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# The power park initiative--A model for the future of distributed generation

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HOUSTON, Texas, Oct. 2, 2000 (Oil & Gas Journal)-The confluence of electricity industry restructuring in major industrial states across the country with the implementation by several Public Utilities Commissions of performance based rate-making provides the opportunity for the introduction of distributed energy resources (DER) into the country's energy mix.

With the recent forecast of summer blackouts and the memories of past outages and price spikes still very vivid in the minds of energy consumers across the country, DER usage through Power Parks can be positioned to immediately provide energy customers with reliable, cost-effective, energy efficient and safe electricity.

The longer term, sustaining role of Power Parks is even more profound. Development of old or abandoned industrial sites is a critical "smart growth" strategy for economic development of urban areas in the US. Smart use of resources in expanding suburban areas is also critical.

In order to provide energy consumers valued-added solutions, attract new industry and create jobs, there is an essential need to provide reliable, energy efficient power while maintaining a sustainable environmental quality of life. One approach emerging in key states is the concept of Power Parks - real estate developments with collections of distributed, on-site, energy generation joined by a minigrid and often by a thermal energy loop and advanced telecommunications technologies.

Using new technologies such as fuel cells and microturbines, often linked with renewable energy sources such as photovoltaics, and integrated with energy efficient designs for the new buildings and facilities, Power Parks can provide developments that do not burden the existing grid, particularly during periods of high use. Power Parks ensure the highest level of reliable energy for occupants of the development and provide a consistent and predictable cost of energy using sustainable clean technologies for energy production, resources consumption and waste reduction.

Power Parks will provide an avenue for the assessment of technologies and designs as well as regulatory and legislative requirements that enable the use of DER. Real examples of Power Parks are under development today which will likely determine the infrastructure and features required to meet the demands of critical energy markets.

These examples include the Pleasanton Power Park in Pleasanton, California and the University Research Park at the University of California, Irvine. The UCI University Research Park provides a flexible "living laboratory"

environment where the latest developments in DER state-of-the-art can be implemented to better enable utilities.

developers, and customers to benefit from the implementation of DER.

## Background

In 1995, the University of California, Irvine in cooperation with Southern California Gas Company and Southern California Edison, evolved the concept for a "Living Laboratory" for energy technologies as an integral part of a proposed 200 acre, University Research Park (URP).

Today, the concept is being implemented in cooperation with the developer, The Irvine Company Investment Properties Group, one of the nation's most respected development and management companies. Over 40 buildings and 2.4 million square feet of space are included with an infrastructure design that offers facilities ideal testing scenarios for comprehensive DER R&D collaborative opportunities.

The campus-like setting features facilities for DER integrated R&D with an IT infrastructure emphasizing light manufacturing, professional office use and corporate headquarters. The URP offers an attractive "Living Power Park Laboratory" for an integrated approach for demonstrating multiple renewable technology, combined heat and power (CHP), microturbine generator (MTG) and fuel cell applications as well as microgrid and IT alternatives.

Existing tenants already include AOL, Cannon, and Cisco. Other collaborative partners include SoCal Edison, SoCal Gas, Siemens-Westinghouse, Toyota, and Capstone Turbine Corporation.

The stakeholders at the URP represent true public/private partnerships.<sup>1</sup> As the URP has moved forward, interest from industry in this living laboratory for Power Parks has increased. UCI continues to receive calls from around the world inquiring as to whether the Power Park concept could be duplicated elsewhere. Discussions and interest with the DOE culminated in the desire to create a Power Park initiative that would provide key demonstrations of several distinct applications of the Power Park concept.

## The initiative

Using the concept and components of the URP, which is currently 25% occupied, as a model, UCI will lead a consortium of stakeholders to accomplish the Power Park Initiative's goal. That goal is to understand and evaluate Power Park concepts and components applicability at the URP as well as at other locations. The evaluations will encompass:

- Variations in physical size and power consumption,
- Varying geographic areas for weather and infrastructure considerations,
- Different commercial characteristics, e.g., heavy industrial, light industrial, R&D, business park, shopping center, campus, telecommunications centers,
- Greenfields, brownfields, and retrofits,
- Different technological considerations including generation, storage, distribution, power quality, enabling information technology and information systems, communications and telephony, waste reduction, recycling, etc., and
- Permit and siting considerations, regulatory and legislative environments.

Additionally, the Initiative will.

- Promote and champion the Power Park concept: hold workshops, facilitate visits, assimilate and disseminate information,
- Provide a formal clearinghouse of information related to Power Parks for public consumption, and
- Identify critical hurdles and market barriers, propose resolutions, and provide input to DOE and other government agencies and programs.

## **Roles for consortium**

Since the depth and breadth of the Initiative is vast, a consortium of stakeholders acting together in their common interests will facilitate the accomplishment of Initiative's goals. As the Initiative should be technology neutral and should assess as many applications as possible, the consortium members for the most part will not include manufacturers.

The following technology applications will be among those pursued: Fuel cells, MTGs, fuel cell-MTG hybrids, Renewables (i.e. PVs; Stirling dish); CHP(including cooling); building CHP; and information and control systems. At this time the potential consortium members include:

UCI Advanced Power and Energy Program (APEP) - (Independent Evaluation, Research, Testing, and Demonstration)

RealEnergy - (Utility Infrastructure Developer)

Nextek - (DC Power System Enabling Technology)

Panattoni Development - (Commercial/ Industrial Land Developer)

California Energy Commission (Government/Regulatory)

Silicon Energy - (Information Management and Control)

Shawnee Electric Company - (Native American Owned Electric Contractor)

DTE Energy Technologies - (DER Technology and Engineering Provider)

Upon determining the targeted areas for development, the Consortium will identify the specific sites, create the development plan, implement the plan (often using additional sub-contractors) and provide the operational assessment and report.

## **U.S. Department of Energy role**

The U.S. DOE will play a key role in the success of the Initiative. Today there are many barriers to the deployment of DER. The regulatory environment for DER including energy distribution systems, tariffs, and siting, permitting and community planning issues is in a state of change across the country.

There are numerous agencies involved including: FERC, state public utility commissions, state energy offices, cities, counties and the local utility companies. DOE has overarching interests, relationships and competencies with regard to the subject matter and has the ability to provide a communications bridge among all of the stakeholders. Facilitation and knowledgeable public policy input will be critical to the Power Park Initiative's pilot development success.

Because there are few business models that demonstrate the viability of the Power Park concept, objective chronicling of the pilots from concept through operation will be a valuable contribution of DOE. The pilots themselves can become "business cases" that will assist in widespread understanding of the concept and how it can be successfully implemented.

There are numerous existing subsidies at the state and federal level, as well as tax credits and other favorable treatment available for those who deploy some distributed generation technologies.

DOE can assist in ensuring that these benefits flow to the pilot projects, as appropriate, based on the pilots meeting program criteria.

DOE's role for specific pilot developments should also include assistance with project planning, preliminary engineering and design, metering, and measurement and verification.

DOE can also provide a forum for discussion and education about the Power Park concept. Both the public and private sectors will benefit from DOE's experience as facilitator and chronicler of the Initiative and the pilots.

### URP highlights

The University Research Park (URP) is a 200-acre, 2.4 million square foot joint venture between the University of California Irvine (UCI) and The Irvine Company. Infrastructure requirements to support the deployment of Distributed Energy Resources has been designed and implemented by the Southern California Gas Company (natural gas distribution), Southern California Edison (electric distribution), and The Irvine Company (fiber optic distribution).

For each of the 43 buildings, up to 500 kW of natural-gas powered electric generation can be incorporated in a variety of locations and configurations, and flexible space for photovoltaics is provided.

External of the buildings, capability is provided for 10 megawatts of energy generation using large fuel cell systems, Gas Turbine co-generation, and/or premium grid fuel cell distribution. As a result, the URP microgrid is designed for (1) flexibility in order to test different configurations, (2) alternative distribution options such as premium power, and (3) multi-point monitoring of power quality. The infrastructure for information technology is designed to provide maximum flexibility and options for a variety of IT scenarios.

The principal building employed in the URP is The Irvine Company Flex-Tech building.

This particular edifice varies in footprint from 50,000 to 90,000 square feet and has been designed to provide maximum flexibility in occupancy options while achieving high building efficiency performance. The Flex-Tech building is, as a result, used by developers around the country as a model. As a result, the building serves as an excellent test-bed for the deployment, demonstration, and evaluation of DER.

The Irvine Company, one of the most respected developers in the country, has partnered with UCI in formulating the URP as a "Living Power Park Laboratory" with the goal of incorporating sufficient infrastructure and substantial flexibility to facilitate both the incorporation as well as the evaluation of DER in a Power Park Setting.

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