



Metro Nashville
DISTRICT ENERGY SYSTEM

DES Customer Meeting

Spring FY23

May 25, 2023



Agenda

1. Welcome!
2. Historic Customer Expenses
3. Historic Customer Consumption
4. Historic System Efficiency
5. Natural Gas Pricing
6. DES FY22 and FY23 Budgets
7. Side Stream Filter
8. DES Projects
9. Questions and Answers
10. Adjourn

1. *Welcome DES Customers!*



DES Contacts

- ❖ Constellation – Mike Winters, General Manager 615-742-1883 (michael.winters@constellation.com)
- ❖ Constellation – Chuck Tucker, Customer Service 615-742-1883 (chuck.tucker@constellation.com)
- ❖ Constellation – Jimmy Hatcher, Invoicing 615-742-1883 (jimmy.hatcher@constellation.com)
- ❖ Thermal Engineering Group, Inc – Dan Coyle, Contract Administrator 615-264-2611 (dcoyle@thermalegi.com)
- ❖ Metro Water Services – Adrienne Fancher, Metro Liaison 615-862-4820 (adrienne.fancher@nashville.gov)

2. Historical Customer Expenses

- ❖ Figure 2A. Historical Chilled Water Variable Unit Costs
- ❖ Figure 2B. Historical Steam Variable Unit Costs
- ❖ Table 2. Rolling Twelve Month Expenses

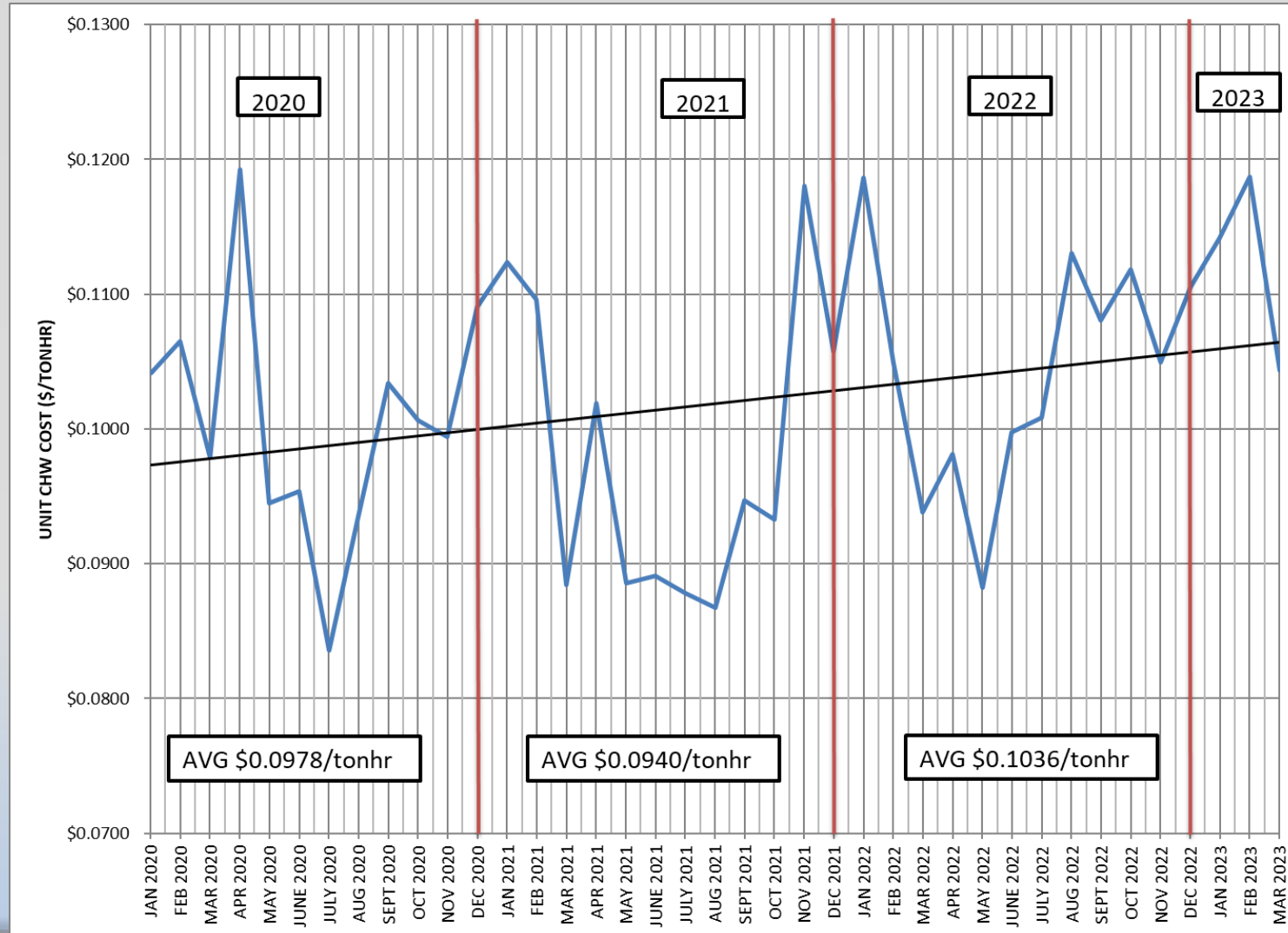
Customer Charges

- Customer charges include fixed and variable costs
- Fixed costs include Capacity Charges that are independent of monthly consumption
 - Contract Capacity Charge (based on contract demand)
 - Fixed Operating Charge (based on contract demand)
 - EDS Improvement Charge (based on contract demand)
 - Metro Incremental (based on contract demand)
 - Engineering (based on contract demand)
 - Insurance (based on contract demand)
 - EDS Maintenance Allocation (based on contract demand)
 - EDS Electricity (based on contract demand)
- Variable costs include utilities and chemicals that vary based on monthly consumption

Customer Charges

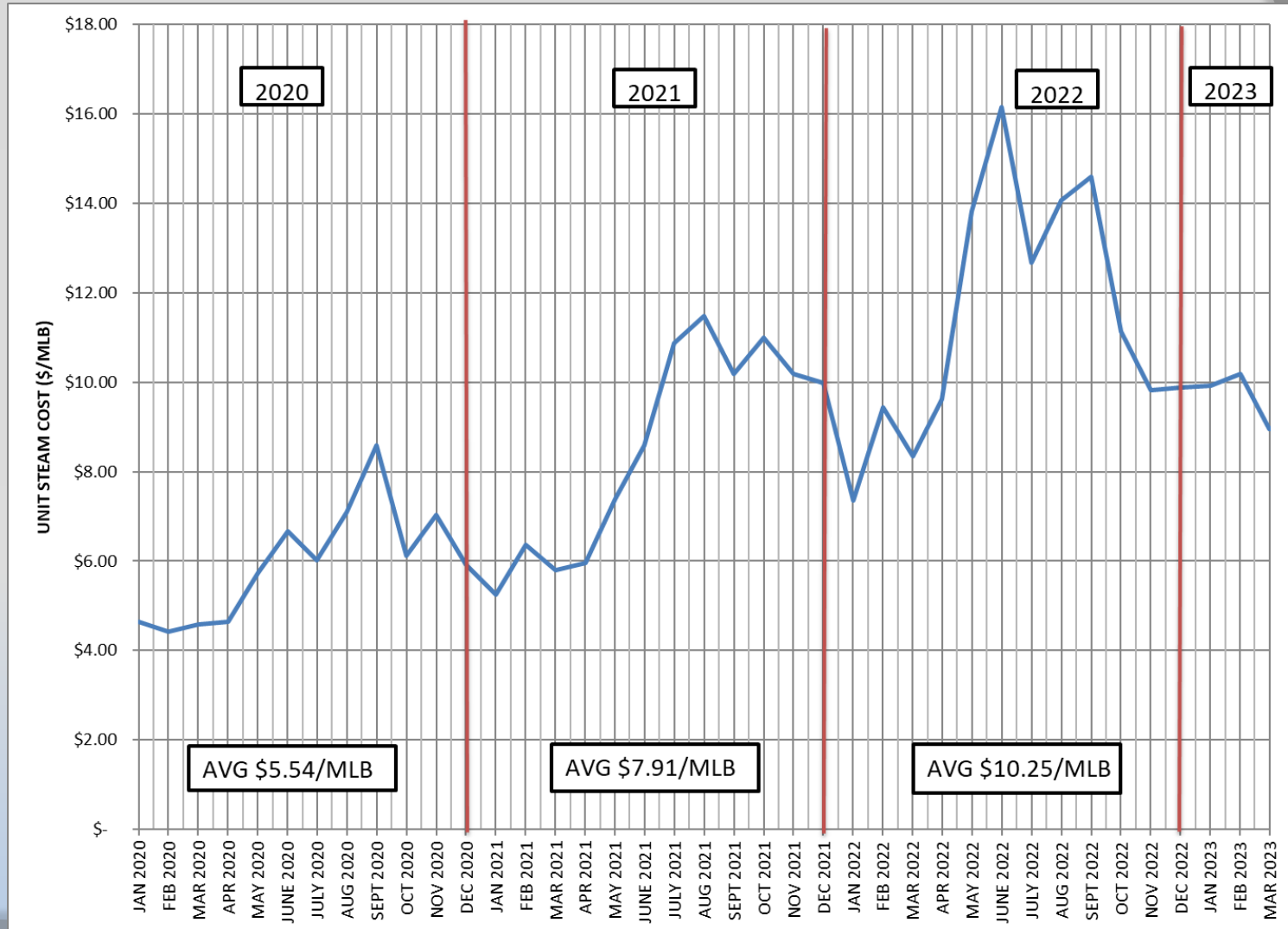
- Variable costs vary each month based on actual charges and allocable to customers based on their monthly metered consumption (tonhrs and lbs)
- Capacity Charges + Variable Costs + Taxes = Total Invoice
- Avg Unit Cost = $\frac{\text{Total Invoice}}{\text{Monthly Consumption}}$ (\$/tonhr or \$/Mlb)
- If consumption is low in a month, variable costs and total invoice will be low but Avg Unit Cost will be high.
- If consumption is high, variable costs and total invoice will be high, but Avg Unit Cost will be low.

Figure 2A. Historical CHW Variable Unit Costs



Includes water, sewer, electricity, chemicals, EDS electricity and FEA

Figure 2B. Historical Steam Variable Unit Costs



Includes water, sewer, electricity, chemicals, EDS electricity, FEA, gas consultant, natural gas and propane

Table 2. Rolling Twelve Month Expenses

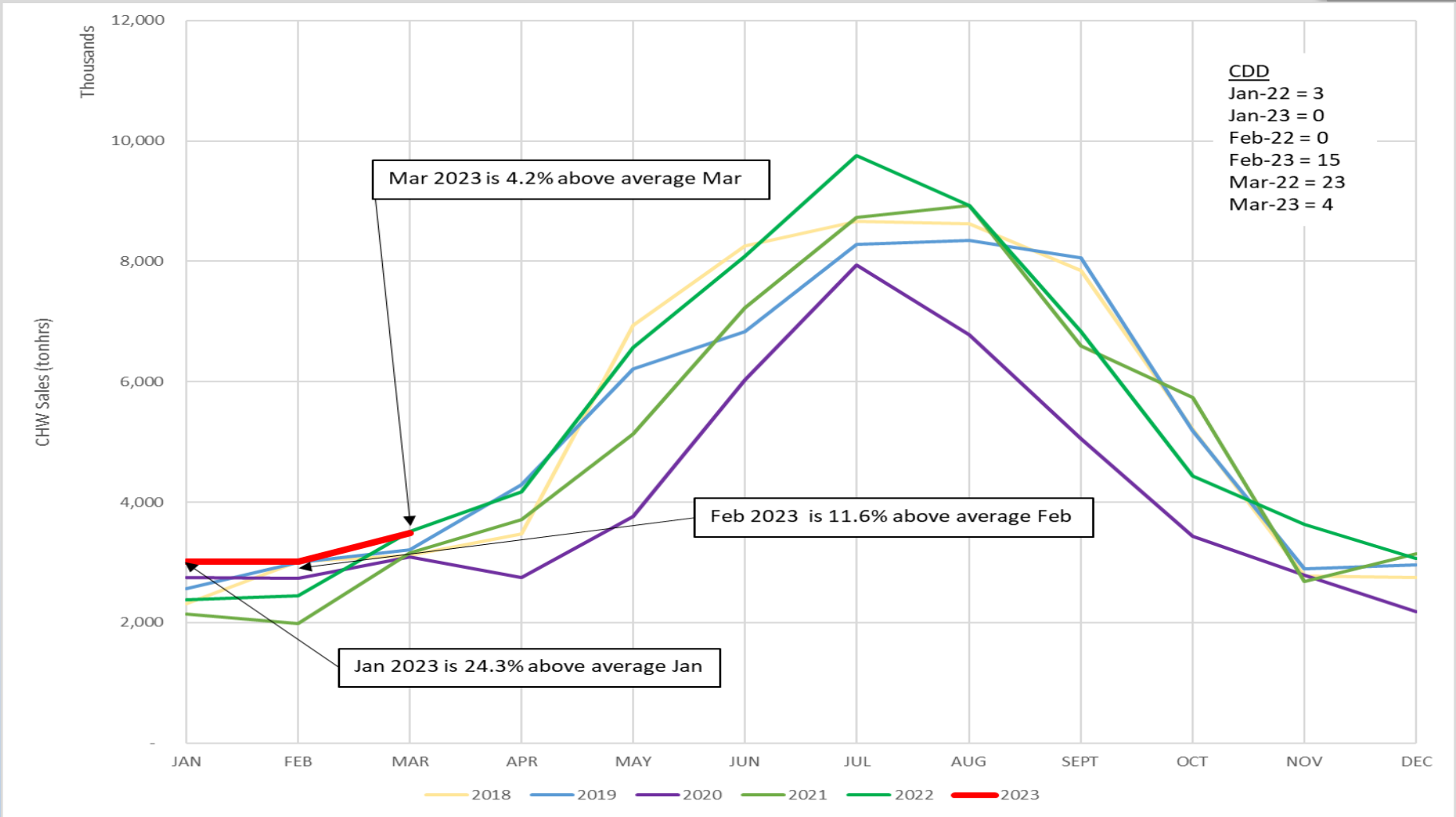
		Steam - Rolling 12 Month			Chilled Water - Rolling 12 Month		
		Apr 2021- Mar 2022	Apr 2022- Mar 2023	% Diff.	Apr 2021- Mar 2022	Apr 2022- Mar 2023	% Diff.
Private	Cost	\$ 1,578,881	\$ 1,796,226	13.77%	\$ 4,104,844	\$ 4,627,769	12.74%
	Usage (lbs or tonhrs)	91,262,240	94,042,066	3.05%	21,531,885	23,625,674	9.72%
State	Cost	\$ 2,003,922	\$ 2,307,024	15.13%	\$ 3,316,357	\$ 3,546,793	6.95%
	Usage (lbs or tonhrs)	105,983,296	114,254,268	7.80%	13,582,769	14,445,087	6.35%
Metro	Cost	\$ 1,980,386	\$ 2,290,836	15.68%	\$ 4,661,051	\$ 5,134,396	10.16%
	Usage (lbs or tonhrs)	132,254,216	136,214,341	2.99%	25,409,360	26,913,888	5.92%
Aggregate	Cost	\$ 5,563,189	\$ 6,394,087	14.94%	\$12,082,252	\$13,308,958	10.15%
	Usage (lbs or tonhrs)	329,499,752	344,510,675	4.56%	60,524,014	64,984,649	7.37%
	Unit Cost	\$ 16.88	\$ 18.56	9.9%	\$ 0.200	\$ 0.205	2.59%

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

3. *Historical Customer Consumption*

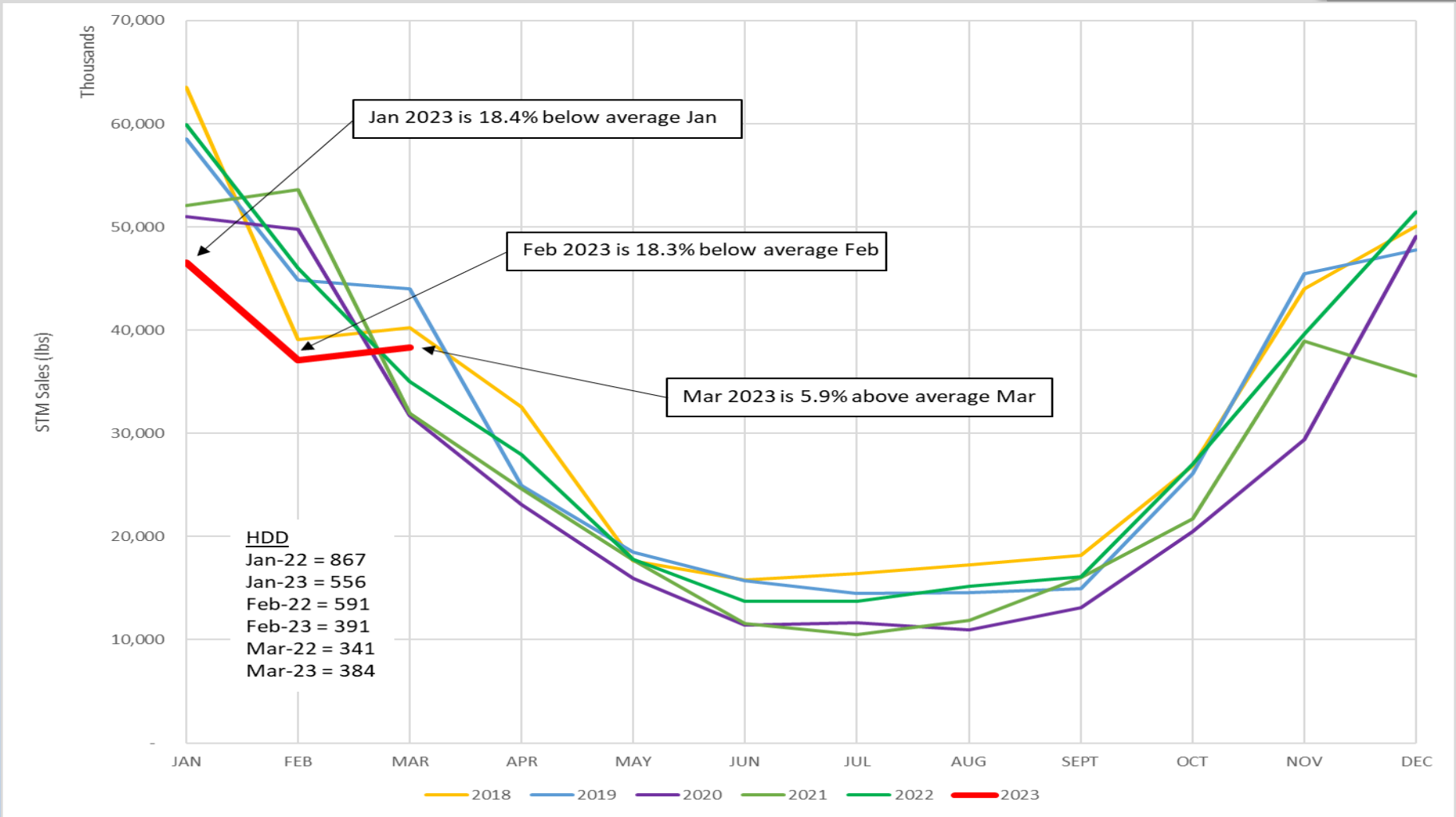
- ❖ Figure 3A. Historical CHW Consumptions
- ❖ Figure 3B. Historical Steam Consumptions

Figure 3A. Historical CHW Consumptions



Averages include the years 2018, 2019, 2020, 2021, and 2022.

Figure 3B. Historical Steam Consumptions

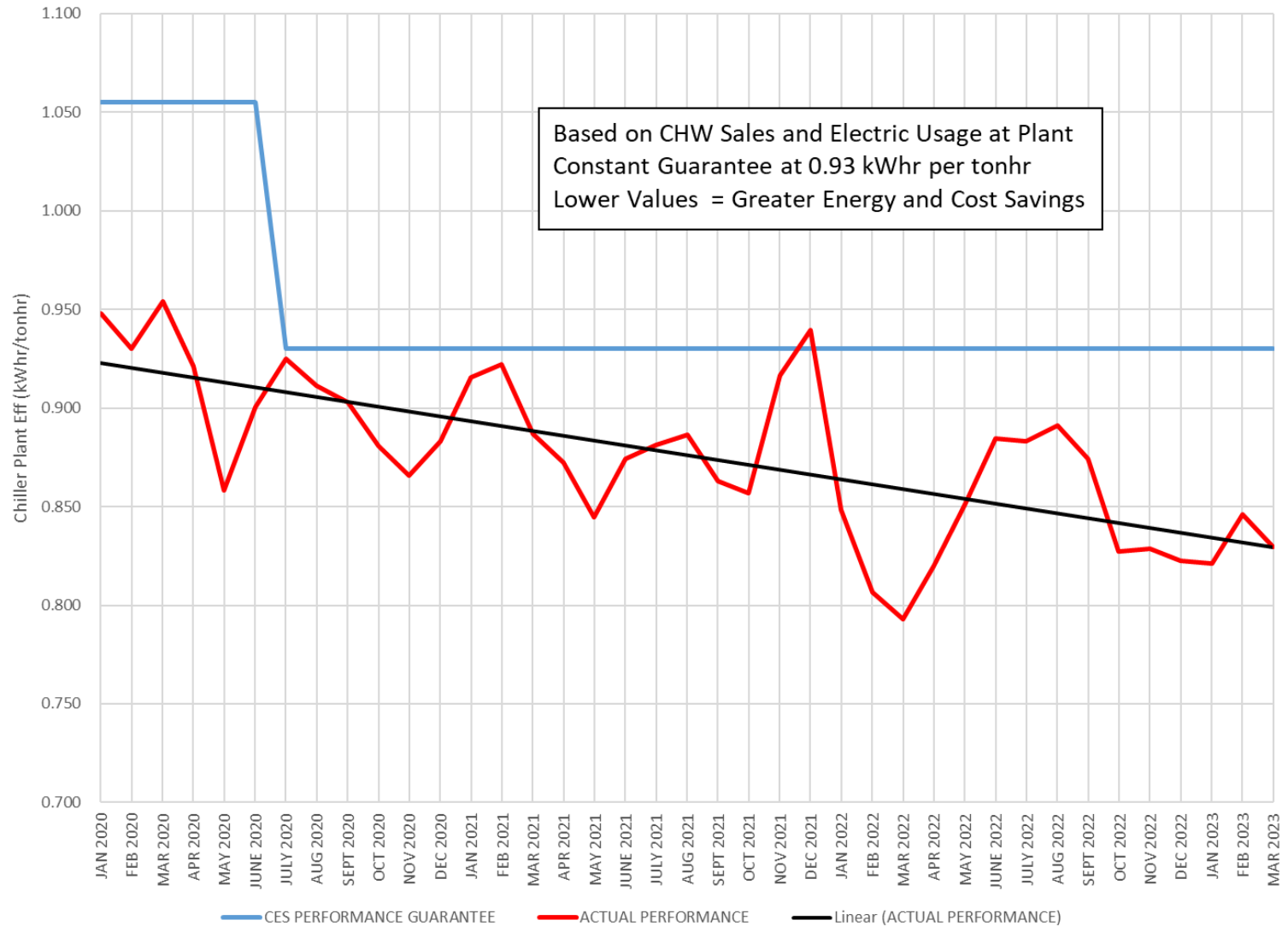


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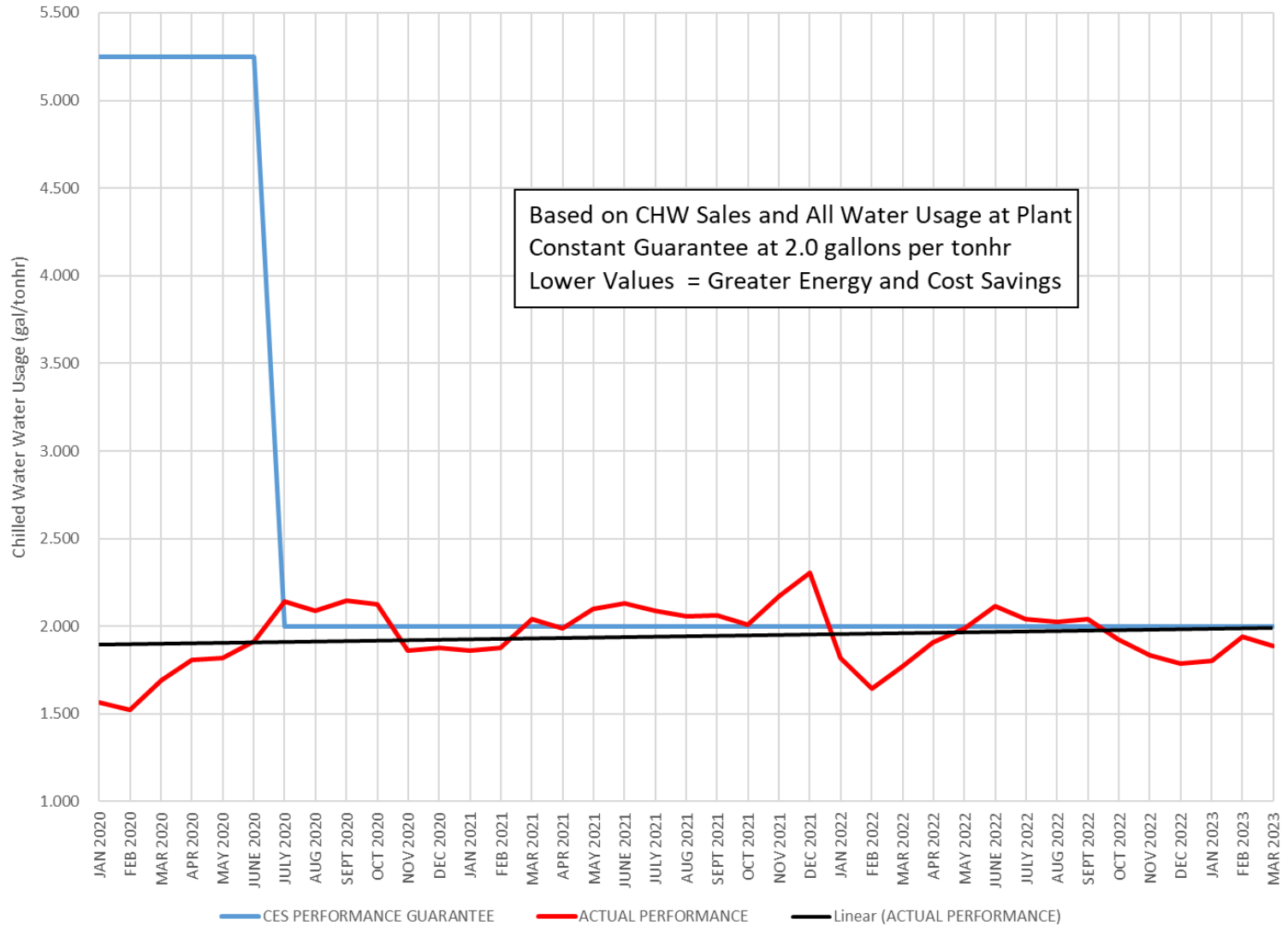
4. *Historical System Efficiency*

- ❖ Five Efficiency Metrics:
 - ❖ CHW: Electricity per unit of sales (kWhr/tonhr)
 - ❖ CHW: Water per unit of sales (equation) (gallons/tonhr)
 - ❖ STM: Fuel per unit of sendout (equation) (dktherm/Mlb)
 - ❖ STM: Water per unit of sendout (equation) (gallons)
 - ❖ STM: Electricity per unit of sales (kWhr/Mlb)
- ❖ Cost benefit to customers based on CES's operation of system – Fuel Efficiency Adjustment
 - ❖ CES receives “bonus” of 25% of difference in cost for meeting guarantees each month in each category
 - ❖ “Bonus” capped at ~\$200,000 per year
 - ❖ CES pays 100% of difference in cost for exceeding guarantees each month in each category

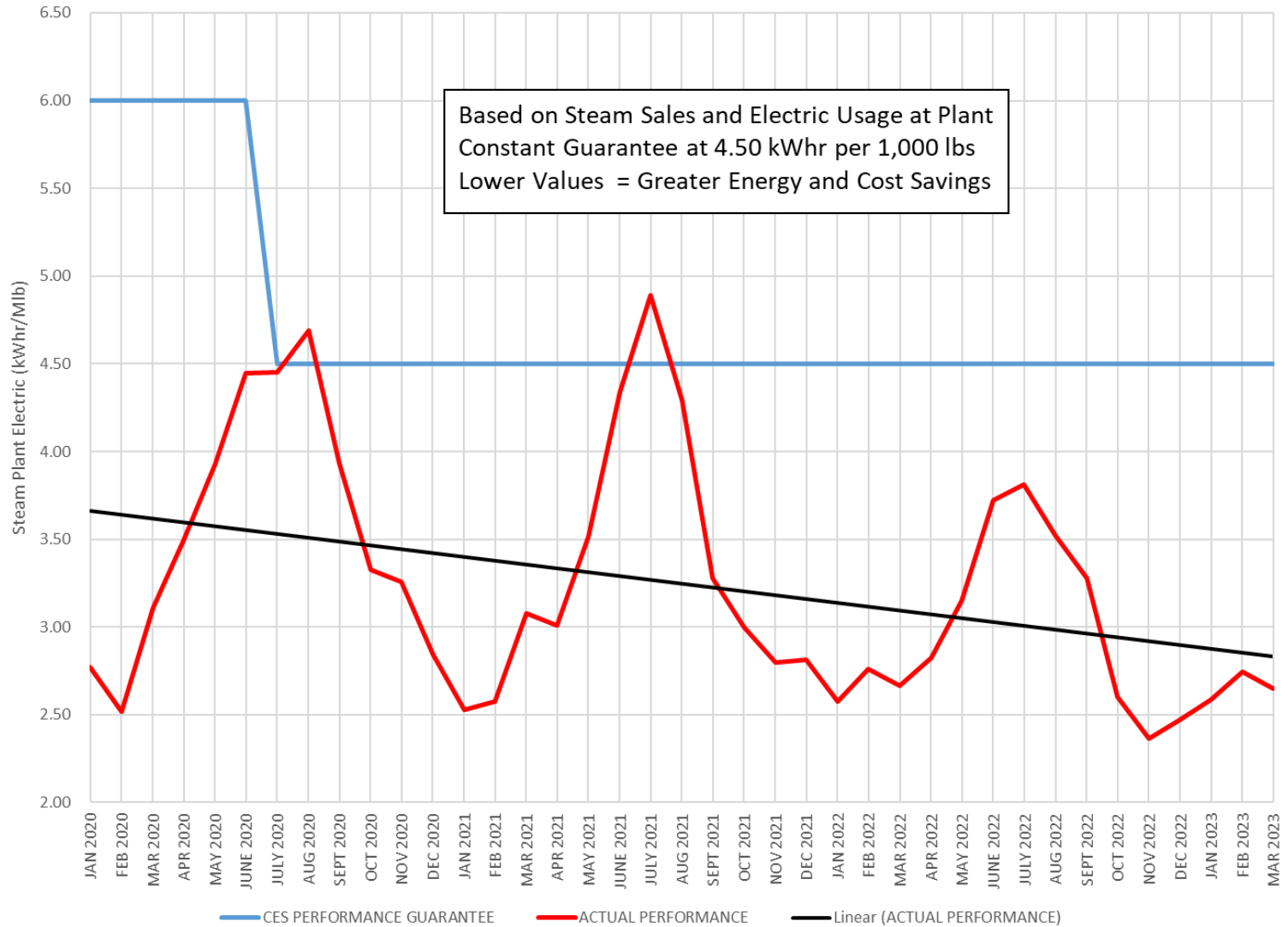
Chilled Water: Electric



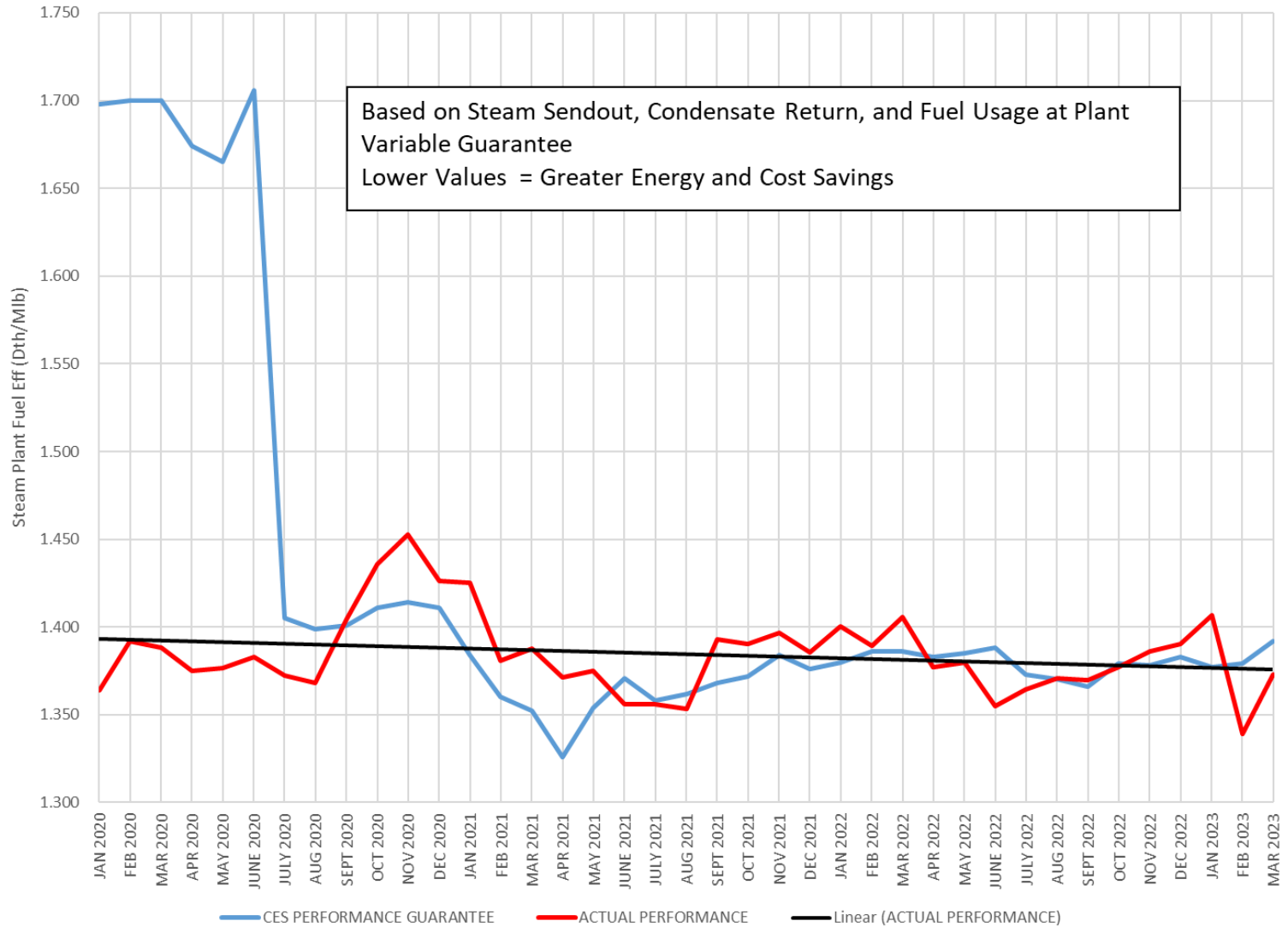
Chilled Water: Water



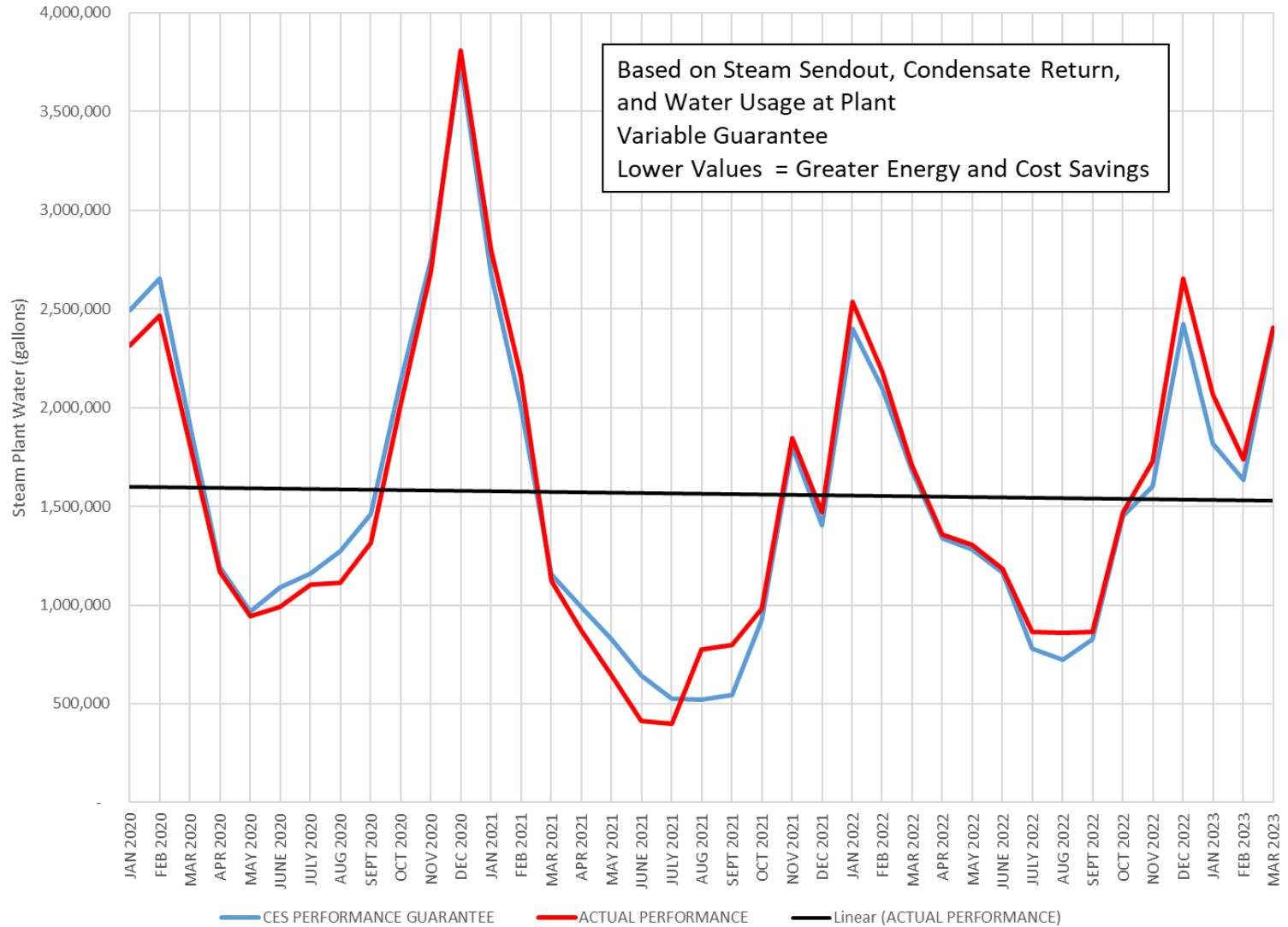
Steam: Electric



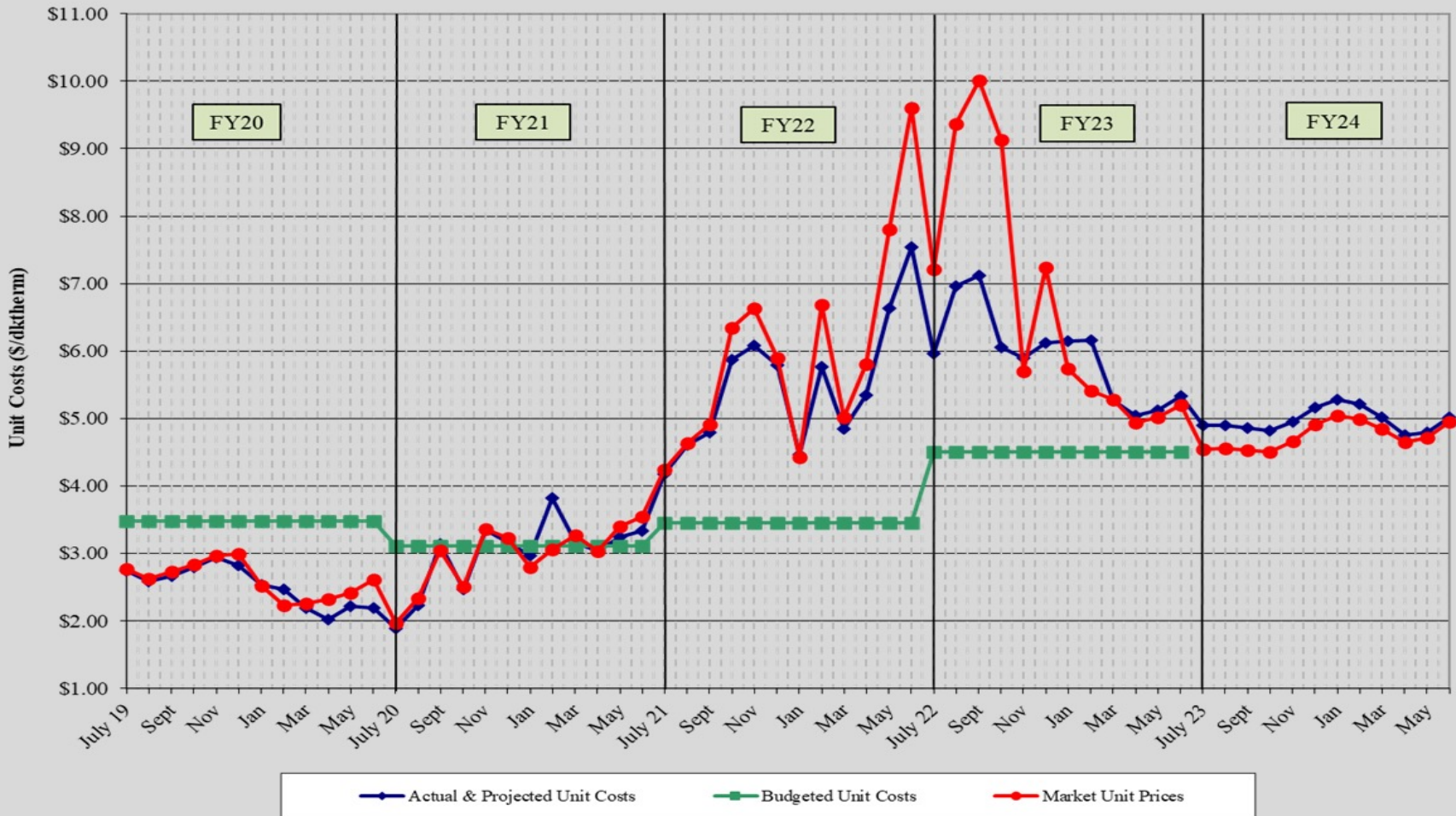
Steam: Fuel



Steam: Water



5. Natural Gas and Propane Pricing



Currently hedging 80% of natural gas through FY23; FY24 futures include hedged price, NYMEX and transportation (hedging at 50%).

Table 5: FY23 Gas Spending & Budget Comparison

	Actual FY23 To Mar 31	Budget FY23	Percent Difference
Steam Sendout (Mlbs)	324,437	332,513	-2.4%
Fuel Use (Dth) (includes propane)	447,091	480,149	-6.9%
Plant Eff (Dth/Mlb)	1.378	1.444	-4.6%
Total Gas Cost (includes propane)	\$2,770,543	\$2,165,472	27.9%
Unit Cost of Fuel (\$/Dth)	\$6.197	\$4.510	37.4%

Excludes consultant fees, FEA, and pre-purchased and stored propane; Includes transportation and actual propane costs and usages

6. DES FY22 and FY23 Budgets

Item	FY21 Budget	FY22 Budget	FY23 Budget	% Change FY21 to FY22	% Change FY22 to FY23
FOC's	\$ 3,776,800	\$ 3,890,100	\$ 4,006,800	3.00%	3.00%
Pass Throughs					
Administrative Costs	\$ 393,900	\$ 459,600	\$ 932,100	16.68%	102.81%
Chemicals	\$ 260,700	\$ 232,200	\$ 255,700	-10.93%	10.12%
R&I Fund Transfers	\$ 291,900	\$ 294,800	\$ 303,700	0.99%	3.02%
Water/Sewer	\$ 624,000	\$ 751,500	\$ 773,400	20.43%	2.91%
Fuel Base	\$ 2,001,900	\$ 2,115,186	\$ 2,797,256	5.66%	32.25%
Fuel Contingency	\$ 431,900	\$ 516,814	\$ 677,044	19.66%	31.00%
Electricity	\$ 6,130,100	\$ 6,329,500	\$ 6,394,800	3.25%	1.03%
ORF Deposit	\$ -	\$ -	\$ 85,800	N.A.	N.A.
Debt Service	\$ 5,098,000	\$ 5,083,200	\$ 4,311,300	-0.29%	-15.19%
Total Expenses	\$ 19,009,200	\$ 19,672,900	\$ 20,537,900	3.49%	4.40%
Total Revenues	\$ 18,378,500	\$ 19,042,200	\$ 20,163,600	3.61%	5.89%
Metro Funding	\$ 630,700	\$ 630,700	\$ 374,300	0.00%	-40.65%

FY23 Expenses to Date

Item	FY23 Budget	FY23 Actual to date	Percent of FY23 Budget
FOC's	\$ 4,006,800	\$ 3,005,114	75.00%
Pass Throughs			
Administrative Costs	\$ 932,100	\$ 430,074	46.14%
Chemicals	\$ 255,700	\$ 157,539	61.61%
R&I Fund Transfers	\$ 303,700	\$ 253,083	83.33%
Water/Sewer	\$ 773,400	\$ 767,130	99.19%
Fuel Base	\$ 2,797,256	\$ 2,797,256	100.00%
Fuel Contingency	\$ 677,044	\$ 24,079	3.56%
Electricity	\$ 6,394,800	\$ 4,342,042	67.90%
ORF Deposit	\$ 85,800	\$ 71,500	83.33%
Debt Service	\$ 4,311,300	\$ 3,359,031	77.91%
Total Expenses	\$ 20,537,900	\$ 15,206,849	74.04%
Total Revenues	\$ 20,163,600	\$ 15,306,849	75.91%
Metro Funding	\$ 374,300	\$ 280,725	75.00%

7. *Side Stream Filter*

- Installed on chilled water return at EGF
- Filters chilled water at 500 gpm filtering all the water in about two months
- Will remove suspended solids down to 0.5 micron
- Improves water quality delivered to customers which may also improve heat transfer
- Became fully operational in May 2023
- Changes in suspended solids will be tracked and presented at subsequent meetings

Side Stream Filter (under construction)



8. *DES Projects*

Active Capital Projects – General & Marketing

- DES 163: Peabody Union – working with developer on Guthrie St impact to DES; blasting is complete
- 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 3rd Qtr FY23 with operation in 4th Qtr

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: 7th and Commerce Hotel – proposed hotel intends to be a customer; service will extend from 7th 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 – closed

New Plant Sign



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 N2 under Amendment 2 obligations; MH N1 insulation moved to DES207 therefore this project will be closed.
- DES 178: MH 5 Repairs – corrosion/concrete/insulation repairs; piping insulation remains to be completed. Insulation expected to be completed during the 4th Qtr FY23.
- DES 180: State Tunnel Support Repairs – several of the supports in the State Tunnel are corroded and need to be cleaned and coated to prevent further propagation of the corrosion. The project was temporally delayed but is expected to be completed in the 4th Qtr FY23.

Capital Projects Review

Active Capital Projects – Corrosion Repair/Prevention

- DES 193: MH 13 Pipe and Pipe Support Repairs – closed
- DES 194: MH B4 Repairs – cleaning and coating of structural steel; re-insulation of piping; pre-bid meeting was held during 2nd Qtr FY23; construction began late 3rd Qtr FY23; work is expected to be completed during 4th Qtr FY23.

Capital Projects Review

Active Capital Projects – Repairs/Modifications

- DES 191: MH 20 Repairs – condensate return piping leaking (corrosion); ground/surface water collection/diversion needed; new access ladder needed; bid in late 3rd Qtr FY22; contractor delays; supply chain delays; underground work is complete. Anticipate construction completion by end of 4th Qtr FY23.
- DES 196: Exploratory Excav. & Cond. Leak Repair at MH 9 – TEG design is 95% complete; will also include pipe replacement at MH 10 and MH 11; anticipate bidding during 4th Qtr FY23
- DES 198: MH18 Condensate Pump Replacement – replace pumps with new configuration to improve reliability and automation; pumps and VFDs delivered; anticipate bid/construction 4th Qtr FY23

Capital Projects Review

Active Capital Projects – Repairs/Modifications

- DES 205: January CHW Outage – work is complete; milling and paving is complete, awaiting striping; TEG to review cost substantiation; anticipate closing project during 4th Qtr FY23.
- DES 206: 7th Ave Tunnel Fan Replacement – 7th Ave Tunnel ventilation fan disintegrated while in operation; no injuries; new fan on-site; expect work to take place during 4th Qtr FY23/1st Qtr FY24
- DES 207: MH N1 Insulation – CES was going to install insulation under their Amendment 2 obligations however, the result would have met CES's obligation past their contract expiration. Therefore, this project number was assigned, and work will be paid for by Metro.

Capital Expenditures

	Spent to End of FY22	FY23 Spending	Balance to Date (04/26/23)
R&I Projects	\$4,358,854	\$75,005	\$438,572
49116-DES Infrastructure Fund	\$4,649,663	\$223,664	\$4,500,530
Total	\$9,008,517	\$298,669	\$4,939,102

9. Questions and Answers

Please complete and submit survey

10. Adjourn