



Independent Statistics & Analysis

U.S. Energy Information Administration

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

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SCHEDULE 1. IDENTIFICATION

Survey Contact

First Name: _____ Last Name: _____
Title: _____
Telephone (include extension): _____ Fax: _____
Email: _____

Supervisor of Contact Person for Survey

First Name: _____ Last Name: _____
Title: _____
Telephone (include extension): _____ Fax: _____
Email: _____

Report For

Regional Entity: _____
Reporting Party (Regional Entity or subregion): _____

For questions about the data requested on Form EIA-411, contact the Survey Manager:

Tim Shear
Telephone Number: (202) 586-0403
FAX Number: (202) 287-1938
Email: Tim.Shear@eia.gov



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 (Actual - Prior Year)		2017 (RY - Report Year)		2018 (Next 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 MEGA-WATTHOURS) (b)
1	January						
2	February						
3	March						
4	April						
5	May						
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
1	Summer Peak Hour Demand (Megawatts) June-September											
2	Winter Peak Hour Demand (Megawatts) December - February											
3	Net Annual Energy (Gigawatt hours)											



Regional Entity: _____

Reporting Party: _____

SCHEDULE 3. PART A. PROJECTED DEMAND AND CAPACITY - SUMMER

LINE NO.		YEAR				
			Year 1 (RY 2017)	Year 2 (2018)	Year 9 (2025)	Year 10 (2026)
DEMAND (IN MEGAWATTS)						
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					
SUPPLY CATEGORIES (IN MEGAWATTS)						
5	TOTAL INTERNAL CAPACITY (sum of 6 and 8a)					
6	EXISTING CAPACITY (6a+6b+6c)					
6a	Certain					
6b	Other					
6c	Unavailable					



Regional Entity: _____
 Reporting Party: _____

SCHEDULE 3. PART A. PROJECTED DEMAND AND CAPACITY - SUMMER

LINE NO.		YEAR					
		)	Year 1 (RY 2017)	Year 2 (2018)	....	Year 9 (2025)	Year 10 (2026)
FUTURE CAPACITY CATEGORIES (IN MEGAWATTS)							
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						
9a	Firm						
9b	Expected						
10	CAPACITY TRANSFERS – EXPORTS						
10a	Firm						
10b	Expected						



Regional Entity: _____

Reporting Party: _____

SCHEDULE 3. PART A. PROJECTED DEMAND AND CAPACITY - SUMMER

LINE NO.		YEAR				
		Year 1 (RY 2017)	Year 2 (2018)	....	Year 9 (2025)	Year 10 (2026)
CAPACITY - Continued (IN MEGAWATTS)						
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					



Regional Entity: _____
Reporting Party: _____

SCHEDULE 3. PART B. PROJECTED DEMAND AND CAPACITY - WINTER

LINE NO.		YEAR				
		Year 1 (RY 2017)	Year 2 (2018)	....	Year 9 (2025)	Year 10 (2026)
DEMAND (IN MEGAWATTS)						
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					
SUPPLY CATEGORIES (IN MEGAWATTS)						
5	TOTAL INTERNAL CAPACITY (sum of 6 and 8a)					
6	EXISTING CAPACITY (6a+6b+6c)					
6a	Certain					
6b	Other					
6c	Unavailable					



Regional Entity: _____
 Reporting Party: _____

SCHEDULE 3. PART B. PROJECTED DEMAND AND CAPACITY - WINTER

LINE NO.		YEAR					
			Year 1 (RY 2017)	Year 2 (2018)	....	Year 9 (2025)	Year 10 (2026)
FUTURE CAPACITY CATEGORIES (IN MEGAWATTS)							
7	FUTURE CAPACITY ADDITIONS						
7a	Tier 1 (Most Certain)						
7b	Tier 2						
7c	Tier 3 (Least Certain)						
8	ANTICIPATED CAPACITY (6a+8a)						
CAPACITY TRANSFERS (IN MEGAWATTS)							
9	CAPACITY TRANSFERS – IMPORTS						
9b	Firm						
9c	Expected						
10	CAPACITY TRANSFERS – EXPORTS						
10ab	Firm						
10b	Expected						



Regional Entity: _____

Reporting Party: _____

SCHEDULE 3. PART B. HISTORICAL AND PROJECTED DEMAND AND CAPACITY - WINTER

LINE NO.		YEAR				
		Year 1 (RY 2017)	Year 2 (2018)	....	Year 9 (2025)	Year 10 (2026)
CAPACITY - Continued (IN MEGAWATTS)						
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					



Regional Entity: _____

Reporting Party: _____

SCHEDULE 4. BULK TRANSMISSION FACILITY POWER FLOW CASES

Line No.				
1	Case Name:			
2	Year of Study:			
3	Case Number:			
PROSPECTIVE FACILITIES AND CONNECTIONS				
4	Name And Type Of Facility (a)	Projected In-Service Date (e.g., 12-2018) (b)	Connections	
			Bus Number (c)	Bus Name (d)



Regional Entity: _____
 Reporting Party: _____

SCHEDULE 5. BULK ELECTRIC TRANSMISSION SYSTEM MAPS

LINE NO.			
1	Specify the Number of Maps Provided:		
2	For each map provide file name, coverage, and map software:		
	MAP NUMBER (if applicable) (a)	FILE NAME (if applicable) (b)	MAP SOFTWARE (if applicable) (c)



Regional Entity: _____

Reporting Party: _____

SCHEDULE 6. PART A. EXISTING AND PROJECTED CIRCUIT MILES

		CIRCUIT MILES											
		In 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 (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)												



Regional Entity: _____

Reporting Party: _____

SCHEDULE 6. PART B. CHARACTERISTICS OF PROJECTED TRANSMISSION LINE ADDITIONS

LINE NO.	TRANSMISSION LINE (a)	TRANSMISSION LINE (b)	TRANSMISSION LINE (c)
TRANSMISSION LINE IDENTIFICATION			
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 OWNERSHIP			
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
13	Voltage Type	[] 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: OH=Overhead UG=Underground SM=Submarine		Voltage Type: AC=Alternating Current DC=Direct Current	



Regional Entity: _____

Reporting Party: _____

SCHEDULE 7. PART A, ANNUAL DATA ON TRANSMISSION LINE OUTAGES FOR AC LINES
(Report following data for each applicable EHV Voltage Class)

In Report Year 2014 and Report Year 2015 report for voltage categories 200 kV and above. From Report Year 2016 forward report only for transmission elements that are part of the new BES definition.

LINE NO.	Applicable AC Voltage Class	Less Than 100 kV		100-199 kV		200-299 kV		300-399 kV		400-599 kV		600-799 kV	
		(a)	(b)	(c)	(d)	(e)	(f)						
AUTOMATIC (Unscheduled), Sustained Outages for Specified Voltage Class													
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	I	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												
3l	Failed DC Circuit Equipment												
3m	Human Error												
3n	Vegetation												
3o	Power System Condition												
3p	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												
6c	System Operating Limit Mitigation (excluding voltage)												
6d	Other Operational Outage												



Regional Entity: _____

Reporting Party: _____

SCHEDULE 7. PART B, ANNUAL DATA ON TRANSMISSION LINE OUTAGES FOR DC LINES

(Report following data for each applicable EHV Voltage Class)

In Report Year 2014 and Report Year 2015 report for voltage categories 200 kV and above. From Report Year 2016 forward report only for transmission elements that are part of the new BES definition.

LINE NO.	Applicable DC Voltage Class	Less Than	± 100-	± 200-	± 300-	± 400-	± 500-	± 600-
		± 100 kV (a)	199 kV (b)	299 kV (c)	399 kV (d)	499 kV (e)	599 kV (f)	799 kV (f)

AUTOMATIC (Unscheduled), Sustained Outages for Specified Voltage Class

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	I	S	I	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															
3l	Failed DC Circuit Equipment															
3m	Human Error															
3n	Vegetation															
3o	Power System Condition															
3p	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															
6c	System Operating Limit Mitigation (excluding voltage)															
6d	Other Operational Outage															



Regional Entity: _____
Reporting Party: _____

SCHEDULE 7. PART C, ANNUAL DATA ON TRANSFORMER OUTAGES
(Report following data for each applicable class)

In Report Year 2014 and Report Year 2015 report for transformers with low-side 200 kV and above. From Report Year 2016 forward report only for elements that are part of the new BES definition.

LINE NO.	Applicable Transformer Low-Side Voltage Class	Less Than	100-199	200-299	300-399	400-599	600-799
		100 kV (a)	kV (b)	kV (c)	kV (d)	kV (e)	kV (f)

AUTOMATIC (Unscheduled), Sustained Outages for Specified Voltage Class

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 Transformer-Hours Out of Service													
3	Initiating (I) and Sustained (S) Causes (Count of Outages per Cause Category)	I	S	I	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													
3l	Failed DC Circuit Equipment													
3m	Human Error													
3n	Vegetation													
3o	Power System Condition													
3p	Unknown													
3q	Other													

NON-AUTOMATIC, Operational Outages for Specified Voltage Class

4	Number of Outages													
5	Number of Transformer-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													



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 Year 2014 and Report Year 2015 report for voltage categories 200 kV and above. From Report Year 2016 forward report only for transmission elements that are part of the new BES definition.						
AC Circuit 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 Circuit 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 NO.	Conventional Generating Unit	Total Number of GADS Generator Units	Forced Outage		Maintenance Outage		Planned Outage	
			Hours (FOH)	Count (FO)	Hours (MOH)	Count (MO)	Hours (POH)	Count (PO)
		A	B	C	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. Combust. 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 Vintage								
Units that entered commercial operation in or before 1972								
15	Coal Steam - Subcritical							
16	Coal Steam - Supercritical							
Units that entered commercial operation in or after 1973								
17	Coal Steam - Subcritical							
18	Coal Steam - Supercritical							
Combined Cycle Units by Vintage								
Units that entered commercial operation in or before 2002								
19	Combined Cycle							
Units that entered commercial operation in or after 2003								
20	Combined Cycle							



Regional Entity: _____

Reporting Party: _____

SCHEDULE 8. PART B. ANNUAL DATA ON GENERATING UNIT DERATING HOURS AND COUNTS

LINE NO.	Conventional Generating Unit	Forced Derating		Maintenance Derating		Planned Derating		Equivalent Seasonal Derating Hours (ESDH)
		Equivalent Hours (EFDH)	Counts (Unique) (FD)	Equivalent Hours (EMDH)	Counts (Unique) (D4)	Equivalent Hours (EPDH)	Counts (Unique) (PD)	
		A	B	C	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. Combust. 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 Vintage								
Units that entered commercial operation in or before 1972								
15	Coal Steam - Subcritical							
16	Coal Steam - Supercritical							
Units that entered commercial operation in or after 1973								
17	Coal Steam - Subcritical							
18	Coal Steam - Supercritical							
Combined Cycle Units by Vintage								
Units that entered commercial operation in or before 2002								
19	Combined Cycle							
Units that entered commercial operation in or after 2003								
20	Combined Cycle							



Regional Entity: _____
Reporting Party: _____

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	B	C	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. Combust. 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 Vintage								
Units that entered commercial operation in or before 1972								
15	Coal Steam – Subcritical							
16	Coal Steam–Supercritical							
Units that entered commercial operation in or after 1973								
17	Coal Steam – Subcritical							
18	Coal Steam–Supercritical							
Combined Cycle Units by Vintage								
Units that entered commercial operation in or before 2002								
19	Combined Cycle							
Units that entered commercial operation in or after 2003								
20	Combined Cycle							



Regional Entity: _____

Reporting Party: _____

SCHEDULE 8. PART C.2. ANNUAL DATA ON GENERATING UNIT PERFORMANCE INDEXES

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)
		A	B	C	D	E
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. Combust. 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 Vintage						
Units that entered commercial operation in or before 1972						
15	Coal Steam – Subcritical					
16	Coal Steam–Supercritical					
Units that entered commercial operation in or after 1973						
17	Coal Steam – Subcritical					
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					



Regional Entity: _____

Reporting Party: _____

**SCHEDULE 8. PART D. ANNUAL DATA ON GENERATING
UNIT 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	B	C	D	E	F	G	H
FORCED OUTAGE EVENTS									
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								
3	Pollution Control Equipment								
4	External								
4.a	Severe Weather								
4.b	Non-weather catastrophes								
4.c	Economic								
4.d	Fuel Quality								
4.e	Transmission System								
4.f	Other External								
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		

SCHEDULE 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: _____

Reporting Party: _____

SCHEDULE 9. PART C. SMART GRID PMU APPLICATIONS

LINE NO.	Application Type	Application Used
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
1l	• Equipment problem detection	[] Yes, [] No
B. Planning and Off-line Applications		
2	Indicate whether PMUs are being used to support the following applications:	
2a	• Baseline 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



Regional Entity: _____

Reporting Party: _____

SCHEDULE 10. COMMENTS

LINE NO.	Schedule (A)	Schedule Part (B)	Schedule Line No. (C)	Schedule Column (D)	Schedule Page (E)	Comment (F)
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