

#### 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:									
Rep	ort For								
Regional Entity:									
Reporting Party (Regional Entity or subregion):									
For questions about the data requested or	Form EIA-411, contact the Survey Manager:								
	Shear								
	per: (202) 586-0403 (202) 287-1938								
	Shear @eia.gov								



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### 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.

				Y	EAR		
		2016 (Actua	l - 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

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						<u>۱</u>	(EAR				
		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 (Gigawatt hours)										



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	SCHEDULE 3. PART A. PROJECTED DEMAND AND CAPACITY - SUMMER										
		YEAR									
LINE 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	SUPPL									
5	(sum of 6 and 8a)										
-											
6 6a	EXISTING CAPACITY (6a+6b+6c) Certain										
6b	Other										
6C	Unavailable										
				·	·						



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# Regional Entity: \_\_\_\_\_

S	CHEDULE 3. PART A. PROJECT	ED DEMAND	AND CAPA	CITY - SUM	MER				
LINE				YEAF	2				
NO.		)	Year 1	Year 2		Year 9	Year 10		
			(RY 2017)	(2018)	••••	(2025)	(2026)		
		FUTURE	E CAPACITY	CATEGORIES	5 (IN MI	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								
9a	Firm								
9b	Expected								
10	CAPACITY TRANSFERS – EXPORTS								
10a	Firm								
10b	Expected								



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•	nal Entity:						
керог	ting Party:						
S	CHEDULE 3. PART A. PROJECT	ED DEMA	ND AND CAF	PACITY - SU	MMER		
LINE				YEAF	२		
NO.			Year 1	Year 2		Year 9	Year 10
			(RY 2017) CAPACITY - C	(2018)		(2025)	(2026)
	EXISTING, CERTAIN & NET FIRM		CAPACITY - C			WATTSJ	
11	TRANSFERS (6a+10b-11b)						
12	ANTICIPATED CAPACITY RESOURCES (12+8a)						
13	PROSPECTIVE CAPACITY RESOURCES						
14	ADJUSTED POTENTIAL CAPACITY RESOURCES						
RESERVE AND CAPACITY MARGINS							
	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					ļ	
				1	1	1	



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### Regional Entity: \_\_\_\_\_

	SCHEDULE 3. PART B. PROJ	ECTED DEM	AND AND C	APACITY - W	/INTER						
LINE			YEAR								
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 6b	Certain Other										
6D 6C	Unavailable										
00											



# Regional Entity: \_\_\_\_\_

S	CHEDULE 3. PART B. PROJECT	ED DEMAND	AND CAPA	CITY - WIN	TER		
LINE				YEAF	2		
NO.			Year 1	Year 2		Year 9	Year 10
			(RY 2017)	. ,	- /INI NAI	(2025)	(2026)
		FUTURE	E CAPACITY	CATEGORIES	5 (111 111)	EGAWATTS)	
7	FUTURE CAPACITY ADDITIONS						
7a	Tier 1 (Most Certain)						
7b	Tier 2						
7c	Tier 3 (Least Certain)						
8	ANTICIPATED CAPACITY (6a+8a)						
		CA	PACITY TRA	NSFERS (IN	MEGAV	VATTS)	
9	CAPACITY TRANSFERS – IMPORTS						
					_		
9b	Firm						
9c	Expected						
10	CAPACITY TRANSFERS – EXPORTS						
10ab	Firm						
10b	Expected						



### Regional Entity: \_\_\_\_\_\_ Reporting Party: \_\_\_\_\_\_

5	SCHEDULE 3. PART B. HISTORIC	AL AND P	ROJECTED	DEMAND A	ND CAF	PACITY - WI	NTER
LINE				YEAI	२		
NO.			Year 1	Year 2		Year 9	Year 10
			(RY 2017)	(2018)		(2025)	(2026)
			CAPACITY - C	Continued (IN	<b>MEGA</b>	WATTS)	1
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 CAPACI	TY MAR	GINS	
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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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** Projected Connections Name And Type **In-Service Date** 4 Of Facility (e.g., 12-2018) **Bus Number Bus Name** (a) (b) (C) (d)



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Regional Entity:

	SCHEDULE 5. BULK	ELECTRIC TRANSMISSION S	YSTEM 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)



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	SCH	EDULE	6. PA	RT A.	EXIST	ING A	ND PF	ROJEC	TED C	IRCUI	TMILE	ES	
			CIRCUIT MILES										
		In Report	t Year 20 Year 2	14 and R 2016 forw	eport Yea	ar 2015 r t only for	eport circ transmis	uit miles fo sion elemo	or voltag ents that	e categoi are part	ries 100 k of the nev	(V and al w BES de	oove. From Report efinition
			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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Regi	onal	Ent	ity:	_
_		_		

Reporting Party:

S	CHEDULE 6. PART B. CHA	RACTERISTICS OF PRO	JECTED TRANSMISSIO	N LINE ADDITIONS		
LINE NO.		TRANSMISSION LINE (a)	(a) (b)			
		TRANSMISSION LINE IDE	ENTIFICATION			
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 LI	NE 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=Over		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)													
	(Report following data for	In Re	port Year	2014 a	and Rep	ort Yea	r 2015	report	for volt	age ca	ategorie	es 200	kV
		a	nd above.		Report ` nts that							ssion	
		Less Than 100-199 200-299 300-399 400-599 600-79 100 kV kV kV kV kV kV kV											
LINE NO.	Applicable AC Voltage Class	-	0 кV (a)		kV (b)	k ((	V N		V d)		cV e)	к (1	V n
	AUTOMATIC (Unscheduled), Sust					-	-		-		e)		<b>'</b>
1	Number of Outages		Outage		Speci		υπαί		.33	1			
1a	Number of Single Mode Outages												
1b	Number of Dependent Mode Outages												
1c 2													
2	Initiating (I) and Sustained (S) Causes												
3	(Count of Outages per Cause Category)	1	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												
31	Failed DC Circuit Equipment												
3m	Human Error												
3n	Vegetation												
30	Power System Condition												
Зр	Unknown												
3q	Other												
	NON-AUTOMATIC, Operation	al Outa	ges for	Spe	cified	Volta	ge Cl	ass					
4	Number of Outages												
5	Number of Circuit-Hours Out of Service												
6	Outage Cause (Count)												
6a	Emergency												
6b	System Voltage Limit Mitigation												
	System Operating Limit Mitigation												
6C	(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 f	or ea	ch ap	plica	ble E	ΗΥ Ν	/oltag	ge Cla	ass)						
		In Ro abo	eport Ye we. Fro	ear 201 m Rep	ort Ye	ar 201	t Year 6 forw rt of th	ard rep	ort on	ly for	transn	atego nissior	ries 20 1 eleme	0 kV a ents th	ınd at
LINE NO.	Applicable DC Voltage Class	TI ± 10	ess han 00 kV (a)	199	00- ) kV b)	299	200- 9 kV (c)	399	800- 9 kV d)				± 60 799 (f	kV	
	AUTOMATIC (Unscheduled), S	ustai	ned O	utag	es fo	r Spe	ecifie	d Vo	Itage	Cla	SS				
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		S		s	1	s		s		s		s		s
3	(Count of Outages per Cause Category)		5	'	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														
3ĥ	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														
Зр	Unknown														
3q	Other														
	NON-AUTOMATIC, Operati	onal	Outag	jes fo	or Sp	ecifie	ed Vo	ltage	e Cla	SS	1		1		
4	Number of Outages														
5	Number of Circuit-Hours Out of Service														
6	Outage Cause (Count)														
6a	Emergency														
6b	System Voltage Limit Mitigation														
6-	System Operating Limit Mitigation														
6C	(excluding voltage)														
6d	Other Operational Outage														
								-							



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### Regional Entity: \_\_\_\_\_\_ Reporting Party: \_\_\_\_\_\_

SCHEDULE 7. PART C, ANNUAL DATA ON TRANSFORMER OUTAGES													
	(Report following da	ata for	r each a	applie	cable c	lass)							
			port Yea V and ab		rom Rep	ort Yea	ar 2010		d repo	rt only			
LINE NO.	Applicable Transformer Low-Side Voltage Class	10	s Than 0 kV (a)		0-199 kV	k	-299 V	k	-399 V	k	-599 (V	k	-799 V
			(a)		(b)	-	c)		d)	(	e)	(	f)
	AUTOMATIC (Unscheduled), Sust	tained	l Outag	jes fo	or Spec	ified	Volta	age C	lass				
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												
	Initiating (I) and Sustained (S) Causes	_	_	_	_	_				_	_	_	
3	(Count of Outages per Cause Category)		S		S		S		S		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												
30 3p	Unknown												
3p 3q	Other												
ЗЧ	NON-AUTOMATIC, Operation	al Out	anos f	or Sn	ocified	   Volt	one (	Class					
			ayes n	or sp	ecineu	voit	aye	1235					
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												
00	(excluding voltage)												
6d	Other Operational Outage												



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	SCHEDULE 7. PART D,	TRANSMIS	SION ELEI			ND EVENT	SUMMAR	Y
	(Report f	ollowing da	ata for eac	h applicab	le voltage	class)		
LINE NO.						tage categories nents that are pa		
AC Cir	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 Cir	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							
Transf	ormer 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)		I	1	1	I	I	1



### 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 GADS	Forced C	Outage	Maintenanc	e Outage	Planned Outage			
NO.	Conventional Cenerating 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		-				
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	by Vintage						
	Units that entered commerci	al operation ir								
15	Coal Steam – Subcritical									
16	Coal Steam –Supercritical									
	Units that entered commerci	al operation ir	or after 1973	3		1				
17	Coal Steam – Subcritical					1				
18	Coal Steam –Supercritical									
		Com	bined Cycle L	Jnits by Vi	ntage			1		
	Units that entered commerci									
19	Combined Cycle									
13	Units that entered commerci	al operation in	) or after 2003	2				I		
20	Combined Cycle		1 01 anei 2003							
20	Compilied Cycle							1		



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S	SCHEDULE 8. PART B. ANNUAL DATA ON GENERATING UNIT DERATING HOURS AND COUNTS									
		Forced D	erating	Maintenance	e Derating	Planned D	Perating	Equivalent Seasonal		
LINE NO.	Conventional Generating Unit	Equivalent Hours (EFDH)	Counts (Unique) (FD)	Equivalent Hours (EMDH)	Counts (Unique) (D4)	Equivalent Hours (EPDH)	Hours (Unique)			
		Α	В	С	D	E	F	G		
				By Unit Type	1		1			
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	tage					
	Units that entered comm	ercial operati	ion in or be	efore 1972						
15	Coal Steam – Subcritical	•								
16	Coal Steam –Supercritical									
	Units that entered comm	ercial operati	ion in or af	ter 1973						
17	Coal Steam – Subcritical	•								
18	Coal Steam –Supercritical									
				Cycle Units b	by Vintage					
	Units that entered commercial operation in or before 2002									
19	Combined Cycle	• • • • • • • • • • • • • • • • • • • •								
	Units that entered comm	ercial operati	ion in or af	ter 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)			
		Α	В	С	D	E	F	G			
						By Unit Type					
1	Coal Steam (ST)										
2	Fossil Steam (ST)										
	Nuclear (NUC)										
	Gas Turbines (GT)										
	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	nercial ope	ration in or b	efore 1972	2						
	Coal Steam - Subcritical	•									
16	Coal Steam-Supercritical										
		orcial one	ration in or a	fter 1973	· ·						
	Units that entered comm	iercial ope									
	Units that entered comm Coal Steam – Subcritical	ierciai ope									
17	Coal Steam – Subcritical										
17					nits by Vintag	16					
17 18	Coal Steam – Subcritical Coal Steam–Supercritical		Combine	d Cycle Ur		je					
17 18	Coal Steam – Subcritical Coal Steam–Supercritical Units that entered comm		Combine	d Cycle Ur		je					
17 18 19	Coal Steam – Subcritical Coal Steam–Supercritical	nercial ope	Combine ration in or b	d Cycle Ur pefore 2002		je					



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### Regional Entity: \_\_\_\_\_

LINE INO.Conventional Generating UnitEquivalent 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)1Coal Steam (ST)ABCDE2Fossil Steam (ST)BCDE3Nuclear (NUC)BCDE4Gas Turbines (GT)CCCC5Combined Cycle (CT, CA)CCCC6Int. Combus, Engines (IC)CCCC7Hydro (HY)CCCCC8OtherCCCCC9TOTALCoal Steam - SupervisitionCCCC10199 MW and belowCCCCC11Z00-399 MWCCCCC12400-699 MWCCCCC13700 MW and aboveCCCCC14Coal Steam - SubcriticalCCCCC15Coal Steam - SubcriticalCCCCC16Coal Steam - SubcriticalCCCCC17Coal Steam - SubcriticalCCCCC18Coal Steam - SubcriticalCCCC <td< th=""><th></th><th colspan="12">SCHEDULE 8. PART C.2. ANNUAL DATA ON GENERTING UNIT PERFORMANCE INDEXES</th></td<>		SCHEDULE 8. PART C.2. ANNUAL DATA ON GENERTING UNIT PERFORMANCE INDEXES											
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           Coal Units by Vintage           11         200-399 MW           12         400-699 MW           13         700 MW and above           Coal Units by Vintage           Units that entered commercial operation in or before 1972            Image: Subcritical           16         Coal Steam – Subcritical         Image: Subcritical           16         Coal Steam – Subcritical         Image: Subcritical           17         Coal Steam – Subcritical         Image: Subcritical           18         Coal Steam – Subcritical         Image: Subcritical			Forced Outage Rate	Maintenance Outage Rate	Planned Outage Rate	Rate Demand	Forced Outage Rate Demand						
1       Coal Steam (ST)       Image: Construction of the structure of the st			Α	_	-	D	E						
2       Fossil 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       Coal Steam - Subcritical       Image: Steam (ST)       Image: Steam (ST)         18				By Unit Ty	be								
3       Nuclear (NUC)	1												
4       Gas Turbines (GT)       Image: Combined Cycle (CT, CA)         5       Combined Cycle (CT, CA)       Image: Combined Cycle (CT, CA)         6       Int. Combus. Engines (IC)       Image: Combined Cycle (CT, CA)         7       Hydro (HY)       Image: Combined Cycle (CT, CA)         8       Other       Image: Combined Cycle (CT, CA)         9       TOTAL       Image: Combined Cycle (CT, CA)         10       199 MW and below       Image: Combined Cycle (CT, CA)         11       200-399 MW       Image: Combined Cycle (CT, CA)         12       400-699 MW       Image: Combined Cycle (CT, CA)         13       700 MW and above       Image: Combined Cycle (CT, CA)         14       TOTAL       Image: Combined Cycle (CT, CA)         13       TotAL       Image: Combined Cycle (CT, CA)         14       TOTAL       Image: Combined Cycle (CT, CA)         15       Coal Steam - Subcritical       Image: Coal Steam - Subcritical         16       Coal Steam - Subcritical <td>2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	2												
5       Combined Cycle (CT, CA)       Image: Combust Engines (IC)       Image: Combust Engines (IC)         6       Int. Combust Engines (IC)       Image: Combust Engines (IC)       Image: Combust Engines (IC)         7       Hydro (HY)       Image: Combust Engines (IC)       Image: Combust Engines (IC)         8       Other       Image: Combust Engines (IC)       Image: Combust Engines (IC)         9       TOTAL       Image: Combust Engines (IC)       Image: Combust Engines (IC)         9       TOTAL       Image: Combust Engines (IC)       Image: Combust Engines (IC)         10       199 MW and below       Image: Combust Engines (IC)       Image: Combust Engines (IC)         11       200-399 MW       Image: Combust Engines (IC)       Image: Combust Engines (IC)       Image: Combust Engines (IC)         11       200-399 MW       Image: Combust Engines (IC)       Image: Combust Engines (IC)       Image: Combust Engines (IC)         12       400-699 MW       Image: Combust Engines (IC)       Image: Combust Engines (IC)       Image: Combust Engines (IC)       Image: Combust Engines (IC)         13       700 MW and above       Image: Combust Engines (IC)       Image: Combust Engines (IC)       Image: Combust Engines (IC)       Image: Combust Engines (IC)         14       TOTAL       Image: Combust Engines (IC)       Image: Combust En	3												
6       Int. Combus. Engines (IC)       Image: Comparison of the second	4	Gas Turbines (GT)											
7       Hydro (HY)       Image: Second Secon													
8       Other       Image: Second sec	-												
9TOTALImage: Second seco	7												
By Capacity         10       199 MW and below       By Capacity         11       200-399 MW       Constant of the second	8												
10199 MW and belowImage: Constraint of the second se	9	TOTAL											
11200-399 MWImage: Sector of the secto													
12       400-699 MW       Image: Second Seco	_												
13       700 MW and above       Image: Constraint of the second s	11	200-399 MW											
14TOTALImage: Coal Steam - SubcriticalImage: Coal Steam - SubcriticalImage: Coal Steam - Subcritical16Coal Steam - SubcriticalImage: Coal Steam - SubcriticalImage: Coal Steam - Subcritical17Coal Steam - SubcriticalImage: Coal Steam - SubcriticalImage: Coal Steam - Subcritical18Coal Steam - SupercriticalImage: Coal Steam - SubcriticalImage: Coal Steam - Subcritical	12	400-699 MW											
Coal Units by Vintage         Units that entered commercial operation in or before 1972         15       Coal Steam - Subcritical       Image: Coal Steam - Supercritical         16       Coal Steam - Supercritical       Image: Coal Steam - Supercritical         17       Coal Steam - Subcritical       Image: Coal Steam - Supercritical         18       Coal Steam - Supercritical       Image: Coal Steam - Supercritical	_												
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	14	TOTAL											
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													
15       Coal Steam - Subcritical       Image: Coal Steam - Supercritical       Image: Coal Steam - Supercritical       Image: Coal Steam - Subcritical       Image: Coal Steam - Supercritical       Image: Coal Steam - Supercritical <td< td=""><td></td><td></td><td></td><td>Coal Units by \</td><td>/intage</td><td></td><td></td></td<>				Coal Units by \	/intage								
16     Coal Steam-Supercritical     Image: Coal Steam - Supercritical       17     Coal Steam - Subcritical     Image: Coal Steam - Supercritical       18     Coal Steam - Supercritical     Image: Coal Steam - Supercritical		Units that entered comm	nercial operation i	in or before 1972									
Units that entered commercial operation in or after 1973         17       Coal Steam – Subcritical         18       Coal Steam–Supercritical	15	Coal Steam – Subcritical	-										
17     Coal Steam - Subcritical       18     Coal Steam-Supercritical	16	Coal Steam-Supercritical											
17     Coal Steam - Subcritical       18     Coal Steam-Supercritical		Units that entered comm	nercial operation i	in or after 1973									
	17		•										
	18	Coal Steam-Supercritical											
		Combined Cycle Units by Vintage											
Units that entered commercial operation in or before 2002		Units that entered comm	nercial operation i	in or before 2002									
19 199 MW and below	19	199 MW and below	•										
Units that entered commercial operation in or after 2003			nercial operation i	n or after 2003	<b>ا</b> ــــــــــــــــــــــــــــــــــــ								
20 199 MW and below	20		• • • •										



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	SCHEDULE 8. PART D. ANNUAL DATA ON GENERATING UNIT PRIMARY CAUSE OF ACTIVE STATE FORCED										
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		
		Α	В	С	D	E	F	G	Н		
		1	FOR	CED OUT	AGE 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 Other External										
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)										
		1	1	1	I	I	I	1	L]		



### 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		



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### 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	<ul> <li>Alarming and setting system operating limits, event detection and avoidance</li> </ul>	[]Yes, []No							
1f	Resource integration	[]Yes,[]No							
1g	State estimation	[ ] Yes, [ ] No							
1h	Dynamic line ratings and congestion management	[ ] Yes, [ ] No							
<b>1</b> i	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 Applica	tions							
2	Indicate whether PMUs are being used to support the following app	lications:							
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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