

A photograph of a large industrial combustion turbine, identified as CT1, located at the Lodi / Alameda facility. The turbine is a tall, light-colored metal structure with a blue steel frame and stairs. It has a large, rectangular, vertically-slatted section on its upper half. The unit is situated on a gravel lot under a clear blue sky.

# Combustion Turbine

CT1 – Lodi / Alameda

FY 2017 Proposed Budget

March 15, 2016

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- Assumptions
- FY2017 Proposed Budget
- Trend, Routine O&M with Labor
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    - Maintenance Reserve Projects
  - Description and Justification of Each Proposed Project
- 10-Year Project Forecast
  - Schedule and Cost
  - Trend, Project Expenditures Including Maintenance Reserve

## Assumptions

- Capacity Value \$30/KW-Yr
- Projects Identified Based on 10 Year Operation
  - Perform turbine maintenance based on condition only
  - Defer availability projects
- Permit Limited Operation

# FY 2017 – CT1 Proposed Budget

	FY 2015 Budget	FY 2015 Actual	FY 2016 Budget	FY 2017 Budget	Increase/ (Decrease)
<b>Routine O&amp;M Costs</b>					
Variable	\$10,440	\$19,347	\$10,040	\$10,040	\$0
Fixed	382,261	398,032	400,119	407,140	7,021
Administration	39,650	52,621	33,543	43,285	9,742
Mandatory Costs	163,280	189,262	158,280	159,818	1,538
Inventory	0	0	0	45,000	45,000
<b>Labor</b>	<b>595,631</b>	<b>659,262</b>	<b>601,982</b>	<b>665,283</b>	<b>63,301</b>
<b>Labor</b>	<b>667,831</b>	<b>944,334</b>	<b>682,506</b>	<b>793,990</b>	<b>111,484</b>
<b>Total Routine O&amp;M Costs</b>	<b>1,263,462</b>	<b>1,603,596</b>	<b>1,284,488</b>	<b>1,459,273</b>	<b>174,785</b>
<b>Other Costs</b>					
Debt Service	0	0	0	0	0
CAISO Charges (Variable)	12,737	119,237	5,670	1,030	(4,640)
Other Costs	139,787	393,848	138,678	290,494	151,816
Generation Services Shared	69,493	64,708	61,919	62,969	1,050
Administrative & General	302,081	368,056	312,360	291,056	(21,304)
<b>Total O&amp;M Costs</b>	<b>1,787,560</b>	<b>2,549,445</b>	<b>1,803,115</b>	<b>2,104,822</b>	<b>301,707</b>
<b>Projects</b>					
Operations & Maintenance	1,082,600	1,019,954	1,074,200	0	(1,074,200)
Capital	0	0	0	0	0
Maintenance Reserve	0	0	0	525,000	525,000
<b>Total Projects Costs</b>	<b>1,082,600</b>	<b>1,019,954</b>	<b>1,074,200</b>	<b>525,000</b>	<b>(549,200)</b>
<b>Annual Budget Cost</b>	<b>2,870,160</b>	<b>3,569,399</b>	<b>2,877,315</b>	<b>2,629,822</b>	<b>(247,493)</b>
Revenue	71,877	597,719	55,906	88,198	32,292
<b>Net Cost to Members</b>	<b>2,798,283</b>	<b>2,971,680</b>	<b>2,821,409</b>	<b>2,541,624</b>	<b>(279,785)</b>

Travel to  
Alameda

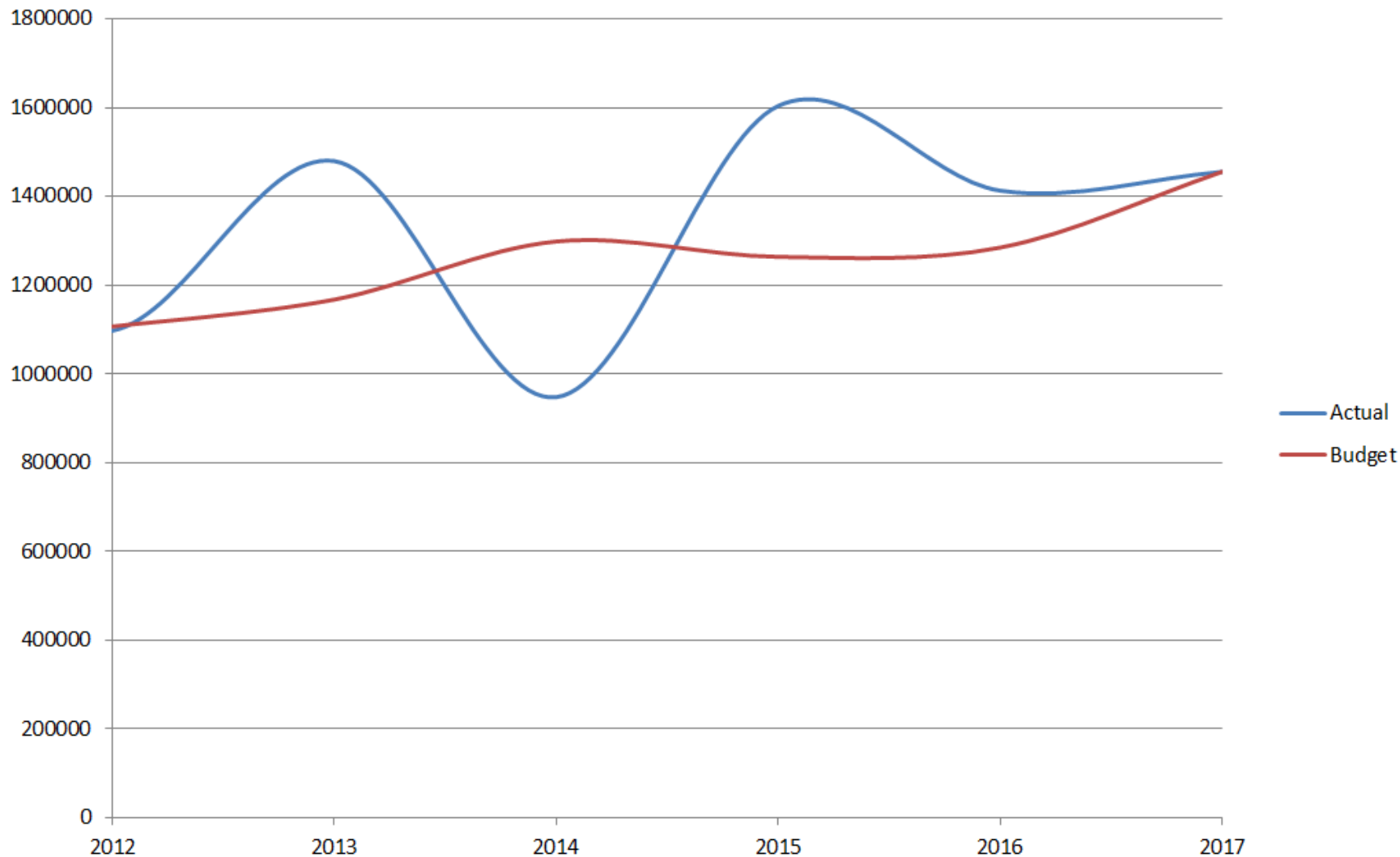
Gas Comp /  
Turb Parts

Merit,  
Benefit,  
actuarial,  
retirement  
med

Fuel

Maint project  
now Maint  
Reserve

## Routine O&M w/ Labor



▪ FY16 is forecast in the Actual trend line

## FY17 Budget to FY15 Actual Variances

- Administration 18% Less due to high travel to Alameda during the FY15 outage
- Mandatory 16% Less due to FY15 installation of emergency shutoff valve on gas pipeline
- Inventory New line item due to need to purchase parts for gas compressor and turbine



## FY 2017 – CT1 Proposed Projects

### O&M Projects

### Notes

Total 0

### Capital Projects

### Notes

Total 0

### Maintenance Reserve

### Notes

Gas Compressor Maintenance D 20,000

Painting D 50,000

Replace U-Type Bushings D 245,000

Total 315,000

# FY 2017 – CT1 Gas Compressor

Project	Notes	Total Cost	FY 2016	FY 2017	FY 2018	FY 2019
CT1 Gas Compressor	MR	\$20,000		\$20,000		

## Notes:

D	Discretionary
M	Mandatory
MR	Draw from Maintenance Reserve

- Improve Reliability
- Most Significant cause of missed or delayed starts
- Lubricator Valving





# FY 2017 – CT1 Painting

Project	Notes	Total Cost	FY 2016	FY 2017	FY 2018	FY 2019
CT1 Gas Compressor	MR	\$50,000		\$50,000		

## Notes:

D	Discretionary
M	Mandatory
MR	Draw from Maintenance Reserve

- Corrosion and Rust affected by marine environment.
- Thinning Walls
- Interior corrosion flakes off and goes downstream



# FY 2017 – CT1 Transformer Bushings

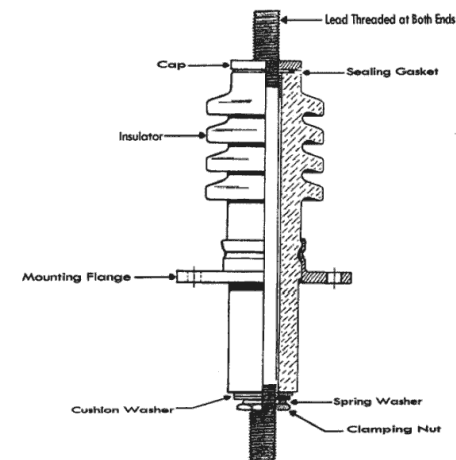
Project	Notes	Total Cost	FY 2016	FY 2017	FY 2018	FY 2019
CT1 Transformer Bushing	D	\$245,000		\$245,000		

## Notes:

D	Discretionary
M	Mandatory
CR	Annual deposit to the Capital Reserve

AFE Financial Measurements	Value	Units
NPV @ Discount Rate	101,009	\$
IRR	12.5%	%
Average Annual Benefits	34,601	\$
Payback	5.0	Years
Useful Life	10.0	Years
B/C Ratio	1.41	B/C Ratio

- Mitigate Fire Risk
- Replace U-Type Bushings on CT1 Lodi and both Alameda Transformers
- Assumptions:
  - Avoid Transformer Replacement - \$450k
  - Missed RA Opportunity (6 Months) - \$375k
  - Assume 5% Probable
  - Less than 3.54% probability ~ 0 NPV Break Even



# FY 2017– CT1 Project Forecast

**Operate until 2025, Option to Continue**

	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
<b>O &amp; M PROJECTS</b>	All remaining recommended projects rolled into Maintenance Reserve, Annual Outage									
<b>TOTAL O&amp;M PROJECTS</b>	0	0	0	0	0	0	0	0	0	0
<b>CAPITAL PROJECTS</b>	All remaining recommended projects rolled into Maintenance Reserve, Annual Outage									
<b>TOTAL CAPITAL PROJECTS</b>	0	0	0	0	0	0	0	0	0	0
<b>RESERVE FUND SPENDING</b>										
<b>BEGINNING YEAR BALANCE</b>	250,000	460,000	855,000	1,090,000	215,000	37,000	270,000	260,000	260,000	250,000
Annual Outage, Routine Maint	315,000	130,000	290,000	125,000	553,000	0	10,000	0	10,000	2,458,830
Turner CT and Gen Maint	0	0	0	75,000	75,000	0	0	0	0	1,250,000
ALA1 CT and Gen Maint	0	0	0	75,000	75,000	0	0	0	0	1,250,000
ALA2 CT and Gen Maint	0	0	0	1,125,000	0	0	0	0	0	450,000
<b>TOTAL RESERVE FUND SPENDING</b>	315,000	130,000	290,000	1,400,000	703,000	0	10,000	0	10,000	5,408,830
ADDITIONAL FUNDING	525,000	525,000	525,000	525,000	525,000	233,000		0	0	5,408,830
<b>END OF YEAR BALANCE</b>	460,000	855,000	1,090,000	215,000	37,000	270,000	260,000	260,000	250,000	250,000
<b>TOTAL O&amp;M, ALL PROJECTS, FUNDING</b>	525,000	525,000	525,000	525,000	525,000	233,000	0	0	0	5,408,830

# Combustion Turbine

## CT2 – STIG



FY 2017 Proposed Budget

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## CT2 Assumptions

- Capacity \$30/KW-Yr
- Debt paid in 2026
- Air New Zealand expects to service LM5000 until 2026
- Expected STIG will retire in 2026 or shortly thereafter
- Repower Options
  - Estimate \$50mm +100%
  - NPV **-\$38mm**
  - IRR **-4.1%**
- Decommissioning, no estimates at this time
- Maintenance / Project Plan based on 9 remaining years



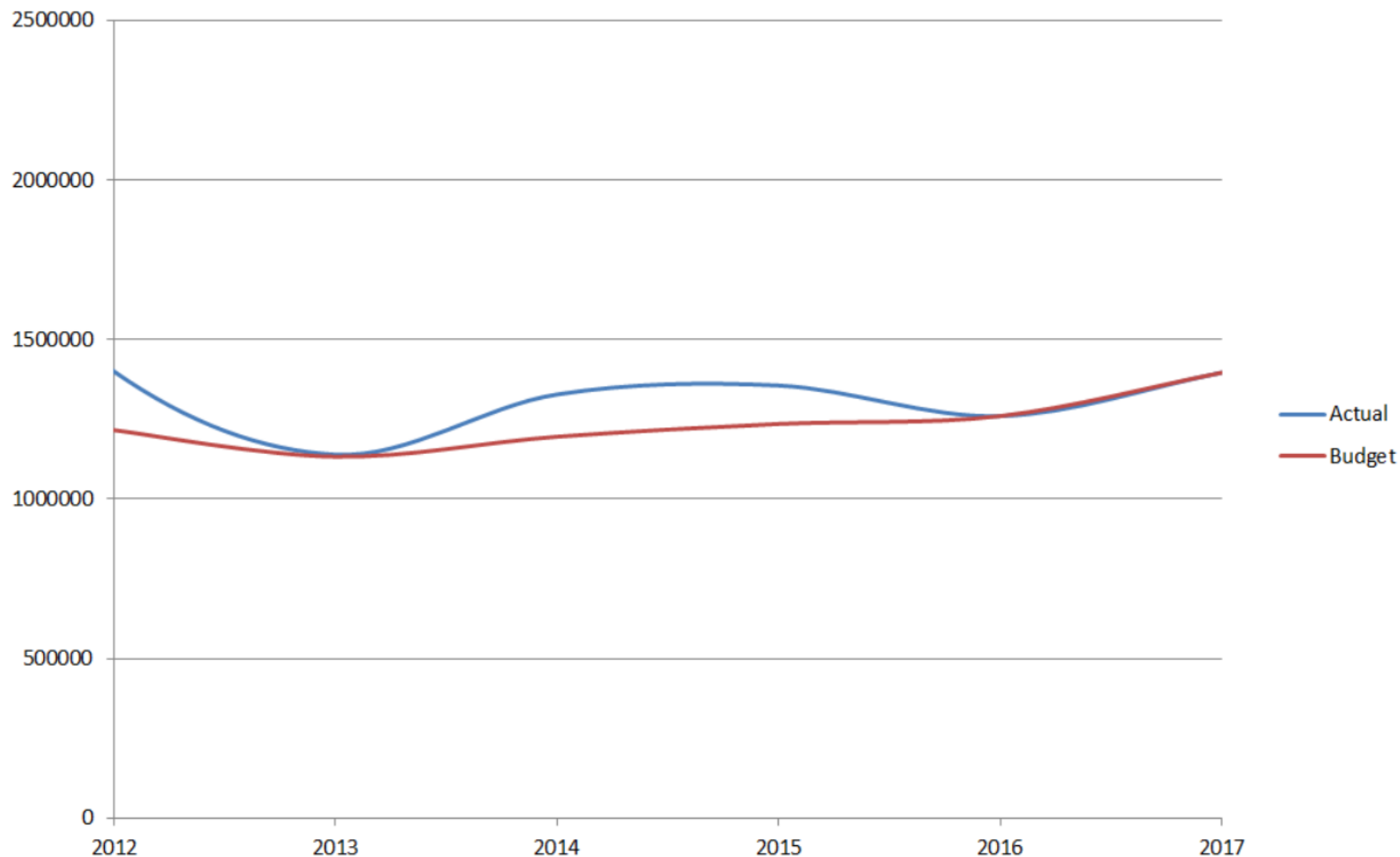
# FY 2017 – CT2 Proposed Budget

	FY 2015 Budget	FY 2015 Actual	FY 2016 Budget	Proposed FY 2017 Budget	Increase/ (Decrease)
<b>Routine O&amp;M Costs</b>					
Variable	\$92,500	\$72,187	\$84,300	\$86,700	\$2,400
Fixed	403,245	477,049	412,367	430,295	17,928
Administration	56,606	44,178	53,545	53,178	(367)
Mandatory Costs	57,500	66,360	71,200	79,235	8,035
Inventory	0	0	0	15,000	15,000
<b>Labor</b>	<b>609,851</b>	<b>659,774</b>	<b>621,412</b>	<b>664,408</b>	<b>42,996</b>
<b>Labor</b>	<b>625,764</b>	<b>696,247</b>	<b>639,061</b>	<b>745,364</b>	<b>106,303</b>
<b>Total Routine O&amp;M Costs</b>	<b>1,235,615</b>	<b>1,356,021</b>	<b>1,260,473</b>	<b>1,409,772</b>	<b>149,299</b>
<b>Other Costs</b>					
Debt Service	5,699,135	5,699,135	5,679,515	5,625,568	(53,947)
CAISO Charges (Variable)	2,343	26,359	1,241	2,289	1,048
Other Costs	1,172,612	1,030,449	1,058,565	1,022,849	(35,716)
Generation Services Shared	65,058	47,659	57,980	59,034	1,054
Administrative & General	288,910	291,599	293,365	340,713	47,348
<b>Total O&amp;M Costs</b>	<b>8,463,673</b>	<b>8,451,222</b>	<b>8,351,139</b>	<b>8,460,225</b>	<b>109,086</b>
<b>Projects</b>					
Operations & Maintenance	143,500	97,071	80,060	30,000	(50,060)
Capital	0	0	0	193,780	193,780
Maintenance Reserve	416,525	416,525	0	0	0
<b>Total Projects Costs</b>	<b>560,025</b>	<b>513,596</b>	<b>80,060</b>	<b>223,780</b>	<b>143,720</b>
<b>Annual Budget Cost</b>	<b>9,023,698</b>	<b>8,964,818</b>	<b>8,431,199</b>	<b>8,684,005</b>	<b>252,806</b>
Revenue	725,728	961,201	534,387	600,942	66,555
<b>Net Cost to Members</b>	<b>8,297,970</b>	<b>8,003,617</b>	<b>7,896,812</b>	<b>8,083,063</b>	<b>186,251</b>

Gas  
Compressor  
Parts

Merit,  
Benefit,  
actuarial,  
retirement  
med

# Routine O&M w/ Labor



▪ FY16 is forecast in the Actual trend line

## FY17 Budget to FY15 Actual Variances

- Inventory New line item due to need to purchase parts for gas compressor and turbine

## FY 2017– CT2 Proposed Projects

O&M Projects	Notes	
DCS Software Upgrade (Contract Yr 3 of 3)	M	30,000
Total		30,000
Capital Projects	Notes	
Ammonia Risk Reduction (15.13% shared)	S	90,780
BOP Battery Replacement	M	103,000
Total		193,780
Maintenance Reserve	Notes	
Total		0

# FY 2017 – CT2 DCS Operating System

Project	Notes	Total	FY 2016	FY 2017	FY 2018	FY 2019
		Cost to Complete	Current Budget			
DCS Operating System	D	\$150,000	90,000	30,000	30,000	0

## Notes:

- D Discretionary
- M Mandatory
- Annual deposit to the Capital
- CR Development Reserve

AFE Financial Measurements	Value	Units
NPV @ Discount Rate	13,593	\$
IRR	7.8%	%
Average Annual Benefits	15,938	\$
Payback	3.0	Years
Useful Life	10.0	Years
B/C Ratio	1.09	B/C Ratio

- Approved Project in 2015
- FY16 Complete, HMI Installation Successful
- FY2017-18, 2<sup>nd</sup> of 3<sup>rd</sup> Year Agreement

# FY 2017 – Ammonia Risk Reduction

Project	Notes	Total Cost	FY 2016	FY 2017	FY 2018	FY 2019
Ammonia Risk Reduction	D	\$600,000		\$90,780 (STIG Share)		

## Notes:

D	Discretionary
M	Mandatory
CR	Annual deposit to the Capital Reserve

AFE Financial Measurements	Value	Units
NPV @ Discount Rate	39,744,231	\$
IRR	349.3%	%
Average Annual Benefits	1,344,808	\$
Payback	0.0	Years
Useful Life	30.0	Years
B/C Ratio	67.24	B/C Ratio

- CH2MHILL Security Study Noted Ammonia Release Highest Risk (\$100M Liability based on recent litigation events in California utilities, \$22M Revenue/Asset Losses, \$500k Environmental Damage, and Unquantifiable Public Safety Risks
- Other Options Explored
- B&V Study Recommends Enclosing Tank and/or Other Options.
- Feasibility and Construction.





## **FY 2017 – Ammonia Risk Reduction Alternate Cost Sharing**

- Ammonia project is a 30 year asset
- STIG future beyond 9 years is uncertain
- Recommend LEC pay full cost initially
- STIG to repay LEC
  - Annual payment of share
  - Based on \$20,000 / year straight line depreciation
  - \$3,106 annual payment
  - Only as long as STIG remains in service
  - Transfer Ownership of ammonia tank / equipment to LEC

# FY 2017 – CT2 BOP Battery Replacement

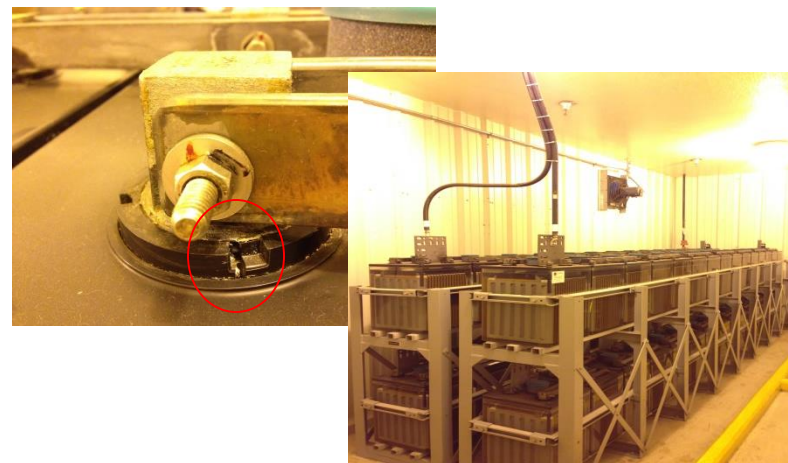
Project	Notes	Total Cost	FY 2016	FY 2017	FY 2018	FY 2019
CT2 BOP Battery Replacement	D	\$103,000		\$103,000		

## Notes:

D	Discretionary
M	Mandatory
CR	Annual deposit to the Capital Reserve

A/E Financial Measurements	Value	Units
NPV @ Discount Rate	NA	\$
IRR	NA	%
Average Annual Benefits	NA	\$
Payback	NA	Years
Useful Life	NA	Years
B/C Ratio	NA	B/C Ratio

- Generator and Control, Station Battery Bank
- Installed 1994, ~20 Year Life
- Going into 22 Years
- Post Swelling and beginning to crack Battery Tops
- Maintain NERC Compliance



## FY 2017– CT2 Proposed Projects

O&M Projects	Notes	
DCS Software Upgrade (Contract Yr 3 of 3)	M	30,000
Total		30,000
Capital Projects	Notes	
Ammonia Risk Reduction (15.13% shared)	S	90,780
BOP Battery Replacement	M	103,000
Total		193,780
Maintenance Reserve	Notes	
Total		0

# FY 2017– CT2 Project Forecast

	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
<b>O &amp; M PROJECTS</b>											
DCS Software Upgrade		30,000									
High Energy Pipe Inspection						15,000					17,500
DS416 Breaker Repair											
Repack HRSG Bellows			50,000								
STIG 480V MCC Breaker Maintenance			30,000					35,000			
ARC Flash Mitigation											
Ammonia System Major Maintenance						30,000					6,000
Water Plant VFDs				30,000							
<b>TOTAL O&amp;M PROJECTS</b>	<b>0</b>	<b>30,000</b>	<b>80,000</b>	<b>30,000</b>	<b>0</b>	<b>45,000</b>	<b>0</b>	<b>35,000</b>	<b>0</b>	<b>0</b>	<b>23,500</b>
<b>CAPITAL PROJECTS</b>											
Ammonia Risk Reduction (15.13% shared)		90,780									
BOP Battery Replacement		103,000									
<b>TOTAL CAPITAL PROJECTS</b>	<b>0</b>	<b>193,780</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>RESERVE FUND SPENDING</b>											
<b>BEGINNING YEAR BALANCE</b>	<b>500,000</b>										
Annual Outage, Routine Maint											
Turner CT and Gen Maint											
ALA1 CT and Gen Maint											
ALA2 CT and Gen Maint											
<b>TOTAL RESERVE FUND SPENDING</b>											
<b>ADDITIONAL FUNDING</b>											
<b>END OF YEAR BALANCE</b>	<b>500,000</b>										
<b>TOTAL O&amp;M, ALL PROJECTS, FUNDING</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>