



2018 RTP Update

May 22, 2018

Agenda

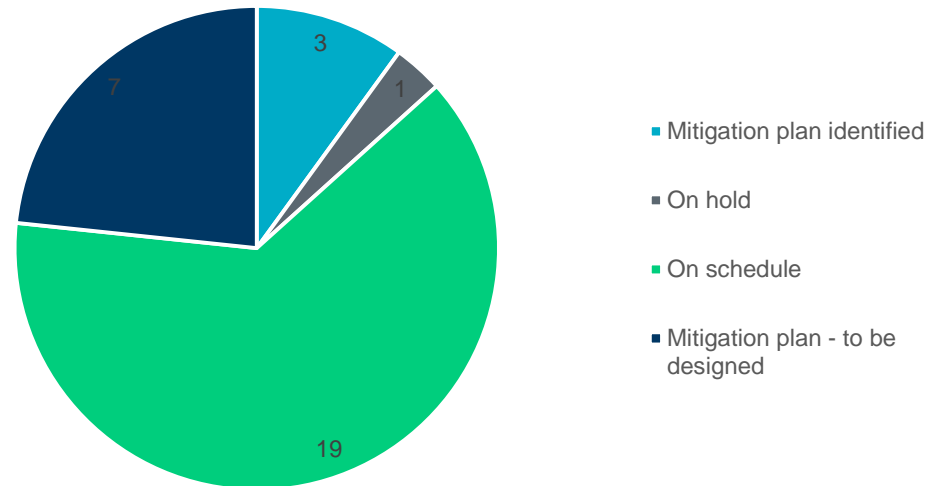
- 2017 RTP Projects Status Report
- 2018 RTP Final Load for Far West Weather Zone
- 2018 RTP Sensitivity Study
- 2018 RTP Status Update

2017 RTP Project Status Update

- In the 2017 RTP, 30 transmission upgrades and additions were identified as needed by summer 2019.
- ERCOT worked with TSPs on updating the status of those identified projects, and below is the summary of the status.
- The detailed information was posted on MIS.

<https://mis.ercot.com/pps/tibco/mis/Pages/Grid+Information/RegionalPlannin>

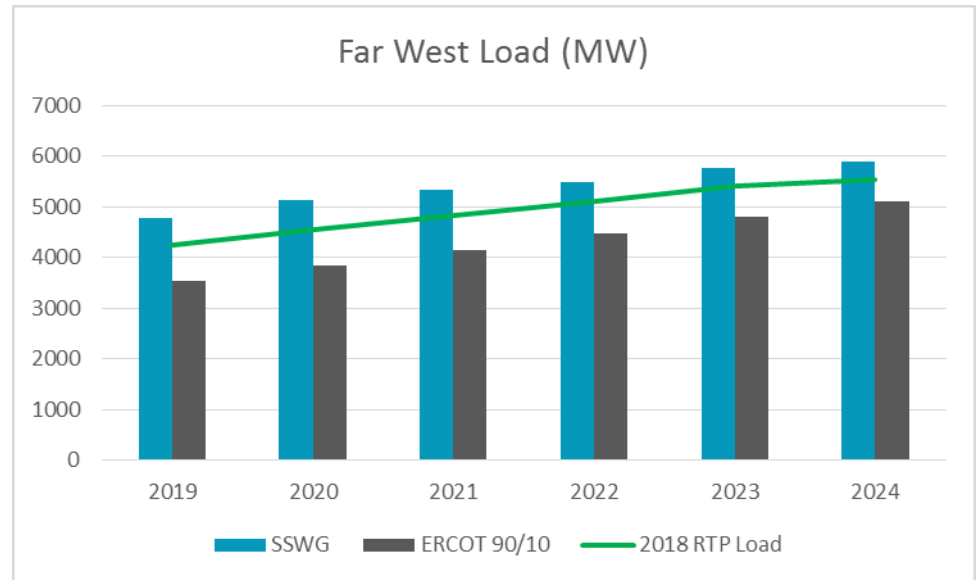
Status update: 2017 RTP projects for summer 2019



2018 RTP Final Load for Far West Weather Zone

- ERCOT completed the load review for Far West weather zone. The final load level (less self-served and losses) for 2018 RTP is summarized below:

Year	Far West
2019	4,249
2020	4,557
2021	4,837
2022	5,103
2023	5,403
2024	5,543



90th percentile
SSWG Forecast
Bounded (based on 5% threshold)

2018 RTP Sensitivity Study Assumption and Methodology

- Sensitivity analysis will be performed on:
 - summer peak base cases for 2020 (year 2) and 2023 (year 5)
 - off-peak case for 2021 (year 3).
- All assumptions and performance criteria will be held consistent with the 2018 RTP scope and process document.

2018 RTP Sensitivity Study Scenario

- Based on ERCOT past experience and stakeholder feedback, ERCOT plans to include the following sensitivity studies in 2018 RTP.
 - No wind and no hydro sensitivity for summer peak conditions
 - Higher load sensitivity (SSWG or TSP submitted load level during the load review process) for summer peak conditions
 - High wind and low load sensitivity for off peak conditions
- Due to resource constraint, the higher load sensitivity will only include P0, P1, P2.1, P7, P3 and P6.2 i.e. (N-1, G-1+N-1, and X-1+N-1) analysis.

2018 RTP Sensitivity Scenario Specifications

Condition	Region	Variable	Study years
Summer peak	All regions	Dispatch: Wind and Hydro units in all weather zones will be modeled offline (None in East and Coast weather zones) (Units will be taken completely out of service, including reactive support)	2020, 2023
Summer peak	WFW	Demand: SSWG level or the TSP submitted load level during the load review process if bounded	2020, 2023
Off-peak	All regions	Dispatch and Demand: Wind generation dispatch is increased with a moderate change in system wide demand to simulate HWLL conditions	2021

Assumptions: Higher Load for Summer Peak Cases

- The higher load level of the following three load forecasts is summarized in the following table:
 - ERCOT 90th percentile load forecast
 - The October 2017 SSWG load level
 - The TSP submitted load level during the load review process

Year	Coast	East	Far West	North	North Central	South Central	Southern	West	NCP Total
2020	23620	3015	5048	1706	26604	13701	6604	2337	82636
2023	23932	3093	5779	1723	27471	14388	6999	2396	85781

- The final load used in 2018 RTP is shown below.

Year	Coast	East	Far West	North	North Central	South Central	Southern	West	NCP Total
2020	23198	2950	4557	1503	26604	13701	6433	2248	81195
2023	23932	3018	5403	1515	27471	14246	6926	2319	84831

Assumptions: Higher Load for Summer Peak Cases

- The MW and percentage load increase between the RTP case and high load sensitivity case is summarized below.

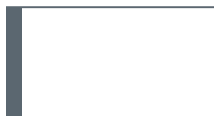
Year	Coast	East	Far West	North	North Central	South Central	Southern	West	NCP Total
2020	422	65	491	203	0	0	171	89	1441
2023	0	75	376	208	0	141	73	77	950

Year	Coast	East	Far West	North	North Central	South Central	Southern	West	NCP Total
2020	2%	2%	11%	14%	0%	0%	3%	4%	2%
2023	0%	2%	7%	14%	0%	1%	1%	3%	1%

- ERCOT will perform high load sensitivity studies for the West and Far West study region

2018 RTP Status Update

- 2018 RTP initial violations results except for WFW have been posted on MIS:
<https://mis.ercot.com/pps/tibco/mis/Pages/Grid+Information/RegionalPlanning>
- Transmission Planning Assessment department is currently working on the N-1 analysis.



Appendix

2018 RTP Sensitivity Study

- The purpose of the sensitivity study is to study the impact of varying one or more of the system conditions as listed in R 2.4.3 of NERC TPL-001-4 reliability standards.
- Requirement 2.4.3 of NERC Standard TPL-001-4 states:
- 2.4.3. For each of the studies described in Requirement R2, Parts 2.4.1 and 2.4.2, sensitivity case(s) shall be utilized to demonstrate the impact of changes to the basic assumptions used in the model. To accomplish this, the sensitivity analysis in the Planning Assessment must vary one or more of the following conditions by a sufficient amount to stress the System within a range of credible conditions that demonstrate a measurable change in performance:
 - Load level, Load forecast, or dynamic Load model assumptions.
 - Expected transfers.
 - Expected in service dates of new or modified Transmission Facilities.
 - Reactive resource capability.
 - Generation additions, retirements, or other dispatch scenarios.

Assumptions

No Wind No Hydro for Summer Peak Cases

- All hydro units in each study region are turned off in the respective base cases
- The table below summarizes the status of wind units for each study region

Region	Wind Units Offline	Wind Units Online
South/South Central/East/Coast	Wind units in South and South Central zones	Wind units in West, Far West, and North zones
North/North Central/West/Far West	Wind units in West, Far West, and North zones	Wind units in South and South Central zones

Assumptions

No Wind No Hydro for Summer Peak Cases

- The following table summarizes approximate change in dispatch (MW of wind and hydro generation being turned off) resulting from the sensitivity

Year	Wind (MW) in RTP Cases				Hydro (MW) in RTP Cases			
	EC	NNC	WFW	SSC	EC	NNC	WFW	SSC
2020	-	432	318	1030	-	113	96	251
2023	-	443	318	1030	-	113	96	251

Assumptions

High Wind Low Load for Off Peak Case

Wind

- Use the historical factors for wind units based on high wind conditions for each zone:
 - 89.9% capacity factor for PANHANDLE
 - 81.1% capacity factor for SOUTH (COASTAL)
 - 88.5% capacity factor for WEST and NORTH
- Applying the historical capacity factors, the dispatchable wind in the HWLL case is approximately 23,096 MW

Assumptions

High Wind Low Load for Off Peak Case

Load

- The load level was determined by reviewing historical load levels during top wind hours
- The following table summarizes the approximate demand resulting from the sensitivity

Year	2018 RTP Min Case Load (MW)	2018 RTP HWLL Case Load (MW)
2020	35,312	37,103