



Customer-side Distributed Generation Impacts

Lead Commissioner Workshop on Preliminary
Electricity and Natural Gas Demand
Forecasts 2014 – 2024

Sacramento, CA

May 30, 2013

Asish Gautam

Demand Analysis Office

Electricity Supply Analysis Division

Asish.Gautam@energy.ca.gov / 916-654-3900



Key Sources of Data

- Annual/Quarterly power plant reporting to CEC (Form CEC 1304)
- Emerging Renewables Program
- Self-Generation Incentive Program
- California Solar Initiative
- New Solar Homes Partnership
- POU PV (SB 1 Report to CEC)
- California Solar Initiative – Thermal



Key Sources of Data

- DG incentive program EM&V reports
 - CSI 2010 Impact Evaluation (2007 – 2010)
 - SGIP 11th Year Impact Evaluation (2002 – 2011)
- DOE/EIA PV cost projections developed for AEO 2013
- CEC sponsored report on CHP market potential (ICF CHP Policy Analysis)

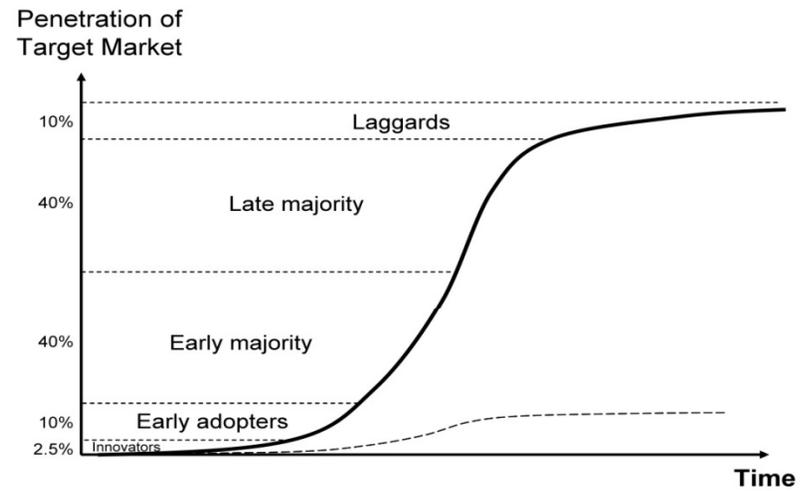
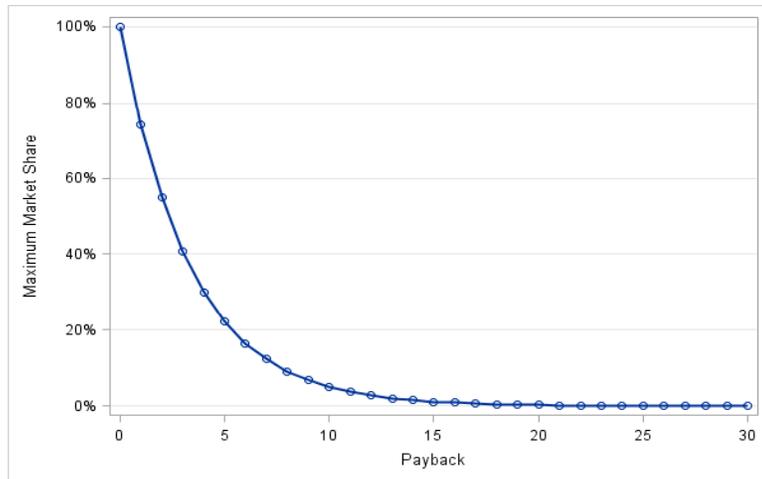


Predictive Modeling (Residential Sector PV/SHW)

- Underlying structure similar to payback/cash flow model used by EIA/NREL
- Payback calculations based on system and maintenance costs, incentives, and fuel rates
- Estimated payback applied to a Bass Diffusion adoption curve
- Results for adoption differ by demand scenario since projected fuel rates and number of homes vary by scenario



Adoption Modeling





Predictive Modeling (Residential Sector PV/SHW...continued 2)

- PV system cost and performance data come from incentive program data and EIA's AEO 2013 forecast report
- SHW system cost and performance data based on CSI Thermal program database and CPUC sponsored study
- Residential sector model output used for system sizing and valuing net surplus compensation



Predictive Modeling (Non-Residential Sector PV)

- No predictive model
- Forecast based on trend analysis
 - Examine rate of growth in adoption based on DG incentive program data
 - Estimate growth and then estimated energy and peak impacts based on capacity/peak factors from DG EM&V reports



Predictive Modeling (Commercial Sector CHP)

- Meeting onsite demand for power and two thermal end-uses: hot water and space heating
- CEUS survey data used to compile and summarize building electric and gas demand
 - ~ 2900 sites represented in survey
 - 12 Building Types
 - 4 Building Size Categories



Predictive Modeling (Commercial Sector CHP...continued 2)

- CEUS profiles are then benchmarked to QFER calibrated Commercial sector model output and floorspace projections
- Use DrCEUS building energy use simulation tool to create load shapes for CHP thermal analysis and economic modeling
- Map CEUS site profiles to retail electric/gas tariffs
- Retail electric/gas tariff details escalated based on retail electric/gas rate forecast developed for CED 2013 Preliminary



Predictive Modeling (Commercial Sector CHP...continued 3)

- CHP technology details come from CEC sponsored report conducted by ICF
 - Heat rate, installed cost, waste heat recovery, maintenance cost, etc
 - Use DrCEUS generated load shapes and technology profiles to estimate impacts: generation, onsite use, export, and grid purchase

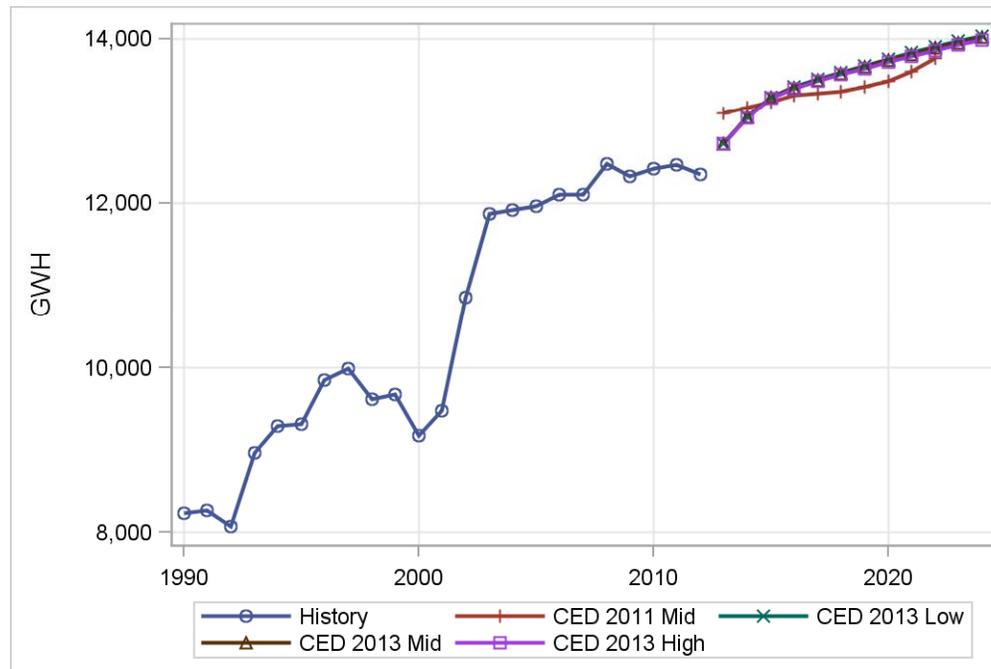


Predictive Modeling (Commercial Sector CHP...continued 4)

- Incorporate SGIP incentives and Federal tax credit for CHP
- Adoption modeling same as Residential sector PV/SHW model

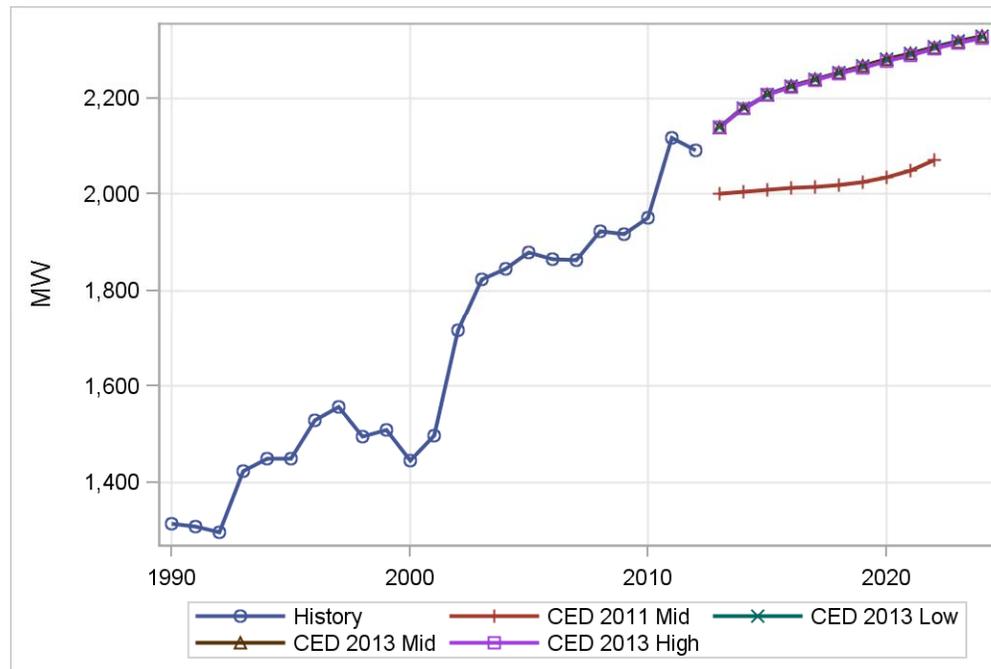


Results: Statewide Non-PV Energy Impact



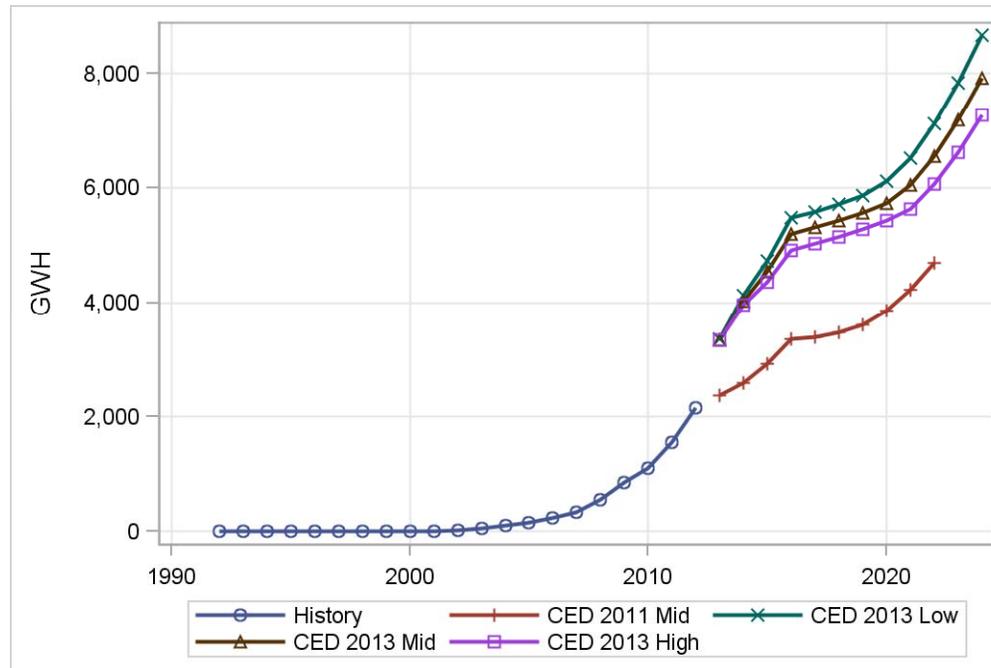


Results: Statewide Non-PV Peak Impact



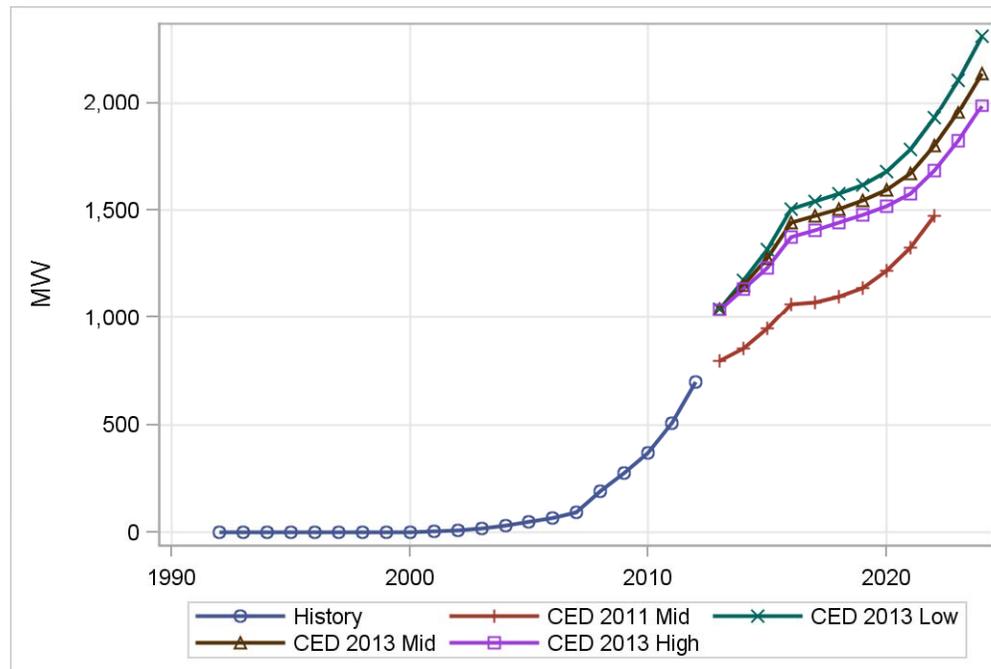


Results: Statewide PV Energy Impact





Results: Statewide PV Peak Impact





Key Uncertainties

- NEM redesign
- Retail electric tariff redesign
- Federal Tax Credit
- CHP
 - Interconnection
 - Standby and departing load charges



Next Steps

- Ongoing data updates
- Revise Residential Sector model
 - Incorporate utility specific retail rates
 - Use RASS survey to develop residential profiles similar to method used in profiling CEUS survey data for commercial sector
 - Incorporate NEM benefits
- Complete work on Non-Residential PV model