

DOCKETED	
Docket Number:	18-IEPR-04
Project Title:	Energy Demand Forecast Update
TN #:	226032
Document Title:	Behind-the-Meter PV Forecast
Description:	*** THIS DOCUMENT SUPERSEDES TN 226018 *** - Presentation by Sudhakar Konala, Energy Commission
Filer:	Raquel Kravitz
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	12/6/2018 2:30:53 PM
Docketed Date:	12/6/2018



Behind-the-Meter PV Forecast

Sudhakar Konala

Demand Analysis Office

Energy Assessments Division

Sudhakar.Konala@energy.ca.gov



Scenario Definitions

❑ High = High Electricity Demand Case

- High economic / demographic growth → high growth in building stock
- Low electricity rates
- Low PV adoption

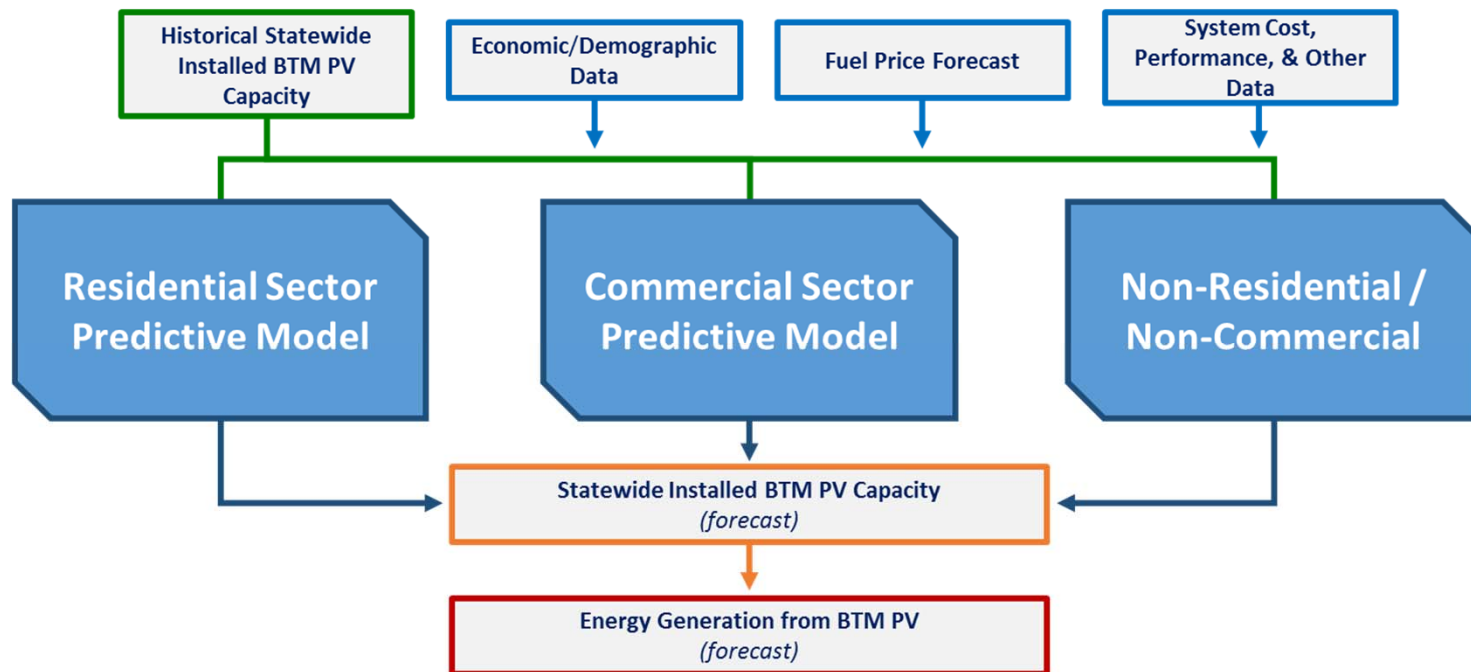
❑ Low = Low Electricity Demand Case

- Low economic / demographic growth → low growth in building stock
- High electricity rates
- High PV adoption

❑ Mid = Mid Electricity Demand Case



Energy Commission PV Model



- Residential and commercial models predict PV penetration based on calculated payback / bill savings.



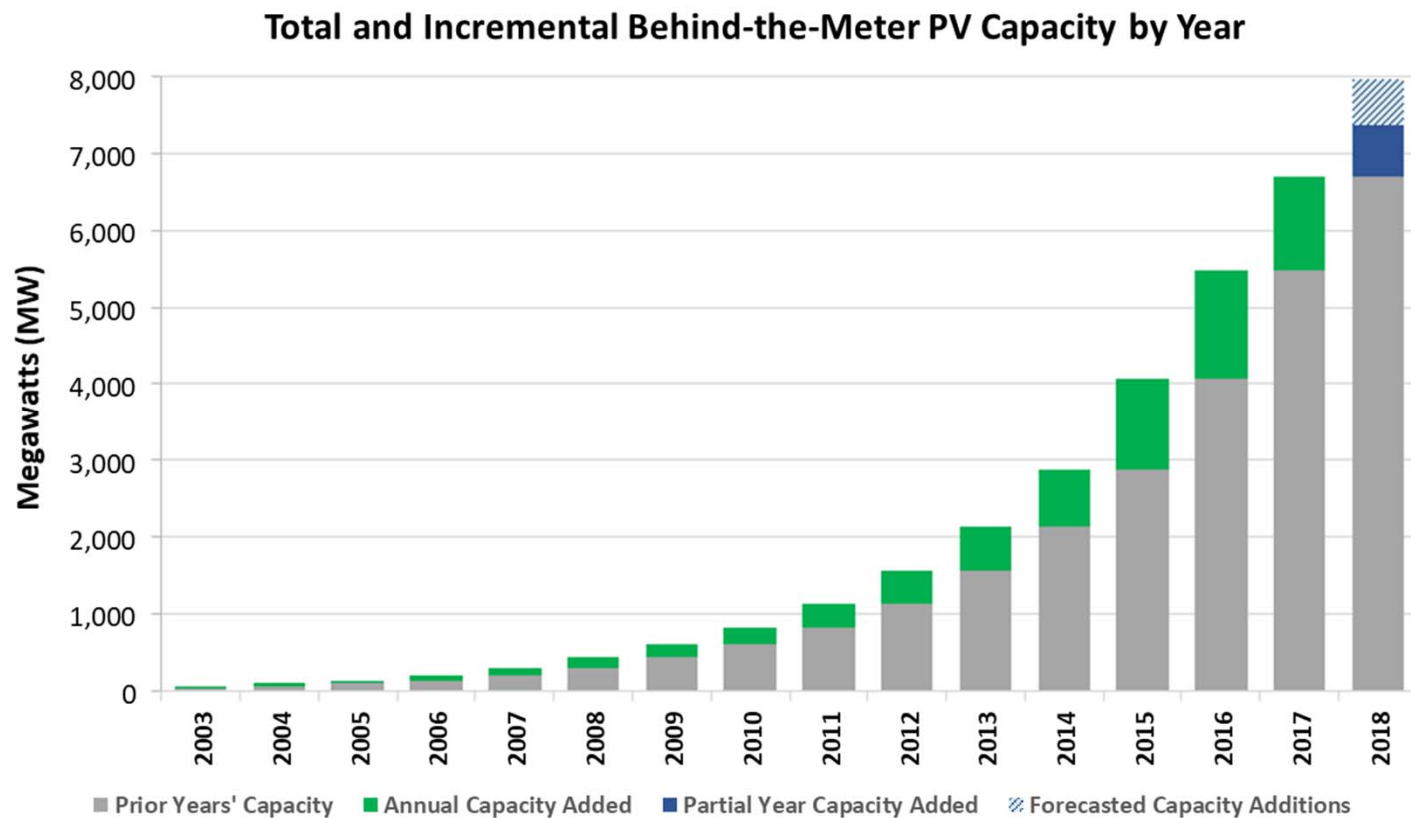
Updated Inputs for 2018 PV Forecast



- PV installed capacity
- Demographic / economic data
- Forecast of electricity rates
- PV Installation costs



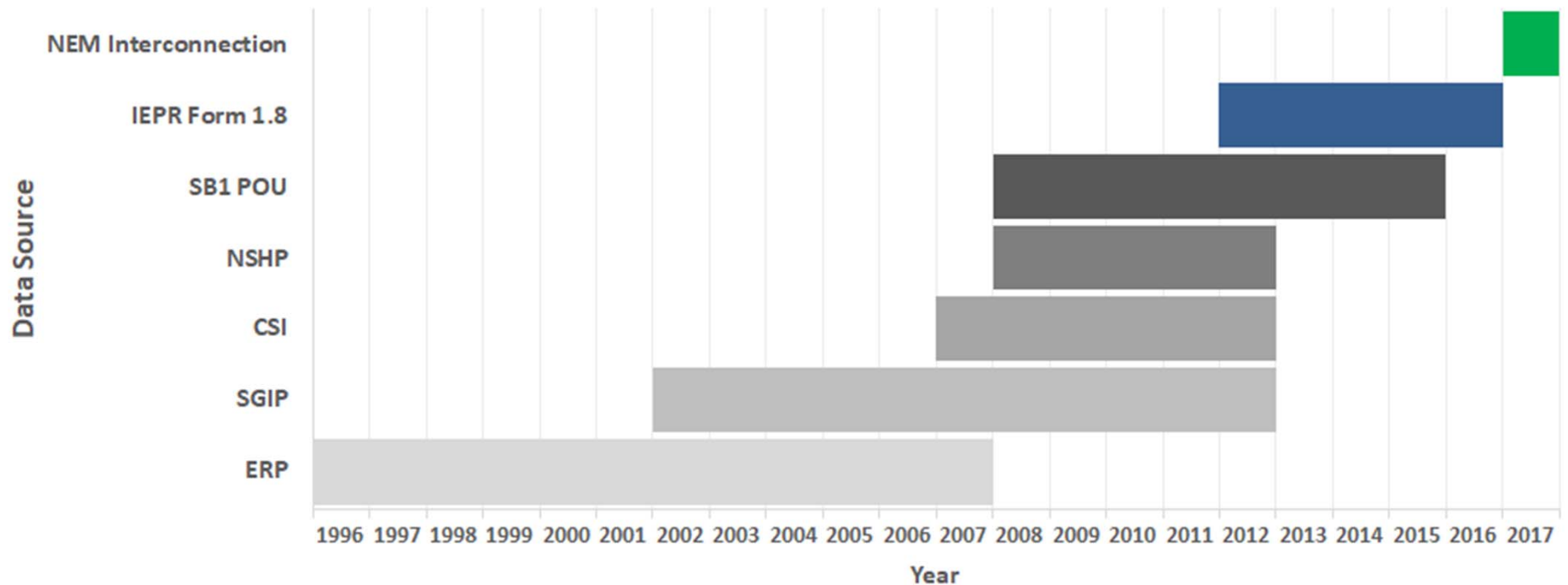
Historical Statewide PV Installations





Where Does Installation Data Come From?

Sources of Historical BTM PV Installation Data



Sources: Net Energy Meeting (NEM) Currently Interconnected Dataset, CEC IEPR Form 1.8, SB1 POU, New Solar Homes Partnership (NSHP), California Solar Initiative (CSI), Self-Generation Incentive Program (SGIP), Emerging Renewables Program (ERP). www.californiadgstats.ca.gov/downloads/



Input Changes Drive Forecast Changes

- Changes in forecast of building count and electric rates.
- Change in market share methodology (in high case).

	High Electricity Demand		Low Electricity Demand	
INPUTS	Δ from 2017 forecast	Effect on PV forecast	Δ from 2017 forecast	Effect on PV forecast
RESIDENTIAL				
Building count	↓	—	↓	—
Electric rates	↓	—	↓	—
Market share methodology	↑	+	No Change	
COMMERCIAL				
Floor space / building count	↑	+	↑	+
Electric rates	↓	—	↑	+



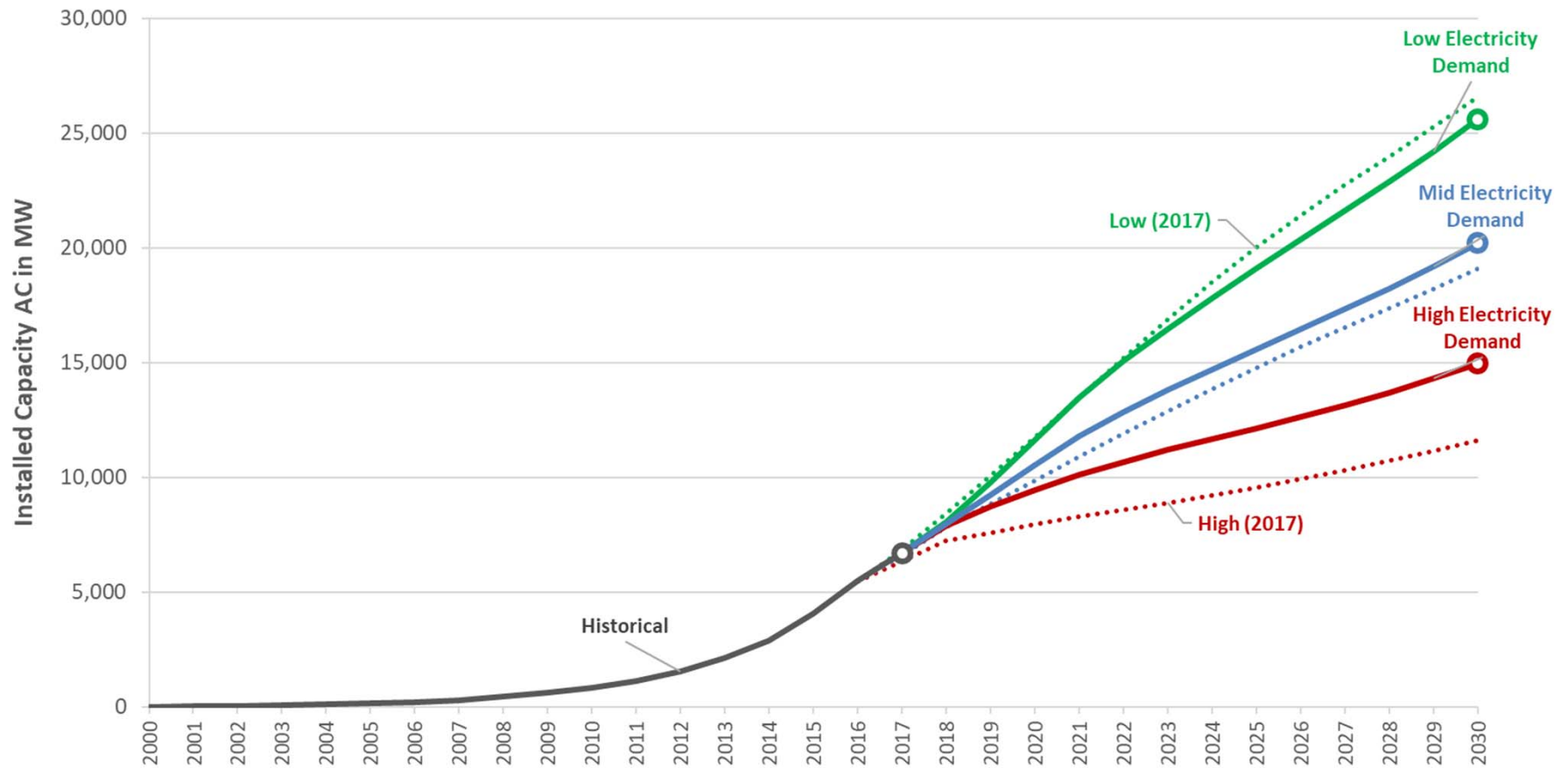
STATEWIDE FORECAST



California Energy Commission

2018 Baseline PV Forecast

BTM PV - Statewide Capacity



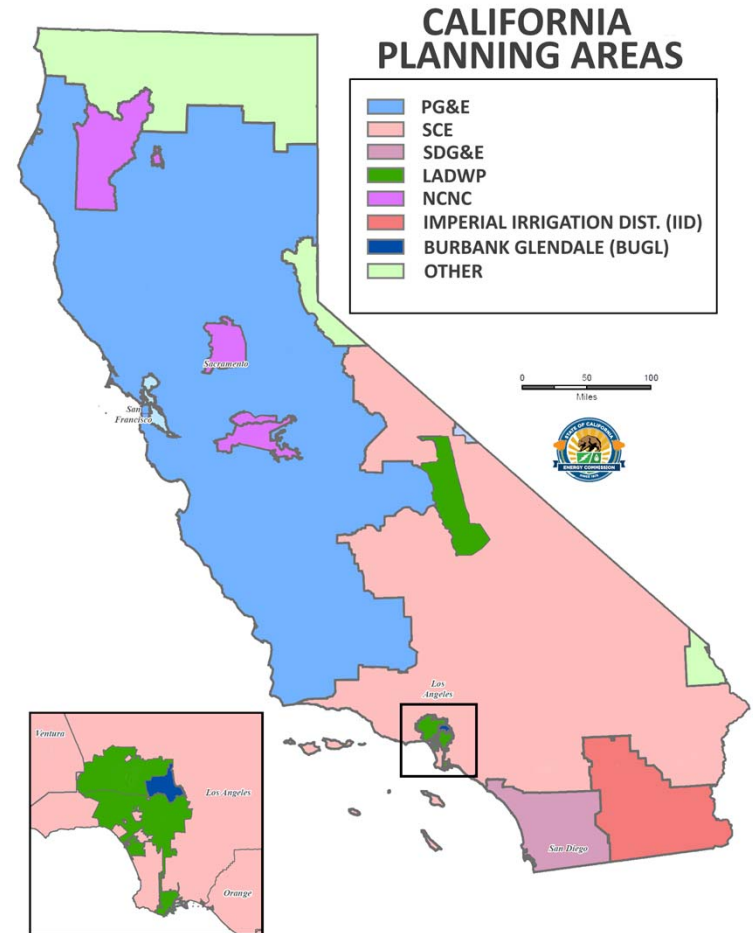


2018 Baseline PV Forecast

- Forecast results are shown for 2030

Capacity (MW)

Planning Area	High Demand	Low Demand	Mid Demand
BUGL	49	70	59
IID	131	203	166
LADWP	586	783	683
NCNC	497	946	719
OTHER	20	20	20
PGE	6,710	12,227	9,440
SCE	5,085	8,675	6,840
SDGE	1,876	2,690	2,275
Statewide	14,954	25,613	20,203
Δ 2017 IEPR	+ 3,363	- 951	+ 1,125



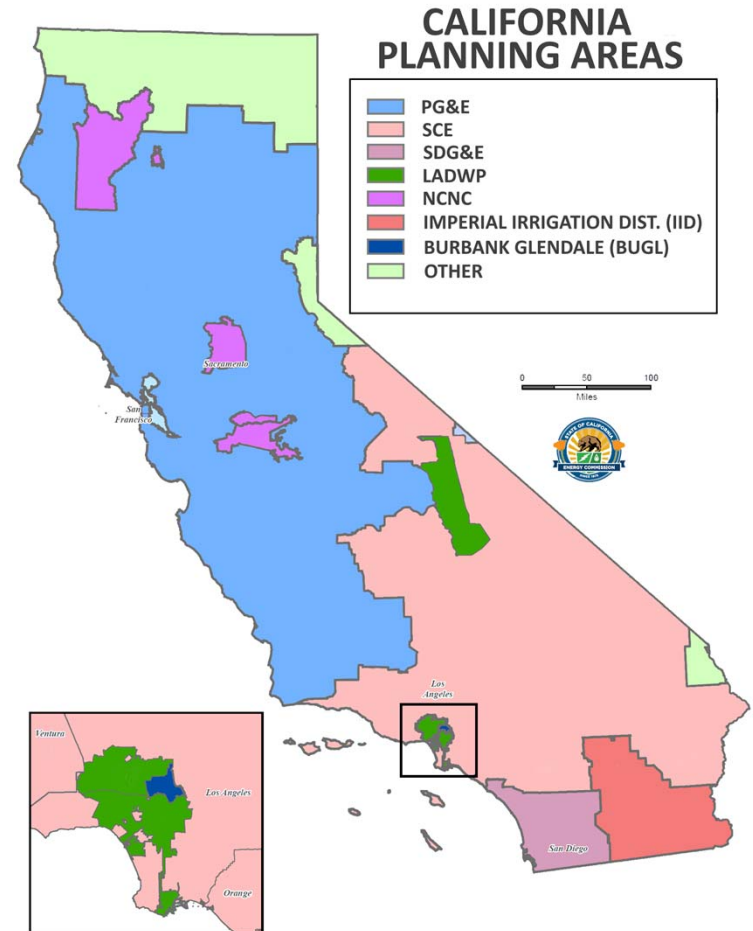


2018 Baseline PV Forecast

- Forecast results are shown for 2030

Energy (GWh)

Planning Area	High Demand	Low Demand	Mid Demand
BUGL	85	120	102
IID	226	348	286
LADWP	1,007	1,344	1,173
NCNC	858	1,638	1,244
OTHER	34	34	34
PGE	11,553	21,156	16,306
SCE	9,020	15,452	12,169
SDGE	3,300	4,710	3,991
Statewide	26,083	44,804	35,305
Δ 2017 IEPR	+ 5,913	-1,832	+1,902





AAPV Forecast Update

- Additional achievable photovoltaic (AAPV) adoption
 - Accounts for PV system requirements for new homes (2019 Title 24 standards)
 - In baseline forecast, a certain percentage of new homes adopt PV systems
 - AAPV = difference between PV adoptions for new homes due to 2019 Title 24 regulations vs. new home PV adoptions already in baseline forecast
- AAPV assumptions same as 2017 IEPR AAPV Forecast
 - Expected level of compliance (Low = 90%, Mid = 80%, High = 70%)
 - Average PV system size for new homes



2030 AAPV Forecast Results

- Higher baseline forecast and lower overall household growth (compared to 2017 IEPR) are “squeezing” the AAPV forecast.

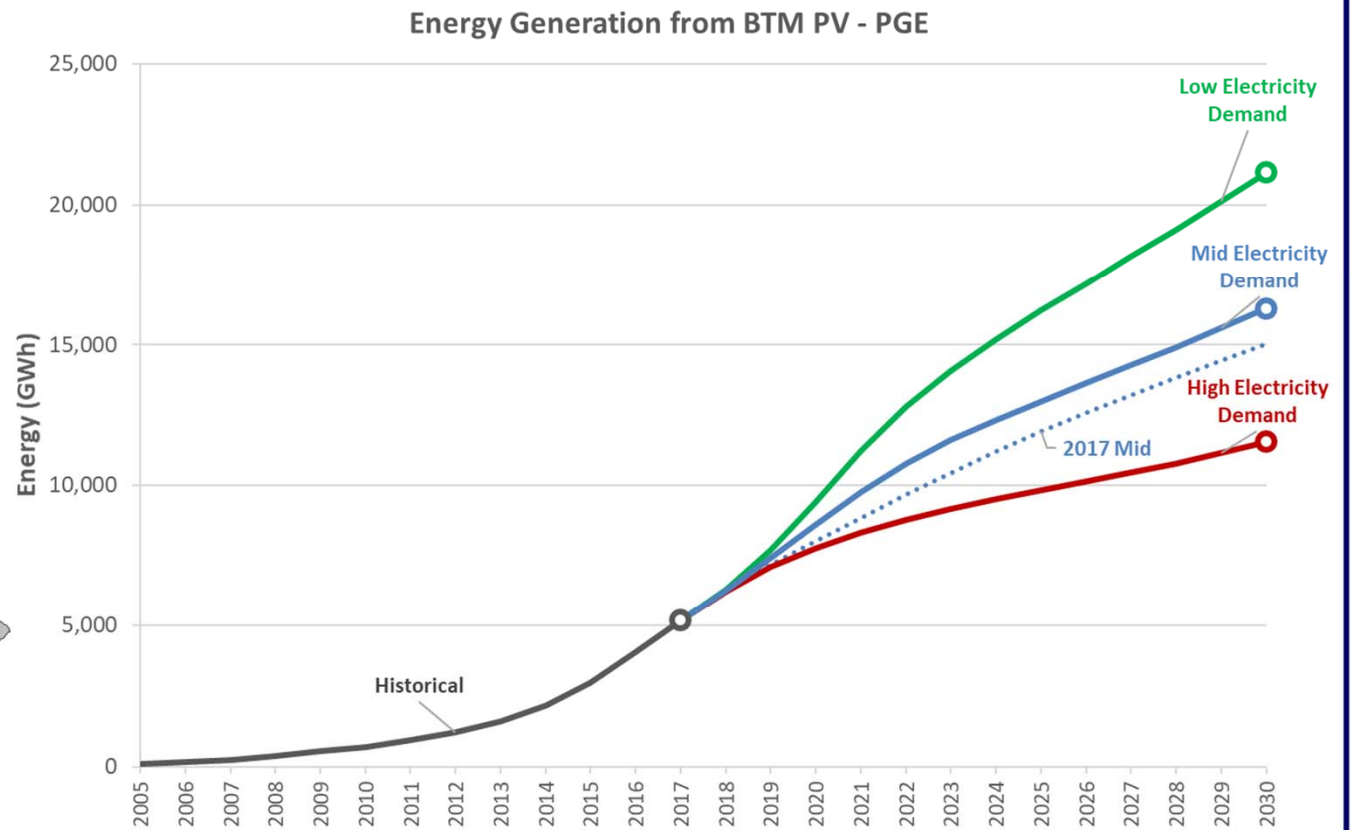
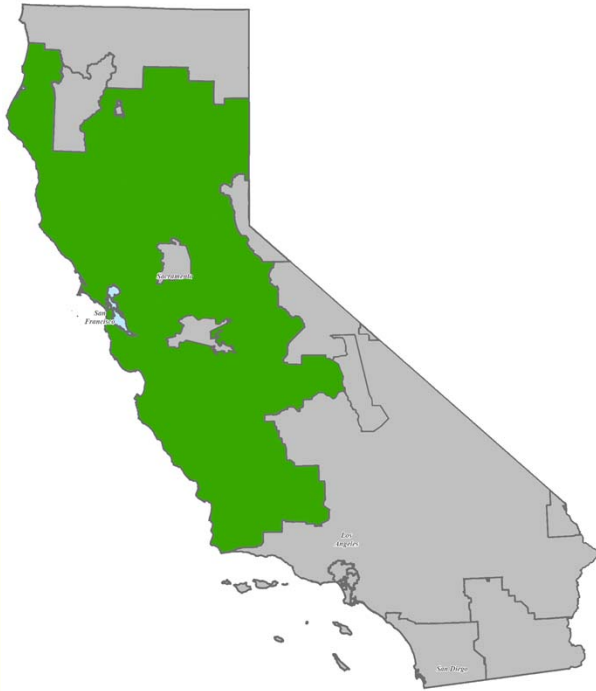
Planning Area	High Demand		Low Demand		Mid Demand	
	Baseline	AAPV	Baseline	AAPV	Baseline	AAPV
BUGL	49	5	70	9	59	7
IID	131	76	203	85	166	80
LADWP	586	104	783	162	683	133
NCNC	497	206	946	229	719	217
OTHER	20	-	20	-	20	-
PGE	6,710	905	12,227	418	9,440	662
SCE	5,085	813	8,675	575	6,840	694
SDGE	1,876	181	2,690	129	2,275	155
Statewide	14,954	2,290	25,613	1,607	20,203	1,949



UTILITY / PLANNING AREA FORECASTS



PGE Baseline Forecast

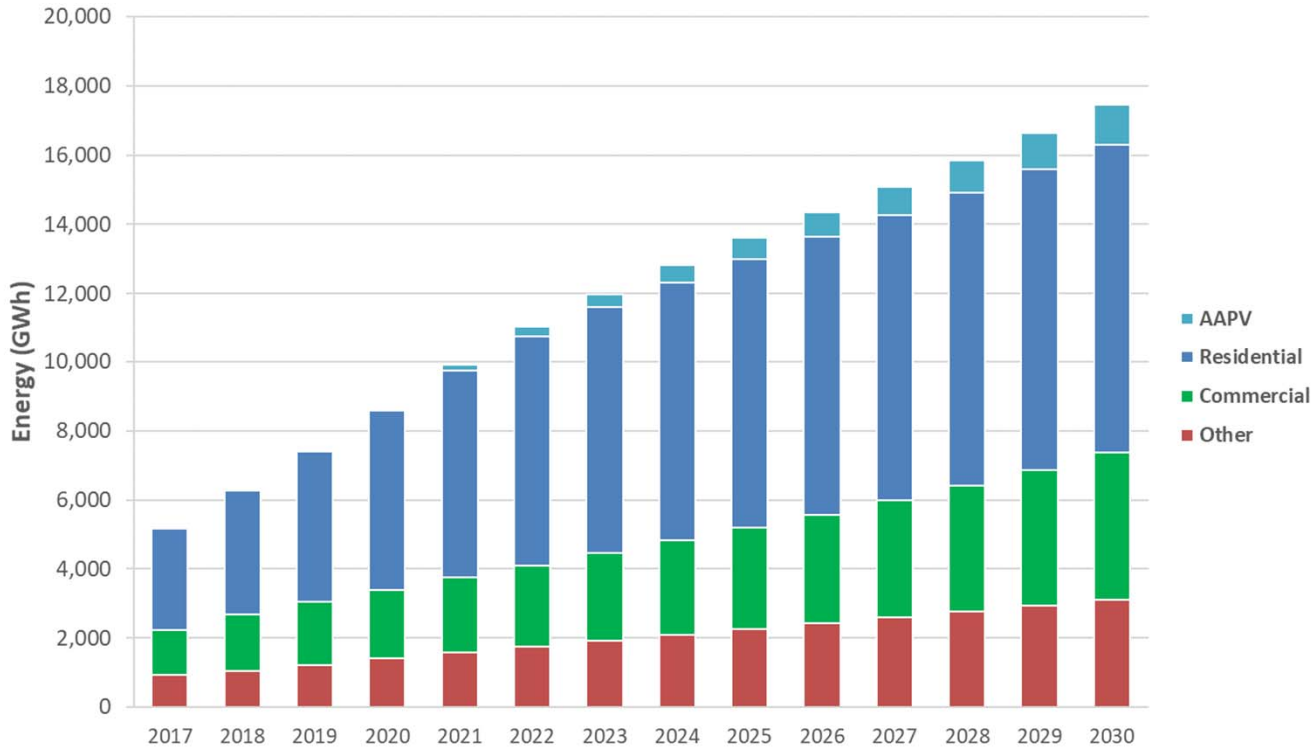




California Energy Commission

PGE Forecast by Sector

PGE BTM PV Forecast by Sector - Mid Case



Capacity (MW)

Sector	2017	2030	%
Residential	1,769	5,143	8.6%
Commercial	825	2,501	8.9%
Other	526	1,796	9.9%
Total	3,120	9,440	8.9%
AAPV	-	662	-

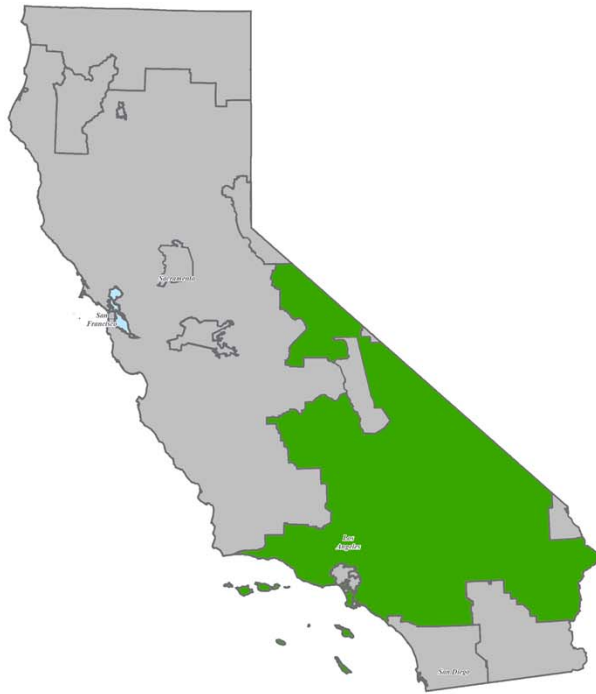
Energy (GWh)

Sector	2017	2030	%
Residential	2,937	8,939	8.9%
Commercial	1,309	4,266	9.5%
Other	931	3,100	9.7%
Total	5,177	16,306	9.2%
AAPV	-	1,146	-

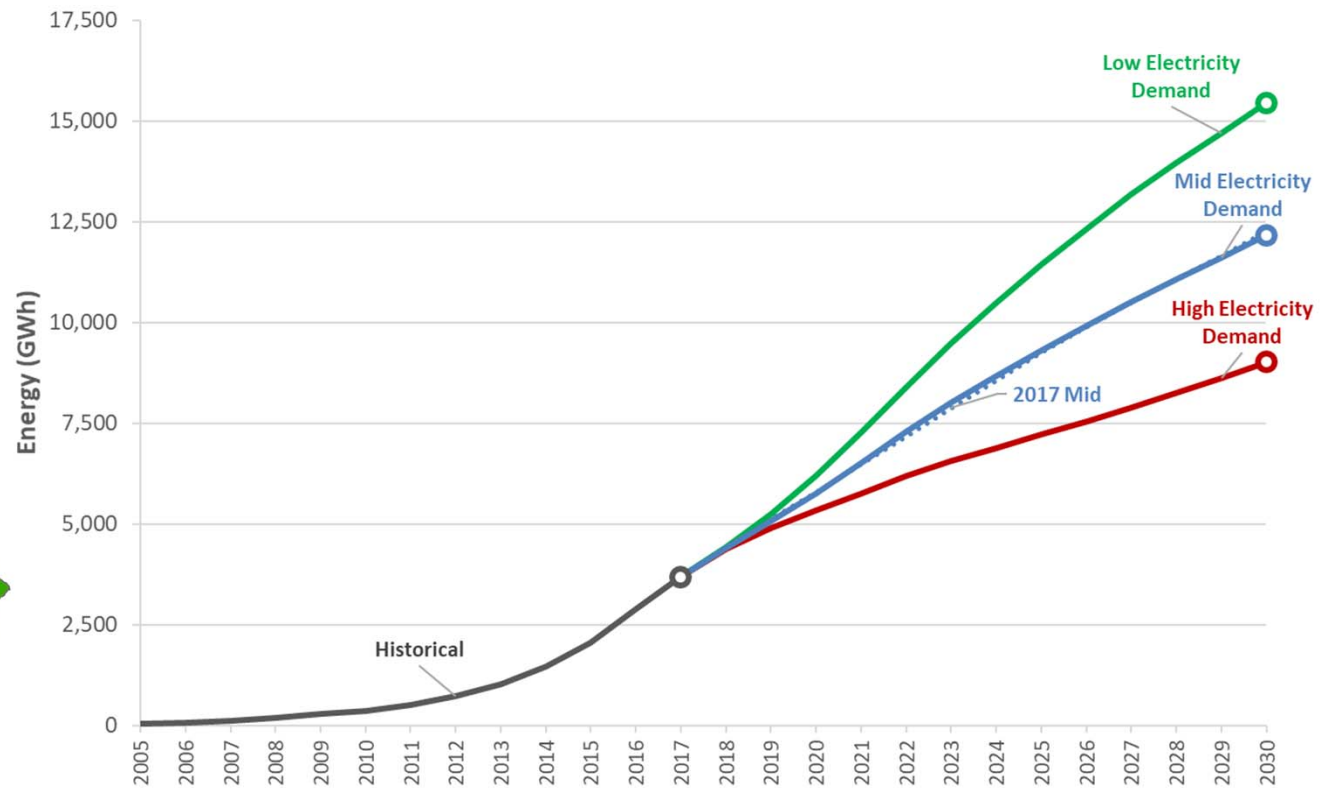


California Energy Commission

SCE Baseline Forecast



Energy Generation from BTM PV - SCE

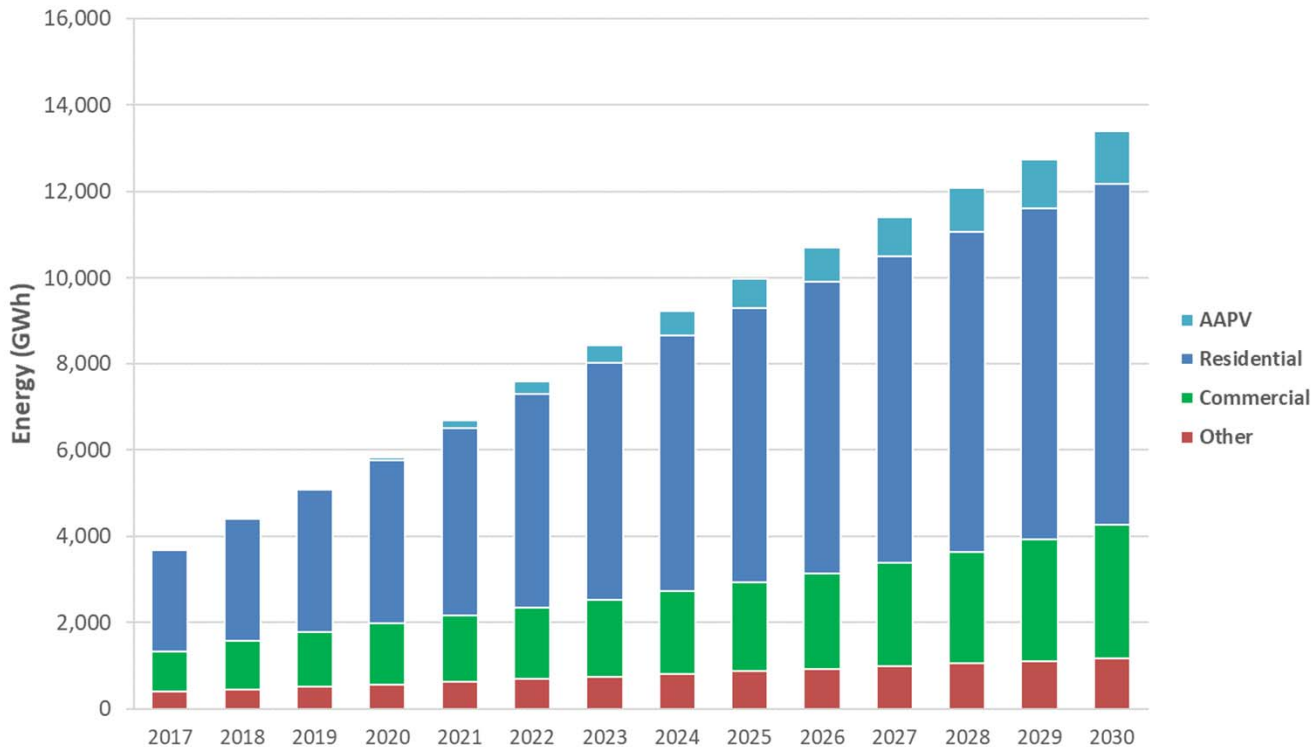




California Energy Commission

SCE Forecast by Sector

SCE BTM PV Forecast by Sector - Mid Case



Capacity (MW)

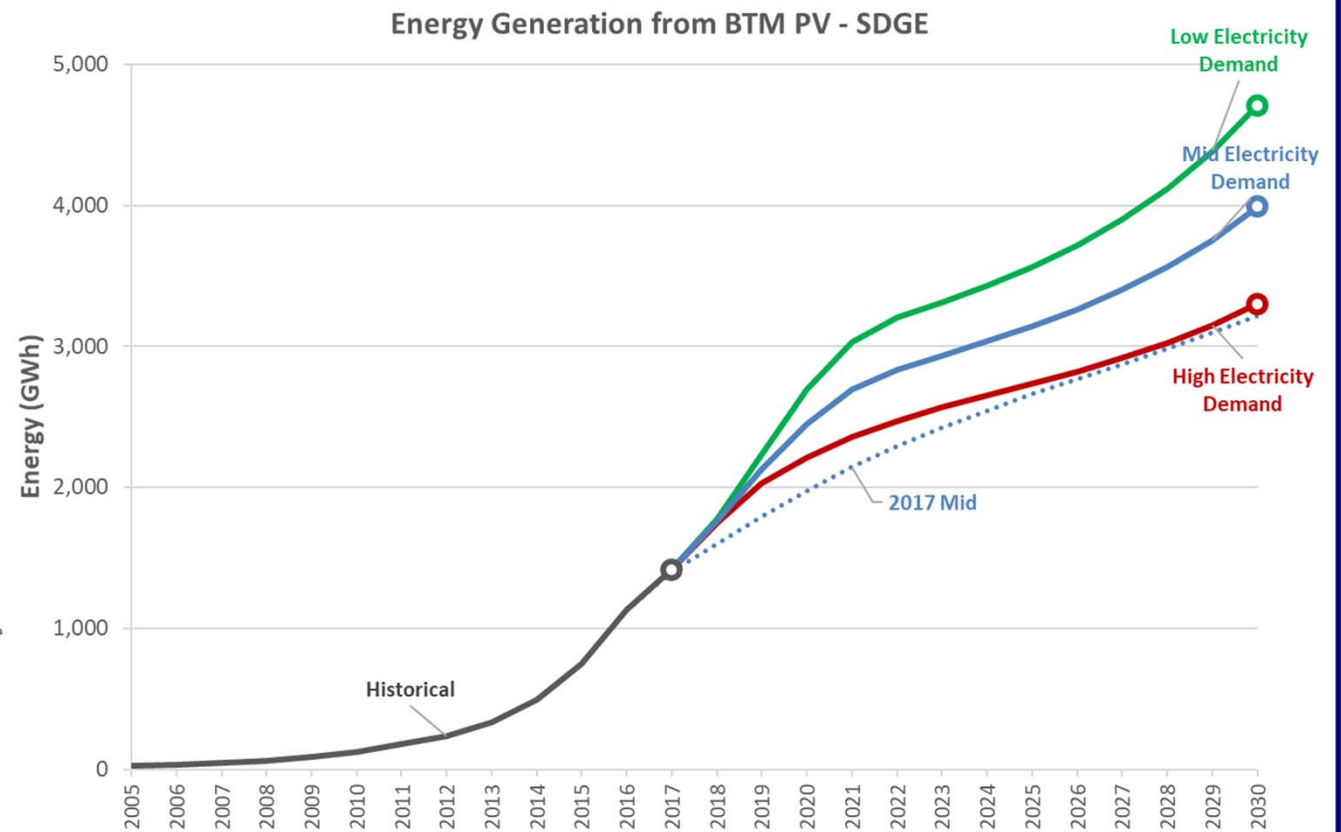
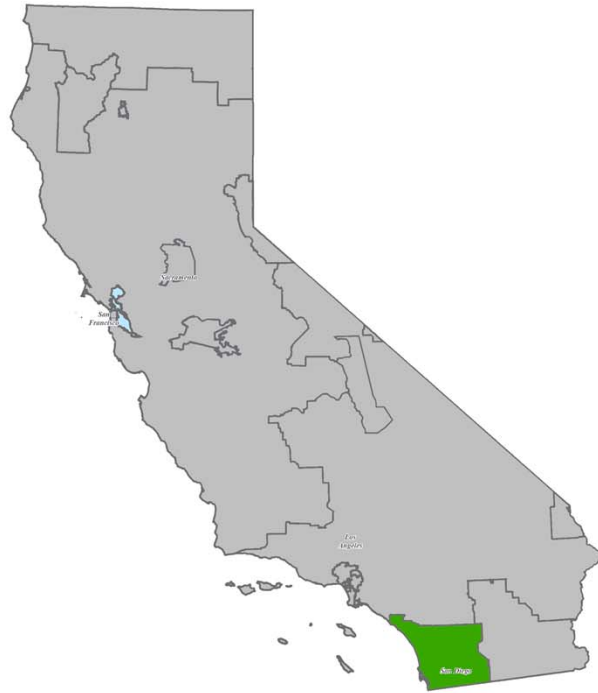
Sector	2017	2030	%
Residential	1,378	4,417	9.4%
Commercial	562	1,782	9.3%
Other	206	641	9.1%
Total	2,146	6,840	9.3%
AAPV	-	694	-

Energy (GWh)

Sector	2017	2030	%
Residential	2,366	7,894	9.7%
Commercial	909	3,109	9.9%
Other	413	1,166	8.3%
Total	3,689	12,169	9.6%
AAPV	-	1,234	-



SDGE Baseline Forecast

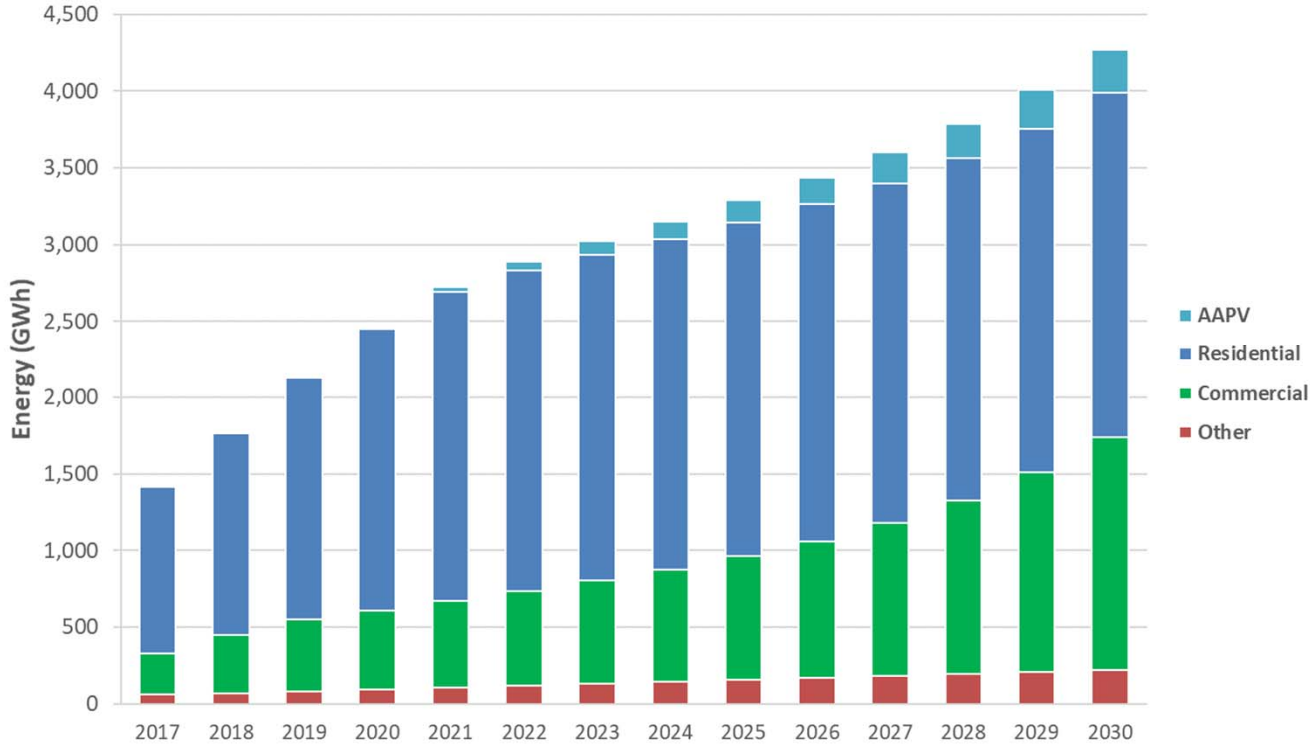




California Energy Commission

SDGE Forecast by Sector

SDGE BTM PV Forecast by Sector - Mid Case



Capacity (MW)

Sector	2017	2030	%
Residential	631	1,262	5.5%
Commercial	171	890	13.5%
Other	32	123	10.9%
Total	835	2,275	8.0%
AAPV	-	155	-

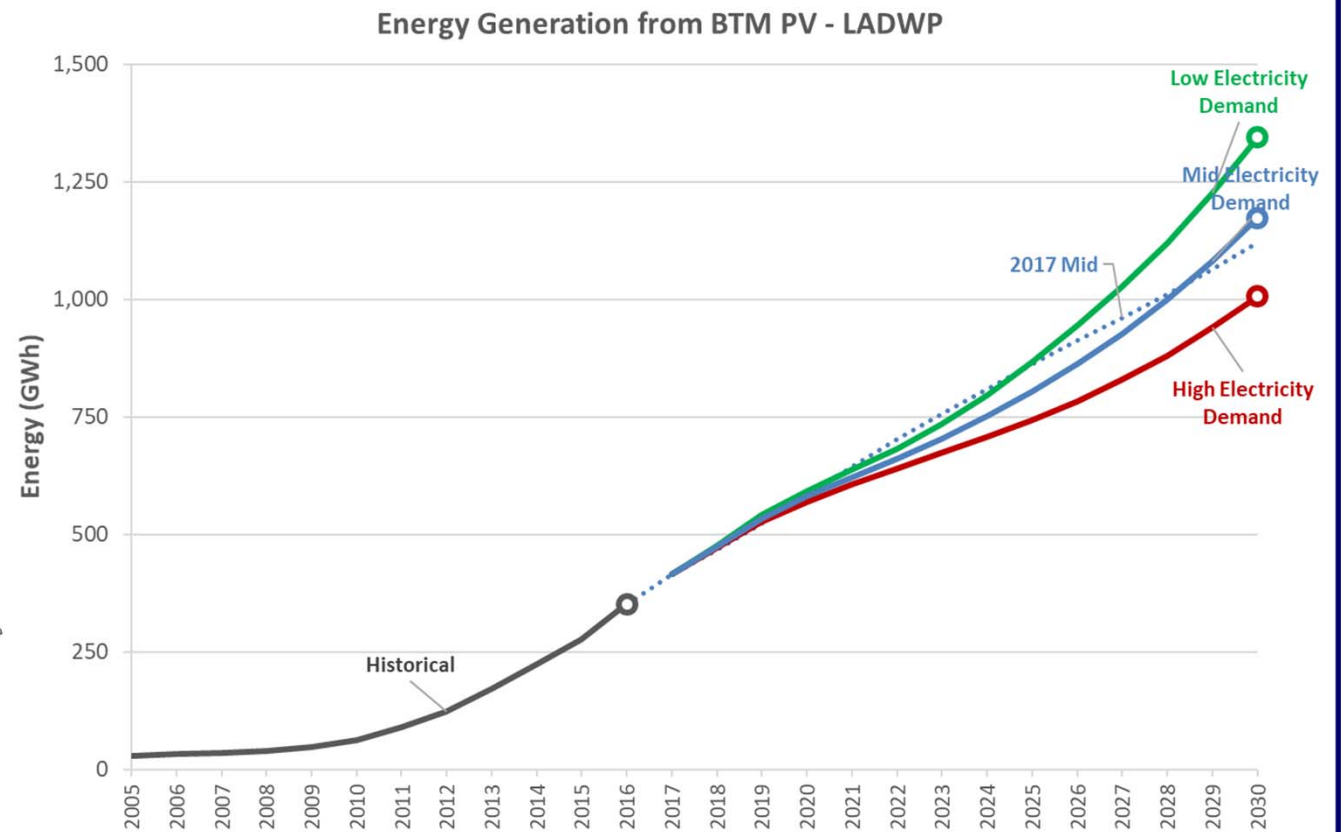
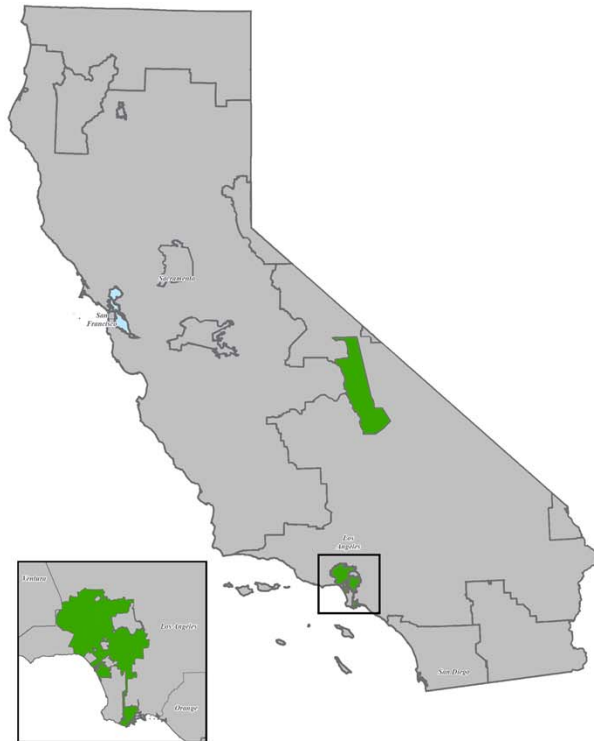
Energy (GWh)

Sector	2017	2030	%
Residential	1,088	2,254	5.8%
Commercial	269	1,518	14.2%
Other	60	219	10.5%
Total	1,417	3,991	8.3%
AAPV	-	277	-



California Energy Commission

LADWP Baseline Forecast

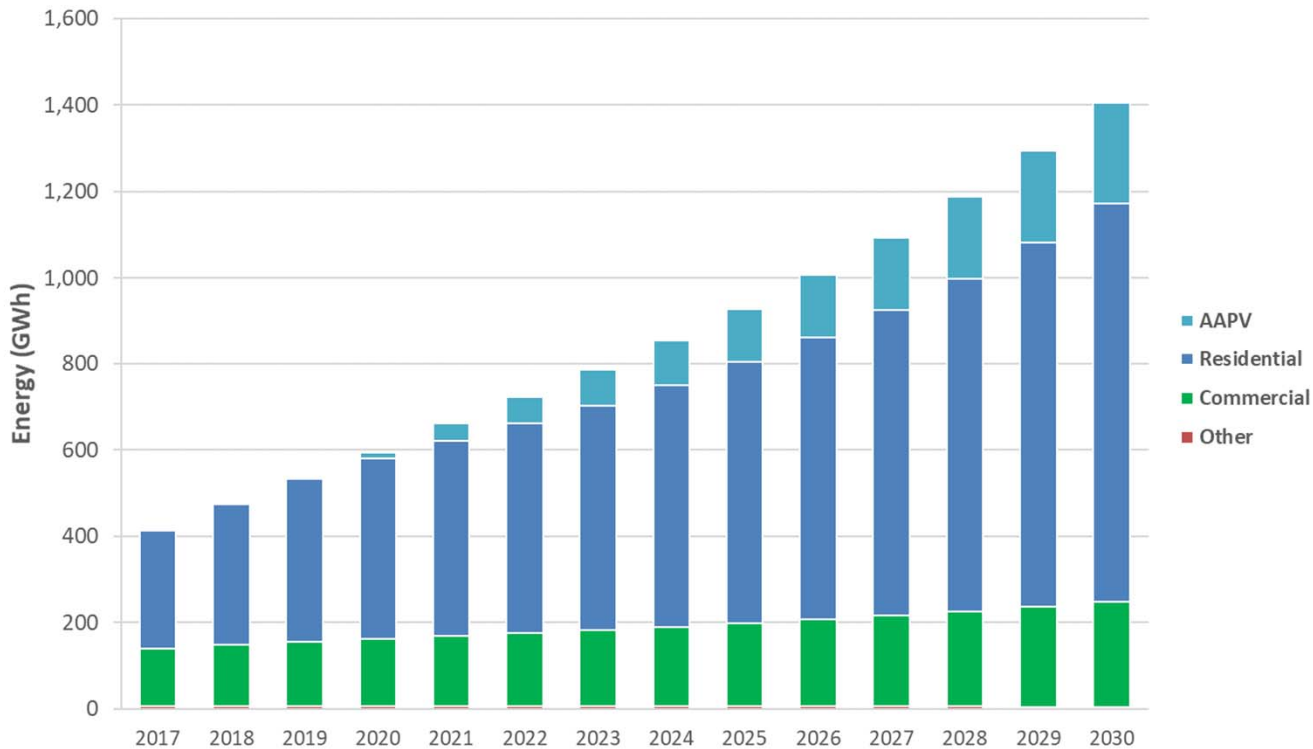




California Energy Commission

LADWP Forecast by Sector

LADWP BTM PV Forecast by Sector - Mid Case



Capacity (MW)

Sector	2017	2030	%
Residential	159	537	9.8%
Commercial	77	143	4.8%
Other	3	3	-
Total	239	683	8.4%
AAPV	-	133	-

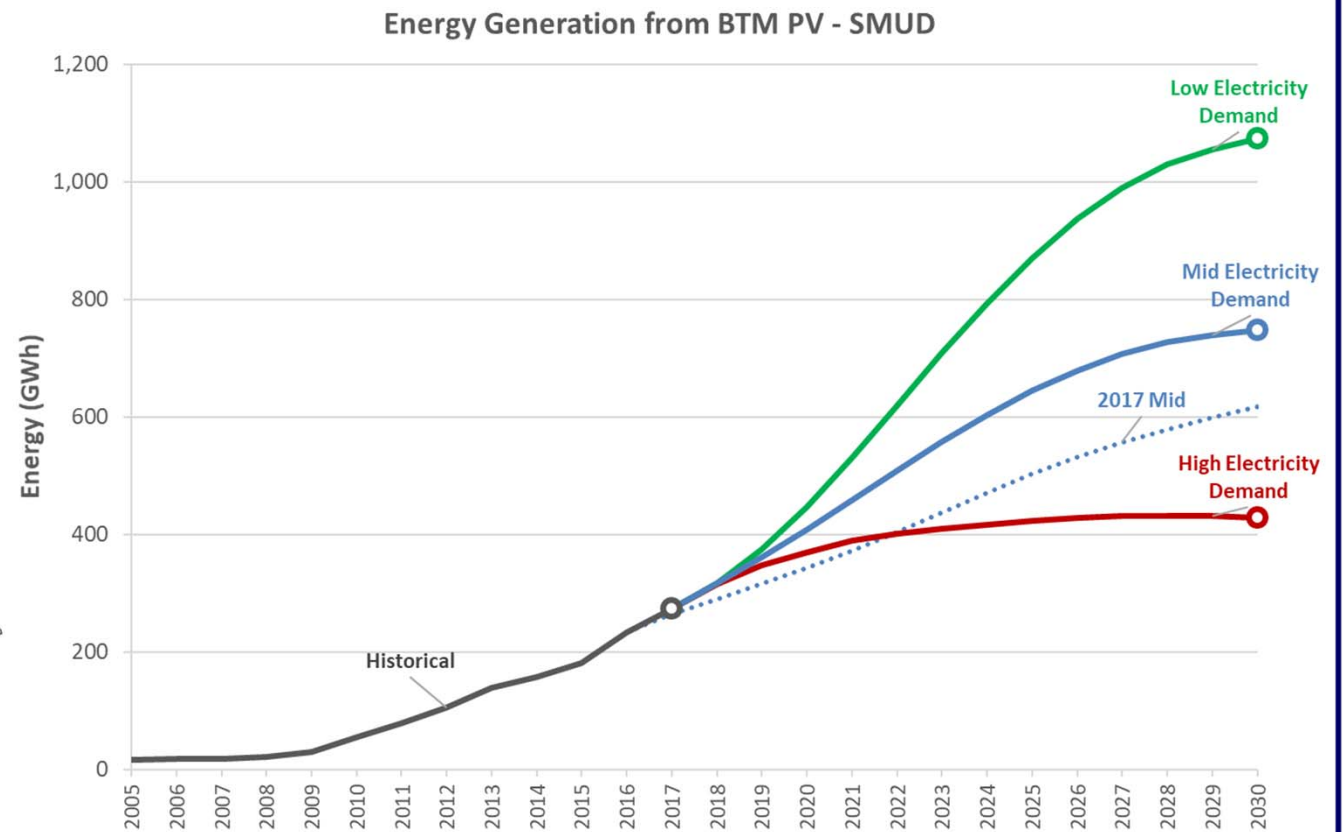
Energy (GWh)

Sector	2017	2030	%
Residential	274	924	9.8%
Commercial	135	243	4.7%
Other	6	6	-0.5%
Total	414	1,173	8.3%
AAPV	-	233	-



California Energy Commission

SMUD Baseline Forecast

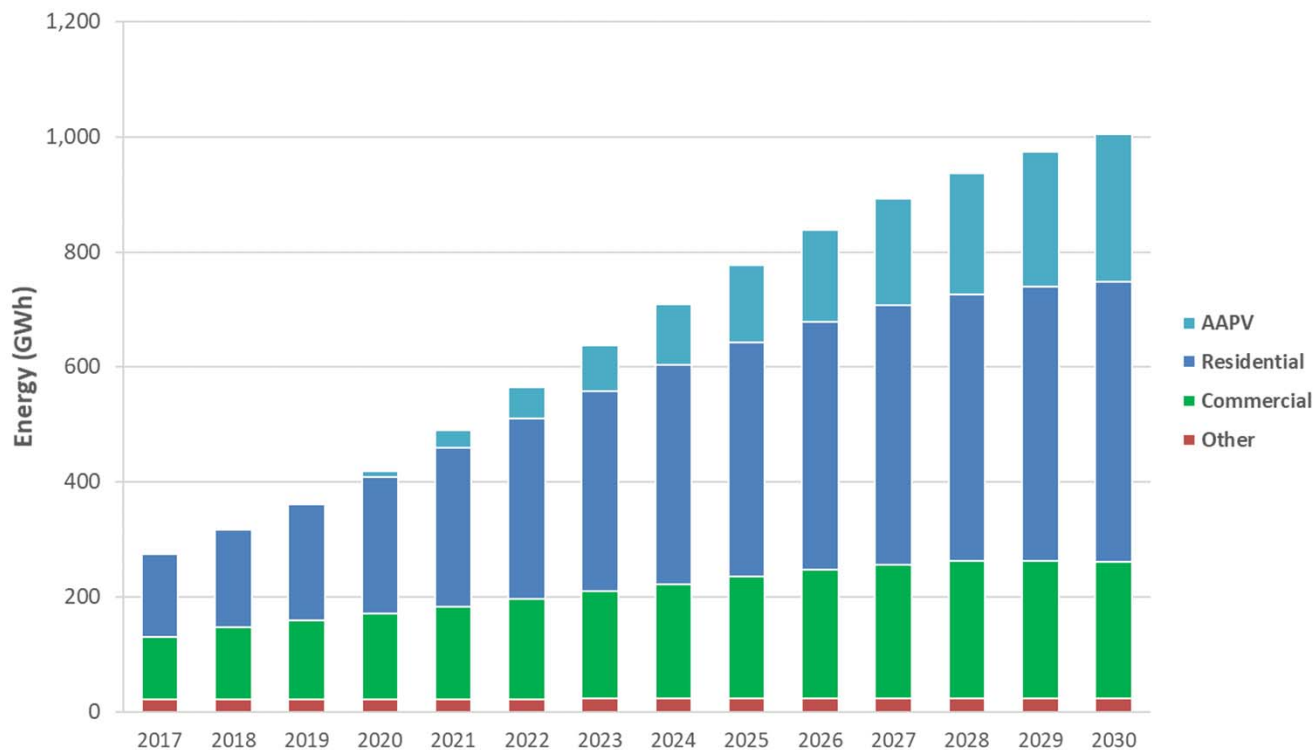




California Energy Commission

SMUD Forecast by Sector

SMUD BTM PV Forecast by Sector - Mid Case



Capacity (MW)

Sector	2017	2030	%
Residential	86	281	9.5%
Commercial	65	137	5.9%
Other	7	9	1.9%
Total	158	427	8.0%
AAPV	-	150	-

Energy (GWh)

Sector	2017	2030	%
Residential	143	487	9.9%
Commercial	109	238	6.2%
Other	22	24	0.7%
Total	274	748	8.0%
AAPV	-	257	-