



Memorandum from the Office of the Inspector General

November 26, 2024

Cassidy L. Larson

REQUEST FOR FINAL ACTION – AUDIT 2024-17502 – TVA'S COST OF SERVICE STUDY

Attached is the subject final report for your review and final action. Your written comments, which addressed your management decision and actions planned or taken, have been included in the report. Please notify us when final action is complete. In accordance with the Inspector General Act of 1978, as amended, the Office of the Inspector General is required to report to Congress semiannually regarding audits that remain unresolved after 6 months from the date of report issuance.

If you have any questions or wish to discuss our findings, please contact Jennifer R. Bogus, Senior Auditor, at (865) 633-7372 or Rick C. Underwood, Director, Financial & Operational Audits, at (423) 785-4824. We appreciate the courtesy and cooperation received from your staff during the audit.

David P. Wheeler
Assistant Inspector General
(Audits and Evaluations)

JRB:KDS

Attachment

cc (Attachment):

TVA Board of Directors
Janda E. Brown
Buddy Eller
Jeremy P. Fisher
David B. Fountain
Douglas N. Lindauer
Jeffrey J. Lyash
Jill M. Matthews
Ben R. Wagner
OIG File No. 2024-17502



Office of the Inspector General

Audit Report

To the Vice President,
Contracts and Rates Strategy,
Pricing and Contracts

TVA'S COST OF SERVICE STUDY

Audit Team
Jennifer R. Bogus
Andrew A. Bailey

Audit 2024-17502
November 26, 2024

ABBREVIATIONS

CES	Commercial Energy Solutions
FERC	Federal Energy Regulatory Commission
FY	Fiscal Year
G&A	General and Administrative
kWh	Kilowatt Hour
LPC	Local Power Company
MW	Megawatt
MWh	Megawatt Hour
SPP	Standard Programs and Processes
TVA	Tennessee Valley Authority
VII	Valley Investment Initiative

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DAVID P. WHEELER



Audit 2024-17502 – TVA's Cost of Service Study

EXECUTIVE SUMMARY

Why the OIG Did This Audit

The Tennessee Valley Authority (TVA) performs an annual cost of service study that, according to Commercial Energy Solutions Standard Programs and Processes 21.7.3, *Cost of Service*, "is used to estimate the cost to TVA of serving particular classes of customers and to compare that cost to the estimated revenue derived from those classes. The analysis may be used to derive, evaluate, initiate, or justify rate actions."

Due to the importance of fairly recovering costs to serve TVA customers through rate design, we performed an audit of TVA's fiscal year (FY) 2023 cost of service study. Our audit objectives were to determine if TVA's cost of service study was (1) performed in accordance with policies and procedures and (2) designed to accurately consider all revenue and costs to serve each customer classification.

What the OIG Found

We determined TVA's FY 2023 cost of service study was performed in accordance with TVA policies and procedures; however, we noted the detailed internal procedure had not been recently updated to reflect organizational changes. Additionally, we identified an area where the cost of service study design could more accurately reflect the costs to serve each customer classification.

What the OIG Recommends

We made two recommendations to the Vice President, Contracts and Rates Strategy, Pricing and Contracts, to update internal guidance and evaluate the cost of service study design.

TVA Management's Comments

In response to our draft, TVA management provided actions they plan to take to address each of our recommendations. See Appendix B for management's complete response.

Auditor's Response

We agree with TVA management's planned actions.

BACKGROUND

The Tennessee Valley Authority (TVA) provides power to about 10 million people and over 750,000 businesses across the seven states of the Tennessee Valley region. According to a 2016 TVA whitepaper,¹ TVA's customers are separated into three service classifications:

- **Standard Service** – residential, general/commercial, manufacturing/industrial, and lighting customers with contract demand² less than five megawatts (MW).
- **Large Manufacturing/Industrial** – defined as having a contract demand greater than five MW or with contracts served under the seasonal time-of-use rate schedules for customers with demands less than five MW. Industrial customers differ from general/commercial in that industrial are typically defined by Standard Industrial Classification codes or the North American Industrial Classification System.
- **Large General/Commercial** – defined as having a contract demand greater than five MW or with contracts served under the seasonal time-of-use rate schedules for customers with demands less than five MW. Commercial are usually defined as those customers that are neither residential nor industrial.

According to Commercial Energy Solutions (CES) Standard Programs and Processes (SPP) 21.7.3, *Cost of Service*, TVA performs an annual cost of service study to determine how revenue from each customer class compared to costs TVA incurred to serve each customer class. The study “is used to estimate the cost to TVA of serving particular customers or classes of customers and to compare that cost to the estimated revenue derived from those customers or classes. The analysis may be used to derive, evaluate, initiate, or justify rate actions.” According to the 2016 TVA whitepaper, the study is a detailed analysis of financial and operational data that culminates in the assignment of all system level costs to the three rate classes and their customers.

The creation of the cost of service study (1) involves identifying the costs, revenues, metered load, and sales for the fiscal year (FY) under analysis and (2) results in a final ratio for each customer classification. The final ratio signifies the relationship of costs to revenues for each customer classification.

Costs are classified into four categories as discussed below. During the classification stage, TVA reclassifies some credits, booked as reductions in revenue, as expenses.

- **Capacity** – Generation costs, including operations and maintenance, fixed interest, fixed plant and general depreciation, and general and

¹ TVA, *Wholesale Embedded Cost of Service*, September 2016

² Contract demand is the contractual agreement of total amount of power made available by the power distributor to the customer.

administrative (G&A) costs, which include property insurance, regulatory commission expenses, and other general expenses;

- **Energy** – Fuel and purchased power;
- **Transmission and Ancillary Services** – Transmission costs, including operations and maintenance, interest, depreciation, and G&A costs; and
- **Other** – Payments in lieu of taxes, amortization, customer service, nonnative transmission costs, off system energy costs/revenue, corporate G&A, and miscellaneous general expenses.

TVA identified over \$12.3 billion in costs to serve its customers in the FY 2023 completed cost of service study. The four categories and their total costs are shown in Table 1 below.

Cost of Service Study – FY 2023 Total Costs by Category	
Capacity	\$5,456,009,750
Energy	4,039,838,368
Transmission/ Ancillary Services	1,030,392,192
Other	1,827,319,868
Total	\$12,353,560,178

Table 1

According to CES-SPP-21.7.3 and the 2016 TVA whitepaper, the costs in each category are then allocated to each customer classification in a manner reflective of cost causation, based on the following methodologies:

- **Capacity** – TVA identifies the top 200 native peaking hours out of the 8,760 hours in the year, obtains meter readings for customers during those peaking hours, and allocates the capacity costs to each customer based on their share of use during those peaking hours.
- **Energy** – TVA determines each customer group's hourly cost based on their usage each hour of the year multiplied by TVA's hourly power supply cost. This is referred to as hourly load-weighted incremental costs. Then, the total energy costs are allocated to each customer group based on their hourly load-weighted incremental costs as a percentage of the overall annual total.
- **Transmission and Ancillary Services** – TVA calculates each customer's load share ratio based on the time of TVA's 12 transmission coincident peaks, which are the single peaks from each month of the year.
- **Other** – The other costs are allocated based on the average of the other three percentages determined above.

Table 2 shows the total costs allocated to each customer classification in TVA's FY 2023 cost of service study.

Cost of Service Study – FY 2023 Cost Allocations	
Standard Service	\$10,117,240,063
Large Industrial	1,974,084,137
Large Commercial	262,235,978
Total	\$12,353,560,178

Table 2

Internal Control

TVA uses the Federal Energy Regulatory Commission (FERC) Uniform System of Accounts for Electric Utilities. Those FERC account numbers and descriptions are used as the guide when TVA functionalizes the costs in the cost of service study (i.e., capacity, energy, transmission and ancillary, other). As a control to avoid data entry errors, values are not keyed into the cost of service study models/spreadsheets. Instead, values are linked to the source documentation. Additionally, TVA personnel perform a reconciliation of totals to the source data.

Due to the importance of fairly recovering costs to serve TVA customers through rate design, we performed this audit of TVA's FY 2023 cost of service study.

OBJECTIVE, SCOPE, AND METHODOLOGY

Our audit objectives were to determine if TVA's cost of service study was (1) performed in accordance with policies and procedures and (2) designed to accurately consider all revenue and costs to serve each customer classification. Our audit scope included the annual cost of service study completed in April 2024 for FY 2023. A complete discussion of our audit objectives, scope, and methodology is included in Appendix A.

FINDINGS

We determined TVA's FY 2023 cost of service study was performed in accordance with TVA policies and procedures; however, we noted the detailed internal procedure had not been recently updated to reflect organizational changes. Additionally, we identified an area where the cost of service study design could more accurately reflect the costs to serve each customer classification.

COST OF SERVICE WAS PERFORMED IN ACCORDANCE WITH TVA POLICIES AND PROCEDURES

We determined TVA's cost of service study was performed in accordance with TVA policies and procedures. We verified the final ratios in the FY 2023 cost of service study were supported by documentation without exception by (1) verifying the functionalization and classification agreed with FERC account descriptions, (2) agreeing included costs to the trial balance, (3) agreeing sales and metered load to supporting documentation, and (4) recalculating customer cost allocators.

Table 3 below shows the results of TVA's FY 2023 cost of service study, including the allocation of total costs discussed in the background section of this report and the metered load in kilowatt hours (kWh), gross revenue, and sales in kWh. The unit cost and unit revenue are presented as amounts per megawatt hour (MWh).

The calculations to arrive at the unit cost, unit revenue, and ending ratio are:

$$\begin{aligned} &(\text{Total Costs/Metered Load}) * 1,000 = \text{Unit Cost} \\ &(\text{Gross Revenue/Sales}) * 1,000 = \text{Unit Revenue} \\ &(\text{Unit Revenue/Unit Cost}) = \text{Ratio} \end{aligned}$$

Results of Cost of Service Study FY 2023				
	<u>Standard Service</u>	<u>Large Industrial</u>	<u>Large Commercial</u>	<u>TOTAL</u>
Total Costs	\$10,117,240,063	\$1,974,084,137	\$262,235,978	\$12,353,560,178
Metered Load (kWh)	115,597,446,464	36,936,405,778	4,294,069,755	156,827,921,997
Gross Revenue	\$9,856,336,136	\$2,184,029,079	\$315,515,270	\$12,355,880,485
Sales (kWh)	115,626,767,622	36,987,298,394	4,294,162,824	156,908,228,840
Unit Revenue (\$/MWh)	\$85.24	\$59.05	\$73.48	
Unit Cost (\$/MWh)	\$87.52	\$53.45	\$61.07	
Ratio	0.97	1.10	1.20	

Table 3

TVA graphed the resulting ratios for presentation purposes, as shown in Figure 1. According to TVA personnel, the size of the sphere is directly proportional to the size of the customer classification group. A 1.0 ratio represents the costs and revenues being equal, while a higher number indicates TVA is over recovering costs and a lower number indicates TVA is under recovering costs. The parity lines on the graph represent a +/- \$5 difference between the unit revenue and unit cost.

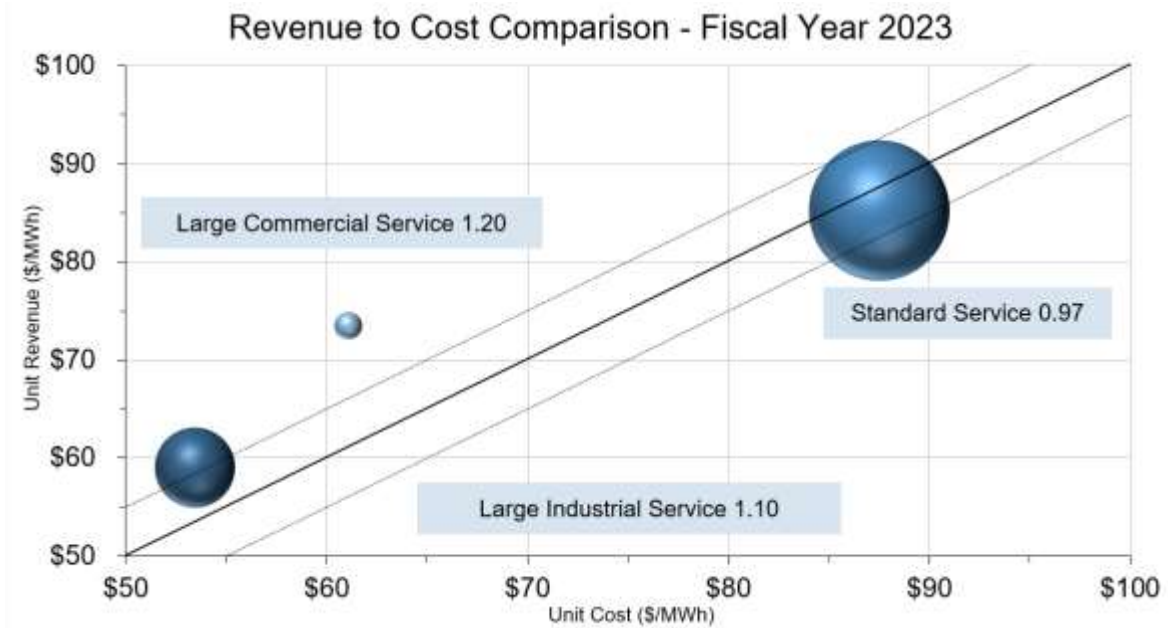


Figure 1

Figure 1 shows the large commercial results at 1.20 and large industrial results at 1.10, which were not in-line with previous years.³ TVA concluded that Winter Storm Elliott⁴ created an irregularity in the data, causing it to appear as if these groups were paying more than their typical allocated costs. We performed an analysis and determined, during FY 2023, 43 of the top 200 native peaking hours occurred December 23, 2023, through December 25, 2023. After noting the irregularity, TVA performed additional analyses that indicated if those three days were omitted from the cost of service entirely, the FY 2023 results would be more in-line with previous years.

We utilized CES-SPP-21.7.3, the 2016 TVA whitepaper, and discussions with TVA personnel to understand how the cost of service study information was obtained and compiled. However, we noted the whitepaper was created in 2016 and had not been updated since its creation. It was specifically out of date regarding data sources throughout TVA, such as business unit names and personnel to contact. The risk of inaccuracies could increase without current information in the cost of service study policies and procedures.

³ Large Commercial ratios were 1.10 in FY 2021 and 1.09 in FY 2022. Large Industrial ratios were 0.99 in both FY 2021 and FY 2022.

⁴ Winter Storm Elliott was an extreme cold weather event occurring between December 21 and 26, 2022, which impacted the reliability of the Bulk Electric System in the U.S. Eastern Interconnection.

COST OF SERVICE DESIGN IMPROVEMENT IDENTIFIED

During the classification stage of the cost of service study creation, some credits TVA provides to customers are reclassified from a reduction in revenue to an expense. Those expenses are then included in the total costs to be allocated. In FY 2023, the Valley Investment Initiative (VII) and performance grant payments, totaling \$311,230,792 and \$6,415,000 respectively, were included in total costs to be allocated. Additionally, a single interest discount accrual of \$304,291 at a Local Power Company (LPC) was reclassified.⁵ As stated in the background, TVA categorizes expenses as either capacity, energy, transmission and ancillary services, or other. TVA added the \$317,950,083 to customer service expenses, which increased the “other” cost category by that amount.

According to TVA-SPP-24.007, *Valley Investment Initiative*, and TVA-SPP-24.012, *The Performance Grant Program*, the VII and performance grant payments are economic development incentives. The VII is offered to qualifying power customers who contribute to the economic development of the Tennessee Valley region and complement TVA's power resources. The Performance Grant program allows direct investment in economic development projects and large scale regional and Valley-wide initiatives.

The economic development incentives and the accrual at the LPC do not represent costs incurred by TVA to provide power to all end-use customers. These amounts relate to individual businesses and an LPC and were not available to residential customers. Residential customers are part of the Standard Service class, along with lighting, small commercial, and small manufacturing customers. Figure 2 shows how the \$317,950,083 was allocated to each group in the FY 2023 cost of service study.

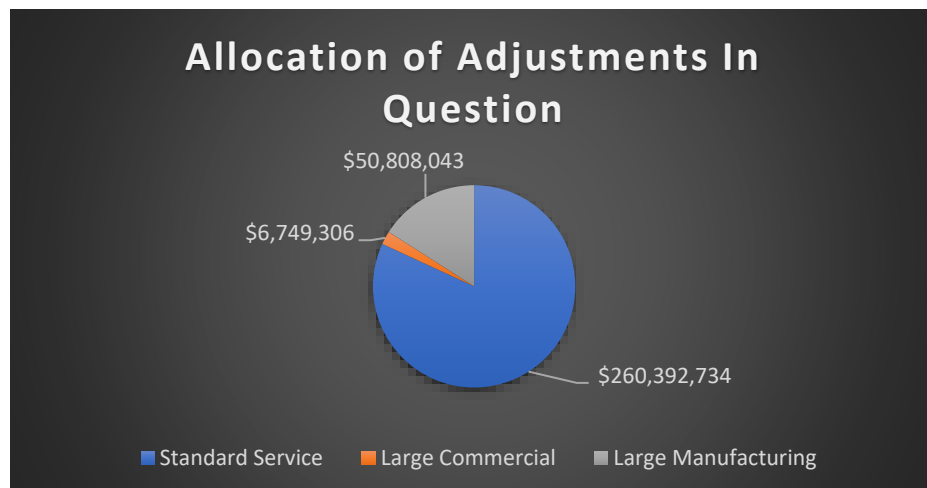


Figure 2

⁵ Due to a meter failure, an LPC was underbilled \$3,756,417 by TVA. The LPC agreed to pay the amount owed over time. The \$304,291 is the difference between the book value and fair market value of the total amount owed to TVA.

Table 4 shows an adjusted cost allocation and final ratios for FY 2023, if the identified \$317,950,083 was omitted from the “other” costs in the cost of service study. The amounts shown do not take into account the previously discussed Winter Storm Elliott data irregularities.

Adjusted Costs and Revenue				
	<u>Standard Service</u>	<u>Large Industrial</u>	<u>Large Commercial</u>	<u>TOTAL</u>
Adjusted Costs	\$9,856,847,329	\$1,923,276,094	\$255,486,672	\$12,035,610,095
Metered Load (kWh)	115,597,446,464	36,936,405,778	4,294,069,755	156,827,921,997
Adjusted Gross Revenue	\$9,802,605,613	\$1,921,233,499	\$314,091,290	\$12,037,930,402
Sales (kWh)	115,626,767,622	36,987,298,394	4,294,162,824	156,908,228,840
Unit Revenue (\$/MWh)	\$84.78	\$51.94	\$73.14	
Unit Cost (\$/MWh)	\$85.27	\$52.07	\$59.50	
Ratio	0.99	1.00	1.23	

Table 4

The inclusion of customer specific programs like the VII and performance grants should be evaluated to ensure the cost of service is designed to accurately consider all revenue and costs to serve each customer classification.

RECOMMENDATIONS

We recommend the Vice President, Contracts and Rates Strategy, Pricing and Contracts:

1. Formalize and update the cost of service study internal guidance, and develop a cadence for review and approval.

TVA Management’s Comments – In response to our draft report, TVA management stated they plan to update CES-SPP-21.7.3, implementing documents, and associated documentation during FY 2025. See Appendix B for TVA management’s complete response.

Auditor’s Response – We agree with TVA management’s planned actions.

2. Evaluate the inclusion of VII and Performance Grant credits, as well as any other local power company or customer specific costs going forward, as part of the cost of service study.

TVA Management’s Comments – In response to our draft report, TVA management stated they will evaluate the inclusion of VII and Performance Grant credits. The evaluation will consider, among other things, existing TVA accounting policy guidance as well as implications to TVA’s Section 13 (Payment in Lieu of Taxes) payments. See Appendix B for TVA management’s complete response.

Auditor’s Response – We agree with TVA management’s planned actions.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our audit objectives were to determine if the Tennessee Valley Authority's (TVA) cost of service study was (1) performed in accordance with policies and procedures and (2) designed to accurately consider all revenue and costs to serve each customer classification. Our audit scope included the annual cost of service study completed in April 2024 for fiscal year (FY) 2023. To achieve our audit objective, we:

- Reviewed Commercial Energy Solutions Standard Programs and Processes 21.7.3, *Cost of Service*, and a 2016 TVA whitepaper,¹ to identify key requirements applicable to the creation of the cost of service.
- Interviewed TVA personnel from Commercial Energy Solutions, to gain an understanding of the methodology for creating the cost of service study.
- Obtained an understanding of internal controls associated with TVA's cost of service study, including information systems controls. We identified three key controls significant to the audit objective. We determined each of these three controls were properly designed, implemented appropriately, and were operating effectively. These three controls are:
 - TVA uses the Federal Energy Regulatory Commission (FERC) Uniform System of Accounts for Electric Utilities. Those FERC account numbers and descriptions are used as the guide when TVA functionalizes the costs in the cost of service study.
 - No values are keyed in directly to the cost of service study models. Instead, all values are linked to the source documentation.
 - For each element of the analysis, the TVA analyst performs a reconciliation of totals to the source data.
- Obtained all documentation supporting the creation of the cost of service study for FY 2023 and (1) agreed all elements of the cost of service to the supporting documentation and (2) verified all formulas for accuracy.
- Independently obtained sales, load, revenue, and credit data, and performed data reliability steps and analysis to ensure the TVA provided data could be relied upon.
- Verified the classification/functionalization of costs followed the FERC Uniform System of Accounts.
- Recalculated the cost allocators for each customer classification.
- Reviewed the cost of service study adjustments/reclassifications for reasonableness.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis

¹ TVA, *Wholesale Embedded Cost of Service*, September 2016

for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

November 18, 2024

Mr. David Wheeler, Assistant Inspector General
Audits and Evaluations
TVA Office of the Inspector General

Request for Comments – Draft Audit 2024-17502 – TVA's Cost of Service Study

As requested, below are responses to the OIG's two recommendations to Pricing and Contracts (P&C) and CES Analytics (CESA).

OIG recommends the Vice President, Contracts & Rates Strategy, Pricing and Contracts:

1. Formalize and update the cost of service study internal guidance, and develop a cadence for review and approval.

P&C Response:

CESA plans to update the COS SPP, implementing document, and associated documentation during FY2025.

OIG recommends the Vice President, Contracts & Rates Strategy, Pricing and Contracts:

2. Evaluate the inclusion of VII and Performance Grand credits, as well as any other local power company or customer specific costs going forward, as part of the cost of service study.

P&C Response:

We will evaluate the inclusion of VII and Performance Grand credits as recommended. Such evaluation will consider, among other things, existing TVA accounting policy guidance as well as implications to TVA's Section 13 (Payment in Lieu of Taxes) payments.

Thank you for the work your team has done in evaluating TVA's Cost of Service Study Process.

If you have additional questions, please let me know.

Thank you.



Cass Larson
Vice President, Contracts & Rates Strategy
Pricing & Contracts