Resource Adequacy Assessment Methodology Improvements

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Background

- The Capacity, Demand and Reserves report (CDR) is intended to provide a reasonable, long-term view of resource adequacy in the ERCOT Region based on available information
  - Uses probabilistically-derived reserve margin to account for variability in demand and in resource availability
- Analysis of system operations during the peak days this summer have noted differences between CDR inputs / assumptions and actual reserve availability
  - The CDR load forecast is intentionally based on Normal Peak weather due to NERC reporting requirements and the use of a reserve margin measure that covers load variability
  - All resources are counted as available due to the use of a reserve margin measure that covers forced outages and derates
  - The reserve margin is explicitly intended to cover these variations
  - However, other discrepancies indicate improvements that need to be made to the data collection process for the CDR

Procedural Changes

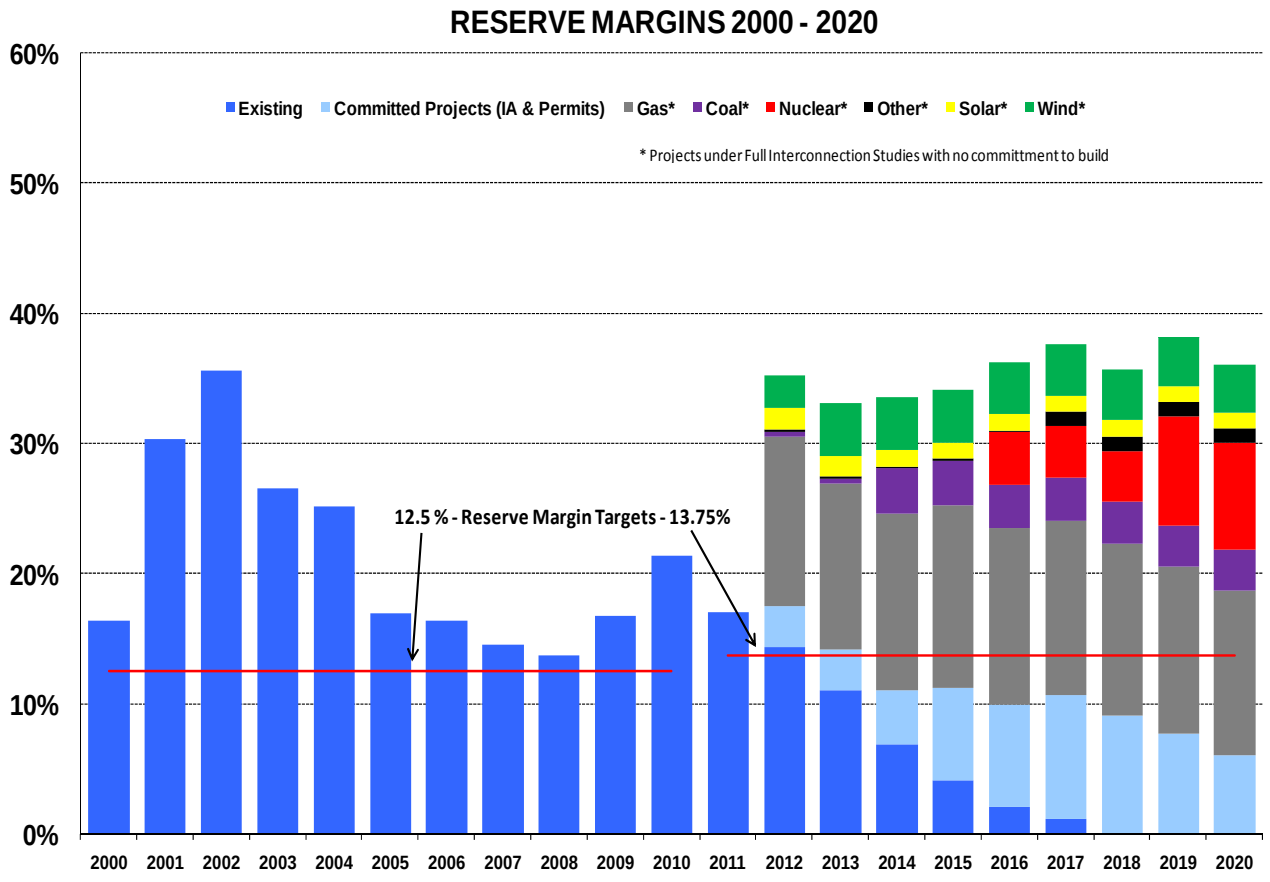
- ERCOT is proposing several improvements to the CDR, as well as the creation of a new report – the ***Seasonal Assessment of Resource Adequacy*** (SARA) – to facilitate understanding of near-term risks
- CDR would continue to be based on assumptions consistent with use of probabilistic-derived target reserve margin, albeit with improvements to some inputs
  - Long-term projections are necessarily based on less certain information than near-term projections
  - The CDR would be issued annually in January for *Year+1* to *Year+10*
    - e.g. January 2012 release would include 2013-2022
- SARA would be based on most-current available projections of inputs
  - Would be released in ~April 15 for Summer season and ~October 15 for winter season
  - Inputs to SARA would be deterministic ranges; comparison would not be made to target reserve margin

Improvements to Long-Term CDR Data Inputs

- **Demand Forecast**
  - Evaluating use of additional historic years of weather data to determine "Normal" system peak weather
  - Investigating use of "Rank and Sort" selection of hourly temperatures for forecast year weather pattern
  - Adding High and Low Economic Forecast scenarios for CDR
- **Resources :**
  - Need improved definition for "Seasonal Maximum Sustainable Limit (MSL)" provided by Generating Entities in registration data
  - Revise the survey sent to PUNs to better capture expected output during EEA and ensure generating capacity/load reduction not double counted in Demand Forecast, Load Resources and EILS
  - Include probability-weighted capacities for "Committed" new generation projects; recent survey showed reduced expectations for completion of several projects

Impact of CDR Data Improvements

- Each of these changes will tend to lower projected reserve margins
- In addition, while not included in the CDR, planned changes to the generation interconnection process will eliminate inactive projects from the list of projects under full interconnection study



Graph is based on May 2011 CDR and does not include CSAPR impacts or other updates

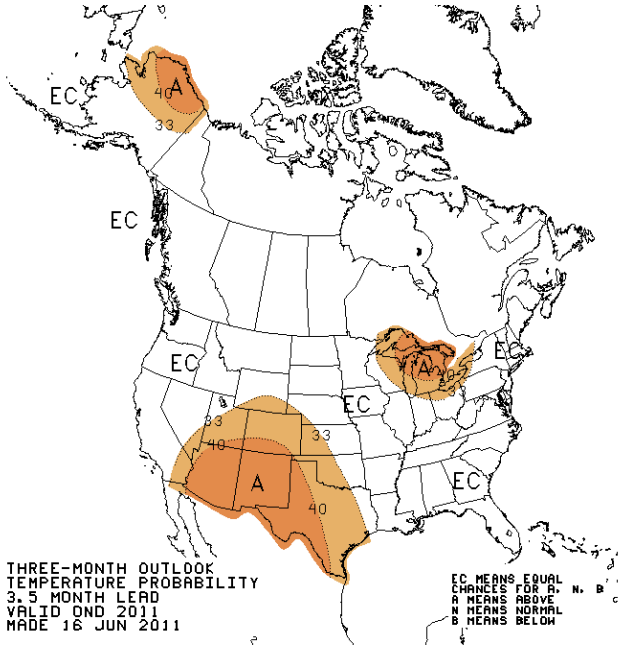
Seasonal Assessment of Resource Adequacy (SARA)

- **Approach**
  - Deterministic, illustrating range of potential values for uncertain inputs
  - Incorporate near-term forecasted data, where available
  - ERCOT independent assessment with flexible assumptions to address currently-relevant issues

- **Adequacy not based on target reserve margin, since uncertainties addressed deterministically in SARA report**

Conceptual Differences from Long-term CDR Assumptions

- **Demand:**
  - Use 3 month-ahead weather outlook to develop Base forecast
    - Include appropriate range to assess potential variability above Base forecast



Conceptual Differences from Long-term CDR Assumptions

- **Resources**
  - Use capacities from CDR (including previously-discussed improvements)
  - Illustrate with and without planned generation
  - Reduced by planned maintenance outages
  - Illustrate range of forced outages
  - Reflect any uncertainty associated with drought, environmental restrictions, and other relevant factors that may arise over time
  - May be appropriate to look at this on monthly basis due to seasonal outages

What is correct measure of capacity adequacy for SARA?

- Use of the 13.75% planning reserve margin in this context is NOT APPROPRIATE due to deterministic inputs that cover risks for which reserve margin is calculated
- **Possible measures (Still under discussion at GATF)**
  - EEA Risk = MW by which available generating capacity exceeds the level of demand at which EEA would be called
  - Capacity Insufficiency Risk = MW by which available generating capacity exceeds level of demand at which firm load shed would be called
- **Calculate several scenarios for each measure:**
  - Base – Demand Forecast is accurate with typical Resource Outages
  - Medium – Demand, or Resource Outages, are at ~90th percentile level
  - High – Demand, AND Resource Outages, are at ~90th percentile level

Example - What might the SARA have looked like for 2011

Summer 2011	SARA (MW)			
Total Summer Peak Demand, MW	**66,500**	Use 3 Month Outlook, includes serving DR loads		
Installed Capacity, MW	63,859	Will be updated due to changes in def'n for seasonal MSL		
Capacity from Private Networks, MW	5,023	Will be updated by new PUN survey		
Effective Load-Carrying Capability (ELCC) of Wind Generation, MW	822			
RMR Units to be under Contract, MW	0			
Operational Generation, MW	**69,704**			
50% of Non-Synchronous Ties, MW	553			
Switchable Units, MW	2,962			
less Switchable Units Unavailable to ERCOT, MW	317			
Available Mothballed Generation , MW	0			
Planned Units (not wind) with Signed IA and Air Permit, MW	260			
ELCC of Planned Wind Units with Signed IA, MW	13			
Total Resources, MW	**73,175**			
Reserve Capacity (MW)	**6675**			
	The highlighted numbers below are not "real"			
Typical August Forced Outage MW	3500	3500	3500	
High Seasonal Load Forecast Range		2000	2000	
90th Percentile Forced Outage MW			2000	
Other Risks (Drought, Fuel, etc.)				
Op Risk MW	3500	5500	7500	
Responsive Reserves Req from Gen	1,237	1,237	1,237	
less LAARs Serving as Responsive Reserve, MW	1,063	1,063	1,063	
less LAARs Serving as Non-Spinning Reserve, MW	0	0	0	
less Emergency Interruptible Load Service	421	421	421	
Demand Response (DR)	1484	1484	1484	
EEA Risk				
(Reserve Capacity - Resp. Res. From Gen - Op Risk MW)	1938	-62	-2062	
Capacity Insufficiency Risk				
(Reserve Capacity - Resp. Res from Gen - Oper Risk MW + DR)	3422	1422	-578	

Status

- **Changes to CDR may require Protocol and Planning guide changes**
- **ERCOT will be seeking additional feedback on format and adequacy criteria for SARA report**

Questions?