Reliability Risks Due to Coal Retirements at ERCOT

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Coal-fired power plants in ERCOT are under economic pressure

- Low natural gas prices have reduced profit margins for coal plants and threaten their economic viability.
  - Abundant natural gas resources have resulted in Henry Hub gas prices largely below $4/MMbtu since 2009, averaging $2-$3/MMbtu during the last two years.

- Generation from renewables and gas has been displacing generation from coal plants, and this trend is likely to continue.
  - As of May, 2016, 3.1 GW of gas plants and 4.8 GW of wind were added to ERCOT since 2014.
  - In May ERCOT reported that 7.4 GW of thermal resources, 11 GW of wind resources and 1.8 GW of solar resources are projected to be added over the next few years.
Markets may drive coal units to retire, which could pose a threat to ERCOT’s reliability

- Our prior analysis showed that up to 10 GW of coal-fired units in ERCOT could retire by 2022 due to persistently low natural gas prices and the penetration of new renewable resources.
- This study explores the impacts of coal unit retirements on ERCOT’s reliability.

Potential Effect of Coal Retirements on ERCOT Reserve Margin

Source: Existing and planned capacity are based on ERCOT’s May 2016 CDR; coal at risk of retirement is based on Brattle’s analysis: Exploring Natural Gas and Renewables in ERCOT, Phase IV. Ira Shavel et al. May 17, 2016.
Note: Capacity for coal at risk of retirement also includes 1.7 GW of retirement due to the Regional Haze Rule.
Coal retirements are unlikely to impact ERCOT’s reliability

- **Resource Adequacy**
  - Currently oversupplied and forecasted additions of natural gas and solar generation should provide a cushion to absorb many retirements that may occur.
  - ERCOT’s market is designed to, and has to date, effectively dealt with resource adequacy needs.
  - In an extreme scenario with a large number of coal plants retiring over a very short period, resource adequacy could be diminished resulting in more frequent scarcity events, but this is unlikely to result in significant customer outages.
  - RMR contracts can be a short-term option too, despite that they are designed to address local reliability issues.

- **Local Reliability**
  - There are tools and safeguards in place to ensure that reliability issues that may arise can be addressed by ERCOT and the state.
  - As a last resort, the US Department of Energy can prevent a unit’s closure under Section 202(c) of the Federal Power Act, if no other solution is found.
Short-term options are available

- **Operational options**
  - Technology options such as Dynamic Power Flow, Dynamic Line Ratings, and Transmission Topology Control.
  - Special Protection Systems.
  - Load and generation resource alternatives.

- **Reliability-Must-Run (RMR)**
  - ERCOT can contract with a generator to prevent it from shutting down.
  - Used in 2016 for Greens Bayou.

- **Must-Run Alternatives (MRA)**
  - After entering an RMR contract, ERCOT identifies other short-term options to replace the RMR agreement.
  - Includes short-term transmission solutions, local demand response, distributed generation, and short-term contracts with new grid connected generation.
Long-term options are also available

- **New generation resources**
  - Includes gas, wind, solar, and storage.
  - The CREZ line can transfer up to 11 GW of solar in Western Texas to the east.

- **Demand side resources**
  - Includes DR, EE, and distributed resources.

- **Transmission updates**
Dr. Shavel is an energy economist with over 30 years of experience in the energy industry, specializing in the economics and operations of the U.S. electric power system, generation and transmission investment, and environmental strategy. He has performed work for a wide range of clients, including generation and transmission companies, natural gas pipelines, marketers, developers, industry research groups, and as federal agencies. Recently he co-authored a study for the Texas Clean Energy Coalition on the future of renewable and natural gas generation in ERCOT.

Dr. Shavel has broad experience developing models of North American power systems, including the Integrated Planning Model by ICF International. He has also directed significant assignments for major electric utilities, independent transmission companies, RTOs, independent power producers and private equity on matters such as coal plant retirements, fuel price forecasting, the benefits of new transmission lines and power plant valuation. Dr. Shavel has testified before the Federal Energy Regulatory Commission (FERC), state regulatory agencies, and the Ontario Energy Board. Prior to joining Brattle, Dr. Shavel was a Vice President at Charles River Associates (CRA). While at CRA, he led the development of the National Energy and Environment Model (NEEM) and contributed to its integration with the Multi-Region National Macroeconomic Model.
Dr. Yingxia Yang is currently an associate in the Utility Practice Area of Brattle. Her experience is focused on developing and using economic models to conduct the economic and policy analysis of energy and environmental issues in the energy industries with a focus on the power and natural gas sectors. She has performed the economic and policy analysis of the power system and generation technologies to consult energy industry companies for integrated operation planning and environmental strategies as well as the impact of shale gas production on the electric sector and the whole economy.

Before she joined Brattle, she worked for CRA, where Dr. Yang led the modeling effort of MRN-NEEM (Multi-Regional National model-North American Electricity and Environment Model). Prior to joining CRA, Dr. Yang worked at MIT Energy Initiative during her postdoctoral research where she participated in a large interdisciplinary MIT study entitled “The Future of Natural Gas” and led the quantitative analysis of the impacts of a US climate policy on natural gas consumption in the power sector by employing the MARKAL model and contributed to the chapter, “Demand for gas in the power sector.”
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