PJM RASTF: Seasonal Capacity Discussion

Mark Spencer

Tom Hoatson

August 8, 2022

About LS Power

LS Power is a development, investment and operating company focused on the North American power and energy infrastructure sector

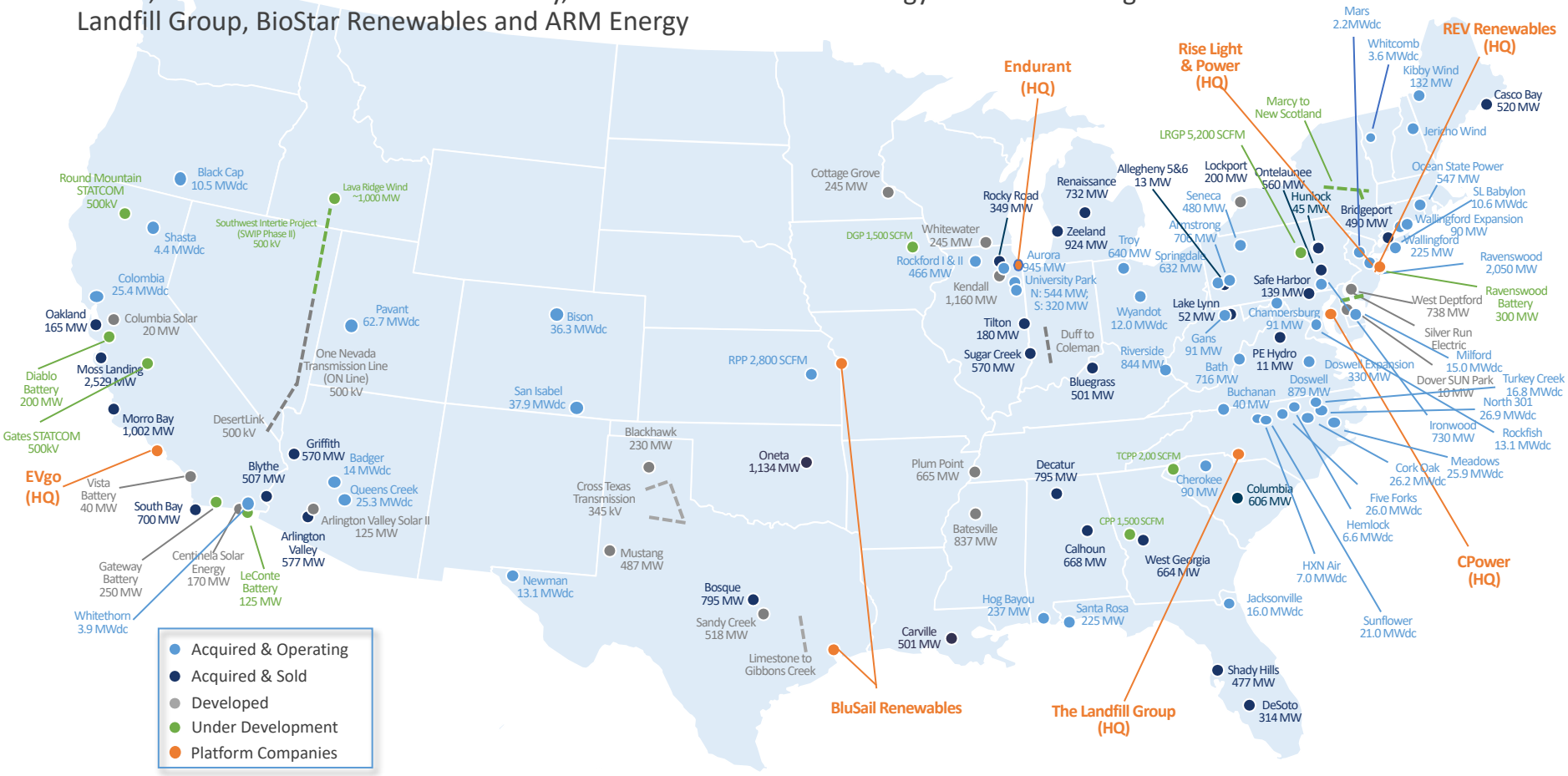
- Founded in 1990, LS Power has 280 employees across its principal and affiliate offices in New York, New Jersey, Missouri, Texas and California
- LS Power is at the leading edge of the industry's transition to low-carbon energy by commercializing new technologies and developing new markets.
  - **Utility-scale power projects across multiple fuel and technology types**, such as pumped storage hydro, wind, solar and natural gas-fired generation
  - **Battery energy storage**, market-leading utility-scale solutions that complement weather dependent renewables like wind and solar energy
  - **High voltage electric transmission infrastructure**, which is key to increasing grid reliability and efficiency, as well as carrying renewable energy from remote locations to population centers
  - **EVgo, the nation's largest public fast charging platform for electric vehicles** and first platform to be 100% powered by renewable energy
  - **CPower Energy Management**, the largest demand response provider in the country that is dedicated solely to the commercial and industrial sector
- Since inception, LS Power has developed, constructed, managed and acquired competitive power generation and transmission infrastructure, for which **we have raised over $47 billion in debt and equity financing.**
  - **Developed over 11,000 MW of power generation** (both conventional and renewable) across the United States
  - **Acquired over 34,000 MW of power generation assets** (both conventional and renewable)
  - **Developed over 660 miles of high voltage transmission**, with ~400 miles of additional transmission under development

Utilize deep industry expertise as owner/operator

LS Power Project Portfolio

Extensive development/operating experience across multiple markets and technologies

- With over $47 billion in equity and debt raised, LS Power has developed and acquired 120 Power Generation projects (renewable and conventional generation), 7 Transmission projects, and 5 Battery Energy Storage projects
- LS Power's Energy Transition Platforms includes CPower Energy Management, Endurant Energy, EVgo, Rise Light & Power, and REV Renewables. Additionally, LS Power has Waste to Energy initiatives through its Joint Ventures with the Landfill Group, BioStar Renewables and ARM Energy



Maintaining Reliability in PJM

- **RPM Capacity Performance Product: Capacity Performance Resources must be capable of sustained, predictable operation that allows resource to be available to provide energy and reserves throughout the Delivery Year [PJM Statement]**
- Resource Adequacy [Steel in the Ground] vs. Resilience [Real Time Availability]
- We must ensure PJM has the necessary resources to achieve decarbonization goals reliably
- Must prioritize changes to the capacity market

“Flaws” Cited By Others to Advocate for a Seasonal Approach

- As articulated by Brattle, by combining winter and summer resources, the value is not allocated properly to the higher value summer resources:

  “However, an inefficiency is introduced because the summer and winter capacity resources are each awarded the same price on a daily basis (or half of the total annual payment). This results in the higher-cost summer resource being paid less than its offer price, introducing the possible need for uplift payments not just for the marginal price-setting resource but also for the summer component of a number of infra-marginal matched resources. For winter resources, this results in over-payment. A more efficient price outcome would be to set summer and winter prices based on the offer price for the marginal price-setting resource in each season (which would average to the annual price)” [Brattle]

“Flaws” Cited By Others to Advocate for a Seasonal Approach

- Procuring based on the Summer Installed Reserve Margin over procures for other seasons with lower IRMs resulting in consumers overpaying [Wilson]

Considerations Moving to Seasonal Capacity Market

- Seasonal CIRs. Necessitates deliverability studies of all resources for each season.
- Equity among resources
- LOLE
- Revenue Requirements
- Market Structure (e.g. MISO proposal has make-whole payments)

What would the Winter PRM be in a Two Season Capacity Market?

- P_{summer} could be lowered to balance the risk between the winter and summer but that would require a higher summer PRM.
- Let's assume P_{summer} is set to a 1-in-12 LOLE, or 0.083. P_{annual} must still be 0.1 (i.e., 1-in-10 LOLE) and solving for P_{winter} we arrive at 1-in-100 (LOLE), or 0.01.
- What's the MW delta between a summer IRM equal to a 1-in-12 LOLE and a winter IRM equal to a 1-in-100 LOLE?
  - We suspect much less than assumed.
- As an aside, if the P_{summer} and the P_{winter} are both set to 1-in-10 LOLE (i.e., 0.1), the P_{annual} becomes ~1-in-5 LOLE.

Conclusion

Feedback / Questions?