



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

*DES Advisory Board Meeting*  
*First Quarter FY25*  
*November 21, 2024*



*Presented by:*  
*MNDES Project Administrator*  
*Thermal Engineering Group, Inc*

# *Agenda*

1. Call to Order
2. Review & Approval of Previous Meeting Minutes
3. Metro Liaison Update
4. Customer Sales
5. Marketing
6. Review of DES Contractor Performance
7. Natural Gas Purchasing Update
8. FY25 Costs to Date
9. FY25 Budget
10. Review of EGF and EDS
11. Capital Projects Review & Status
12. System Operator Update
13. Special Topics
14. Other Board Member Items
15. Adjourn

1. Call to Order
2. Review & Approval of Previous Meeting Minutes
3. Metro Liaison Update

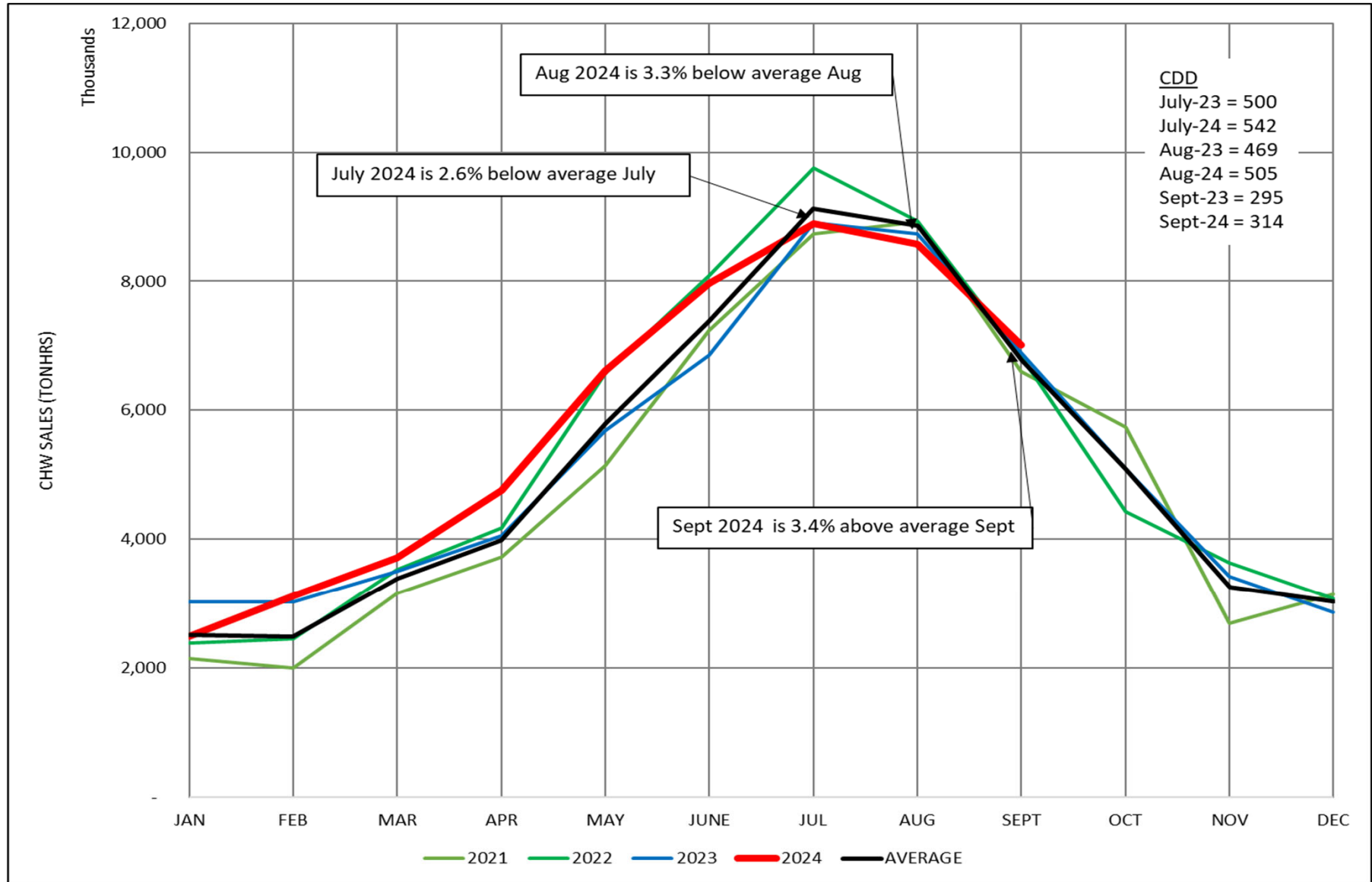
## 4. *Customer Sales*

- ❖ There are 0 customers in arrears more than 30 days
- ❖ Table 4: Customer Cost Comparison for the Previous 12 Months
- ❖ Figure 4A: Historic Chilled Water Sales
- ❖ Figure 4B: Historic Steam Sales

## Summary Table 4: Customer Cost Comparison for the Previous 12 Months

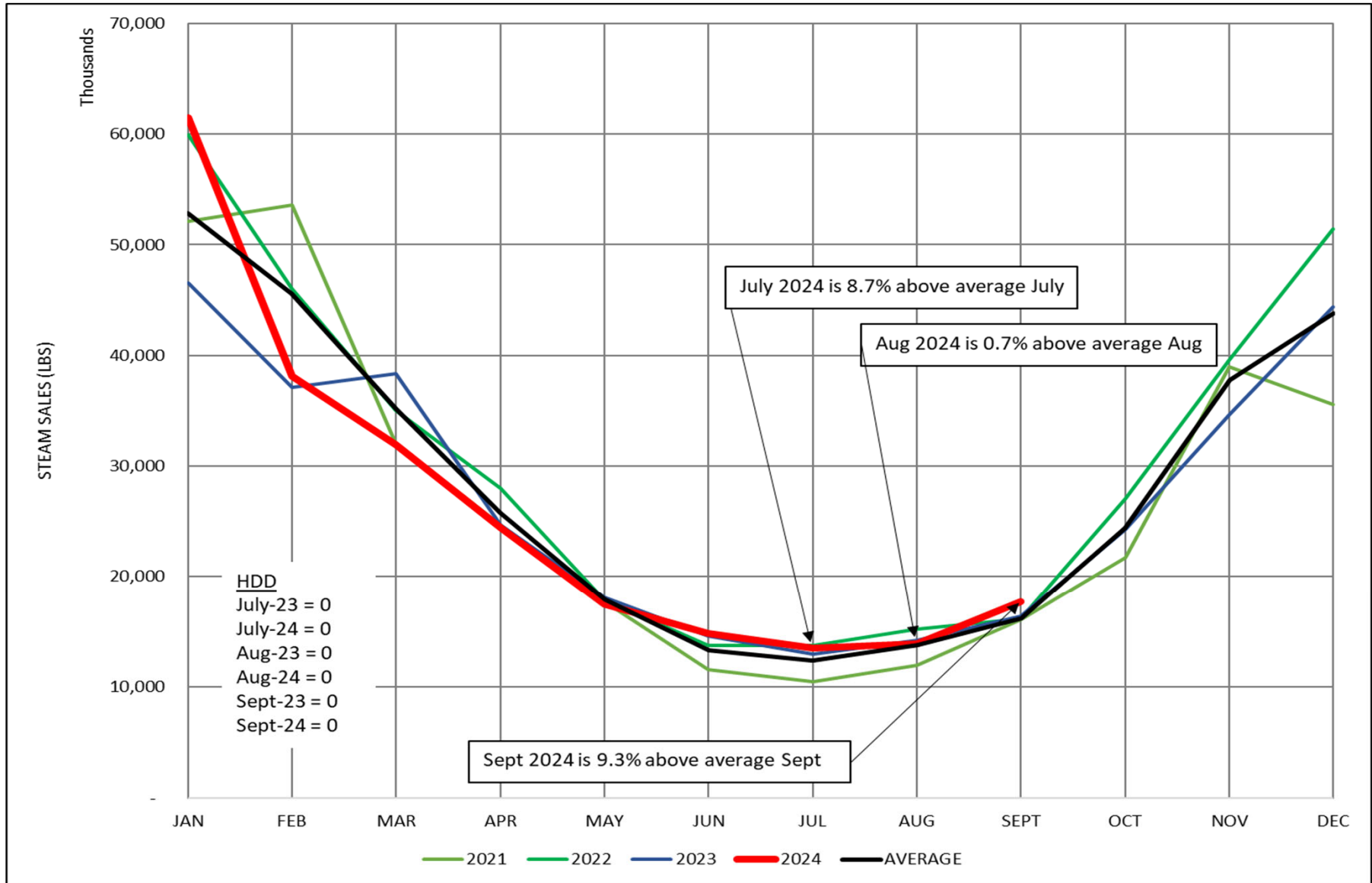
	Steam - Rolling 12 Month			Chilled Water - Rolling 12 Month		
	Oct 2022- Sept 2023	Oct 2023- Sept 2024	% Diff.	Oct 2022- Sept 2023	Oct 2023- Sept 2024	% Diff.
<b>Private</b> Cost	\$ 1,743,964	\$ 1,669,020	-4.30%	\$ 4,514,174	\$ 4,500,194	-0.31%
Usage (lbs or tonhrs)	94,819,609	95,427,133	0.64%	21,969,689	22,666,535	3.17%
<b>State</b> Cost	\$ 2,223,241	\$ 2,070,968	-6.85%	\$ 3,523,450	\$ 3,469,605	-1.53%
Usage (lbs or tonhrs)	112,850,918	106,715,614	-5.44%	13,796,320	12,908,990	-6.43%
<b>Metro</b> Cost	\$ 2,152,512	\$ 2,038,754	-5.28%	\$ 5,048,873	\$ 5,225,703	3.50%
Usage (lbs or tonhrs)	133,081,269	134,168,658	0.82%	26,005,960	28,884,000	11.07%
<b>Aggregate</b> Cost	\$ 6,119,717	\$ 5,778,743	-5.57%	\$13,086,497	\$13,195,502	0.83%
Usage (lbs or tonhrs)	340,751,796	336,311,405	-1.30%	61,771,969	64,459,525	4.35%
<b>Unit Cost</b>	\$ <b>17.96</b>	\$ <b>17.18</b>	<b>-4.3%</b>	\$ <b>0.212</b>	\$ <b>0.205</b>	<b>-3.37%</b>

# Figure 4A. Historic Chilled Water Sales



Averages include the years 2021, 2022, and 2023.

# Figure 4B. Historic Steam Sales



Averages include the years 2021, 2022, and 2023.

## *5. Marketing*

- Remaining Capacity for Sale (approximate)
  - 1,400 tons of chilled water
  - 35,105 pph of steam
- Potential New Customer Interest
  - ~5,000 tons
  - ~87,000 pph (or equivalent)



## *Marketing (con't)*

- Peabody St Development
  - 1<sup>st</sup> and KVB
    - Development on hold
  - 4<sup>th</sup> and Lea Ave
    - Re-evaluating development; on hold
  - 4<sup>th</sup> and Elm
    - Developers in preliminary design; evaluating options
- Lafayette St
  - A few developments have shown interest; all in preliminary design

## *Marketing (con't)*

- New Developments North of KVB
  - Printer's and Banker's Alley (DES203)
    - Development moving forward; design includes chilled water
  - US Courthouse (Estes Kefauver Bldg)
    - Building evaluating options; may have transferred ownership/lease
  - Washington Square
    - Building evaluating options
  - 333 Union
    - Small hotel development; current design includes chilled water

## 6. *Review of DES Contractor Performance*

CES Operating Agreement Amendment 3 began July 1 which includes revised performance guarantees which may result in improved energy efficiencies.

- Chilled Water to Electric: changed to 0.92 kWhr/tonhr sales
- Chilled Water to Water: equation changed
- Steam to Electric: no change
- Steam to Fuel: no change
- Steam to Water: equation changed

## *Chilled Water to Water*

GMQ = 2.0 gallons per tonhr sales (same as Amendment 2)

“Actual” Metric Equation:

$$Actual = \frac{MU - BW - EDSMU}{CHWsales}$$

MU = total chilled water city water makeup

BW = side stream filter backwash

EDSMU = If city water makeup to the EDS is greater than 20,000 gallons per day, cap at 20,000 gallons per day. Otherwise, EDSMU = 0 in equation. (Amendment 2 cap was 30,000 gallons per day)

CHWsales = monthly chilled water sales

## *Steam to Water*

Performance Guarantee Metric Equation:

$$GMQ = 1.2 * (Steam\ SO - Cnd\ Ret)$$

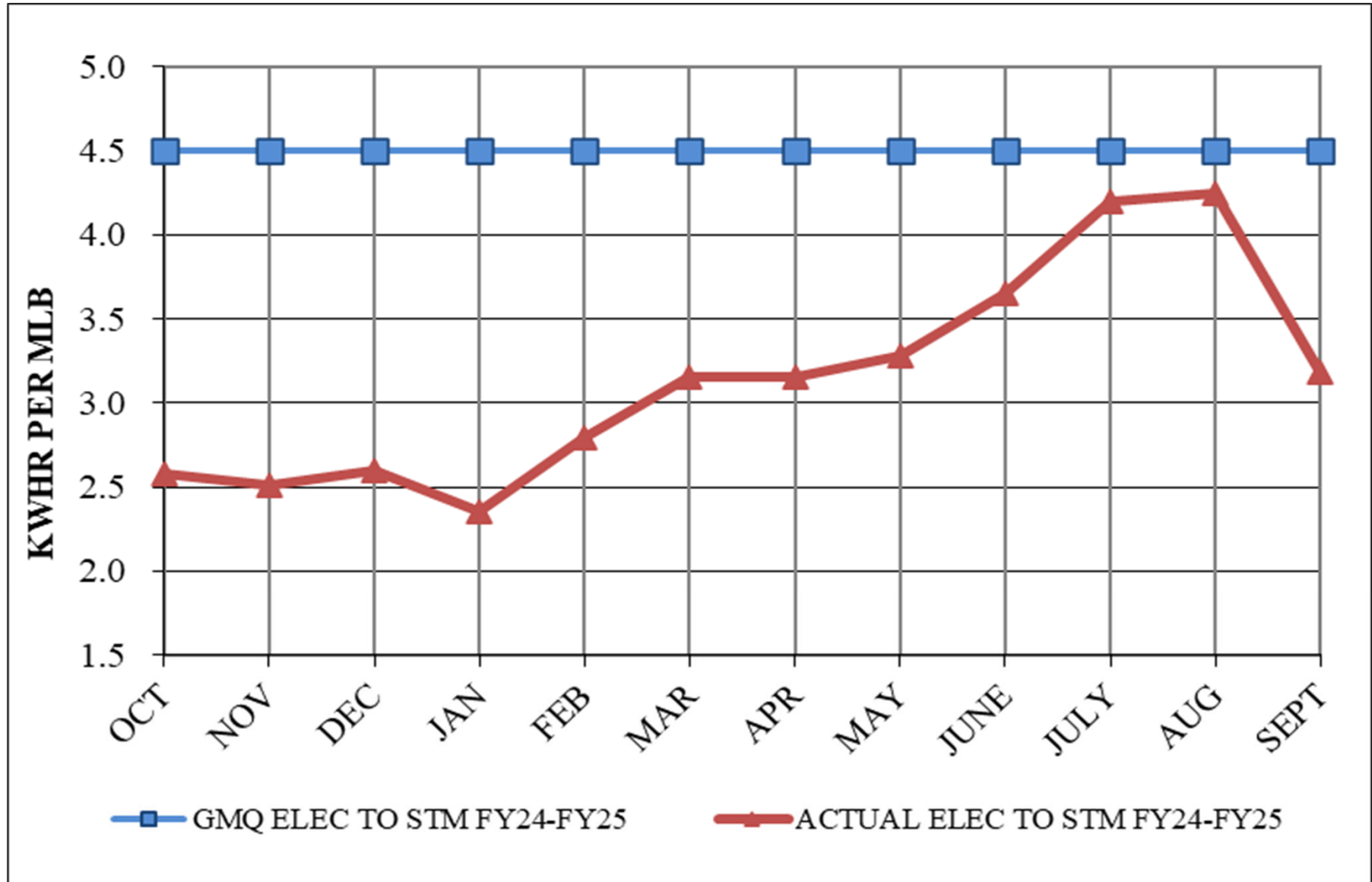
Where the condensate return is corrected for density in real time (i.e. converted to pounds), and the steam sendout is measured in pounds.

Actual Metric Equation:

$$Actual = Stm\ city\ water\ makeup * 8.342$$

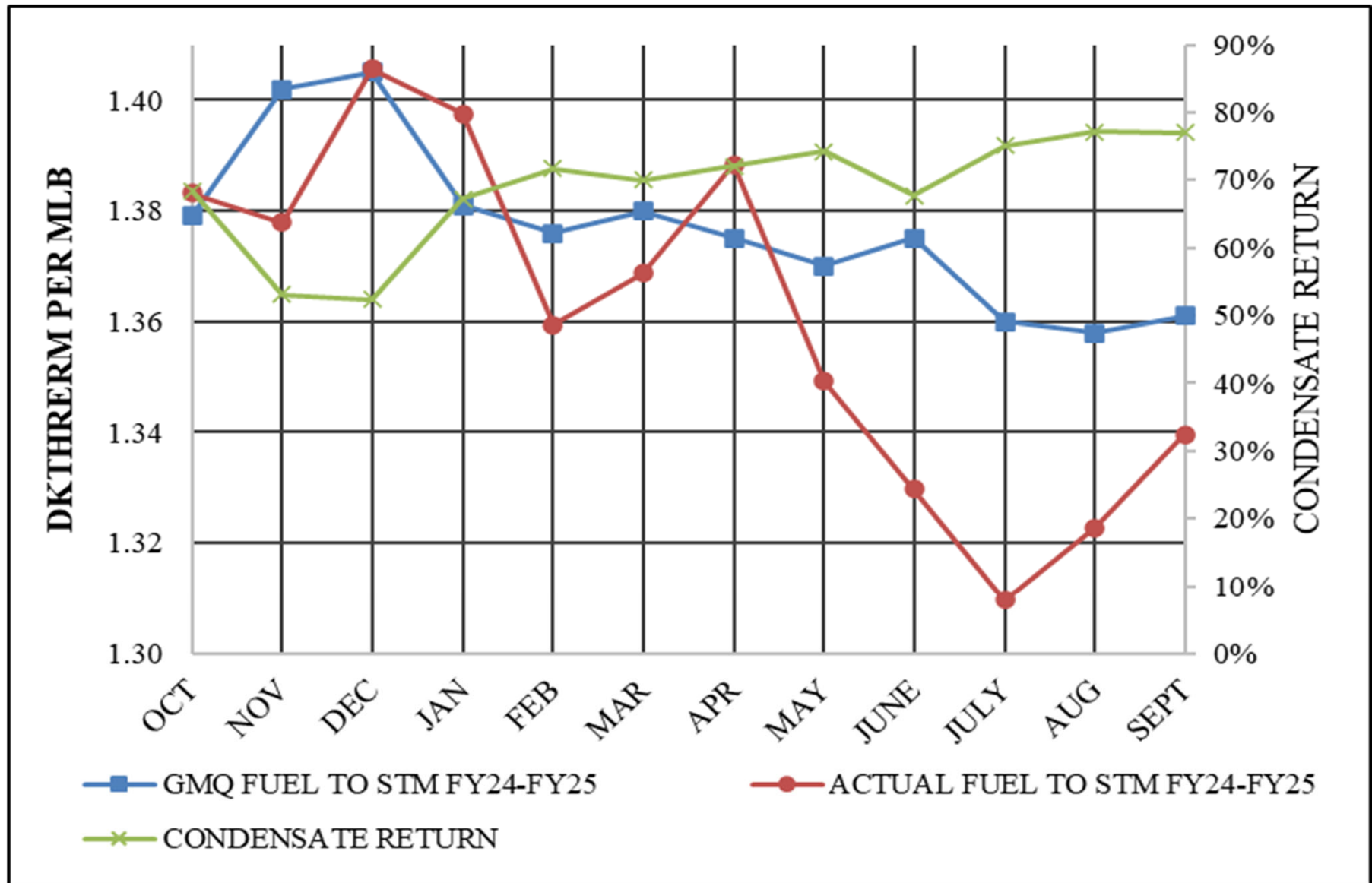
8.342 pounds per gallon at standard conditions conversion factor

## Performance Measurement FY25: Steam Electric



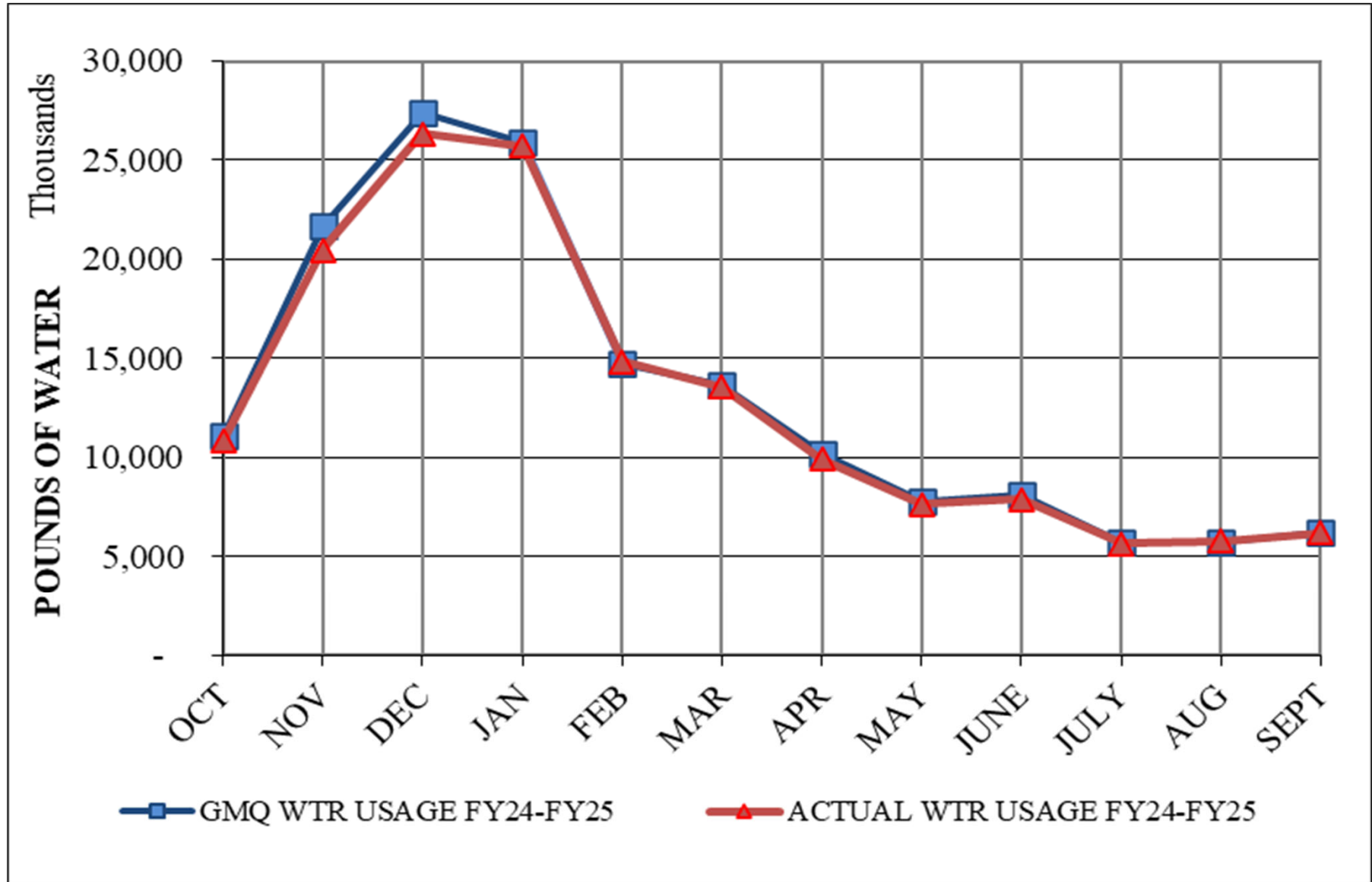
GMQ equation did not change with Amendment 3. GMQ met in all months shown.

# Performance Measurement FY25: Steam Plant Eff



Amendment 3 changed CR calculation. GMQ met Nov, Feb, Mar, May, June, July, Aug, Sept.

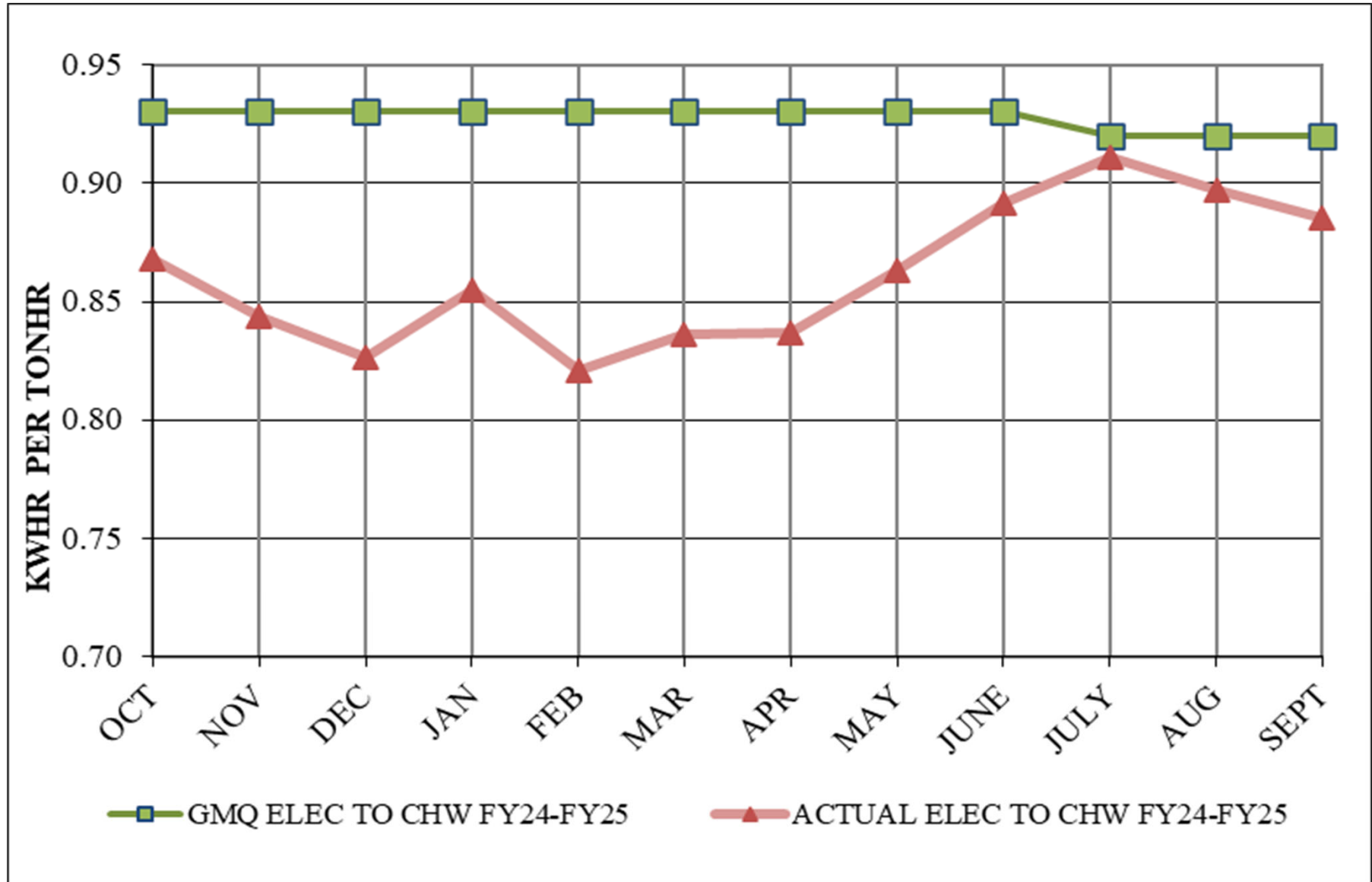
## Performance Measurement FY25: Steam Water



Amendment 3 changed GMQ and “actual” equation; graph shows historic data converted to pounds. GMQ met in July and Sept.

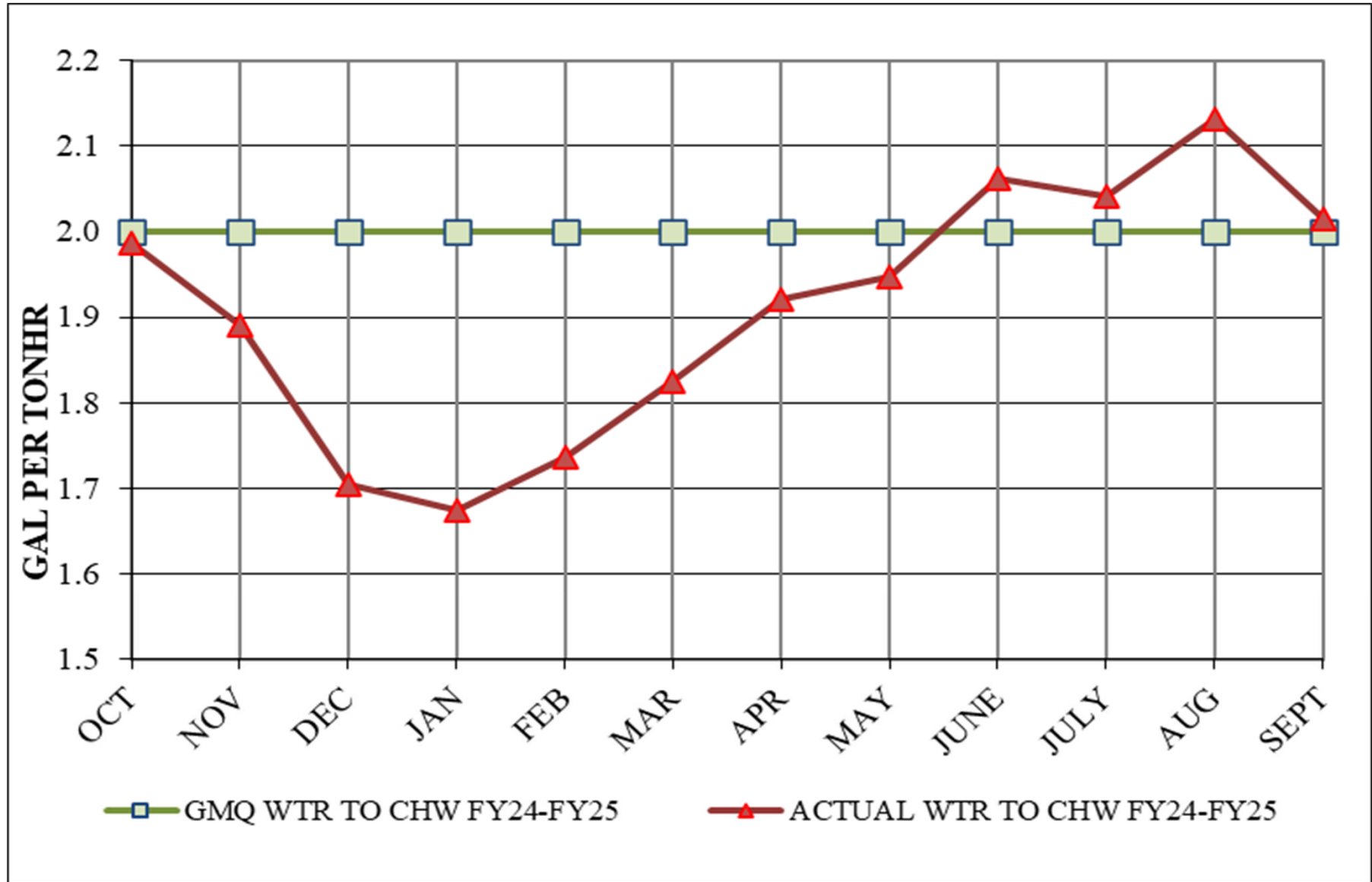


## Performance Measurement FY25: CHW Electric



Amendment 3 changed GMQ. GMQ met in all months shown.

## Performance Measurement FY25: CHW Water

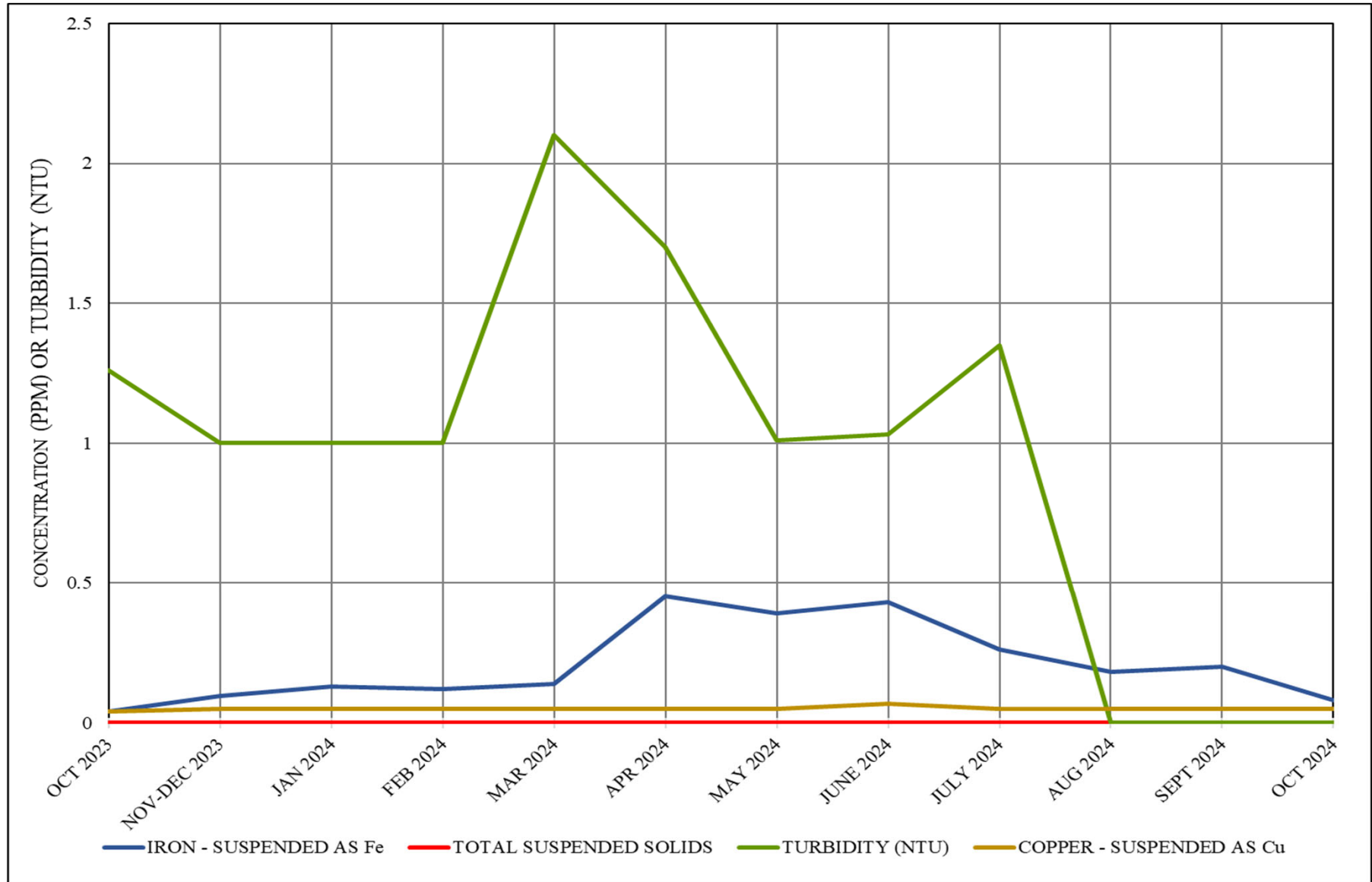


Amendment 3 changed “actual” equation. GMQ met Oct, Nov, Dec, Jan, Feb, Mar, Apr, and May.

# *Water Treatment*

- ❖ **Steam and Condensate**
  - ❖ Corrosion
  - ❖ Iron
  - ❖ Hardness
  - ❖ Chlorine/Sulfite
- ❖ **Condensing Water**
  - ❖ Conductivity
  - ❖ Biologicals; excursion but returned to normal
- ❖ **Chilled Water**
  - ❖ Hardness
  - ❖ Corrosion
  - ❖ EGF and Customer Biologicals Good
  - ❖ Side Stream Filter

# Side Stream Filter Performance



Increase in iron and turbidity believed to be due to increase in CHW usage.

## *7. Natural Gas Purchasing*

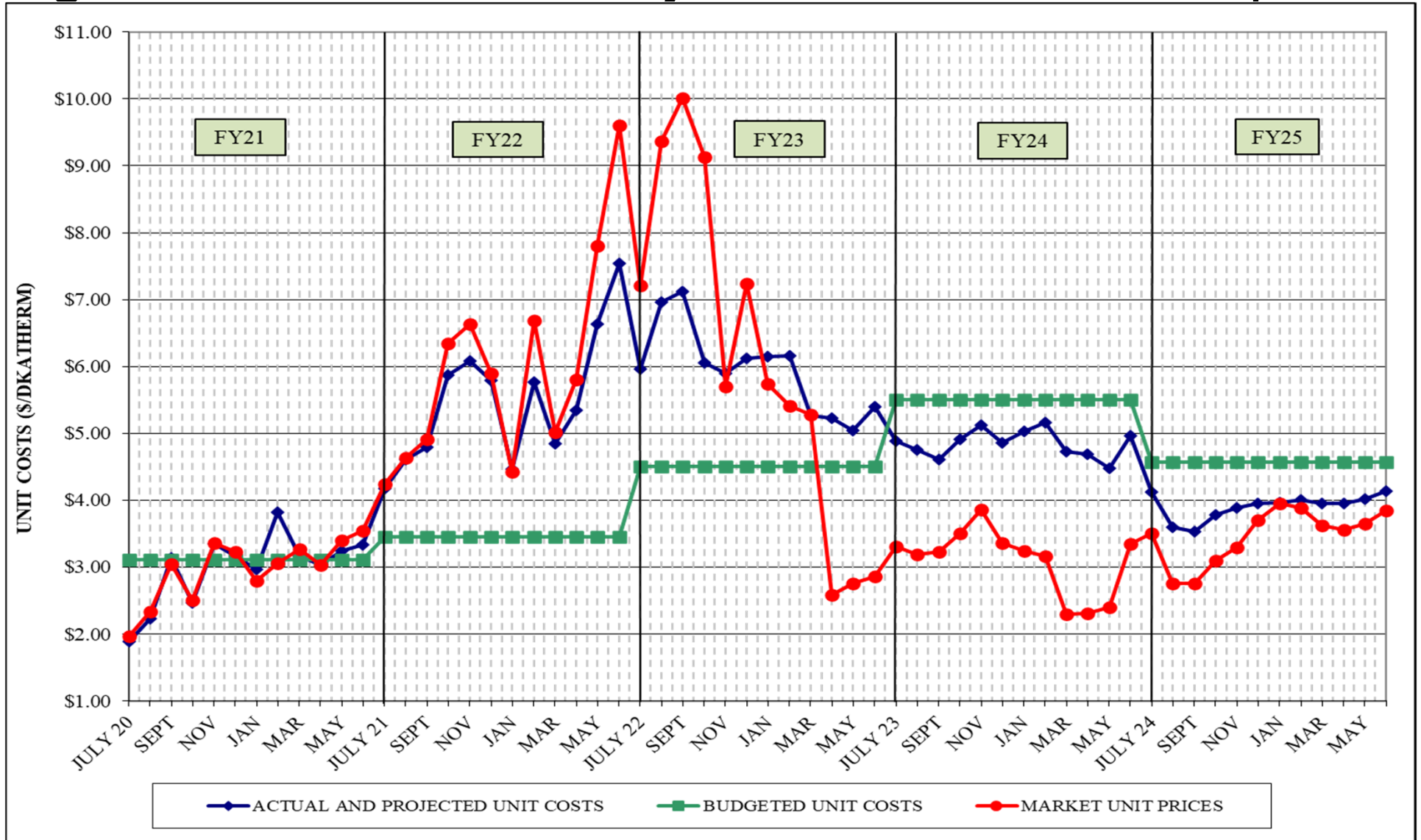
- ❖ Natural Gas Purchasing Review
  - ❖ Table 7: FY25 Gas Spending & Budget Comparison
  - ❖ Figure 7: Actual and Projected Fuel Cost Comparison

## Table 7: FY25 Gas Spending & Budget Comparison

	<b>Actual FY25 To Sept 30</b>	<b>Budget FY25</b>	<b>Percent Difference</b>
Steam Sendout (Mlbs)	62,616	63,026	-0.7%
Fuel Use (Dth) (includes propane)	82,954	90,316	-8.2%
Plant Eff (Dth/Mlb)	1.325	1.433	-7.5%
Total Gas Cost (includes propane)	\$308,452	\$470,048	-34.4%
Unit Cost of Fuel (\$/Dth)	\$3.718	\$5.204	-28.6%

Excludes consultant fees, FEA, and pre-purchased and stored propane; Includes transportation and actual propane costs and usages. Budget values include price and weather contingencies.

# Figure 7. Actual and Projected Fuel Cost Comparison



Currently hedging 70% of natural gas through FY25; transportation costs included.

## 8. *FY25 Costs to Date*

Item	FY24 Budget	FY25 Budget	FY25 Actual to date	Percent of FY25 Budget
FOC's	\$ 4,127,000	\$ 4,250,800	\$ 1,062,708	25.00%
Pass Throughs				
Administrative Costs	\$ 638,300	\$ 752,500	\$ 120,848	16.06%
Chemicals	\$ 331,200	\$ 379,300	\$ 83,309	21.96%
R&I Fund Transfers	\$ 312,900	\$ 322,200	\$ 107,400	33.33%
Water/Sewer	\$ 1,152,000	\$ 1,187,300	\$ 408,000	34.36%
Fuel Base	\$ 3,422,700	\$ 2,631,171	\$ 435,585	16.55%
Fuel Contingency	\$ 764,200	\$ 795,729	\$ -	0.00%
Electricity	\$ 6,476,700	\$ 6,801,900	\$ 2,046,482	30.09%
ORF Deposit	\$ 188,200	\$ -	\$ -	0.00%
Debt Service	\$ 4,774,000	\$ 5,385,300	\$ 1,342,400	24.93%
<b>Total Expenses</b>	<b>\$ 22,187,200</b>	<b>\$ 22,506,200</b>	<b>\$ 5,606,733</b>	<b>24.91%</b>
<b>Total Revenues</b>	<b>\$ 21,802,800</b>	<b>\$ 22,121,200</b>	<b>\$ 5,647,765</b>	<b>25.53%</b>
<b>Metro Funding</b>	<b>\$ 384,400</b>	<b>\$ 385,000</b>	<b>\$ 96,250</b>	<b>25.00%</b>

Actual Costs and Revenues to Date include FY24 True-up Items.



## 9. FY25 Budget

Item	FY24 Budget	FY25 Budget	Percent of FY24 Budget
FOC's	\$ 4,127,000	\$ 4,250,800	3.00%
Pass Throughs			
Administrative Costs	\$ 638,300	\$ 752,500	17.89%
Chemicals	\$ 331,200	\$ 379,300	14.52%
R&I Fund Transfers	\$ 312,900	\$ 322,200	2.97%
Water/Sewer	\$ 1,152,000	\$ 1,187,300	3.06%
Fuel Base	\$ 3,422,700	\$ 2,631,171	-23.13%
Fuel Contingency	\$ 764,200	\$ 795,729	4.13%
Electricity	\$ 6,476,700	\$ 6,801,900	5.02%
ORF Deposit	\$ 188,200	\$ -	-100.00%
Debt Service	\$ 4,774,000	\$ 5,385,300	12.80%
<b>Total Expenses</b>	<b>\$ 22,187,200</b>	<b>\$ 22,506,200</b>	<b>1.44%</b>
<b>Total Revenues</b>	<b>\$ 21,802,800</b>	<b>\$ 22,121,200</b>	<b>1.46%</b>
<b>Metro Funding</b>	<b>\$ 384,400</b>	<b>\$ 385,000</b>	<b>0.16%</b>

Budget shown does not include any budget true-up items.

## *10. Review of EGF and EDS*

- Routine maintenance of the EDS is the responsibility of System Operator and is defined within the ARMA. Additional maintenance is directed by the Project Administrator resulting from reviews performed quarterly for tunnels and manholes such that each section and manhole are reviewed annually as defined in the quarterly EDS reports.
- As identified in one or more EDS and EGF quarterly reports, there are several outstanding maintenance items that remain unaddressed.

## *EGF Walkthrough*

- Equipment Maintenance
  - Cooling towers
  - Pipe insulation
- Operations
- Electrical
  - Electric dampers' wiring needs attention
- Housekeeping
- Building Structure
- Building Exterior and Grounds

# *EDS Walkthrough*

- **Piping**
  - Steam leak in Hyatt Place service piping (in parking garage)
  - Steam leak in Manhole B2
  - Valve replacements
  - 1<sup>st</sup> & Molloy hot spot repair
- **Insulation**
  - Capital Project for various manhole repairs
  - Tunnels
- **Water Infiltration**
  - Manhole 15/north end of 4th Ave Tunnel
  - 7<sup>th</sup> Ave Tunnel at Metro Library
  - Runoff through manways – various manholes
  - Seepage at pipe penetrations
- **Corrosion**
  - State Tunnel
  - Main Tunnels
- **Housekeeping**
- **Safety**
- **Action Items**

# 10. Capital Expenditure Update

	<b>Spent to End of FY24</b>	<b>FY25 Spending</b>	<b>Balance to Date (10/23/24)</b>
R&I Projects	\$5,158,425	\$50,049	\$134,875
49116-DES Infrastructure Fund	\$6,461,760	\$237,128	\$4,002,385
<b>Total</b>	<b>\$11,620,185</b>	<b>\$287,177</b>	<b>\$4,137,260</b>

## *Capital Projects Review*

### **Active Capital Projects – General & Marketing**

- DES 163: Peabody Union – working with developer on Guthrie St. impact to DES; restoration of wall completed; fencing coming soon.
- DES 192: Peabody St. Developments – survey of routing down Peabody; DES plan for expansion in area with new customers.
- DES 195: DES Parking Area – on hold pending Guthrie St. mods.
- DES 201: East Bank Development – ongoing development and marketing activities related to the East Bank.
- DES 202: 7<sup>th</sup> and Commerce Hotel – building development moving forward; intends to use DES CHW and STM.
- DES 203: Printer’s and Banker’s Alley Building – building development moving forward; intends to use DES CHW.

## *Capital Projects Review*

### **Active Capital Projects – General & Marketing**

- DES 217: DES Service to Auto Nashville Hotel, LLC (8<sup>th</sup> and Demonbreun)
  - expecting service during construction in mid-2026; 1,300 tons chilled water contract capacity with no steam
- DES 222: EDS Valve Identification and Tagging
  - project established to identify EDS manhole and tunnel valves to assist with maintenance scheduling; manhole and tunnel drawings completed identifying each valve; project will continue with DEAO attaching ID tags to each valve in manholes and tunnels; project will be ongoing until all valves are tagged
- DES 224: EGF Optimization Evaluation
  - review of the EGF by Optimum Energy to identify and quantify energy savings potentials; report expected 2<sup>nd</sup> Qtr FY25

# *Capital Projects Review*

## **Active Capital Projects – Repairs/Modifications**

- DES 213: 4<sup>th</sup>, 7<sup>th</sup> & Broadway Tunnel Piping Slide Support Repairs
  - repair and replacement of pipe slides; bidding anticipated in 2<sup>nd</sup> Qtr FY25
- DES 219: 7<sup>th</sup> Ave Tunnel Shotcrete Extension
  - relocation of Metro Library STM & CND service piping for tunnel repairs and water infiltration mitigation (city water leak); piping relocated during 1<sup>st</sup> Qtr FY25 (48-hr isolation of library); piping insulation repairs to be completed during 2<sup>nd</sup> Qtr FY25; Next step: extend shotcrete down west wall of 7<sup>th</sup> Ave Tunnel to capture and direct incoming water to tunnel floor
- DES 221: War Memorial and Legislative Plaza Renovation
  - State is renovating the two buildings requiring demo of piping and rework of DES meter stations; building offline until late 2024/early 2025
- DES 223: MH 18 Electrical Repairs
  - electrical components in MH 18 need to be replaced due to corrosion; work anticipated to start during 2<sup>nd</sup> Qtr FY25



## *Capital Projects Review*

### **Active Capital Projects – Repairs/Modifications**

- **DES 225: Hot Spot @ 1<sup>st</sup> and Molloy**
  - DEAO monthly thermographic imaging detected hot spot in sidewalk in northwest corner of 1<sup>st</sup> & Molloy intersection (sidewalk surface temp of ~140°F); exploratory excavation revealed groundwater accumulation (underground stream); sump pump manhole needed to alleviate water accumulation; TEG developed design dwgs; cast-in-place underground vault constructed; plumbing and electrical work in process
- **DES 226: State PRV Replacement**
  - Existing actuator faulty; replacement PRV purchased and to be installed 2<sup>nd</sup> Qtr FY25
- **DES 227: Manhole 16 Condensate Piping Repair**
  - Existing CND service piping corroded; replacing with high temp hose; anticipate completion during 2<sup>nd</sup> Qtr FY25

## *Capital Projects Review*

### **Active Capital Projects – Repairs/Modifications**

- **DES 228: Manhole B2 and B3 Dripleg Modifications**
  - Existing driplegs close to manhole floor; groundwater accumulation causing corrosion on drain piping; driplegs to be “shortened” to raise drain piping; Manhole B3 was modified during partial isolation to repair steam leak in Hyatt Place; Manhole B2 to be addressed during planned system outage in spring ‘25

# *12. System Operator Update*

*By System Operator's Service Manager*



*DE Asset Operations, LLC*

## *13. Special Topics*

- ❖ CES System Operating Agreement Amendment 3 began July 1 and extends terms to end of FY28

# *14. Other Board Member Items*

# *15. Adjourn*

- *Advisory Board Meeting Schedule*
- FY25 – 2<sup>nd</sup> Quarter Meeting – February 20, 2025
- FY25 – 3<sup>rd</sup> Quarter Meeting – May 15, 2025
- FY25 – 4<sup>th</sup> Quarter Meeting – August 21, 2025
- FY26 – 1<sup>st</sup> Quarter Meeting – November 20, 2025