Q25. PLEASE DESCRIBE THE TRANSMISSION ACTIVITIES PERFORMED FOR ETI BY THE CAPITAL PROJECTS ORGANIZATION.

A. Similar to the Transmission Organization's Project Management and Construction Department, the Project Management Department within the Capital Projects Organization manages large transmission line and substation capital additions (i.e., over $20 million) for ETI. The Capital Projects Organization does not contain any ETI personnel; therefore all costs associated with its activities are affiliate expenses.

C. <u>MISO's Role</u>

Q26. PLEASE GENERALLY EXPLAIN MISO'S ROLE IN THE ETI TRANSMISSION SYSTEM.

A. MISO is a regional transmission organization formed with the approval of FERC to coordinate, control, and monitor the use of an electric transmission system by utilities, generators, and marketers. MISO provides non-discriminatory access to its transmission network, which includes the Entergy transmission system, pursuant to the MISO Tariff. As I mentioned earlier, ESL system operators in conjunction with MISO staff operate the Entergy transmission system. MISO is also required to meet specific FERC and NERC regulations related to transmission planning and expansion.

Q27. PLEASE EXPLAIN THE TRANSMISSION PLANNING PROCESS UNDER THE MISO TARIFF.

A. The MISO regional transmission planning process has as its fundamental goal the development of a comprehensive transmission expansion plan that meets reliability, policy, and economic needs. A set of principles adopted by the MISO Board of Directors guides MISO in its planning efforts. Those principles are as follows:

- Develop transmission plans that will ensure a reliable and resilient transmission system that can respond to the operational needs of the MISO region;
- Make the benefits of an economically efficient electricity market available to customers by identifying transmission projects which provide access to electricity at the lowest total electric system cost;
- Support federal, state, and local energy policy requirements by planning for access to a changing resource mix;
- Provide an appropriate cost allocation mechanism that ensures that costs of transmission projects are allocated in a manner roughly commensurate with the projected benefits of those projects;
- Analyze system scenarios and make the results available to federal, state and local energy policy makers and other stakeholders to provide context and to inform choices; and
- Coordinate planning processes with neighbors and work to eliminate barriers to reliable and efficient operations.[13]

Consistent with the purposes of the MISO planning process, the annual

[13] MISO Board of Directors, *Statement of Guiding Principles for the MISO Transmission Expansion Plans*, adopted on August 18, 2005, and revised or reaffirmed by the System Planning Committee of the MISO Board in February 2007, August 2009, May 2011, March 2013, August 2014, April 2015, March 2016, and June 2021 are *available at* https://cdn.misoenergy.org/System%20Planning%20-%20Statement%20of%20Guiding%20Principles113847.pdf.

MISO Transmission Expansion Plan ("MTEP") identifies solutions to meet transmission needs for the entire MISO system and to create value opportunities over the planning horizon through the implementation of a comprehensive planning approach.

Q28. HOW DOES MISO IMPLEMENT THE MTEP PLANNING PROCESS?

A. As an RTO and a Planning Authority under the NERC[14] functional model, MISO must independently verify that the transmission system is being planned efficiently to meet reliability needs. Consistent with that obligation, MISO planning staff is responsible for conducting the regional planning process. MISO staff integrates the planning processes used by each Transmission Owner member (e.g., ETI) for that owner's own transmission system and the advice and guidance of stakeholders into a coordinated regional transmission plan (the MTEP) and identifies additional projects as needed to provide for an efficient and reliable transmission system. Among other things, MISO staff is responsible for developing regional transmission planning models, testing regional models to identify performance of the models against national reliability standards,

[14] The North American Electric Reliability Corporation ("NERC") is a not-for-profit corporation originally formed by the electric utility industry in 1968 to promote the reliability of the electricity supply in North America. On July 20, 2006, FERC certified NERC as the electric reliability organization ("ERO") for North America, subject to oversight and audit by FERC and governmental authorities in Canada. In March 2007, FERC approved 83 NERC Reliability Standards that became effective June 18, 2007. This was the first set of legally enforceable standards for the U.S. bulk power system. To achieve its mission of improving reliability and security of the bulk power system in North America, NERC continually develops and enforces reliability standards; monitors the system; assesses future adequacy of the system; audits owners, operators, and users of the system for preparedness; and educates and trains industry personnel. Currently, NERC has approved 100 Reliability Standards. NERC consists of eight Regional Reliability Organizations whose members account for virtually all electricity supplied in the United States, Canada, and a portion of Baja California Norte, Mexico.

evaluating alternative solutions to identified needs, developing (through a collaborative process) possible solutions to identified issues, selecting preferred solutions, identifying opportunities for economic expansions, determining funding and cost responsibility, and monitoring the progress of solution implementation.

MISO staff is also responsible for directing the preparation of a preliminary MTEP report, proposing new projects, modifying existing projects, proposing alternative solutions to deficiencies identified in the assessment process, presenting the highlights of the report to stakeholders, and distributing the report to stakeholders for written comments. Finally, MISO staff is responsible for preparing the final draft of the comprehensive MTEP and presenting that plan to the MISO Board of Directors for approval.

Q29. WHO ULTIMATELY DETERMINES WHETHER PROJECTS ARE INCLUDED IN THE MTEP?

A. The MISO Board of Directors ultimately determines the projects that are included in the MTEP.

Q30. WHAT HAPPENS ONCE A PROJECT IN ETI'S SERVICE TERRITORY IS INCLUDED IN THE MTEP?

A. Pursuant to the MISO Transmission Owners Agreement, ETI, as the incumbent Transmission Owner for projects in its service territory, has the obligation to make a good faith effort to design, certify, and build MTEP Appendix A projects,[15] subject to such siting, permitting, and environmental constraints as may be imposed by state, local, and federal laws and regulations, and subject to the receipt of any necessary federal or state regulatory approvals.

D. Transmission Incident Response Plan

1. Overview

Q31. DESCRIBE ENTERGY TRANSMISSION'S PLANNING TO ADDRESS MAJOR STORMS AND EMERGENCY EVENTS.

A. Entergy maintains a thorough and comprehensive storm plan (the Incident Response Plan ("IRP")) and conducts refresher training primarily in conjunction with an annual system-level drill to test processes and abilities. The overall Entergy storm plan is comprised of smaller, but well-coordinated, incident response plans at the department, business unit, state, and overall system levels. These plans, including the IRP, are updated on an ongoing basis. The IRP is accessible by all Transmission employees via an internal company web site.

Q32. PLEASE DESCRIBE THE ORGANIZATIONAL STRUCTURE FOR MANAGING THE IRP.

A. The System Command Center ("SCC") is a functional organizational structure based on the National Incident Management System. All functions, including

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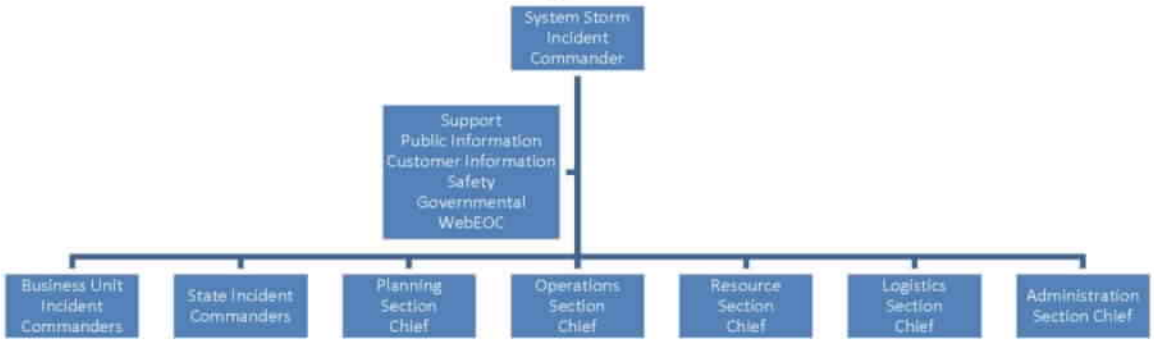
[15] MTEP Appendix A contains transmission expansion plan projects recommended by MISO staff and approved by the MISO Board of Directors for implementation by Transmission Owners. Generally, transmission projects that require monies to be expended for the purpose of scoping or design or construction within calendar year following the MTEP year are included in the MTEP Appendix A.

Transmission activities, are completely integrated within this command structure. The SCC organizational structure is shown in Figure 1.

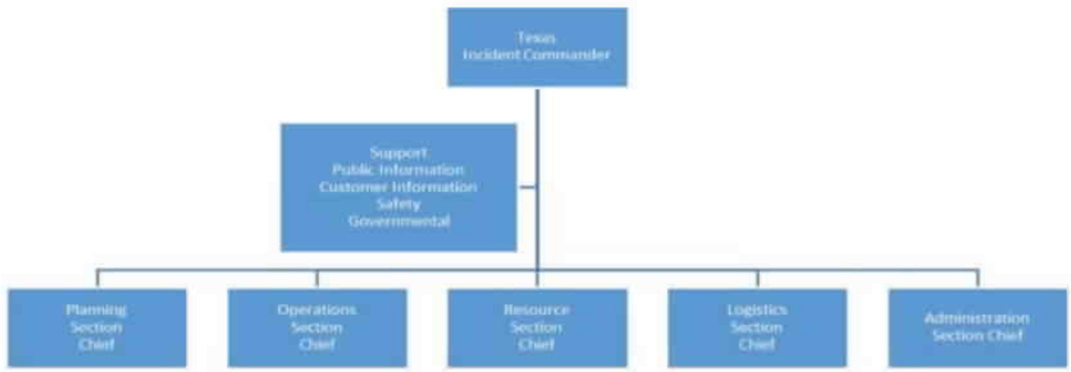
Figure 1



The Transmission IRP includes definitions of the roles and responsibilities of the key positions in our leadership structure and thorough checklists that are executed in staged time intervals in advance of the storm. Detailed contact information is included in the plan for employees and contractors.

As illustrated in Figure 1 (above), the System Storm Incident Commander is responsible for coordinating the response among all applicable organizations and functions, including ensuring communications with customers, as well as key governmental, regulatory and incident management contacts.

Figure 2



The State Command Centers, including the Texas Command Center under the leadership of ETI President and CEO, direct prioritization and restoration efforts within their respective EOC, as shown in Figure 2 (above).

Q33. DOES ENTERGY CONDUCT PERIODIC DRILLS FOR STORM PLANNING AND PREPAREDNESS?

A. Yes, Entergy conducts a system drill each year. Entergy tests its storm plan and communication links with an annual hurricane drill that includes the System Command Center, the EOCs, Transmission and other Business Organizations, and Corporate support groups. The drill is not only a test of our readiness, but is also used as a training tool. The drill allows participants an opportunity for "hands-on" experience in incident response and, therefore, is an opportunity to practice and improve the performance of incident response personnel and to test response processes, which leads to a realistic experience. The drill usually consists of two days of hurricane simulation with many other days of preparation and post-drill critiquing. The drill is comprised of hundreds of simulated messages where the participants' actions are observed by evaluators. Also, there are separate functions that may conduct their own drills independent of the system drill (e.g., Business Continuity, Corporate Communications).

We have found these hurricane drills to be useful in many ways: (1) employees get a clear focus of their assigned roles and duties; (2) they are forced to think about the resources, data and tools they will need during an actual storm; and (3) we are able to test and refine the reporting and communication processes.

Q34. WHAT ELSE DOES ENTERGY DO IN REGARD TO STORM PLANNING?

A. Entergy annually reviews and adjusts its incident response plans in order to include new information and lessons learned from supporting other companies (in a mutual assistance role) as well as from its own activities in storm restoration. Entergy conducts pre-hurricane season meetings with local leaders and the media to ensure that communication links and protocols are in place. Entergy is an active participant in several mutual-assistance groups, including the Edison Electric Institute ("EEI"), the Southeastern Electric Exchange ("SEE"), Texas Mutual Assistance Group and the Midwest Mutual Assistance Group. Entergy also participates in national professional meetings on hazard mitigation, including the National Hurricane Conference.

Entergy's System Outage Response group conducts training on key restoration software prior to each hurricane season. This group also conducts training on specific restoration processes, including the Gateway process for crew check-in and crew leader/worker documentation. Entergy continues to train in the use of the federal government's Incident Command System format in restoration activities and to push this work process down into the various levels of the organization. We are constantly refining our incident response plans based upon experiences gained from frequent, more common events such as severe thunderstorms. We also learn from experiences with other utilities, as we routinely (several times each year) provide mutual assistance to other utilities affected by significant storms and participate in regional and national mutual-assistance groups.

Q35. HAS ENTERGY RECEIVED ANY AWARDS FOR ITS WORK IN RESPONDING TO THE HURRICANES AND OTHER STORMS?

A. Entergy has received numerous awards for its storm restoration efforts. Entergy received the Edison Electric Institute Emergency Recovery Award for its efforts in restoring power following Hurricane Laura. This is the 24th straight year that Entergy has received an EEI award for its storm restoration work. Entergy is the only company to have received an EEI Emergency Response Award every year since the awards were created in 1998.

2. Hurricanes Laura and Delta Example of Incident Response Plan Execution and Storm Restoration

Q36. PLEASE SUMMARIZE THE IMPACT OF HURRICANES LAURA AND DELTA IN 2020 AND THE CHALLENGES ASSOCIATED WITH RESTORING POWER.

A. The 2020 hurricane season was extraordinarily active with 30 named storms and 13 hurricanes, six of which became major hurricanes. The first major threats to the Gulf Coast began in late August as Hurricanes Marco and Laura were simultaneously active in the Gulf of Mexico by August 25. Hurricane Marco weakened as Hurricane Laura rapidly intensified and struck southwest Louisiana on August 27. Hurricane Laura was the strongest hurricane to make landfall in Louisiana since 1856. All transmission tie lines between southwest Louisiana and southeast Texas were damaged or destroyed rendering them "out of service." These tie lines included two 500 kV lines, one 230 kV line, and five 138 kV lines. In total, 62 transmission branches experienced an outage as a result of Hurricane Laura. Just across the Sabine River, transmission damages in southwest Louisiana were devastating. Long sections of transmission lines capable of transporting thousands of megawatts of energy were destroyed. In the Lake Charles area, over 1,400 transmission structures were destroyed and over 640 miles of transmission lines were out of service at the peak of the event. The storm resulted in over 90 bulk power and load-serving substations being unable to deliver energy to customers. The city of Lake Charles experienced 13 days with no power.

The most immediate challenge to restoration was the damage to the tie lines between Texas and Louisiana. Without these ties, ETI was hampered in its ability to move power from its northern regions into areas in southeast Texas. In addition, ties to the AEP-West Control Area were opened by the Southwest Power Pool Reliability Coordinator in order to protect the stability of that system during and following the storm, which prevented imports of power from the north. As a result, ETI was forced to closely balance its load and generation without the benefits of the larger interconnected system to the east and north. Until multiple ties with Louisiana were restored, operations were limited in ETI. Thus, restoring ties to the east, primarily the 500 kV line to ELL's Nelson Station in Lake Charles, was essential to restoring reliable service to ETI's customers.

Other challenges included managing transmission system usage to move power from the western part of ETI to the east to offset the inability to import electricity from Louisiana, accessing a restoration-critical transmission line in a remote and wooded area in order to remove a tree that had fallen from outside of the right-of-way onto the facility, and expediting the replacement of a transformer that failed just prior to the storm in order to increase the capability to transfer power into southeast Texas.

When Hurricane Laura made landfall, other regional utilities were still recovering from the numerous hurricanes that impacted the U.S. in 2020, which presented a limited supply of and extreme demand for personnel, material and logistical resources required for the restoration effort ongoing in Texas and Louisiana. To overcome these challenges, ETI's transmission function brought in substation, relay, line and vegetation personnel from mutual-aid utilities and third-party contractors to assist in the restoration. Employees and contractors worked up to 16-hour shifts to restore service as quickly as possible.

Obtaining sufficient food and lodging were also challenges due to the widespread damage in Louisiana and ongoing restoration work in other areas. Additional challenges around providing these logistical support functions had to be overcome given the ongoing health requirements and protocols associated with the response to COVID-19. To overcome these challenges, ETI utilized commercial lodging where available as well as a variety of logistics contractors to provide alternative lodging sites, both fixed and mobile.

Approximately three weeks after Hurricane Laura, the Gulf of Mexico was threatened by another significant storm when Hurricane Sally formed. Hurricane Sally ultimately moved east and impacted the Mobile, Alabama area on September 15. By September 18, Tropical Storm Beta was in the Gulf of Mexico and again utilities and their shared resources were forced to plan a response. A few days later, on October 4, Tropical Storm Gamma was threatening the same region, and just five days after that on October 9, Hurricane Delta struck southwest Louisiana very near the same location that Hurricane Laura had come ashore as a Category 4 hurricane.

Hurricane Delta caused outages to additional ETI transmission lines. Damages were not as severe as those incurred from Hurricane Laura and included more ancillary structure damages such as cross-arms and hardware as opposed to more severe structural failures. However, challenges associated with the protracted response to earlier storms continued to mount. Mutual-assistance resources continued to release back to their home systems, requiring company resources to backfill restoration roles. As with Hurricane Laura, damage in the Lake Charles area was more significant than damage in Texas. This complicated restoration efforts, as impacted circuits and damage were spread across a wider area.

Q37. PLEASE SUMMARIZE THE DAMAGE TO ETI'S TRANSMISSION SYSTEM FOLLOWING HURRICANES LAURA AND DELTA.

A. Hurricane Laura's historic intensity caused catastrophic damage to Entergy's transmission system, particularly in southwest Louisiana. Often after a hurricane passes, restorations can begin with a few "quick-wins," where facilities that survived can be used to begin piecing the system back together and begin the process of getting power into areas in or near the point where the hurricane made landfall. For Hurricane Laura, the damages to key transmission facilities were so extensive and so severe that there were no viable paths to bring power into southwest Louisiana from points east or north for several days. These severe damages in southwest Louisiana also impacted Texas, as all of the transmission tie lines between ELL and ETI had been severed. Hurricane Laura caused outages to 62 of the 254 transmission lines and 58 of the 372 electrical stations in the ETI area.

For Hurricane Delta, damages were not as severe as those incurred with Laura and included more ancillary structure damages such as cross-arms and hardware as opposed to more severe structural failures. Hurricane Delta caused outages to 36 of the 254 transmission lines and 33 of the 372 electrical stations in the ETI area.

Q38. PLEASE EXPLAIN HOW ENTERGY IMPLEMENTED THE STORM PLAN.

A. State Command Centers were utilized in preparation efforts prior to the arrival of each hurricane. The State Command Centers were also active in restoration activities in their own state or in support of the other EOCs. Prior to the arrival of Hurricane Laura, the SCC Planning Section was closely monitoring both Hurricane Marco, for potential effects on securing mutual-assistance support, and Hurricane Laura while providing continuous updates to Entergy management. Prior to Hurricane Delta making landfall, the System Planning Section was closely monitoring Tropical Storms Beta and Gamma. The SCC Planning Section also provided damage prediction information, based on the Tropical Prediction Center's weather data and other weather forecast services, to the System Resource and Logistics departments to assist in the determination of restoration resources and requirements. When it became apparent that Hurricane Laura would develop into a large hurricane that would affect the Louisiana and upper Texas coasts, the primary focus at the system level was the protection of existing restoration workers and the preparation of the EOCs' critical infrastructure for a hurricane landfall in southwest Louisiana and southeast Texas. Similarly, when Entergy recognized Hurricane Delta would develop into a major storm that would again impact the Louisiana and upper Texas coasts, system-level preparations were initiated to prepare a prompt and orderly response and restoration effort.

As soon as Hurricane Laura made landfall, the SCC began adjusting personnel and logistical resource deployments based on transmission and distribution damage prediction information, which was later augmented with damage assessment information from the field. The logistics efforts to support the arrival of additional workers were already underway, and sites were opened as soon as the winds dropped to a safe level.

Similarly, when Hurricane Delta made landfall, the SCC adjusted personnel and logistical resource deployments based on transmission and distribution damage prediction information and field assessments of the damage caused by Hurricane Delta. Logistical efforts followed to support the resources deployed once the SCC determined it was safe to do so.

Restoration conference calls were also held to provide overall coordination for the operational and support groups throughout Entergy. There were frequent conference calls with the mutual-assistance companies to coordinate resources. That line of communication was particularly important because as Hurricane Laura, for instance, continued its path through Arkansas and east toward the Mid-Atlantic, other utilities in those areas had to recall their resources in support of their home systems. Those communications allowed Entergy to ensure enough workers were available to accomplish each storm restoration.

Q39. PLEASE SUMMARIZE THE VOLUME OF LOGISTICAL RESOURCES UTILIZED TO MANAGE THE STORM RESTORATION PROCESS.

A. The ETI logistical effort necessary to restore service following Hurricane Laura was a significant undertaking. ETI set up multiple logistical sites following Hurricane Laura, and two of those were full-service logistical sites with lodging, food, and fuel. The Company utilized over 600 transmission restoration workers, all of whom needed basic necessities to work as safely and quickly as possible. Following Hurricane Delta, ETI set up one logistical site to serve over 250 transmission restoration workers.

Q40. DID COVID-19 PRESENT ADDITIONAL CHALLENGES FOR STORM RESTORATION?

A. The COVID-19 pandemic especially presented logistical challenges associated with the 2020 hurricane restorations. There was a need to not only adhere to the usual safety protocols associated with system restoration after a major event, but also a requirement to include protocols associated with COVID-19 in order to ensure the health and safety of those involved in the restoration efforts. So, along with the standard storm preparations, Entergy took additional steps to adjust crew staging locations in order to help team members maintain social distancing.

Q41. DESPITE ALL THOSE CHALLENGES, WAS ETI ABLE TO EFFECTIVELY RESTORE SERVICE TO ITS CUSTOMERS FOLLOWING THE HURRICANES?

A. Yes. Through effectively executing the Incident Response Plan and relying on Entergy's training and experience, following Hurricane Laura ETI restored service to over half its customers in five days, and, within seven days, service was restored to over 80% of customers. By the tenth day, power was restored to nearly all customers who could safely take service. For Hurricane Delta, ETI restored service to approximately 70% of its customers by day three, and 95% of customers had service restored by day five. Nearly all customers who could safely take service were restored in eight days.

III. TRANSMISSION FUNCTION CAPITAL ADDITIONS

Q42. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR TESTIMONY?

A. In this section of my testimony, I address and sponsor the total Transmission Function capital investment ETI seeks in rate base in this filing: $838,178,935. This amount includes transmission-related capital additions closed to plant in service from the day following the end of the test year in Docket No. 48371 through the end of the Test Year in this proceeding; that is, from January 1, 2018 through December 31, 2021.

A. Overview of Projects

Q43. PLEASE GENERALLY DESCRIBE THE CAPITAL ADDITIONS CLOSED TO PLANT IN SERVICE YOU SPONSOR FOR INCLUSION IN RATE BASE.

A. I sponsor for inclusion in rate base, ETI's Transmission Function capital additions from the end of ETI's last rate case through the end of the Test Year. That investment totals $838,178,935.

Transmission Function capital projects include capital additions in the categories of General Plant, Intangible, and Transmission Plant. Certain projects contain a combination of these categories. The breakdown for each of these categories is shown in Table 1 below.

Table 1: Transmission Function Capital Projects Summary by Asset Class

January 1, 2018 December 31, 2021	DOLLARS CLOSED TO PLANT	PERCENT
General Plant	$1,804,273	0.2%
Intangible	$4,042,835	0.5%
Transmission Plant	$832,331,826	99.3%
Total Transmission Function	**$838,178,935**	**100%***

* Totals may not sum due to rounding.

Q44. WHERE CAN THE READER FIND A COMPLETE LIST OF TRANSMISSION FUNCTION CAPITAL PROJECTS CLOSED TO PLANT IN SERVICE YOU SPONSOR FOR INCLUSION IN RATE BASE?

A. I provide a complete list of the projects making up the $838,178,935 amount in Exhibit KV-3.

Q45. PLEASE EXPLAIN THE INFORMATION PROVIDED ON EXHIBIT KV-3.

A. Exhibit KV-3 is organized by asset class, which includes General Plant, Intangible, and Transmission Plant. Each project can be identified by a specific project code and project code description, which provides an explanation for the expense. The exhibit includes the following information under column headers:

Column A	Witness Name
Column B	Witness Class
Column C	Project Code
Column D	Project Code Description
Column E	Asset class
Column F	In-service date
Column G	Asset location description
Column H	State location
Column I	Business Unit ("BU")
Column J	Non-Affiliate Charges Excluding Capital Suspense and Reimbursements
Column K	Reimbursements
Column L	Represents capital suspense overhead costs associated with administrators, engineers and supervisors to the capital projects for which they provide services. Each function charges its capital suspense to a "Capital Suspense" project, which is then allocated out to the appropriate capital projects. Capital Suspense costs and the subsequent allocation are separated by BU and function combination to more accurately match such costs on the actual projects worked on for each function within a BU.
Column M	Represents the portion of capital suspense overhead costs (in Column L) from an affiliate.

Column N	Represents the portion of capital suspense overhead costs (in Column L) that are charged to the project by ETI employees.
Column O	Represents charges incurred by the ESL service company and allocated out to the appropriate BUs based on the ESL billing method assigned to the project plus loaned resource charges incurred at one BU and charged to another BU for services rendered on behalf of that BU.
Column P	Represents the total affiliate portion of the charges included in Column Q, and is the total of Columns M and O.
Column Q	Represents the total amount of capital additions closed to plant in service.

Q46. GENERALLY, WHAT TYPES OF PROJECTS APPEAR IN EXHIBIT KV-3?

A. Generally, the Transmission Function capital projects reflected in Exhibit KV-3 expanded and upgraded the ETI Transmission System infrastructure to interconnect new customers and new generation, improve and maintain reliability, and improve load-serving capability. They include the construction of new transmission lines, reconductoring of existing transmission lines with wires of higher capacity, construction of new substations, and replacement of aging or failed transmission line and substation assets.

Q47. HOW DOES ETI CATEGORIZE ITS TRANSMISSION FUNCTION CAPITAL PROJECTS?

A. ETI categorizes its Transmission Function capital projects as follows:

Reliability – A project (i) that is needed for the continued uninterrupted operation of the transmission system to prevent an operational deficiency, or (ii) that is the result of load growth. In general, this category includes projects necessary to comply with the NERC Reliability Standards, which can include the construction of new transmission switching stations and transmission lines, upgrades of existing transmission lines (i.e., reconductoring, voltage conversion), and installation of substation equipment such as autotransformers and capacitor banks. Examples of projects undertaken to address operational deficiencies include the shielding of lines for lightning protection and the addition of switches/circuit breakers for quicker or easier restoration of customers. Examples of projects undertaken to address load growth include the construction of a new substation to serve load, the addition of transformer capacity to a substation for area load growth, the addition of substation capacitor banks, and the construction of a new line into an area to increase import capacity. This category also includes storm restoration work as well as projects for storm-hardening (e.g., raising substation equipment for flood mitigation) and enhancing transmission system resiliency.

Revenue – A project required (i) to connect a new customer to the transmission system, (ii) to provide capability to serve increased load for an existing customer, or (iii) for the addition of facilities to be fully covered under facility charges. Examples include the addition of a new substation for an industrial customer, the addition of a new transmission line for a specific customer, or an increase of transformer capacity at an industrial site. All are required to meet specific load requirements of individual customers.

Failures – A project necessary to replace or repair failed equipment. Examples include the rewinding or replacing of a failed transformer and replacing damaged poles, insulators, circuit breakers, shield wire, etc.

Generation Interconnection – Transmission facilities necessary to interconnect generation assets.

Infrastructure – A project that provides for replacement of antiquated, technologically-outdated equipment or equipment no longer supported by the manufacturer. Examples include certain types of lightning arresters, batteries, relays, or any obsolete equipment.

Mandated – Projects that must be funded and completed without delay due to contractual agreement, law, or regulatory requirements. Examples include moving facilities at the request of the highway department, adding/modifying facilities under a contractual agreement, and reimbursable projects for interconnecting utilities.

Transmission Service – Transmission upgrades necessary to designate generation as a network resource or accommodate point-to-point transmission service.

Economic – Projects that typically provide reductions in production costs due to reduced congestion and energy losses, as well as reductions in capacity requirements due to reduced capacity losses and planning reserve margin requirements. Other economic benefits directly related to transmission service may be identified and considered as well.

Other – Projects that are needed to support the operation of the electrical system but are not a direct part of the electrical system. Examples include facility additions, the funds used to replace or purchase new tools required for construction and/or maintenance, and general and intangible additions that were specifically related to transmission functions.

1. Major Projects

Q48. OF THE CAPITAL ADDITIONS YOU SPONSOR, WHICH PROJECTS INCURRED THE HIGHEST TOTAL COSTS?

A. Nineteen of the Transmission Function capital projects had costs that exceeded $10 million. These 19 projects account for approximately 75% of the total capital additions I sponsor. I list those projects by Funding Project Code[16] in Table 2 below and describe them in greater detail immediately following the table.

Table 2: Highest Transmission Function Capital Projects by Cost

	Funding Project Code	Description	Asset Class	Type	Dollars Closed to Plant
1	F1PPU75798	WREP: Construct Lewis Creek-Rocky Creek 230 kV Line	Transmission Plant	Economic	$96,913,390
2	F1PPU75762	PARIP: New 230 kV Substation & Line	Transmission Plant	Reliability	$88,534,473

[16] A Funding Project Code is a high-level description of a capital project that encompasses one or more Project Codes, which are also referred to as Work Orders. Project Codes are generally created for work at a specific asset location (e.g., substation, transmission line).

	Funding Project Code	Description	Asset Class	Type	Dollars Closed to Plant
3	F1PPU75863	MCPS: NRIS/ Reliability Projects	Transmission Plant and General Plant	Transmission Service	$72,250,418
4	F1PPU75787	Build China-Stowell 230 kV Line	Transmission Plant	Reliability	$67,715,570
5	F1PPU75742	Hull-Sour Lake: Reconductor 69 kV Line	Transmission Plant	Reliability	$42,141,109
6	F1PPU51199	MCPS: Interconnection & Breakers Upgrades at Lewis Creek	Transmission Plant	Generation Interconnection	$41,336,938
7	F1PPU75716	Bryan: Replace Autotransformers & Reconfigure 69 kV and 138 kV Buses	Transmission Plant	Reliability	$34,572,943
8	F1PPUT0556	Transmission Substation Failure Blanket	Transmission Plant and General Plant	Failures	$26,240,174
9	F1PPVS0232	Montgomery County Power Station	Transmission Plant	Generation Interconnection	$24,940,373
10	F1PPU75797	WREP: Newton Bulk to Leach Rebuild	Transmission Plant	Economic	$17,720,651
11	F1PPU51048	Pintail 138 kV: Build New Switching Substation	Transmission Plant	Reliability	$17,088,579
12	F1PPUX4778	Build New Heights Substation	Transmission Plant	Reliability	$15,799,000

	Funding Project Code	Description	Asset Class	Type	Dollars Closed to Plant
13	F1PCUD0279	Transmission Lines Program Blanket	Transmission Plant	Infrastructure	$15,204,045
14	F1PPUT0117	Transmission Substation Relay Improvements Blanket	Transmission Plant	Infrastructure	$14,863,753
15	F1PCUD0551	Transmission Line Failure Blanket	Transmission Plant	Failures	$14,312,301
16	F1PPU51073	Helbig: Install Breakers on AT1/AT2	Transmission Plant	Reliability	$11,123,381
17	F1PPUT0119	Transmission Substation Breaker Replacement Blanket	Transmission Plant	Infrastructure	$10,796,776
18	F1PPU51376	Build New Star Bayou 230kV Substation	Transmission Plant	Revenue	$10,215,367
19	F1PPU51151	ExxonMobil – Build New Substation	Transmission Plant	Revenue	$10,200,140
				TOTAL	**$631,969,381**

1. **Project F1PPU75798: WREP: Construct Lewis Creek-Rocky Creek 230 kV Line.** This project was part of the Western Region Economic Project ("WREP") identified by MISO in its Market Congestion Planning Study. The project involved building a new 230 kV line to provide an additional path to the Conroe, TX area. This economic transmission project was identified through MISO's transmission planning process and was determined to reduce congestion in the Western Region of ETI's service area.

2. **Project F1PPU75762: PARIP: New 230 kV Substation and Line**. The Port Arthur Reliability Improvement Plan ("PARIP") project involved (i) the construction of a new 230 kV substation (Garden) that cuts into the McFadden Bend – China 230 kV and Nederland – Mid County 230 kV lines (L-496 & L-539); (ii) the construction of a new 230 kV substation (Legend) that cuts into both Port Acres Bulk to Keith Lake 230 kV lines (L-829 & L-830); and (iii) the construction of a 12-mile-long 230 kV line between Garden and Legend substations. This project was necessary to comply with NERC Reliability Standards. Without this project, multiple contingency scenarios on the 230 kV network between Sabine and Port Acres Bulk substations can cause cascading events resulting in load loss in excess of 850 MW in violation of Entergy's local planning criteria.

3. **Project F1PPU75863: MCPS: NRIS/ Reliability Projects.** This transmission project portfolio includes a series of projects to support reliability and network resource interconnection service to the Montgomery County Power Station ("MCPS"), which includes: (i) construction of a new Lewis Creek to Porter 230 kV line; (ii) rebuild of the existing Lewis Creek to Sheawill-FW Pipe 138 kV line; (iii) rebuild of the existing Conair-Conroe Bulk 138 kV line; (iv) rebuild of three spans of the existing Lewis Creek to New Caney Creek 138 kV line; and (v) partial rebuild of the existing Lewis Creek to Alden 138 kV line. At the Porter Substation, the project installed a new 230 kV line bay and two new 230 kV circuit breakers, turning the Porter substation configuration into a three-breaker ring bus.

4. **Project F1PPU75787: Build China-Stowell 230 kV Line.** This project involved the construction of a new approximately 20-mile, 230 kV electric transmission line from China substation to Stowell substation with a minimum rating of 1,950 Amps. It also included the installation of a 230/138 kV, 400 MVA autotransformer at Stowell. This project was necessary to mitigate low voltage issues and to comply with NERC Reliability Standard TPL-001-4 and Entergy's local transmission planning criteria. The Commission approved ETI's application for a certificate of convenience and necessity ("CCN") for this project in Docket No. 46248.[17]

5. **Project F1PPU75742: Hull-Sour Lake: Reconductor 69 kV Line.** This project involved rebuilding the Hull to Sour Lake 69 kV line with a new conductor. This project is necessary to comply with NERC Reliability Standards to mitigate low voltage and thermal overloads.

6. **Project F1PPU51199: MCPS: Interconnection & Breakers Upgrades at Lewis Creek**. This transmission project portfolio relates to the interconnection and upgrades for MCPS and includes: (i) expanding the Lewis Creek 230 kV Substation to add an additional two-breaker line bay; (ii) expanding the Lewis Creek 138 kV Substation to add two additional two-breaker line bays; (iii) relocating an existing capacitor bank in the Lewis Creek 138 kV Substation; and (iv) building three generator interconnection lines (two at 138 kV and one at

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[17] *Application of Entergy Texas, Inc. to Amend its Certificate of Convenience and Necessity for 230-kV Transmission Line within Jefferson, Chambers and Liberty Counties*, Docket No. 46248, Order (May 9, 2017).

230 kV). This project also includes rebuilding the existing Lewis Creek to Goree to Rivtrin 138 kV line and replacing 12 circuit breakers at the Lewis Creek 138 kV Substation.

7. **Project F1PPU75716: Bryan: Replace Autotransformers & Reconfigure 69 kV and 138 kV Buses**. This project involved replacing both autotransformers at Bryan Substation with 100 MVA units. This project also included reconfiguring the Bryan Substation 69 kV and 138 kV buses into ring buses. This project is necessary to comply with NERC Reliability Standards to eliminate low voltage and thermal violations in the Calvert, TX area under contingency scenarios.

8. **Project F1PPUT0556: Transmission Substation Failure Blanket.** This project is necessary to provide quick response to substation failures of equipment that need immediate attention to preserve the integrity and reliability of the ETI's transmission substations.

9. **Project F1PPVS0232: Montgomery County Power Station.** This project captures the transmission-related costs associated with ETI's MCPS, which is a natural gas-fired generation facility based at the existing Lewis Creek power plant in Willis, TX.

10. **Project F1PPU75797: WREP: Newton Bulk to Leach Rebuild**. This project involved the rebuilding to a higher capacity (145 MVA to 287 MVA) of the existing approximately 25-mile 138 kV transmission line from Newton Bulk substation to Leach substation. This project was part of the Western Region Economic Project identified by MISO in its Market Congestion Planning Study.

The project will help alleviate congestion in the West Atchafalaya Basin and Western Region load pockets.

11. **Project F1PPU51048: Pintail 138 kV: Build New Switching Substation.** This project involved constructing a new switching substation with a three-breaker ring bus at the existing Magnolia Ames tap point. The substation is designed to accommodate a future distribution power transformer and is necessary to comply with NERC Reliability Standards to eliminate low voltage issues.

12. **Project F1PPUX4778: Build New Heights Substation.** This project involved the construction of the Heights 230/34.5 kV substation and new 230 kV overhead electric transmission lines (looped) to connect the substation to the existing 230 kV transmission Line #822. The Heights substation serves as a new ETI distribution point of delivery. It provides additional load serving transformer capacity that is necessary to eliminate an expected New Caney substation transformer overload condition. Load growth within ETI's New Caney network in southeast Montgomery County is expected to continue over the next 10 to 20 years. This project also addresses New Caney substation load that could not be restored until repairs are made for transformer contingencies. The Commission approved ETI's application for a CCN for the new 230 kV transmission line portion of the project in Docket No. 46408.[18]

13. **Project F1PCUD0279: Transmission Lines Program Blanket.**

[18] *Application of Entergy Texas, Inc. to Amend its Certificate of Convenience and Necessity for a 230kV Transmission Line in Montgomery County (Heights Substation to Line 822)*, Docket No. 46408, Notice of Approval (Dec. 13, 2016).

This project captures the costs primarily for maintaining the integrity of transmission lines to provide reliable and quality service. This project includes replacing damaged and diminished transmission line assets identified during inspections and reliability analyses.

14. **Project F1PPUT0117: Transmission Substation Relay Improvements Blanket**. This project involved upgrading and improving substation relaying equipment. The extra-high-voltage transmission system designed in the 1960s and early 1970s is primarily protected with General Electric MOD 3 and Westinghouse Uniflex solid state relay systems. This equipment is nearing the end of its useful service life. Furthermore, replacement components are no longer available from the manufacturer. Thus, this equipment is being upgraded with current technology.

15. **Project F1PCUD0551: Transmission Line Failure Blanket.** This project is needed to provide quick response to transmission line failures of equipment that need immediate attention to preserve the integrity and reliability of ETI' transmission lines.

16. **Project F1PPU51073: Helbig: Install Breakers on AT1/AT2**. This project involved the installation of two circuit breakers on two autotransformers at the Helbig Bulk 230 kV Substation in Beaumont, TX. This project is necessary to meet NERC Reliability Standards and address thermal overloads.

17. **Project F1PPUT0119: Transmission Substation Breaker Replacement Blanket.** This project involved the removal and replacement of

(i) obsolete circuit breakers for which ETI can no longer obtain parts or manufacturer support and (ii) underrated circuit breakers, which are unable to interrupt the fault current at their respective locations.

18. **Project F1PPU51376: Build New Star Bayou 230 kV Substation.** This project involved the construction of a new 230 kV substation to reliably serve the increased load of Jefferson Railport Terminal LLC's tank and dock facilities in the Port of Beaumont.

19. **Project F1PPU51151: ExxonMobil – Build New Substation.** This project involved the construction of a new 230 kV four-breaker ring bus substation, referred to as the Willow Marsh Substation, to serve growth in load. The new substation was constructed on Line 599 between the Amelia Bulk and China substations. Upgrades were also required at the Amelia Bulk and China substations.

Q49. PLEASE PROVIDE A HIGH-LEVEL DESCRIPTION OF THE REMAINING 25% OF TRANSMISSION FUNCTION CAPITAL INVESTMENT THAT IS NOT DESCRIBED ABOVE.

A. The remaining 25% of additions for Transmission Function capital projects includes a range of projects including the construction of new substations, upgrades of existing transmission lines, storm restoration-related work, storm-hardening projects (e.g., raising substation control houses), telecommunication upgrades, substation infrastructure improvements (e.g., relaying upgrades, remote terminal unit replacements, critical infrastructure protection), line infrastructure improvements (e.g., wood pole replacement/reinforcements), and the acquisition of transmission assets (e.g., transfer of transmission operations centers to the EOCs, Hardin generating facility).

B. Appropriate in Rate Base

Q50. ARE THE CAPITAL PROJECT COSTS IDENTIFIED IN EXHIBIT KV-3 PROPERLY INCLUDED IN RATE BASE IN THIS PROCEEDING?

A. Yes. The $838,178,935 in Transmission Function invested capital is currently used and useful in providing service to ETI's customers. These investments were for ETI substations, transmission lines, and related equipment and facilities that were required to reliably serve customers in ETI's service territory and incurred at a reasonable cost.

1. Projects Are Used and Useful

Q51. ARE THE TRANSMISSION FUNCTION CAPITAL PROJECTS DISCUSSED ABOVE USED AND USEFUL IN PROVIDING SERVICE?

A. Yes. Each of the items shown on Exhibit KV-3 is in service and being used to provide service to ETI's customers.

2. Investment Prudently Incurred

Q52. WAS THE TOTAL TRANSMISSION FUNCTION CAPITAL INVESTMENT PRUDENTLY INCURRED?

A. Yes. As discussed, the projects listed in Exhibit KV-3 were necessary to expand and sustain the ETI Transmission System that serves as the path between generation and the distribution systems. For example, ETI needed to construct new transmission lines and substations to interconnect new generation and to deliver that energy reliably to its customers. ETI also needed to complete transmission system rehabilitation projects related to transmission line and substation improvements, replace obsolete and failed equipment, and replace systems damaged by storms, including hurricanes. These new and reinforced transmission lines, substations, and protection and control systems are integral to providing reliable service to ETI customers.

Q53. PLEASE EXPLAIN THE BUDGETING AND COST CONTROL PROCESSES THAT SUPPORT THE REASONABLENESS OF THE TOTAL TRANSMISSION FUNCTION CAPITAL ADDITIONS.

A. As explained in the direct testimony of Bobby Sperandeo, ESL employs a budgeting process that builds from budgets prepared by each Operating Company and functional organization. Relevant here, the Transmission Organization prepares a budget reflecting ETI's Transmission Function capital projects. Once the budget is approved, the Transmission Organization monitors actual spending compared to budget through the following reports, at the time intervals indicated, to assist in controlling costs:

- **Monthly** – Capital budget to actual report for ETI with explanations of the variances. This document reports current-month spending versus current-month budget, current-month spending versus prior-year same-month spending, year-to-date spending versus year-to-date budget, and year-to-date spending versus year-to-date spending prior year.
- **Monthly/Quarterly** – Capital current year-end projection (present estimate) for ETI.
- **Monthly** – Construction work in progress at the detail capital work order level, including the preparation of reports showing which work orders are past the estimated in-service date and field updates on a monthly basis for all projects that are in service or updates on the estimated in-service date for those projects that have been delayed.

Q54. PLEASE PROVIDE MORE DETAIL ON HOW THE TRANSMISSION ORGANIZATION USES THESE BUDGET REPORTS.

A. On a monthly basis, budget versus actual reports are monitored by each department within the Transmission Organization. Costs are analyzed by resources (e.g., labor, material, contract labor, and employee expenses), which are tracked through the accounting systems. Any significant variances are reviewed, and updated spending plans are implemented. The Transmission Organization's updated plan is submitted to ETI and Corporate Planning[19] on a monthly basis with any changes to the original plan. In addition, the updated plans are reviewed quarterly with ETI.

[19] Corporate Planning exists to update and maintain Entergy's financial forecasts. By coordinating with other organizations and functions, Corporate Planning captures relevant inputs, updates the corporate financial model, and provides reporting and analysis of the results in support of strategic decision making.

Q55. ARE ETI O&M EXPENSES (EXCLUSIVE OF AFFILIATE CHARGES) INCLUDED IN THE TRANSMISSION FUNCTION CAPITAL ADDITIONS?

A. Yes.

Q56. WERE THESE ETI O&M EXPENSES ADDED TO RATE BASE NECESSARY?

A. Yes. The ETI O&M costs are largely composed of capitalized ETI direct-labor costs, and the cost of materials, subcontractors and independent contractors, and land rights procurement—all of which are necessary to build capital projects.

Q57. WERE THESE ETI O&M EXPENSES ADDED TO RATE BASE REASONABLE?

A. Yes. The reasonableness of the compensation and benefits program associated with the direct-labor costs for ETI employees is addressed in the direct testimony of Jennifer Raeder. With regard to materials and subcontractors, ETI purchases materials and secures contractors in a manner that ensures reasonable costs are incurred. Similarly, the interests in real property that are necessary to site these transmission projects are procured in a manner that ensures reasonable costs are incurred.

Q58. WHAT MEASURES DOES ETI HAVE IN PLACE TO ENSURE THAT MATERIALS ARE PROCURED AT A REASONABLE COST?

A. As explained in more detail in the direct testimony of Mr. Sperandeo, ETI has a number of cost-control measures in place to ensure materials are procured at a reasonable cost. First, all materials purchases are made through arm's-length transactions from non-affiliated parties in a competitive market. ETI chooses among several suppliers for comparable materials. For some commonly used materials and equipment, ETI has negotiated alliance agreements with suppliers. Such alliances are based on a competitive bid process that takes place on a regular basis. All other materials are procured though a competitive bid process from a list of approved suppliers. ETI has also used reverse auctions to bid commodity-type products. All alliance agreements and bid results are checked against market indices to ensure that the pricing is reasonable and prudent.

Q59. WHAT STEPS DOES ETI TAKE TO ENSURE SUBCONTRACTORS AND INDEPENDENT CONTRACTORS ARE PROCURED AT A REASONABLE COST?

A. As is the case with materials, ETI has a number of cost-control measures in place to ensure that contracting costs are reasonable. The primary method of ensuring reasonable costs for contractors is through the utilization of a competitive bid process and fixed-price contracts. ETI ensures that costs stay within the estimates by providing inspectors/representatives to check quality and scope of work on all jobs that involve the construction of facilities. ETI requires documented change requests to be approved by management before any work outside the scope of a contract is performed. In some cases, ETI has negotiated alliance agreements with contractors. These alliances are the result of a competitive bid process and are re-bid on a regular basis. In the case of a contract alliance, ETI also maintains and uses the right to bid individual contracts during the life of the alliance to ensure that the alliance is still a reasonable and competitive vehicle for conducting business.

Q60. WHAT MEASURES ENSURE REAL PROPERTY RIGHTS ARE OBTAINED AT A REASONABLE COST?

A. ETI purchases rights in real property from third parties through arm's-length transactions based on the market value of the land. If necessary, appraisers are retained to determine the reasonable value. If the price demanded by a landowner is unreasonable, ETI has the option to seek condemnation of the property and have a court set the value of the property. If feasible, ETI acquires only an easement from property owners (as opposed to acquiring outright title to the land) to reduce the cost of the acquisition.

Q61. WHAT MEASURES DOES ETI HAVE IN PLACE TO ENSURE FACILITIES ARE CONSTRUCTED IN A TIMELY MANNER AND AT A REASONABLE COST?

A. As previously mentioned, the Project Management and Construction Department within the Transmission Organization and the Project Management Department within the Capital Projects Organization provide project management on the construction of transmission line and substation facilities. Project management involves a number of cost control measures. First and foremost, construction of transmission facilities is done predominantly via a firm, fixed-price contract or through the use of an alliance agreement. The contract itself helps ensure reasonableness through the bidding process and serves as a cost-control instrument. To ensure that ETI's contractors are working safely, performing quality work, and building within the scope of all contracts, ETI utilizes inspectors/representatives on all jobs that involve the construction of facilities. The inspectors keep daily job logs for use when approving contractor timesheets or invoices. ETI also utilizes a change-control process to document and approve all changes to the construction of facilities before those changes take place. Finally, project schedules and estimates, and the tracking and management of each, are also used to ensure reasonable costs.

Q62. ARE ANY AFFILIATE EXPENSES INCLUDED IN THE TRANSMISSION FUNCTION CAPITAL ADDITIONS?

A. Yes. Affiliate costs totaled $78,286,450 of the requested capital additions of $838,178,935 for Transmission Function capital projects shown in Exhibit KV-3.

Q63. WERE THESE AFFILIATE EXPENSES ADDED TO RATE BASE NECESSARY?

A. Yes. These costs are the result of ESL employees providing the design and construction management of specific capital projects for the ETI Transmission System, as well as for general planning, design, design engineering services, project management, and construction management. These affiliate charges are for services that benefit the ETI Transmission System and are necessary to meet the current and future needs of ETI's customers.

Q64. WERE THESE AFFILIATE EXPENSES ADDED TO RATE BASE REASONABLE?

A. Yes. In the affiliate charges portion of my testimony supporting Test Year O&M expenses (Section IV), I discuss how ETI and its affiliates ensure ETI's affiliate costs are reasonable, including budget and cost controls, and some of the efficiencies captured through process improvements and technology advances. That discussion is applicable to these capitalized affiliate charges. Moreover, these capitalized affiliate charges are made under the same cost-causative system of billing methods discussed in that section. Accordingly, these capitalized affiliate charges are at-cost and at a rate no higher than the charges made to other affiliates for the same or similar services.

Q65. BASED ON ALL OF THIS INFORMATION, HAVE YOU REACHED A CONCLUSION REGARDING THE REASONABLENESS OF ETI'S TRANSMISSION FUNCTION CAPITAL ADDITIONS?

A. Yes. It is reasonable to include $838,178,935 in ETI's rate base in this case because these investments were necessary for ETI to provide safe and reliable electric service to its customers. These capital additions to the ETI Transmission System are used and useful in providing that service. The budgeting and cost control measures discussed herein ensure that only reasonable capital costs were incurred, including affiliate costs.

3. Transmission Cost Recovery Factor

Q66. IS THE COMPANY CURRENTLY RECOVERING REVENUES RELATED TO TRANSMISSION CAPITAL THROUGH A TCRF?

A. Yes. In Docket Nos. 49057, 49874, 51406, and 52624, the Commission established and amended a TCRF for ETI. The TCRF allows the Company to recover revenues related to transmission capital additions made since the end of the test year in the last rate case, January 1, 2018, through July 31, 2021.

Q67. IS THE COMPANY SEEKING TO INCLUDE THE TRANSMISSION INVESTMENT USED TO CALCULATE THE CURRENT TCRF IN THE COMPANY'S BASE RATES?

A. Yes. I am advised by counsel that the Commission's orders in the TCRF dockets noted above prescribe that the Commission will make a prudence determination regarding whether the transmission invested costs used to calculate the TCRF authorized by those orders may be included in base rates in ETI's next base rate proceeding. This is the next base rate proceeding to occur since Docket No. 49057. I note that Company witness David Batten addresses the TCRF revenue true-up described in the Docket No. 52624 order.

Q68. ARE CAPITAL INVESTMENTS SUBJECT TO THE TCRF DOCKETS STATED ABOVE NOW INCLUDED IN EXHIBIT KV-3?

A. Yes. The TCRF additions are included with the list of capital additions closed to plant through the end of the Test Year shown in Exhibit KV-3, which I discuss above at length. My testimony demonstrates that all of the Company's transmission-related capital additions since the end of the test year in the last base rate case (including those additions reflected in the TCRF) comply with PURA, including Sections 36.053, 36.058, and 36.209 were prudent, reasonable, and necessary.

Q69. WILL THE AMOUNTS CURRENTLY RECOVERED THROUGH THE TCRF NOW BE REFLECTED IN BASE RATES?

A. Yes, and the TCRF will then be set to zero, as Company witness Allison Lofton discusses.

4. Future Capital Projects

Q70. CAN YOU PLEASE DESCRIBE ETI'S PLANS AS FAR AS FUTURE TRANSMISSION INVESTMENT?

A. ETI plans to continue to make significant investment in the Transmission System. ETI's service territory includes some of the fastest-growing areas in the nation. To enable economic growth and enhance the reliability of the ETI Transmission System, ETI is proactive in its investment in new and upgraded transmission facilities. ETI's planned transmission capital spending in 2022–2024 totals approximately $475 million and is primary comprised of projects in the following categories, which are described above: reliability, infrastructure, generation interconnection, revenue, and failures.

IV. <u>TEST YEAR TRANSMISSION FUNCTION O&M COSTS</u>

Q71. DO YOU SPONSOR ETI'S TRANSMISSION FUNCTION O&M COSTS FOR THE TEST YEAR?

A. Yes. I sponsor the reasonableness and necessity of ETI's total Test Year Transmission Function O&M costs. I divide these O&M costs into two categories for purposes of my testimony: (1) ETI's own costs; and (2) ETI's affiliate costs.

Q72. HOW DID YOU ORGANIZE SECTION IV OF YOUR TESTIMONY?

A. First in Section IV.A, I introduce the activities associated with the Transmission Function O&M costs ETI incurred during the Test Year and explain why those activities were necessary to provide reliable service to ETI's customers at a high level. Then in Section IV.B, I demonstrate through budget controls, process improvement controls, and benchmarking that the Transmission Function O&M costs incurred during the Test Year are reasonable.

In Section IV.C, I describe in more detail the non-affiliate Transmission Function O&M costs for the Test Year, which include the costs associated with ETI (as opposed to ESL) personnel responsible for the maintenance of ETI's transmission facilities and other planning activities, and explain in more detail why these costs are necessary. These costs are reflected in the cost of service for the Test Year.

In Section IV.D, I describe in more detail the affiliate Transmission Function O&M costs for the Test Year, which include the costs associated with support services provided by ESL personnel to ETI, and explain in more detail why these costs are necessary. These costs amount to $5,396,793. I also lay out in Section IV.D how these costs meet the affiliate standard—the services are not duplicated by others, including ETI; ESL does not charge ETI more for these services than it charges other entities for the same or similar services; and the costs reasonably approximate ESL's costs to provide the services.

A. Overall Description of Activities and Necessity

Q73. PLEASE GENERALLY DESCRIBE THE ACTIVITIES ASSOCIATED WITH TRANSMISSION FUNCTION O&M DURING THE TEST YEAR.

A. Generally speaking, Test Year Transmission Function O&M activities included transmission system operations, maintenance, construction, management, and storm response. I describe in more detail the specific activities associated with each of the three categories (ETI and affiliate) following my explanation of the overall reasonableness of these costs.

Q74. WERE THE TOTAL O&M COSTS FOR THE ETI TRANSMISSION FUNCTION DURING THE TEST YEAR NECESSARY?

A. Yes. The Transmission Function O&M expenses incurred during the Test Year represent the costs necessary to operate and maintain the ETI Transmission

System in a safe, economical, and reliable manner. I provide specific evidence of the necessity of the three categories (ETI and affiliate) in their respective subsections.

B. Overall Reasonableness of Costs

Q75. ARE THE TOTAL TEST YEAR O&M COSTS FOR THE TRANSMISSION FUNCTION REASONABLE?

A. Yes. ETI's total Test Year Transmission Function O&M costs are reasonable.

Q76. WHAT EVIDENCE DEMONSTRATES THAT THE TEST YEAR O&M COSTS FOR THE TRANSMISSION FUNCTION ARE REASONABLE?

A. I demonstrate the reasonableness of these costs through the following discussion of (1) budget controls, (2) process improvements, and (3) benchmarking.

1. Budget Controls

Q77. PLEASE EXPLAIN THE BUDGETING PROCESSES THAT SUPPORT THE REASONABLENESS OF THE TRANSMISSION FUNCTION O&M COSTS FOR THE TEST YEAR.

A. The Transmission Organization prepares a budget reflecting ETI Transmission Function O&M costs—both ETI costs and ESL costs. Once the budget is approved, that budget is periodically compared to actual spending levels for the same organization and the same entity. The Transmission Organization monitors actual spending compared to budget through the following reports and measures, at the time intervals indicated, to assist in controlling costs:

- **Monthly:** O&M budget to actual report by legal entity with explanations of the variances. This document reports current month spending versus current-month budget, current month spending versus prior-year same-month spending, year-to-date spending versus year-to-date budget, and year-to-date spending versus year-to-date spending prior-year.

- **Monthly/Quarterly:** O&M current year-end projections (present estimate) by legal entity are reported monthly, updated for any major variances. On a quarterly basis, O&M projections are updated in detail by the Transmission Organization.

- **Monthly:** Metrics including O&M, headcount, and reliability actual versus budget results at the total Transmission Function level are reviewed by the Vice President of Transmission and the Chief Operating Officer. Variances compared to the budget are discussed and decisions are made on what actions are needed to address any significant variances.

Q78. PLEASE PROVIDE MORE DETAIL ON HOW THE TRANSMISSION ORGANIZATION USES THESE BUDGET REPORTS.

A. On a monthly basis, budget versus actual reports are monitored by each department within the Transmission Organization. Costs are analyzed by resources (e.g., labor, material, contract labor, and employee expenses), which are tracked through the accounting systems. Any significant variances are reviewed and updated spending plans are implemented. The Transmission Organization's updated plan is submitted to Transmission Finance Business Partners[20] with any changes to the original plan.

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[20] Transmission Finance Business Partners exists to provide valued financial services, such as financial guidance, financial data and variance analysis, financial reporting, financial forecasting, and facilitation of accounting treatment determination.

2. Process Improvement Controls

Q79. SEPARATE FROM THE BUDGETING PROCESS, DOES THE TRANSMISSION ORGANIZATION UNDERTAKE OTHER MEASURES OR INITIATIVES TO CONTROL COSTS OR IMPROVE ITS SERVICES?

A. Yes. Entergy has implemented several innovative work processes within the Transmission Function that are further designed to improve efficiencies, reduce costs, and improve reliability. These programs include:

- **Transmission Outage Management System ("TOMS"):** TOMS provides a central unified source for all outage management and approval processes by replacing the existing tools and components used for outage management, some of them developed in-house, with a vendor-provided product that runs on a standard commercially available hardware and software platform. TOMS provides significant benefits, improved speed, and improved efficiency for various Entergy stakeholder groups, including Transmission Operations, Grid Operations, Project Management & Construction, Industrial Accounts, and others.

- **Global Information System ("GIS")/Mapping:** With the GIS/Mapping system, all transmission line structures in the Entergy system have been mapped and photographed using aerial mapping. Global Positioning Satellite ("GPS") coordinates have been established for all structures and substations within the service area. Using information provided by the relaying group, ESL employees map the location of outages to identify recurring problems and dispatch crews directly to problem areas.

- **Fault Analysis and Lightning Location System ("FALLS"):** FALLS is a lightning application that makes use of the GPS coordinates established through the mapping project to determine the location and magnitude of each lightning strike. By combining this lightning data with the results of the mapping project and the data from Transmission Consolidated Outage System, ETI is capable of identifying transmission lines that perform poorly with respect to outages caused by lightning.

- **Maximo:** Maximo is a web-based work and asset management system for initiating work orders, managing asset and location information, and running data analytics. Maximo serves as the current asset and work management system across the Utility, Transmission and Fleet. Maximo not only serves as a data repository, but also allows for improved work order management capabilities to better plan our work. This project also arms employees with processes and procedures to improve operating strategy.

Through the combined use of these applications, the Transmission Organization has been able to pinpoint and identify maintenance issues faster, restore the transmission system to its normal state more expeditiously, and optimize costs associated with preventive and corrective maintenance.

In addition to the process improvements noted above, the Transmission Organization encourages employees to seek out areas where practices, processes, and procedures can be improved to enhance the organization's effectiveness and efficiency, and to reduce costs.

3. Benchmarking

Q80. PLEASE EXPLAIN HOW BENCHMARKING SUPPORTS THE REASONABLENESS OF ETI'S TRANSMISSION FUNCTION O&M COSTS.

A. Benchmarking analysis is a standard type of analysis performed by utility managers to gauge a utility's performance against that of other utilities. Benchmarking analyses are performed internally through the use of publicly available data. The results of such benchmarking analysis show that ETI's Transmission Function O&M expenses compare favorably to those of other electric utilities.

Q81. PLEASE SUMMARIZE THE TRANSMISSION FUNCTION O&M BENCHMARKING ANALYSIS PERFORMED FOR ETI.

A. Using data reported in FERC Form No. 1 ("Form 1")[21] filings, ESL has performed a benchmarking analysis comparing the O&M expenses of each of the five EOCs to that of 32 other companies.[22] A complete list of the 37 companies (including the EOCs) included in this analysis can be found in Exhibit KV-4. In an effort to better compare O&M expenses by accounting for fluctuations from year to year, ESL calculated the average O&M spending for each of these companies over the three-year period of 2019 to 2021. For that time period, ETI incurred an average of $9,745 in O&M expenses per transmission line-mile. As shown in Exhibit KV-5, this ranked ETI as the 9th most cost-efficient company out of the 37 companies considered. From 2019 to 2021, ETI's average O&M expenditures were equivalent to 1.58% of its total transmission assets. As shown in Exhibit KV-6, this ranked ETI as the 10th most cost-efficient company of the 37 companies considered in this analysis.

Q82. WHAT IS THE CONCLUSION YOU DRAW FROM THIS BENCHMARKING ANALYSIS?

A. This analysis demonstrates that ETI's total Transmission Function O&M costs

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[21] FERC Form 1 is an annual regulatory reporting requirement for major electric utilities, licensees, and others. The report is designed to collect financial and operational information from these entities that are subject to FERC jurisdiction. It is a mandatory filing under the Federal Power Act, and the information contained in Form 1 is public information.

[22] These 37 companies, including the 5 EOCs, were selected based on similar size and operation.

compare favorably to the O&M costs of other similarly-situated utilities. I conclude that this analysis is a reliable indicator that ETI's Transmission Function O&M costs for the Test Year are reasonable.

Q83. IS THERE ANY OTHER OBJECTIVE EVIDENCE THAT TRANSMISSION FUNCTION O&M COSTS FOR THE TEST YEAR WERE REASONABLE?

A. Yes. Mr. Sperandeo addresses benchmarking applicable to ETI total company non-production O&M costs, of which Transmission Function O&M is a part. He likewise concludes that the overall non-production O&M costs for the Test Year were reasonable.

C. ETI's Own O&M Costs

Q84. WITH RESPECT TO ETI'S OWN O&M EXPENSES SPECIFICALLY—EXCLUSIVE OF AFFILIATE CHARGES—WHERE ARE THESE EXPENSES REFLECTED IN THE RATE FILING PACKAGE?

A. ETI's own O&M expenses are reflected in the overall cost of service included in Schedule A of ETI's Rate Filing Package.

Q85. PLEASE DESCRIBE THE ACTIVITIES COVERED BY THESE EXPENSES.

A. These activities relate primarily to local maintenance and construction of the ETI Transmission System, as well as review and approval of proposed transmission projects identified by ESL planning engineers.

Q86. WERE THE ETI TEST YEAR O&M EXPENSES NECESSARY?

A. Yes. These expenses were necessary for ETI to provide safe and reliable electric service to its customers.

Q87. WERE THE ETI TEST YEAR O&M EXPENSES REASONABLE?

A. Yes. As explained in the Overall Reasonableness of Costs section, the budget controls and process improvement controls ensured that, and the benchmarking demonstrated that the Test Year O&M expenses of ETI (exclusive of affiliate costs) were reasonable.

D. Affiliate O&M Costs

1. Description of Transmission Operations Class

Q88. HOW ARE THE TRANSMISSION-RELATED SERVICES PROVIDED BY ESL TO ETI PRESENTED IN THIS CASE?

A. The transmission-related services provided by ESL to ETI are classified as the Transmission Operations Class of affiliate services. The Transmission Operations Class falls within ESL's Operations family as described by Ryan Dumas in his direct testimony and as reflected in Exhibit RMD-6.

Q89. PLEASE DESCRIBE THE TRANSMISSION OPERATIONS CLASS.

A. The Transmission Operations Class can be categorized into four groups: (a) Transmission Planning & Strategy, (b) Transmission Engineering & Construction, (c) Transmission System Operations, and (d) Transmission Asset

Management. Exhibits KV-7 through KV-10 show the relationship between the Transmission Organization and the four groups of services included within this class. The services associated with each of the four groups are highlighted on the appropriate exhibit. In addition, the exhibits delineate the transmission-related services performed by ETI personnel.

Exhibit KV-7 shows the relationship between the Transmission Organization and the Transmission Planning & Strategy group of affiliate services. The services provided by ESL that comprise this group are: (i) transmission policy and regulatory support, (ii) transmission system planning, (iii) commercial and economic planning, (iv) transmission customer services, and (v) asset management strategy/technical services.

Exhibit KV-8 shows the relationship between the Transmission Organization and the Transmission Engineering & Construction group of affiliate services. The services provided by ESL that comprise this group are: (i) design, (ii) design engineering services, (iii) project management, (iv) construction management, (v) project controls, and (vi) right-of-way procurement.

Exhibit KV-9 shows the relationship between the Transmission Organization and the Transmission System Operations group of affiliate services. The services provided by ESL that comprise this group include system operations & security and operations training.

Exhibit KV-10 shows the relationship between the Transmission Organization and the Transmission Asset Management group of affiliate services. The services provided by ESL that comprise this group are: (i) maintenance management, (ii) maintenance support, (iii) safety and skills training, and (iv) risk controls.

The following subsections provide further explanation of these groups of affiliate services.

a. Transmission Planning & Strategy

Q90. PLEASE DESCRIBE THE TRANSMISSION POLICY AND REGULATORY SUPPORT SERVICES THAT BENEFIT ETI.

A. The transmission policy and regulatory support services include administration of the transmission compliance program, which ensures that Entergy's transmission business is in compliance with FERC regulations governing standards of conduct, SOX regulations, records retention requirements, ERO requirements and standards, and other regulatory compliance programs within the Transmission Organization. These services also include: (1) development and administration of transmission policy; (2) regulatory support, including monitoring of policy trends, support for regulatory filings, and managing implementation of new and revised regulatory requirements; (3) development and execution of transmission business policies; (4) coordination of the Transmission Function's participation in the MISO stakeholder process; (5) maintain compliance with Entergy's record management and retention policy; and (6) maintain the transmission management manual to ensure procedures are current and operationally valid.

Q91. PLEASE DESCRIBE THE TRANSMISSION SYSTEM PLANNING SERVICES THAT BENEFIT ETI.

A. The services in this category include: (1) providing long-term planning for transmission line and substation capacity additions; (2) defining criteria (e.g., reliability and equipment) for transmission line and substation additions; (3) participating in the development of NERC and SERC engineering reliability policies, processes, and procedures that seek to maintain and enhance bulk power supply reliability; (4) participating in Regional Reliability Organization activities and utility study groups; and (5) performing special reliability studies (e.g., transmission voltage and transient analysis and generator stability analysis).

Q92. PLEASE DESCRIBE THE COMMERCIAL AND ECONOMIC PLANNING SERVICES THAT BENEFIT ETI.

A. The services in this category include: (1) performing economic studies to evaluate and recommend projects for inclusion in the MISO RTO's MTEP through the Market Congestion Planning Studies and other ad hoc economic studies; (2) providing analyses related to integrated planning on the economic value of potential transmission projects and any other analyses requested by ETI; and (3) participating in the MISO RTO's economic study users groups.

Q93. PLEASE DESCRIBE THE WORK COVERED BY THE TRANSMISSION CUSTOMER SERVICES CATEGORY.

A. Through the services provided in the transmission services category, ESL: (1) acts as the Transmission Organization's technical representative for ETI in meetings with customers requiring transmission-related services, (2) prepares and presents alternative solutions for new and/or expanded services, and (3) coordinates with the ETI's Industrial Accounts organization to support large industrial customers.

Q94. PLEASE DESCRIBE THE WORK COVERED BY THE TRANSMISSION ASSET MANAGEMENT STRATEGY / TECHNICAL SUPPORT CATEGORY OF SERVICES.

A. The services in this category include for providing technical support to the field organizations, reviewing and supporting equipment specifications, and conducting relay mis-operation analysis. Other services in this category include maintaining and developing the technical basis for asset management maintenance programs and developing asset renewal plans, while also providing oversight of system spare equipment programs. Other services include reporting on key metrics and conducting reliability performance analysis and trending.

b. <u>Transmission Engineering & Construction</u>

Q95. PLEASE EXPLAIN IN GREATER DETAIL THE TRANSMISSION ENGINEERING & CONSTRUCTION GROUP OF AFFILIATE SERVICES.

A. As discussed above, Exhibit KV-8 shows the relationship between the Transmission Organization and the Transmission Engineering & Construction group of affiliate services. The Transmission Construction services include the design and construction management services of all transmission, substation, and system protection facilities for ETI.

Q96. WHAT CATEGORIES OF SERVICES DOES ESI PROVIDE TO ETI UNDER THIS GROUP OF SERVICES?

A. The services provided by ESL to ETI that are part of this group include: (i) design, (ii) design engineering services, (iii) project management, (iv) construction management, (v) project controls, and (vi) right-of-way procurement.

The design services provided to ETI and its customers include: (1) transmission line design, (2) substation design, (3) system protection and control design, (4) purchasing specifications, (5) drafting, and (6) engineering support for construction projects.

Design engineering services provided to ETI and its customers include: (1) development of material procurement standards and (2) development of design and construction standards.

Project management services provided to ETI and its customers include: (1) project management; (2) project scoping; and (3) budget tracking. The Project Management and Construction Department of the Transmission Organization provide these services. Additionally, the Capital Project Organization provides these services on capital investments generally greater than $20 million.

Construction management services provided to ETI and its customers include: (1) construction planning, (2) material coordination, (3) outage coordination, (4) quality control, (5) safety audits, and (6) contract management.

As with project management services, the Project Management and Construction group within the Transmission Organization provides these services, as well as the Capital Project Organization on capital investments generally greater than $20 million.

Project control services provides help to ensure portfolio success by managing risks, maintaining project estimate development, and managing funding project and work order initiation and maintenance.

The Transmission Engineering & Construction group of affiliate services also includes the services required to determine the rights-of-way necessary for construction and to acquire those rights-of-way for project implementation.

c. **<u>Transmission System Operations</u>**

Q97. PLEASE EXPLAIN IN GREATER DETAIL THE TRANSMISSION SYSTEM OPERATIONS GROUP OF AFFILIATE SERVICES.

A. As discussed above, Exhibit KV-9 shows the relationship between the Transmission Organization and the Transmission System Operations group of affiliate services. This group of services includes the transmission system security services necessary for real-time operational control of the interconnected transmission systems of the EOCs, including ETI. These services ensure the reliable and secure transmission of power from the point of receipt to the point of delivery. Transmission system security services provided to ETI and its customers include: (1) monitoring of the bulk transmission system; (2) dynamic monitoring of transmission system operations, including voltage, frequency, line loading, interconnection line flows, and generation unit output; and (3) advising ETI's transmission customers (e.g., generation owners) to increase or decrease power flows to maintain system reliability and security.

The Transmission System Operations group of services also includes the following services: (1) monitoring the operational reliability of the combined Entergy transmission system; (2) coordinating outages with MISO, including outages within other transmission systems; (3) implementing NERC operating guidelines for operation of interconnected transmission networks; and (4) participating in the development of NERC and SERC[23] operating policies, processes, and procedures that seek to maintain and enhance bulk power supply reliability.

d. <u>Transmission Asset Management</u>

Q98. PLEASE EXPLAIN IN GREATER DETAIL THE TRANSMISSION ASSET MANAGEMENT GROUP OF AFFILIATE SERVICES.

A. As discussed above, Exhibit KV-10 shows the relationship between the Transmission Organization and the Transmission Asset Management group of

[23] According to the SERC website, SERC was originally formed in 1970 as the Southeastern Electric Reliability Council. It incorporated in 2005 as the SERC Reliability Corporation, dropping the Southeastern Electric Reliability Council name but keeping the acronym SERC. SERC is a Regional Reliability Organization with delegated authority from NERC, which is the overarching Electric Reliability Organization, for the purpose of proposing and enforcing reliability standards within its region. SERC sets power coordination and planning criteria for its 81 member entities operating within portions of Alabama, Arkansas, Florida, Georgia, Illinois, Iowa, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia. SERC members include cooperatives, federal/state entities, investor-owned utilities, power marketers, merchant electricity generators, municipals, and RTOs. The EOCs have been members of SERC since January 1, 1998.

affiliate services. This group includes the technical and administrative support necessary to maintain ETI's interconnected transmission system and to protect ETI's investment in equipment and property.

Q99. WHAT CATEGORIES OF SERVICES ARE INCLUDED WITHIN THIS GROUP OF AFFILIATE SERVICES?

A. ESL's Transmission Maintenance services consist of: (i) maintenance management, (ii) maintenance support, (iii) safety and skills training, and (iv) risk controls.

Maintenance management services provided to ETI and its customers include: (1) maintenance prioritization, (2) transmission problem tracking and reporting, (3) performance monitoring and assessment, (4) power quality monitoring, (5) root-cause analysis, and (6) maintenance standards development.

Maintenance support services provided to ETI and its customers include: (1) preventive maintenance diagnostics; (2) transformer inspections; (3) transformer oil analysis; (4) infrared testing; (5) corona, ultrasonic, and other diagnostic testing; (6) transformer life extension projects; (7) equipment acceptance testing support; (8) relay analysis and failure analysis; (9) supervisory control and data acquisition ("SCADA") system support; (10) maintenance of equipment information databases; (11) maintenance of a centralized spare parts inventory database; (12) training and safety development and coordination; (13) permitting; (14) lease management; (15) addressing right-of-way encroachments; (16) timber management; and (17) vegetation management.

Safety and skills training services provided to ETI include: (1) safety support/oversight for field and office personnel, (2) safety oversight for contract personnel, and (3) safety and skills training development and delivery for field and office personnel.

Risk controls services include: (1) defining and documenting transmission asset design requirements; (2) identifying, documenting, and evaluating any field changes, including construction, operation, and maintenance changes; (3) approving or disapproving field changes; (4) recording and reporting approved field changes and implementing those changes into the physical configuration of the asset; and (5) updating design-state documentation to reflect the actual state of the asset after approved field changes.

Q100. PLEASE ELABORATE ON THE TYPES OF ACTIVITIES CONDUCTED UNDER TIMBER AND VEGETATION MANAGEMENT MAINTENANCE WITHIN THE MAINTENANCE SUPPORT SERVICES.

A. These services include the continual development of a proactive safety culture, management of the transmission vegetation program and budget, compliance with applicable NERC standards, resolving customer complaints, completing required annual transmission right-of-way ("ROW") inspections, supporting storm restoration efforts, and coordinating any other associated vegetation management requests across the transmission system. This also includes the coordination of all preventative and corrective work activities, including transmission ROW side trimming, transmission off-ROW risk tree removal, herbicide maintenance, and aerial and ground inspections of transmission lines and rights-of-ways.

2. Reasonableness and Necessity of Transmission Operations Class

Q101. DOES ETI NEED THE SERVICES YOU JUST DESCRIBED?

A. Yes. I describe in more detail the reasonableness and necessity of each of the four groups of services included in the Transmission Operations Class next.

Q102. ARE THE TRANSMISSION OPERATIONS CLASS OF AFFILIATE SERVICES DUPLICATED BY ETI'S INTERNAL ACTIVITIES OR BY ANY OTHER ENTITY?

A. No. There is no overlap of services from other business units within ESL or from other Entergy affiliates, nor are these services duplicated by ETI or any outside entity.

a. Transmission Planning & Strategy

Q103. ARE THE SERVICES PROVIDED TO ETI INCLUDED IN THE TRANSMISSION PLANNING & STRATEGY GROUP REASONABLE AND NECESSARY?

A. Yes. These services are necessary to achieve a coordinated and efficiently planned, constructed, maintained, and operated transmission system.

Transmission policy and regulatory services are necessary due to the stringent requirements imposed on ETI by the various regulatory agencies and industry organizations discussed previously. Transmission services are necessary because they coordinate planning for transmission customer needs and manage the numerous contracts that affect every area of service. ESL personnel who provide these services interface with ETI customers to determine transmission and substation requirements.

Transmission system planning services are necessary to meet existing and future customer needs and to be compliant with NERC Reliability Standards, National Electrical Safety Code rules, and other regulatory and industry standards. Commercial and economic planning services are necessary to identify economic transmission opportunities and to fully participate in the MISO RTO transmission planning process.

b. <u>Transmission Engineering & Construction</u>

Q104. ARE THE SERVICES PROVIDED TO ETI INCLUDED IN THE TRANSMISSION ENGINEERING & CONSTRUCTION GROUP REASONABLE AND NECESSARY?

A. Yes. The Transmission Engineering & Construction services are necessary for the expansion, renewal, and maintenance of the ETI Transmission System and to maintain reliable service to ETI customers.

Due to load growth, aging of facilities, new loads, generation additions and other system changes, it is necessary to continually plan, design, and construct new facilities to comply with applicable standards and maintain reliable service to customers. Industry organizations, such as Institute of Electrical and Electronics Engineers ("IEEE") and American National Standards Institute

("ANSI"), set rules and guidelines that dictate the requirements of design and construction of both transmission and substation facilities. Due to those requirements, each system addition must be carefully designed and constructed such that the rules and guidelines are followed. ESL and ETI comply with those rules and guidelines.

c. Transmission System Operations

Q105. ARE THE SERVICES PROVIDED TO ETI INCLUDED IN THE TRANSMISSION SYSTEM OPERATIONS GROUP REASONABLE AND NECESSARY?

A. Yes. Transmission service is necessary to efficiently transport electric power and energy from generation resources and transmission system interconnections to load centers. In addition, the ETI Transmission System must comply with the policies and procedures of FERC, NERC, and SERC. Personnel performing services within the Transmission System Operations group of affiliate services provide the needed skills and resources to ensure compliance with those policies and procedures.

d. Transmission Asset Management

Q106. ARE THE SERVICES PROVIDED TO ETI INCLUDED IN THE TRANSMISSION ASSET MANAGEMENT GROUP REASONABLE AND NECESSARY?

A. Yes. Maintenance on the ETI Transmission System is necessary to ensure reliable electricity service. Over time and with normal use, individual components of the transmission system deteriorate. Preventive maintenance attempts to correct problems before they arise. Corrective maintenance repairs a problem after it occurs. ESL personnel use diagnostic and statistical techniques to establish preventive maintenance schedules in order to reasonably minimize corrective maintenance. In sum, ESL provides the technical and administrative support necessary to maintain the ETI Transmission System. Without a disciplined and systematic approach to maintenance, customers would experience unnecessary outages and significant deterioration of service.

Q107. WHAT ORGANIZATIONS ESTABLISH REQUIREMENTS FOR PREVENTIVE AND CORRECTIVE MAINTENANCE?

A. The following industry organizations set requirements for preventive and corrective maintenance on transmission-related equipment: the Occupational Safety and Health Administration ("OSHA"), the ANSI, the IEEE, and NERC. The standards set forth by these organizations relate to requirements such as equipment loading, component interconnections, safe electrical clearances, electrical bonding and grounding, fencing, barriers, and other personnel protective activities. Recommendations provided by the manufacturers of equipment used on the system also influence preventive maintenance activities. In many cases, specific maintenance is required to preserve warranty coverage. In order to meet or exceed the life expectancies of transmission equipment, preventive maintenance must be performed.

Q108. WHY DO ESL AND ETI FOLLOW THESE INDUSTRY STANDARDS AND RECOMMENDATIONS?

A. These industry standards and recommendations have evolved over many years of application and have been refined to maximize their effectiveness in reducing costs, improving reliability, and prolonging equipment life. These standards and recommendations are intended to preserve the safety of both the public and employees, ensure the reliable operation of the ETI Transmission System, and maintain warranty coverage on installed equipment. In addition, FERC now mandates the NERC Reliability Standards.

3. <u>Overview of Transmission Operations Class Costs and Billing</u>

Q109. WHAT IS THE TOTAL AMOUNT OF TRANSMISSION FUNCTION AFFILIATE O&M COSTS THAT YOU SUPPORT FOR THE TEST YEAR?

A. The total amount of Transmission Function O&M affiliate charges that I support recovery of is $5,396,793. This amount, referred to as the "Total ETI Adjusted" amount in corresponding exhibits, consists of the total affiliate charges to ETI associated with the Transmission Operations Class during the Test Year subject to certain exclusions and adjustments explained below or in the testimony of other witnesses identified below. ESL bills ETI directly for some of these charges and allocates others, which I explain in more detail below as well. My alpha exhibits (KV-A, KV-B, KV-C, and KV-D) present this information and Table 3 summarizes it.

Table 3: Transmission Operations Class – Total ETI Adjusted Amount[24]

Class	Total Billings	Total ETI Adjusted Amount	% Direct Billed	% Allocated
Transmission Operations	$119,305,327	$5,396,793	12%	88%

Q110. PLEASE DESCRIBE THE EXHIBITS THAT SUPPORT THE INFORMATION INCLUDED IN TABLE 3.

A. Attached to my testimony are three exhibits showing the affiliate costs I sponsor and the calculation of the total adjusted amount for which ETI seeks recovery. In Exhibit KV-A, the information shows the Transmission Operations Class broken down by the departments providing services in this class. Exhibit KV-B shows the class costs broken down by project code and shows the billing method assigned to each project code. Exhibit KV-C shows the class costs broken down by department, billing method, and by project code.

For an explanation of Columns A through H on these exhibits, please refer to Mr. Dumas's direct testimony. Mr. Dumas also describes the calculations that take the dollars of support services in Column A to the Total ETI Adjusted figures shown in Column H.

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[24] **Total Billings** is ESL's total billings to all Entergy companies for the Test Year, plus all other affiliate charges that originated from any Entergy company. This is the amount from Column C of Exhibits KV-A, KV-B, and KV-C. **Total ETI Adjusted Amount** is ETI's cost of service amount after pro forma adjustments and exclusions. **% Direct Billed** is the percentage of the Total ETI Adjusted Amount that was billed directly to ETI for the Test Year. **% Allocated** is the percentage of the Total ETI Adjusted Amount that was allocated to ETI for the Test Year.

Q111. WHO ADDRESSES THE EXCLUSIONS REFLECTED IN EXHIBITS KV-A, KV-B, AND KV-C?

A. The exclusions column in these exhibits shows items such as capital expenditures, below the line amounts, and amounts charged to other balance sheet accounts. Mr. Dumas discusses exclusions in his direct testimony.

Q112. DOES ETI PROPOSE ANY KNOWN AND MEASURABLE ADJUSTMENTS TO THE TRANSMISSION OPERATIONS CLASS?

A. Yes. The witnesses identified in Exhibit KV-D sponsor the listed known and measurable adjustments to the Transmission Operations Class.

Q113. WHAT ARE THE MAJOR COST COMPONENTS OF THE CHARGES FOR THE TRANSMISSION OPERATIONS CLASS?

A. Table 4 shows the major cost components of the Transmission Operations Class of affiliate services.

Table 4: Transmission Operations Class – Major Cost Components

Transmission Affiliate O&M Cost Component	Cost	% of Total
Office and Employee Expenses	$193,980	4%
Other	$49,732	1%
Outside Services	$335,447	6%
Payroll & Employee Costs	$4,198,241	78%
Service Company Recipient	$619,393	11%
Total	**$5,396,793**	**100%***

* Totals may not sum due to rounding.

Q114. WHAT IS THE SIGNIFICANCE OF THESE COST CATEGORIES?

A. Other witnesses, including Ms. Raeder, Mr. Dumas, and Dawn Renton, provide additional support for the reasonableness of the costs included in many of these categories on behalf of all the affiliate witnesses. For instance, as Table 4 shows, approximately 78% of the affiliate Transmission Function costs are for payroll-related expenses. Ms. Raeder discusses the reasonableness and necessity of ETI's compensation-related programs. The "Service Company Recipient" row of the table pertains to costs common throughout ESL, such as general information technology, rents, and human resources. These costs are spread to all affiliate classes, as is explained by Mr. Dumas. "Office and Employee Expenses" covers the costs of maintaining workspaces and office supplies as well as employee business travel and expenses. Ms. Renton addresses workspaces and office supplies, and Mr. Sperandeo addresses the employee business travel and expense processes.

Q115. HOW ARE THE COSTS OF THE TRANSMISSION OPERATIONS CLASS OF SERVICES BILLED TO ETI?

A. As with all classes of ESL charges, Transmission Operations Class costs are both direct billed and allocated to affiliates. Of the $5,396,793 Total ETI Adjusted amount for this class, $624,371 (12%) was directly billed to ETI and $4,772,422 (88%) was allocated to ETI.[25]

[25] The percentage of direct-billed and allocated affiliate costs is rounded.

Direct-billed costs are fully assigned to a single affiliate, such as ETI. Allocated costs are billed to two or more affiliates based on the cost-causative driver of the services provided by ESL. As Mr. Dumas explains, project codes are utilized to capture ESL costs. All ESL costs are billed to one or more project codes. Each project code is assigned a billing method, which is the mechanism for ensuring that the costs captured are billed to the correct entity and that the amount billed—either directly or by way of an allocation—is accurate. Exhibits KV-B and KV-C show all of the costs included in this Transmission Operations Class of affiliate services, broken down by project code and the billing method associated with each project code.

Only one billing method is assigned to each project code. All organizations performing work directly associated with a project bill to a single project code. The billing method is selected based on the cost causative driver. Because only one billing method is assigned to a project code, the process ensures that the amount billed to ETI is at a rate no higher than the rate charged to other affiliates for the same or similar services and represents the actual cost of the services.

Q116. DO THE EMPLOYEES PROVIDING TRANSMISSION FUNCTION SERVICES HAVE ANY INVOLVEMENT IN THE PROCESS OF SETTING UP PROJECT CODES AND DETERMINING BILLING METHODS?

A. Yes. Employees providing Transmission Function services set up the project codes for their area of responsibility and determine which billing methods are appropriate to assign expenses to those project codes.

Q117. WHAT CONTROLS EXIST TO ENSURE THAT THE APPROPRIATE PROJECT CODE IS USED?

A. A project code for affiliate billing purposes, including the billing method assigned to that code, must be approved by several levels of authority before it is implemented. In addition, all projects are subject to internal auditing.

Q118. WHAT WERE THE PREDOMINANT BILLING METHODS USED FOR THE TRANSMISSION OPERATIONS CLASS OF SERVICES?

A. The predominant billing methods were TRSBLNOP, PKLOADAL, and DIRECTTX. For the Test Year, these three billing methods were used for 92% of the Total ETI Adjusted costs associated with the Transmission Operations Class. These billing methods are appropriate because they are based on cost causation principles. For a detailed explanation of these predominant billing methods and why they are appropriate for the project codes to which they are assigned, please see Exhibit KV-11.

Q119. WHAT IS INCLUDED IN THE REMAINING 8%?

A. A number of other project codes and different billing methods were used for the remaining 8% of such costs. The billing methods applicable to this 8% are set forth in Exhibits KV-B and KV-C.

Q120. HAVE YOU DETERMINED THAT THE APPROPRIATE PROJECT CODES AND BILLING METHODS HAVE BEEN USED FOR THE REMAINING 8% OF TOTAL ETI ADJUSTED COSTS ASSOCIATED WITH THIS CLASS?

A. Yes. I have reviewed each of the project codes and the associated billing methods used for the remaining 8% of Total ETI Adjusted costs associated with this class and they are reasonable. The costs associated with the remaining billing methods are consistent with and reflect the services captured in each respective project code.

Q121. HAVE YOU REACHED A CONCLUSION ABOUT THE MANNER ESL BILLS ETI FOR THE TRANSMISSION OPERATIONS CLASS OF AFFILIATE SERVICES?

A. Yes. The unit cost to ETI as a result of the application of these billing methods is no higher than the unit cost to other affiliates for the same or similar service and represents the actual cost of the services.

4. <u>Reasonableness and Necessity of Transmission Operations Class Costs</u>

Q122. ARE THE COSTS OF THE TRANSMISSION OPERATIONS CLASS OF AFFILIATE SERVICES REASONABLE AND NECESSARY?

A. Yes. As I explained above, the services provided by ESL were necessary for ETI to provide reliable service to its customers; therefore, the costs associated with these services are also necessary. Additionally, ESL personnel within the Transmission Organization employ the budget and process improvement controls explained earlier in Section IV.B to ensure costs are reasonable and the benchmarking in Section IV.B demonstrates this reasonableness.

Q123. HOW HAVE THE AFFILIATE TRANSMISSION COSTS ASSIGNED TO ETI TRENDED OVER THE PERIOD OF 2018 TO THE TEST YEAR (2021)?

A. Affiliate O&M charges to ETI for the Transmission Operations Class over the period of 2018, 2019, 2020, and the Test Year are shown in Table 5.

Table 5: Transmission Operations Class Cost Trends*

	2018	**2019**	**2020**	**Test Year**
Total Affiliate O&M	$6,045,818	$5,620,516	$5,277,324	$5,396,793

* These cost trends have been adjusted to remove Corporate Aviation costs, and Nuclear and Gas Department costs, and other non-ratemaking items.

Q124. CAN YOU IDENTIFY THE MAJOR COST DRIVERS THAT IMPACTED ESL AFFILIATE TRANSMISSION FUNCTION CHARGES OVER THIS PERIOD?

A. Yes. The year over year ESL affiliate Transmission Function charges are generally comparable over this period. The decrease in costs from 2018 to 2020 is primarily attributable to the reduction in costs for the operations, maintenance management, and engineering technical support.

Q125. PLEASE SUMMARIZE THE EVIDENCE THAT THE COSTS OF SERVICES SUPPLIED BY THE TRANSMISSION OPERATIONS CLASS OF AFFILIATE SERVICES ARE REASONABLE.

A. The benchmarking analyses discussed in Section IV.B demonstrate that the Transmission Operations Class affiliate charges for Transmission Function O&M are reasonable. I also note that Mr. Dumas and Mr. Sperandeo present benchmark analyses that support the overall reasonableness of affiliate expenses. ESL actively manages its costs and has a number of cost-control measures in place as described in Section IV.B. Finally, ESL employs a budget process in which the budget performance is actively reviewed and corrective actions are taken when necessary as outlined in Section IV.B.

5. <u>Summary of Transmission Operations Class Costs</u>

Q126. WHAT OVERALL CONCLUSIONS DO YOU DRAW FROM YOUR SUPPORTING EVIDENCE REGARDING THE TRANSMISSION OPERATIONS CLASS OF AFFILIATE SERVICES?

A. From the evidence presented, I conclude that the services provided by the Transmission Operations Class of affiliate services are reasonable and necessary because they support the operations of the ETI Transmission System and ensure compliance with the applicable codes and standards. These services are not duplicated by ETI or any other affiliate or third party. I conclude that the expenses for this cost class are in turn necessary. These costs are reasonable because ETI's total Transmission Function O&M costs compare favorably to other utilities, as demonstrated by the benchmarking analyses. Finally, the affiliate charges associated with these services reflect actual costs and are billed at a cost and at a rate no higher than the charges to the other Entergy affiliates for the same or similar services.

V. DEMAND AND ENERGY LOSS FACTORS

Q127. WHAT ARE LOSS FACTORS, AND WHAT IS THE PURPOSE OF CALCULATING TRANSMISSION AND DISTRIBUTION SYSTEMS' DEMAND AND ENERGY LOSSES?

A. In broad terms, loss factors represent energy consumed during the process of moving the power from generation to load. Because transmission and distribution losses are so widespread and vary depending on distance and grid infrastructure, metered losses are not readily available. Instead, they are usually estimated. ETI's transmission and distribution systems' demand and energy losses are calculated by the Transmission Organization to enable the Regulatory Services Department to develop allocation factors for use in the cost-of-service study. There are two types of losses: (1) demand loss, which is the increased generating capacity requirements necessary to meet the power consumption of a utility's customers (capacity demanded by customers); and (2) energy loss, which is the increased energy requirements over a certain period of time to meet the energy usage requirements of a utility's customers (energy consumption).

Q128. WHAT ARE TRANSMISSION AND DISTRIBUTION SYSTEM DEMAND LOSSES?

A. Demand losses result mainly from electrical impedance as power flows through transmission and distribution facilities. The demand losses add to the power generation requirements such that the total generation capacity output at the power plants must be greater than the total demand of the customers. Electric utilities generally analyze system demand losses during a system peak for a relevant time period. The total power generation requirements of ETI's power system are made up of its area generation and net power interchange.

Q129. WHAT ARE TRANSMISSION AND DISTRIBUTION ENERGY LOSSES?

A. Energy losses are electrical energy that must be generated in excess of customer demand in order to serve customer energy consumption. Energy losses for a given time period are calculated by summing the instantaneous demand loss for the relevant time period.

Utilities cannot measure the instantaneous demand of all customers and do not have instantaneous demand meters on all components of the transmission and distribution network. Therefore, energy loss factors are estimated by using load descriptors such as the peak responsibility factor,[26] the coincidence factor,[27] the load factor,[28] and the loss factor.[29]

A. Development of Transmission and Distribution Demand Losses

Q130. PLEASE PROVIDE AN OVERVIEW OF HOW ETI DEVELOPED ITS DEMAND LOSS FACTORS.

A. ETI utilizes a top-down approach to estimate its demand loss; that is, it analyzes demand losses for the highest voltage level in the system and then for each successively lower voltage level. ETI calculated demand loss factors for the analysis period, July 1, 2020 through June 30, 2021. The demand loss analysis that I sponsor estimates demand losses for four voltage levels: (1) the transmission system at 230 kV and above ("bulk transmission system"); (2) the transmission system below 230 kV and above or equal to 69 kV ("local

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[26] The peak responsibility factor is the ratio of the on-peak load for each component of the transmission and distribution system to the peak design ("rated") load for each component of the transmission and distribution system.

[27] The coincidence factor is a ratio of the maximum demand coincident with the company's system peak for a specified group of customers to the sum of the individual maximum non-coincident demands of the members of such group.

[28] Load factor is calculated by dividing the energy consumed for a specified time period by the product of the number of time units for such specified time period and the peak demand that occurred during such time period.

[29] Loss factor is defined as the energy loss during a specific time period divided by the product of the specific time period and the peak demand loss.

transmission system"); (3) the primary distribution system; and (4) the secondary distribution system.

ETI analyzes measured on-peak generation and net power interchange on the supply-side and the on-peak power demands of its customers for comparable time periods. On-peak power deliveries were estimated by using demand data for all locations equipped with interval recording demand meters installed for billing purposes and by using estimated hourly demands of customers who normally do not have hourly demand meters at their service location.

The average of the 12 monthly coincident peaks ("12 CP") during the analysis period is used to estimate demand losses. The Company's average 12 CP generation plus net power interchange ("Total Input") for the analysis period was 3,721 MW and the average 12 CP demand ("Total Delivery to Customers") for the analysis period was 3,647 MW.

Q131. PLEASE DESCRIBE HOW ETI CALCULATES DEMAND LOSS FACTORS.

A. Transmission demand losses are determined by performing transmission load-flow simulations using the Power System Simulator for Engineering ("PSS/E") model for ETI's 12 CP in the analysis period. The demand losses of the bulk and local transmission systems are derived from the sum of average demand losses. Distribution demand losses are calculated by the Simplified Calculation of Loss Equations ("SCALE") model developed by the Electric Power Research Institute ("EPRI"). SCALE uses the observed customer demand patterns to calculate demand losses for substation transformers, distribution primaries (feeders and laterals), distribution secondaries, and distribution transformers.

After the demand losses are estimated for all voltage levels, loss ratios for each voltage level are determined as the ratio of input power to the input power, less the demand loss calculated for each voltage level. The cumulative demand loss factor for a given voltage level is determined as the product of the loss ratio for each voltage level and the cumulative demand loss factor for the next lower voltage level.

Q132. HOW DID ETI ESTIMATE TRANSMISSION DEMAND LOSSES?

A. ETI uses the PSS/E transmission network load-flow analysis software to estimate demand losses for the transmission system. The results from the PSS/E software show that transmission system losses ("Transmission Delivery") accounted for 34 MW of the total system losses: 9 MW were lost in the bulk transmission system, and 25 MW were lost in the local transmission system (rounded and as reflected on Exhibit KV-12). Therefore, the remaining 142 MW of losses were attributable to losses in the substation (33 MW), distribution primary (69 MW), and distribution secondary systems (40 MW). These losses are reflected on Exhibit KV-12.

Q133. PLEASE DESCRIBE THE PSS/E MODEL.

A. The PSS/E software, created by Power Technologies, Inc., is an electric transmission system network simulation software used by many of the major utilities in the world to simulate power flows. PSS/E is an integrated, interactive program for simulating, analyzing, and optimizing power system performance.

Q134. PLEASE DESCRIBE HOW ETI ESTIMATED SUBSTATION DEMAND LOSSES.

A. Substation demand losses are estimated for the average of 12 CP for the test period. Only substation transformer losses are considered in calculating substation losses. Additional losses, such as in the substation transformer cooling fans, the control equipment, the feeder bay equipment, the lightning arrestors, and the capacitor banks, are minimal and not considered. Test data for a representative group of transformers are studied. The load loss characteristics of the transformers under no load and on-peak conditions are used in developing the loss estimation.

The demands measured in megawatts on the transformers are determined from the transmission deliveries to the substation (i.e., the net input into the transmission system less the sum of deliveries to bulk and local transmission customers and bulk and local transmission system losses). The total substation transformer loss is determined by multiplying the sum of the no-load losses per transformer and on-peak transformer losses per transformer by the number of transformers on the system.

The substation transformer demand losses for the bulk transmission system are estimated to be 3 MW, and the substation transformer demand losses for the local transmission system are estimated to be 30 MW, for a total of 33 MW (rounded and as reflected on Exhibit KV-12).

Q135. HOW DID ETI ESTIMATE THE PRIMARY DISTRIBUTION DEMAND LOSSES?

A. The primary distribution system is composed mainly of feeders and laterals.[30] The typical voltages of ETI's distribution primary system are 13.2 kV or 34.5 kV. ETI calculated losses separately for feeders and laterals.

The load injected into the distribution feeders was determined by subtracting the substation transformer losses from transmission supply. The average loss per feeder was determined for three-phase feeders.[31] The total feeder demand losses ("Feeder Trunk Losses") were estimated to be 67 MW for the analysis period. The equation used to calculate line losses for lateral distribution lines was the same as the equation used for feeders, except the Distribution Factor reflected the load diversity characteristics of lateral distribution lines. For the analysis period, the allocated demand loss for distribution laterals was zero MW.

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[30] A feeder is a three-phase circuit that originates at a distribution substation. Feeders generally distribute power to laterals and provide three-phase service to large customers. A typical feeder consists of 3/4-inch diameter aluminum composite steel reinforced cable. A lateral is generally a single-phase circuit that branches from a feeder. Laterals distribute power to smaller customers.

[31] The formula used to calculate feeder and lateral line losses was $L = I^2 * R *$ Distribution Factor. Where:

L = the average demand loss per feeder/lateral for the average of the 12 CP;
I = the average current on the feeder/lateral;
R = the average resistance for the feeder/lateral; and
Distribution Factor = a coefficient which describes the equivalent aggregated distribution along a distribution feeder or lateral. The Distribution Factor is 1.15 for feeders and for laterals.

The total primary distribution demand losses, including feeders, laterals, and other losses, were 69 MW (rounded and as reflected on Exhibit KV-12).

Q136. HOW DID ETI DETERMINE THE SECONDARY DISTRIBUTION SYSTEM DEMAND LOSSES?

A. The secondary distribution system consists of many different components. There are two major components of the secondary distribution system: distribution transformers and the secondaries (service drops from the distribution transformers to the service locations). The voltage of the secondary distribution system is typically 240 volts. Distribution transformer losses and the losses on secondaries were calculated for ETI's average of 12 CP. Both the no-load and load loss characteristics of a representative distribution transformer were used to calculate distribution demand losses.

For a secondary, the average on-peak current per secondary (240 volts) was determined from a representative sampling of ETI's secondary lines. The average on-peak demand loss per secondary was determined based upon the average current and the average resistance for the line.[32] The total secondary demand loss was determined by multiplying the average loss per secondary by the number of secondaries. The estimated secondary line loss ("Secondary and Service Loss") was 3 MW.

[32] The formula used to calculate secondary line losses was $L = I^2 * R$. Where:
L = the average demand loss per secondary line for the average of the 12 CP;
I = the average current on the secondary line; and
R = the average resistance for the secondary line.

The total secondary distribution transformer demand loss was determined by summing the demand loss under no-load conditions and the on-peak demand loss of representative secondary distribution transformers multiplied by the number of secondary distribution transformers on ETI's distribution system. The estimated distribution transformer losses were 36 MW. The total secondary distribution demand losses, including distribution transformers and distribution secondaries, were 40 MW (rounded and as reflected on Exhibit KV-12).

B. Development of Transmission and Distribution Energy Losses

Q137. PLEASE PROVIDE AN OVERVIEW OF HOW ETI DEVELOPED ITS ENERGY LOSS FACTORS.

A. Energy loss factors were developed from engineering studies of ETI's transmission and distribution systems. ETI first estimated demand loss in order to estimate energy loss; that is, demand loss was an input into the Company's energy loss calculation. Exhibit KV-12 depicts the process used by ETI to estimate demand losses, and Exhibit KV-13 diagrams the process used by ETI to estimate energy losses.

The estimation process for energy losses was bottom-up; that is, the energy losses were determined for the lowest voltage level on the system and then for each successively higher voltage level from the secondary distribution system to the bulk transmission system. ETI calculated energy loss factors for the analysis period July 1, 2020 through June 30, 2021. The energy loss analysis that I sponsor estimated energy losses for four voltage levels: (1) the secondary distribution system; (2) the primary distribution system; (3) the transmission system below 230 kV and above 69 kV (local transmission system); and (4) the transmission system 230 kV and above (bulk transmission system).

Q138. PLEASE DESCRIBE HOW ETI CALCULATES ENERGY LOSS FACTORS.

A. Distribution energy losses are calculated by the SCALE model developed by EPRI. The SCALE model utilizes known energy loss characteristics of electric systems and observed customer demand patterns to estimate energy losses for distribution transformers, distribution secondaries, distribution primaries (feeders and laterals), and substation transformers. Observed analysis period load characteristics from a representative sampling of ETI's distribution system are input into SCALE to determine distribution energy losses. Transmission energy losses are determined by performing transmission load-flow simulations using the PSS/E model.

After the energy losses are estimated for all voltage levels, loss ratios for each voltage level are determined as the ratio of input energy to the input energy less the energy loss calculated for each voltage level. The cumulative energy loss factor for a given voltage level is determined as the product of the loss ratio for each voltage level and the cumulative energy loss factor for the next lower voltage level.

Q139. WHAT WERE ETI'S ENERGY LOSSES DURING THE ANALYSIS PERIOD?

A. During the analysis period, the energy injected into ETI's electric system by ETI's net generation and net interchange was 19,339,874 Megawatt hour ("MWh"). The energy consumed by ETI's customers was 19,333,806 MWh for the same period. The energy loss of ETI's transmission and distribution system ("Total Losses Calculated") for the analysis period (using engineering equations and models) was estimated to be 919,199 MWh.

Q140. HOW DID ETI DETERMINE ENERGY LOSSES FOR ITS DISTRIBUTION TRANSFORMERS AND SECONDARIES?

A. Energy loss for secondary distribution transformers was determined by multiplying the product of the number of secondary distribution transformers on the ETI distribution system by the sum of the full-load energy loss and the no-load energy loss for representative secondary distribution transformers. The secondary distribution transformer energy loss under both loading conditions was estimated from manufacturer test data of energy loss of representative test transformers under prescribed conditions. The following system load characteristics were utilized to determine distribution transformer energy losses: the peak responsibility factor (0.90 for the analysis period), the load factor (0.46 for the analysis period), and the loss factor (0.25 for the analysis period). Energy losses estimated for secondary distribution transformers were 280,792 MWh during the analysis period.

For distribution secondaries, ETI utilized the SCALE model and observed load data for the analysis period from a representative sampling of its secondary distribution system to determine secondary losses. The following system load characteristics were utilized to determine secondary losses: the peak responsibility factor (0.85 for the analysis period), the service coincident factor (0.85 for the analysis period), and the loss factor (0.22 for the analysis period). During the analysis period, the energy loss estimated for ETI's distribution secondaries was 14,345 MWh. The total secondary distribution energy losses including distribution transformers and distribution secondaries were 295,137 MWh (as reflected on Exhibit KV-13).

Q141. PLEASE DESCRIBE HOW ETI DETERMINED ITS ENERGY LOSSES OF PRIMARY DISTRIBUTION.

A. The energy losses for feeders and the laterals were calculated using the SCALE model. Annual energy losses were determined by calculating the product of full-load demand loss, the loss factor (0.25), and the number of hours per year. Primary distribution energy losses were estimated to be 196,348 MWh for the analysis period (as reflected on Exhibit KV-13).

Q142. HOW DID ETI ANALYZE SUBSTATION TRANSFORMER ENERGY LOSSES?

A. The SCALE model estimated substation losses. ETI analyzed only the energy losses of substation transformers. Additional losses, such as in the substation transformer cooling fans, the control equipment, the feeder bay equipment, the lightning arrestors, and the capacitor banks, were minimal and not considered. Energy losses were determined under no load and full-load conditions from manufacturer test data for representative substation transformers. During the analysis period, energy losses for substation transformers were estimated at 167,023 MWh (as reflected on Exhibit KV-13).

Q143. HOW DID ETI DETERMINE TRANSMISSION ENERGY LOSSES?

A. ETI utilized the PSS/E transmission network load-flow analysis to estimate energy losses in the bulk and local transmission systems. PSS/E calculated the power flows for each transmission line and auto-transformer in the interconnected transmission network. The energy losses were analyzed at each transmission voltage level. One scenario for each month of the analysis period was run to calculate transmission energy losses. The scenarios analyzed changes in area generation, loads, sales, purchases, and seasonal changes on both the generation and transmission systems of neighboring utilities. During the analysis period, the estimated energy losses for the bulk transmission system were 79,686 MWh, and the estimated energy losses at the local transmission system were 181,004 MWh (as reflected on Exhibit KV-13).

C. <u>Summary of Results</u>

Q144. PLEASE DESCRIBE THE RESULTS OF YOUR ANALYSIS.

A. Summarizing from Exhibits KV-12 and KV-13, and as further presented in Schedule O-6.3, the results of the analyses described above are listed in Table 6.

Table 6: Summary of Cumulative Demand and Energy Loss Factors*

Voltage Level	Cumulative Demand Loss Factor	Cumulative Energy Loss Factor
Transmission 230 kV and Above (Bulk Transmission System)	1.002464	1.004137
Transmission below 230 and above 69 kV (Local Transmission System)	1.010983	1.016396
Distribution Primary System	1.057216	1.047994
Distribution Secondary System	1.078320	1.076798

* The loss factors cited in the table above were calculated with respect to the generation source.

Q145. ARE THE DEMAND AND ENERGY LOSS FACTORS PROPOSED BY ETI IN THIS DOCKET THE SAME AS THE DEMAND AND ENERGY LOSS FACTORS APPROVED IN DOCKET NOS. 41791 AND 48371?

A. No. The demand and energy loss factors vary slightly among these dockets. Table 7 summarizes the loss factors calculated in Docket Nos. 41791 and 48371. Also, the percentage changes from the factors proposed in this proceeding to the factors calculated and proposed in those dockets are summarized. The variances in the loss factors in Table 7 are the result of changes in generation patterns and load patterns from one analysis period to the next. For Docket No. 41791, it was April 1, 2012 through March 31, 2013, and for Docket No. 48371 it was January 1, 2016 through December 31, 2016.

Table 7: Previously Approved and Proposed Loss Factors

Voltage Classes	Docket No. 41791	Docket No. 48371	Proposed in this Proceeding
Demand			
Bulk	1.003190	1.004022	1.002464
Local	1.013438	1.017418	1.010983
Primary	1.068849	1.059999	1.057216
Secondary	1.088532	1.081032	1.078320
% Changes From Proposed Factors			
Bulk	-0.07%	-0.16%	
Local	-0.24%	-0.63%	
Primary	-1.09%	-0.26%	
Secondary	-0.94%	-0.25%	

Voltage Classes	Docket No. 41791	Docket No. 48371	Proposed Factors in this Proceeding
Energy			
Bulk	1.004608	1.004965	1.004137
Local	1.019753	1.022111	1.016396
Primary	1.060855	1.048181	1.047994
Secondary	1.088718	1.075685	1.076798
% Changes From Proposed Factors			
Bulk	-0.05%	-0.08%	
Local	-0.33%	-0.56%	
Primary	-1.21%	-0.02%	
Secondary	-1.09%	+0.10%	

Q146. ARE THE RESULTS FROM THE LOSS ANALYSIS PRESENTED IN THIS TESTIMONY REASONABLE?

A. Yes. The demand and energy loss factors were calculated in a manner consistent with standard utility transmission planning practices. The projected cumulative demand and energy loss factors derived from the analysis are similar to previously calculated factors.

VI. CONCLUSION

Q147. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, at this time.

AFFIDAVIT OF KHAMSUNE VONGKHAMCHANH

THE STATE OF LOUISIANA)
)
ORLEANS PARISH)

This day, June 9, 2022, the affiant appeared in person before me, a notary public, who knows the affiant to be the person whose signature appears below. The affiant stated under oath:

My name is Khamsune Vongkhamchanh. I am of legal age and a resident of the State of Louisiana. The foregoing testimony and exhibits offered by me are true and correct, and the opinions stated therein are, to the best of my knowledge and belief, accurate, true and correct.

Khamsune Vongkhamchanh
Khamsune Vongkhamchanh

SUBSCRIBED AND SWORN TO BEFORE ME, notary public, on this the 9th day of June 2022.

Kathy Hinojosa-Brown
Notary Public, State of Louisiana
Kathy Hinojosa-Brown # 130458

My Commission expires:
Upon death

KATHY HINOJOSA-BROWN
Notary Public
Notary ID No. 130458
Jefferson Parish, Louisiana

PREVIOUS TESTIMONY FILED BY KHAMSUNE VONGKHAMCHANH

Before the Public Utility Commission of Texas

Docket No. 23429, *Application of Entergy Gulf States, Inc. to Obtain a Certificate of Convenience and Necessary for a Proposed Transmission Line Within Montgomery County*

Docket No. 29079, *Application of Entergy Gulf States, Inc. to Obtain a Certificate of Convenience and Necessary for a Proposed Transmission Line Within Jefferson County*

Docket No. 29420, *Application of Entergy Gulf States, Inc. to Obtain a Certificate of Convenience and Necessary for a Proposed Transmission Line Within Montgomery County*

Docket No. 31198, *Application of Entergy Gulf States, Inc. to Obtain a Certificate of Convenience and Necessary for a Proposed Transmission Line Within Jefferson County, Texas*

Docket No. 31241, *Application of Entergy Gulf States, Inc. to Obtain a Certificate of Convenience and Necessary for a Proposed Transmission Line Within Orange County*

Docket No. 44704, *Application of Entergy Texas, Inc. for Authority to Change Rates*

Docket No. 45084, *Application of Entergy Texas, Inc. for Approval of a Transmission Cost Recovery Factor*

Docket No. 46357, *Application of Entergy Texas, Inc. for Approval to Amend its Transmission Cost Recovery Factor*

Docket No. 48371, *Application of Entergy Texas, Inc. for Authority to Change Rates*

Docket No. 49057, *Application of Entergy Texas, Inc. for Approval to Amend its Transmission Cost Recovery Factor*

Docket No. 49874, *Application of Entergy Texas, Inc. for Approval to Amend its Transmission Cost Recovery Factor*

Docket No. 51406, *Application of Entergy Texas, Inc. for Approval to Amend its Transmission Cost Recovery Factor*

Docket No. 52624, *Application of Entergy Texas, Inc. for Approval to Amend its Transmission Cost Recovery Factor*

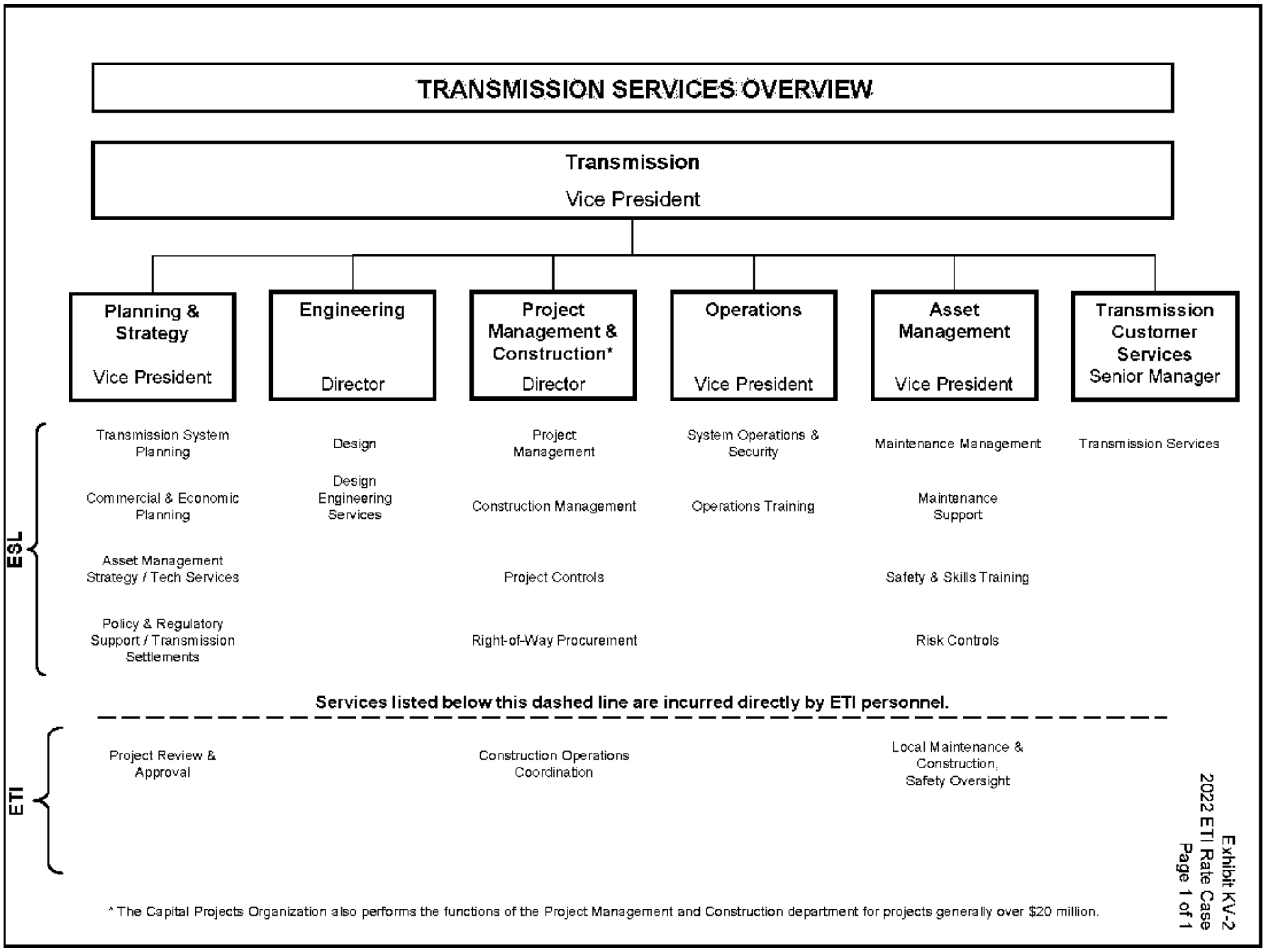
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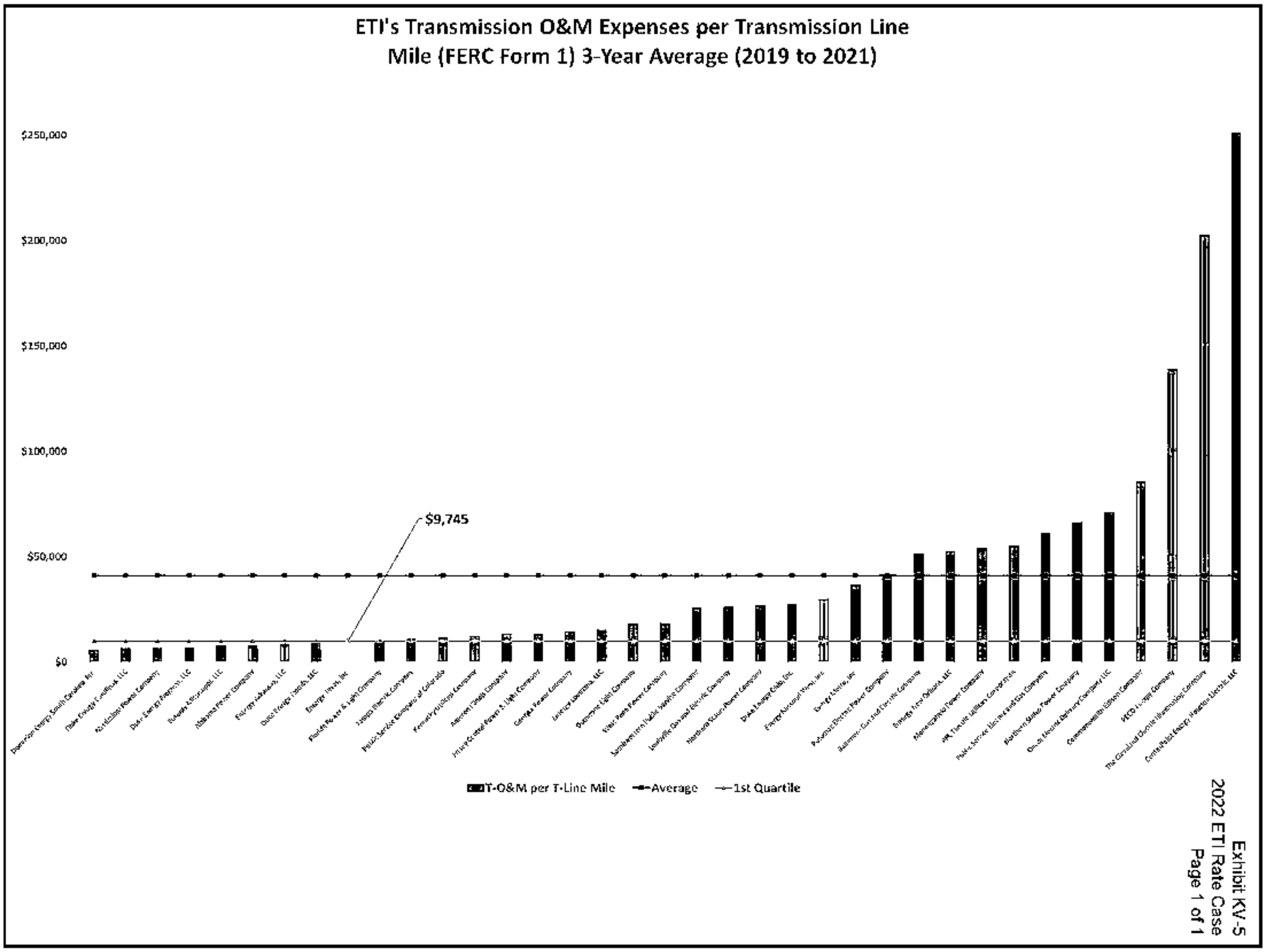
Exhibit KV-2
2022 ETI Rate Case
Page 1 of 1
* The Capital Projects Organization also performs the functions of the Project Management and Construction department for projects generally over $20 million.

See Native Excel file Vongkhamchanh Direct_Exhibit KV-3.

List of Utilities Considered for ETI's Benchmarking Analysis

1. Alabama Power Company
2. Ameren Illinois Company
3. Baltimore Gas and Electric Company
4. CenterPoint Energy Houston Electric, LLC
5. Commonwealth Edison Company
6. Dominion Energy South Carolina, Inc.
7. Duke Energy Carolinas, LLC
8. Duke Energy Florida, LLC
9. Duke Energy Ohio, Inc.
10. Duke Energy Progress, LLC
11. Duquesne Light Company
12. Entergy Arkansas, LLC
13. Entergy Louisiana, LLC
14. Entergy Mississippi, LLC
15. Entergy New Orleans, LLC
16. Entergy Texas, Inc.
17. Evergy Metro, Inc.
18. Evergy Missouri West, Inc.
19. Florida Power & Light Company
20. Georgia Power Company
21. Jersey Central Power & Light Company
22. Kentucky Utilities Company
23. Louisville Gas and Electric Company
24. Mississippi Power Company
25. Monongahela Power Company
26. Northern States Power Company
27. Northern States Power Company
28. Oncor Electric Delivery Company LLC
29. PECO Energy Company
30. Potomac Electric Power Company
31. PPL Electric Utilities Corporation
32. Public Service Company of Colorado
33. Public Service Electric and Gas Company
34. Southwestern Public Service Company
35. Tampa Electric Company
36. The Cleveland Electric Illuminating Company
37. West Penn Power Company


ETI's Transmission O&M Expenses per Transmission Line Mile (FERC Form 1) 3-Year Average (2019 to 2021)
$250,000
$200,000
$150,000
$100,000
$50,000
$0
$9,745
Entergy Texas, Inc
Florida Power & Light Company
Public Service Company of Colorado
Georgia Power Company
West Penn Power Company
Potomac Electric Power Company
Monongahela Power Company
Commonwealth Edison Company
PECO Energy Company
The Cleveland Electric Illuminating Company
CenterPoint Energy Houston Electric, LLC
T-O&M per T-Line Mile
Average
1st Quartile
Exhibit KV-5
2022 ETI Rate Case
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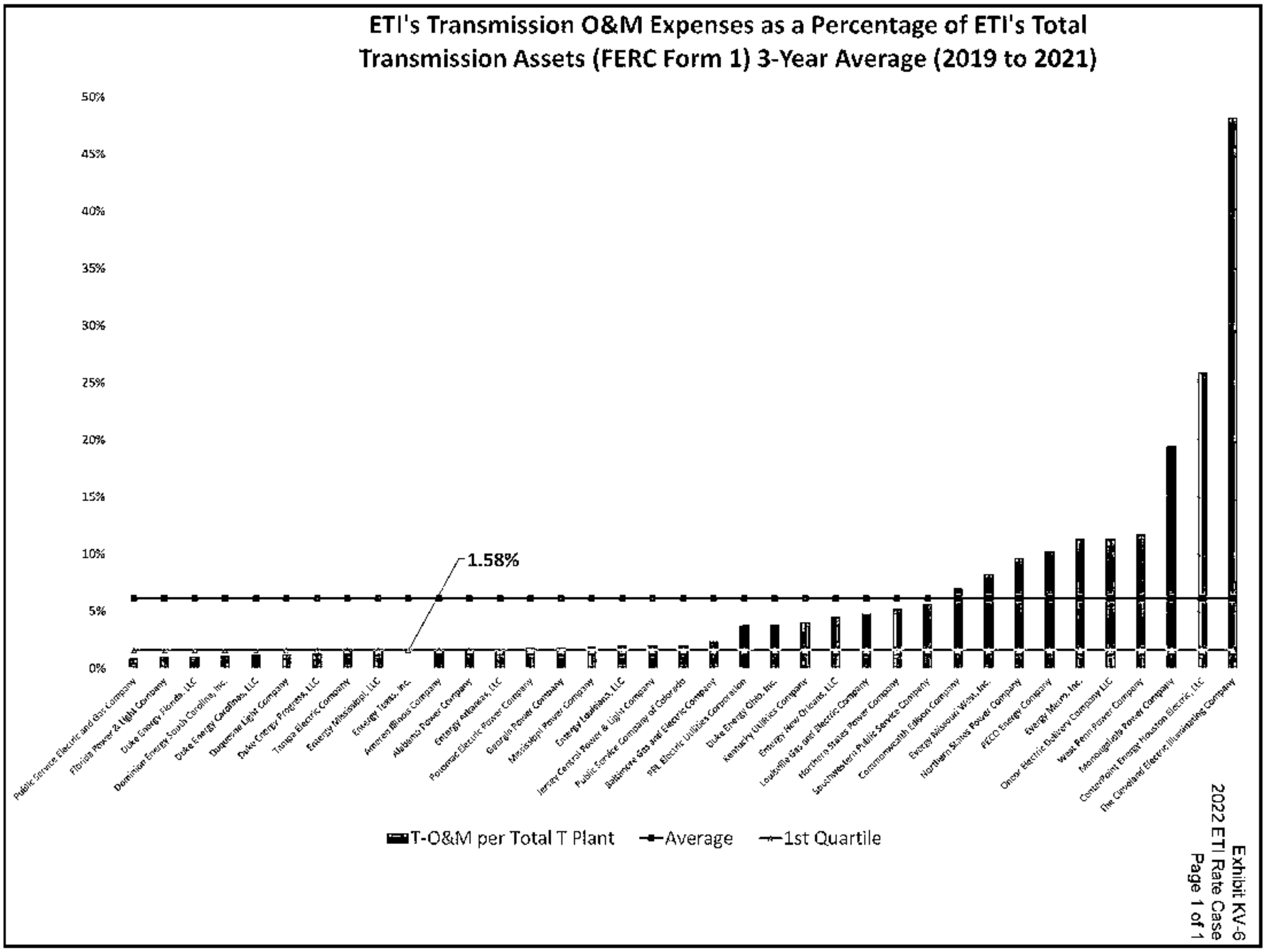
ETI's Transmission O&M Expenses as a Percentage of ETI's Total Transmission Assets (FERC Form 1) 3-Year Average (2019 to 2021)
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
1.58%
Public Service Electric and Gas Company
Florida Power & Light Company
Duke Energy Florida, LLC
Dominion Energy South Carolina, Inc.
Duke Energy Carolinas, LLC
Duquesne Light Company
Duke Energy Progress, LLC
Tampa Electric Company
Entergy Mississippi, LLC
Entergy Texas, Inc.
Ameren Illinois Company
Alabama Power Company
Entergy Arkansas, LLC
Potomac Electric Power Company
Georgia Power Company
Mississippi Power Company
Entergy Louisiana, LLC
Jersey Central Power & Light Company
Public Service Company of Colorado
Baltimore Gas and Electric Company
PPL Electric Utilities Corporation
Duke Energy Ohio, Inc.
Kentucky Utilities Company
Entergy New Orleans, LLC
Louisville Gas and Electric Company
Northern States Power Company
Southwestern Public Service Company
Commonwealth Edison Company
Evergy Missouri West, Inc.
Northern States Power Company
PECO Energy Company
Evergy Metro, Inc.
Oncor Electric Delivery Company LLC
West Penn Power Company
Monongahela Power Company
CenterPoint Energy Houston Electric, LLC
The Cleveland Electric Illuminating Company
T-O&M per Total T Plant
Average
1st Quartile
Exhibit KV-6
2022 ETI Rate Case
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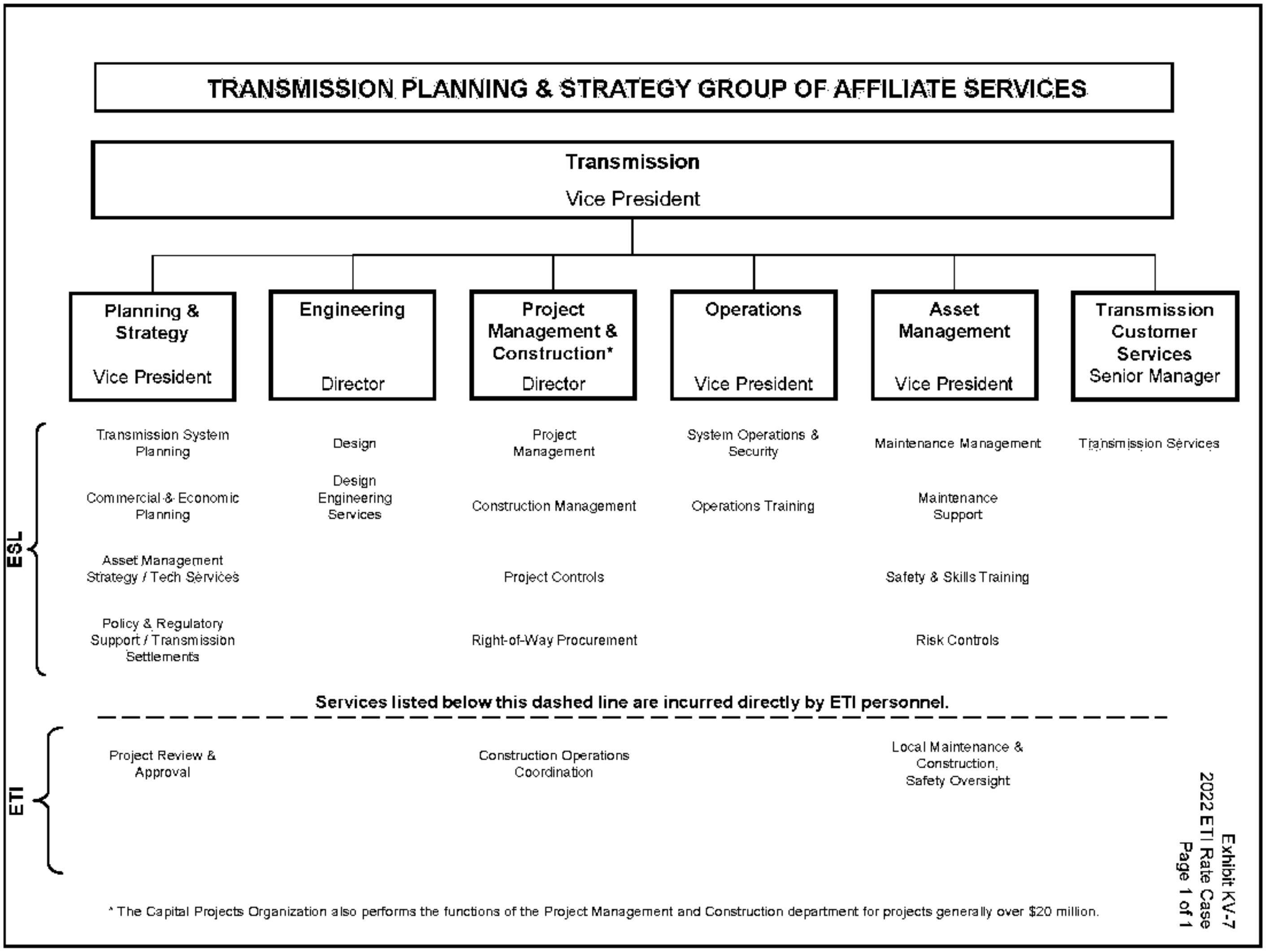
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2022 ETI Rate Case
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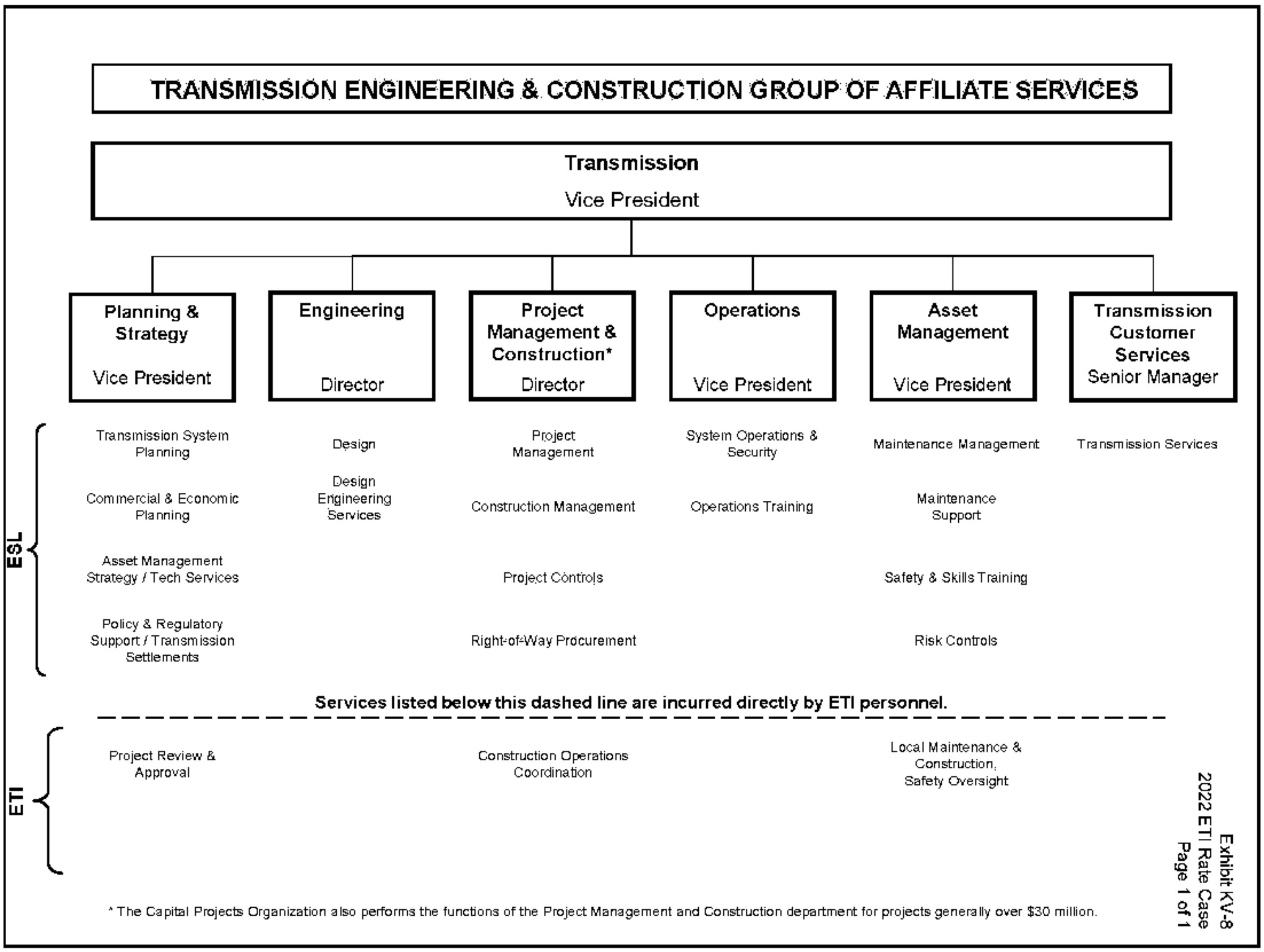
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Exhibit KV-8
2022 ETI Rate Case
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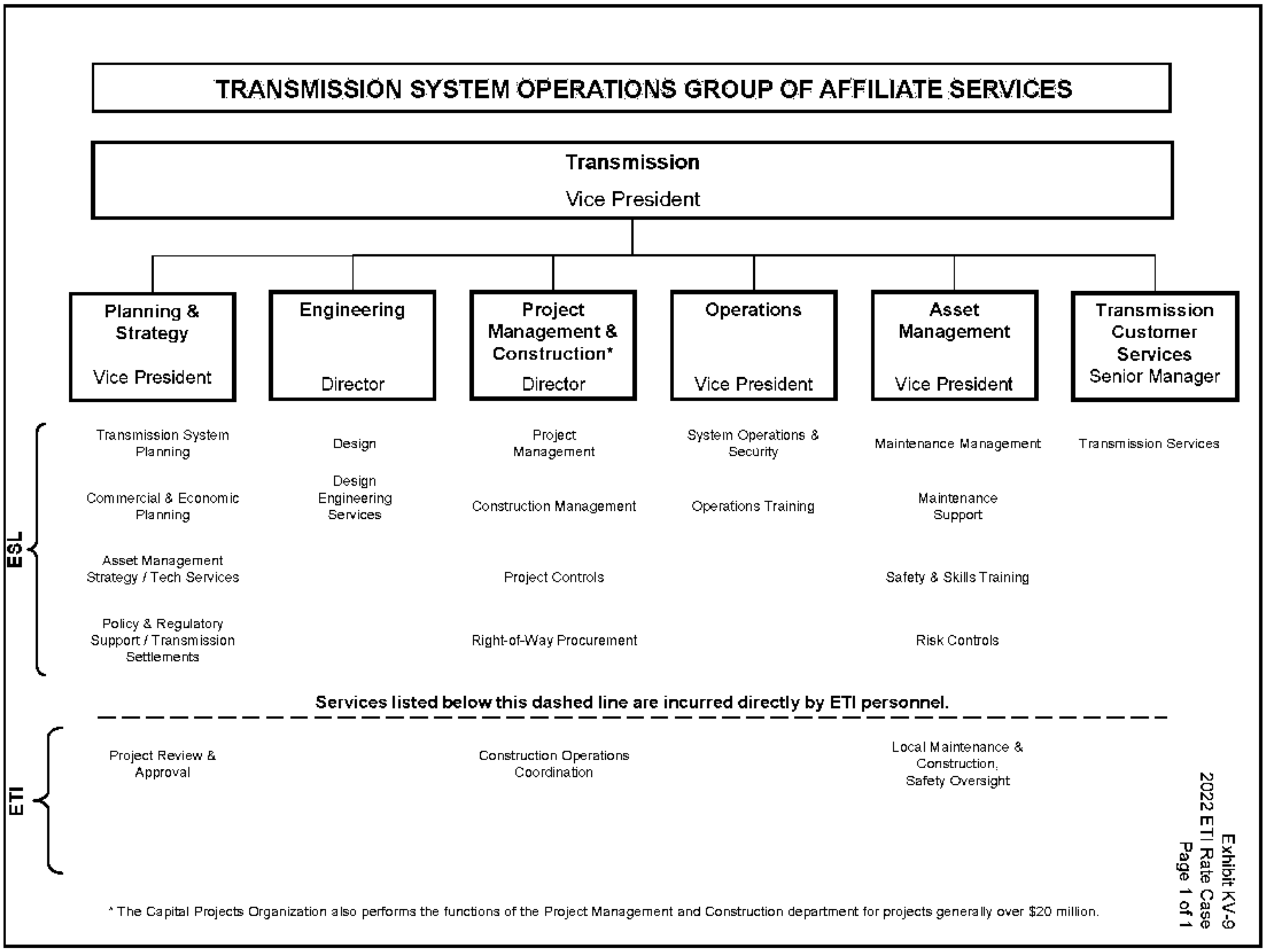
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Exhibit KV-9
2022 ETI Rate Case
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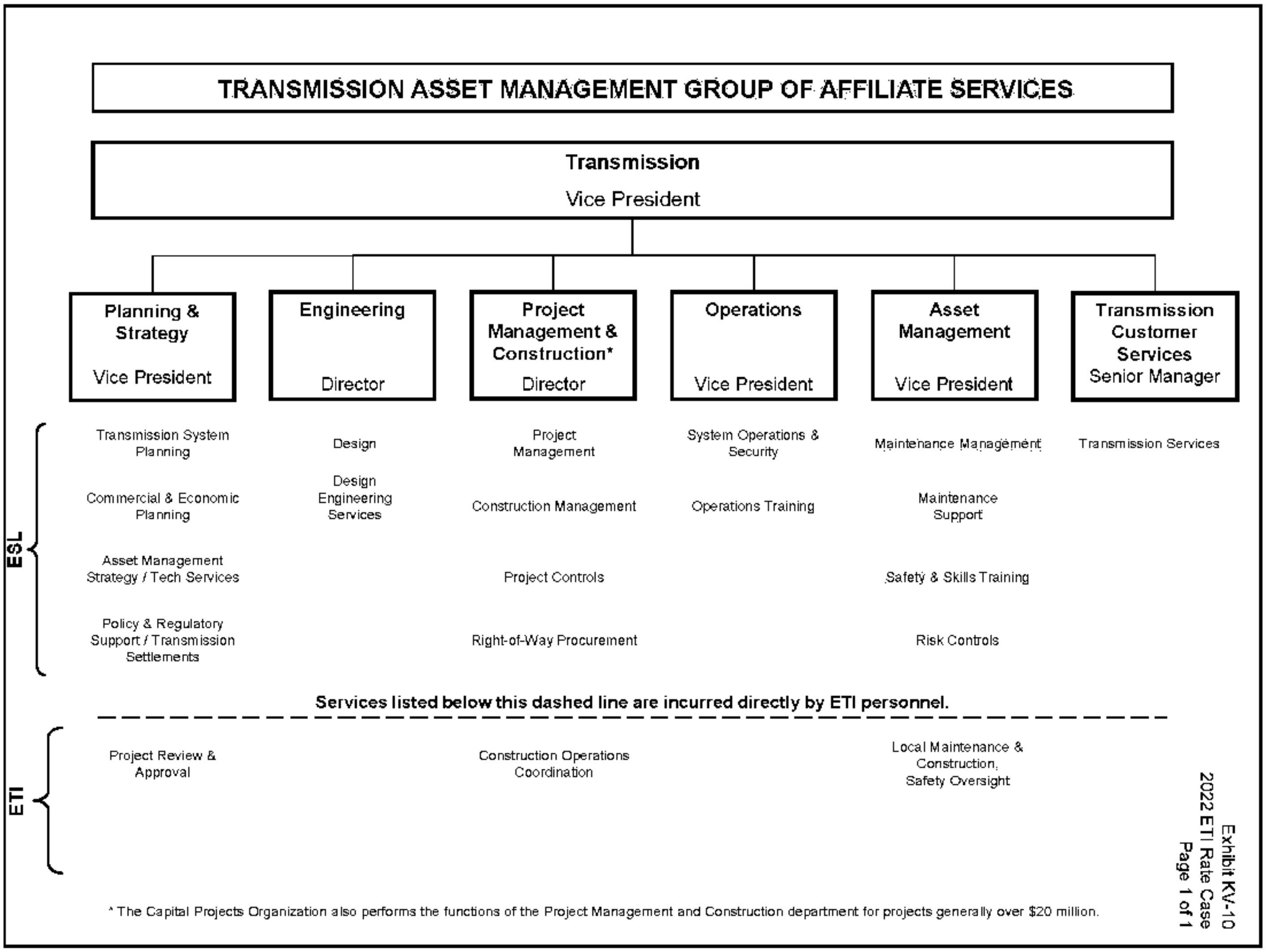
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Page 1 of 1
* The Capital Projects Organization also performs the functions of the Project Management and Construction department for projects generally over $20 million.

Transmission Operations Class Predominant Billing Methods

Billing Allocation Methodology	Basis for Selection of Billing Allocation Methodology
TRSBLNOP	For the project codes assigned this billing method, the cost driver is based on a combination of the number of miles of transmission lines and the number of transmission substations within each of the EOCs in proportion to the total miles of the combined Entergy transmission system. The type of work associated with billing method TRSBLNOP consists of transmission line- and substation-related activities that benefit all EOCs. Examples include transmission line and transmission substation database management and the creation of transmission line and transmission substation standards.
PKLOADAL	For the project codes assigned this billing method, the cost driver is based on the ratio of each EOC's load to the peak load at the time of all EOCs' peak load, using a 12-month rolling average of the coincident peaks.
DIRECTTX	Billing method DIRECTTX represents costs for the projects that are directly applicable to ETI. The billing method directly bills ETI 100% of the charges.