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Making Clean Local Energy Accessible Now

Storage Bid Evaluation Protocols

Role of CEP, Quantifiable Benefits

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Role of the Consistent Evaluation Protocol (CEP)

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The Consistent Evaluation Protocol (CEP) should enable the Commission to objectively evaluate any utility's claim that it is appropriate to defer its storage procurement target due to the lack of cost-effective bids.

- If a utility requests a deferral of its procurement target, the Commission should be able to compare the utility's evaluation of the cost-effectiveness of the bids against the CEP's Net Market Value evaluation of cost-effectiveness.

- However, the CEP Net Market Value tool currently does not include enough of the quantifiable benefits of storage to be used for this purpose.

The Clean Coalition recommends including all quantifiable benefits of storage in the Net Market Value tool, including many of the benefits listed in the Qualitative section.

- This presentation will focus on Locational Values and Voltage Support.

Locational Values

Distribution investment deferral was the only locational value input included in the proposed Net Market Value tool.

Net Market Value should also include the following quantifiable locational benefits:

- Avoided line losses and congestion costs

  System loss factors were listed as CEP publicly available inputs

  Congestion costs are part of utility Least Cost Best Fit calculations

- Transmission investment deferral or avoidance value

  This value should be determined through T&D planning process

  Has been calculated by utilities such as PSEG Long Island (f/k/a LIPA), found local solar could avoid a $84 million dollar transmission investment, so a 7 cent per kWh adder for 40 MW local solar in specific locations would result in net $60 million ratepayer savings

California Distribution Resources Plans (AB 327)

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The utilities' Distribution Resources Plans should provide sufficient data for the Net Market Value tool to estimate the transmission upgrade deferral/avoidance value.

AB 327 requires California investor owned utilities to proactively plan for distributed energy resources, and guide these resources to optimal locations on the grid.

Section 769 of the Public Utilities Code:

- By July 1, 2015, each regulated utility shall submit to the CPUC a proposed distribution resources plan to identify optimal locations for the deployment of distributed energy resources.
- Each plan must "evaluate locational benefits and costs" of distributed energy resources to the electric grid and ratepayers.
- Propose methods to maximize locational benefits and minimize costs of distributed energy resources in existing programs.
- Propose utility spending to integrate cost-effective distributed energy resources into distribution planning, with the goal of yielding net benefits to ratepayers.

Potential Transmission Savings for CA

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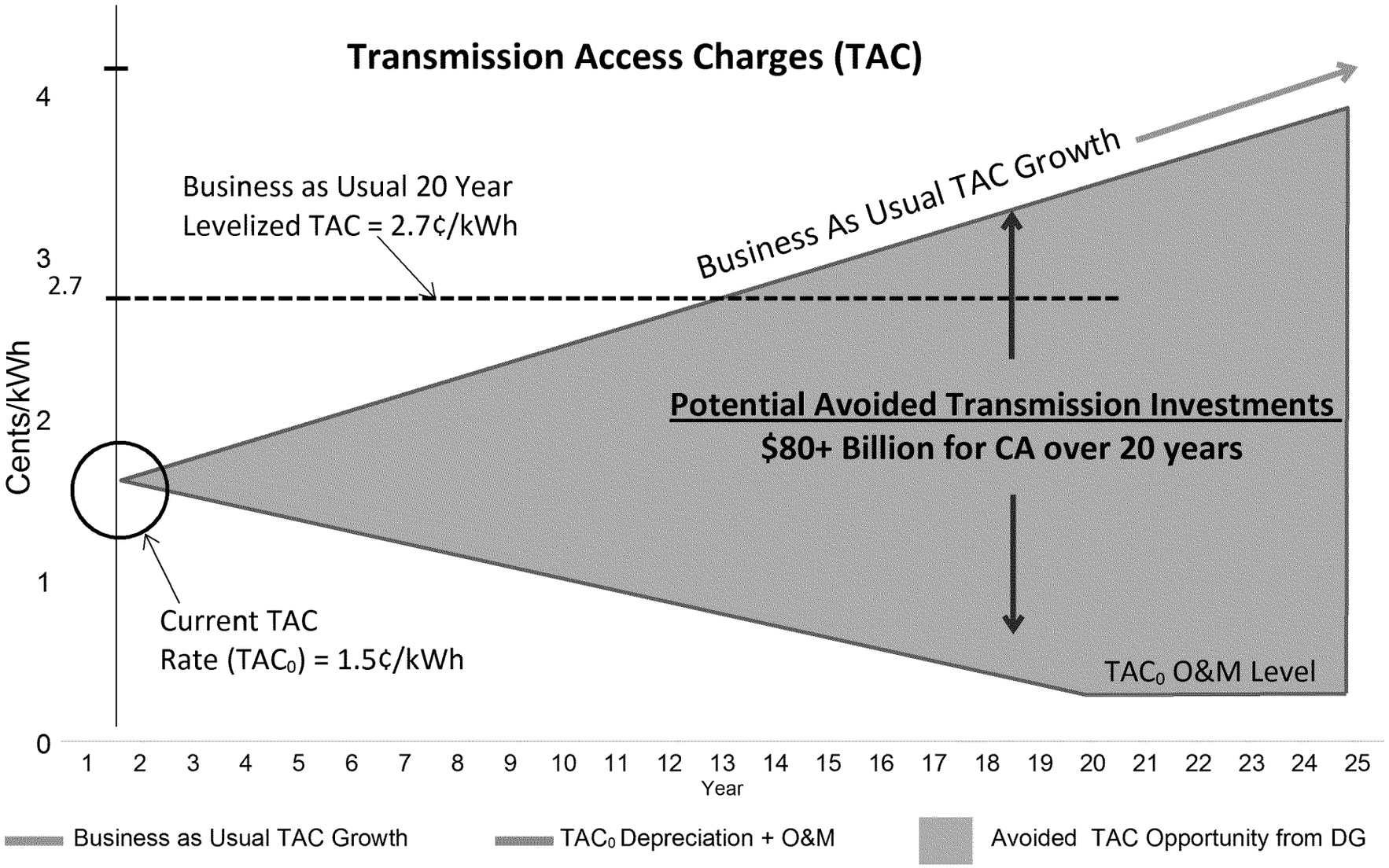

Optimizing Grid Investments

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Calculating the optimal level of avoided transmission investments is an essential step for complying with the intent of AB 327 to maximize ratepayer savings based on locational value of distributed energy resources.

- Distribution Resources Plans should include the optimal uses, amounts and locations for storage to avoid or defer transmission investments.

- Plans should determine the most cost-effective balance between local and remote resources, after accounting for avoided or deferred transmission costs for addressing transmission constraints or remote renewable generation.

- Utilities should procure distribution storage in alignment with the Distribution Resources Plan and the Storage Procurement Targets

- Distribution level storage should be assigned a proportionate share of the avoided or deferred costs of transmission, based on an average value per unit of capacity.

Voltage Support Benefits

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Energy storage with advanced inverters can provide voltage support services:

- Increase grid resilience and reliability by providing reactive power where it is needed most during a contingency, e.g. when a transmission path is lost

- Integrate higher levels of intermittent distributed renewable generation by smoothing out voltage fluctuations

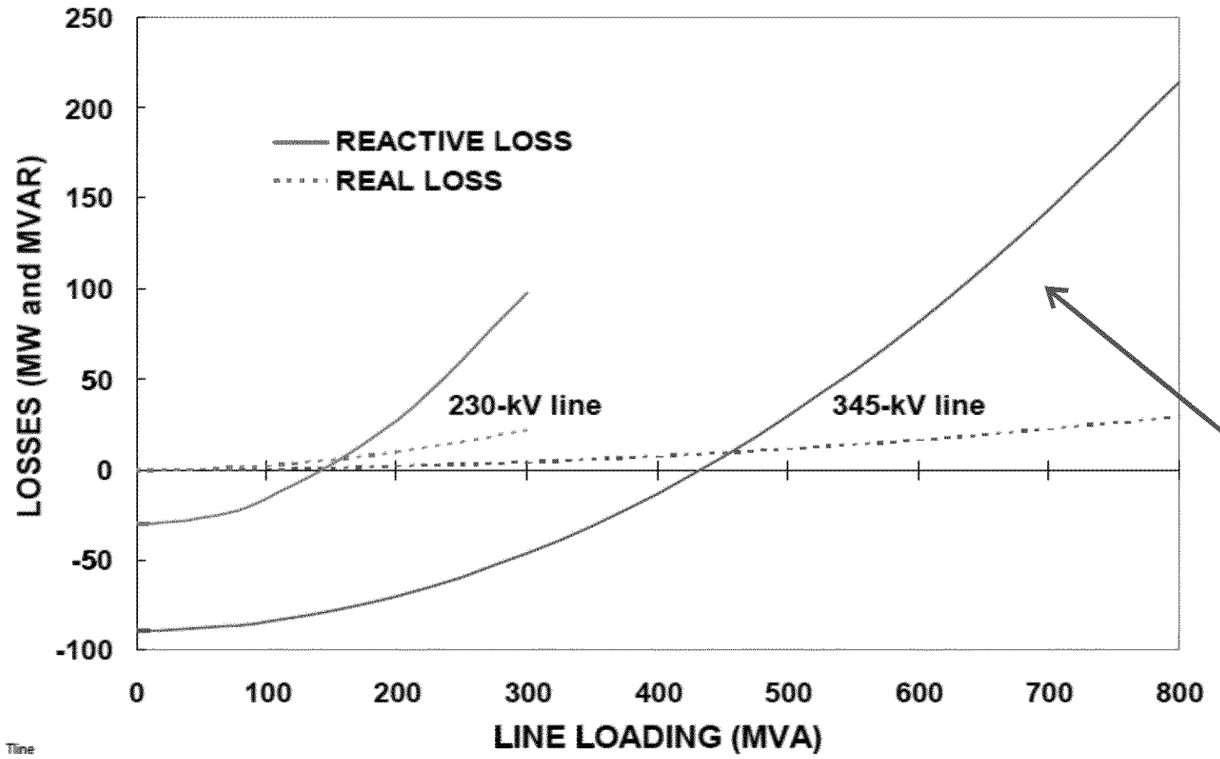
- Enable conservation voltage reductions by maintaining consistent voltage levels along feeder lines, allowing operators to reduce average voltage

While it may be impractical for the Net Market Value tool to calculate the value of such services for each individual bid, the Net Market Value tool should include estimates of the average avoided costs of providing such services with other voltage support resources, such as capacitor banks.

Location Matters – Distributed Voltage Regulation

"The old adage is that reactive power does not travel well."

Oak Ridge National Laboratory (2008)



***Prevent Blackouts*:** When a transmission path is lost, remaining lines are heavily loaded.

T&D lines absorb far more reactive power than real power when heavily loaded.

Figure 1-1. Transmission line absorption of reactive power.

Source: Oak Ridge National Laboratory (2008)

Storage + Advanced Inverters Reduce Variability

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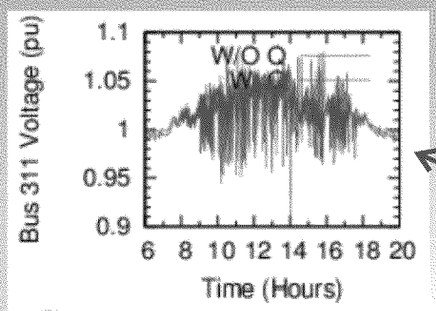
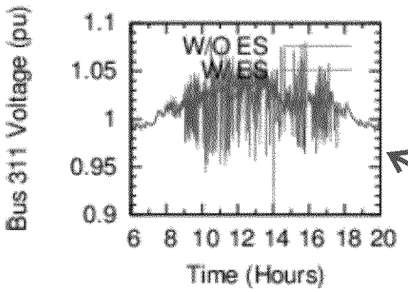
PV Intermittency Mitigation Based Upon Modeling with Smart Inverters

SDGE connected — A Sempra Energy utility



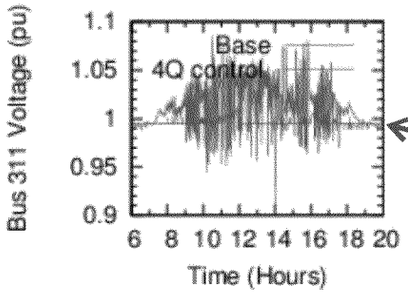
With and without dynamic VAr device

Advanced Inverters (reactive power)



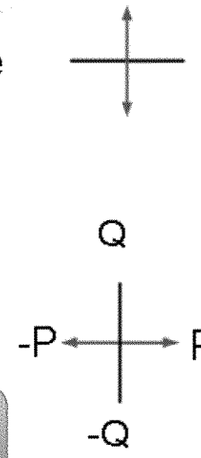
With and without energy storage

Energy Storage (only using real power)



With and without storage and 4 quadrant control

Advanced Inverters + Energy Storage Combined



Red = With Blue = Without

Conservation Voltage Reduction

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