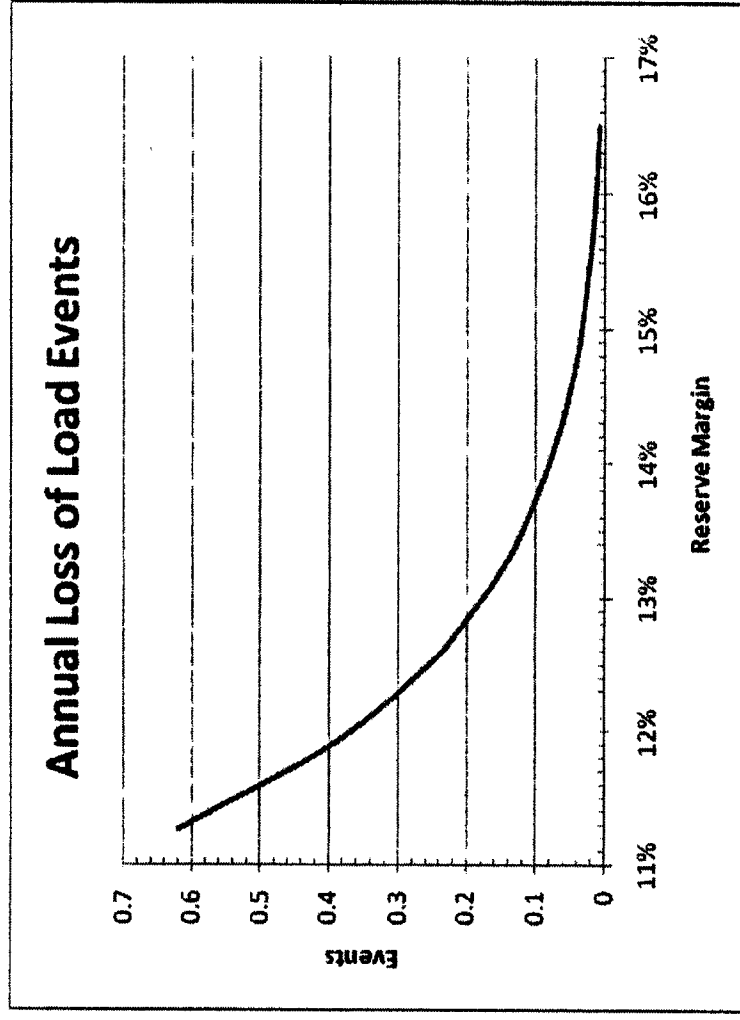


Target Reserve Margin Studies

- Probabilistic analysis to define the likelihood of system outage events (loss-of-load events)
 - Modeling includes unit outages (forced and maintenance outages), load variation due to weather, and variability of renewable generation
 - Results in a mathematical relationship between planning reserve margin and system risk

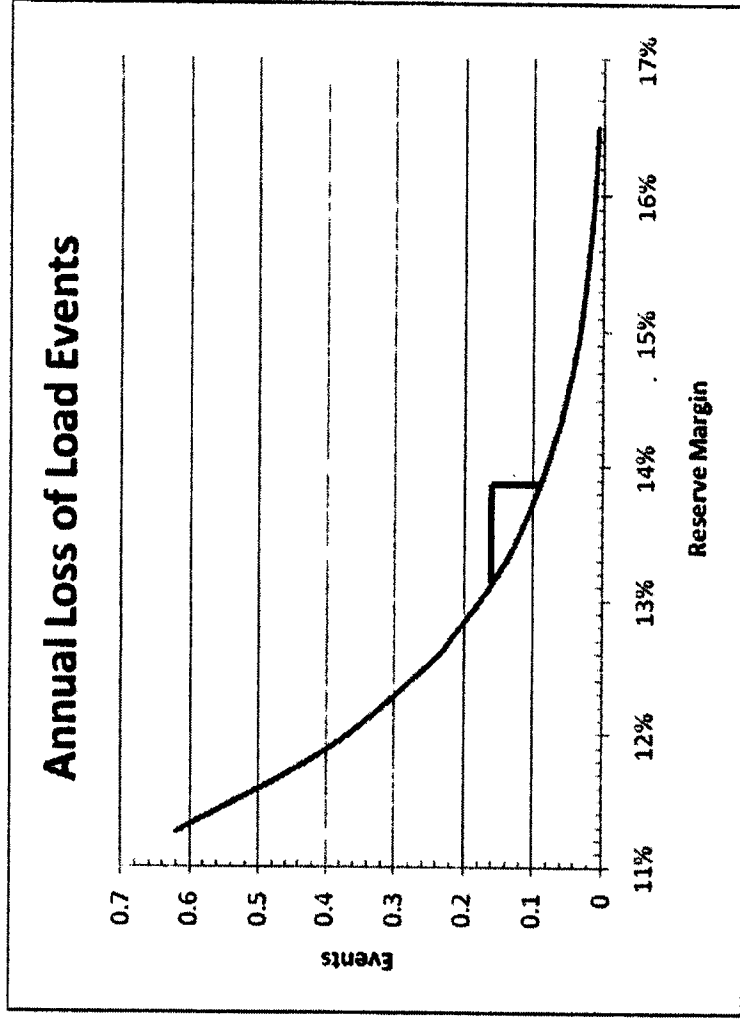


Effective Load Carrying Capability

- The contribution of variable resources to reserve margin is calculated using the same probability simulation

- **Steps:**

- Run the simulation with existing resources
- Remove the variable generation and run again
 - Loss-of-load events will have increased
- Add thermal generation (average of existing fleet) until you return to initial number of LOL events



- **ELCC = Thermal capacity added ÷ wind capacity removed**

Loss-of-Load Studies

Designed to evaluate the unavoidable system risk due to the inherent variability of loads and resources

Does not include consideration of:

- Unit commitment or day-ahead load forecast errors (assumes all units, if not on outage, are available)
- Required ancillary services (assumes a loss-of-load event occurs when customer demand exceeds available generation)
- Deliverability of generation
- Correlated unit outages (such as result of extreme weather, fuel supply issues or water availability)

Criteria for assessing adequate level of loss of load reliability (one day in 10 years) is used across industry for these types of studies

Reserve Margin Determination

Results of loss-of-load studies are reviewed by stakeholder committees

Target Reserve Margin and ELCC for variable generation are determined by ERCOT Board of Directors

Calculation of reserve margin in Capacity, Demand and Reserves report is proscribed in stakeholder-developed, Board-approved Planning Guide

Reporting of Expected Future Year Reserves

Development of the Capacity, Demand and Reserves report is defined by Section 8 of the ERCOT Planning Guides

Examples:

Firm Peak Load Estimate = Total Peak Load Estimate

- Load Resource providing Responsive Reserves
- Load Resource providing Non-Spin Reserves
- Emergency Interruptible Load Service
- Amount of Controllable Load Resource
- Amount of Energy Efficiency Programs Procured

Total Capacity = Seasonal Net Max Sustainable Rating

- + Private Use Network Capacity
- + Effective Load Carrying Capability of Wind Generation
- + Seasonal Net Max Sustainable Rating of RMR Units
- + Seasonal Net Max Sustainable Rating of DC Tie X 50%
- + Seasonal Net Max Sustainable Rating for Switchable Gen
- + ...

Long-Term Load Forecast

- An econometric model is developed using historical data of customer demand, economic growth, and weather conditions
- Future forecast is developed using the econometric model with an economic forecast and average weather year conditions

CDR Result

2011 Report on the Capacity, Demand, and Reserves

Summer Summary

	2011	2012	2013	2014
Load Forecast:				
Total Summer Peak Demand, MW	63,898	65,665	67,757	70,540
less LAARs Serving as Responsive Reserve, MW	1,063	1,063	1,063	1,063
less LAARs Serving as Non-Spinning Reserve, MW	0	0	0	0
less Emergency Interruptible Load Service	421	463	509	560
less Energy Efficiency Programs (per SB1125)	128	259	395	536
Firm Load Forecast, MW	62,286	63,880	65,790	68,381
Resources:				
Installed Capacity, MW	63,859	63,859	63,859	63,859
Capacity from Private Networks, MW	5,023	5,071	5,074	5,074
Effective Load-Carrying Capability (ELCC) of Wind Generation, MW	822	822	822	822
RMR Units to be under Contract, MW	0	0	0	0
Operational Generation, MW	69,704	69,752	69,755	69,755
50% of Non-Synchronous Ties, MW	553	553	553	553
Switchable Units, MW	2,962	2,962	2,962	2,962
Available Mothballed Generation, MW	0	110	146	164
Planned Units (not wind) with Signed IA and Air Permit, MW	260	1,940	1,940	2,720
ELCC of Planned Wind Units with Signed IA, MW	13	65	113	131
Total Resources, MW	73,492	75,382	75,469	76,284
less Switchable Units Unavailable to ERCOT, MW	317	317	317	317
less Retiring Units, MW	0	0	0	0
Resources, MW	73,175	75,065	75,152	75,967
Reserve Margin	17.5%	17.5%	14.2%	11.1%



Questions