Nevada Committee on Energy Choice

Technical Working Group on Innovation, Technology and Renewable Energy Industries

Grid Infrastructure and Distributed Energy Resources

Phil Pettingill, Director, Regional Integration

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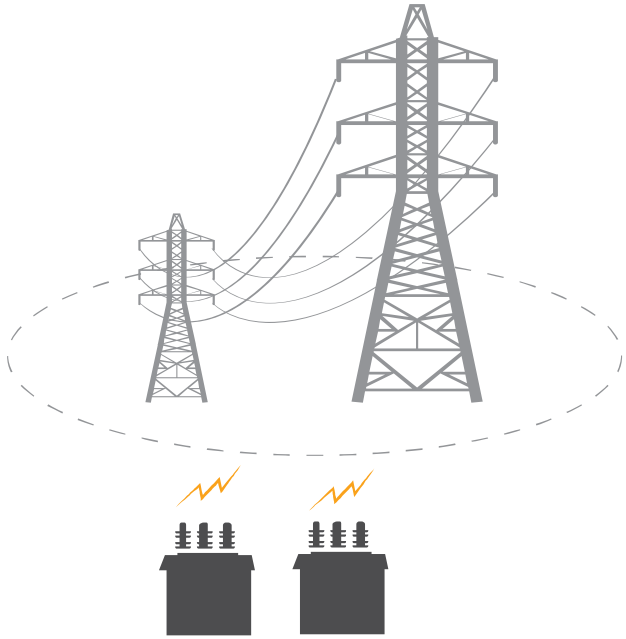
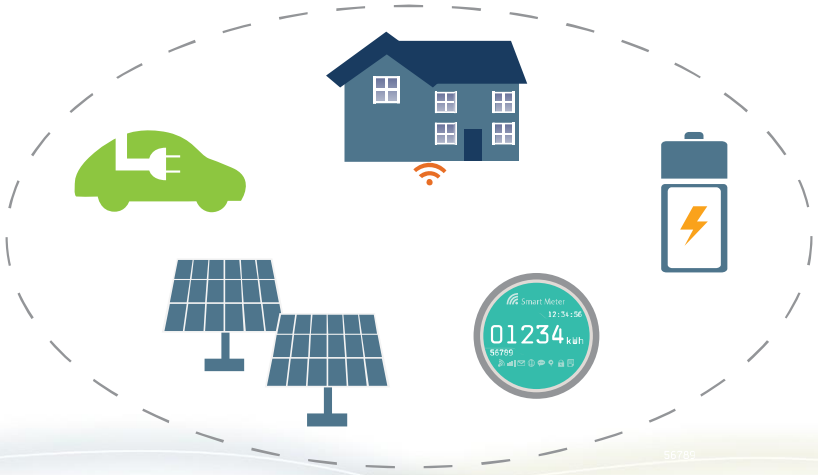
DERs are located on the distribution side of the bulk electric system.

- The ISO operates resources on the transmission grid.



- Distribution operators are responsible for DERs below the T-D interface.



What is a Distributed Energy Resource?

- Distributed energy resources (DERs), are any resources connected on the distribution level, customer side or utility side of the customer meter.

- Some technology types of DERs can include:
  - Rooftop solar, energy storage, plug-in electric vehicles, and demand response.

Distribution connected resources are becoming an increasingly important part of the CAISO energy resource mix

- The increasing number of DERs are due to…
  - DER technology becoming more cost effective for residential customers
  - A shift to renewable energy resources and away from convention fossil-fuel generation at all scales of the electric industry

The ISO established the DER provider as a new type of market participant in 2015

- The DER provider owns or operates DERs that are able to fully participate in the ISO market.

- DERs can also participate in the ISO market through two models.
  - Demand response resource
  - Non-generator resource (NGR)

DER providers can aggregate a variety of distribution connected resources to the ISO market.

- DERs in an aggregation can be connected…
  - In front of the end-use customer meter, or
  - Behind the end-use customer meter, with an additional meter on the DER

- These options open a pathway for DERs to aggregate and meet the ISO's .5 MW minimum participation requirement

DERs participate in the ISO market as a demand response or non-generator resource

- Demand response is the direct participation of load reduction as a supply resource in the market
  - Can participate under two models:
    - Proxy Demand Response (PDR)
    - Reliability Demand Response Resource (RDRR)

- Non-Generator Resource (NGR) allows for the participation of energy storage resources
  - e.g. flywheel, lithium ion battery, electric vehicles, pumped hydro, and etc.

Facilitating DERs - Some examples for the local Public Utility Commission

- Broadened consumer protection rules
- Universal regulatory obligations on all LSEs
  - state policies, rate policies (NEM), provider of last resort
- Establish short and long-term adequacy obligations on all LSEs in alignment with reliability needs and state policy goals
- New interconnection rules and procedures, including DER
  - wholesale distribution access tariffs
- Access to customer information with confidentiality
  - enable DER providers to assess investments that make sense

Appendix

- Additional Details to follow

NGRs have the capability to serve as both generation and load.

- NGRs are able to operate similar to any generating resource in the ISO market
  - offer all market services
  - bid in both the day-ahead and real-time market

- Key benefits of NGR model:
  - Seamless bid from load to generation and back
  - Management of the state of charge (SOC) by either the ISO or the resource owner

PDRs are resources that offers economic bids for load reduction but is recognized like any other generator

- Can economically bid into both the day-ahead and real-time market

- Can provide the following market services:
  - Energy
  - AS non-spinning/ spinning
  - Residual Unit Commitment (RUC)

RDRRs are emergency response reliability resources.

- RDRRs can only economically bid in to the day-ahead market.
  - Offer uncommitted capacity and respond to a reliability event for the delivery of “reliability energy” in real-time.

- Unlike PDR, RDRR cannot economically bid in the real-time market and offer any other service such as A/S.