Chelan PUD

Energy Resources
Quarterly Board Update
1st Quarter 2017

May 15, 2017

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Energy Planning & Trading
2017 Q1

- 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)

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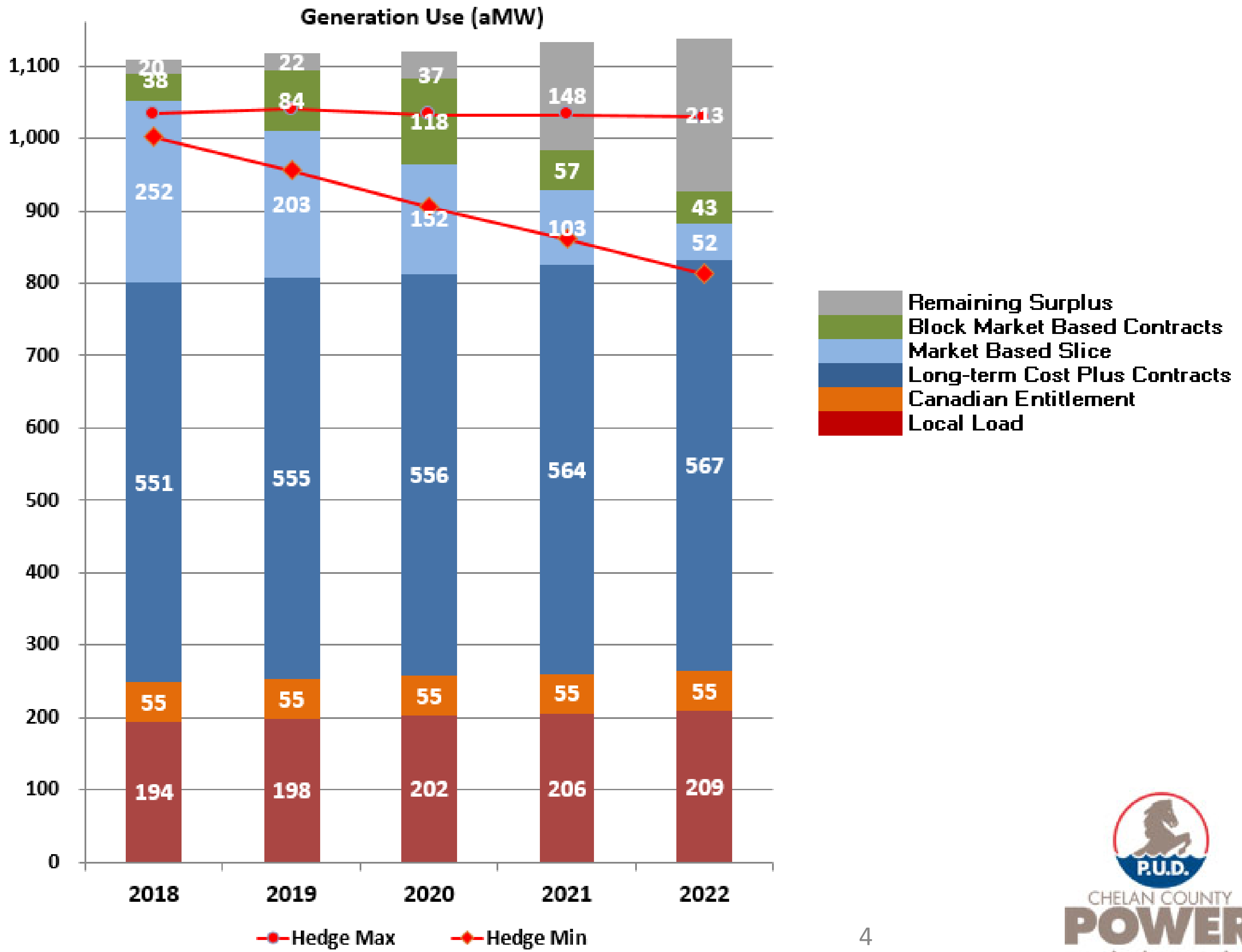
Key Message Points

- The District's 2017 Net Wholesale Revenue and other energy related revenue forecast ($116.1 Million) is slightly higher than the budget amount for 2017 ($114.1 Million).
- The Specified Source energy sales contributed $3.1 Million to the Net Wholesale Revenue which is the same as budget.
- Higher than average river flows for Q1 allowed for more generation. However, District load for Q1 was higher than budgeted due to colder temperatures. The net wholesale sales were close to budget. In Q2, higher river flows may just translate to more spill.
- Energy Efficiency starting out slow, but the pipeline is filling up.

District's Load/Resource Balance

(average MW)



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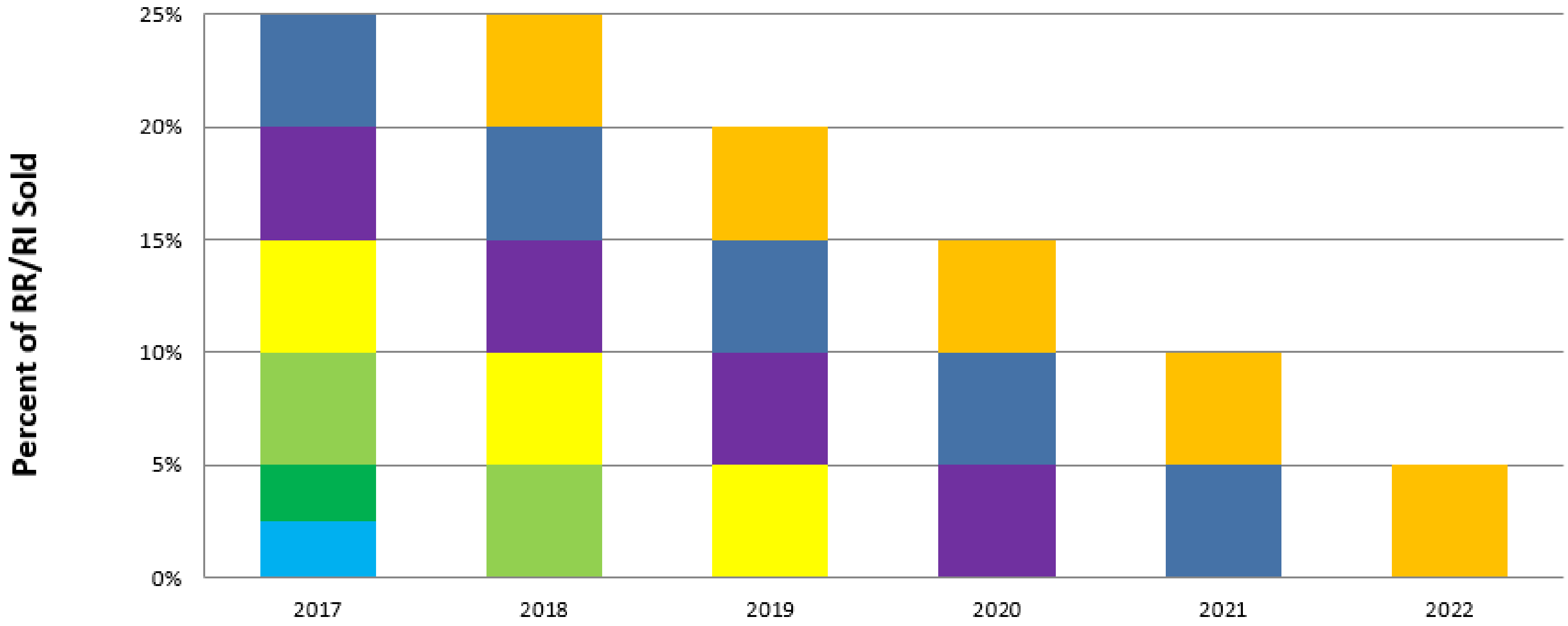
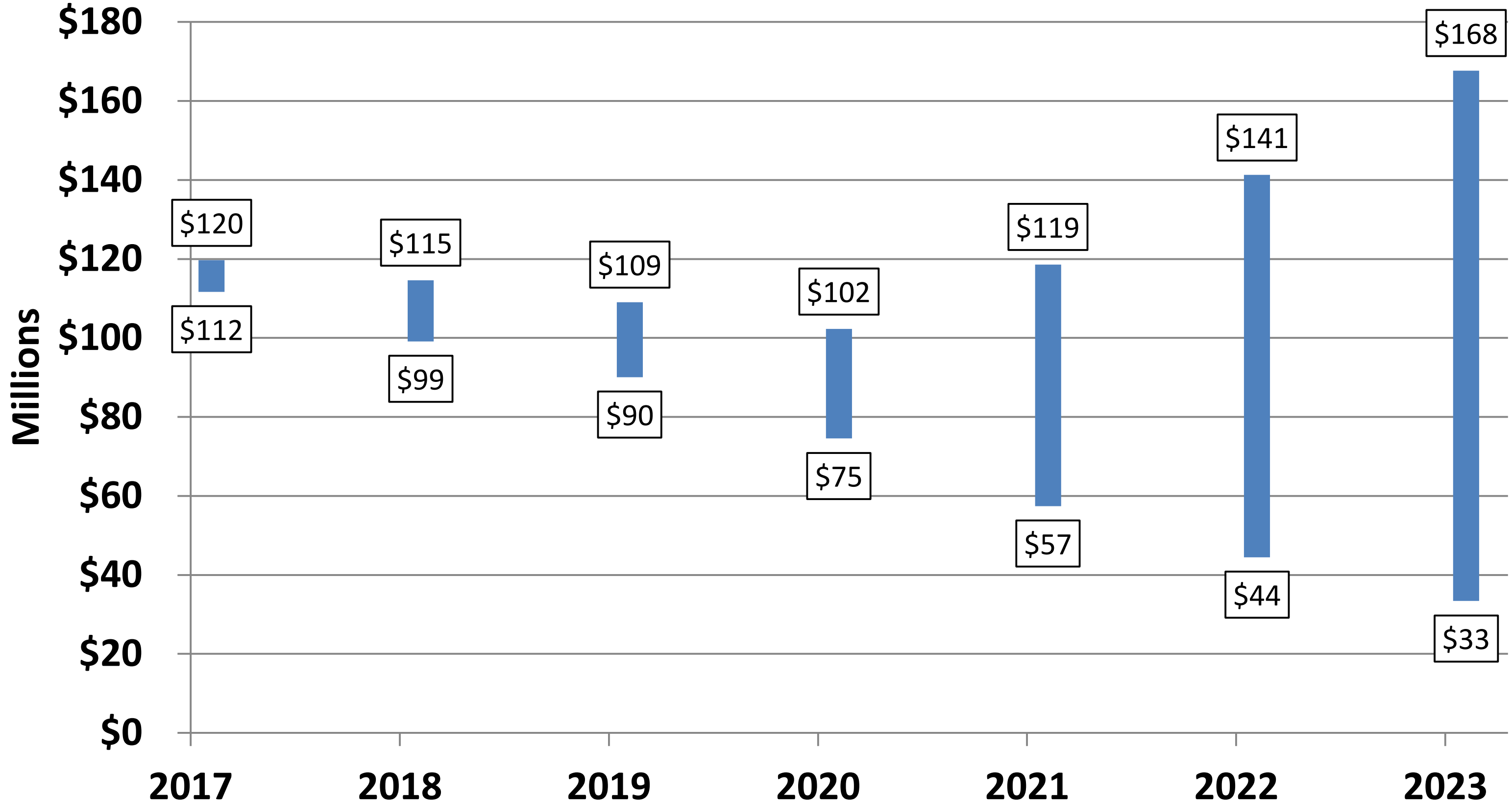
Current Market Position - Slice Products



	2017	2018	2019	2020	2021	2022
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%					

Net Wholesale Revenue Projections



Columbia River Flow Update for 2017

2016	Rocky Reach Flow (kcfs)	Budget Rocky Reach Flow (kcfs)	% of Budget
Jan	128	115	111%
Feb	119	110	108%
Mar	158	102	155%
Apr	207	114	182%
May		147	
Jun		167	
Jul		131	
Aug		106	
Sep		76	
Oct		78	
Nov		92	
Dec		108	
YTD Average	153	110	139%

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

Cold Temps and Higher District Load

	Budgeted District Load (aMW)	Actual District Load (aMW)	Difference (aMW)	% Increase
Jan 2017	271	339	+68	25%
Feb 2017	238	293	+55	23%
Mar 2017	192	222	+30	15%
April 2017	161	162	+1	0%

Temps from NWS at Pangborn Field

	Average Monthly Temp (F)	2017 Average Temp (F)	Departure from Normal (F)
Jan 2017	29.5	20.5	-9.0
Feb 2017	34.8	26.9	-7.9
Mar 2017	44.1	41.0	-3.1
April 2017	51.6	49.0	-2.6

Water Supply Forecast

COLUMBIA - GRAND COULEE DAM (GCDW1)
Forecasts for Water Year 2017

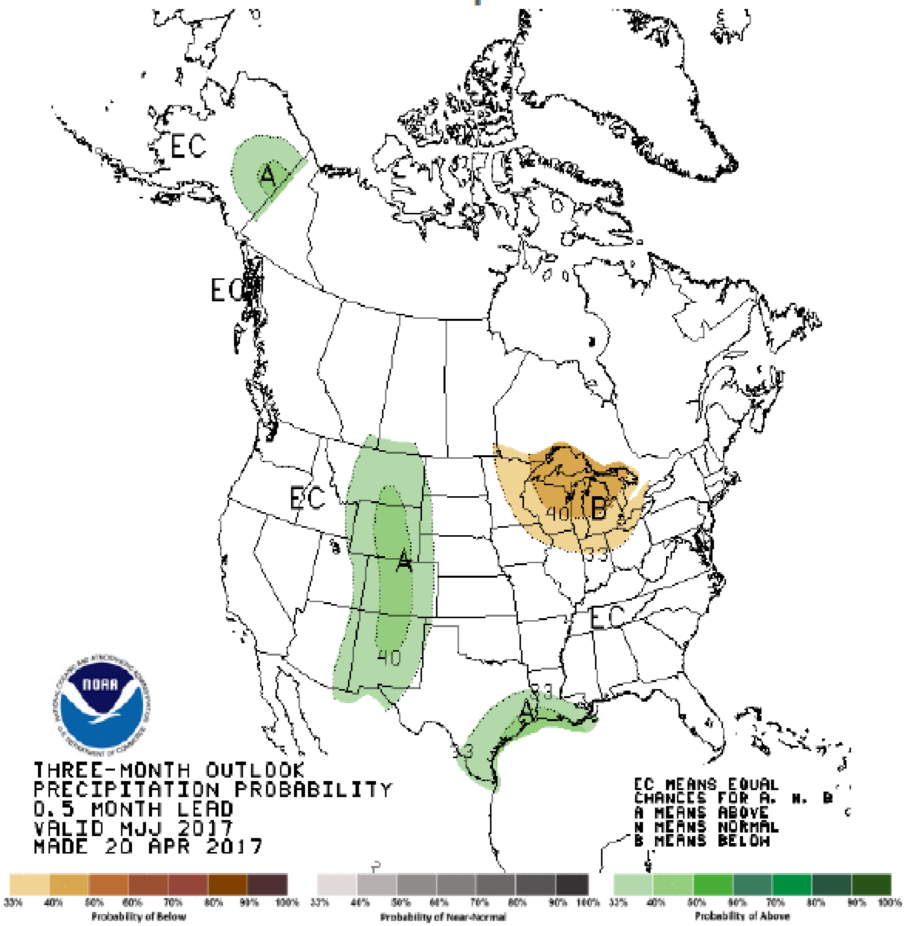
Official Forecast

10 days QPF: Ensemble: 2017-05-14 Issued: 2017-05-14

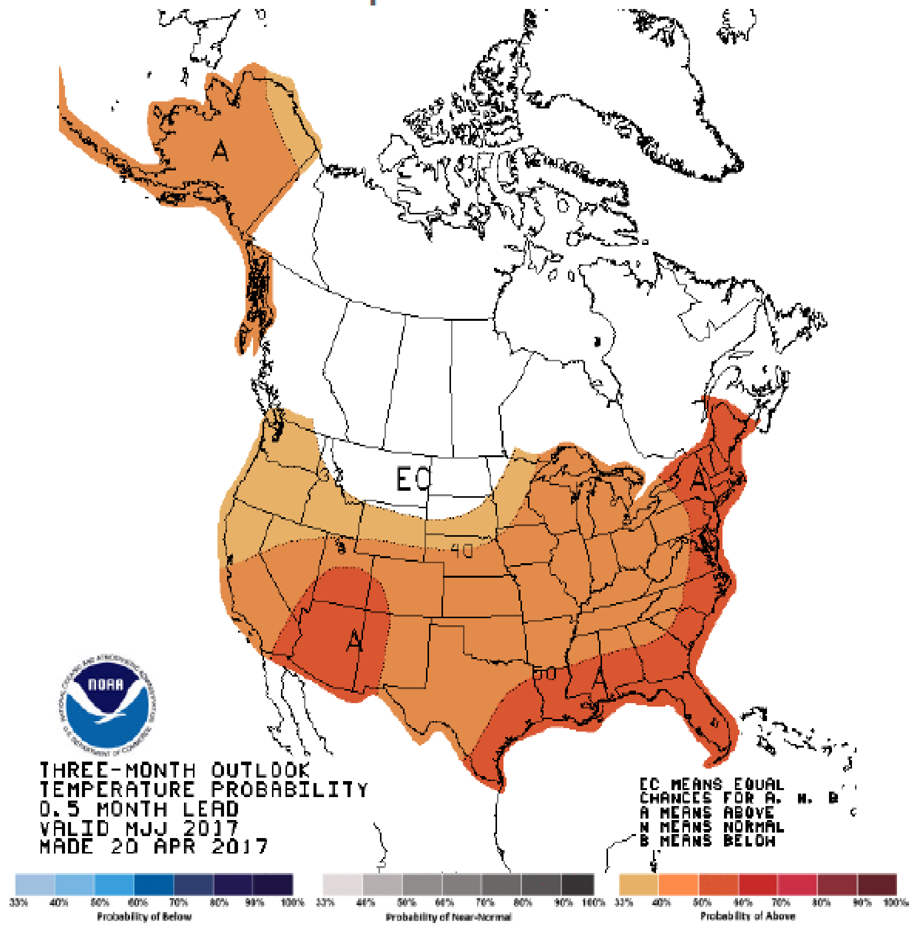
Forecast Period	Forecasts Are in KAF				30 Year Average (1981-2010)
	90 %	50 %	% Average	10 %	
APR-SEP	69135	73032	121	77829	60110
APR-JUL	59180	62369	122	66545	51015
APR-AUG	65578	68822	121	73362	56763
JAN-SEP	83024	86921	127	91718	68694
JAN-JUL	73070	76258	128	80434	59599
OCT-SEP	97391	101288	132	106086	76824

NOAA May-Jul Climate Forecast

Precipitation



Temperature

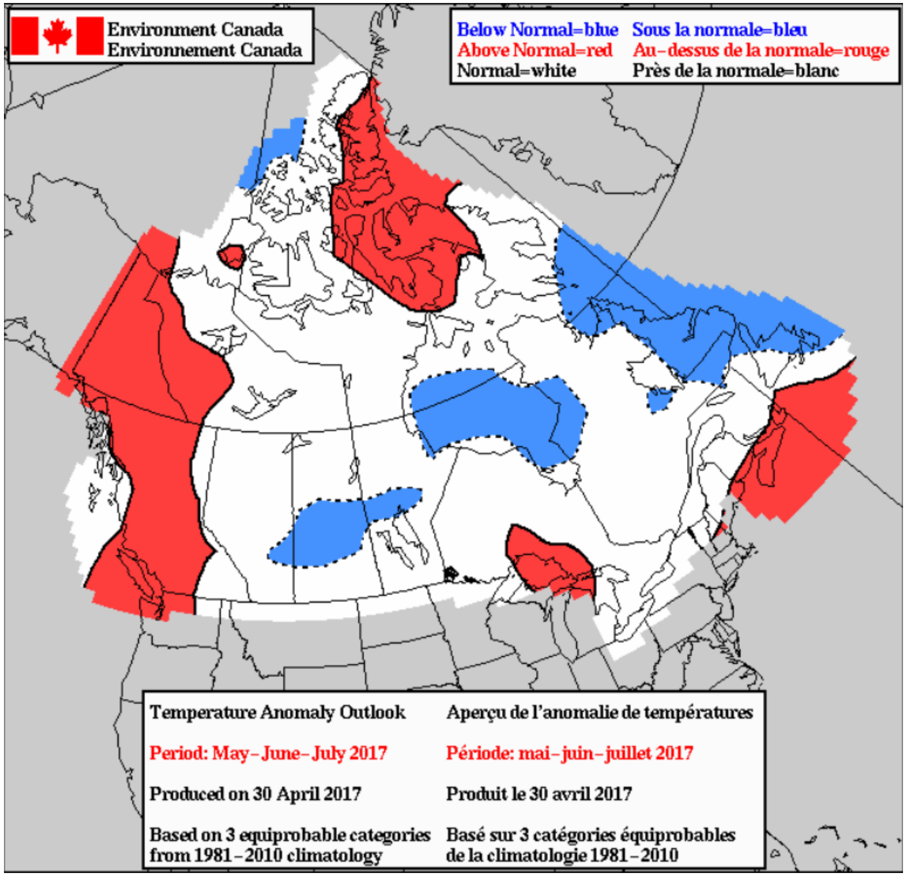


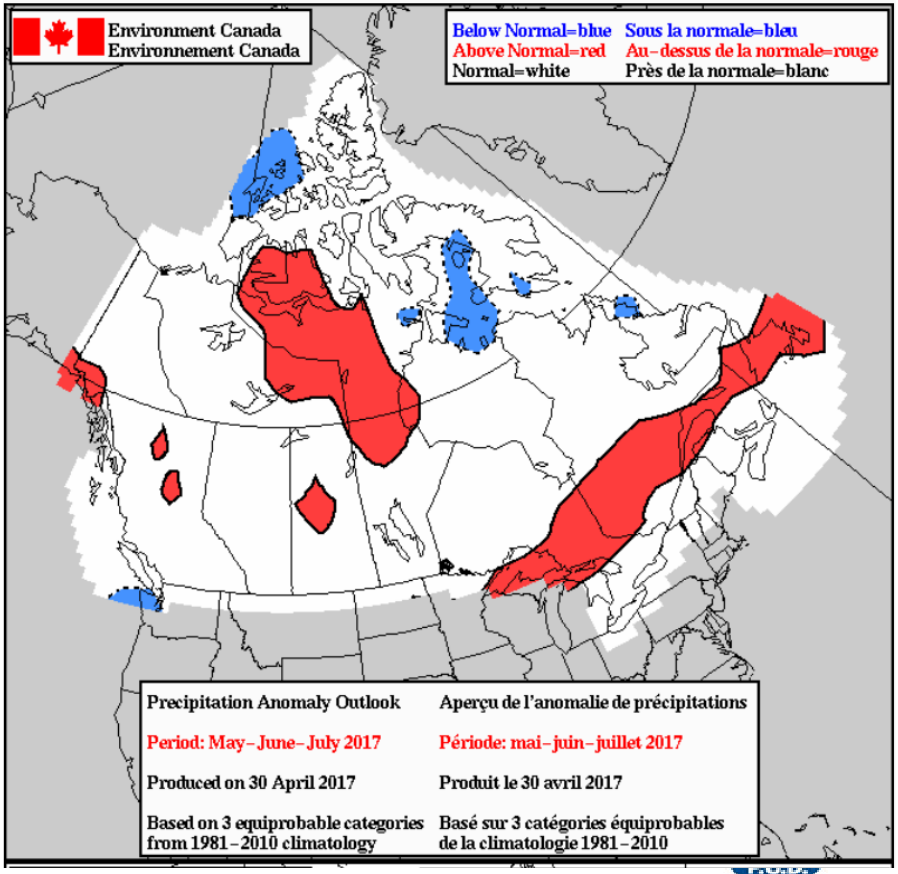
Canadian May-Jul Forecasts

Temperature and Precipitation Deterministic Forecasts

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

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





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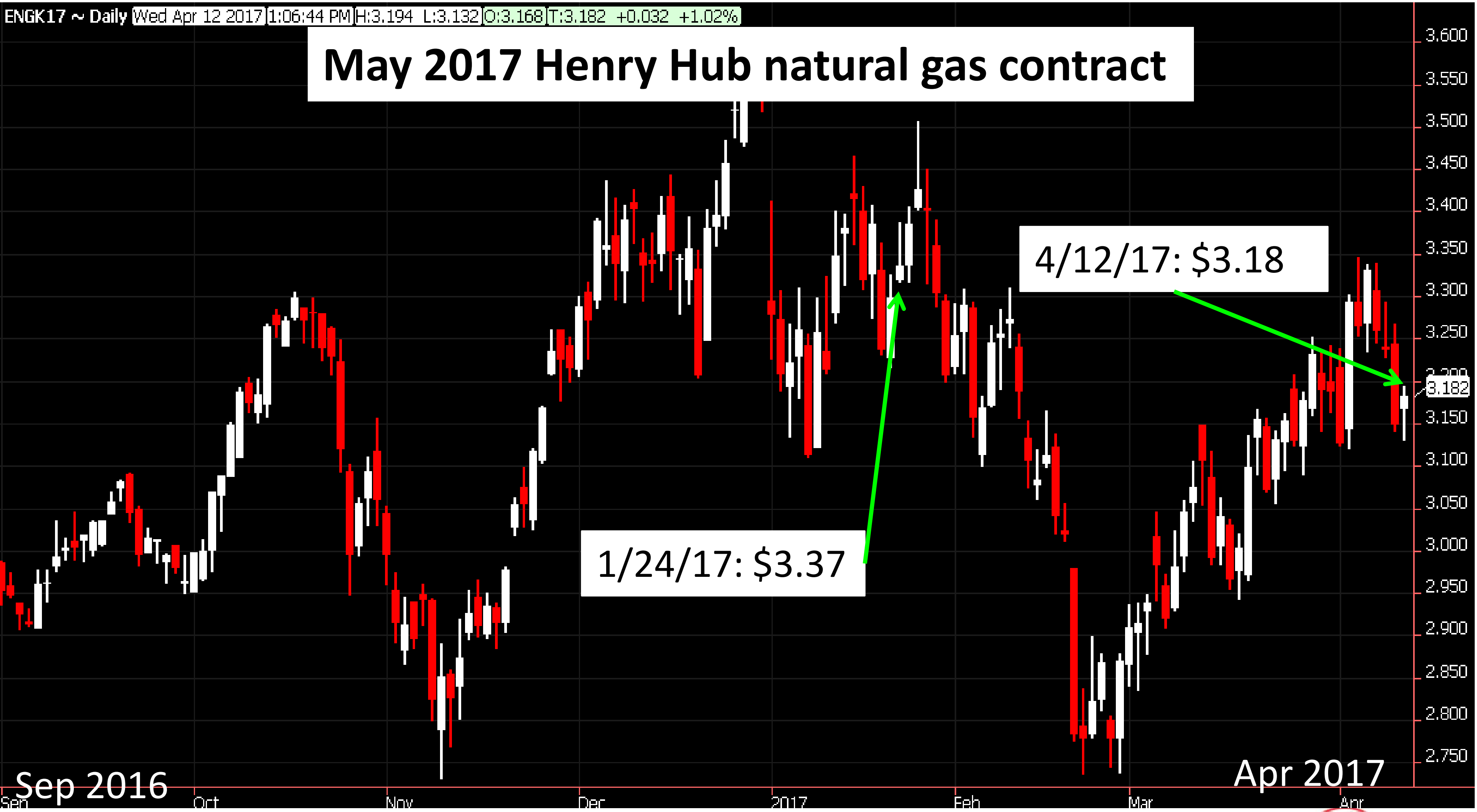

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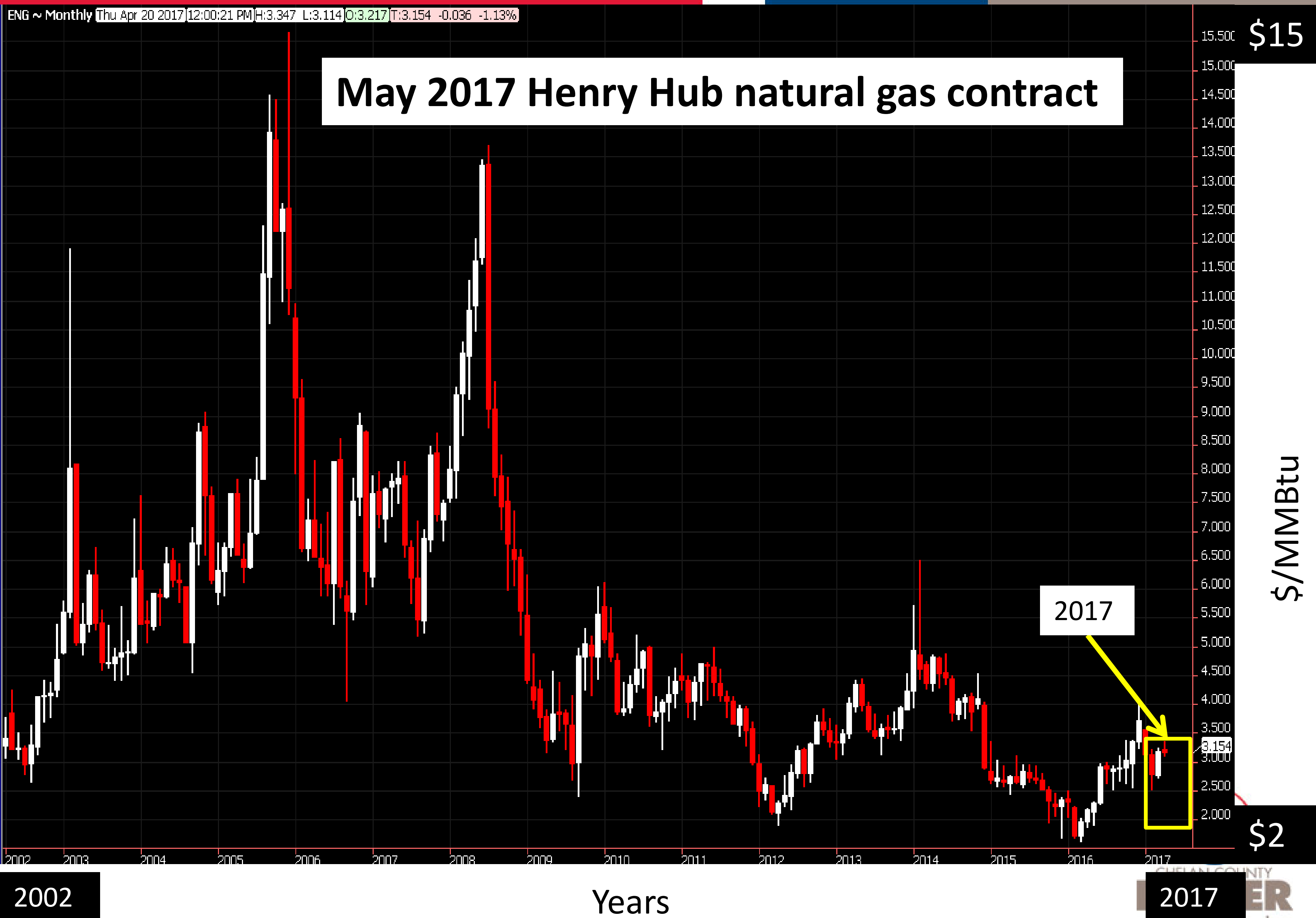
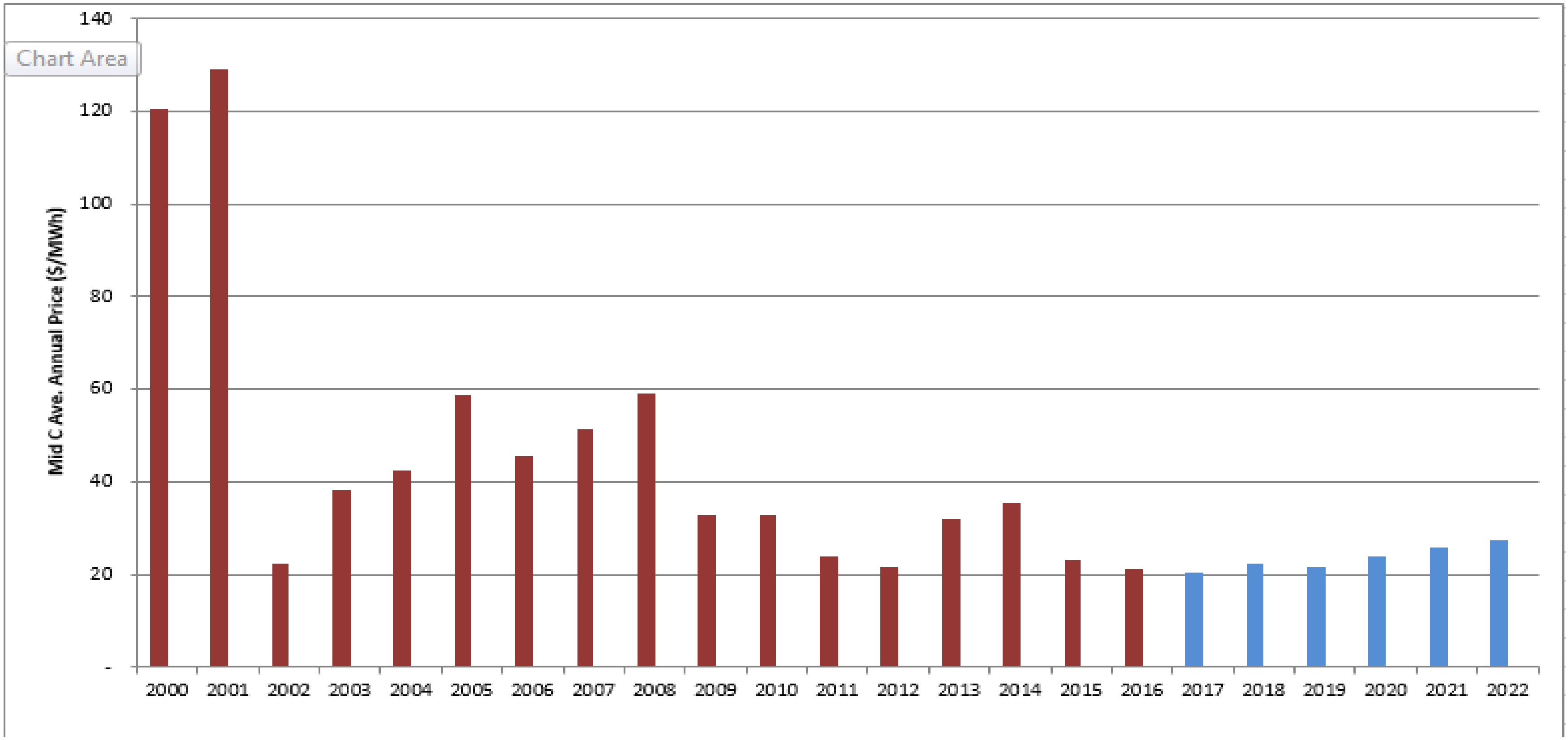
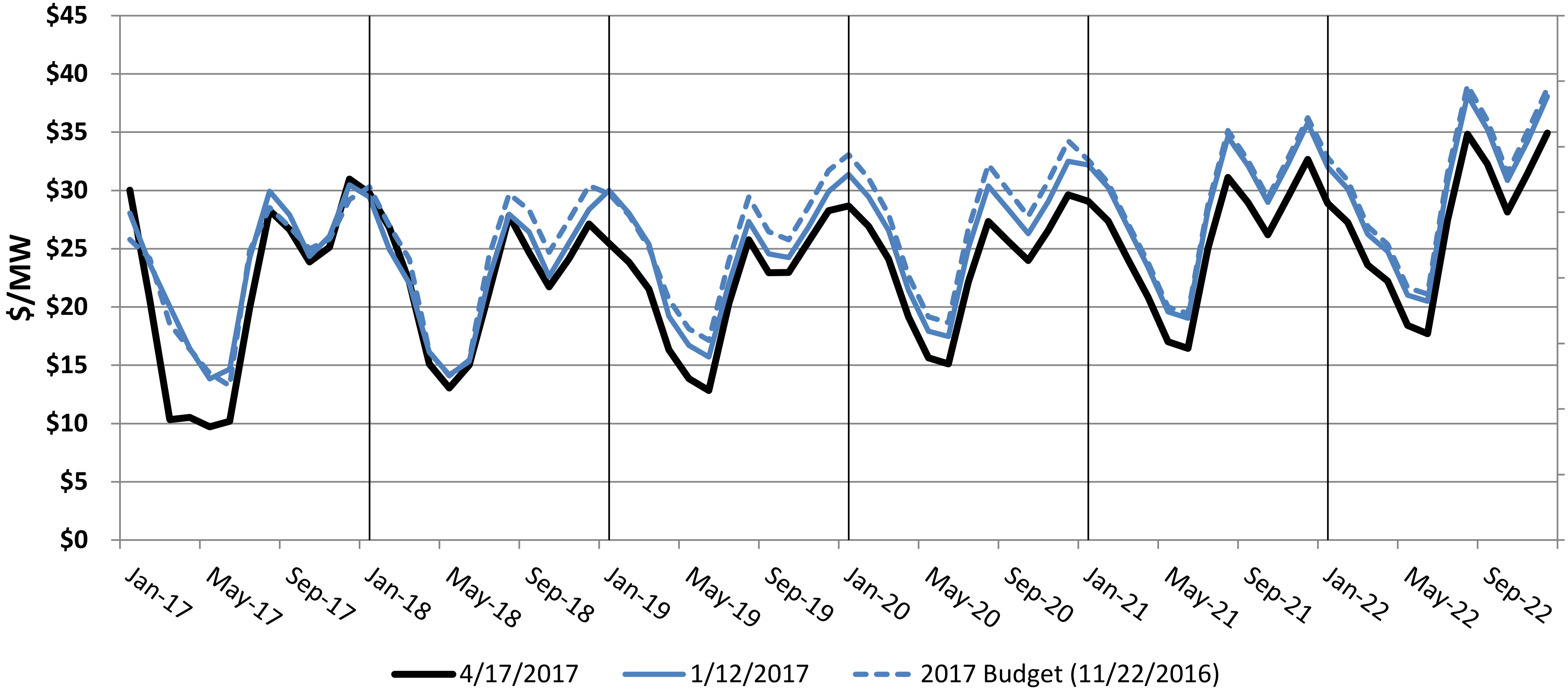

ENG ~ Monthly Thu Apr 20 2017 12:00:21 PM H:3.347 L:3.114 O:3.217 T:3.154 -0.036 -1.13%
May 2017 Henry Hub natural gas contract
$15
$2
$/MMBtu
2017
2002
Years
2017

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)

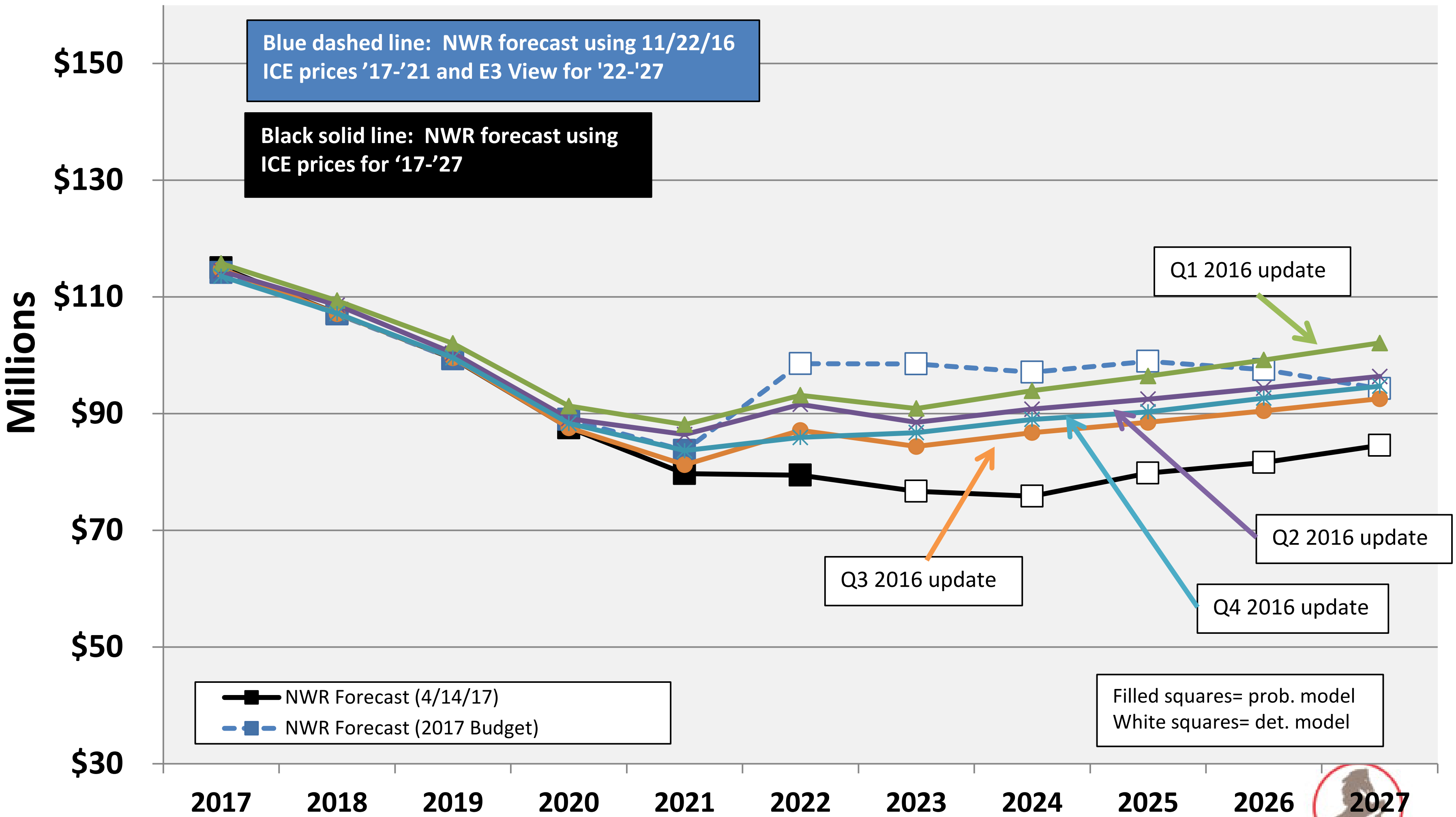


2017 NWR and Other Energy-Related Revenue						
		Budget		**Forecast****		**Variance**
Net Wholesale Revenue*	$	114,138,098	$	116,159,784	$	2,021,686
Specified Source	*$*	*3,091,960*	*$*	*3,091,960*	*$*	*-*
Other	*$*	*615,896*	*$*	*635,010*	*$*	*19,114*
Alcoa PSC Revenue	*$*	*-*	*$*	*1,796,135*	*$*	*1,796,135*
Frequency Response	$	282,750	$	282,750	$	-
Renewables	$	458,090	$	414,261	$	(43,829)
Real-Time Revenue	$	7,000,000	$	7,439,885	$	439,885
NWR and Other Energy-Related Revenue	**$**	**121,878,938**	**$**	**124,296,680**	**$**	**2,417,742**

**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. Alcoa PSC surplus proceeds are also included in the NWR forecast. Other premium products include hubbing, system delivery, scheduling services, Lake Chelan reserves and super peak products*

***2017 forecast based on Jan-Mar unaudited actuals and Apr-Dec estimates.*

Net Wholesale Revenue Forecast



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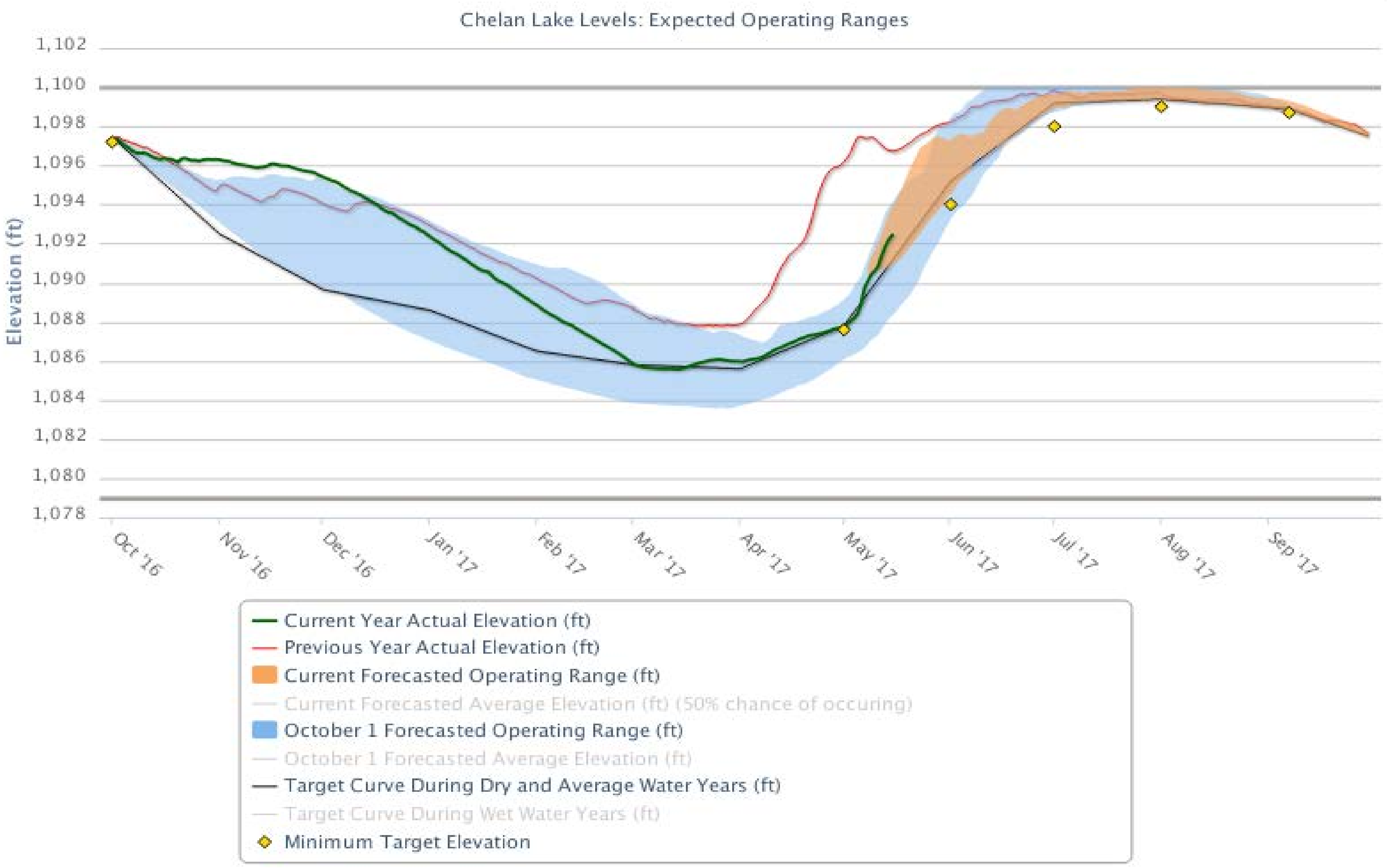
Lake Chelan Lake Level Webpage (5/15/17)



Market Info

Cal-ISO sees Growing Flexible Capacity Need

•CA's need is increasing as the state adds more renewable resources to its generating mix.

•ISO expects wind and solar (internal and external to its footprint) to grow from 14,220 MW las year to 17,345 MW this year and to 18,053 MW in 2018.

•ISO is forecasting about 1,600 MW of rooftop solar will come online this year in its footprint.

•"flexible capacity need" is the amount of resources needed to manage grid reliability during the greatest there-hour continuous ramp in each month.

IPPs face long-term viability issues: S&P Report

•Independent power producers must reduce debt, control costs and focus on contracted generation if they expect to remain competitive in the long-term

•…becoming increasingly evident that IPPS need to "hunker down and adapt to factors driving long-term market fundamentals"

•Power prices are low as a result of significant supply of gas

•…renewable and storage proliferation, and technology improvements in energy efficiency, have been more pronounced than earlier expected.

•…these efficiencies could "continue to nip at demand" in such a way that the "economic life" of conventional generation assets will be diminished.

Q1 Energy Efficiency Results

Two-Year Compliance Target 1.66 aMW-this was met in 2016
Annual 2017 Stretch Target is 2.1 aMW

Energy Efficiency Savings (aMW)[1]	Incentive and Labor Cost	$/MWh over life	Estimated Value over Life[2]
0.22	$ 485,000	$ 16.80	$ 608,422

1 Pending metering and verification and based on expected NEEA savings

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

Projects in the Pipeline

- Justice Center
- Stemilt
- Cascade School District-High School and Elementary School

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LED Streetlight Status Update

- Applied for additional Commerce grant funding
- Completed decorative light audit
- Met with Transportation Improvement Board
- Ongoing meetings with municipals

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Questions?

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