Locational Value

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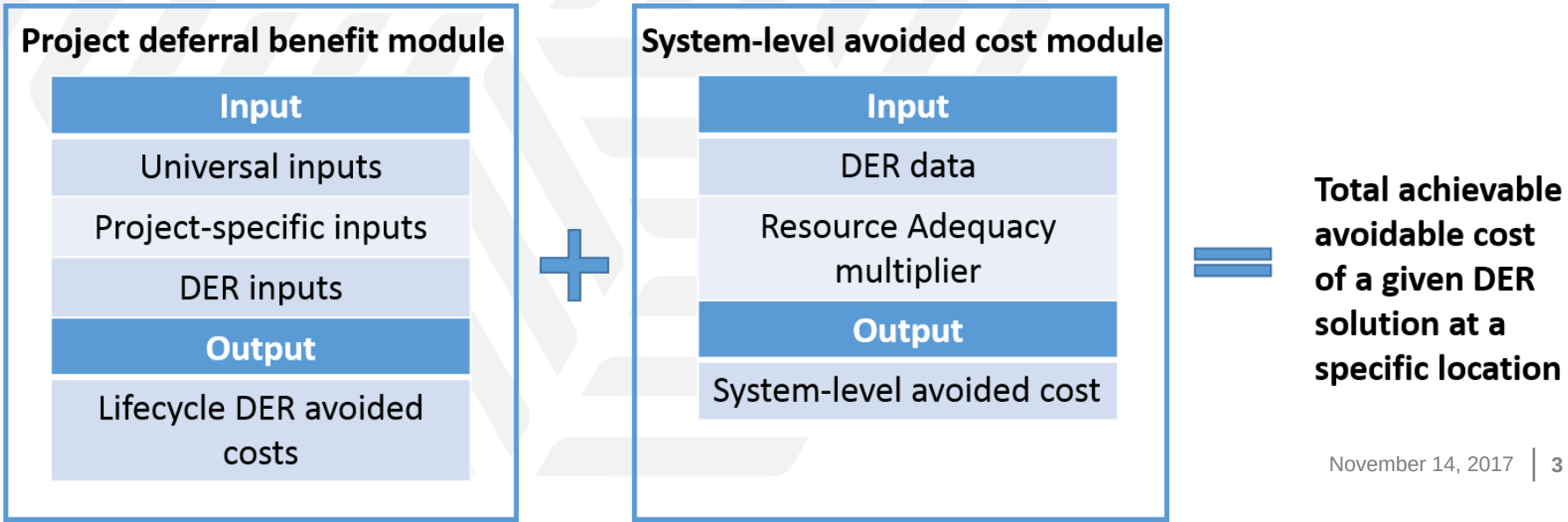
Desired outcomes

- Locational value analysis is a new and emerging field of study
- California and New York are actively engaged in this area
- Understanding Hawai'i context re: locational value is important
- There are multiple options for achieving location-specific desired outcomes
- Suggest using an evolutionary process - start with greatest value and simplest application and grow from there

Context

- California Distribution System Planning
  - Original legislation required:
    - "Evaluate locational benefits and costs of distributed resources on the distribution system"
  - The Commission directed utilities to use a two part methodology
    - System-level avoided costs which estimates the system-level avoided costs given a user-defined DER solution calculated through E3's DER Avoided Cost Calculator
    - Project deferral benefits which calculates the values of deferring a specific capital project



California Competitive Solicitation Working Group

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- Approved valuation components for distribution grid service competitive solicitations
  - **Quantitative Factors -** net market value, resource adequacy value, energy value benefit, ancillary services value benefit, renewables portfolio standard benefit, reduced greenhouse gas emissions benefit, renewable integration cost/reduced cost benefit, distribution deferral value, transmission deferral value, and contract payments cost
  - **Qualitative Factors,** including project viability, voltage and other power quality services, equipment life extensions, societal net benefits, and other factors such as supplier diversity, counterparty concentration, site diversity, and technology/end-use directory to help market transformation.

New York

- Through the Value Stack Tariff proceeding, demand relief values were calculated and Locational Specific Relief Value (LSRV) zones identified
- Payments to be made to DER projects based on energy, capacity, environmental, demand reduction and locational system relief value
- Hosting capacity maps for all circuits ≥12 kV by 10/1/17
- Future:
  - Updated marginal cost of service studies – (identify the cost of providing service to each rate class as a function of load and service characteristics)

New York PSC Approved Value Components for Value Stack Tariff

Component	Calculation based on
Energy value	Day-ahead hourly Locational Based Marginal Price (LBMP) grossed up for losses
Capacity value – market value	Monthly NYISO auction price
Capacity value – out of market value	The difference between the market value and the total generating capacity payments made to Value Stack customers
Environmental value – market value	Higher of Tier 1 REC price per kWh, or social cost of Carbon per kWh less Regional Greenhouse Gas Initiative (RGGI); customers who want to retain RECs will not receive compensation
Environmental value – out of market value	Difference between compensation and market will be recovered from customers within the same service class as the customers receiving benefits from the DER
Demand reduction value	Compensation based on eligible DER performance during 10 highest usage hours at $ per kw-year value
Locational system relief value	Static rate per kW-year value applied to net injected kW
Market transition credit	Static rate per kWh applied to net injected kWh; steps down by tranche

The Hawai'i context

- Areas of particular interest for Hawai'i where location-specific solutions could provide great value:
  - Increasing circuit hosting capacity for solar PV
  - Managing short-term volatility (Ex: from cloud passing over solar PV)
  - Mitigating extreme load and supply profiles throughout the day with higher percentages of renewable generation (the “duck curve” phenomenon in CA)
    - Specifically, shift supply from the middle of the day to the peak hours of the afternoon or net peak hours after solar production declines
    - This is really the key service Hawai'i needs to address; not typically considered as an ancillary service
- Areas of lesser importance for Hawai'i from a DER locational value perspective:
  - Addressing new load from load growth (Load growth in Hawai'i is relatively flat)
  - Ongoing infrastructure replacements (not typically good candidates for non-wires alternatives)

Options for meeting needs

- So, if Hawai'i's specific needs are to a) increase circuit hosting capacity, b) manage short-term volatility, and c) mitigate extreme load profiles, what are options for doing that?
  - Option 1: Utilize one or all of the **3 P's** – open competitive procurements, pricing and programs
  - Option 2: Achieve some of desired ends through **mandates** - contractual interconnection agreements or tariff requirements
  - Option 3: Identify grid needs to achieve goals and characterize the providing of the grid needs as **core infrastructure** to be provided by the utility
    - In core infrastructure determinations, cost metric changes to least-cost, best-fit
    - In this approach, comprehensive, detailed, and transparent planning is increasingly necessary to ensure core infrastructure investments are needed and made in the best interests of customers and the system
  - Option 4: **Quantify all grid services provided by DERs** – ID grid services, parse them apart, establish locational value for each (relative to the specific needs) and provide compensation for value provided through a tariff or market framework

Market evolution*

- Good to start with the greatest need and simplest application and move from there
- Start with most largest and most tangible value potential first
- Characterization of unbundled distribution services not likely the best place to start due to complexity, transaction costs and supporting infrastructure requirements (communications, controls, etc.)
- Many consider non-wires alternatives (NWAs) to traditional investments the low-hanging fruit. NWAs can be secured through the three Ps - open competitive procurements, pricing, and programs.
- Near-term, low-hanging fruit solutions should not preclude more complex and higher level solutions over time – should support a sequential and iterative process that allows for next evolution solutions as the need arises.

*From De Martini P. (Resnick Institute, Caltech), D. Murdock (ICF), B. Chew (ICF), S. Fine (ICF). Evolving Distribution Operational Markets. 2017.

Summary

- Focus on needs/problems to solve and let solutions arise from there
- Hawai'i specific needs include:
  a) Increase circuit hosting capacity to accommodate solar PV,
  b) Manage short-term volatility
  c) Mitigate extreme load profiles
- Take an evolutionary approach - Start small and then expand
- Consider alternative mechanisms to achieve desired outcomes
- Open and transparent stakeholder engagement process is important

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Thanks!

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