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California Energy Commission

Preliminary Self-Generation Forecast

**2017 Integrated Energy Policy Report
California Energy Commission**

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Data Sources

- CPUC NEM Interconnection
- Self-Generation Incentive Program
- New Solar Homes Partnership
- CSI Thermal
- POU SB 1 Filings
- Energy Commission data from co-generation plants



Forecasting Approach

- Based on customer response to cost benefit/economic metrics
- Adoption follows a Bass Diffusion curve
- Results for adoption differ by demand scenario since projected fuel rates and number of homes/floor space and assumptions regarding NEM vary by scenario



Changes to PV Forecast Methodology

- Residential Sector:
 - Incorporates TOU rates/periods for IOUs and SMUD
 - Rates and periods based on utility filings regarding proposed default TOU pilots
 - Using average annual residential rate for other POUs
 - Residential profiles also further segregated by annual electric usage



Changes to PV Forecast Methodology

- Residential Sector:
 - Adoption based on revised cost-benefit approach
 - Switch from payback period to monthly bill savings for IOU/SMUD
 - Updated payback curve from CPUC/E3 NEM tool for other POUs
- Commercial Sector:
 - Revised adoption curve based on payback (NEM 2.0 tool)



CEC Battery Storage

- Model development ongoing
- Adoption targets 3 segments:
 - Standalone battery storage
 - Battery storage paired with PV
 - Storage from past adopters of PV systems
- Primarily focused on residential sector
 - 5kW/15kWh
 - 85% RTE
 - Cost trends from SGIP



CEC Battery Storage

- Standalone storage operation based on retail rate arbitrage
 - Limited potential due to relatively small differential between peak/off-peak
 - Negligible differential in non-summer months
- Storage paired with PV
 - Maximizes onsite use of PV before storing PV energy
 - Discharge based relative to retail TOU rates



Other Updates

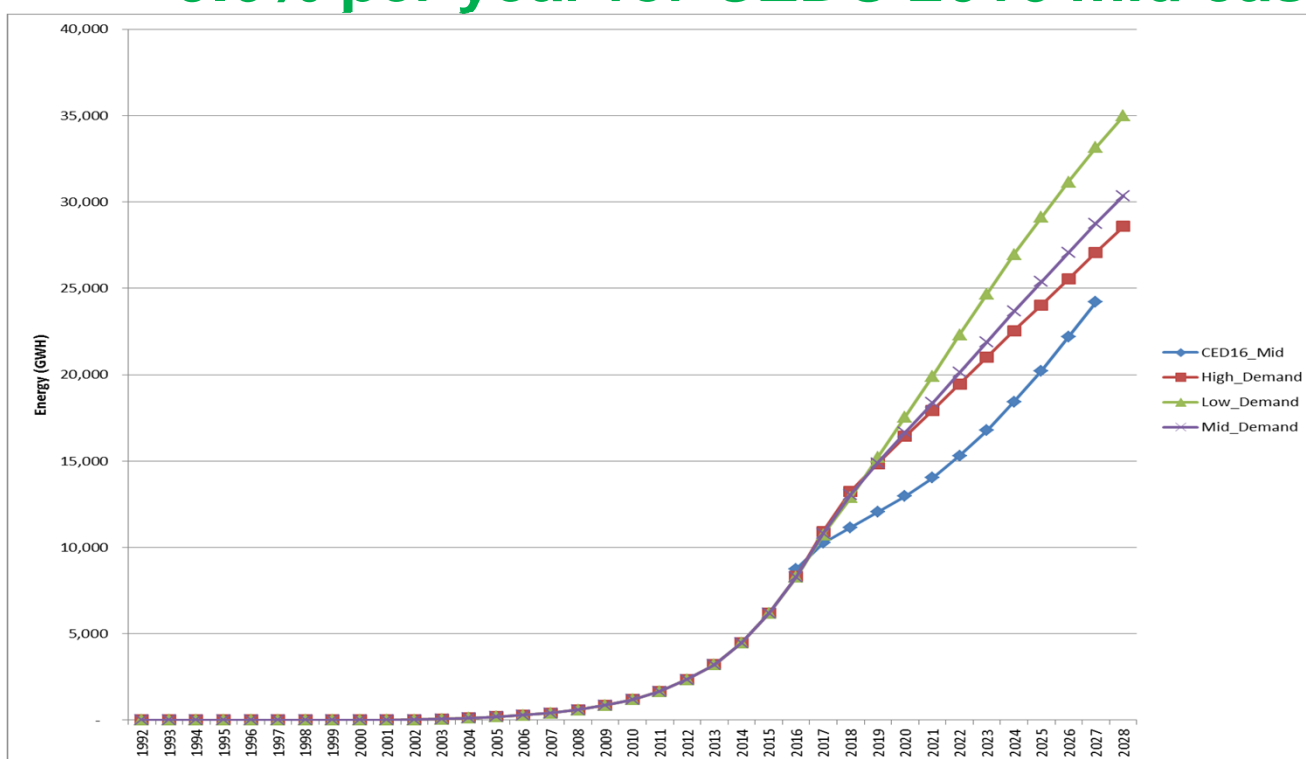
- NEM:
 - Options presented at March 17 DAWG workshop
 - Presented to JASC group on April 4/April 20
- Low Demand: Assumes current NEM over forecast period
- Mid Demand: Assumes exports credited at \$0.10/kWh
- High Demand: Same as Mid but adds \$3/kW charge based on PV system size
- Updated assumptions regarding Federal ITC



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Statewide Results (PV Energy- GWh)

All 3 scenarios above *CEDU 2016* mid case
New mid case grows 13% per year compared to
9.6% per year for *CEDU 2016* mid case





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PV Capacity (MW) by Planning Area and Scenario

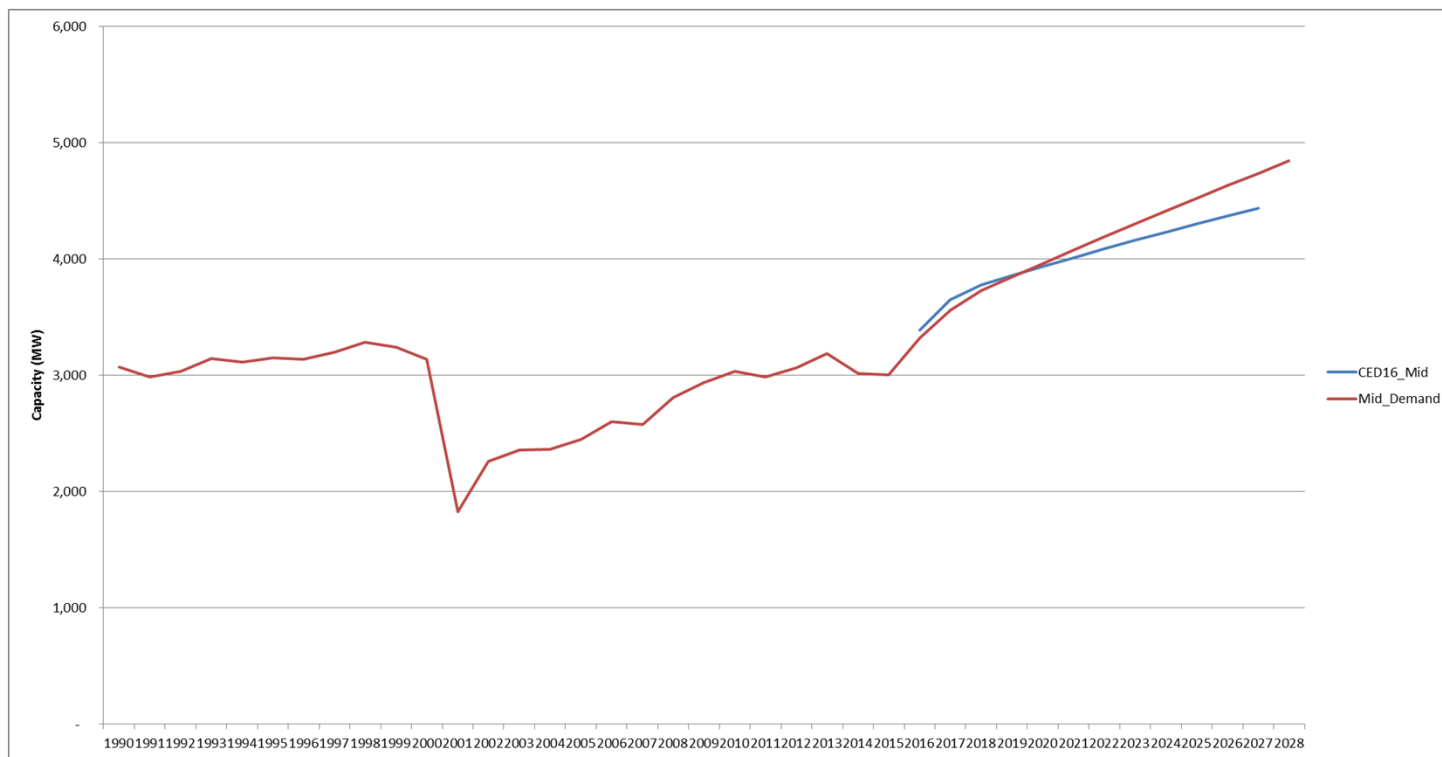
| Planning Area | High_Demand | Low_Demand | Mid_Demand |
|---------------|---------------|---------------|---------------|
| BUGL | 58 | 56 | 56 |
| IID | 140 | 139 | 139 |
| LADWP | 689 | 671 | 672 |
| NCNC | 1,071 | 1,336 | 1,144 |
| OTHER | 20 | 20 | 20 |
| PGE | 7,407 | 8,796 | 7,749 |
| SCE | 5,997 | 7,362 | 6,284 |
| SDGE | 1,785 | 2,180 | 1,898 |
| | 17,166 | 20,561 | 17,962 |



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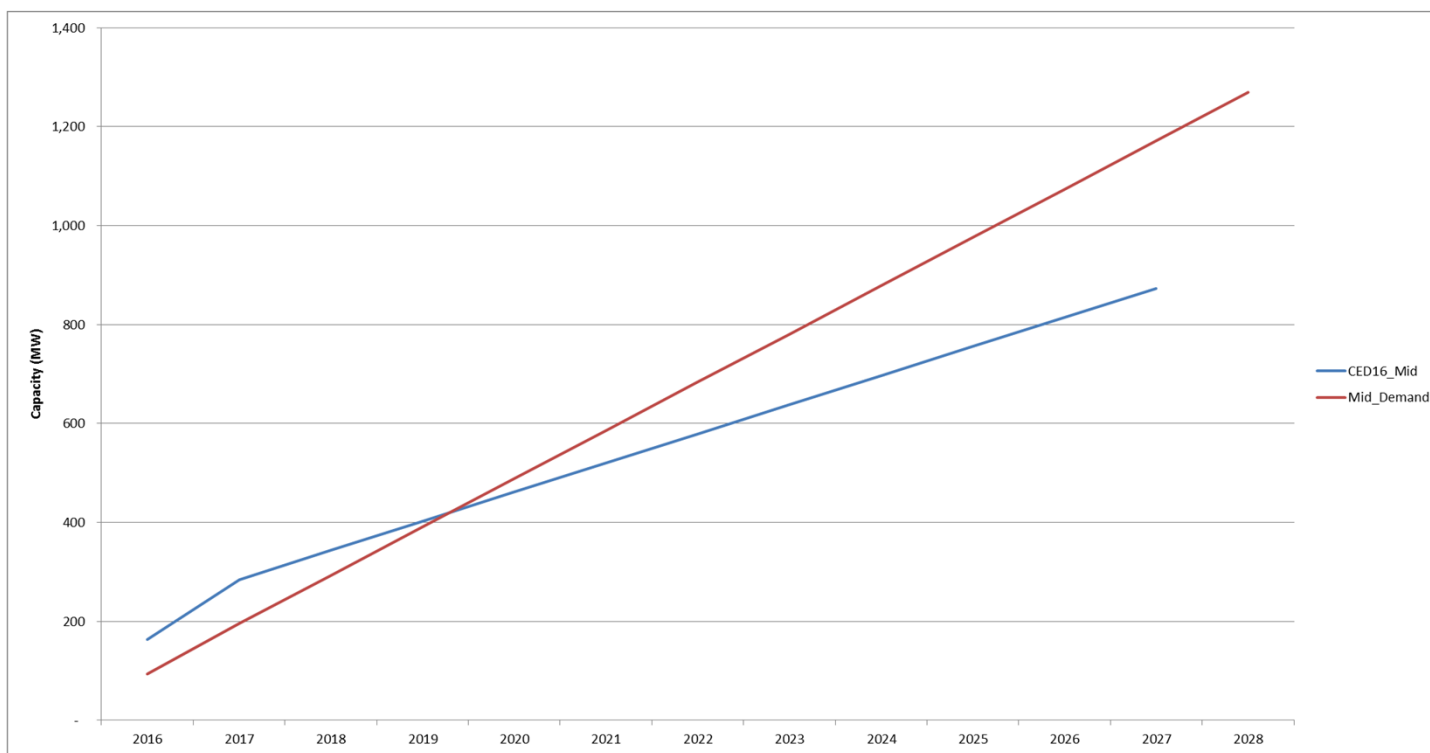
Statewide Results (Non-PV)

New mid case grows ~4% per year compared to ~3% per year for *CEDU 2016* mid case





Statewide Battery Storage Capacity (MW)





Residential New Construction PV

- Focus on single family homes
- Serves as proxy for ZNE
- Accounting of upcoming 2019 building standards
 - Baseline forecast vs managed forecast



Key Uncertainties

- Rate and NEM reform
- Technology cost/performance trends
- Regulatory/utility transition
- Development of market opportunities for aggregating preferred resources in retail and wholesale markets



Next Steps

- Near Term:
 - Update historical data
 - Complete storage analysis
 - Incorporate stakeholder comments for revised forecast
 - Kickoff project with NREL to prepare for 2018/2019 IEPR
- Longer Term:
 - Rulemaking proceeding to modernize data collection activities related to DERs
 - Coordination with stakeholders in other venues regarding IEPR demand forecast
 - DRP, TPP, IRP