



Light Load Operational Performance

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8/11/10

- What load level should the system be evaluated at for off-peak studies?
- What generation dispatch should be specified as part of the criteria?
- What interchange with adjacent areas should be assumed?
- What tests should be evaluated?

- What generation dispatch should be specified as part of the criteria?
 - Base load nuclear and coal at $P_{\max}(1-EFOR_d)$
 - Combustion turbines off-line
 - Pumped storage at full pump
 - Wind resources at a percentage of nameplate based on selected system load level to be studied (from historical data) but allowed to ramp to a higher percentage of nameplate in test
 - Mid-merit generation scaled proportionately to meet interchange



Historical Operational Load Data

- Operational data
- Entire PJM RTO
- **Entire Year** Hours ending 1 AM – 5 AM (1825 samples per year)
- Metered PJM RTO load as a percentage of the annual peak
- Measured RTO load / Peak RTO load averages approximately 50% for these hours

YEAR	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	Average
2007	50%	48%	48%	48%	50%	49%
2008	52%	51%	51%	51%	53%	52%
2009	51%	50%	50%	50%	53%	51%



Historical Operational Generation Data

- Operational data
- Entire PJM RTO
- **Entire Year** Hours ending 1 AM – 5 AM (1825 samples per year)
- Average capacity factor calculated for midnight through 5 am for three years of data, 2007 – 2009

Fuel Type	Percentage of Installed Capacity	2007-2009 Annual Capacity Factor AVG
Coal (<500 MW)	15%	46%
Coal (>500 MW)	26%	59%
Natural Gas	29%	6%
Nuclear	19%	93%
Wind	0%	27%
Other	13%	7% or less
TOTAL	100%	



Historical Operational Interchange Data

- Operational data
- Entire net PJM RTO net interchange
- **Entire Year** Hours ending 1 AM – 5 AM (1825 samples per year)
- Negative value indicates net PJM imports

YEAR	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	Average
2007	-2436	-2261	-2222	-2035	-1630	-2116
2008	-1395	-1274	-1208	-1059	-670	-1121
2009	257	274	227	146	79	196

- Wind
 - Higher wind capacity factor of 38% when only looking at hours ending 1AM – 5AM in November – April

- Load
 - Operational data
 - Entire PJM RTO
 - **November – April** Hours ending 1 AM – 5 AM
 - Metered PJM RTO load as a percentage of the yearly hourly peak
 - Measured RTO load / Peak RTO load averages approximately 53% for these hours

YEAR	1:00 AM	2:00 AM	3:00 AM	4:00 AM	5:00 AM	Average
2007	52%	50%	50%	49%	50%	50%
2008	55%	54%	53%	53%	54%	54%
2009	56%	54%	53%	53%	54%	54%

- Proposed Tests
 - NERC category A
 - NERC category B
 - NERC category C except C3

- Identify frequency and magnitude of peak wind hours
- Gather additional information
- Consider wind impact from neighboring systems