



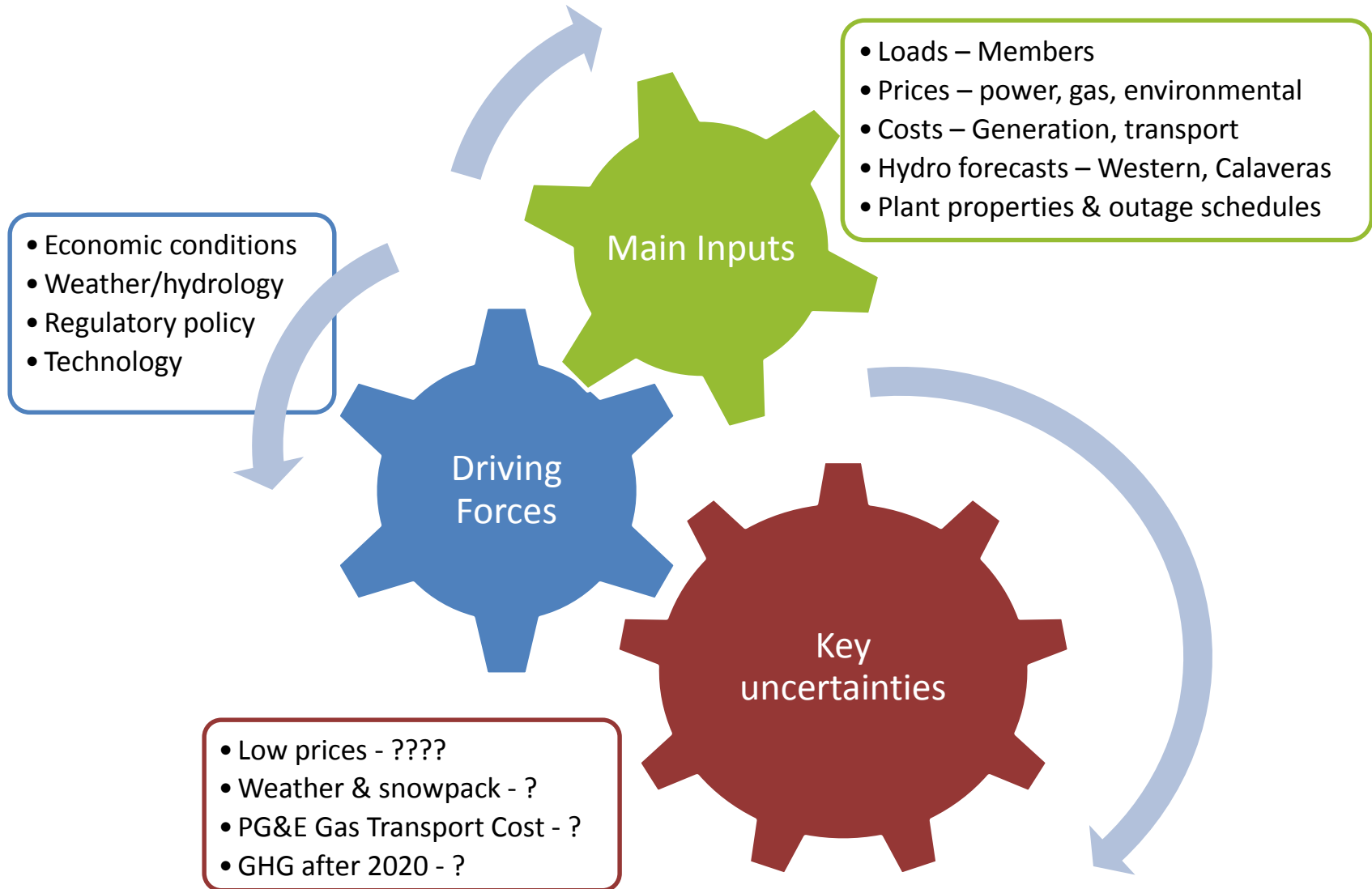
FY 2017 Power Supply Budget: Assumptions and Preliminary Results

Facilities Committee Meeting

1/6/2016

Jan Bonatto,
Power Market Analyst

FY 2017 Power Supply Budget: Moving Parts



FY 2017 Budget

Summary of Key M38 Input Assumptions

- **System optimization (using PLEXOS energy market simulation/optimization software)**
 - PLEXOS Version = 6.207R05 Model = NCPA **M38**
 - Optimization Run Date = 2015-12-11 (11 Calendar Years: 1/1/2016 through 12/31/2026)
- **Hourly value of resource energy is maximized/optimized against hourly market prices**
 - If generation exceeds load, then surplus generation is sold into market
 - If load exceeds generation, then generation need is purchased from market
- **Loads**
 - November 2015 M38 hourly load forecast – Ken Goeke
 - Key Assumptions:
 - Average weather conditions (i.e. a 1-in-2 probability of monthly heating degree days and cooling degree days)
 - Real GDP growth based on the Congressional Budget Office 2015 second-quarter forecast of potential GDP resulting in growth rates of **3.03%**, 3.1%, 3.0%, 2.9% and 2.75% for **2016** through 2020 respectively. Out years' GDP growth continued at average annual rate of 2.5% through 2026.
 - Pool unemployment was based on CA Department of Finance data and the UCLA forecast of employment for the state. Resulting unemployment rates for the Pool were **5.2%**, 4.9%, 4.6%, 4.5% and 4.5% for the years **2016-2020** respectively. The rate then remains at 4.5% through the remaining forecasted period.
 - Future energy efficiency program savings were assumed to be reflected in model's regression coefficients – that is, future energy efficiency programs were expected to continue at the same implementation rate as in the recent past.
 - Load forecasts were reviewed at the November pooling meeting.

M38 Input Assumptions: Geothermal and Calaveras Plants

- **Geothermal:**
 - Based on Steam Field Operations Forecast Report dated **April 27, 2015** (including planned outages)
- **Calaveras Forecast:**
 - Utilizes constraints based on 12/5/2015 updated Calaveras forecast (below) –based on current conditions.

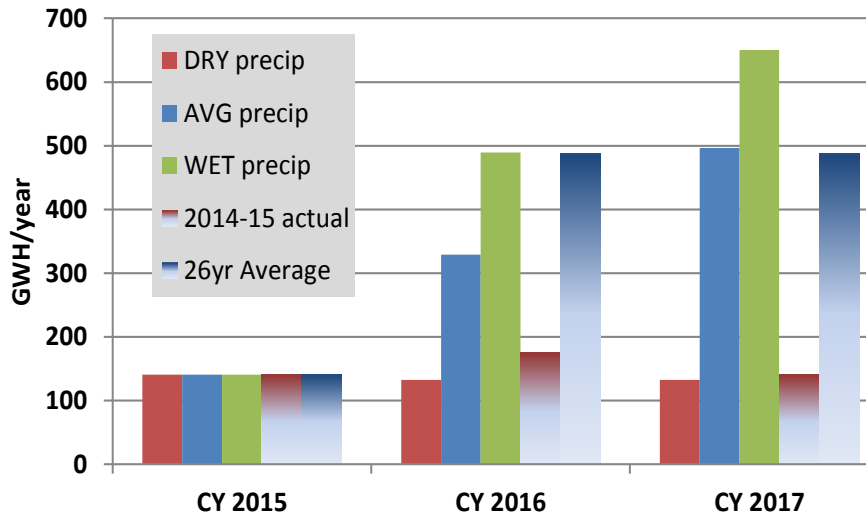
GWH	PROJECT TOTAL		55% NSM HLH Ratio				AVERAGE HYDROLOGY	
	Collierville		NSMR			Collierville	NSMR	
	HLH	LLH	HLH	LLH	total	total	total	
2016								
Jan	16.2	1.8	0.1	0.1	18.1	18.0	0.1	
Feb	30.0	0.9	0.2	0.2	31.3	30.9	0.4	
Mar	46.4	0.9	0.1	0.1	47.5	47.3	0.2	
Apr	61.5	1.7	0.1	0.1	63.3	63.2	0.1	
May	76.7	7.5	0.8	0.6	85.6	84.2	1.4	
Jun	20.2	5.0	0.2	0.1	25.6	25.3	0.3	
Jul	8.7	0.9	0.7	0.6	10.9	9.6	1.3	
Aug	8.0	1.8	0.9	0.7	11.4	9.8	1.6	
Sep	7.3	1.1	0.8	0.6	9.8	8.4	1.4	
Oct	9.5	1.8	0.8	0.7	12.7	11.3	1.5	
Nov	7.0	1.5	0.5	0.4	9.5	8.5	0.9	
Dec	10.2	2.1	0.1	0.1	12.6	12.3	0.3	
	301.8	27.0	5.3	4.3	338.4	328.9	9.6	
2017								
Jan	34.8	1.8	0.9	0.8	38.2	36.6	1.7	
Feb	47.2	0.9	1.0	0.9	50.0	48.1	1.9	
Mar	65.7	0.9	1.0	0.8	68.4	66.6	1.8	
Apr	82.5	1.7	1.0	0.9	86.1	84.2	1.9	
May	85.6	1.6	1.1	0.9	89.2	87.2	1.9	
Jun	36.8	5.0	1.1	0.9	43.9	41.9	2.0	
Jul	21.7	0.9	1.5	1.2	25.3	22.6	2.7	
Aug	22.0	1.8	1.7	1.4	26.9	23.8	3.0	
Sep	21.3	1.1	1.5	1.2	25.2	22.4	2.7	
Oct	19.5	1.8	1.3	1.1	23.6	21.3	2.3	
Nov	16.0	1.5	0.9	0.8	19.2	17.5	1.7	
Dec	22.2	2.1	0.7	0.5	25.5	24.3	1.2	
	475.4	21.1	13.7	11.2	521.4	496.6	24.9	

M38 Input Assumptions: Calaveras (Continued)

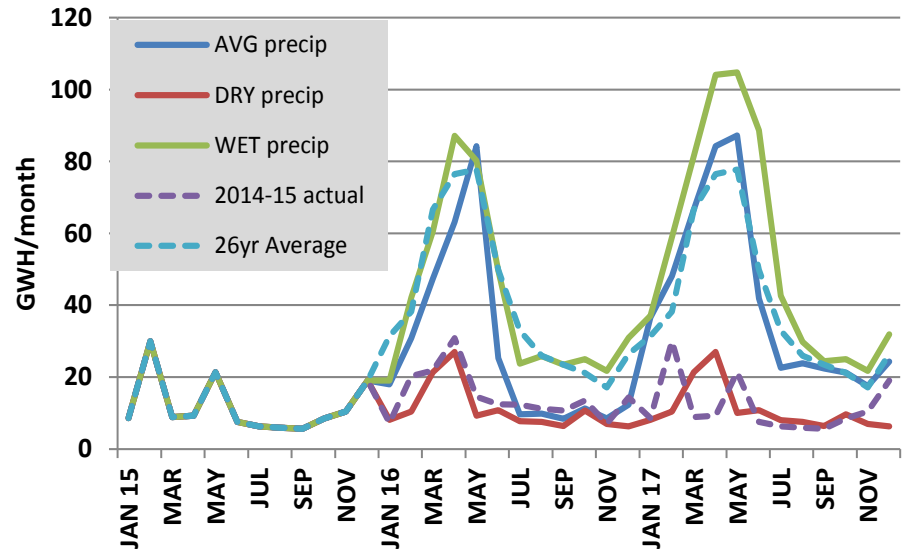
•Calaveras Forecast:

- Utilizes constraints based on 12/5/2015 updated Calaveras AVERAGE forecast, based in turn on current conditions. In order to provide best-possible information - *if conditions warrant* - it would be possible to re-run on 1/8/2016 with an updated forecast.

CY 2016-17 Collierville Generation Projections

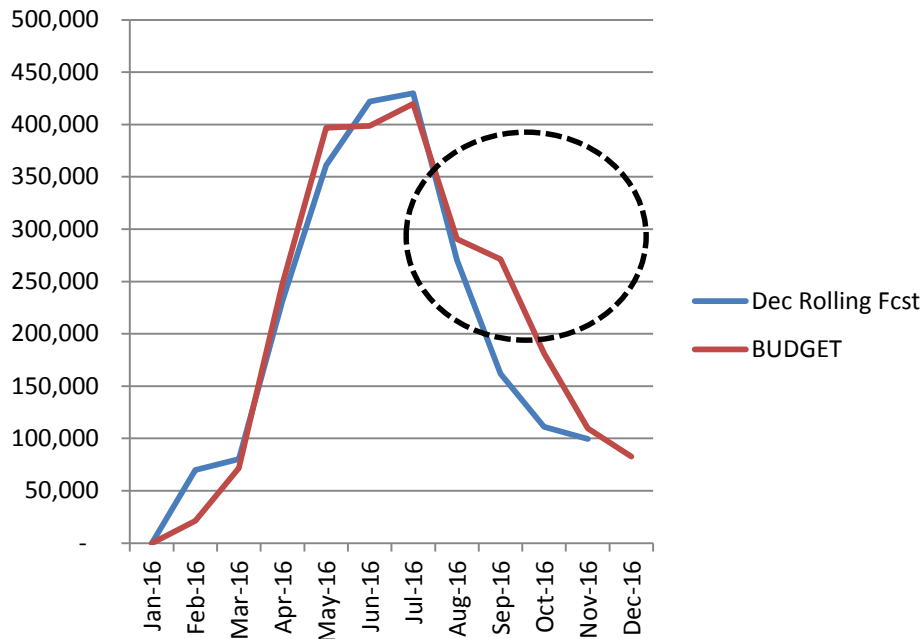


CY 2016-17 Collierville Generation Projections



M38 Input Assumptions: Western - Base Resource

- **Western’s 36-month forecast** (dated October 2015) is utilized through “Water Year 3” – or September 2018. Forecast prepared by Tom Kabat.
- **After September 2018** –subsequent years repeat the Water Year 3 values.
- In **most-recent** rolling forecast, Sept-Oct. 2016 are substantially lower than present budget forecast.



	Dec-15	BR (MWh)	HLH	LLH	
Sep-15	Rolling Fcst	197,252	114,569	82,683	
Oct-15		110,839	76,956	33,883	WATER YEAR 1
Nov-15		43,623	16,104	27,518	2,307,964
Dec-15		35,757	14,619	21,138	
Jan-16		-	-	-	
Feb-16	69,968	21,246	21,246	-	
Mar-16	80,340	71,580	63,738	7,841	
Apr-16	231,316	247,557	164,626	82,931	
May-16	361,134	396,779	273,070	123,709	
Jun-16	422,064	398,821	313,800	85,021	
Jul-16	429,780	419,776	293,374	126,402	
Aug-16	270,219	290,635	209,561	81,074	
Sep-16	161,849	271,352	174,957	96,396	
Oct-16	111,182	181,417	129,450	51,967	WATER YEAR 2
Nov-16	99,417	109,448	67,113	42,335	2,803,747
Dec-16		82,618	55,348	27,270	
Jan-17		-	-	-	
Feb-17		73,101	73,101	-	
Mar-17		250,315	220,519	29,796	
Apr-17		275,488	178,145	97,343	
May-17		405,282	293,763	111,519	
Jun-17		405,456	319,108	86,348	
Jul-17		426,785	299,258	127,527	
Aug-17		301,394	220,017	81,378	
Sep-17		292,442	193,135	99,307	
Oct-17		234,180	172,432	61,748	WATER YEAR 3
Nov-17		158,456	111,406	47,050	3,060,776
Dec-17		104,138	67,033	37,105	
Jan-18		23,971	23,971	-	
Feb-18		116,550	116,203	347	
Mar-18		249,083	217,576	31,507	
Apr-18		288,047	188,301	99,746	
May-18		421,844	307,045	114,799	
Jun-18		422,169	333,076	89,093	
Jul-18		437,718	307,497	130,221	
Aug-18		312,122	228,785	83,337	
Sep-18		292,497	193,204	99,293	

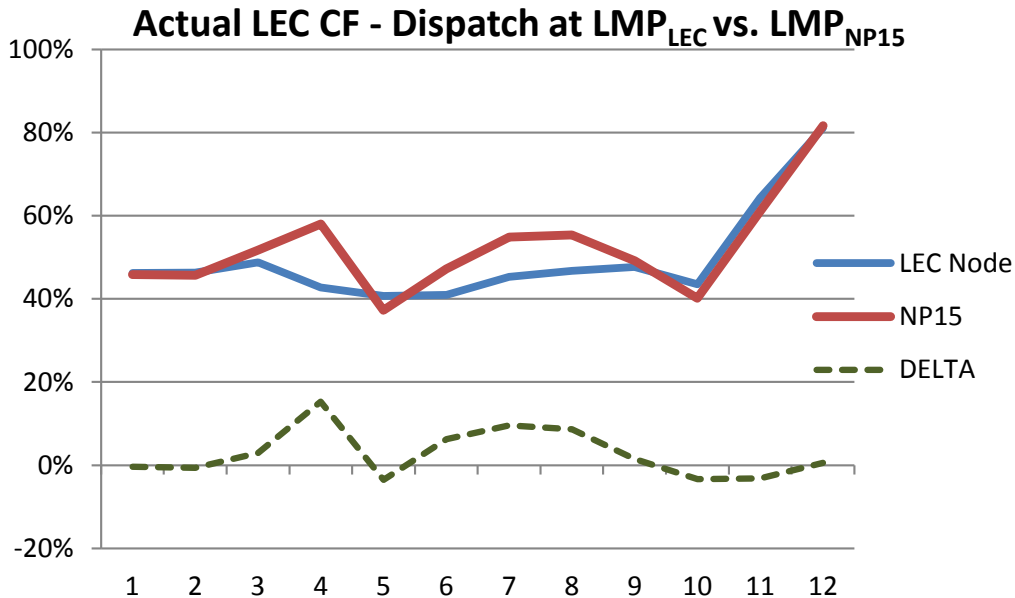
M38 Input Assumptions (Continued)

Market Price Assumptions for Natural Gas and Electric Power

- PLEXOS results for the **gas plants** are price-dependent. FY 2017 prices were prepared in November 2015 to reflect price levels consistent with expected mild weather-related demand depleting natural gas inventory levels during Q1-3 2016 (**VO**, dated 10/29/2015) and the chance of a normal hydro season.
 - Power prices reflect market price curves from ICE and EOX (and the market heat rates they imply) during early winter. They coordinate ICE/NYMEX natural gas prices for the same dates.
 - **VO** incorporates current analysis of factors including: (**PG&E Citygate gas**) the potential for moderating shale gas production, a slow but gradual increase in demand, costs of regulation, and global economic factors. (**NP15 power**) expecting spot power to gradually trend higher as gas prices begin to reflect supply/demand equilibrium and also reflecting renewable energy prices (e.g. RECs, GHG), increasing transmission costs, and changing demand patterns
 - Prices from 2022 through 2025 were derived from CERA's "Rivalry" (base-case planning) scenario using price escalators based on ICE and EOX price curves post-2019.
- After monthly price curves are developed, a SAS program (based on the previous year's **ISO plant nodal prices**, plus hourly **load** and **Western** delivery patterns and plant **outages** for each individual day) transforms the monthly prices into unique hourly prices for each day of the 11-year PLEXOS optimization run.

Hourly Prices Affect Average Daily Capacity Factors

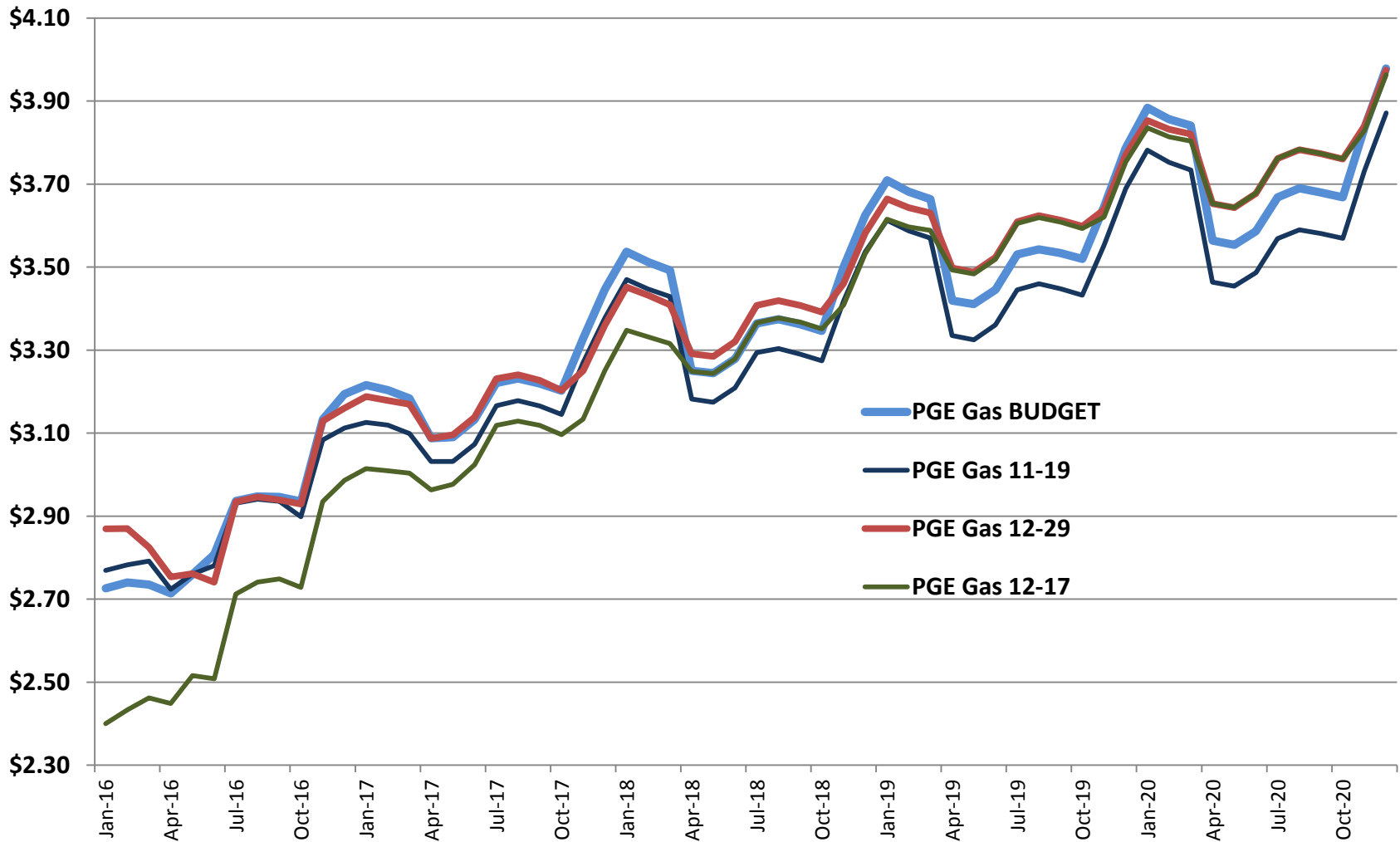
HISTORICAL DISPATCH: 1 January 2013 – 15 December 2013



	LMP_{LEC}	LMP_{NP15}	DELTA
JAN	0.462	0.458	(0.004)
FEB	0.463	0.457	(0.006)
MAR	0.488	0.517	0.030
APR	0.428	0.581	0.153
MAY	0.407	0.372	(0.035)
JUN	0.410	0.472	0.063
JUL	0.453	0.548	0.095
AUG	0.468	0.554	0.086
SEP	0.476	0.492	0.015
OCT	0.435	0.402	(0.034)
NOV	0.643	0.611	(0.032)
DEC	0.811	0.817	0.006
TOTAL	0.495	0.523	0.028

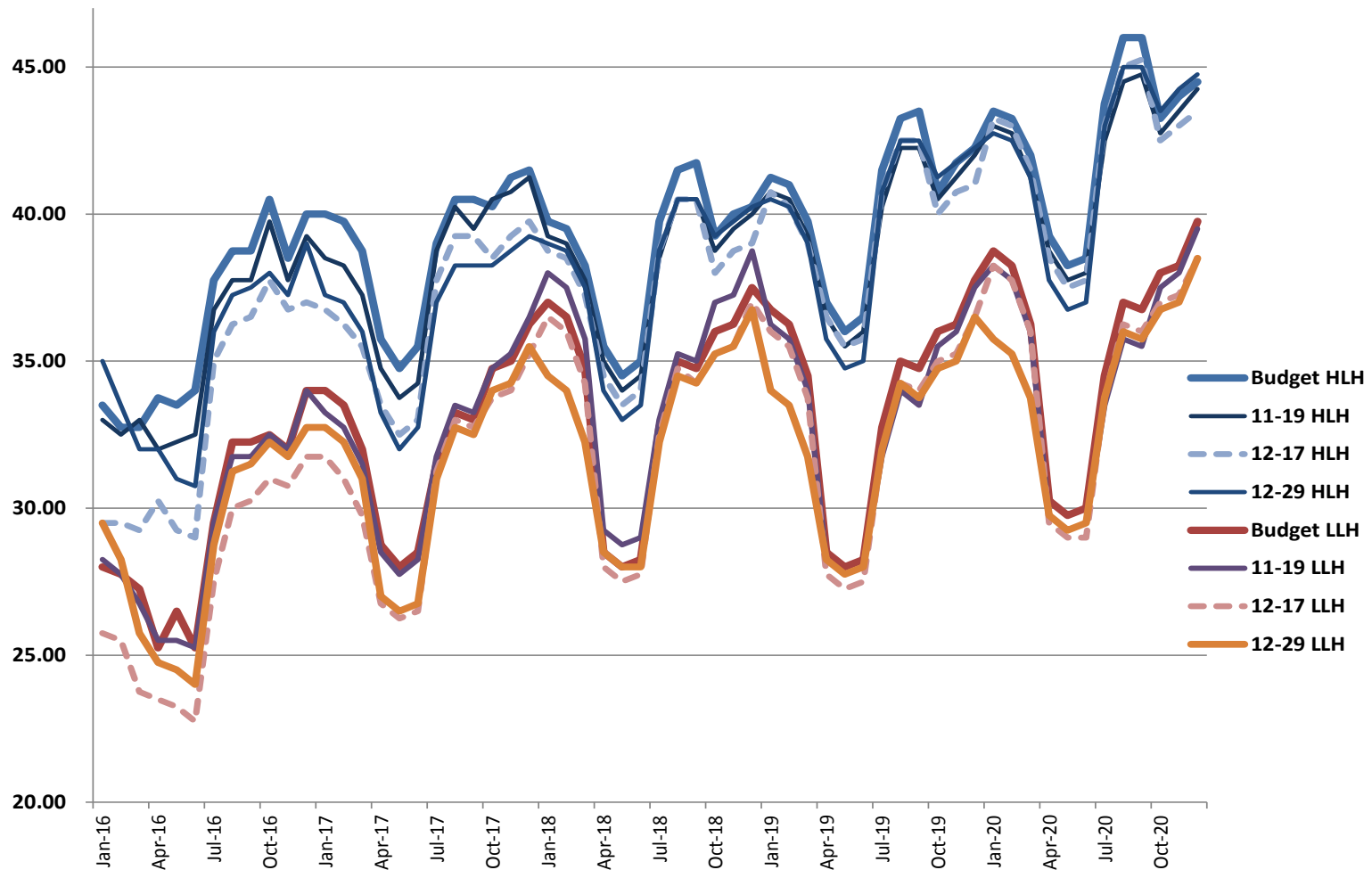
Using TH_NP15 prices to model LEC generation can yield results differing from actual generation patterns. PLEXOS optimizes hourly, using an hourly price curve based on the previous year's daily ISO patterns. Because LEC experienced significant negative congestion components ***though still dispatched*** – shown here as the daily capacity factor difference between NP15 and LEC nodes - an adjustment *could* be made to the PLEXOS model – *in addition to current ratings limits* – to further limit summer month capacity, since the summer dispatch was often below P_{MAX} – but the annual difference < 3%.

Forward Price Curves – Recent changes / Gas



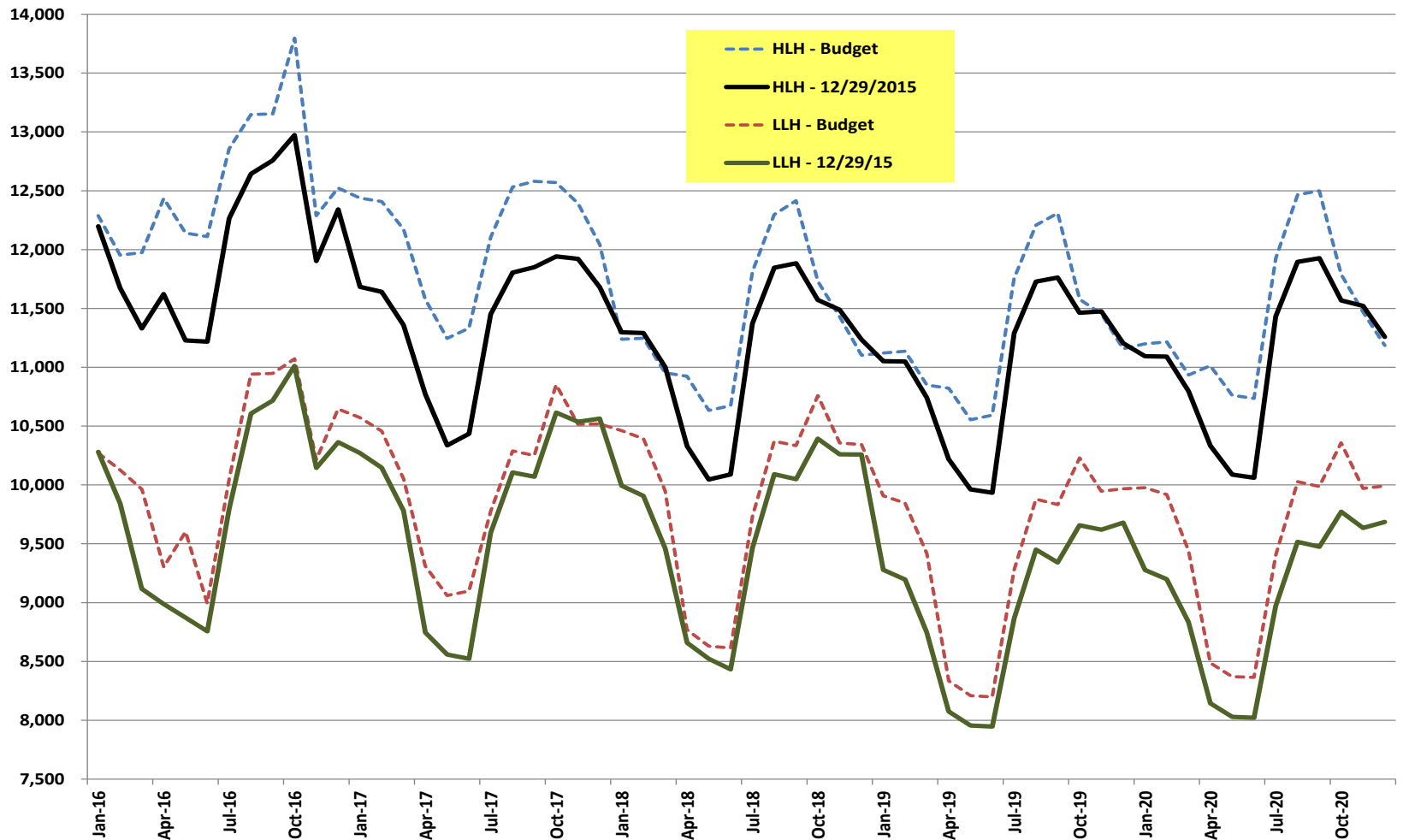
Natural gas prices have risen 35% off lows set 12/17/2015 – which brings them back very close to the budget gas price forecast.

Forward Price Curves – Recent changes / Power



Other than for the initial months of 2016, NP15 power price forecast changes have been less volatile.

Implied Market Heat Rates – now lower



The relationship between power and gas prices has changed **enough** (power prices are proportionately lower in relation to gas prices now than two months ago) to **lower implied market heat rates** and thus potentially lower gas plant dispatch.

Average Electric & Natural Gas Market Prices - V0

Weighted Average Forward Electric Prices For Fiscal Year Budget 2017 Version 10-28-2015

Peak	FY	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	Annual
OFF	2017	\$ 31.07	\$ 33.55	\$ 33.33	\$ 33.18	\$ 32.57	\$ 34.64	\$ 34.58	\$ 34.01	\$ 32.65	\$ 29.44	\$ 28.75	\$ 30.21	\$ 32.34
OFF	2018	\$ 33.20	\$ 34.46	\$ 34.13	\$ 35.45	\$ 35.64	\$ 36.85	\$ 37.57	\$ 37.04	\$ 35.52	\$ 29.23	\$ 28.84	\$ 29.86	\$ 34.00
OFF	2019	\$ 34.87	\$ 36.33	\$ 35.94	\$ 36.66	\$ 36.91	\$ 38.26	\$ 37.39	\$ 36.83	\$ 35.22	\$ 29.20	\$ 28.77	\$ 30.26	\$ 34.76
OFF	2020	\$ 34.52	\$ 36.15	\$ 35.87	\$ 36.68	\$ 36.87	\$ 38.50	\$ 39.40	\$ 38.85	\$ 36.88	\$ 30.86	\$ 30.44	\$ 31.47	\$ 35.60
OFF	2021	\$ 36.10	\$ 38.28	\$ 37.66	\$ 38.57	\$ 38.78	\$ 40.37	\$ 40.83	\$ 40.24	\$ 38.38	\$ 32.10	\$ 31.74	\$ 32.89	\$ 37.20
OFF	2022	\$ 37.41	\$ 39.92	\$ 39.34	\$ 40.39	\$ 40.59	\$ 42.23	\$ 42.72	\$ 42.20	\$ 40.32	\$ 33.78	\$ 33.29	\$ 34.73	\$ 38.93
OFF	2023	\$ 39.33	\$ 41.76	\$ 41.26	\$ 42.35	\$ 42.48	\$ 44.04	\$ 44.54	\$ 43.93	\$ 42.00	\$ 35.20	\$ 34.48	\$ 35.78	\$ 40.61
OFF	2024	\$ 41.07	\$ 43.40	\$ 43.07	\$ 44.13	\$ 44.32	\$ 45.83	\$ 46.38	\$ 45.81	\$ 43.83	\$ 36.73	\$ 35.99	\$ 37.71	\$ 42.38
OFF	2025	\$ 42.84	\$ 45.14	\$ 44.86	\$ 45.97	\$ 46.18	\$ 47.96	\$ 48.43	\$ 47.79	\$ 45.74	\$ 38.26	\$ 37.54	\$ 39.10	\$ 44.18
OFF	2026	\$ 44.67	\$ 47.36	\$ 46.47	\$ 47.77	\$ 48.00	\$ 49.84	\$ 50.42	\$ 49.69	\$ 47.50	\$ 39.77	\$ 38.98	\$ 40.20	\$ 45.93
ON	2017	\$ 39.46	\$ 40.30	\$ 39.68	\$ 40.98	\$ 38.98	\$ 40.55	\$ 40.33	\$ 40.03	\$ 38.92	\$ 35.97	\$ 35.18	\$ 36.79	\$ 38.96
ON	2018	\$ 40.73	\$ 42.11	\$ 41.43	\$ 40.72	\$ 41.74	\$ 42.09	\$ 40.09	\$ 39.78	\$ 38.40	\$ 35.71	\$ 34.90	\$ 36.29	\$ 39.54
ON	2019	\$ 41.37	\$ 43.13	\$ 42.71	\$ 39.72	\$ 40.48	\$ 40.81	\$ 41.58	\$ 41.28	\$ 39.91	\$ 37.22	\$ 36.42	\$ 37.72	\$ 40.24
ON	2020	\$ 43.26	\$ 44.96	\$ 44.47	\$ 41.21	\$ 42.25	\$ 42.82	\$ 43.84	\$ 43.53	\$ 42.09	\$ 39.42	\$ 38.57	\$ 39.81	\$ 42.21
ON	2021	\$ 45.51	\$ 47.64	\$ 47.02	\$ 43.70	\$ 44.48	\$ 45.04	\$ 45.29	\$ 44.99	\$ 43.35	\$ 40.92	\$ 39.84	\$ 41.34	\$ 44.15
ON	2022	\$ 47.28	\$ 49.47	\$ 49.07	\$ 45.78	\$ 46.55	\$ 46.86	\$ 47.11	\$ 46.80	\$ 45.41	\$ 42.72	\$ 41.87	\$ 43.07	\$ 46.07
ON	2023	\$ 49.47	\$ 51.82	\$ 51.34	\$ 48.01	\$ 48.80	\$ 48.87	\$ 49.12	\$ 48.81	\$ 47.37	\$ 44.56	\$ 43.77	\$ 45.02	\$ 48.15
ON	2024	\$ 51.57	\$ 54.07	\$ 53.51	\$ 50.07	\$ 50.87	\$ 50.99	\$ 51.25	\$ 50.91	\$ 49.40	\$ 46.48	\$ 45.63	\$ 46.84	\$ 50.20
ON	2025	\$ 53.73	\$ 56.42	\$ 55.81	\$ 52.22	\$ 53.07	\$ 53.15	\$ 53.42	\$ 53.06	\$ 51.51	\$ 48.48	\$ 47.55	\$ 48.92	\$ 52.35
ON	2026	\$ 56.00	\$ 58.77	\$ 58.14	\$ 54.38	\$ 55.27	\$ 55.36	\$ 55.66	\$ 55.27	\$ 53.65	\$ 50.49	\$ 49.50	\$ 50.99	\$ 54.51

Simple Average Forward Gas Prices For Fiscal Year Budget 2017 Version 10-28-2015

Peak	FY	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	Annual
na	2017	\$ 2.94	\$ 2.95	\$ 2.95	\$ 2.94	\$ 3.13	\$ 3.19	\$ 3.22	\$ 3.20	\$ 3.18	\$ 3.09	\$ 3.09	\$ 3.13	\$ 3.08
na	2018	\$ 3.22	\$ 3.23	\$ 3.22	\$ 3.20	\$ 3.33	\$ 3.45	\$ 3.54	\$ 3.51	\$ 3.49	\$ 3.25	\$ 3.24	\$ 3.28	\$ 3.33
na	2019	\$ 3.36	\$ 3.37	\$ 3.36	\$ 3.34	\$ 3.50	\$ 3.63	\$ 3.71	\$ 3.68	\$ 3.67	\$ 3.42	\$ 3.41	\$ 3.44	\$ 3.49
na	2020	\$ 3.53	\$ 3.54	\$ 3.54	\$ 3.52	\$ 3.64	\$ 3.79	\$ 3.88	\$ 3.85	\$ 3.84	\$ 3.56	\$ 3.55	\$ 3.59	\$ 3.65
na	2021	\$ 3.67	\$ 3.69	\$ 3.68	\$ 3.67	\$ 3.84	\$ 3.98	\$ 4.07	\$ 4.04	\$ 4.03	\$ 3.69	\$ 3.68	\$ 3.72	\$ 3.81
na	2022	\$ 3.80	\$ 3.83	\$ 3.82	\$ 3.82	\$ 3.98	\$ 4.12	\$ 4.22	\$ 4.19	\$ 4.17	\$ 3.85	\$ 3.84	\$ 3.87	\$ 3.96
na	2023	\$ 3.96	\$ 3.99	\$ 3.99	\$ 3.98	\$ 4.14	\$ 4.28	\$ 4.38	\$ 4.35	\$ 4.33	\$ 4.01	\$ 3.99	\$ 4.03	\$ 4.12
na	2024	\$ 4.11	\$ 4.15	\$ 4.15	\$ 4.16	\$ 4.26	\$ 4.42	\$ 4.54	\$ 4.51	\$ 4.50	\$ 4.16	\$ 4.15	\$ 4.18	\$ 4.27
na	2025	\$ 4.27	\$ 4.31	\$ 4.31	\$ 4.32	\$ 4.42	\$ 4.60	\$ 4.72	\$ 4.69	\$ 4.67	\$ 4.32	\$ 4.31	\$ 4.35	\$ 4.44
na	2026	\$ 4.44	\$ 4.48	\$ 4.48	\$ 4.49	\$ 4.59	\$ 4.77	\$ 4.90	\$ 4.87	\$ 4.85	\$ 4.49	\$ 4.48	\$ 4.51	\$ 4.61

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M38 Input Assumptions: GHG Allowance Cost Forecast

2016 floor
= \$12.73

	<u>FCST</u>	<u>IHS</u>	<u>ICE</u>	<u>M37</u>	
			12/30/2015		
	Value	Value	Value	Value	Units
2014	\$ 12.00	11.691039		\$ 12.00	\$/mT
2015	12.50	12.154763		12.50	\$/mT
2016	13.00	12.723265	13.19	13.00	\$/mT
2017	13.95	13.934687	13.77	13.75	\$/mT
2018	14.95	17.424676	14.39	14.50	\$/mT
2019	16.00	23.571888	15.10	17.00	\$/mT
2020	17.50	33.054114		20.00	\$/mT
2021	19.00	39.118902		24.00	\$/mT
2022	20.50	40.588256		26.00	\$/mT
2023	22.00	40.588256		28.00	\$/mT
2024	24.00	40.588256		30.00	\$/mT
2025	26.00	40.588256		33.00	\$/mT
2026	28.00	40.588256		33.00	\$/mT

GHG allowance prices remain relatively flat and are expected to do so until a greater supply-demand imbalance develops – expected to be late in the third compliance period. Model **M38** is based on **ICE futures** through calendar **2019**, after which estimated prices are utilized which coordinate with market power and gas prices.

Gas Transport Rate Case – Possible Outcomes

PG&E rate case is currently on hold...

2014 rate was **\$.54/MMBtu**

Rate - effective Jan 1, 2015 - is **\$.2921/MMBtu**

(Change due entirely to disallowance of Pipeline Safety Enhancement Program (PSEP) expense recovery *until current rate case is completed*)

PG&E's proposal through the current rate case has been to increase to **\$1.003/MMBtu** (justification is "pipeline safety")

Experts on natural gas rate cases expect the rate to rise eventually to a level around **\$0.80/MMBtu** – that is the rate currently used in M38, for the period 1/1/2016 through 12/31/2017.

This includes countervailing effects of OII (Order Instituting Investigation) credit and retro-active recovery of PSEP costs

Calculation of VOM Adder – for GHG Cost (Gas fired Units)

	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021+</u>
CCA Forecast (\$/mT)	13.00	13.95	14.95	16.00	17.50	20.00
Escalator		3.1%	3.0%	2.9%	2.75%	2.5%
LEC						
LDC (included in fuel cost)	<i>0.8000</i>	<i>0.80</i>	<i>0.82</i>	<i>0.85</i>	<i>0.87</i>	<i>0.89</i>
Regular VO&M (incl. GMC)	3.443	3.55	3.66	3.76	3.87	3.96
LEC - mT/MWh	0.371	0.371	0.371	0.371	0.371	0.371
GHG \$/MWh	4.82	5.18	5.55	5.94	6.49	7.42
TOTAL/MWh (before fuel)	\$ 8.27	\$ 8.73	\$ 9.20	\$ 9.70	\$ 10.36	\$ 11.38
STIG						
Regular VO&M	4.80	4.95	5.10	5.25	5.39	5.52
Long-term Maintenance	11.00	11.00	11.00	11.00	11.00	11.00
STIG - mT/MWh	0.477	0.477	0.477	0.477	0.477	0.477
GHG \$/MWh	6.20	6.65	7.13	7.63	8.35	9.54
TOTAL/MWh (before fuel)	\$ 22.00	\$ 22.60	\$ 23.23	\$ 23.88	\$ 24.74	\$ 26.06
CT1						
Regular VO&M	4.80	4.95	5.10	5.25	5.39	5.52
CT1 - mT/MWh	0.848	0.848	0.848	0.848	0.848	0.848
GHG \$/MWh	-	-	-	-	-	-
TOTAL /MWh (before fuel)	\$ 4.80	\$ 4.95	\$ 5.10	\$ 5.25	\$ 5.39	\$ 5.52
IMPORTS						
Imports - mT/MWh	0.457	0.457	0.457	0.457	0.457	0.457
GHG \$/MWh	\$ 5.94	\$ 6.38	\$ 6.83	\$ 7.31	\$ 8.00	\$ 9.14
TOTAL GENERATION COST_{PLEXOS} = Fuel Cost + Startup Cost + VO&M Cost + GHG (Emissions) Cost						

FY 2017 Generation – by resource by month

FY	2017												
Property	Generation												
Sum of Value	Column L												
Row Labels	7	8	9	10	11	12	1	2	3	4	5	6 Grand Total	
Collierville	9.620	9.820	8.440	11.290	8.520	11.330	36.570	48.080	66.600	81.373	86.163	41.840	419.646
NSM	1.290	1.620	1.420	1.470	0.950	0.180	1.680	1.910	1.780	1.875	1.920	2.040	18.134
Geo	69.500	69.400	67.000	69.249	66.844	69.192	68.500	61.800	65.300	62.300	68.000	65.700	802.786
LEC	115.571	162.971	171.847	194.888	145.744	180.126	183.265	162.009	187.137	9.472	105.828	109.113	1,727.971
STIG	1.485	1.341	0.096	0.297	-	0.299	-	-	-	-	-	0.399	3.918
CT1_AL1	0.219	0.338	-	-	-	-	-	-	-	-	-	-	0.557
CT1_AL2	0.234	0.361	-	-	-	-	-	-	-	-	-	-	0.594
CT1_LD	0.440	0.410	-	-	-	-	-	-	-	-	-	-	0.850
Western BR	416.427	290.619	271.353	181.415	109.184	82.618	-	73.101	250.315	275.486	405.283	404.426	2,760.226
BART-PV	0.576	0.513	0.440	0.335	0.188	0.165	0.130	0.229	0.339	0.469	0.511	0.539	4.436
GR-PV_Main	0.269	0.260	0.208	0.120	0.072	0.079	0.066	0.081	0.142	0.181	0.275	0.243	1.996
Graeagle	0.139	0.079	0.052	0.059	0.099	0.112	0.184	0.166	0.238	0.301	0.312	0.263	2.004
UK_Mendo	1.332	1.376	1.224	1.213	0.864	0.707	0.543	0.712	0.722	1.058	1.161	1.181	12.093
PS_HighSierra1	2.485	2.485	2.405	2.485	2.405	2.485	2.485	2.241	2.464	2.405	2.485	2.405	29.234
PS_HighSierra2	2.436	2.482	2.402	2.485	2.405	2.485	2.485	2.241	2.453	2.403	2.482	2.029	28.786
SCL_Supply	21.669	13.842	20.970	10.485	-	-	-	-	-	-	-	20.970	87.936

FY 2017 Generation – Contracts by month

	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
1025450 NCPA BART-Shell	16.802	16.988	18.707	20.128	19.269	19.588	-	-	-	-	-	-	111.481
1026682 NCPA MPP-AL Shell 10MW HLH Q1/4 2015-16	-	-	-	4.160	4.000	4.160	-	-	-	-	-	-	12.320
1028697 NCPA MPP-LD-Shell 15MW HLH Q1-16	-	-	-	-	-	-	-	-	-	-	-	-	-
1028698 NCPA MPP-LD-Noble 15MW HLH Nov-Dec16	-	-	-	-	6.000	6.240	-	-	-	-	-	-	12.240
1028699 NCPA MPP-Noble 30MW HLH Q1-17	-	-	-	-	-	-	12.000	11.520	12.960	-	-	-	36.480
1029200 NCPA MPP-AL NextEra 10MW HLH JFND-2017	-	-	-	-	-	-	4.000	3.840	-	-	-	-	7.840
1029545 NCPA BART-Nacimiento	2.180	1.949	1.030	0.677	0.493	0.246	0.379	0.235	1.064	1.462	1.339	1.915	12.969
1029862 NCPA MPP-NextEra 20MW LLH Q1-2016	-	-	-	-	-	-	-	-	-	-	-	-	-
1029863 NCPA MPP-NextEra 15MW LLH Q4-2016	-	-	-	4.920	4.800	4.920	-	-	-	-	-	-	14.640
1030750 NCPA MPP-Powerex 4MW HLH Jan-Feb16	-	-	-	-	-	-	-	-	-	-	-	-	-
1030751 NCPA MPP-Shell 6MW HLH Q4-2016	-	-	-	2.496	2.400	2.496	-	-	-	-	-	-	7.392
1030752 NCPA MPP-Powerex 4MW HLH CY2017	-	-	-	-	-	-	1.600	1.536	1.728	1.600	1.664	1.664	9.792
1030753 NCPA MPP-Shell 5MW HLH CY2018	-	-	-	-	-	-	-	-	-	-	-	-	-
1030754 NCPA MPP-Cargill 4MW LLH Jan-Feb16	-	-	-	-	-	-	-	-	-	-	-	-	-
1030757 NCPA MPP-Powerex 4MW LLH Q3-2016	1.376	1.248	1.280	-	-	-	-	-	-	-	-	-	3.904
1030758 NCPA MPP-NextEra 7MW LLH Q4-2016	-	-	-	2.296	2.240	2.296	-	-	-	-	-	-	6.832
1030759 NCPA MPP-Shell 8MW LLH CY2017	-	-	-	-	-	-	2.752	2.304	2.496	2.560	2.624	2.432	15.168
1030760 NCPA MPP-Shell 9MW LLH CY2018	-	-	-	-	-	-	-	-	-	-	-	-	-
1031039 NCPA MPP-EDF 7MW HLH Jan-2016	-	-	-	-	-	-	-	-	-	-	-	-	-
1031040 NCPA MPP-Noble 3MW HLH Mar-2016	-	-	-	-	-	-	-	-	-	-	-	-	-
1031041 NCPA MPP-Shell 4MW LLH Jan16	-	-	-	-	-	-	-	-	-	-	-	-	-
1031368 NCPA BART-Shell-COB	9.229	10.032	6.953	7.162	6.953	7.162	-	-	-	-	-	-	47.491
1031512 NCPA MPP-EDF 7MW HLH Q1-2016	-	-	-	-	-	-	-	-	-	-	-	-	-
1031513 NCPA MPP-EDF 3MW HLH Q2-2016	-	-	-	-	-	-	-	-	-	-	-	-	-
1031516 NCPA MPP-Powerex 11MW LLH Q1-2016	-	-	-	-	-	-	-	-	-	-	-	-	-
1031517 NCPA MPP-Powerex 13MW HLH Q2-2016	-	-	-	-	-	-	-	-	-	-	-	-	-
1030496 PA Powerex 20MW 7x24 Dec15-Mar16	-	-	-	-	-	-	-	-	-	-	-	-	-
1030505 PO Shell 2MW 7x24 CY2016	1.488	1.488	1.440	1.488	1.440	1.488	-	-	-	-	-	-	8.832
1030506 PO Shell 2MW 7x24 CY2017	-	-	-	-	-	-	1.488	1.344	1.488	1.440	1.488	1.440	8.688
1030692 PA Shell 15MW LLH Q1&Q4 2016	-	-	-	0.120	4.800	4.920	-	-	-	-	-	-	9.840
1030726 PO Powerex 3MW 7x24 Q1/16	-	-	-	-	-	-	-	-	-	-	-	-	-
1030727 PO Powerex 2MW 7x24 CY2016	1.488	1.488	1.440	1.488	1.440	1.488	-	-	-	-	-	-	8.832
1030947 PO Shell 2MW 7x24 CY2017-18	-	-	-	-	-	-	1.488	1.344	1.488	1.440	1.488	1.440	8.688
1031070 PO Powerex 1MW 7x24 Q1/16	-	-	-	-	-	-	-	-	-	-	-	-	-
1039998 PO Powerex 3MW 7x24 Q1/16	-	-	-	1.488	1.440	1.488	-	-	-	-	-	-	4.416
1039999 PO Powerex 3MW 7x24 Q1/17	-	-	-	-	-	-	1.488	1.344	1.488	-	-	-	4.320
1000000 AL_SVP-Renewables	-	-	-	-	-	-	-	-	-	-	-	-	-
1008746 AL-PA_High Winds	12.081	11.634	9.468	6.699	2.739	3.131	2.985	3.189	6.231	7.911	10.180	10.806	87.055
1011074 AL_Richmond_LFG	1.674	1.674	1.620	1.674	1.620	1.674	1.674	1.512	1.674	1.620	1.674	1.620	19.710
1011826 PA_Shiloh Wind	11.724	10.224	7.926	5.394	2.697	2.610	2.610	2.682	4.278	6.672	8.736	9.723	75.277
1012236 AL-PA_SantaCruz_LFG	1.934	1.934	1.872	1.934	1.872	1.934	1.934	1.747	1.934	1.872	1.934	1.872	22.776
1021782 AL-PA_OxMtn_LFG	7.901	7.901	7.646	7.901	7.646	7.901	7.901	7.137	7.901	7.646	7.901	7.646	93.031
1021785 AL-PA_KellerCanyon_LFG	2.381	2.381	2.304	2.381	2.304	2.381	2.381	2.150	2.381	2.304	2.381	2.304	28.032
1027008 AL_Butte_LFG	1.414	1.414	1.368	1.414	1.368	1.414	1.414	1.277	1.414	1.368	1.414	1.368	16.644
1027538 PA_JohnsonCyn_LFG	0.969	0.969	0.938	0.969	0.938	0.969	0.969	0.876	0.969	0.938	0.969	0.938	11.414
1027602PO EBMUD 1MW 7x24 11/12-10/17	0.744	0.744	0.720	0.744	0.720	0.744	0.744	0.672	0.744	0.720	0.744	0.720	8.760
1029610 PA_San_Joaquin_LFG	3.026	3.026	2.928	3.026	2.928	3.026	3.026	2.733	3.026	2.928	3.026	2.928	35.627
1000000 LD-Astoria Solar 10 MW	-	-	-	-	-	-	1.703	1.787	2.532	2.771	3.114	3.241	15.146
1028687 PA-Elevation Solar 40 MW	12.382	11.039	9.797	7.541	4.229	3.702	2.934	5.186	7.417	10.291	10.873	11.521	96.912
1028688 PA-Blue Sky Ranch Solar 20 MW	-	-	-	-	-	-	1.467	2.593	3.709	5.146	5.436	5.760	24.111
1028689 PA-Frontier Solar 20 MW	-	-	-	-	-	-	1.479	2.614	3.734	5.183	5.466	5.793	24.269
1030034 PA-Hayworth Solar 25 MW	7.394	6.559	5.824	4.451	2.496	2.185	1.732	3.061	4.421	6.116	6.547	6.893	57.678
1030061 PA-Kettleman Solar 20 MW	6.184	5.966	4.910	4.015	2.465	1.768	1.592	2.689	4.045	5.334	5.612	5.959	50.539

Annual Generation* – by resource

Property	Generation											
Sum of Value	Column Labels											
Row Labels	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	
Collierville	318.400	492.646	494.346	493.703	493.701	486.601	493.657	492.616	493.701	495.464	493.040	
NSM	9.540	24.984	25.030	24.995	25.020	25.030	25.012	24.984	24.968	25.003	25.020	
Geo	776.385	791.900	772.703	753.902	702.000	718.493	702.930	686.502	673.644	632.031	642.407	
LEC	1,614.636	1,695.299	1,447.194	1,198.412	1,325.044	1,293.862	1,193.421	1,050.300	1,013.733	961.777	1,067.547	
STIG	4.118	3.279	2.802	1.904	2.154	1.605	1.555	1.754	1.904	2.527	3.375	
CT1_AL1	0.557	0.376	0.376	0.376	0.367	0.390	0.390	0.547	0.681	0.728	0.838	
CT1_AL2	0.594	0.401	0.417	0.417	0.391	0.442	0.467	0.711	0.803	0.777	0.914	
CT1_LD	0.850	0.774	0.673	0.658	0.825	0.774	0.799	0.911	0.911	0.926	0.941	
Western BR	2,486.124	2,921.963	3,055.450	3,055.481	3,055.311	3,055.593	3,054.151	3,053.542	3,053.705	3,053.065	3,053.512	

- totals are by calendar-year and are plant totals

Cost/Revenue Projections – LEC

12/4/2015

REVENUE (\$1000s) - Expected Energy Value of Generation													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2016	\$ 4,984.638	\$ 4,381.765	\$ 5,242.437	\$ 4,269.572	\$ 392.540	\$ 4,625.323	\$ 5,380.453	\$ 6,834.693	\$ 6,876.904	\$ 7,895.680	\$ 5,954.760	\$ 7,513.731	\$ 64,352.496
2017	7,561.333	6,669.382	7,403.711	364.102	4,108.906	4,851.279	5,393.939	6,415.299	6,443.715	7,726.305	7,283.779	7,697.783	71,919.533
2018	7,385.899	6,443.312	3,903.285	916.254	2,663.508	3,937.159	5,344.455	6,375.845	6,253.386	7,297.772	6,331.712	6,791.768	63,644.355
2019	6,246.995	5,899.286	1,725.414	492.265	2,381.367	3,835.927	5,389.355	5,899.167	5,412.687	6,787.478	5,330.184	6,394.969	55,795.095
2020	7,007.133	6,326.921	6,106.646	579.878	1,387.032	4,242.670	5,660.588	6,399.541	5,888.745	7,753.636	5,860.465	6,806.360	64,019.615
TOTAL (Variable) GENERATION COST													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2016	\$ 4,547.990	\$ 4,064.436	\$ 4,886.557	\$ 3,983.177	\$ 361.750	\$ 3,914.479	\$ 4,228.924	\$ 5,557.819	\$ 5,760.716	\$ 6,521.622	\$ 5,192.398	\$ 6,363.437	\$ 55,383.304
2017	6,573.179	5,824.178	6,657.389	345.335	3,810.297	4,205.583	4,333.239	5,283.400	5,519.008	6,663.578	6,274.424	6,633.243	62,122.853
2018	6,669.362	5,851.684	3,610.929	852.855	2,531.415	3,495.821	4,316.103	5,252.073	5,347.259	6,515.999	5,653.040	6,049.014	56,145.552
2019	5,757.852	5,464.188	1,624.776	466.687	2,266.441	3,442.136	4,392.895	4,827.658	4,587.638	6,173.446	4,763.313	5,696.930	49,463.960
2020	6,425.836	5,826.680	5,797.164	574.052	1,312.478	3,769.595	4,563.344	5,207.046	4,929.264	6,988.111	5,268.336	6,050.567	56,712.474
NET REVENUE (Generation Value - Total Generation Cost)													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2016	\$ 436.648	\$ 317.329	\$ 355.880	\$ 286.395	\$ 30.789	\$ 710.844	\$ 1,151.529	\$ 1,276.874	\$ 1,116.188	\$ 1,374.058	\$ 762.363	\$ 1,150.294	\$ 8,969.191
2017	988.154	845.204	746.322	18.767	298.610	645.696	1,060.700	1,131.899	924.707	1,062.727	1,009.355	1,064.540	9,796.681
2018	716.536	591.628	292.356	63.399	132.094	441.338	1,028.352	1,123.773	906.128	781.774	678.672	742.754	7,498.803
2019	489.143	435.099	100.638	25.578	114.926	393.791	996.460	1,071.509	825.050	614.032	566.871	698.039	6,331.135
2020	581.297	500.240	309.483	5.826	74.553	473.075	1,097.244	1,192.494	959.481	765.525	592.129	755.793	7,307.141
(A/S Revenue is added separately, after generation inputs are finalized)													

Total Generation Cost_{PLEXOS} = Fuel Cost + VOM + Startup + Emissions

Budget Schedule

Next steps:

- Re-run optimization with updated Calaveras and Western forecasts – **if necessary - plus any changes to gas transport charges or price curves** - then organize results in Appendix G format (**by 1/15/2016**)
- Allocate generation and variable costs to members, calculating monthly surplus/deficits (**by 1/22/2016**). This year members have requested both fiscal-year and calendar-year formatted data.

1/15/2016	Initial budget input due to Accounting/Finance
1/22/2016	Preliminary Power Supply Models due to Members (" Load - Resource Balances")
2/05/2016	FINAL DEADLINE for Power Supply Model output

Questions??