Estimating Distribution Costs and Benefits of DERs in IRP

Recap of May MAG Presentation

CPUC Energy Division

June 29, 2018

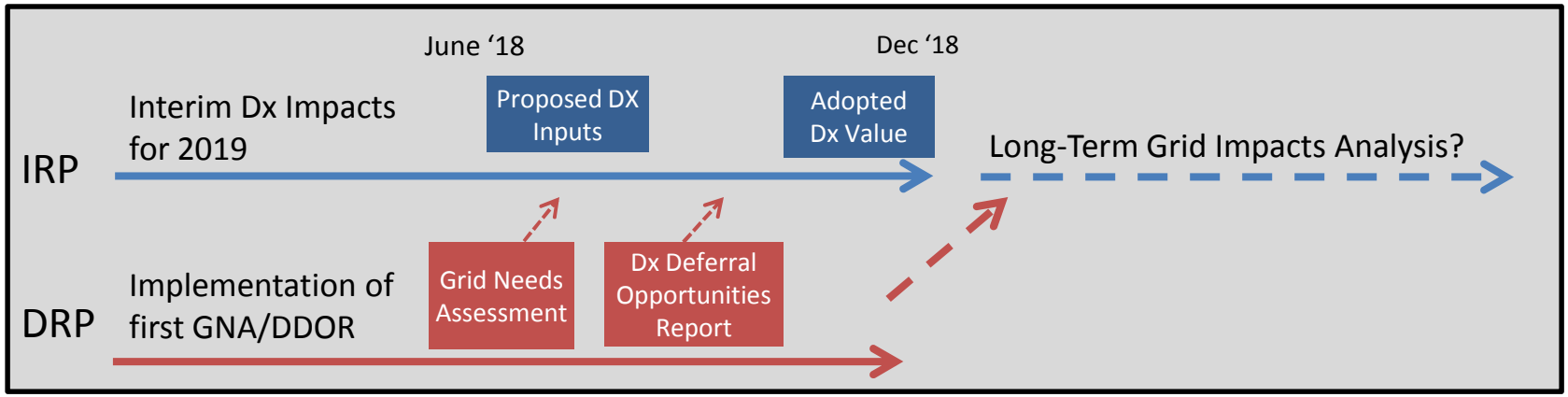
Proposed Approach to Develop Location-Specific Distribution Impact Values

- To optimize DERs in 2019, staff proposes to integrate location-specific distribution (Dx) impacts in IRP analysis
  - Dx Impacts = location specific DER integration costs + avoided costs of distribution
- These costs and benefits can vary significantly based on location and depend on load growth/associated DER resource mix forecasted to occur
- Distribution Resource Planning (DRP) Proceeding has adopted a framework and analytical tools in order to:
  - Identify potential distribution upgrade projects that could be deferred by DERs
  - Determine the avoided costs of the deferral opportunities
- DRP planning tools can recommend quantities (MW) of incremental DERs and associated avoided distribution system costs for IRP to include as an input in modeling candidate resources

2019 IRP proposes to use best data currently available from DRP for Dx inputs

- Results from DRP planning tools could provide Dx inputs for IRP (price and MW values) on an interim basis
- IRP schedule for 2019 Reference System Plan (RSP) to vet Dx input methods and values via the MAG process so they can be addressed in the formal record by the end of 2018
- Staff recommend that the 2019 RSP conduct sensitivities to evaluate whether avoided distribution costs materially affect the economically optimal amount of DERs
  - If so, then changes to existing tools and methods may be needed to create a more granular successor to interim approach

IRP Interim Approach for 2019 Reference Plan & Possible Future Analysis

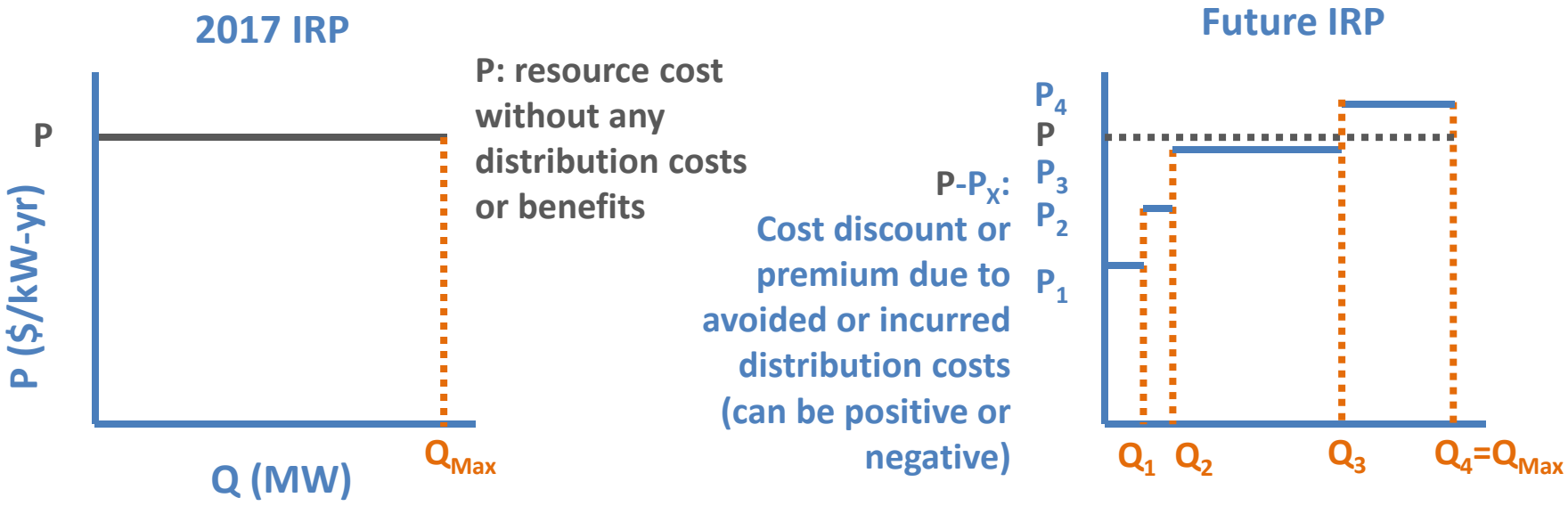


Developing DER Supply Curves in IRP

In order to optimize DERs, DER supply curves should capture the range of distribution impacts based on location

2017 IRP did not consider distribution system costs and benefits

Capacity expansion modeling in future IRP cycles can include distribution system costs and benefits

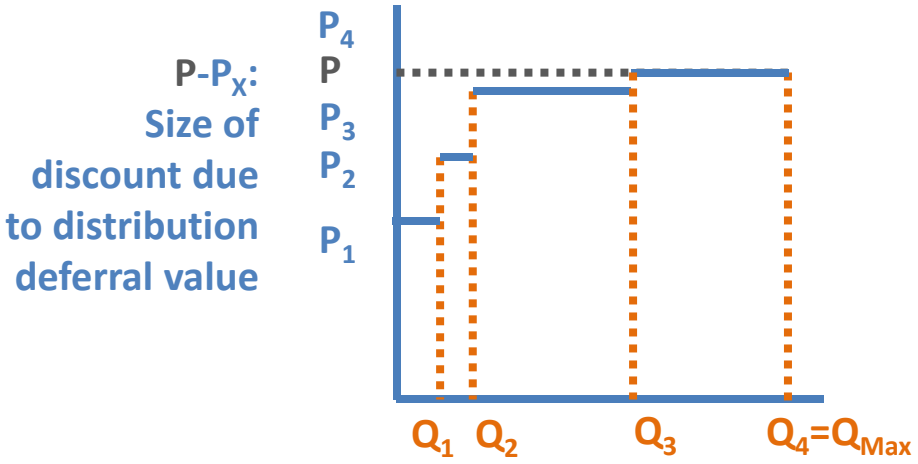


Deferral Value Considerations to Address in Supply Curve Modeling

- DERs should receive value based on their ability to avoid distribution capacity
- Avoided distribution value depends on:
  - Projected evolution of distribution capacity needs (2018-2030+)
    - Needs are dependent on policy assumptions and baseline DER resources
  - Timing of DER installation relative to upgrade needs
    - To receive value, DER must be installed before upgrade is triggered
  - Coincidence of DER production and consumption (8760) with distribution system needs
  - Ability of DERs to effectively target high value areas
- Note - Some DERs may impose costs on the distribution system

Quantifying deferral opportunities

- Goal: Estimate value and variation of distribution avoided cost across entire CAISO system
  - Conceptually, goal is to estimate the fraction of distribution system infrastructure in need of capacity upgrades (Q), and the value of deferring upgrades (P)
- DERs in RESOLVE will compete for areas with high deferral value



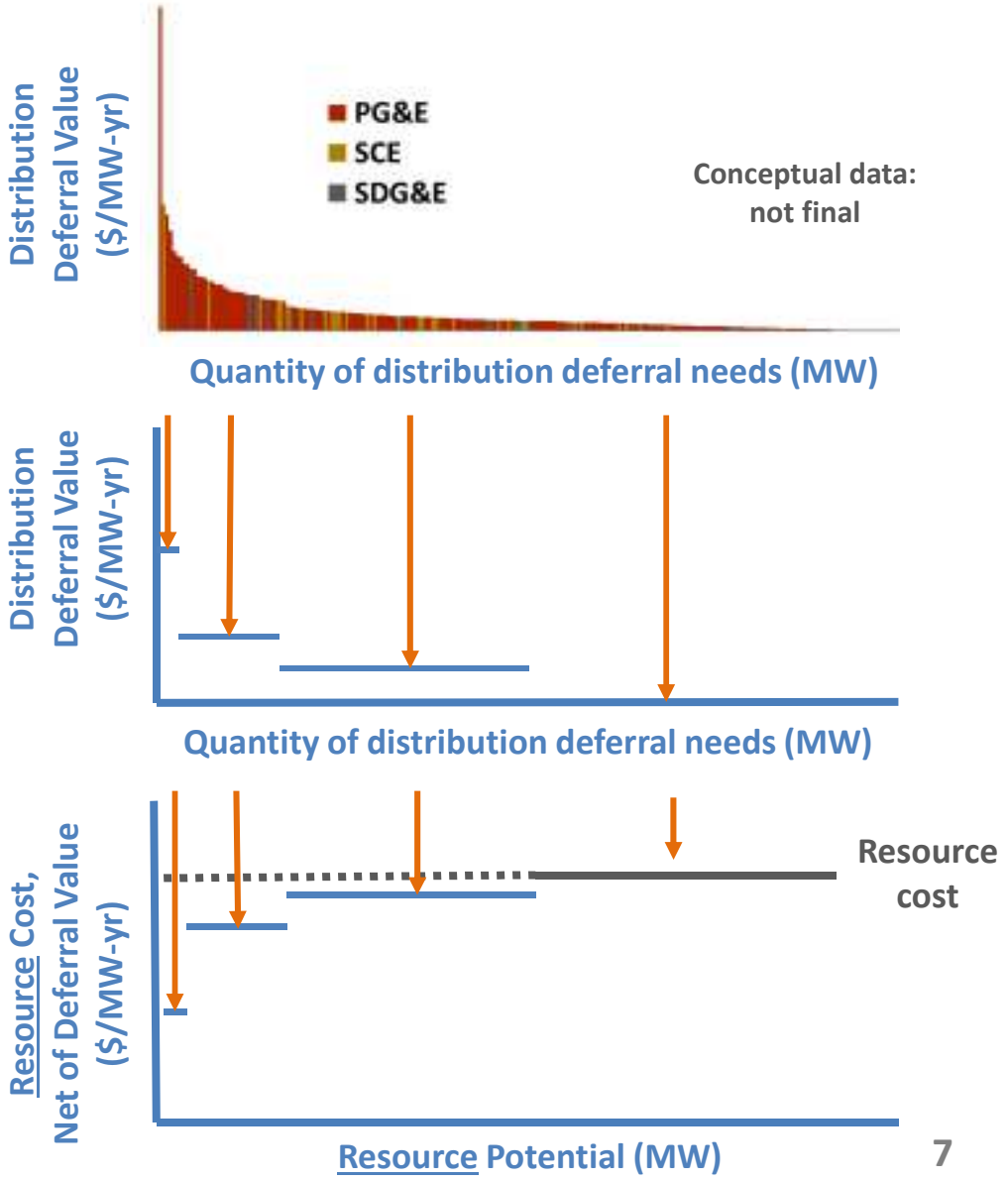
P-Q Data Flow from DRP into RESOLVE Supply Curves

Distribution system data will be used to create detailed supply curve

Simplify detailed supply curve for RESOLVE

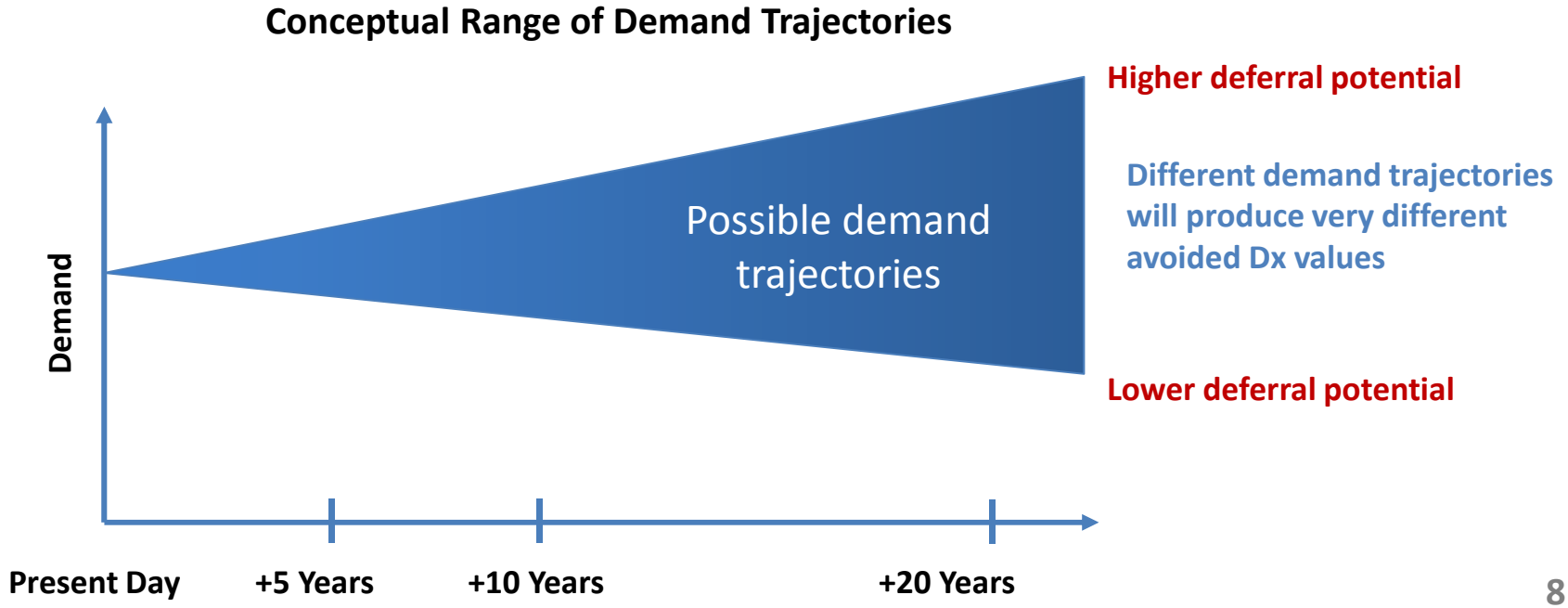
Relate deferral needs to resource capabilities

Deferral value only captured if deferral need is not filled by other resources



Deferral Potential Depends on Load Forecast

- Challenge: Dx impacts areas not well understood in a high EV/PV/DER future because existing DRP analysis is based on the current demand forecast
- Scale of potential distribution deferral impacts depend on whether load is increasing or declining
- To calculate avoided Dx costs for DERs as candidate resources, the DERs would need to be removed from the forecast to identify system deficiencies that DER growth is mitigating
- In this MAG, IOUs will propose an interim approach to calculate the P & Q



Next Steps

- Informal Review of Distribution Impacts in 2019
  - IOUs to present proposal for using DRP inputs as data source for Dx Impacts
  - ED to request informal comments on proposal presented in the May and June MAG
- Formal Review via IRP Ruling
  - Release of 2019-2020 IRP Assumptions via Ruling (anticipated in Q3 2018) for formal party comment
- Distribution Impacts Analysis for 2020 or 2021
  - If more detailed analysis is determined to be necessary, additional methodology development and vetting may occur in time to inform the 2020 Preferred System Plan