Smart Grid and Climate Change
Michael Hoover, Senior Director, State Regulatory Affairs
Agenda

• Overview

• Climate Policy in California – Now and Then

• SCE’s Demand Response Portfolio Overview

• Demand Response – Market Integration

• Overview of Regulatory Proceedings/Path Forward
Overview – Key Points

• Current legislation and CPUC policy are focused on GHG reduction

• SCE’s efforts through grid modernization and “Distributed Energy Resources” support achieving California’s overall policy
  – Grid modernization efforts will enhance the ability to integrate Distributed Energy Resources (DERs)
  – SCE’s demand response programs are a type of DER and are being integrated into the wholesale market

• Numerous proceedings in California are underway to advance these efforts

• Achieving the State’s climate goals requires a broader recognition of DERs
Climate Policy in California – Now and Then

• AB32 created a GHG Goal for the State
  – Return to 1990 levels by 2020

• Regulators relied upon Renewable Generation, markets (Cap-and-Trade), mandates to achieve AB32 vision

• Governor Brown’s Executive orders sketch out the path post-2020
  – 40% below 1990 levels by 2030, and 80% below by 2050
  – 50% Renewables, 50% increase in building EE

• SB350 enshrines much of the Governor’s post-2020 vision in legislation, and more
  – Creates an Integrated Resources Planning process
  – Permanent role for utilities in Transportation Electrification
DERs and Grid Modernization May Enhance System Reliability and Safety

• Potential enhanced grid capabilities that can be achieved from DERs, coupled with grid modernization investments include:
  – Support grid reliability during system problems by providing power to the grid during significant voltage and frequency variations
  – Local voltage support
  – Microgrids

• Potential grid modernization and grid reinforcement solutions are needed to enable these enhanced grid capabilities.
  – Communications needed to fully integrate DERs
  – Grid Reinforcement for resiliency
  – Modernization of protection relays
  – Mitigation of cybersecurity risks
## SCE Demand Response Portfolio Overview

<table>
<thead>
<tr>
<th>Approx. Load Impact* (MW)</th>
<th>Program Design</th>
</tr>
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<tbody>
<tr>
<td><strong>Commercial &amp; Industrial Customers</strong></td>
<td></td>
</tr>
<tr>
<td>Base Interruptible Program</td>
<td>660</td>
</tr>
<tr>
<td>Agricultural Pumping &amp; Interruptible</td>
<td>60</td>
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<tr>
<td>Demand Bidding Program</td>
<td>110</td>
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<tr>
<td>Critical Peak Pricing</td>
<td>25</td>
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<tr>
<td>Aggregator Managed</td>
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<td>Summer Discount Plan</td>
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<tr>
<td><strong>Residential Customers</strong></td>
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<tr>
<td>Summer Discount Plan</td>
<td>295</td>
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<tr>
<td>Peak Time Rebate</td>
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</table>

*Approximate MW Load Impact using 2014 Ex Ante Load Impact Tables for an August monthly peak, 1-in-2 weather year.
Demand Response – Market Integration

Regulatory Directives

- The California Public Utilities Commission (CPUC) has required California utilities to integrate their DR programs as resources available for dispatch in the CAISO wholesale energy market.
- Per Decision D.14-12-024, programs that are not integrated by January 1, 2018 could be subjected to devaluation and operational constraints.

Policy Rationale

- Treat DR more like a true “resource” that both responds to market signals and provides information to the market.
- Increase CAISO visibility to available and utilized DR resources.
- Subject DR to higher operational and performance requirements so it can better meet future grid needs from renewable integration, ramping periods, increased storage, etc.

Current Status

- As of July 2015, SCE completed the integration of approximately 90% (1,100 MW) of its DR portfolio.

Customer Impact

- Should be minimal, as programs are still dispatched according to the same criteria.
Overview of Regulatory Proceedings/Path Forward

• Distribution Resources Plan OIR (DRP)
  – AB 327 required utilities to submit a DRP by July 1, 2015
  – DRP OIR will delineate the distribution system needs and how those needs can be optimally provided by DERs
  – DRP OIR underway, proceeding schedule to be issued 4Q 2015

• Integrated Distributed Energy Resources OIR (IDER)
  – Develop a framework to determine how the DERs could be sourced
  – Determine how to implement mechanisms proposed in DRPs
  – IDER to be handled in two phases. CPUC Decision pending to finalize scope.

• SB 350 and SB 802
  – SB 350 creates an Integrated Resources Plan process
  – AB 802 provides utilities incentives to bring buildings up to code
  – Additional regulatory proceedings to be initiated to implement goals
Appendix
SCE’s Vision for a 21st Century Power System
Grid Modernization Investment Plan

• To meet the Commission’s objectives, SCE plans to begin foundational grid modernization investments immediately
  
  – Investments to increase distribution grid capacity and resiliency for DERs in some areas
  
  – Integrated grid technologies necessary for the 21st century power system
  
  – Broad deployment over a number of years beginning with foundational and enabling deployment of tools, applications, and grid devices
Grid Modernization Requirements

Capabilities

- Expedient Interconnection Processing
- Increased Situational Awareness
- Accurate Forecasting and Planning
- Greater Interaction with and Control of DERs
- Distribution and Substation Automation
- Communication Services & Interoperability
- Technology Platforms and Applications
- Grid Reinforcement

Investments

Enabled By

<table>
<thead>
<tr>
<th>People Strategy</th>
<th>Business Processes</th>
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</thead>
<tbody>
<tr>
<td>• Increased manpower</td>
<td>• Work Management &amp; logistics</td>
</tr>
<tr>
<td>• New skill sets</td>
<td>• Evaluation of processes for suitability</td>
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<td>• Training process</td>
<td>• Design Standards moving forward</td>
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<td>• Procurement &amp; Planning Integration</td>
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## Integration Status of SCE’s Demand Response Portfolio

<table>
<thead>
<tr>
<th>Demand Response Program/Contract</th>
<th>Integration Status</th>
<th>Customers (Aug. 2015)</th>
<th>Customer Class</th>
<th>MW (approx.)</th>
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<tbody>
<tr>
<td>Base Interruptible Program</td>
<td>Real-Time Reliability Energy</td>
<td>611</td>
<td>Non-Res</td>
<td>590</td>
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<tr>
<td>Ag Pumping &amp; Interruptible</td>
<td>Real-Time Reliability Energy</td>
<td>1,224</td>
<td>Non-Res</td>
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<td>Capacity Bidding Program</td>
<td>Day Ahead Economic Energy</td>
<td>838</td>
<td>Non-Res</td>
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<tr>
<td>Aggregator Managed Portfolio</td>
<td>Day Ahead Economic Energy</td>
<td>1,266</td>
<td>Non-Res</td>
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<td><strong>Total Integrated MW (aka Supply Resource DR)</strong></td>
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<tr>
<td>Critical Peak Pricing</td>
<td>Not Integrated</td>
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<td>Res</td>
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<td>Demand Bidding</td>
<td>Not Integrated</td>
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<td>Non-Res</td>
<td>5*</td>
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<tr>
<td><strong>Total Non-Integrated MW (aka Load-Modifying DR)</strong></td>
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<td><strong>65</strong></td>
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<td></td>
</tr>
</tbody>
</table>

*Due to BIP/DBP dual participation, approximately 95% of DBP’s 100 MW load impact is integrated under BIP.*