



Behind-the-Meter Distributed Generation Forecast Updates

Presenter: Mark Palmere, Electric Generation System Specialist I Date: August 8, 2023



- Energy Commission forecasts capacity and energy generated from distributed generation sources
- Main technologies are Solar Photovoltaic (PV) and Energy Storage
- Capacity forecast developed using:
 - Interconnection data
 - Factors that will influence future adoption, such as:
 - System costs
 - Energy costs
 - Incentives
- Electricity generation and hourly impacts are calculated using:
 - Capacity results
 - Performance measures
 - Hourly profiles

How Models Are Developed







Energy Demand Model System





Improvements to 2023 Forecast





- The Energy Commission is contracted with data provider to receive historical PV profiles
- Profiles will be at following resolution:
 - 15-minute interval readings
 - Aggregated by Energy Commission's forecast zones (right)
 - Divided into residential/non-residential based on system size
- Data will be used to inform:
 - Forecast BTM PV energy generation impacts
 - Hourly load model calibration
 - Long-term forecast hourly load impacts across CAISO footprint





- Energy Commission has worked with the National Renewable Energy Laboratory (NREL) to develop a California-specific version of their Distributed Generation (DGen) model
 - Model covers PV and Paired Storage forecasting
- Subsequent presentation from NREL will cover model components in greater detail
- Model will incorporate several updated policies, including Net Billing Tariff and Investment Tax Credit

Net Billing Tariff Update

- New Net Billing Tariff (NBT) policy has been finalized
- NBT defines how compensation for solar energy exported to grid by customers is determined in IOU territory
 - Adopted in late 2022 by CPUC as update to Net Energy Metering (NEM 2.0)
 - Went into effect April 2023
 - Calculates compensation using new methodology
 - Rates are based on Avoided Cost Calculator (ACC)
 - ACC determines what cost of equivalent energy generation would have been for utility; this amount is credited to customer
 - PG&E and SCE customers receive additional credits to make payment reduction more gradual (glide path)

Updated rates incorporated into 2023 forecast

Investment Tax Credit Update

- Federal Investment Tax Credit (ITC) extension was announced in August 2022
 - ITC has been extended multiple times
 - Most recent extension is part of Inflation Reduction Act (IRA)
 - Now extended through 2034; this extension is incorporated into self-gen forecast
 - IRA also introduced new tax credit for standalone storage installation
 - Provides tax credit of up to 30% of installation cost

Standalone Storage Model

- Standalone Storage must be modeled separately
- Interconnection data will be used to determine historical standalone storage capacity
 - Previously, Self-Generation Incentive Program (SGIP) data was used
- Lazard, a financial services company, releases annual Levelized Cost of Electricity (LCOE) report that lists latest costs of various generation technologies
 - Shows decreases in cost of storage systems
- To extend costs through forecast period, staff determined the historical average annual percentage decrease in cost, and factored in an effective 30% decrease in cost due to new federal standalone storage incentive

Change in Cost of Standalone Storage



Standalone Storage Model (Cont.)

- Cost numbers will be used in conjunction with historical growth rates to determine a cost/growth equation
- A scatterplot was used to determine best fit regression equation of cost vs. installation
- Projected storage cost values were incorporated into equation to calculate each year's ratio of added storage to base year, resulting in a moderate increase in added standalone storage
- Our calculations forecast annual capacity added will increase by approximately 30% by 2040
- Comparison results will be available at future workshop

Storage Cost vs. Installation



Historical Linear (Historical)



- Staff separately accounts for additional PV installation due to Title 24 Building Standards
- Standards require new building projects (both residential and nonresidential) to include PV installation
 - In 2021, the Energy Commission adopted the 2022 standards, which went into effect at the beginning of 2023—note that we already forecast standards compliance
- Staff is working with the Standards Compliance Branch to leverage collected data to more accurately estimate average residential compliance installation size
- Staff will use updated Commercial Buildings Energy Consumption Survey (CBECS) data to reflect latest survey (2018 vs. 2012)
 - Survey is used to gather information on buildings (e.g., type, floors, tenants) that affects commercial PV requirements

Title 24 Commercial Methodology



Preliminary Comparison of Models



- Staff compared preliminary results from DGen model to finalized 2022 forecast
- Staff expects new NBT to have a downward effect on solar adoption (longer payback period due to lower compensation rates)
- Staff expects ITC extension to have an upward effect on solar adoption



Thank You!

