and Safety		
T	GR	Percentage of transportation investments toward maintenance and rehabilitation
T	GR	Percentage of transportation investments toward operational improvements
Mobility		
T	M	Average work trip travel time (in minutes)
T	M--sov,cp,tr	Average work trip travel speed by mode (in m.p.h.) (drive alone, carpool, transit)
T	A-dt	Percentage of work and higher education trips accessible within 30 minutes in peak periods, by mode
T	A-dt	Percentage of non work-related trips accessible within 15 minutes, by mode
T	UC	Out-of-pocket user costs per trip \$
Prosperous Economy		
T	CB	Benefit/Cost Ratio
Economic impacts		
EC	J	Job impacts (average number per year)
EC	GP	Output impacts (gross regional product in millions - average amount per year)
EC	J	Payroll impacts (in millions - average amount per year)

**Table A2 (cont.)**

		<b>Reliability</b>
		Congested Vehicle Miles of Travel (VMT)
T	Mh	Percentage of total auto travel in congested conditions (peak periods)
T	Mh	Percentage of total auto travel in congested conditions (all day)
T	Mtr	Percentage of total transit travel in congested conditions (peak periods)
T	Mtr	Percentage of total transit travel in congested conditions (all day)
T	Mh	Daily vehicle delay per capita (minutes)
T	M-GM	Daily truck hours of delay
		<b>Healthy Environment</b>
QoL	AQ	Smog-forming pollutants for all vehicle types (daily pounds per capita)
T	VMT	Systemwide VMT (all day) for all vehicle types per capita
T	TP	Transit passenger miles (all day) per capita
T	A-tr	Percent of peak period trips within 1/2 mile of a transit stop
T	A-tr	Percent of daily trips within 1/2 mile of a transit stop
T	MS	Work trip mode share (sov, cp, tr, bw)
T	Mbw	Total bike and walk trips
Env	GHG	CO2 emissions for all vehicle types (daily pounds per capita)

**SACOG Performance Measures, RTP Appendix G-6**

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		<b>Land Use Measures</b>
		<b>Housing</b>
LU	HS	Growth in housing units by Community Type
LU	HS	Change in housing product mix, 2008 to 2035, and by Community Type
LU	CG	Housing growth through reinvestment
		<b>Employment</b>
LU	JHB	Employment growth in different Community Types by sector
LU	JHB	Employment growth by Community Type
LU	CG	Employment growth through reinvestment
		<b>Land Usage</b>
LU	CG	Compact development: growth in population compared with acres developed
ENV	L	Farmland acres developed – total and per capita
ENV	L	Vernal pool acres developed
ENV	L	Developed acres by Community Type
		<b>Mix of uses</b>
LU	JHB	Jobs-Housing balance within four-mile radius of employment centers
LU	MX	Mix of use by Community Type
		<b>Transit-oriented development</b>
LU	CG	Growth in dwelling units within half-mile of quality transit (in TPA) by county
LU	CG	Growth in employees within half-mile of quality transit (in TPA) by county
LU	MX	New housing product mix in TPAs by county
LU	CG	Proximity to transit by Community Type
		<b>Urban Design</b>
QoL	D	Change in street pattern in different Community Types
LU	CG	Change in residential density by Community Type

**Table A2 (cont.)**

<b>Transportation measures</b>		
Driving access		
T	A	Total jobs within 30-minute drive by Community Type
Vehicles Miles Traveled (VMT)		
T	VMT	Total weekday VMT & average annual growth rates – regionally, by county, and per capita
T	VMT	Weekday VMT by source and total
T	VMT	Commute share of household-generated VMT
T	VMT	Weekday VMT by source per capita or per job
T	VMT	Total VMT per capita
T	VMT	Percent change in VMT per capita or per job compared to 2008
T	VMT	Weekday household-generated VMT per capita by Community Type
T	VMT	Weekday household-generated VMT per capita by TPA
T	VMT	Household-generated commute VMT by Community Type and regional total
Congested Vehicle Miles Traveled (VMT)		
T	VMT	Commute VMT per worker by Community Type and regional total
T	Mh	Congested VMT total and per capita
T	Mh	Congested VMT by source - total, per capita, per job
T	Mh	Congested VMT for household-generated travel by Community Type
Transit Service		
T	TP	Increases in transit vehicle service hours per day by transit type
Transit productivity		
T	TP	Weekday transit vehicle service hours
T	TP	Weekday passenger boardings
T	TP	Weekday boardings per service hour
T	TP	Farebox revenues as percent of operating costs (farebox recovery rate)
Bicycle Infrastructure		
QoL	WB	Increases in miles of bicycle route mileage by county
QoL	WB	Bike route miles per 100,000 population
Transit, walk and bike travel		
T	MS	Weekday person trips by transit, walk and bike modes
T	MS	Transit, walk and bike trips per capita
T	MS	Transit, bike and walk trips per capita by Community Type
T	MS	Transit trips per capita by Transit Priority Area (TPA)
T	MS	Transit, bike and walk trips per capita by Community Type
T	MS	Transit trips per capita by Transit Priority Area (TPA)
Roadway Utilization/ Optimal use		
T	M	Underutilized, optimally utilized, over-utilized roadways by roadway type
Commute Travel		
T	MS	Weekday commute tours by mode
T	MS	Commute mode share
Non-Commute Travel		
T	MS	Weekday non-commute person trips by mode
T	MS	Non-commute mode share
Safety		
T	S	Percent reduction in accident rates

**Table A2 (cont.)**

**Environmental Measures**

Farmland impacts		
ENV	L	Farmland conversion
ENV	L	Acres of impact from growth and transportation projects by type of farmland
ENV	L	Percent of Williamson Act contract acres impacted
Habitat impacts		
ENV	L	Percent of habitat and land cover impacted
ENV	L	Acres of impact from growth and transportation projects by type of wildland habitat/land cover
Floodplain development		
ENV	L	Percent of housing units expected to be constructed in 200-year floodplain
Toxic air contaminants		
EQ	EJ	Percent of population within 500 feet of high-volume roadway by county, region
Greenhouse gas emissions		
ENV	GHG	Greenhouse gas emissions by sector
ENV	GHG	Greenhouse gas emission reductions per capita by pounds per day, percentage

**Table A3. MTC scenario modeling results**

Goal/ target:	1st and 2nd round modeling 2035 from 2005 base year								EIR modeling 2040 from 2005 base year				
	Current Regional Plans:	Initial Vision (Round 1)	Initial Vision (Round 2)	Core Concen- tration:	Focused Growth	Constrain- ed Core Concen- tration	Out- ward Growth	No Project	Prefer- red (plan)	Transit Priority Focus	Enhanced Network of Comm- unities	Environ- ment, Equity, and Jobs	
Adopted Target #1: Reduce CO2 emissions	-15%	-11%	-12%	-8%	-8%	-9%	-9%	-8%	-8%	-18%	-16%	-16%	-17%
Adopted Target #2: House 100% of the region's projected growth	100%	73%	100%	100%	100%	98%	98%	98%	100%	100%	100%	118%	100%
Adopted Target #3: Reduce exposure to particulate emissions.													
Target #3a: Reduce premature deaths from exposure to fine particulates (P2.5) by 10 percent.	-10%	-25%	-24%	-23%	-27%	-32%	-32%	-31%	-71%	-71%	-72%	-69%	-72%
Target #3b: Reduce coarse particulate emissions (PM10) by 30 percent.	-30%	-13%	-10%	-6%	-9%	-13%	-13%	-11%	-16%	-17%	-17%	-14%	-18%
Target #3c: Achieve greater reductions in highly impacted areas.	Yes	not modeled	not modeled	not modeled	not modeled	not modeled	not modeled	not modeled	Yes	Yes	Yes	No	Yes
Adopted Target #4: Reduce by 50% the number of injuries and fatalities from all collisions (including bike and pedestrian).	-50%	18%	21%	26%	23%	19%	18%	20%	18%	18%	17%	23%	16%
Adopted Target #5: Increase the average daily time walking or biking per person for transportation by 70% (for an average of 15 minutes per person per day).	70%	12%	18%	15%	20%	14%	15%	10%	12%	17%	18%	13%	20%
Adopted Target #6: Direct all non-agricultural development within the urban footprint (existing urban development and urban growth boundaries).	100%	95%	97%	97%	92%	92%	92%	90%	53%	100%	100%	100%	100%
Adopted Target #7: Decrease by 10 percentage points (to 56 percent, from 66 percent) the share of low-income and lower-middle income residents' household income consumed by transportation and housing.	-10%	3%	-4%	-4%	8%	9%	9%	9%	8%	3%	5%	3%	2%
Adopted Target #8: Increase GRP by an average annual rate of approximately 2% (+90% target for year 2035).	90%	not modeled	not modeled	131%	134%	113%	113%	113%	118%	119%	118%	123%	118%
Adopted Target #9: Increase non-auto mode share by 10% and decrease automobile VMT per capita by 10%													
Target #9a: Increase non-auto mode share by 10 percentage points (to 26 percent of trips).	26%	19%	20%	19%	20%	19%	19%	18%	19%	20%	20%	19%	21%
Target #9b: Decrease automobile vehicle miles traveled (VMT) per capita by 10 percent.	-10%	-8%	-10%	-6%	-6%	-6%	-7%	-5%	-5%	-9%	-8%	-9%	-9%
Adopted Target #10: Maintain the transportation system in a state of good repair													
Target #10a: Increase local road pavement condition index (PCI) to 75 or better	19%	0%	0%	5%	5%	5%	5%	5%	-21%	8%	8%	8%	13%
Target #10b: Decrease distressed lane-miles of state highways to less than 10 percent of total.	-63%	30%	30%	30%	30%	30%	30%	30%	63%	63%	63%	11%	52%
Target #10c: Reduce the share of transit assets past their useful life to 0 percent.	-100%	not modeled	not modeled	138%	138%	138%	138%	138%	179%	88%	88%	88%	88%

Sources: Results for 1st and 2nd round modeling are from Table 4, and for EIR modeling from Table 10, in *Final Plan Bay Area Performance Assessment Report*, available at [http://planbayarea.org/pdf/final\\_supplemental\\_reports/FINAL\\_PBA\\_Performance\\_Assessment\\_Report.pdf](http://planbayarea.org/pdf/final_supplemental_reports/FINAL_PBA_Performance_Assessment_Report.pdf)

**Table A4. SCAG scenario modeling results (plan versus no project and/or base year)**

	Base Year (2008)	Baseline (No Project)	Plan	Plan compared to baseline	Plan compared to base year
<b>Location efficiency</b>					
Growth in employment in HQTAs		31%	53%	71%	
Growth in households in HQTAs		24%	51%	113%	
Greenfield land consumption in sq mi		742	334	-55%	
Average distance for work trips in miles		14.8	14.7	-1%	
Average distance for non-work trips		7.3	7.5	3%	
Percent of work trips less than 3 miles		14.8%	15.4%	4%	
<b>Mobility and accessibility</b>					
Person delay per capita in minutes		20	11	-45%	-24%, acc to plan
Truck delay by facility type					
Freeway				-40%	"above"
Arterials				-55%	"above"
<b>Share of PM peak period work trips completed within 45 minutes*</b>					
Transit	22%	20%	21%	5%	-5%
HOV	73%	68%	77%	13%	5%
SOV	79%	79%	82%	4%	4%
<b>Environmental quality**</b>					
Per capita GHG reductions for SB 375 vehicle classes, 2005 baseline	23.9	22.9	20.5	-10%	-14%
<b>Economic wellbeing</b>					
<b>Additional jobs supported by improving competitiveness (REMI model)</b>					
Average annual jobs due to economic improvement from congestion reduction and regional amenities			354,000		
<b>Additional jobs supported by transportation investment (REMI model)</b>					
Average annual new jobs generated from construction and operations expenditures, and associated indirect and induced jobs			174,500		
<b>Investment effectiveness</b>					
Benefit/cost ratio - benefit per dollar invested (2011 \$)			\$2.90		
<b>Social equity</b>					
<i>Shown separately</i>					
<b>Local infrastructure capital, operations, and maintenance costs</b>					
Local capital investment, O&M costs to extend or build new local roads, water and sewer systems, and parks		\$33.2 billion	\$27.2 billion	\$ 6 billion savings	
<b>Household costs</b>					
Average household costs associated with driving and residential energy and water use		\$19,000	\$16,000	-16%	
Local government revenues generated per acre	187	\$9,800	\$13,800	41%	

Sources: SCAG RTP performance chapter, unless otherwise noted; \*From EIR, Table 3.12-16; \*\* From EIR, Table 3.6-5

**Table A5. SANDAG scenario modeling results**

	1st round modeling						EIR: plan vs. no-build			Plan compared to no-build
	Exist-ing (2008)	No Build (2050)	Rail/Transit Emphasis (2050)	Freight Emphasis (2050)	High-way Emphasis (2050)	Fusion Emphasis (2050)	Exist-ing (2008)	No Build (2050)	Revenue Constrained (= Plan) (2050)	
<b>System Preservation and Safety</b>										
Annual projected number of vehicle injury/fatal collisions per 1000 ppl	4.0	4.1	3.7	3.7	3.8	3.7				
Annual number of bicycle/pedestrian injury/fatal collisions per 1000	0.7	0.6	2.6	2.7	2.6	2.6				
Percentage of transport investments for maintenance and rehabilitation	N/A	36%	40%	39%	40%	40%	N/A	N/A	29%	
Percentage toward operational improvements	N/A	36%	40%	39%	40%	40%				
<b>Mobility</b>										
Average work trip travel time (in minutes)	26	28	27	27	27	27	26	28	28	0%
Average work trip travel speed by mode (in m.p.h.)										
Drive alone	34	28	29	29	30	29	34	28	31	11%
Carpool	34	30	31	31	31	31	35	30	32	7%
Transit	10	10	13	13	13	13	10	10	13	30%
Percentage of work and higher education trips accessible within 30 minutes in peak periods, by mode										
Drive alone	74%	68%	73%	73%	74%	74%	73%	68%	70%	3%
Carpool	75%	69%	75%	75%	76%	76%	74%	69%	72%	4%
Transit	7%	8%	15%	14%	15%	14%	7%	8%	14%	75%
Percentage of non work-related trips accessible within 15 minutes, by mode										
Drive alone	72%	67%	68%	68%	68%	68%	71%	67%	67%	0%
Carpool	72%	68%	68%	68%	69%	68%	72%	68%	68%	0%
Transit	4%	4%	8%	8%	8%	8%	4%	4%	8%	100%
Out-of-pocket user costs per trip \$	\$2.10	\$2.19	\$2.20	\$2.20	\$2.22	\$2.20	\$2.06	\$2.24	\$2.28	2%
Number of interregional transit routes	9	16	41	30	46	35				
Freight capacity acreage	470	470	580	580	580	580				
Freight capacity mileage	3,200	3,400	3,600	3,600	3,900	3,600				
<b>Prosperous Economy</b>										
Benefit/Cost Ratio							N/A	N/A	2.1	
Economic impacts										
Job impacts (average number per year)	N/A	1,000	35,500	34,700	36,700	35,300	N/A	17,100	35,600	108%
Output impacts (GRP in millions - average amount per year)	N/A	130	\$4,700	\$4,600	\$4,800	\$4,600	NA	\$2,000	\$4,400	120%
Payroll impacts (in millions - average amount per year)	N/A	50	\$1,800	\$1,800	\$1,900	\$1,800	N/A	\$900	\$1,800	100%
<b>Reliability</b>										
Percentage of total auto travel (VMT) in congested conditions (peak)	14%	28%	12%	12%	10%	12%	13%	28%	17%	-38%
Percentage of total auto travel (VMT) in congested conditions (all day)	6%	18%	8%	8%	7%	8%	6%	18%	11%	-40%
Percentage of total transit travel (VMT) in congested conditions (peak)	5%	10%	4%	4%	4%	4%	5%	9%	5%	-44%
Percentage of total transit travel (VMT) in congested conditions (all day)	5%	9%	4%	4%	4%	4%	5%	8%	5%	-41%
Daily vehicle delay per capita (minutes)	3	9	4	4	3	4	3	9	5	-44%
Daily truck hours of delay (1,000s)	6.1	34.2	13.4	13.5	11.8	13.5	5.9	32.3	16.0	-50%
<b>Healthy Environment</b>										
CO2 emissions for all vehicle types (daily pounds per capita)	28	20.1	17.6	17.6	17.8	17.7	28	19.9	18.8	-6%
Gross acres or constrained lands consumed for transit and highways	NA	98	245	275	362	264				
On-road fuel consumption (all day) per capita	1.45	1.02	0.89	0.89	0.90	0.89				
Smog-forming pollutants for all vehicle types (daily pounds per capita)	66.3	22.5	22.1	22.0	22.2	22.1	0.08	0.02	0.02	0%
Systemwide VMT (all day) for all vehicle types per capita	25.7	27.0	23.4	23.4	23.7	23.5	25.6	26.7	25.2	-5%
Transit passenger miles (all day) per capita	0.50	0.40	0.78	0.79	0.76	0.78	0.48	0.39	0.83	113%
Percent of peak period trips within 1/2 mile of a transit stop	76%	72%	77%	77%	77%	77%	75%	71%	76%	7%
Percent of daily trips within 1/2 mile of a transit stop	78%	74%	79%	79%	79%	79%	78%	73%	78%	7%
Total bike and walk trips (1000s)	523	617	1357	1364	1357	1357	510	610	1340	120%
Work trip mode share (peak periods)										
Drive alone	81%	82%	69%	69%	69%	69%	81%	83%	69%	-16%
Carpool	11%	10%	15%	15%	15%	15%	11%	10%	15%	49%
Transit	6%	5%	11%	11%	10%	11%	6%	5%	11%	124%
Bike/Walk	3%	2%	5%	5%	5%	5%	2%	2%	5%	109%
Non work trip mode share (all day)										
Drive alone	49%	50%	47%	47%	47%	47%				
Carpool	47%	47%	46%	46%	46%	46%				
Transit	1%	1%	1%	1%	1%	1%				
Bike/Walk	3%	18%	3%	6%	6%	6%				

Sources: First round scenario results from SANDAG's draft RTP, *SCS Background Documentation*, "Attachment 1," pp.46-47; final plan versus no-build results from SANDAG RTP, *Technical Appendix Three: Goals and Performance Measurement*, Table TA 3.1, <http://www.sandag.org/uploads/2050RTP/F2050RTPA3.pdf>

**Table A6. SACOG modeling results (from EIR)**

	Base year 2008	MTP/SCS for 2035 (proposed project)	Alt 1/ Workshop scenario 1 (= no project)	Alt 2/ Workshop scenario 2	Alt 3/ Workshop scenario 3	Plan compared to no project	Plan compared to base year
<b>Transportation inputs</b>							
Funding (total in billions of dollars)							
Transit	na	\$11.3	\$10.7	\$11.7	\$13.7	6%	na
Road, bike, pedestrian M&O	na	\$11.3	\$10.9	\$11.0	\$11.0	4%	na
New road capacity	na	\$7.4	\$8.7	\$8.0	\$6.7	-15%	na
Bike & ped street and trail improvements	na	\$3.0	\$2.8	\$2.9	\$3.0	7%	na
Programs (community design, tdm, in billions)	na	\$2.2	\$1.5	\$1.6	\$1.7	47%	na
New or expanded roads (road lane miles % increase from 2008)	na	29%	32%	31%	26%	-9%	na
Transit service (vehicle service hours % increase since 2008)	na	98%	54%	88%	127%	81%	na
Farebox recovery (% transit costs recovered by ticket sales)	23%	38%	38%	41%	51%	0%	65%
<b>Land use inputs (in percent of new homes)</b>							
By community type	current	share of growth to plan year					
Center and Corridor Communities	12%	30%	19%	28%	36%	58%	150%
Established Communities	77%	26%	30%	28%	27%	-13%	-66%
Developing Communities	3%	42%	46%	41%	35%	-9%	1300%
Rural Residential Communities	8%	1%	5%	3%	2%	-80%	-88%
By type of home							
Large-lot single-family homes	65%	28%	39%	33%	25%	-28%	-57%
Small-lot single-family homes	9%	28%	30%	25%	23%	-7%	211%
Attached homes	26%	43%	31%	42%	52%	39%	65%
<b>Land usage</b>							
Gross acres of development	N/A	7%	12%	9%	7%	-42%	na
Square miles of farmland converted to dev't	N/A	57	93	70	50	-39%	na
Vernal pool acres developed	N/A	7	9	8	7	-22%	na
<b>Transit-oriented development</b>							
Share of new homes near high frequency transit	15%	34%	22%	28%	35%	55%	127%
Share of new jobs near high frequency transit	27%	49%	35%	43%	52%	40%	81%
<b>Transportation measures</b>							
Household-generated VMT per capita per day	19.3	17.6	18.1	17.8	17.6	-3%	-9%
VMT in heavy congestion	6%	6%	5%	6%	7%	20%	0%
Share of person trips for transit, walk, bike	9%	13%	11%	12%	12%	18%	44%
<b>Environmental measures</b>							
Weekday passenger vehicle CO2 emissions (% change per capita from 2005)	N/A	-16%	-14%	-16%	-17%	14%	na

Source: SACOG RTP EIR, Table 18.2



**Table A7. MTC's EIR scenario performance results, presented as multi-attribute criteria scores**

	No		Enhanced	Environ-	
Scenario:	Project	PLAN	Transit	ment,	
			Priority	Equity,	
			Focus	and Jobs	
			of Commu-		
			nities		
<i>Total score</i>	8.83	12.23	11.80	12.65	<b>12.96</b>
<i>Transportation</i>					
<i>Sustainable</i>	3.92	5.82	5.76	6.36	6.21
Target #4: Reduce harm from collisions	0.89	0.89	0.94	0.70	1.00
Target #5: Increase average daily time walking or biking per person	0.90	0.95	0.95	0.90	1.00
Target #9a: Increase non-auto mode share	0.90	0.95	0.95	0.90	1.00
Target #9b: Decrease auto VMT	0.56	1.00	0.89	1.00	1.00
Target #10a: Improve local road PCI	0.00	0.85	0.85	0.85	1.00
Target #10b: Decrease distressed highway lane miles	0.17	0.17	0.17	1.00	0.21
Target #10c: Reduce % transit assets past useful life	0.49	1.00	1.00	1.00	1.00
<i>Land use</i>					
Target #2: House 100% of the region's projected growth	0.85	0.85	0.85	1.00	0.85
<i>Economic</i>	0.96	0.97	0.96	1.00	0.96
Target #8: Increase GRP	0.96	0.97	0.96	1.00	0.96
<i>Environmental</i>	0.97	2.00	1.89	1.89	1.94
Target #1: Reduce CO2 emissions	0.44	1.00	0.89	0.89	0.94
Target #6: Direct development within the urban footprint	0.53	1.00	1.00	1.00	1.00
<i>Equity</i>	0.25	0.67	0.40	0.67	1.00
Target #3c: Achieve greater particulate emission reductions in highly impacted areas	Yes	Yes	Yes	No	Yes
Target #7: Decrease % of low-income and low-middle income HH income consumed by T+H	0.25	0.67	0.40	0.67	1.00
<i>Quality of Life</i>	1.88	1.93	1.94	1.74	2.00
Target #3a: Reduce P2.5 emissions	0.99	0.99	1.00	0.96	1.00
Target #3a: Reduce PM10 emissions	0.89	0.94	0.94	0.78	1.00

Source: Author calculations from data in MTC's *Plan Bay Area*, Performance Assessment Report, Table 10

## APPENDIX B. Multi-criteria decision-making technique

Multi-criteria Decision-making (MCDM), which relies on MAUT, is an established decision-making technique, considered appropriate especially for situations where multiple criteria of interest, often with conflicting outcomes or attributes, are at stake (Jeon et al., 2010). By normalizing scores across multiple attributes of interest, MCDM allows for closer approximation of apples-to-apples comparison of the relative benefits (or dis-benefits) of a decision scenario measured across multiple performance attributes. The weighted-sum (or simple additive weighting) method is an easy-to-understand MCDM technique, which calls first for calculating normalized scores for the modeled performance results for each performance measure of interest, as follows:

For positive criteria (where the direction of change is considered to be a positive outcome):

$$n_{ij} = \frac{r_{ij}}{r_{j\max}} \quad i = 1, \dots, m, \quad j = 1, \dots, n$$

where  $r$  is the modeled score for performance measure  $j$  (a.k.a. criterion  $j$ ) for Scenario  $i$ .

For negative criteria (where the direction of change is considered to be a negative outcome):

$$n_{ij} = \frac{r_{j\min}}{r_{ij}} \quad i = 1, \dots, m, \quad j = 1, \dots, n$$

The normalized ratings range from zero to one, such that the larger the rating becomes, the higher preference it indicates (Yoon and Hwang, 1995). Then, for each alternative scenario,  $A_i$ , being evaluated, the technique calls for summing the normalized scores across all the performance measures assessed in each scenario, and for applying weighting, as desired, to distinguish the relative importance (as determined by decision makers) of each performance measure in the index, as follows.

$$A_i = \sum w_j x_{ij}$$

where  $x_{ij}$  is the score of the  $i$ th alternative with respect to the  $j$ th criterion, and  $w_j$  is the weight assigned to the criterion.

The weighted sum is intended to indicate the relative utility of a given scenario.