

Renewables in Integrated Resource Planning: The Role of Set Asides

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THE ROLE OF SET ASIDES

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Introduction

State utility commissions working on integrated resource planning have an opportunity to encourage the use of photovoltaics (PV) and other renewable energy technologies by allowing utilities to include a set aside portion of their planned resource acquisitions for renewables. The need for a concise summary of issues regarding set asides in integrated resource planning became apparent during discussions with state utility regulators and utility companies concerning implementation of large-scale PV projects in Colorado.

Benefits to Utilities, Suppliers, and Customers

At this stage in the development of renewable energy technologies, utility involvement with these technologies can be beneficial to both utilities and to the renewable energy industries. Utilities can learn the cost and benefit of these technologies first hand, as applied in the circumstances found in their own service territories. If a set aside portion of the utility resource plan is approved by regulators for utility investment in renewables, a market of significant size can be aggregated nationally, providing assurance for renewables technology industries to ramp up their investment in new manufacturing and bring improved, lower cost products to the market. While such an aggregated national utility market for renewables would be viewed as very large by the renewables industries, when the financial commitment of the utilities is compared, rate impacts would be negligible.

Utility customers can benefit as well. Early utility involvement with renewable technologies can help to hedge against fuel price and environmental cost uncertainties customers will face in the long term, particularly in states where fuel cost adjustments automatically flow the risk of fuel price volatility through the regulatory process into the customer's rates. In the long term, customers benefit from current utility involvement with renewables as utilities develop their abilities to use these technologies as part of a diverse portfolio of resources available to meet customer needs at least long term cost.

State Integrated Resource Planning (IRP)

Many state utility regulatory commissions are currently either

implementing IRP rules or reviewing utility plans filed to meet the requirements of IRP rules. At the same time, interest in renewable energy resources is increasing, driven by environmental concerns, customer demand, and by integrated resource planning itself, which requires analysis of all possible utility resource options. Since the majority of electricity is generated by coal burning power plants, the options under most consideration in current integrated resource planning tend to emphasize generation fired by natural gas and various customer options for increased efficiency in energy use.

The Natural Gas Bridge to Renewables

Since natural gas is a finite fossil fuel, it is often characterized as a "bridge" fuel between current use of coal to produce electricity and the future use of renewable energy resources. Present domestic U.S. reserves of natural gas may be sufficient to serve several generations of future utility customers. They are likely to be expanded as drilling and recovery technologies improve. But at some point long before total exhaustion of the resource, natural gas will become too expensive to burn to produce electricity. If significant use of natural gas as a transportation fuel becomes a reality, then the point at which natural gas becomes too expensive for electric production will be brought much closer.

At the other end of the natural gas "bridge" are the renewable technologies of the future: solar, wind, biomass, hydro, and geothermal. A renewables set aside of a portion of the utility resource plan is one way to start planning what direction the natural gas "bridge" will run, how much time and expense it will need to span, and what sort of surroundings will be found around the footings on the renewables side of the bridge.

Set Asides Limit Regulatory Risk

By setting aside a portion of the utility resource plan for renewables, utilities can explore the capabilities of these technologies within cost and benefit parameters which are defined by the integrated resource plan. Carving out a set aside in the resource plan, utilities can gain knowledge about PV and other renewables without risking later regulatory findings of imprudency. Set asides allow regulators to communicate to utilities and other interested parties how much renewables investment they believe is in the public interest, when, and at what cost.

Set Asides in IRP: Getting Started on Utility Renewables

Basic to the notion of integrated resource planning is thorough consideration of all possible options for meeting future utility resource demands. At the end of an integrated resource planning

process, the preferred plan chosen must meet customer demands at the lowest long term cost. Since the new options of DSM and renewables have very different characteristics from the standard fossil fuel technologies, they call for new methods for analysis in planning. New information about these new options must be gathered and mastered. Since the resources of DSM and renewables are diffuse, new means of involving customers and of bringing these resources to the service of customer needs must be found. None of these problems are trivial; but none of them present impossible burdens either. Getting started up the learning curve to make the potential of PV and renewable energy resource a substantial option for the future is the basic purpose of the set aside.

Some questions and answers about set asides for renewables follow:

1. What are the purposes of a set aside?

Reserving a portion of an electric utility's generating resources to be supplied by renewable energy resources can have several purposes. Planning issues can be identified and addressed, so that utility integrated resource planning can take into account the costs and benefits of renewable resources. New methods for valuing the costs and benefits of the new technologies can be tested and improved in the planning process. Acquisition issues can be confronted in the implementation of a set aside, as renewable energy resources are brought into use in the utility system or on customers' premises.

Information to inform a utility integrated resource plan, created by the planning and implementation of a set aside for renewable sources of energy, will define what renewable forms of energy resources are available to a utility, what technologies to consider, and which applications of these technologies are most useful for the demonstration and commercialization functions of a set aside. If a set aside is carefully planned, it should focus on the end result of information which will help determine what future role renewables can play as resource options for both utilities and their customers.

An interesting example of a regional approach to planning for renewables is provided by The Northwest Power Planning Council (NWPPC) Resource Confirmation Program. It emphasizes regional issues; cutting development time for projects; allocating costs and risks to the beneficiaries; achieving multiple goals and benefits; encouraging the resource in general rather than projects; and placing priority on resources which promise low or declining costs, abundance, reduced environmental stress, modularity, and short lead times. (See Hamrin, p. 114)

Once a logical set of renewable resources has been identified,

the process of acquiring these resources to fill up the set aside amount should also be planned to be a learning experience. A carefully planned program of acquisition of renewable resource electricity generating projects can generate important new information for subsequent planning efforts, including knowledge about the availability of renewables applications and projects and the cost of producing electricity and customer energy services with renewable resources. This cost and availability information will define the supply and demand curves for utility PV and other renewable energy resources.

The state of the supplier and distributor markets for utility-owned PV applications and other renewable resource projects as well as the potential for response by independent renewable power producers who might supply the set aside renewable resources could both be defined in the implementation of a set aside. In addition, utility provided remote or non grid connected renewable energy services might be part of the experimentation within a renewable set aside. Finally, utility use of renewables in demand side management (DSM) projects could be included in a renewable set aside.

2. What renewable resources should be considered?

Generally renewable resources include solar, wind, hydro, biomass, waste, and geothermal energy resources used to produce electricity. State and utility service area specific analysis of the availability of each of these resources is required, since each state and utility franchise area has its own set of renewable resources. Both the current use of renewable resources for electric utility generation and the quantity and location of renewable resource potential for electric generation need to be studied.

A significant amount of information about these resources exists at the national level. Regional, state, and site specific local resource assessment needs to be done to determine which renewable resources to include in a state IRP set aside.

3. What technologies to convert renewable resources to electricity should be analyzed for inclusion in a set aside?

To produce information about the availability and cost of renewable technologies for IRP, a set aside might gather preliminary information useful in screening each potential renewable energy conversion technology. A preliminary screening process to determine which technologies to include in the set aside might analyze considerations of availability, economic cost and benefit, environmental values, reliability, diversity in technology and fuel type, future potential, and other factors. Based on these screening criteria, a set of potential

technologies to be included in the set aside could be identified. Portions of the renewables set aside might be allocated to each of several technologies, depending on the outcome of the screening analysis.

4. Do research, development, demonstration, and commercialization purposes for a renewables set aside help to define the concept?

Renewables addressed in a set aside need to be carefully distinguished, because each technology is at its own stage of readiness for use by utilities and their customers. Distinguishing among research, development, demonstration, and commercialization stages can help to define the appropriate treatment within the set aside for each technology.

Research

Some renewables technologies may be at the research stage, where the technology is being developed in a laboratory setting. A utility company might find it useful to be involved in renewable energy research projects, through its own research budget, and in conjunction with others, such as the Electric Power Research Institute (EPRI). Research on renewables might be part of a set aside in the utility integrated resource plan, but the arguments for treating research and development separately are quite strong.

Development

Where a renewable energy technology has been shown by laboratory research to have promise, development of the technology might be aided by utility involvement. Work to increase efficiency of energy conversion processes, to reduce costs, or to work out additional systems needed to use the technology might characterize the development process. A utility set aside portion of the resource plan might include development work on renewable technologies.

However, research and development projects may be inconsistent with the purposes of the utility integrated resource plan, which is to identify those resources which are useful, or likely to be useful over time, in providing service to the customers at least cost. If research and development are viewed as being stages of technology involvement which are preliminary to the identification of technologies that are potentially used and useful as utility resources, technologies at the R & D stage would not be part of a set aside.

Utility R & D expenditures should support work on renewables technologies which are in the research and development stages. For example, some thin film and concentrator PV technologies would benefit from utility involvement in their research and

development. These technologies need research and development support to prove that they have potential for use by utilities and their customers, although some of these technologies may shade over into the demonstration stage.

Demonstration

Renewable technologies which are ready for demonstration have had their basic operations defined and improved through the research and development processes. For demonstration stage technologies, the basic technical processes are well understood, and their use by utilities and their customers has been defined. The demonstration stage suggests that broader knowledge of the new technology, its use in different circumstances, and the gathering and dissemination of information about broader use of the technology would help utilities determine if the new technology is ready for the market. Set asides would appropriately include renewable technologies which are ready for demonstration, on the theory that they might be least cost resources for the future.

Photovoltaics based on crystalline technology fits this demonstration level analysis. The technology is well known and reliable, and already cost effective in certain niche markets. Broader use of this PV technology in many new applications could help to prove whether the promises of high value in utility applications of this technology and further cost reductions will be kept.

Commercialization

Finally, commercialization stage technologies are ready for development of larger markets. Technologies which are ready for commercial use face marketing problems, such as lack of supplier support or lack of buyer knowledge. These renewable technologies would be appropriate for treatment in the utility set aside, since they are fully prepared to compete once the commercial market has developed to support them.

5. How would renewables projects included in the set aside be obtained by utilities?

There are several options for utilities to acquire the renewables to fill up a portion of their resource plan set aside for these technologies:

Utility build and own

A utility might build renewables projects identified in screening tests for inclusion in the rate base under normal regulatory scrutiny. These investments might be analyzed with the regulatory principles which apply to the utility research and development budget. (See question 6 below.)

Utility request for proposals

A utility might put out a request for proposals, reciting the conclusions of the preliminary screening exercise and identifying the kinds of projects in which was interested. Those responding to the RFP could show the utility how they planned to meet the screening criteria. Negotiations would follow to sell the proposed projects to the utility for inclusion in rate base. Alternatively, power from the projects might be sold to the utility, while the project itself was owned by the renewable developer.

Renewables bidding

A utility might open a renewables bid, asking project developers to bid to it all renewables projects, or those renewable projects producing electricity at or below a certain cost. Open bidding would put more priority on creativity in the renewables market to respond with projects which meet utility requirements.

Customer renewables incentive

An incentive in the form of a rebate or otherwise might be given by the utility for those customers willing to try renewables projects for a part or all of their electric requirements. These renewables might be part of a utility DSM program. The incentive would buy down the customers' cost of renewables projects, thereby inducing maximum customer and renewables developer creativity. The incentive might be funded in part by green pricing or green bonding.

Green pricing

Green pricing is a concept which would allow customers to obtain part of their electric service from renewable resources owned by the utility. The utility would charge a premium over its usual rates for the premium service. The price premium would be designed to cover the incremental cost of developing the new renewable resources to be obtained by the utility.

The green pricing concept serves three goals. It would help to encourage the development of renewable resources. Customers would be able to chose renewable generated power and utilities would be able to offer a new service. Finally, the planning process would be improved since a new set of options could be considered. Green pricing is being considered by several utilities, some of which have developed market research programs which show that customers would respond if green pricing were offered.

Green bonding

Green bonding is a concept which would allow investors to invest in utility renewable energy projects. Since renewables avoid the price and availability risks of fossil fuel projects, the holders of green bonds would require less of a risk premium and, therefore, a lower rate of return for their relatively less risky investments. The investment capital of green investors would be used to acquire renewable resources which would be employed for the benefit of the green investors, who would enjoy rates which would reflect the absence of fuel cost and risk. Green investors could cap that portion of their rates provided by renewables, securing for their investment a price guaranty not available to those who continue to rely solely on fossil fueled power supplies.

Utility and customer partnerships

The utility and the customer could be partners in the project, with the customer providing the site, a portion of the capital investment, and supervision and maintenance, with the utility providing engineering and other technical services, part of the capital, and evaluation and monitoring, and owning a proportionate share of the capital investment.

In both renewables bidding and in a partnership with a customer installation, monitoring and evaluation to gain the information required to define the cost; availability; reliability; and relation to system, transmission, and distribution and other values would be a key factor justifying utility involvement.

6. How would a utility recover its investment and expenses for renewable energy projects?

Investment could be rate-based or, together with planning costs, recovered through expense treatment in a rate case or otherwise. Capital goods purchased to last more than one year, and included in a set aside project which have reasonable potential to be used and useful in the utility's operations could be included in rate base. Since the utility has the opportunity to earn its authorized rate of return on these investments, it has an incentive to make these investments. Capital cost treatment of utility investments in a set aside for renewables spreads these costs over time, as their depreciation expense is recognized in rates. Since the benefits of these investments are gained over time as well, capital cost treatment of these investments has logical appeal.

The treatment of utility RD&D expenses depends on the timing of rate cases. Expenses for RD&D which are incurred in the utility test year used for setting rates would be recognized in setting customer rates. Generally, RD&D expenses are included in rates

where they bear a reasonable relation to the utility enterprise. Some DSM program expenses have been allowed to be included in rates by an adjustment mechanism. This current recovery of set aside expenses might be a necessary incentive for a utility facing increased RD&D expense between rate cases to encourage the utility to fund the analysis of technologies, economics, and applications necessary to make a set aside work.

7. Will developers respond to utility offers to purchase renewable energy or renewable energy projects?

Given the responses to several utility renewable RFPs, there seems to be potential for developer response.

8. Are there logical partners for utility set asides for renewables?

Yes. The logical partners for utilities interested in pursuing renewables set asides include:

- o The Electric Power Research Institute (EPRI),
- o The National Renewable Energy Laboratory (NREL),
- o The Utility Wind Users Support Group (UWUSG),
- o The United State Department of Energy (USDOE),
Photovoltaics for Utilities (PVforU), and
- o the Federal Power Marketing Agencies, such as the Bonneville Power Administration (BPA) and the Western Area Power Administration (WAPA), as well as consultants and the renewables industries.

9. Which states have renewables set asides?

Colorado. The Rules of the Colorado Public Utilities Commission concerning integrated resource planning require that:

In addition to currently cost-effective renewable resources, analysis and discussion of the potential benefits and costs of a two percent set aside of its annual load growth to be provided by additional renewable resources in such manner and detail that the Commission may approve the additional two percent renewable resource investment if it determines it to be in the public interest to do so.

The language in the rule was the result of a settlement proposed by the Colorado Solar Energy Industries Association (COSEIA) and the Colorado Office of Consumer Counsel (OCC), the state consumer

advocate for Colorado. The set aside is now under development in utility integrated resource planning.

Public Service Company of Colorado has included an analysis of a set aside in its May 1, 1993 first draft integrated resource plan. The set aside is for 62.3 MW of capacity over the twenty years of the plan. Capital dollars are split 60% to wind, and 20% each to solar thermal and PV. A final plan will be filed in the fall of 1993.

New York. The current New York State Energy Plan (May 4, 1992) includes a 300 MW set aside for a "diverse range" of renewables to be acquired by the regulated utilities to be on line by 1998. The purposes of the New York set aside include:

1. To achieve guidance on alternative methods for procuring capacity.
2. To pilot differential treatment for emerging technology.
3. To address individual utility and poolwide responsibility for obtaining renewable capacity.
4. To meet diversity requirements.
5. To determine an acceptable price premium for renewables.
6. The price premium for renewables is to consider benefits of environmental externalities, economic development, price certainty, fuel diversity and scarcity, and overall rate impact.

A July 1991 Technology Assessment of renewables by the New York State Energy Office includes recommendations for the renewable resources and technologies to be considered. These include:

1. All wind in wind classes 5 and 4 and part of wind class 3.
2. Low cost wood fuel capacity (primarily urban wood waste).
3. All municipal solid waste.
4. Hydro from expansion of existing hydro facilities.

The PUC, which, together with the Energy Office, is responsible for the New York State Energy Plan, has opened Case No. 92E-0954, the Commission renewable resource docket. It should also be noted that Commissioner MacFarland has filed a dissent to the opening of this docket which bears scrutiny. A settlement of contested issues in the docket is expected to lead to implementation of the set aside.

California. The California legislature has added Public Utilities Code Section 701.3 (AB 1090, Hayden):

Until the [CPUC] completes an electric generation procurement methodology that values the environmental and diversity costs and benefits associated with various generation technologies, the [CPUC] shall

direct that a specific portion of future electrical generating capacity needed for California be reserved or set aside for renewable resources.

This statute took effect on January 1, 1992. In its order instituting an investigation to implement the Biennial Resource Plan Update following the California Energy Commission's seventh electricity report, the California PUC ordered a set aside portion for renewable resources in the next bid solicitation, subject to further comment by the parties. In the current round of resource acquisitions, the CPUC responded to the statute by creating renewable energy set-asides for each utility. Out of a total of 1450 MW of resource additions to be obtained by 1999, for all the California utilities, 300 MW are set aside for renewables.

All technologies are to be bid against renewables, but at least half the capacity of each renewable bid solicitation will be awarded to renewable bidders, applying the Commission's second price auction rules to the price awarded the winning bidders.

Iowa. The Iowa Utilities Board requires the states' utilities to buy 105 MW of renewable capacity, with each company's purchases based on its load.

Wisconsin. In Docket No. 05-EP-6, concerning Advance Plans for Construction of Facilities, the Wisconsin Public Service Commission ordered (on September 18, 1992):

1. Standard, long term levelized contracts for purchase of electricity from small, customer-owned renewable resources.

2. Net energy billing for customer owned renewable resources less than 20 KW.

3. Identification of a lead contact person on renewables in each utility.

4. Future reports on renewable implementation plans, including PV, wind, hydro, biomass, solid waste, and tire-derived fuels. These reports are to identify problems and solutions and to include actual plans for use of renewables for Advance Plan 7 filings.

5. Eastern Wisconsin Utilities shall plan for a wind farm research facility of 10 MW or more, following a previous study and experiment.

6. Investor owned utilities shall offer incentives or customer rebate programs for solar water heating.

7. Further investigation of the potential for alternate combustible fuels, including a survey of community waste to energy plans and tree farms for wood fuel is required.

8. PSC staff is to propose a renewables incentive plan, based on avoided costs plus a renewable energy adder or diversification credit as benchmarks for measuring the cost of installing renewable resources. If a utility brings a project on

line for less, they get a percentage share of the difference:

10. Have utilities requested renewables projects in bids or otherwise which are comparable to set asides in IRP?

Yes.

Bonneville Power Administration. BPA announced its intention on June 18 to conduct a 50 MW wind solicitation. It issued an RFP in September, 1992 which closed November 13. Ten proposals, totalling over 270 MW were received. A BPA press release stated that the projects eventually selected will be used ". . .to confirm and demonstrate wind as a viable, long-term and cost effective resource to meet future electricity needs in the region."

Evaluation was expected to be complete January 29, 1993, with negotiations to wind up by July, 1993. Power production is contemplated as early as 1995.

New England Power. Competitive solicitation for renewable resources in New England received 41 bids accounting for over 7 times the 45 MW (200,000 MWH) sought. As of April 9, 1993, New England Power Service had tentatively selected seven projects--four landfill gas, one back-end heat recovery, one wind, and one integrated waste management project. Four of the projects had signed contracts, and three were in negotiations. On July 22, 1993, NEP announced its commitment to 36 MW from seven renewable energy projects. The projects include state of the art wind machines, landfill methane, and waste to energy.

Portland General Electric. To replace power requirements created by the closure of the Trojan nuclear power plant, Portland General Electric has opened an all-renewables bidding process to diversify its new portfolio of power supplies. 200 MW of power supplied by water, wind, solar, geothermal or bio-mass based technologies are to be submitted to the company by 5:00 PM on September 3, 1993. PGE's goals for the RFP are to: assess the commercial readiness and potential of these technologies; gain experience with renewable resource project licensing, operating characteristics and costs; promote public acceptance and understanding of these technologies; and stimulate further development of these resources. A short list of potential developers will be selected by December 13, 1993, with final selections to be announced by March 31, 1994.

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