



CHELAN PUD ENERGY RESOURCES

Quarterly Board Update

3rd Quarter 2017 • November 6, 2017

ENERGY PLANNING & TRADING

2017 Q3

Portfolio Overview

Operations and Planning

- » Snowpack, Streamflow and Pricing update
- » Net Wholesale Revenue Forecast update

Market Update

Energy Efficiency Update

KEY MESSAGE POINTS

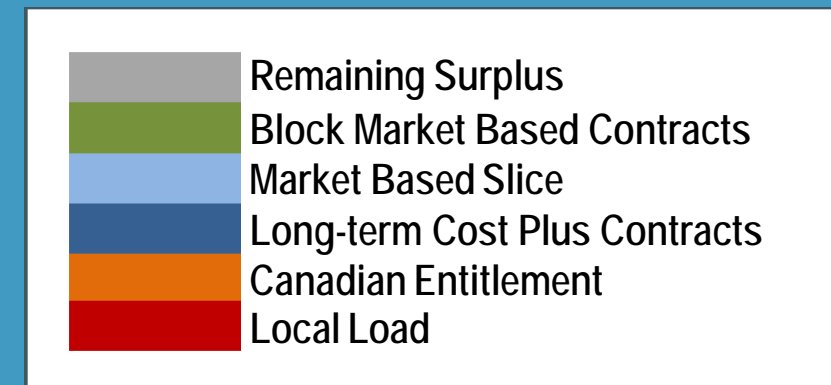
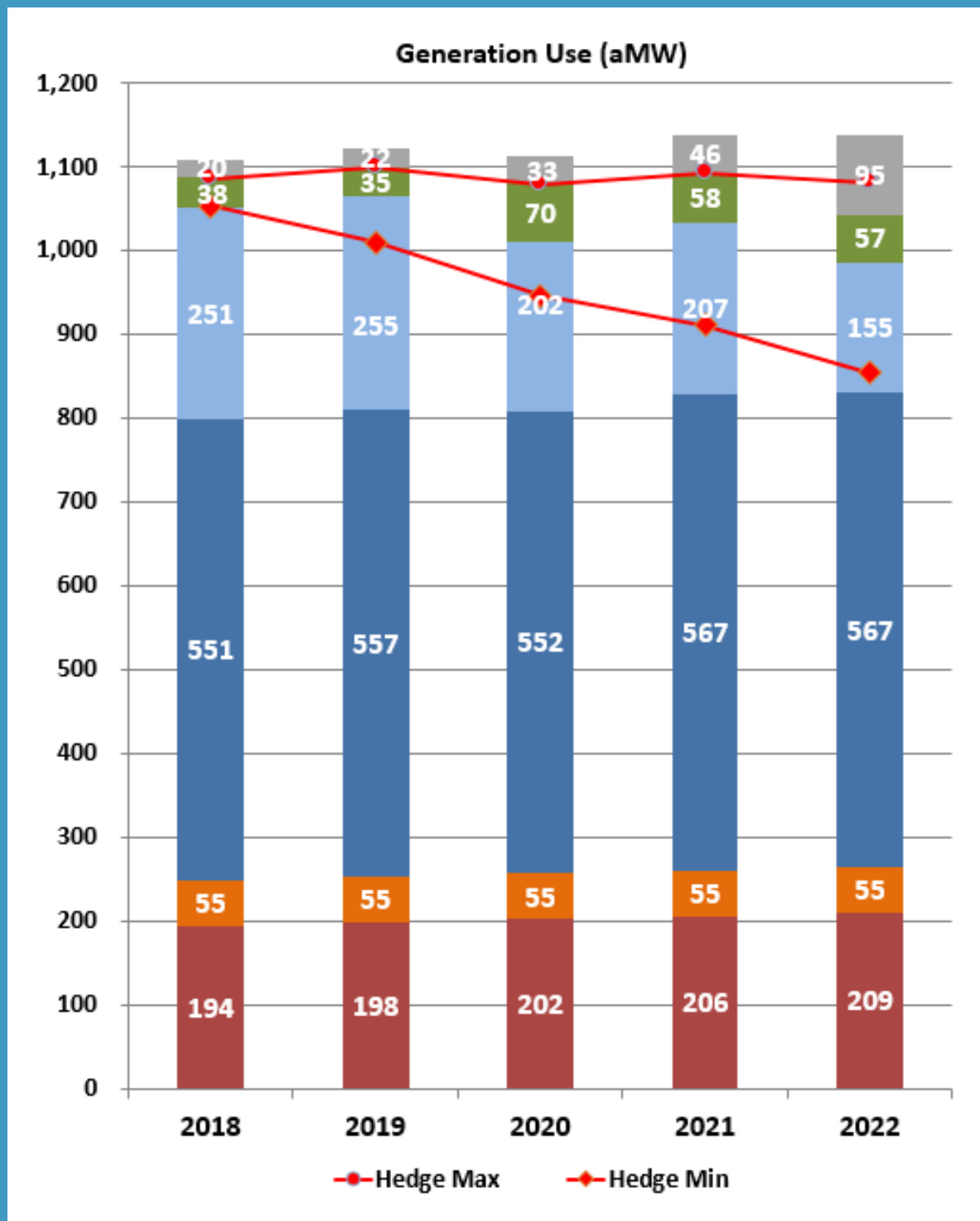
The District's 2017 Net Wholesale Revenue is 2.7 Million higher than budget and increased by \$400,000 since the last quarterly update.

Specified Source energy sales contributed \$4.6 Million to the Net Wholesale Revenue which is \$1.5 Million higher than budget.

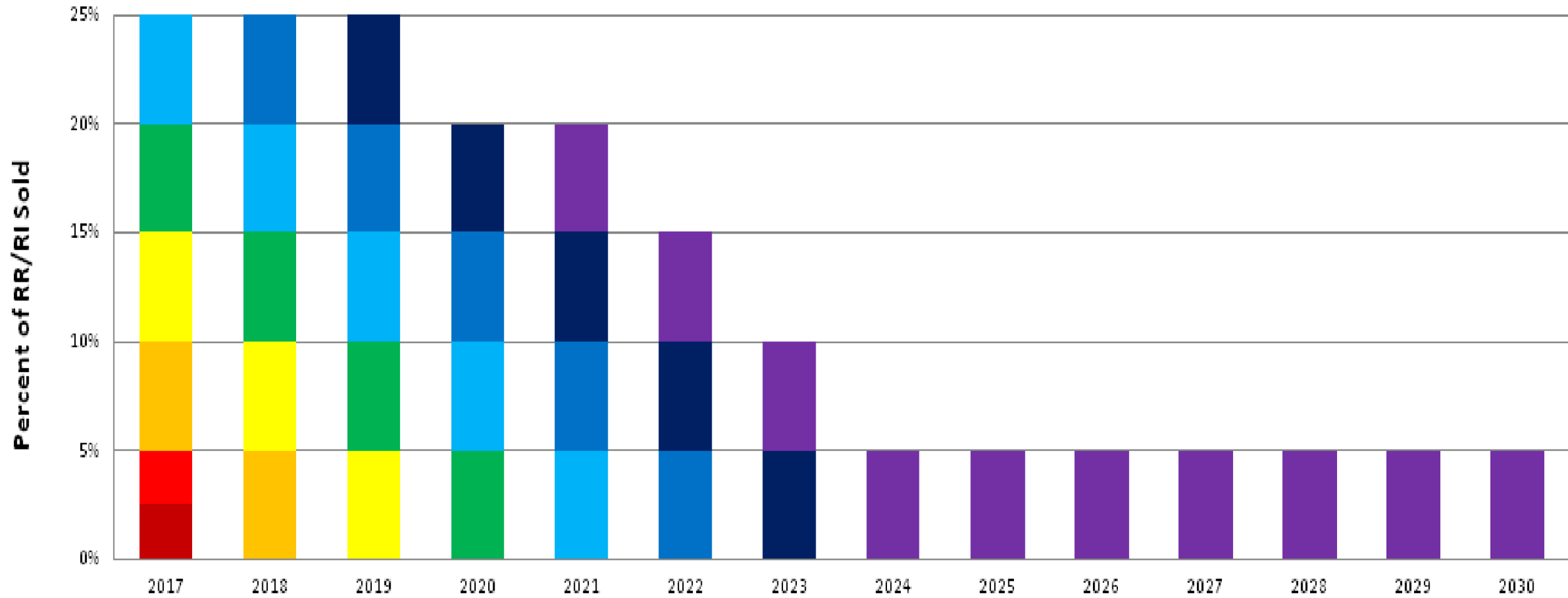
Energy Efficiency programs have met the compliance target.

DISTRICT'S LOAD/RESOURCE BALANCE

(average MW)



Current Market Position - Market Based Slice Products



	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Long Term Slice - Avista					5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Slice Product 30 - Avangrid			5.0%	5.0%	5.0%	5.0%	5.0%							
Slice Product 29 - Morgan		5.0%	5.0%	5.0%	5.0%	5.0%								
Slice Product 26 - Morgan	5.0%	5.0%	5.0%	5.0%	5.0%									
Slice Product 22 - Avista	5.0%	5.0%	5.0%	5.0%										
Slice Product 18 - Exelon	5.0%	5.0%	5.0%											
Slice Product 15 - Morgan	5.0%	5.0%												
Slice Product 11 - Morgan	2.5%													
Slice Product 10 - Exelon	2.5%													

COLUMBIA RIVER FLOW

UPDATE FOR 2017

2016	Rocky Reach Flow (kcf)	Budget Rocky Reach Flow (kcf)	% of Budget
Jan	128	115	111%
Feb	119	110	108%
Mar	158	102	155%
Apr	207	114	182%
May	236	147	161%
Jun	209	167	125%
Jul	122	131	93%
Aug	91	106	86%
Sep	72	76	94%
Oct	68	78	87%
Nov		92	
Dec		108	
YTD Average	141	115	123%

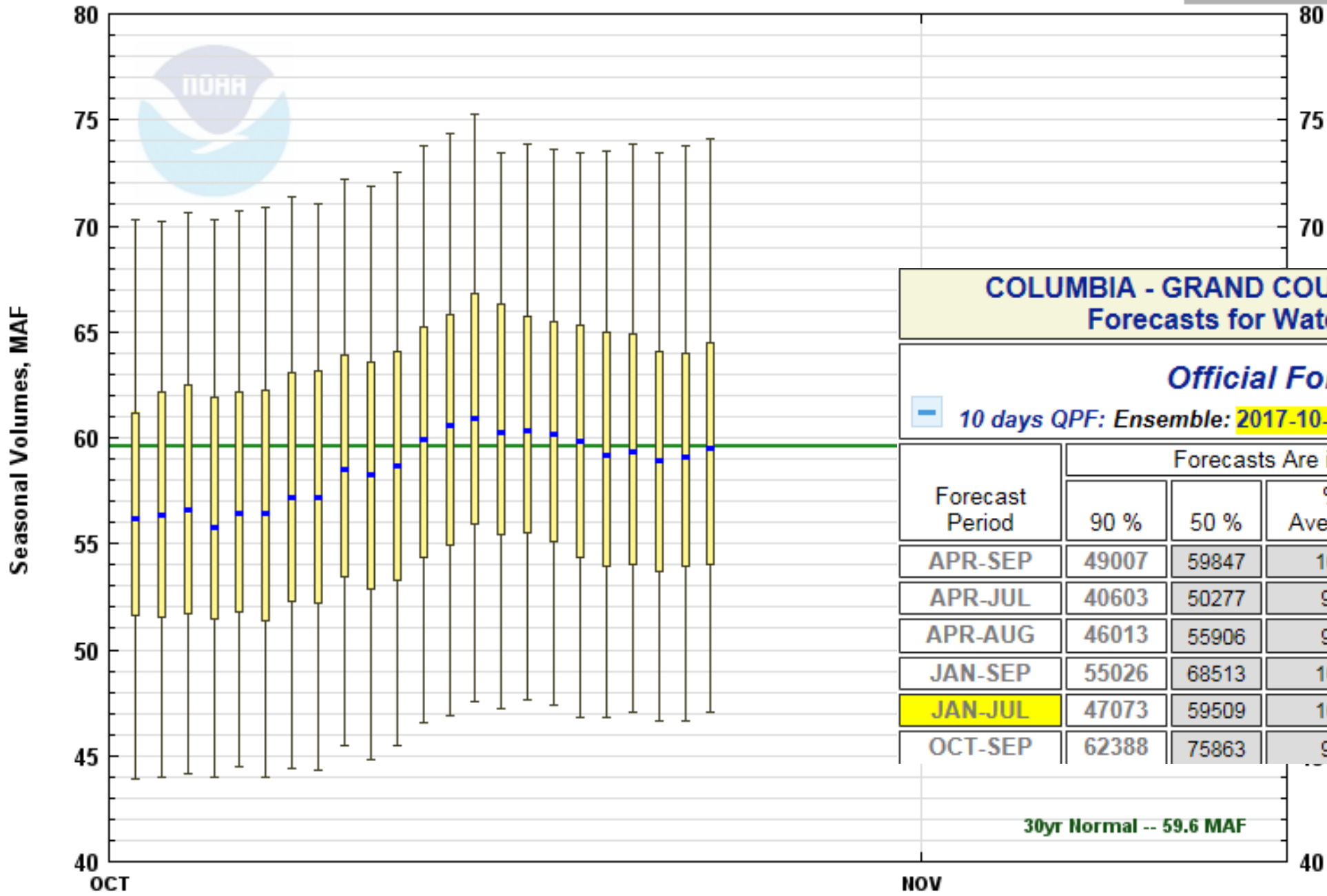
* Budgeted Rocky Reach flow is the median year from the 1929-2011 data set

WATER SUPPLY FORECAST

Water Supply Forecasts

COLUMBIA - GRAND COULEE DAM
 Period JAN to JUL -- Water Year 2018

— 30yr Normal
 ■ ESP10



COLUMBIA - GRAND COULEE DAM (GCDW1) Forecasts for Water Year 2018

Official Forecast

10 days QPF: Ensemble: **2017-10-24** Issued: 2017-10-24

Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	49007	59847	100	75449	60110
APR-JUL	40603	50277	99	65116	51015
APR-AUG	46013	55906	98	72154	56763
JAN-SEP	55026	68513	100	85364	68694
JAN-JUL	47073	59509	100	74121	59599
OCT-SEP	62388	75863	99	93413	76824

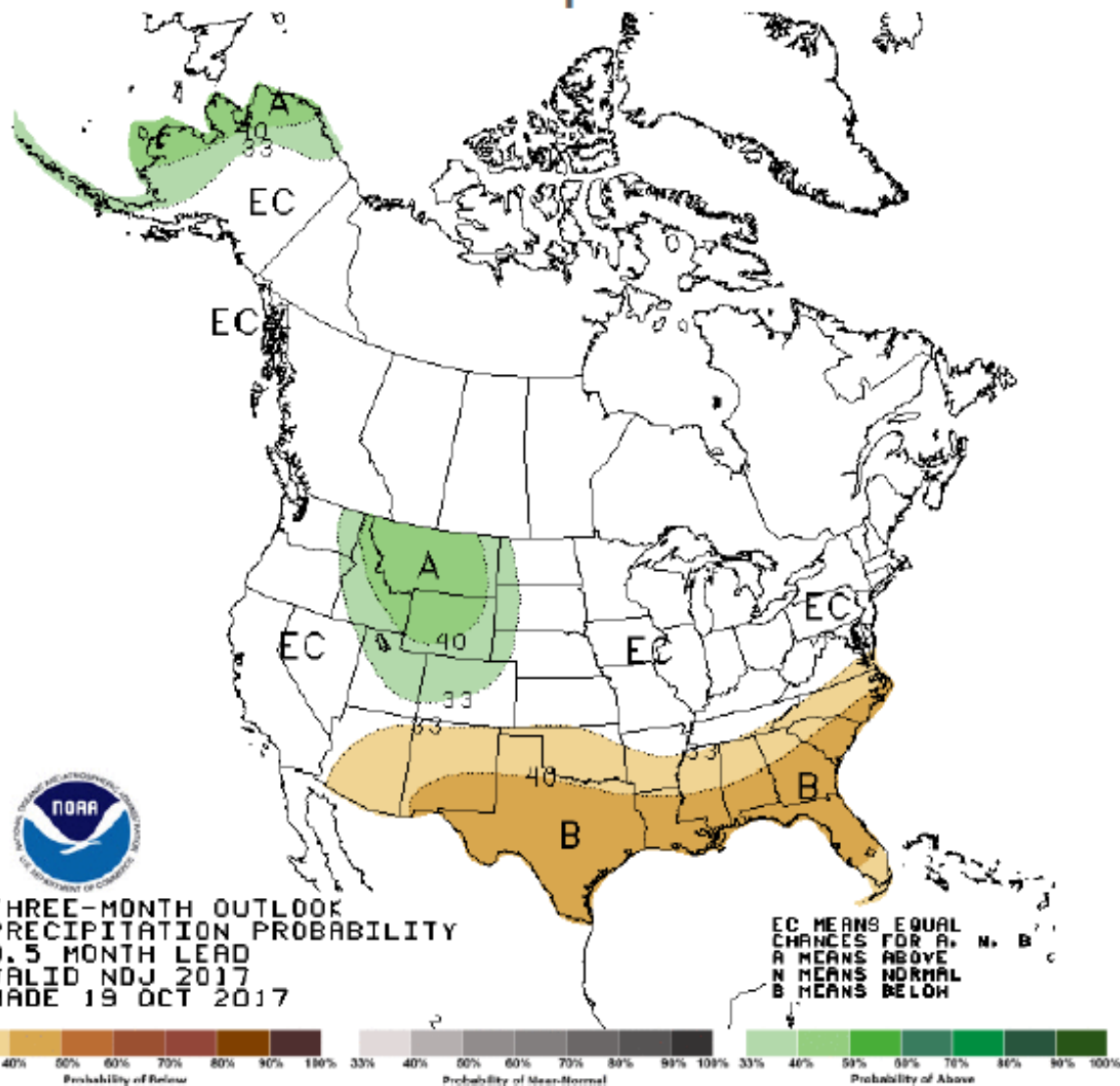
30yr Normal -- 59.6 MAF

U. S. Seasonal Outlooks

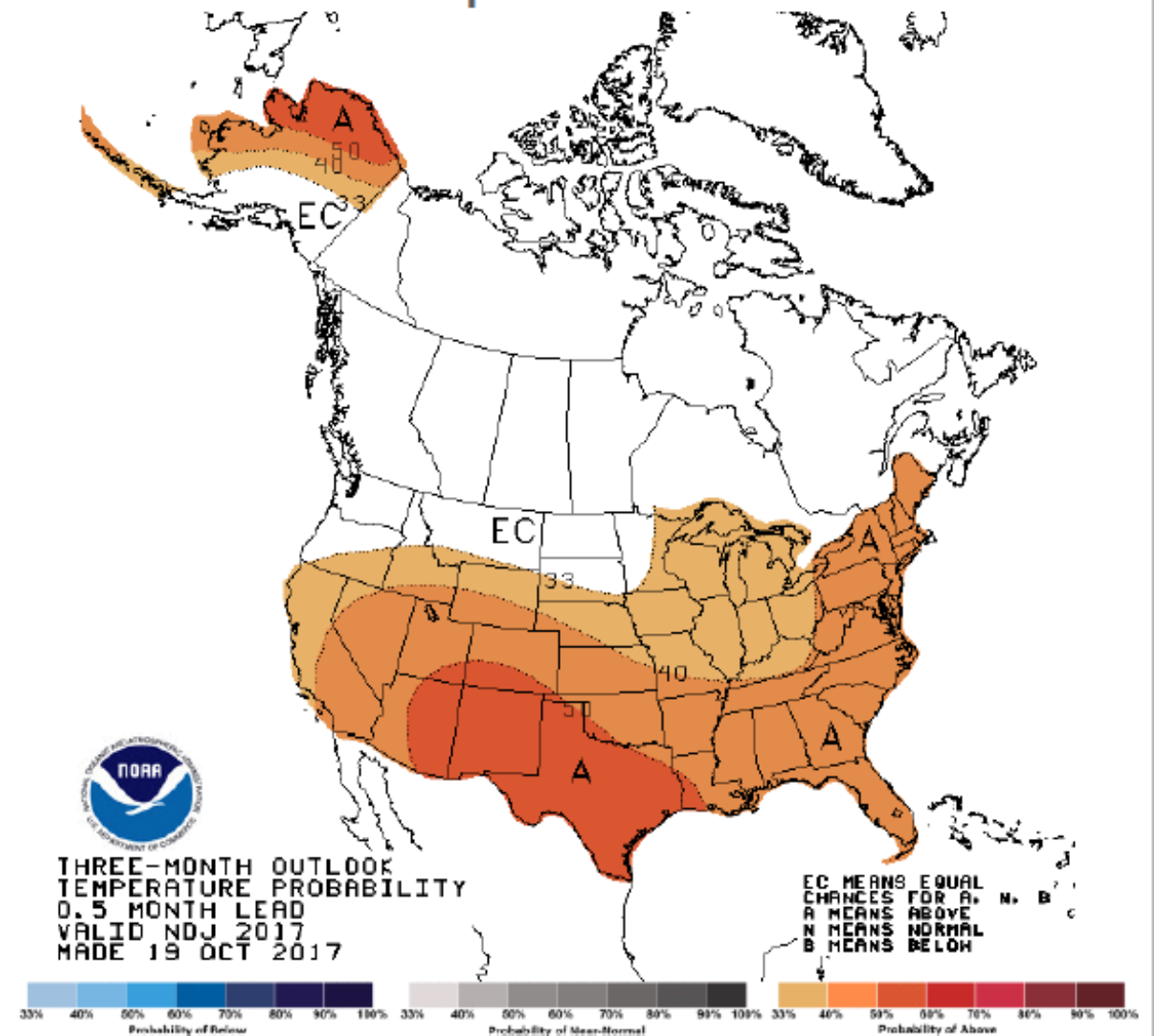
November 2017- January 2018

The seasonal outlooks combine the effects of long-term trends, soil moisture, and, when appropriate, ENSO.

Precipitation

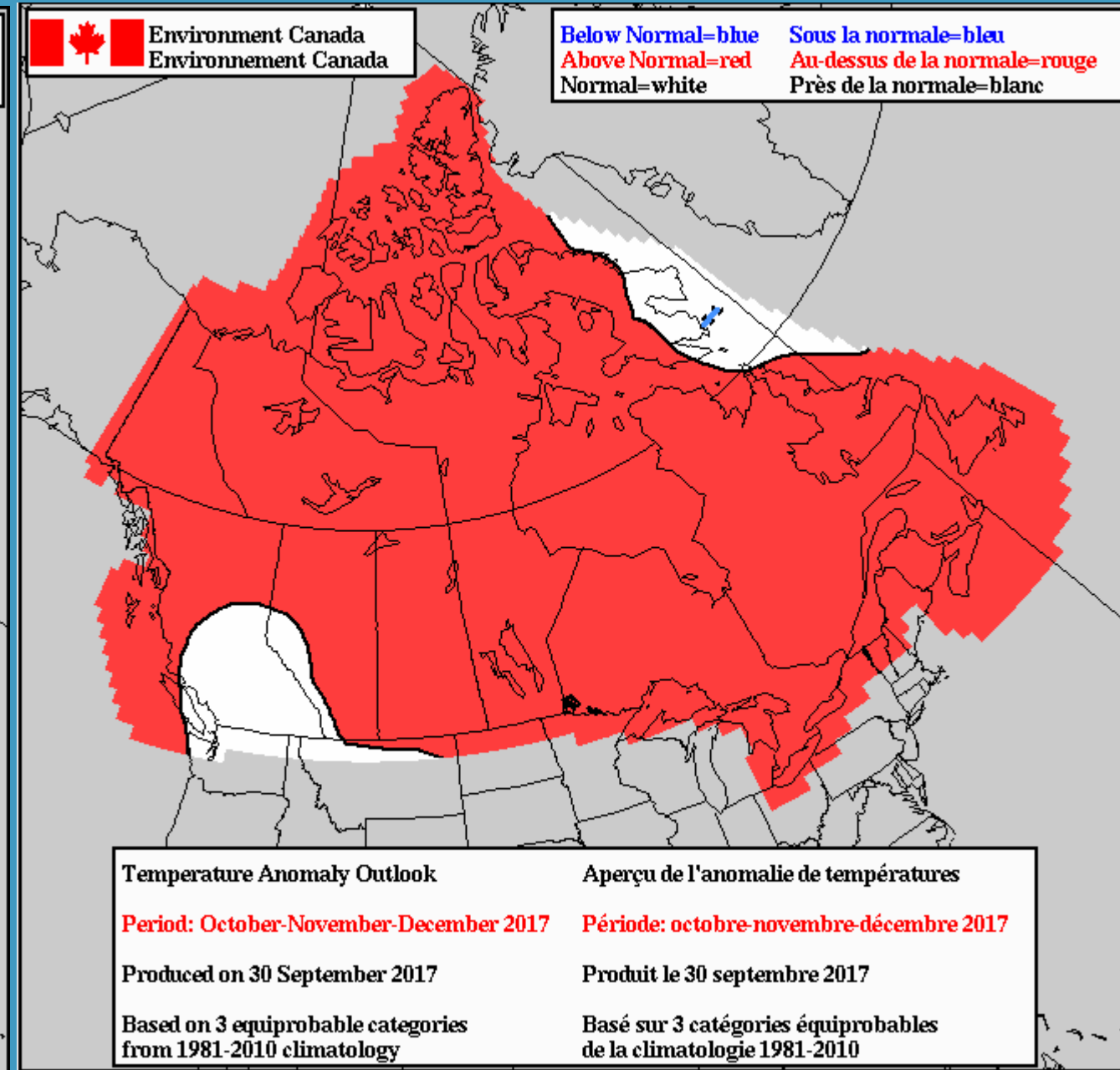
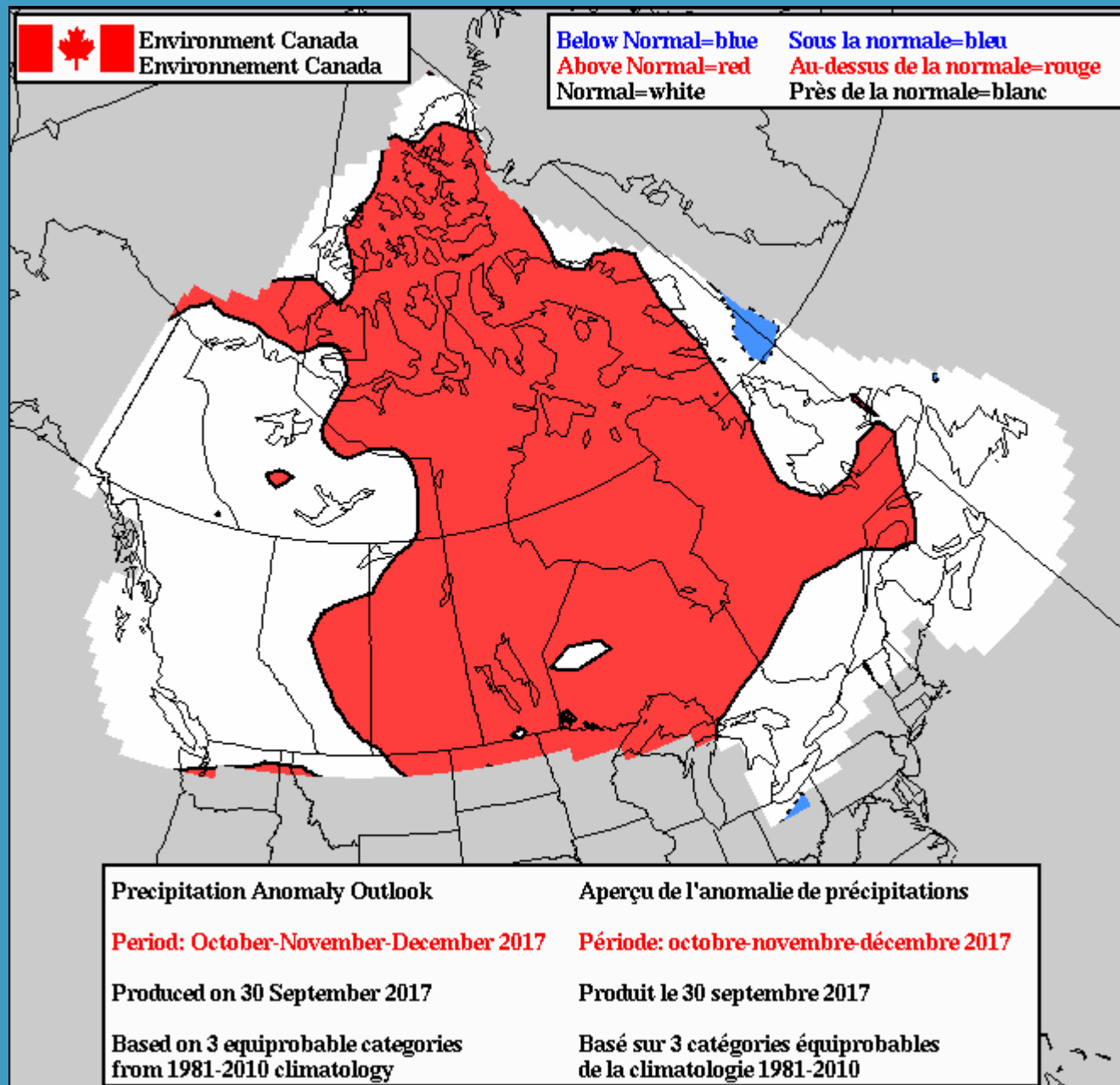


Temperature



CANADIAN OCT-DEC FORECASTS

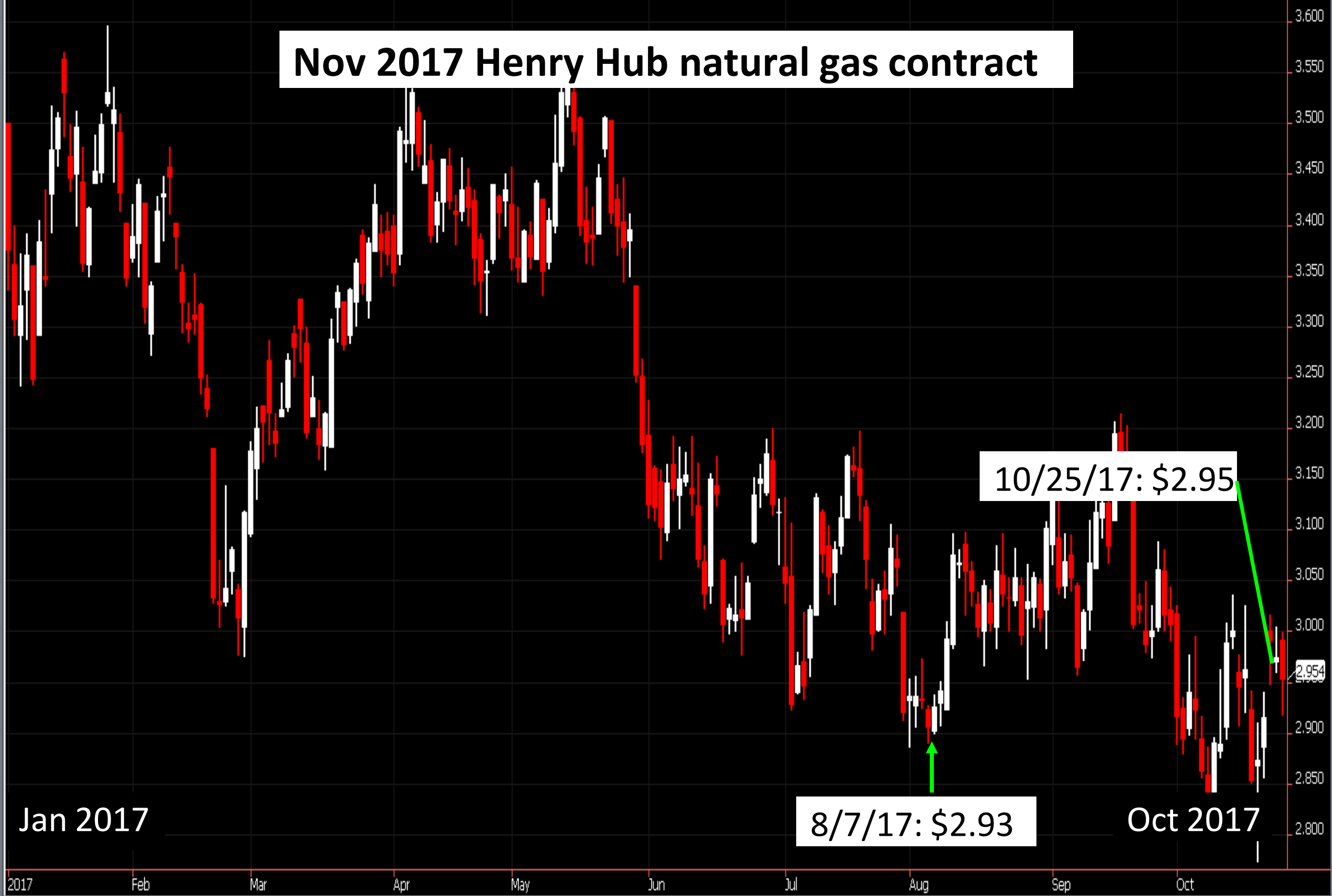
Temperature and Precipitation Deterministic Forecasts



Red = Above (wetter)
Blue = Below (drier)

Red = Above (warmer)
Blue = Below (colder)

Nov 2017 Henry Hub natural gas contract



Jan 2017

8/7/17: \$2.93

10/25/17: \$2.95

Oct 2017

Nov 2017 Henry Hub natural gas contract



\$15 00

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14.500
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2017



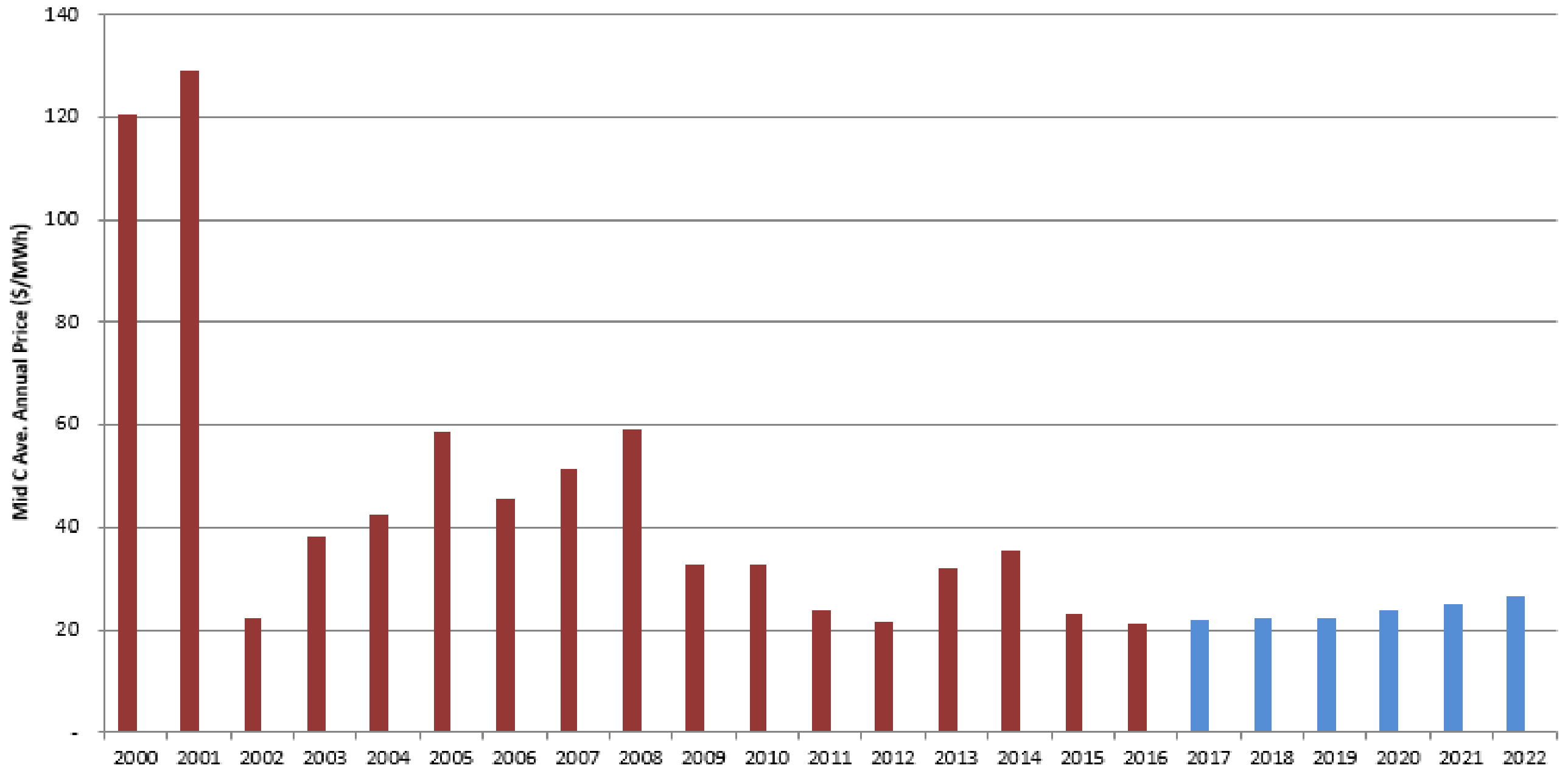
2.949

2002

2017 \$2 00

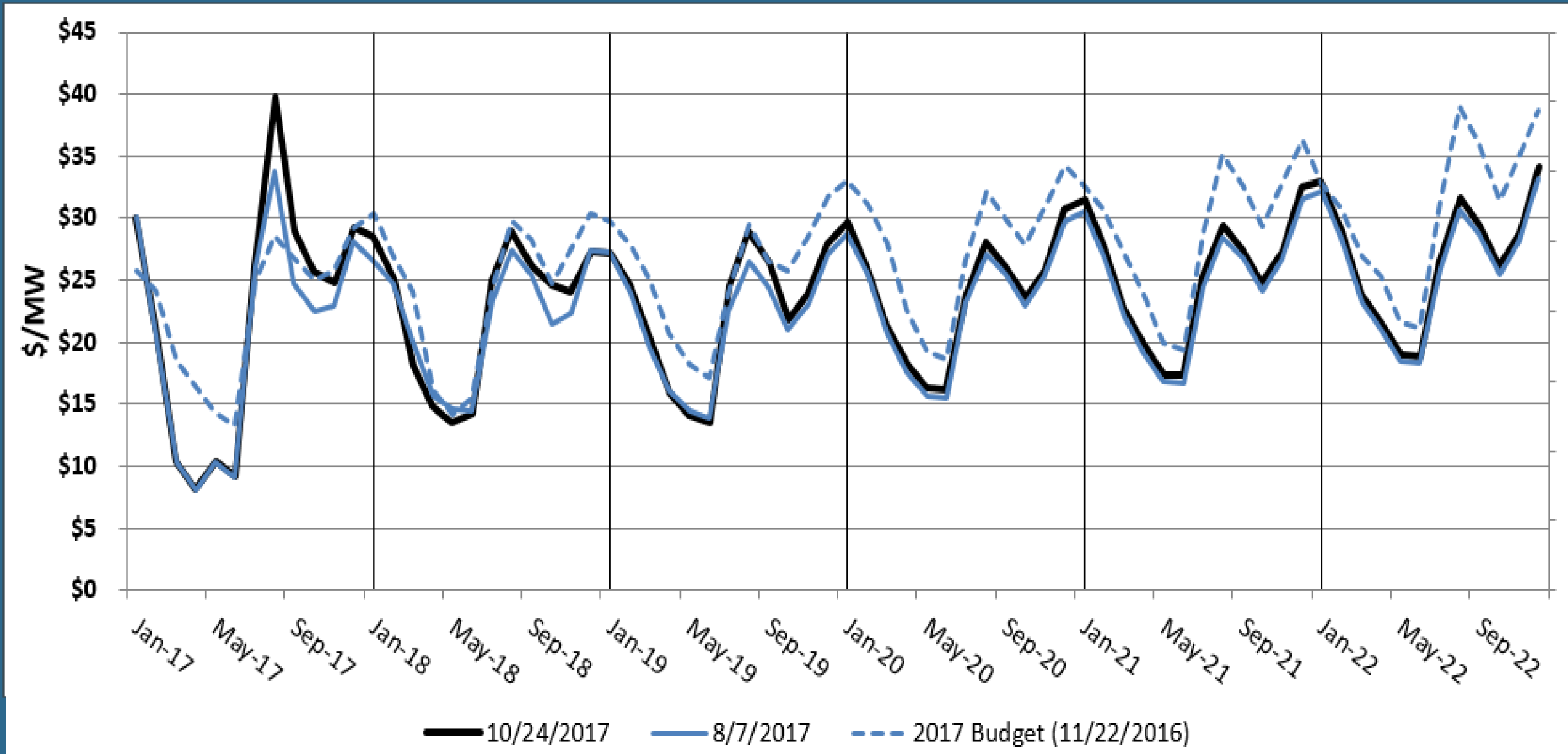
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017

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)



2017 NWR and Other Energy-Related Revenue

	Budget	Forecast**	Variance
Net Wholesale Revenue*	\$ 114,138,098	\$ 112,508,370	\$ (1,629,728)
<i>Specified Source</i>	\$ 3,091,960	\$ 4,609,705	\$ 1,517,745
<i>Other</i>	\$ 615,896	\$ 622,694	\$ 6,798
Alcoa PSC Revenue	\$ -	\$ 2,899,185	\$ 2,899,185
Frequency Response	\$ 282,750	\$ 282,750	\$ -
Renewables	\$ 458,090	\$ 438,219	\$ (19,871)
Real-Time Revenue	\$ 7,000,000	\$ 8,466,818	\$ 1,466,818
NWR and Other Energy-Related Revenue	\$ 121,878,938	\$ 124,595,342	\$ 2,716,404

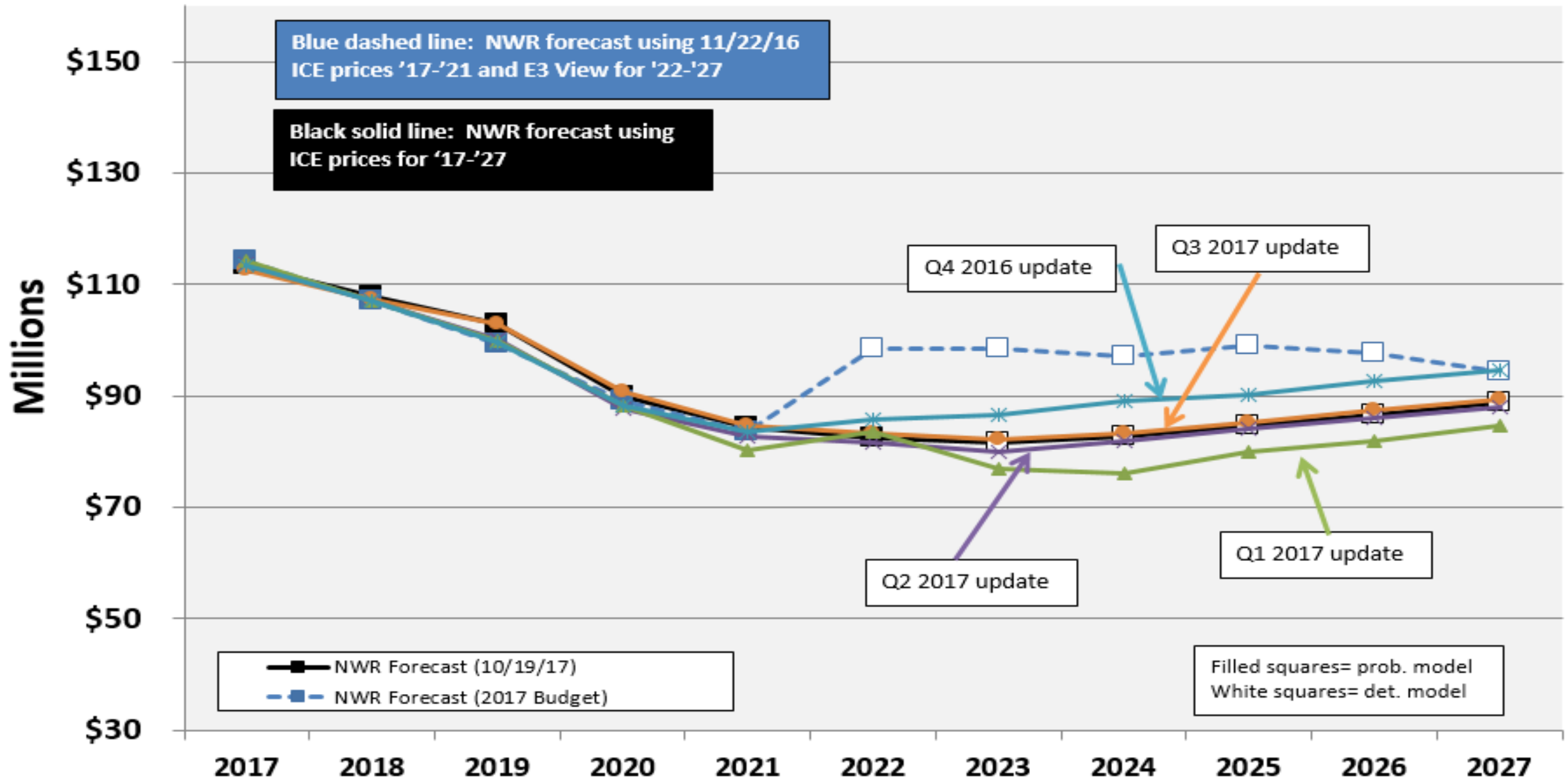
**Net Wholesale Revenue (NWR) includes all premiums from specified source and other premium products as well as slice sales and standard forward / pre-schedule energy trading activity.*

Other premium products include hubbing, system delivery, scheduling services, Lake Chelan reserves and super peak products

***2017 forecast based on Jan-Sep unaudited actuals and Oct-Dec estimates.*

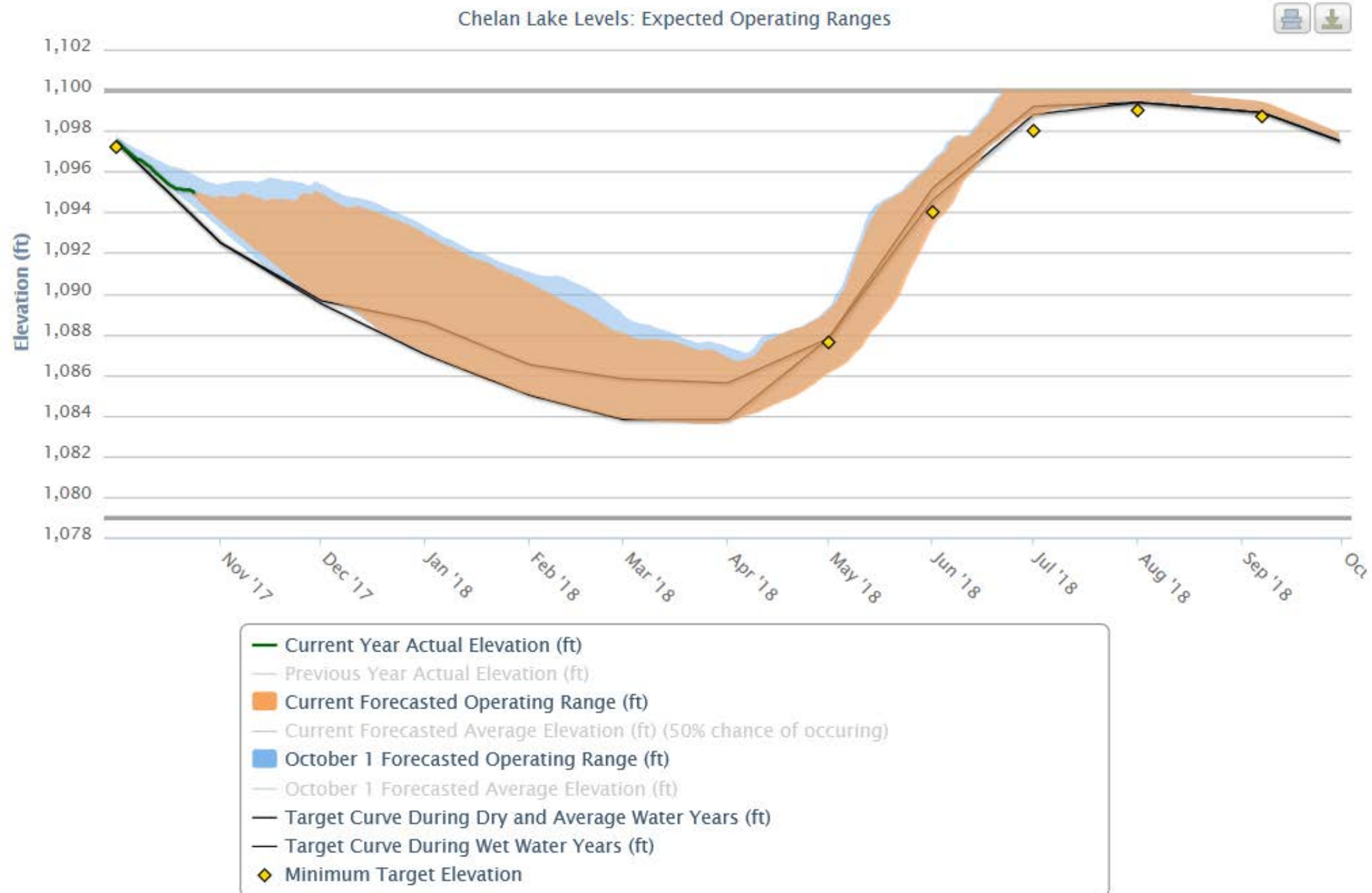
NET WHOLESALE REVENUE FORECAST

Net Wholesale Revenue Forecast



LAKE CHELAN LAKE LEVEL WEBPAGE

(10/24/17)



MARKET INFO

NPCC expects stable, low Northwest gas prices

- Abundant supply
- 300% in well productivity improvement in last 4 years
- Flat residential and commercial consumption for last 2 decades

Western EIM Grows on PGE Entrance

- PGE has started participating in the rapidly expanding Western Energy Imbalance market on Oct 1.
- Powerex, which already participates in Cal-ISO's markets, will aggregate eight hydroelectric facilities totaling 10,674 MW to participate in the EIM. Targeting April 2018 start.

DOE calls for major power market revamp

- DOE directing FERC to consider a plan that would compensate certain types of generators for the inherent reliability and resilience they provide to the grid.
- As envisioned by DOE, rule would push coal-fired and nuclear generation into a more advantageous market position, allowing these power sources to compete more effectively with renewable and natural gas-fired generation.

Q3 ENERGY EFFICIENCY RESULTS

Two-Year Compliance Target 1.66 aMW-this was met in 2016

Annual 2017 Stretch Target is 2.1 aMW

Q3 Energy Savings (aMW) ¹	Incentive and Labor Cost	\$/MWh over Life	Estimated Value over Life ²
0.84	\$ 1,800,000	\$ 16.50	\$ 2,600,000

1. Pending metering and verification and based on expected NEEA savings
2. Based on weighted average life and 7% discount

UPCOMING ENERGY EFFICIENCY BOARD OF COMMISSIONERS PRESENTATIONS

Conservation Potential Assessment

- » November 20-Review I-937 Compliance Goals
- » December 4-Board Resolution to set 2018/2019 compliance target

LED Streetlight Project

- » November 20- Review proposed streetlight rates
- » December 4-Set public meeting dates for January

SUMMARY

2017 Net Wholesale Revenue and other energy related revenue \$2.7 million above budget forecast.

Specified Source energy sales contributed \$4.6 Million to the Net Wholesale Revenue which is \$1.5 higher than budget.

Energy Efficiency programs have met the ~1.7 aMW 2016/2017 compliance goal. Year-to-date savings are behind pace to meet 2017 stretch goal. Actions are being implemented to change this.

QUESTIONS?



CHELAN COUNTY