



2017-2024 Production Cost Simulation Modeling Assumptions and Selected Results

**Updates For the 2016 Time Dependent
Value Calculations**

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Angela Tanghetti
Electricity Analysis Office
Electricity Supply Analysis Division
angela.tanghetti@energy.ca.gov / 916-654-4854



Scope of Presentation

- Three production cost simulation scenarios for TDV
- Key 2013 IEPR forecasts and simulation drivers
- Selected simulation results



TDV Scenarios

- 2013 IEPR Mid Consumption/Mid Price Scenario
- 2013 IEPR Low Consumption/High Price Scenario
- 2013 IEPR Mid Consumption Scenario with 40% RPS by 2024



Key Drivers Affecting Simulation Results

- CED 2013 Adopted Demand projections (posted February 2014)
- Additional Achievable Energy Efficiency (AAEE) (posted April 2014) and Incremental Energy Efficiency (IEE) – March 2013 IEPR Supply Filings
- IEPR 2013 Green House Gas Price Projections (appendix to Natural Gas Outlook Reported posted April 2014)



Key Drivers Affecting Simulation Results

- Burner-tip Price Forecast (posted November 2013 and updated January 2014)
- 33% by 2020 and 40% by 2024 RPS Portfolio
- Hydro Generation Prediction (WECC wide average 1992-2012)



CED 2013 Adopted Demand Forecast

- Low Demand Scenario : lower economic and demographic growth, higher efficiency program impacts, higher energy price forecast*
 - 2024 Statewide 1in2 Peak = 66,100 MW
 - 2024 Statewide Net Energy For Load = 308,039 GWh
 - Mid Demand Scenario: in between high and low*
 - 2024 Statewide 1in2 Peak = 70,109 MW
 - 2024 Statewide Net Energy For Load = 324,241 GWh
- * Without IOU Additional Achievable Energy Efficiency or POU Incremental Energy Efficiency forecast



CED 2013 IOU Additional Achievable (AAEE)* And POU Incremental Energy Efficiency (IEE)** Forecast

Low Demand/High AAEE and High IEE Scenario

- 2024 IOU High AAEE = 8,514 MW and 36,683 GWh
- 2024 POU High IEE = 278 MW and 5,281 GWh

Mid Demand/Mid AAEE and Mid IEE Scenario

- 2024 IOU Mid AAEE = 4,056 MW and 22,681 GWh
- 2024 POU Mid IEE = 270 MW and 3,420 GWh

* IOU AAEE forecast posted February 2014

** POU IEE Forecast From IEPR 2013 Energy and Capacity Supply Plan Filings (Forms S-1 and S-2)



EPR 2013 GHG Price Projections

Price projection scenarios are based on analyses in *Forecasting Supply and Demand Balances in California's Greenhouse Gas Cap-and-Trade Market* (March 2013 Draft Paper) and 2013 Auction Results

	2017	2024
GHG Price Projections (Nominal\$/metric ton)		
Mid Consumption and Price Scenario	16.11	40.88
Low Consumption High Price Scenario	48.34	81.76



Burner-tip Price Forecast California Weighted Average

- Based on draft methodology presented in *Estimating Burner-tip Prices, Uses and Potential Issues* – November 2013 Draft Paper

Burner-tip Price Forecast	2017	2024
(Nominal\$/mmBtu) California Weighted Average		
Mid Consumption and Price Scenario	4.50	5.00
Low Consumption High Price Scenario	5.13	6.09



Renewable Portfolio Standard (RPS) 2024 Incremental Portfolios

Incremental to existing operational RPS generation – as of 12/31/2013

Breakout By Technology	Scenario Name		
	33% by 2020 Mid Scenario	33% by 2020 Low Consumption /High Price	40% By 2024 Mid Scenario
Nameplate (AC) MW			
Biomass	125	125	125
Geothermal	250	250	250
Large Scale Solar PV	7,100	5,200	9,208
Small Solar PV	2,200	1,550	7,750
Solar Thermal	1,350	1,150	1,350
Wind	1,300	875	2,343
Total	12,325	9,150	21,026



Selected PLEXOS Simulation Results

- PLEXOS is a cost based production cost model that produces a marginal price forecast
- PLEXOS does not include costs for ancillary services or fixed operation and maintenance



Selected PLEXOS Simulation Results

Difference in Annual Price (Nominal\$/MWh) From Mid Consumption Scenario Results

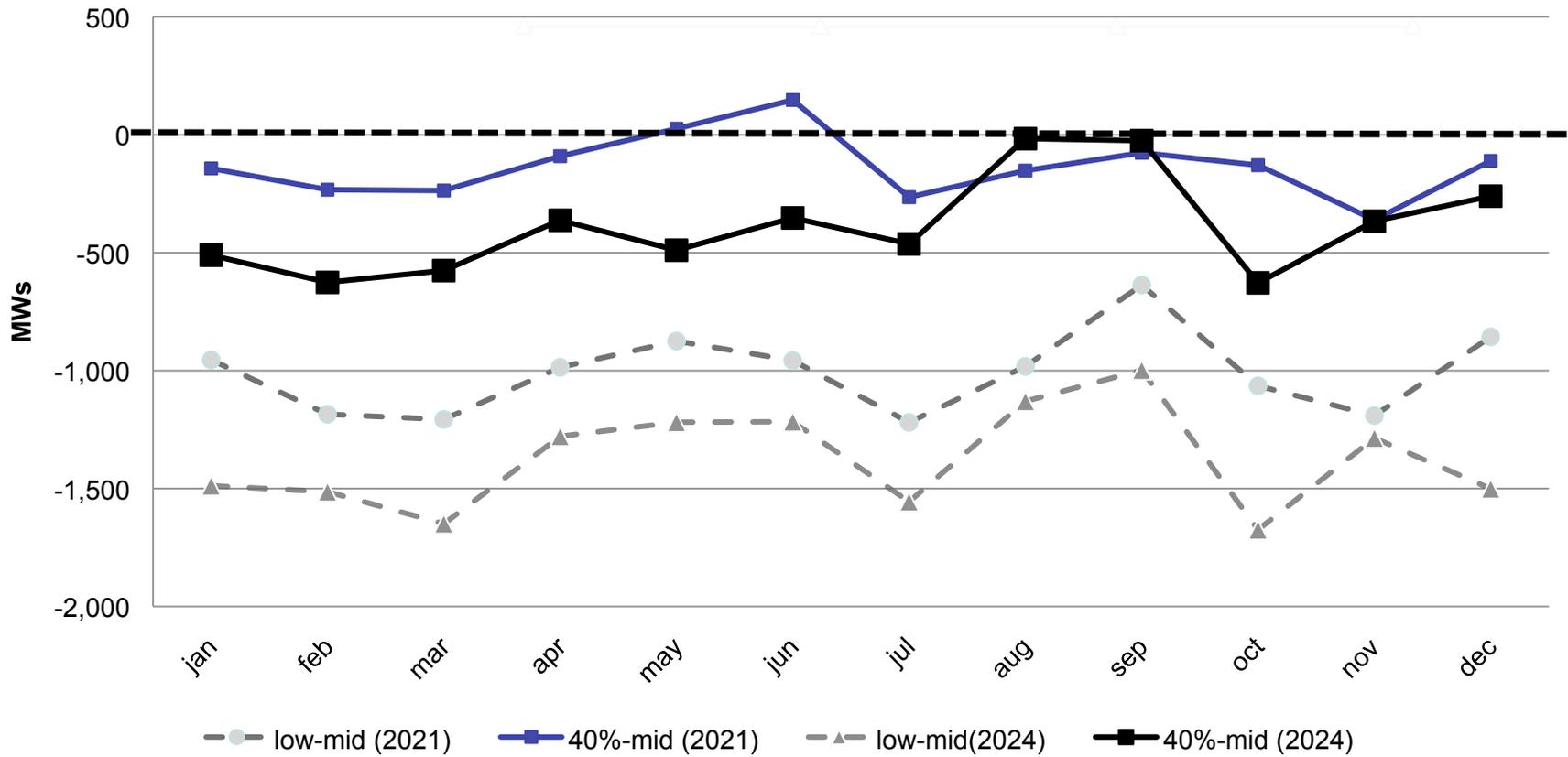
Annual Price = Average of Hourly Price by Transmission Area

	PG&E Bay		PG&E Valley		SCE		SDG&E	
	Low-Mid	40%- Mid	Low-Mid	40%- Mid	Low-Mid	40%- Mid	Low-Mid	40%- Mid
	Nominal \$/MWh							
2021	5.20	(0.42)	4.80	(0.56)	5.89	(0.53)	9.07	2.37
2024	3.99	(2.70)	3.04	(3.17)	4.43	(3.31)	10.95	3.06



Selected PLEXOS Simulation Results

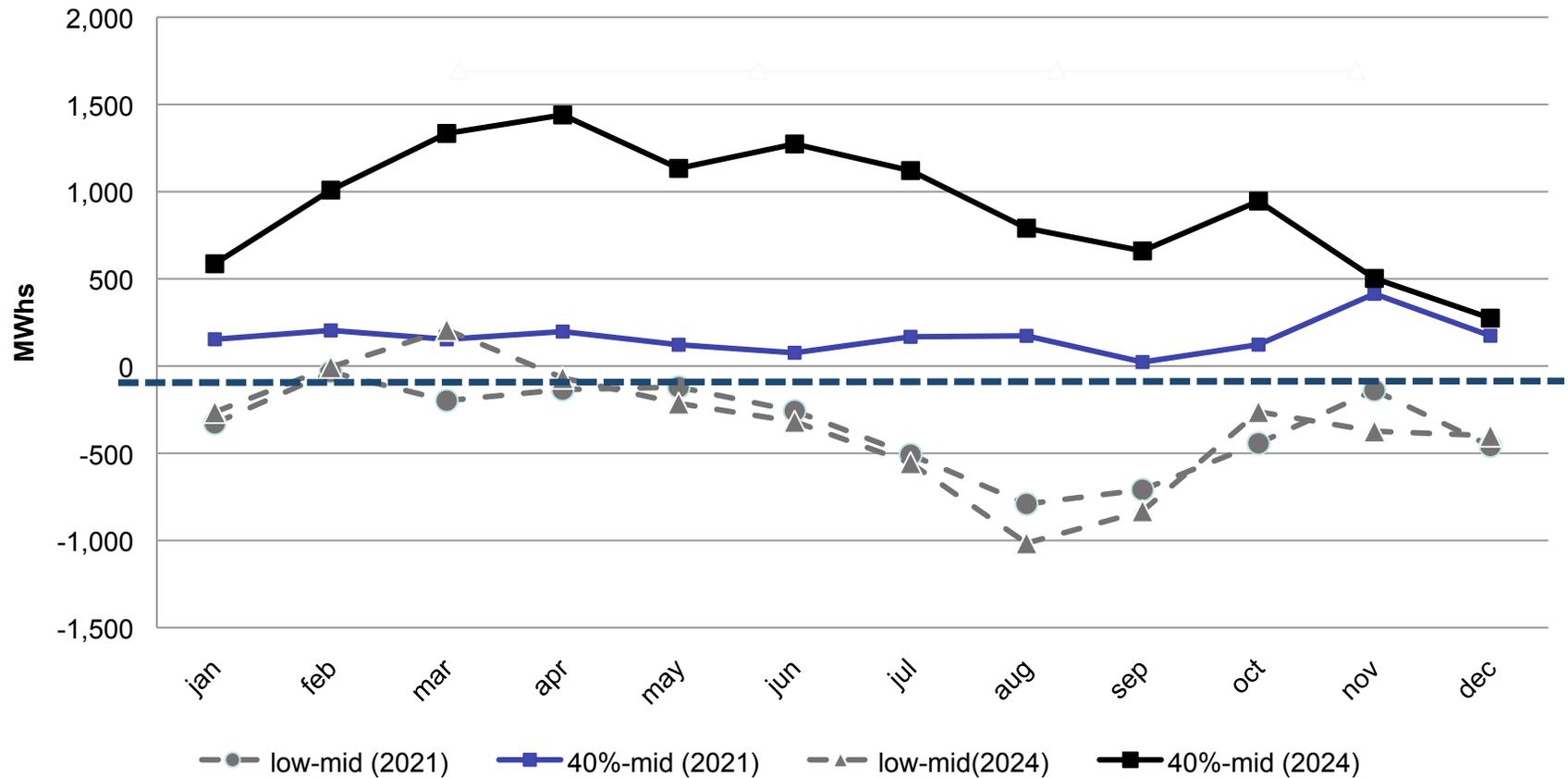
PG&E Bay Generation Differences From Mid Scenario (MWh)





Selected PLEXOS Simulation Results

SCE Generation Differences From Mid Scenario (MWh)





Selected PLEXOS Simulation Results

SDG&E Generation Differences From Mid Scenario (MWh)

