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Reimagining Energy Efficiency Resource Standards

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Executive Summary

Energy efficiency resource standards (EERS) are a long-standing policy used to advance state goals and priorities, such as reliability, affordability, and emissions reductions. They ensure cost-effective energy efficiency is used to lower energy consumption, reduce peak demand, and enable grid flexibility. Adapting EERS through strategic design, and integrating EERS into broader energy plans and policies, can help states optimize their approach to meet modern and evolving power system needs and achieve sustainable energy outcomes.

Energy efficiency resource standards can be broadly or narrowly defined. For the purpose of this paper, we are defining energy efficiency resource standards as any policy action requiring or encouraging utilities or program administrators to achieve a quantity of energy savings during a designated time period. This broad perspective allows for robust consideration of what energy efficiency resource standards could encompass in the future.

This report examines how states consider energy efficiency in the context of four policy priorities: provide grid benefits, address electricity load growth, reduce emissions, and promote affordability (Figure ES-1).

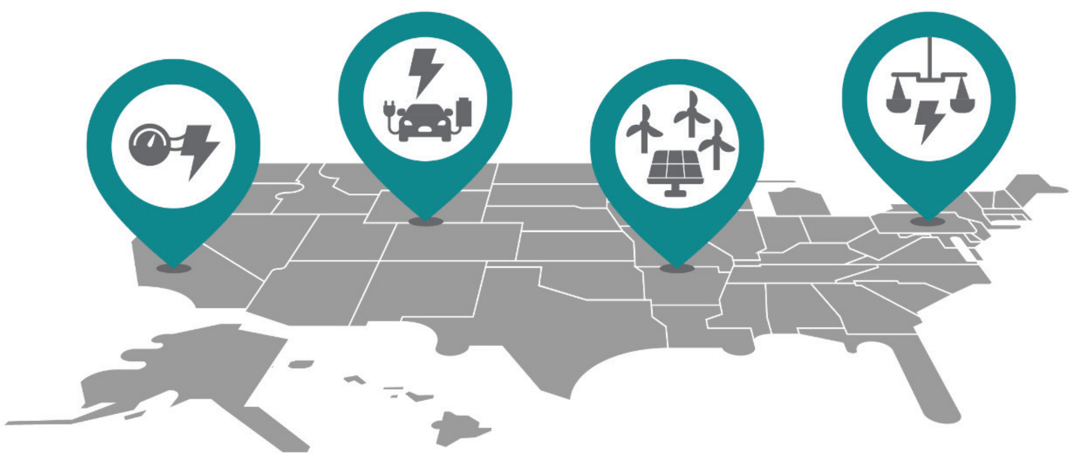


Figure ES-1. Four policy priorities for energy efficiency resource standards

This report provides examples of states that are pursuing these priorities, reviews the role of energy efficiency in the policies, and identifies opportunities to further promote energy efficiency alongside these policies. The examples are geographically diverse and present a range of options states are considering when developing EERS policy; however, they are not comprehensive and may represent the starting point of a robust solution. Further, the actions identified in the examples are not mutually exclusive — states can implement more than one action within each of the four policy priorities. Decision makers and stakeholders can draw directly from these examples and findings to design an EERS that maximizes co-benefits, captures synergies, and promotes consideration of the all the possible solutions to advance their goals.

Example Actions

The following tables below highlight actions that states can use to deploy efficiency to achieve each policy priority. Examples of states that are currently using these strategies are provided in the report.

Provide grid benefits

A resource's ability to contribute grid services when and where they are needed is referred to as the time and locational value in this report. Prioritizing investments aligned with grid needs allows for energy efficiency to provide value beyond annual energy savings, such as helping utilities meet peak demands or relieving transmission and distribution system constraints.

Table ES-1. Actions and Examples to Provide Grid Benefits

Action	Examples
Allow demand reductions and flexibility to contribute toward efficiency goals	Integrate efficiency and demand flexibility goals with resource planning
	Include virtual power plant savings in efficiency plans
	Identify that the timing of efficiency savings is valuable to the utility system
	Use a multiplier for on-peak efficiency savings
	Include peak demand reduction requirements in EERS
Quantify the time and locational value of energy efficiency in planning	Create a publicly available avoided cost calculator
	Develop regional energy supply cost estimates for the energy and capacity values of efficiency
	Model efficiency in integrated resource plans (IRPs) without restrictions on how much can be acquired
	Allow efficiency to compete with supply-side resources and consider avoided transmission and distribution system costs in IRPs and integrated grid plans (IGP)
	Establish energy efficiency as the first fuel to meet resource needs
	Include efficiency in IRP and IGP scenario requirements
	Include efficiency in non-wires alternative (NWA) definitions
	Develop NWA pilots that go beyond existing efficiency programs
	Use efficiency in NWA implementation
	Plan for interrelated effects of efficiency and other distributed energy resources (DERs) in distribution system planning
	Use load forecast sensitivities and model locational impacts of efficiency and other DERs

Address electricity load growth

Load growth can occur when electricity consumption increases. Changing the fuel source of space or water heating, or transportation to electricity; re-shoring manufacturing, and new construction of data centers are some examples of electricity load growth. Efficiency can be used to mitigate potential reliability and affordability issues associated with unmanaged load growth.

Table ES-2. Actions and Examples to Address Electricity Load Growth

Action	Examples
Plan for efficiency and electricity load growth together	Consider beneficial electricity consumption and energy efficiency targets
	Plan for transportation load growth and efficiency together
Encourage efficiency, regardless of fuel source	Establish a site-level energy consumption savings metric
	Use a fuel-neutral savings goal
	Create program incentives for natural gas and electric customers
	Create technology-specific goals
	Establish beneficial decarbonization programs
Establish fuel-neutral utility performance incentives	Create a fuel-neutral utility performance metric

Reduce emissions

Emissions of air pollutants and greenhouse gases (GHG) occur from combustion of fuel for electricity generation and direct combustion of fuel in buildings, industrial facilities, and vehicles, among other sources. Energy efficiency reduces the need to generate electricity, including electricity generated from fossil fuels, and it can reduce the amount of fuel needed to provide space and water heating in buildings or industrial processes.

Table ES-3. Actions and Examples to Reduce Emissions

Action	Examples
Allow utilities to pursue efficiency that achieve emissions reduction goals	Use efficiency to meet clean energy goals
	Use efficiency to meet emissions reduction goals
	Prioritize efficiency programs that create GHG savings
	Target weatherization and efficient new buildings to achieve GHG goals
	Use efficiency to reduce the cost of decarbonization and electrification
Account for the cost of emissions in planning and cost-effectiveness	Quantify air quality benefits
	Use social cost of carbon in utility planning
	Use social cost of carbon in efficiency potential assessments or IRP
	Include GHG reductions in definition of cost-effective resource
	Include regional avoided carbon dioxide values in cost-effectiveness analysis
	Use social cost of carbon when considering efficiency benefits
Establish an emissions reduction metric for energy efficiency performance	Establish a total system benefit metric for energy efficiency performance
Create or participate in carbon markets	Create a cap-and-invest program to encourage efficiency investments
	Participate in regional GHG markets to encourage efficiency investments

Promote affordability

Energy affordability can be measured by the amount of household spending on energy as a percent of total spending and can be particularly significant for vulnerable or low-income populations that have a higher energy burden.[1] Efficiency can be used to reduce energy burdens for all customers.

Table ES-4. Actions and Examples to Promote Affordability

Actions	Examples
Consider affordability when evaluating efficiency	Use a multipronged approach to equitable energy efficiency
	Pilot distributional equity analyses for energy efficiency programs
	Allow for additional consideration of benefits for low-income programs
	Include nonenergy benefit adder for low-income programs
	Create a tool to assess the long-term rate and bill impacts of efficiency programs
	Explore efficiency cost-effectiveness in the context of community benefits indicators
	Provide guidance on stakeholder engagement
	Include equity in regional power plans
Prioritize efficiency that achieves affordability	Require a percentage of benefits of efficiency investments to accrue to disadvantaged communities
	Include programs for low-income and disproportionately impacted communities in beneficial electrification plans
	Use a dashboard to track progress toward prioritized programs
Incentivize efficiency that achieves affordability	Reduce low- and moderate-income energy burden
	Reduce residential disconnections
	Improve the efficiency of buildings serving low-income residents

[1] "Energy burden is defined as the percentage of gross household income spent on energy costs. It is calculated by dividing the average housing energy cost by the average annual household income. A household with 6% or greater energy burden is considered to be a high burden energy household." (DOE n.d.-a)

Introduction

An energy efficiency resource standard (EERS) is a policy establishing energy efficiency targets that require utilities (electric, gas, or both) or program administrators to achieve energy savings or peak-demand reductions. Typically, reductions in energy consumption from utility, statewide, or third-party administered programs (e.g., residential weatherization, commercial lighting, industrial motors, and pumps) contribute toward achieving the goal. In some states, energy savings from supporting adoption of building energy codes, appliance standards, and new rate design initiatives contribute toward achieving the goal as well. For the purpose of this paper, we are defining EERS to include any policy action requiring or encouraging utilities or program administrators to achieve an established quantity of energy savings during a designated time period. This broad categorization allows us to think about EERS in conjunction with other policies and to creatively use EERS to achieve its benefits while complementing other state goals.

Based on this definition, about half of U.S. states have an EERS that requires electric utilities or program administrators to achieve a specified level of annual energy savings from energy efficiency measures or acquire all cost-effective energy efficiency measures, typically over a specified time period (ACEEE n.d.). The standards vary by state, requiring a reduction of less than 1% to over 2.5% of retail electricity sales annually (Frick and Schwartz 2019). Currently, Massachusetts and Rhode Island have the strongest EERS requirements, which require a more than 2.5% reduction in retail sales annually (Subramanian et al. 2022). Additional states have voluntary electric energy efficiency targets or include energy efficiency as an eligible resource in renewable portfolio standards, clean energy standards, or alternative energy standards. Other states call for all cost-effective energy efficiency resources, as determined by cost-benefit tests or other means (e.g., integrated resource planning [IRP]).

While many states already support policies that acknowledge the role of energy efficiency, many EERS targets are modest in their commitment because few states consider the benefits of the time or locational value of efficiency or the value efficiency's contribution to benefits such as reliability and resilience.2 However, there are lessons learned and best practices to build on from states that are adopting multiple complementary policy objectives or capturing multiple types of benefits in the goal-setting process (Gold et al. 2019).

Historically, EERS metrics have focused on annual energy, or kilowatt-hour, savings. Such energy savings targets ensure that states capture the critical baseline benefits of energy reductions that lead to financial savings through reduced energy bills; job creation in sectors related to the manufacture and sales of energy-efficient technologies; and reduced energy waste, particularly in industrial settings.

However, there are growing opportunities for EERS to target the specific benefits of efficiency that align with states' emerging policy priorities. Moving forward, states can strategically design EERS to create

[2] See Goldman et al. 2018, Frick and Schwartz 2019, and Frick et al. 2021a.

synergies with other policies in helping to address new grid challenges.

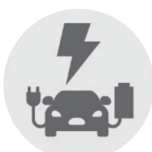
The Role of Energy Efficiency in Meeting Policy Goals

This report examines energy efficiency's role in achieving four policy priorities that are common across states of varying geographies, political landscapes, and energy resource availability and market structure.

Provide grid benefits

The electric grid is facing pressure from multiple directions. Such pressures include load growth from electrification and new demand, increasingly severe and frequent extreme weather events, aging infrastructure, and increasing adoption of customer-sited distributed energy resources (DERs). Utilities and transmission owners must invest in grid equipment and technology to meet these emerging demands, which can create strain at specific times and places. Energy efficiency can be used to provide targeted energy reductions that reduce energy needs when grid costs are highest and relieve grid constraints in specific locations.

Address electricity load growth



Load growth is driven by increased electricity consumption, which can occur due to advancements in electric technologies, new industrial loads and data centers, consumer preferences, and policy objectives. Some jurisdictions are pursuing policies to reduce local and indoor air pollution from gas appliances and combustion or to accelerate reductions in GHG emissions associated with fossil fuel combustion for building energy needs. Other states recognize that markets and consumer preferences are increasingly shifting toward electric appliances and vehicles in a way that may require significantly more generation. Efficiency can reduce the impact of electricity load growth and contribute toward keeping electricity system costs low.

Reduce emissions

Policies and goals that aim to reduce emissions across sectors such as buildings, transportation, and industry often involve transitioning from carbon-intensive to low-carbon or carbon-free energy resources. Some states have adopted policies for the purpose of reducing emissions to address climate change. Others have policies in place to support industries where large companies are increasingly requesting low-carbon electricity for their operations and to reduce electricity costs for emerging electricity-intensive industries such as data centers. Efficiency contributes to emissions reductions by reducing the need for fossil fuel electricity generation or the combustion of fuels for other purposes.

Promote affordability

State energy regulators' responsibilities typically include ensuring that utility services are provided at rates that are fair, just, and reasonable to all consumers, making affordability a central tenet of their duty (NCSL 2019). Utility planning is centered on identifying the least reasonable cost and risk resource portfolios to reliably meet electricity needs, and there are a variety of strategies utilities and regulators can use to ensure affordability for all customers. Vulnerable, historically underserved, disadvantaged, and low-income populations often face a higher energy burden, making affordable energy even more important. Energy efficiency can improve affordability by reducing energy burdens through thoughtfully designed programs that reduce costs for all customers, including the most vulnerable.

Executive Order 14008 created a goal that 40% of the overall benefits of certain federal investments flow to disadvantaged communities that are marginalized, underserved, and overburdened by pollution, including investments in energy efficiency, energy, housing, and transportation (EPA 2021).

Study Approach

This report examines how states consider energy efficiency in the context of four state policy priorities. Based on our review of current policies and recent literature, we identified these four priorities as being relatively nascent in EERS implementation. To identify the examples discussed in the report, we identified states that have both an EERS and policy supporting at least one of the four priorities shown in Figure 1 (ACEEE n.d., CCES n.d., ACEEE 2022, NCSL 2021, EPA 2022). In many cases, the examples included in this report drive toward more than one of these priorities simultaneously.

Provide grid benefits	Policies that target energy efficiency at specific times, locations, or both to improve system reliability or relieve grid congestion
Address electricity load growth	Policies that convert buildings and vehicles fueled or powered by fossil fuels to low- and zero-emission, energy-efficient buildings and vehicles
Reduce emissions	Policies — often described as carbon-free, carbon neutrality, or net-zero emission — that drive a shift in electric generation to clean and renewable resources or move toward reducing fossil fuel consumption
Promote affordability	Policies that target efficiency services that improve energy affordability for consumers

Figure 1. Policy priorities explored in this paper

We reviewed the current role of energy efficiency in these policies, identified opportunities to promote energy efficiency alongside these policies, and articulated ways that energy efficiency can help in advancing state goals related to these policies.[3]

The examples in this report can help states seize each opportunity to use EERS to improve the effectiveness of the solutions deployed to meet these goals. The examples are geographically diverse and present a range of options states are considering when developing EERS policy; however, they are not comprehensive and may represent the starting point of a robust solution. Further, the actions identified in the examples are not mutually exclusive — states can implement more than one action within each of the four policy priorities. Decision makers, policymakers, and stakeholders can draw directly from the examples and lessons in this report as models as they consider policy change.

[3] Energy efficiency can help achieve a variety of additional state policy and regulatory goals such as resiliency, reliability, building health and safety, water conservation, and economic development.

Inflation Reduction Act

The Inflation Reduction Act (IRA) and Bipartisan Infrastructure Law (BIL) provide opportunities for states to accelerate progress toward their energy efficiency goals. The laws include incentives that will reduce the cost of energy efficiency measures, building and transportation electrification, and renewable energy generation for consumers. The U.S. Department of Energy (DOE) estimates that, compared to a future without BIL and IRA, these federal policies can save customers $27 billion–$38 billon on electricity bills between 2022 and 2030 and reduce U.S. GHG emissions 35%–41% below 2005 levels in 2030 (DOE 2023). Similarly, the Energy Information Administration (EIA 2023a) projects electricity prices in 2030 will be nearly 10% lower than they would have been without the IRA, in part due to tax credits that incentivize solar and wind over natural gas generation.

There are several opportunities for states to leverage the energy efficiency incentives in these laws to maximize savings. First, states can reevaluate electricity planning assumptions to better understand how the reduced costs of efficient technology impact cost and adoption in potential studies and load forecasts (Fitch et al. 2024). With this new funding, states may see an increase in participation in existing utility customer-funded programs, enabling utilities to reach higher targets within their existing program budgets. Adjusting EERS to consider these increases can be an important step as states work to develop programs. For example, the Colorado Public Utilities Commission required the Public Service Company of Colorado (Xcel Energy) to update or perform a new potential study to better understand the impact of increased funding and reduced utility cost associated with energy efficiency incentives from IRA (Colorado PUC 2022).

States can also consider how the Home Efficiency Rebates and Home Electrification and Appliance Rebates, collectively the Home Energy Rebates Programs, can be leveraged or braided with existing efficiency program offerings to amplify benefits and reduce costs (DOE n.d.-b). State implementation began in mid-2024 — DOE has announced programs in AZ, CA, CO, DC, GA, ME, MI, NM, NY, RI and WI (DOE 2024) — public utility commissions, state energy offices, and utilities have acknowledged the importance of coordination between IRA incentives and existing efficiency programs. States such as Colorado and Wisconsin are directing program implementers to educate customers and contractors on how to take advantage of the new incentives and tax credits to maximize participation in efficiency programs (Colorado PUC 2022, Wisconsin PSC 2024).

Another opportunity for states is to consider how federal efficiency funding can inform utility customer-funded efficiency program design and be used to help achieve state energy goals. Efficiency Maine conducted public outreach to solicit input on the proposed IRA efficiency program implementation approach. The stakeholders sought to identify how the programs could support state policies such as the state’s climate action plan goals, which include specific targets for weatherizing and electrifying homes. The program designs focus on delivering carbon benefits and avoiding disruption of existing programs (Maine Governor’s Energy Office n.d.).

Provide Grid Benefits

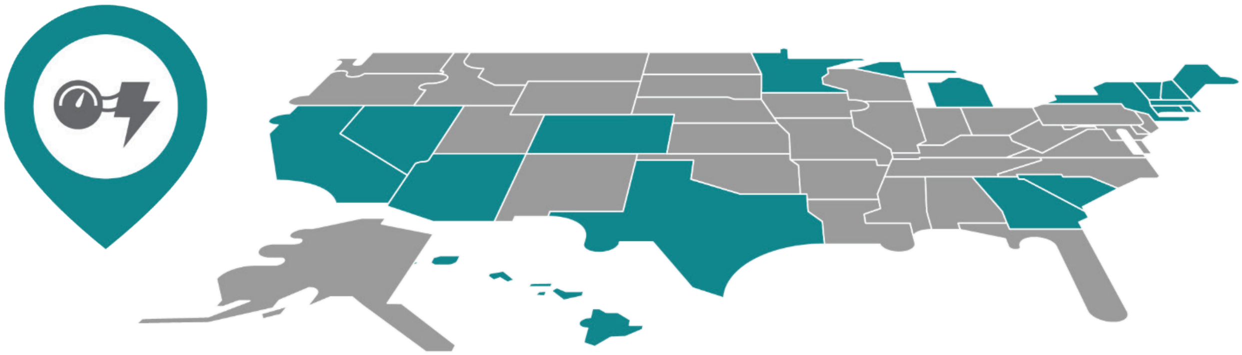


Figure 2. Examples of states providing grid benefits with energy efficiency

Energy efficiency provides the most value to the grid when the time and location of savings are aligned with grid needs, such as during times of peak demand or where and when there is grid congestion. States seeking to advance adoption of DERs; integrate DERs into the grid; increase electric space and water heating in buildings; accelerate the adoption of electric vehicles; or address load growth from new and existing electrified manufacturing operations, data centers, and advanced computing development will benefit from consideration of the time and location of energy efficiency (EIA 2023b, EIA 2024).

Historically, the consideration of the value of energy efficiency's peak demand reductions (i.e., capacity savings) has been limited, in part, due to the lack of research on the hourly and seasonal timing of savings of energy efficiency measures (Frick 2017). Recent advancements in data availability, such as the detailed load profiles provided by organizations such as the Northwest Energy Efficiency Alliance (NEEA n.d.) and the National Renewable Energy Laboratory (NREL n.d.), enable utilities to assess the time-varying value of efficiency measures accurately. By focusing on these elements, EERS can support economic savings and reliability in the energy system.

Two approaches states are using to reduce grid constraints are allowing demand reductions to contribute toward energy efficiency goals and quantifying the capacity value of energy efficiency in planning. Examples of actions states are taking (Figure 2) are described below.

Allow demand reductions and flexibility to contribute toward energy efficiency goals

Several states allow or incentivize utilities to use peak demand reductions to contribute toward achieving their energy efficiency goals. Focusing program performance and impact on times when the grid is the most constrained produces high-value savings.

Arizona – Integrate efficiency and demand flexibility goals with resource planning

The Arizona Corporation Commission required Arizona Public Service (ACC 2022a) and Tucson Electric Power (ACC 2022b) to achieve 1.3% annual savings through energy efficiency over a three-year period and report the savings in their next IRPs. Both utilities were also required to develop demand-side resources providing capacity savings of at least 35% of their 2020 peak demand by 2030 using demand response, energy storage, and smart thermostats. In staff's review of the 2023 IRPs, they acknowledged that the utilities stated they met the energy savings and capacity requirements in one or more of the resource portfolios developed (ACC 2024).

Massachusetts – Include virtual power plant savings in efficiency plans

Massachusetts utilities file energy efficiency investment plans every three years, and they must include load management programs (e.g., demand response), in the plan (Massachusetts General Laws n.d.). The utilities' 2025–2027 energy efficiency plans propose to reduce peak demand by 300–350 megawatts each year using their ConnectedSolutions virtual power plant program, which includes demand response (Mass Save 2024).

Minnesota – Identify that the timing of efficiency savings is valuable to the utility system

Minnesota updated its energy efficiency savings goal in 2021 and identified that "optimizing the timing and method used by energy consumers to manage energy use provides significant benefits to the consumers and utility system as a whole" (Minnesota Legislature 2021). Utilities can receive credit toward achieving their energy efficiency goal using load management activity that is integrated with energy efficiency programs.

Time-Sensitive Value Calculator

Efficiency targets that are specified in annual savings or percentages of sales typically allow the program administrators to determine the mix of measures that are implemented. This may result in a mix of measures that provides less overall value compared to targets that consider time and locational value (i.e., measures with savings that are not aligned with grid needs compose a large proportion of the program savings).

To assist with quantifying energy efficiency's value, Lawrence Berkeley National Laboratory developed a Time-Sensitive Value Calculator. The publicly available tool estimates the value of energy efficiency and other DER measures using hourly estimates of electricity system costs. The calculator takes hourly profiles of up to six measures and monetizes their value for six value streams. The calculator was designed for public utility commissions, state energy offices, utilities, and stakeholders to estimate the value of energy efficiency and DER measures under various future electricity system scenarios (Frick et al. 2022).

Nevada – Use a multiplier for on-peak efficiency savings

Nevada utilities can use energy efficiency to meet their renewable portfolio standard and receive double compliance credits for energy savings that occur during peak periods (Nevada Legislature 2005, Nevada PUC n.d.).

Texas – Include peak demand reduction requirements in EERS

Texas' EERS requires utilities to reduce their peak demand by 0.4% with energy efficiency (Texas Utilities Code n.d.).

Quantify the time and locational value of energy efficiency in planning

Including energy efficiency in electric utility planning processes (e.g., demand-side management, distribution system, and integrated resource planning) allows utilities to assess when and where efficiency can defer or avoid investments and when it can be deployed to maximize value to the system.

Avoided cost

A foundational element of including efficiency in planning is estimating the avoided cost[4] of a resource.

California – Create a publicly available avoided cost calculator

The California Public Utilities Commission (PUC) created the Avoided Cost Model, a publicly available tool that forecasts the long-term marginal costs used to evaluate the cost-effectiveness of DERs, including efficiency. The Avoided Cost Model uses annual hourly data to forecast the long-term avoided costs in California. The Avoided Cost Model calculates the benefits of energy efficiency and other DERS for use by program administrators in California (California PUC n.d.-a)

[4] "There are two main categories of avoided costs: energy-related and capacity-related. Energy-related avoided costs refer to market prices of energy, fuel costs, natural gas commodity prices, and other variable costs. Capacity-related avoided costs refer to infrastructure investments such as power plants, transmission and distribution lines, and pipelines." (National Action Plan for Energy Efficiency 2008)

New England – Develop regional energy supply cost estimates for energy and capacity values of efficiency

Six New England states sponsor an Avoided Energy Supply Costs study that evaluates the avoided cost of marginal energy supply for program-based energy efficiency or other demand side management measures. The most recent study determined peak impacts of energy efficiency and energy efficiency's contribution to the capacity requirement based on the annual regionwide energy efficiency amount and annual system demand impact (Synapse Energy Economics 2024).

Integrated resource planning

IRPs are long-term plans for a utility to reliably meet energy system needs at the lowest cost and least risk. A majority of states require utilities to file IRPs, and most if not all states require utilities to include energy efficiency in them (Biewald et al. 2024). Energy efficiency can be incorporated into IRPs in two ways: It can be allowed to directly compete with other supply-side resources, or it can be embedded into utility resource planning as a "must-take" resource or reduction from utility load forecasts (Frick et al. 2021b). Examples from the two different approaches are discussed below.

Arizona – Model energy efficiency in IRPs without restrictions

The Arizona Corporation Commission required Arizona Public Service (ACC 2022a) and Tucson Electric Power (ACC 2022b) to remove modeling restrictions that limit the amount of energy efficiency that can be selected as a resource option in their 2023 IRPs. Arizona Corporation Commission staff review of the 2023 IRPs found that it did not appear that the utilities provided unrestricted modeling portfolios (ACC 2024).

Georgia – Allow efficiency to compete with supply-side resources in IRPs and consider avoided distribution system costs

The Georgia Public Service Commission (PSC) requires Georgia Power to file an IRP every three years. The plan includes an assessment of the role of existing demand-side resources in meeting future demand and potential new demand-side resources (Georgia State Rules and Regulations n.d.). In 2022, the Georgia PSC directed Georgia Power and GPSC PSC staff to include in its 2025 IRP an additional sensitivity analysis of energy efficiency and demand response that competes "head-to-head" with supply-side resources (Georgia PSC 2022). Additionally, the Georgia PSC instructed Georgia Power to consider the locational value of efficiency by requiring the company to use the avoided distribution costs within demand-side management program cost-benefit analysis.

California – Establish energy efficiency as the first fuel to meet resource needs

One of California's state policies that support energy efficiency is the loading order. Through legislation, the state requires utility resource procurement plans to pursue cost-effective energy efficiency and renewable energy first, before other resources (California PUC, n.d.-b).

South Carolina – Include efficiency in IRP scenario requirements

Utilities in South Carolina are required to consider several resource portfolios with varying levels of cost-effective demand-side resources as part of the IRP process (South Carolina General Assembly 2019). In their 2023 IRP, Dominion Energy evaluated high, medium, and low energy efficiency portfolios and ultimately reduced their load forecast through the medium efficiency scenario (Dominion Energy 2023).

Distribution system planning

Distribution system planning (DSP) is an energy planning process that ultimately results in a plan that identifies grid deficiencies, analyzes potential solutions, and prioritizes capital investments and other distribution expenditures. Utilities conduct distribution planning annually to ensure their system meets technical standards, policies, and regulations; addresses forecasted grid conditions; satisfies customer needs; and advances utility priorities (Murphy et al. 2025).

The predominant way that energy efficiency appears in distribution system plans is through non-wires alternatives (NWA) analysis. NWAs can be used to provide relief to a specific location on the transmission or distribution system. Energy efficiency can be included as a resource in an NWA and can help avoid or defer building more transmission or distribution infrastructure to meet grid load, grid constraints, or customer needs. Among states with NWA analysis requirements, eligible DERs typically include demand response, distributed generation (including diesel-fired generators), and energy storage. Several states explicitly include energy efficiency as part of their DER definition or separately identify energy efficiency (e.g., CA, CO, CT, DC, ME, MI, NV, NY) as eligible NWA resources (Schwartz et al. 2024).

Colorado – Include efficiency in non-wires alternative definition

Colorado PUC's DSP regulations state that NWAs can "include one or multiple DERs, including but not limited to demand response measures, energy efficiency, energy storage, and distributed generation (Colorado PUC 2021). DERs "may include, but are not limited to, distributed generation, energy storage systems, electric vehicles, microgrids, fuel cells, and demand side management measures including energy efficiency, demand response, and demand flexibility that are deployed at the distribution grid level, on either the customer or utility side of the meter."

Michigan – Develop NWA pilots that go beyond existing efficiency programs

Michigan's PSC directed utilities to work with commission staff to develop NWA pilots that go beyond the utilities' existing demand response and energy efficiency programs (Michigan PSC 2020).

New York – Use efficiency in NWA implementation

Utilities in New York have included NWA analysis in their distribution system implementation plans for several years and are well known for successful NWA solutions that include energy efficiency. This can largely be attributed to Con Edison's Brooklyn Queens Demand Management (BQDM) program, which is one of the most well-known and longest-running NWA projects in New York. As of Q3 2024, the BQDM program is estimated to have achieved more than 61 megawatts of customer-side load reduction (Con Edison 2024a). In 2024, Con Ed continued their use of energy efficiency adders, providing additional financial incentives for small-to-medium businesses within the BQDM region to participate in the program (Con Edison 2024b).

Emerging approaches

There are several emerging approaches that incorporate energy efficiency into DSP.

New York – Plan for interrelated effects of efficiency and other DERs

New York has required utilities to file distribution system implementation plans since 2016. In the Staff Department of Public Service's most recent guidance on what the utilities should include in the plan, they suggested utilities include "how the utility's means and methods enable probabilistic planning which effectively anticipates the interrelated effects of distributed generation, energy storage, electric vehicles, beneficial electrification and energy efficiency" (New York PSC 2023).

Compensate Customers for Energy Efficiency Based on Demand Reduction and Location

While not typically part of distribution system planning, compensation for energy efficiency can also take the time and locational value of resources into account. The New York State Public Service Commission created the Value of Distributed Energy Resources (VDER), a mechanism which provides bill credits based on the time sensitive value of DERs. The credits are determined by calculating DER value in several distinct categories, including energy value, environmental value, and demand reduction value. In addition, other DER projects may receive credits based on avoided carbon emissions, cost savings to customers and utilities, and avoided cost for large-scale capital investments (NYSERDA n.d.).

Michigan – Use load forecast sensitivities and model locational impacts of efficiency and other DERs

Regulators in Michigan require utilities to explicitly including energy efficiency in distribution system planning and DER forecasts. For example, the Michigan PSC required utilities to consider efficiency in their 2021 distribution system plans and identified that it is "important to run sensitivities in load forecasts for distribution planning and to start modeling locational impacts from customer behavior (whether through plug-in electric vehicles, EWR [energy waste reduction, Michigan's term for energy efficiency], storage, solar DG, DR, etc.)" (Michigan PSC 2020).

Hawaii – Include efficiency in integrated grid planning

DSP is one component of integrated grid planning (IGP), and states can include specific guidance on energy efficiency as it relates to IGP requirements.[5] For example, the Hawaii PUC directed Hawaiian Electric to evaluate energy efficiency on a consistent and comparable basis with supply-side resources by developing efficiency supply curves and modeling them as portfolio options that compete with supply-side options (Hawaii PUC 2022).

Maine – Require integrated grid planning scenarios that include efficiency

Utilities in Maine must include at least two potential planning scenarios in their IGPs: a baseline scenario and a scenario of high-penetration DERs and end-use electrification including energy efficiency and NWA (Maine Legislature n.d.).

[5] Integrated grid planning may also include generation and transmission, resilience, and other types of planning in addition to distribution system planning.

Address Electricity Load Growth

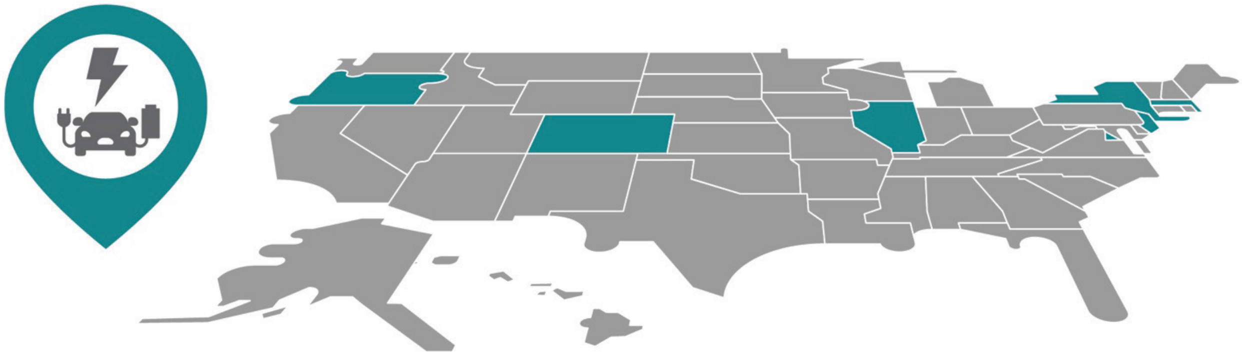


Figure 3. Examples of states addressing electricity load growth with energy efficiency

Load growth from buildings, industry, and vehicles can occur when consumers shift from a non-electric source of energy to electricity. It is often discussed in the context space and water heating in buildings, industrial processes, and electric vehicles.

Many states have an EERS and a separate policy that promotes load growth (ACEEE n.d., ACEEE 2022, NCSL 2021) which range from economy-wide energy plans and cap-and-trade policies to policies targeting specific end uses. Historically, EERS are stated as an annual reduction target that is based on a percentage of electricity retail sales; thus, policies driving electrification may seem to be at odds with an EERS, since they can create load growth rather than the energy savings required for EERS compliance. However, states are taking a variety of actions to thoughtfully address electricity load growth with energy efficiency. For example, some EERS policies more recently have established energy savings metrics in British thermal units (Btu) in addition to resource-specific goals (i.e. multiple goals) to enable both efficiency and electrification measures. Examples of actions states are taking (Figure 3) are described below.

Plan for efficiency and electricity load growth together

Combining electricity load growth and efficiency planning processes is an emerging practice to support synergies across the portfolios. An EERS can minimize potential negative impacts of electrification efforts by reducing existing loads and ensuring that new loads are efficient, even as they grow (ESIG 2024). States can use electrification and energy efficiency together to create more robust outcomes by planning for efficiency and electrification together, and through thoughtful program design.

Colorado – Consider beneficial electricity consumption and energy efficiency targets

Colorado defines “beneficial electrification” as electrification that reduces GHGs over the lifetime of the conversion to electricity and reduces societal costs or provides for a more efficient utilization of grid resources (Colorado General Assembly 2021). In 2023, the Public Service Company of Colorado filed their beneficial electrification plan as part of their 2023 demand-side management plan. In the settlement agreement, the commission required the utility to separately track the estimated gas and electric savings and increased electric load from beneficial electrification and noted that increased electric consumption from beneficial electrification will not represent “negative savings” or count against energy efficiency targets.[6] The company committed to research phasing out of incentives for standalone air conditioning systems and gas water heaters to allocate more resources to electrification (Colorado PUC 2023).

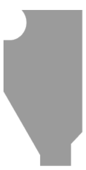
Oregon – Plan for transportation load growth and efficiency together

Oregon has several policies that promote planning for transportation load growth and energy efficiency together. The state’s 2024 distribution system planning guidelines require utilities to coordinate with other related planning processes, including transportation electrification plans and demand-side management plans. Utilities must describe how they considered those plans when determining their grid needs and how proposed investments are coordinated with those planning processes (Oregon PUC 2024).

Encourage efficiency, regardless of fuel source

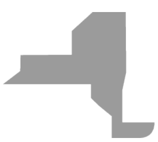
States can promote energy efficiency regardless of the underlying fuel source used to provide energy. One strategy can be to develop fuel-neutral efficiency metrics that can promote electric or gas energy efficiency. As electricity load growth occurs and natural gas combustion in buildings may decline, using fuel-neutral metrics can enable natural gas utilities to contribute toward state energy goals.

Illinois – Establish a site-level energy consumption savings metric



Illinois allows electric utilities to promote measures that electrify space heating, water heating, drying, cooking, industrial processes, and other end uses. Utilities can count electrification measures toward their annual energy efficiency savings if there is a reduction in site-level energy consumption. This is calculated based on the net reduction in energy consumption across all fuels, converted to kilowatt-hours (Illinois General Assembly 2021).

New York – Use a fuel-neutral savings goal



New York established a goal in 2018 to reduce energy consumption by 185 trillion Btu in buildings and facilities by 2025 (NYSERDA 2018). To achieve the goal, the state identified strategies including accelerating (and changing) utility energy efficiency programs and considering a fuel-neutral approach to utility-delivered energy efficiency programs to save energy across all fuel sources.

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[6] Colorado has an EERS with a relative baseline, meaning it is established as a percent of electricity consumption. For states with other types of EERS baselines (e.g., absolute, fixed, rolling) this approach may not be applicable, and other approaches discussed in this section may be more appropriate. For more information on EERS baselines see Gold et al. 2019.

Massachusetts – Create program incentives for natural gas and electric customers

In the program administrator's 2022–24 efficiency plan, the Massachusetts Department of Public Utilities approved programs that allowed natural gas heating customers to receive fuel-switching incentives if they switched to electric heat pumps. In their approval, they also directed program administrators to implement the plans to meet the electric and gas GHG emissions reduction goals (Massachusetts DPU 2022).

New York – Create technology-specific goals

As part of the order approving the utilities' energy efficiency plans, the New York PSC established a minimum jurisdictional heat pump savings of 3.6 trillion Btu (New York PUC 2020). While building envelope and weatherization measures are not required in New York, it is valuable for states to consider incentivizing them in advance of installing heat pumps to maximize total energy savings.

New Jersey – Establish beneficial decarbonization programs

The New Jersey Board of Public Utilities (BPU) required utilities to develop building decarbonization (or electrification) start-up programs in the utilities' multiyear energy efficiency goals in 2023 and specifically required the electric utilities to propose efficiency programs that focus on switching from delivered fuels (e.g., heating oil) to electric heat pumps and making buildings ready for electrification, while allowing gas utilities to propose programs that included hybrid heating systems and district geothermal heating systems (New Jersey BPU 2023). Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, and Public Service Electric & Gas proposed a heat pump program that provides higher incentives for efficiency measures that replace space and water heating from delivered fuels than the BPU approved (New Jersey BPU 2024).

Establish fuel-neutral utility performance incentives

New Jersey – Create a fuel-neutral utility performance metric

The New Jersey Board of Public Utilities approved using metric million British thermal units (MMBtu) for the utilities' efficiency performance metric in 2023. Previous efficiency goals were expressed as a percentage of sales; however, in their most recent order, the BPU identified energy savings in MMBtu to provide a common energy unit across the energy efficiency and building decarbonization programs (New Jersey BPU 2023).

Washington, D.C. – Create a fuel-neutral utility performance metric

Half of the DC Sustainable Energy Utility's performance incentive is associated with reducing energy consumption. Performance is measured on a MMBtu basis, regardless of whether the savings are from electricity, natural gas, or delivered fuels (District of Columbia DOEE 2024).

Reduce Emissions

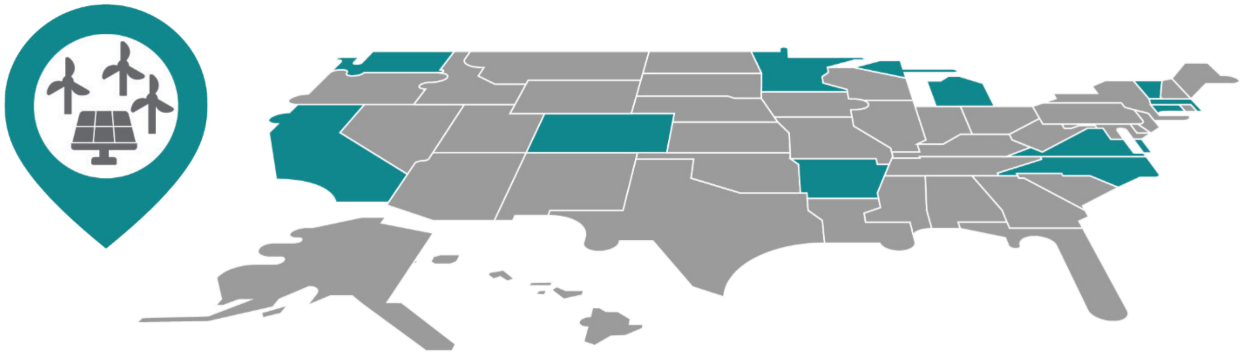


Figure 4. Examples of states reducing emissions with energy efficiency

EERS inherently contribute to emissions reduction efforts (e.g., decarbonization) through energy savings. However, states can accelerate the impact by strategically targeting their efficiency savings to advance air pollutant emission reductions. For example, states can target energy efficiency that reduces load during a period where the generation mix is higher in carbon-emitting resources (e.g., California). States can also incorporate EERS or efficiency into broader climate action or air pollutant emissions reduction plans. Almost all states with an EERS also have decarbonization goals (ACEEE n.d., CCES n.d.). Many utilities have also established carbon reduction goals, regardless of state energy policy requirements (Smart Electric Power Alliance n.d.).

An emerging approach to strengthening the link between EERS and decarbonization is to establish specific GHG metrics or targets within an EERS, or vice versa, to identify an EERS target within a GHG reduction plan. Where applicable, utilities can also plan to meet GHG targets through strategically deployed electrification measures and by incentivizing fuel switching.

Strategies states can use to integrate their energy efficiency and decarbonization goals (Figure 4) are discussed below.

Allow utilities to pursue efficiency that achieves emissions reduction goals

EERS can be used to achieve decarbonization goals, and states can highlight that linkage through policies or directives. States that have specific carbon reduction goals or that develop standalone climate plans can create synergies with EERS by explicitly allowing utilities to use efficiency to meet decarbonization goals, permitting utilities to use energy efficiency that does not pass cost-effectiveness tests but achieves carbon reductions, prioritizing energy efficiency programs that produce carbon reductions, and ensuring alignment across planning processes and including energy efficiency as part of a low-carbon resource mix.

North Carolina – Use efficiency to meet clean energy goals

In North Carolina, efficiency and decarbonization goals are connected through the energy efficiency and renewable energy resource standard established in 2007, which requires all utilities to acquire 10% (cooperative or municipal utilities) or 12.5% (investor-owned utilities) of the prior year's retail sales in energy efficiency and renewable energy (North Carolina General Assembly n.d.-a). Beginning in 2021, 40% of the standard can be met with energy efficiency. In 2022, over 6,700 gigawatt-hours of energy efficiency were used to comply with the standard (NC-RETS n.d.).

North Carolina – Use efficiency to meet emissions reduction goals

State law requires utilities to file carbon reduction plans every two years (North Carolina General Assembly n.d.-b), and given the significant overlap with IRPs, the North Carolina Utilities Commission combined the carbon and integrated resource planning in 2023 (North Carolina Utilities Commission 2023). In November 2024, the commission approved Duke Energy's plan, which included achieving energy efficiency savings equal to 1% of eligible load in the preferred resource portfolio (North Carolina Utilities Commission 2024).

Massachusetts – Prioritize efficiency programs that create GHG savings

Massachusetts passed legislation establishing a minimum statewide GHG reduction goal of 845,000 metric tons by 2030. The state requires calculation of program benefits, including calculation of the social value of GHG emissions reductions, and it allows utility three-year energy efficiency plans to prioritize projects that will result in substantial GHG reductions (Massachusetts Legislature 2021). As part of their 2025–2027 energy efficiency plans, program administrators proposed saving approximately 1 million metric tons of carbon dioxide equivalent during the plan period.[7]

Vermont – Target weatherization and efficient new buildings to achieve GHG goals

Vermont's Comprehensive Energy Plan identifies emissions reductions pathways, strategies, and recommendations across the state's economy to meet its goals for renewable energy and GHG reductions. The plan identified that "efficiency continues to be the most cost-effective first resource" and set a target of weatherizing 120,000 households by 2030. The plan also maintained a prior goal of using building energy standards to achieve net-zero ready construction for all new construction buildings by 2030 (Vermont DPU 2022).

[7] Massachusetts's EERS and decarbonization requirements extend to gas utilities, which have a goal of approximately 374,000 million metric tons of carbon dioxide equivalent by 2030.

Washington – Use efficiency to reduce the cost of decarbonization and electrification

Legislation passed in 2024 requires the Washington Utilities and Transportation Commission to establish a cost-effectiveness test for emissions reductions measures identified by large combination gas and electric utilities in forthcoming integrated system plans. Integrated system plans consolidate or coordinate many planning processes, including both the gas and electric systems, EERS targets, and transportation electrification plans. The cost test will apply at the portfolio level to determine the lowest reasonable cost decarbonization and low-income electrification measures (Washington State Legislature 2024a). The commission is currently in a rulemaking process to develop the cost test and explore implementation details, such as clearly identifying which resources and measures it will apply to, what costs and benefits to include, and which stages of the integrated system planning process will use the test (Washington UTC 2024).

Account for the cost of emissions in planning and cost-effectiveness

EERS can target decarbonization by placing a price on damage from carbon emissions. States can identify a value for the cost of carbon when setting efficiency goals and undertaking planning processes, recognizing an additional value stream for carbon-free resources such as energy efficiency and renewable energy. In a planning process where carbon-intensive resources are more expensive, the mix of selected resources may shift to favor those that have greater relative emissions reductions. States can estimate the value of avoided carbon either through utility-specific modeling or by using an established carbon value, such as a social cost of carbon. Strategies that states are using to include the value of carbon are discussed below.

As part of many EERS policies, governments use a value for the social cost of carbon to estimate the climate impacts of decisions and rules. The U.S. Environmental Protection Agency (EPA) defines social cost of carbon as "a measure, in dollars, of the long-term damage done by a ton of carbon dioxide (CO2) emissions in a given year." (EPA 2016). It values impacts on human health, changes in agricultural productivity, property damage from climate-driven weather events, and changes in energy system costs, among others.

Arkansas – Quantify air quality benefits

The Arkansas Department of Environmental Quality and the Arkansas Public Service Commission quantified the air quality benefits of the state's EERS using the U.S. Environmental Protection Agency's AVoided Emissions and geneRation Tool (AVERT) (Arkansas DEQ 2019).

Colorado – Use social cost of carbon in utility planning

Colorado legislation required utilities to include a value for the social cost of carbon dioxide and methane emissions in beneficial electrification planning (which includes building electrification measures) and directed utilities to rely on the most recent assessment by the federal government to determine the value of the avoided emissions (i.e., social cost of carbon) (Colorado General Assembly 2021).

Washington – Use social cost of carbon in efficiency potential assessments or IRP

Electric utilities in Washington with more than 25,000 customers must establish energy efficiency targets every two years based on the amount of cost-effective energy efficiency savings potential identified through a conservation potential assessment or an integrated resource plan (Washington State Legislature n.d.) In their cost-effectiveness analysis, the utilities must use and include a modified total resource cost test (Northwest Power and Conservation Council 2019) includes that includes a value for the social cost of carbon (Washington UTC 2022).

Cost-effectiveness analysis

Energy efficiency program administrators and regulators frequently use cost-effectiveness analyses to guide program development. Including the cost of carbon helps to ensure that cost-effectiveness testing accurately captures the full benefits of energy efficiency, which can lead to greater deployment.

Washington – Include GHG reductions in definition of cost-effective resource

In the legislation establishing integrated system planning, Washington defines a resource or project as cost-effective if it is projected to be reliable and available when it is needed, reduces GHGs, meets or reduces energy demand or supply without reducing the level of energy service, and is equal to or less costly than available alternatives including the cost of compliance with the forward ceiling price of carbon allowances under the state's cap-and-invest program. In the integrated system plans, large combination utilities must demonstrate how they will achieve a 2% reduction in electricity each year (Washington State Legislature 2024).

Connecticut – Include regional avoided carbon dioxide value in cost-effectiveness analysis

Connecticut uses the Connecticut Efficiency Test as the primary cost-effectiveness test for energy efficiency. The test includes an avoided carbon dioxide value based on a regional avoided energy supply cost study (Eversource Energy et al. 2023).

Minnesota – Use social cost of carbon when considering energy efficiency benefits

The Minnesota legislature established an energy efficiency goal for public utilities, requiring that they save the equivalent of 1.75% of gross annual retail sales every year until modified (Minnesota Legislature 2021). The legislation identified that the commission must consider the costs and benefits to ratepayers, the utility, participants, and society, among other requirements. The Minnesota cost test includes consideration of environmental damage, and the Minnesota PUC established environmental cost values for carbon dioxide for 2017–2050 (Minnesota Commerce Department 2023).

Establish an emissions reduction metric for energy efficiency performance

Several states have established fuel-neutral energy efficiency metrics in an effort to promote energy efficiency, regardless of whether the energy provider is an electric or gas utility. Typically, fuel-neutral efficiency metrics are used to encourage building electrification or decarbonization. Another option is to create a carbon metric to measure energy efficiency performance and prioritize investment in efficiency that produces air pollutant reductions.

California – Establish a total system benefit metric for energy efficiency performance

In 2021, California adopted a new metric to measure the success of energy efficiency programs. In addition to energy and demand savings goals, energy efficiency programs will be evaluated based on a total system benefit (TSB) metric, which reflects the life-cycle economic benefits of energy and capacity savings, as well as GHG reductions. In 2024, the TSB replaced the energy and demand savings goals as the single metric used for evaluation. Energy and demand savings will continue to be reported (California PUC 2021). The goal of the TSB metric is to encourage utilities to acquire high-value energy savings such as those that coincide with times of high costs of energy and higher emissions rates, or both, instead of targeting programs for the fulfillment of annual savings and demand goals. California PUC 2021).

Create or participate in carbon markets

States may be able to further their decarbonization and energy efficiency efforts by creating or participating carbon markets. In venues where states are exploring new energy policies, market mechanisms, or programs, consideration of EERS can help to connect portfolios with broader policy initiatives and enhance the effectiveness of both initiatives.

Washington – Create a cap-and-invest program to encourage efficiency investments

Washington has an economy-wide cap-and-invest program that sets a path for the state to achieve net-zero carbon emissions by 2050. The Climate Commitment Act created a market mechanism that encourages investment in energy efficiency and electrification such as heat pump installations and clean transportation, as any such investment would eliminate the need to purchase emissions allowances (Washington Department of Ecology, n.d.).

Virginia – Participate in regional greenhouse gas markets to encourage efficiency investments

Virginia's 2020 Clean Energy and Community Flood Preparedness Act, which authorized a cap-and-trade program to reduce carbon dioxide emissions from power plants, allowed Virginia's participation in the Regional Greenhouse Gas Initiative (RGGI), a regional cap-and-invest initiative to reduce carbon dioxide emissions from the power sector. States participating in the RGGI include Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia, which joined in 2021. The state's RGGI revenue will go to fund new, efficient, affordable housing and to communities along coasts and rivers that have flood risk. The act's many clean energy provisions include requirements that utilities in Virginia become 100% carbon-free by 2050 (Virginia General Assembly 2019).[8]

[8] Virginia's decarbonization requirements are defined for each utility: 100% carbon-free electricity by 2045 for Dominion Energy and by 2050 for Appalachian Power Company.

Promote Affordability

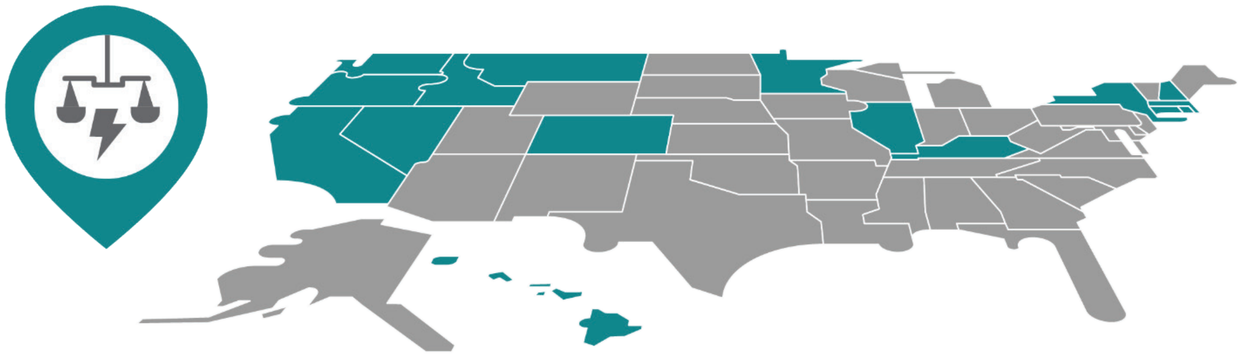


Figure 5. Examples of states promoting affordability with energy efficiency

Energy efficiency is often called the "first fuel" because it provides some of the quickest and most cost-effective resources while lowering energy bills and strengthening energy security.

While many states may have specific definitions for disadvantaged communities, this term is typically defined as groups such as environmental justice communities, tribes, rural communities, and low- to moderate-income communities that have been historically neglected, under-funded, and impacted by multiple disparities and injustices.

EERS policies contribute to affordability by reducing energy consumption and lowering costs associated with building out new grid infrastructure. Typically, energy efficiency program administrators perform an analysis on their energy efficiency programs or portfolios using cost-effectiveness tests such as the Total Resource Cost test to prove the efficiency investment has greater benefits than costs. Often, to get an efficiency program or portfolio approved and implemented, program administrators must prove it will cost less than avoided cost.

In the past, many states have only addressed disadvantaged communities by offering state-level low-income programs or requiring utilities to offer low-income weatherization programs. Today, states are leveraging or expanding their EERS to ensure that energy efficiency helps maintain an affordable energy system (Figure 5) using a variety of approaches that are discussed below.

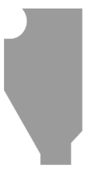
Consider affordability when evaluating efficiency

States have begun to require consideration of affordability and equity as part of utility benefit-cost analysis and program evaluation. For example, the National Standard Practice Manual, a guidance document for states on calculating cost-effectiveness for efficiency and other DERs, discusses opportunities for states to robustly evaluate the impact of DER program investment on customer bills (NESP 2020). Examples of approaches states are using to advance affordability for all customers, including disadvantaged communities are discussed below.

Connecticut – Use a multipronged approach to equitable energy efficiency

Connecticut has taken action to ensure that multiple state agencies work together to integrate equity into climate action and resiliency (Connecticut Executive Order 2021). The state's initiative advances affordable heating and cooling as well as energy efficient and resilient building codes, and it requires an assessment of the vulnerability of state assets and operations to climate change. The state also established an Equity and Environmental Justice Advisory Council, which is tasked with developing a plan and guidelines for engaging diverse stakeholders in the assessment process. The council also collaborates with other working groups to evaluate recommended strategies through an equity lens. In addition, the state includes nonenergy benefits as part of its energy efficiency benefit-cost testing, and in 2021 the PUC approved an adder for energy storage systems in households that earn less than 60% of the state's median income or are in underserved communities (Connecticut Public Utilities Regulatory Authority 2021).[9]

Illinois – Pilot distributional equity analyses for energy efficiency programs



Leveraging Berkeley Lab's *Practical Guide to Distributional Equity Analysis for Energy Efficiency and Other DERs* (Woolf et al. 2024) — a report describing a seven-stage framework to assess the distribution of benefits and costs of utility DER investments on specific populations — Commonwealth Edison and Ameren are exploring the distributional impacts of their energy efficiency and beneficial electrification programs. The process began in 2024 and is ongoing. In late 2024, the analysis advisory group identified metrics for their analysis (Midwest Energy Efficiency Alliance n.d.).

Kentucky – Allow for additional consideration of benefits for low-income programs

Low-income programs are exempt from program-level cost-effectiveness screening in Kentucky. Further, the PSC stated that if low-income programs fail any of the traditional cost-benefit tests, utilities and their associated collaboratives may supply additional documentation to justify the need for the program (Kentucky PSC 1998).

Nevada – Include nonenergy benefit adder for low-income programs

Nevada applies a 25% nonenergy benefits adder to low-income customer programs. Depending on the percentage of low-income participation in a program, the nonenergy benefits adder is adjusted (ACEEE 2021).

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[9] Connecticut defines underserved communities as environmental justice communities and distressed municipalities under general statutes 22a-20a and 32-96p, respectively. They also include public housing as an underserved community.

New Hampshire and Rhode Island – Create a tool to assess long-term rate and bill impacts of efficiency programs

New Hampshire developed a tool to assess the rate and bill impacts — common metrics for affordability — of energy efficiency programs. The tool will help the utility evaluate the potential for cost-shifting between customers and address potential equity concerns (Malone et al. 2020). A similar tool was created in Rhode Island (Lane and Takahashi 2020). Both were based on guidance from the *National Standard Practice Manual*, Appendix A, which discusses how to conduct a meaningful rate, bill, and participation impact analysis (NESP 2020).

Oregon – Explore efficiency cost-effectiveness in the context of community benefit indicators

Oregon's House Bill 2021 set decarbonization goals that are implemented through utility clean energy plans, which consider energy efficiency and equity as key components (Oregon PUC n.d.) The Oregon PUC established guidance for clean energy plans requiring investor-owned utilities to evaluate the impacts of community benefit indicators for resilience, health and community well-being, environmental impacts, energy equity, and economic impacts. The utilities are encouraged to identify how otherwise non-cost-effective energy efficiency, when considered in the context of community benefit indicators, can be incorporated into IRP portfolio analysis and meet utility system needs (Oregon PUC 2022).

Oregon – Provide guidance on stakeholder engagement

Oregon's DSP guidelines require utilities to engage traditional and nontraditional stakeholders (e.g., community and environmental justice organizations) in their DSP process and specifically within their NWA process. DERs that can be included in NWA explicitly include efficiency in Oregon (Oregon PUC 2024). This example is specific to NWA, but providing guidance for stakeholder engagement for any proceeding is a regulatory best practice (Biewald et al., 2024, Schwartz et al., 2024).

Pacific Northwest – Include equity in regional power plans

The Northwest Power and Conservation Council's regional power plans influence the utility resource and energy efficiency plans throughout the region. The power plans also specify conservation actions and targets for the public utilities receiving power from the Bonneville Power Administration, which serves approximately 40% of the region. In its 2021 Power Plan, in addition to setting a regional target for energy efficiency, the council called for regional utilities to continue to invest in weatherization programs, specifically addressing homes that are poorly weatherized (Northwest Power and Conservation Council 2022). Since the council's power plans define what measures are cost-effective for the Bonneville Power Administration's customer utilities, and many weatherization measures have struggled to achieve cost-effectiveness, this allowed utilities to continue to include weatherization measures in their programs while also encouraging them to focus on the homes that need them the most.

Prioritize efficiency that achieves affordability

States are using several approaches to prioritize implementing energy efficiency programs that target implementation for historically underserved communities, disadvantaged communities, or low-to-moderate income customers.

New York – Require that a percentage of efficiency investment benefits accrue to disadvantaged communities

New York's Climate Leadership and Community Protection Act requires disadvantaged communities receive at least 35% (with a goal of 40%) of the benefits of spending on clean energy and energy efficiency to achieve state decarbonization goals. The state's scoping plan identifies four strategies to advance building energy efficiency goals: adopting zero emissions codes and standards and building benchmarking; scaling up public financial incentives and expanding access to public and private low-cost financing for building decarbonization; expanding the state's lead-by-example projects; and advancing a managed and just transition from reliance on hydrofluorocarbons (New York State Climate Action Council 2022).

Colorado – Include programs for low-income and disproportionately impacted communities in beneficial electrification plans

Colorado requires utilities to file plans for beneficial electrification (which include energy efficiency measures), and they must include programs targeted to low-income and disproportionately impacted communities. The programs must receive at least 20% of the overall funding (Colorado General Assembly 2021). In its beneficial electrification plan, Public Service Company of Colorado (Xcel Energy) included a pilot that would test geographic prequalification of direct-install weatherization programs, potentially removing the additional administrative burden of proving qualification for low-income programs (Colorado PUC 2023).

Massachusetts – Use a dashboard to track progress toward prioritized programs

Massachusetts energy efficiency program administrators host a dashboard and map of energy efficiency program spending, savings, participation, and demographics by census tract (Mass Save n.d.). The data allows the utilities to measure the progress of their programs toward equity targets and goals. The utilities' 2025–2027 energy efficiency plan includes seven strategies to accelerate program access for vulnerable and underserved customers, including increasing electrification and weatherization for low-income customers; reducing barriers to program qualification for moderate-income customers; and partnering and investing in communities to reach underserved customers (Mass Save 2024).

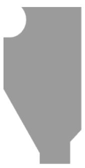
Incentivize efficiency that achieves affordability

Utility performance incentive mechanisms align their performance with desired outcomes. Regulators identify measurable outcomes (i.e., metrics) and utilities receive a financial reward or penalty based on their performance (Gold and Rosenbach 2024). Several states have developed performance incentive metrics that align equity and efficiency.

Hawaii – Reduce low-and-moderate income energy burden

Hawaiian Electric Company has 10 performance incentive metrics that guide the utility's performance, one of which is affordability. Annual reported metrics for affordability include the low- and moderate-income energy burden, payment arrearages by zip code, and quantity of disconnections. Customer equity is also reported on annually, measured by low- and moderate-income customer participation in energy efficiency programs (Hawaii PUC, n.d.).

Illinois – Reduce residential disconnections

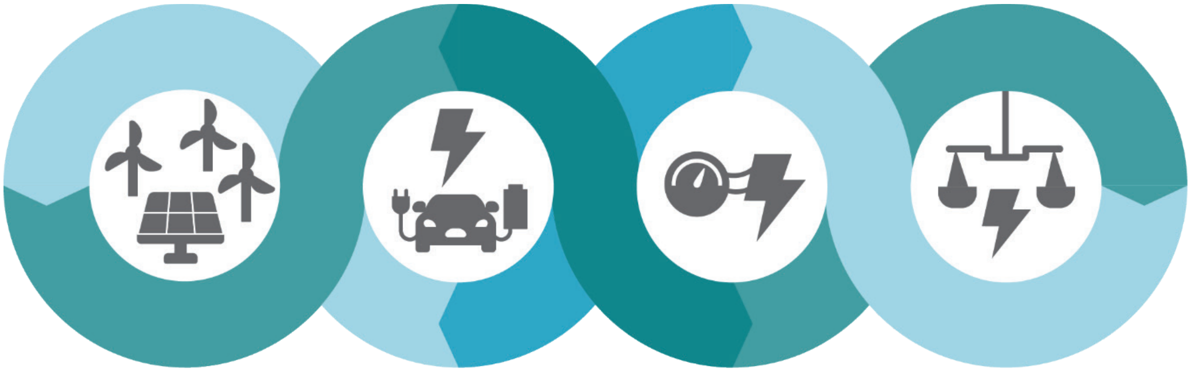


Commonwealth Edison's proposed affordability performance metric is focused on reducing residential disconnections by 10% over a four-year period in 20 ZIP codes that have historically had high disconnection rates. One of the strategies Commonwealth Edison plans to use to achieve this goal is to connect customers in the identified ZIP codes with energy efficiency programs (ComEd 2024).

Washington, D.C. – Improve the efficiency of buildings serving low-income residents

The DC Sustainable Energy Utility is compensated based on several performance metrics. One of their performance benchmarks is to improve efficiency and renewable energy capacity of low-income households and other buildings serving low-income residents. The utility must spend 30% of its annual funds to achieve 12.5% of its incentive payment and is compensated on a sliding scale (DOEE 2024).

Summary of State Policy Examples



Incorporating energy efficiency into the four policy priorities discussed in this paper can provide multiple benefits to states such as reducing customer bills, lowering electricity system costs and emissions, and helping to manage load growth. State examples are summarized below.

Provide grid benefits

- **Arizona:** Requires utilities to use demand-side resources to provide capacity savings
- **Massachusetts**: Allows capacity savings from virtual power plants to contribute to achieving utilities' energy efficiency goals
- **Minnesota**: Identified that the timing of efficiency savings is beneficial to the utility system as a whole when they updated their energy efficiency goals
- **Nevada:** Allows utilities to use efficiency to contribute to achieving their clean energy requirements and provides a multiplier for efficiency that occurs on-peak
- **Texas**: The state EERS requires annual peak demand reduction
- **California:** Created a publicly available avoided cost calculator that considers the time and location of efficiency in cost-effectiveness analysis
- **New England**: Uses a regional avoided cost study that considers the time of efficiency savings for cost-effectiveness analysis
- **Arizona**: Required utilities to remove modeling restrictions on the amount of efficiency that can be selected as a resource option in IRP
- **Georgia**: Required Georgia Power to include in the next IRP a sensitivity analysis that allows efficiency to directly compete with supply-side resources and to include the avoided distribution system costs in efficiency cost-effectiveness
- **California**: Established cost-effective energy efficiency as the first resource to be pursued in resource procurement plans
- **South Carolina**: Requires utilities to use high, medium, and low energy efficiency in their IRP scenario analysis
- **Colorado**: Includes energy efficiency in the definition of NWA
- **Michigan**: Required utilities to develop NWA pilots that go beyond utilities' existing efficiency programs

- **New York**: Requires utilities to consider NWA in distribution system planning and has utilities that are successfully deploying energy efficiency in NWA
- **New York**: Encourages utilities to include the interrelated effects of distributed generation, storage, electric vehicles, beneficial electrification, and efficiency in their distribution system plans
- **Michigan**: Noted importance of load forecast sensitivities in distribution plans and modeling locational impacts from customer behavior, including efficiency
- **Hawaii:** Includes energy efficiency in integrated grid planning
- **Maine:** Requires utilities to include scenarios with high DER (including efficiency) and electrification adoption

Address electricity load growth

- **Colorado**: Excludes beneficial electrification electricity growth from energy efficiency targets
- **Oregon**: In distribution system planning guidelines, requires utilities to discuss how transportation electrification, demand-side management, and other planning efforts are coordinated
- **Illinois**: Allows electric utilities to count electrification toward energy savings targets, particularly promoting electric vehicle adoption and reducing peak demand
- **New York:** Established a MMBtu energy efficiency target that is fuel-neutral to encourage gas and electricity savings
- **Massachusetts:** Allows utilities to provide incentives for switching from gas to electricity heating in their energy efficiency programs
- **New York:** Established an electric heat pump minimum savings requirement as part of the utilities' energy efficiency goals
- **New Jersey**: Requires utilities to develop building decarbonization programs alongside energy efficiency goals
- **New Jersey:** Switched to using MMBtu as a quantitative impact metric to measure utility energy efficiency performance
- **Washington, D.C.:** Created a MMBtu quantitative impact metric to measure utility energy efficiency performance

Reduce emissions

- **North Carolina:** Encourages utilities to use efficiency to meet utility decarbonization plans
- **North Carolina:** Allows utilities to use energy efficiency to contribute to meeting renewable portfolio standard compliance
- **Massachusetts**: Implemented energy efficiency targets and mandates that utility plans prioritize projects that achieve significant GHG reductions
- **Vermont:** Targeted weatherization and efficient new buildings to meet state GHG goals
- **Washington:** Establishing a cost-effectiveness test for emissions reductions measures that utilities will use in future IRPs
- **Arkansas**: The state Department of Environmental Quality and the PSC quantified the air quality benefits of their EERS

- **Colorado**: Requires utilities to include social cost of carbon in utility planning
- **Washington**: Requires utilities to use social cost of carbon in efficiency cost-effectiveness, either through potential studies or IRPs
- **Washington**: Includes GHG reductions in the definition of a cost-effective resource
- **Connecticut**: Uses avoided carbon dioxide value in the state cost-effectiveness test
- **Minnesota**: Uses a value for the social cost of carbon in efficiency cost-effectiveness testing
- **California**: Introduced a total system benefit metric to evaluate energy efficiency programs based on overall economic benefits, including GHG reductions
- **Washington**: Created a state economy-wide carbon cap-and-trade program
- **Virginia**: Participates in a regional GHG market and uses revenue for energy efficiency investments

Promote affordability

- **Connecticut:** Has a multipronged approach to equity, including an initiative to advance affordable heating and cooling efficiency; an Equity and Environmental Justice Advisory Council; and analysis of nonenergy benefits in energy efficiency cost-effectiveness
- **Illinois:** A Midwest Energy Efficiency Alliance sponsored distribution equity analysis pilot with Commonwealth Edison and Ameren is exploring the distribution of utility DER benefits and costs
- **Kentucky**: Exempts low-income programs from traditional cost-effectiveness screenings to ensure accessibility and effectiveness of energy efficiency measures for vulnerable populations
- **Nevada**: Applies a 25% nonenergy benefit adder to low-income programs that enhance program cost-effectiveness and accessibility for disadvantaged communities
- **New Hampshire and Rhode Island:** Developed tools to assess the rate and bill impacts of energy efficiency programs
- **Oregon**: Requires investor-owned utilities to evaluate the impacts of community benefit indicators for resilience, health and community well-being, environmental impacts, energy equity, and economic impact in clean energy plans, which include efficiency
- **Oregon**: Requires utilities to engage with stakeholders in NWA processes, which include efficiency
- **Pacific Northwest**: The Northwest Power and Conservation Council includes equity in its regional power plan
- **New York**: Directs 40% of clean energy investments, which include efficiency, to benefit disadvantaged communities, integrating equity into climate and energy policies comprehensively
- **Colorado**: Requires utilities to allocate at least 20% of beneficial electrification funding, which includes efficiency measures, to programs benefiting low-income and disproportionately impacted communities
- **Massachusetts**: Created a dashboard to track energy efficiency program outcomes by demographic and geographic data, ensuring equity targets are met
- **Hawaii**: Identified affordability as a performance incentive metrics, and requires the utility to annually reporting metrics related to energy burden, arrearages, disconnections and efficiency program participation

- **Illinois**: Commonwealth Edison’s proposed affordability performance metric focuses on reducing residential disconnections by 10% over four years in specific zip codes
- **Washington, D.C.:** The energy efficiency utility’s compensation is in part tied to improving efficiency and renewable energy capacity in buildings serving low-income residents

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