



High-Level Perspectives for Capacity Market Reform

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LS Power Group Overview

LS Power is at the leading edge of the industry's transition to low-carbon energy by commercializing new technologies and developing new markets

- LS Power is a **development, investment and operating company** focused on North American power and energy infrastructure
- Founded in 1990, LS Power has over 300 employees across offices in New York, New Jersey, Missouri, Texas and California
- In total, LS Power has developed, constructed, managed and acquired more than **45,000 MW** of competitive (conventional & renewable) power generation and over **660 miles of high voltage transmission** infrastructure, raising over **\$48 billion** in debt and equity financing to invest in North American infrastructure
- Highlights include **Gateway, the world's largest battery** when energized in Aug 2020, utility-scale solar projects in AZ and CA, **2.6 GW operating portfolio of renewable generation and energy storage**, and flexible, deployable generation resources critical to grid reliability
- LS Power's approach to the energy transition is deliberately **focused on investments that will likely yield long-term reductions in greenhouse gas (GHG) emissions at the system level**

2021 Avoided GHG Emissions

(assets under LS Power control)

80,670,100

metric tons CO₂e avoided

EQUALS

17,550,629

passenger vehicles taken off the road for one year

or

14,658,563

homes' electricity use for a year

or

186,837,560

barrels of oil not consumed

or

27,448,980

tons of waste recycled instead of landfilled

or

98,871,825

acres of forest sequestering carbon for a year

Please see [LS Power Sustainability](#) for additional details including GHG emission avoidance calculation methodology.

LS Power Energy Transition Platforms

National Leaders in Distributed Energy, Electric Vehicle Charging, Energy Storage and Renewable Generation/Fuels



- **CPower Energy Management is the leading demand-side energy management solutions provider in the U.S.**, that helps nearly 2,000 commercial, industrial and government organizations save on energy costs, earn revenue through energy curtailment, enhance their sustainability efforts, and support the decarbonization and reliability of the electric grid.



- **REV Renewables is an industry leader in the development, acquisition and operation of renewables and energy storage.** REV's 2.6 GW operating portfolio includes 25 solar projects, 1 wind projects, and several battery projects including Gateway, the world's largest battery when energized in Aug 2020. REV represents one of the nation's largest non-utility portfolios of renewables and energy storage.



- **Primary Renewable Fuels partners with the Landfill Group, a leader in the Landfill Gas to Energy Industry.** With over 30 years of experience, the Landfill Group was created to answer a need expressed by the landfill gas market – the ability to build a project where all vendors come together and seamlessly connect all the parts by providing complete solutions from development, operations, construction, equipment manufacturing, and ownership of landfill gas projects to municipal and private landfill owners across the U.S.



- **EVgo is the nation's largest and most reliable public fast charging network for electric vehicles**, powered 100% by renewable energy, with more than 850+ locations and 400,000+ retail and fleet customers across more than 30 states. EVgo has the best operating record in the industry – more than 98% uptime – and consistently earns the highest consumer scores for U.S. public charging networks on PlugShare.



- **BluSail Renewable Fuels represents a JV with BioStar Renewables and ARM Energy to develop, build, own and operate waste to energy projects.** BluSail uses anaerobic digestion (AD) to break down waste, isolating by-products such as ammonia and methane, to be converted into Renewable Natural Gas or Renewable Electricity. Through its AD Waste to Energy solutions, BluSail reduces Greenhouse Gas Emissions, provides Renewable Energy, and diverts waste from landfills to support farming and other government, commercial and industrial users with their waste management needs.



- **Rise Light & Power is a regional manager and developer of energy assets** which provides more than 20% of New York City's generating capacity and is making significant investments to enable the state to reach its clean energy goals. From modernizing facilities to investing in large-scale renewable energy projects, Rise Light & Power is working to light the future.

514,814

metric tons of CO₂e collectively avoided
across LS Power's Energy Transition Platforms in 2021

Please see [LS Power Sustainability](#) for additional details including GHG emission avoidance calculation methodology.

LS Power Project Portfolio

Extensive development/operating experience across multiple markets and technologies

- With over **\$48 billion** in equity and debt raised, LS Power has developed and acquired **over 100 Power Generation projects** (renewable and conventional), 7 Transmission projects, and 7 Battery Energy Storage projects
- LS Power's **Energy Transition Platforms** include CPower Energy Management, Endurant Energy, EVgo, Rise Light & Power, REV Renewables and Waste-to-Energy initiatives through joint ventures with The Landfill Group and BluSail Renewables



Need for Capacity Market

- The PJM Capacity Market has been successful in insuring an adequate supply of resources to meet the PJM reliability requirement
- With the expected large increase in renewable, non-deployable resources, the Capacity Market takes on increased importance to provide those resources needed to maintain reliability and beyond solving the “missing money” problem
- Capacity Market will be the primary market to ensure reliability going forward
- It will continue to solve the “missing money” problem which itself will become a larger problem as more and more \$0.00/MWh marginal resources participate and clear the Energy Market driving those clearing prices to near \$0.00/MWh in any given hour
- LS Power continues to believe there needs to be a Capacity Market to incent the deployable resources that will be needed to maintain reliability in a market with large penetration of non-deployable resources

PJM Capacity Market: Establishing the Goal

- RPM was designed to ensure PJM could meet the reliability standard of a 1 in ten years loss of load event
 - This reliability standard did not value the difference between loss of 1 MW of load for 1 hour versus loss of hundreds of MWs of load for multiple hours
- Current capacity market is working under the 1 in 10 LOLE standard
- The challenge is to ensure we continue to meet reliability requirements given the changing fleet
- We must first establish the reliability standard that we need to maintain reliability given the expectation that short duration and intermittent resources are expected to be the predominant resources providing electricity
 - Do we stick with a 1 in 10 LOLE; do we set a new standard and procure separately for it?
- ONCE WE IDENTIFY THE RELIABILITY GOAL, WE CAN DESIGN A PRODUCT TO MEET THAT OBJECTIVE

Attributes that Appear to Support New Reliability Requirements

- After identifying the reliability standard, the attributes that must be procured (either through enhancements to the existing capacity product or through a new product) must be identified:
- LS Power suggests these attributes could include:
 - Deployable – the PJM operators should be able to control the dispatch of all Capacity Resources
 - Fast-Start – Capacity Resources should be capable of starting-up “quickly” to prevent the loss of load when Variable Resources are no longer generating
 - Fuel Neutral – Capacity Resources can be of any fuel providing they can satisfy the attributes of a Capacity Resources
 - Durational quality to be able to run regardless of weather conditions
- There should be no exceptions or “carve outs” for participation by favored resources
 - Hybrid resources could be combined to satisfy the product definition

High-Level Properties of a Capacity Market

- The Capacity Market should be a competitive process with a 3-year forward procurement horizon
- The Capacity Market needs to procure the right amount of resources needed to meet the new requirements.
- Capacity resources must be properly accredited including thermal resource accreditation which should take into consideration stressed periods of operation in their accreditation
- Market mitigation needs to be reviewed and potentially restructured to reflect the diversity of supply and recognizing the number of retirements and changes in resource ownership that have occurred over the years and the potential reduction in market concentration
- After identifying the reliability goal and the required attributes, it will be necessary to assure a just and reasonable rate to those resources that satisfy the established criteria and incent investment in such resources.