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PCDS

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WECC

Forced Outage Rates

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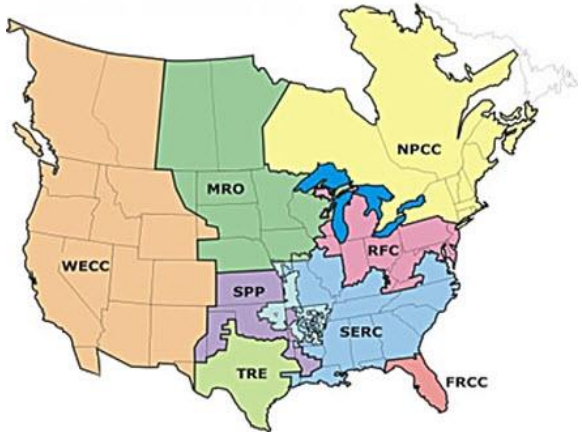
Description:

- The forced outage rates represent the percentage of the year that a thermal generator is offline for unplanned outages. The forced outage rates are developed from the Generator Availability Data System (GADS) and are represented as a percentage of time each component will be offline. The point in time at which the component is forced offline during each simulation is random and based on a seed, or number in GridView.

- ***Data Sources:***

- Generator Availability Data Set (GADS) using the pc-GAR program from NERC.



Forced Outage Rates

- ***Data Development and Validation Process:***
- Data from GADS is collected from pc-GAR software. GADS data is considered confidential information at a unit level or even a regional level. Pc-GAR will provide the yearly statistics only if the following rules are followed to mask unit, utility, or regional level data:
  - A minimum of two regions, i.e., WECC and SERC;
  - A minimum of seven units; and
  - A minimum of three utilities.
- The Equivalent Forced Outage Rate demand (EFORd) statistic is used in the PCM for the forced outage rate. The simple average was used for gas turbines, combined cycles, and steam-coal turbines. For steam-gas turbines, the median was used.
- GridView then randomly forces out each thermal generator according to its seed and Monte-Carlo simulation.

Criteria for querying GADS Data

- pc-GAR-PG used to calculate the annual unit statistics
- Criteria used is as follows:
  - Average of 2017-2019 (2030 ADS) (latest 3 years 2021-2023) data latest 3 years 2021-2023
    - (recommendation to use 10 years for PC-Gar)
    - MAVRIC uses last 10 years
  - Minimum of two regions were required
    - Used WECC and TRE
  - Unit age was not considered

GADS Data for Outage Rates (Units that had Events All Three Years)

Generator type	Max Cap (MW) From	Max Cap (MW) To	# Units	Equiv. Scheduled Outage Factor	EFORd	Availability Factor
Combustion Turbine	0	50	137	6.76%	7.60%	86.15%
	51	150	168	7.38%	7.95%	85.26%
	151	2,000	11	5.34%	2.63%	92.17%
Combined Cycle Block	0	225	25	7.81%	7.22%	85.53%
	226	2,000	16	6.21%	6.43%	87.76%
CC GT Part	All	All	205	10.64%	4.06%	85.73%
CC Steam Part	All	All	103	10.86%	5.19%	84.51%
Steam-Coal	0	150	Insufficient Utilities			
	151	400	26	7.70%	6.72%	86.10%
	401	5,000	38	8.23%	7.79%	84.62%
Steam-Gas	All	All	11	12.61%	15.71%	73.66%

Coal and Gas

- Coal
  - Use American Transmission Company coal outage rates from CEMS data (2002-2015)-This is what we have used previously
  - Or we can also create this in PC-GAR
- Gas
  - For gas generators, use GADS EFORd

Nomograms

Known Nomograms

- TEP generation will meet 32% or greater of its local load.
  - "TEP does not have an official nomogram. I think we set something up several years ago to cover a local gen requirement with higher loads. Since we plan at peak with most of our local gen on, you can ignore this in the development of the ADS."
- EPE generation will meet 85% or greater of its local load.
  - Haven't heard anything yet
- Path 8
  - Haven't heard anything yet

Other nomograms in Nomograms in PRC

- Lots of paths refer to nomograms (about 15)
  - Did not include RAS or real time nomograms
  - Some have more details than others
- Paths with mentioned nomograms include: Path 15, 17, 19, 20, 28, 29, 32, 65, 66, 76, 80, 81, 84, 85

Path Definitions/Ratings

- Still checking path definitions and ratings for WECC Paths
- Do we still want the non WECC paths in the case. Review as PCD
  - P – WECC Paths
  - Pth – Non WECC PAths

Next meeting

- Wheeling Rates (from Utility Tariffs)
  - OASIS, OATI, OATT
    - Save documents for each BA

Outstanding Items

- V1_Transmission Contingencies
- V1_Phase Shifter Transformers – Reviewing in 2032 ADS V2.4.2
- V1_Hourly Utility Scale Wind and Solar shapes – Reviewing in 2032 ADS V2.4.2
- Heat Rates
- FOR
- Path Ratings
- Transmission nomograms in Path Rating Catalog
- EPE and TEPC load and generation balance nomograms
- Wheeling Rates

WECC

Electric Reliability and Security for the West

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