

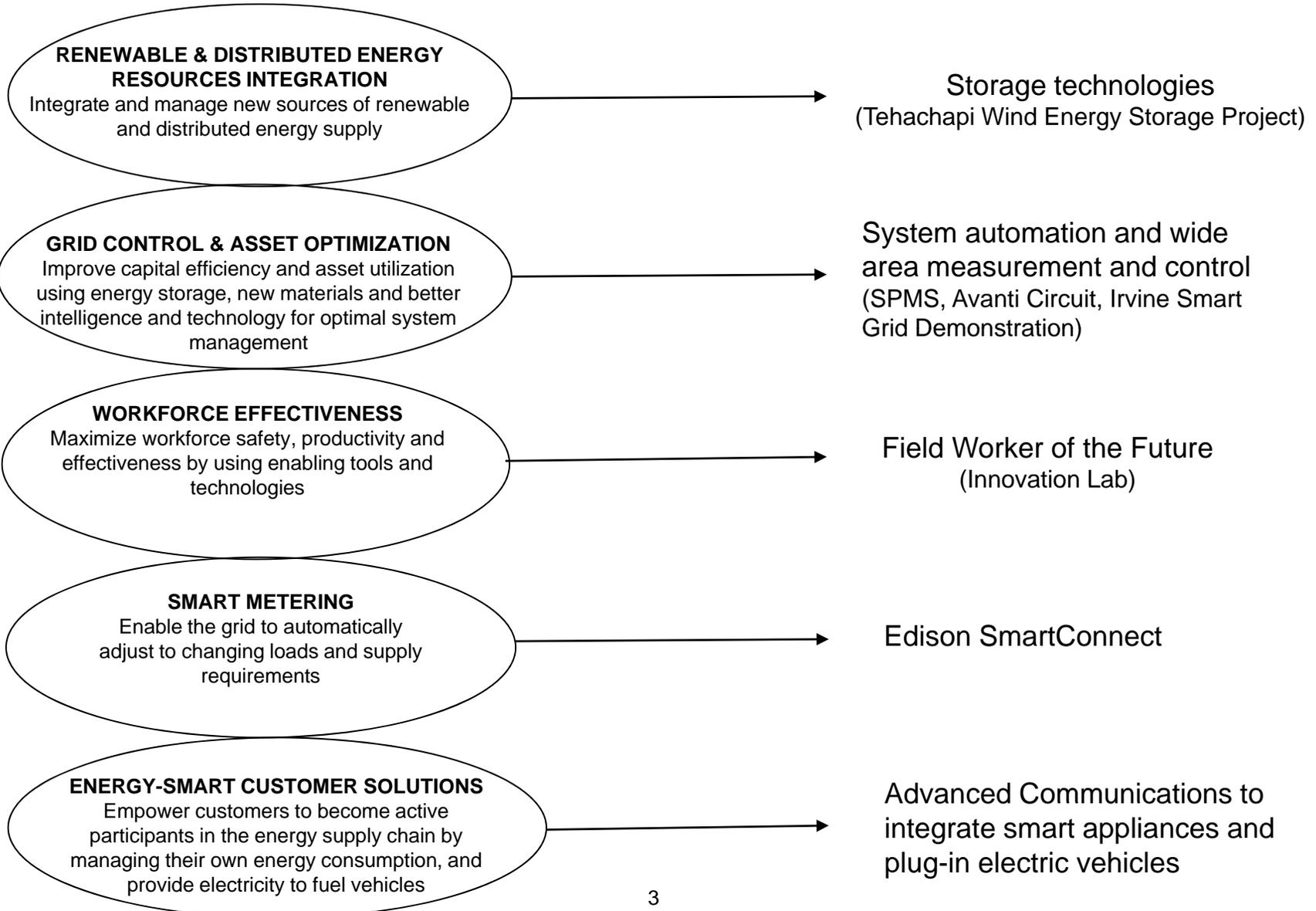
Smart Grid and Demand Response Implementation and Pricing Issues

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What is a Smart Grid?

- ❑ A smart grid is capable of performing two functions that are lacking in current systems
 - Providing information to the utilities and consumers concerning electricity use (e.g., by hour and by appliance) and prices, and digital controls to manage and modify electricity demand to promote economic efficiency
 - Improving grid reliability and security by sensing disruptions or changes in power flow and enabling fast and automatic protective responses
- ❑ To date, most of the technological and analytical focus has been on the first function although work on the second function is accelerating

SCE's Smart Grid Strategy



SCE's Current Direct Load Control and Price Response Programs

<u>Direct Load Control</u>	<u>Service Accounts</u>	<u>MW</u> s
Interruptible	1,427	745
AC Cycling		
Residential	341,324	635
Commercial	<u>10,987</u>	<u>122</u>
Total	353,738	1,502
<u>Price Response</u>		
Critical Peak Pricing	484	46
Demand/capacity Bidding	1,931	122
DR Contracts	1,172	81
Real-Time Pricing	<u>97</u>	<u>24</u>
Total	3,684	273

❑ Customers have so far shown more interest in direct load control programs than price response programs

Demand Response Valuation Methodology in the Absence of a “market” price

- ❑ Variations in hourly energy costs are generally small, it is the proxy for capacity cost that provides the bulk of the price signal or the incentive
- ❑ Demand response programs are valued in relation to their alternative supply-side capacity resource
- ❑ Demand response programs are “de-rated” relative to the capacity resource based on various program restrictions
- ❑ It is this de-rated capacity that is incorporated into the various rate designs and program incentives

More Valuable	Less Valuable
<ul style="list-style-type: none"> • No seasonal, day-type call restrictions • Higher availability – 20 6-hour events • 30-minute notice required • Interruptible Program rated at 92% of supply-side resource 	<ul style="list-style-type: none"> • Summer, workday call restriction • Lower availability – 15 4-hour events • Day-ahead notice required • Critical Peak Pricing rated at 55% of supply-side resource

Smart Metering Enabled Dynamic Pricing

- ❑ California's Statewide Pricing Pilot (2003-2004) quantified the degree to which residential customers would respond to Critical Peak Pricing (CPP) signals (12% demand drop at \$0.70/kWh price)
- ❑ Existing statutory provisions in California restrict the widespread applicability of CPP to residential customers leading to the focus on Peak Time Rebate (PTR) structures

Smart Metering Enables Dynamic Pricing (continued)

- ❑ Unlike CPP, which charges customers a high price for the energy they consume, PTR provides a bill credit based on the energy saved relative to a baseline quantity of consumption
- ❑ Two side by side studies (Ontario Hydro and Baltimore Gas and Electric) have produced like demand responses between CPP and PTR rate structures (BGE – 22% demand reduction from \$1.16 credit)
- ❑ Post SmartConnect deployment, dynamic rates will be fully deployed:
 - Non-residential – Mandatory TOU rate structures with Default CPP
 - Residential customers – Default PTR/TOU

Some General Observations Regarding Dynamic Pricing Pilots and Few Actual Tariff Options

- ❑ Residential Customers do respond to dynamic price signals
- ❑ Enabling technologies increase the level of response
- ❑ The level of response varies by such factors as usage level, household type (single-or multi-family) and central air-conditioning saturation
- ❑ No statistically significant difference in response between CPP/TOU and PTR when customers were directly notified of critical events
- ❑ No statistically significant difference in response between structural winners and losers (in any case, structural winners deserve a lower bill by virtue of their existing load patterns)

Residential Customers' Attitude Toward Dynamic Pricing?

- ❑ Appear most receptive to PTR, perhaps due to focusing more on downside risk of CPP than its upside rewards
- ❑ Savings levels, rebates and incentives are the biggest drivers of interest
- ❑ Dislike others controlling their appliances without an over-ride opportunity
- ❑ In addition to saving money, they cite preventing brownouts and other reliability problems as reasons for participation

Commercial/Industrial Customers' Attitude Toward Dynamic Pricing?

- ❑ Negative initial reaction to default CPP, but more receptive after learning curtailment is not “all or nothing”
- ❑ They need to know why default CPP is being implemented, otherwise they assume it is a way for SCE to make money
- ❑ Many are reluctant to take on additional rate risk, at least one year of bill protection increases the likelihood of their participation
- ❑ They desire written information and interaction with account representatives about default CPP and technical assistance from the utility