



***Metro Nashville***  
**DISTRICT ENERGY SYSTEM**

*DES Advisory Board Meeting*  
*Second Quarter FY15*  
*March 5, 2015*

# *Agenda*

1. Call to Order
2. Review & Approval of Previous Meeting Minutes
3. Customer Sales
4. Review of DES Contractor Performance
5. Natural Gas Purchasing Status
6. Natural Gas Curtailment
7. FY15 Costs to Date
8. Capital Projects Review & Status
9. DES Combined Heat and Power Project
10. Other Board Member Items
11. Adjourn

1. *Call to Order*
2. *Review and Approval of  
Previous Meeting Minutes*

## 3. *Customer Sales*

- ❖ Table 3A: Customer Cost Comparison
- ❖ Figure 3A: Historic Customer TIFS
- ❖ Table 3B: Historic Customer TIFS Summary
- ❖ Figure 3B: Historic System Delta T

## Summary Table 3A: Customer Cost Comparison for the Previous 12 Months

	Steam - Rolling 12 Month			Chilled Water - Rolling 12 Month			
	Jan 2013 - Dec 2013	Jan 2014 - Dec 2014	% Diff.	Jan 2013 - Dec 2013	Jan 2014 - Dec 2014	% Diff.	
<b>Private</b>	Cost	\$ 1,360,721	\$ 1,560,909	14.71%	\$ 3,301,911	\$ 3,418,326	3.53%
	Usage (lbs or tonhrs)	91,310,531	94,403,874	3.39%	17,326,547	16,874,237	-2.61%
	Unit Cost	\$ 14.90	\$ 16.53	11.0%	\$ 0.191	\$ 0.203	6.3%
<b>State</b>	Cost	\$ 1,917,956	\$ 2,211,669	15.31%	\$ 3,332,261	\$ 3,315,912	-0.49%
	Usage (lbs or tonhrs)	116,908,202	122,481,519	4.77%	16,027,536	14,285,716	-10.87%
	Unit Cost	\$ 16.41	\$ 18.06	10.1%	\$ 0.208	\$ 0.232	11.6%
<b>Metro</b>	Cost	\$ 2,447,347	\$ 2,822,225	15.32%	\$ 5,109,691	\$ 5,559,240	8.80%
	Usage (lbs or tonhrs)	187,820,650	185,965,300	-0.99%	30,443,759	28,799,790	-5.40%
	Unit Cost	\$ 13.03	\$ 15.18	16.5%	\$ 0.168	\$ 0.193	15.0%
<b>Aggregate</b>	Cost	\$ 5,762,111	\$ 6,727,020	16.75%	\$ 11,743,863	\$ 12,403,034	5.61%
	Usage (lbs or tonhrs)	397,524,127	408,785,823	2.83%	63,797,842	60,547,663	-5.09%
	Unit Cost	\$ 14.49	\$ 16.46	13.5%	\$ 0.184	\$ 0.205	11.28%

MFA not included in values shown

# Figure 3A: Historic Customer TIFS

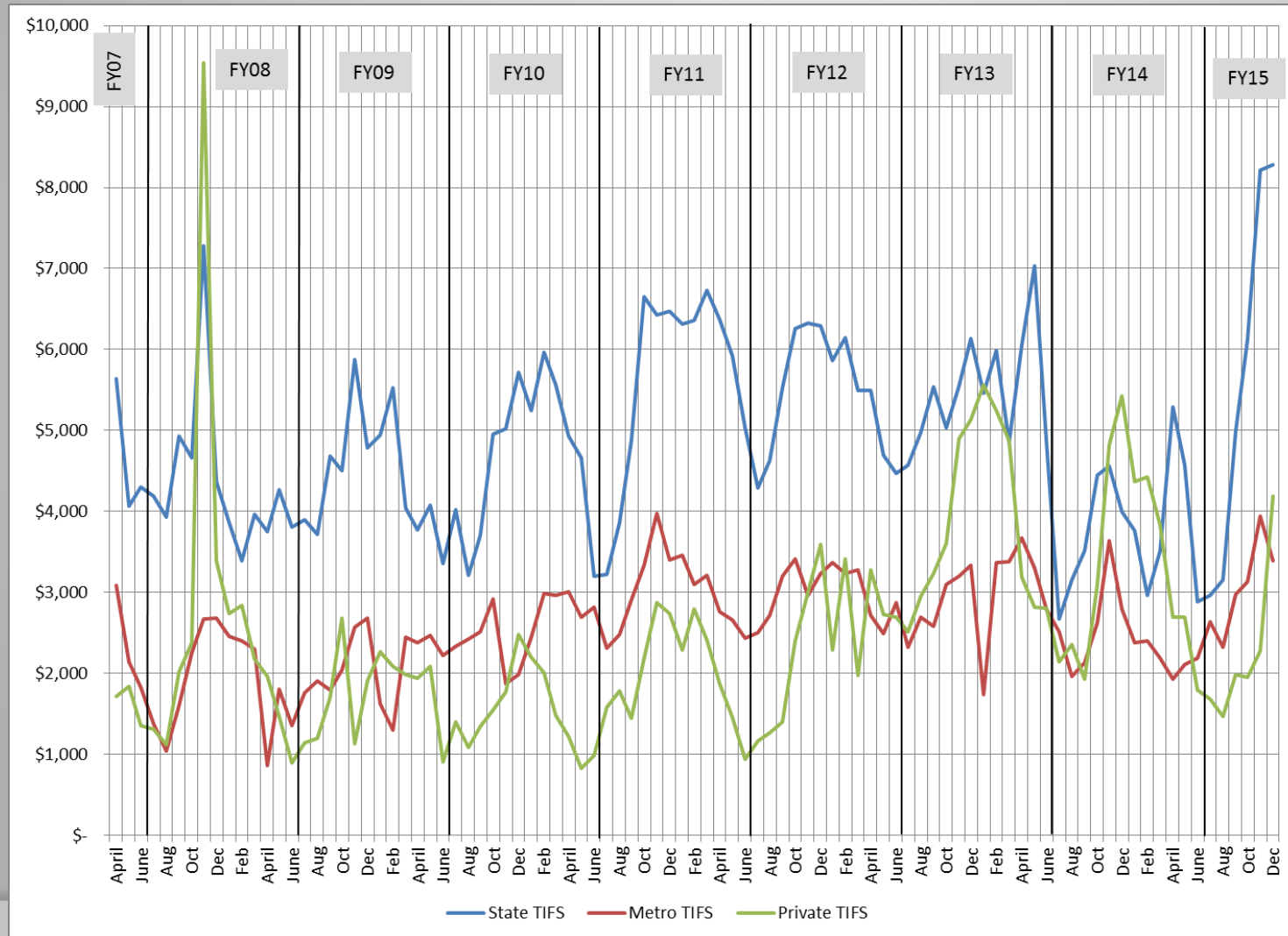
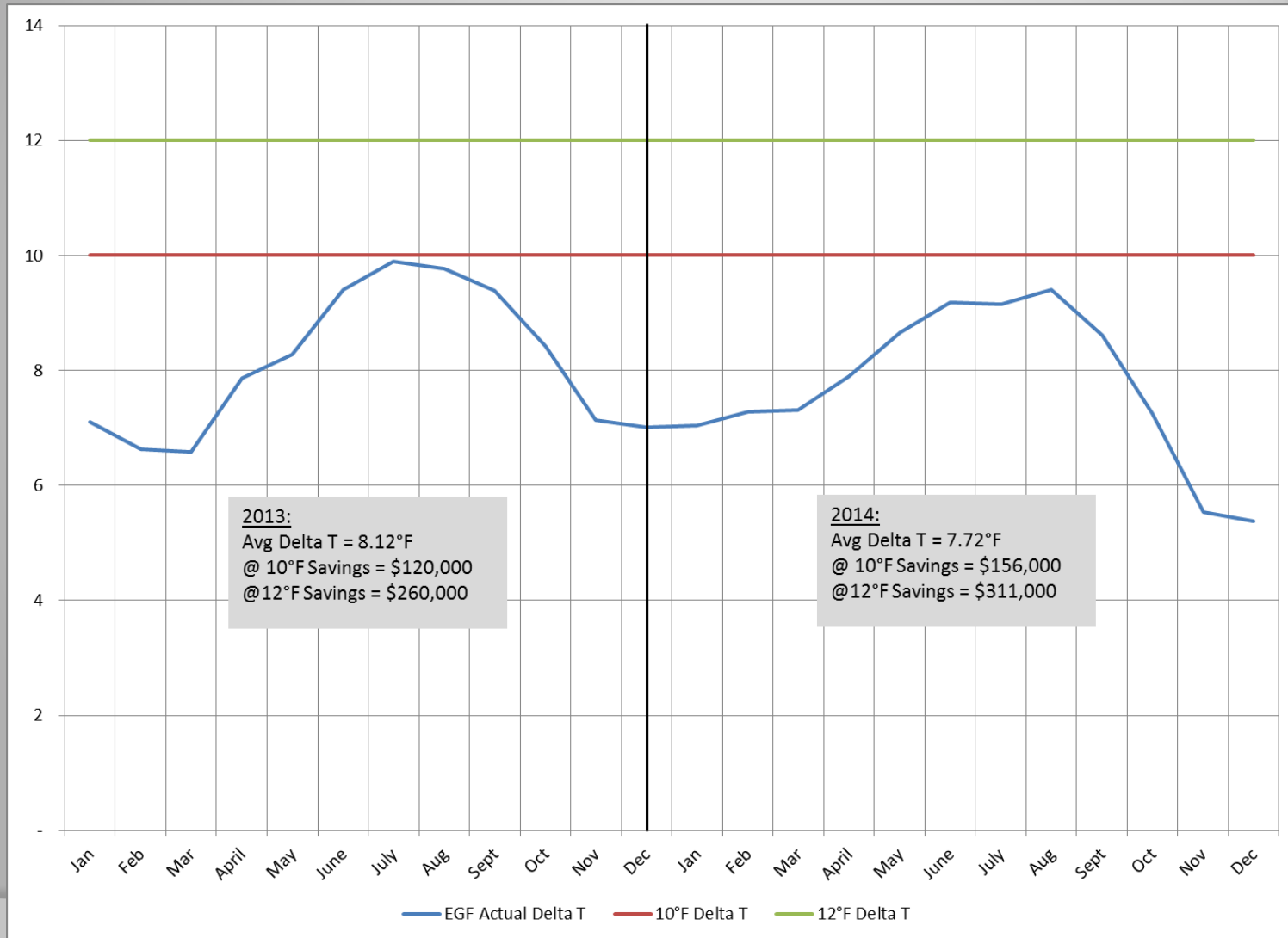


Table 3B: Historic Customer TIFS Summary

	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>	<b>FY10</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>	<b>FY14</b>	<b>FY15</b>	<b>Cumulative</b>
State TIFS	\$ 13,997	\$ 52,421	\$53,165	\$ 56,182	\$ 68,228	\$ 65,471	\$ 66,074	\$ 45,327	\$33,720	\$ 454,584
Metro TIFS	\$ 7,061	\$ 22,810	\$25,188	\$ 30,929	\$ 36,007	\$ 35,969	\$ 35,496	\$ 28,873	\$18,375	\$ 240,708
Private TIFS	\$ 4,912	\$ 31,830	\$21,022	\$ 18,318	\$ 24,372	\$ 29,201	\$ 46,829	\$ 39,558	\$13,542	\$ 229,584
<b>Totals</b>	<b>\$25,970</b>	<b>\$107,061</b>	<b>\$99,374</b>	<b>\$105,429</b>	<b>\$128,607</b>	<b>\$130,641</b>	<b>\$148,399</b>	<b>\$113,757</b>	<b>\$65,637</b>	<b>\$ 924,875</b>
State TIFS	54%	49%	53%	53%	53%	50%	45%	40%	51%	49%
Metro TIFS	27%	21%	25%	29%	28%	28%	24%	25%	28%	26%
Private TIFS	19%	30%	21%	17%	19%	22%	32%	35%	21%	25%
<b>Totals</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>




# Figure 3B: Historic System Delta T



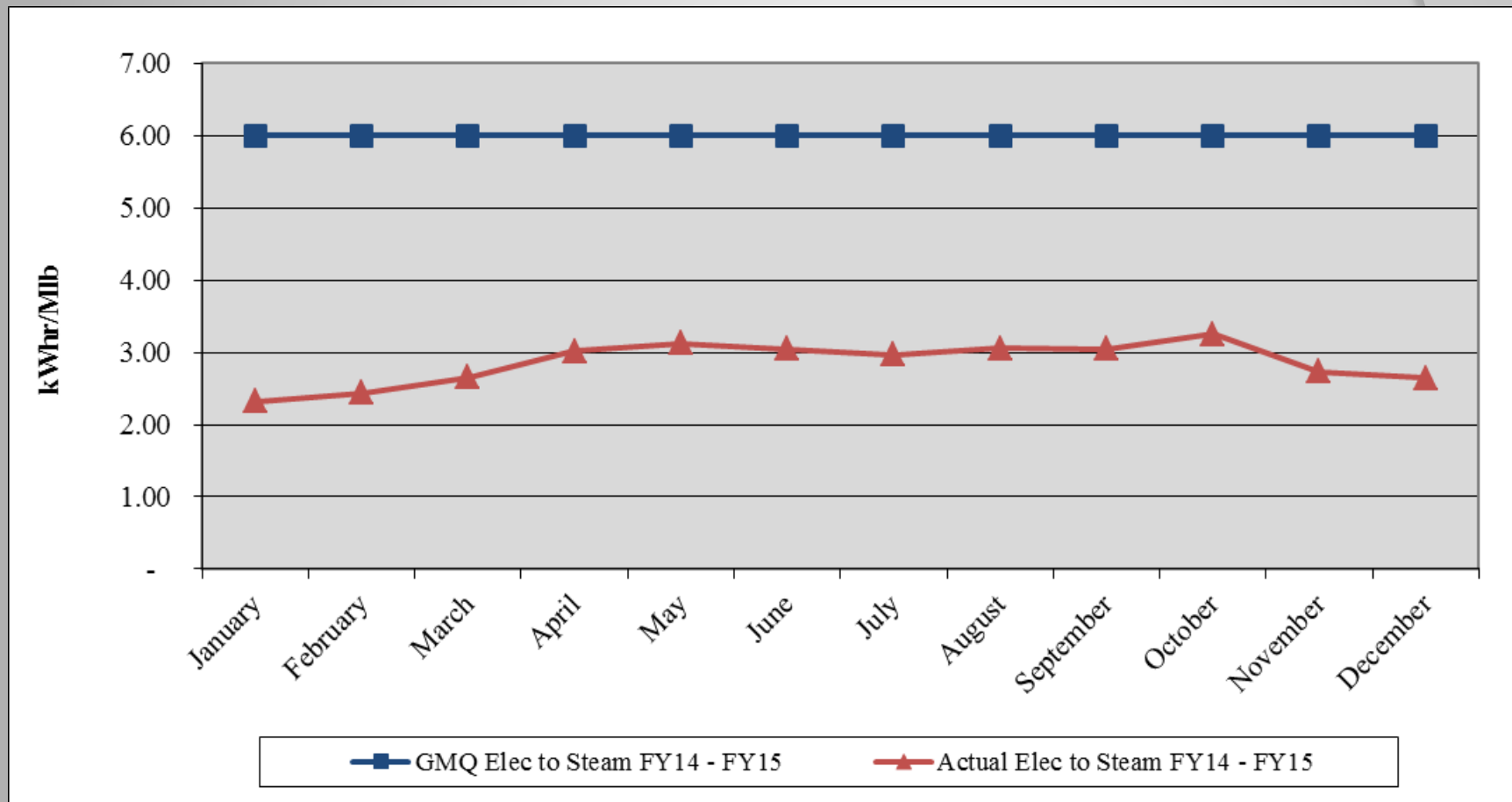


## 4. *Review of DES Contractor Performance*

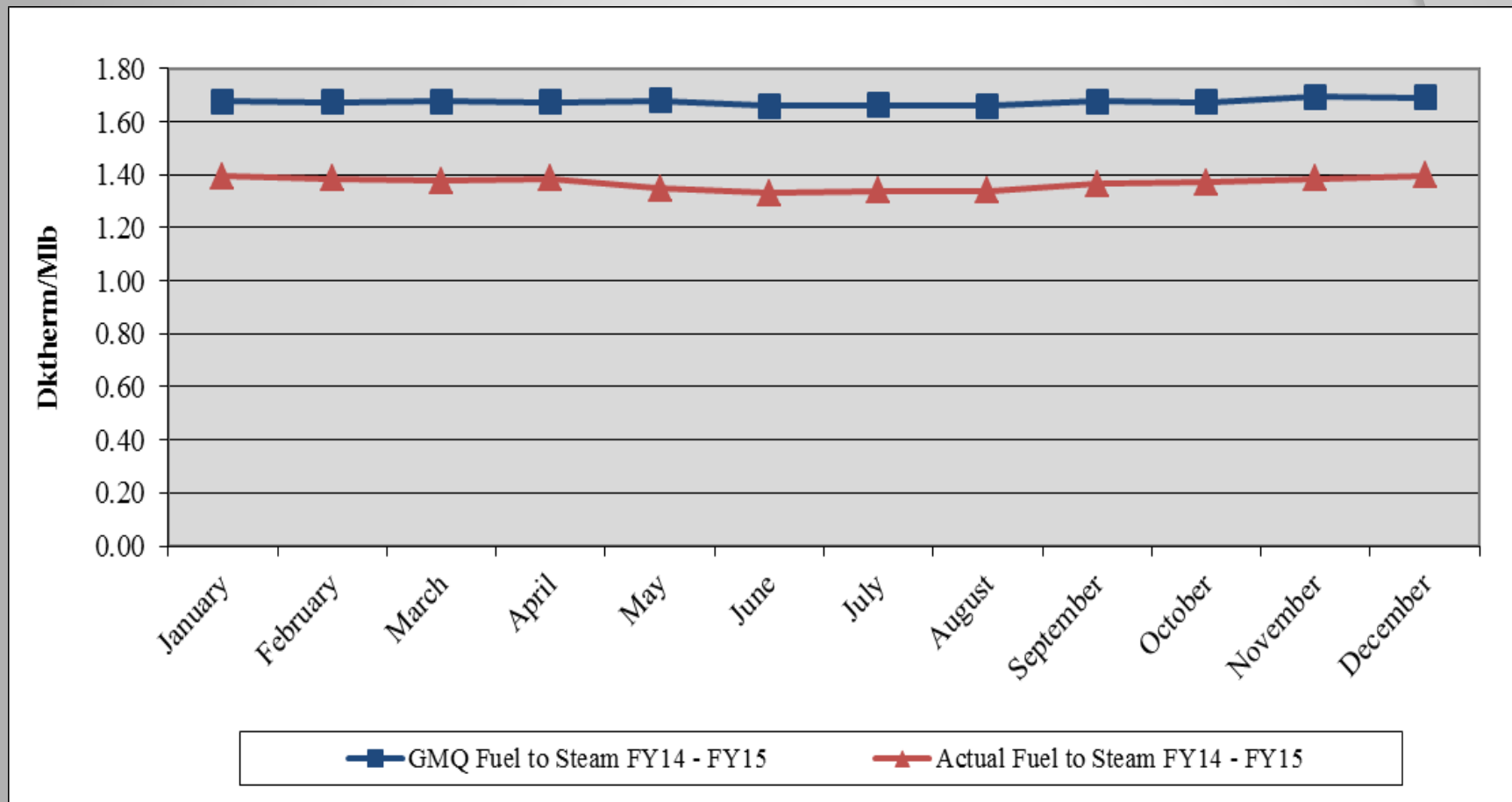
Contractor (CNE) is in compliance with their contractual obligations for FY15.

-  Excellent Performance – No Improvement Necessary
-  Satisfactory Performance – Some Improvement Could Be Made
-  Poor Performance – Much Improvement Necessary

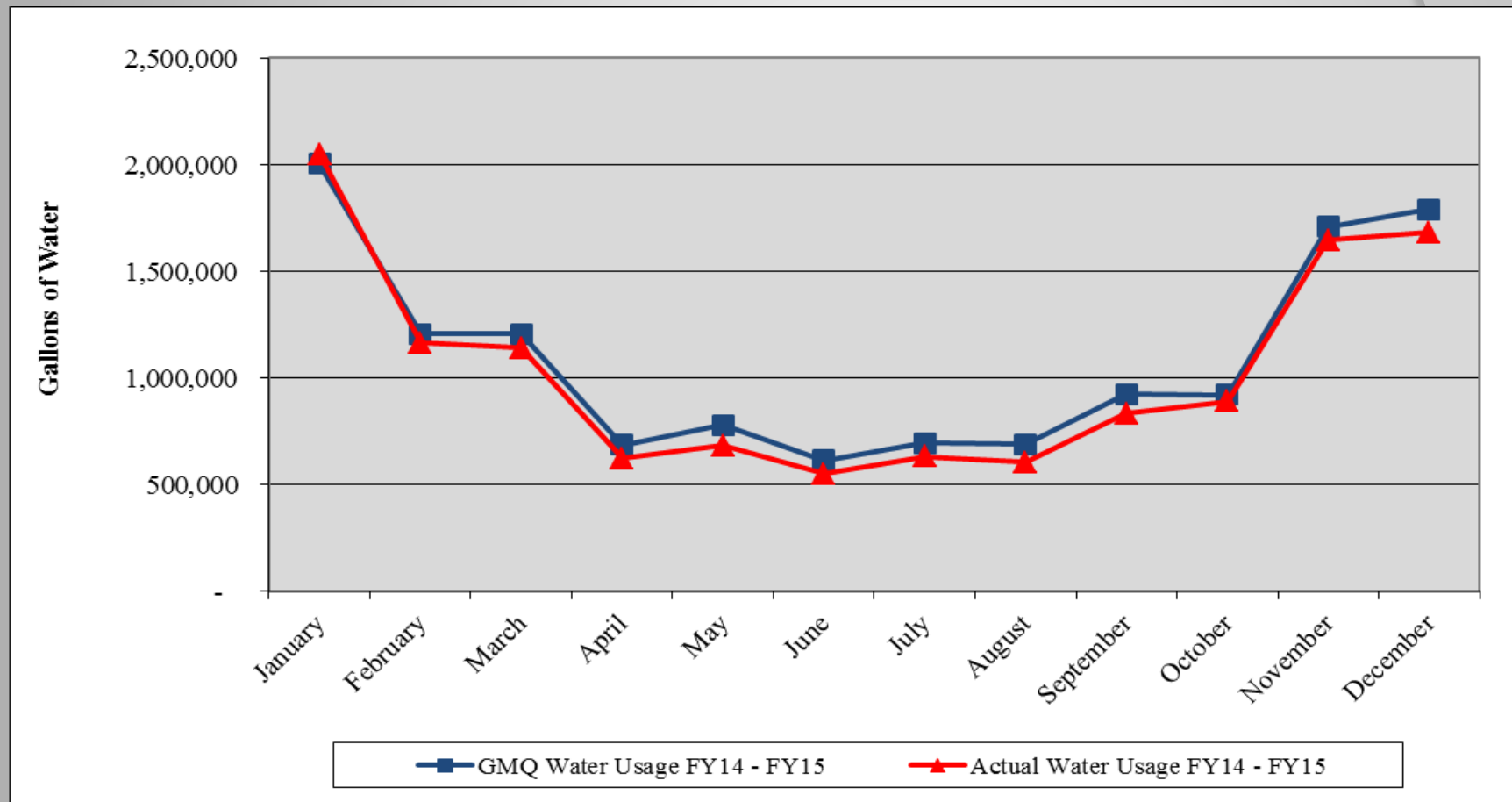
# Performance Measurement FY15: Steam Electric Conversion ●



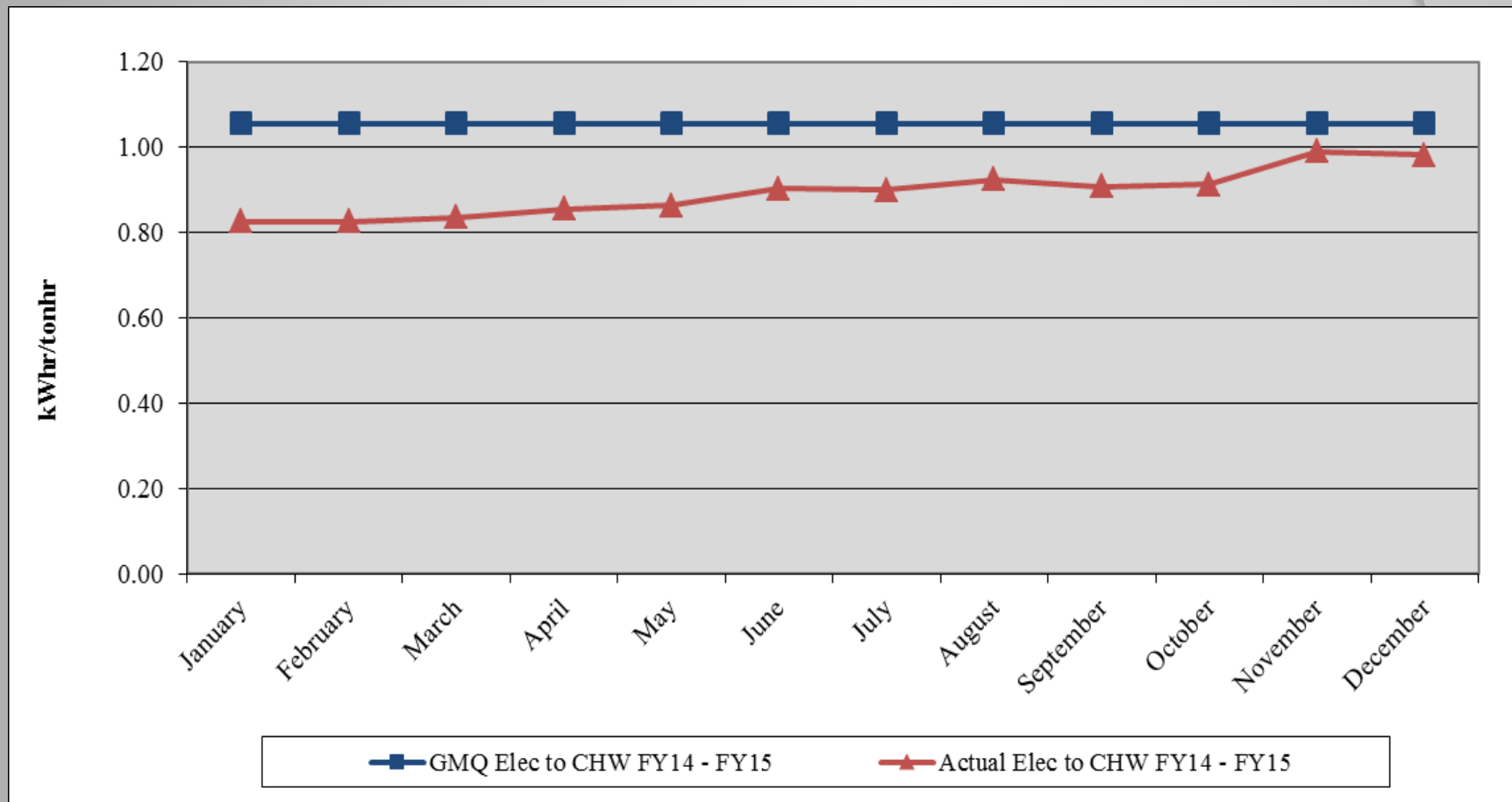
# Performance Measurement FY15: Steam Plant Efficiency



# Performance Measurement FY15: Steam Water Conversion ●

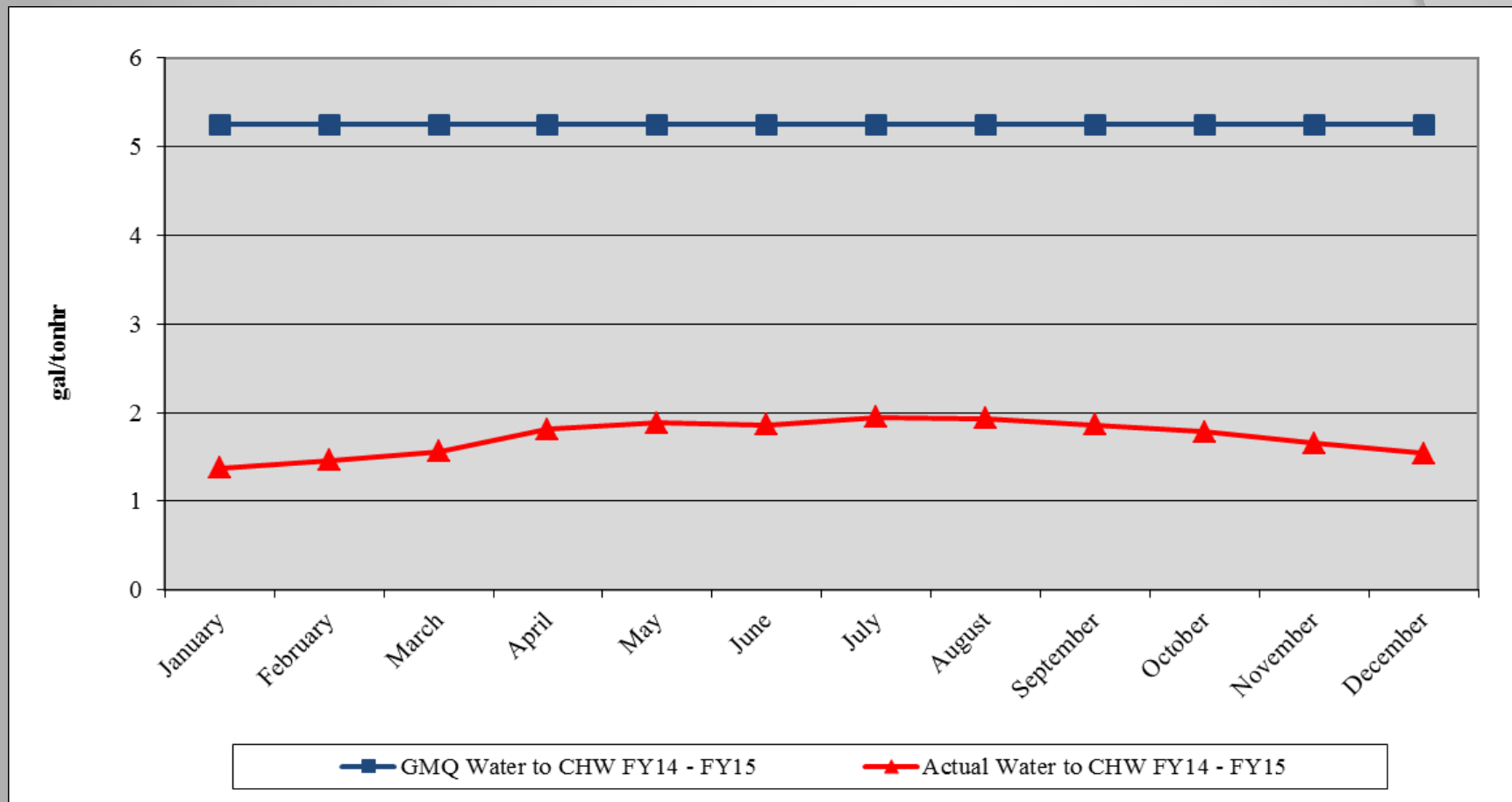


# Performance Measurement FY15: CHW Electric Conversion ●



# Performance Measurement FY15: CHW

## Water Conversion ●





# *Water Treatment*

## ❖ Steam and Condensate ●

- ❖ Corrosion
- ❖ Iron
- ❖ Hardness
- ❖ Chlorine/Sulfite

## ❖ Condensing Water ●

- ❖ Conductivity
- ❖ Biologicals

## ❖ Chilled Water ●

- ❖ Hardness
- ❖ Corrosion
- ❖ Biologicals
- ❖ Delta T Issue



## *EGF Walkthrough*

- ✓ Equipment Maintenance ●
- ✓ Operations ●
- ✓ Electrical ●
- ✓ Housekeeping ●
- ✓ Building Structure ●
- ✓ Building Exterior and Grounds ●





## *EDS Walkthrough*

- ✓ Vault/Tunnel Housekeeping ●
- ✓ Maintenance Items ●
  - ✓ Insulation Repair/Replacement ●
  - ✓ Water Infiltration ●
  - ✓ Corrosion of Structural Metal Components ●
- ✓ Safety Items ●

## *5. Natural Gas Purchasing*

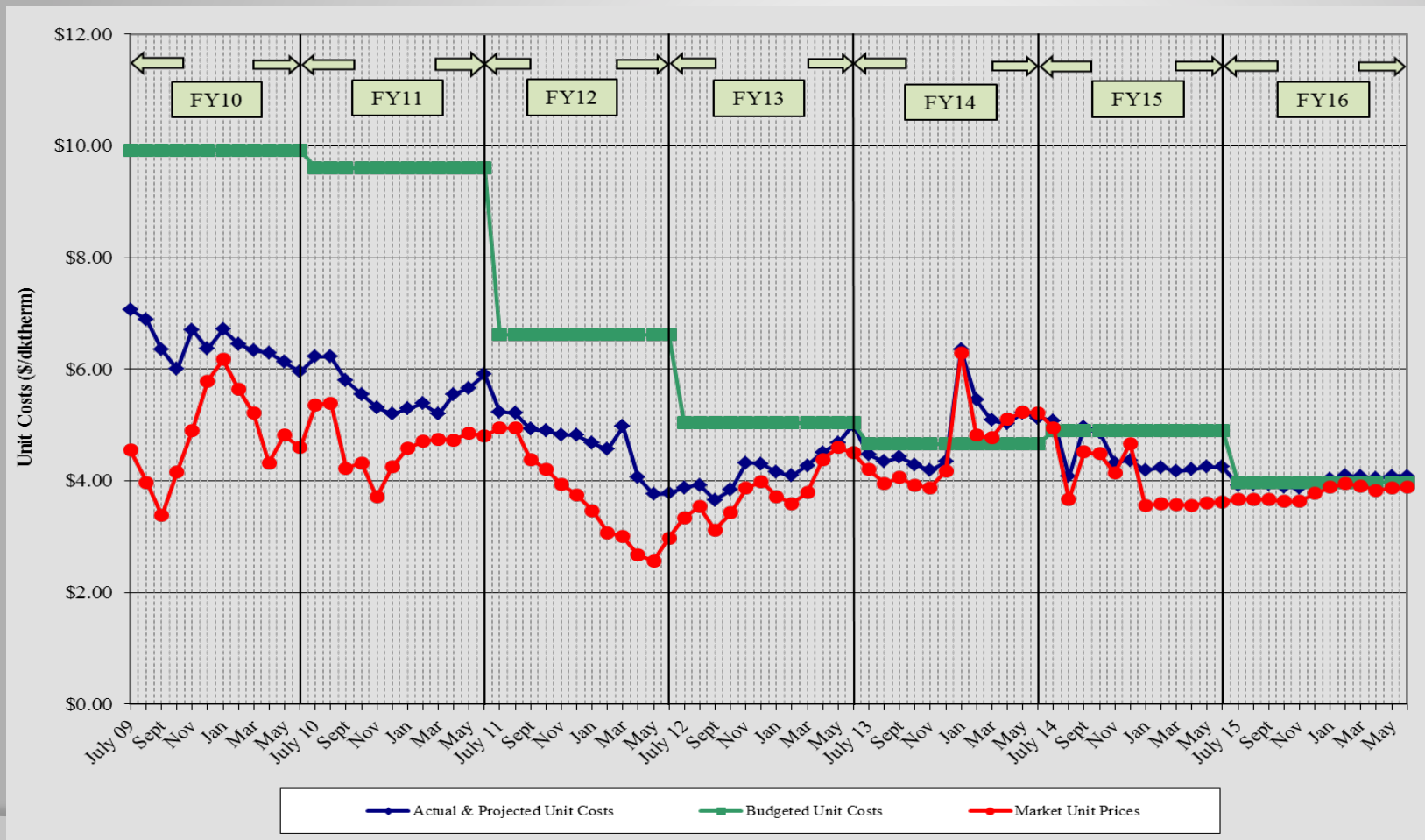
- ❖ Natural Gas Purchasing Review
  - ❖ Table 5: FY15 Gas Spending & Budget Comparison
  - ❖ Figure 5: Actual and Projected Gas Cost Comparison

## Table 5: FY15 Gas Spending & Budget Comparison

		Actual FY15 To date (Dec 31)	Budget FY15	Percent Difference
Steam Sendout (Mlbs)		199,432	189,497	5.0%
Fuel Use (Dth) (includes propane)	●	273,769	263,211	4.0%
Plant Eff (Dth/Mlb)	●	1.372	1.389	-1.2%
Total Gas Cost (includes propane)	●	\$1,318,016	\$1,289,997	2.2%
Unit Cost of Fuel (\$/ Dth)	●	\$4.814	\$4.901	-1.8%

Excludes consultant fees and FEA and budget contingency;  
 Includes transportation and propane costs

# Figure 5. Actual and Projected Gas Cost Comparison History



## 6. *Natural Gas Curtailment*

- Piedmont Natural Gas Company notified CNE at 9:00 am Tuesday January 6, 2015 of an upcoming gas curtailment
- Anticipated Curtailment Period:
  - 9:00 am Wednesday January 7, 2015 – 9:00 am Friday January 9, 2015
- Storage Tank
  - Capacity: 18,000 Gallons
  - Maximum Fill Level: (80%) 14,400 Gallons
- Anticipated Usage
  - Burn Rate: 2,000 gallons per hour
  - Propane Heat Value = 91,000 BTU per gallon
  - 182 DECATHERMS/HOUR
  - Full Storage Tank = 6.5 Hours
- Transport
  - Tanker Truck Capacity: 9,300 gallons



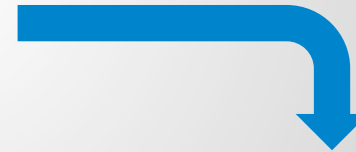
# Propane System



UNDERGROUND STORAGE  
TANK



VAPORIZER



BOILER

# Propane Delivery Schedule

	Deliveries (Gal)		Tank Level (Gal)				
	<u>Scheduled</u>	<u>Actual</u>	<u>Before</u>		<u>After</u>		
<b>Tuesday January 6, 2015</b>							
5:00 PM	2700	2920	12,150	67.5%	15,066	83.7%	
<b>Wednesday January 7, 2015</b>							
7:00 AM			Swap Boilers to Propane				
<b>9:00 AM</b>			<b>Curtailment Begins</b>				
2:00 PM	9300	9300	2,466	11.2%	11,920	66.2%	
7:00 PM	9300	9199	2,920	16.2%	12,119	67.3%	
12:00 AM	9300	9304	3,119	17.3%	12,423	69.0%	
<b>Thursday January 8, 2015</b>							
5:00 AM	9300	9344	3,423	19.0%	12,767	70.9%	
10:00 AM	9300	9304	3,767	20.9%	13,071	72.6%	
3:00 PM	9300	9329	4,071	22.6%	13,400	74.4%	
8:00 PM	9300	9304	4,400	24.4%	13,704	76.1%	
<b>Friday January 9, 2015</b>							
1:00 AM	9300	9329	4,704	26.1%	14,033	78.0%	
6:00 AM	9000	9005	5,033	28.0%	14,038	78.0%	
<b>9:00 AM</b>			<b>Curtailment Ends</b>				
10:00 AM	9000	9000	4,950	27.5%	13,950	77.5%	

## Propane Usage and Costs

	Deliveries (Gal)	Unit Cost	Cost	Vendor
<b>Tuesday January 6, 2015</b>				
5:00 PM	2,920	\$ 0.91	\$ 2,642.87	Advanced
<b>Wednesday January 7, 2015</b>				
2:00 PM	9,300	\$ 0.91	\$ 8,417.37	Advanced
7:00 PM	9,199	\$ 0.88	\$ 8,109.84	Targa
12:00 AM	9,304	\$ 0.88	\$ 8,202.40	Targa
<b>Thursday January 8, 2015</b>				
5:00 AM	9,344	\$ 0.88	\$ 8,237.67	Targa
10:00 AM	9,304	\$ 0.88	\$ 8,202.40	Targa
3:00 PM	9,329	\$ 0.88	\$ 8,224.44	Targa
8:00 PM	9,304	\$ 0.88	\$ 8,202.40	Targa
<b>Friday January 9, 2015</b>				
1:00 AM	9,329	\$ 0.88	\$ 8,224.44	Targa
6:00 AM	9,005	\$ 0.88	\$ 7,938.81	Targa
10:00 AM	<u>9,000</u>	\$ 0.88	<u>\$ 7,934.40</u>	Targa
Gallons Purchased	95,338		\$ 84,337.06	
Beginning Inventory	<u>12,150</u>	\$ 2.89	\$ 35,070.49	
	107,488			
Remaining Inventory	<u>13,950</u>			
Propane Used	93,538	\$ 1.11	<b>\$ 103,909.83</b>	= \$12.21/Dth
		(weighted average)		



## 7. FY15 Costs to Date

Item	FY14 Actual	FY15 Budget	FY15 Actual to date	Percent of FY15 Budget
FOC's	\$ 4,459,927	\$ 4,533,300	\$ 2,266,038	49.99%
Pass Throughs				
Non-Energy	\$ 1,082,270	\$ 1,187,267	\$ 749,119	63.10%
Water/Sewer	\$ 485,337	\$ 721,800	\$ 311,472	43.15%
Natural Gas Base	\$ 3,354,335	\$ 2,972,673	\$ 1,289,992	43.40%
Natural Gas Contingency	\$ -	\$ 635,260	\$ 28,024	4.41%
Electricity	\$ 5,225,956	\$ 6,576,100	\$ 3,276,845	49.83%
Debt Service	\$ 5,705,732	\$ 5,491,800	\$ 3,089,859	56.26%
<b>Total Expenses</b>	<b>\$ 20,313,558</b>	<b>\$ 22,118,200</b>	<b>\$ 11,011,349</b>	<b>49.78%</b>
<b>Total Revenues</b>	<b>\$ 18,396,977</b>	<b>\$ 20,268,500</b>	<b>\$ 9,814,029</b>	<b>48.42%</b>
<b>Metro Funding Amount</b>	<b>\$ 1,916,581</b>	<b>\$ 1,849,700</b>	<b>\$ 924,850</b>	<b>50.00%</b>

## 8. *Capital Expenditure Update*

	<b>Spent to End of FY14</b>	<b>FY15 Spending</b>	<b>Balance to Date (01/19/15)</b>
R&I Projects	\$2,293,259	\$29,699	\$321,101
49109-2010 Bond	\$1,891,257	\$10,996	\$723,663
49107-Customer Connection Fund	\$6,575,530	\$44,716	\$1,886,682
<b>Total</b>	<b>\$10,760,046</b>	<b>\$85,411</b>	<b>\$2,931,446</b>

# *Capital Projects Review*

## Active Capital Projects

- DES 061: MH & Tunnel Steel Corrosion Repair & Prevention – ongoing
- DES 089: AA Birch Tunnel Repairs
- DES 104: TOU – developing TOU invoicing changes
- DES 105: Vertical Tunnel Shaft Repairs at Suntrust Building
- DES 106: MCH Chilled Water Mods – awaiting Phase II
- DES 107: West Riverfront Park Manhole Repairs
- DES 108: 7<sup>th</sup> Avenue Tunnel Insulation Repairs
- DES 109: Indigo Hotel Sparge Tube
- DES 110: EGF Alternate Fuels Evaluation
- DES 111: EGF Combined Heat and Power

# *Capital Projects Review*

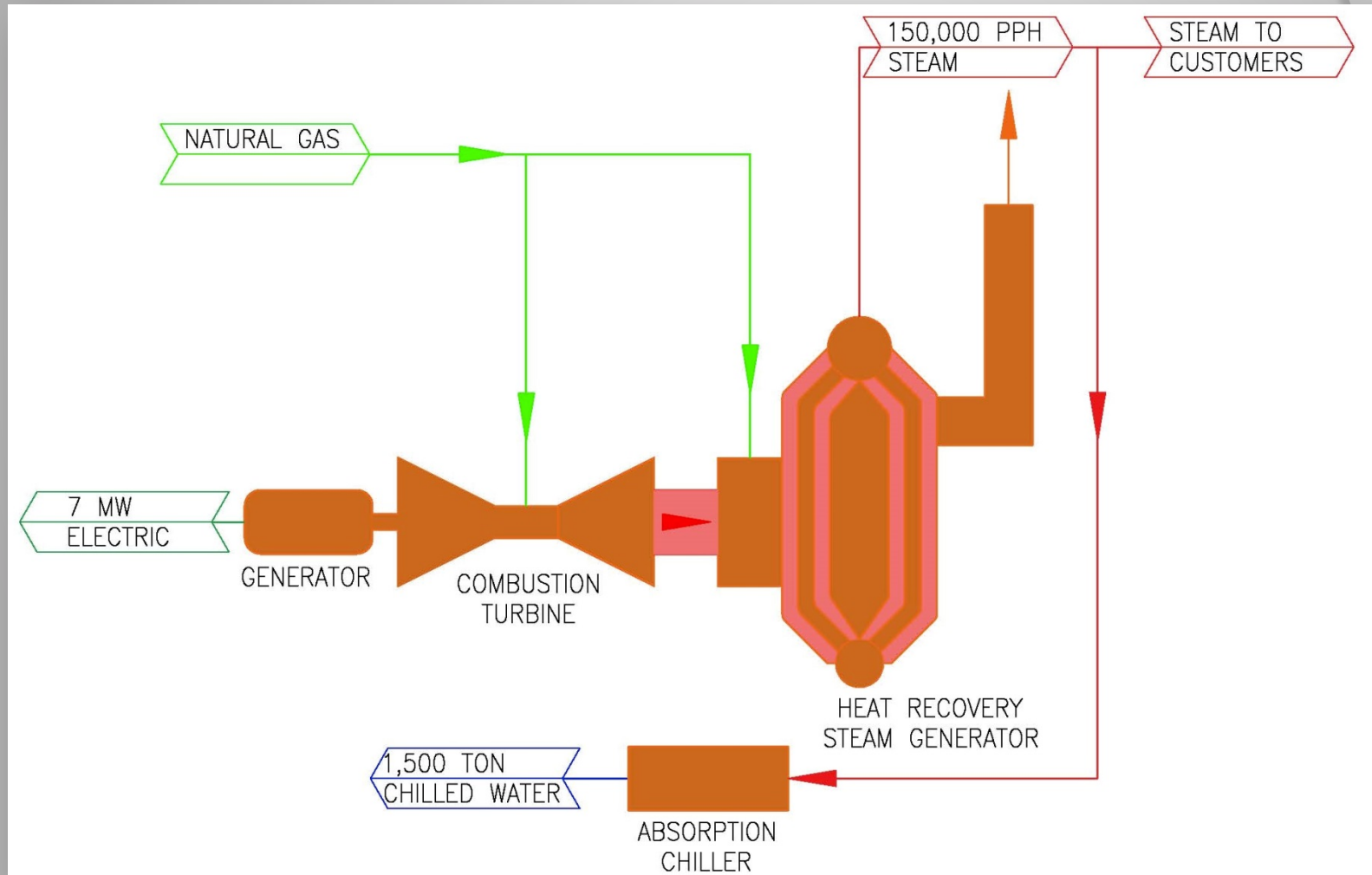
## Capital Projects in Close-out

- DES 089: AA Birch Tunnel Repairs
- DES 105: Vertical Tunnel Shaft Repairs at Suntrust Building

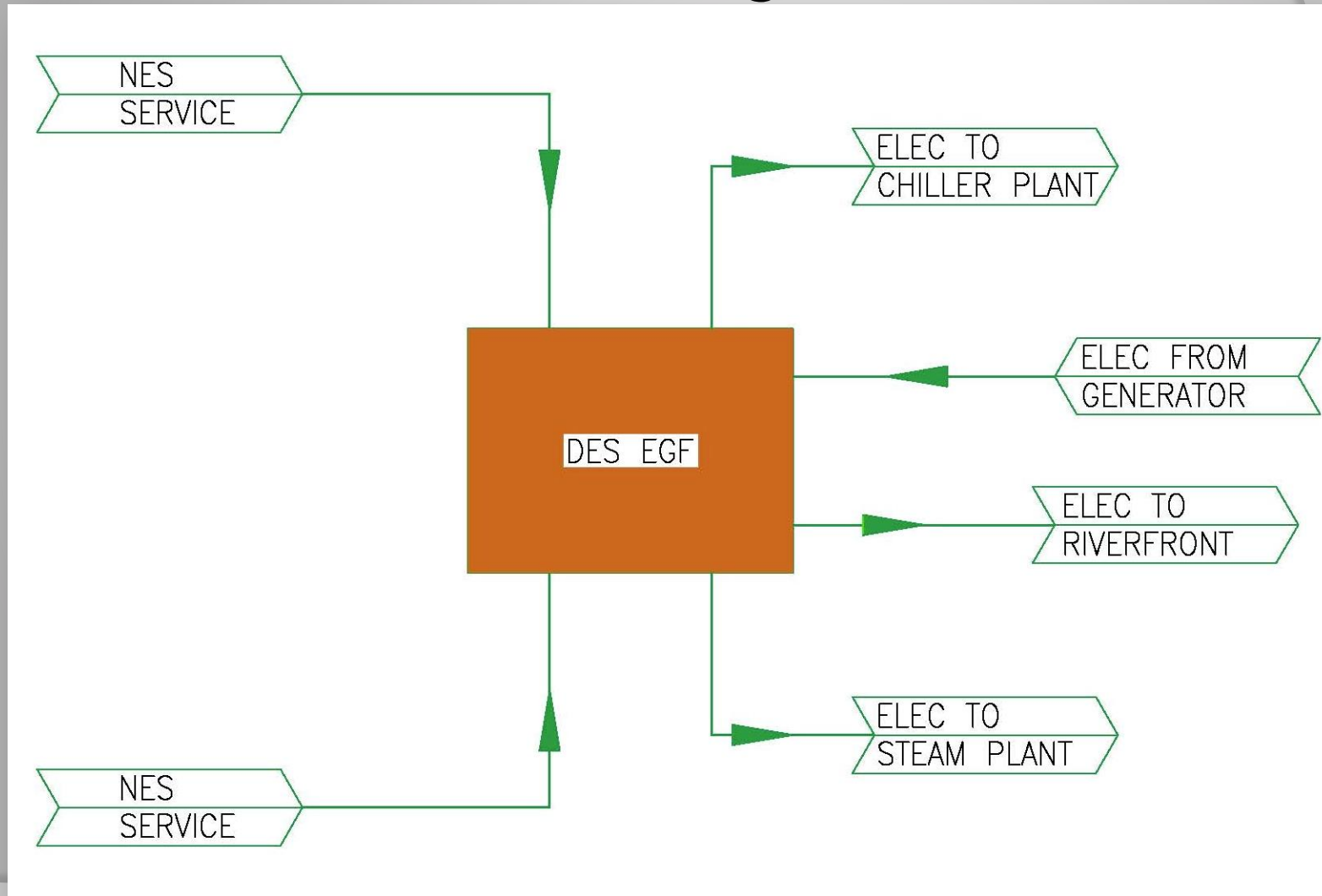
## *9. DES Combined Heat and Power*

1. Provides Approximately 7,000 kW of Self-generated Electricity
2. Provides 150,000 pph of Additional Steam
3. Provides 1,500 tons of Additional Chilled Water
4. Improves DES Efficiency
5. Annual Operating Savings of \$2,450,000 to DES Customers with Net 6.2% Average Annual Savings
6. Provides Triple Electrical Redundancy to Riverfront Flood Mitigation Project
7. Approximately \$18 million in Net Capital Cost
8. Less Than 8 Year Simple Return on Investment

# CHP Flow Diagram



# CHP Electric Flow Diagram



## *10. Other Board Member Items*



## 11. *Adjourn*

- *Advisory Board Meeting Schedule*
- FY15 – 3<sup>rd</sup> Quarter Meeting – May 21, 2015
- FY15 – 4<sup>th</sup> Quarter Meeting – August 20, 2015
- FY16 – 1<sup>st</sup> Quarter Meeting – November 19, 2015
- FY16 – 2<sup>nd</sup> Quarter Meeting – February 18, 2016