

Western Energy Markets Oversupply Discussion

No Action Required

April 17, 2017



CHELAN COUNTY
POWER

www.chelanpud.org

Background- 2017

- Spring
 - Increased solar penetration in CA
 - ~9,800 MW of utility scale and ~5,000 MW of rooftop
 - CA hydro (~8,500 MW of capacity)
 - 161% of normal
 - NW hydro
 - 131% (Jan-Jul at The Dalles)
 - BPA wind
 - ~4,800 MW capacity

Water Supply Forecasts- 2017

COLUMBIA - GRAND COULEE DAM (GCDW1) Forecasts for Water Year 2017					
Official Forecast					
10 days QPF: Ensemble: 2017-04-09 Issued: 2017-04-09					
Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	66657	70606	117	75912	60110
APR-JUL	56300	59771	117	66220	51015
APR-AUG	62762	66351	117	72477	56763
JAN-SEP	80546	84495	123	89801	68694
JAN-JUL	70189	73660	124	80109	59599
OCT-SEP	94914	98862	129	104169	76824

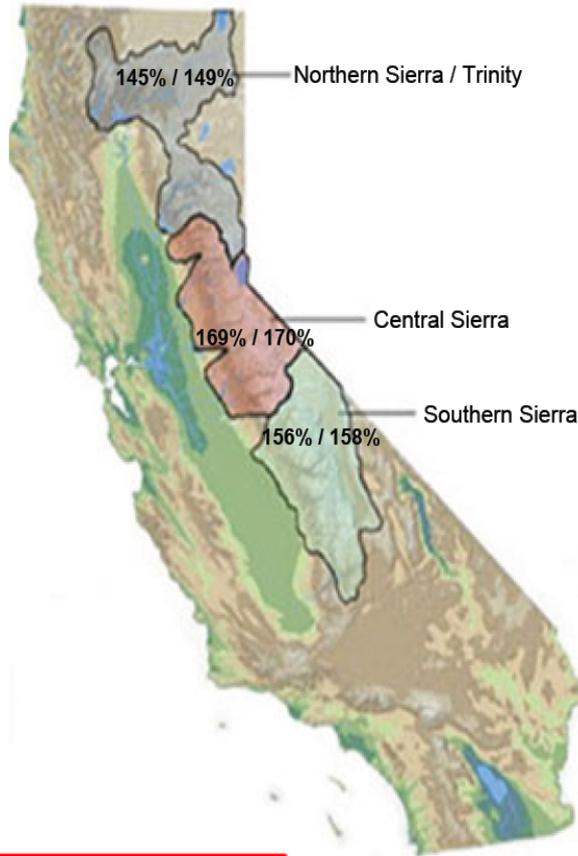
COLUMBIA - THE DALLES DAM (TDAO3) Forecasts for Water Year 2017					
Official Forecast					
10 days QPF: Ensemble: 2017-04-09 Issued: 2017-04-09					
Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	108444	112725	122	123246	92704
APR-JUL	93045	98079	123	107407	79855
APR-AUG	102032	107020	122	116735	87532
JAN-SEP	142697	146979	129	157500	114216
JAN-JUL	127299	132332	131	141660	101368
OCT-SEP	164771	169052	130	179573	130518

SNAKE - LOWER GRANITE DAM (LGDW1) Forecasts for Water Year 2017					
Official Forecast					
10 days QPF: Ensemble: 2017-04-09 Issued: 2017-04-09					
Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	28419	30641	138	34540	22279
APR-JUL	25671	27693	140	31502	19848
APR-AUG	27129	29122	138	32939	21091
JAN-SEP	41624	43846	147	47746	29872
JAN-JUL	38876	40899	149	44707	27440
OCT-SEP	46054	48276	139	52175	34667

California snowpack- 2017

Current Regional Snowpack from Automated Snow Sensors

% of April 1 Average / % of Normal for This Date



NORTH	
Data as of April 7, 2017	
Number of Stations Reporting	28
Average snow water equivalent (Inches)	40.6
Percent of April 1 Average (%)	145
Percent of normal for this date (%)	149

CENTRAL	
Data as of April 7, 2017	
Number of Stations Reporting	41
Average snow water equivalent (Inches)	48.7
Percent of April 1 Average (%)	169
Percent of normal for this date (%)	170

SOUTH	
Data as of April 7, 2017	
Number of Stations Reporting	26
Average snow water equivalent (Inches)	41.8
Percent of April 1 Average (%)	156
Percent of normal for this date (%)	158

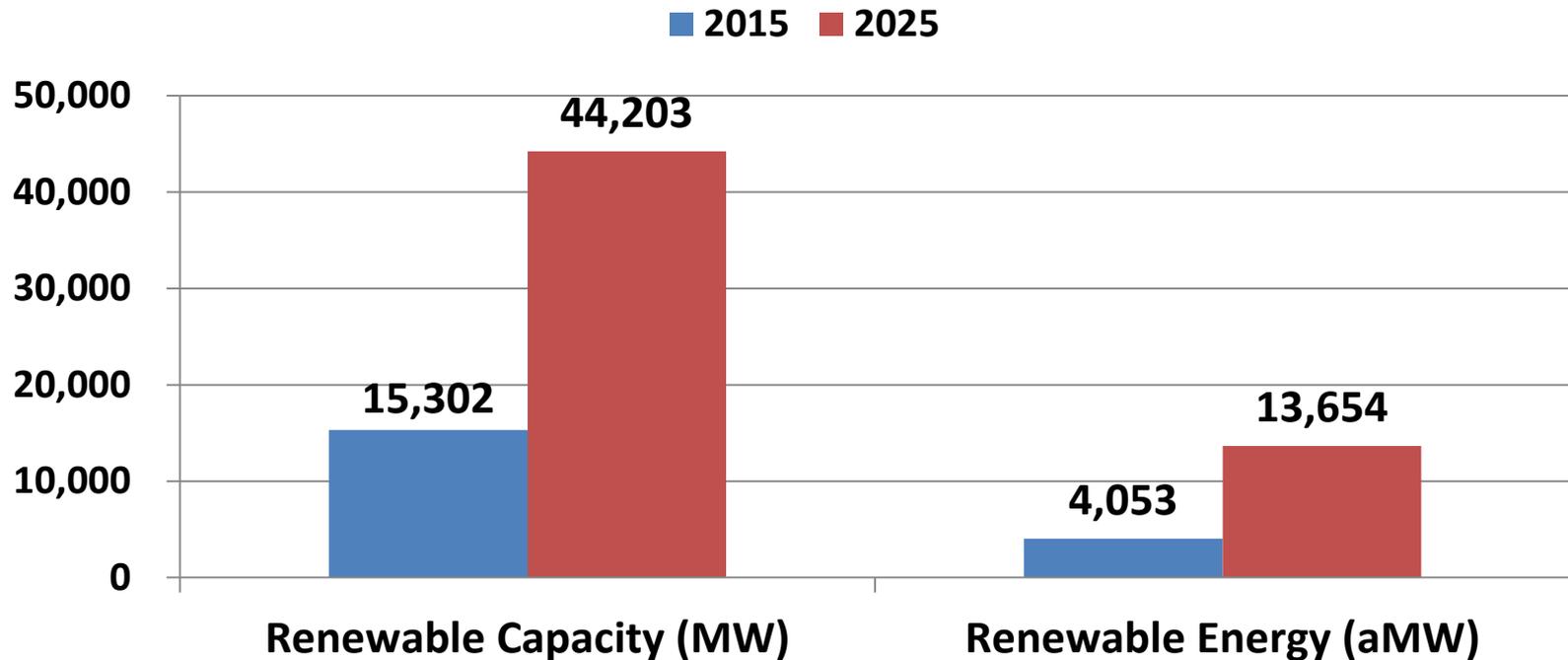
STATE	
Data as of April 7, 2017	
Number of Stations Reporting	95
Average snow water equivalent (Inches)	44.4
Percent of April 1 Average (%)	158
Percent of normal for this date (%)	161

Statewide Average: 161%

Data as of April 7, 2017

Projected Renewable Build Out PNW/CA

Capacity and Energy 2015 vs. 2025

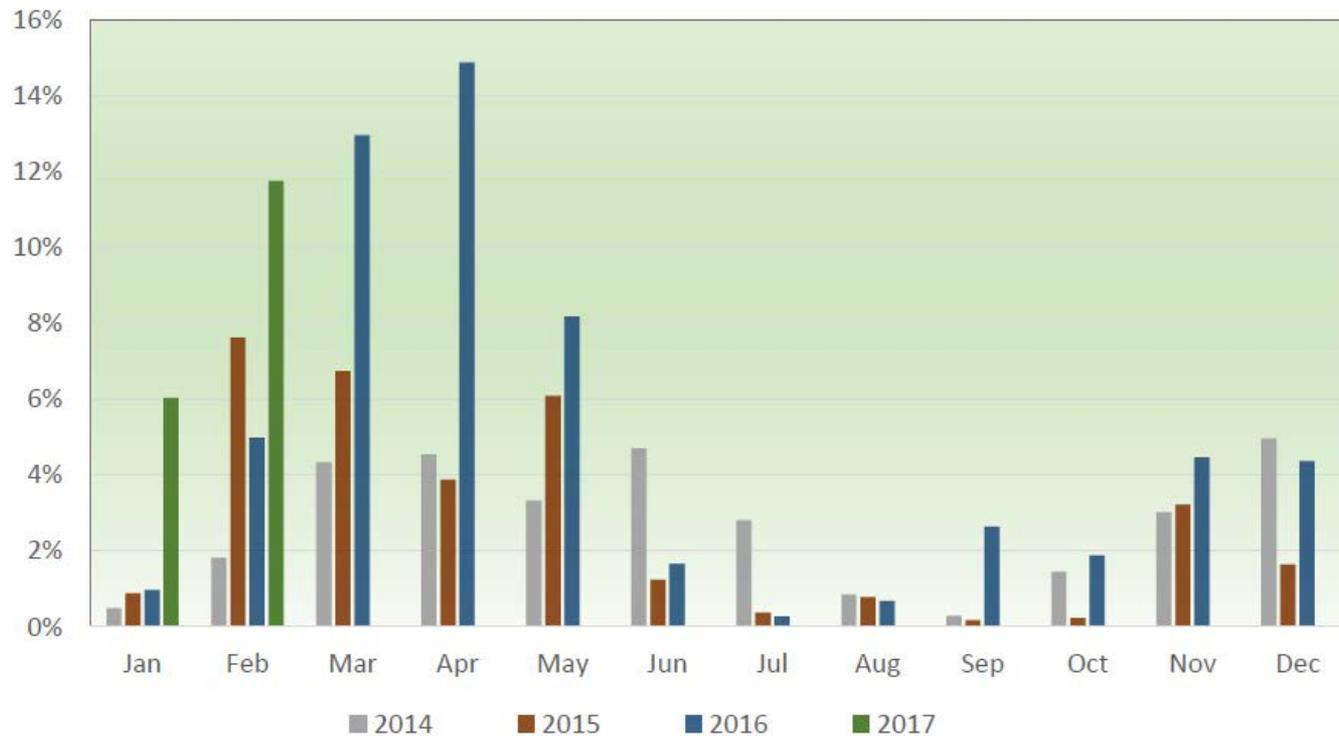


CAISO – Market Performance and Planning

Presentation 3/14/17

(as a percent of real-time trades)

Frequency of negative system prices has steadily increased year over year



Current Q2 2017 Pricing

(Day-Ahead prices, ICE)

Northwest

Mid C	On-peak	Off-Peak	Flat
Balance of April	\$14.00	\$4.00	\$9.60
May	\$15.00	\$5.00	\$10.60
June	\$17.00	\$5.35	\$11.87

Northern California

NP 15	On-peak	Off-Peak	Flat
Balance of April	\$24.35	\$16.10	\$20.72
May	\$26.30	\$19.45	\$23.29
June	\$29.40	\$22.00	\$26.14

Note: We have seen day ahead prices at Mid C settle below \$0.00

District Risk Mitigation

- Hedging
 - Slices – convey price, operational, hydro risk
 - Blocks
 - Loads
 - Fine tune day-ahead
- Strategy- maintain a relatively flat position in Q2 (District resources only)

District Risk Mitigation

- Real time agreement helps minimize exposure to real-time prices since we go into current day with an energy neutral position, yet real-time price volatility increases District revenue
- In the CAISO (California Market) there is a hard cap of $-\$150/\text{MWh}$
 - Day ahead most likely not to exceed $-\$20$ to $-\$55/\text{MWh}$
- In the CAISO there is a hard cap of $+\$1000/\text{MWh}$

Summary/Questions

- Evolving market conditions (regulations, load growth, gas supply) are impacting supply/demand and energy prices
- We have measures in place that help address price risk
- We believe that the combination of the real-time agreement and market responses (day-ahead prices) will allow us to capture upside potential
- The District may need to consider additional measures in the future