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<th><strong>Docket Number:</strong></th>
<th>16-IEPR-05</th>
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<tr>
<td><strong>Project Title:</strong></td>
<td>Electricity Demand Forecast</td>
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<td>Presentation - California Energy Demand Update Forecast</td>
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<tr>
<td><strong>Description:</strong></td>
<td>By Cary Garcia, CEC, December 8, 2016</td>
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<td><strong>Filer:</strong></td>
<td>Denise Costa</td>
</tr>
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<td><strong>Organization:</strong></td>
<td>California Energy Commission</td>
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<tr>
<td><strong>Submitter Role:</strong></td>
<td>Commission Staff</td>
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<td>12/5/2016</td>
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California Energy Demand Update
Forecast 2016

December 8, 2016

Cary Garcia
Demand Analysis Office
Energy Assessments Division
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Overview

- Update Process
- Economic/Demographic Assumptions
- Statewide Baseline Results
- Major Planning Area Results
- Updated Managed Forecasts
- Next Steps
California Energy Demand Update Forecast (CEDU 2016)

- Update for California ISO Transmission Planning and CPUC procurement planning covering 2017-2027
- Incorporates more recent economic and demographic expectations
- Includes new historical data (2015 for consumption/sales and 2016 for peak)
- Additional Achievable Energy Efficiency (AAEE) estimated for 2027 by Navigant
- No updates for committed efficiency, distributed generation (DR), or climate change, except to rescale or extrapolate to 2027
Update Process

- Re-estimate econometric models for the major sectors and peak demand:
  - Residential
  - Commercial
  - Manufacturing
  - Resource Extraction/Construction
  - Agriculture/Water Pumping
  - Transportation, Communication, and Utilities
  - Street Lighting
Update Process

- Run econometric models with economic and demographic data used in CED 2015
- Run econometric models with newer economic and demographic data (August 2016)
- Apply percentage differences in econometric forecasts to CED 2015 net of post processed impacts (efficiency, DR, electrification, etc.)
Update Process

➢ Develop one more year (out to 2027) for post-processed impacts
  - Committed efficiency decayed one more year
  - DR for 2027 is the same as 2026
  - Electric vehicles (EVs) and electrification extrapolated out one year

➢ Apply re-scaled post-processed impacts through 2027 to electricity consumption and initial peak forecasts
Update Process

- For electricity sales, subtract projected distributed generation (DG) from consumption (updated DG with 2015 adoptions and pending adoptions for 2016)
- Develop weather-normalized peaks for 2016 to serve as starting point for peak forecasts
- Post-processed planning area results to develop sales by load serving entity (LSE) (1.1c form) and sales and peak for local areas (1.5 forms)
Economic/Demographic Scenarios

Same scenarios as in CED 2015

- High Demand Case: Global Insight Optimistic Scenario
- Mid Demand Case: Moody’s Baseline Scenario
- Low Demand Case: Moody’s Lower Long-Term Growth Scenario
# Comparison to CED 2015

**Average annual growth 2015-2026**

<table>
<thead>
<tr>
<th>Driver</th>
<th>CED 2015 Mid</th>
<th>CEDU 2016 High</th>
<th>CEDU 2016 Mid</th>
<th>CEDU 2016 Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Income</td>
<td>2.88%</td>
<td>3.18%</td>
<td>2.94%</td>
<td>2.71%</td>
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<tr>
<td>Population</td>
<td>0.93%</td>
<td>0.88%</td>
<td>0.88%</td>
<td>0.86%</td>
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<tr>
<td>Manufacturing Output</td>
<td>2.38%</td>
<td>5.07%</td>
<td>2.68%</td>
<td>2.35%</td>
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<tr>
<td>Commercial Employment</td>
<td>1.19%</td>
<td>1.25%</td>
<td>1.17%</td>
<td>1.06%</td>
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Economic/Demographic Data

Manufacturing growth from tech/biotech

- Manufacturing output growth has been concentrated in transportation, electronics, and chemicals/energy/plastics (autos, tech, and biotech)

- Strong innovation/bio-tech development in SoCal and Bay Area
By 2026, mid case income is 1.19% greater than CED 2016
Statewide Population
Mid case lower by 1%+ in 2026 in comparison to CED 2015
Statewide Manufacturing Output

Mid case 5.6% higher than CED 2015 due to more tech/biotech innovation
Statewide Commercial Employment

Mid case down by 0.6% in 2026 in comparison to CED 2015
Actual 2015 consumption lower than expected; Mid case is only 0.2% higher than CED 2015
Statewide Sales
As with consumption, lower in near-term; Mid case 0.2% lower than CED 2015
IOU AAEE Savings

Peak savings incremental to 2016;
Mid Baseline - Mid AAEE exceeds 4,500 MW
IOU AAEE Savings
Energy savings incremental to 2015; Mid Baseline - Mid AAEE ~21,000 GWh
POU AAEE Savings
SMUD and LADWP;
Peak Mid Demand ~850 MW
POU AAEE Savings
Energy savings incremental to 2015; Mid Demand ~3,500 GWh
Managed Statewide Sales

Mid-Mid AAEE case 1% lower than CED 2015; ~25,000 GWh of AAEE impact
Statewide PV Generation

Updated for 2016 capacity; 5,000 MW of generation by 2027
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Climate Change Impacts: Electricity Consumption

1,000 GWh impact in Mid Case by 2027
Climate Change Impacts: Peak
450 MW impact in Mid Case by 2027
Planning Areas
Planning Area Results

- PG&E
- SCE
- SDG&E
- NCNC (Northern California Non-CAISO)
- LADWP
SCE and LADWP planning areas see modest decrease in population growth in comparison to the rest of the state.

More personal income growth in Central and Northern California regions.

Commercial employment generally reduced in all planning areas in comparison to the expectation in 2015.

Manufacturing output up in all planning areas expect for NCNC.
PG&E Planning Area Managed Sales
Mid case 0.3% lower than CED 2015

CEDU 2016 Mid Baseline Demand
CED 2015 Mid Baseline with AAEE Savings
CEDU 2016 Mid Baseline with AAEE Savings
History
California Energy Commission

PG&E Planning Area Managed Peak

AAEE incremental to 2016;
CEDU 2016 ~500 MW higher in 2026
SCE Planning Area Managed Sales

Mid case CEDU 2016 is 1.3% lower than CED 2015
SCE Planning Area Managed Peak
Mid case 2% lower than CED 2015

MW


CEDU 2016 Mid Baseline Demand
CED 2015 Mid Baseline with AAEE Savings
CEDU 2016 Mid Baseline with AAEE Savings
History
SDG&E Managed Sales
CEDU 2016 Mid case 2% lower vs. CED 2015

Graph showing the comparison of SDG&E managed sales between CEDU 2016 Mid Baseline Demand and CED 2015 Mid Baseline with AAEE Savings.
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SDG&E Planning Area Managed Peak
Mid case 3% lower than CED 2015

MW

CEDU 2016 Mid Demand
CED 2015 Mid Demand with AAEE Savings
CEDU 2016 Mid Baseline with AAEE Savings
History
NCNC Planning Area Managed Sales

Mid case sales 4.6% lower than CED 2015
NCNC Planning Area Managed Peak
Mid case 3% lower than CED 2015

[Graph showing MW values from 2000 to 2027]
LADWP Planning Area Managed Sales

Mid case sales 3.3% higher than CED 2015

GWh

CEDU 2016 Mid Baseline Demand
CED 2015 Mid Baseline with AAEE Savings
CEDU 2016 Mid Baseline with AAEE Savings
History
LADWP Planning Area Managed Peak
Mid case 1% lower than CED 2015

MW

CEDU 2016 Mid Demand
CED 2015 Mid Demand with AAEE Savings
CEDU 2016 Mid Baseline with AAEE Savings
History
Next Steps

- Written comments from stakeholders due by Monday, December 19th
- Incorporate these comments as appropriate
- Forecast adopted January 2017