Distributed Generation and DER Management: Market Perspective

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Scale of CA Challenge Over Next 10 years

Shift in Resource Mix and Location is Increasing Variability Requiring System Flexibility and More Tightly Coupling of T&D

- ~50 GW System Peak
- AB 32 GHG Requirements to 1990 levels
- 16+ GWs of load center generation shutdown due to retirements
- Increase in RPS from 33% to 50% RPS?
- Zero Net Energy Building Codes
- 12 GWs of Distributed Generation
- 2+ GWs of Storage
- 3 GWs of Demand Response
- 1.5 million Zero Emission Vehicles
What Do We Want to Achieve?

Distribution system and related operations is being asked to address changing customer expectations and an increasing range of policy objectives. These objectives lead to a wide range of potential distribution system qualities that are driving the need for integration, not disaggregation.
Fundamental change is needed in distribution processes and practices related to *Planning, Design* and *Operations* to integrate and benefit from DER at scale.

How are We Going to Execute?

Each aspect involves utilizing new technology to assess, build and operate a more distributed power system.
Planning: What Are We Seeking to Optimize?

- Scenario-Driven Integrated Planning Analysis Framework
  - Clarify Value Maximization or Cost Minimization
  - Reconcile locational benefits with system benefits
- Standardized methodology and tools for distribution planning
  - Engineering models and tools should address all relevant power system characteristics and dynamics for a well defined distribution area and inter-related local transmission system consistent with best practice
- Qualified access to grid asset and operational planning data
- Integrated Multi-stakeholder Distribution Planning Process
Design for the Future

- Evolve grid to an open network
  - Create a node-friendly distribution network that is open, visible, flexible, reliable, resilient and safe
  - Incorporate full operational risk mitigation considerations into physical designs and protection and control systems leveraging DER/microgrid

- Modular designs & distributed architecture
  - Leverage systems engineering methods to create more modular design to address differences in technology lifecycles to mitigate stranded costs
  - Employ distributed architecture for operational systems to address scale issues involving integration of edge devices

- Align deployment timing with customer and policy needs
- Align utility technology adoption
Operations: Distribution System Operator

• Provide safe and reliable distribution service
  • Define minimal utility DSO functional related responsibility and accountability for physical operations of a local distribution area
  • DSO should provide T-D Interface reliability coordination with ISO for a local distribution area.
  • DSO should provide physical coordination with the TSO for energy transaction across the T-D interface.
• Provide neutral marketplace coordination
• Situational awareness and operational information exchange
  • Operational information and communication standards are needed for “plug and play” DER integration
  • DSO operational system architecture and related requirements should be developed to guide implementation
  • T-D operational information interface requirements should be assessed current ISO protocols and standards
• Avoid conflicts of interest through functional separation
DER Services: Realizing the Value

• Fully address DER participation in wholesale markets and resource adequacy

• Unbundle distribution grid operational services
  • Identification and prioritization of differentiated distribution grid operational services should fully support grid operations, asset utilization, capital investment and meet policy requirements
  • Definition of service performance characteristics and related performance requirements should use technology neutral methods

• Transparent DER value identification and monetization
  • Distribution services value identification and monetization methods should provide reasonable results for all stakeholders including net benefits for ratepayers.
  • Distribution tariffs and/or procurements for flexible DER should be fully expanded to enable DER to support grid operations.

• Open access and low barriers to DER participation
  • The cost of integrating flexible DER should not be a barrier to participation. Alternative solutions should be considered.
  • Transaction processes including scheduling, verification and settlement should not be a barrier to participation.