



DEFG

*Distributed Energy Financial Group LLC
Proposals and Projects*

Resource Adequacy and the Cost of Reliability

The Impact of Alternative Policy Approaches on Customers and Electric Market Participants

On January 19, 2005, the Distributed Energy Financial Group, LLC (DEFG) and the Center for the Advancement of Energy Markets (CAEM) released a major new study on resource adequacy and the cost of reliability.

A DEFG Web Conference was held on Tuesday, February 22nd. Thirty electric utility regulators representing ten states and one Canadian province participated. The conference explored the cost of capacity payments for resource adequacy, and the desirability of aligning the cost of providing reliability with the value consumers place on it.

EXECUTIVE SUMMARY

During the 1990's, governments around the world implemented reforms to increase the reliance of the electric sector on market forces. Some new market structures introduced planning reserve requirements that were not supported by system engineers and operators. These changes heighten concern about whether generating resources will be adequate in the future to provide reliable electricity at low cost. Regulators now express concern about power shortages, price spikes and volatility, and rising (not falling) energy costs. There is a concern that generation resources are inadequate, where capacity resources are viewed as insurance against the physical non-delivery of energy and against significant price increases. Policy makers are responding with regulations to ensure that enough generating capacity will be built. At issue is whether efforts to increase generating capacity are warranted in terms of the cost imposed on consumers compared to the benefit of increased reliability. The paper examines approaches to resource adequacy, including their costs to customers and enhancements in reliability.

The main conclusions of this study are:

1. Empirical estimates presented here indicate that more reliance on competitive processes and efficient prices would reduce the average cost of electricity by more than one cent per kilowatt-hour in certain regions of the U.S. This price reduction would produce a \$19 billion annual benefit to ultimate U.S. customers. The benefit would result from avoiding unnecessary capacity reserves, and encouraging price-demand response.
2. The optimum level of reliable service (and minimum electricity cost) is obtained by equating the value and cost of reliability at the margin. Efforts to encourage investment in additional generation capacity in the name of "resource adequacy" tend to increase costs to customers beyond the value of improved reliability.
3. Regulations that require an annual capacity obligation and recover the cost from all customers, inhibit the development of efficient electricity markets and preclude price-demand response. Restructuring will fail to produce its potential benefit to customers without efficient pricing.
4. Reliability has both public good and private good characteristics. A competitive market for reliability relies on price-demand response, distributed energy resources, and numerous, competing technologies and services. Focusing resource adequacy and reliability on generation is inappropriate because most electrical outages result from distribution system failures.

We recommend that electric markets be designed to achieve economic efficiency. In an efficient

electric market, generation should be priced at its marginal cost. This marginal cost will approximate the long run average cost (which includes capital cost) over time, which ensures an adequate level of investment. Annual capacity obligations should be replaced with an optimum capacity reserve margin that equates the costs and benefits of reliability at the margin. Economically efficient markets provide reliable electric service at a minimum cost to customers. Price-demand response contributes to meeting peak demand by encouraging conservation and other substitutes for peak power plants. Price-demand response requires time to develop; therefore, the transition to a more efficient market may require a larger capacity reserve margin in the near term, than would be required over the long run.

We recommend:

1. The matching of capacity reserves to expected peak generation plus a reserve margin, during a short planning period (months, not years).
2. The linking of the marginal cost and marginal value of reliability to customers, as opposed to setting a reserve margin by a rule of thumb.
3. Floating wholesale prices that accurately reflect the marginal cost of supplying electricity.
4. Elimination of barriers to a highly responsive demand market.
5. Larger capacity reserves during the transition (for example, when prices are capped), and reduction or elimination of capacity reserve requirements once the market is competitive.

Average Cost and Marginal Cost Pricing

Maintaining a constant level of generating capacity throughout the year provides justification for the allocation of capacity costs to all hours of the year, with the resultant flat electricity prices. These flat rate prices do not reflect the actual marginal cost of meeting peak demand; hence customers use an inefficient amount of a scarce resource. By recovering peak-related costs during non-peak times, the average price exceeds the marginal cost during most hours of the year. This pricing inefficiency further explains the high cost of the regulatory model relative to the competitive model. The lack of price-demand response is widely recognized as the limitation in current restructuring efforts.

The unnecessary high cost produced by the regulatory model is only part of the story. The regulatory model further produces flat-rate prices that preclude the development of efficient wholesale and retail markets. The deregulation of several industries in the U.S. has produced enormous benefits where price declines often exceed 50%. Benefits of this magnitude do not characterize any electric restructuring effort in the U.S. Restructuring efforts in the U.S. include the use of auction markets and retail access to power suppliers, but some such efforts are superimposed on the old regulatory model of flat-rate pricing and large reserve margins. The inefficiencies inherent in the regulatory model preclude restructuring efforts from providing the potential benefits to customers.

Current Trends Toward More Regulation

We find that concerns about resource adequacy are motivating policy changes in the direction of the regulatory model and away from the competitive model. The evidence reviewed here indicates that administrative requirements for investments in generating capacity—in both fully regulated and restructured markets—produce a level of generating capacity where the marginal costs exceed the marginal value of reliability. This result is consistent with the history of electric utility regulation and current market conditions. Current and historical reserve margins produce unnecessarily high prices for customers and impede the development of efficient markets.

Failure to Achieve Benefits of Competition

The restructuring of electricity markets has failed to achieve benefits even approaching the cost reduction benefit achieved in other markets. The failure of various restructuring efforts to achieve the full benefit of an efficient market probably owes to the market design that retains the regulatory inefficiency of average-cost pricing and the use of a large amount of installed capacity

to meet peak demand. Restructuring efforts, such as auction markets and retail competition, imposed on a base of an inefficient capacity market, cannot enhance efficiency in a major way. The apparent reliability and security of large reserve margins and stable prices precludes the development of an efficient market that would provide the large potential benefits to customers.

Demand Response Study

Growing our of this resource adequacy work is a request for an analysis of demand response programs. DEFG plans to team up again with the Center for the Advancement of Energy Markets (CAEM, a non-profit think tank) to conduct a critical examination of demand response programs.

We have been asked to provide an assessment of demand response programs to better understand how to make a transition to truly market-based demand-price response. Participants in the study will receive a critique of current programs, an analytical framework to measure the efficiency and equity impacts of current programs, a literature review, and a report with best practices and recommendations.

For more information about the the demand response study, select the title from the proposals list.