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Demand Response and California's Energy Future

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I was asked to speak to you this morning about our vision for the role of demand response programs in California's energy future. It is perhaps easier to begin by talking about the substantial challenges we are likely to face if we choose not to avail ourselves of the significant opportunities demand response offers.

As you are aware, we recently dodged a fairly large bullet in the form of the heat storm that hit the state in July of this year.

Despite facing average temperatures that were unprecedented, and peak loads approaching 51,000 MW, the grid continued to operate with relatively minimal disruption.

This was achieved through a combination of solid planning, coordination between the IOUs and the CAISO, strong generator performance, active participation in a variety of load shedding programs and, as much as I would like to attribute our weathering of the storm to human foresight and ingenuity, no small degree of luck.

Although we emerged from that event largely unscathed, it highlighted for many the precarious position we find ourselves in. It would be comforting to believe that the heat storm was a freak incident. Unfortunately data suggests otherwise.

- According to the CEC, peak loads are forecast to grow at a rate of 1.4 to 1.8 percent per year through 2016.
- In addition, these loads are growing increasingly “peaky,” by which I mean to say that the difference between peak demand and average demand has been growing larger.
- Empirically this can be observed in the decline in the weather-normalized load factor that we have seen over the past several years.

Together these trends suggest that the state will need to make substantial investments in additional peaking generation and augment transmission infrastructure to ensure that the grid can accommodate periods of increasingly high and unpredictable peak demand.

Such a supply-side strategy is undesirable for a number of reasons.

- From a purely economic standpoint, a supply-side approach to meeting peak demand requires building generating and T&D facilities that stand idle for substantial periods of time, resulting in extremely high marginal energy costs.
- Furthermore, for a variety of reasons, peaking resources will tend to run counter to the environmental goals of the state.
- Because conventional peaking generating facilities tend to be relatively inefficient, they produce significant levels of emissions when operating.

Given that this is a conference about demand response and its role in meeting California's energy needs, you may have some idea where this is going.

The CPUC and the CEC have fully embraced the notion that demand response represents a critical component of our overall strategy to ensure an economically efficient and environmentally sound energy future.

This is evidenced by its position on the list of preferred resources identified in the state's Energy Action Plan, where it joins energy efficiency as the resource of first choice, followed by renewables and clean fossil-fuel generation.

The speed with which a creature can adjust to its environment is largely a function of the sophistication of its feedback mechanisms. In the case of an electric grid, as conventionally conceived, these feedback mechanisms are woefully inadequate to address the challenge of emergency peak events and generalized peak demand growth.

The basic problem is that the end users are insulated from the real-time costs associated with procuring resources to meet their energy needs. As supply constraints are reached, wholesale prices increase, but the ability of the utilities to pass these costs to end-users in a way that impacts their energy decisions is severely limited. Customers pay whatever rate exists in their tariff, irrespective of wholesale prices. This disconnect can lead to excess demand and, in some circumstances, supply constraints being reached and grid failure.

In this respect the grid is like an individual with a degraded nervous system: the speed with which it can respond to external stimuli has been slowed to months, or even years. If a person with this condition accidentally touched a hot burner, they wouldn't know they were being burned until it was too late. Of course to prevent future injury, they would prepare themselves for this contingency, much like under status quo approaches to resource planning the utilities invest in peaking resources sufficient to meet worst case scenarios. The costs of this

insurance policy are extremely high and are eventually born by consumers in the form of higher rates.

We believe there is another way.

Demand response programs are intended to improve the grid's feedback mechanisms, allowing the system to respond more effectively to the realities of energy availability and costs at a given moment in time, giving the grid and consumers the ability to pull their hand from the fire before it gets burned. This approach is far more cost effective than pursuing supply-side solutions.

Case in point: we recently directed SCE to expand their AC cycling program, adding an incremental 225 MW to their existing program at a cost of $23 million. Meeting this demand with additional peakers, as SCE had originally proposed, would have cost ratepayers over $250 million. Not only did this make sense for ratepayers, it also made sense for the environment.

I'd like to turn now to specific demand response programs. Many of these focus on mitigating peak demand events by providing incentives that encourage load reductions during periods of constrained supply.

- Critical peak pricing programs offer large customers the opportunity to take service under a tariff that provides relatively advantageous on-peak rates for much of the year in exchange for exposure to very high rates during a limited number of "critical peak periods".
- Demand Bidding Programs allow large customers to sell load reductions to the utilities on a day-ahead basis, with payment received for the actual load reductions they are able to provide during a peak event.
- And the state's Demand Reserves Partnership works with third-party providers to aggregate load reductions from commercial and industrial customers which are then delivered to the utilities in much the same way as an equivalent amount of generation would be dispatched.

- I'd like to personally commend John Phillips, of the Energy Coalition, for his role in development of this model, through his ground-breaking work implementing load management energy cooperatives.

We also have a number of programs that are intended to deal with acute system emergencies, triggered by the IOUs upon notification by the CAISO. These include an interruptibles program, an air conditioner cycling program, and a more limited back-up generator program.

Although many of these focus on larger commercial and industrial customers, I would be remiss if I failed to mention a number of efforts that target electricity customers more broadly.

- The utilities have seen real success with their "20/20" programs, which reward customers with a 20% discount on their bills for reducing their summer usage by 20% compared to the same period in the previous year.

- "Flex Your Power Now" represents another important piece in our current efforts to encourage customers to reduce their load during peak periods, by alerting customers of times when supply limits are being approached and educating them on the impact their energy decisions have on the electricity system.
- I'd also like to mention PG&E's "Energenius" Program, which provides educational materials to teach children about electricity, and the benefits of energy efficiency.

Most of the programs here described work by increasing the opportunity cost of energy consumption during times of peak demand, either by increasing the price of consumption during those periods, paying customers for foregone consumption, or in some instances, an element of both. Although participation has been encouraging, substantial potential remains, as evidenced by the fact that, in general, the goals we have set for these programs have not been achieved.

There are a number of potential reasons for this, many revolving around the perception by large customers that the benefits of DR programs

and/or tariffs do not off-set the cost to participate. Because, at present, participation is voluntary, overcoming this perception is a critical element to program success.

Currently we are pursuing a number of efforts to expand the role of these programs in meeting our capacity needs. Earlier this year we directed the utilities to include a default critical peak pricing tariff for their large customers in their next general rate case. In addition, in August, I directed the utilities to present proposals to the Commission to augment their demand response programs for the purpose of having additional demand side resources by summer 2007 in light of this year's heat storm.

ADVANCED METERING

As the costs of advanced metering and communication technologies fall, the potential to migrate to a truly responsive regime becomes all the more real. In some ways, real-time pricing represents the demand response end game.

By expressly linking the prices energy consumers pay to the costs of that energy in the wholesale market, consumers will be empowered with the information necessary to make sound energy choices. Research suggests that even modest levels of price sensitivity in the retail market can yield substantial benefits as customer decrease or shift their loads. This functions to moderate system peaks. It also offers the ancillary benefit of reducing the market power generators can exert in times of tight supply, no small advantage in light of the state's all too recent experience during the energy crisis.

Advanced metering infrastructure provides the core foundation for this vision of the energy system. However, the deployment of AMI is only one step in this evolution. It must be combined with dynamic pricing tariffs that convey the appropriate price signals to end users and the energy management technologies and tools that will allow consumers to fully exploit this information.

CURRENT AMI ACTIVITIES

Our efforts to deploy advanced metering infrastructure are already quite extensive.

- All of the large IOU customers currently have interval meters.
- In 2004, a two-year statewide pricing pilot was completed that examined the demand response capability of residential and small commercial customers.
    - One of the key conclusions from that study was that residential customers can, on average, reduce their peak usage by 13 – 16 percent.
- To that end, in 2005, the IOUs filed AMI applications along with business case analyses laying out a plan for the eventual deployment of advanced meters to all customers.
- All though each of the IOUs are at different stages in the process to full deployment, substantial progress has already been made.

As I indicated earlier, if present trends in energy consumption in the state continue, the challenge of peak demand is only going to grow.

There are a variety of factors driving these trends including increased temperatures and temperature volatility, increased air-conditioning loads, a function of both higher annual temperatures and increased development in the interior and therefore hottest parts of the state, as well as economic growth.

A business-as-usual approach in which we seek to meet escalating peak demand with additional supply is unlikely to yield the best outcome, inasmuch as it leaves intact the disconnect between the price signals end-users see and actual costs of energy generation. Demand response represents a crucial policy approach that addresses this problem through a variety of regulatory and outreach programs that I have already described. As these new approaches and technologies are rolled out, education will undoubtedly play a key roll.

Demand response fundamentally changes the nature of the relationship that has traditionally existed between electricity customers and the utility.

Ultimately this transition will be empowering, giving customers greater control over their energy bills while simultaneously ensuring that our energy needs are met economically and with reduced environmental impacts.

Thank you.