



Metro Nashville
DISTRICT ENERGY SYSTEM

DES Advisory Board Meeting
Second Quarter FY25
February 20, 2025



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*

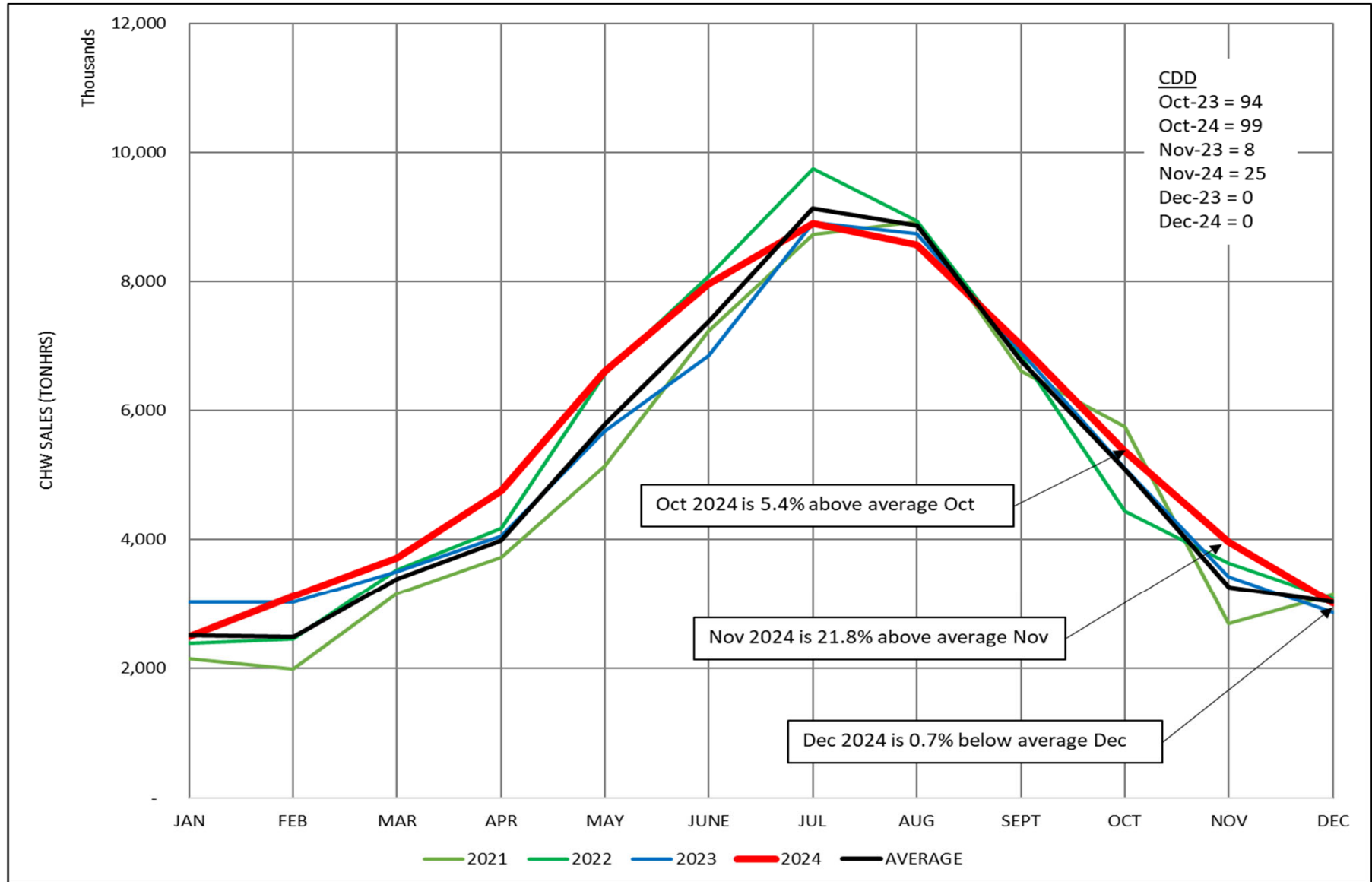
- ❖ There is 1 customer in arrears more than 30 days
- ❖ Table 4: Customer Cost Comparison for the Previous 12 Months
- ❖ Figure 4A: Historic Chilled Water Sales
- ❖ Figure 4B: Historic Steam Sales

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

		Steam - Rolling 12 Month			Chilled Water - Rolling 12 Month		
		Jan 2023-Dec 2023	Jan 2024-Dec 2024	% Diff.	Jan 2023-Dec 2023	Jan 2024-Dec 2024	% Diff.
Private	Cost	\$ 1,670,285	\$ 1,628,688	-2.49%	\$ 4,516,096	\$ 4,557,002	0.91%
	Usage (lbs or tonhrs)	91,099,494	93,290,523	2.41%	22,030,541	22,870,224	3.81%
State	Cost	\$ 2,115,188	\$ 2,015,002	-4.74%	\$ 3,524,600	\$ 3,494,206	-0.86%
	Usage (lbs or tonhrs)	105,943,615	104,883,323	-1.00%	13,612,493	13,091,551	-3.83%
Metro	Cost	\$ 2,057,412	\$ 2,020,395	-1.80%	\$ 5,067,723	\$ 5,330,261	5.18%
	Usage (lbs or tonhrs)	128,835,363	136,961,938	6.31%	26,366,995	29,446,197	11.68%
Aggregate	Cost	\$ 5,842,885	\$ 5,664,085	-3.06%	\$13,108,419	\$13,381,469	2.08%
	Usage (lbs or tonhrs)	325,878,472	335,135,784	2.84%	62,010,029	65,407,972	5.48%
	Unit Cost	\$ 17.93	\$ 16.90	-5.7%	\$ 0.211	\$ 0.205	-3.22%

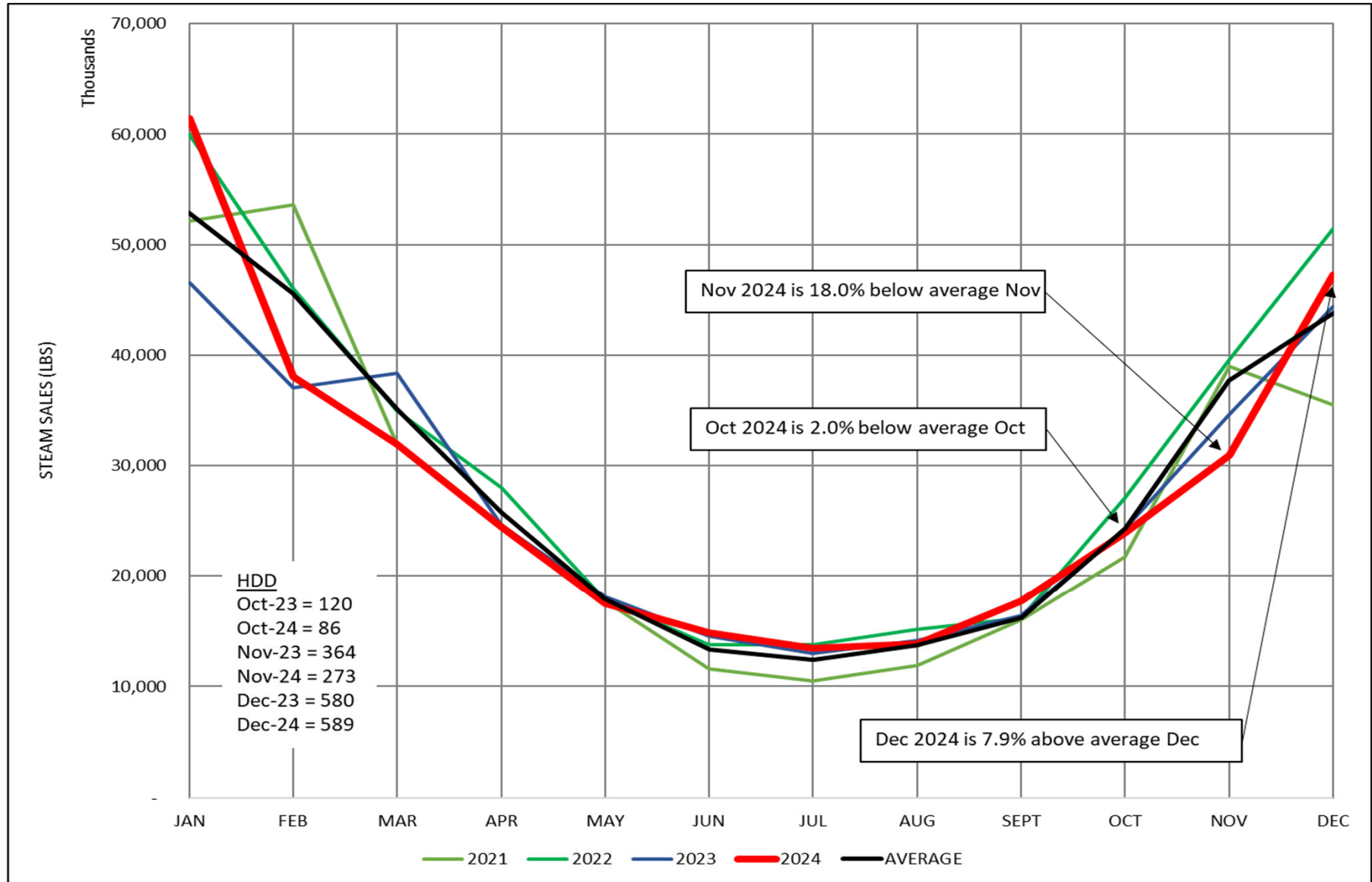
MFA, True-up, late fees and misc. are not included in values shown

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

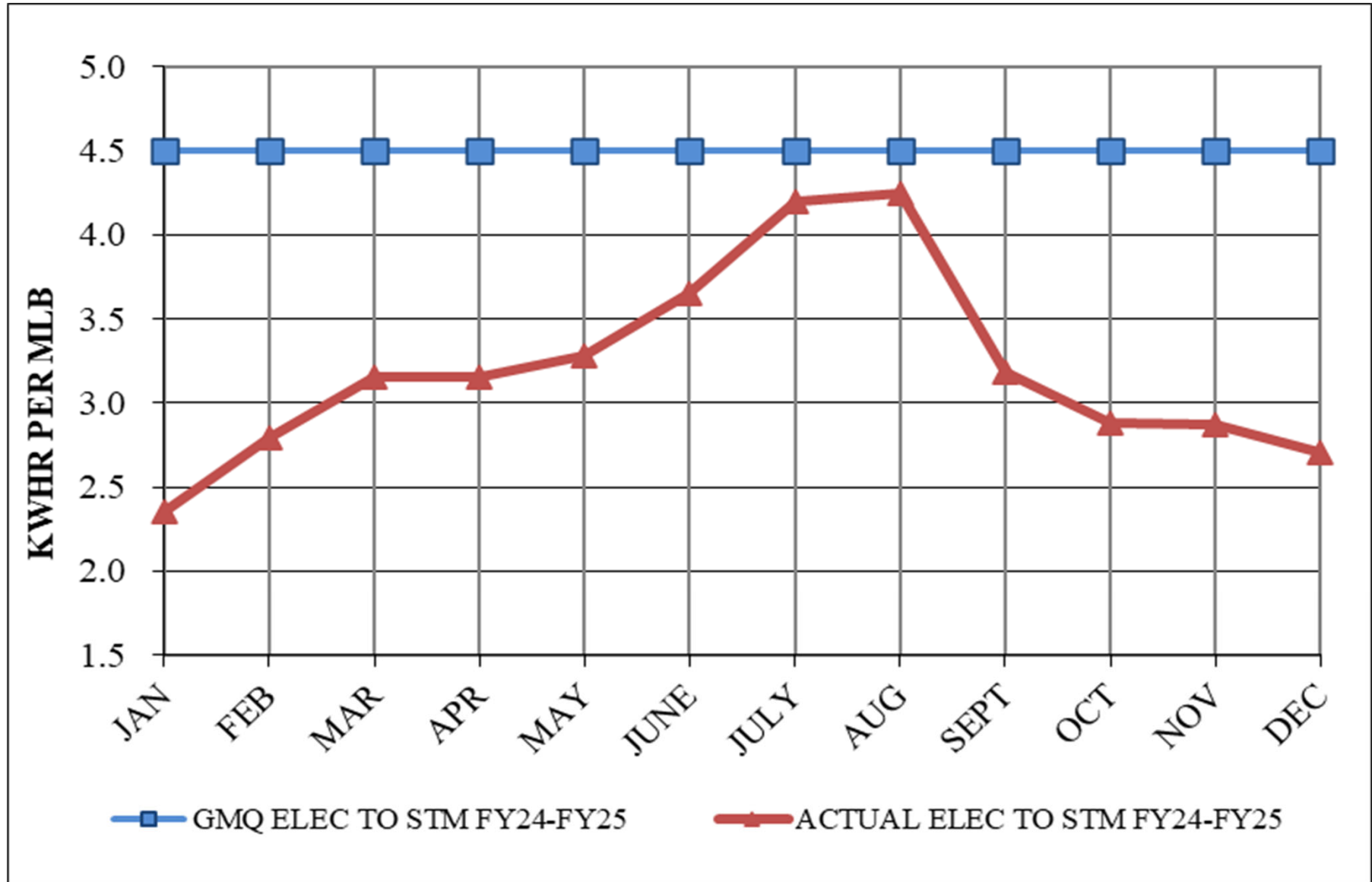
Marketing (con't)

- New Developments North of KVB
 - Printer's and Banker's Alley (DES203)
 - Development moving forward; design includes chilled water
 - 333 Union
 - Small hotel development; current design includes chilled water
 - 7th and Commerce (DES202)
 - Development moving forward; current design includes steam and chilled water

6. Review of DES Contractor Performance

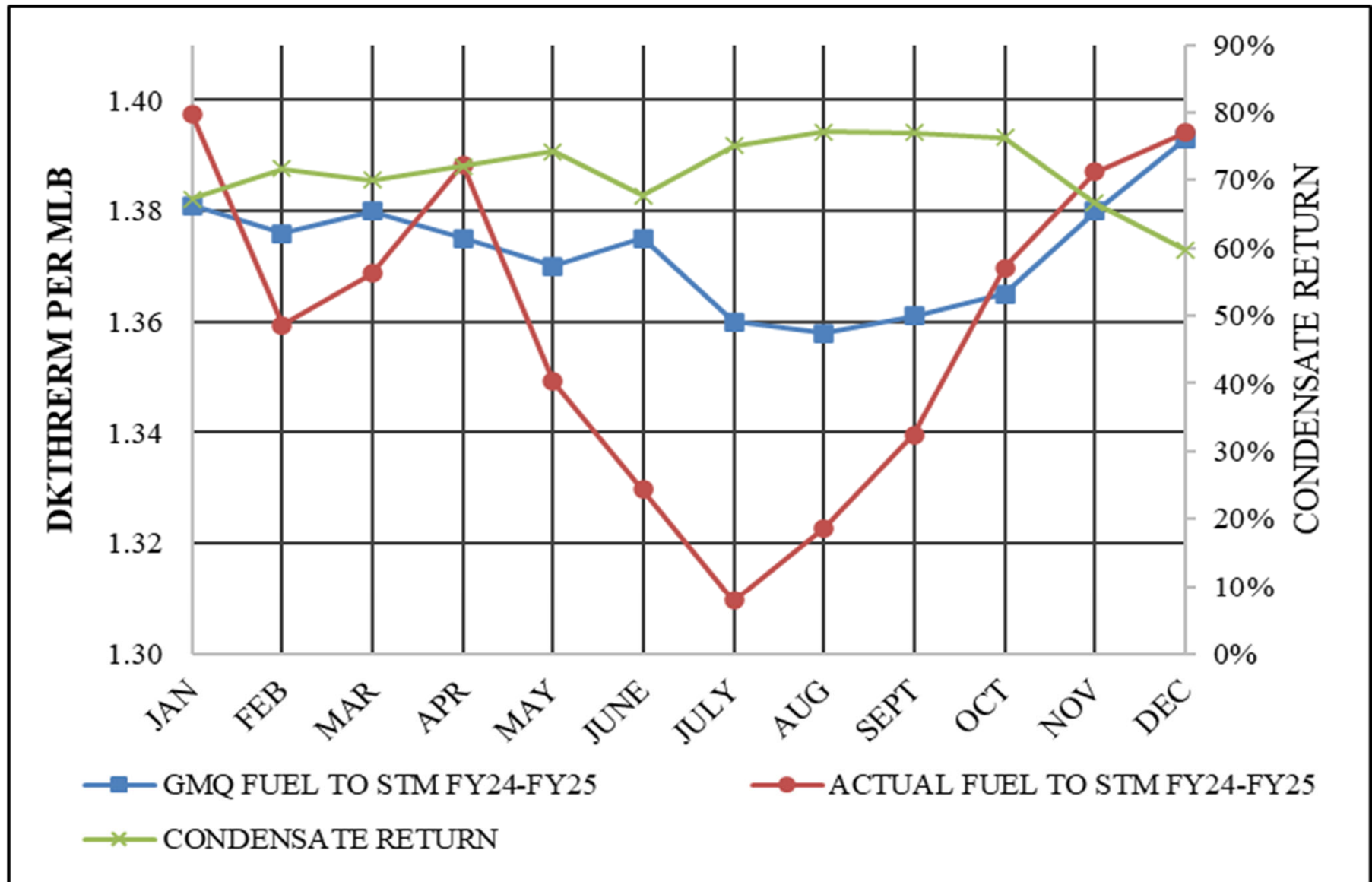
DEAO has made improvements in FY25 and has met several of the performance metrics for Q2. DEAO continues to address the system energy usage.

Performance Measurement FY25: Steam Electric



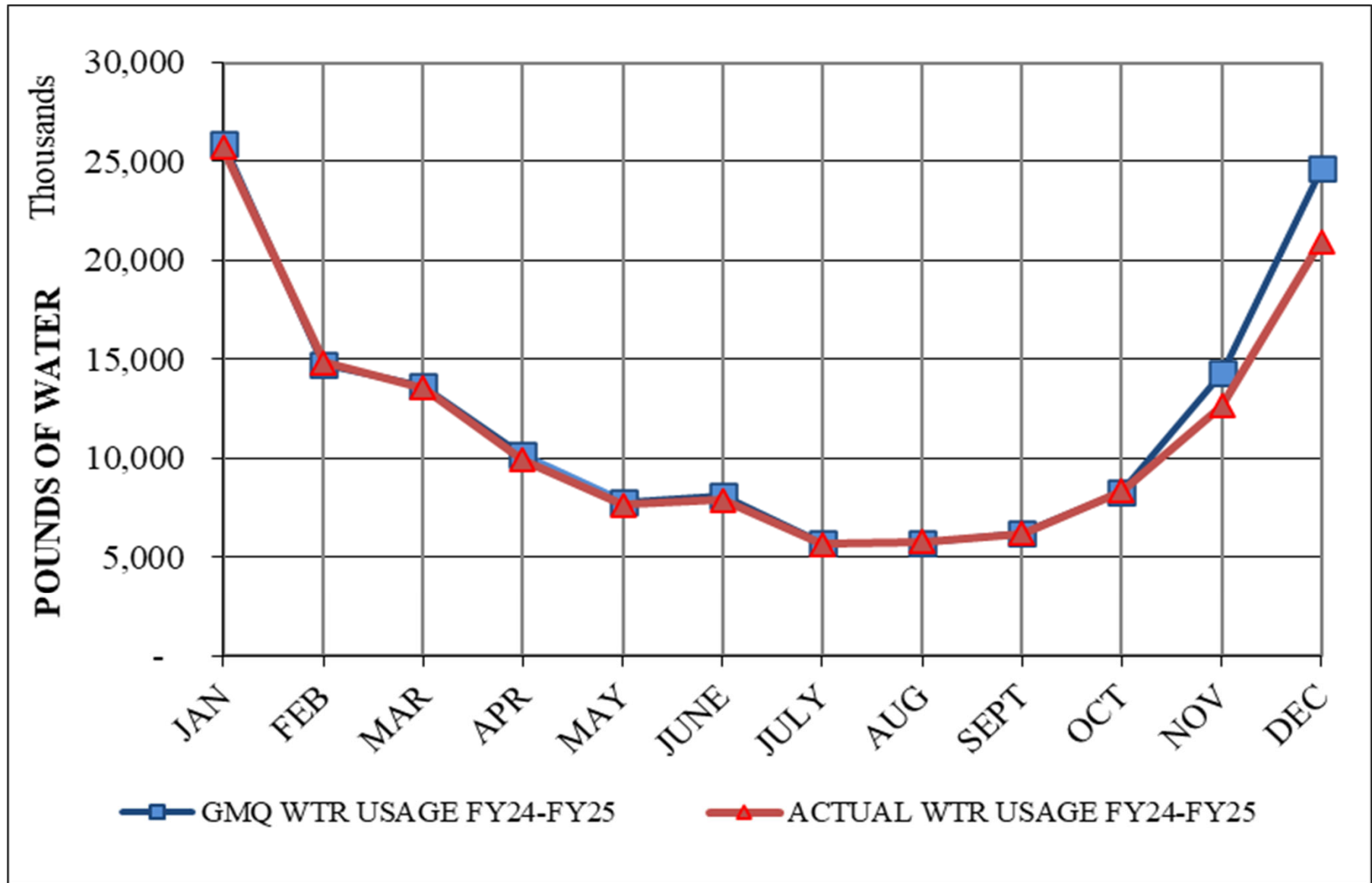
GMQ met in all months shown.

Performance Measurement FY25: Steam Plant Eff



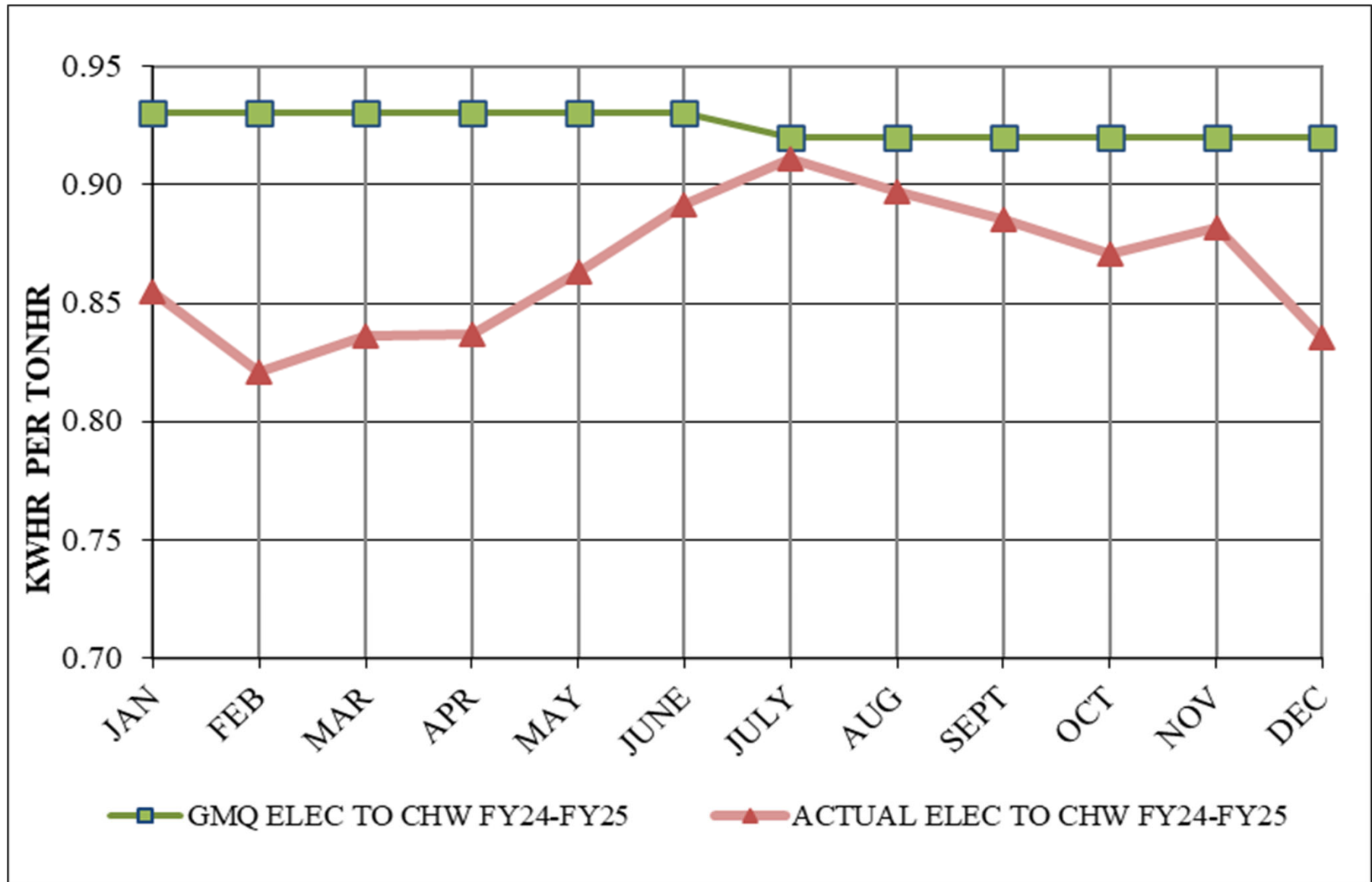
GMQ met Feb, Mar, May, June, July, Aug, and Sept.

Performance Measurement FY25: Steam Water



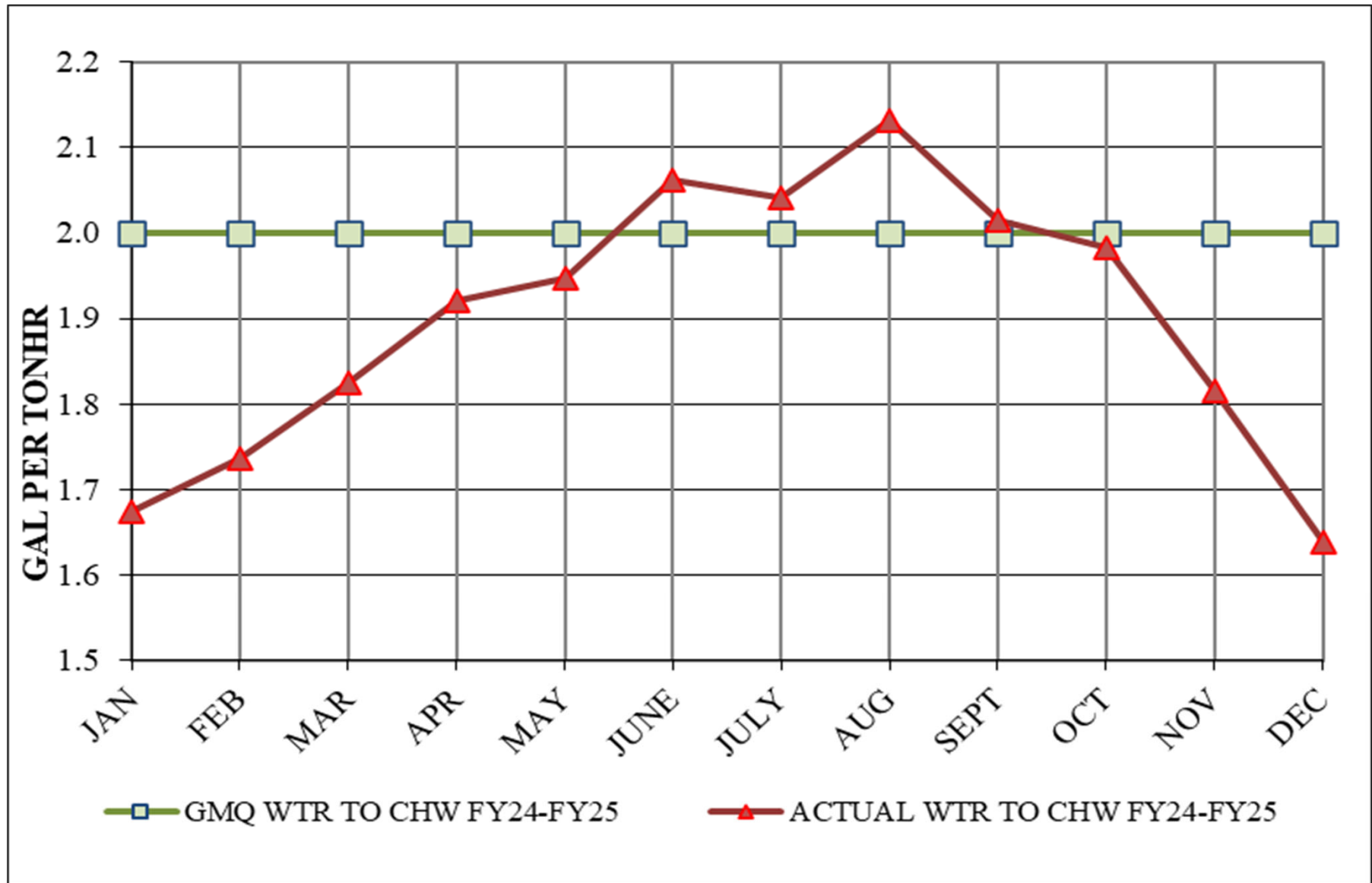
Graph shows historic data converted to pounds. GMQ met in July, Sept, Nov, and Dec.

Performance Measurement FY25: CHW Electric



GMQ met in all months shown.

Performance Measurement FY25: CHW Water



GMQ met Jan, Feb, Mar, Apr, May, Oct, Nov, and Dec.

Water Treatment

❖ Steam and Condensate

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

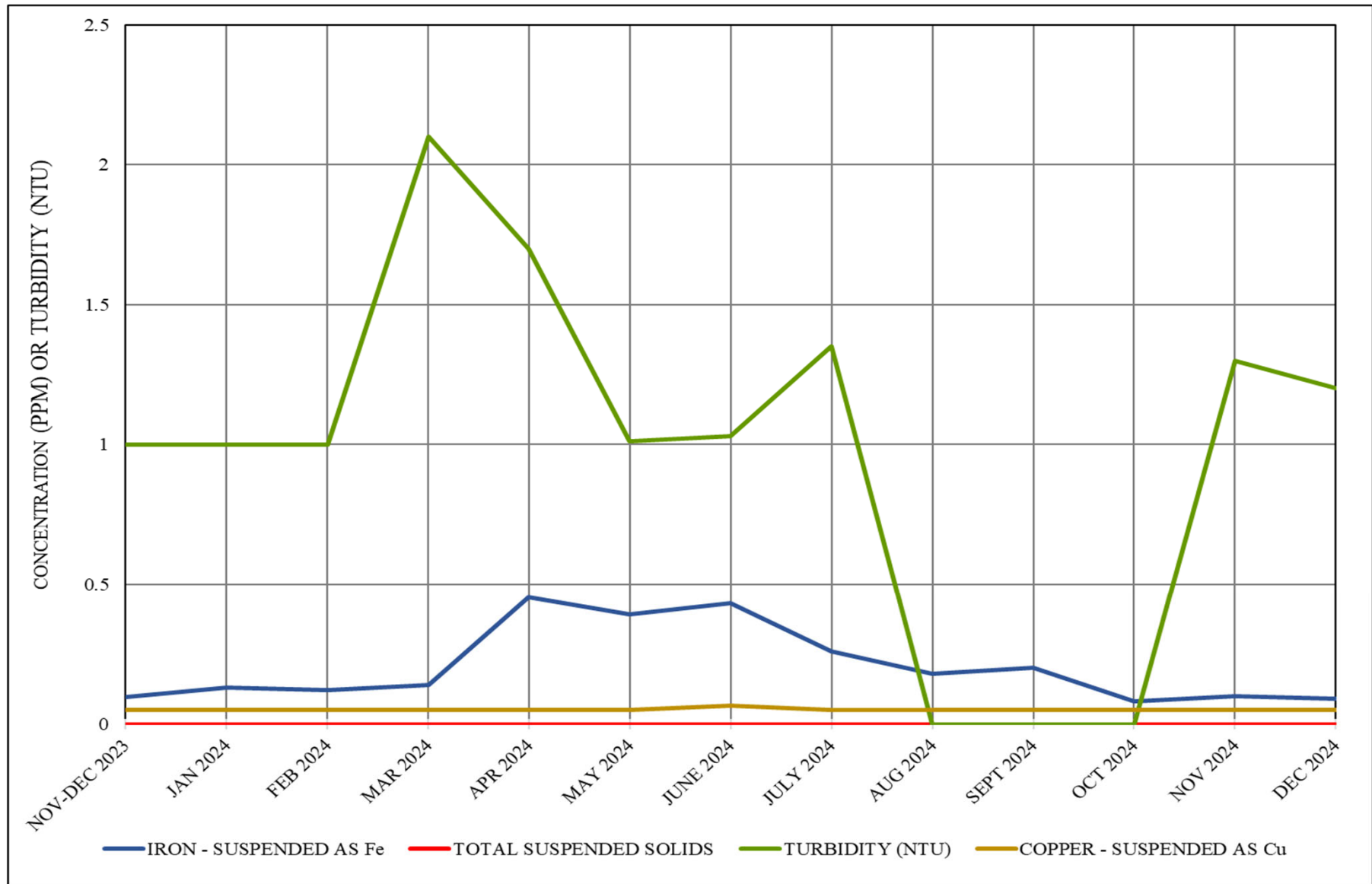
❖ Condensing Water

- ❖ Conductivity
- ❖ Biologicals

❖ 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

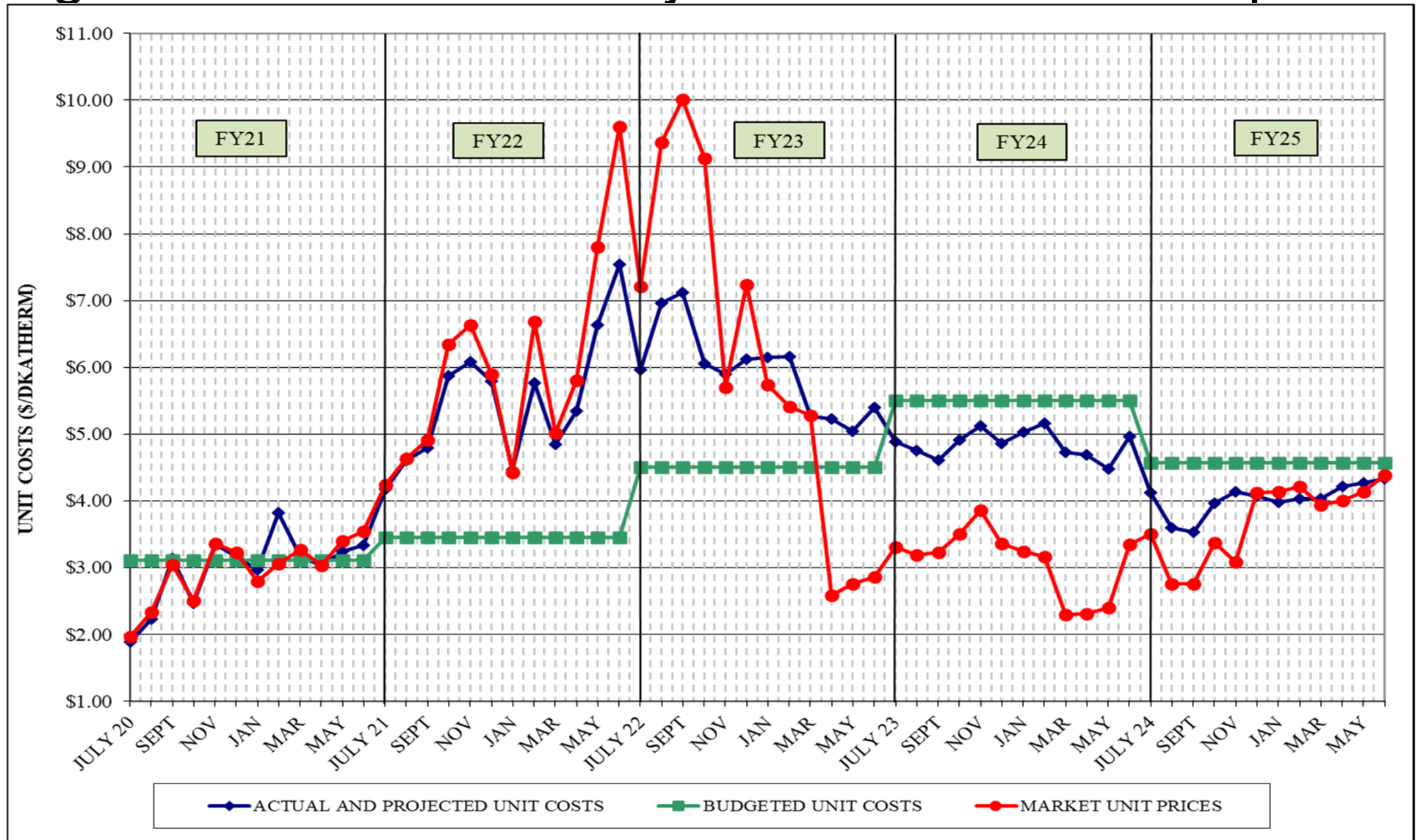
- ❖ Natural Gas Purchasing Review
 - ❖ Table 7: FY25 Gas Spending & Budget Comparison
 - ❖ Figure 7: Actual and Projected Fuel Cost Comparison

Table 7: FY25 Gas Spending & Budget Comparison

	Actual FY25 To Dec 31	Budget FY25	Percent Difference
Steam Sendout (Mlbs)	178,668	219,471	-18.6%
Fuel Use (Dth) (includes propane)	243,761	314,502	-22.5%
Plant Eff (Dth/Mlb)	1.364	1.433	-4.8%
Total Gas Cost (includes propane)	\$962,120	\$1,439,160	-33.1%
Unit Cost of Fuel (\$/Dth)	\$3.947	\$4.576	-13.7%

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 60% to 80% on natural gas through end of 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	\$ 2,125,417	50.00%
Pass Throughs				
Administrative Costs	\$ 638,300	\$ 752,500	\$ 333,648	44.34%
Chemicals	\$ 331,200	\$ 379,300	\$ 156,556	41.27%
R&I Fund Transfers	\$ 312,900	\$ 322,200	\$ 187,950	58.33%
Water/Sewer	\$ 1,152,000	\$ 1,187,300	\$ 619,900	52.21%
Fuel Base	\$ 3,422,700	\$ 2,631,171	\$ 1,108,758	42.14%
Fuel Contingency	\$ 764,200	\$ 795,729	\$ -	0.00%
Electricity	\$ 6,476,700	\$ 6,801,900	\$ 3,190,019	46.90%
ORF Deposit	\$ 188,200	\$ -	\$ -	0.00%
Debt Service	\$ 4,774,000	\$ 5,385,300	\$ 2,707,084	50.27%
Total Expenses	\$ 22,187,200	\$ 22,506,200	\$ 10,429,332	46.34%
Total Revenues	\$ 21,802,800	\$ 22,121,200	\$ 10,302,214	46.57%
Metro Funding	\$ 384,400	\$ 385,000	\$ 192,500	50.00%

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%
Total Expenses	\$ 22,187,200	\$ 22,506,200	1.44%
Total Revenues	\$ 21,802,800	\$ 22,121,200	1.46%
Metro Funding	\$ 384,400	\$ 385,000	0.16%

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 – Third party inspection/review in 3rd Qtr
 - Pipe insulation
- Operations
- Electrical
- Housekeeping
- Building Structure
- Building Exterior and Grounds

EDS Walkthroughs

- **Piping**
 - Valve replacements being evaluated
 - 1st & Molloy hot spot repair substantially complete
 - CND leaks discovered
- **Insulation**
 - Capital Project for various manhole repairs
 - Tunnels
- **Water Infiltration**
 - Manhole 15/north end of 4th Ave Tunnel – CND leak (DES 233)
 - 7th Ave Tunnel at Metro Library (DES 219) substantially complete
 - Runoff through manways – various manholes
 - Seepage at pipe penetrations
- **Corrosion**
 - State Tunnel
 - Main Tunnels
- **Housekeeping**
- **Safety**
- **Action Items**
 - Several repeat items

10. *Capital Expenditure Update*

	Spent to End of FY24	FY25 Spending	Balance to Date (01/24/25)
R&I Projects	\$5,158,425	\$78,304	\$187,170
49116-DES Infrastructure Fund	\$6,461,760	\$504,297	\$3,735,216
Total	\$11,620,185	\$582,601	\$3,922,386

Capital Projects Review

Active Capital Projects – General & Marketing

- DES 163: Peabody Union
 - Working with developer on Guthrie St. impact to DES; fence installation is ongoing.
- DES 192: Peabody St. Developments
 - Expansion of services along Peabody corridor.
- DES 195: DES Parking Area
 - On hold pending Guthrie St. mods.
- DES 201: East Bank Development
 - Ongoing activities in coordination with the Metro East Bank staff.
- DES 202: 7th and Commerce Hotel
 - Value engineering stage; 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 (8th 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
 - Draft of Optimum Energy report issued 3rd Qtr FY25

Capital Projects Review

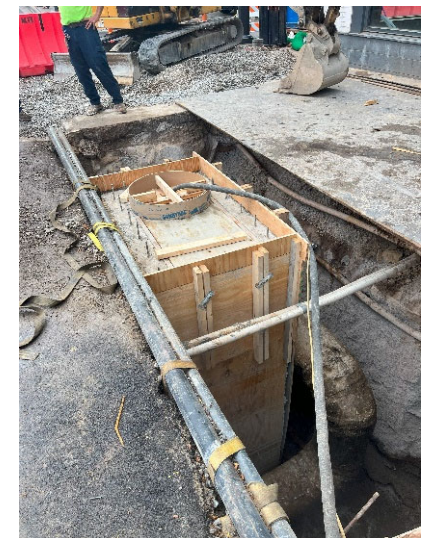
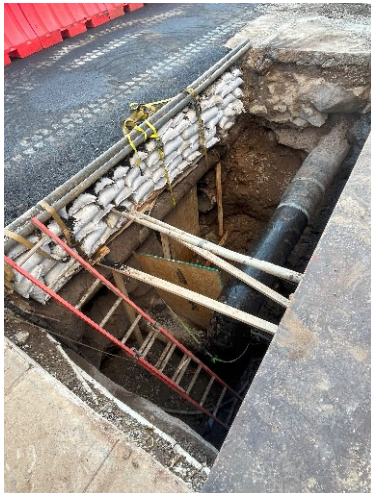
Active Capital Projects – Repairs/Modifications

- DES 213: 4th, 7th & Broadway Tunnel Piping Slide Support Repairs
 - Repair and replacement of pipe slides; bidding anticipated in 2nd or 3rd Qtr FY25
- DES 219: 7th 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 1st Qtr FY25 (48-hr isolation of Library); piping insulation repairs and shotcrete extension completed during 2nd Qtr FY25; project billing in process
- 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; DEAO completed temporary electrical during 2nd Qtr FY25; awaiting delivery of permanent electrical components to begin work

Capital Projects Review

Active Capital Projects – Repairs/Modifications

- DES 225: Hot Spot @ 1st and Molloy
 - DEAO monthly thermographic imaging detected hot spot in sidewalk in northwest corner of 1st & Molloy intersection (sidewalk surface temp of ~140°F); exploratory excavation revealed groundwater accumulation (underground stream); sump pump manhole installed to alleviate water accumulation; plumbing and electrical work completed during 2nd Qtr FY25; awaiting paving repair



Capital Projects Review

Active Capital Projects – Repairs/Modifications

- DES 226: State PRV Replacement
 - Replacement PRV to be installed 3rd Qtr FY25
- DES 227: Manhole 16 Condensate Piping Repair
 - Existing CND service piping corroded; replaced with high temp hose; re-insulation delayed due to interference with DES 232
- DES 228: Manhole B2 and B3 Dripleg Modifications
 - Existing driplegs close to manhole floors; 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/summer 2025

Capital Projects Review

Active Capital Projects – Repairs/Modifications

- DES 229: Misc Manhole Insulation Repairs
 - Addresses various manhole insulation needs from quarterly reviews; completion expected during 4th Qtr FY25
- DES 230: Manhole 6A Investigation
 - Manhole 6A consists of two separate manholes (steam/condensate and CHW) for Hermitage Hotel service piping valves; steam valve is inoperable
 - Manhole 6 and Manhole 23 can provide isolation for hotel; however, Manhole 6 CND valve needs replacement due to corrosion.
 - Valves exist inside hotel, but accessibility is problem.
 - Investigating need for Manhole 6A.

Capital Projects Review

Active Capital Projects – Repairs/Modifications

- DES 231: Tennessee Tower Service Piping Relocation
 - State unknowingly placed emergency generator “on top of” DES service piping; project involves relocation of a portion of these lines; project execution late summer/early fall
- DES 232: 4th Avenue Tunnel Water Infiltration Remediation
 - DES 227 exposed areas of Manhole 16 vertical shaft which could not be shotcreted during 2017 project to control groundwater infiltration;
 - Project also addresses shotcrete needs in 4th Avenue Tunnel;
 - Work scheduled to be completed during 3rd Qtr FY25
- DES 233: Manhole 12 to Manhole 15 Hot Spot Repair
 - Water infiltration increased significantly in Manhole 15 during 2nd Qtr FY25
 - Thermographic review revealed hot spot near Manhole 15
 - Excavation occurred during 2nd Qtr FY25 which revealed CND leak
 - Repair underway; anticipated completion during 3rd Quarter FY25

Capital Projects Review

Active Capital Projects – Repairs/Modifications

- DES 234: Manholes 9 and 18 Repairs
 - Manhole 9: groundwater seepage around piping penetrations
 - Manhole 18: corrosion cleaning and coating of structural beam
 - Work began during 2nd Qtr FY25; anticipate completion during 3rd Qtr FY25

12. System Operator Update

By System Operator's Service Manager



DE Asset Operations, LLC

13. Special Topics

- ❖ Draft of Optimum Energy's report completed; currently under Metro's review

14. Other Board Member Items

15. Adjourn

- *Advisory Board Meeting Schedule*
- FY25 – 3rd Quarter Meeting – May 15, 2025
- FY25 – 4th Quarter Meeting – August 21, 2025
- FY26 – 1st Quarter Meeting – November 20, 2025
- FY26 – 2nd Quarter Meeting – February 19, 2026