



# UNCERTAINTY RESERVE PRODUCT

KATHRYN DIAL

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the lights on... today and in the future.*



SouthwestPowerPool



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# UNCERTAINTY PRODUCT CONSIDERATIONS

Increasing penetration of Variable Energy Resources

Conventional generation retirements

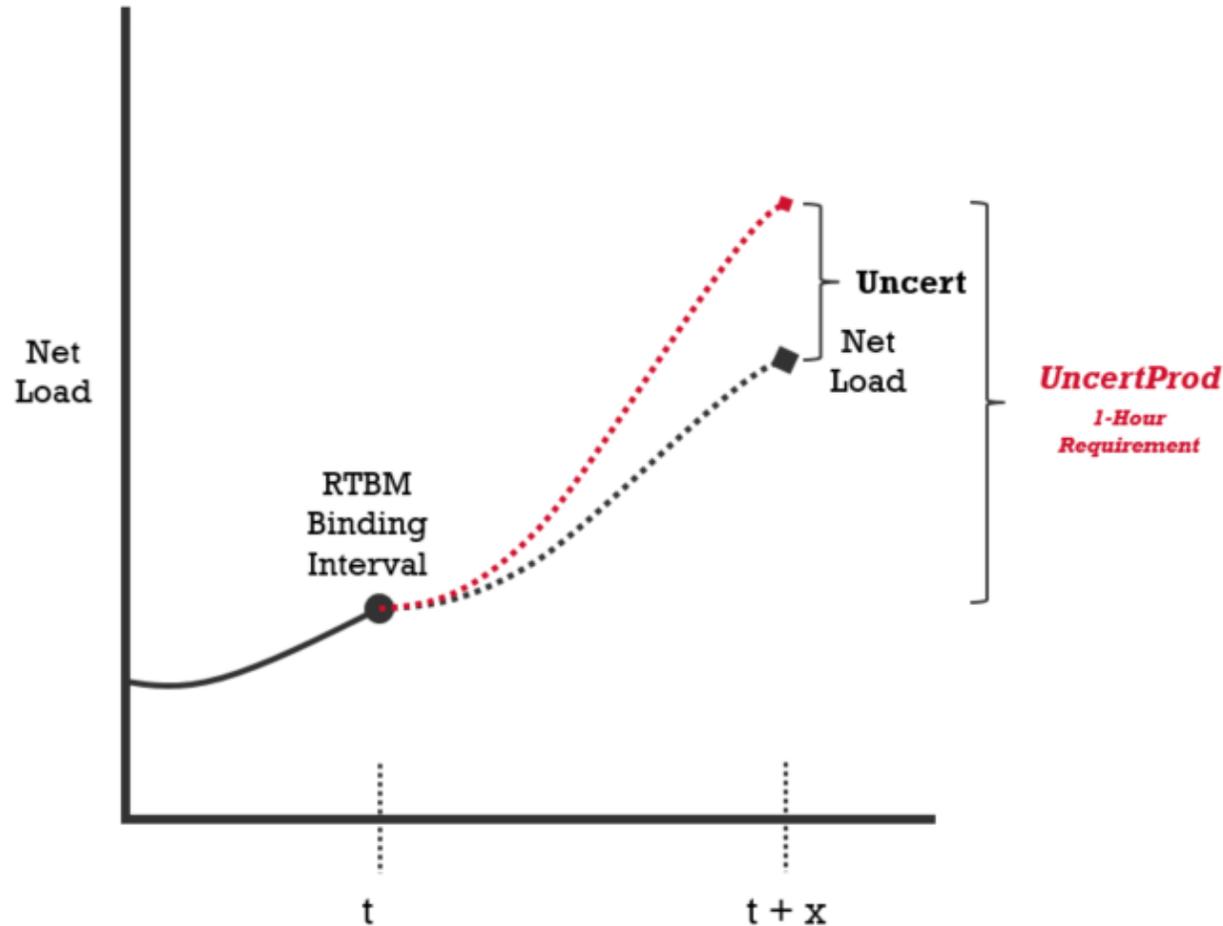
Market may commit all short-lead generation as the most economic solution leaving little offline capacity to respond to intra-day uncertainty

# UNCERTAINTY PRODUCT OVERVIEW

- Applied to all market studies
- Online & offline resources are eligible
- 1-hour horizon
- 97.5<sup>th</sup> percentile forecast error coverage



# UNCERTAINTY PRODUCT CONCEPT DIAGRAM



- " $t$ " represents the current interval (Ex: 13:05)
- " $x$ " represents the time-horizon of the product (1-hour)
- " $t + x$ " takes place 1-hour after " $t$ " (Ex: 14:05)
- "**Net Load**" represents the overall obligation at " $t + x$ "
- "**Uncert**" represents the statistical 97.5<sup>th</sup> percentile upward uncertainty for the hour (Ex: hour 13)
- The "**UncertProd 1-Hour Requirement**" is the expected hourly change in "**Net Load**" b/t time " $t$ " and " $t + x$ " plus the upward uncertainty "**Uncert**"
- " $t$ " interval will secure enough rampable online and offline capacity to meet the "**UncertProd 1-Hour Requirement**" or go scarce

# CALCULATING PRODUCT REQUIREMENTS

- The Planned component is the planned ramp from existing forecasts over the specified time horizon
- The Uncertainty component will be based on forecast errors over the specified time horizon
- One Hour Flexibility Requirement = Planned + Uncertainty ramps
- Uncertainty Reserve Requirement = One Hour Flexibility Requirement – (REGUP + CR + Ramp Capability Up Requirements)
- There is no downward product for the Uncertainty Reserve
- The ramps defined are for **Net Load**

# EXAMPLE PRODUCT REQUIREMENT CALCULATION

	13:00	14:00	15:00	16:00	17:00	18:00	19:00
Forecasted Net Load	28,000	29,000	30,000	32,500	34,500	34,000	33,000
One Hour Planned Ramp	1,000	1,000	2,500	2,000	-500	-1,000	-
97.5 <sup>th</sup> Percentile Uncertainty Error	947	755	492	657	525	733	-
One Hour Flexibility Requirement	1,947	1,755	2,992	2,657	25	-267	-
REGUP + CR + Ramp Capability Requirement	2,000	2,000	2,000	2,000	2,000	2000	-
<b>Uncertainty Reserve Requirement</b>	<b>0</b>	<b>0</b>	<b>992</b>	<b>657</b>	<b>0</b>	<b>0</b>	<b>-</b>



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