



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

*DES Advisory Board Meeting*  
*First Quarter FY23*  
*November 17, 2022*



# *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 Update
6. FY23 Costs to Date and Budget
7. Marketing
8. Capital Projects Review & Status
9. Energy Savings Plan
10. Other Board Member Items
11. Adjourn



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

## 3. *Customer Sales*

- ❖ There are 0 customers in arrears more than 30 days
- ❖ Table 3: Customer Cost Comparison for the Previous 12 Months
- ❖ Figure 3A: Historic Chilled Water Sales
- ❖ Figure 3B: Historic Steam Sales

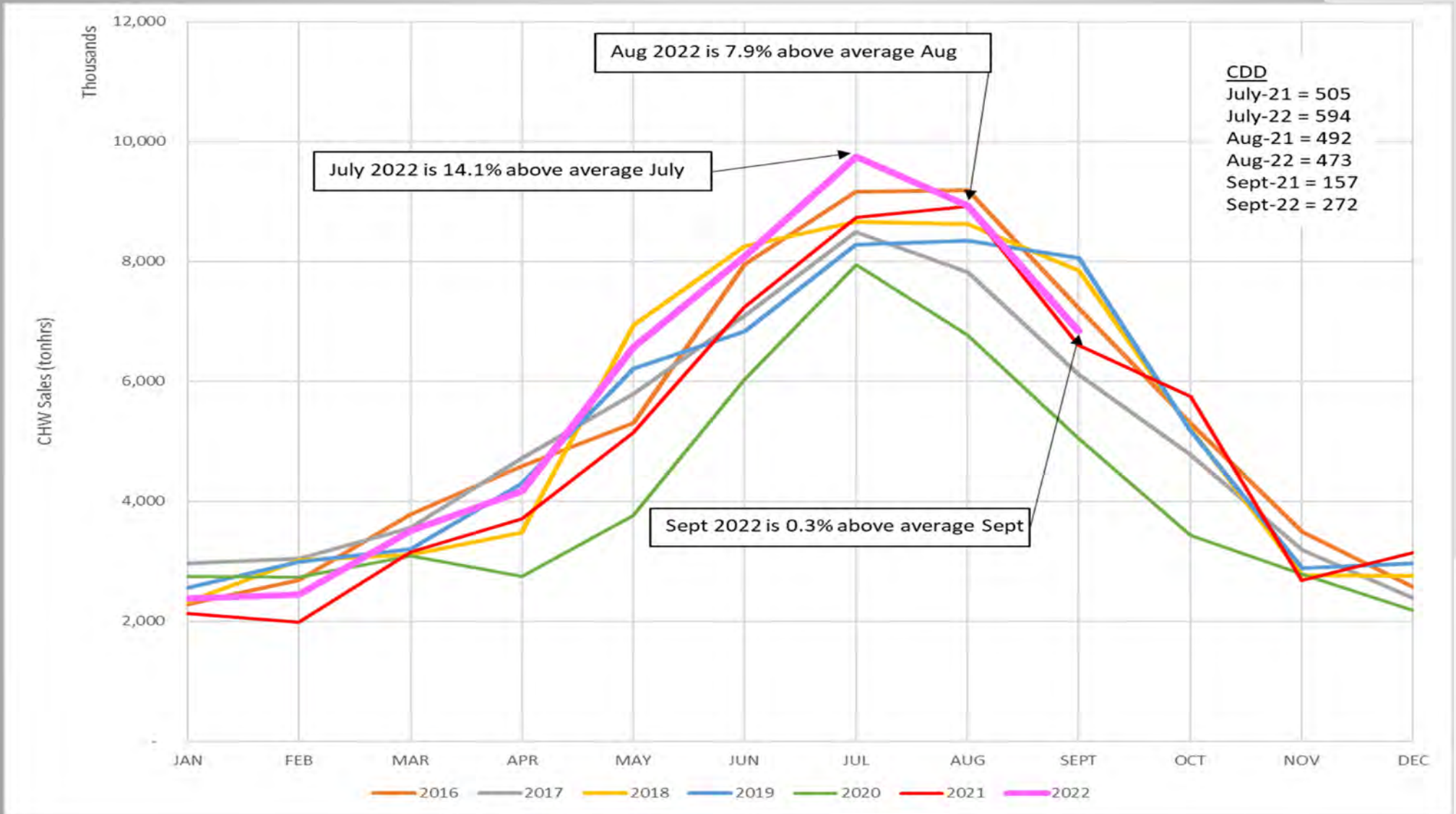
## Summary Table 3: Customer Cost Comparison for the Previous 12 Months

		Steam - Rolling 12 Month			Chilled Water - Rolling 12 Month		
		Oct 2020- Sept 2021	Oct 2021- Sept 2022	% Diff.	Oct 2020- Sept 2021	Oct 2021- Sept 2022	% Diff.
<b>Private</b>	Cost	\$ 1,330,840	\$ 1,733,552	30.26%	\$ 3,867,021	\$ 4,497,864	16.31%
	Usage (lbs or tonhrs)	85,100,994	93,832,584	10.26%	19,737,760	23,382,999	18.47%
<b>State</b>	Cost	\$ 1,800,911	\$ 2,182,984	21.22%	\$ 3,277,227	\$ 3,465,403	5.74%
	Usage (lbs or tonhrs)	112,665,296	108,845,815	-3.39%	13,402,819	14,053,007	4.85%
<b>Metro</b>	Cost	\$ 1,673,236	\$ 2,235,496	33.60%	\$ 4,382,443	\$ 5,047,744	15.18%
	Usage (lbs or tonhrs)	131,247,412	138,946,799	5.87%	23,158,627	26,815,947	15.79%
<b>Aggregate</b>	Cost	\$ 4,804,987	\$ 6,152,032	28.03%	\$11,526,691	\$13,011,011	12.88%
	Usage (lbs or tonhrs)	329,013,702	341,625,198	3.83%	56,299,206	64,251,953	14.13%
	Unit Cost	\$ 14.60	\$ 18.01	23.3%	\$ 0.205	\$ 0.202	-1.09%

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

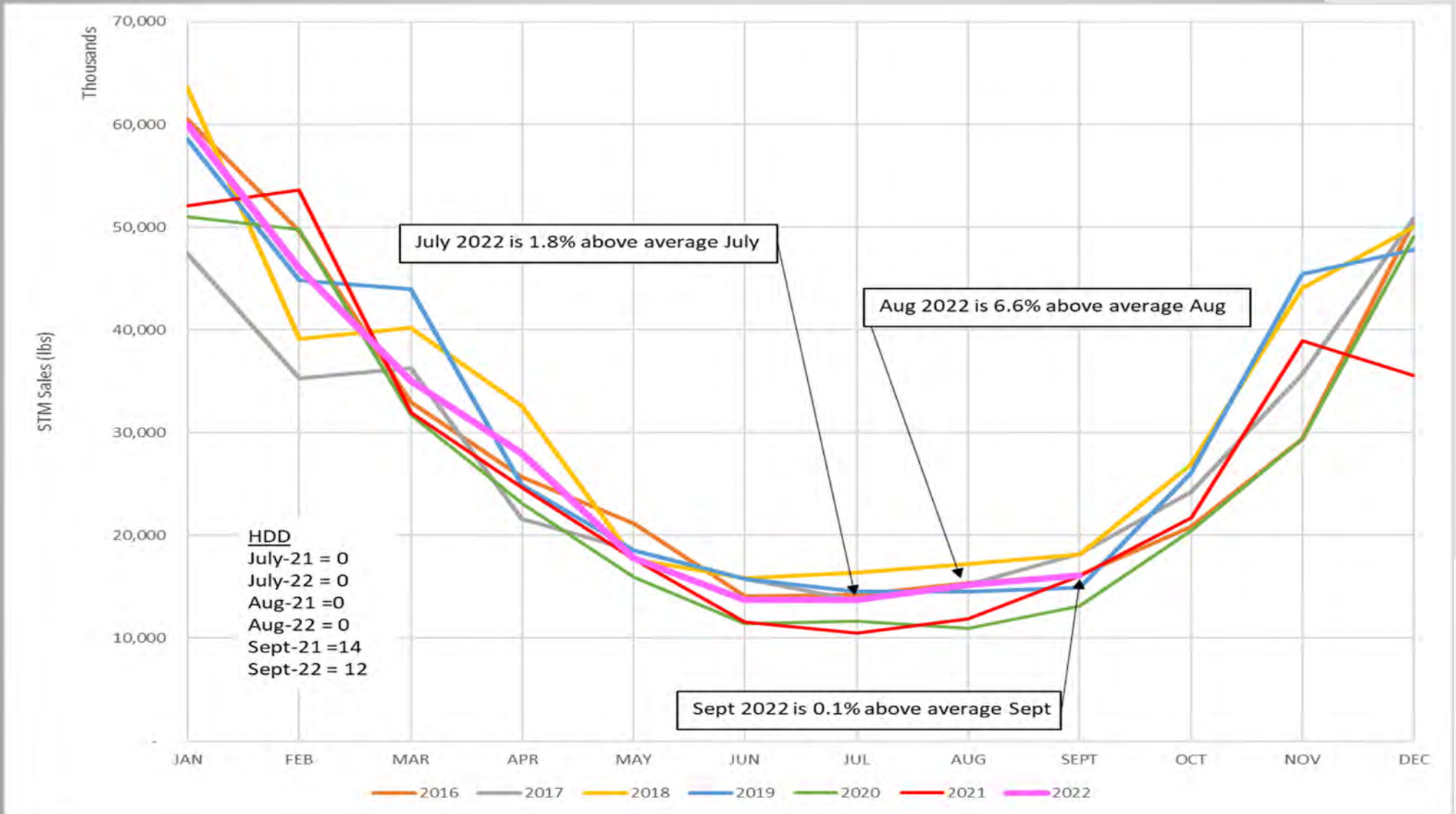


# Figure 3A. Historic Chilled Water Sales



Averages include the years 2016, 2017, 2018, 2019, 2020 and 2021.

# Figure 3B. Historic Steam Sales






Averages include the years 2016, 2017, 2018, 2019, 2020 and 2021.

## 4. *Review of DES Contractor Performance*

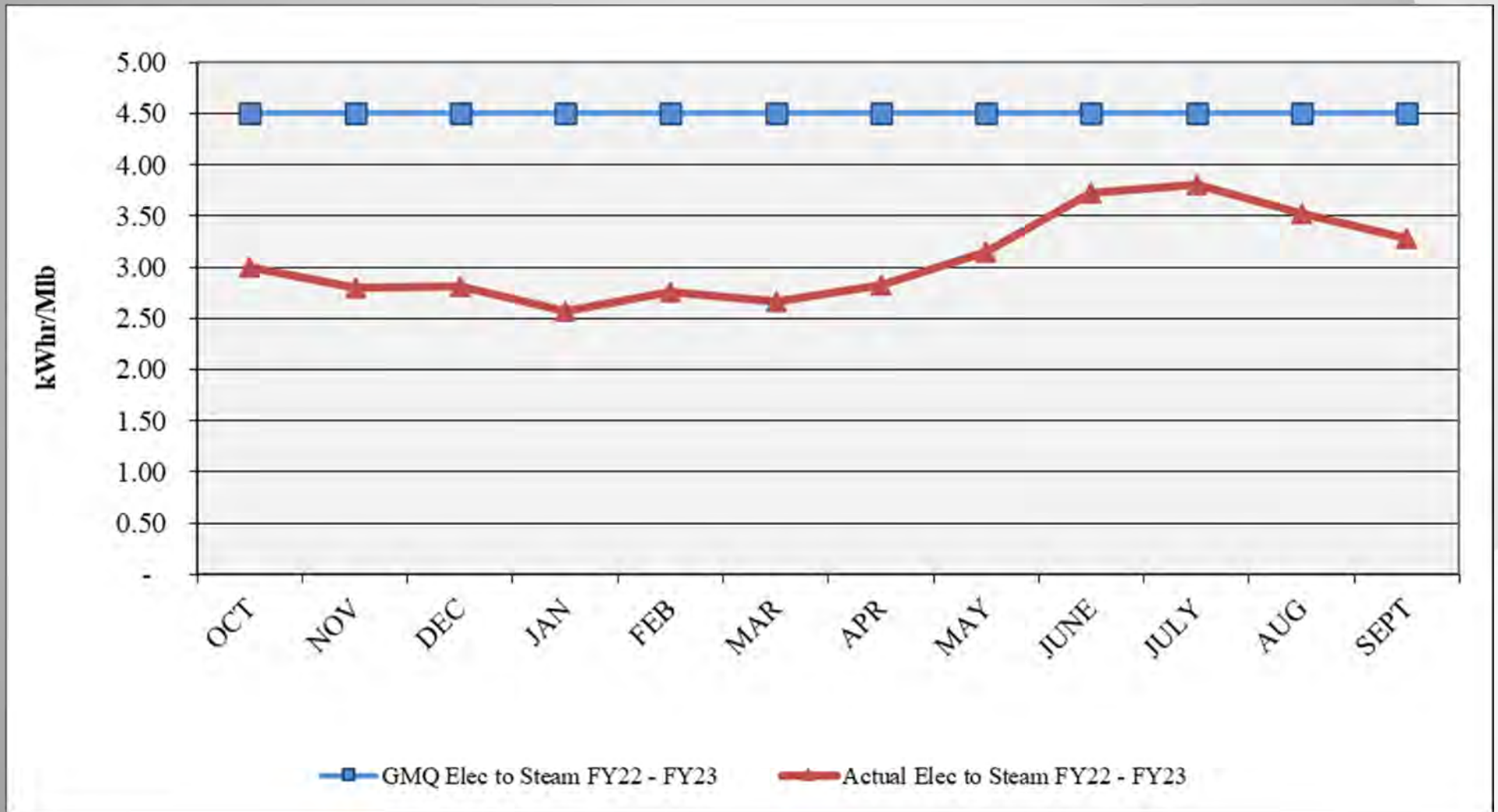
Contractor (CES) has failed to meet all the new performance guarantees during the 1<sup>st</sup> Quarter FY23 and for all of FY22 and FY21. CES is developing plan to address the failure to meet the new performance guarantees. (Q1 FEA = \$25,444)

CES has several long-term, outstanding maintenance items in EDS tunnels that need to be addressed.

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

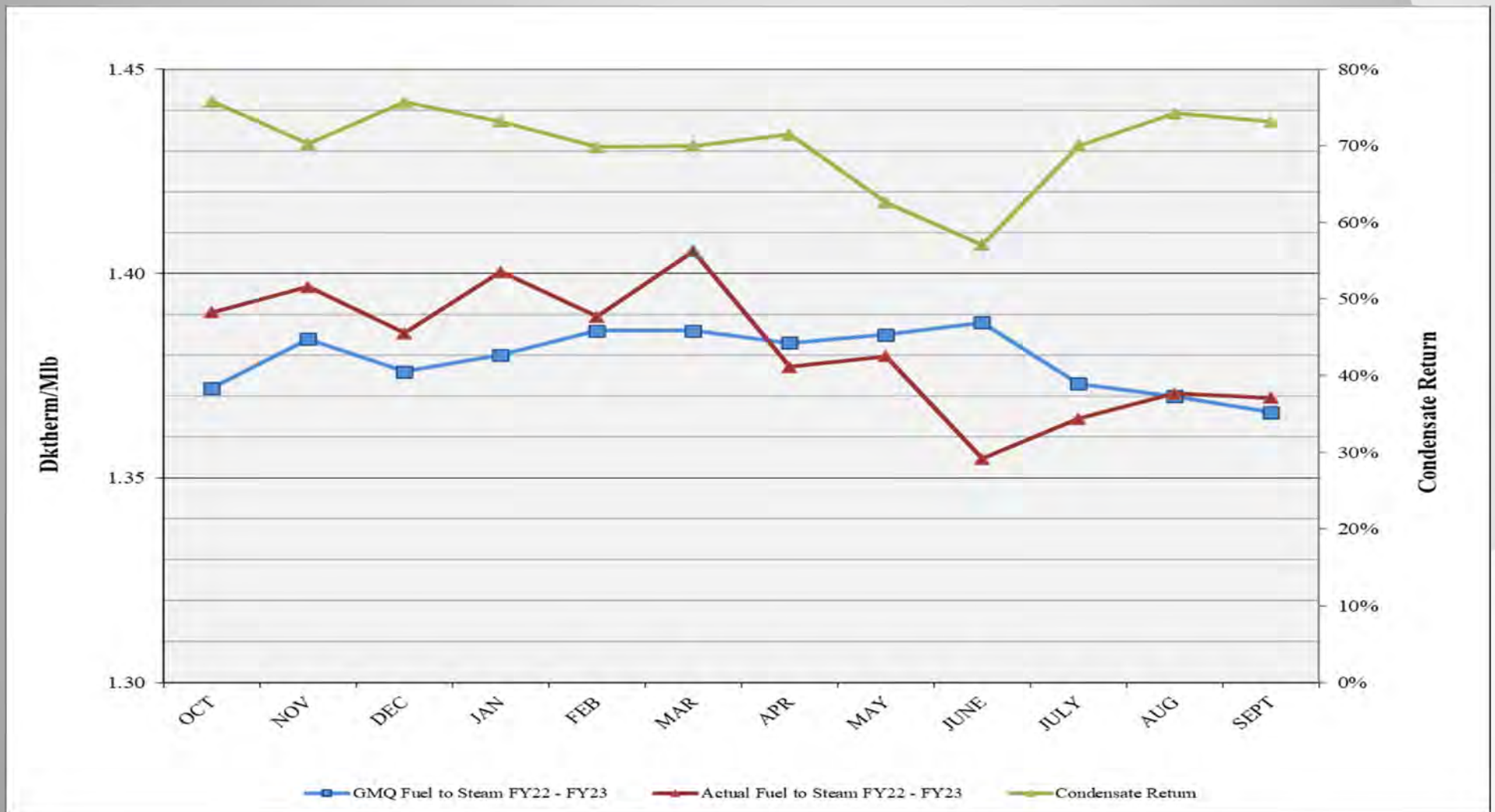


# Performance Measurement FY23: Steam Electric Conversion ●



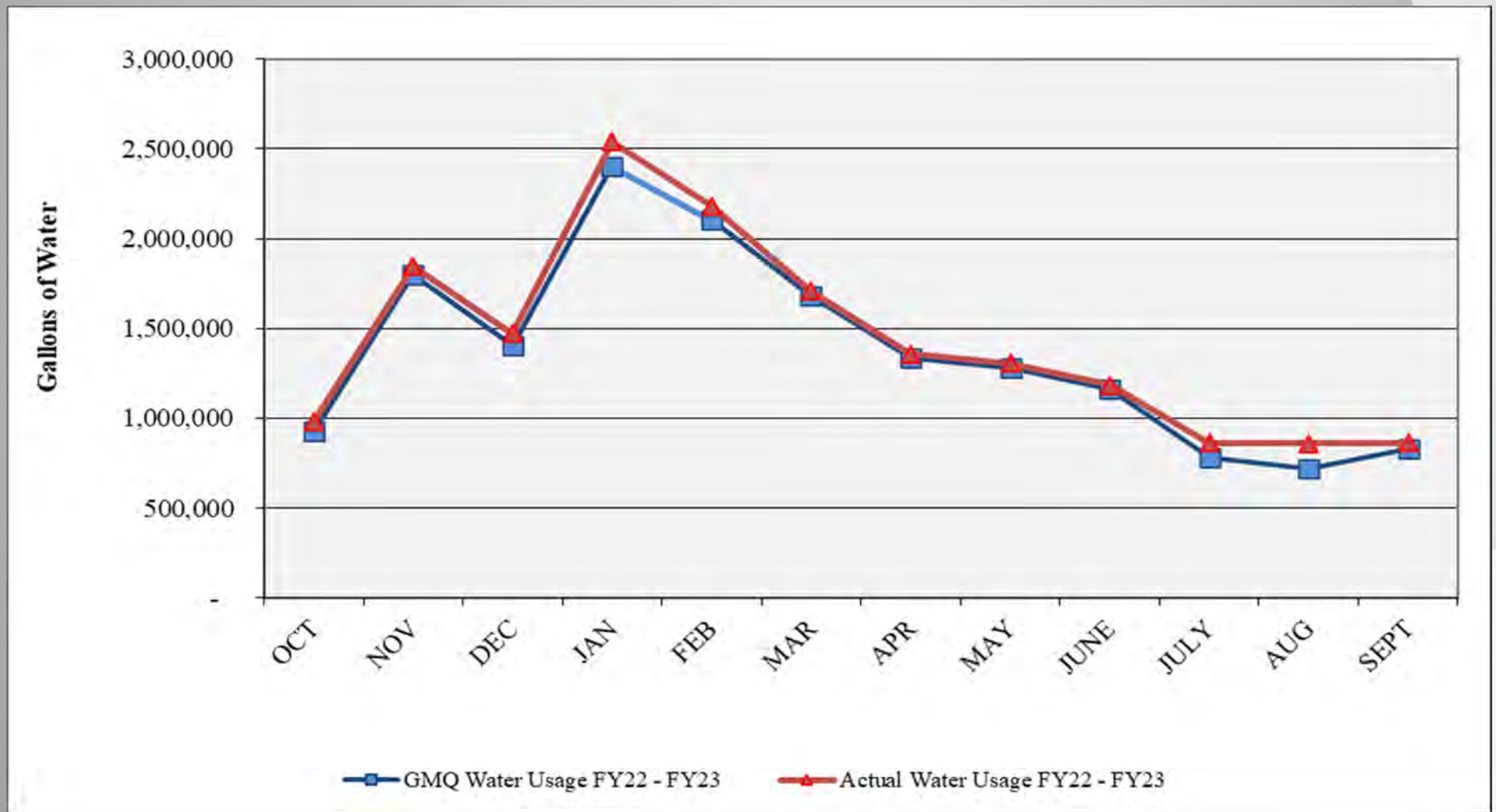
# Performance Measurement FY23: Steam Plant Efficiency

● +



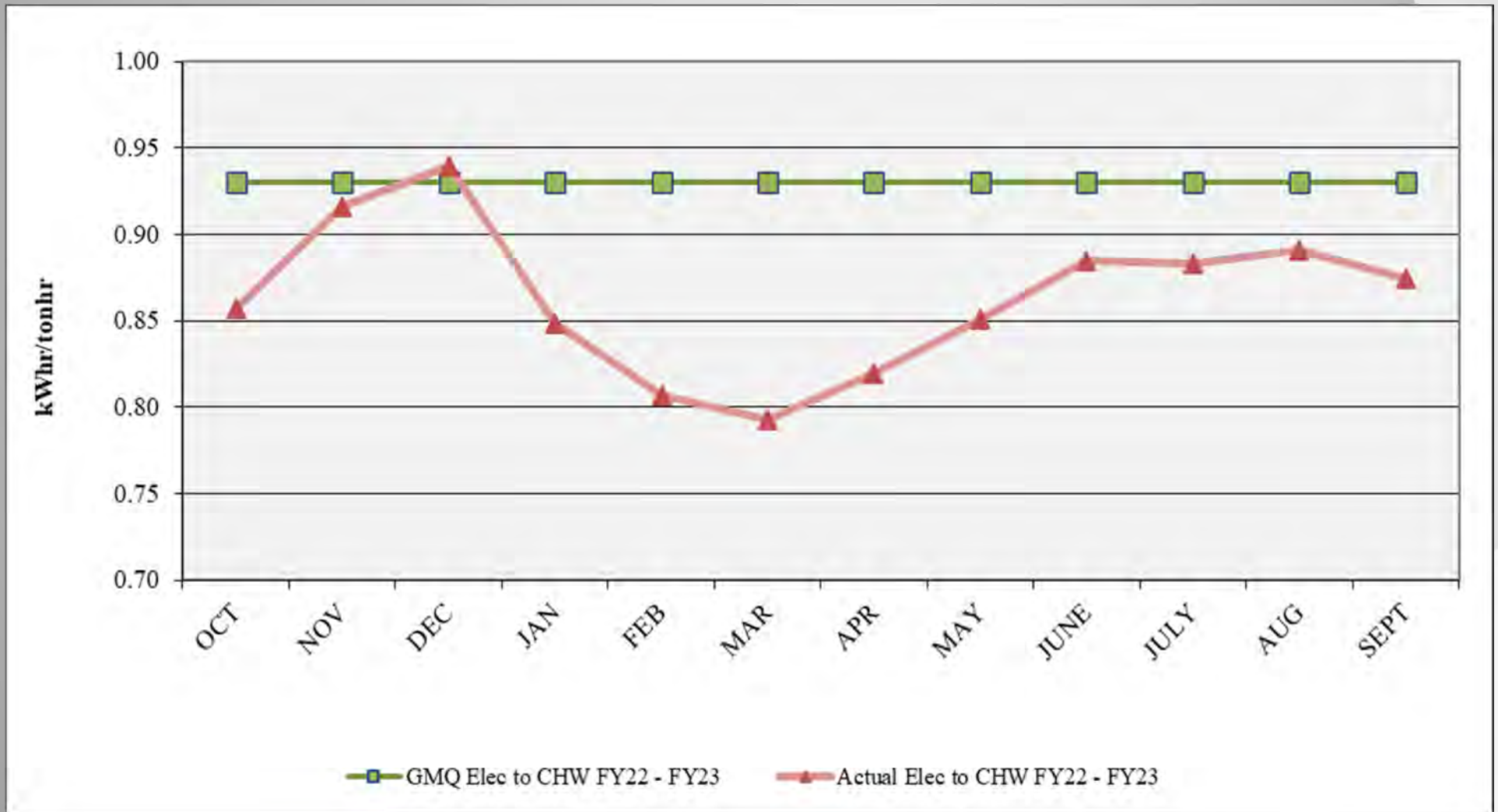
GMQ exceeded in Oct, Nov, Dec, Jan, Feb, Mar, Aug, and Sept.

# Performance Measurement FY23: Steam Water Conversion ●



GMQ exceeded in all months of FY22 and FY23 except July 2021.

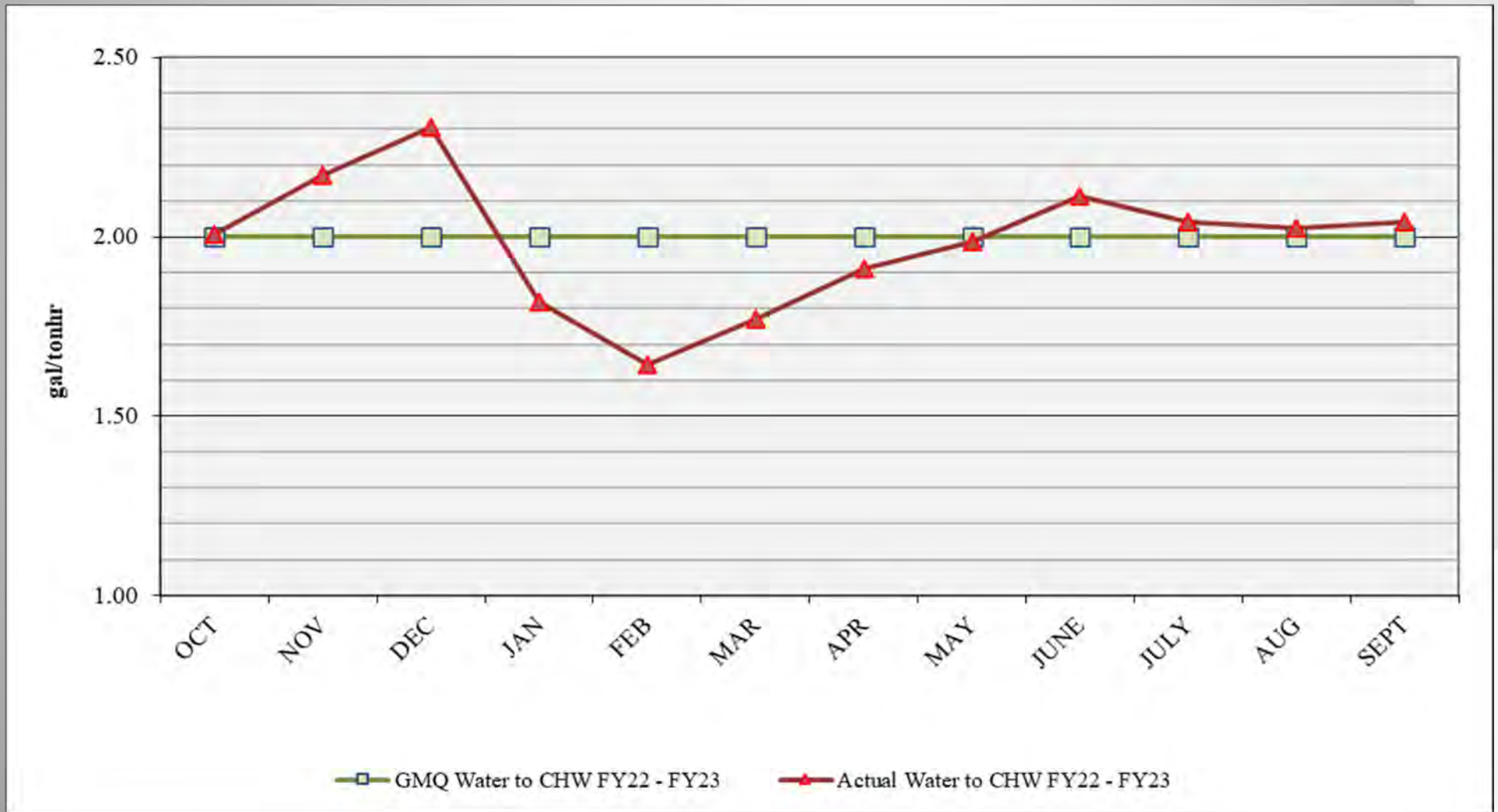
# Performance Measurement FY23: CHW Electric Conversion ●



GMQ exceeded in Dec 2021.



# Performance Measurement FY23: CHW Water Conversion



GMQ exceeded Oct, Nov, Dec, June, July, Aug, and Sept.





# Water Treatment

Q1FY23    Q4FY22    Q3FY22    Q2FY22

## ❖ Steam and Condensate

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



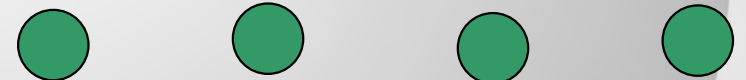
## ❖ Condensing Water

- ❖ Conductivity
- ❖ Biologicals



## ❖ Chilled Water

- ❖ Hardness
- ❖ Corrosion
- ❖ EGF and Customer Biologicals Good
- ❖ Deposits



❖ Chilled water side-stream filter to be installed Q2FY23



# *EGF Walkthrough*

Q1FY23    Q4FY22    Q3FY22    Q2FY22

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



# EDS Walkthrough

Q1FY23    Q4FY22    Q3FY22    Q2FY22

✓ Overall Status; Tunnels	● -	● -	● -	n/a
✓ Overall Status; Vaults	● -	● -	● -	n/a
✓ Housekeeping	●	● -	● -	● -
✓ Maintenance Items				
✓ Piping	● -	● -	● -	●
✓ Insulation R/R	● -	● +	● +	● +
✓ Water Infiltration	● +	●	●	●
✓ Corrosion of Structural Metal Components	● -	● -	● -	● +
✓ Safety Items	●	●	●	●



## *5. Natural Gas Purchasing*

- ❖ Natural Gas Purchasing Review
  - ❖ Table 5: FY23 Gas Spending & Budget Comparison
  - ❖ Figure 5: Actual and Projected Fuel Cost Comparison

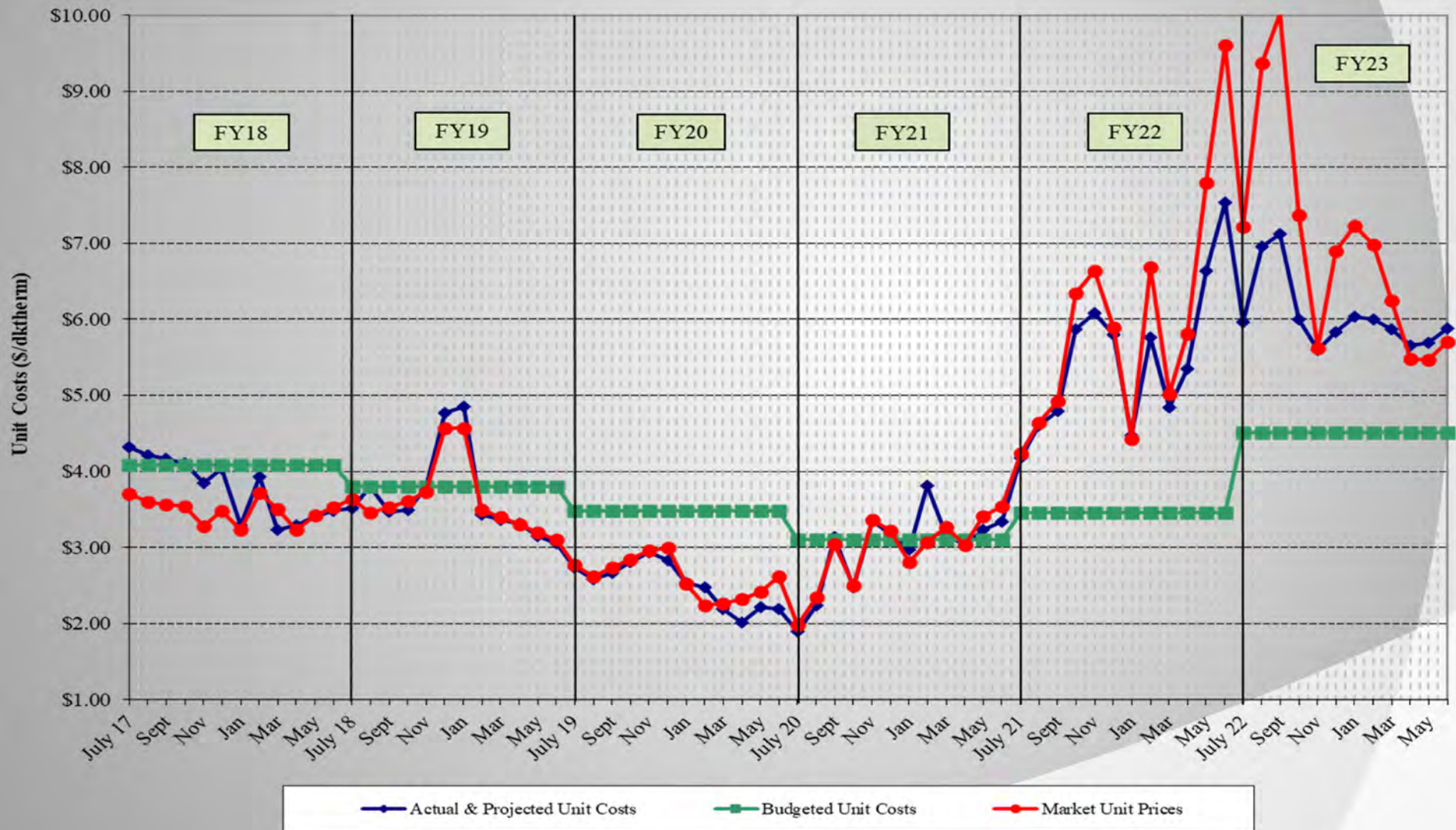
## Table 5: FY23 Gas Spending & Budget Comparison

		Actual FY23 To Sept 30	Budget FY23	Percent Difference
Steam Sendout (Mlbs)		60,047	63,256	-5.1%
Fuel Use (Dth) (includes propane)	●	82,166	91,341	-10.0%
Plant Eff (Dth/Mlb)	●	1.368	1.444	-5.3%
Total Gas Cost (includes propane)	●	\$551,585	\$411,947	33.9%
Unit Cost of Fuel (\$/Dth)	●	\$6.713	\$4.510	48.8%

Excludes consultant fees and FEA; Includes transportation and actual propane costs and usages



# Figure 5. Actual and Projected Fuel Cost Comparison



Currently hedging 74% of natural gas through FY23; transportation costs included.



## 6. FY23 Costs to Date

Item	FY23 Budget	FY23 Actual to date	Percent of FY23 Budget
FOC's	\$ 4,006,800	\$ 1,001,705	25.00%
Pass Throughs			
Administrative Costs	\$ 932,100	\$ 134,627	14.44%
Chemicals	\$ 255,700	\$ 57,601	22.53%
R&I Fund Transfers	\$ 303,700	\$ 75,925	25.00%
Water/Sewer	\$ 773,400	\$ 389,483	50.36%
Fuel Base	\$ 2,797,256	\$ 572,817	20.48%
Fuel Contingency	\$ 677,044	\$ -	0.00%
Electricity	\$ 6,394,800	\$ 2,350,399	36.75%
ORF Deposit	\$ 85,800	\$ 21,450	
Debt Service	\$ 4,311,300	\$ 1,160,357	26.91%
<b>Total Expenses</b>	<b>\$ 20,537,900</b>	<b>\$ 5,764,363</b>	<b>28.07%</b>
<b>Total Revenues</b>	<b>\$ 20,163,600</b>	<b>\$ 5,738,040</b>	<b>28.46%</b>
<b>Metro Funding</b>	<b>\$ 374,300</b>	<b>\$ 93,575</b>	<b>25.00%</b>

Actual Costs and Revenues to Date include FY22 True-up Items.



# FY23 Budget

Item	FY22 Budget	FY23 Budget	Percent of FY22 Budget
FOC's	\$ 3,890,100	\$ 4,006,800	3.00%
Pass Throughs			
Administrative Costs	\$ 459,600	\$ 932,100	102.81%
Chemicals	\$ 232,200	\$ 255,700	10.12%
R&I Fund Transfers	\$ 294,800	\$ 303,700	3.02%
Water/Sewer	\$ 751,500	\$ 773,400	2.91%
Fuel Base	\$ 2,115,186	\$ 2,797,256	32.25%
Fuel Contingency	\$ 516,814	\$ 677,044	31.00%
Electricity	\$ 6,329,500	\$ 6,394,800	1.03%
ORF Deposit	\$ -	\$ 85,800	
Debt Service	\$ 5,083,200	\$ 4,311,300	-15.19%
<b>Total Expenses</b>	<b>\$ 19,672,900</b>	<b>\$ 20,537,900</b>	<b>4.40%</b>
<b>Total Revenues</b>	<b>\$ 19,042,200</b>	<b>\$ 20,163,600</b>	<b>5.89%</b>
<b>Metro Funding</b>	<b>\$ 630,700</b>	<b>\$ 374,300</b>	<b>-40.65%</b>

## *7. Marketing*

### Remaining Capacity for Sale (approximate)

- 2,429 tons of chilled water
- 24,622 pph of steam

### IDEA Article

### Potential Customers

- Contacts with several A/E regarding new developments





## *Marketing (con't)*

- New Development North of KVB
  - Potential ~1,100 tons and ~15,000 pph
  - Early stages of discussions
- 1<sup>st</sup> and KVB
  - Potential ~1,100 tons and ~17,000 pph steam
  - Early stages of discussions
- Peabody St Development
- 2<sup>nd</sup> Ave and Peabody
  - Early stages of discussions





## *Marketing (con't)*

- **Printer's and Banker's Alley**
  - ~600 tons Apartment and Retail Development
  - No interest in steam at this point
  - Building design progressing with DES
- **7<sup>th</sup> and Commerce**
  - Potential ~700 tons and ~11,000 pph steam
  - Hotel, Restaurants and Retail
  - Building design progressing with DES
- **8<sup>th</sup> and Demonbreun**
  - Early stages of discussions

## 8. *Capital Expenditure Update*

	<b>Spent to End of FY22</b>	<b>FY23 Spending</b>	<b>Balance to Date (11/01/22)</b>
R&I Projects	\$4,358,854	\$25,032	\$330,736
49116-DES Infrastructure Fund	\$4,649,663	\$140,133	\$4,584,061
<b>Total</b>	<b>\$9,008,517</b>	<b>\$165,165</b>	<b>\$4,914,797</b>

## *Capital Projects Review*

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

- DES 139: Options Review - ongoing
- DES 163: Peabody Union – using project number to track time and expenses associated with Guthrie St development; blasting began in early July
- DES 192: Peabody St Developments – survey of routing down Peabody; DES plan for expansion in area with new customers
- DES 195: DES Parking Area – review of options for developing a parking area on the west side of the EGF to replace space lost in the Guthrie St development; preliminary drawings presented to TEG/Metro
- DES 200: Side-stream Filter – addition of filter on CHW at EGF; installation expected 2<sup>nd</sup> Qtr FY23

## *Capital Projects Review*

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

- DES 201: East Bank Development – ongoing development and marketing activities related to the proposed Titans stadium, Oracle, and other potential developments on the East Bank
- DES 202: 7<sup>th</sup> and Commerce Hotel – proposed hotel intends to be a customer; service will extend from 7<sup>th</sup> Ave
- DES 203: Printer’s and Banker’s Alley Building – proposed residential and retail site intends to be a customer; service will extend from Union St.
- DES 204: New Signs for EGF – replacing signs at EGF with new, illuminated signs; to be completed 2<sup>nd</sup> Qtr FY23

## *Capital Projects Review*

### **Active Capital Projects – Corrosion Repair/Prevention**

- DES 143: MH N1 and N2 Insulation – MH N1 corrosion cleaned and coated; CES to install insulation in MH N1 under Amendment 2 obligations. CES considering installing insulation in MH N2 under Amendment 2 obligations.
- DES 154: MH K Repairs – in close-out
- DES 178: MH 5 Repairs – corrosion/concrete/insulation repairs; work began during 4<sup>th</sup> Qtr FY22; final item is re-insulate piping; due to weather (heat) work was delayed; anticipate work completion during 2<sup>nd</sup> Qtr FY23
- DES 188: 4<sup>th</sup> & Church Bldg Access Tunnel Repairs – closed
- DES 189: MH 4 Structural Steel & Insulation Repair – closed



## *Capital Projects Review*

### **Active Capital Projects – Corrosion Repair/Prevention**

- DES 193: MH 13 Pipe and Pipe Support Repairs – awaiting insulation repairs; anticipate work to be completed during 2<sup>nd</sup> Qtr FY23
- DES 194: MH B4 Repairs – cleaning and coating of structural steel; re-insulation of piping; anticipate construction to begin during 2<sup>nd</sup> Qtr FY23
- DES 197: MH 3 Coatings and Repairs – in close-out



## *Capital Projects Review*

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

- DES 177: MH B1 Platform & Ladder – bids rec'd; verbal award; dispute over CES mark-up
- DES 185: 5<sup>th</sup> Ave N Exploratory Excavation – work complete; cost substantiation approved; project closed during 4<sup>th</sup> Qtr FY22
- DES 187: Exploratory Excavation at MH 22B (Metro Public Library) – work complete; cost substantiation approved; project closed during 4<sup>th</sup> Qtr FY22
- DES 191: MH 20 Repairs – condensate return piping leaking (corrosion); ground/surface water collection/diversion needed; new access ladder needed; bid in late 3<sup>rd</sup> Qtr FY22; contractor delays; anticipate construction to start during 1<sup>st</sup> Qtr FY23



## *Capital Projects Review*

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

- DES 196: Exploratory Excav. & Cond. Leak Repair at MH 9 – in planning/design stage; will include pipe replacement at MH 10 and MH 11 also; anticipate bidding late 2<sup>nd</sup> Qtr FY23 or early 3<sup>rd</sup> Qtr FY23
- DES 198: MH18 Condensate Pump Replacement – replace pumps with new configuration to improve reliability and automation; pumps and VFDs delivered; anticipate bidding 3<sup>rd</sup> Qtr FY23
- DES 199: MH D3 Sparge Tube Addition – existing pipe support needs replacement due to corrosion and adding sparge tube because of steam hammer; sparge tube complete, pipe support could not be installed at specified location; design modifications completed; anticipate construction completion during 2<sup>nd</sup> Qtr FY23

***Constellation Energy Solutions,  
LLC  
System Operator***



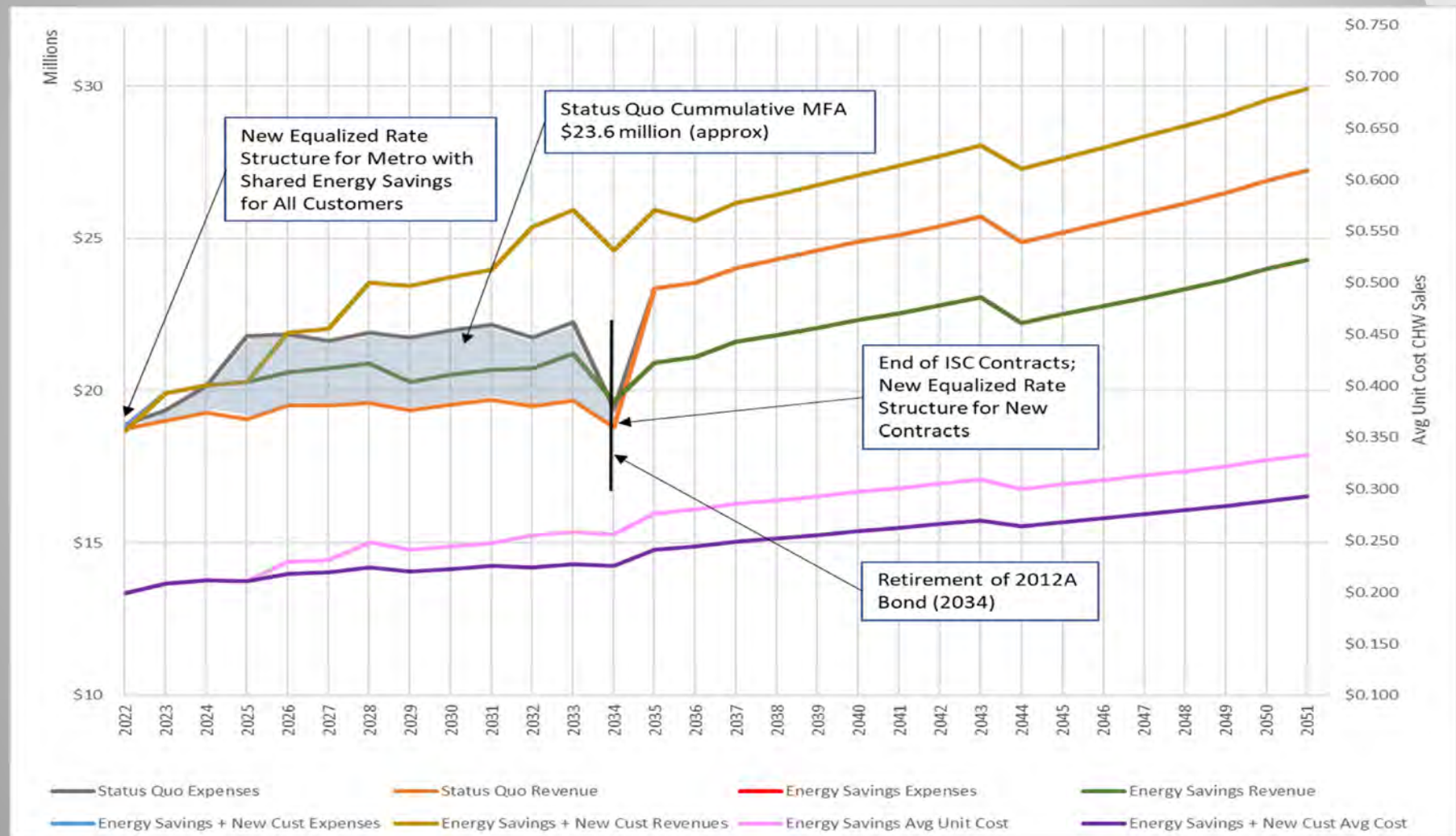
## 9. Energy Savings Plan

- ❖ Three Phases of Proposed Business
  - ❖ Step 1: New Customer Contracts
  - ❖ Step 2: Energy Savings Plan
  - ❖ Step 3: New Customer Expansion



# Projected Future Costs and Revenues

## Comparison of Energy Savings Options



Assumes average 1.5% price escalation for each model.

## *Step 1: Proposed Customer Contract Changes*

- Eliminates direct pass throughs for energy costs and replaces it with a fixed efficiency for the energy to allow for the recovery of the capital costs associated with any energy savings program
- Doubles the CHW TIFS charge while allowing a credit for operating at higher Delta T than contract; no current credit
- Creates a variable CHW delivery temperature based on the time of year and outside air temperature instead of a fixed sendout temperature
- Detaches actual FOC and Debt Service payments from customer capacity charges and replaces it with a fixed contract capacity charge that is allowed to escalate

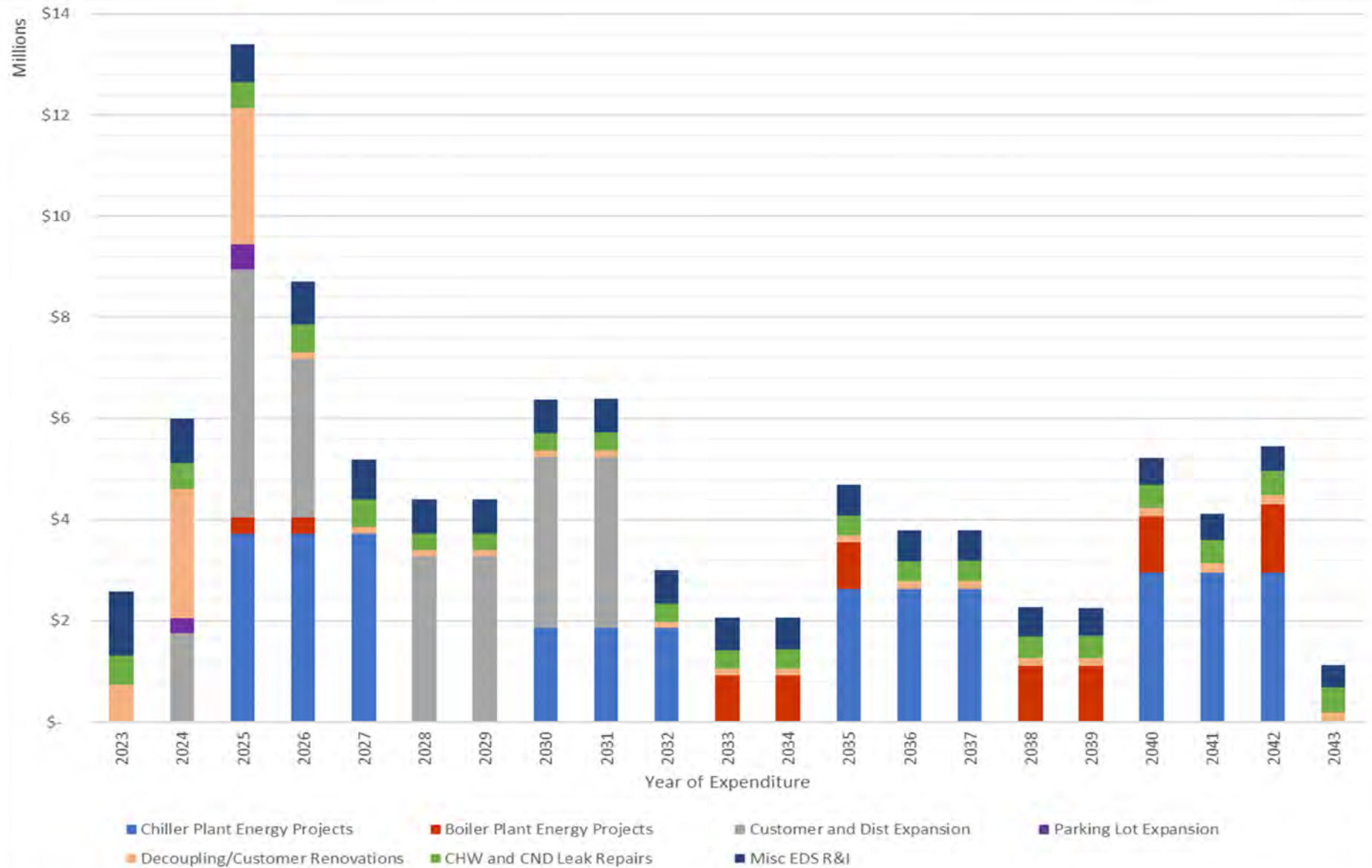


## *Step 2: Energy Saving Plan*

- **Chiller Replacement**
  - 5-year simple return from electrical energy savings for first chiller
  - Annual estimated avoided electric 5,600 MWhrs
  - Annual estimated avoided CO2 emissions 1,850 tons
- **Additional savings opportunities include:**
  - Thermal Storage
  - Condensing Economizer
  - O2 Trim
  - Cooling Tower Replacement
  - Variable Speed Drives
  - Controls Modifications
  - Hydraulic Balancing



# Capital Expenditure Summary







## *Step 3: New Customer Expansion*

- With the new chiller(s):
  - Lower cost of production
  - Greater savings for customers (DES becomes more competitive)
  - Additional capacity
  - Lower operating and maintenance cost
  - Life extension
- Expansion to west and south:
  - New developments planned along Peabody corridor
  - New pipelines with chilled water and hot water
  - Lower cost to install and maintain without steam distribution, vaults, etc.



## *Conclusion:*

- DES is at an inflection point in its operation
- EGF equipment reaching end of useful life
- **No equipment replacement = Increased operating cost**
- Without customer contract changes, MFA and debt **increase** without means of capital recovery
- Customer contract changes allow for **shared energy savings** with capital recovery
- Long-term energy savings with new and improved equipment result in **reduced** customer energy costs

## *10. Other Board Member Items*

*RFQ for DES PA proposal deadline was June 21, 2022. Evaluation of proposals was completed during Quarter and TEG was selected. TEG contract temporarily extended through November 30<sup>th</sup> with no agreed upon contract to date.*

# *11. Adjourn*

- *Advisory Board Meeting Schedule*
- FY23 – 2<sup>nd</sup> Quarter Meeting – February 16, 2023
- FY23 – 3<sup>rd</sup> Quarter Meeting – May 18, 2023
- FY23 – 4<sup>th</sup> Quarter Meeting – August 17, 2023
- FY24 – 1<sup>st</sup> Quarter Meeting – November 16, 2023