

Independent Statistics & Analysis U.S. Energy Information Administration

FORM EIA-411 COORDINATED BULK POWER SUPPLY AND DEMAND PROGRAM REPORT

OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

NOTICE: This report is **mandatory** under the Federal Energy Administration Act of 1974 (Public Law 93-275) for all parts. Failure to comply may result in criminal fines, civil penalties and other sanctions as provided by law. For further information concerning sanctions and data protections see the provision on sanctions and the provision concerning the confidentiality of information in the instructions. **Title 18 USC 1001 makes it a criminal offense for any person knowingly and willingly to make to any Agency or Department of the United States any false, fictitious, or fraudulent statements as to any matter within its jurisdiction.**

| SCHEDULE 1. IDENTIFICATION | | | | | | | | | |
|---|---|--|--|--|--|--|--|--|--|
| Survey | <u>y Contact</u> | | | | | | | | |
| First Name: | Last Name: | | | | | | | | |
| Title | | | | | | | | | |
| Telephone (include extension): | Fax: | | | | | | | | |
| Email: | | | | | | | | | |
| Supervisor of Contact Person for Survey | | | | | | | | | |
| First Name: | | | | | | | | | |
| | | | | | | | | | |
| Title: | | | | | | | | | |
| Telephone (include extension): | Fax: | | | | | | | | |
| Email: | | | | | | | | | |
| Rep | oort For | | | | | | | | |
| Regional Entity: | | | | | | | | | |
| Reporting Party (Regional Entity or subregion): | | | | | | | | | |
| For questions about the data requested or | n Form EIA-411, contact the Survey Manager: | | | | | | | | |
| Tim | ו Shear | | | | | | | | |
| | ber: (202) 586-0403 | | | | | | | | |
| Email: Tim. | : (202) 207-1938 Shear @eia.gov | | | | | | | | |
| | | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

Reporting Party:

SCHEDULE 2. PART A. HISTORICAL AND PROJECTED PEAK DEMAND AND ENERGY - MONTHLY

Peak Demand Reported:

Coincident

Non-Coincident

If non-coincident, please explain why coincident is not used.

| | | | YEAR | | | | | | | | | | |
|-------------|-----------|---|---|---|---|---|--|--|--|--|--|--|--|
| | | 2016 (Actua | I - Prior Year) | 2017 (RY - | Report Year) | 2018 (N | lext Year) | | | | | | |
| LINE NO. | MONTH | PEAK HOUR DEMAND (MEGAWATTS) (a) | NET ENERGY (THOUSANDS OF MEGA-WATTHOURS) (b) | PEAK HOUR DEMAND (MEGAWATTS) (a) | NET ENERGY (THOUSANDS OF MEGA-WATTHOURS) (b) | PEAK HOUR DEMAND (MEGAWATTS) (a) | NET ENERGY (THOUSANDS OF MEGAWATTHOURS) (b) | | | | | | |
| 1 | January | | | | | | | | | | | | |
| 2 | February | | | | | | | | | | | | |
| 3 | March | | | | | | | | | | | | |
| 4 | April | | | | | | | | | | | | |
| 5 | Мау | | | | | | | | | | | | |
| 6 | June | | | | | | | | | | | | |
| 7 | July | | | | | | | | | | | | |
| 8 | August | | | | | | | | | | | | |
| 9 | September | | | | | | | | | | | | |
| 10 | October | | | | | | | | | | | | |
| 11 | November | | | | | | | | | | | | |
| 12 | December | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

SCHEDULE 2. PART B. HISTORICAL AND PROJECTED PEAK DEMAND AND ENERGY - ANNUAL

| | | | YEAR | | | | | | | | | |
|---|---------------------|--------|--------|--------|--------|--|--|--|---|--------|--------|---------|
| | | Actual | Year 1 | Year 2 | Year 3 | | | | | Year 8 | Year 9 | Year 10 |
| | Summer Peak Hour | | | | | | | | | | | |
| | Demand (Megawatts) | | | | | | | | | | | |
| 1 | June-September | | | | | | | | | | | |
| | Winter Peak Hour | | | | | | | | | | | |
| | Demand (Megawatts) | | | | | | | | | | | |
| 2 | December - February | | | | | | | | | | | |
| 3 | Net Annual Energy | | | | | | | | 1 | | | |
| | (Gigawatt hours) | | | | | | | | | | | |



Regional Entity:

| | SCHEDULE 3. PART A. PROJECTED DEMAND AND CAPACITY - SUMMER | | | | | | | | | | |
|-----|--|--------|---------------------|------------------|-------|------------------|-------------------|--|--|--|--|
| | | | | YEAF | 2 | | | | | | |
| NO. | | | Year 1 (RY 2017) | Year 2 (2018) | | Year 9 (2025) | Year 10 (2026) | | | | |
| | | DEMAND | (IN MEGAWA | TTS) | | | | | | | |
| 1 | Unrestricted Peak Demand | | | | | | | | | | |
| 1a | New Conservation (Energy Efficiency) | | | | | | | | | | |
| 1b | Estimated Diversity | | | | | | | | | | |
| 1c | Additions for non-member load | | | | | | | | | | |
| 1d | Stand-by Load Under Contract | | | | | | | | | | |
| 1e | Non-Controllable Demand Response | | | | | | | | | | |
| | | | | | | | | | | | |
| 2 | Total Internal Demand | | | | | | | | | | |
| 2a | Direct Control Load Management | | | | | | | | | | |
| 2b | Interruptible Load | | | | | | | | | | |
| 2c | Critical Peak Pricing with Control | | | | | | | | | | |
| 2d | Load as a Capacity Resource | | | | | | | | | | |
| | | | | | | | | | | | |
| 3 | Net Internal Demand | | | | | | | | | | |
| | | | | | | | | | | | |
| 4 | Total Demand Response | | | | | | | | | | |
| | | | | | | | | | | | |
| | TOTAL INTERNAL CAPACITY | JOFFL | | | ATT3) | | | | | | |
| 5 | (sum of 6 and 8a) | | | | | | | | | | |
| • | | | | | | | | | | | |
| 62 | EXISTING CAPACITY (68+6b+6C) | | | | | | | | | | |
| 6b | Other | | | | | | | | | | |
| 6c | Unavailable | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |



Regional Entity:

| S | SCHEDULE 3. PART A. PROJECTED DEMAND AND CAPACITY - SUMMER | | | | | | | | | |
|-----|--|-----------------------------------|------------|------------|----------|-----------|---------|--|--|--|
| | | | | YEAR | 2 | | | | | |
| NO. | |) | Year 1 | Year 2 | | Year 9 | Year 10 | | | |
| | | | (RY 2017) | (2018) | •••• | (2025) | (2026) | | | |
| | | FUTURI | E CAPACITY | CATEGORIES | 5 (IN ME | EGAWATTS) | - | | | |
| 7 | FUTURE CAPACITY ADDITIONS | | | | | | | | | |
| 7a | Tier 1 (Most Certain) | | | | | | | | | |
| 7b | Tier 2 | | | | | | | | | |
| 7c | Tier 3 (Least Certain) | | | | | | | | | |
| | | | | | | | | | | |
| 8 | ANTICIPATED CAPACITY (6a+7a) | | | | | | | | | |
| | | | | | | | | | | |
| | | CAPACITY TRANSFERS (IN MEGAWATTS) | | | | | | | | |
| 90 | CAPACITY TRANSFERS – IMPORTS | | | | | | | | | |
| | | | | | | l | I | | | |
| 9a | Firm | | | | | | | | | |
| 9b | Expected | | | | | | | | | |
| | | | | | | | | | | |
| 10 | CAPACITY TRANSFERS – EXPORTS | | | | | | | | | |
| | | | | | | | | | | |
| 10a | Firm | | | | | | | | | |
| 10b | Expected | | | | | | | | | |
| | | | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

| Regior | nal Entity: | | | | | | | |
|--------|--|------------------------------|---------------------|---------------|------|------------------|---------|--|
| Report | ting Party: | | | | | | | |
| S | CHEDULE 3. PART A. PROJECT | | | ACITY - SUN | IMER | | | |
| | | | | YEAF | ł | | | |
| NO. | | | Year 1 (PX 2017) | Year 2 | | Year 9 (2025) | Year 10 | |
| | | | CAPACITY - (| Continued (IN | MEGA | WATTS) | (2020) | |
| 11 | EXISTING, CERTAIN & NET FIRM TRANSFERS (6a+10b-11b) | | | | | | | |
| 12 | ANTICIPATED CAPACITY RESOURCES (12+8a) | | | | | | | |
| 13 | PROSPECTIVE CAPACITY RESOURCES | | | | | | | |
| 14 | ADJUSTED POTENTIAL CAPACITY RESOURCES | | | | | | | |
| | | | | | | | | |
| | | RESERVE AND CAPACITY MARGINS | | | | | | |
| 15 | TARGET RESERVE MARGIN FOR Region/Assessment Area | | | | | | | |
| | | | | | | | | |
| 16 | EXISTING, CERTAIN & NET FIRM TRANSFERS | | | | | | | |
| 16.1 | Reserve Margin | | | | | | | |
| 16.2 | Capacity Margin | | | | | | | |
| 17 | ANTICIPATED RESOURCES | | | | | | | |
| 17.1 | Reserve Margin | | | | | | | |
| 17.2 | Capacity Margin | | | | | | | |
| 18 | PROSPECTIVE RESOURCES | | | | | | | |
| 18.1 | Reserve Margin | | | | | | | |
| 18.2 | Capacity Margin | | | | | | | |
| 19 | ADJUSTED POTENTIAL RESOURCES | | | | | | | |
| 19.1 | Reserve Margin | | | | | | | |
| 19.2 | Capacity Margin | | | | | | | |
| | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity: _____

| ę | SCHEDULE 3. PART B. PROJECTED DEMAND AND CAPACITY - WINTER | | | | | | | | | |
|-----|--|--------|---------------------|------------------|-------|------------------|-------------------|--|--|--|
| | | | | YEAR | 2 | | | | | |
| NO. | | | Year 1 (RY 2017) | Year 2 (2018) | | Year 9 (2025) | Year 10 (2026) | | | |
| | | DEMAND | (IN MEGAWA | TTS) | | | | | | |
| 1 | Unrestricted Peak Demand | | | | | | | | | |
| 1a | New Conservation (Energy Efficiency) | | | | | | | | | |
| 1b | Estimated Diversity | | | | | | | | | |
| 1c | Additions for non-member load | | | | | | | | | |
| 1d | Stand-by Load Under Contract | | | | | | | | | |
| 1e | Non-Controllable Demand Response | | | | | | | | | |
| | | | | | | | | | | |
| 2 | Total Internal Demand | | | | | | | | | |
| 2a | Direct Control Load Management | | | | | | | | | |
| 2b | Interruptible Load | | | | | | | | | |
| 2c | Critical Peak Pricing with Control | | | | | | | | | |
| 2d | Load as a Capacity Resource | | | | | | | | | |
| | | | | | | | | | | |
| 3 | Net Internal Demand | | | | | | | | | |
| | | | | | | | | | | |
| 4 | Total Demand Response | | | | | | | | | |
| | | SUPPL | Y CATEGORIE | S (IN MEGAW | ATTS) | | | | | |
| 5 | TOTAL INTERNAL CAPACITY (sum of 6 and 8a) | | | | | | | | | |
| | | | | | | | | | | |
| 6 | EXISTING CAPACITY (6a+6b+6c) | | | | | | | | | |
| 6a | Certain | | | | | | | | | |
| 60 | Utner | | | | | | | | | |
| 60 | Unavallaple | | | | | | | | | |
| | | | | | l | l | | | | |
| | | | | | | | | | | |



Regional Entity:

| S | SCHEDULE 3. PART B. PROJECTED DEMAND AND CAPACITY - WINTER | | | | | | | | | | |
|------|--|--------|--------------------|------------|----------|-----------|---------|--|--|--|--|
| | | YEAR | | | | | | | | | |
| NO. | | | Year 1 | Year 2 | | Year 9 | Year 10 | | | | |
| | | | (RY 2017) | (2018) | | (2025) | (2026) | | | | |
| | | FUTURI | E CAPACITY | CATEGORIES | S (IN ME | EGAWATTS) | | | | | |
| 7 | FUTURE CAPACITY ADDITIONS | | | | | | | | | | |
| 7a | Tier 1 (Most Certain) | | | | | | | | | | |
| 7b | Tier 2 | | | | | | | | | | |
| 7c | Tier 3 (Least Certain) | | | | | | | | | | |
| | | | | | | | | | | | |
| 8 | ANTICIPATED CAPACITY (6a+8a) | | | | | | | | | | |
| | | | | | | | | | | | |
| | | CA | APACITY TRA | NSFERS (IN | MEGAV | VATTS) | | | | | |
| 9 | CAPACITY TRANSFERS – IMPORTS | | | | | | | | | | |
| | | | | | | | | | | | |
| 9b | Firm | | | | | | | | | | |
| 9c | Expected | | | | | | | | | | |
| | | | | | | | | | | | |
| 10 | CAPACITY TRANSFERS – EXPORTS | | | | | | | | | | |
| | | | | | | | | | | | |
| 10ab | Firm | | | | | | | | | | |
| 10b | Expected | | | | | | | | | | |
| | | | | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity: _____ Reporting Party:

SCHEDULE 3. PART B. HISTORICAL AND PROJECTED DEMAND AND CAPACITY - WINTER YEAR LINE Year 1 Year 2 Year 9 Year 10 NO. (RY 2017) (2018)(2025) (2026) CAPACITY - Continued (IN MEGAWATTS) **EXISTING, CERTAIN & NET FIRM** 11 TRANSFERS (6a+10b-11b) ANTICIPATED CAPACITY 12 RESOURCES (12+8a) PROSPECTIVE CAPACITY 13 RESOURCES ADJUSTED POTENTIAL CAPACITY 14 RESOURCES **RESERVE AND CAPACITY MARGINS** TARGET RESERVE MARGIN FOR 15 **Region/Assessment Area EXISTING, CERTAIN & NET FIRM** 16 TRANSFERS **Reserve Margin** 16.1 **Capacity Margin** 16.2 17 ANTICIPATED RESOURCES **Reserve Margin** 17.1 17.2 **Capacity Margin PROSPECTIVE RESOURCES** 18 18.1 **Reserve Margin** 18.2 Capacity Margin ADJUSTED POTENTIAL RESOURCES 19 **Reserve Margin** 19.1 19.2 **Capacity Margin**



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

Reporting Party:

SCHEDULE 4. BULK TRANSMISSION FACILITY POWER FLOW CASES

| Line No. | | | | | | | | | | |
|-------------|----------------|-----------------|--------------------------------|----------|--|--|--|--|--|--|
| 1 | Case Name: | | | | | | | | | |
| 2 | Year of Study: | | | | | | | | | |
| 3 | Case Number: | | | | | | | | | |
| | | PROSPECT | TIVE FACILITIES AND CONNECTION | ONS | | | | | | |
| | Name And Type | Projected | Projected Connections | | | | | | | |
| 4 | Of Facility | (e.g., 12-2018) | Bus Number | Bus Name | | | | | | |
| | (a) | (b) | (c) | (d) | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | 1 | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

| SCHEDULE 5. BULK ELECTRIC TRANSMISSION SYSTEM MAPS | | | | | | | | | | |
|--|---|----------------------------|------------------------------|--|--|--|--|--|--|--|
| LINE NO. | | | | | | | | | | |
| 1 | Specify the Number of Maps Provided: | | | | | | | | | |
| 2 | For each map provide file name, c | overage, and map software: | | | | | | | | |
| | MAP NUMBER (if applicable) | FILE NAME (if applicable) | MAP SOFTWARE (if applicable) | | | | | | | |
| | (a) | (b) | (c) | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

Reporting Party: _____

| | SCHEDULE 6. PART A. EXISTING AND PROJECTED CIRCUIT MILES | | | | | | | | | | | | |
|---|--|---------------------|--|-------------|-------------|-------------|------|-------|-------------|-------------|-------------|--------|-------|
| | | | CIRCUIT MILES | | | | | | | | | | |
| | | In Repor | n Report Year 2014 and Report Year 2015 report circuit miles for voltage categories 100 kV and above. From Report Year 2016 forward report only for transmission elements that are part of the new BES definition | | | | | | | | | | |
| | | | | | AC (kV | ") | | | | | DC | C (kV) | |
| | | Less than 100 | 100- 199 | 200- 299 | 300- 399 | 400- 599 | 600+ | TOTAL | 100- 299 | 300- 399 | 400- 599 | 600+ | TOTAL |
| 1 | Existing (as of last day of prior report year) | | | | | | | | | | | | |
| 2 | Under Construction (as of first day of current report year) | | | | | | | | | | | | |
| 3 | Planned (completion within first five years) | | | | | | | | | | | | |
| 4 | Conceptual (completion within first five years) | | | | | | | | | | | | |
| 5 | Planned (completion within second five years) | | | | | | | | | | | | |
| 6 | Conceptual (completion within second five years) | | | | | | | | | | | | |
| 7 | Sum of Existing, Under Construction, and Planned Transmission (full ten-year period) | | | | | | | | | | | | |
| 8 | Sum of Existing, Under Construction, Planned, and Conceptual Transmission (full ten-year period) | | | | | | | | | | | | |
| | | | | | | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

| S | CHEDULE 6. PART B. CHA | RACTERISTICS OF PRO | JECTED TRANSMISSION | I LINE ADDITIONS | | | | | |
|--|------------------------------------|---|--------------------------|--------------------------|--|--|--|--|--|
| LINE NO. | | TRANSMISSION LINE (a) | TRANSMISSION LINE (b) | TRANSMISSION LINE (c) | | | | | |
| | | TRANSMISSION LINE IDE | NTIFICATION | | | | | | |
| 1 | Project Name | | | | | | | | |
| 2 | Project Status | | | | | | | | |
| 3 | Tie line | | | | | | | | |
| 4a | Primary Driver | | | | | | | | |
| 4b | Secondary Driver | | | | | | | | |
| 5 | Terminal Location (From) | | | | | | | | |
| 6 | Terminal Location (To) | | | | | | | | |
| | | TRANSMISSION LINE C | WNERSHIP | | | | | | |
| 7 | Company Name | | | | | | | | |
| 8 | EIA Company Code | | | | | | | | |
| 9 | Type of Organization | | | | | | | | |
| 10 | Percent Ownership | | | | | | | | |
| TRANSMISSION LINE DATA | | | | | | | | | |
| 11 | Line Length (miles) | | | | | | | | |
| 12 | Line Type | []OH[]UG[]SM | []OH[]UG[]SM | []OH[]UG[]SM | | | | | |
| 13 | Voltage Type | []AC[]DC | [] AC [] DC | [] AC [] DC | | | | | |
| 14 | Voltage Operating (Kilovolts) | | | | | | | | |
| 15 | Voltage Design (Kilovolts) | | | | | | | | |
| 16 | Circuits per Structure Present | | | | | | | | |
| 17 | Circuits per Structure Ultimate | | | | | | | | |
| 18 | Capacity Rating (MVA) | | | | | | | | |
| 19 | Original In-Service Date | | | | | | | | |
| 20 | Expected In-Service Date | | | | | | | | |
| 21 | Line Delayed? | | | | | | | | |
| 22 | Cause of Delay | | | | | | | | |
| | | LEGEND | | | | | | | |
| Line Type | | Voltage Type: | | | | | | | |
| OH=Overhead AC= UG=Underground SM=Submarine DC= | | AC=Alternating Current DC=Direct Current | | | | | | | |
| | | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

Reporting Party: _____

| | SCHEDULE 7. PART A, ANNUAL DATA O | N TRA | NSMIS | SSIO | N LIN | E OU | TAG | ES F | OR / | | INES | ļ į | |
|-------------|--|----------------------------|------------------------|-------------------------|---------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------------------|--------------------|----------------------|----|
| | (Report following data for | each a | pplicab | le EH | IV Vol | tage (| Class |) | | | | | |
| | | In Re ai | port Year nd above. | 2014 a From eleme | ind Rep Report ` nts that | ort Yea Year 20 are par | r 2015 16 forv t of the | report f vard rep new B | or volta port on ES def | age ca ly for t inition. | itegorie ransmi | s 200 ssion | kV |
| LINE NO. | Applicable AC Voltage Class | Less Than 100 kV (a) | | 100-199 kV (b) | | 200-299 kV (c) | | 300-399 kV (d) | | 400-599 kV (e) | | 600-799 kV (f) | |
| | AUTOMATIC (Unscheduled), Susta | ained C | Outages | for S | specifi | ed Vo | ltage | Clas | S | | | | |
| 1 | Number of Outages | | | | | | | | | | | | |
| 1a | Number of Single Mode Outages | | | | | | | | | | | | |
| 1b | Number of Dependent Mode Outages | | | | | | | | | | | | |
| 1c | Number of Common Mode Outages | | | | | | | | | | | | |
| 2 | Number of Circuit-Hours Out of Service | | | | | | | | | | | | |
| 3 | Initiating (I) and Sustained (S) Causes (Count of Outages per Cause Category) | I | S | Ι | S | I | S | I | S | I | S | I | S |
| 3a | Weather, excluding lightning | | | | | | | | | | | | |
| 3b | Lightning | | | | | | | | | | | | |
| 3c | Environmental | | | | | | | | | | | | |
| 3d | Foreign Interference | | | | | | | | | | | | |
| 3e | Contamination | | | | | | | | | | | | |
| 3f | Fire | | | | | | | | | | | | |
| 3g | Vandalism, Terrorism, or Malicious Acts | | | | | | | | | | | | |
| 3h | Failed AC Substation Equipment | | | | | | | | | | | | |
| 3i | Failed AC/DC Terminal Equipment | | | | | | | | | | | | |
| 3j | Failed Protection System Equipment | | | | | | | | | | | | |
| 3k | Failed AC Circuit Equipment | | | | | | | | | | | | |
| 31 | Failed DC Circuit Equipment | | | | | | | | | | | | |
| 3m | Human Error | | | | | | | | | | | | |
| 3n | Vegetation | | | | | | | | | | | | |
| 30 | Power System Condition | | | | | | | | | | | | |
| 3p | Unknown | | | | | | | | | | | | |
| 3q | Other | | | | | | | | | | | | |
| | NON-AUTOMATIC, Operationa | l Outa | ges for | Spec | ified \ | /oltag | e Cla | SS | • | | | | |
| 4 | Number of Outages | | | | | | | | | | | | |
| 5 | Number of Circuit-Hours Out of Service | | | | | | | | | | | | |
| 6 | Outage Cause (Count) | | | | | | | | | | | | |
| 6a | Emergency | | | | | | | | | | | | |
| 6b | System Voltage Limit Mitigation | | | | | | | | | | | | |
| 6c | System Operating Limit Mitigation (excluding voltage) | | | | | | | | | | | | |
| 6d | Other Operational Outage | | | | | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

| SCHEDULE 7. PART B, ANNUAL DATA ON TRANSMISSION LINE OUTAGES FOR DC LINES | | | | | | | | | | | | | | | |
|---|--|---------------------------------|----------------------|-----------------------------|-----------------|---------------------------|-------------------------------|--------------------------|----------------------------|-----------------------------------|-------------------------|-------------------|------------------|-------------------|-----------|
| | (Report following data f | ior ea | ch app | plical | ble E | HV V | oltag | e Cla | ass) | | | | | | |
| | | In Re abc | eport Ye ove. Fro | ear 201 m Rep | 4 and ort Ye | Repor ar 201 are pa | t Year 6 forwa rt of th | 2015 ard rej e new | report port on BES c | for vol Ily for t definitio | tage c transm on. | atego: | ries 20 eleme | 0 kV a ents th | ind at |
| LINE NO. | Applicable DC Voltage Class | Less Than ± 100 kV (a) | | ± 100- 199 kV (b) (c) | | ± 300- 399 kV (d) | | ± 400- 499 kV (e) | | ± 5 599 | 00- kV | ± 60 799 (f |)0- kV) | | |
| | AUTOMATIC (Unscheduled), S | ustair | ned Ou | utage | es for | Spe | cified | l Voli | tage | Class | S | | | | |
| 1 | Number of Outages | | | | | | | | | | | | | | |
| 1a | Number of Single Mode Outages | | | | | | | | | | | | | | |
| 1b | Number of Dependent Mode Outages | | | | | | | | | | | | | | |
| 1c | Number of Common Mode Outages | | | | | | | | | | | | | | |
| 2 | Number of Circuit-Hours Out of Service | | | | | | | | | | | | | | |
| 2 | Initiating (I) and Sustained (S) Causes | | G | | c | | c | | e | | 9 | | c | | c |
| 3 | (Count of Outages per Cause Category) | I | 3 | | 3 | | 3 | | 3 | | 3 | | 3 | | 3 |
| 3a | Weather, excluding lightning | | | | | | | | | | | | | | |
| 3b | Lightning | | | | | | | | | | | | | | |
| 3c | Environmental | | | | | | | | | | | | | | |
| 3d | Foreign Interference | | | | | | | | | | | | | | |
| 3e | Contamination | | | | | | | | | | | | | | |
| 3f | Fire | | | | | | | | | | | | | | |
| 3g | Vandalism, Terrorism, or Malicious Acts | | | | | | | | | | | | | | |
| 3h | Failed AC Substation Equipment | | | | | | | | | | | | | | |
| 3i | Failed AC/DC Terminal Equipment | | | | | | | | | | | | | | |
| 3j | Failed Protection System Equipment | | | | | | | | | | | | | | |
| 3k | Failed AC Circuit Equipment | | | | | | | | | | | | | | |
| 31 | Failed DC Circuit Equipment | | | | | | | | | | | | | | |
| 3m | Human Error | | | | | | | | | | | | | | |
| 3n | Vegetation | | | | | | | | | | | | | | |
| 30 | Power System Condition | | | | | | | | | | | | | | |
| 3р | Unknown | | | | | | | | | | | | | | |
| 3q | Other | | | | | | | | | | | | | | |
| NON-AUTOMATIC, Operational Outages for Specified Voltage Class | | | | | | | | | | | | | | | |
| 4 | Number of Outages | | | | | | | | | | | | | | |
| 5 | Number of Circuit-Hours Out of Service | | | | | | | | | | | | | | |
| 6 | Outage Cause (Count) | | | | | | | | | | | | | | |
| 6a | Emergency | | | | | | | | | | | | | | |
| 6b | System Voltage Limit Mitigation | | _ | | | | | l | | Ì | | | | | |
| 6c | System Operating Limit Mitigation (excluding voltage) | | | | | | | | | | | | | | |
| 6d | Other Operational Outage | | | | | | | | | 1 | | | | | |



Regional Entity: ______ Reporting Party: ______

| | SCHEDULE 7. PART C, ANNUAL DATA ON TRANSFORMER OUTAGES | | | | | | | | | | | | |
|-------------|--|----------------|---|------------------|-------------------------------|---------------------------------|-------------------------------|-----------------------------|-------------------------------|-------------------|----------------------|------------------|--------------|
| | (Report following da | ata for | each a | applic | cable c | lass) | | | | | | | |
| | | In Re 200 k | port Year V and ab | r 2014 ove. F | and Rep rom Rep are pai | ort Yea ort Yea rt of the | ar 2015 ar 2016 e new E | report forwar BES del | for trar d repo inition | nsform rt only | ers wit for ele | h low-s ments | side that |
| LINE NO. | Applicable Transformer Low-Side Voltage Class | Less 10 | Less Than 100-199 100 kV kV (a) (b) | | 200-299 kV (c) | | 300-399 kV (d) | | 400-599 kV (e) | | 600-799 kV (f) | | |
| | AUTOMATIC (Unscheduled), Sust | ained | Outage | es for | Speci | fied V | /oltag | ge Cla | SS | | | | |
| 1 | Number of Outages | | | | | | | | | | | | |
| 1a | Number of Single Mode Outages | | | | | | | | | | | | |
| 1b | 1b Number of Dependent Mode Outages | | | | | | | | | | | | |
| 1c | Number of Common Mode Outages | | | | | | | | | | | | |
| 2 | Number of Transformer-Hours Out of Service | | | | | | | | | | | | |
| 3 | Initiating (I) and Sustained (S) Causes (Count of Outages per Cause Category) | I | S | Т | S | I | S | Ι | S | Ι | S | I | S |
| 3a | Weather, excluding lightning | | | | | | | | | | | | |
| 3b | Lightning | | | | | | | | | | | | |
| 3c | Environmental | | | | | | | | | | | | |
| 3d | Foreign Interference | | | | | | | | | | | | |
| 3e | Contamination | | | | | | | | | | | | |
| 3f | Fire | | | | | | | | | | | | |
| 3g | Vandalism, Terrorism, or Malicious Acts | | | | | | | | | | | | |
| 3h | Failed AC Substation Equipment | | | | | | | | | | | | |
| 3i | Failed AC/DC Terminal Equipment | | | | | | | | | | | | |
| 3j | Failed Protection System Equipment | | | | | | | | | | | | |
| 3k | Failed AC Circuit Equipment | | | | | | | | | | | | |
| 31 | Failed DC Circuit Equipment | | | | | | | | | | | | |
| 3m | Human Error | | | | | | | | | | | | |
| 3n | Vegetation | | | | | | | | | | | | |
| 30 | Power System Condition | | | | | | | | | | | | |
| 3р | Unknown | | | | | | | | | | | | |
| 3q | Other | | | | | | | | | | | | |
| | NON-AUTOMATIC, Operationa | al Outa | ages fo | or Spe | ecified | Volta | ge C | lass | | | | | |
| 4 | Number of Outages | | | | | | | | | | | | |
| 5 | Number of Transformer-Hours Out of Service | | | | | | | | | | | | |
| ő | Outage Cause (Count) | | | | | | | | | | | | |
| 6a | Emergency | | | | | | | | | | | | |
| 6b | System Voltage Limit Mitigation | | | | | | | | | | | | |
| 6c | System Operating Limit Mitigation (excluding voltage) | | | | | _ | | | | | | | |
| 6d | Other Operational Outage | | | | | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

Reporting Party: _____

| | SCHEDULE 7. PART D, TRANSMISSION ELEMENT INVENTORY AND EVENT SUMMARY | | | | | | | | | |
|------------------------------------|--|---------------------------------|-------------------------------|--------------------------------------|--------------------------------------|------------------------|-------------------------------------|-------------------------------|--|--|
| | (Report following data for each applicable voltage class) | | | | | | | | | |
| LINE NO. | | In Report Y Report Year 2 | Year 2014 and 2016 forward re | Report Year 20 eport only for tra | 15 report for vol Insmission elem | tage categories | s 200 kV and at art of the new E | oove. From BES definition. | | |
| AC Circ | cuit Voltage Class | Less Than 100 kV (a) | 100-199 kV (b) | 200-299 kV (c) | 300-399 kV (d) | 400-599 kV (e) | 600-799 kV (f) | All Voltages (g) | | |
| 1 | Number of AC Circuits (Total) | | | | | | | | | |
| 1a | Overhead | | | | | | | | | |
| 1b | Underground | | | | | | | | | |
| 2 | Number of AC Circuit Miles (Total) | | | | | | | | | |
| 2a | Overhead | | | | | | | | | |
| 2b | Underground | | | | | | | | | |
| 3 | Number of AC Multi-Circuit Structure Miles | | | | | | | | | |
| DC Circ | cuit Voltage Class | Less Than ± 100 kV (a) | ± 100-199 kV (b) | ± 200-299 kV (c) | ± 300-399 kV (d) | ± 400-499 kV (e) | ± 500-599 kV (f) | ± 600-799 kV (g) | | |
| 4 | Number of DC Circuits (Total) | | | | | | | | | |
| 4a | Overhead | | | | | | | | | |
| 4b | Underground | | | | | | | | | |
| 5 | Number of DC Circuit Miles (Total) | | | | | | | | | |
| 5a | Overhead | | | | | | | | | |
| 5b | Underground | | | | | | | | | |
| Transformer Low-Side Voltage Class | | Less Than 100 kV (a) | 100-199 kV (b) | 200-299 kV (b) | 300-399 kV (c) | 400-599 kV (d) | 600-799 kV (e) | Reserved (f) | | |
| 6 | Number of Transformers | | | | | | | | | |
| 7 | Total Number of Events (all Voltage Classes) | | | | | | | | | |



Regional Entity:

Reporting Party:

SCHEDULE 8. ANNUAL DATA ON GENERATING UNIT OUTAGES, DERATINGS AND PERFORMANCE INDEXES For Conventional Units

SCHEDULE 8. PART A. ANNUAL DATA ON GENERATING UNIT OUTAGE HOURS AND COUNTS

| LINE | Conventional Generating Unit | Total Number of | Forced O | outage | Maintenan | ce Outage | Planned C | Planned Outage | | | |
|------|------------------------------|--------------------|----------------|---------------|----------------|---------------|----------------|----------------|--|--|--|
| NO. | Conventional Generating Onit | Generator Units | Hours (FOH) | Count (FO) | Hours (MOH) | Count (MO) | Hours (POH) | Count (PO) | | | |
| | | Α | В | С | D | E | F | G | | | |
| | | | By Unit | Туре | F | | - | | | | |
| 1 | Coal Steam (ST) | | | | | | | | | | |
| 2 | Other Fossil Steam (ST) | | | | | | | | | | |
| 3 | Nuclear (NUC) | | | | | | | | | | |
| 4 | Gas Turbines (GT) | | | | | | | | | | |
| 5 | Combined Cycle (CT, CA) | | | | | | | | | | |
| 6 | Int. Combus. Engines (IC) | | | | | | | | | | |
| 7 | Hydro (HY) | | | | | | | | | | |
| 8 | Other | | | | | | | | | | |
| 9 | TOTAL | | | | | | | | | | |
| | By Capacity | | | | | | | | | | |
| 10 | 199 MW and below | | | | | | | | | | |
| 11 | 200-399 MW | | | | | | | | | | |
| 12 | 400-699 MW | | | | | | | | | | |
| 13 | 700 MW and above | | | | | | | | | | |
| 14 | TOTAL | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | Coal Units b | y Vintage | | | | | | | |
| | Units that entered commerci | al operation in | or before 197 | 72 72 | | | | | | | |
| 15 | Coal Steam – Subcritical | | | | | | | | | | |
| 16 | Coal Steam –Supercritical | | | | | | | | | | |
| | Units that entered commerci | al operation in | or after 1973 | | | | | 1 | | | |
| 17 | Coal Steam – Subcritical | | | | | | | | | | |
| 18 | Coal Steam – Supercritical | | | | | | | | | | |
| | | Com | bined Cvcle L | Jnits by Vir | ntage | | | | | | |
| | Units that entered commerci | al operation in | or before 200 |)2 | | | | | | | |
| 19 | Combined Cycle | | | | | | | | | | |
| | Units that entered commerci | al operation in | or after 2003 | | 1 | | | | | | |
| 20 | Combined Cycle | | | | | | | | | | |
| 20 | Combined Cycle | | | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

Reporting Party: _____

| S | SCHEDULE 8. PART B. ANNUAL DATA ON GENERATING UNIT DERATING HOURS AND COUNTS | | | | | | | | | |
|-------------|--|-------------------------------|----------------------------|-------------------------------|----------------------------|-------------------------------|----------------------------|---|--|--|
| | | Forced De | erating | Maintenance | Derating | Planned D | erating | Equivalent | | |
| LINE NO. | Conventional Generating Unit | Equivalent Hours (EFDH) | Counts (Unique) (FD) | Equivalent Hours (EMDH) | Counts (Unique) (D4) | Equivalent Hours (EPDH) | Counts (Unique) (PD) | Seasonal Derating Hours (ESDH) | | |
| | | Α | В | С | D | E | F | G | | |
| | | | | By Unit Type | | | | | | |
| 1 | Coal Steam (ST) | | | | | | | | | |
| 2 | Other Fossil Steam (ST) | | | | | | | | | |
| 3 | Nuclear (NUC) | | | | | | | | | |
| 4 | Gas Turbines (GT) | | | | | | | | | |
| 5 | Combined Cycle (CT, CA) | | | | | | | | | |
| 6 | Int. Combus. Engines (IC) | | | | | | | | | |
| 7 | Hydro (HY) | | | | | | | | | |
| 8 | Other | | | | | | | | | |
| 9 | TOTAL | | | | | | | | | |
| | By Capacity | | | | | | | | | |
| 10 | 199 MW and below | | | | | | | | | |
| 11 | 200-399 MW | | | | | | | | | |
| 12 | 400-699 MW | | | | | | | | | |
| 13 | 700 MW and above | | | | | | | | | |
| 14 | TOTAL | | | | | | | | | |
| | | | | | | | | | | |
| | | | Coal | Units by Vint | age | | | | | |
| | Units that entered comm | ercial operation | on in or be | fore 1972 | | | | | | |
| 15 | Coal Steam – Subcritical | | | | | | | | | |
| 16 | Coal Steam –Supercritical | | | | | | | | | |
| | Units that entered comm | ercial operation | on in or aft | er 1973 | | | | | | |
| 17 | Coal Steam – Subcritical | | | | | | | | | |
| 18 | Coal Steam – Supercritical | | | | | | | | | |
| | | | Combined | Cycle Units b | y Vintage | | | | | |
| | Units that entered comm | ercial operation | on in or be | fore 2002 | | | | | | |
| 19 | Combined Cycle | - | | | | | | | | |
| | Units that entered comm | ercial operation | on in or aft | er 2003 | · | | | | | |
| 20 | Combined Cycle | • | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

| | SCHEDULE 8. PART C.1. ANNUAL DATA ON GENERATING UNIT PERFORMANCE INDEXES | | | | | | | | | | |
|-------------|--|------------------------------------|-------------------------------|---------------------------|-----------------------------|-------------------------------|--|---|--|--|--|
| Line No. | Conventional Generating Unit | Net Capacity Factor (NCF) | Net Output Factor (NOF) | Service Factor (SF) | Availability Factor (AF) | Unavailability Factor (UF) | Unit Derating Factor (UDF) | Equivalent Availability Factor (EAF) | | | |
| | | A | В | С | D | E | F | G | | | |
| | | | | | | By Unit Type | | | | | |
| 1 | Coal Steam (ST) | | | | | | | | | | |
| 2 | Fossil Steam (ST) | | | | | | | | | | |
| 3 | Nuclear (NUC) | | | | | | | | | | |
| 4 | Gas Turbines (GT) | | | | | | | | | | |
| 5 | Combined Cycle (CT, CA) | | | | | | | | | | |
| 6 | Int. Combus. Engines (IC) | | | | | | | | | | |
| 7 | Hydro (HY) | | | | | | | | | | |
| 8 | Other | | | | | | | | | | |
| 9 | TOTAL | | | | | | | | | | |
| | By Capacity | | | | | | | | | | |
| 10 | 199 MW and below | | | | | | | | | | |
| 11 | 200-399 MW | | | | | | | | | | |
| 12 | 400-699 MW | | | | | | | | | | |
| 13 | 700 MW and above | | | | | | | | | | |
| 14 | TOTAL | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | Coa | al Units by | Vintage | | | | | | |
| | Units that entered comm | ercial oper | ration in or b | efore 1972 | Ŭ | | | | | | |
| 15 | Coal Steam – Subcritical | | | | | | | | | | |
| 16 | Coal Steam–Supercritical | | | | | | | | | | |
| | Units that entered comm | ercial oper | ration in or a | fter 1973 | 1 | | | | | | |
| 17 | Coal Steam – Subcritical | | | | | | [| | | | |
| 18 | Coal Steam–Supercritical | | | | | | | | | | |
| | | | Combine | d Cycle Ur | hits by Vintag | IE | | | | | |
| | Units that entered comm | ercial one | ration in or b | efore 2002 | inte is y mintug | • | | | | | |
| 19 | Combined Cycle | | | | | | [| | | | |
| 19 | Units that ontored comm | orgial ana | ration in or o | ftor 2002 | I | | | | | | |
| 20 | Combined Cycle | lercial oper | ation in or a | | | | le l | | | | |
| 20 | Combined Cycle | | | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

| LINE NO. Conventional Generating Unit Equivalent Forced Outage Rate (FOR) Equivalent Maintenance (MOR) Equivalent Planned (POR) Forced Outage Rate Demand (FORd) Equivalent Planned (FORd) 1 Coal Steam (ST) B C D E 2 Fossil Steam (ST) B C D E 3 Nuclear (NUC) B C D E 4 Gas Turbines (GT) S | | SCHEDULE 8. PART C.2. ANNUAL DATA ON GENERTING UNIT PERFORMANCE INDEXES | | | | | | | | | | | |
|---|-------------|---|--|---|---|--|---|--|--|--|--|--|--|
| ABCDEBy Unit Type2Fossil Steam (ST)Image: Steam (ST)Image: Steam (ST)3Nuclear (NUC)Image: Steam (ST)Image: Steam (ST)4Gas Turbines (GT)Image: Steam (ST)Image: Steam (ST)5Combined Cycle (CT, CA)Image: Steam (ST)Image: Steam (ST)6Int. Combus. Engines (IC)Image: Steam (ST)Image: Steam (ST)7Hydro (HY)Image: Steam (ST)Image: Steam (ST)8OtherImage: Steam (ST)Image: Steam (ST)9TOTALImage: Steam (ST)Image: Steam (ST)10199 MW and belowImage: Steam (ST)Image: Steam (ST)11200-339 MWImage: Steam (ST)Image: Steam (ST)12400-699 MWImage: Steam (ST)Image: Steam (ST)13700 MW and aboveImage: Steam (ST)Image: Steam (ST)14TOTALImage: Steam (ST)Image: Steam (ST)15Coal Steam - SubcriticalImage: Steam (ST)Image: Steam (ST)16Coal Steam - SubcriticalImage: Steam (ST)Image: Steam (ST)17Coal Steam - SubcriticalImage: Steam (ST)Image: Steam (ST)18Coal Steam - SubcriticalImage: Steam (ST)Image: Steam (ST)19199 MW and belowImage: Steam (ST)Image: Steam (ST)19199 MW and belowImage: Steam (ST)Image: Steam (ST)20199 MW and belowImage: Steam (ST)Image: Steam (ST) | LINE NO. | Conventional Generating Unit | Equivalent Forced Outage Rate (FOR) | Equivalent Maintenance Outage Rate (MOR) | Equivalent Planned Outage Rate (POR) | Forced Outage Rate Demand (FORd) | Equivalent Forced Outage Rate Demand (EFORd) | | | | | | |
| By Unit Type 1 Coal Steam (ST) Image: Steam (ST) Image: Steam (ST) 3 Nuclear (NUC) Image: Steam (ST) Image: Steam (ST) 4 Gas Turbines (GT) Image: Steam (ST) Image: Steam (ST) 5 Combined Cycle (CT, CA) Image: Steam (ST) Image: Steam (ST) 6 Int. Combus. Engines (IC) Image: Steam (ST) Image: Steam (ST) 7 Hydro (HY) Image: Steam (ST) Image: Steam (ST) 8 Other Image: Steam (ST) Image: Steam (ST) 9 TOTAL Image: Steam (ST) Image: Steam (ST) 10 199 MW and below Image: Steam (ST) Image: Steam (ST) 11 200-399 MW Image: Steam (ST) Image: Steam (ST) 12 400-699 MW Image: Steam (ST) Image: Steam (ST) 13 700 MW and above Image: Steam (ST) Image: Steam (ST) 14 TOTAL Image: Steam (ST) Image: Steam (ST) 15 Coal Steam - Subcritical Image: Steam (ST) Image: Steam (ST) 16 | | | Α | В | С | D | E | | | | | | |
| 1 Coal Steam (ST) Image: Coal Steam (ST) Image: Coal Steam (ST) 2 Fossil Steam (ST) Image: Coal Steam (ST) Image: Coal Steam (ST) 4 Gas Turbines (GT) Image: Coal Steam (ST) Image: Coal Steam (ST) 4 Gas Turbines (GT) Image: Coal Steam (ST) Image: Coal Steam (ST) 6 Int. Combus. Engines (IC) Image: Coal Steam (ST) Image: Coal Steam (ST) 7 Hydro (HY) Image: Coal Steam (ST) Image: Coal Steam (ST) 10 199 MW and below Image: Coal Steam (ST) Image: Coal Steam (ST) 11 200-399 MW Image: Coal Steam (ST) Image: Coal Steam (ST) 12 400-699 MW Image: Coal Steam (ST) Image: Coal Steam (ST) 13 700 MW and above Image: Coal Steam (ST) Image: Coal Steam (ST) 14 TOTAL Image: Coal Steam (ST) Image: Coal Steam (ST) 14 TOTAL Image: Coal Steam (ST) Image: Coal Steam (ST) 15 Coal Steam (ST) Image: Coal Steam (ST) Image: Coal Steam (ST) 16 Coal Steam (St) Image: Coal Steam (ST) Image: Coal St) 17 Coal Steam | | | | By Unit Typ | be | | | | | | | | |
| 2 Fossil Steam (ST) | 1 | Coal Steam (ST) | | | | | | | | | | | |
| 3 Nuclear (NUC) | 2 | Fossil Steam (ST) | | | | | | | | | | | |
| 4 Gas Turbines (GT) Image: Combined Cycle (CT, CA) 5 Combined Cycle (CT, CA) Image: CT, CA) 6 Int. Combus. Engines (IC) Image: CT, CA) 7 Hydro (HY) Image: CT, CA) 8 Other Image: CT, CA) 9 TOTAL Image: CT, CA) 9 TOTAL Image: CT, CA) 10 199 MW and below Image: CT, CA) 11 200-399 MW Image: CT, CA) 12 400-699 MW Image: CT, CA) 13 700 MV and above Image: CT, CA) 13 700 MV and above Image: CT, CA) 14 TOTAL Image: CT, CA) 13 700 MV and above Image: CT, CA) 14 TOTAL Image: CT, CA) Coal Units by Vintage Units that entered commercial operation in or before 1972 15 Coal Steam – Subcritical Image: CT, CA) 16 Coal Steam – Subcritical Image: CT, CA) 17 Coal Steam – Subcritical Image: CT, CA) 18 Coal Steam – Subcritical Image: CT, CA) | 3 | Nuclear (NUC) | | | | | | | | | | | |
| 5 Combined Cycle (CT, CA) Image: Combined Cycle (CT, CA) 6 Int. Combus. Engines (IC) Image: Combined Cycle (IY) 7 Hydro (HY) Image: Combined Cycle (IY) 8 Other Image: Combined Cycle (IY) 9 TOTAL Image: Combined Cycle (IY) 10 199 MW and below Image: Combined Cycle (IY) 11 200-399 MW Image: Combined Cycle (IY) 12 400-699 MW Image: Combined Cycle (IY) 13 700 MW and above Image: Combined Cycle (IY) 14 TOTAL Image: Combined Cycle (IY) Coal Units by Vintage Units that entered commercial operation in or before 1972 15 Coal Steam – Subcritical Image: Combined Cycle Units by Vintage Units that entered commercial operation in or after 1973 Image: Combined Cycle Units by Vintage 17 Coal Steam – Subcritical Image: Combined Cycle Units by Vintage Units that entered commercial operation in or before 2002 Image: Combined Cycle Units by Vintage 18 Coal Steam – Subcritical Image: Combined Cycle Units by Vintage Units that entered commercial operation in or after 2003 Image: Combined Cycle Uni | 4 | Gas Turbines (GT) | | | | | | | | | | | |
| 6 Int. Combus. Engines (IC) | 5 | Combined Cycle (CT, CA) | | | | | | | | | | | |
| 7 Hydro (HY) Image: Second Secon | 6 | Int. Combus. Engines (IC) | | | | | | | | | | | |
| 8 Other Image: strain of the strain of | 7 | Hydro (HY) | | | | | | | | | | | |
| 9 TOTAL By Capacity 10 199 MW and below By Capacity 11 200-399 MW Image: Strategy St | 8 | Other | | | | | | | | | | | |
| By Capacity 10 199 MW and below Image: Second S | 9 | TOTAL | | | | | | | | | | | |
| 10 199 MW and below Image: state of the state of | | | | By Capacit | t y | | | | | | | | |
| 11 200-399 MW Image: Second Seco | 10 | 199 MW and below | | | | | | | | | | | |
| 12 400-699 MW Image: Sector of the sect | 11 | 200-399 MW | | | | | | | | | | | |
| 13 700 MW and above | 12 | 400-699 MW | | | | | | | | | | | |
| 14 TOTAL Image: Constraint of the second secon | 13 | 700 MW and above | | | | | | | | | | | |
| Coal Units by Vintage Units that entered commercial operation in or before 1972 15 Coal Steam – Subcritical Image: Coal Steam – Subcritical Image: Coal Steam – Subcritical 16 Coal Steam – Subcritical Image: Coal Steam – Subcritical Image: Coal Steam – Subcritical Image: Coal Steam – Subcritical 17 Coal Steam – Subcritical Image: Coal Steam – Subcritical Image: Coal Steam – Subcritical Image: Coal Steam – Subcritical 18 Coal Steam – Supercritical Image: Coal Steam – Subcritical Image: Coal Steam – Subcritical Image: Coal Steam – Subcritical 18 Coal Steam – Supercritical Image: Coal Steam – Subcritical Image: Coal Steam – Subcritical Image: Coal Steam – Subcritical 19 199 MW and below Image: Coal Steam – Subcritical Operation in or after 2003 Image: Coal Steam – Subcritical Operation in or after 2003 20 199 MW and below Image: Coal Steam – Subcritical Operation in or after 2003 Image: Coal Steam – Subcritical Operation in or after 2003 | 14 | TOTAL | | | | | | | | | | | |
| Coal Units by Vintage Units that entered commercial operation in or before 1972 15 Coal Steam – Subcritical Image: Coal Steam – Supercritical Image: Coal Steam – Supercritical 16 Coal Steam – Subcritical Image: Coal Steam – Subcritical Image: Coal Steam – Subcritical 17 Coal Steam – Subcritical Image: Coal Steam – Subcritical Image: Coal Steam – Subcritical 18 Coal Steam – Supercritical Image: Coal Steam – Supercritical Image: Coal Steam – Supercritical 18 Coal Steam – Supercritical Image: Coal Steam – Supercritical Image: Coal Steam – Supercritical 19 199 MW and below Image: Coal Steam – Supercritical Operation in or after 2003 Image: Coal Steam – Supercritical Operation in or after 2003 20 199 MW and below Image: Coal Steam – Supercritical Operation in or after 2003 Image: Coal Steam – Supercritical Operation in or after 2003 | | | | | | | | | | | | | |
| Units that entered commercial operation in or before 1972 15 Coal Steam – Subcritical 16 Coal Steam–Supercritical 17 Coal Steam – Subcritical 18 Coal Steam–Supercritical 18 Coal Steam–Supercritical 19 199 MW and below 19 199 MW and below 20 199 MW and below | | | | Coal Units by V | /intage | | | | | | | | |
| 15 Coal Steam – Subcritical Image: constraint of the second straint of | | Units that entered comm | ercial operation i | n or before 1972 | | | | | | | | | |
| 16 Coal Steam-Supercritical Image: construct of the second state | 15 | Coal Steam – Subcritical | | | | | | | | | | | |
| Units that entered commercial operation in or after 1973 17 Coal Steam – Subcritical 18 Coal Steam – Supercritical 18 Coal Steam – Supercritical Combined Cycle Units by Vintage Units that entered commercial operation in or before 2002 19 199 MW and below Units that entered commercial operation in or after 2003 20 199 MW and below | 16 | Coal Steam–Supercritical | | | | | | | | | | | |
| 17 Coal Steam – Subcritical 18 Coal Steam–Supercritical 18 Coal Steam–Supercritical Combined Cycle Units by Vintage Units that entered commercial operation in or before 2002 19 199 MW and below Units that entered commercial operation in or after 2003 20 199 MW and below | | Units that entered comm | ercial operation i | n or after 1973 | | | | | | | | | |
| 18 Coal Steam–Supercritical Combined Cycle Units by Vintage Units that entered commercial operation in or before 2002 Units that entered commercial operation in or after 2003 19 199 MW and below Image: Commercial operation in or after 2003 20 199 MW and below Image: Commercial operation in or after 2003 | 17 | Coal Steam – Subcritical | | | | | | | | | | | |
| Combined Cycle Units by Vintage Units that entered commercial operation in or before 2002 19 199 MW and below Units that entered commercial operation in or after 2003 20 199 MW and below | 18 | Coal Steam–Supercritical | | | | | | | | | | | |
| Units that entered commercial operation in or before 2002 19 199 MW and below Units that entered commercial operation in or after 2003 20 199 MW and below | | Combined Cycle Units by Vintage | | | | | | | | | | | |
| 19 199 MW and below Units that entered commercial operation in or after 2003 | | Units that entered comm | ercial operation i | n or before 2002 | | | | | | | | | |
| Units that entered commercial operation in or after 2003 | 19 | 199 MW and below | • | | | | | | | | | | |
| 20 199 MW and below | | Units that entered comm | ercial operation i | n or after 2003 | · | • • | | | | | | | |
| | 20 | 199 MW and below | | | | | | | | | | | |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

| PRIMARY CAUSE OF ACTIVE STATE FORCED OUTAGES | | | | | | | | | |
|--|--|----------------------------------|---------------------------|---------------------------------|--|---|--|-----------------------|--------------------------|
| LINE NO. | Forced Outage and Unplanned Derating Causes | Fossil Steam Units (ST) | Nuclear Units (NUC) | Gas Turbine Units (GT) | Combined Cycle Units (CT, CA) | Internal Combustion Engines (IC) | Hydro/ Pumped Storage Units (HY) | All Other Units | Total Outage Count |
| | | A | В | C | D | E | F | G | н |
| | | | FOR | | AGE EVENTS | | 1 | | |
| 1 | Major Components | | | | | | | | |
| 1.a | Boiler | | | | | | | | |
| 1.b | Reactor | | | | | | | | |
| 1.C | Engine | | | | | | | | |
| 1.d | Turbine | | | | | | | | |
| 1.e | Generator | | | | | | | | |
| | | | | | | | | | |
| 2 | Balance of Plant (BoP) | | | | | | | | |
| 2.a | Water Systems | | | | | | | | |
| 2.b | Electrical | | | | | | | | |
| 2.C | Power Station Switchyard | | | | | | | | |
| 2.d | Auxiliary Systems | | | | | | | | |
| 2.e | All Other BOP Systems | | | | | | | | |
| 0 | Dollution Control Equipment | | | | | | | | |
| 3 | Pollution Control Equipment | | | | | | | | |
| 4 | External | | | | | | | | |
| 4 | External Severe Weether | | | | | | | | |
| 4.a | Non weather estastrophes | | | | | | | | |
| 4.0 | Feenomic | | | | | | | | |
| 4.0 | Economic Evol Quality | | | | | | | | |
| 4.u | Transmission System | | | | | | | | |
| 4.e | Other External | | | | | | | | |
| 7.1 | | | | | | | | | |
| 5 | Regulatory, Safety, Environmental | | | | | | | | |
| 5.a | Regulatory | | | | | | | | |
| 5.b | Stack Emissions | | | | | | | | |
| 5.c | Other Env. Limitations | | | | | | | | |
| 5.d | Safety | | | | | | | | |
| | | | | | | | | | |
| 6 | Personnel or Procedure Errors | | | | | | | | |
| 6.a | Personnel Errors | | | | | | | | |
| 6.b | Procedural Errors | | | | | | | | |
| 6.c | Staff Shortage | | | | | | | | |
| | | | | | | | | | |
| 7 | Performance | | | | | | | | |
| | | | | | | | | | |
| 8 | All Other Causes | | | | | | | | |
| | | | | | | | | | |
| 9 | TOTAL (All Causes) | | | | | | | | |



Regional Entity:

Reporting Party:

SCHEDULE 9. SMART GRID TRANSMISSION SYSTEM DEVICES AND APPLICATIONS

SCHEDULE 9. PART A. DYNAMIC CAPABILITY RATING SYSTEMS (DCRSs)

| LINE NO. | AC Circuit Voltage Class | 100- 299 kV (A) | 300-799 kV (B) |
|-------------|---|--------------------|-------------------|
| 1 | Number of transmission circuits utilizing a dynamic capability rating system | | |
| 2 | Miles of AC transmission lines utilizing a dynamic capability rating system | | |
| 3 | Number of station transformers utilizing a dynamic capability rating system | | |

SCHEDUEL 9. PART B. PHASOR MEASUREMENT UNITS (PMUs)

| LINE NO. | AC Circuit Voltage Class | 100- 299 kV (A) | 300-799 kV (B) |
|-------------|---|--------------------|-------------------|
| 1 | Number of non-networked PMUs | | |
| 2 | Number of networked PMUs | | |
| 3 | Number of substations with at least one networked PMU installed | | |
| 4 | Number of total substations | | |



Regional Entity:

| SCHEDULE 9. PART C. SMART GRID PMU APPLICATIONS | | | | | | | | | | |
|---|---|------------------|--|--|--|--|--|--|--|--|
| | | | | | | | | | | |
| LINE NO. | Application Type | Application Used | | | | | | | | |
| PMU | PMU APPLICATIONS | | | | | | | | | |
| | A. Real-time Operations Applications | | | | | | | | | |
| 1 | Indicate whether PMUs are being used to support the following applications: | | | | | | | | | |
| 1a | Wide-area situational awareness | []Yes,[]No | | | | | | | | |
| 1b | Frequency stability monitoring and trending | []Yes, []No | | | | | | | | |
| 1c | Power oscillation monitoring | []Yes, []No | | | | | | | | |
| 1d | Voltage monitoring and trending | []Yes, []No | | | | | | | | |
| 1e | Alarming and setting system operating limits, event detection and avoidance | []Yes, []No | | | | | | | | |
| 1f | Resource integration | []Yes, []No | | | | | | | | |
| 1g | State estimation | []Yes, []No | | | | | | | | |
| 1h | Dynamic line ratings and congestion management | []Yes, []No | | | | | | | | |
| 1i | Outage restoration | []Yes, []No | | | | | | | | |
| 1j | Operations planning | []Yes, []No | | | | | | | | |
| 1k | Islanding detection, management, and restoration | []Yes, []No | | | | | | | | |
| 11 | Equipment problem detection | []Yes, []No | | | | | | | | |
| | B. Planning and Off-line Applications | | | | | | | | | |
| 2 | Indicate whether PMUs are being used to support the following applications: | | | | | | | | | |
| 2a | Baselining power system performance | []Yes, []No | | | | | | | | |
| 2b | Event analysis | []Yes,[]No | | | | | | | | |
| 2c | Static system model calibration and validation | []Yes, []No | | | | | | | | |
| 2d | Dynamic system model calibration and validation | []Yes, []No | | | | | | | | |
| 2e | Power plant model validation | []Yes, []No | | | | | | | | |
| 2f | Load characterization | []Yes, []No | | | | | | | | |

| 2g | Special protection schemes and islanding | []Yes, []No |
|----|--|-------------|
| 2h | Primary frequency (governing) response | []Yes, []No |
| 2i | Operator training | []Yes, []No |



OMB No. 1905-0129 Approval Expires: 03/31/2020 Burden: 122 hours

Regional Entity:

| SCHEDULE 10. COMMENTS | | | | | | | | | | |
|-----------------------|-----------------|-------------------------|-----------------------------|---------------------------|-------------------------|----------------|--|--|--|--|
| LINE NO. | Schedule (A) | Schedule Part (B) | Schedule Line No. (C) | Schedule Column (D) | Schedule Page (E) | Comment (F) | | | | |
| 1 | | | | | | | | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| 5 | | | | | | | | | | |
| 6 | | | | | | | | | | |
| 7 | | | | | | | | | | |
| 8 | | | | | | | | | | |
| 9 | | | | | | | | | | |
| 10 | | | | | | | | | | |
| 11 | | | | | | | | | | |
| 12 | | | | | | | | | | |
| 13 | | | | | | | | | | |
| 14 | | | | | | | | | | |
| 15 | | | | | | | | | | |
| 16 | | | | | | | | | | |
| 17 | | | | | | | | | | |
| 18 | | | | | | | | | | |
| 19 | | | | | | | | | | |
| 20 | | | | | | | | | | |
| 21 | | | | | | | | | | |
| 22 | | | | | | | | | | |
| 23 | | | | | | | | | | |
| 24 | | | | | | | | | | |
| 25 | | | | | | | | | | |
| 26 | | | | | | | | | | |
| 27 | | | | | | | | | | |