



California Energy Commission

Preliminary 2013 IEPR Electricity Demand Forecast Rate, Efficiency, Self-Generation, and Electrification Assumptions

2013 IEPR Electricity, Natural Gas, and Transportation Energy Inputs and Assumptions Workshop

California Energy Commission

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Electricity Rate Scenarios

- Used Energy and Environmental Energy (E3) GHG calculator to develop 3 scenarios
- E3 calculator allows users to create scenarios by inputting assumptions for:
 - Efficiency program savings
 - Natural gas and coal rates
 - Electricity demand
 - Renewable generation
 - Combined Heat and Power (CHP)
 - Demand response
 - Carbon prices



Electricity Rate Scenarios

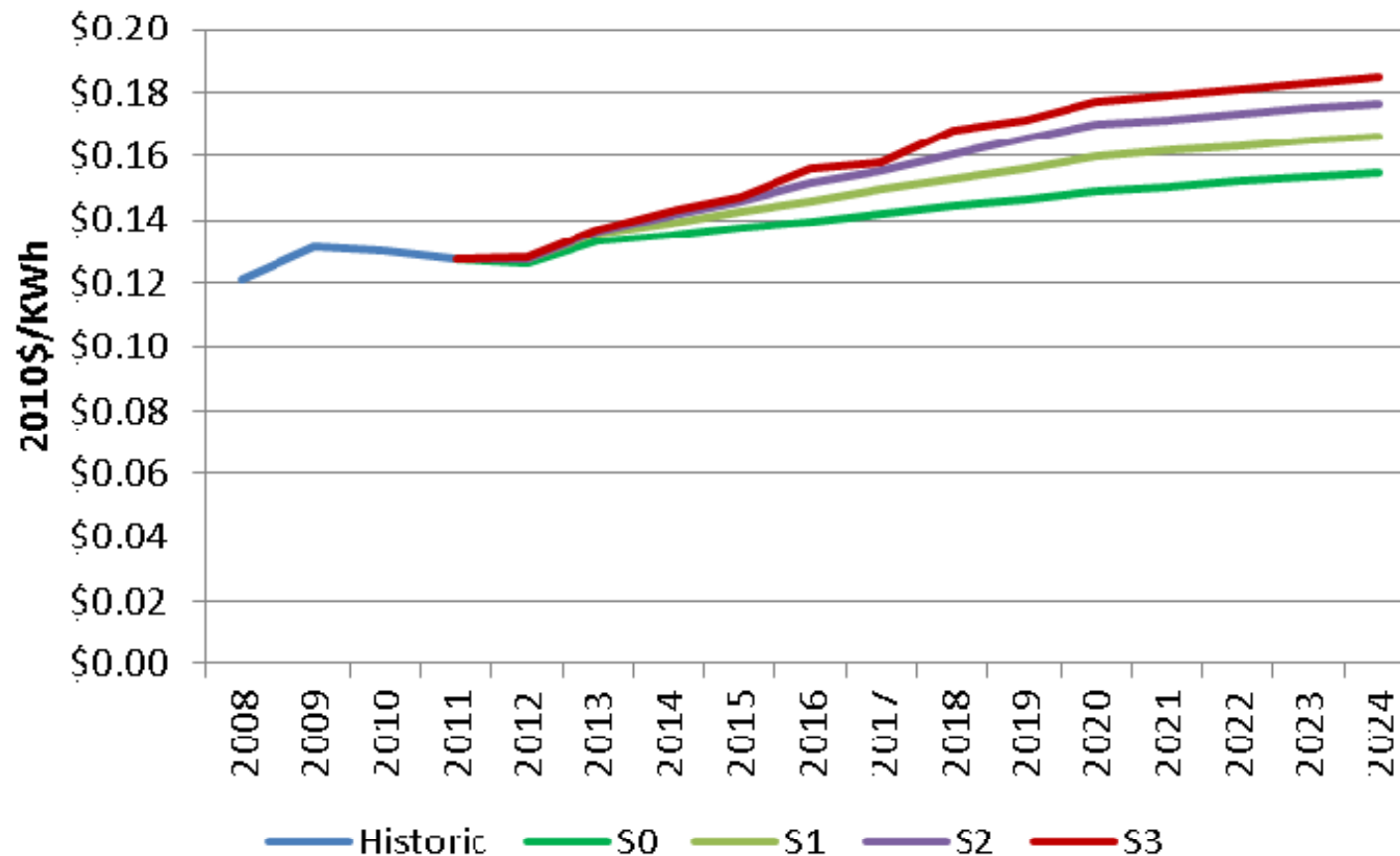
- **Scenario 0** is a low energy price, high electricity demand case with low levels of EE, minimal PV, no CHP, and 1,000 MW new renewable generation. No increased demand response over forecast. No Cap and Trade markets are used.
- **Scenario 1** is a low energy price, high electricity demand case with low levels of EE, PV, CHP, and new renewable generation. No increased demand response over forecast. Low carbon prices for the Cap and Trade markets are used.
- **Scenario 2** is the mid energy price, mid electricity demand case with the mid level of EE, PV, CHP, new renewable generation, and a mid range Cap and Trade carbon price. Additional 5 percent demand response by 2020.
- **Scenario 3** is the high energy price, low electricity demand case with high levels of EE, PV, CHP, new renewable generation, and a high Cap and Trade carbon price. Additional 5 percent demand response by 2020.



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Electricity Rate Scenarios (2010\$)

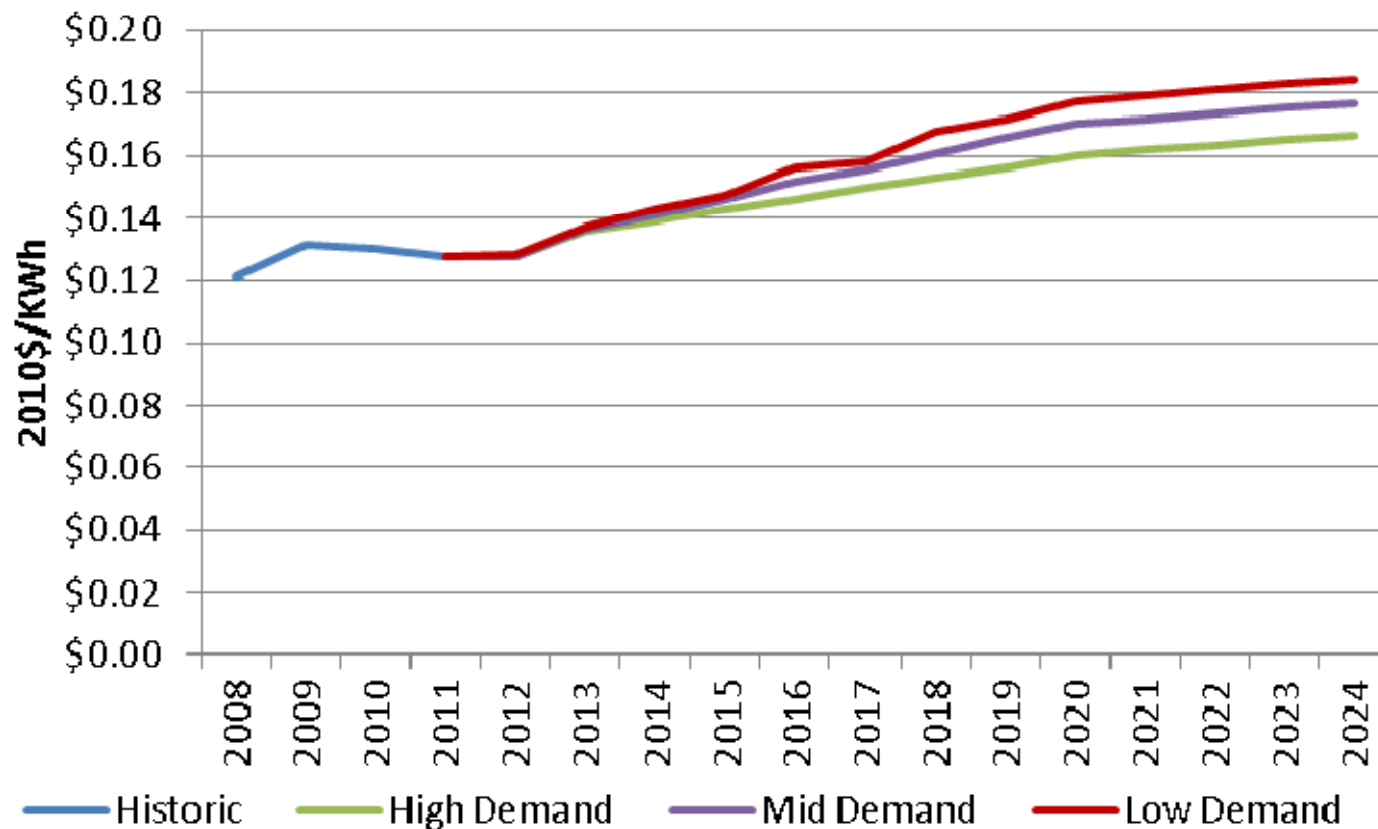
3.0 cents difference between high and low by 2024





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Proposed Electricity Rate Scenarios (2010\$)





Energy Efficiency, Demand Response, Natural Gas and Coal Prices

- Effort was made to ensure these were consistent across the three primary scenarios
- May differ due to the needed inputs (i.e. mine mouth versus burner tip)



Electricity Demand Assumptions

- Demand inputs were updated from the 2008-2016 defaults with demand from the adopted 2011 CED forecast
- Mid case demand in 2020 decreased from 321,000 GWh to 285,000 GWh.
- Mid case 2020 total peak load demand decreased from approximately 74,000 MW to 69,000 MW



Photovoltaic Assumptions (Customer Side Capacity)

- Rooftop PV capacities for the three cases consistent with the adopted 2011 CED
- Results in higher installed capacities for two of three demand cases

Installed Capacity	High Demand	Mid Demand	Low Demand
2011 CED rate assumptions	940	2,260	3,000
Preliminary 2013 IEPR	2,189	2,311	2,582

The shown 2011 CED capacities were input into the E3 GHG calculator as part of the preliminary forecast work on electricity rates.



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New Renewable Generation Assumptions

Preliminary values for new renewable generation significantly higher than 2011 CED rate assumptions and consistent with latest CPUC/CEC joint scenario development for LTPP and the CAISO 2013/2014 Transmission Planning Process.

	High Demand	Mid Demand	Low Demand
2011 CED rate assumptions	1,000	5,839	13,044
Preliminary 2013 IEPR	11,954	12,855	13,504



CHP Assumptions

Combined Heat and Power: Policy Analysis and 2011-2030 Market Assessment (2012) defined CHP **levels** for each scenario.

Low demand case represents an updated capacity estimate for AB 32 compliance.

	Installed Capacity	High Demand	Mid Demand	Low Demand
2011 CED rate assumption	<5 MW	0	0	1,574
	>5 MW	0	0	2,804
	Total	0	0	4,378
Preliminary 2013 IEPR	<5 MW	181	1,469	1,925
	>5 MW	1,246	1,526	2,909
	Total	1,427	2,995	4,834



Carbon Price Assumptions

- California's Cap and Trade regulation will continue through the forecast period.
- Carbon prices under Cap and Trade will increase from a 2013 reserve auction price of \$10.71/MTCO₂e (nominal \$) in all three scenarios.
- The low carbon prices will be set to the reserve auction prices which is defined as increasing by CPI plus 5 percent.
- High prices are assumed to be capped at the third reserve tier price of \$50/MTCO₂e.
- In 2020 carbon prices will be \$20, \$29, and \$50 per MTCO₂e in the high, mid, and low demand cases, respectively.



Scenario 2020 Input Assumptions

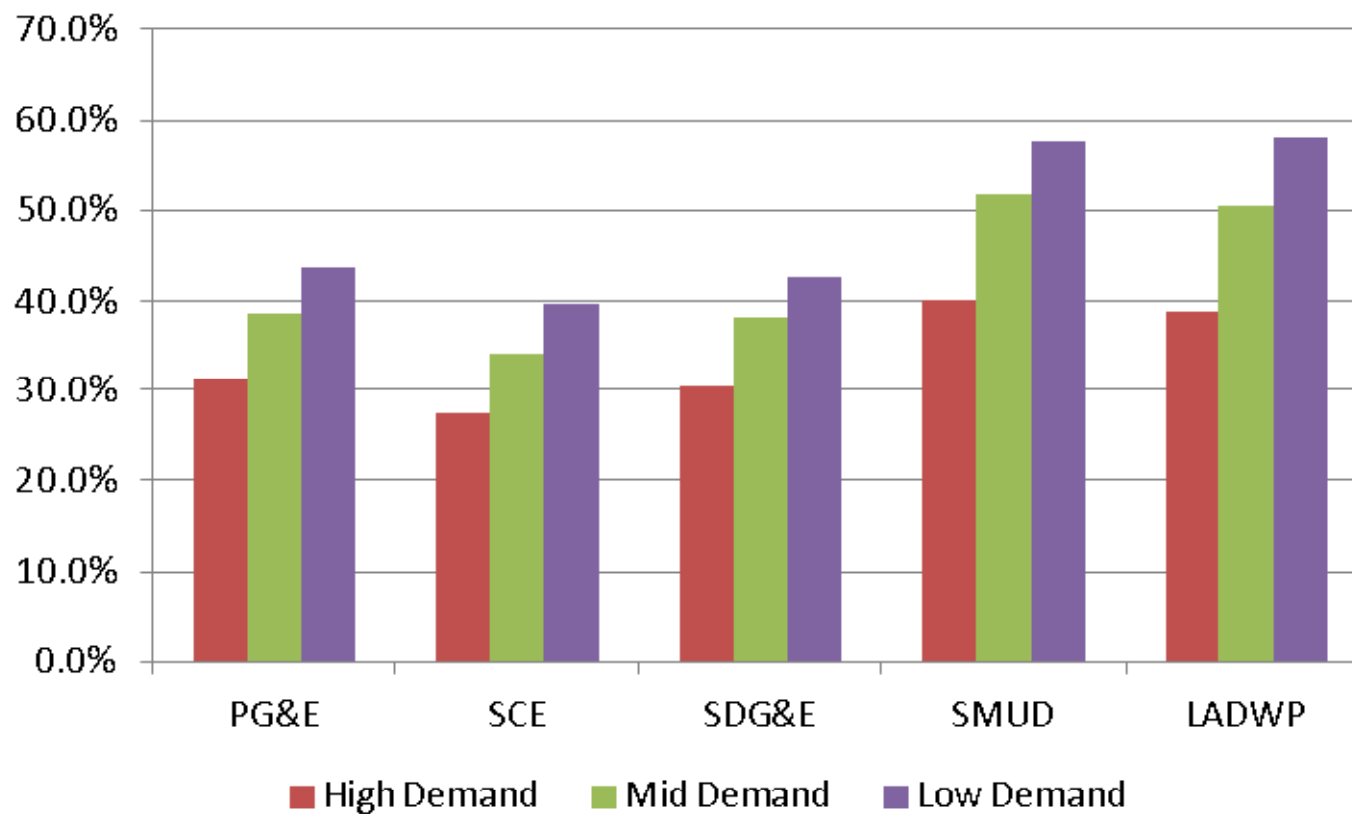
	High Demand	Mid Demand	Low Demand	Units
Energy Efficiency	Reference	Mid	High	
Natural Gas Prices	\$4.77	\$4.81	\$5.24	2008\$
Photovoltaic Installed Capacity	2,189	2,311	2,582	MW
Demand Response	0	5%	5%	Percent of Load
Renewable Generation	11,954	12,855	13,504	MW
Combined Heat and Power	1,427	2,995	4,834	MW
Carbon Prices	\$20	\$29	\$50	Nom\$/MTCO ₂ e
Coal Prices	\$2.07	\$2.07	\$2.07	2008\$



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Major Utilities Rate Increase (E3 Calculator) 2012 to 2024

Largest growth from LADWP





Potential Further Analyses

- Energy efficiency values
- Evaluate revising the costs of new renewable generation to be consistent with Electricity Analysis Office renewable and levelized costs activities
- Evaluate the impact of the preliminary demand results and updated renewable generation
- Refine demand response values
- Evaluate impact of carbon market credit allotments



Electrification Assumptions

- Energy Commission intends to evaluate and potentially include electricity demand from:
 - Plug-in electric vehicles
 - Fuel cell and natural gas vehicles
 - Port electrification
 - High Speed Rail
 - Truck stop electrification
 - Bay Delta Conservation Plan