



Transmission Impact of the Regional Haze Environmental Regulation

RPG
ERCOT Public
Oct 15, 2015

Study Purpose and Background

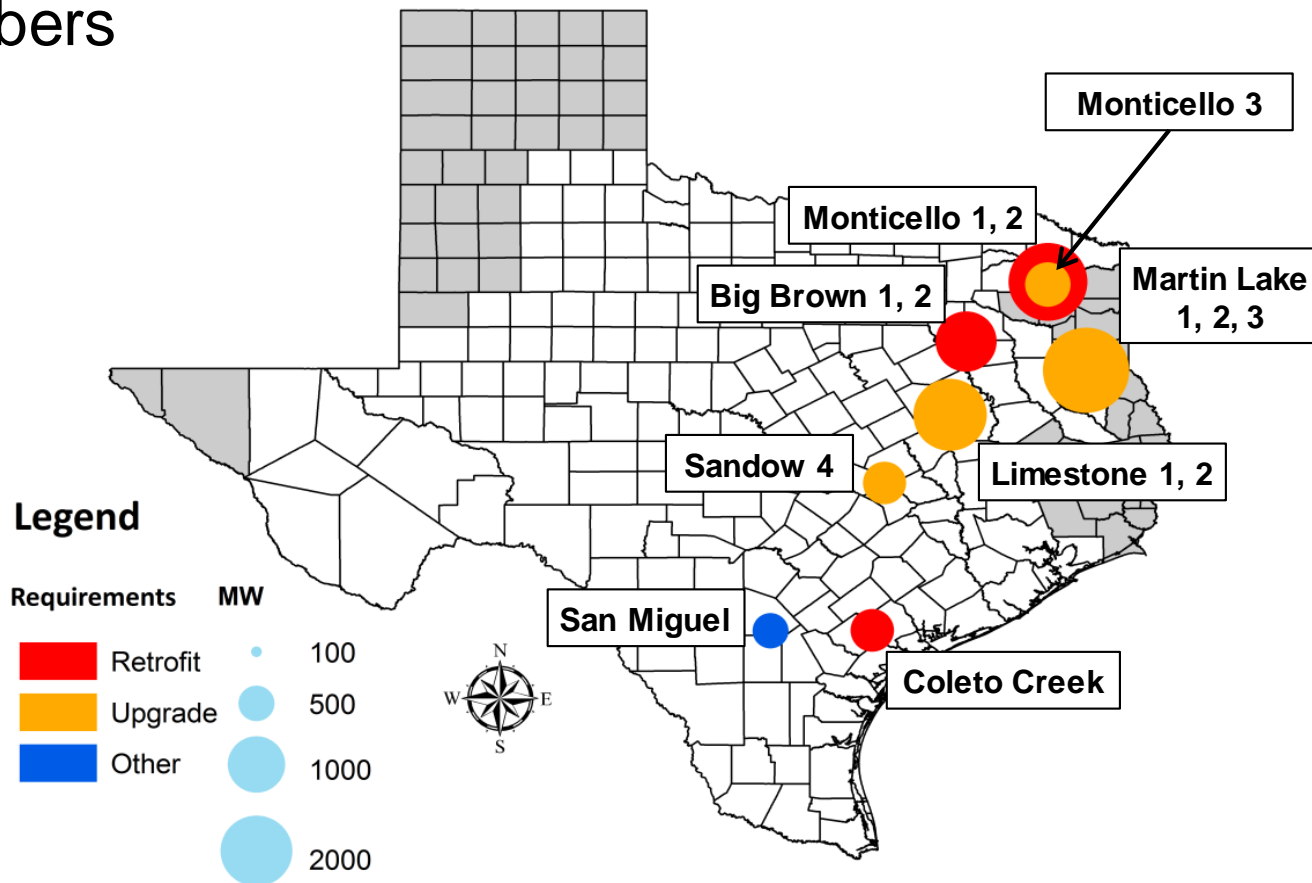
- There are several proposed or recently finalized environmental regulations that could have an impact on grid reliability in ERCOT
- One of these rules is the proposed Regional Haze Federal Implementation Plan (FIP), which would:
 - Set SO₂ emissions limits for specific coal-fired units in the ERCOT region
 - Require owners of affected coal units to retrofit with new scrubbers or upgrade existing scrubbers within three to five years after the final Federal Plan is issued
- As part of ongoing work studying the potential impacts of environmental regulations, ERCOT conducted this study to evaluate potential retirement scenarios resulting from compliance with the proposed Regional Haze FIP.

Disclaimer

- This study is not intended to evaluate the viability of specific units, but rather to assess the transmission reliability implications of the retirement of multiple coal-fired units over a relatively short period of time, using the Regional Haze requirements to provide a scope for the analysis.

Regional Haze Affected Generation in ERCOT

- 3,000 MW in ERCOT required to retrofit with new scrubbers; 5,500 MW required to upgrade existing scrubbers



Transmission Impact - Study Scope

- **Base Cases**

- The 2020 reliability summer peak cases of East/Coast (EC), North/North Central (NNC) and South/South Central (SSC) from the 2015 Regional Transmission Plan (RTP)

- **Generation and/or Load assumptions**

- Switch off the coal-fired generation units in the study region impacted by the Regional Haze program
- Add new conventional and solar generation resources with a signed Generator Interconnection Agreement (SGIA)* outside of the study region to balance the load, supply, and reserves
- Scale down the load outside of the study region if the new conventional and solar generation resources are not enough

- **Criteria**

- The reliability criteria used in this study is consistent with the RTP study assumptions
- NERC TPL-001-4 contingency events (P0, P1, P2-1, P3, P6 and P7) were analyzed for all the cases

* Includes Generator resources with SGIA that might not fully meet Planning Guide criteria 6.9

Study Cases

- ERCOT retired impacted Generation units in phases to create the study cases
 - First assuming the retirement of units with scrubber retrofit requirements
 - Then adding to that the potential retirement of units with scrubber upgrade requirements
- ERCOT evaluated the potential impacts separately for each study region with impacted capacity (East/Coast, South/South Central, and North/North Central)
- Total six scenarios/cases were developed and analyzed for this study

Study Cases

Study Cases	Phase	Unit Retirement	New Generation Addition (outside study area)	Load Reduction (outside study area)
Case 1 (2020 EC)	Scrubber Retrofit	Big Brown 1 & 2; Monticello 1 & 2 (Total: 2,265 MW)	2,273 MW	n/a
Case 2 (2020 SSC)	Scrubber Retrofit	Coletto Creek; (Total: 650 MW)	660 MW	n/a
Case 3 (2020 EC)	Scrubber Retrofit & Scrubber Upgrade	Big Brown 1 & 2; Monticello 1, 2, & 3; Martin Lake 1, 2, & 3 (Total: 5,435 MW)	2,383 MW	3,052 MW
Case 4 (2020 SSC)	Scrubber Retrofit & Scrubber Upgrade	Coletto Creek; Sandow 4; (Total: 1,250 MW)	1,265 MW	n/a
Case 5 (2020 NNC)	Scrubber Retrofit & Scrubber Upgrade	Limestone 1 & 2; Big Brown 1 & 2 (Total: 2,884 MW)	2,897 MW	n/a
Case 6 (2020 NNC)	Scrubber Retrofit & Scrubber Upgrade	Monticello 1, 2, & 3; Martin Lake 1, 2, & 3 (Total: 4,240 MW)	4,246 MW	n/a

Summary of the Study Results

Study Cases	Unit Retirement	Transmission Overloads (in Miles)			Number of Transformers overloads	
		345 kV	138 kV	69 kV	345/138 kV	138/69 kV
Case 1 (2020 EC)	Big Brown 1 & 2; Monticello 1 & 2	n/a	3	34	1	1
Case 2 (2020 SSC)	Coletto Creek	45	133	72	2	2
Case 3 (2020 EC)	Big Brown 1 & 2, Monticello 1, 2, & 3; Martin Lake 1, 2, & 3	n/a	111	34	1	1
Case 4 (2020 SSC)	Coletto Creek; Sandow 4	45	133	72	2	2
Case 5 (2020 NNC)	Limestone 1 & 2; Big Brown 1 & 2	n/a	33	17	7	1
Case 6 (2020 NNC)	Monticello 1, 2, & 3; Martin Lake 1, 2, & 3	143	147	39	9	2
Total		188	413	135	13	4

Conclusions

- Based on the initial study assumption, Regional Haze requirement would have a significant local and regional impact on the reliability of the ERCOT transmission system
 - Local transmission issues identified in all of the studied regions
 - Regional issues identified in the North/North Central region
- Significant upgrades to the ERCOT transmission infrastructure might be required depending on:
 - The amount of coal-fired capacity retirement
 - The locations of the new generation resources



Appendix - New Generation Addition

- New conventional and solar generation with signed IA as of April 2015

GINR Reference Number	Project Name	County	Projected Date	Fuel	MW For Grid	Financial Commitment	Notice To Proceed
13INR0049	Friendswood G	Harris	5/2016	GAS	121	NO	FALSE
15INR0032	Antelope Station Elk 2	Hale	6/2016	GAS	197	YES	TRUE
15INR0033	Antelope Station Elk 3	Hale	6/2016	GAS	197	YES	TRUE
15INR0070_1	West Texas Solar	Pecos	6/2016	SOLAR	110	YES	TRUE
16INR0052	Paint Creek Solar	Haskell	8/2016	SOLAR	110	YES	TRUE
15INR0023	Indeck Wharton	Wharton	4/2017	GAS	700	NO	FALSE
16INR0003	Freeport LNG	Brazoria	6/2017	GAS	11	YES	TRUE
16INR0008	Tenaska Roans Prairie	Grimes	6/2017	GAS	663	NO	FALSE
16INR0010	FGE Texas 1	Mitchell	7/2017	GAS	799	NO	FALSE
10INR0022	Pondera King G	Harris	8/2017	GAS	925	NO	FALSE
16INR0006	Pinecrest G	Angelina	10/2017	GAS	785	NO	FALSE
16INR0004	LaPaloma G	Cameron	11/2017	GAS	730	NO	FALSE
17INR0003	SPC Jackson County	Jackson	6/2018	GAS	916	NO	FALSE
13INR0023	Texas Clean C	Ector	10/2018	COAL	240	NO	FALSE