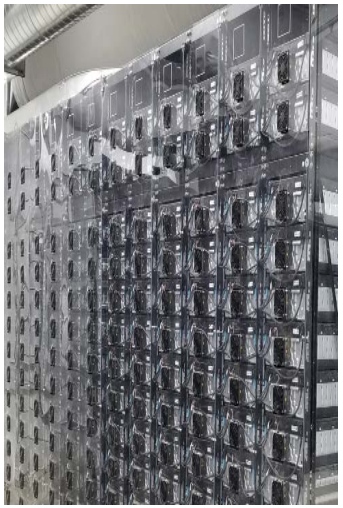
Thoughts on the Treatment of Gas Availability in RCA

December 6, 2022



LS Power Overview

At the leading edge of making the nation's energy system cleaner, more affordable, and more reliable

- LS Power is a development, investment and operating company focused on the North American power and energy infrastructure sector
- Founded in 1990, LS Power has 315+ employees across New York, New Jersey, Missouri, Texas, California, and remotely
- Since inception, LS Power has raised **$49 billion** in equity and debt capital to develop or acquire more than 46,000 MW of power generation and ~680 miles of transmission infrastructure, and build some of the country's leading energy transition platforms
- In-house functional experts provide due diligence and additional management capabilities to projects and investments

LS Power Group

Investment Partnerships

Flagship Infrastructure Funds

- **$10.2 billion in equity capital** committed to power and energy infrastructure
- **Acquired over 33,000 MW of power generation** assets (conventional and renewable)
- **Established Energy Transition Platforms** CPower Energy Management, Craft Work Capital Investments, Endurant Energy, EVgo, REV Renewables, Rise Light & Power, and Waste-to-Energy initiatives

Other Partnerships

Development

Transmission

- Leading national non-incumbent transmission owner with **~680 miles of high-voltage transmission completed,** and an additional 100+ miles and multiple substations under construction

Energy Storage

Renewables

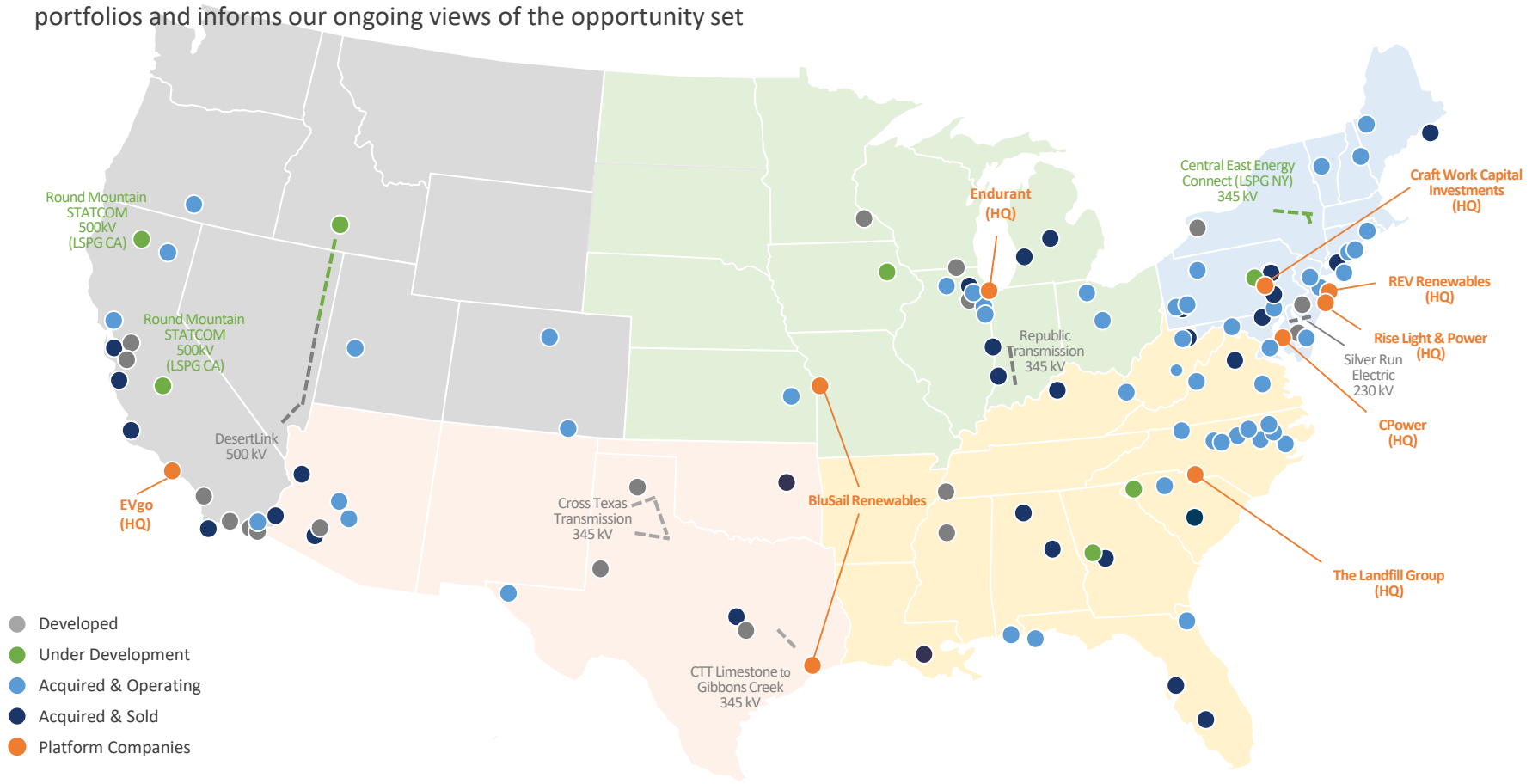
- **Developed ~14,000 MW of power generation** (conventional and renewable) across the United States

Note: Through 2021, assets under LS Power control avoided 80.7 million metric tons of CO_2e, equivalent to nearly 187 million barrels of oil not consumed or more than 17.5 million cars taken off the road for one year. Please see the LS Power website Sustainability page for additional details and calculation methodology.

Project Portfolio

Extensive development and operating experience across multiple markets and technologies

- With $49 billion in equity and debt raised, LS Power has developed or acquired 118 Power Generation projects (renewable and conventional), 7 Transmission projects, 7 Battery Energy Storage projects, and multiple Energy Transition Platforms
- A reduction in the carbon intensity of the system is a secular long-term trend – one which we anticipated in constructing our portfolios and informs our ongoing views of the opportunity set



Position Summary

- LS agrees that accreditation is inadequate in New England currently, and should be improved. Better treatment of fuel is one key area for enhancement.
- ISO-NE's RCA project has the opportunity meaningfully enhance accreditation.
  - Unit-specific, marginal MRI has the potential to yield the most accurate capacity values.
- LS is concerned that the ISO is deviating from its unit-specific approach when addressing pipeline gas availability.
- This is a problem because gas-only resources are not all the same and gas availability is not uniform across the region.
  - Significant variability between gas-only resources.
- Proposals that rely on class-level accreditation mechanisms, such as ISO's fuel framework, will mute the price signals that induce necessary investment in reliability.
- RCA will be a failure unless it can reasonably distinguish between high quality gas-only resources and low quality ones.

A few observations about gas pipelines as gas resources

- Gas is not uniformly available in the New England region.
  - Gas availability tends to get worse at downstream delivery points;
  - Different pipelines go different places: Iroquois and M&N are fundamentally different;
  - LDCs own different amounts of the FT on different mainlines and laterals;
  - Different units have gas arrangements with different degrees of "firmness".
- Generator efficiency, alone, cannot explain observed dispatch behavior in cold weather.
  - Appears that some resources are unable to get gas at *any price* in some conditions.
- In practice, there is not 1-for-1 substitutability between gas units.
  - Moving a unit like LS Power's Wallingford peaking facility from central Connecticut to metro-Boston would almost assuredly result in worse gas availability and, consequently, worse energy availability.
  - Part of Wallingford's value proposition is based on its advantageous pipeline location.

There are instances where some gas resources fall offline for fuel insufficiency while others take their place.

Operational Event on 3/29/2022, per April 2022 COO Report [1]

- "Between 05:00 and 06:30 ISO was notified by several gas fired generators of potential upcoming restrictions due to a lack of scheduled gas; potential reductions totaled approx. 1,100 MW of capacity"
- "Between 07:00 and 08:05 Some gas-fired resources that had reported the potential restrictions were directed offline by gas pipeline operators resulting in the loss of approx. 840 MW of capacity"
- "In response to the ongoing events and uncertainties, ISO system operators initiated the following actions to ensure adequate system reserves"
- "Between 07:27 and 07:45 committed additional offline fast start resources totaling approx. 1,000 MW" – *including Wallingford*.

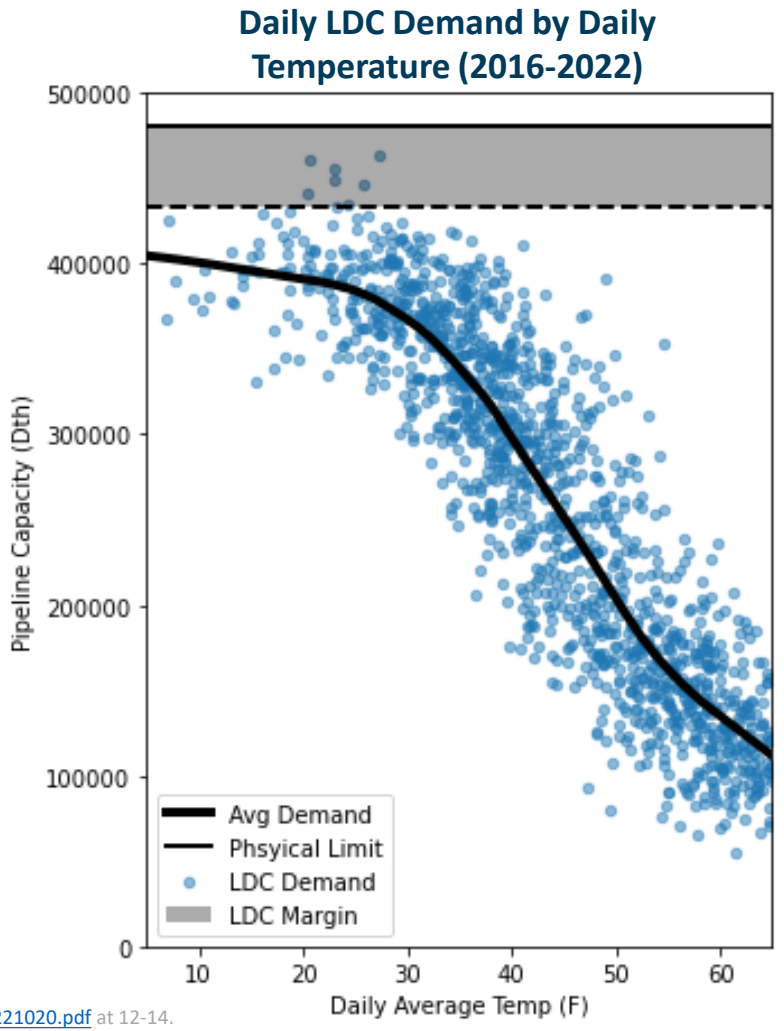
If some gas resources are coming *off-line* for fuel unavailability while others can come *online* with no notice to replace them, then gas resources cannot be treated as 1-for-1.

1. April 2022 COO Report, 12-17 https://www.iso-ne.com/static-assets/documents/2022/04/april-2022-coo-report.pdf

LS POWER

LDC ownership of frim transmission on the Algonquin G-Lateral limits gas generation on that lateral on cold days.

- LDCs own approximately all FT capacity on Algonquin G-Lateral (or, conversely, G-Lateral sized for LDC demand).
- As temperatures decrease, LDC demand approaches lateral capacity, less a reserve margin, leaving little-to-nothing for power gen.
- Gas-only resources on G-lateral should not be expected to have gas available on cold days, even if otherwise in merit.
- On other portions of gas system, marketers own a meaningful amount of capacity, yielding different gas availability dynamics.
- N.b., the EMM has published complementary results for LDCs in New York with same punchline. [1]



1. https://www.potomaceconomics.com/wp-content/uploads/2022/10/MMU-Gas-Availability-Presentation__20221020.pdf at 12-14.

Some principles for high quality fuel modeling in RCA

- Fuel modeling should be unit specific, just like RCA as a whole.
- Observed unit fuel access should be factored into overall accreditation, using something like the "hybrid empiricism + modeling" approach described by Brattle [1].
  - Blending observed performance with MRI-type modeling can capture unit-specific operational nuances and certain system risks that could be omitted by an approach that only relies on one technique or the other.
- An incremental MW of a given resource should be assumed to perform like the rest of that resource (i.e., marginal with respect to a *unit*).
  - If a resource has demonstrated cold weather performance, we should assume that an additional MW of that resource would perform just as well.
- Concede the aphorism "all models are wrong, some are useful" and align RCA with performance incentives to ensure that expected resource performance is "trued-up" with actual performance in operational timeframe.

1. https://www.iso-ne.com/static-assets/documents/2022/09/a05e_mc_2022_09_13-14_rca_ma_ago_presentation.pptx at 8.

A caution: failure to pursue granular fuel modeling will tend to result in higher consumer costs and worse system outcomes.

- In prior presentations [1], LS provided operational data on Wallingford demonstrating consistent ability to provide energy when called to do so, even in cold weather, and no fuel-related unavailability since at least the introduction of EMOF in December 2014.
  - Over past 8 winter seasons unit had 98.1% availability and successfully started, following dispatch signal, 99.86% of time (2 failures due to mechanical issues, not fuel).
- Applying a fleet-wide gas derate value to Wallingford, despite the resource doing everything that the ISO asked of it, will reduce QMRIC, and most likely revenues.
  - As revenue requirements are annual dollar values, would likely necessitate higher delist bids → capacity prices pushed up?
- As in any average, for any *overperforming* resource there must be one or more *underperforming* resources.
  - Underperforming resources end up over-accredited compared to true performance → overstated system reliability and worse outcomes in operational timeframe?
- Unit-specific adjustments can partly mitigate, but not eliminate, the bias of class values.

1. https://www.iso-ne.com/static-assets/documents/2022/07/a02_mc_2022_07_12-14_rca_ls_power_presentation.pdf

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