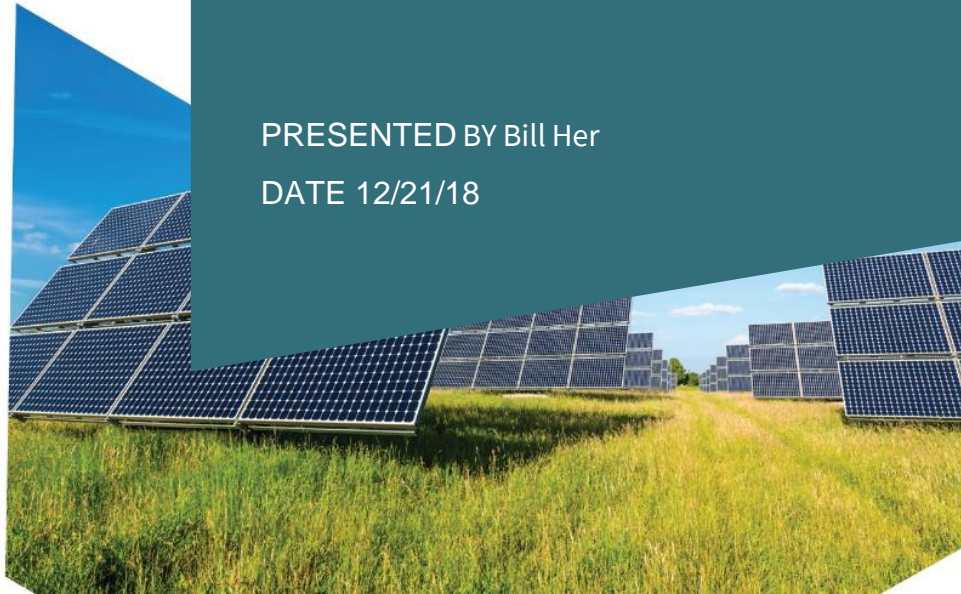




Power Resources Update

PRESENTED BY Bill Her

DATE 12/21/18

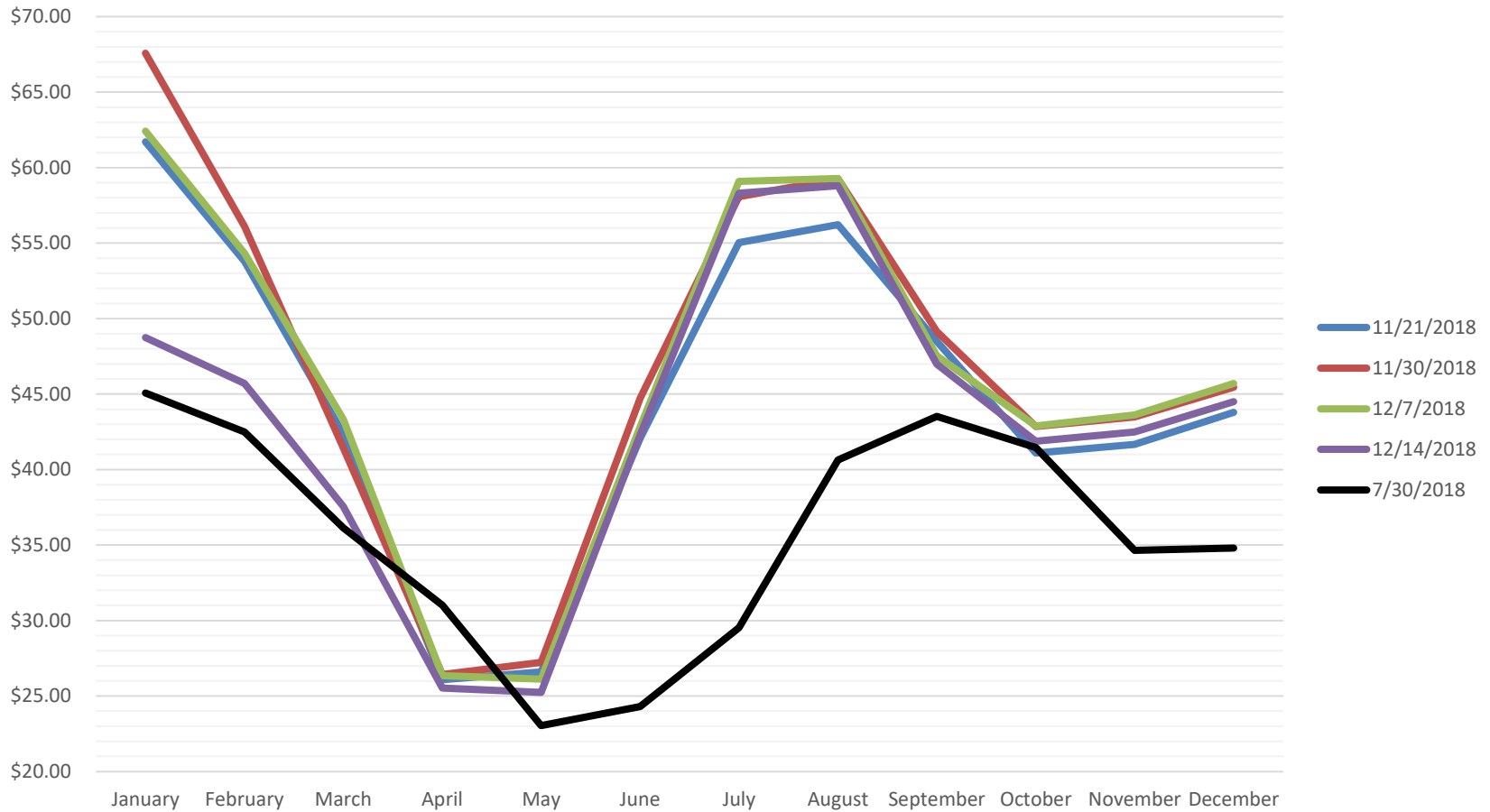


Agenda

- Current Energy Markets Overview
- Resource Adequacy Overview
- CA RFP Update
- OCEI RFP Update

Recent Market Volatility

2019 Forward Curve Prices \$/MWh



Recent Market Volatility

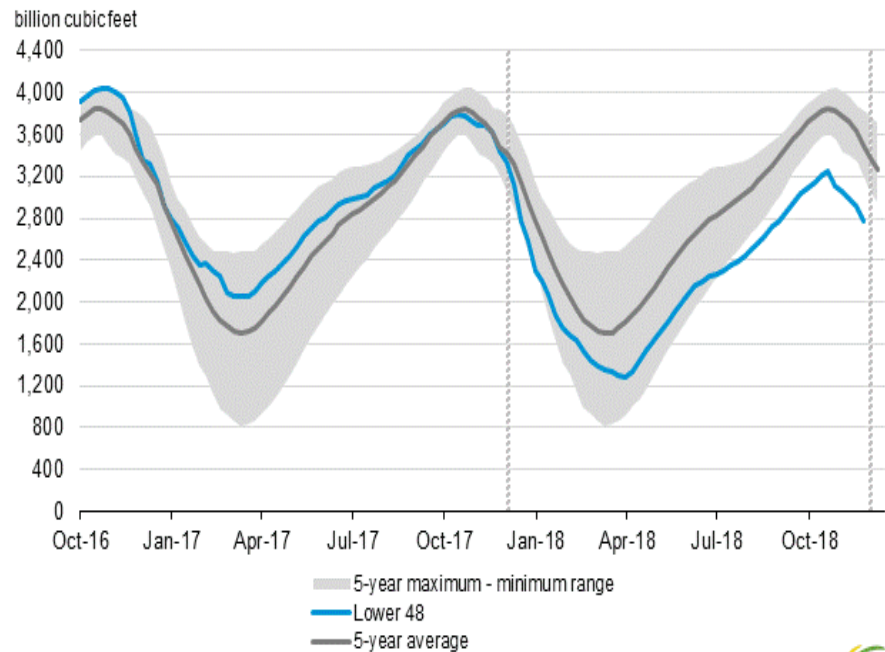
Historical Spot Market Prices vs 2019 Future Prices for Energy

	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010
January	\$ 49.13	\$ 34.15	\$ 35.83	\$ 29.31	\$ 34.82	\$ 47.60	\$ 38.64	\$ 27.75	\$ 33.53	\$ 48.23
February	\$ 46.15	\$ 31.41	\$ 29.75	\$ 24.71	\$ 31.64	\$ 63.83	\$ 39.03	\$ 25.78	\$ 32.73	\$ 44.60
March	\$ 37.86	\$ 31.07	\$ 22.74	\$ 20.08	\$ 31.43	\$ 49.02	\$ 41.63	\$ 22.35	\$ 26.27	\$ 40.65
April	\$ 25.91	\$ 25.85	\$ 22.85	\$ 21.85	\$ 32.92	\$ 48.48	\$ 43.70	\$ 21.45	\$ 26.47	\$ 35.22
May	\$ 25.63	\$ 21.95	\$ 30.17	\$ 21.96	\$ 33.47	\$ 48.39	\$ 40.17	\$ 24.74	\$ 24.70	\$ 31.62
June	\$ 42.93	\$ 29.43	\$ 34.74	\$ 30.23	\$ 37.87	\$ 48.66	\$ 41.89	\$ 26.25	\$ 27.36	\$ 28.58
July	\$ 59.81	\$ 57.72	\$ 37.48	\$ 34.59	\$ 38.84	\$ 51.04	\$ 44.30	\$ 27.78	\$ 33.42	\$ 35.72
August	\$ 60.39	\$ 51.77	\$ 46.56	\$ 36.26	\$ 37.56	\$ 50.66	\$ 41.12	\$ 35.07	\$ 35.45	\$ 34.51
September	\$ 48.34	\$ 34.82	\$ 40.97	\$ 35.71	\$ 36.48	\$ 48.32	\$ 42.28	\$ 32.46	\$ 37.33	\$ 36.49
October	\$ 42.39	\$ 44.23	\$ 42.39	\$ 34.92	\$ 33.67	\$ 46.91	\$ 40.01	\$ 37.09	\$ 32.57	\$ 34.67
November	\$ 42.96	\$ 53.97	\$ 37.40	\$ 30.85	\$ 30.30	\$ 46.56	\$ 42.15	\$ 36.07	\$ 32.89	\$ 36.37
December	\$ 45.00	\$ 65.91	\$ 35.32	\$ 37.63	\$ 29.58	\$ 39.08	\$ 51.06	\$ 33.72	\$ 31.71	\$ 35.12
Average	\$ 43.87	\$ 40.19	\$ 34.68	\$ 29.84	\$ 34.05	\$ 49.05	\$ 42.16	\$ 29.21	\$ 31.20	\$ 36.82
Annual Costs for 6,700 Gigawatt Hours	\$ 295,767,928	\$ 271,979,556	\$ 233,504,861	\$ 201,251,684	\$ 228,186,380	\$ 327,243,242	\$ 282,720,111	\$ 196,348,819	\$ 209,417,141	\$ 246,185,294
Deviation from Average (%)	19%	9%	-6%	-19%	-8%	31%	13%	-21%	-16%	-1%
Deviation from Average (\$)	\$ 46,507,427	\$ 22,719,055	\$ (15,755,641)	\$ (48,008,818)	\$ (21,074,122)	\$ 77,982,740	\$ 33,459,609	\$ (52,911,683)	\$ (39,843,360)	\$ (3,075,207)

Reasons

- Market driven by natural gas prices
- Low storage levels
- Cold start to early winter
- Canada pipeline issue reduces supply to the NorthWest

Working gas in underground storage compared with the 5-year maximum and minimum



Source: U.S. Energy Information Administration



Resource Adequacy Overview

- Process by which Load Serving Entities ensure there are enough resources to supply their demand obligations
- LSE's provide forecast of their demand to CEC
- CPUC calculates and provides RA Requirements
- Different Categories- System, Local*, Flexible
- Year-Ahead vs. Month-Ahead
- Challenges
 - Market Structure
 - Liquidity
 - Requirements Change
 - Regulatory Uncertainty

CA RFP Status Overview

- 25 projects and 18 developers in consideration at this stage of evaluation
- Continuing advanced analytics on optimal portfolio – running 30,000+ portfolio scenarios
- Next step: Select 12-14 projects to move forward in this process
- Form PPA in process
- 1/7/19-1/18/19 Provide form PPA and get redlines back
- 1/23/19: Select 5-7 projects to move forward on full negotiations
- 3/13/19: Complete negotiations with 2-4 counterparties
 - Seek Board approval 3/20/18
- 4/10/19: Complete negotiations with 2-4 counterparties
 - Seek Board approval 4/17/18

CA RFP Procurement Targets

- 4-8 projects
- 500-700MWs
- 1.5-2 million MWhs
- Annual load: ~6TWh
 - 2021 RPS: 36%
 - Long-term (>10yr) contracting 65% of RPS
- Build a diverse portfolio:
 - Pnode vs. hub offers
 - Tenor: 10-20yr
 - Solar and wind
 - Battery storage add-on
 - 2020-2023 COD dates
 - Alameda County, NP15, SP15

OCEI RFP Status Overview

- Current projects include multiple BTM proxy demand response and IFM storage proposals with a wide range of project sizes and varying execution risks
- Next steps: Select final counterparties to move forward on providing form PPA and negotiations
- 1/7/19-1/18/19: Provide form PPA and get initial redlines back
- 1/23/19: Select final projects to move forward on full negotiations
- 3/13/19: Complete negotiations with counterparties
 - Seek Board approval 3/20/19
- Current RA proceeding may eliminate local RA value