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: xx/xx/xxxx 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 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

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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 MEGAWATTHOURS) (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)**											

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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						

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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						

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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						

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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						

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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						

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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						

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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)

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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)

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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)												

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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	[ ] 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 UG=Underground SM=Submarine	AC=Alternating Current DC=Direct Current	

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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 (a)**		**100-199 kV (b)**		**200-299 kV (c)**		**300-399 kV (d)**		**400-599 kV (e)**		**600-799 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
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												

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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 kV (a)**		**± 100-199 kV (b)**		**± 200-299 kV (c)**		**± 300-399 kV (d)**		**± 400-499 kV (e)**		**± 500-599 kV**		**± 600-799 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														

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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 kV (a)		100-199 kV (b)		200-299 kV (c)		300-399 kV (d)		400-599 kV (e)		600-799 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 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												

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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)							

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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. 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 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							

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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. 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 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							

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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. 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 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							

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SCHEDULE 8. PART C.2. ANNUAL DATA ON GENERTING 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. 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 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					

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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)								

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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		

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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	• 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**

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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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