Historical Loss of Load Probability Analysis

- Probabilistic –
  - deploys the fundamental data regarding unit capacity, random and planned outage rate, and load demand

Sample Station Innage/Outage Rates

	Capacity	FOR	Innage Rate
Unit A	50	.05	.95
Unit B	100	.07	.93
Unit C	200	.10	.90
System	350		

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Sample Combined Station Outage Probabilities

On Outage	MW of outage	In Service	Probability
None	0	A,B,C	.95*.93*.90=.79515
A	50	B,C	.05*.93*.90=.04185
B	100	A,C	.95*.07*.90=.05985
C	200	A,B	.95*.93*.10=.08835
A,B	150	C	.05*.07*.90=.00315
A,C	250	B	.05*.93*.10=.00465
B,C	300	A	.95*.07*.10=.00665
A,B,C	350	None	.05*.07*.10=.00035
			1.00000

Consider the probability of not being able to supply a 220 MW load demand. If 220 MW or less capacity is in service, a 220 MW load cannot be served. Since the capacity of the three-unit system is 350 MW, the load could not be supplied if (350-220) or 130 MW of capacity or more is on outage. According to the data in the table above, the probability of 130 MW or more on outage is:

.08835+.00315+.00465+.00665+.00035=.10315

This is the probability of not meeting a peak load of 220 MW in one day.

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- Look at each daily peak in a year and determine the probability of not meeting the peak in each day
- Sum the probabilities for all days
- A sum of 1.0 means there is a probability of 1-day outage in one year
- A sum of probabilities of 0.1 means there is a probability of 1-day outage in 10 years

Limitations of Historical Approach

- Focuses on meeting load on peak hour
- Does not consider load volatility
- Does not consider interconnections
- Does not consider magnitude of energy not served