

Chelan PUD

Energy Resources Quarterly Board Update Q2

August 15, 2016



CHELAN COUNTY
POWER

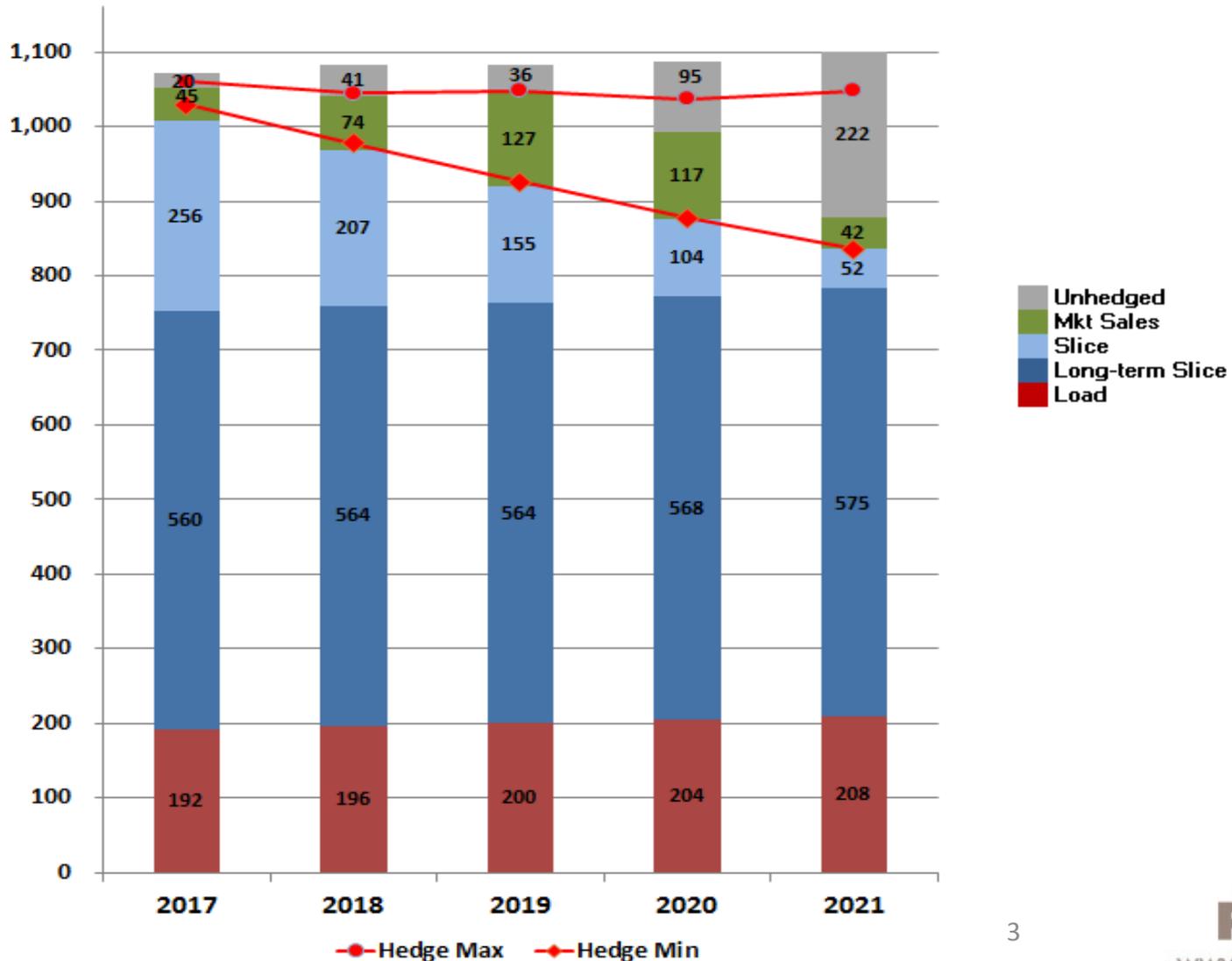
www.chelanpud.org

Energy Planning & Trading

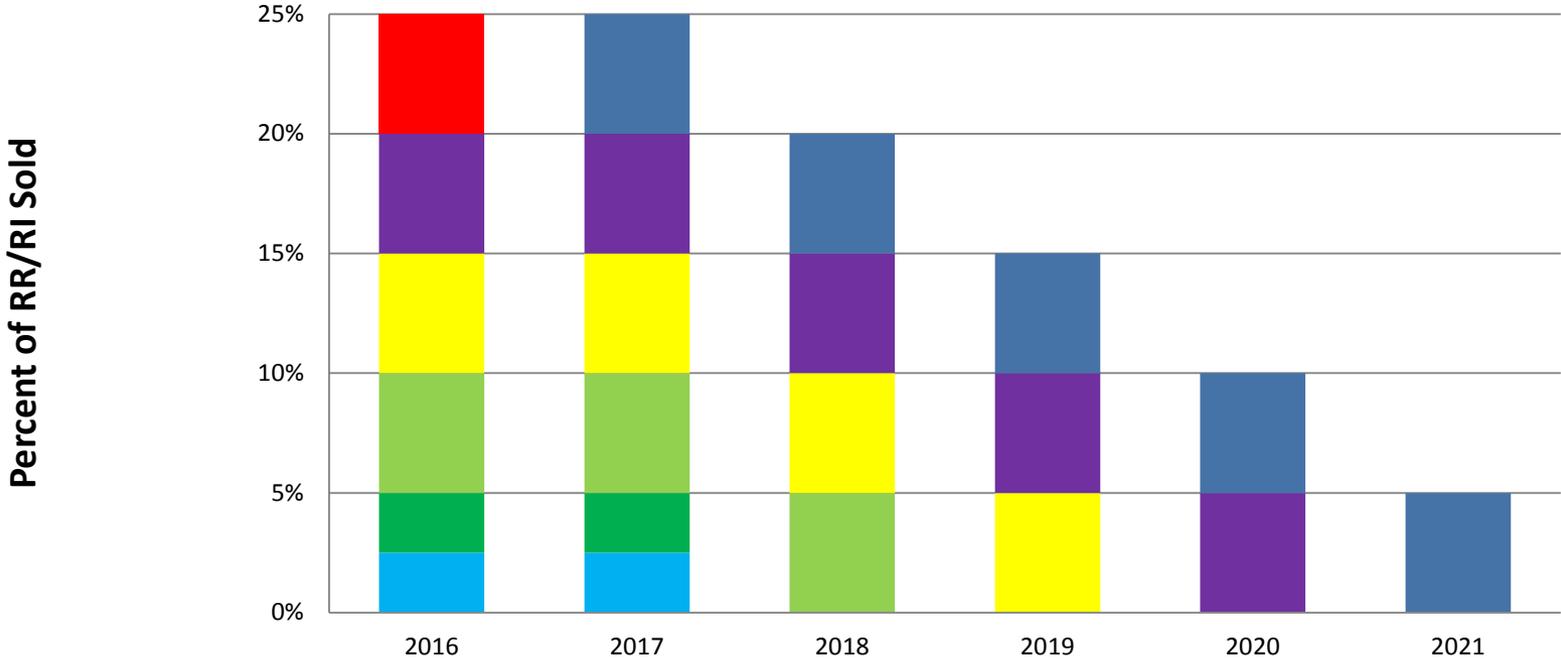
2016 Q2

- **Portfolio Overview** (Gregg Carrington)
- **Operations and Planning** (Janet Jaspers)
 - Snowpack, Streamflow and Pricing update
 - Net Wholesale Revenue Forecast update
- **Market Update** (Janet Jaspers)
- **Energy Efficiency Update** (Andrew Grassell)

District's Load/Resource Balance (average MW)



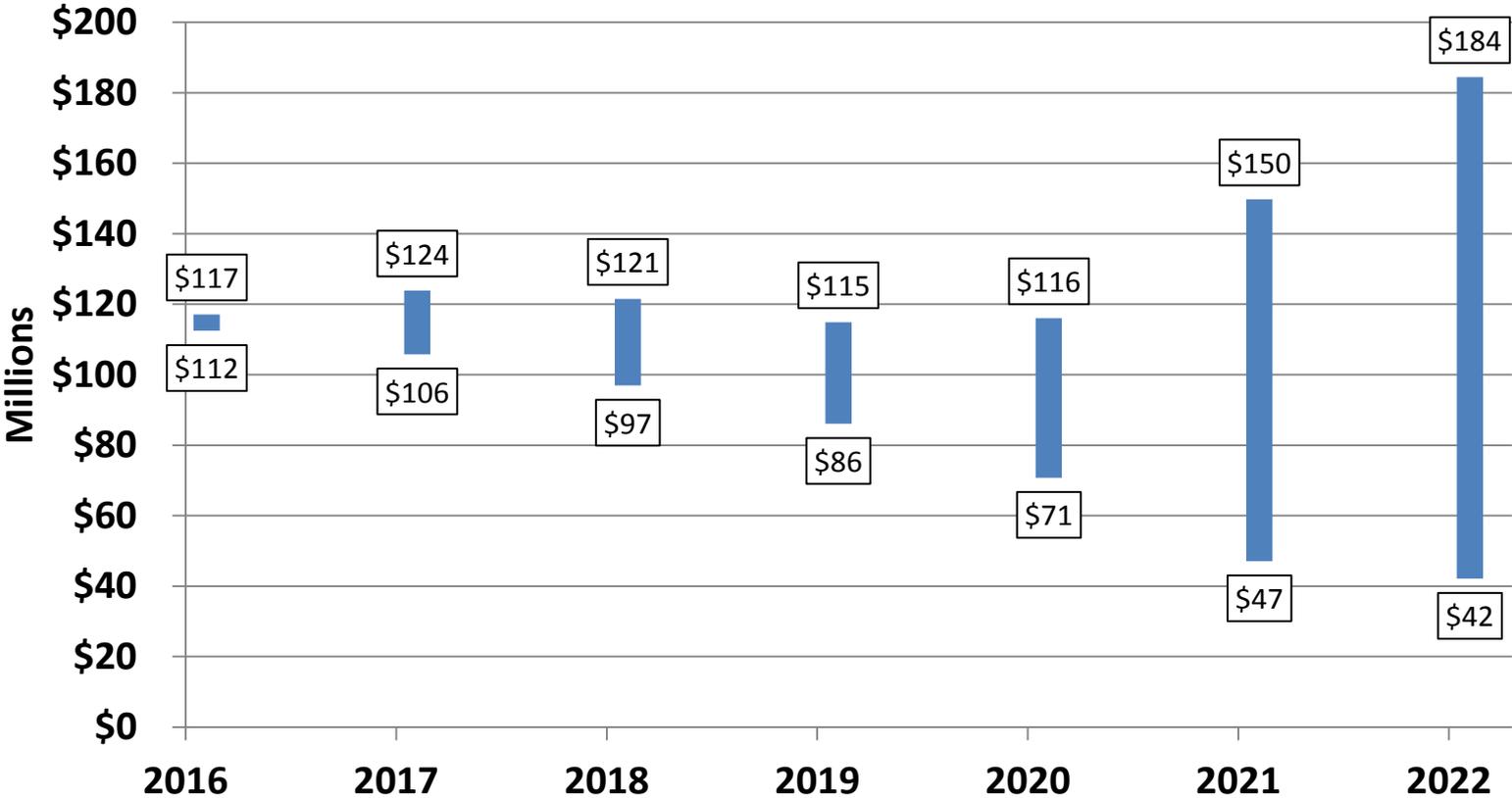
Current Market Position - Slice Products



	2016	2017	2018	2019	2020	2021
■ Slice Product 26 - Morgan		5.0%	5.0%	5.0%	5.0%	5.0%
■ Slice Product 23 - TransAlta	5.0%					
■ Slice Product 22 - Avista	5.0%	5.0%	5.0%	5.0%	5.0%	
■ Slice Product 18 - Exelon	5.0%	5.0%	5.0%	5.0%		
■ Slice Product 15 - Morgan	5.0%	5.0%	5.0%			
■ Slice Product 11 - Morgan	2.5%	2.5%				
■ Slice Product 10 - Exelon	2.5%	2.5%				



Net Wholesale Revenue Projections



Columbia River Flow Update for 2016

2016	Rocky Reach Flow (kcf)	Budget Rocky Reach Flow (kcf)	% of Budget
Jan	94	115	82%
Feb	98	110	89%
Mar	110	102	108%
Apr	153	114	134%
May	132	147	90%
Jun	128	167	76%
Jul	111	131	85%
Aug		106	
Sep		76	
Oct		78	
Nov		92	
Dec		108	
YTD Average	118	127	93%

* Budgeted Rocky Reach flow is the median year from the 1929-2011 data set



CHELAN COUNTY
POWER

www.chelanpud.org

Water Supply Forecast



COLUMBIA - GRAND COULEE DAM (GCDW1) Forecasts for Water Year 2016

Official Forecast

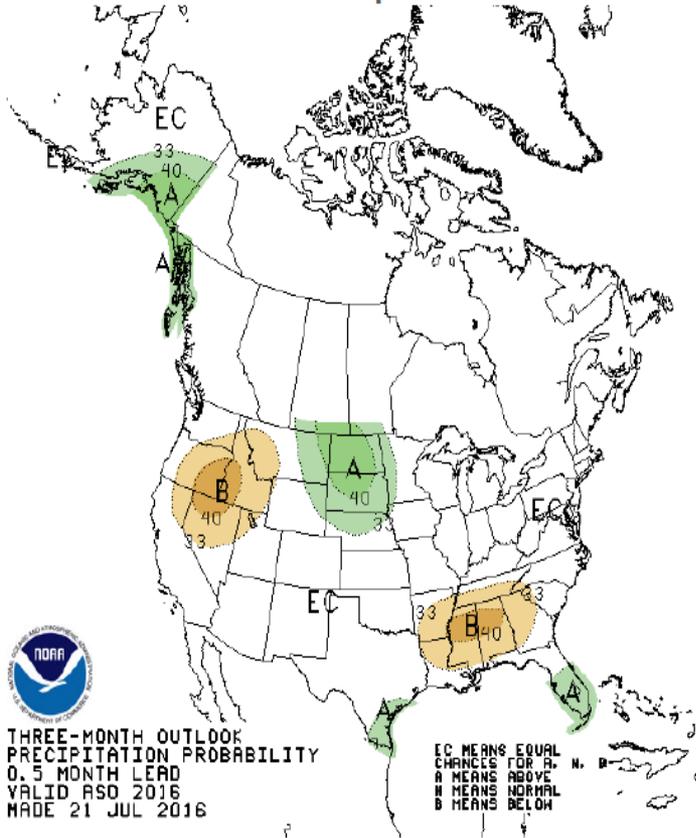
10 days QPF: Ensemble: 2016-08-03 Issued: 2016-08-03

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	54817	55409	92	56917	60110
APR-JUL	47312	47312	93	47312	51015
APR-AUG	52059	52235	92	52823	56763
JAN-SEP	65950	66542	97	68050	68694
JAN-JUL	58445	58445	98	58445	59599
OCT-SEP	74245	74837	97	76345	76824

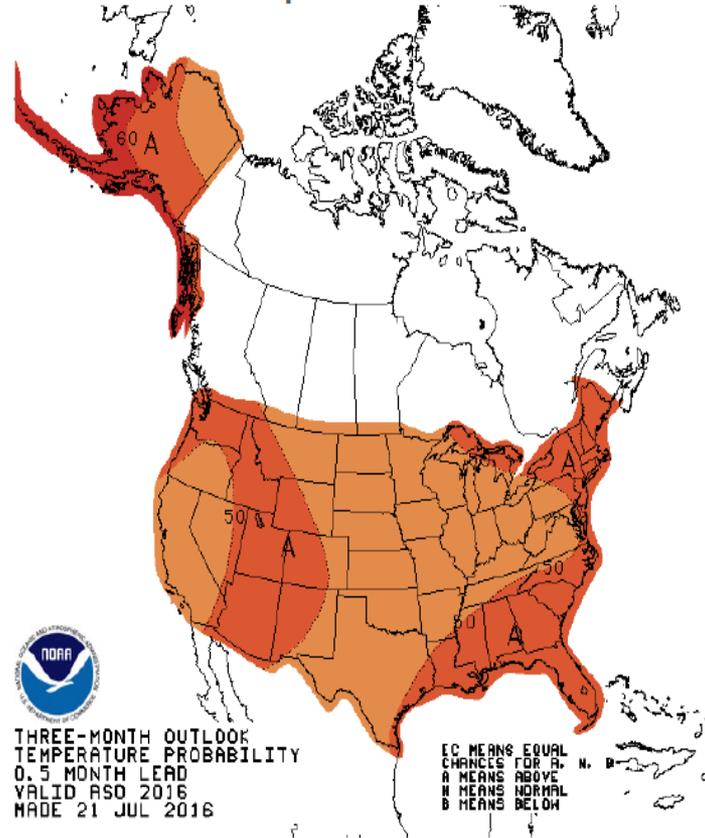


NOAA Aug- Oct Climate Forecast

Precipitation



Temperature



CHELAN COUNTY
POWER

www.chelanpud.org

Short term market info

Sep 2016 Henry Hub natural gas price

1/2/2016

ENGU16 ~ Daily Wed Aug 3 2016 2:58:59 PM H:2.866 L:2.722 O:2.734 T:2.846 +0.113 +4.13%

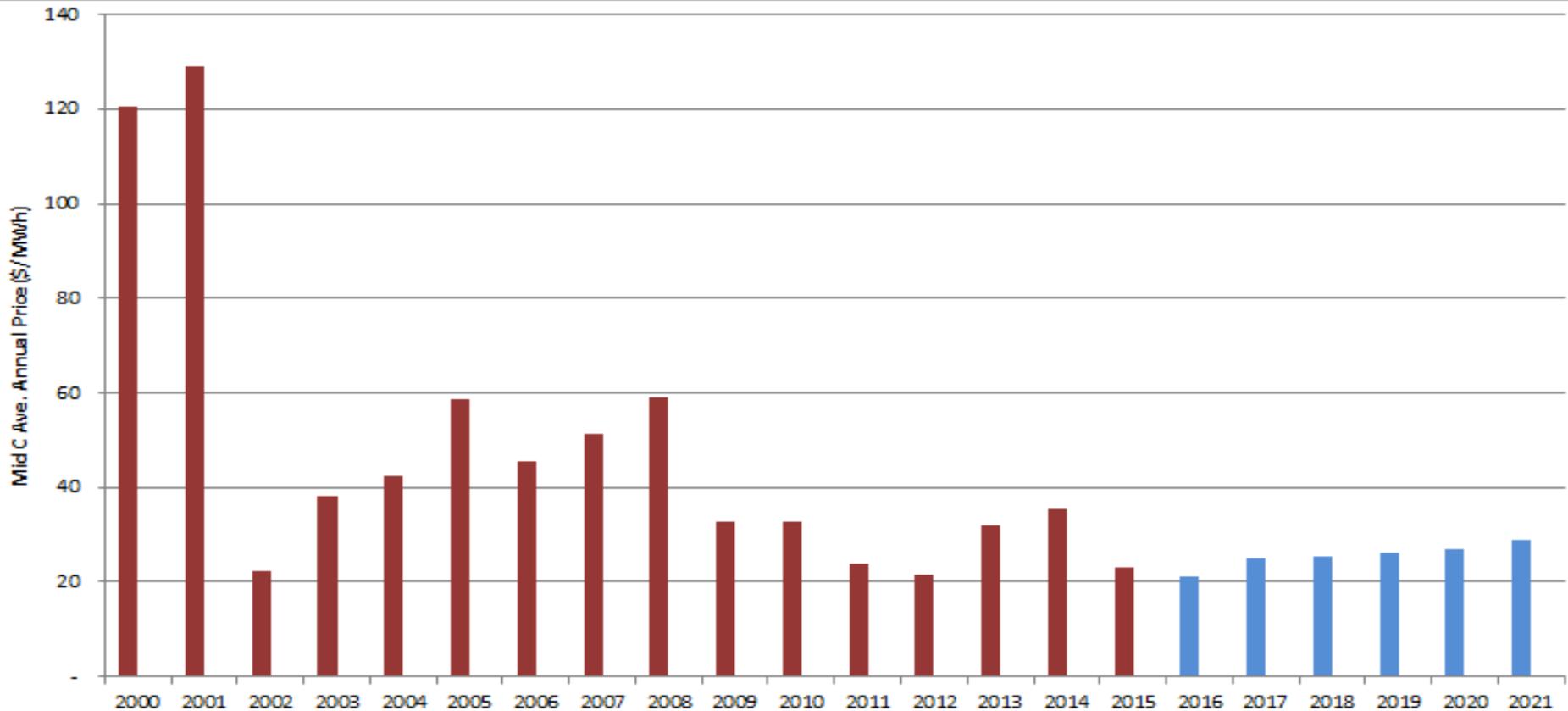
8/3/2016



CHELAN COUNTY
POWER

www.chelanpud.org

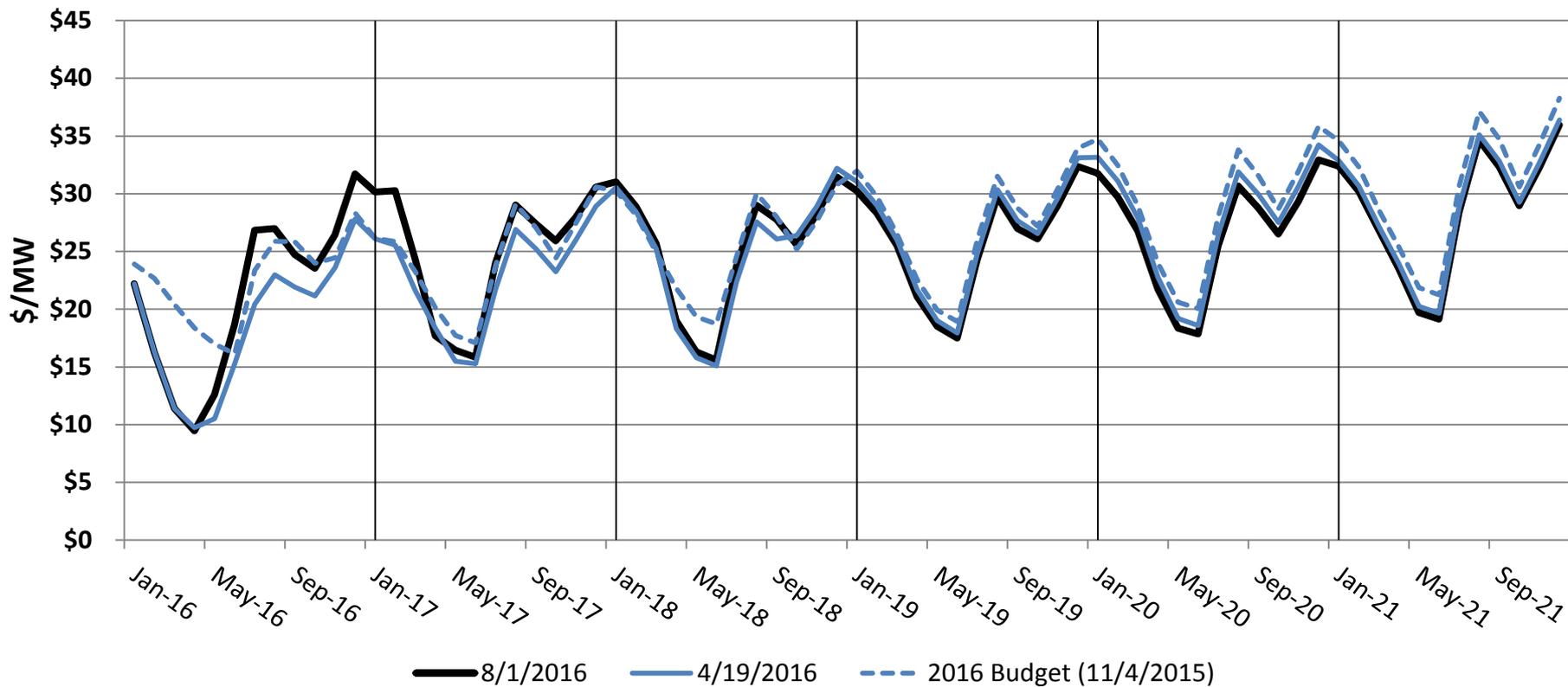
Mid-C Flat Annual Wholesale Electricity Prices



Red = Historical prices

Blue = Forward price curve

MIDC Flat Forward Price Curve (ICE DA index prices for previous months)



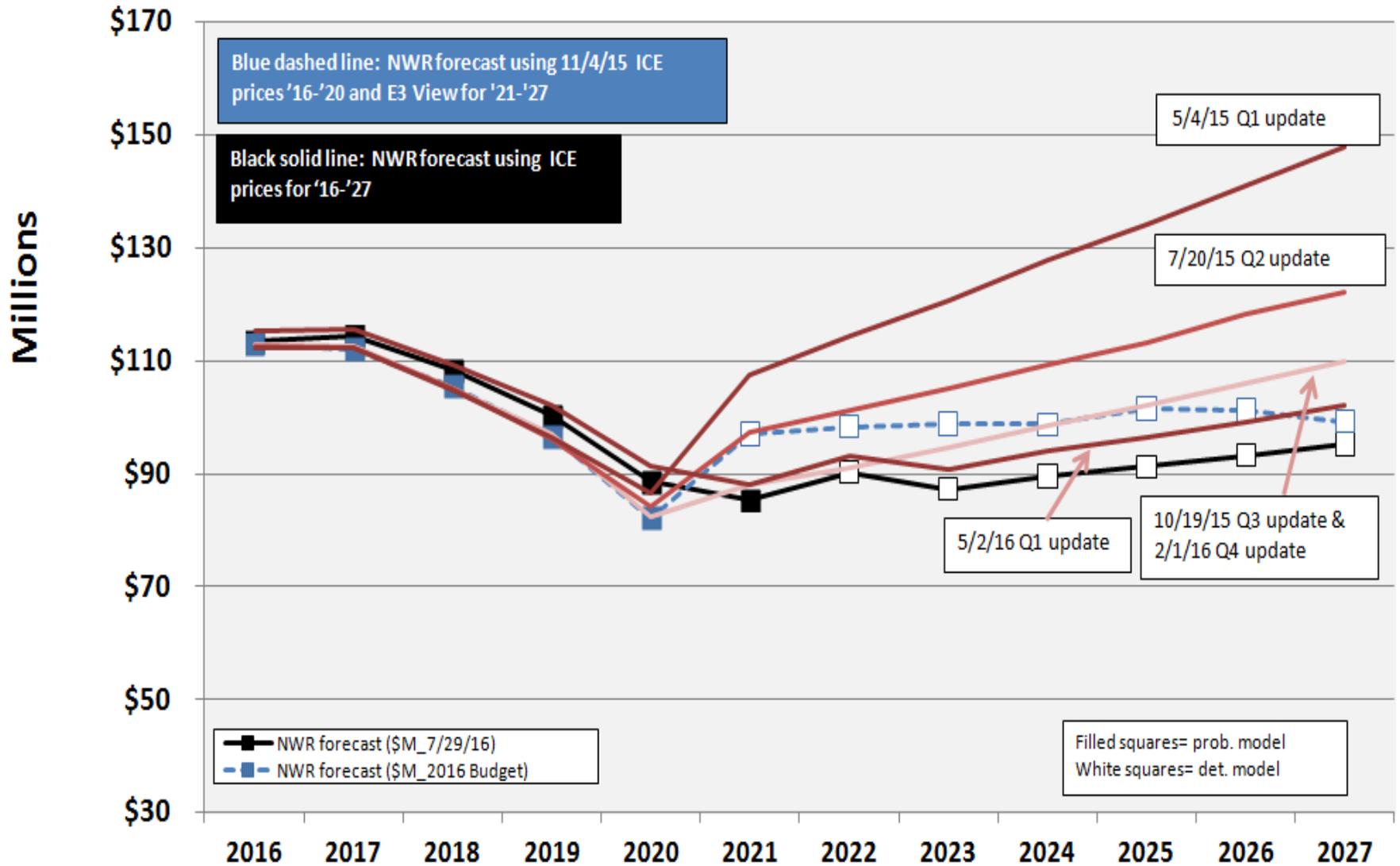
2016 NWR and Other Energy-Related Revenue

	Budget	Forecast**	Variance
Net Wholesale Revenue*	\$ 112,896,790	\$ 113,419,489	\$ 522,699
Specified Source	\$ 2,727,396	\$ 3,650,484	\$ 923,087
Other	\$ 523,275	\$ 504,718	\$ (18,557)
Renewables	\$ 285,435	\$ 403,139	\$ 117,704
Real-Time Revenue	\$ 8,000,000	\$ 6,827,865	\$ (1,172,135)
NWR and Other Energy-Related Revenue	\$ 121,182,225	\$ 120,650,493	\$ (531,732)

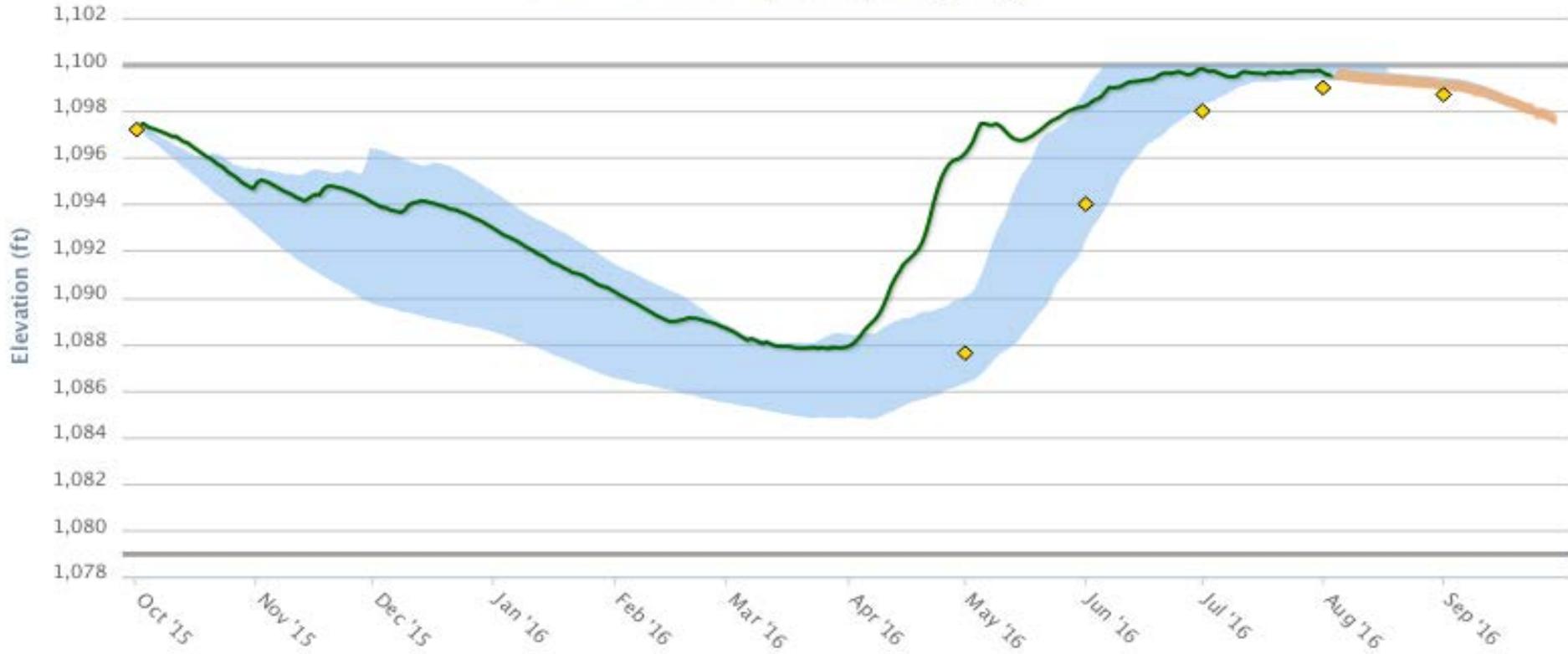
**Net Wholesale Revenue (NWR) includes all premiums from specified source and other premium products as well as slice sales and standard forward / pre-schedule energy trading activity. Other premium products include hubbing, system delivery, scheduling services, Lake Chelan reserves, super peak products.*

***2016 forecast based on Jan-Jul actuals and Aug-Dec estimates.*

Net Wholesale Revenue Forecast



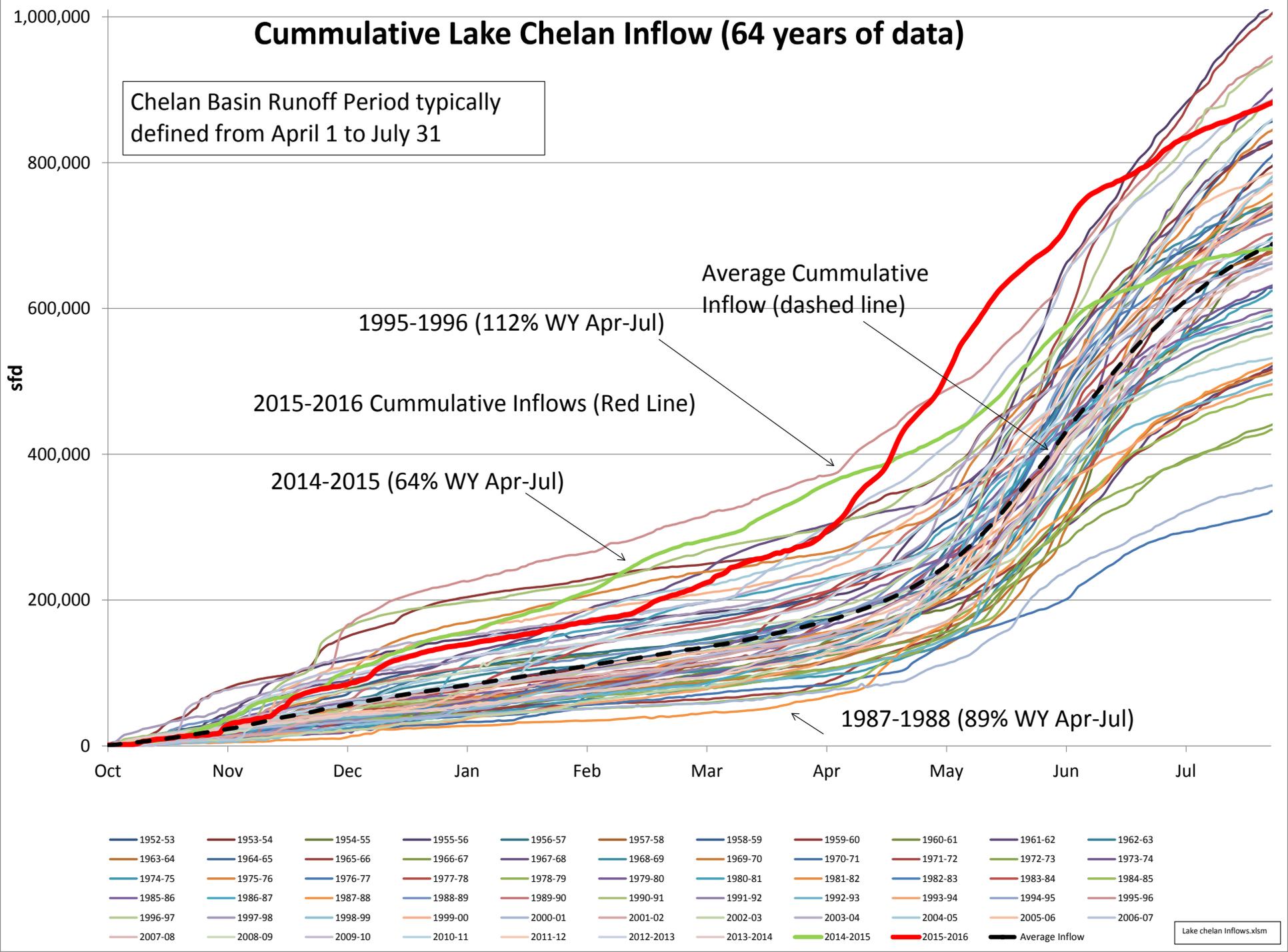
Chelan Lake Levels: Expected Operating Ranges



- Current Year Actual Elevation (ft)
- Previous Year Actual Elevation (ft)
- Current Forecasted Operating Range (ft)
- Current Forecasted Average Elevation (ft) (50% chance of occurring)
- October 1 Forecasted Operating Range (ft)
- October 1 Forecasted Average Elevation (ft)
- Target Curve During Dry and Average Water Years (ft)
- Target Curve During Wet Water Years (ft)
- ◆ Minimum Target Elevation

Cummulative Lake Chelan Inflow (64 years of data)

Chelan Basin Runoff Period typically defined from April 1 to July 31

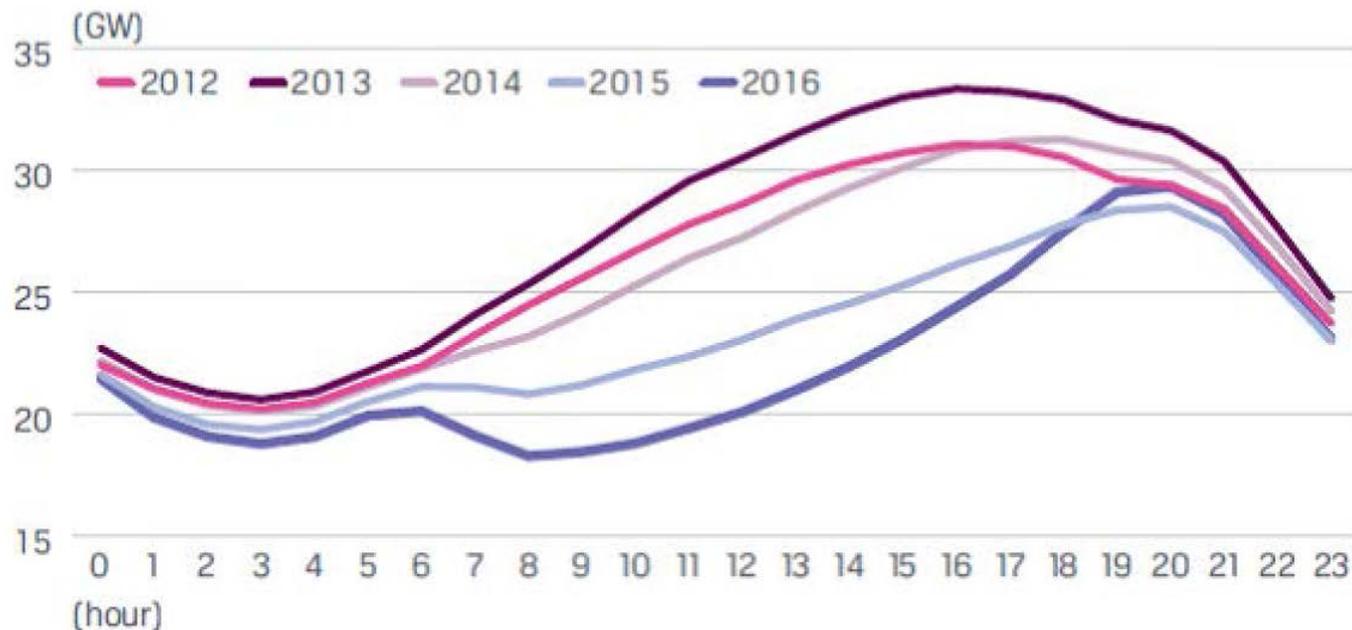


- | | | | | | | | | | | |
|---------|---------|---------|---------|---------|-----------|-----------|-----------|-----------|----------------|---------|
| 1952-53 | 1953-54 | 1954-55 | 1955-56 | 1956-57 | 1957-58 | 1958-59 | 1959-60 | 1960-61 | 1961-62 | 1962-63 |
| 1963-64 | 1964-65 | 1965-66 | 1966-67 | 1967-68 | 1968-69 | 1969-70 | 1970-71 | 1971-72 | 1972-73 | 1973-74 |
| 1974-75 | 1975-76 | 1976-77 | 1977-78 | 1978-79 | 1979-80 | 1980-81 | 1981-82 | 1982-83 | 1983-84 | 1984-85 |
| 1985-86 | 1986-87 | 1987-88 | 1988-89 | 1989-90 | 1990-91 | 1991-92 | 1992-93 | 1993-94 | 1994-95 | 1995-96 |
| 1996-97 | 1997-98 | 1998-99 | 1999-00 | 2000-01 | 2001-02 | 2002-03 | 2003-04 | 2004-05 | 2005-06 | 2006-07 |
| 2007-08 | 2008-09 | 2009-10 | 2010-11 | 2011-12 | 2012-2013 | 2013-2014 | 2014-2015 | 2015-2016 | Average Inflow | |

Cal-ISO Duck Curve Rears Head in July

Average hourly net load has reached new summertime lows in July as surging solar generation increases the severity of the “duck curve”, generation data from the California ISO shows. So far this month, hourly Cal-ISO net load has averaged 22.2 GW, 5% lower than July 2015 and 14% lower than the same time in 2014. In previous years, the duck curve was primarily limited to the shoulder season load periods in the spring and fall due to higher renewable market share as a result of lower overall electricity demand.

AVERAGE CAL-ISO NET LOAD FOR JULY



Source: Cal-ISO

Market Info

Cal-ISO solar sets all-time high

Solar generation in the California Independent System Operator's grid territory set an all-time high yesterday, July 12, with total daily output increasing to 73.5 GWh. Tuesday's output beat the prior record of 73.3 GWh, which was set recently on May 27.

Colstrip Units 1 and 2 to Close by July 2022

Puget Sound Energy and Talen Energy have reached an historic agreement with environmental groups in Montana to close units 1 and 2 of the Colstrip Generating Station no later than July 1, 2022.

Region Could Face 2021 Power-Supply Shortfall with Centralia, Boardman Closures

- Power supply is expected to meet the Council's RA standard (5%) through 2020, the loss of 1,330 MW with the closure of Boardman and 2 of Centralia's units kicks the likelihood up to 10%.
- Depending on load growth, the region could need from 1,000-2,000 MW of new capacity to meet the 5% adequacy standard.



CHELAN COUNTY
POWER

www.chelanpud.org

Energy Efficiency Results to Date

2016

Compliance Target is .83 aMW

Stretch Target was 2.1 aMW

Energy Efficiency Savings (aMW) ¹	Incentive and Labor Cost	\$/MWh over life	Estimated Value over Life ²
1.00	\$ 1,660,000	\$ 12.60	\$ 2,530,000

1 Pending metering and verification and based on expected NEEA savings

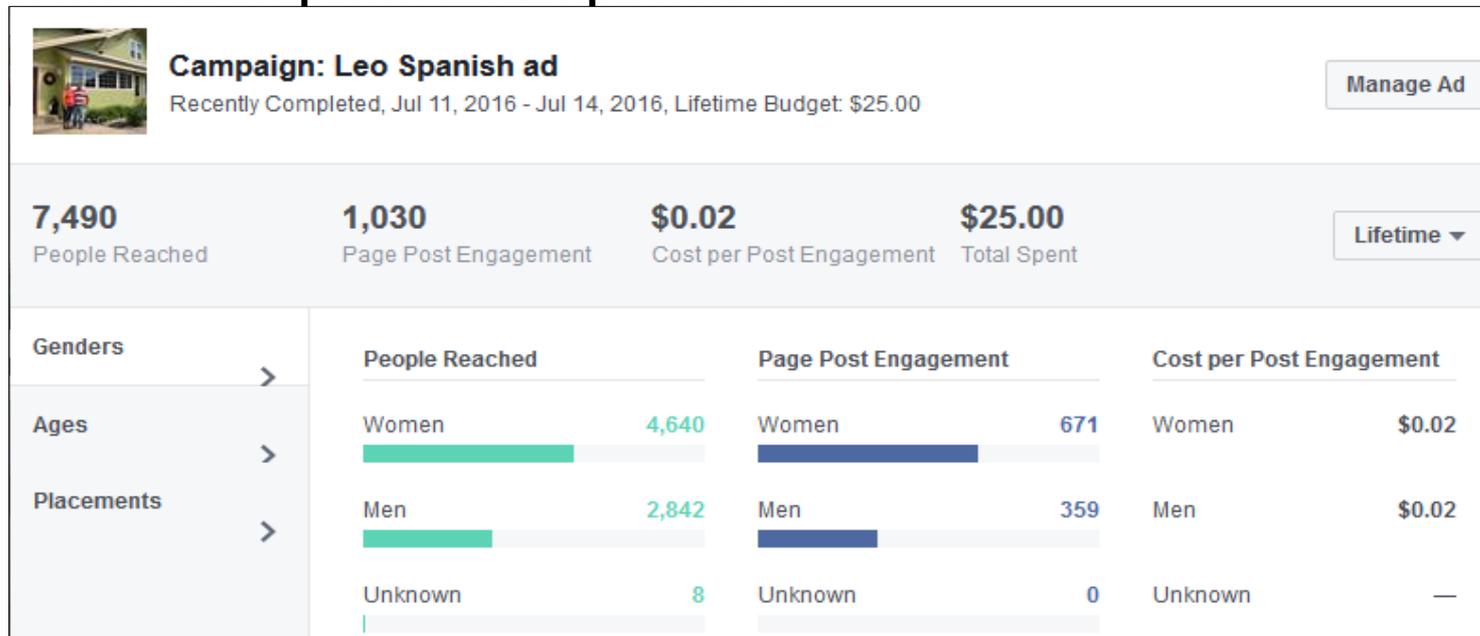
2 Based on weighted avg. life of measure and discounted at 7%

Hispanic/Latino Customer Outreach

- Brochures in English/Spanish
- Reserved south-end billboard for next spring for Spanish message
- Placing brochures in local markets frequented by Latino/Hispanic customers
- Plan to attend the August Hispanic Chamber meeting to present our programs
- Conservation contractors have Spanish-speaking staff

Outreach Cont.

- July Lightly newsletter featured Hispanic customer's success using conservation rebates-
<https://www.chelanpud.org/learning-center/blog/chelan-pud-blog/2016/07/05/this-old-house>
- Facebook posts in Spanish



HELAN COUNTY
OWER

Project Spotlight-Town Toyota Center

- A great video on Town Toyota Center Lighting

<https://www.youtube.com/watch?v=Nj3jnzFAeys>

Summary

- The District's current 2016 Net Wholesale Revenue and other energy related revenue forecast (\$120.6 Million) is slightly lower than the budget amount for 2016 (\$121.1 Million).
- The increase in forecasted High Density Load out in the future has decreased the amount of energy that can be sold. The District's resulting forecasted Net Wholesale Revenue has dropped for future years. The District's forecasted Retail Revenue has increased from the expected higher High Density Load sales revenue.
- The Energy Efficiency team continues to support customers locally and regionally to provide them value and save energy. Find out more at www.chelanpud.org

Questions?



CHELAN COUNTY
POWER

www.chelanpud.org