

Observations on the Value of Solar

Pricing Energy, Capacity and Fuel Hedging/ Financial Risk

SMUD Technical Advisory Committee

Jan Smutny-Jones, Independent Energy Producers/ SMUD Customer

21 November 2019

Purpose of “Value of Solar (VOS)”

- Determine fair compensation for SMUD Net Energy Metering (NEM) customers generating/exporting energy into the SMUD grid.
- Ensure no cross-subsidy is borne by SMUD Customers not participating in the NEM.
- ISSUE= Other than costs, does solar on a utility level need a value?

The Sale of Electricity is Regulated

- The sale for resale of electricity is regulated by the Federal Power Act, as well as, California Law.
- Generators are considered utilities subject to regulation unless they fit into specific exemptions.
- One exemption is the Public Utilities Regulatory Policy Act (PURPA), requiring utilities to purchase power and pay “avoided costs” for energy delivered by “Qualifying Facilities”. These include solar facilities.
- Another exemption is Exempt Wholesale Generators (EWGs) which can participate in the wholesale markets and are paid market prices.

How Does NEM Fit Within This Regulatory Framework?

- The Federal Energy Regulatory Commission (FERC) determined that NEM is not a “sale for resale” of electricity into the wholesale market, but a “billing arrangement” (Mid-America Energy) subject to the rate-setting responsibilities of the state.
- NEM is the swapping of energy generated by the NEM customers that are exporting solar into the grid when sun is available, with the consumption of kilowatt hours generated the utility back to the customer when solar is not available.
- There is no sale of electricity. It is a swap of energy. No other “value”.

Fundamentals

- Demand - The amount of electricity required to meet the needs of the customer, AKA“load”.
- Capacity- The resources available to meet the demand expressed as Kilowatts or Megawatts.
- Energy- The actual delivery of electrons. Expressed as Kilowatt-hours or Megawatt-hours.

An Analogy

- You have the need to get to the maternity ward, specific time unknown. This is Demand.
- You hire a taxi to standby in front of your house, for use when you need it. They charge \$25.00/hour to sit there. This is a Capacity cost.
- Time to go, future SMUD customer on the way. Taxi hits the meter, 50 cents/mile. This is an Energy cost. Demand has been met.

Cost of Capacity= SMUD Meeting Demand

- SMUD can meet Demand with several sources of Capacity.
- SMUD Owned Resources- Hydro-electric, Consumnes gas unit, Combined Heat & Power, Local Solar, Solano Wind.
- Power Purchase Agreements with Generators.
- Imports from other Balancing Authorities
- Customer Generated resources.
- Effective Load Carrying Capacity (ELCC)-All resources provide some level of Capacity. ELCC reduces Wind, Solar and Storage capacity due to their intermittent availability. It is not zero.
- ISSUE= These Capacity products have different costs and capabilities

Cost of Energy

- The production of electricity (Energy) has both “embedded cost” associated with building/financing a generator, as well as, “marginal costs”, fuel and O&M used to generate.
- Generally, marginal costs are used to determine wholesale electricity prices in real time.
- Energy prices shift throughout the day, reflecting the need to meet demand, with lower cost generation dispatched (used) first. There is a seasonal variance on cost of energy, with summer peak currently having the highest cost. Spring normally has low energy needs and abundant hydroelectric generation due to Spring runoff.
- Long-term Peak will shift to Winter due to high level of Summer solar generation.
- Solar and Wind have no fuel costs which are reflected in marginal costs.
- ISSUE= The Levelized Cost of Energy (LCOE) shows a wide variation of energy costs among different technologies. What does is a well-balanced energy portfolio.
- ISSUE= How are system energy costs recovered in rates?

Value of Hedging/Financial Risk

- What/why are we discussing this?
- SMUD uses a large volume of natural gas to balance demand with energy.
- Natural gas is a commodity exposed to supply/demand priced and weather conditions.
- SMUD can hedge volatility risk by:1) reducing Natural gas use; 2) buying natural gas futures; or, 3) owning gas fields/gas storage.
- ISSUE= Gas hedging has low value:1) natural gas volatility is low; 2) increasing amount of mid-day energy is solar, with less gas used to generate; 3) gas consumed mid-day either meeting immediate load needs or needs to be operational at peak.

ISSUES

- What is a balanced electricity portfolio that deliver (in this order): reliable, affordable and clean energy that meet long-term carbon reduction goals?
- How are Energy and Capacity costs incurred by SMUD to meet all customers Demand, equitably recovered in rates so there is no cross-subsidy?
- Does current SMUD Rate Structure meet these goals?
- Commentary –JSJ says No.