Electric Reliability and Smart Grid

Prepared for the
2011 Summer Electric Reliability Assessment Meeting

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FERC / NERC Summer Assessment

FERC / NERC Highlights

- Electric demand forecasts essentially unchanged
- Summer capacity reserves are adequate
- Incremental Growth in Demand Response
- Forward energy prices differ from 2010
- New infrastructure may impact markets

Ensuring Reliable Service in PA

Electric Reliability and Safety

- Transmission and distribution facilities shall be installed, maintained and operated in accordance with the National Electrical Safety Code

- 52 PA Code § 57.82. Installation of distribution and service lines
- 52 PA Code § 57.193. Transmission system reliability
- 52 PA Code § 57.194(b) Distribution system reliability

Electric Service Reliability Metrics

The *System Average Interruption Frequency Index* (SAIFI) measures the average frequency of interruptions per total number of customers

SAIFI = Number of Interruptions divided by Total Number of Customers Served

Electric Service Reliability Metrics

The *Customer Average Interruption Duration Index* (CAIDI) measures the average duration of service interruptions for affected customers

CAIDI = Minutes Interrupted divided by Customers Affected

Electric Service Reliability Metrics

The *System Average Interruption Duration Index* (SAIDI) measures the average duration of service interruptions per total number of customers

SAIDI = Minutes Interrupted divided by Total Number of Customers Served

Pennsylvania Electric Distribution Company Reliability Data
For The Rolling 12-Months Ended March 31, 2011

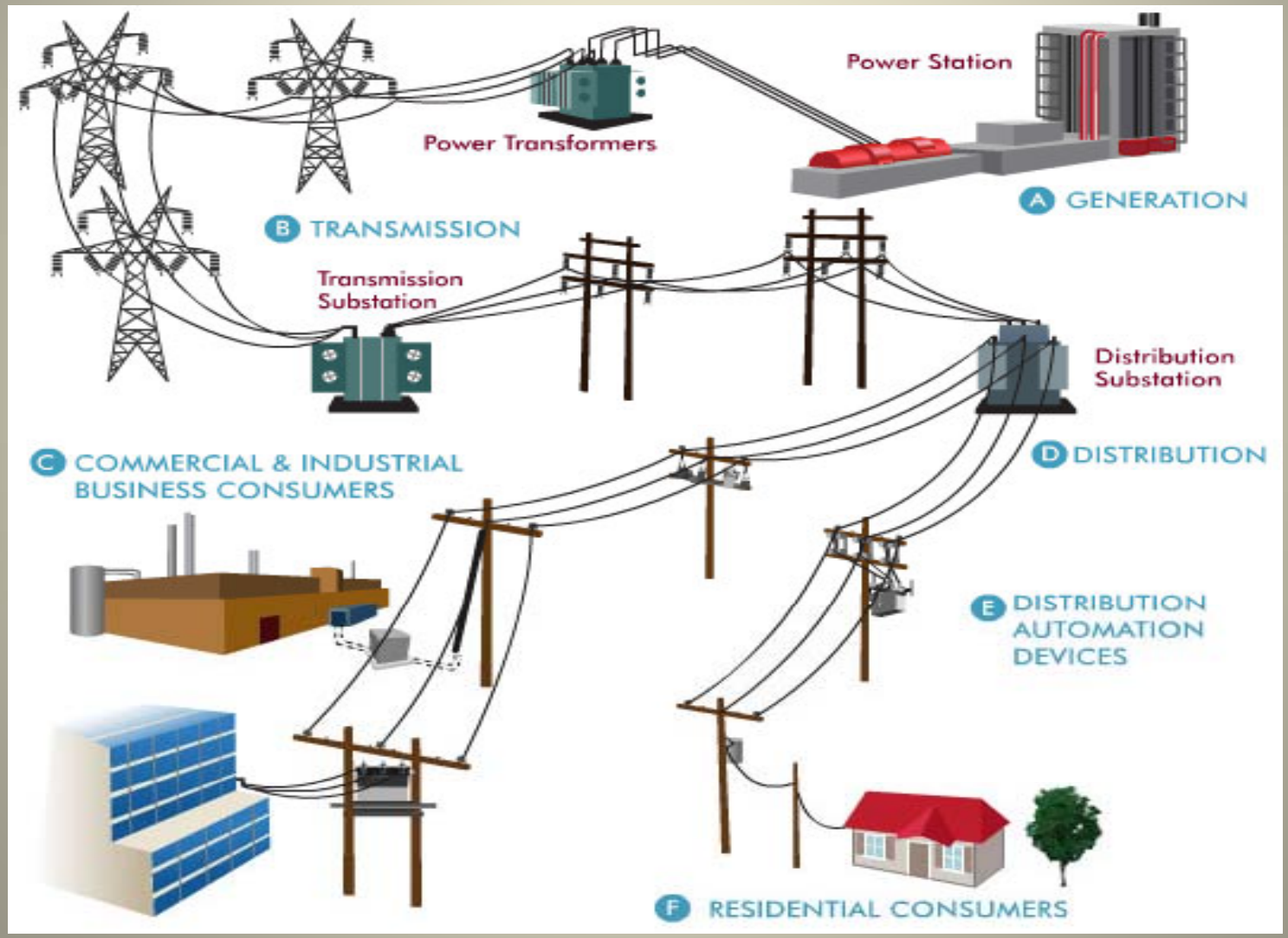
Customer Average Interruption Duration Index (CAIDI)				% Above (+) or	% Above (+) or
EDC	Mar-11	Benchmark	Standard	Below (-) Benchmark	Below (-) Standard
Citizens'	77	105	141	-26.7	-45.4
Duquesne Light	82	108	130	-24.1	-36.9
Met-Ed (FE)	111	117	140	-5.1	-20.7
PECO	127	112	134	13.4	-5.2
Penelec (FE)	123	117	141	5.1	-12.8
Penn Power (FE)	105	101	121	4.0	-13.2
Pike County	172	174	235	-1.1	-26.8
PPL	131	145	174	-9.7	-24.7
UGI	114	169	228	-32.5	-50.0
Wellsboro	76	124	167	-38.7	-54.5
West Penn (FE)	189	170	204	11.2	-7.4

System Average Interruption Frequency Index (SAIFI)				% Above (+) or	% Above (+) or
EDC	Mar-11	Benchmark	Standard	Below (-) Benchmark	Below (-) Standard
Citizens'	0.14	0.20	0.27	-30.0	-48.1
Duquesne Light	1.10	1.17	1.40	-6.0	-21.4
Met-Ed (FE)	1.46	1.15	1.38	27.0	5.8
PECO	1.18	1.23	1.48	-4.1	-20.3
Penelec (FE)	1.39	1.26	1.52	10.3	-8.6
Penn Power (FE)	0.90	1.12	1.34	-19.6	-32.8
Pike County	0.58	0.61	0.82	-4.9	-29.3
PPL	1.16	0.98	1.18	18.6	-1.5
UGI	0.49	0.83	1.12	-41.0	-56.3
Wellsboro	1.38	1.23	1.66	12.2	-16.9
West Penn (FE)	1.15	1.05	1.26	9.5	-8.7

System Average Interruption Duration Index (SAIDI)				% Above (+) or	% Above (+) or
EDC	Mar-11	Benchmark	Standard	Below (-) Benchmark	Below (-) Standard
Citizens'	11	21	38	-47.6	-71.1
Duquesne Light	90	126	182	-28.6	-50.5
Met-Ed (FE)	161	135	194	19.3	-17.0
PECO	150	138	198	8.7	-24.2
Penelec (FE)	172	148	213	16.2	-19.2
Penn Power (FE)	94	113	162	-16.8	-42.0
Pike County	99	106	194	-6.6	-49.0
PPL	153	142	205	7.7	-25.4
UGI	55	140	256	-60.7	-78.5
Wellsboro	105	153	278	-31.6	-62.4
West Penn (FE)	217	179	257	21.2	-15.6

Smart Grid

Basic Structure of the Electric System



Key Aspects of a Smart Grid

- Advanced Metering Infrastructure with two way communications
- Advanced sensors throughout grid – smart relays, smart switches, etc.
- Dynamic optimization of distribution network

Smart Grid Pilot Updates

- PPL
- FirstEnergy
- PECO

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