Evaluation of Storage Offers

Redacted

Energy Policy Modeling and Analysis

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PG&E ®

PG&E Utility-Specific Evaluation

Quantitative Criteria

Portfolio Adjusted Value (PAV) =

Net Market Value (NMV) Benefits minus Costs

+ Adjustments for Localized Benefits, Portfolio Fit

Qualitative Criteria

- Project Viability and other criteria

Ranked Shortlisted Offers

- Based on PAV and qualitative criteria

Net Market Value

Co-optimize Energy, A/S, Variable Cost => Charging/Discharging

+ Net Energy Value

- Value of discharging – cost of charging using projected LMP

+ Ancillary Services Value

- Regulation Up/Down/REM, Spin in a limited market

+ Capacity Value

- Generic Resource Adequacy using Net Qualifying Capacity
- Flexible RA using Effective Flexible Capacity

- Variable Cost

- Variable O&M price applied over *discharge* schedule
- Includes fuel and start-up costs plus GMC, but not charging cost

- Fixed Cost

- Sum of capacity payment price times monthly contract capacity
- Fixed overhead (administrative costs plus cost of CAISO scheduling)

Quantitative Adjustments => PAV

Adjustments for Localized Benefits and Portfolio Effects

+/- Location

- Preference for NP15 projects
- Local Capacity Requirement may warrant premium

- Transmission Network Upgrade Cost

- This is past first point of interconnection; cost to interconnect in bid

+ Transmission/Distribution Investment Deferral Value

- NPV of least expensive non-storage alternative
- If dual-use, meet reliability need first, remaining hours play in market

+ Increased Efficiency for Fossil Generation

- Value to smoothing out net load => fewer starts, better efficiency
- Portfolio-wide benefit, will probably depend on generic characteristics

+ Renewable Generation Curtailment Support

- Also portfolio-wide: benefit of reduced curtailment, increased RPS

GHG Impacts Captured in NPV and PAV

NPV: GHG Impacts Included in Energy and A/S Prices

Energy prices now include GHG cost, $12/t ~ $6/MWh

- Effectively works as an adder to gas cost
- Higher $/MWh on-peak because less efficient plants run then
- GHG impacts incorporated when modeling energy cycling

Ancillary Services prices also incorporate GHG cost

- Based on opportunity cost of not generating

PAV: GHG Impacts Included in Increased Efficiency Metric

Portfolio-wide benefit – rest of fleet operates more efficiently

- Fewer starts, more efficient operation => less cost => less GHGs
- Will evaluate for generic 15 minute, … 8 hr resources => lookup table

Note that GHG impacts (and all others) may change *type* of storage that we procure, but not the *amount*

Comparison is between storage projects, not to "status quo"

Qualitative Criteria

Implicit factors that inform Short List Selection

Project Viability
- Assess likelihood that Project can deliver
- May also assess environmental impacts

Creditworthiness
- Ability to meet financing obligations

Supplier Diversity
- Give maximum practicable opportunity to DBE, encourage > 30%

Credit and Counterparty Concentration
- Effect on credit concentration, and counterparty concentration

Technology Diversity
- May seek technological diversity to further market transformation

Modifications to Key Contract Terms
- Operational/cost impact of any proposed modifications

Questions ?