

1 Q111. WHAT IS THE EQUIVALENT AVAILABILITY FACTOR FOR ETI'S UNITS  
2 DURING THE SAME PERIOD?

3 A. Schedule H-12.3a contains the monthly and composite Equivalent Availability  
4 Factor ("EAF") for each of ETI's units during the Test Year. EAF represents  
5 the percentage of time that a unit is available for full load operation during a  
6 specific period of time. A larger number indicates a unit is available for a  
7 greater percentage during the specified time period. Planned and unplanned  
8 outages and derates reduce a unit's EAF. Exhibit BG-9 shows ETI's EAF for  
9 2017 through the Test Year and compares ETI's EAF to the plants in the NERC  
10 for 2017 through 2020, which is the most recently available industry data. As  
11 shown, the EAF for ETI's fleet, as a whole, during this time period is slightly  
12 below the industry average due largely to more planned maintenance during the  
13 period analyzed.

14

15 Q112. WHAT ARE YOUR CONCLUSIONS REGARDING ETI'S UNIT  
16 AVAILABILITY DURING THE TEST YEAR?

17 A. The SOF, FOR, and EAF trends for ETI's fleet are comparable with those of other  
18 utilities. The Company performed reasonable on-line and outage maintenance to  
19 ensure that units were available for dispatch. When forced outages did occur, the  
20 Company took reasonable steps to quickly restore the units to operation. Overall,  
21 ETI achieved a reasonable level of unit availability during the Test Year that is  
22 comparable to other utilities.

**VII. PLANT EFFICIENCY**

Q113. PLEASE EXPLAIN THE CONCEPT OF HEAT RATE AND HOW IT MEASURES UNIT EFFICIENCY.

A. Unit heat rate measures the thermal performance, or efficiency, of a generating unit and is defined as the amount of energy required to produce one unit of electrical energy, or kilowatt-hour (“kWh”). The lower the heat rate, the less fuel required to produce a specific amount of electricity. It is common practice to use the term “net unit heat rate” for describing the performance of a steam power plant. Net unit heat rate is defined as the amount of energy input in British Thermal Units (“Btu”) needed to produce one kWh of electricity delivered to the transmission system. A Btu is a measure of the heat content of fuel or energy sources and represents the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit at standard temperature and pressure conditions. All references to heat rate in my testimony are considered to be net heat rates.

Q114. PLEASE DEFINE ANY OTHER TERMS THAT YOU USE IN DISCUSSING HEAT RATE.

A. I also use the term “average actual heat rate” in this section of my testimony. The average actual heat rate of a unit achieved over a specific time period is calculated by dividing the total heat input (Btus) by the total net generation (kWhs) during that period of time. The average actual heat rate for gas plants is calculated from monthly fuel invoice usage data and measured monthly net electrical outputs.

1           The average actual heat rate for coal units is calculated from the fuel burn rates  
2           and coal heat content routinely measured at the plant and the measured net  
3           monthly electrical output. Average actual heat rates are normally higher than test  
4           heat rates due to the fact that test heat rates are carefully measured at steady-state  
5           conditions, while average actual heat rates are measured under a variety of  
6           loading and transient conditions.

7

8   Q115. WHAT HEAT RATE DATA HAVE YOU PROVIDED?

9   A.   Average actual monthly heat rates for each ETI unit during the Test Year are  
10       provided in Schedule H-12.3a. In addition, Exhibits BG-10 and BG-11 provide  
11       heat rate data for ETI's gas and coal units, as discussed below.

12

13   Q116. WHAT FACTORS SIGNIFICANTLY AFFECT A GENERATING UNIT'S  
14       HEAT RATE?

15   A.   A number of unit specific factors can significantly affect heat rate. Examples of  
16       such factors include unit design (e.g., boiler type, type of cooling system, etc.),  
17       fuel type, composition and quality of fuel, the dispatch of the unit, age of the unit,  
18       and the effects of normal wear. These factors must be considered when analyzing  
19       unit heat rate data.

20

21                           A.    Gas Unit Heat Rates

22   Q117. HOW DID ETI'S GAS UNITS PERFORM DURING THE TEST YEAR?

23   A.   Exhibit BG-10 presents the average heat rates for ETI's gas units for the years

1           2017 through the Test Year.

2

3   Q118. HOW DOES THE AVERAGE HEAT RATE FOR ETI'S GAS UNITS  
4       COMPARE TO THE INDUSTRY?

5   A.   ETI has compared its average gas unit heat rates to the heat rates of the gas units  
6       in NERC regions. Exhibit BG-10 demonstrates that ETI's gas unit heat rates are  
7       slightly below (better than) the NERC four-year industry average. During the  
8       Test Year, ETI's heat rates have reduced significantly due to the more efficient  
9       CCGT plants (MCPS and Hardin County) that have been added to the Company's  
10      fleet.

11

12                                   **B.    Coal Unit Heat Rates**

13   Q119. HOW HAVE ETI'S COAL UNITS PERFORMED IN TERMS OF HEAT  
14      RATE?

15   A.   Exhibit BG-11 presents the average heat rate for ETI coal units for the year 2017  
16      through the Test Year.

17

18   Q120. HOW DOES THE AVERAGE HEAT RATE OF ETI'S COAL PLANTS  
19      COMPARE TO THE INDUSTRY DURING THAT SAME PERIOD?

20   A.   Comparing subbituminous coal burning plants in NERC regions, ETI's composite  
21      heat rate is slightly above the industry average for the years 2017 through 2020,  
22      as well as the Test Year. This is a result of Nelson 6 heat rate. Comparing  
23      Nelson 6 to the industry average may produce misleading results because the

1 industry data represents the average heat rate for units with a variety of  
2 differences in design, operation and other factors that can affect heat rates. One  
3 example of a difference is that the output of Nelson 6 is slightly lower than other  
4 coal units in the fleet. In general, larger output coal units have a lower heat rate.

5  
6 Q121. BASED UPON YOUR ANALYSIS, HAVE NELSON UNIT 6 AND BIG  
7 CAJUN II, UNIT 3 OPERATED EFFICIENTLY?

8 A. Yes. My analysis indicates that the heat rates for Nelson Unit 6 and Big Cajun II,  
9 Unit 3 have been reasonably maintained.

10  
11 **C. Employee Safety**

12 Q122. PLEASE DESCRIBE HOW THE SAFETY RECORD OF ETI-OPERATED  
13 PLANTS COMPARES WITH THE INDUSTRY.

14 A. Three industry measures for safety are the Total Recordable Incident Rate  
15 (“TRIR”) (previously known as the Recordable Accident Index (“RAI”)) Lost  
16 Workday Incident Rate (“LWDI”) and Days Away, Job Restriction or Transfer  
17 Rate (“DART”). TRIR is defined as the number of recordable injury and illness  
18 incidents per 200,000 employee hours worked. LWDI Rate is defined as the  
19 number of lost workday incidents per 200,000 employee hours worked. Lost  
20 workday incidents are classified as lost-time accidents only. DART Rate is  
21 defined as the number of days away from work, job restriction or transfer  
22 incidents per 200,000 employee hours worked. A work-related injury or illness  
23 must be recorded if it meets one or more of the general recording criteria

1           according to OSHA 29 CFR 1904.7. Recordable accident incidents include those  
2           accidents that OSHA defines as recordable in its regulations. Exhibit BG-12  
3           indicates how the annual safety record (TRIR, LWDI & DART) at ETI operated  
4           plants (Sabine Plant, Lewis Creek Plant, and Montgomery County Power Station  
5           only) compares with the electric utility industry rates determined by the  
6           U.S. Department of Labor, Bureau of Labor Statistics (BLS). ETI's Test Year  
7           safety performance was the best of the most recent five years, which is indicative  
8           of Power Generation's prioritization of safety.

9  
10       Q123. HAVE ANY ETI-OWNED PLANTS ACHIEVED OFFICIAL RECOGNITION  
11       FROM OSHA ON THEIR SAFETY PERFORMANCE?

12       A.    Yes. Nelson Unit 6 (August 2003 - 2021) and the Sabine plant (August 2005 &  
13           2017) have earned from OSHA the Voluntary Protection Program ("VPP") Star  
14           status. In addition, Power Generation and SPO Headquarters was ESL's first  
15           corporate office to be certified a VPP Star site (April 2007) by OSHA. The VPP  
16           Star designation is OSHA's official recognition of the outstanding efforts of  
17           employers and employees who have achieved exemplary occupational safety and  
18           health. The VPP Star recognizes businesses that go above and beyond the  
19           minimum requirements for protecting employees' health and safety. The Sabine  
20           plant has achieved the Region VI VPP "Star of Excellence Award" each year  
21           since 2017. The Nelson plant also achieved "Star of Excellence Award" in  
22           August of 2021.

1   **VIII.    ADDITION OF HARDIN COUNTY TO ETI'S GENERATION FLEET**

2   Q124. PLEASE PROVIDE A BRIEF OVERVIEW OF HARDIN COUNTY.

3   A.     The Hardin County facility is comprised of two combustion turbine generation  
4           units totaling approximately 151 megawatts located near the City of Kountze in  
5           Hardin County, Texas. The Hardin facility provides ETI with incremental  
6           capacity to help address its overall capacity needs and specifically its peaking and  
7           reserve capacity needs. In Docket No. 50790,<sup>6</sup> the Commission found that ETI's  
8           acquisition of the Hardin County facility from ETEC was in the public interest.

9

10  Q125. WAS THE HARDIN COUNTY FACILITY ACQUIRED PURSUANT TO THE  
11       TERMS OF THE ASSET PURCHASE AGREEMENT REVIEWED IN  
12       DOCKET NO. 50790?

13  A.     Yes.

14

15  Q126. WHEN DID THE HARDIN COUNTY FACILITY BEGIN PROVIDING  
16       SERVICE TO ETI CUSTOMERS?

17  A.     ETI placed the Hardin County facility in service on June 5, 2021 and began  
18       providing service to ETI's customers on that date.

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<sup>6</sup> Docket No. 50790, Order at Finding of Fact No. 77 (April 7, 2021).

1 Q127. PLEASE EXPLAIN THE STEPS ETI TOOK TO APPROPRIATELY  
2 EXECUTE THE HARDIN ASSET PURCHASE AGREEMENT AND ENSURE  
3 THE COMPANY'S AND ITS CUSTOMERS' INTERESTS WERE  
4 PROTECTED CONSISTENT WITH THE TERMS OF THAT AGREEMENT.

5 A. Prior to engaging in negotiations regarding the acquisition for the Hardin facility,  
6 ETI sent a list of diligence questions to ETEC. The list of questions included  
7 subject areas in the following: plant equipment descriptions, equipment ratings,  
8 operations and maintenance practices, environmental assessment, transmission,  
9 employment, safety, accounting, fuel supply, NERC/CIP compliance, insurance,  
10 real estate, intellectual property, information technology and telecom. The list of  
11 questions, and provided responses, is aimed at identifying potential risks or fatal  
12 flaws that would prevent the acquisition or require Seller mitigation and inclusion  
13 into the final agreement between the Parties. ETI also conducted numerous site  
14 visits to the Facility. Within the Asset Purchase Agreement there are conditions  
15 which must be satisfied in order for ETI to close and purchase the facility. These  
16 closing conditions include, among other things, regulatory approval, satisfaction  
17 the facility to pass performance test requirements, insurable title, interconnection  
18 service, no material adverse effect, no condemnation, and credit support. The  
19 credit support is required to be in place at the time of the closing to support  
20 potential Buyer claims against the Seller representations and warranties which are  
21 made as of the Closing. Fundamental Seller Representations survive for the  
22 statute of limitation, plus 30 days, and all other representations and warranties  
23 under the Asset Purchase Agreement survive for 18 months.



1 **IX. CONCLUSION**

2 Q128. ARE ETI'S TEST YEAR NON-FUEL O&M AND CAPITAL EXPENDITURES  
3 CLOSED TO PLANT SINCE THE TEST YEAR IN THE COMPANY'S LAST  
4 RATE CASE FOR ITS GENERATING PLANTS REASONABLE AND  
5 NECESSARY?

6 A. Yes. The O&M for ETI's power plants incurred during the Test Year and capital  
7 expenditures closed to plant since the Test Year in the Company's last rate case  
8 were reasonable and necessary. These amounts were incurred to operate and  
9 maintain each of ETI's power plants in a safe, economical, and reliable manner.  
10 Power Generation's budgeting and cost monitoring processes are effective in  
11 controlling costs. Overall, ETI continues to rank among the most cost-efficient  
12 power plant operators in the U.S. This conclusion is based on my cost  
13 comparisons with industry data, which indicate that ETI's production non-fuel  
14 O&M \$/kW installed capacity and the EOCs' (consolidated view) production  
15 non-fuel O&M \$/kW installed capacity rank favorably compared to the industry.  
16

17 Q129. WHAT OVERALL CONCLUSIONS DO YOU DRAW FROM YOUR  
18 SUPPORTING EVIDENCE REGARDING THE CLASSES OF AFFILIATE  
19 SERVICES THAT YOU SPONSOR?

20 A. Based upon the evidence presented in this filing, I conclude that the products and  
21 services provided under the affiliate classes I sponsor are necessary, that the  
22 respective class costs are reasonable, and that the products and services are  
23 delivered to ETI at costs no greater than that charged to ETI's other affiliates for

1           the same or similar services and at costs that reflect the actual cost of such  
2           products and services. In addition, these services are not duplicated within ETI or  
3           any other ESL organization.

4

5       Q130. WHAT DO YOU CONCLUDE ABOUT THE PERFORMANCE OF ETI'S  
6           FOSSIL POWER PLANTS DURING THE TEST YEAR?

7       A.     ETI operated its generating units in a reasonable, efficient, and reliable manner  
8           during the Test Year.

9

10      Q131. WHAT DO YOU CONCLUDE REGARDING THE ADDITION OF HARDIN  
11           COUNTY?

12      A.     The Hardin County facility was acquired pursuant to the terms of the asset  
13           purchase agreement reviewed in Docket No. 50790. In executing that asset  
14           purchase agreement, ETI ensured that the interests of the Company and its  
15           customers were protected. The Hardin County facility began providing service to  
16           ETI's customers on June 5, 2021.

17

18      Q132. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

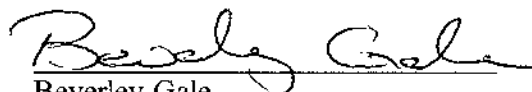
19      A.     Yes, it does.

**AFFIDAVIT OF BEVERLEY GALE**


THE STATE OF TEXAS                     )  
  )  
COUNTY OF MONTGOMERY            )

This day, Beverley Gale 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 Beverley Gale. I am of legal age and a resident of the State of Texas. 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.

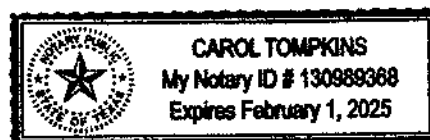
  
Beverley Gale

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

  
Notary Public, State of Texas

My Commission expires:

February 01, 2025



# Entergy Power Generation Organization Chart

ESL Exec. Vice President & Chief  
Operating Officer

ESL Vice President Power Generation

ESL Vice President Louisiana  
Plants

## Entergy Louisiana

Acadia  
Calcasieu Plant  
Little Gypsy Plant  
J. Wayne Leonard Plant  
Lake Charles Plant  
Louisiana Station 2 Plant  
Nelson Plant  
Ninemile Point Plant  
Ninemile 6 Plant  
Ouachita Plant  
Perryville Plant  
Sterlington Plant  
Waterford 1&2 Plant  
Washington Parish

## Entergy New Orleans LLC

New Orleans Power Station  
New Orleans Solar Station  
Paterson Solar Plant

ESL Vice President Mississippi  
Plants

## Entergy Mississippi LLC

Attala Plant  
Baxter Wilson Plant  
Brookhaven Solar Plant  
Choctaw Plant  
Desoto Solar Plant  
Gerald Andrus Plant  
Hinds Plant  
Hinds Solar Plant

ESL Vice President Texas Plants

## Entergy Texas Inc.

Big Cajun 2  
Hardin County Plant  
Montgomery County Plant  
Lewis Creek Plant  
Sabine Plant  
Spindletop Gas Storage Plant

ESL Vice President Arkansas  
Plants

## Entergy Arkansas LLC

Carpenter Dam  
Hot Springs Plant  
Independence Plant  
Lake Catherine Plant  
Remmel Dam  
Union Power Plant  
Union Water Facility  
White Bluff Plant

ESL Vice President Operations  
Support Power Generation

Director of Fleet  
Maintenance

OPS Support SPM

Fleet Chemistry  
Manager

Risk & Compliance  
Manager

Fleet Training Manager

Commercial Excellence

Decommission/Demolition  
Superintendent

Business Support  
Manager

Chief Dam Safety  
Engineer

Director of  
Environmental  
Support/Safety

Power Generation  
Entergy Texas, Inc.  
Fossil Generating Unit Information  
Effective January 1, 2021 through December 31, 2021

| Plant        | Unit | *Net Maximum Demonstrated Capacity |              | Primary Fuel Type | Year of Operation | Location                              | Owners   | Comments   |
|--------------|------|------------------------------------|--------------|-------------------|-------------------|---------------------------------------|--|--|
|              |      | MW                                 |              |                   |                   |                                       |  |  |
|              |      | ETI Owned                          | ETI Operated |                   |                   |                                       |  |  |
| Hardin       | 1    | 79                                 | 0            | Gas               | 2021              | Kountze, TX                           | 100% ETI   | Hardin is two units totalling 157 MW maintained and operated by Ethos, a third party vendor. ETI took over ownership of these units in June of 2021. |
|              | 2    | 78                                 | 0            | Gas               | 2021              | Hardin, County                        | 100% ETI   |  |
| Lewis Creek  | 1    | 255                                | 255          | Gas               | 1970              | Willis, TX                            | 100% ETI   |  |
|              | 2    | 255                                | 255          | Gas               | 1971              | Montgomery, County                    | 100% ETI   |  |
| Montgomery   | 1    | 899                                | 972          | Gas               | 2021              | Willis, TX<br>Montgomery, County      | 92.44% - ETI (899 MW)<br>7.56% - East Texas Electric Cooperative (73 MW)   | Montgomery is a 972 MW unit operated and maintained by Entergy Texas, Inc.   |
| Nelson       | 6    | 156                                | 0            | Coal              | 1982              | Westlake, LA<br>Calcasieu Parish      | 40.25% - ELL (211 MW)<br>29.75% - ETI (156 MW)<br>10.90% - EAM Nelson Holdings (57 MW)<br>10.00% - Sam Rayburn G&T (52MW)<br>9.10% - East Texas Electric Cooperative (48 MW) | Nelson 6 is a 524 MW unit operated and maintained by Entergy Louisiana L.L.C.  |
| Sabine       | 1    | 213                                | 213          | Gas               | 1962              | Bridge City, TX<br>Orange County      | 100% ETI   | Sabine 2 permanently retired effective 10/1/2016   |
|              | 2    | N/A                                | N/A          | Gas               | 1962              |                                       | 100% ETI   |  |
|              | 3    | 415                                | 415          | Gas               | 1966              |                                       | 100% ETI   |  |
|              | 4    | 536                                | 536          | Gas               | 1974              |                                       | 100% ETI   |  |
|              | 5    | 479                                | 479          | Gas               | 1979              |                                       | 100% ETI   |  |
| Big Cajun II | 3    | 99                                 | 0            | Coal              | 1983              | New Roads, LA<br>Pointe Coupee Parish | 24.15% - ELL (135 MW)<br>17.85% - ETI (99 MW)<br>58.00% - CLECO Cajun LLC (323 MW)   | 557 MW unit maintained and operated by CLECO Cajun LLC.  |
| Total        |      | 3,464                              | 3,125        |                   |                   |                                       |  |  |

\*MW winter capacity from GADRS at the end of 2021

2022 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Parent Co.

Operator Company Name(s) # Capacity = 200 MW – Non-Fuel Units  
Source: O&M \$/kW as of 3/31/2022

| Rank | Operator Parent Co Name             | Name Plate Capacity MW | Net Generation MWh | Total Non-Fuel O&M \$ | Calculated NF O&M \$/MWh | Calculated NF O&M \$/kW |
|------|-------------------------------------|------------------------|--------------------|-----------------------|--------------------------|-------------------------|
| 1    | Lo Puerco Capital, LP               | 1,126                  | 284,617            | 4,444,030             | 1,550                    | 8.86                    |
| 2    | Brimstone Corporation               | 2,672                  | 1,038,466          | 14,077,754            | 7.14                     | 7.19                    |
| 3    | Tenaska Energy, Inc.                | 2,862                  | 7,852,570          | 7,676,698             | 1.20                     | 1.68                    |
| 4    | North Star Generation LLC           | 778                    | 1,759,080          | 7,767,474             | 4.50                     | 9.90                    |
| 5    | Moravian Energy                     | 1,381                  | 1,754,856          | 12,180,174            | 7.10                     | 18.28                   |
| 6    | Starwood Energy Group, LLC          | 1,862                  | 5,811,784          | 15,865,088            | 3.51                     | 11.04                   |
| 7    | Edwards Group                       | 7,028                  | 22,414,235         | 17,006,301            | 4.70                     | 11.46                   |
| 8    | Rocky Mountain Petroleum Group, LLC | 7,028                  | 10,039,076         | 89,417,177            | 2.12                     | 12.28                   |
| 9    | Force Energy International, Inc.    | 14,111                 | 3,412,984          | 26,235,486            | 6.64                     | 12.70                   |
| 10   | Rocky Mountain Petroleum, LLC       | 14,068                 | 1,838,000          | 1,988,000             | 5.38                     | 12.71                   |
| 11   | The Eagle Group, Inc.               | 2,541                  | 1,094,867          | 53,066,000            | 4.87                     | 12.89                   |
| 12   | Camden Energy Corporation           | 15,441                 | 22,186,111         | 187,077,026           | 6.97                     | 13.09                   |
| 13   | State of California                 | 2,672                  | 4,394,844          | 28,498,186            | 2.91                     | 13.74                   |
| 14   | General Petroleum Refining          | 14,072                 | 6,072,884          | 42,041,221            | 4.03                     | 13.88                   |
| 15   | ACE Energy, Inc.                    | 1,122                  | 2,130,645          | 16,016,353            | 2.38                     | 13.90                   |
| 16   | Bank of America, P.                 | 1,076                  | 2,176,737          | 13,613,641            | 6.36                     | 14.61                   |
| 17   | Power Generation, LLC               | 940                    | 1,444,210          | 13,884,244            | 2.89                     | 14.78                   |
| 18   | Nature Energy, Inc.                 | 18,942                 | 11,000,387         | 578,866,087           | 4.73                     | 14.78                   |
| 19   | AgriPower, Inc.                     | 1,045                  | 2,178,754          | 36,367,743            | 1.91                     | 14.82                   |
| 20   | Capital Energy, Inc.                | 2,777                  | 7,070,000          | 23,880,000            | 1.28                     | 14.86                   |
| 21   | BlackRock, Inc.                     | 2,441                  | 10,088,862         | 18,018,862            | 2.80                     | 14.98                   |
| 22   | Ministry of Finance (Canada)        | 828                    | 2,000,000          | 12,280,423            | 0.10                     | 15.19                   |
| 23   | HOVCO Corporation                   | 30,414                 | 74,861,837         | 507,066,338           | 6.74                     | 15.40                   |
| 24   | Capital Energy Corporation          | 1,137                  | 2,083,867          | 14,777,000            | 4.49                     | 15.45                   |
| 25   | Energy Corporation                  | 14,028                 | 5,124,485          | 14,422,220            | 3.54                     | 15.50                   |
| 26   | City of Seattle                     | 2,607                  | 5,480,000          | 12,800,000            | 4.97                     | 15.89                   |
| 27   | ACE Energy Corp.                    | 7,031                  | 21,714,117         | 145,177,886           | 6.70                     | 16.01                   |
| 28   | Energy Corporation                  | 22,544                 | 1,000,000          | 1,000,000             | 4.88                     | 16.07                   |
| 29   | BP America, Inc.                    | 2,228                  | 5,862,000          | 41,493,746            | 9.54                     | 16.22                   |
| 30   | Centennial Petroleum Corporation    | 14,028                 | 8,864,137          | 9,146,486             | 1.17                     | 16.81                   |
| 31   | Chubb, Inc.                         | 2,112                  | 7,884,116          | 7,884,116             | 0.15                     | 17.05                   |
| 32   | U.S. Department of Defense          | 21,813                 | 78,838,882         | 878,113,886           | 4.77                     | 17.19                   |
| 33   | Inveray LLC                         | 5,226                  | 15,144,004         | 11,217,111            | 2.81                     | 17.29                   |
| 34   | Chesapeake Energy                   | 1,888                  | 5,880,044          | 34,437,460            | 3.71                     | 17.33                   |
| 35   | Amstar Corporation                  | 10,110                 | 5,172,110          | 17,543,560            | 3.51                     | 17.55                   |
| 36   | General Petroleum Refining          | 2,777                  | 5,299,000          | 30,111,546            | 1.91                     | 18.09                   |
| 37   | HW Energy                           | 422                    | 5,400,000          | 14,000,000            | 3.01                     | 18.12                   |
| 38   | Unifac Energy                       | 44,046                 | 12,147,288         | 601,036,000           | 6.38                     | 18.16                   |
| 39   | Chesapeake Energy                   | 12,787                 | 5,116,631          | 245,116,708           | 1.91                     | 18.46                   |
| 40   | Chesapeake Energy                   | 1,045                  | 5,795,000          | 20,044,222            | 2.00                     | 19.11                   |
| 41   | U.S. E.                             | 2,227                  | 1,100,000          | 44,200,000            | 0.11                     | 19.69                   |
| 42   | U.S. Energy Corporation             | 1,888                  | 2,000,000          | 1,888,000             | 1.00                     | 19.81                   |
| 43   | State of New York                   | 6,400                  | 20,111,111         | 10,000,000            | 0.20                     | 19.94                   |
| 44   | ONPR Administration Corporation     | 3,164                  | 1,100,774          | 22,100,000            | 2.44                     | 19.97                   |
| 45   | National Site, Inc.                 | 4,000                  | 5,444,000          | 20,000,000            | 1.00                     | 20.12                   |
| 46   | U.S. Energy Corporation             | 1,110                  | 10,000,000         | 133,777,333           | 8.55                     | 20.20                   |
| 47   | Chesapeake Energy                   | 1,076                  | 5,116,631          | 14,000,000            | 2.81                     | 20.24                   |
| 48   | Chesapeake Energy, Inc.             | 26,840                 | 5,000,000          | 54,000,000            | 1.86                     | 20.42                   |
| 49   | Edwards Group                       | 1,110                  | 12,000,000         | 5,000,000             | 4.00                     | 20.69                   |
| 50   | KW, LLC                             | 1,862                  | 1,110,000          | 75,000,000            | 0.60                     | 20.86                   |
| 51   | Energy Corporation                  | 5,703                  | 10,777,000         | 11,000,000            | 6.15                     | 20.96                   |
| 52   | BP America, Inc.                    | 5,226                  | 10,000,000         | 11,000,000            | 1.00                     | 21.09                   |
| 53   | BP America, Inc.                    | 1,888                  | 22,222,222         | 1,888,000             | 0.08                     | 21.49                   |
| 54   | U.S. Energy Corporation             | 40,000                 | 144,000,000        | 77,000,000            | 6.00                     | 21.62                   |
| 55   | Edwards Group                       | 7,112                  | 1,000,000          | 1,000,000             | 0.08                     | 21.80                   |
| 56   | Edwards Group                       | 51,000                 | 10,000,000         | 1,000,000             | 1.00                     | 21.91                   |
| 57   | U.S. Energy Corporation             | 21,884                 | 20,000,000         | 4,000,000             | 0.80                     | 22.22                   |
| 58   | U.S. Energy Corporation             | 1,110                  | 5,116,631          | 78,000,000            | 1.50                     | 22.24                   |
| 59   | BP America, Inc.                    | 1,110                  | 10,000,000         | 27,000,000            | 1.80                     | 22.52                   |
| 60   | Capital Energy, Inc.                | 1,776                  | 3,883,888          | 41,000,000            | 1.06                     | 22.54                   |
| 61   | U.S. Energy, Inc.                   | 21,408                 | 20,000,000         | 50,000,000            | 3.01                     | 22.82                   |
| 62   | Energy Production, LLC              | 2,877                  | 2,000,000          | 36,774,178            | 1.77                     | 23.44                   |
| 63   | U.S. Energy, Inc.                   | 10,000                 | 5,000,000          | 27,778,111            | 2.78                     | 23.76                   |
| 64   | Midwestern Petroleum Corporation    | 1,000                  | 7,777,777          | 36,000,000            | 4.00                     | 24.00                   |
| 65   | AgriPower & Logistics Corp.         | 2,000                  | 2,444,444          | 50,000,000            | 1.80                     | 24.39                   |
| 66   | Edwards Group                       | 22,000                 | 1,000,000          | 1,000,000             | 0.08                     | 24.60                   |
| 67   | Edwards Group                       | 1,110                  | 3,883,888          | 3,883,888             | 0.80                     | 25.38                   |
| 68   | U.S. Energy Corporation             | 7,707                  | 10,000,000         | 24,000,000            | 1.00                     | 25.43                   |
| 69   | U.S. Energy, Inc.                   | 14,028                 | 24,000,000         | 38,000,000            | 2.80                     | 25.74                   |
| 70   | U.S. Energy, Inc.                   | 1,862                  | 2,000,000          | 4,000,000             | 2.14                     | 26.11                   |
| 71   | U.S. Energy, Inc.                   | 1,076                  | 3,883,888          | 26,777,777            | 6.00                     | 26.12                   |
| 72   | Rockwell Automation, Inc.           | 10,000                 | 11,000,000         | 60,000,000            | 7.00                     | 26.61                   |
| 73   | State of Texas                      | 4,000                  | 10,000,000         | 10,000,000            | 0.04                     | 27.09                   |
| 74   | City of Orlando                     | 1,000                  | 5,000,000          | 44,000,000            | 1.00                     | 28.11                   |
| 75   | U.S. Energy, Inc.                   | 2,777                  | 5,000,000          | 76,000,000            | 1.70                     | 28.56                   |
| 76   | BP America, Inc.                    | 7,112                  | 9,800,000          | 27,000,000            | 2.70                     | 28.67                   |
| 77   | The AES Corporation                 | 10,000                 | 20,000,000         | 10,000,000            | 1.00                     | 29.39                   |
| 78   | The Southern Company                | 44,414                 | 100,000,000        | 1,000,000,000         | 7.01                     | 29.57                   |
| 79   | U.S. Energy, Inc.                   | 3,883                  | 1,000,000          | 10,000,000            | 0.80                     | 29.58                   |
| 80   | U.S. Energy, Inc.                   | 7,112                  | 2,000,000          | 24,000,000            | 1.00                     | 30.33                   |
| 81   | U.S. Energy, Inc.                   | 1,000                  | 10,000,000         | 10,000,000            | 1.00                     | 31.19                   |
| 82   | State of North Carolina             | 5,000                  | 10,000,000         | 10,000,000            | 0.00                     | 31.19                   |
| 83   | U.S. Energy, Inc.                   | 1,000                  | 5,000,000          | 5,000,000             | 0.00                     | 31.20                   |
| 84   | U.S. Energy, Inc.                   | 1,000                  | 2,000,000          | 44,000,000            | 0.08                     | 32.04                   |
| 85   | State of Maryland                   | 5,000                  | 24,000,000         | 10,000,000            | 0.80                     | 33.58                   |
| 86   | U.S. Energy, Inc.                   | 1,000                  | 10,000,000         | 1,000,000             | 0.00                     | 34.30                   |
| 87   | Consolidated Edison, Inc.           | 3,128                  | 2,000,000          | 1,000,000             | 0.10                     | 35.20                   |
| 88   | U.S. Energy, Inc.                   | 26,880                 | 70,777,777         | 76,000,000            | 1.00                     | 35.96                   |
| 89   | U.S. Energy, Inc.                   | 5,000                  | 10,000,000         | 20,000,000            | 1.00                     | 36.08                   |
| 90   | U.S. Energy, Inc.                   | 5,000                  | 10,000,000         | 10,000,000            | 1.00                     | 36.81                   |
| 91   | U.S. Energy, Inc.                   | 5,000                  | 10,000,000         | 10,000,000            | 1.00                     | 36.48                   |
| 92   | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 37.08                   |
| 93   | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 37.71                   |
| 94   | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 38.16                   |
| 95   | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 38.45                   |
| 96   | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 40.52                   |
| 97   | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 40.59                   |
| 98   | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 41.28                   |
| 99   | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 44.97                   |
| 100  | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 48.19                   |
| 101  | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 49.12                   |
| 102  | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 51.77                   |
| 103  | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 52.85                   |
| 104  | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 54.93                   |
| 105  | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 61.46                   |
| 106  | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 68.81                   |
| 107  | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 86.90                   |
| 108  | U.S. Energy, Inc.                   | 1,110                  | 10,000,000         | 10,000,000            | 1.00                     | 106.42                  |

2019 Non-Fuel O&M \$/kW Installed  
Backed by Generator Parent Co.

Crystalline Capacity Membrane Capacity = 800 MW = Min. Number of Cells  
Therefore, 800 MW global capacity is required.

| Rank | Operator/Parent Co. Name                 | Name Plate Capacity MW | Not Generated MW | Total Notified CBM \$/MWh | Calculated NF CBM \$/MWh | Calculated NF CBM \$/MWh |
|------|--|------------------------|------------------|---------------------------|--------------------------|--------------------------|
| 1    | LA Power Control, LP                     | 1,136                  | 1,040.2          | 2,342,004                 | 11.27                    | 8.69                     |
| 2    | MidSouth Generation, LLC                 | 1,088                  | 1,042,654        | 1,042,654                 | 1.64                     | 8.11                     |
| 3    | First Solar, Inc. Generation, LLC        | 719                    | 710.4            | 7,837,068                 | 8.11                     | 8.11                     |
| 4    | Tenaska Energy, Inc.                     | 693                    | 174,810          | 249,998,40                | 2.86                     | 10.60                    |
| 5    | Meridian Energy                          | 1,387                  | 1,000,47         | 12,598,508                | 8.12                     | 10.94                    |
| 6    | Delaware Energy Services Corp., LLC      | 1,002                  | 5,561,478        | 26,777,608                | 2.32                     | 11.40                    |
| 7    | 11 Power Corp.                           | 538                    | 21,274,149       | 1,167,517,72              | 1.00                     | 11.76                    |
| 8    | Power Generation Resources, Inc.         | 1,113                  | 7,181,79         | 12,125,404                | 2.09                     | 11.98                    |
| 9    | PG & Service, Inc. Electric Interconnect | 1,104                  | 2,224,176        | 100,000,894               | 4.00                     | 12.25                    |
| 10   | PG & Service, Inc. Electric Interconnect | 1,008                  | 1,122,124        | 1,444,444                 | 2.00                     | 12.28                    |
| 11   | Genex Inc. Energy Services Inc.          | 1,000                  | 1,739,049        | 188,535,79                | 1.00                     | 12.45                    |
| 12   | TE Energy Services, Inc.                 | 1,001                  | 10,778,27        | 34,788,00                 | 2.00                     | 12.52                    |
| 13   | Rockwell Control, LLC                    | 1,000                  | 2,444,100        | 12,122,508                | 1.00                     | 12.81                    |
| 14   | ALL-ELI, Inc.                            | 1,122                  | 4,102,393        | 1,802,481                 | 2.00                     | 13.77                    |
| 15   | NextEra Energy, Inc.                     | 3,087                  | 128,957,71       | 660,481,60                | 1.01                     | 14.43                    |
| 16   | INTEGRIS, Inc.                           | 1,000                  | 10,907,13        | 16,533,378                | 1.00                     | 14.88                    |
| 17   | Power USA Generation, LLC                | 940                    | 1,099,440        | 11,841,021                | 1.00                     | 14.74                    |
| 18   | HECO Corporation                         | 2,407                  | 10,022,88        | 1,000,000,00              | 2.00                     | 14.86                    |
| 19   | Apex Energy, Inc.                        | 1,040                  | 34,706,8         | 30,743,878                | 1.00                     | 15.01                    |
| 20   | City of Seattle                          | 2,007                  | 5,550,00         | 30,555,78                 | 2.00                     | 15.01                    |
| 21   | State of California                      | 2,016                  | 5,000,04         | 10,122,801                | 4.00                     | 15.75                    |
| 22   | Chesapeake Energy Services, Inc.         | 1,088                  | 1,000,000        | 1,000,000                 | 4.00                     | 15.99                    |
| 23   | Genex, Inc. Energy Services Inc.         | 1,007                  | 11,700,47        | 5,545,477                 | 1.00                     | 16.01                    |
| 24   | Power Generation                         | 1,040                  | 5,764,88         | 17,133,055                | 1.00                     | 16.55                    |
| 25   | Capital Power Generation                 | 1,000                  | 1,000,000        | 1,000,000                 | 4.00                     | 16.55                    |
| 26   | U.S. Department of Defense               | 2,100                  | 2,100,000        | 1,000,000,00              | 4.00                     | 16.80                    |
| 27   | Energy Services, Inc.                    | 2,000                  | 10,000,000       | 1,000,000,00              | 1.00                     | 17.23                    |
| 28   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 29   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 30   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 31   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 32   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 33   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 34   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 35   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 36   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 37   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 38   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 39   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 40   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 41   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 42   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 43   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 44   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 45   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 46   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 47   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 48   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 49   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |
| 50   | Energy Services, Inc.                    | 1,000                  | 1,000,000        | 1,000,000,00              | 1.00                     | 17.40                    |

2022 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Parent Co.

Collection Company's parent company is listed as the FERC MWh when the parent company is not listed as of 3/1/2022

| Rank | Operator Parent Co Name                   | Name Plate Capacity MW | Net Generation MWh | Total Non-Fuel O&M \$ | Calculated NF O&M \$/MWh | Calculated NF O&M \$/kW |
|------|---|------------------------|--------------------|-----------------------|--------------------------|-------------------------|
| 1    | US Power Corp., LLC                       | 1,150                  | 479,120            | 4,545,986             | 9.44                     | 8.91                    |
| 2    | Wabash Corporation                        | 2,165                  | 4,531,113          | 7,777,375             | 9.15                     | 8.21                    |
| 3    | Transtar Energy, LLC                      | 1,105                  | 3,771,771          | 3,377,924             | 9.74                     | 10.35                   |
| 4    | Norfolk Energy Services, LLC              | 1,515                  | 7,957,741          | 7,577,558             | 9.57                     | 10.83                   |
| 5    | Vantage Energy                            | 1,187                  | 1,544,421          | 1,159,004             | 8.90                     | 11.17                   |
| 6    | Powerco Energy Group Global, LLC          | 1,755                  | 8,879,757          | 7,550,170             | 9.07                     | 11.22                   |
| 7    | Gasification Energy Corporation           | 2,270                  | 13,150,527         | 12,296,570            | 9.34                     | 11.83                   |
| 8    | Public Service Energy Group International | 8,150                  | 12,811,070         | 6,736,077             | 5.24                     | 11.87                   |
| 9    | US Power Corp.                            | 5,965                  | 23,211,960         | 11,115,161            | 4.80                     | 12.04                   |
| 10   | Public Service Energy Group International | 1,628                  | 1,548,531          | 1,233,112             | 11.40                    | 12.45                   |
| 11   | ACF Energy, LLC                           | 1,155                  | 3,500,170          | 5,007,122             | 2.68                     | 13.03                   |
| 12   | Tru Energy Group, Inc.                    | 4,341                  | 1,187,078          | 37,300,779            | 5.04                     | 13.21                   |
| 13   | Goodwin Capital, LLC                      | 9,120                  | 2,146,527          | 11,249,128            | 5.25                     | 13.27                   |
| 14   | State of Colorado                         | 2,160                  | 4,456,527          | 12,455,156            | 5.17                     | 13.90                   |
| 15   | WACOR, LLC                                | 1,652                  | 6,078,248          | 2,679,380             | 8.53                     | 13.98                   |
| 16   | Edison Electric Energy, LLC               | 670                    | 3,700,248          | 3,179,705             | 8.58                     | 14.02                   |
| 17   | Energy Corporation                        | 24,100                 | 6,266,861          | 15,616,542            | 5.12                     | 14.34                   |
| 18   | Apex Energy, LLC                          | 2,049                  | 13,456,512         | 13,648,597            | 7.97                     | 14.88                   |
| 19   | TCOR, Corporation                         | 49,629                 | 17,103,930         | 49,500,917            | 6.32                     | 14.83                   |
| 20   | Acadia Corporation                        | 1,517                  | 17,745,006         | 32,742,735            | 5.67                     | 14.97                   |
| 21   | OK Energy Corp.                           | 8,962                  | 21,111,558         | 11,042,550            | 4.47                     | 15.24                   |
| 22   | Meridian Energy Services                  | 2,273                  | 14,733,884         | 4,726,249             | 4.12                     | 15.31                   |
| 23   | New England Energy                        | 22,110                 | 17,775,325         | 67,300,380            | 4.32                     | 15.37                   |
| 24   | Alliant Energy Corporation                | 6,006                  | 13,001,870         | 14,430,647            | 5.38                     | 15.50                   |
| 25   | City of Seattle                           | 2,200                  | 6,200,252          | 12,208,642            | 5.35                     | 15.55                   |
| 26   | Wabash Corporation                        | 1,261                  | 4,769,450          | 5,719,710             | 1.98                     | 16.82                   |
| 27   | Capital Power Corporation                 | 557                    | 1,006,557          | 1,674,124             | 5.77                     | 16.20                   |
| 28   | Power Corporation                         | 8,200                  | 7,950,000          | 17,350,079            | 5.62                     | 16.78                   |
| 29   | United States                             | 4,148                  | 118,710,550        | 13,848,960            | 5.15                     | 17.08                   |
| 30   | US Department of Defense                  | 21,812                 | 17,266,562         | 18,549,150            | 7.23                     | 17.48                   |
| 31   | Tru Energy Group, Inc.                    | 1,707                  | 8,777,151          | 17,351,717            | 5.07                     | 17.53                   |
| 32   | US Energy Corp.                           | 2,160                  | 6,111,608          | 48,705,078            | 7.10                     | 17.61                   |
| 33   | Goodwin Capital, LLC                      | 1,870                  | 12,551,586         | 13,564,138            | 4.12                     | 17.88                   |
| 34   | Apex Energy Corporation                   | 1,179                  | 2,111,241          | 2,100,155             | 8.74                     | 18.32                   |
| 35   | Wabash                                    | 1,115                  | 3,339,738          | 4,787,310             | 4.47                     | 18.33                   |
| 36   | State of New York                         | 1,500                  | 1,715,370          | 2,141,210             | 1.26                     | 18.34                   |
| 37   | Wabash Corporation                        | 1,261                  | 4,769,450          | 2,141,120             | 1.08                     | 18.75                   |
| 38   | Energy, Inc.                              | 11,529                 | 20,266,500         | 216,266,237           | 7.16                     | 18.59                   |
| 39   | Algonquin Power & Utilities Corp.         | 1,727                  | 3,555,008          | 45,700,550            | 7.76                     | 18.72                   |
| 40   | Energy, Inc.                              | 1,217                  | 22,849,114         | 1,125,906,664         | 5.16                     | 19.87                   |
| 41   | Goodwin Capital, LLC                      | 4,118                  | 9,366,526          | 9,548,117             | 11.49                    | 19.05                   |
| 42   | City of Seattle                           | 1,464                  | 1,464,549          | 18,889,741            | 18.79                    | 19.19                   |
| 43   | State of New York                         | 1,717                  | 8,009,387          | 114,800,760           | 24.13                    | 20.00                   |
| 44   | Wabash Corporation                        | 1,170                  | 1,717,775          | 8,777,770             | 5.18                     | 20.20                   |
| 45   | Energy Services International, LLC        | 2,817                  | 9,000,641          | 17,114,151            | 5.04                     | 20.26                   |
| 46   | Wabash                                    | 2,411                  | 10,000,170         | 10,466,553            | 10.22                    | 20.39                   |
| 47   | Wabash Corporation                        | 21,511                 | 13,271,000         | 48,700,708            | 7.32                     | 20.41                   |
| 48   | Goodwin Capital, LLC                      | 1,152                  | 1,170,115          | 47,380,158            | 7.72                     | 20.71                   |
| 49   | Wabash Corp.                              | 1,464                  | 1,256,562          | 6,106,009             | 5.67                     | 20.78                   |
| 50   | City of Jackson, Florida                  | 2,461                  | 12,551,586         | 11,126,957            | 5.77                     | 20.82                   |
| 51   | Wabash Corporation                        | 1,300                  | 4,155,000          | 12,478,007            | 6.12                     | 21.10                   |
| 52   | Tru Energy Corporation                    | 3,977                  | 11,000,760         | 1,111,170,000         | 8.01                     | 21.21                   |
| 53   | State of New York                         | 1,464                  | 1,464,549          | 11,464,150            | 1.04                     | 21.38                   |
| 54   | Wabash Corporation                        | 4,078                  | 6,178,041          | 11,576,011            | 14.87                    | 21.38                   |
| 55   | Wabash                                    | 1,077                  | 7,771,701          | 33,007,778            | 8.48                     | 21.86                   |
| 56   | Wabash Corporation                        | 1,720                  | 3,555,150          | 11,111,110            | 5.17                     | 21.87                   |
| 57   | Wabash Corp.                              | 21,000                 | 18,464,111         | 4,984,648             | 12.11                    | 22.02                   |
| 58   | Wabash Energy, Inc.                       | 25,072                 | 12,464,088         | 13,555,575            | 7.97                     | 22.15                   |
| 59   | Wabash                                    | 1,175                  | 6,078,378          | 71,778,387            | 7.12                     | 22.67                   |
| 60   | Wabash Corporation                        | 20,144                 | 8,111,110          | 11,111,110            | 5.02                     | 22.68                   |
| 61   | Canada Power Plant Investment Board       | 1,460                  | 4,464,560          | 46,126,048            | 1.44                     | 22.85                   |
| 62   | Wabash Corporation                        | 5,259                  | 24,111,110         | 10,000,155            | 7.34                     | 23.35                   |
| 63   | Wabash                                    | 8,547                  | 10,000,170         | 18,178,271            | 7.90                     | 23.37                   |
| 64   | Wabash                                    | 6,076                  | 12,464,560         | 12,464,560            | 5.20                     | 23.46                   |
| 65   | Goodwin Capital, LLC                      | 8,002                  | 12,464,560         | 18,006,007            | 11.04                    | 23.94                   |
| 66   | Wabash Energy Services                    | 4,118                  | 1,464,549          | 10,000,640            | 7.16                     | 23.68                   |
| 67   | Wabash Corporation                        | 1,175                  | 6,078,378          | 17,330,150            | 7.81                     | 24.15                   |
| 68   | Wabash Corp.                              | 8,888                  | 12,464,560         | 20,000,000            | 6.12                     | 24.80                   |
| 69   | Wabash Energy Services                    | 1,460                  | 8,111,110          | 18,006,040            | 4.90                     | 24.77                   |
| 70   | State of New York                         | 4,118                  | 12,464,560         | 18,111,110            | 1.08                     | 25.18                   |
| 71   | Wabash Corporation                        | 1,175                  | 6,078,378          | 44,000,000            | 7.40                     | 25.18                   |
| 72   | Wabash Corporation                        | 1,175                  | 6,078,378          | 17,330,150            | 1.14                     | 25.23                   |
| 73   | Wabash Corporation                        | 4,200                  | 11,111,110         | 12,464,560            | 6.12                     | 25.69                   |
| 74   | City of Seattle                           | 1,200                  | 2,464,549          | 41,000,150            | 1.18                     | 25.89                   |
| 75   | Wabash Corporation                        | 1,464                  | 12,464,560         | 68,000,170            | 7.41                     | 26.19                   |
| 76   | Wabash Corporation                        | 1,710                  | 7,000,170          | 70,000,170            | 6.07                     | 26.63                   |
| 77   | Wabash, LLC                               | 1,159                  | 2,464,549          | 11,464,549            | 11.34                    | 27.34                   |
| 78   | Wabash, LLC                               | 1,460                  | 1,111,110          | 10,000,170            | 7.78                     | 27.52                   |
| 79   | Wabash Energy Corp.                       | 1,887                  | 6,078,378          | 10,700,155            | 1.12                     | 27.84                   |
| 80   | Wabash Energy Services                    | 1,175                  | 6,078,378          | 10,000,170            | 1.08                     | 28.28                   |
| 81   | Wabash, LLC                               | 1,214                  | 8,006,000          | 8,006,000             | 8.00                     | 28.48                   |
| 82   | State of New York                         | 4,118                  | 12,464,560         | 18,006,040            | 10.41                    | 28.75                   |
| 83   | Wabash Corp.                              | 6,077                  | 11,000,170         | 11,000,170            | 7.17                     | 28.85                   |
| 84   | Wabash                                    | 1,061                  | 1,111,110          | 11,000,170            | 11.27                    | 29.01                   |
| 85   | Wabash Corporation                        | 25,000                 | 14,464,560         | 18,006,040            | 12.38                    | 31.15                   |
| 86   | State of New York                         | 4,066                  | 12,464,560         | 10,000,170            | 7.80                     | 31.56                   |
| 87   | Wabash Corporation                        | 1,511                  | 1,000,170          | 47,300,170            | 7.12                     | 31.87                   |
| 88   | Wabash Corporation                        | 1,460                  | 4,000,170          | 47,300,170            | 6.00                     | 32.02                   |
| 89   | Wabash Corp.                              | 1,264                  | 12,464,560         | 11,000,170            | 5.81                     | 34.42                   |
| 90   | Wabash Corporation                        | 1,011                  | 1,000,170          | 10,000,170            | 8.92                     | 34.72                   |
| 91   | Wabash Corporation                        | 1,011                  | 6,078,378          | 10,000,170            | 1.18                     | 35.46                   |
| 92   | Wabash Corporation                        | 1,011                  | 4,464,560          | 11,000,170            | 5.81                     | 35.82                   |
| 93   | Wabash Corporation                        | 1,117                  | 1,111,110          | 11,000,170            | 10.34                    | 36.82                   |
| 94   | Wabash Corp., Inc.                        | 1,429                  | 1,464,560          | 11,000,170            | 7.07                     | 36.81                   |
| 95   | Wabash Corporation                        | 808                    | 4,000,170          | 10,000,170            | 6.00                     | 38.61                   |
| 96   | Wabash Corp.                              | 7,000                  | 12,464,560         | 18,006,040            | 11.02                    | 38.81                   |
| 97   | Wabash Corporation                        | 1,112                  | 1,000,170          | 11,000,170            | 11.12                    | 39.86                   |
| 98   | Wabash Corporation                        | 1,460                  | 8,111,110          | 11,111,110            | 12.86                    | 41.18                   |
| 99   | Wabash Corporation                        | 1,460                  | 6,000,170          | 67,000,170            | 11.00                    | 41.34                   |
| 100  | Wabash Corporation                        | 1,550                  | 3,000,170          | 10,000,170            | 20.00                    | 41.61                   |
| 101  | Wabash Corp.                              | 1,460                  | 1,000,170          | 11,000,170            | 18.87                    | 42.01                   |
| 102  | Wabash Corp.                              | 2,012                  | 12,464,560         | 11,000,170            | 10.00                    | 44.42                   |
| 103  | Wabash Corp.                              | 1,715                  | 6,000,170          | 10,000,170            | 15.00                    | 46.36                   |
| 104  | Wabash Corporation                        | 1,300                  | 4,000,170          | 11,000,170            | 14.00                    | 48.74                   |
| 105  | Wabash Corporation                        | 1,110                  | 1,000,170          | 11,000,170            | 18.88                    | 52.90                   |
| 106  | Wabash Corp., Inc.                        | 8,002                  | 11,000,170         | 67,000,170            | 20.00                    | 78.01                   |
| 107  | Wabash Corp., Inc.                        | 808                    | 4,000,170          | 70,000,170            | 17.00                    | 88.29                   |
| 108  | Wabash Corporation                        | 1,007                  | 4,000,170          | 21,000,170            | 51.00                    | 113.78                  |



**2018 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                               | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 1    | Tenaska Operations, Inc.                    | 1,134                     | 145,905               | 3,728,221                | 25.55                       | 3.29                       |
| 2    | Riverside Generating Co LLC                 | 1,150                     | 694,617               | 4,444,690                | 6.40                        | 3.86                       |
| 3    | Tenaska Georgia Partners, L.P.              | 1,099                     | 92,227                | 4,344,465                | 47.11                       | 3.95                       |
| 4    | NRG Marsh Landing LLC                       | 828                       | 219,407               | 3,523,000                | 16.06                       | 4.25                       |
| 5    | Diamond Generating Corporation              | 1,099                     | 642,651               | 5,090,073                | 7.92                        | 4.63                       |
| 6    | Rolling Hills Generating, LLC               | 978                       | 790,934               | 4,619,375                | 5.84                        | 4.73                       |
| 7    | RA Generation, LLC                          | 1,570                     | 992,065               | 7,807,606                | 7.87                        | 4.97                       |
| 8    | NRG Oswego Harbor Power Operations Inc      | 1,804                     | 41,725                | 11,329,350               | 271.52                      | 6.28                       |
| 9    | The Silverfern Group, Inc.                  | 985                       | 2,084,851             | 6,304,938                | 3.02                        | 6.40                       |
| 10   | Wolverine Power Supply Cooperative, Inc.    | 1,008                     | 1,110,598             | 7,655,019                | 6.89                        | 7.60                       |
| 11   | Florida Power & Light Company               | 24,873                    | 92,493,892            | 193,781,168              | 2.10                        | 7.79                       |
| 12   | NextEra Energy, Inc.                        | 1,683                     | 1,815,214             | 13,451,681               | 7.41                        | 7.99                       |
| 13   | Constellation Power Source Generation LLC   | 994                       | 353,812               | 8,176,541                | 23.11                       | 8.23                       |
| 14   | Oglethorpe Power Corporation                | 5,438                     | 10,558,516            | 49,459,379               | 4.68                        | 9.09                       |
| 15   | DGC Operations LLC                          | 920                       | 1,384,880             | 8,550,571                | 6.17                        | 9.30                       |
| 16   | NRG California South LP                     | 2,910                     | 192,257               | 27,281,985               | 141.90                      | 9.38                       |
| 17   | Nevada Power Company                        | 5,169                     | 15,006,904            | 51,802,791               | 3.45                        | 10.02                      |
| 18   | Consolidated Asset Management Services, LLC | 2,251                     | 6,823,032             | 22,725,683               | 3.33                        | 10.10                      |
| 19   | Dynegy -Moss Landing LLC                    | 1,398                     | 4,178,782             | 14,810,463               | 3.54                        | 10.59                      |
| 20   | PSEG Fossil LLC                             | 5,974                     | 13,844,106            | 63,426,232               | 4.58                        | 10.62                      |
| 21   | Siemens Energy, Inc.                        | 2,022                     | 6,505,585             | 21,848,892               | 3.36                        | 10.81                      |
| 22   | The Carlyle Group Inc.                      | 2,968                     | 10,980,600            | 32,562,055               | 2.97                        | 10.97                      |
| 23   | NRG Energy, Inc.                            | 2,221                     | 1,611,995             | 25,124,498               | 15.59                       | 11.31                      |
| 24   | USCE - Savannah District                    | 1,410                     | 1,817,367             | 16,050,490               | 8.83                        | 11.38                      |
| 25   | Exelon Power                                | 6,727                     | 9,692,185             | 77,304,889               | 7.98                        | 11.49                      |
| 26   | WGP Acquisition LLC                         | 1,374                     | 5,759,520             | 15,880,460               | 2.76                        | 11.55                      |
| 27   | EthosEnergy                                 | 3,317                     | 12,488,684            | 38,581,195               | 3.09                        | 11.63                      |
| 28   | Old Dominion Electric Cooperative           | 2,162                     | 4,887,878             | 25,427,288               | 5.20                        | 11.76                      |
| 29   | Southern Power Company                      | 8,593                     | 34,200,833            | 101,230,455              | 2.96                        | 11.78                      |
| 30   | Dynegy Inc.                                 | 1,333                     | 3,755,308             | 16,171,451               | 4.31                        | 12.13                      |
| 31   | NRG Cottonwood Tenant LLC                   | 1,434                     | 7,170,723             | 17,486,923               | 2.44                        | 12.20                      |
| 32   | Seminole Electric Cooperative Inc.          | 853                       | 3,637,057             | 10,454,518               | 2.87                        | 12.25                      |
| 33   | Banpu Public Company Limited                | 1,606                     | 5,472,304             | 19,975,910               | 3.65                        | 12.44                      |
| 34   | Jade Power Generation Holdings, LLC         | 1,346                     | 2,418,663             | 16,936,924               | 7.00                        | 12.59                      |
| 35   | Aspen Generating, LLC                       | 907                       | 4,493,414             | 11,472,911               | 2.55                        | 12.65                      |
| 36   | H2O Power Limited Partnership               | 1,406                     | 1,906,658             | 17,839,910               | 9.36                        | 12.69                      |
| 37   | Panda Power Funds, LP                       | 1,615                     | 8,513,943             | 20,512,485               | 2.41                        | 12.70                      |
| 38   | Kiowa Power Partners, LLC                   | 1,370                     | 5,485,625             | 17,587,967               | 3.21                        | 12.84                      |
| 39   | Constellation Energy Nuclear Group, LLC     | 3,776                     | 10,585,131            | 49,281,311               | 4.66                        | 13.05                      |
| 40   | LS Power Development, LLC                   | 1,469                     | 5,366,802             | 19,218,136               | 3.58                        | 13.08                      |
| 41   | California Department of Water Resources    | 1,474                     | 2,693,527             | 19,353,742               | 7.19                        | 13.13                      |
| 42   | Delta Energy Center LLC                     | 944                       | 3,081,664             | 12,498,369               | 4.06                        | 13.25                      |
| 43   | Rise Light & Power                          | 2,551                     | 3,337,961             | 34,018,963               | 10.19                       | 13.34                      |
| 44   | NRG REMA, LLC                               | 1,898                     | 579,423               | 25,510,992               | 44.03                       | 13.44                      |
| 45   | Tenaska Alabama Partners LP                 | 939                       | 1,882,859             | 12,744,700               | 6.77                        | 13.57                      |
| 46   | Odessa-Ector Power Partners, L.P.           | 1,153                     | 7,420,294             | 15,645,442               | 2.11                        | 13.57                      |
| 47   | Morgan Energy Center, LLC                   | 900                       | 4,532,851             | 12,226,329               | 2.70                        | 13.58                      |
| 48   | Channel Energy Center, LP                   | 924                       | 4,142,358             | 12,610,028               | 3.04                        | 13.65                      |
| 49   | Calpine Central, L.P.                       | 933                       | 4,294,527             | 12,750,195               | 2.97                        | 13.67                      |
| 50   | Austin Energy                               | 1,635                     | 2,734,806             | 22,487,784               | 8.22                        | 13.76                      |
| 51   | Entergy Texas, Inc.                         | 2,609                     | 6,437,777             | 36,014,600               | 5.59                        | 13.81                      |
| 52   | Calpine Corp-Magic Valley                   | 801                       | 3,271,743             | 11,082,677               | 3.39                        | 13.84                      |
| 53   | Connectiv Bethlehem LLC                     | 1,153                     | 4,159,649             | 16,029,595               | 3.85                        | 13.90                      |
| 54   | Brazos Electric Power Cooperative, Inc.     | 1,884                     | 4,053,737             | 26,189,800               | 6.46                        | 13.90                      |
| 55   | CER Generation, LLC                         | 823                       | 4,376,115             | 11,451,760               | 2.62                        | 13.92                      |
| 56   | Astoria Generating Company LP               | 1,697                     | 1,164,381             | 23,776,182               | 20.42                       | 14.01                      |
| 57   | Entergy Louisiana, LLC                      | 9,148                     | 24,874,368            | 128,252,566              | 5.16                        | 14.02                      |

**2018 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                                    | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|--|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 58   | Texgen Power, LLC                                | 2,457                     | 3,625,782             | 34,477,204               | 9.51                        | 14.03                      |
| 59   | Occidental Chemical Corporation                  | 938                       | 5,289,832             | 13,313,192               | 2.52                        | 14.19                      |
| 60   | Tenaska Gateway Partners Ltd                     | 940                       | 2,905,428             | 13,392,051               | 4.61                        | 14.25                      |
| 61   | Dynegy Kendall Energy, LLC                       | 1,256                     | 5,857,928             | 17,902,466               | 3.06                        | 14.25                      |
| 62   | NRG Bowline LLC                                  | 1,242                     | 473,118               | 17,707,035               | 37.43                       | 14.26                      |
| 63   | TNA Merchant Projects, Inc                       | 1,240                     | 2,712,761             | 17,702,683               | 6.53                        | 14.28                      |
| 64   | New Covert Generating Company LLC                | 1,176                     | 6,785,423             | 16,866,697               | 2.49                        | 14.34                      |
| 65   | PSEG Power New York LLC                          | 893                       | 5,142,115             | 12,851,159               | 2.50                        | 14.39                      |
| 66   | Argo Infrastructure Partners LP                  | 1,494                     | 6,113,782             | 21,529,180               | 3.52                        | 14.41                      |
| 67   | WorleyParsons                                    | 918                       | 5,347,392             | 13,247,643               | 2.48                        | 14.43                      |
| 68   | Deer Park Energy Center LLC                      | 1,176                     | 6,891,970             | 17,066,700               | 2.48                        | 14.51                      |
| 69   | La Frontera Holdings, LLC                        | 3,007                     | 17,706,672            | 43,712,421               | 2.47                        | 14.54                      |
| 70   | Invenergy LLC                                    | 1,853                     | 5,807,419             | 27,151,554               | 4.68                        | 14.65                      |
| 71   | Tenaska Virginia Partners, L.P.                  | 1,011                     | 5,771,750             | 14,823,070               | 2.57                        | 14.66                      |
| 72   | Freestone Power Generation LP                    | 1,036                     | 6,394,911             | 15,240,995               | 2.38                        | 14.71                      |
| 73   | Tenaska Frontier Partners, Ltd.                  | 940                       | 3,566,210             | 13,868,254               | 3.89                        | 14.76                      |
| 74   | JEA  | 4,299                     | 9,029,686             | 63,887,865               | 7.08                        | 14.86                      |
| 75   | CCI Roseton LLC                                  | 1,242                     | 516,508               | 18,475,818               | 35.77                       | 14.88                      |
| 76   | Wood Group GTS                                   | 853                       | 2,787,013             | 12,707,150               | 4.56                        | 14.90                      |
| 77   | Marcus Hook Energy, L.P                          | 836                       | 4,132,590             | 12,488,164               | 3.02                        | 14.94                      |
| 78   | Idaho Power Company                              | 2,561                     | 10,089,852            | 38,368,871               | 3.80                        | 14.98                      |
| 79   | Entergy Mississippi, LLC                         | 4,425                     | 12,389,324            | 67,755,746               | 5.47                        | 15.31                      |
| 80   | NAES Corporation                                 | 39,424                    | 94,692,657            | 607,069,538              | 6.41                        | 15.40                      |
| 81   | Avista Corporation                               | 1,280                     | 4,568,954             | 19,739,447               | 4.32                        | 15.42                      |
| 82   | Dynegy Power, LLC                                | 1,814                     | 9,348,152             | 27,999,604               | 3.00                        | 15.43                      |
| 83   | Duke Energy Florida, LLC                         | 12,921                    | 37,205,534            | 200,654,527              | 5.39                        | 15.53                      |
| 84   | Calpine Bosque Energy Center, LLC                | 807                       | 4,184,857             | 12,544,977               | 3.00                        | 15.55                      |
| 85   | AES Alamos, LLC                                  | 1,922                     | 958,300               | 29,917,917               | 31.22                       | 15.57                      |
| 86   | Midland Cogeneration Venture Limited Partnership | 1,854                     | 7,896,076             | 29,207,699               | 3.70                        | 15.76                      |
| 87   | Cooperative Energy                               | 2,209                     | 5,136,040             | 35,011,506               | 6.82                        | 15.85                      |
| 88   | The City of Seattle—City Light Department        | 2,007                     | 6,409,721             | 31,900,288               | 4.98                        | 15.89                      |
| 89   | South Houston Green Power, LLC                   | 1,052                     | 4,572,434             | 16,737,259               | 3.66                        | 15.91                      |
| 90   | Starwood Energy Group Global, LLC                | 2,278                     | 9,818,305             | 36,449,760               | 3.71                        | 16.00                      |
| 91   | Oklahoma Gas and Electric Company                | 8,952                     | 23,710,217            | 143,327,846              | 6.04                        | 16.01                      |
| 92   | Lake Road Generating Company, LP                 | 840                       | 5,211,758             | 13,477,823               | 2.59                        | 16.05                      |
| 93   | AES Redondo Beach, L.L.C.                        | 1,316                     | 274,507               | 21,208,438               | 77.26                       | 16.11                      |
| 94   | U.S. Bureau Of Reclamation                       | 14,689                    | 40,917,686            | 237,277,308              | 5.80                        | 16.15                      |
| 95   | Onward Energy                                    | 2,558                     | 4,802,080             | 41,493,756               | 8.64                        | 16.22                      |
| 96   | Arkansas Electric Cooperative Corp.              | 2,175                     | 3,384,347             | 35,684,768               | 10.54                       | 16.41                      |
| 97   | USCE - Little Rock District                      | 1,089                     | 2,331,995             | 18,005,503               | 7.72                        | 16.53                      |
| 98   | Tallahassee City of                              | 970                       | 2,832,410             | 16,084,388               | 5.68                        | 16.58                      |
| 99   | Interstate Power and Light Company               | 3,636                     | 12,343,531            | 60,938,276               | 4.94                        | 16.76                      |
| 100  | NRG Cabrillo Power Operations Incorporated       | 890                       | 299,121               | 14,917,291               | 49.87                       | 16.77                      |
| 101  | Colorado Energy Management LLC                   | 867                       | 1,349,745             | 14,544,613               | 10.78                       | 16.77                      |
| 102  | USCE - Mobile District                           | 1,186                     | 2,289,462             | 19,894,407               | 8.69                        | 16.78                      |
| 103  | Duke Energy Carolinas, LLC                       | 16,623                    | 44,888,798            | 281,358,455              | 6.27                        | 16.93                      |
| 104  | USCE - North Pacific Division                    | 13,111                    | 53,610,263            | 223,489,795              | 4.17                        | 17.05                      |
| 105  | USCE - Missouri River District                   | 2,540                     | 11,405,592            | 43,636,880               | 3.83                        | 17.18                      |
| 106  | NRG Arthur Kill Operations, Inc.                 | 896                       | 989,784               | 15,417,356               | 15.58                       | 17.22                      |
| 107  | Public Utility District No. 1 of Chelan County   | 1,988                     | 9,283,644             | 34,457,160               | 3.71                        | 17.33                      |
| 108  | Calpine Mid-Atlantic Generation LLC              | 2,044                     | 3,074,233             | 35,618,045               | 11.59                       | 17.42                      |
| 109  | NRG Chalk Point, LLC                             | 2,647                     | 1,454,986             | 46,340,177               | 31.85                       | 17.51                      |
| 110  | Union Electric Company                           | 10,228                    | 32,572,811            | 179,527,185              | 5.51                        | 17.55                      |
| 111  | Invenergy Services LLC                           | 5,143                     | 15,521,874            | 90,407,059               | 5.82                        | 17.58                      |
| 112  | NextEra Energy Resources, LLC                    | 2,304                     | 5,139,198             | 41,202,301               | 8.02                        | 17.88                      |
| 113  | Grant County Public Utility District             | 2,173                     | 10,125,688            | 38,867,604               | 3.84                        | 17.88                      |
| 114  | Platte River Power Authority                     | 800                       | 1,870,849             | 14,464,901               | 7.73                        | 18.07                      |

**2018 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                                       | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 115  | The Dow Chemical Company                            | 2,628                     | 12,323,057            | 47,642,520               | 3.87                        | 18.13                      |
| 116  | Grand River Dam Authority                           | 1,712                     | 3,353,515             | 31,427,710               | 9.37                        | 18.36                      |
| 117  | Evergy Missouri West, Inc.                          | 1,830                     | 1,083,370             | 34,057,780               | 31.44                       | 18.61                      |
| 118  | Los Angeles Department of Water and Power, Califc   | 7,628                     | 16,261,529            | 144,806,848              | 8.90                        | 18.98                      |
| 119  | Pattern Energy Group Inc.                           | 845                       | 2,063,597             | 16,054,009               | 7.78                        | 18.99                      |
| 120  | Tennessee Valley Authority                          | 29,444                    | 84,764,856            | 563,743,759              | 6.65                        | 19.15                      |
| 121  | Ethos Energy Group Limited                          | 1,353                     | 5,521,821             | 25,992,321               | 4.71                        | 19.21                      |
| 122  | Southwestern Public Service Company                 | 4,744                     | 14,797,224            | 91,308,548               | 6.17                        | 19.25                      |
| 123  | Brookfield Renewable Partners L.P.                  | 885                       | 1,983,436             | 17,132,737               | 8.64                        | 19.36                      |
| 124  | Dominion Energy South Carolina, Inc.                | 4,490                     | 14,584,519            | 88,032,152               | 6.04                        | 19.61                      |
| 125  | Consumers Energy Company                            | 7,608                     | 17,921,882            | 149,969,324              | 8.37                        | 19.71                      |
| 126  | Helix Generation, LLC                               | 1,418                     | 7,015,135             | 28,104,621               | 4.01                        | 19.82                      |
| 127  | Entergy Arkansas, LLC                               | 7,360                     | 32,125,419            | 146,211,405              | 4.55                        | 19.86                      |
| 128  | Power Authority of the State of New York            | 5,400                     | 28,321,233            | 107,660,982              | 3.80                        | 19.94                      |
| 129  | PSEG Power Connecticut LLC                          | 1,060                     | 364,994               | 21,219,128               | 58.14                       | 20.02                      |
| 130  | National Grid Generation, LLC                       | 3,945                     | 4,672,529             | 78,996,460               | 16.91                       | 20.02                      |
| 131  | Hawaiian Electric Company, Inc.                     | 1,258                     | 3,496,406             | 25,326,238               | 7.24                        | 20.14                      |
| 132  | Duke Energy Progress, LLC                           | 10,773                    | 33,645,354            | 217,726,826              | 6.47                        | 20.21                      |
| 133  | Sacramento Municipal Utility District               | 1,203                     | 2,617,116             | 24,351,007               | 9.30                        | 20.24                      |
| 134  | Clearway Energy Operating LLC                       | 948                       | 2,208,578             | 19,311,938               | 8.74                        | 20.37                      |
| 135  | Calpine Corporation                                 | 4,630                     | 13,276,181            | 94,526,200               | 7.12                        | 20.42                      |
| 136  | Apex Clean Energy, Inc.                             | 1,314                     | 4,324,739             | 26,832,995               | 6.20                        | 20.42                      |
| 137  | BP Wind Energy North America Inc.                   | 1,537                     | 4,481,773             | 31,416,497               | 7.01                        | 20.44                      |
| 138  | Virginia Electric and Power Company                 | 20,560                    | 48,882,243            | 422,755,568              | 8.65                        | 20.56                      |
| 139  | Vestas Wind Systems A/S                             | 930                       | 3,095,677             | 19,143,367               | 6.18                        | 20.59                      |
| 140  | E.ON Climate & Renewables North America Inc.        | 3,710                     | 11,198,687            | 77,078,971               | 6.88                        | 20.78                      |
| 141  | Tampa Electric Company                              | 5,792                     | 19,726,918            | 121,394,461              | 6.15                        | 20.96                      |
| 142  | Talen Generation LLC                                | 5,193                     | 5,179,694             | 109,224,268              | 21.09                       | 21.03                      |
| 143  | Luminant Generation Company LLC                     | 12,634                    | 28,382,108            | 266,975,253              | 9.41                        | 21.13                      |
| 144  | EDF Renewables Services                             | 6,495                     | 21,278,655            | 137,348,038              | 6.45                        | 21.15                      |
| 145  | USCE - Nashville District                           | 932                       | 3,609,369             | 19,827,855               | 5.49                        | 21.28                      |
| 146  | Dynegy Power America, Inc.                          | 2,356                     | 9,389,571             | 50,776,884               | 5.41                        | 21.55                      |
| 147  | Public Service Company of Oklahoma                  | 4,782                     | 10,196,550            | 103,258,799              | 10.13                       | 21.59                      |
| 148  | Duke Energy Renewables, Inc.                        | 1,593                     | 4,906,886             | 34,522,995               | 7.04                        | 21.68                      |
| 149  | GE Energy   | 1,003                     | 3,330,088             | 21,834,531               | 6.56                        | 21.78                      |
| 150  | FPL Energy Wyman LLC                                | 846                       | 156,386               | 18,648,000               | 119.24                      | 22.04                      |
| 151  | Salt River Project Agricultural Improvement and Pov | 11,111                    | 38,770,027            | 248,086,748              | 6.40                        | 22.33                      |
| 152  | Clearway Energy, Inc.                               | 1,057                     | 2,541,623             | 23,867,552               | 9.39                        | 22.59                      |
| 153  | Avangrid Renewables LLC                             | 5,254                     | 13,282,669            | 121,141,398              | 9.12                        | 23.06                      |
| 154  | Sustainable Power Group, LLC                        | 844                       | 1,810,358             | 19,537,044               | 10.79                       | 23.15                      |
| 155  | City Public Service of San Antonio                  | 6,152                     | 19,843,510            | 145,802,306              | 7.35                        | 23.70                      |
| 156  | City Utilities of Springfield                       | 1,087                     | 2,771,366             | 25,820,347               | 9.32                        | 23.76                      |
| 157  | Talen Energy Supply, LLC                            | 1,606                     | 1,743,304             | 38,842,195               | 22.28                       | 24.18                      |
| 158  | Wisconsin Power and Light Company                   | 3,498                     | 11,470,630            | 84,673,388               | 7.38                        | 24.20                      |
| 159  | DTE Electric Company                                | 9,374                     | 31,930,531            | 226,947,863              | 7.11                        | 24.21                      |
| 160  | Wisconsin Public Service Corporation                | 1,869                     | 5,951,944             | 45,481,854               | 7.64                        | 24.33                      |
| 161  | Empire District Electric Company                    | 1,599                     | 4,981,215             | 38,901,422               | 7.81                        | 24.34                      |
| 162  | PowerSouth Energy Cooperative                       | 1,876                     | 5,661,081             | 45,845,742               | 8.10                        | 24.44                      |
| 163  | Sunflower Electric Power Corporation, Inc.          | 1,108                     | 1,547,607             | 27,657,877               | 17.87                       | 24.96                      |
| 164  | Great River Energy                                  | 2,874                     | 9,832,841             | 72,198,955               | 7.34                        | 25.12                      |
| 165  | MidAmerican Energy Company                          | 10,134                    | 33,084,919            | 254,544,220              | 7.69                        | 25.12                      |
| 166  | Dairyland Power Co-op                               | 1,387                     | 4,114,974             | 34,897,608               | 8.48                        | 25.17                      |
| 167  | Northern States Power Company                       | 7,414                     | 23,733,859            | 186,651,307              | 7.86                        | 25.18                      |
| 168  | Ihi Power Services Corp.                            | 919                       | 1,302,266             | 23,187,224               | 17.81                       | 25.23                      |
| 169  | Public Service Company of Colorado                  | 7,059                     | 25,841,438            | 178,193,779              | 6.90                        | 25.24                      |
| 170  | El Paso Electric Company                            | 1,933                     | 5,041,205             | 48,999,135               | 9.72                        | 25.34                      |
| 171  | Cleco Power LLC                                     | 5,131                     | 16,552,538            | 131,760,203              | 7.96                        | 25.68                      |

**2018 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name   | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 172  | Midwest Generation EME, LLC                           | 5,147                     | 7,724,298             | 132,948,201              | 17.21                       | 25.83                      |
| 173  | East Kentucky Power Cooperative, Inc.                 | 3,034                     | 8,835,949             | 78,599,671               | 8.90                        | 25.91                      |
| 174  | Sierra Pacific Power Company                          | 1,836                     | 6,312,613             | 47,708,070               | 7.56                        | 25.99                      |
| 175  | NextEra Energy Partners, LP                           | 4,105                     | 14,512,206            | 106,876,521              | 7.36                        | 26.04                      |
| 176  | Louisville Gas and Electric Company                   | 5,489                     | 22,647,768            | 143,254,668              | 6.33                        | 26.10                      |
| 177  | Consolidated Edison Development, Inc.                 | 1,301                     | 2,983,742             | 34,154,017               | 11.45                       | 26.26                      |
| 178  | Vistra Corp.  | 5,554                     | 32,169,293            | 146,634,884              | 4.56                        | 26.40                      |
| 179  | Colorado Springs City of                              | 1,139                     | 4,803,114             | 30,199,019               | 6.29                        | 26.52                      |
| 180  | Southwestern Electric Power Company                   | 5,778                     | 20,444,035            | 153,834,247              | 7.52                        | 26.62                      |
| 181  | Morgantown Steam, LLC                                 | 2,481                     | 2,864,804             | 66,520,945               | 23.22                       | 26.81                      |
| 182  | Lower Colorado River Authority                        | 4,028                     | 16,642,649            | 108,876,565              | 6.54                        | 27.03                      |
| 183  | Associated Electric Cooperative Inc.                  | 4,816                     | 22,358,685            | 131,046,085              | 5.86                        | 27.21                      |
| 184  | Allegheny Energy Supply Company, LLC                  | 2,052                     | 13,251,012            | 56,039,961               | 4.23                        | 27.31                      |
| 185  | Portland General Electric Company                     | 4,491                     | 14,160,564            | 122,875,771              | 8.68                        | 27.36                      |
| 186  | Eversys Kansas Central, Inc.                          | 4,559                     | 14,843,698            | 124,785,944              | 8.41                        | 27.37                      |
| 187  | First Solar, Inc.                                     | 1,163                     | 2,756,242             | 31,986,396               | 11.61                       | 27.50                      |
| 188  | Eversys Metro, Inc.                                   | 5,744                     | 16,790,274            | 158,094,461              | 9.42                        | 27.52                      |
| 189  | 8point3 Energy Partners LP                            | 906                       | 2,163,927             | 24,970,532               | 11.54                       | 27.57                      |
| 190  | BHE Solar, LLC  | 998                       | 2,491,731             | 27,594,683               | 11.07                       | 27.66                      |
| 191  | Western Farmers Electric Cooperative                  | 1,394                     | 3,522,050             | 38,581,971               | 10.95                       | 27.68                      |
| 192  | Castleton Commodities International LLC               | 1,268                     | 1,387,688             | 35,141,880               | 25.32                       | 27.71                      |
| 193  | AES Wind Generation, LLC                              | 889                       | 2,414,340             | 24,939,527               | 10.33                       | 28.05                      |
| 194  | Orlando Utilities Commission                          | 1,605                     | 6,180,472             | 45,109,083               | 7.30                        | 28.11                      |
| 195  | Puget Sound Energy, Inc.                              | 2,712                     | 6,047,508             | 76,912,059               | 12.72                       | 28.36                      |
| 196  | TerraForm Power, Inc.                                 | 916                       | 2,067,919             | 26,237,706               | 12.69                       | 28.65                      |
| 197  | Lakeland City of                                      | 1,074                     | 3,886,293             | 30,861,613               | 7.94                        | 28.74                      |
| 198  | NRG Texas Power LLC                                   | 7,657                     | 27,083,628            | 221,748,356              | 8.19                        | 28.96                      |
| 199  | Georgia Power Company                                 | 18,102                    | 61,639,724            | 525,795,788              | 8.53                        | 29.05                      |
| 200  | Kingfisher Development Co.                            | 2,531                     | 3,539,694             | 73,930,145               | 20.89                       | 29.21                      |
| 201  | NRG Power Midwest LP                                  | 2,096                     | 2,749,844             | 61,671,302               | 22.43                       | 29.42                      |
| 202  | Springfield City of - (IL)                            | 806                       | 2,386,447             | 24,229,526               | 10.15                       | 30.07                      |
| 203  | ArLight Capital Partners, LLC                         | 11,017                    | 56,948,189            | 334,626,912              | 5.88                        | 30.37                      |
| 204  | NRG Energy Services LLC                               | 2,756                     | 9,553,185             | 83,734,793               | 8.77                        | 30.39                      |
| 205  | Omaha Public Power District                           | 2,848                     | 11,071,624            | 88,219,484               | 7.97                        | 30.98                      |
| 206  | PacificCorp   | 11,775                    | 49,211,372            | 366,446,988              | 7.45                        | 31.12                      |
| 207  | South Carolina Public Service Authority               | 5,173                     | 16,515,585            | 161,365,996              | 9.77                        | 31.19                      |
| 208  | Big Rivers Electric Corporation                       | 1,290                     | 5,300,526             | 41,239,698               | 7.78                        | 31.96                      |
| 209  | Kentucky Utilities Company                            | 4,043                     | 13,960,668            | 130,069,698              | 9.32                        | 32.17                      |
| 210  | Tri-State Generation & Transmission Association, Inc. | 2,646                     | 8,342,886             | 85,459,942               | 10.24                       | 32.30                      |
| 211  | Enel Green Power North America, Inc.                  | 2,071                     | 7,868,005             | 68,416,735               | 8.70                        | 33.03                      |
| 212  | Basin Electric Power Cooperative                      | 5,331                     | 25,918,178            | 180,984,960              | 6.98                        | 33.95                      |
| 213  | Mississippi Power Company                             | 4,309                     | 16,693,816            | 147,463,337              | 8.83                        | 34.22                      |
| 214  | Energy Harbor Generation                              | 5,241                     | 7,848,924             | 182,303,022              | 23.23                       | 34.78                      |
| 215  | Appalachian Power Company                             | 5,966                     | 20,605,122            | 210,522,393              | 10.22                       | 35.29                      |
| 216  | Kincaid Generation LLC                                | 1,319                     | 4,798,673             | 46,630,407               | 9.72                        | 35.35                      |
| 217  | Minnesota Power Enterprises, Inc.                     | 2,111                     | 9,589,558             | 75,800,543               | 7.90                        | 35.91                      |
| 218  | Pacific Gas and Electric Company                      | 5,323                     | 15,198,048            | 193,299,155              | 12.72                       | 36.31                      |
| 219  | Southern California Edison Company                    | 2,547                     | 5,859,043             | 92,929,571               | 15.86                       | 36.49                      |
| 220  | Nebraska Public Power District                        | 2,239                     | 10,468,012            | 82,614,614               | 7.89                        | 36.90                      |
| 221  | Archer-Daniels-Midland Company                        | 991                       | 3,710,383             | 37,597,570               | 10.13                       | 37.92                      |
| 222  | Homer City Generation, L.P.                           | 2,012                     | 5,130,945             | 76,420,241               | 14.89                       | 37.98                      |
| 223  | Monongahela Power Company                             | 1,152                     | 6,014,055             | 43,893,614               | 7.30                        | 38.10                      |
| 224  | TransAlta Centralia Generation LLC                    | 1,461                     | 5,370,662             | 55,858,199               | 10.40                       | 38.24                      |
| 225  | Raven Power Generation Holdings LLC                   | 1,370                     | 4,732,171             | 52,590,176               | 11.11                       | 38.38                      |
| 226  | AEP Generation Resources Inc.                         | 3,610                     | 14,155,847            | 139,653,480              | 9.87                        | 38.69                      |
| 227  | Longview Power LLC                                    | 808                       | 5,224,706             | 31,853,211               | 6.10                        | 39.45                      |
| 228  | Duke Energy Indiana, LLC                              | 8,230                     | 30,887,221            | 325,414,269              | 10.54                       | 39.54                      |

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Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                                 | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/KW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 229  | Duke Energy Kentucky, Inc.                    | 1,351                     | 2,916,245             | 53,561,337               | 18.37                       | 39.66                      |
| 230  | Hoosier Energy Rural Electric Coop Inc.       | 1,123                     | 5,962,886             | 44,643,797               | 7.49                        | 39.76                      |
| 231  | Kentucky Power Company                        | 1,913                     | 6,128,095             | 76,081,350               | 12.42                       | 39.77                      |
| 232  | Dynegy Midwest Generation, Inc.               | 2,688                     | 11,387,092            | 107,843,255              | 9.47                        | 40.11                      |
| 233  | AGC Division of APG Inc                       | 823                       | 4,336,582             | 33,115,900               | 7.64                        | 40.25                      |
| 234  | Illinois Power Generating Company             | 2,723                     | 13,357,897            | 109,824,830              | 8.22                        | 40.34                      |
| 235  | Alabama Power Company                         | 13,230                    | 53,196,371            | 533,744,609              | 10.03                       | 40.34                      |
| 236  | MOR PPM Inc                                   | 1,429                     | 7,708,433             | 58,018,269               | 7.53                        | 40.59                      |
| 237  | Illinois Power Resources Generating, LLC      | 1,085                     | 5,716,668             | 44,541,323               | 7.79                        | 41.04                      |
| 238  | Pleasants Corporation                         | 1,368                     | 7,021,328             | 56,183,805               | 8.00                        | 41.07                      |
| 239  | AES Indiana                                   | 4,184                     | 13,119,371            | 174,598,292              | 13.31                       | 41.73                      |
| 240  | Louisiana Generating LLC                      | 2,604                     | 4,737,785             | 113,928,645              | 24.05                       | 43.75                      |
| 241  | Northern Indiana Public Service Company       | 4,021                     | 11,979,274            | 177,957,709              | 14.86                       | 44.26                      |
| 242  | Arizona Public Service Company                | 6,623                     | 19,473,432            | 297,800,252              | 15.29                       | 44.97                      |
| 243  | Talen Montana, LLC                            | 2,363                     | 12,656,682            | 107,311,286              | 8.48                        | 45.41                      |
| 244  | Otter Tail Power Company                      | 1,302                     | 6,502,323             | 62,752,754               | 9.65                        | 48.19                      |
| 245  | Gulf Power Company                            | 1,811                     | 7,367,989             | 87,960,017               | 11.94                       | 48.58                      |
| 246  | Southern Indiana Gas and Electric Company     | 1,244                     | 4,364,653             | 61,744,022               | 14.15                       | 49.64                      |
| 247  | Public Service Company of New Mexico          | 1,624                     | 6,329,303             | 84,009,795               | 13.27                       | 51.75                      |
| 248  | Indiana-Kentucky Electric Corporation         | 1,304                     | 6,369,305             | 68,267,855               | 10.72                       | 52.36                      |
| 249  | Northern California Power Agency              | 900                       | 2,597,577             | 48,849,174               | 18.81                       | 54.28                      |
| 250  | Consolidated Edison Company of New York, Inc. | 819                       | 2,956,300             | 47,127,321               | 15.94                       | 57.53                      |
| 251  | International Paper Company                   | 883                       | 4,136,591             | 52,017,208               | 12.57                       | 58.90                      |
| 252  | Tucson Electric Power Company                 | 2,554                     | 11,434,531            | 150,786,873              | 13.19                       | 59.04                      |
| 253  | Ohio Valley Electric Corporation              | 1,087                     | 5,801,085             | 69,560,622               | 11.99                       | 64.02                      |
| 254  | Wisconsin Electric Power Company              | 7,309                     | 23,315,422            | 628,291,764              | 26.95                       | 85.96                      |
| 255  | Indiana Michigan Power Company                | 2,637                     | 12,030,004            | 241,492,922              | 20.07                       | 91.57                      |
| 256  | Prairie State Generating Company, LLC         | 1,766                     | 11,532,418            | 180,734,169              | 15.67                       | 102.34                     |
| 257  | Geysers Power Co LLC                          | 1,241                     | 5,113,475             | 148,520,171              | 29.04                       | 119.68                     |

**2019 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                               | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 1    | Riverside Generating Co LLC                 | 1150                      | 376501                | 4242003.669              | 11.27                       | <b>3.69</b>                |
| 2    | Tenaska Georgia Partners, L.P.              | 1099.2                    | 127139                | 4311813.16               | 33.91                       | <b>3.92</b>                |
| 3    | NRG Marsh Landing LLC                       | 828                       | 63231                 | 3419705.668              | 54.08                       | <b>4.13</b>                |
| 4    | The Silverfern Group, Inc.                  | 985                       | 425156                | 4400310.426              | 10.35                       | <b>4.47</b>                |
| 5    | Rolling Hills Generating, LLC               | 977.5                     | 572940                | 4505463.448              | 7.86                        | <b>4.61</b>                |
| 6    | Diamond Generating Corporation              | 1099.4                    | 720162                | 5067719.275              | 7.04                        | <b>4.61</b>                |
| 7    | RA Generation, LLC                          | 1570.2                    | 868354                | 7754852.022              | 8.93                        | <b>4.94</b>                |
| 8    | NRG Oswego Harbor Power Operations Inc      | 1803.6                    | 16813                 | 9068813.892              | 539.39                      | <b>5.03</b>                |
| 9    | Constellation Power Source Generation LLC   | 994.1                     | 294879                | 5286754.664              | 17.93                       | <b>5.32</b>                |
| 10   | Florida Power & Light Company               | 23982.4                   | 95882035              | 154540782.5              | 1.61                        | <b>6.44</b>                |
| 11   | Evergy Missouri West, Inc.                  | 1306.2                    | 262000                | 8449164.956              | 32.25                       | <b>6.47</b>                |
| 12   | NextEra Energy, Inc.                        | 1682.7                    | 1781449               | 13780421.75              | 7.74                        | <b>8.19</b>                |
| 13   | Oglethorpe Power Corporation                | 5438.4                    | 12467101              | 50498073.05              | 4.05                        | <b>9.29</b>                |
| 14   | Wolverine Power Supply Cooperative, Inc.    | 1007.8                    | 683452                | 9872082.588              | 14.44                       | <b>9.80</b>                |
| 15   | Consolidated Asset Management Services, LLC | 2251.1                    | 6747328               | 22221701.08              | 3.29                        | <b>9.87</b>                |
| 16   | Talen Energy Supply, LLC                    | 1606.3                    | 1268744               | 16390824.2               | 12.92                       | <b>10.20</b>               |
| 17   | Dynegy -Moss Landing LLC                    | 1398                      | 5220833               | 14901938.31              | 2.85                        | <b>10.66</b>               |
| 18   | Exelon Power                                | 6726.5                    | 6273081               | 72339015.96              | 11.53                       | <b>10.75</b>               |
| 19   | Nevada Power Company                        | 5169                      | 14738101              | 56086423.51              | 3.81                        | <b>10.85</b>               |
| 20   | The Carlyle Group Inc.                      | 2968.2                    | 9448876               | 32245672.01              | 3.41                        | <b>10.86</b>               |
| 21   | DGC Operations LLC                          | 919.7                     | 4134367               | 10074023.48              | 2.44                        | <b>10.95</b>               |
| 22   | PSEG Fossil LLC                             | 5521.5                    | 16296223              | 60598758.08              | 3.72                        | <b>10.98</b>               |
| 23   | AES Redondo Beach, L.L.C.                   | 1316.4                    | 195943                | 14493015.6               | 73.97                       | <b>11.01</b>               |
| 24   | WGP Acquisition LLC                         | 1374.4                    | 4933816               | 15537301.01              | 3.15                        | <b>11.30</b>               |
| 25   | Tenaska Operations, Inc.                    | 1134                      | 5161329               | 12847501.77              | 2.49                        | <b>11.33</b>               |
| 26   | USCE - Savannah District                    | 1409.9                    | 2338834               | 16472615.46              | 7.04                        | <b>11.68</b>               |
| 27   | Banpu Public Company Limited                | 1606.4                    | 4638514               | 18774668.85              | 4.05                        | <b>11.69</b>               |
| 28   | Southern Power Company                      | 8692.7                    | 33395891              | 101659955.4              | 3.04                        | <b>11.69</b>               |
| 29   | Siemens Energy, Inc.                        | 2022                      | 11480355              | 23990742.14              | 2.09                        | <b>11.86</b>               |
| 30   | Panda Power Funds, LP                       | 1615.2                    | 7162270               | 19359613.58              | 2.70                        | <b>11.99</b>               |
| 31   | Jade Power Generation Holdings, LLC         | 1345.8                    | 1922121               | 16245323.65              | 8.45                        | <b>12.07</b>               |
| 32   | Dynegy Inc.                                 | 1333                      | 4029542               | 16196465.2               | 4.02                        | <b>12.15</b>               |
| 33   | EthosEnergy                                 | 3316.8                    | 17650376              | 40357223.15              | 2.29                        | <b>12.17</b>               |
| 34   | NRG Cottonwood Tenant LLC                   | 1433.6                    | 7246613               | 17464761.91              | 2.41                        | <b>12.18</b>               |
| 35   | NRG Energy, Inc.                            | 2220.7                    | 2601971               | 27403566.92              | 10.53                       | <b>12.34</b>               |
| 36   | H2O Power Limited Partnership               | 1405.9                    | 1730385               | 17388995.31              | 10.05                       | <b>12.37</b>               |
| 37   | Cooperative Energy                          | 1793                      | 5613223               | 22798658.04              | 4.06                        | <b>12.72</b>               |
| 38   | Kiowa Power Partners, LLC                   | 1370                      | 5500881               | 17694168.05              | 3.22                        | <b>12.92</b>               |
| 39   | NRG REMA , LLC                              | 1897.7                    | 282065                | 24537587.73              | 86.99                       | <b>12.93</b>               |
| 40   | Tenaska Alabama Partners LP                 | 939.4                     | 1723985               | 12329833.68              | 7.15                        | <b>13.13</b>               |
| 41   | LS Power Development, LLC                   | 1468.9                    | 6961569               | 19311532.95              | 2.77                        | <b>13.15</b>               |
| 42   | Seminole Electric Cooperative Inc.          | 853.3                     | 3749101               | 11245022.64              | 3.00                        | <b>13.18</b>               |
| 43   | Morgan Energy Center, LLC                   | 900                       | 3121340               | 11899659.14              | 3.81                        | <b>13.22</b>               |
| 44   | Delta Energy Center LLC                     | 943.5                     | 3533557               | 12484815.69              | 3.53                        | <b>13.23</b>               |
| 45   | Constellation Energy Nuclear Group, LLC     | 3776.3                    | 13119102              | 50027991.35              | 3.81                        | <b>13.25</b>               |
| 46   | Brazos Electric Power Cooperative, Inc.     | 1883.6                    | 4461760               | 25143517.05              | 5.64                        | <b>13.35</b>               |
| 47   | Rise Light & Power                          | 2551                      | 2298704               | 34367029.92              | 14.95                       | <b>13.47</b>               |
| 48   | Aspen Generating, LLC                       | 906.8                     | 5191555               | 12228405.25              | 2.36                        | <b>13.49</b>               |
| 49   | Austin Energy                               | 1634.5                    | 2236870               | 22278492.32              | 9.96                        | <b>13.63</b>               |
| 50   | Entergy Louisiana, LLC                      | 9296.3                    | 26551132              | 127075838.9              | 4.79                        | <b>13.67</b>               |
| 51   | Channel Energy Center, LP                   | 923.8                     | 4176244               | 12669001.7               | 3.03                        | <b>13.71</b>               |
| 52   | Conectiv Bethlehem LLC                      | 1153                      | 4721993               | 15813490.57              | 3.35                        | <b>13.72</b>               |
| 53   | Calpine Corp-Magic Valley                   | 801                       | 2850038               | 10995644.45              | 3.86                        | <b>13.73</b>               |
| 54   | Calpine Central, L.P.                       | 932.9                     | 4721930               | 12900845.83              | 2.73                        | <b>13.83</b>               |
| 55   | Astoria Generating Company LP               | 1697                      | 701896                | 23628468.1               | 33.66                       | <b>13.92</b>               |
| 56   | Texgen Power, LLC                           | 2456.7                    | 4923676               | 34242969.54              | 6.95                        | <b>13.94</b>               |
| 57   | NRG California South LP                     | 1670                      | 164383                | 23310607.03              | 141.81                      | <b>13.96</b>               |

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Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                                    | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|--|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 58   | CER Generation, LLC                              | 822.8                     | 5035173               | 11670979.17              | 2.32                        | 14.18                      |
| 59   | Dynegy Kendall Energy, LLC                       | 1256                      | 6605374               | 17851490.74              | 2.70                        | 14.21                      |
| 60   | New Covert Generating Company LLC                | 1176                      | 7405770               | 16767190.93              | 2.26                        | 14.26                      |
| 61   | Tenaska Gateway Partners Ltd                     | 939.6                     | 3903757               | 13447723.15              | 3.44                        | 14.31                      |
| 62   | Odessa-Ector Power Partners, L.P.                | 1152.8                    | 7366950               | 16563261.19              | 2.25                        | 14.37                      |
| 63   | La Frontera Holdings, LLC                        | 3006.8                    | 17531006              | 43288362.26              | 2.47                        | 14.40                      |
| 64   | Idaho Power Company                              | 2560.6                    | 10407519              | 36922477.72              | 3.55                        | 14.42                      |
| 65   | Tenaska Virginia Partners, L.P.                  | 1011.4                    | 5938030               | 14590344.19              | 2.46                        | 14.43                      |
| 66   | Deer Park Energy Center LLC                      | 1176                      | 6809470               | 16997494.76              | 2.50                        | 14.45                      |
| 67   | Occidental Chemical Corporation                  | 937.9                     | 5773776               | 13605263.52              | 2.36                        | 14.51                      |
| 68   | NRG Bowline LLC                                  | 1242                      | 286744                | 18038567.63              | 62.91                       | 14.52                      |
| 69   | WorleyParsons                                    | 918.3                     | 5536983               | 13343285.43              | 2.41                        | 14.53                      |
| 70   | Argo Infrastructure Partners LP                  | 1494                      | 6446637               | 21731052.03              | 3.37                        | 14.55                      |
| 71   | TNA Merchant Projects, Inc                       | 1239.7                    | 4346109               | 18038204.59              | 4.15                        | 14.55                      |
| 72   | Tenaska Frontier Partners, Ltd.                  | 939.7                     | 3993421               | 13847215.91              | 3.47                        | 14.74                      |
| 73   | PSEG Power New York LLC                          | 893.1                     | 4544459               | 13307449.96              | 2.93                        | 14.90                      |
| 74   | Dynegy Power, LLC                                | 1814.1                    | 8711011               | 27133323.33              | 3.11                        | 14.96                      |
| 75   | NAES Corporation                                 | 41466.7                   | 102323585             | 621009598.5              | 6.07                        | 14.98                      |
| 76   | CCI Roseton LLC                                  | 1242                      | 143675                | 18672442.95              | 129.96                      | 15.03                      |
| 77   | PSEG Power Connecticut LLC                       | 1636.4                    | 2095755               | 24632792.05              | 11.75                       | 15.05                      |
| 78   | The City of Seattle—City Light Department        | 2007.4                    | 5334992               | 30233178.32              | 5.67                        | 15.06                      |
| 79   | Freestone Power Generation LP                    | 1036                      | 7381531               | 15632538.29              | 2.12                        | 15.09                      |
| 80   | Avista Corporation                               | 1279.9                    | 4100821               | 19346536                 | 4.72                        | 15.12                      |
| 81   | Midland Cogeneration Venture Limited Partnership | 1853.8                    | 8853024               | 28785007.07              | 3.25                        | 15.53                      |
| 82   | Dominion Energy South Carolina, Inc.             | 4489.6                    | 12821212              | 69822388.63              | 5.45                        | 15.55                      |
| 83   | Wood Group GTS                                   | 853                       | 3873564               | 13336897.75              | 3.44                        | 15.64                      |
| 84   | Calpine Bosque Energy Center, LLC                | 807                       | 4256899               | 12692633.61              | 2.98                        | 15.73                      |
| 85   | Arkansas Electric Cooperative Corp.              | 2174.7                    | 3045309               | 34233291.25              | 11.24                       | 15.74                      |
| 86   | U.S. Bureau Of Reclamation                       | 14688.7                   | 36687692              | 231242839.3              | 6.30                        | 15.74                      |
| 87   | Marcus Hook Energy, LP                           | 836.1                     | 4470434               | 13193663.44              | 2.95                        | 15.78                      |
| 88   | Duke Energy Florida, LLC                         | 12076.4                   | 38685494              | 192411217                | 4.97                        | 15.93                      |
| 89   | Starwood Energy Group Global, LLC                | 2277.5                    | 9738837               | 36319814.33              | 3.73                        | 15.95                      |
| 90   | NRG Chalk Point, LLC                             | 2647                      | 496023                | 42296894.54              | 85.27                       | 15.98                      |
| 91   | AES Alamitos, LLC                                | 1922                      | 581118                | 30727390.18              | 52.88                       | 15.99                      |
| 92   | Public Utility District No. 1 of Chelan County   | 1988.2                    | 7605021               | 31800531.07              | 4.18                        | 15.99                      |
| 93   | California Department of Water Resources         | 1474.2                    | 4577585               | 23613165.19              | 5.16                        | 16.02                      |
| 94   | USCE - North Pacific Division                    | 13111.4                   | 45072089              | 210336571.5              | 4.67                        | 16.04                      |
| 95   | Invenergy LLC                                    | 2710.4                    | 13551042              | 43545429.53              | 3.21                        | 16.07                      |
| 96   | Tallahassee City of                              | 955.2                     | 2908136               | 15462551.24              | 5.32                        | 16.19                      |
| 97   | Lake Road Generating Company, LP                 | 840                       | 5322170               | 13605631.6               | 2.56                        | 16.20                      |
| 98   | Calpine Mid-Atlantic Generation LLC              | 2044.4                    | 1616068               | 33664502.81              | 20.83                       | 16.47                      |
| 99   | South Houston Green Power, LLC                   | 1052.1                    | 4637298               | 17590262.66              | 3.79                        | 16.72                      |
| 100  | USCE - Mobile District                           | 1185.7                    | 2458788               | 19901564.56              | 8.09                        | 16.78                      |
| 101  | Grand River Dam Authority                        | 1712                      | 3678841               | 28774096.23              | 7.82                        | 16.81                      |
| 102  | Grant County Public Utility District             | 2173.4                    | 8288398               | 36636009.91              | 4.42                        | 16.86                      |
| 103  | NRG Arthur Kill Operations, Inc.                 | 895.5                     | 903336                | 15307704.41              | 16.95                       | 17.09                      |
| 104  | Interstate Power and Light Company               | 3865.8                    | 13847268              | 66247281                 | 4.78                        | 17.14                      |
| 105  | FPL Energy Wyman LLC                             | 846                       | 5942                  | 14673051                 | 2469.38                     | 17.34                      |
| 106  | Union Electric Company                           | 10215.7                   | 26343263              | 178500341.2              | 6.78                        | 17.47                      |
| 107  | Onward Energy                                    | 2746.4                    | 6176864               | 48039092.49              | 7.78                        | 17.49                      |
| 108  | Oklahoma Gas and Electric Company                | 8952                      | 21010462              | 156813951.6              | 7.46                        | 17.52                      |
| 109  | Southwestern Public Service Company              | 5221.5                    | 14574249              | 92259329                 | 6.33                        | 17.67                      |
| 110  | Entergy Texas, Inc.                              | 2608.6                    | 5883409               | 46295087.17              | 7.87                        | 17.75                      |
| 111  | Tampa Electric Company                           | 6070.3                    | 19426456              | 108480556.3              | 5.58                        | 17.87                      |
| 112  | Los Angeles Department of Water and Power, Calif | 7623.3                    | 15420345              | 136435609.2              | 8.85                        | 17.90                      |
| 113  | USCE - Little Rock District                      | 1089.2                    | 3778976               | 19646976.92              | 5.20                        | 18.04                      |
| 114  | Colorado Energy Management LLC                   | 867.2                     | 1533508               | 15805792.46              | 10.31                       | 18.23                      |

**2019 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                                       | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 115  | Hawaiian Electric Company, Inc.                     | 1277.7                    | 3493652               | 23622468.27              | 6.76                        | 18.49                      |
| 116  | Duke Energy Carolinas, LLC                          | 16596.5                   | 43019954              | 310216149                | 7.21                        | 18.69                      |
| 117  | Tennessee Valley Authority                          | 28454.3                   | 81408163              | 534031449.9              | 6.56                        | 18.77                      |
| 118  | USCE - Missouri River District                      | 2539.8                    | 12934741              | 47692900.77              | 3.69                        | 18.78                      |
| 119  | Calpine Corporation                                 | 5519.3                    | 20529533              | 104630776.4              | 5.10                        | 18.96                      |
| 120  | The Dow Chemical Company                            | 2627.5                    | 12659662              | 49882728.4               | 3.94                        | 18.98                      |
| 121  | Consumers Energy Company                            | 7530.1                    | 19211949              | 143709873.7              | 7.48                        | 19.08                      |
| 122  | Talen Generation LLC                                | 5185.3                    | 4065694               | 99093977.81              | 24.37                       | 19.11                      |
| 123  | Platte River Power Authority                        | 800.4                     | 2037519               | 15359691.67              | 7.54                        | 19.19                      |
| 124  | Invenery Services LLC                               | 5142.7                    | 17256027              | 99231204.87              | 5.75                        | 19.30                      |
| 125  | Old Dominion Electric Cooperative                   | 2162                      | 4548043               | 42241548.77              | 9.29                        | 19.54                      |
| 126  | Duke Energy Progress, LLC                           | 10705.9                   | 31534740              | 212787200.5              | 6.75                        | 19.88                      |
| 127  | Entergy Arkansas, LLC                               | 7360.3                    | 26860258              | 146683171                | 5.46                        | 19.93                      |
| 128  | Ethos Energy Group Limited                          | 1353.3                    | 5170098               | 27413151.29              | 5.30                        | 20.26                      |
| 129  | Evergy Kansas Central, Inc.                         | 4476.5                    | 11396101              | 90971817                 | 7.98                        | 20.32                      |
| 130  | Public Service Company of Oklahoma                  | 4782.4                    | 9072228               | 97438785.09              | 10.74                       | 20.37                      |
| 131  | Power Authority of the State of New York            | 5399.9                    | 28346144              | 110809358.4              | 3.91                        | 20.52                      |
| 132  | Entergy Mississippi, LLC                            | 3576.3                    | 11541595              | 73465022.88              | 6.37                        | 20.54                      |
| 133  | USCE - Nashville District                           | 931.6                     | 3455537               | 19184890                 | 5.55                        | 20.59                      |
| 134  | National Grid Generation, LLC                       | 3945.4                    | 3886660               | 81463819.36              | 20.96                       | 20.65                      |
| 135  | JEA   | 2941                      | 8301380               | 60910340.03              | 7.34                        | 20.71                      |
| 136  | Dynegy Power America, Inc.                          | 2356.4                    | 8762618               | 49012193.28              | 5.59                        | 20.80                      |
| 137  | Helix Generation, LLC                               | 1418                      | 6384397               | 29615048.48              | 4.64                        | 20.89                      |
| 138  | City Public Service of San Antonio                  | 6156.8                    | 16430521              | 128923018.7              | 7.85                        | 20.94                      |
| 139  | Great River Energy                                  | 2874.4                    | 8500298               | 60343347.65              | 7.10                        | 20.99                      |
| 140  | EDF Renewables Inc.                                 | 1061.9                    | 1976421               | 22516663.25              | 11.39                       | 21.20                      |
| 141  | Cleco Power LLC                                     | 5181.6                    | 15798964              | 110205170                | 6.98                        | 21.27                      |
| 142  | Northern States Power Company                       | 7448.3                    | 23734268              | 159261527.1              | 6.71                        | 21.38                      |
| 143  | Sacramento Municipal Utility District               | 1202.9                    | 3484992               | 25733868.77              | 7.38                        | 21.39                      |
| 144  | Energy Harbor Generation                            | 5241.2                    | 4611477               | 112241983.7              | 24.34                       | 21.42                      |
| 145  | NextEra Energy Resources, LLC                       | 3155.96                   | 8440243               | 68069457.29              | 8.06                        | 21.57                      |
| 146  | Wisconsin Power and Light Company                   | 3147.3                    | 8371298               | 68582271                 | 8.19                        | 21.79                      |
| 147  | Duke Energy Renewables, Inc.                        | 1803.95                   | 4674878               | 40349929.9               | 8.63                        | 22.37                      |
| 148  | City Utilities of Springfield                       | 1086.5                    | 2027288               | 24375012.47              | 12.02                       | 22.43                      |
| 149  | Brookfield Renewable Partners L.P.                  | 885                       | 1578538               | 19875847.76              | 12.59                       | 22.46                      |
| 150  | Empire District Electric Company                    | 1598.5                    | 4904363               | 36263549                 | 7.39                        | 22.69                      |
| 151  | El Paso Electric Company                            | 1933.4                    | 5201814               | 44521568.72              | 8.56                        | 23.03                      |
| 152  | DTE Electric Company                                | 9323.1                    | 28353703              | 215972690.8              | 7.62                        | 23.17                      |
| 153  | East Kentucky Power Cooperative, Inc.               | 3033.8                    | 6516647               | 70506402.73              | 10.82                       | 23.24                      |
| 154  | Pattern Energy Group Inc.                           | 845.24                    | 2307586               | 19802079.89              | 8.58                        | 23.43                      |
| 155  | First Solar, Inc.                                   | 1470.8                    | 2965082               | 34496583.94              | 11.63                       | 23.45                      |
| 156  | Apex Clean Energy, Inc.                             | 1476.9                    | 4353099               | 34733276.12              | 7.98                        | 23.52                      |
| 157  | Avangrid Renewables LLC                             | 5948.25                   | 12902295              | 141036017.9              | 10.93                       | 23.71                      |
| 158  | Clearway Energy Operating LLC                       | 948                       | 2069513               | 22541831.16              | 10.89                       | 23.78                      |
| 159  | BP Wind Energy North America Inc.                   | 1537                      | 4475066               | 36769603.22              | 8.22                        | 23.92                      |
| 160  | EDF Renewables Services                             | 6522.2                    | 20229360              | 156099706.6              | 7.72                        | 23.93                      |
| 161  | Public Service Company of Colorado                  | 7057.9                    | 26784847              | 170002611.6              | 6.35                        | 24.09                      |
| 162  | Evergy Metro, Inc.                                  | 5368.3                    | 17615831              | 129701364                | 7.36                        | 24.16                      |
| 163  | Vestas Wind Systems A/S                             | 1087.7                    | 3845212               | 26410247.12              | 6.87                        | 24.28                      |
| 164  | Salt River Project Agricultural Improvement and Pov | 11111                     | 37761727              | 271236755.6              | 7.18                        | 24.41                      |
| 165  | Vistra Corp.  | 5554.3                    | 30488803              | 137548758.3              | 4.51                        | 24.76                      |
| 166  | Wisconsin Public Service Corporation                | 1638.2                    | 4845186               | 40577178                 | 8.37                        | 24.77                      |
| 167  | E.ON Climate & Renewables North America Inc.        | 3709.8                    | 11515507              | 92259794.91              | 8.01                        | 24.87                      |
| 168  | GE Energy   | 1007.9                    | 3371074               | 25301455.26              | 7.51                        | 25.10                      |
| 169  | Lower Colorado River Authority                      | 4028.1                    | 16384922              | 101277145.9              | 6.18                        | 25.14                      |
| 170  | MidAmerican Energy Company                          | 10873.4                   | 28512744              | 273876702.9              | 9.61                        | 25.19                      |
| 171  | Clearway Energy, Inc.                               | 1180.5                    | 2473961               | 30323599.52              | 12.26                       | 25.69                      |



**2019 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                              | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|--|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 172  | Sustainable Power Group, LLC               | 950.4                     | 2103095               | 24413640.8               | 11.61                       | 25.69                      |
| 173  | Associated Electric Cooperative Inc.       | 4816                      | 22983238              | 123817039.7              | 5.39                        | 25.71                      |
| 174  | PowerSouth Energy Cooperative              | 1876.2                    | 5190613               | 48399185.21              | 9.32                        | 25.80                      |
| 175  | Midwest Generation EME, LLC                | 5146.9                    | 5662927               | 133226342                | 23.53                       | 25.88                      |
| 176  | Louisiana Generating LLC                   | 2604.2                    | 3407291               | 67551952.85              | 19.83                       | 25.94                      |
| 177  | Monongahela Power Company                  | 1152                      | 6701026               | 29900065                 | 4.46                        | 25.95                      |
| 178  | Southwestern Electric Power Company        | 5778                      | 17582584              | 150057656.7              | 8.53                        | 25.97                      |
| 179  | Orlando Utilities Commission               | 1604.8                    | 6181750               | 41907434.9               | 6.78                        | 26.11                      |
| 180  | Morgantown Steam, LLC                      | 2481                      | 1942326               | 65188783.04              | 33.56                       | 26.28                      |
| 181  | Castleton Commodities International LLC    | 1268.2                    | 823612                | 33371829.22              | 40.52                       | 26.31                      |
| 182  | Luminant Generation Company LLC            | 8214.9                    | 26613969              | 216654058                | 8.14                        | 26.37                      |
| 183  | Sunflower Electric Power Corporation, Inc. | 1108.1                    | 1676499               | 29266384.04              | 17.46                       | 26.41                      |
| 184  | NRG Texas Power LLC                        | 7656.5                    | 25149474              | 202948800                | 8.07                        | 26.51                      |
| 185  | Dairyland Power Co-op                      | 1386.6                    | 3308444               | 37143257.11              | 11.23                       | 26.79                      |
| 186  | Western Farmers Electric Cooperative       | 1393.9                    | 1688388               | 37795017.49              | 22.39                       | 27.11                      |
| 187  | Sierra Pacific Power Company               | 1835.9                    | 6589046               | 49981658.09              | 7.59                        | 27.22                      |
| 188  | Puget Sound Energy, Inc.                   | 2712.1                    | 7451755               | 74496760.62              | 10.00                       | 27.47                      |
| 189  | ArcLight Capital Partners, LLC             | 11017.3                   | 54926949              | 305797719.3              | 5.57                        | 27.76                      |
| 190  | Louisville Gas and Electric Company        | 5488.8                    | 22555646              | 152505459.5              | 6.76                        | 27.78                      |
| 191  | South Carolina Public Service Authority    | 5176                      | 14981779              | 145376062                | 9.70                        | 28.09                      |
| 192  | 8point3 Energy Partners LP                 | 905.6                     | 2069074               | 25486949.02              | 12.32                       | 28.14                      |
| 193  | NRG Power Midwest LP                       | 2095.9                    | 1652957               | 59413439.37              | 35.94                       | 28.35                      |
| 194  | BHE Solar, LLC                             | 997.8                     | 2413224               | 28434320.84              | 11.78                       | 28.50                      |
| 195  | Allegheny Energy Supply Company, LLC       | 2052                      | 12894205              | 58799998                 | 4.56                        | 28.65                      |
| 196  | AEP Generation Resources Inc.              | 3609.7                    | 11950930              | 103875726.2              | 8.69                        | 28.78                      |
| 197  | NextEra Energy Partners, LP                | 4105                      | 14283726              | 118195770.1              | 8.27                        | 28.79                      |
| 198  | Consolidated Edison Development, Inc.      | 1310.6                    | 3591333               | 37971868.08              | 10.57                       | 28.97                      |
| 199  | Omaha Public Power District                | 2847.7                    | 8976690               | 83673812.05              | 9.32                        | 29.38                      |
| 200  | TerraForm Power, Inc.                      | 921.9                     | 1747784               | 27619719.84              | 15.80                       | 29.96                      |
| 201  | Portland General Electric Company          | 4487.42                   | 16416939              | 135044382.4              | 8.23                        | 30.09                      |
| 202  | Lakeland City of                           | 1074                      | 3295986               | 32728646.75              | 9.93                        | 30.47                      |
| 203  | Springfield City of - (IL)                 | 805.9                     | 1865733               | 24681456.14              | 13.23                       | 30.63                      |
| 204  | Georgia Power Company                      | 18108.82                  | 57025140              | 555106166.6              | 9.73                        | 30.65                      |
| 205  | Kentucky Utilities Company                 | 4043.2                    | 11700073              | 123994168                | 10.60                       | 30.67                      |
| 206  | Colorado Springs City of                   | 1138.9                    | 4726386               | 35016812.45              | 7.41                        | 30.75                      |
| 207  | AES Wind Generation, LLC                   | 889                       | 2351514               | 27413949.8               | 11.66                       | 30.84                      |
| 208  | Dynegy Midwest Generation, Inc.            | 2688.4                    | 8710463               | 83521018.93              | 9.59                        | 31.07                      |
| 209  | Big Rivers Electric Corporation            | 1290.2                    | 4974189               | 40386291.22              | 8.12                        | 31.30                      |
| 210  | PadffCorp                                  | 11775.26                  | 47951969              | 370705468.1              | 7.73                        | 31.48                      |
| 211  | Mississippi Power Company                  | 4200.5                    | 18610111              | 133312062.9              | 7.16                        | 31.74                      |
| 212  | Pacific Gas and Electric Company           | 5321.82                   | 18299987              | 174060069.3              | 9.51                        | 32.71                      |
| 213  | Appalachian Power Company                  | 5966                      | 19863883              | 195157741                | 9.82                        | 32.71                      |
| 214  | Enel Green Power North America, Inc.       | 2873.5                    | 10671385              | 94381905.75              | 8.84                        | 32.85                      |
| 215  | Minnesota Power Enterprises, Inc.          | 1960.8                    | 7152899               | 64929719.42              | 9.08                        | 33.11                      |
| 216  | Gulf Power Company                         | 1810.7                    | 6651816               | 60114130.61              | 9.04                        | 33.20                      |
| 217  | Arizona Public Service Company             | 7426.9                    | 21344741              | 248200531.7              | 11.63                       | 33.42                      |
| 218  | Kincaid Generation LLC                     | 1319                      | 3114921               | 44116272.19              | 14.16                       | 33.45                      |
| 219  | Longview Power LLC                         | 807.5                     | 5264653               | 28074121.26              | 5.33                        | 34.77                      |
| 220  | Raven Power Generation Holdings LLC        | 1370.2                    | 2231445               | 47892831.66              | 21.46                       | 34.95                      |
| 221  | NRG Energy Services LLC                    | 2755.5                    | 10012809              | 96754636.13              | 9.66                        | 35.11                      |
| 222  | Nebraska Public Power District             | 2239.1                    | 10030029              | 79585388.98              | 7.93                        | 35.54                      |
| 223  | Homer City Generation, LP                  | 2012                      | 6827882               | 73316711.64              | 10.74                       | 36.44                      |
| 224  | Hoosier Energy Rural Electric Coop Inc.    | 1119.2                    | 4686672               | 40857912.98              | 8.72                        | 36.51                      |
| 225  | MOR PPM Inc                                | 1429.2                    | 7054142               | 52581062.04              | 7.45                        | 36.79                      |
| 226  | Southern California Edison Company         | 2546.92                   | 7526858               | 93827175.97              | 12.47                       | 36.84                      |
| 227  | TransAlta Centralia Generation LLC         | 1460.8                    | 7157224               | 54205847.44              | 7.57                        | 37.11                      |
| 228  | Duke Energy Kentucky, Inc.                 | 1350.5                    | 3315252               | 50145414.23              | 15.13                       | 37.13                      |

**2019 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name  | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|--|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 229  | Pleasants Corporation                                | 1368                      | 4965173               | 50795700.83              | 10.23                       | 37.13                      |
| 230  | Tri-State Generation & Transmission Association, Inc | 2646.1                    | 9132585               | 99687838.98              | 10.92                       | 37.67                      |
| 231  | Kentucky Power Company                               | 1913.1                    | 6103601               | 72706961                 | 11.91                       | 38.00                      |
| 232  | AES Indiana  | 4183.5                    | 14938261              | 162920943.1              | 10.91                       | 38.94                      |
| 233  | Illinois Power Generating Company                    | 2722.6                    | 10296255              | 106161579.4              | 10.31                       | 38.99                      |
| 234  | Alabama Power Company                                | 13230.1                   | 51563513              | 525637879.3              | 10.19                       | 39.73                      |
| 235  | AGC Division of APG Inc                              | 822.8                     | 4214527               | 32896114.17              | 7.81                        | 39.98                      |
| 236  | Archer-Daniels-Midland Company                       | 991.4                     | 3443693               | 40112250.45              | 11.65                       | 40.46                      |
| 237  | Duke Energy Indiana, LLC                             | 8059.6                    | 22103885              | 331478639.3              | 15.00                       | 41.13                      |
| 238  | Virginia Electric and Power Company                  | 20821.81                  | 49487222              | 870762742.9              | 17.60                       | 41.82                      |
| 239  | Illinois Power Resources Generating, LLC             | 1085.3                    | 5453752               | 45518558.77              | 8.35                        | 41.94                      |
| 240  | Talen Montana, LLC                                   | 2363.4                    | 13407682              | 107145861                | 7.99                        | 45.34                      |
| 241  | Otter Tail Power Company                             | 1302.14                   | 5495931               | 59310582.8               | 10.79                       | 45.55                      |
| 242  | Northern Indiana Public Service Company              | 3417.4                    | 10329418              | 162555566.9              | 15.74                       | 47.57                      |
| 243  | Public Service Company of New Mexico                 | 1643.5                    | 6252333               | 79584016.29              | 12.73                       | 48.42                      |
| 244  | Southern Indiana Gas and Electric Company            | 1190.7                    | 3856697               | 61416699.2               | 15.92                       | 51.58                      |
| 245  | International Paper Company                          | 945.1                     | 4207633               | 48819477.84              | 11.60                       | 51.66                      |
| 246  | Indiana-Kentucky Electric Corporation                | 1303.8                    | 5722979               | 68043472                 | 11.89                       | 52.19                      |
| 247  | Tucson Electric Power Company                        | 2647.9                    | 9668728               | 138374162.9              | 14.31                       | 52.26                      |
| 248  | Northern California Power Agency                     | 900                       | 2789257               | 49937029.09              | 17.90                       | 55.49                      |
| 249  | Ohio Valley Electric Corporation                     | 1086.5                    | 5515010               | 69384373                 | 12.58                       | 63.86                      |
| 250  | Consolidated Edison Company of New York, Inc.        | 819.2                     | 2819850               | 54866238.01              | 19.46                       | 66.98                      |
| 251  | Basin Electric Power Cooperative                     | 5330.5                    | 24151940              | 370427990.1              | 15.34                       | 69.49                      |
| 252  | Indiana Michigan Power Company                       | 2637.3                    | 8271174               | 219082850                | 26.49                       | 83.07                      |
| 253  | Prairie State Generating Company, LLC                | 1766                      | 12053090              | 172439782                | 14.31                       | 97.64                      |
| 254  | Wisconsin Electric Power Company                     | 6073.5                    | 21171466              | 604126530.5              | 28.53                       | 99.47                      |
| 255  | Geysers Power Co LLC                                 | 1241                      | 4701507               | 170967034.7              | 36.36                       | 137.77                     |

**2020 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                               | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 1    | NRG Oswego Harbor Power Operations Inc      | 1803.6                    | 22540                 | 6484213.381              | 287.68                      | 3.60                       |
| 2    | Riverside Generating Co LLC                 | 1150                      | 476100                | 4494984.433              | 9.44                        | 3.91                       |
| 3    | Tenaska Georgia Partners, L.P.              | 1099.2                    | 74103                 | 4528929.254              | 61.12                       | 4.12                       |
| 4    | NRG Marsh Landing LLC                       | 828                       | 265306                | 3702369.804              | 13.96                       | 4.47                       |
| 5    | The Silverfern Group, Inc.                  | 985                       | 294337                | 4563665.431              | 15.50                       | 4.63                       |
| 6    | Rolling Hills Generating, LLC               | 977.5                     | 267125                | 4592870.449              | 17.19                       | 4.70                       |
| 7    | Diamond Generating Corporation              | 1099.4                    | 746908                | 5310662.181              | 7.11                        | 4.83                       |
| 8    | Constellation Power Source Generation LLC   | 840.6                     | 204945                | 4117944.2                | 20.09                       | 4.90                       |
| 9    | RA Generation, LLC                          | 1570.2                    | 981031                | 8163029.89               | 8.32                        | 5.20                       |
| 10   | Talen Energy Supply, LLC                    | 1606.3                    | 964035                | 11930254.88              | 12.38                       | 7.43                       |
| 11   | Florida Power & Light Company               | 24950.9                   | 99128317              | 187061650.1              | 1.89                        | 7.50                       |
| 12   | NextEra Energy, Inc.                        | 1732.1                    | 2276167               | 14100752.17              | 6.19                        | 8.14                       |
| 13   | Ethos Energy Power Plant Services LLC       | 1258.2                    | 3835743               | 10881932.68              | 2.84                        | 8.65                       |
| 14   | Oglethorpe Power Corporation                | 5438.4                    | 13005686              | 49110180.84              | 3.78                        | 9.03                       |
| 15   | Consolidated Asset Management Services, LLC | 2251.1                    | 5619481               | 20516003.73              | 3.65                        | 9.11                       |
| 16   | Eergy Missouri West, Inc.                   | 1306.2                    | 217904                | 12624611.92              | 57.94                       | 9.67                       |
| 17   | Exelon Power                                | 6726.5                    | 5461017               | 65230241.32              | 11.94                       | 9.70                       |
| 18   | Dynegy -Moss Landing LLC                    | 1398                      | 5223032               | 14086361.35              | 2.70                        | 10.08                      |
| 19   | DGC Operations LLC                          | 919.7                     | 4741581               | 9278517.496              | 1.96                        | 10.09                      |
| 20   | The Carlyle Group Inc.                      | 2968.2                    | 11724253              | 30518916.87              | 2.60                        | 10.28                      |
| 21   | Tenaska Operations, Inc.                    | 1134                      | 6270337               | 11674728.43              | 1.86                        | 10.30                      |
| 22   | PSEG Fossil LLC                             | 5521.5                    | 13656500              | 57595533.54              | 4.22                        | 10.43                      |
| 23   | Banpu Public Company Limited                | 1606.4                    | 5433243               | 16794036.95              | 3.09                        | 10.45                      |
| 24   | Siemens Energy, Inc.                        | 2022                      | 11833541              | 21480620.05              | 1.82                        | 10.62                      |
| 25   | Panda Power Funds, LP                       | 1615.2                    | 7657461               | 17647662.9               | 2.30                        | 10.93                      |
| 26   | Nevada Power Company                        | 5169                      | 14842730              | 56707979.7               | 3.82                        | 10.97                      |
| 27   | Austin Energy                               | 1634.5                    | 2284820               | 17963978.31              | 7.86                        | 10.99                      |
| 28   | NRG Cottonwood Tenant LLC                   | 1433.6                    | 6163166               | 15962650.09              | 2.59                        | 11.13                      |
| 29   | WGP Acquisition LLC                         | 1374.4                    | 5442588               | 15535886.33              | 2.85                        | 11.30                      |
| 30   | EthosEnergy                                 | 3316.8                    | 16703793              | 37979351.68              | 2.27                        | 11.45                      |
| 31   | Jade Power Generation Holdings, LLC         | 1345.8                    | 1354890               | 15506736.93              | 11.45                       | 11.52                      |
| 32   | Southern Power Company                      | 9028.8                    | 33256154              | 104093322.1              | 3.13                        | 11.53                      |
| 33   | Kiowa Power Partners, LLC                   | 1370                      | 5128258               | 16275769.29              | 3.17                        | 11.88                      |
| 34   | Wolverine Power Supply Cooperative, Inc.    | 984.8                     | 1193829               | 11888338.72              | 9.96                        | 12.07                      |
| 35   | Constellation Energy Nuclear Group, LLC     | 3776.3                    | 11482280              | 45601688.9               | 3.97                        | 12.08                      |
| 36   | NRG Energy, Inc.                            | 2220.7                    | 2343595               | 27023413.55              | 11.53                       | 12.17                      |
| 37   | USCE - Savannah District                    | 1409.9                    | 2597893               | 17394072.43              | 6.70                        | 12.34                      |
| 38   | Dynegy Inc.                                 | 1333                      | 4044362               | 16515207.57              | 4.08                        | 12.39                      |
| 39   | Brazos Electric Power Cooperative, Inc.     | 1883.6                    | 3484879               | 23391272.16              | 6.71                        | 12.42                      |
| 40   | H2O Power Limited Partnership               | 1405.9                    | 1536141               | 17476826.79              | 11.38                       | 12.43                      |
| 41   | LS Power Development, LLC                   | 1468.9                    | 7754437               | 18317881.51              | 2.36                        | 12.47                      |
| 42   | Tenaska Alabama Partners LP                 | 939.4                     | 1825393               | 11764575.03              | 6.44                        | 12.52                      |
| 43   | Entergy Louisiana, LLC                      | 10629.9                   | 29449752              | 133302699.7              | 4.53                        | 12.54                      |
| 44   | Morgan Energy Center, LLC                   | 900                       | 2848326               | 11301586.53              | 3.97                        | 12.56                      |
| 45   | ENGIE North America Inc.                    | 977.55                    | 1573012               | 12406314.23              | 7.89                        | 12.69                      |
| 46   | Delta Energy Center LLC                     | 943.5                     | 3860213               | 12059210.69              | 3.12                        | 12.78                      |
| 47   | Cooperative Energy                          | 1815.7                    | 6022059               | 23212613.76              | 3.85                        | 12.78                      |
| 48   | Conectiv Bethlehem LLC                      | 1153                      | 5602149               | 15027122.13              | 2.68                        | 13.03                      |
| 49   | Tenaska Virginia Partners, L.P.             | 1011.4                    | 4533164               | 13313858.76              | 2.94                        | 13.16                      |
| 50   | Rise Light & Power                          | 2551                      | 2078237               | 33587415.03              | 16.16                       | 13.17                      |
| 51   | CER Generation, LLC                         | 822.8                     | 5074658               | 10862581.43              | 2.14                        | 13.20                      |
| 52   | New Covert Generating Company LLC           | 1176                      | 7200741               | 15584344.96              | 2.16                        | 13.25                      |
| 53   | La Frontera Holdings, LLC                   | 3006.8                    | 17372885              | 39915069.8               | 2.30                        | 13.27                      |
| 54   | Calpine Central, L.P.                       | 932.9                     | 4782829               | 12393091.15              | 2.59                        | 13.28                      |
| 55   | California Department of Water Resources    | 1589.3                    | 2106936               | 21216123.59              | 10.07                       | 13.35                      |
| 56   | Channel Energy Center, LP                   | 923.8                     | 4585578               | 12336561.39              | 2.69                        | 13.35                      |
| 57   | Seminole Electric Cooperative Inc.          | 853.3                     | 4402714               | 11408000.38              | 2.59                        | 13.37                      |

**2020 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                                       | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 58   | Dynegy Kendall Energy, LLC                          | 1256                      | 7271182               | 16841893.39              | 2.32                        | 13.41                      |
| 59   | Odessa-Ector Power Partners, L.P.                   | 1152.8                    | 6761970               | 15480276.91              | 2.29                        | 13.43                      |
| 60   | Calpine Corp-Magic Valley                           | 801                       | 3214481               | 10780673.66              | 3.35                        | 13.46                      |
| 61   | Texgen Power, LLC                                   | 2456.7                    | 4791666               | 33336691.62              | 6.96                        | 13.57                      |
| 62   | Deer Park Energy Center LLC                         | 1176                      | 7385212               | 16043785.62              | 2.17                        | 13.64                      |
| 63   | Astoria Generating Company LP                       | 1697                      | 783937                | 23277771.57              | 29.69                       | 13.72                      |
| 64   | Tenaska Gateway Partners Ltd                        | 939.6                     | 4095570               | 12912175.86              | 3.15                        | 13.74                      |
| 65   | NRG California South LP                             | 1670                      | 730991                | 23001180.5               | 31.47                       | 13.77                      |
| 66   | Aspen Generating, LLC                               | 906.8                     | 5374272               | 12509726.86              | 2.33                        | 13.80                      |
| 67   | Occidental Chemical Corporation                     | 937.9                     | 5545213               | 12987166.68              | 2.34                        | 13.85                      |
| 68   | WorleyParsons                                       | 918.3                     | 5126494               | 12730787.28              | 2.48                        | 13.86                      |
| 69   | Invenergy LLC                                       | 3059.3                    | 13237753              | 42719325.82              | 3.23                        | 13.96                      |
| 70   | Idaho Power Company                                 | 2563.8                    | 9073043               | 35834358.96              | 3.95                        | 13.98                      |
| 71   | Hawaiian Electric Company, Inc.                     | 1277.7                    | 3265707               | 17890001.68              | 5.48                        | 14.00                      |
| 72   | Tenaska Frontier Partners, Ltd.                     | 939.7                     | 3700213               | 13170904.54              | 3.56                        | 14.02                      |
| 73   | NRG REMA, LLC                                       | 1897.7                    | 1374706               | 26766363.44              | 19.47                       | 14.10                      |
| 74   | TNA Merchant Projects, Inc                          | 1239.7                    | 3361058               | 17521295.51              | 5.21                        | 14.13                      |
| 75   | Freestone Power Generation LP                       | 1036                      | 6859912               | 14659500.35              | 2.14                        | 14.15                      |
| 76   | PSEG Power New York LLC                             | 893.1                     | 4975715               | 12647315.71              | 2.54                        | 14.16                      |
| 77   | NRG Bowline LLC                                     | 1242                      | 660492                | 17825999.51              | 26.99                       | 14.35                      |
| 78   | Dynegy Power, LLC                                   | 1814.1                    | 8137426               | 26164900.76              | 3.22                        | 14.42                      |
| 79   | Duke Energy Progress, LLC                           | 11293.9                   | 28654879              | 162997492.1              | 5.69                        | 14.43                      |
| 80   | Argo Infrastructure Partners LP                     | 1494                      | 8031079               | 21702054.03              | 2.70                        | 14.53                      |
| 81   | CCI Roseton LLC                                     | 1242                      | 108682                | 18045009.97              | 166.03                      | 14.53                      |
| 82   | Wisconsin Power and Light Company                   | 4022.7                    | 10336363              | 58448876.91              | 5.65                        | 14.53                      |
| 83   | Midland Cogeneration Venture Limited Partnership    | 1853.8                    | 9472409               | 26982085.43              | 2.85                        | 14.56                      |
| 84   | Avista Corporation                                  | 1279.9                    | 4136461               | 18702118                 | 4.52                        | 14.61                      |
| 85   | Entergy Texas, Inc.                                 | 2608.6                    | 7405175               | 38887349.24              | 5.25                        | 14.91                      |
| 86   | NAES Corporation                                    | 42500.4                   | 114658525             | 634521076.3              | 5.53                        | 14.93                      |
| 87   | Union Electric Company                              | 10615.7                   | 28496607              | 158949157.2              | 5.58                        | 14.97                      |
| 88   | PSEG Power Connecticut LLC                          | 1636.4                    | 3597931               | 24543413.37              | 6.82                        | 15.00                      |
| 89   | Duke Energy Florida, LLC                            | 12072.6                   | 40288219              | 182677775.7              | 4.53                        | 15.13                      |
| 90   | Marcus Hook Energy, L.P                             | 836.1                     | 5189530               | 12697155.48              | 2.45                        | 15.19                      |
| 91   | Calpine Bosque Energy Center, LLC                   | 807                       | 4413761               | 12285016.29              | 2.78                        | 15.22                      |
| 92   | NRG Chalk Point, LLC                                | 2647                      | 365748                | 40303786.32              | 110.20                      | 15.23                      |
| 93   | Oklahoma Gas and Electric Company                   | 8962                      | 21121268              | 136582960.4              | 6.47                        | 15.24                      |
| 94   | Dominion Energy South Carolina, Inc.                | 4489.6                    | 11338911              | 68546779.42              | 6.05                        | 15.27                      |
| 95   | Lake Road Generating Company, LP                    | 840                       | 5594590               | 13081787.13              | 2.34                        | 15.57                      |
| 96   | Starwood Energy Group Global, LLC                   | 2211.5                    | 10472607              | 34445117.09              | 3.29                        | 15.58                      |
| 97   | Old Dominion Electric Cooperative                   | 2162                      | 3952101               | 33845885.77              | 8.56                        | 15.65                      |
| 98   | Arkansas Electric Cooperative Corp.                 | 2174.7                    | 3335133               | 34108368.68              | 10.23                       | 15.68                      |
| 99   | Southwestern Public Service Company                 | 5743.5                    | 14053751              | 90092263.67              | 6.41                        | 15.69                      |
| 100  | Salt River Project Agricultural Improvement and Pov | 8701.7                    | 31650117              | 136568619.2              | 4.31                        | 15.69                      |
| 101  | The City of Seattle—City Light Department           | 2007.4                    | 6006202               | 32009902.29              | 5.33                        | 15.95                      |
| 102  | Grand River Dam Authority                           | 1712                      | 3439064               | 27367334.43              | 7.96                        | 15.99                      |
| 103  | Wood Group GTS                                      | 853                       | 3321523               | 13795479.48              | 4.15                        | 16.17                      |
| 104  | Calpine Mid-Atlantic Generation LLC                 | 2044.4                    | 1876705               | 33091857.99              | 17.63                       | 16.19                      |
| 105  | Entergy Arkansas, LLC                               | 7360.3                    | 18334518              | 119629909                | 6.52                        | 16.25                      |
| 106  | AES Alamos, LLC                                     | 1115                      | 544278                | 18304137.25              | 33.63                       | 16.42                      |
| 107  | Tallahassee City of                                 | 961.8                     | 2669699               | 15855262.19              | 5.94                        | 16.48                      |
| 108  | U.S. Bureau Of Reclamation                          | 14688.7                   | 39342574              | 242663416                | 6.17                        | 16.52                      |
| 109  | Entergy Mississippi, LLC                            | 3376.7                    | 12791260              | 56550946.75              | 4.42                        | 16.75                      |
| 110  | Tampa Electric Company                              | 6219.6                    | 18550602              | 104352678.9              | 5.63                        | 16.78                      |
| 111  | USCE - Missouri River District                      | 2539.8                    | 10075554              | 42951284.96              | 4.26                        | 16.91                      |
| 112  | NRG Arthur Kill Operations, Inc.                    | 895.5                     | 870379                | 15153416.1               | 17.41                       | 16.92                      |
| 113  | USCE - North Pacific Division                       | 13111.4                   | 48674010              | 222633586.4              | 4.57                        | 16.98                      |
| 114  | Duke Energy Carolinas, LLC                          | 16621.5                   | 38217549              | 284442028.2              | 7.44                        | 17.11                      |

**2020 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                                     | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 115  | Tennessee Valley Authority                        | 28454.3                   | 80334603              | 494147571.6              | 6.15                        | 17.37                      |
| 116  | Interstate Power and Light Company                | 4397.8                    | 13203187              | 76445463.5               | 5.79                        | 17.38                      |
| 117  | AES Redondo Beach, L.L.C.                         | 821.4                     | 307081                | 14288705.89              | 46.53                       | 17.40                      |
| 118  | Empire District Electric Company                  | 1747.9                    | 4364536               | 30447352.85              | 6.98                        | 17.42                      |
| 119  | Calpine Corporation                               | 5519.3                    | 20425340              | 96403319.06              | 4.72                        | 17.47                      |
| 120  | USCE - Mobile District                            | 1185.7                    | 2730593               | 20763119.52              | 7.60                        | 17.51                      |
| 121  | Public Utility District No. 1 of Chelan County    | 1988.2                    | 8774131               | 34851717.26              | 3.97                        | 17.53                      |
| 122  | South Houston Green Power, LLC                    | 1052.1                    | 4384383               | 18454037.07              | 4.21                        | 17.54                      |
| 123  | Onward Energy                                     | 2746.4                    | 6813908               | 48376577.81              | 7.10                        | 17.61                      |
| 124  | Los Angeles Department of Water and Power, Califc | 7628.2                    | 14177057              | 135651081.7              | 9.57                        | 17.78                      |
| 125  | EDF Renewables Inc.                               | 1436.9                    | 2800990               | 25848476.23              | 9.23                        | 17.99                      |
| 126  | Grant County Public Utility District              | 2191.6                    | 9966037               | 40644868.81              | 4.08                        | 18.55                      |
| 127  | USCE - Little Rock District                       | 1089.2                    | 3838355               | 20263068.44              | 5.28                        | 18.60                      |
| 128  | Platte River Power Authority                      | 800.4                     | 2032320               | 14907056.43              | 7.33                        | 18.62                      |
| 129  | Invenergy Services LLC                            | 5392.7                    | 16436091              | 100623237.9              | 6.12                        | 18.66                      |
| 130  | Evergy Kansas Central, Inc.                       | 4476.5                    | 10525780              | 84932683                 | 8.07                        | 18.97                      |
| 131  | Dynegy Power America, Inc.                        | 2356.4                    | 6434774               | 45577268.19              | 7.08                        | 19.34                      |
| 132  | Consumers Energy Company                          | 7646.5                    | 17848703              | 148790805.7              | 8.34                        | 19.46                      |
| 133  | NextEra Energy Resources, LLC                     | 5252.56                   | 12334753              | 102416019.5              | 8.30                        | 19.50                      |
| 134  | Public Service Company of Oklahoma                | 4729.4                    | 6048778               | 94289489.44              | 15.59                       | 19.94                      |
| 135  | The Dow Chemical Company                          | 2627.5                    | 12985774              | 52493908.01              | 4.04                        | 19.98                      |
| 136  | Colorado Energy Management LLC                    | 867.2                     | 1672504               | 17517828.58              | 10.47                       | 20.20                      |
| 137  | Lakeland City of                                  | 1074                      | 2718762               | 21866621.89              | 8.04                        | 20.36                      |
| 138  | JEA   | 2941                      | 10607421              | 61238953.84              | 5.77                        | 20.82                      |
| 139  | Wisconsin Public Service Corporation              | 1788.2                    | 4647574               | 37244584                 | 8.01                        | 20.83                      |
| 140  | EDP Renewables North America LLC                  | 1065.5                    | 2912453               | 22193389.32              | 7.62                        | 20.83                      |
| 141  | City Public Service of San Antonio                | 6156.8                    | 14534804              | 128685482.8              | 8.85                        | 20.90                      |
| 142  | Ørsted  | 1107.2                    | 3268279               | 23157085.41              | 7.09                        | 20.91                      |
| 143  | Great River Energy                                | 2826.4                    | 8519650               | 59446951.5               | 6.98                        | 21.03                      |
| 144  | Sacramento Municipal Utility District             | 1205.6                    | 1956895               | 25403986.5               | 12.98                       | 21.07                      |
| 145  | National Grid Generation, LLC                     | 3945.4                    | 5101382               | 83744495.13              | 16.42                       | 21.23                      |
| 146  | Evergy Metro, Inc.                                | 5368.3                    | 15405686              | 114153847                | 7.41                        | 21.26                      |
| 147  | Northern States Power Company                     | 7556.9                    | 19563770              | 161115255.6              | 8.24                        | 21.32                      |
| 148  | Power Authority of the State of New York          | 5399.9                    | 29297644              | 115431854.8              | 3.94                        | 21.38                      |
| 149  | City Utilities of Springfield                     | 1086.5                    | 1815966               | 23236682.59              | 12.80                       | 21.39                      |
| 150  | Midwest Generation EME, LLC                       | 5146.9                    | 2776302               | 110659943.4              | 39.86                       | 21.50                      |
| 151  | Ethos Energy Group Limited                        | 1353.3                    | 4490218               | 29165133.98              | 6.50                        | 21.55                      |
| 152  | Cleco Power LLC                                   | 5181.6                    | 15343410              | 112505726                | 7.33                        | 21.71                      |
| 153  | Brookfield Renewable Partners L.P.                | 885                       | 1921272               | 19371849.8               | 10.08                       | 21.89                      |
| 154  | Duke Energy Renewables, Inc.                      | 2063.95                   | 4578236               | 45325315.46              | 9.90                        | 21.96                      |
| 155  | Helix Generation, LLC                             | 1418                      | 6451761               | 31142589.29              | 4.83                        | 21.96                      |
| 156  | USCE - Nashville District                         | 931.6                     | 4128270               | 20589143.91              | 4.99                        | 22.10                      |
| 157  | ALLETE Clean Energy, Inc.                         | 899.8                     | 1781280               | 19968497.72              | 11.21                       | 22.19                      |
| 158  | Pattern Energy Group Inc.                         | 845.24                    | 2230496               | 18937123.42              | 8.49                        | 22.40                      |
| 159  | Castleton Commodities International LLC           | 1268.2                    | 288890                | 28514053.45              | 98.70                       | 22.48                      |
| 160  | Talen Generation LLC                              | 5168.1                    | 2373296               | 116337740.2              | 49.02                       | 22.51                      |
| 161  | Sustainable Power Group, LLC                      | 1417.98                   | 2847805               | 32072150.72              | 11.26                       | 22.62                      |
| 162  | DTE Electric Company                              | 9348.4                    | 22007717              | 212500222.9              | 9.66                        | 22.73                      |
| 163  | Apex Clean Energy, Inc.                           | 1476.9                    | 4785450               | 33794171.11              | 7.06                        | 22.88                      |
| 164  | Sunflower Electric Power Corporation, Inc.        | 1108.1                    | 1476942               | 25375554.86              | 17.18                       | 22.90                      |
| 165  | Energy Harbor Generation                          | 2500.1                    | 4797478               | 57588151                 | 12.00                       | 23.03                      |
| 166  | BP Wind Energy North America Inc.                 | 1537                      | 4463142               | 35523452.03              | 7.96                        | 23.11                      |
| 167  | East Kentucky Power Cooperative, Inc.             | 3033.8                    | 7864095               | 70559426.5               | 8.97                        | 23.26                      |
| 168  | MidAmerican Energy Company                        | 11465.9                   | 27561487              | 266808664.6              | 9.68                        | 23.27                      |
| 169  | Western Farmers Electric Cooperative              | 1393.9                    | 919855                | 32598452.72              | 35.44                       | 23.39                      |
| 170  | Sierra Pacific Power Company                      | 1835.9                    | 6182470               | 43129778.35              | 6.98                        | 23.49                      |
| 171  | Cleanway Energy Operating LLC                     | 948                       | 2012387               | 22297597.45              | 11.08                       | 23.52                      |

**2020 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                                | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|--|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 172  | E.ON Climate & Renewables North America Inc. | 4109.4                    | 11612689              | 96875573.03              | 8.34                        | 23.57                      |
| 173  | PowerSouth Energy Cooperative                | 1876.2                    | 4857203               | 44239610.08              | 9.11                        | 23.58                      |
| 174  | Public Service Company of Colorado           | 7557.9                    | 22740580              | 178438439.5              | 7.85                        | 23.61                      |
| 175  | Southwestern Electric Power Company          | 5704                      | 15246097              | 134839603.1              | 8.84                        | 23.64                      |
| 176  | Virginia Electric and Power Company          | 19136.41                  | 55027681              | 460075774.4              | 8.36                        | 24.04                      |
| 177  | Vestas Wind Systems A/S                      | 1087.7                    | 4193328               | 26249843.09              | 6.26                        | 24.13                      |
| 178  | Morgantown Steam, LLC                        | 2481                      | 1305824               | 60057707.76              | 45.99                       | 24.21                      |
| 179  | EDF Renewables Services                      | 6518.2                    | 21728145              | 158088712.6              | 7.28                        | 24.25                      |
| 180  | GE Energy                                    | 1007.9                    | 3017440               | 24571332.57              | 8.14                        | 24.38                      |
| 181  | Georgia Power Company                        | 17026.72                  | 46247537              | 415787686.1              | 8.99                        | 24.42                      |
| 182  | Portland General Electric Company            | 4567.02                   | 15231836              | 111829275.9              | 7.34                        | 24.49                      |
| 183  | Vistra Corp.                                 | 5554.3                    | 31669998              | 136609732.4              | 4.31                        | 24.60                      |
| 184  | Dairyland Power Co-op                        | 1386.6                    | 2894987               | 34563219.62              | 11.94                       | 24.93                      |
| 185  | Lower Colorado River Authority               | 4028.1                    | 16097470              | 101102042.8              | 6.28                        | 25.10                      |
| 186  | First Solar, Inc.                            | 1749.8                    | 3665226               | 44341229.12              | 12.10                       | 25.34                      |
| 187  | Associated Electric Cooperative Inc.         | 4816                      | 20544294              | 122193599                | 5.95                        | 25.37                      |
| 188  | Orlando Utilities Commission                 | 1604.8                    | 5790530               | 41551349.84              | 7.18                        | 25.89                      |
| 189  | Avangrid Renewables LLC                      | 6098.25                   | 15275181              | 158046986.7              | 10.35                       | 25.92                      |
| 190  | NRG Texas Power LLC                          | 7656.5                    | 18403063              | 199263509.9              | 10.83                       | 26.03                      |
| 191  | NRG Power Midwest LP.                        | 2095.9                    | 1458791               | 55187062.82              | 37.83                       | 26.33                      |
| 192  | Clearway Energy, Inc.                        | 1599.4                    | 3399033               | 42291757.48              | 12.44                       | 26.44                      |
| 193  | Puget Sound Energy, Inc.                     | 2712.1                    | 7961897               | 72231822.59              | 9.07                        | 26.63                      |
| 194  | Luminant Generation Company LLC              | 8214.9                    | 27615667              | 221613494.5              | 8.02                        | 26.98                      |
| 195  | Gulf Power Company                           | 1885.2                    | 6267288               | 51279264.61              | 8.18                        | 27.20                      |
| 196  | ArLight Capital Partners, LLC                | 11017.3                   | 47265047              | 299990102.9              | 6.35                        | 27.23                      |
| 197  | Louisville Gas and Electric Company          | 5472.5                    | 20526531              | 149315931.5              | 7.27                        | 27.28                      |
| 198  | Springfield City of - (IL)                   | 805.9                     | 785329                | 22281723.2               | 28.37                       | 27.65                      |
| 199  | El Paso Electric Company                     | 1933.4                    | 4803153               | 54712518                 | 11.39                       | 28.30                      |
| 200  | Colorado Springs City of                     | 1138.9                    | 4543261               | 32350336.07              | 7.12                        | 28.40                      |
| 201  | NextEra Energy Partners, LP                  | 4105                      | 14524686              | 117525622                | 8.09                        | 28.63                      |
| 202  | South Carolina Public Service Authority      | 5176                      | 14297563              | 148784491.8              | 10.41                       | 28.75                      |
| 203  | 8point3 Energy Partners LP                   | 905.6                     | 2096287               | 26073148.85              | 12.44                       | 28.79                      |
| 204  | Enel Green Power North America, Inc.         | 3773.6                    | 12028858              | 109120209.9              | 9.07                        | 28.92                      |
| 205  | Omaha Public Power District                  | 2847.7                    | 9654997               | 82894525.17              | 8.59                        | 29.11                      |
| 206  | BHE Solar, LLC                               | 997.8                     | 2369176               | 29088310.22              | 12.28                       | 29.15                      |
| 207  | AES Wind Generation, LLC                     | 889                       | 2032728               | 26408329.24              | 12.99                       | 29.71                      |
| 208  | Consolidated Edison Development, Inc.        | 1349.2                    | 3670288               | 40289379.7               | 10.98                       | 29.86                      |
| 209  | PacifiCorp                                   | 12226.16                  | 46163427              | 366669863.3              | 7.94                        | 29.99                      |
| 210  | Appalachian Power Company                    | 5966                      | 17516846              | 180184580                | 10.29                       | 30.20                      |
| 211  | Raven Power Generation Holdings LLC          | 1370.2                    | 951052                | 41436195.7               | 43.57                       | 30.24                      |
| 212  | Louisiana Generating LLC                     | 2604.2                    | 1338670               | 79047012.2               | 59.05                       | 30.35                      |
| 213  | Minnesota Power Enterprises, Inc.            | 1960.8                    | 6621953               | 60213457.54              | 9.09                        | 30.71                      |
| 214  | Allegheny Energy Supply Company, LLC         | 2052                      | 10879715              | 63160002                 | 5.81                        | 30.78                      |
| 215  | Big Rivers Electric Corporation              | 1194.2                    | 3431820               | 36806423.55              | 10.73                       | 30.82                      |
| 216  | Kincaid Generation LLC                       | 1319                      | 1475564               | 40914677.21              | 27.73                       | 31.02                      |
| 217  | Mississippi Power Company                    | 4200.5                    | 18561417              | 130710272                | 7.04                        | 31.12                      |
| 218  | Kentucky Power Company                       | 1913.1                    | 4524358               | 59572037                 | 13.17                       | 31.14                      |
| 219  | Kentucky Utilities Company                   | 3750.1                    | 11317741              | 116917213.1              | 10.33                       | 31.18                      |
| 220  | AES Indiana                                  | 4183.5                    | 13063204              | 136819389.3              | 10.47                       | 32.70                      |
| 221  | Otter Tail Power Company                     | 1452.14                   | 4800830               | 47949523.13              | 9.99                        | 33.02                      |
| 222  | TerraForm Power, Inc.                        | 920.4                     | 1895725               | 30885341.48              | 16.29                       | 33.56                      |
| 223  | Homer City Generation, L.P.                  | 2012                      | 2979035               | 68583271.99              | 23.02                       | 34.09                      |
| 224  | Duke Energy Kentucky, Inc.                   | 1350.5                    | 2340114               | 46269391.82              | 19.77                       | 34.26                      |
| 225  | Alabama Power Company                        | 12063.4                   | 45410405              | 413588863                | 9.11                        | 34.28                      |
| 226  | Hoosier Energy Rural Electric Coop Inc.      | 1119.2                    | 2665911               | 38503865.99              | 14.44                       | 34.40                      |
| 227  | Nebraska Public Power District               | 2236.7                    | 8417721               | 77594375.37              | 9.22                        | 34.69                      |
| 228  | AEP Generation Resources Inc.                | 2721.9                    | 10134267              | 94877611.26              | 9.36                        | 34.86                      |

**2020 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.**

Criteria: Company Nameplate Capacity >= 800 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name  | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|--|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 229  | TransAlta Centralia Generation LLC                   | 1460.8                    | 5153513               | 52250583.17              | 10.14                       | 35.77                      |
| 230  | Longview Power LLC                                   | 807.5                     | 4949857               | 29001774.25              | 5.86                        | 35.92                      |
| 231  | Dynegy Midwest Generation, Inc.                      | 1259.6                    | 4060737               | 45935059.51              | 11.31                       | 36.47                      |
| 232  | Pleasants Corporation                                | 1368                      | 4882214               | 50116105.01              | 10.27                       | 36.63                      |
| 233  | MOR PPM Inc  | 1429.2                    | 6649299               | 52613718.87              | 7.91                        | 36.81                      |
| 234  | NRG Energy Services LLC                              | 2755.5                    | 7939366               | 101843390.2              | 12.83                       | 36.96                      |
| 235  | Archer-Daniels-Midland Company                       | 991.4                     | 3099735               | 38037997.95              | 12.27                       | 38.37                      |
| 236  | Illinois Power Generating Company                    | 1717.2                    | 6740966               | 66041686.78              | 9.80                        | 38.46                      |
| 237  | FPL Energy Wyman LLC                                 | 846                       | 10567                 | 32648361                 | 3089.65                     | 38.59                      |
| 238  | Tri-State Generation & Transmission Association, Inc | 2532.3                    | 8174829               | 98601001.28              | 12.06                       | 38.94                      |
| 239  | AGC Division of APG Inc                              | 822.8                     | 4718034               | 32594900.56              | 6.91                        | 39.61                      |
| 240  | Arizona Public Service Company                       | 7199.7                    | 22168231              | 286651804.9              | 12.93                       | 39.81                      |
| 241  | Pacific Gas and Electric Company                     | 5321.82                   | 13602957              | 212124019.7              | 15.59                       | 39.86                      |
| 242  | Monongahela Power Company                            | 1152                      | 5073932               | 47117360                 | 9.29                        | 40.90                      |
| 243  | Public Service Company of New Mexico                 | 1643.5                    | 6120237               | 67938015.24              | 11.10                       | 41.34                      |
| 244  | Southern California Edison Company                   | 2538.92                   | 5275142               | 105653817.8              | 20.03                       | 41.61                      |
| 245  | Northern Indiana Public Service Company              | 3417.4                    | 7610327               | 143579805.2              | 18.87                       | 42.01                      |
| 246  | International Paper Company                          | 920.1                     | 4253909               | 39421010.96              | 9.27                        | 42.84                      |
| 247  | Duke Energy Indiana, LLC                             | 8061.2                    | 22270386              | 353200073.3              | 15.86                       | 43.81                      |
| 248  | Talen Montana, LLC                                   | 2363.4                    | 7935170               | 106698042                | 13.45                       | 45.15                      |
| 249  | Indiana-Kentucky Electric Corporation                | 1303.8                    | 4375314               | 63548940                 | 14.52                       | 48.74                      |
| 250  | Tucson Electric Power Company                        | 2524.3                    | 9073320               | 125083131.1              | 13.79                       | 49.55                      |
| 251  | Southern Indiana Gas and Electric Company            | 1079.7                    | 3005432               | 57656181.92              | 19.18                       | 53.40                      |
| 252  | Basin Electric Power Cooperative                     | 5330.5                    | 22426973              | 294365590.8              | 13.13                       | 55.22                      |
| 253  | Northern California Power Agency                     | 900                       | 1803277               | 50392350.35              | 27.94                       | 55.99                      |
| 254  | Consolidated Edison Company of New York, Inc.        | 802.9                     | 3122034               | 45196793.54              | 14.48                       | 56.29                      |
| 255  | Ohio Valley Electric Corporation                     | 1086.5                    | 4651760               | 63981538                 | 13.75                       | 58.89                      |
| 256  | Indiana Michigan Power Company                       | 2637.3                    | 4149532               | 201579674                | 48.58                       | 76.43                      |
| 257  | Prairie State Generating Company, LLC                | 1766                      | 11308063              | 175096779                | 15.48                       | 99.15                      |
| 258  | Wisconsin Electric Power Company                     | 5622.1                    | 20976755              | 612899143.9              | 29.22                       | 109.02                     |
| 259  | Geysers Power Co LLC                                 | 1241                      | 5038002               | 176000086.2              | 34.93                       | 141.82                     |
| 260  | Ormat Nevada, Inc.                                   | 813                       | 3373015               | 175036780                | 51.89                       | 215.30                     |

**2018 Non-Fuel O&M \$/kW Installed**  
**Ranked by Operator Co.**  
**NERC: MRO**

Criteria: Company Nameplate Capacity >= 600 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                             | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 1    | Evergy Kansas South, Inc.                 | 756.9                     | 303429                | 8548345                  | 28.17                       | 11.29                      |
| 2    | Onward Energy                             | 641.1                     | 911508                | 8410521.069              | 9.23                        | 13.12                      |
| 3    | WGP Acquisition LLC                       | 925.4                     | 5582118               | 12261577.58              | 2.20                        | 13.25                      |
| 4    | Argo Infrastructure Partners LP           | 1214                      | 4976693               | 16226986.95              | 3.26                        | 13.37                      |
| 5    | Riverside Energy Center LLC               | 674.9                     | 2839949               | 9070732                  | 3.19                        | 13.44                      |
| 6    | Entergy Texas, Inc.                       | 2,609                     | 6,437,777             | 36,014,600               | 5.59                        | 13.81                      |
| 7    | Oklahoma Gas and Electric Company         | 8952                      | 23710217              | 143327845.7              | 6.04                        | 16.01                      |
| 8    | NAES Corporation                          | 2040.9                    | 7838806               | 32676702.35              | 4.17                        | 16.01                      |
| 9    | USCE - Little Rock District               | 1089.2                    | 2331995               | 18005503.08              | 7.72                        | 16.53                      |
| 10   | USCE - Missouri River District            | 2360.1                    | 10165727              | 39294651.69              | 3.87                        | 16.65                      |
| 11   | NextEra Energy Resources, LLC             | 1697                      | 4097821               | 28325531.89              | 6.91                        | 16.69                      |
| 12   | Interstate Power and Light Company        | 3636                      | 12343531              | 60938275.75              | 4.94                        | 16.76                      |
| 13   | Public Service Company of Oklahoma        | 4062.4                    | 6876494               | 70747324.25              | 10.29                       | 17.42                      |
| 14   | Grand River Dam Authority                 | 1712                      | 3353515               | 31427709.73              | 9.37                        | 18.36                      |
| 15   | Invenergy Services LLC                    | 1232.2                    | 3419981               | 22935626.31              | 6.71                        | 18.61                      |
| 16   | Southwestern Public Service Company       | 4743.5                    | 14797224              | 91308548                 | 6.17                        | 19.25                      |
| 17   | NRG Energy Services LLC                   | 1031                      | 2937001               | 20606815                 | 7.02                        | 19.99                      |
| 18   | Enel Green Power North America, Inc.      | 1871.1                    | 7306972               | 39508169.28              | 5.41                        | 21.11                      |
| 19   | Kansas City City of                       | 725.5                     | 1005478               | 15730270.3               | 15.64                       | 21.68                      |
| 20   | EDF Renewables Services                   | 2478.5                    | 8772897               | 54108095.27              | 6.17                        | 21.83                      |
| 21   | NextEra Energy Partners, LP               | 2158.7                    | 8745867               | 47287202.72              | 5.41                        | 21.91                      |
| 22   | Fox Energy Company, LLC                   | 618.8                     | 3644879               | 13645669                 | 3.74                        | 22.05                      |
| 23   | Evergy Missouri West, Inc.                | 1523.8                    | 1019295               | 33682839.91              | 33.05                       | 22.10                      |
| 24   | USCE - Tulsa District                     | 608.8                     | 1639536               | 13538059.57              | 8.26                        | 22.24                      |
| 25   | City Utilities of Springfield             | 1086.5                    | 2771366               | 25820346.9               | 9.32                        | 23.76                      |
| 26   | Avangrid Renewables LLC                   | 1557.3                    | 4218831               | 37057601.67              | 8.78                        | 23.80                      |
| 27   | Wisconsin Public Service Corporation      | 1869.4                    | 5951944               | 45481854                 | 7.64                        | 24.33                      |
| 28   | Empire District Electric Company          | 1598.5                    | 4981215               | 38901422                 | 7.81                        | 24.34                      |
| 29   | Sunflower Electric Power Corporation, Inc | 1108.1                    | 1547607               | 27657877.26              | 17.87                       | 24.96                      |
| 30   | Great River Energy                        | 2874.4                    | 9832841               | 72198954.92              | 7.34                        | 25.12                      |
| 31   | MidAmerican Energy Company                | 10133.6                   | 33084919              | 254544220                | 7.69                        | 25.12                      |
| 32   | Dairyland Power Co-op                     | 1386.6                    | 4114974               | 34897608.38              | 8.48                        | 25.17                      |
| 33   | Northern States Power Company             | 7413.9                    | 23733859              | 186651307.2              | 7.86                        | 25.18                      |
| 34   | Southwestern Electric Power Company       | 5778                      | 20444035              | 153834247                | 7.52                        | 26.62                      |
| 35   | Wisconsin Power and Light Company         | 3127.3                    | 11234304              | 83711060                 | 7.45                        | 26.77                      |
| 36   | Evergy Kansas Central, Inc.               | 4558.5                    | 14843698              | 124785944.3              | 8.41                        | 27.37                      |
| 37   | Evergy Metro, Inc.                        | 5744.3                    | 16790274              | 158094461                | 9.42                        | 27.52                      |
| 38   | Western Farmers Electric Cooperative      | 1393.9                    | 3522050               | 38581970.66              | 10.95                       | 27.68                      |
| 39   | Basin Electric Power Cooperative          | 3069.3                    | 12247966              | 86504623.42              | 7.06                        | 28.18                      |
| 40   | Omaha Public Power District               | 2847.7                    | 11071624              | 88219483.72              | 7.97                        | 30.98                      |
| 41   | Minnesota Power Enterprises, Inc.         | 2110.8                    | 9589558               | 75800542.8               | 7.90                        | 35.91                      |
| 42   | Nebraska Public Power District            | 2239.1                    | 10468012              | 82614613.98              | 7.89                        | 36.90                      |
| 43   | Minnkota Power Cooperative, Inc.          | 734                       | 4908951               | 31566429.11              | 6.43                        | 43.01                      |
| 44   | Otter Tail Power Company                  | 1302.14                   | 6502323               | 62752753.63              | 9.65                        | 48.19                      |



**2019 Non-Fuel O&M \$/kW Installed**  
**Ranked by Operator Co.**  
**NERC: MRO**

Criteria: Company Nameplate Capacity >= 600 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                             | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/KW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 1    | Evergy Missouri West, Inc.                | 1,000                     | 135,883               | 7,893,378                | 58.09                       | 7.89                       |
| 2    | Riverside Energy Center LLC               | 675                       | 4,042,588             | 6,255,748                | 1.55                        | 9.27                       |
| 3    | WGP Acquisition LLC                       | 925                       | 4,798,556             | 12,166,903               | 2.54                        | 13.15                      |
| 4    | Argo Infrastructure Partners LP           | 1,214                     | 5,358,288             | 16,103,919               | 3.01                        | 13.27                      |
| 5    | Onward Energy                             | 830                       | 2,492,448             | 11,633,859               | 4.67                        | 14.02                      |
| 6    | NAES Corporation                          | 2,041                     | 8,001,136             | 31,030,619               | 3.88                        | 15.20                      |
| 7    | Grand River Dam Authority                 | 1,712                     | 3,678,841             | 28,774,096               | 7.82                        | 16.81                      |
| 8    | Fox Energy Company, LLC                   | 619                       | 4,311,102             | 10,414,276               | 2.42                        | 16.83                      |
| 9    | Madison Gas and Electric Company          | 617                       | 797,401               | 10,450,399               | 13.11                       | 16.93                      |
| 10   | Interstate Power and Light Company        | 3,866                     | 13,847,268            | 66,247,281               | 4.78                        | 17.14                      |
| 11   | Oklahoma Gas and Electric Company         | 8,952                     | 21,010,462            | 156,813,952              | 7.46                        | 17.52                      |
| 12   | Public Service Company of Oklahoma        | 4,062                     | 6,470,305             | 71,437,604               | 11.04                       | 17.59                      |
| 13   | Southwestern Public Service Company       | 5,222                     | 14,574,249            | 92,259,329               | 6.33                        | 17.67                      |
| 14   | Entergy Texas, Inc.                       | 2,609                     | 5,883,409             | 46,295,087               | 7.87                        | 17.75                      |
| 15   | USCE - Little Rock District               | 1,089                     | 3,778,976             | 19,646,977               | 5.20                        | 18.04                      |
| 16   | USCE - Missouri River District            | 2,360                     | 11,729,427            | 43,319,769               | 3.69                        | 18.36                      |
| 17   | Kansas City City of                       | 726                       | 1,066,416             | 14,611,899               | 13.70                       | 20.14                      |
| 18   | Evergy Kansas Central, Inc.               | 4,477                     | 11,396,101            | 90,971,817               | 7.98                        | 20.32                      |
| 19   | Great River Energy                        | 2,874                     | 8,500,298             | 60,343,348               | 7.10                        | 20.99                      |
| 20   | Invenergy Services LLC                    | 1,232                     | 3,402,442             | 26,150,707               | 7.69                        | 21.22                      |
| 21   | Northern States Power Company             | 7,448                     | 23,734,268            | 159,261,527              | 6.71                        | 21.38                      |
| 22   | USCE - Tulsa District                     | 609                       | 2,617,414             | 13,531,466               | 5.17                        | 22.23                      |
| 23   | City Utilities of Springfield             | 1,087                     | 2,027,288             | 24,375,012               | 12.02                       | 22.43                      |
| 24   | Empire District Electric Company          | 1,599                     | 4,904,363             | 36,263,549               | 7.39                        | 22.69                      |
| 25   | Evergy Metro, Inc.                        | 5,368                     | 17,615,831            | 129,701,364              | 7.36                        | 24.16                      |
| 26   | NextEra Energy Resources, LLC             | 1,862                     | 6,535,029             | 45,256,195               | 6.93                        | 24.31                      |
| 27   | Enel Green Power North America, Inc.      | 2,489                     | 9,541,715             | 60,565,947               | 6.35                        | 24.34                      |
| 28   | Wisconsin Power and Light Company         | 2,776                     | 8,071,707             | 67,584,102               | 8.37                        | 24.34                      |
| 29   | Wisconsin Public Service Corporation      | 1,638                     | 4,845,186             | 40,577,178               | 8.37                        | 24.77                      |
| 30   | Avangrid Renewables LLC                   | 1,654                     | 3,949,102             | 41,368,649               | 10.48                       | 25.01                      |
| 31   | NextEra Energy Partners, LP               | 2,159                     | 8,807,922             | 54,230,073               | 6.16                        | 25.12                      |
| 32   | MidAmerican Energy Company                | 10,873                    | 28,512,744            | 273,876,703              | 9.61                        | 25.19                      |
| 33   | EDF Renewables Services                   | 2,479                     | 8,447,598             | 63,648,368               | 7.53                        | 25.68                      |
| 34   | Southwestern Electric Power Company       | 5,778                     | 17,582,584            | 150,057,657              | 8.53                        | 25.97                      |
| 35   | Sunflower Electric Power Corporation, Inc | 1,108                     | 1,676,499             | 29,266,384               | 17.46                       | 26.41                      |
| 36   | Dairyland Power Co-op                     | 1,387                     | 3,308,444             | 37,143,257               | 11.23                       | 26.79                      |
| 37   | Western Farmers Electric Cooperative      | 1,394                     | 1,688,388             | 37,795,017               | 22.39                       | 27.11                      |
| 38   | NRG Energy Services LLC                   | 1,031                     | 4,177,235             | 29,098,048               | 6.97                        | 28.22                      |
| 39   | Omaha Public Power District               | 2,848                     | 8,976,690             | 83,673,812               | 9.32                        | 29.38                      |
| 40   | Minnesota Power Enterprises, Inc.         | 1,961                     | 7,152,899             | 64,929,719               | 9.08                        | 33.11                      |
| 41   | Nebraska Public Power District            | 2,239                     | 10,030,029            | 79,585,389               | 7.93                        | 35.54                      |
| 42   | Minnkota Power Cooperative, Inc.          | 734                       | 4,705,187             | 30,483,753               | 6.48                        | 41.53                      |
| 43   | Otter Tail Power Company                  | 1,302                     | 5,495,931             | 59,310,583               | 10.79                       | 45.55                      |
| 44   | Basin Electric Power Cooperative          | 3,069                     | 12,553,737            | 195,559,172              | 15.58                       | 63.71                      |

2020 Non-Fuel O&M \$/kW Installed  
Ranked by Operator Co.  
NERC: MRO

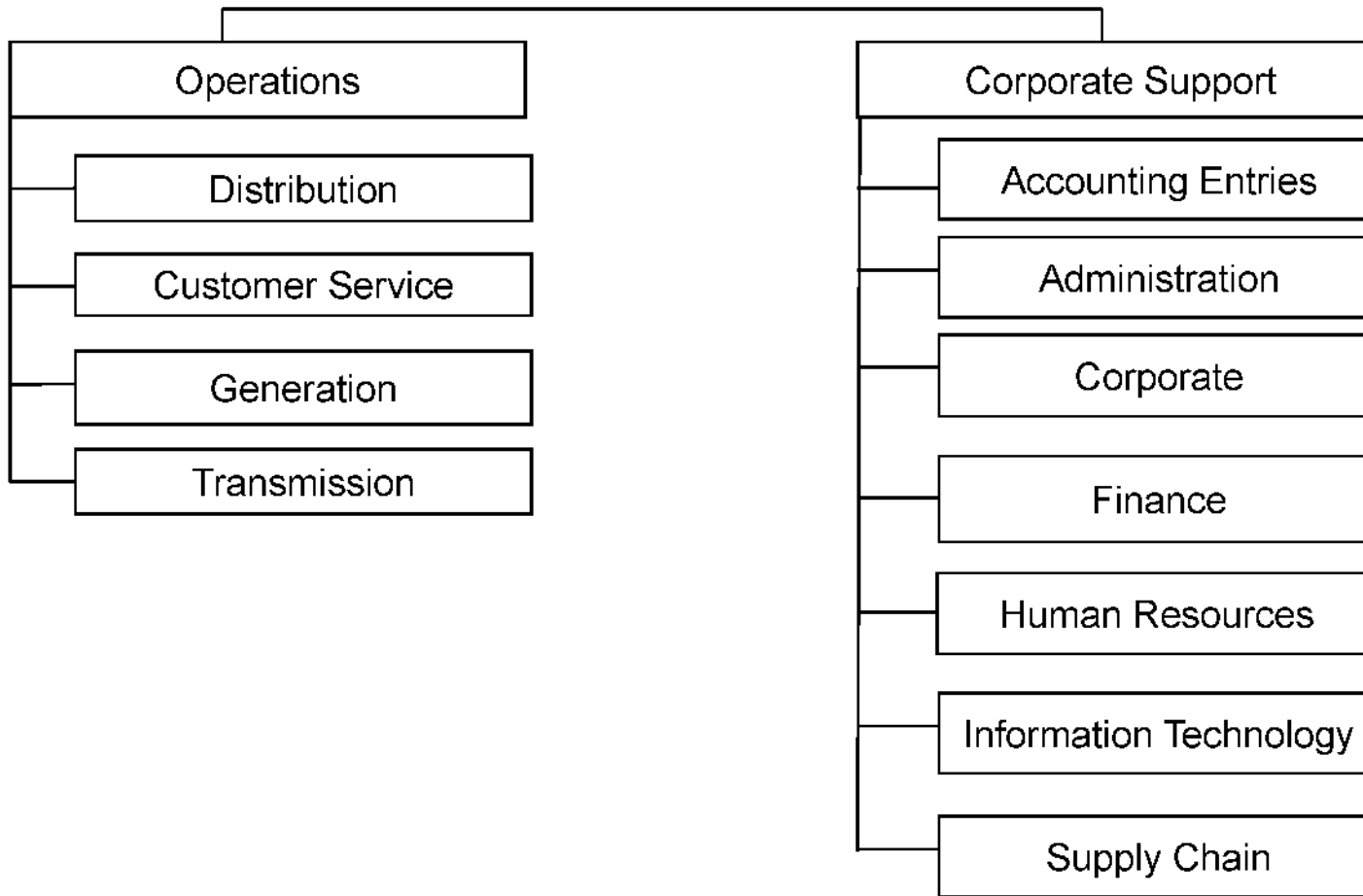
Criteria: Company Nameplate Capacity >= 600 MW -- Non Nuclear Units  
Source: S&P Global as of 3/15/2022

| Rank | Operator Name                             | Name Plate<br>Capacity MW | Net Generation<br>MWh | Total Non-Fuel<br>O&M \$ | Calculated NF<br>O&M \$/MWh | Calculated NF<br>O&M \$/kW |
|------|---|---------------------------|-----------------------|--------------------------|-----------------------------|----------------------------|
| 1    | Riverside Energy Center LLC               | 675                       | 2,662,340             | 6,042,157                | 2.27                        | 8.95                       |
| 2    | Evergy Missouri West, Inc.                | 1,000                     | 101,262               | 12,241,614               | 120.89                      | 12.24                      |
| 3    | Argo Infrastructure Partners LP           | 1,214                     | 6,334,760             | 15,397,643               | 2.43                        | 12.68                      |
| 4    | WGP Acquisition LLC                       | 925                       | 5,268,912             | 12,097,042               | 2.30                        | 13.07                      |
| 5    | Onward Energy                             | 830                       | 3,294,308             | 11,578,201               | 3.51                        | 13.95                      |
| 6    | Entergy Texas, Inc.                       | 2,609                     | 7,405,175             | 38,887,349               | 5.25                        | 14.91                      |
| 7    | NAES Corporation                          | 2,041                     | 7,144,037             | 30,568,890               | 4.28                        | 14.98                      |
| 8    | Oklahoma Gas and Electric Company         | 8,962                     | 21,121,268            | 136,582,960              | 6.47                        | 15.24                      |
| 9    | Southwestern Public Service Company       | 5,744                     | 14,053,751            | 90,092,264               | 6.41                        | 15.69                      |
| 10   | Wisconsin Power and Light Company         | 3,652                     | 9,923,467             | 57,750,684               | 5.82                        | 15.81                      |
| 11   | Fox Energy Company, LLC                   | 619                       | 4,474,657             | 9,793,843                | 2.19                        | 15.83                      |
| 12   | Grand River Dam Authority                 | 1,712                     | 3,439,064             | 27,367,334               | 7.96                        | 15.99                      |
| 13   | USCE - Missouri River District            | 2,360                     | 8,969,899             | 38,681,078               | 4.31                        | 16.39                      |
| 14   | Madison Gas and Electric Company          | 631                       | 829,323               | 10,536,400               | 12.70                       | 16.69                      |
| 15   | Public Service Company of Oklahoma        | 4,009                     | 4,945,151             | 68,747,980               | 13.90                       | 17.15                      |
| 16   | Interstate Power and Light Company        | 4,398                     | 13,203,187            | 76,445,463               | 5.79                        | 17.38                      |
| 17   | Empire District Electric Company          | 1,748                     | 4,364,536             | 30,447,353               | 6.98                        | 17.42                      |
| 18   | USCE - Little Rock District               | 1,089                     | 3,838,355             | 20,263,068               | 5.28                        | 18.60                      |
| 19   | Evergy Kansas Central, Inc.               | 4,477                     | 10,525,780            | 84,932,683               | 8.07                        | 18.97                      |
| 20   | Invenergy Services LLC                    | 1,232                     | 3,563,290             | 25,241,156               | 7.08                        | 20.48                      |
| 21   | Wisconsin Public Service Corporation      | 1,788                     | 4,647,574             | 37,244,584               | 8.01                        | 20.83                      |
| 22   | Great River Energy                        | 2,826                     | 8,519,650             | 59,446,952               | 6.98                        | 21.03                      |
| 23   | Evergy Metro, Inc.                        | 5,368                     | 15,405,686            | 114,153,847              | 7.41                        | 21.26                      |
| 24   | Northern States Power Company             | 7,557                     | 19,563,770            | 161,115,256              | 8.24                        | 21.32                      |
| 25   | City Utilities of Springfield             | 1,087                     | 1,815,966             | 23,236,683               | 12.80                       | 21.39                      |
| 26   | ALLETE Clean Energy, Inc.                 | 719                       | 1,279,643             | 15,548,464               | 12.15                       | 21.62                      |
| 27   | NextEra Energy Resources, LLC             | 2,363                     | 7,525,094             | 52,342,289               | 6.96                        | 22.15                      |
| 28   | USCE - Tulsa District                     | 609                       | 2,153,315             | 13,681,046               | 6.35                        | 22.47                      |
| 29   | Sunflower Electric Power Corporation, Inc | 1,108                     | 1,476,942             | 25,375,555               | 17.18                       | 22.90                      |
| 30   | MidAmerican Energy Company                | 11,466                    | 27,561,487            | 266,808,665              | 9.68                        | 23.27                      |
| 31   | Enel Green Power North America, Inc.      | 2,489                     | 9,802,905             | 58,048,618               | 5.92                        | 23.33                      |
| 32   | Western Farmers Electric Cooperative      | 1,394                     | 919,855               | 32,598,453               | 35.44                       | 23.39                      |
| 33   | Southwestern Electric Power Company       | 5,704                     | 15,246,097            | 134,839,603              | 8.84                        | 23.64                      |
| 34   | NextEra Energy Partners, LP               | 2,159                     | 8,875,138             | 52,904,768               | 5.96                        | 24.51                      |
| 35   | Dairyland Power Co-op                     | 1,387                     | 2,894,987             | 34,563,220               | 11.94                       | 24.93                      |
| 36   | EDF Renewables Services                   | 2,475                     | 8,957,846             | 64,148,066               | 7.16                        | 25.92                      |
| 37   | Avangrid Renewables LLC                   | 1,654                     | 4,227,752             | 44,997,584               | 10.64                       | 27.21                      |
| 38   | Omaha Public Power District               | 2,848                     | 9,654,997             | 82,894,525               | 8.59                        | 29.11                      |
| 39   | NRG Energy Services LLC                   | 1,031                     | 3,135,730             | 31,360,482               | 10.00                       | 30.42                      |
| 40   | Minnesota Power Enterprises, Inc.         | 1,961                     | 6,621,953             | 60,213,458               | 9.09                        | 30.71                      |
| 41   | Otter Tail Power Company                  | 1,452                     | 4,800,830             | 47,949,523               | 9.99                        | 33.02                      |
| 42   | Nebraska Public Power District            | 2,237                     | 8,417,721             | 77,594,375               | 9.22                        | 34.69                      |
| 43   | Minnkota Power Cooperative, Inc.          | 734                       | 4,667,523             | 30,222,240               | 6.48                        | 41.17                      |
| 44   | Basin Electric Power Cooperative          | 3,069                     | 11,202,270            | 172,985,907              | 15.44                       | 56.36                      |

See Native Excel file Gale Direct\_Exhibit BG-4.

This exhibit contains voluminous information that is being provided electronically.

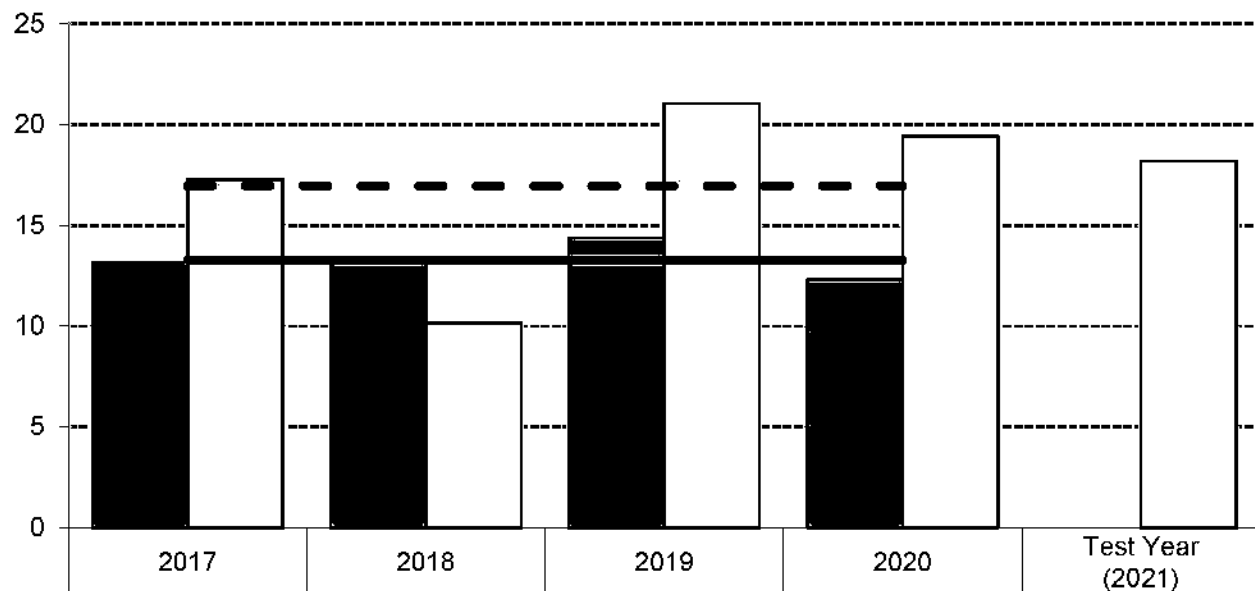
## Families and Functions



# **Entergy Texas, Inc. Scheduled Outage Factor (SOF) Industry Comparison All Fossil Fuels 100 - 600 MW**

Percent

**ETI**  
Lewis Creek 1 & 2  
Nelson 6  
Sabine 1, 3, 4, & 5  
Big Cajun II, Unit 3  
Montgomery County  
Hardin 1 & 2



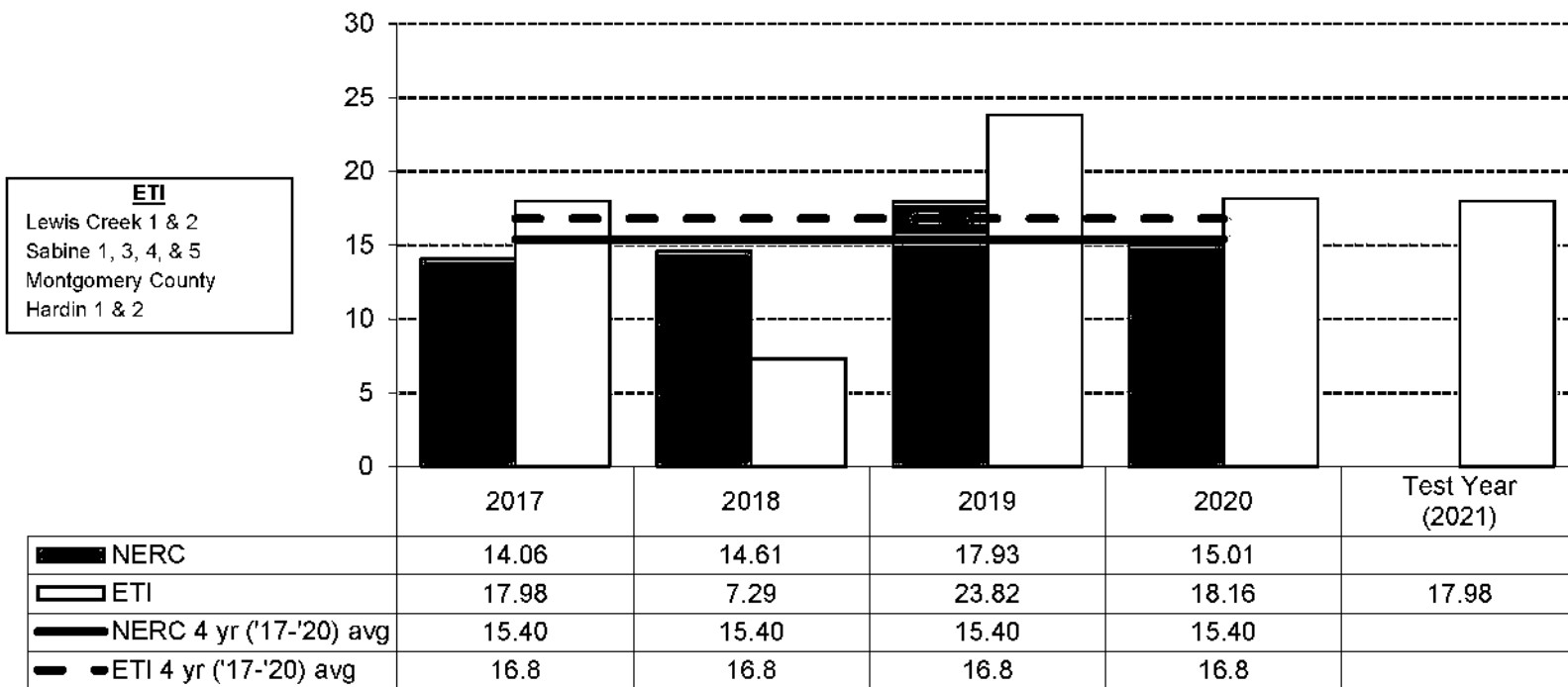
Note: Industry data for 2021 is not yet available. ETI Test Year includes the addition of the Montgomery County and Hardin 1 & 2 units.

Source: NERC – NERC GADS Statistical Brochure; Criteria: All Fossil Fuels 100 – 600 MW units.

SOF = [(Scheduled Outage Hours x NMC) / (Period Hours X NMC)] x 100(%). Scheduled Outage Hours = Sum of Planned and Maintenance Outage hours plus any Scheduled Outage Extension hours associated with those outages. NMC = Net Maximum Capacity.

# **Entergy Texas, Inc. Scheduled Outage Factor (SOF) Industry Comparison Gas Fired Units 100 - 600 MW**

Percent



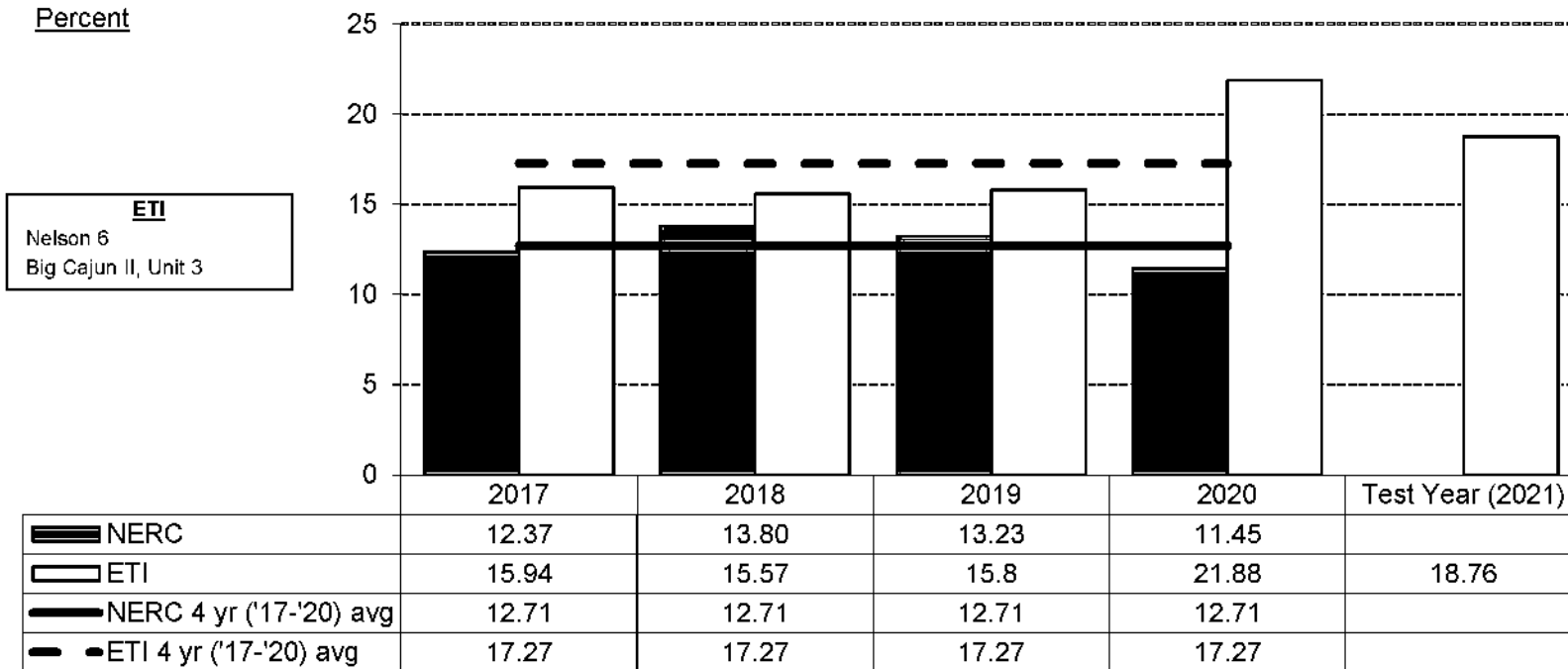
Note: Industry data for 2021 is not yet available. ETI Test Year includes the addition of Montgomery County and Hardin 1 & 2 units.

Source: NERC – NERC GADS Statistical Brochure; Criteria: Gas 100 - 600 MW units.

SOF = [(Scheduled Outage Hours x NMC) / (Period Hours X NMC)] x 100(%). Scheduled Outage Hours = Sum of Planned and Maintenance Outage hours plus any Scheduled Outage Extension hours associated with those outages. NMC = Net Maximum Capacity.

# **Entergy Texas, Inc. Scheduled Outage Factor (SOF) Industry Comparison Coal Fired Units 400 - 600 MW**

Percent



Note: Industry data for 2021 is not yet available.

Source: NERC – NERC GADS Statistical Brochure; Criteria: Coal 400-600 MW units.

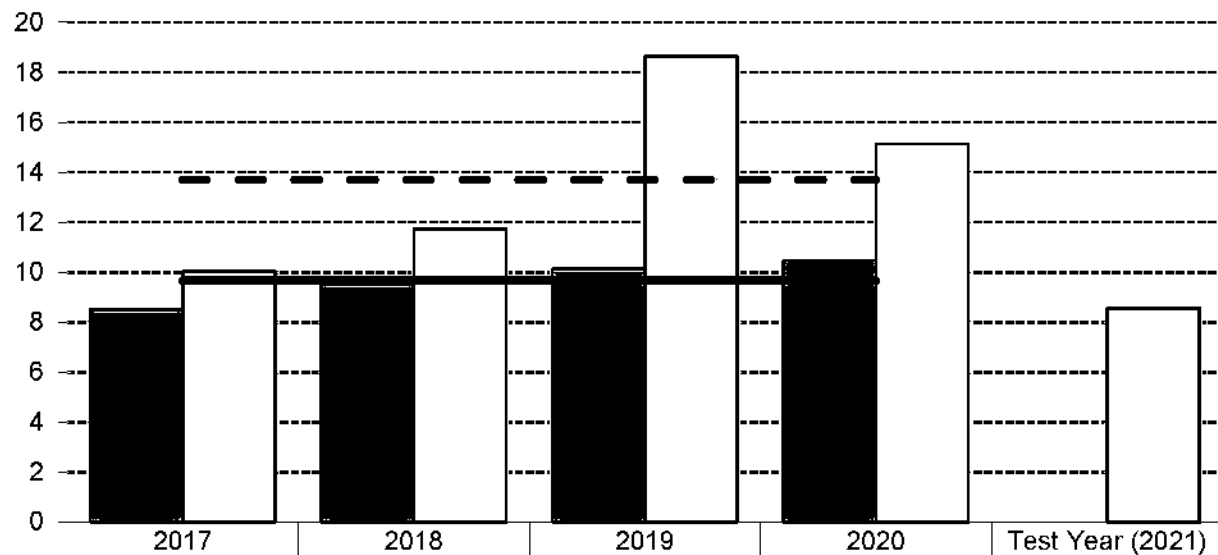
SOF = [(Scheduled Outage Hours x NMC) / (Period Hours X NMC)] x 100(%). Scheduled Outage Hours = Sum of Planned and Maintenance Outage hours plus any Scheduled Outage Extension hours associated with those outages. NMC = Net Maximum Capacity.



# **Entergy Texas, Inc. Fossil Forced Outage Rate (FOR) Industry Comparison All Fossil Fuels 100 - 600 MW**

Percent

**ETI**  
Lewis Creek 1 & 2  
Nelson 6  
Sabine 1, 3, 4, & 5  
Big Cajun II, Unit 3  
Montgomery County  
Hardin 1 & 2



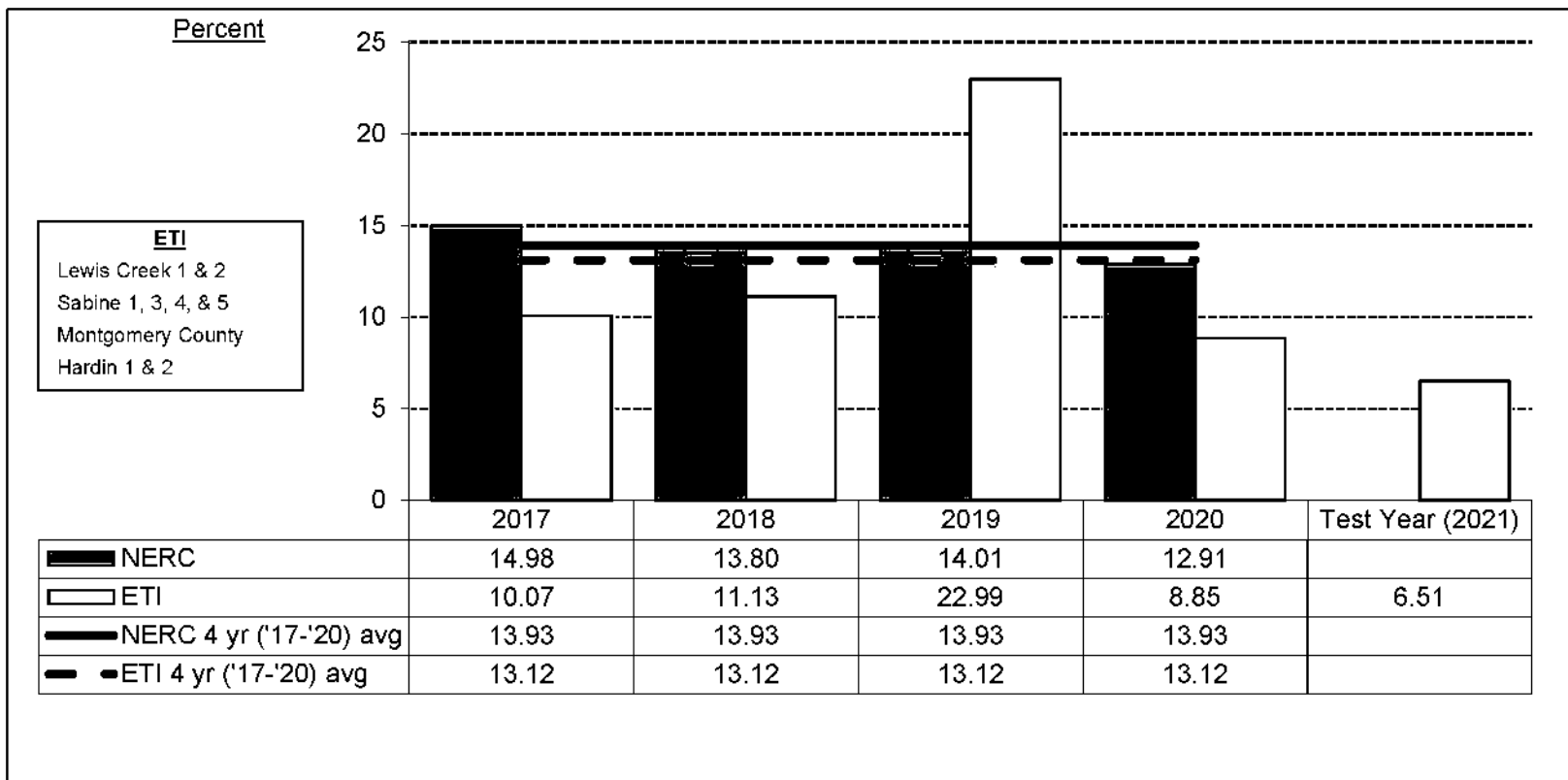
|                         |       |       |       |       |      |
|-------------------------|-------|-------|-------|-------|------|
| NERC                    | 8.49  | 9.53  | 10.13 | 10.47 |      |
| ETI                     | 10.02 | 11.74 | 18.64 | 15.13 | 8.56 |
| NERC 4 yr ('17-'20) avg | 9.66  | 9.66  | 9.66  | 9.66  |      |
| ETI 4 yr ('17-'20) avg  | 13.7  | 13.7  | 13.7  | 13.7  |      |

Note: Industry data for 2021 is not yet available. ETI Test Year includes the addition of the Montgomery County and Hardin 1 & 2 units.

Source: NERC – NERC GADS Statistical Brochure; Criteria: All Fossil Fuels 100 – 600 MW units.

FOR =  $\{[(\text{Forced Outage Hours} \times \text{NMC}) / ((\text{Forced Outage Hours} + \text{Service Hours}) \times \text{NMC})] \times 100 (\%) \}$ . NMC = Net Maximum Capacity

# **Entergy Texas, Inc.** **Fossil Forced Outage Rate (FOR)** **Industry Comparison** **Gas Fired Units 100 - 600 MW**

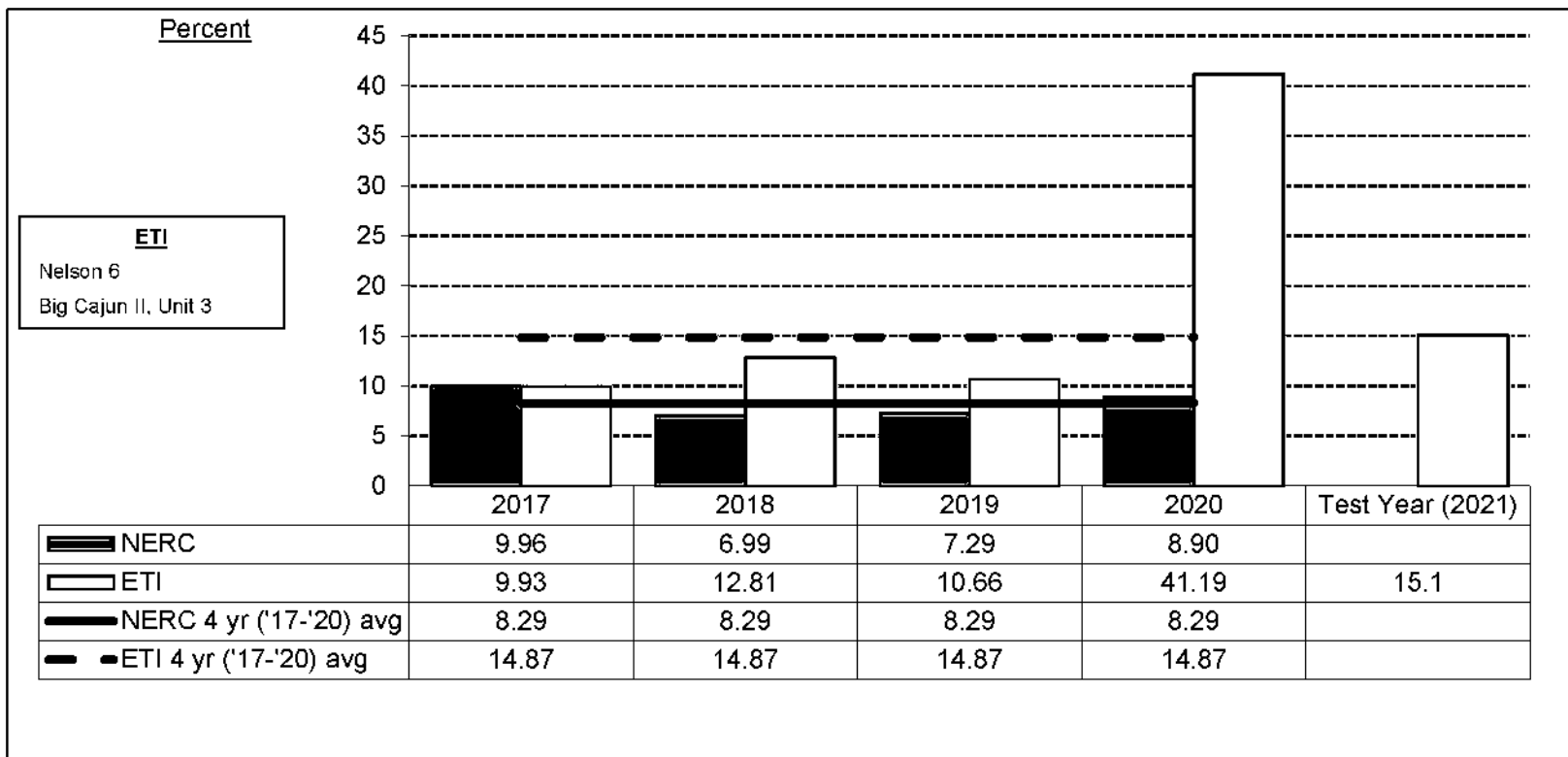


Note: Industry data for 2021 is not yet available. ETI Test Year includes the addition of the Montgomery County and Hardin 1 & 2 units.

Source: NERC – NERC GADS Statistical Brochure; Criteria: Gas 100 - 600 MW units.

FOR =  $\{[(\text{Forced Outage Hours} \times \text{NMC}) / ((\text{Forced Outage Hours} + \text{Service Hours}) \times \text{NMC})]\} \times 100 (\%)$ . NMC = Net Maximum Capacity

# **Entergy Texas, Inc. Fossil Forced Outage Rate (FOR) Industry Comparisons Coal Fired Units 400 - 600 MW**

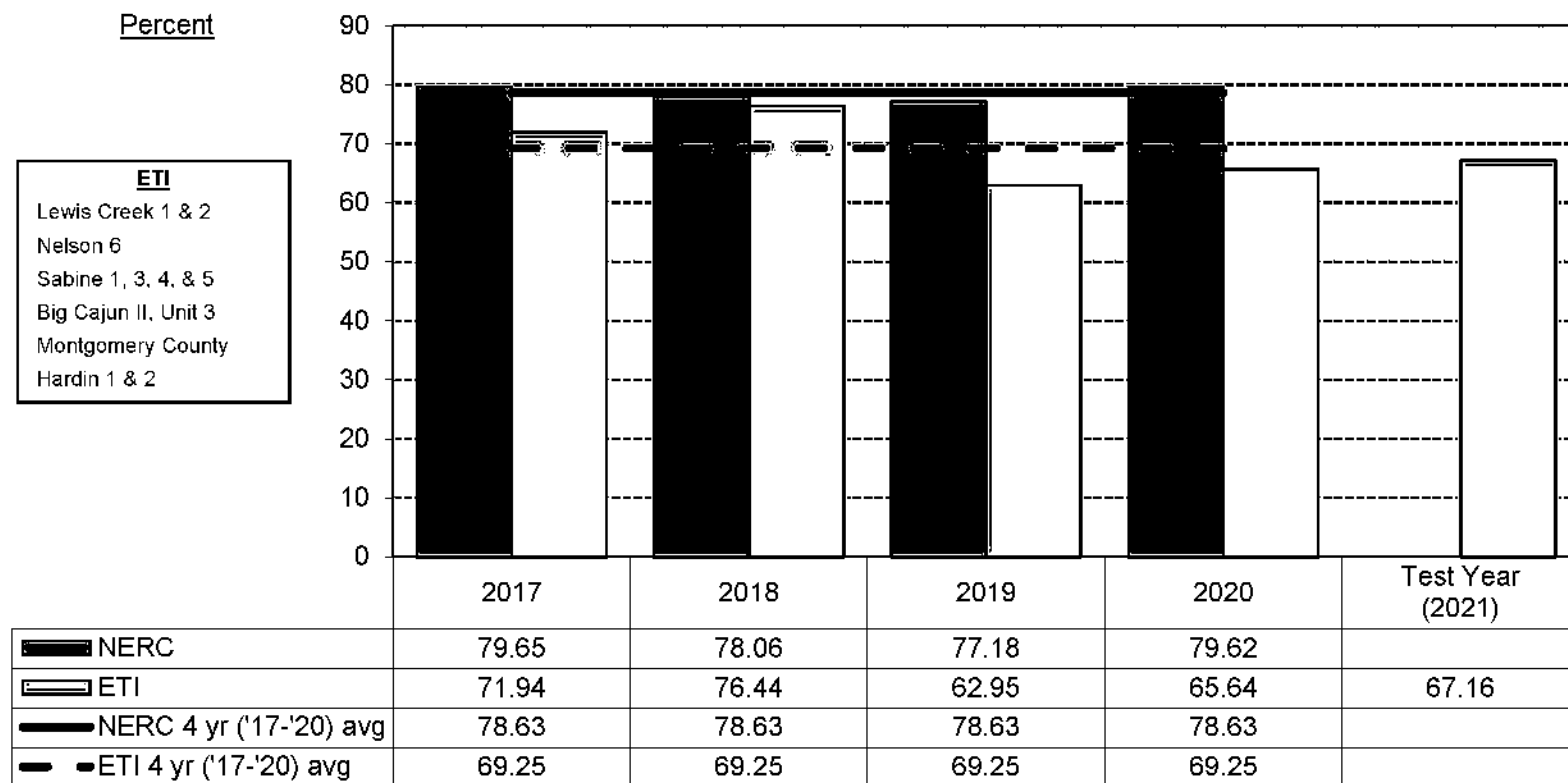


Note: Industry data for 2021 is not yet available.

Source: NERC – NERC GADS Statistical Brochure; Criteria: Coal 400-600 MW units.

FOR =  $\{[(\text{Forced Outage Hours} \times \text{NMC}) / ((\text{Forced Outage Hours} + \text{Service Hours}) \times \text{NMC})]\} \times 100 (\%)$ . NMC = Net Maximum Capacity

# **Entergy Texas, Inc.** **Fossil Equivalent Availability Factor (EAF)** **Industry Comparison** **All Fossil Fuels 100 - 600 MW**



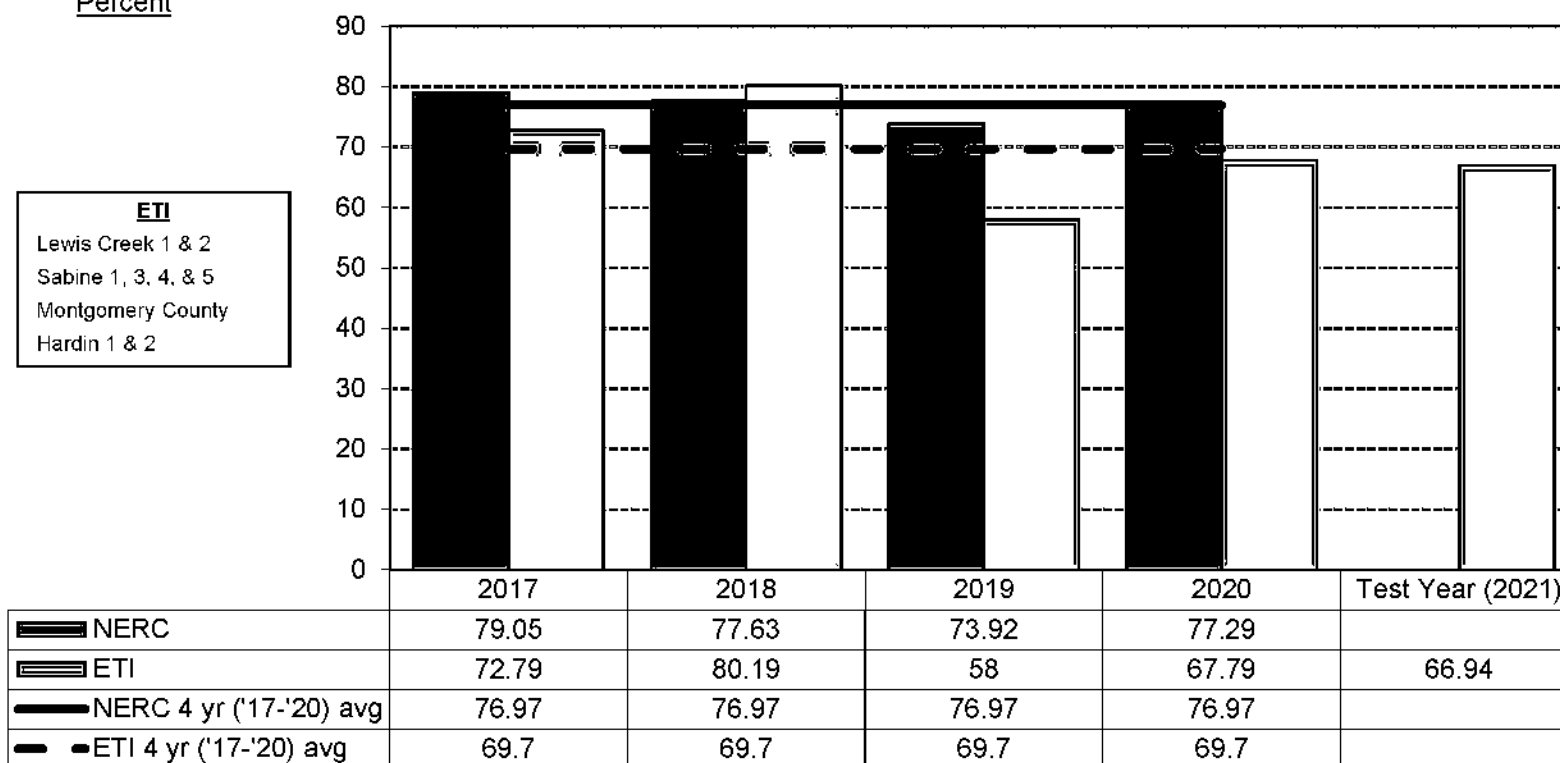
Note: Industry data for 2021 is not yet available. ETI Test Year includes the addition of the Montgomery County and Hardin 1 & 2 units.

Source: NERC – NERC GADS Statistical Brochure; Criteria: All Fossil Fuels 100 – 600 MW units.

EAF =  $\frac{[(\text{Available Hours} \times \text{NMC}) - ((\text{Equivalent Unplanned Derated Hours} + \text{Equivalent Planned Derated Hours} + \text{Equivalent Seasonal Derated Hours}) \times \text{NMC})]}{(\text{Period Hours} \times \text{NMC})} \times 100 (\%)$   
 NMC = Net Maximum Capacity

# **Entergy Texas, Inc. Fossil Equivalent Availability Factor (EAF) Industry Comparison Gas Fired Units 100 - 600 MW**

Percent



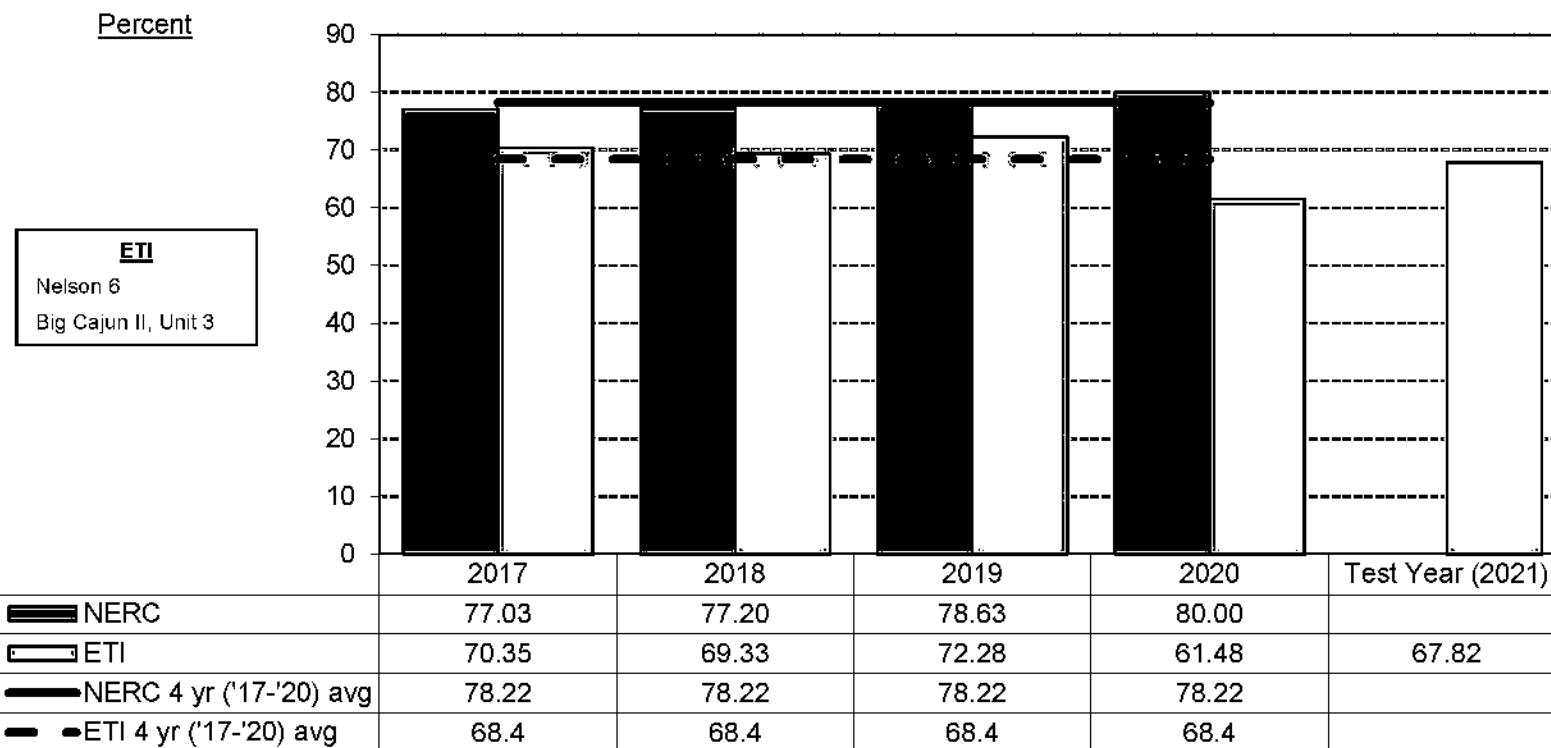
Note: Industry data for 2021 is not yet available. ETI Test Year includes the addition of the Montgomery County and Hardin 1 & 2 units.

Source: NERC – NERC GADS Statistical Brochure; Criteria: Gas 100 - 600 MW units.

EAF =  $\frac{[(\text{Available Hours} \times \text{NMC}) - ((\text{Equivalent Unplanned Derated Hours} + \text{Equivalent Planned Derated Hours} + \text{Equivalent Seasonal Derated Hours}) \times \text{NMC})]}{(\text{Period Hours} \times \text{NMC})} \times 100 (\%)$   
NMC = Net Maximum Capacity

# **Entergy Texas, Inc. Fossil Equivalent Availability Factor (EAF) Industry Comparison Coal Fired Units 400 - 600 MW**

Percent

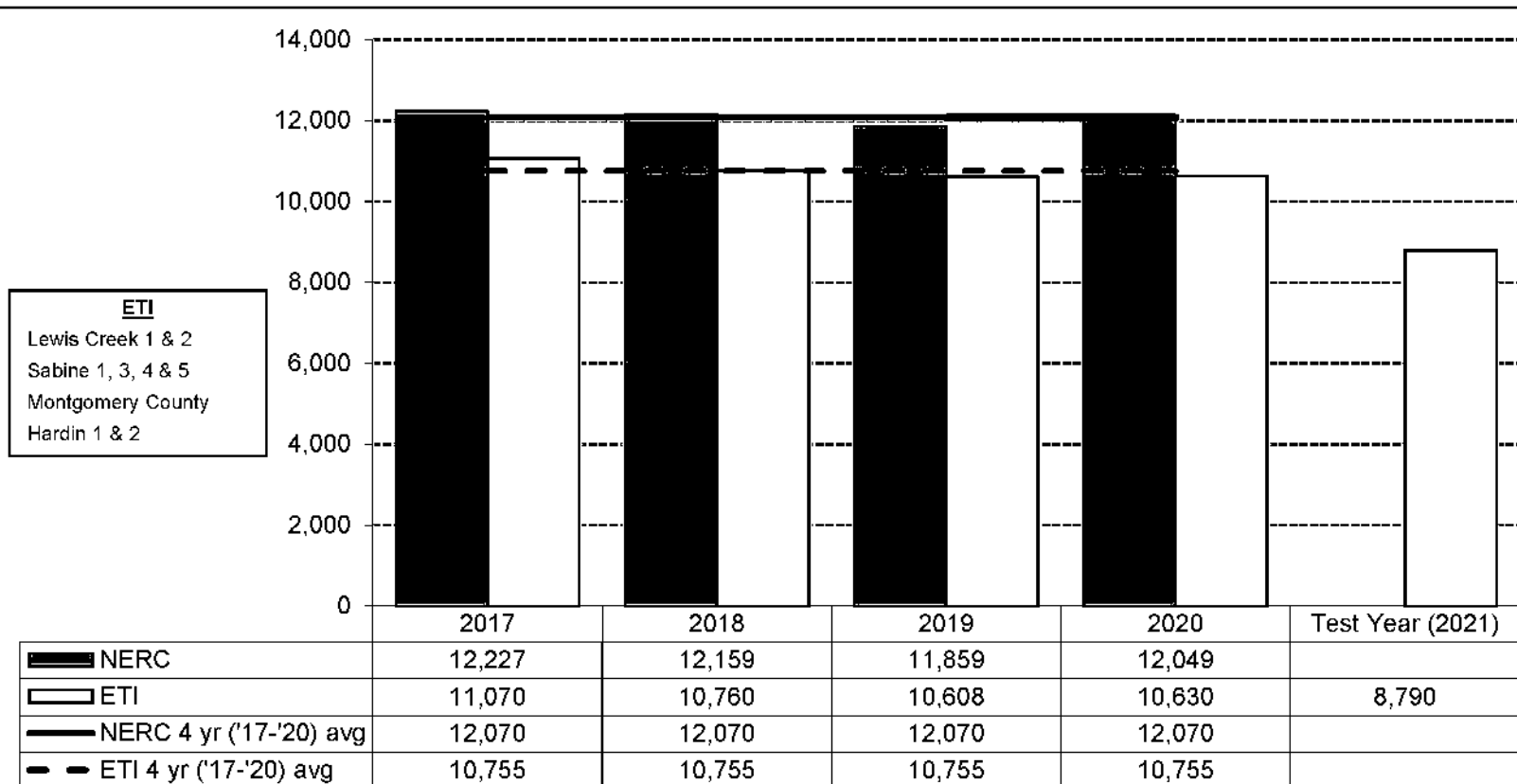


Note: Industry data for 2021 is not yet available.

Source: NERC – NERC GADS Statistical Brochure; Criteria: Coal 400-600 MW units.

EAF =  $\frac{[(\text{Available Hours} \times \text{NMC}) - ((\text{Equivalent Unplanned Derated Hours} + \text{Equivalent Planned Derated Hours} + \text{Equivalent Seasonal Derated Hours}) \times \text{NMC})]}{(\text{Period Hours} \times \text{NMC})} \times 100 (\%)$   
NMC = Net Maximum Capacity

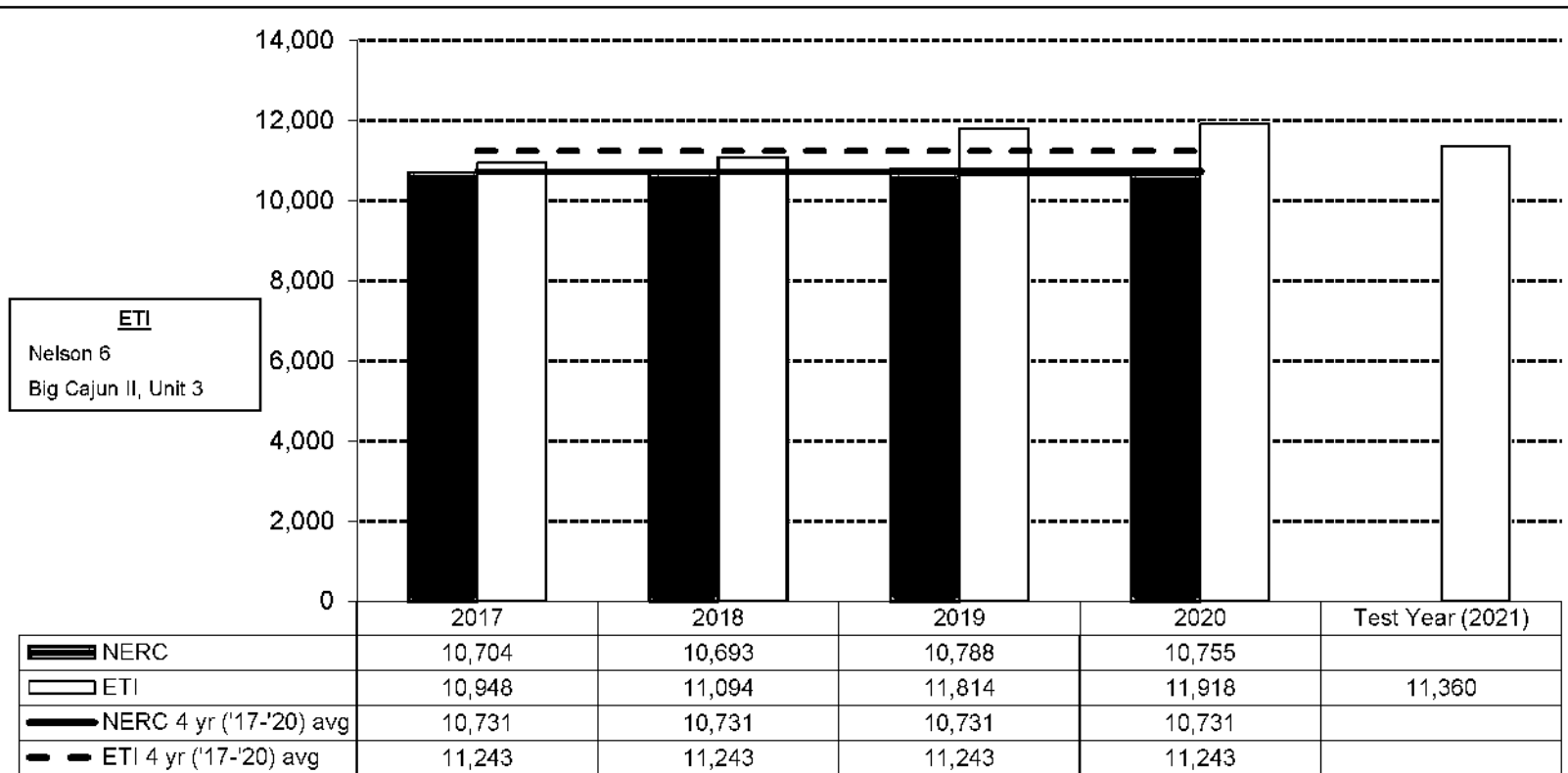
## Entergy Texas, Inc. Gas Units Average Actual Heat Rate (Btu/kWh) Industry Comparison



Note: Industry data for 2021 is not yet available. ETI Test Year includes the addition Montgomery County and Hardin 1 & 2 units.

Data Source: NERC – S&P Global as of 2/10/22. ETI (Lewis Creek, Sabine, Montgomery County, Hardin)

# **Entergy Texas, Inc.** **Coal Units Average Actual Heat Rate (Btu/kWh)** **Industry Comparison – Subbituminous coal**



Note: Industry data for 2021 is not yet available.

Data Source: NERC – S&P Global as of 2/10/22. ETI (Nelson 6, Big Cajun II, Unit 3)



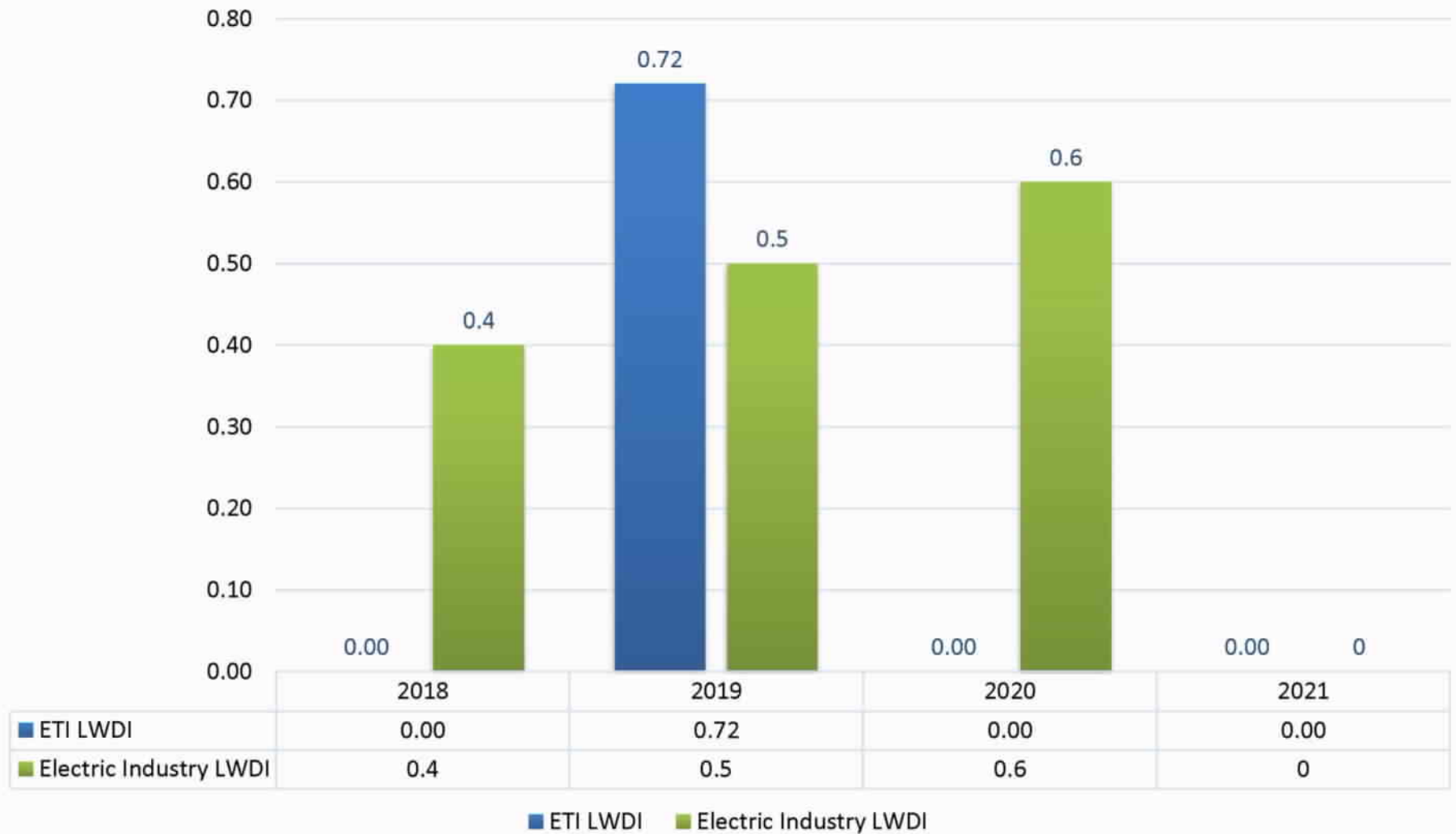
# Entergy Texas, Inc. Total Recordable Injury Rate (TRIR) Comparison



\*Source of Electric Industry TRIR: U.S. Department of Labor, Bureau of Labor Statistics, Fossil fuel electric power generation (2021 rate has not yet been published by BLS)

\*\*ETI rates include Sabine Plant, Lewis Creek Plant, and Montgomery County Power Station only

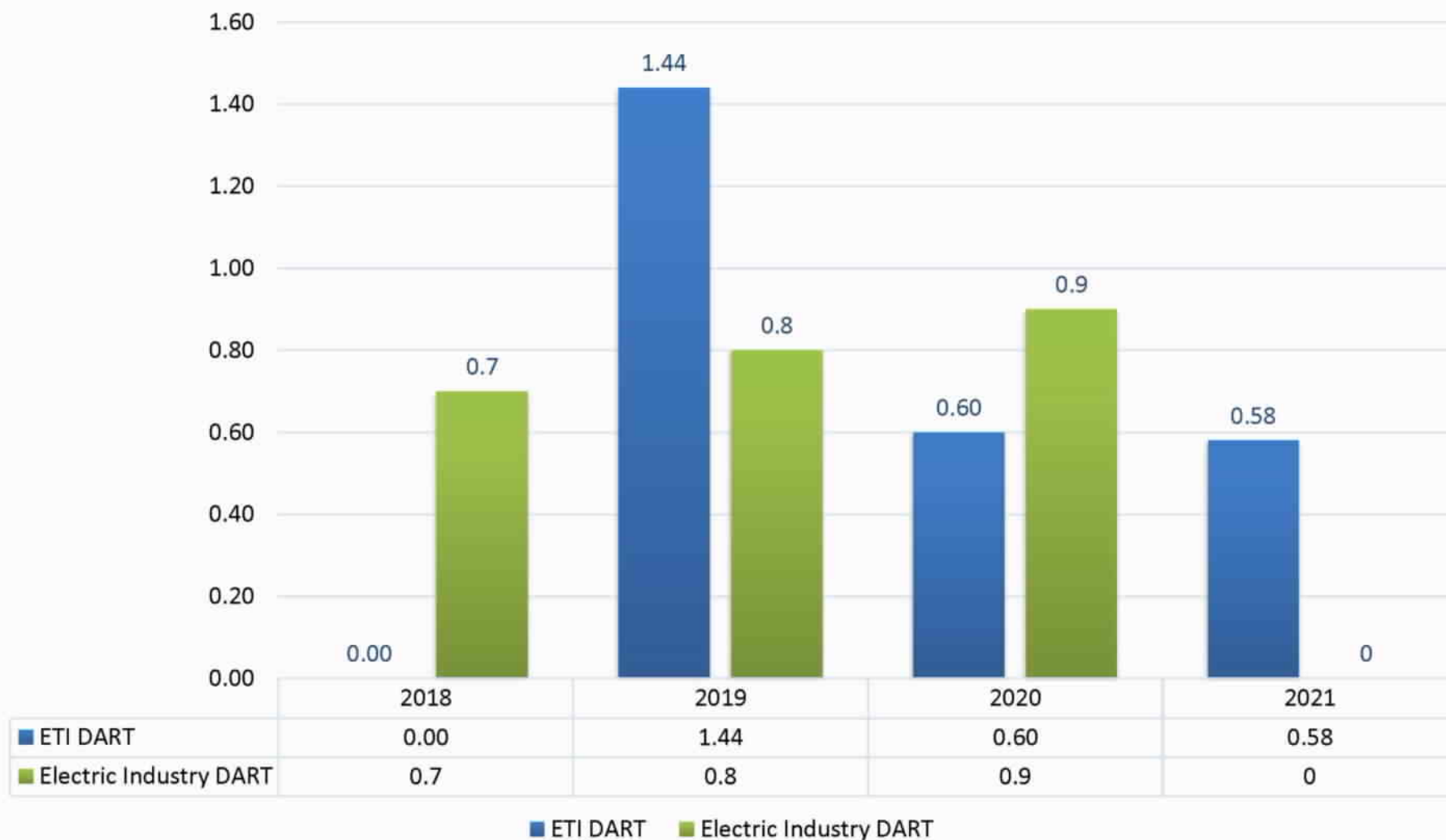
## Entergy Texas, Inc. Lost Work Day Incident (LWDI) Rate Comparison



\*Source of Electric Industry LWDI: U.S. Department of Labor, Bureau of Labor Statistics, Fossil fuel electric power generation (2021 rate has not yet been published by BLS)

\*\*ETI rates include Sabine Plant, Lewis Creek Plant, and Montgomery County Power Station only

## Entergy Texas, Inc. Days Away/Restriction/Transfer (DART) Rate Comparison



\*Source of Electric Industry DART: U.S. Department of Labor, Bureau of Labor Statistics, Fossil fuel electric power generation (2021 rate has not yet been published by BLS)

\*\*ETI rates include Sabine Plant, Lewis Creek Plant, and Montgomery County Power Station only

See Native Excel file Gale Direct\_Exhibits BG-A through D.

DOCKET NO. 53719

|                              |   |                           |
|------------------------------|---|---------------------------|
| APPLICATION OF ENTERGY       | § | PUBLIC UTILITY COMMISSION |
| TEXAS, INC. FOR AUTHORITY TO | § |                           |
| CHANGE RATES                 | § | OF TEXAS                  |

DIRECT TESTIMONY

OF

GARY C. DICKENS

ON BEHALF OF

ENTERGY TEXAS, INC.

JULY 2022

ENTERGY TEXAS, INC.  
DIRECT TESTIMONY OF GARY C. DICKENS  
2022 RATE CASE

**TABLE OF CONTENTS**

|  | <u>Page</u> |
|--|-------------|
| I. Introduction and Purpose                    | 1           |
| II. Addition of MCPS to ETI's Generation Fleet | 4           |
| A. Description of MCPS                         | 4           |
| B. Initiation                                  | 6           |
| C. Planning                                    | 8           |
| D. Project Execution – Construction            | 18          |
| E. Cost Comparison                             | 20          |
| F. Obstacles Overcome                          | 24          |
| III. Conclusion                                | 26          |

**I. INTRODUCTION AND PURPOSE**

Q1. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Gary C. Dickens. My business address is 2107 Research Forest,  
Lake Front North, The Woodlands, Texas 77380.

Q2. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Entergy Services, LLC (“ESL”), the service company for the  
Entergy Operating Companies (“EOCs”),<sup>1</sup> as Vice President, Capital Projects.  
Before taking that position in May 2021, I served as Vice President,  
Project/Construction Management, New Generation Program Execution. In that  
role I was responsible for the owner’s oversight during the development, design,  
engineering, and procurement phases of the Montgomery County Power Station  
(“MCPS” or the “Project”) that was market-tested in the 2015 Request for  
Proposals for Long-Term Combined-Cycle Gas Turbine Capacity and Energy  
Resources and Limited-Term Capacity and Energy Resources for Entergy Texas,  
Inc. (the “2015 RFP”) and approved by the Public Utility Commission of Texas  
(“Commission”) in 2017,<sup>2</sup> and was generally responsible for the continuing  
development, construction, start-up, and commissioning of MCPS. Those project  
development responsibilities included coordinating the activities of the Project

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<sup>1</sup> The five EOCs are Entergy Texas, Inc.; Entergy Arkansas, LLC (“EAL”); Entergy Louisiana, LLC (“ELL”); Entergy Mississippi, LLC (“EML”); and Entergy New Orleans, LLC (“ENO”).

<sup>2</sup> Docket No. 46416, Order (July 28, 2017).

1 Team to obtain all permits and contracts necessary after the transition from the  
2 development phase to execution of the project.

3

4 Q3. ON WHOSE BEHALF ARE YOU TESTIFYING?

5 A. I am testifying on behalf of Entergy Texas, Inc. ("ETI" or the "Company").

6

7 Q4. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE AND  
8 EDUCATIONAL BACKGROUND.

9 A. I have worked in the energy industry since 1991, primarily with the development,  
10 design, construction, operation, and maintenance of industrial and utility power  
11 generation facilities. My initial entry into the industry was in operations, with the  
12 position of shift engineer and then into a management role as plant operations  
13 manager through a division of the Finnish utility, IVO Generation Services,  
14 engaged in the design, building, ownership, operation and maintenance of  
15 combined-cycle combustion turbine ("CCCT") power projects. I joined Entergy  
16 Corporation in 1998 as the Operations Manager providing operations and  
17 commissioning oversight of Entergy's Saltend 1,200 MW Combined Heat and  
18 Power project in England. I also completed the commissioning of the 800 MW  
19 Damhead Creek CCCT project in England as commissioning manager, seconded  
20 to the engineering, procurement, and construction ("EPC") contractor's team.  
21 During the transition from overseas development, I relocated to the United States  
22 for Entergy in the role of director of commissioning for EntergyShaw LLC,  
23 completing the following EPC projects: Crete Energy 320 MW combustion



1 turbine ("CT"), Warren County 320 MW CT, and Harrison County 550 MW  
2 CCCT projects.

3 I transferred to Entergy Services Inc. ("ESI") (now ESL) and represented  
4 fossil operations in the due-diligence and acquisition team for the 830 MW CCCT  
5 Perryville plant, 480 MW CCCT Attala plant, and the 320 MW CT Calcasieu  
6 plant. In 2007, I joined an EPC Contractor as a Senior Project Manager on power  
7 proposals and contract development for the United States and Central South  
8 America regions. In 2012, I returned to ESI as Director, Capital Projects to handle  
9 the construction of Ninemile 6. Following completion of that project, I became  
10 Vice President, Project/Construction Management, New Generation Program  
11 Execution. During my tenure in this position, in addition to MCPS, I have also  
12 overseen the construction of the J. Wayne Leonard Power Station and Lake  
13 Charles Power Station. In May 2021, I accepted my current position as Vice  
14 President, Capital Projects.

15 I am a graduate of the British Royal Naval School of Engineering  
16 (Mechanical). I served fifteen years in fleet engineering on conventional powered  
17 and gas turbine powered ships.

18

19 Q5. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

20 A. The purpose of my testimony is to address the additions of MCPS to the ETI  
21 generation fleet, the reasonableness of the Company's execution of the  
22 construction plans, costs, and the benefits this plant provides to ETI's customers.

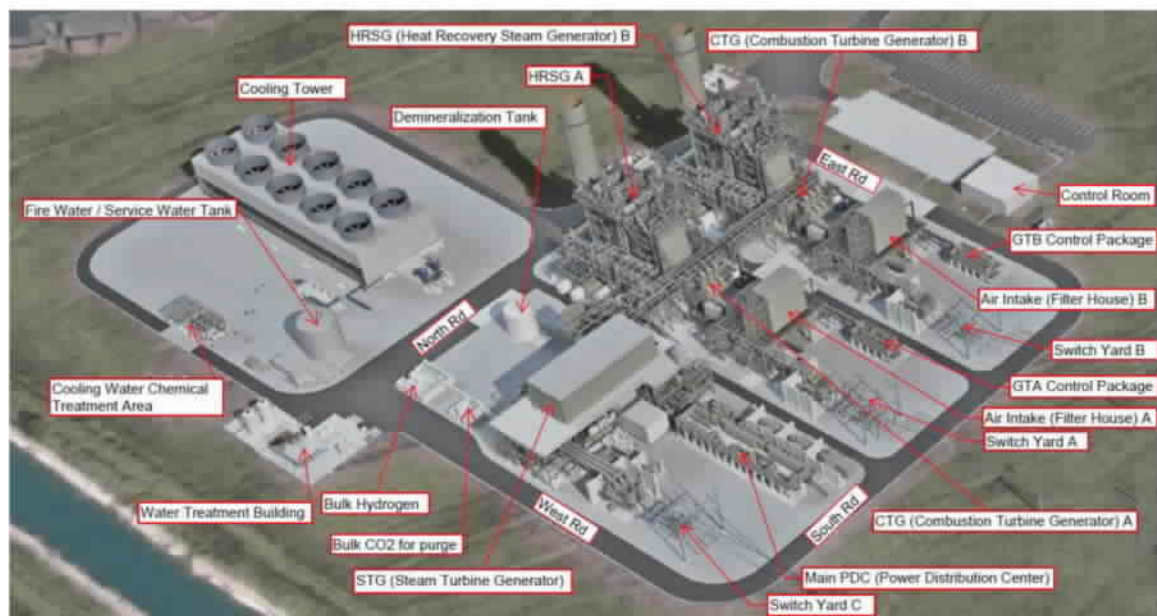
## II. ADDITION OF MCPS TO ETI'S GENERATION FLEET

### A. Description of MCPS

Q6. PLEASE PROVIDE A BRIEF OVERVIEW OF MCPS.

A. MCPS is a 993 MW (nameplate) power station that uses new technology to provide ETI and its customers a cleaner and more efficient source of power. The MCPS CCCT facility consists of two Mitsubishi Hitachi Power Systems ("MHPS") 501 GAC-series combustion turbines, two Nooter Eriksen heat recovery steam generators ("HRSGs") with duct firing, one Toshiba steam turbine generator in a 2x1 combined cycle configuration, and other balance of plant equipment, including a cooling tower for closed-cycle cooling operations. The plant is located near Willis, Texas adjacent to the Lewis Creek generation facility. Figure 1 below illustrates the layout and major components of the facility.

**Figure 1: MCPS Site Configuration**



1           The Commission approved a Certificate of Convenience and Necessity  
2           (“CCN”) for the Project on July 28, 2017 in Docket No. 46416. Construction of  
3           MCPS began in 2018, and the plant officially reached commercial operation well  
4           ahead of its originally scheduled June 2021 completion date. The construction  
5           phase of the Project proceeded expeditiously notwithstanding several considerable  
6           external challenges ETI was required to address and mitigate. Ultimately, MCPS  
7           was placed in service on January 1, 2021, roughly five months ahead of schedule  
8           and under-budget. This early in-service date allowed MCPS to contribute to  
9           ETI’s ability to reliably serve its customers during the February 2021 Winter  
10          Storm Uri. Unquestionably, ETI’s ability to bring this critical unit online  
11          significantly ahead of schedule benefited customers both in terms of added  
12          reliability in ETI’s Western Region and additional fuel cost savings.  
13          Furthermore, ETI’s ability to bring the project in under budget provided  
14          incremental net benefits to ETI customers relative to the estimated cost evaluated  
15          in Docket No. 46416.

16  
17   **Q7. PLEASE DESCRIBE THE ADVANTAGES OF CCCT TECHNOLOGY.**

18   **A.**   Entergy’s System Planning and Operations (“SPO”) group has identified CCCT  
19          technology as the current basic building block to meet the incremental capacity  
20          and energy needs of ETI and the rest of the Entergy System and to reduce reliance  
21          on aging gas-fired units. Operating combustion turbine generators in a combined  
22          cycle configuration for power generation is a proven process that offers high  
23          efficiency in converting fuel to electrical power, provides flexible load-following

automatic generation control (“AGC”) capability, and has the capability to cycle off-line and provide relatively short re-start optionality.

The CCCT is able to achieve full power operation within a few hours of starting, thus providing flexibility for dispatch and allowing the CCCT to shutdown overnight and re-start the next morning to meet peak-load requirements. Further, because CCCT technology uses natural gas, which has a *de minimis* sulfur content, it does not produce significant sulfur dioxide emissions. CCCT technology is considered throughout the industry as the best available technology for limiting greenhouse gas emissions when combusting fossil fuels for electrical generation. Additionally, the Company evaluated control technology performance and costs and selected a variety of controls that will meet best available control technology (“BACT”) standards for all affected pollutants (including greenhouse gas pollutants).

### B. Initiation

**Q8. HOW WAS THE MCPS PROJECT INITIATED?**

A. MCPS was first identified as a self-build proposal that was submitted in response to 2015 ETI RFP for power generating resources. MCPS was selected in a competitive, independently monitored RFP that addressed the supply needs of ETI. The MCPS project had the lowest total supply cost of all the proposals submitted in the RFP, and it adds necessary, reasonably priced long-term capacity in an area that needed and continues to need new generation.

1           The primary objective of the 2015 ETI RFP process was to solicit  
2           competitive proposals for generating resources to meet customers' needs at a  
3           reasonable cost. In the RFP, ETI market-tested the MCPS self-build option  
4           against competitive suppliers on an anonymous basis to identify the alternative  
5           that met ETI's long-term need at the lowest reasonable supply cost.<sup>3</sup> In Docket  
6           No. 46416, the Commission found MCPS was necessary for the service,  
7           accommodation, convenience, or safety of the public.

8  
9   Q9.   PLEASE EXPLAIN WHY THE SELF-BUILD COMMERCIAL TEAM  
10        PROPOSED THE MHPS 501 GAC COMBUSTION TURBINES AS THE  
11        PREFERRED TECHNOLOGY FOR MCPS.

12   A.   Entergy's SPO organization, in consultation with ETI, decided to pursue  
13        advanced gas turbine technology due to its significantly lower cost per unit of  
14        output, decreased heat rate compared to other technologies, and operational  
15        flexibility for the needs of customers in the 2015 ETI RFP. The air cooled,  
16        MHPS 501 GAC was selected as the basis of the reference plant design after  
17        consideration of factors including: equipment operational history, vendor  
18        performance, equipment pricing, and operational performance. Advanced gas  
19        turbines have a higher output per dollar of installed cost and a lower heat rate than  
20        other machines (such as F-class machines). Air-cooling of turbine combustors, as  
21        compared to steam-cooled versions, are able to accomplish improved performance

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<sup>3</sup> See Docket No. 46416, Direct Testimony of Stuart Barrett.

1 without significant reductions in operational flexibility or increases in  
2 maintenance cost.

3 The selection of the gas turbine to serve as the basis for MCPS was  
4 relatively straightforward and built upon the selection for two similar projects that  
5 ESL was developing for ELL. During the development phase for this trio of  
6 projects, the performance and schedule of potential advanced gas turbines was  
7 evaluated. The self-build commercial team selected the MHPS 501 GAC based  
8 on the fact that the gas turbine was commercially proven with multiple machines  
9 in operation at the time it was selected and MHPS's positive service history on  
10 past Entergy affiliate projects.

11  
12 **C. Planning**

13 Q10. WAS THE MCPS PROJECT ORGANIZED TO PROMOTE REASONABLE  
14 AND PRUDENT PLANNING AND MANAGEMENT?

15 A. Yes, it was.

16  
17 Q11. HOW DID THE COMPANY MANAGE THE MCPS PROJECT?

18 A. Given the magnitude of the MCPS Project and the Company's existing  
19 infrastructure for construction and project management, the Company determined  
20 that it would be appropriate to use an EPC contractor in conjunction with the  
21 Company's management team.

1 Q12. WHAT IS AN EPC CONTRACTOR?

2 A. EPC often refers to an agreement structure under which a utility contracts with a  
3 single firm for the provision of engineering, procurement, and construction  
4 services for a large project. EPC is also used to describe the contractor that  
5 performs that function under an agreement for the ultimate project owner.

6

7 Q13. WHAT PROJECT MANAGEMENT APPROACH DID THE COMPANY  
8 FOLLOW FOR MCPS?

9 A. The project management approach followed Entergy's Project Delivery System  
10 ("PDS") Policy, Standards, and Guidelines in support of driving consistency and  
11 certainty in project delivery outcomes. The PDS provides a framework to ensure  
12 Entergy's business units consistently and effectively develop and implement  
13 capital projects. The PDS establishes a Stage Gate Process ("SGP") approach as a  
14 single and comprehensive framework for project development, planning, and  
15 execution. The SGP provides a roadmap of key deliverables and decisions to be  
16 completed sequentially to promote consistent, reliable, and high-quality project  
17 outcomes. Additionally, the SGP also prescribes a continuous systematic  
18 evaluation of the project organization, scope, and maturity of project management  
19 deliverables that helps ensure projects are successfully executed. This occurs  
20 through a series of independent Gate Reviews/Assessment and Approvals.

1 Q14. WHY DID THE COMPANY CHOOSE TO USE AN EPC CONTRACTOR?

2 A. A large construction project like MCPS is a substantial undertaking, and the  
3 Company does not have the in-house capability necessary to execute the  
4 engineering, procurement, and construction for such a project. The use of an EPC  
5 contractor who can perform all these functions under a single contract is cost-  
6 effective and common within the power industry for such projects.

7

8 Q15. WHAT EPC CONTRACTING STRATEGY WAS USED?

9 A. The Company was able to negotiate a fixed-price (with certain exceptions), fixed-  
10 schedule form of contract with Chicago Bridge & Iron ("CB&I") that reflects a  
11 detailed scope of work.

12

13 Q16. WHY DID THE COMPANY ELECT TO USE A FIXED-PRICE FORM OF EPC  
14 CONTRACT?

15 A. The Company designed its EPC strategy to yield the lowest reasonable cost with  
16 an adequate level of risk mitigation. The Company, working with CB&I, was  
17 able to develop a site plan that would accommodate a standard combined-cycle  
18 design and minimize the site retrofit scope.

19

20 Q17. HOW WAS CB&I SELECTED AS THE EPC CONTRACTOR?

21 A. CB&I was selected for a suite of three nearly identical projects that includes the  
22 St. Charles Power Station (later named the J. Wayne Leonard Power Station), the  
23 Lake Charles Power Station, and MCPS. This arrangement provided cost savings,



1 risk reduction, and beneficial experience and learnings that were applied across all  
2 three projects. The suite of EPC contracts was single sourced to CB&I based  
3 mainly on its strength of performance on Entergy's previous Ninemile 6  
4 generating station project, commercially reasonable pricing, and knowledge of the  
5 EOCs' processes gleaned from prior projects, namely the Ninemile 6 project,  
6 which was completed under budget and ahead of schedule. During the course of  
7 the Ninemile 6 project, CB&I and Entergy developed a pricing structure that  
8 defined how direct costs incurred by CB&I would be marked-up by CB&I to  
9 determine the final price. For MCPS, CB&I proposed that the same pricing  
10 structure be applied but with a reduction in the fee portion of the pricing structure.

11 As an additional check on the pricing under the suite of EPC agreements,  
12 ESL's Supply Chain organization worked closely with the self-build commercial  
13 team to ensure the competitiveness of CB&I's pricing through market  
14 benchmarking and the solicitation and evaluation of an EPC estimate from a  
15 competing firm, Black & Veatch. These two independent estimates plus the  
16 benchmark data gave ESL a level of confidence that CB&I's EPC costs were  
17 competitive with market alternatives.

18 It should also be noted that the decision to pursue negotiations with CB&I  
19 was also supported by management's favorable assessment of CB&I's expertise  
20 in the management of CCCT construction projects and experience in the regional  
21 construction market.

1 Q18. WHAT ACTIVITIES DID CB&I PERFORM AS THE EPC CONTRACTOR?

2 A. Under the fixed price EPC contract structure, CB&I acted as an independent  
3 contractor with respect to the engineering, procurement, and construction services  
4 defined in the scope of work. CB&I also procured the combustion turbines,  
5 HRSGs, and steam turbine from the OEMs. Firm, fixed prices for this equipment  
6 were included in CB&I's fixed price and were subject to escalation only at the  
7 rates specified in the EPC agreement. CB&I provided a "wrap" (i.e., guarantee)  
8 of the commitments on schedule and performance for the entire Project, providing  
9 for risk mitigation if there were delays or performance shortfalls. CB&I's  
10 procurement of this equipment allowed it full coordination and scheduling of the  
11 OEMs in order to meet the fixed schedule provided in the agreement.

12

13 Q19. DID CB&I PERFORM ANY WORK OUTSIDE OF THE DEFINED EPC  
14 SCOPE?

15 A. Yes. At the request of ETI, CB&I performed various tasks that were outside the  
16 original scope of work in the EPC, but which were determined by ETI to be  
17 necessary or important for the safety or performance of the Project. This  
18 additional work and the associated cost were agreed to by ETI and CB&I through  
19 issuance of change orders and properly included in the overall project cost.

20

21 Q20. PLEASE DESCRIBE THE CHANGE ORDER PROCESS.

22 A. The Project Manager, Controls Manager, and Project Analyst, with support from  
23 the Project Team, managed Change Control in general conformance with

1 PMM 1130 – The Entergy Project Change Management Procedure. All change  
2 requests were documented and tracked through disposition and required approval  
3 of the Executive Steering Committee. Approved change requests were posted to  
4 the Project Management Information Site and became part of the official record.  
5 Change Orders under the EPC Agreement conformed to the provisions of  
6 Section 5 (Change Orders) in the agreement. Approved Change Orders were  
7 communicated to the EPC Contractor by the Entergy Contract Manager using the  
8 forms and processes identified in the EPC Agreement.

9  
10 Q21. PLEASE DESCRIBE THE CHANGE ORDERS THAT WERE AGREED TO  
11 BY ETI AND CB&I.

12 A. Eight change orders were agreed to and executed between ETI and CB&I for the  
13 Project. Change orders include multiple line items, including debits for additional  
14 work and credits for work not needed.

15 Change Order one (CO-001) cost \$1,274,261 and was approved in  
16 March 2019. This Change Order represented four credits for work not required,  
17 two contract language adjustments and nineteen debits for additional work for  
18 plant modifications to improve the overall operations and maintenance of the  
19 facility. One such improvement was the removal of water treatment equipment  
20 that is not required due to the clean water source at the Lewis Creek Reservoir for  
21 MCPS cooling water.

22 Change Order two (CO-002) cost \$2,549,937, was approved in late  
23 September 2019, and represented three credits for work not required and 12 debits

1           for additional work for plant modifications to improve the overall operations and  
2           maintenance of the facility, including modifications to the Combustion Turbine  
3           cooling air system for low load emissions compliance and the refurbishment of  
4           the Lake Conroe Pumping Station.

5           Change Order three (CO-003) cost approximately \$12.81 million and  
6           represented the First Amendment to the MCPS EPC Agreement by the execution  
7           of a Memorandum of Understanding (“MOU”) dated December 13, 2019. The  
8           MOU addressed true-ups/adjustments to the contract price for escalation in craft  
9           labor wage rates, the Project Cash Flow Ceiling, ad valorem tariffs, and various  
10          agreements between the parties to improve collaboration and transparency into the  
11          CB&I procurement process and project accounting.

12          Change Order four (CO-004) cost \$1,175,369, was approved in May 2020,  
13          and represented one credit and eleven debits for work required, including  
14          enhancements to storm water run-off facilities and Dynamic Disturbance  
15          equipment (for NERC PRC-002 compliance).

16          Change Order five (CO-005) cost \$310,073, was approved October 2020,  
17          and represented three credits and seven debits for work required which included  
18          temporary process water containment during commissioning, valve upgrades for  
19          optimal operation and maintenance requirements and operator training.

20          Change Order six (CO-006) cost \$14,959,919, was approved late  
21          January 2021, and included the early completion bonus specified under the EPC  
22          agreement based on the December 12, 2020 Substantial Completion achieved by

1 CB&I, and the purchase of commissioning spare parts that if not used would  
2 move to the plant inventory upon completion of the project.

3 Change Order seven (CO-007) cost \$950,287, was approved in  
4 August 2021, and included two credits and various plant winterization  
5 improvements and a remote braking system for the cooling tower fans.

6 Change Order eight (CO-008) cost \$297,000, was approved  
7 February 2022, and represented eight credits for warranty work performed by  
8 Entergy charged back to CB&I and additional winterization efforts to improve  
9 plant reliability during the coldest winter months.

10

11 Q22. EXPLAIN THE INFORMATION FLOW BETWEEN CB&I AND THE  
12 COMPANY DURING THE MCPS PROJECT.

13 A. CB&I organized regular monthly reports that were delivered in a meeting where  
14 all senior staff from both parties attended, which provided an up-to-date account  
15 of all activities regarding the MCPS project. In addition, weekly meetings were  
16 held between both construction teams to work through new and existing  
17 construction related issues, which included the Engineering teams from both  
18 parties who attended via teleconference. Meeting minutes were noted and  
19 distributed shortly after.

20 Project oversight involves the systematic evaluation of the completeness  
21 and quality of the project's business case, project management, and technical  
22 deliverables as the Project progressed through the seven-stage gate process.  
23 Assurance was performed through rigorous stage gate reviews, independent

1 project assessments, and reporting to ensure that projects were not only compliant  
2 with the Project Delivery Standard but that the project was well positioned to be  
3 successfully delivered.

4 The ETI Project Team developed a monthly report format to provide  
5 management with clear visibility into project status and key leading performance  
6 indicators, including safety performance, quality, budget, and schedule. The  
7 information provided in these monthly reports allowed the management structure  
8 to generally observe progress on the Project and identify and address issues with  
9 the potential to materially affect Project quality, cost, or schedule. Monthly  
10 Project reports were compiled using information from the monthly EPC  
11 Contractor report, information gathered from the Project Performance  
12 Management (“PPM”) committee and other meetings from the collective  
13 engineering groups and site teams. Meeting notes and monthly reports were  
14 consolidated into presentations that were reviewed with the Committee monthly.

15  
16 Q23. HOW DID THE ORGANIZATIONAL STRUCTURES AND TOOLS YOU  
17 JUST DESCRIBED SUPPORT THE REASONABLE AND PRUDENT  
18 MANAGEMENT OF THE CONSTRUCTION OF MCPS?

19 A. The organizational structure and reporting processes provided the basis for  
20 making prudent decisions in the execution of the MCPS project. The oversight  
21 structure for the Project involved a tiered approach to address strategic,  
22 governance, controls, tactical, and operational levels of project delivery:

- 1           •       The Project Team Organization
- 2               ETI organized an experienced Project Team to provide tactical direction
- 3               and oversight at an operational level, primarily through the Project
- 4               Director, his direct reports, and matrixed and contracted site experts.
- 5               Operational level actions are the day-to-day activities accomplished by the
- 6               groups and individuals assigned or contracted to the Project, either directly
- 7               or through functional matrix assignment. Key attributes of this team
- 8               included manager-level personnel to oversee the areas of project
- 9               management, design, engineering, procurement, construction, site
- 10              integration, and project controls.
- 11          •       Project Performance Management Committee (“PPMC”)
- 12              Project execution and performance were monitored and managed by the
- 13              Project Director and a matrixed team of subject matter experts assigned to
- 14              the PPMC. The PPMC discussed progress and issues facing the Project.
- 15          •       Portfolio Performance Management Team (“PPMT”)
- 16              The PPMT within the Capital Projects (“CP”) group was instrumental to
- 17              the successful planning and execution of the MCPS Project and support of
- 18              the Project team. This team was led by the Director of Portfolio
- 19              Performance Management and provided for structured reviews in the areas
- 20              of schedule, cost control, governance, and execution and ensured that
- 21              lessons learned from the Project were applied to other CCCT build
- 22              projects in the current portfolio.

- Executive Steering Committee (“ESC”) for the Project

The ESC provided strategic direction and oversight for the Project, including monitoring and providing direction relating to Project performance, key risks, value drivers that would affect the Project risk profile, and provided guidance to the Project Team. The ESC acted as liaison between the Project Director and other executive groups and committees and was composed of the following key executives, and proxies, whose organizations were directly supporting the successful completion of the Project as listed below:

- President and CEO of ETI as Project Sponsor
- Director, Operations Finance Business Partners
- Vice President, Capital Projects
- Vice President, SPO
- Vice President, Regulatory Services
- Vice President, Power Generation
- Vice President, Regulatory and Public Affairs
- Associate General Counsel – Regulatory

**D. Project Execution – Construction**

Q24. WHEN DID CONSTRUCTION ON THE MCPS PROJECT BEGIN?

A. Construction began August 1, 2018.



1 Q25. THROUGH PROJECT COMPLETION, WAS CONSTRUCTION  
2 PERFORMED AND EXECUTED AS PLANNED?

3 A. Yes, although the project was completed early.  
4

5 Q26. DOES MCPS, AS BUILT DIFFER FROM THE SELF-BUILD PROPOSAL  
6 PRESENTED AND APPROVED IN THE CCN CASE IN DOCKET NO. 46416?

7 A. The plant does not differ from the self-build proposal mentioned above except for  
8 the following adjustments, which were made to increase reliability or efficiency:

- 9 • the closed cooling water system was designed to use a mixture of  
10 demineralized water and polypropylene glycol; for this project the glycol  
11 was replaced with a corrosion inhibitor and additional freeze protection  
12 installed on the system.
- 13 • the potable water system is taken from city water, which became available  
14 to the project during construction, and which eliminated the need for a  
15 treatment facility to clean up the make-up water supply.
- 16 • a water softener was deemed not required for the GTG evaporative cooler  
17 because the water quality of the make-up water was adequate, and the  
18 plant is able to mix the water supply with demineralized water if  
19 necessary.
- 20 • TCA pumps for the GTG cooling air system were replaced with up-rated  
21 boiler feedwater pumps because this was determined to be more reliable  
22 than the previously scoped TCA pumps due to historical poor performance  
23 on existing projects.

1 Q27. ARE THE CHANGES TO MCPS FROM THE DESIGN SUBMITTED IN THE  
2 CCN CASE IN DOCKET NO. 46416 YOU HAVE DISCUSSED A RESULT OF  
3 IMPRUDENT PLANNING OR MANAGEMENT?

4 A. No. Changes were made either as a result of lessons learned from the previous  
5 two projects or circumstances unique to the specific location of MCPS. All  
6 changes were made to ensure improved reliability and/or regulatory control.

7

8 **E. Cost Comparison**

9 Q28. WHAT RESOURCES WERE USED TO DEVELOP THE OVERALL COST  
10 ESTIMATE FOR MCPS?

11 A. The following resources were used to develop the MCPS Project's two major cost  
12 components:

13 **1) EPC agreement costs:** CB&I, at the request of ESL, provided a cost  
14 estimate based on preliminary engineering that used the Ninemile 6 and  
15 St. Charles Power Station projects as guides for the design basis. CB&I's  
16 EPC estimate formed the basis of the EPC costs contained in the self-build  
17 proposal.

18 **2) Costs outside of the EPC agreement:** The self-build commercial team  
19 developed these costs using internal subject matter experts and third-party  
20 providers (i.e., Sargent & Lundy as owner's engineer and other technical  
21 consulting firms).

1 Q29. WHAT COST ESTIMATE WAS PRESENTED TO THE COMMISSION AT  
2 THE TIME OF THE CCN PROCEEDING?

3 A. The MCPS capital cost estimate presented to the Commission was approximately  
4 \$937.3 million. This amount included \$826.3 million associated with the  
5 generation portion of the Project and \$111.0 million in estimated transmission  
6 interconnection and system upgrade costs. A summary of the components of that  
7 cost estimate is shown below:

8 **Table 1 MCPS Capital Cost Estimate (Millions)**

|                                  | <b>Total \$</b> |
|----------------------------------|-----------------|
| EPC Contract                     | 602.8           |
| Other Vendors                    | 49.9            |
| Entergy Labor                    | 23.0            |
| Other Expenses                   | 5.1             |
| <b>Total Direct Cost</b>         | <b>680.9</b>    |
| AFUDC                            | 103.8           |
| Other Indirect Costs             | 9.8             |
| <b>Total Indirect Cost</b>       | <b>113.7</b>    |
| Contingency                      | 31.8            |
| <b>Generation Project Cost</b>   | <b>826.3</b>    |
| <b>Transmission Project Cost</b> | <b>111.0</b>    |
| <b>Total Project Cost</b>        | <b>937.3</b>    |

1 Q30. WHAT PROCESSES WERE IN PLACE TO CONTROL AND MANAGE  
2 PROJECT COSTS?

3 A. The fixed-price structure and well-defined scope of work of the EPC contract  
4 were the principal mitigation tools to minimize cost risks. The Company  
5 developed mitigation plans and included a contingency in the project cost  
6 estimate to mitigate risks. The project schedule was developed by optimizing the  
7 sequence of activities to produce the shortest practical schedule at the lowest  
8 reasonable cost.

9 Further, under the terms of the agreement with CB&I, CB&I agreed to  
10 assume productivity risk associated with craft labor (i.e., man-hour estimates).  
11 CB&I also agreed to assume subcontractors' craft labor wage escalation risk as  
12 well as engineering and project management labor.

13

14 Q31. DO THESE COST CONTROLS REFLECT REASONABLE AND PRUDENT  
15 PLANNING AND MANAGEMENT?

16 A. Yes. These cost controls ensured that changes to project scope, which ultimately  
17 affects cost, were thoroughly evaluated before execution.

18

19 Q32. IN DOCKET NO. 46416, ETI AGREED TO AND THE COMMISSION  
20 ORDERED A COST CAP. DID ETI EXCEED THAT COST CAP?

21 A. No. In fact, the MCPS project came in under-budget, under the cost cap, and  
22 ahead of schedule.

1 Q33. PLEASE PROVIDE AN EXPLANATION OF THE DIFFERENCES BETWEEN  
2 THE FINAL COST OF MCPS AND THE ESTIMATE PROVIDED IN THE  
3 CCN CASE.

4 A. Completing such a large and complex project within cost estimates is a challenge  
5 in itself. Further, as discussed later in this testimony, the MCPS project faced  
6 challenges not normally faced in the construction of a power plant. In spite of the  
7 challenges faced, the MCPS project was completed ahead of schedule and below  
8 budget and the cost cap established by the Commission in Docket No. 46416. For  
9 MCPS, actual spend through December 2021 was \$842.8 million, which when  
10 compared to the CCN estimate of \$937.3 million, represented a \$94.5 million  
11 favorable variance. While this favorable variance includes a \$59.3 million  
12 contribution by East Texas Electric Cooperative, Inc. (“ETEC”) for its 7.56%  
13 ownership share of the plant<sup>4</sup> that was not contemplated at the time the  
14 Commission granted the CCN, without considering this contribution, the MCPS  
15 project still came in under-budget. The primary differences were as follows:

- 16 • (\$31.2 million): Reduction of Accumulated Funds Used During  
17 Construction (“AFUDC”) due to early in-service date of Project.
- 18 • (\$31.8 million): Project Contingency not used.
- 19 • (\$11.2 million): Reduction of labor and pipeline reservations fees due to  
20 early in-service date of Project.

21 These underruns were offset by \$39.0 million related to EPC change orders  
22 related to EPC amendments and early completion bonus, additional transmission

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<sup>4</sup> ETEC’s acquisition of a portion of MCPS was approved by the Commission in Docket No. 50790.

1 costs (accelerated construction schedule, additional matting rental to support  
2 construction, transmission outage schedule changes, and additional construction  
3 oversight resulting from schedule impacts from multiple named storms and severe  
4 weather events), as well as higher capital suspense rates.

5  
6 **F. Obstacles Overcome**

7 Q34. DID ETI EXPERIENCE ANY SIGNIFICANT OBSTACLES THAT HAD TO  
8 BE ADDRESSED AND MITIGATED IN ORDER TO BRING MCPS ONLINE  
9 EARLY AND UNDER-BUDGET FOR THE BENEFIT OF CUSTOMERS?

10 A. Yes. Apart from challenges that might be expected to arise during the execution  
11 of a large and complex, multi-year project, ETI encountered extraordinary  
12 obstacles that had to be overcome in order to complete MCPS, much less bring  
13 the project in service ahead of schedule and under-budget. These obstacles  
14 included the bankruptcy of the parent company of the EPC contractor, the onset of  
15 the COVID-19 pandemic, and a historic 2020 tropical storm season. First, during  
16 the construction of this significant capital project, the parent company of CB&I,  
17 McDermott International, went through a bankruptcy that threatened CB&I's  
18 ability to complete the project and keep the resources necessary to do so dedicated  
19 to this specific project. Second, the onset of the global COVID-19 pandemic  
20 introduced considerable complexities and certain costs associated with the  
21 completion of this complex project. Third, under the constraints of this global  
22 pandemic, Entergy successfully responded to seven storms in 2020. Despite the  
23 challenges of the 2020 storm season, including Hurricane Laura in September of

1           2020, and the COVID-19 protocols in place at the time, ETI continued to make  
2           progress building MCPS and completed the project ahead of schedule and under  
3           budget. It should be noted that ETI secured these accomplishments for the benefit  
4           of customers while achieving a top decile Total Recordable Incident Rate  
5           ("TRIR") for the Project for the benefit of those building MCPS.

6  
7   Q35. PLEASE EXPLAIN THE CIRCUMSTANCES SURROUNDING  
8       MCDERMOTT INTERNATIONAL'S BANKRUPTCY AND WHAT STEPS  
9       ETI TOOK TO PRUDENTLY MANAGE THE EFFECTS OF THIS  
10      POTENTIALLY DISRUPTIVE EVENT.

11   A.   Faced with what was the eventual bankruptcy of McDermott, ETI proactively  
12       worked with CB&I to mitigate potential disruption to completion of the Project  
13       and better position the Project to be completed within schedule and cost  
14       commitments. Among the actions taken by ETI was to strengthen its visibility  
15       over the Project, including productivity information, man-hour and manpower  
16       reports, and participation in internal project meetings and reviews. CB&I agreed  
17       to an employee retention program that was transparent to ETI. Further, ETI  
18       coordinated with CB&I to address concerns of subcontractors and vendors on the  
19       project to avoid disruptions, including the ability for ETI to directly pay those  
20       subcontractors and vendors or assume the subcontracts, if such a need were to  
21       arise. This approach led to the ability to finish ahead of schedule and have MCPS  
22       available for reliability support during Winter Storm Uri.

1 Q36. PLEASE EXPLAIN HOW THE ONSET OF THE COVID-19 PANDEMIC  
2 IMPACTED THE EXECUTION OF THIS PROJECT.

3 A. Many new procedures were put in place to ensure the health of all people on the  
4 project site; this was recognized by all as a necessity and proved to be successful.  
5 Inevitably there were impacts to the project costs (\$485,000) as a result of the  
6 additional work to maintain clean conditions throughout the project site during the  
7 peak of activities, and these costs were managed through the EPC change order  
8 process.  
9

10 Q37. PLEASE EXPLAIN HOW THE STORMS EXPERIENCED IN 2020  
11 IMPACTED THE PROJECT.

12 A. During the storms of 2020, Lake Charles power station in Louisiana received  
13 damage to the cooling tower, and as a result of this, we designed a remote braking  
14 system for the cooling tower at MCPS, which allows the tower fans to be stopped  
15 and immobilized safely from the control room. It also allows us to operate the  
16 tower at higher wind speeds because our operators no longer need to access the  
17 operating platform in high winds.  
18

19 **III. CONCLUSION**

20 Q38. WHAT DO YOU CONCLUDE REGARDING THE PRUDENCE OF THE  
21 ADDITION OF MCPS TO ETI'S GENERATION FLEET?

22 A. As I noted above, completing such a large and complex project within cost  
23 estimates is a challenge in itself. Further, the MCPS project faced challenges not



1 normally faced in the construction of a power plant. In spite of the challenges  
2 faced, the MCPS project was completed ahead of schedule and below budget and  
3 the cost cap established by the Commission in Docket No. 46416. Apart from  
4 challenges that might be expected to arise during the execution of a large and  
5 complex, multi-year project ETI encountered extraordinary obstacles that had to  
6 be overcome in order to complete MCPS. These obstacles included the  
7 bankruptcy of the parent company of the EPC contractor, the onset of the  
8 COVID-19 pandemic, and a historic 2020 tropical storm season. Despite these  
9 challenges, ETI continued to make progress building MCPS and completed the  
10 project ahead of schedule and under budget and achieved a top decile TRIR  
11 during construction of MCPS. Based on the facts discussed in this testimony, I  
12 have demonstrated that ETI's management of the MCPS Project was  
13 commercially reasonable and prudent.

14

15 Q39. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?


16 A. Yes, it does.

**AFFIDAVIT OF GARY C. DICKENS**


THE STATE OF TEXAS                    )  
  )  
COUNTY OF MONTGOMERY            )

This day, Gary C. Dickens 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:

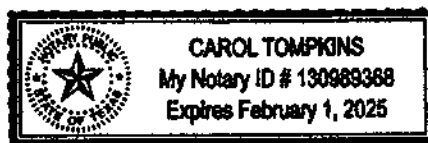
My name is Gary C. Dickens. I am of legal age and a resident of the State of Texas. The foregoing testimony and exhibits offered by me are true and correct, and the opinions stated therein are, to the best of my knowledge and belief, accurate, true and correct.

  
\_\_\_\_\_  
Gary C. Dickens

SUBSCRIBED AND SWORN TO BEFORE ME, notary public, on this the 30<sup>th</sup> day of June 2022.

  
\_\_\_\_\_  
Notary Public, State of Texas

My Commission expires:  
February 1, 2025



This workpaper contains information that is highly sensitive and voluminous and will be provided under the terms of the Protective Order (Confidentiality Disclosure Agreement) entered in this case.

DOCKET NO. 53719

|                              |   |                           |
|------------------------------|---|---------------------------|
| APPLICATION OF ENTERGY       | § | PUBLIC UTILITY COMMISSION |
| TEXAS, INC. FOR AUTHORITY TO | § |                           |
| CHANGE RATES                 | § | OF TEXAS                  |

DIRECT TESTIMONY

OF

KHAMSUNE VONGKHAMCHANH

ON BEHALF OF

ENTERGY TEXAS, INC.

JULY 2022

ENTERGY TEXAS, INC.  
DIRECT TESTIMONY OF KHAM SUNE VONGKHAMCHANH  
2022 RATE CASE

**TABLE OF CONTENTS**

|   | <u>Page</u> |
|---|-------------|
| I. Introduction   | 1           |
| A. Qualifications   | 1           |
| B. Purpose of Testimony                                       | 4           |
| II. ETI Transmission System                                   | 8           |
| A. Description  | 8           |
| B. Organization of ETI's Transmission Function                | 11          |
| C. MISO's Role  | 15          |
| D. Transmission Incident Response Plan                        | 19          |
| III. Transmission Function Capital Additions                  | 31          |
| A. Overview of Projects                                       | 32          |
| B. Appropriate in Rate Base                                   | 46          |
| IV. Test Year Transmission Function O&M Costs                 | 56          |
| A. Overall Description of Activities and Necessity            | 57          |
| B. Overall Reasonableness of Costs                            | 58          |
| C. ETI's Own O&M Costs  | 63          |
| D. Affiliate O&M Costs  | 64          |
| V. Demand and Energy Loss Factors                             | 87          |
| A. Development of Transmission and Distribution Demand Losses | 89          |
| B. Development of Transmission and Distribution Energy Losses | 95          |
| C. Summary of Results   | 99          |
| VI. Conclusion  | 102         |

## **EXHIBITS**

|               |   |
|---------------|---|
| Exhibit KV-1  | List of Prior Testimonies   |
| Exhibit KV-2  | Transmission Services Overview  |
| Exhibit KV-3  | Transmission Function Dollars Closed to Plant from January 1, 2018 to December 31, 2021                     |
| Exhibit KV-4  | Utilities Considered for ETI's Benchmarking Analysis  |
| Exhibit KV-5  | Benchmarking Analysis of ETI's Transmission O&M Expenses Per Transmission Line Mile                         |
| Exhibit KV-6  | Benchmarking Analysis of ETI's Transmission O&M Expenses as a Percentage of ETI's Total Transmission Assets |
| Exhibit KV-7  | Transmission Planning & Strategy Group of Affiliate Services  |
| Exhibit KV-8  | Transmission Engineering & Construction Group of Affiliate Services   |
| Exhibit KV-9  | Transmission Operations Group of Affiliate Services   |
| Exhibit KV-10 | Transmission Asset Management Group of Affiliate Services   |
| Exhibit KV-11 | Transmission Operations Class Predominant Billing Methods   |
| Exhibit KV-12 | Process Flow Diagram for Transmission & Distribution System Demand Loss Analysis                            |
| Exhibit KV-13 | Process Flow Diagram for Transmission & Distribution System Energy Loss Analysis                            |
| Exhibit KV-A  | Affiliate Billings by Class and Department  |
| Exhibit KV-B  | Affiliate Billings by Class and Project   |
| Exhibit KV-C  | Affiliate Billings by Class, Department, and Project  |
| Exhibit KV-D  | Pro Forma Adjustments to Affiliate Billings   |

**I. INTRODUCTION**

Q1. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Khamsune “Kham” Vongkhamchanh. My business address is  
639 Loyola Avenue, New Orleans, Louisiana 70113.

Q2. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the Senior Manager, Transmission Policy and Regulatory Support for  
Entergy Services, LLC (“ESL”), the service company for the five Entergy  
Operating Companies (“EOCs”),<sup>1</sup> including Entergy Texas, Inc. (“ETI” or the  
“Company”).

Q3. ON WHOSE BEHALF ARE YOU FILING THIS DIRECT TESTIMONY?

A. I am testifying on behalf of ETI.

**A. Qualifications**

Q4. PLEASE BRIEFLY DESCRIBE YOUR EDUCATIONAL AND  
PROFESSIONAL QUALIFICATIONS.

A. I received a Bachelor of Science degree in Electrical Engineering in June of 1993  
and a Master of Science degree in Electrical Engineering in December of 1994  
from the Georgia Institute of Technology. I also received a Master of Business

---

<sup>1</sup> ESL (formerly, Entergy Services, Inc.) is an affiliate of the Entergy Operating Companies that provides engineering, planning, accounting, legal, technical, regulatory, and other administrative support services to each of the EOCs, which are Entergy Arkansas, LLC (“EAL”); Entergy Louisiana, LLC (“ELL”); Entergy Mississippi, LLC (“EML”); Entergy New Orleans, LLC (“ENO”); and Entergy Texas, Inc. (“ETI”).

1 Administration from Tulane University in August 2009. I joined Entergy  
2 Services, Inc. in January of 1995. From 1995 to 2007, I held several engineering  
3 and transmission planning positions with responsibilities including (i) distribution  
4 line design, substation design, and system protection and control design,  
5 (ii) engineering field support for substation project installation, checkout, and  
6 commissioning of new facilities, (iii) design, construction, interconnection, and  
7 maintenance assistance to customers wanting to obtain transmission services, and  
8 (iv) oversight and performance of power flow studies on the transmission system.

9 In April 2007, I was named Manager, Transmission Regulatory Support  
10 (“TRS”) supporting the Transmission Operations department. In that capacity, I  
11 provided regulatory support in connection with transmission-related planning and  
12 operating issues associated with the Transmission Functional Organization  
13 (“Transmission Organization”) and in support of the EOCs.<sup>2</sup> TRS provided  
14 regulatory support such as fulfilling requests for information, providing testimony  
15 support, and supporting various industry and regulatory filings. In August 2009, I  
16 was assigned to oversee the Transmission Policy department in addition to the  
17 TRS responsibilities. This department developed and evaluated transmission  
18 policy and regulatory compliance recommendations on behalf of the EOCs and  
19 other business units.

20 Beginning June 2014, I accepted my current position of Senior Manager,

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<sup>2</sup> The Transmission Function is comprised of both EOC personnel and ESL personnel within ESL’s Transmission Organization. Collectively, I will refer to all personnel carrying out the Transmission Function as the Transmission Organization.



1           Transmission Policy and Regulatory Support (successor department to TRS).  
2           This department retained the responsibilities as described for the TRS  
3           Department, but also took on added responsibilities including oversight of the  
4           Transmission Organization's procedures and records coordination. Most recently,  
5           I now also have oversight of transmission settlements.

6

7   Q5.   WHAT ARE YOUR RESPONSIBILITIES AS SENIOR MANAGER,  
8           TRANSMISSION POLICY AND REGULATORY SUPPORT?

9   A.    I oversee a department of analysts, policy consultants, and transmission regulatory  
10        affairs coordinators who perform a myriad of activities in support of the  
11        Transmission Organization, other business units, and the EOCs.<sup>3</sup>

12

13   Q6.   ARE YOU FAMILIAR WITH GENERALLY ACCEPTED TRANSMISSION  
14        PLANNING AND OPERATING STANDARDS USED BY THE ELECTRIC  
15        UTILITY INDUSTRY?

16   A.    Yes. I am familiar with the generally accepted transmission planning and  
17        operating standards used by electric utilities that address planning and operating  
18        transmission systems.

---

<sup>3</sup> Effective May 2022, the Distributions Operations and Transmission Organization groups were combined into the new Power Delivery Organization. The engineering, project management, and construction departments within those respective groups have been moved into the Capital Projects Organization. Also, the training departments within those respective groups were moved into the Operations and Development Organization.

1 Q7. HAVE YOU TESTIFIED BEFORE?

2 A. Yes. I have provided a list of the proceedings in which I have submitted  
3 testimony in Exhibit KV-1.  
4

5 **B. Purpose of Testimony**

6 Q8. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

7 A. I sponsor the overall costs of ETI's Transmission Function in this rate case.  
8 Those costs include (1) transmission-related capital investment ETI seeks to  
9 include in base rates (including capital additions included in ETI's transmission  
10 cost recovery factor ("TCRF") since the last base rate case); and (2) transmission-  
11 related operation and maintenance ("O&M") expenses ETI seeks in base rates.  
12 The transmission-related capital investment is comprised of ETI's capital costs  
13 closed to plant in service during the period January 1, 2018<sup>4</sup> through December  
14 31, 2021.<sup>5</sup> The transmission-related O&M is comprised of ETI's own expenses  
15 and affiliate expenses incurred during the 12 months ending December 31, 2021  
16 (the "Test Year").

17 I demonstrate that the transmission-related capital investment, including  
18 associated capitalized affiliate charges, is used and useful and the costs are  
19 reasonable and necessary and prudently incurred; and, I demonstrate the  
20 reasonableness and necessity of the transmission-related O&M expenses,

---

<sup>4</sup> January 1, 2018 is the next date following the end of the test year in ETI's last base rate case (Docket No. 48371).

<sup>5</sup> The 12 months ending December 31, 2021 are the historical test year for this proceeding (the "Test Year").

1 including that charges from ETI affiliates are no higher than the charge by that  
2 affiliate to any other entity for the same or similar service, and the costs  
3 reasonably approximate the affiliate's cost to provide the service.

4 Finally, I sponsor the demand and energy loss factors for the ETI  
5 transmission and distribution systems. The Transmission Organization calculates  
6 the system line loss factors for inclusion in Rate Filing Package Schedule O-6.3,  
7 which enables the Regulatory Services Department<sup>6</sup> to develop allocation factors  
8 for use in the cost-of-service study.

9  
10 Q9. WHY ARE YOU THE APPROPRIATE PERSON TO SPONSOR THIS  
11 TESTIMONY?

12 A. As Senior Manager, Transmission Policy and Regulatory Support, I have  
13 management responsibility for a variety of activities performed in support of  
14 ETI's Transmission Function. I work very closely with the management of the  
15 departments within the Transmission Organization. Throughout the course of my  
16 career, I have been involved in various aspects of the engineering processes  
17 related to the Transmission Function, and I am familiar with generally accepted  
18 standards and practices for transmission planning and operations used by the  
19 electric utility industry.

---

<sup>6</sup> Regulatory Services provides ETI with advice, analysis, filings, and interpretation of rate tariffs, from a team with regulatory expertise and institutional, industry knowledge.

1 Q10. WHAT EXHIBITS DO YOU SPONSOR IN YOUR DIRECT TESTIMONY?

2 A. I sponsor the exhibits listed after the Table of Contents at the beginning of my  
3 direct testimony.

4

5 Q11. WHAT SCHEDULES DO YOU SPONSOR IN ETI'S RATE FILING  
6 PACKAGE?

7 A. I sponsor or cosponsor the following schedules in the Rate Filing Package:

|         |  |
|---------|--|
| H-12.5a | Line Losses & System's Own Use             |
| H-13.1b | Circuit Breaker Operations                 |
| H-13.1e | Quality of Service Improvements            |
| H-13.2  | IE-24 Reports (Form 417R) – DOE            |
| H-14.1a | Available Capacity Wheeling                |
| H-14.1b | Planned Capacity Wheeling                  |
| H-14.2  | Wheeling Information for Test Year         |
| O-6.1   | Unadjusted kWh Sales by Month of Test Year |
| O-6.2   | Adjusted kWh Sales Data                    |
| O-6.3   | System Line Loss Calculations              |

8 Q12. PLEASE GENERALLY DESCRIBE THE H SCHEDULES YOU SPONSOR  
9 OR COSPONSOR.

10 A. Rate Filing Package Schedule H consists of dynamic engineering schedules. I  
11 provide the line losses and system's own use data in Schedule H-12.5a; the  
12 description of the primary causes for circuit breaker operations in  
13 Schedule H-13.1b; the description of specific programs and activities undertaken  
14 by ETI to improve quality of service in Schedule H-13.1e; and the copies of form

1 IE-24 Reports (Form 417R) filed with the Department of Energy during the Test  
2 Year in Schedule H-13.2.  
3

4 Q13. WHY DO SCHEDULES H-14.1a, H-14.1b, AND H-14.2 CONTAIN NO DATA  
5 RELATED TO QUALIFYING FACILITY WHEELING?

6 A. The Rate Filing Package instructions direct that Schedules H-14.1a and H-14.1b  
7 include “summaries from Qualifying Facilities (QFs) under Substantive Rule  
8 23.66 for transmission Wheeling data from the utility’s company-wide  
9 transmission system by month for the test year.”<sup>7</sup> Schedule H-14.2 likewise  
10 relates to company-wide transmission wheeling data. Because the EOCs  
11 participate in the Midcontinent Independent System Operator (“MISO”) regional  
12 transmission organization (“RTO”), the MISO Open Access Transmission,  
13 Energy and Operating Reserve Markets Tariff (the “MISO Tariff”) governs the  
14 wheeling of power across the ETI footprint. As such, MISO acts as the  
15 Transmission Service Provider. Because MISO conducts wheeling at a MISO-  
16 wide level, statistics for available capacity and planned capacity for wheeling for  
17 only ETI have no meaning. Thus, these schedules reflect that there were no actual  
18 or planned wheeling transactions for QFs during the Test Year.  
19

20 Q14. PLEASE GENERALLY DESCRIBE THE O SCHEDULES YOU SPONSOR.

21 A. Rate Filing Package Schedule O consists of key ETI operating statistics. In

---

<sup>7</sup> *Electric Utility Rate Filing Package for Generating Utilities* at Sch. H-14.1a & 1b instructions, Public Utility Commission of Texas (Sept. 9, 1992).

1 Schedule O-6.1, I provide ETI's total unadjusted kilowatt hour ("kWh") sales by  
2 month of the Test Year. In Schedule O-6.2, I present the same information as in  
3 Schedule O-6.1, but use adjusted kWh sales. And in Schedule O-6.3, I provide  
4 ETI's system line loss calculations.

5  
6 Q15. WHY ARE YOU THE APPROPRIATE PERSON TO SPONSOR OR  
7 COSPONSOR THESE SCHEDULES?

8 A. I am the appropriate person to sponsor or cosponsor these schedules because these  
9 schedules correspond to transmission-related matters.

10  
11 **II. ETI TRANSMISSION SYSTEM**

12 **A. Description**

13 Q16. PLEASE PROVIDE A HIGH-LEVEL OVERVIEW OF ENTERGY'S  
14 TRANSMISSION SYSTEM.

15 A. The combined transmission systems of the EOCs comprise the Entergy  
16 transmission system. The entire Entergy transmission system was integrated into  
17 the MISO RTO in December 2013.

18  
19 Q17. PLEASE DESCRIBE ETI'S TRANSMISSION SYSTEM SPECIFICALLY.

20 A. The ETI Transmission System<sup>8</sup> spans 27 counties in southeast Texas. It primarily  
21 serves local area load from local and system generation, though certain

---

<sup>8</sup> I use the phrase "ETI Transmission System" to refer to the electric transmission facilities of Entergy Texas, Inc.

1 emergency conditions or other unusual events sometimes require providing or  
2 receiving mutual support to/from non-Entergy neighboring systems.

3 The ETI Transmission System is generally planned, designed, and  
4 operated to withstand the unplanned outage of any single component of the  
5 system. It includes transmission lines and substations operating at voltages of  
6 500 kiloVolts (“kV”), 345 kV, 230 kV, 138 kV, and 69 kV.

7

8 Q18. IS THE ETI TRANSMISSION SYSTEM INTERCONNECTED WITH OTHER  
9 TRANSMISSION SYSTEMS?

10 A. Yes. The ETI Transmission System is interconnected with ELL, Cleco  
11 Corporation, East Texas Electric Cooperative, and American Electric Power.

12

13 Q19. PLEASE EXPLAIN.

14 A. The ETI Transmission System is interconnected with other transmission systems  
15 primarily to promote system reliability. The interconnection of transmission  
16 systems also provides access to other power suppliers, some of which may, at  
17 certain times, provide more economic sources of power than is available on-  
18 system.

19

20 Q20. GENERALLY SPEAKING, WHO OPERATES THE ETI TRANSMISSION  
21 SYSTEM AND HOW?

22 A. The generation and transmission functions performed on behalf of ETI were  
23 functionally unbundled in compliance with Federal Energy Regulatory

1 Commission (“FERC”) Order Nos. 888, 889, and related orders. A staff of ESL  
2 system operators located in Little Rock, Arkansas and Jackson, Mississippi—in  
3 conjunction with MISO staff in Little Rock, Arkansas and Carmel, Indiana—  
4 operate the combined Entergy transmission system, which includes the ETI  
5 Transmission System. A staff of generation dispatchers within the Energy  
6 Management Organization (“EMO”) located in The Woodlands, Texas<sup>9</sup>  
7 dispatches Entergy’s generation fleet, which includes ETI’s generation fleet. The  
8 EMO uses the Generation Management System (“GMS”) for generation control.  
9 Separately, ESL transmission personnel in Little Rock, Arkansas and Jackson,  
10 Mississippi use the GMS for transmission functions. The generation and  
11 transmission functions of the GMS are separate and distinct such that the EMO  
12 does not have access to transmission information in conformance with FERC  
13 Order Nos. 717, 888, 889, 2004, and related orders.

14 On any given day, energy flows on the combined Entergy transmission  
15 system include energy generated and consumed within the Entergy Balancing  
16 Authority Area (“EBAA”),<sup>10</sup> energy imported into the EBAA, energy exported  
17 from the EBAA, and energy that is transmitted across the EBAA. All energy  
18 flows that cross the combined Entergy transmission system, including the ETI

---

<sup>9</sup> The EMO is a department within Entergy’s System Planning Organization. Please see Andrew Dornier’s direct testimony for a more detailed discussion of that organization.

<sup>10</sup> A Balancing Authority integrates resource plans ahead of time and maintains in real time the balance of electricity resources and electricity demand in real time. MISO is the Balancing Authority for the combined Entergy system. MISO utilizes Local Balancing Authorities (“LBAs”), which assume certain responsibilities relating to the implementation of the MISO Tariff pursuant to the MISO Amended Balancing Authority Agreement. EBAA is a LBA area administered by ESL.



1 Transmission System, are scheduled hourly with the MISO RTO dispatchers in  
2 Carmel, Indiana by other utilities connected to the combined system and by other  
3 wholesale market participants. Energy flows are scheduled in accordance with  
4 FERC-approved pro forma tariffs that define the service provided and the  
5 curtailment priority in the event that curtailment is required for system reliability  
6 and security. The ETI Transmission System is operated consistent with the  
7 policies and guidelines of appropriate regulatory agencies, including this  
8 Commission, and reliability organizations to meet customer needs.

9  
10 **B. Organization of ETI's Transmission Function**

11 Q21. WHO IS RESPONSIBLE INTERNALLY FOR THE ACTIVITIES OF ETI'S  
12 TRANSMISSION FUNCTION?

13 A. The Transmission Organization, in coordination with MISO in certain areas as  
14 described herein, is primarily responsible for the planning, design, operation,  
15 maintenance management, and construction management of the ETI Transmission  
16 System. Additionally, the Capital Projects Organization<sup>11</sup> assists the  
17 Transmission Organization in the construction management of ETI transmission  
18 projects generally costing over \$20 million.

---

<sup>11</sup> The Capital Projects Organization is responsible for the management and oversight of new transmission projects generally over \$20 million for ETI. The organization secures resources to form a project team and monitor team progress and performance throughout the entire life-cycle of a project. The organization also requests resources from various departments and from project teams to start development of project plans to execute the solution identified by system planning. Lastly, the Capital Projects Organization directs the efforts of subject matter experts to ensure that projects are completed on time, are within budget, and perform as intended.

1 Q22. HOW IS THE TRANSMISSION ORGANIZATION STRUCTURED TO  
2 PERFORM THESE ACTIVITIES?

3 A. The Transmission Organization consists of both Operating Company, including  
4 ETI, and ESL personnel organized into six major departments: (1) Planning and  
5 Strategy,<sup>12</sup> (2) Engineering, (3) Project Management & Construction,  
6 (4) Operations, (5) Asset Management, and (6) Transmission Customer Services.  
7 Exhibit KV-2 shows the organizational structure and services provided by each of  
8 these departments.

9

10 Q23. PLEASE PROVIDE MORE DETAIL ABOUT THE SIX DEPARTMENTS  
11 THAT MAKE UP THE TRANSMISSION ORGANIZATION AND THE  
12 SPECIFIC SERVICES THEY PROVIDE.

13 A. The Planning and Strategy Department is responsible for ensuring that the ETI  
14 Transmission System is designed to meet reliability and firm transmission service  
15 commitments in accordance with all applicable regulations and standards. The  
16 Transmission Planning group identifies system upgrades to ensure that existing  
17 load and future load growth can be served reliably and is responsible for  
18 transmission project development. The Asset Management Strategy group is  
19 responsible for developing projects and programs for transmission line and  
20 substation assets, providing technical support, and tracking transmission system  
21 performance. The Transmission Policy and Regulatory Support group is

---

<sup>12</sup> The Planning and Strategy Department includes three groups: Transmission Planning, Asset Management Strategy, and Transmission Policy & Regulatory Support.

1 responsible for: (1) development and management of transmission policy;  
2 (2) coordination of the Transmission Organization's participation in the MISO  
3 stakeholder process; and (3) implementing and monitoring programs, procedures,  
4 and controls to ensure ETI is in compliance with FERC regulations governing  
5 standards of conduct, Sarbanes-Oxley Act ("SOX") regulations, records retention,  
6 electric reliability organization ("ERO") requirements and standards, and other  
7 transmission regulatory compliance programs.

8 The Engineering Department is responsible for providing transmission line  
9 and substation design engineering and related services for ETI. Such services  
10 include engineering design basis, relay settings, and configuration management.

11 The Project Management and Construction Department manages  
12 transmission line and substation capital additions for ETI. Services include  
13 project and construction management, project controls, and right-of-way  
14 procurement. Operating Company personnel within this department perform  
15 construction operations coordination.

16 The Operations Department is responsible for: (1) monitoring the  
17 transmission grid to ensure voltage and system flows are within limits;  
18 (2) performing real-time and day-ahead contingency analyses to predict and  
19 prepare for altered system states; (3) switching operations to support planned  
20 maintenance outages and respond to unplanned system conditions; and (4) short-  
21 range planning, including system modeling, outage coordination, and day-ahead  
22 security analysis.

23 The Asset Management Department is responsible for: (1) transmission

1 maintenance management, (2) transmission maintenance support including  
2 coordination of transmission maintenance activities, (3) safety and skills training,  
3 and (4) risk controls. In addition, Operating Company personnel assigned to the  
4 Asset Management Department work on construction projects in order to more  
5 effectively utilize the EOCs' resources.

6 The Transmission Customer Services Department is responsible for  
7 wholesale customer coordination, facilitating generator interconnections in  
8 concert with other Transmission Departments and MISO, and coordinating with  
9 the ETI's Industrial Accounts organization to support large industrial customers.

10 Finally, personnel from each of these departments support outage response  
11 services, which include the management and coordination of ETI's response to  
12 major outages caused by weather conditions or other unexpected occurrences.

13  
14 Q24. HOW ARE THESE ACTIVITIES DIVIDED AMONG ETI AND ESL  
15 PERSONNEL?

16 A. ETI personnel within the Transmission Organization are responsible for local  
17 activities, which include various aspects of maintenance and construction, as well  
18 as review and approval of proposed transmission projects identified by ESL  
19 planning engineers. The costs associated with these activities and third-party  
20 contractors are ETI's own expenses. ESL employees within the Transmission  
21 Organization are responsible for the remaining transmission activities described  
22 above and shown in Exhibit KV-2. The costs associated with these activities are  
23 affiliate expenses.