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Comments of Peterson Power Systems

Additional submitted attachment is included below.



December 14, 2020

Peterson Power System Comments to Lead Commissioner Workshop on Incremental Efficiency Improvements to The Natural Gas Powerplant Fleet for Electric System Reliability and Resiliency

Peterson Power Systems appreciates the California Energy Commission's leadership in exploring avenues to optimize and increase the efficiency and output of the existing gas-fired generation in California. Peterson Power Systems is the power division of Peterson CAT, one of the largest and most capable North American Caterpillar dealerships. Peterson Power Systems serves much of Northern California, Oregon and Southern Washington.

Peterson Power Systems and Cupertino Electric, Inc. two California based, experienced electric utility industry leaders, have designed a clean transitional technology solution to address today's electric service providers' needs for providing on demand long duration capacity (resource adequacy). The hybrid system is called the DR2500. Deployment of DR2500 systems will provide environmentally responsible long duration capacity which will directly address the challenges California is currently experiencing. Additionally, the DR2500 system is a microgrid enabled system capable of islanding. When implemented / installed at strategic locations the DR2500 can minimize outages due to Public Safety Power Shutoffs.

The escalating volatility the grid is experiencing will only increase as more intermittent solar and wind resources are added. System imports from neighboring states will continue to diminish as that capacity is needed locally to address load growth and system balancing needs, the shortcomings of having much of California's new capacity limited to four hours of duration may become a foundational impediment to grid reliability.

The DR2500 hybrid system cost-effectively provides best-in-class resiliency, significant duration (weeks, not hours), and zero-emission spinning reserves in utility sized scalable nodes of 2.5MW each. Deploying DR2500 hybrid systems will maximize the contributions of renewable resources, improve resiliency, provide capacity (when it is needed, where it is needed and for however long it is needed), and allow California to continue its leadership in the achievement of a decarbonized energy future in accordance with our climate goals.

The DR2500 hybrid system has been optimized from our extensive experience in the data center industry, where both Cupertino Electric, Inc. and Peterson Power Systems are recognized leaders. The lightning fast, hyperscale rapid deployments required by data center customers combined with the premium placed on square footage has resulted in a highly dense, scalable solution for the energy sector – the DR2500.

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By leveraging our experience in hyperscale rapid deployment mission critical applications we can address immediate and projected capacity shortfalls with the implementation and widespread deployment of our turnkey solution. The DR2500 platform can achieve commercial operation of systems between 5MW and 100MW within one year of receiving a full notice to proceed.

The electric generating sector is undergoing a massive and fundamental change. As we move forward, the capacity factor of natural gas generating facilities will decrease significantly – we are already seeing this. At the same time, the characteristics and capabilities of gas generation will prove critical to maintaining a reliable electric system. Gas generation will be here for the foreseeable future as the transformation to solar energy as a primary source of energy further challenges the morning and evening ramps. Going forward, gas generation will be decarbonized through the utilization of Renewable Natural Gas (RNG) and ultimately Green Hydrogen.

Both RNG and Green Hydrogen are significantly more expensive than pipeline natural gas. As such, heat rate (efficiency) of the gas fleet will become increasingly important. Of paramount significance will be the ability of gas assets to quickly ramp up and down and start multiple times per day. Much of the existing gas fleet, especially the combined cycle plants, are not designed to accommodate the significant amount of cycling that will be required. For significant cycling, high efficiency and a large range of ramping (up or down), reciprocating engines are superior to gas turbines. The DR2500 has been based on the highly efficient, best-in-class Caterpillar G3520H reciprocating engine genset.

Hybridizing gas resources (as pointed out during the 12/2/2020 workshop by CESA) by pairing them with Battery Energy Storage Systems will help to improve flexibility. However, energy storage alone will not provide the durational needs of an intermittent portfolio of resources when solar production or wind production (or both) are limited or nonexistent. Until long duration storage is technologically and economically feasible, CA will continue to rely on gas resources for ramping and long duration RA.

The industry should also be evaluating the lifecycle environmental footprint of various technologies. Of specific concern are the environmental impacts that the disposal of energy storage devices will have when they come to the end of their design life which is a maximum of ten years. The DR2500 prime mover has a design life that will exceed 30 years in this application. At the end of the gensets' lives, they can be refurbished and repurposed or 100% recycled.

As IEP pointed out during the 12/2/2020 workshop, there is a significant risk of ratepayer “pushback” if the transition to 2045 is not managed properly. Californians already pay some of the highest electricity rates nationally. Retreading mature gas plants to address near-term needs may not be the most cost-effective approach, especially considering the higher heat rates and limited flexibility of these legacy facilities. Additionally, as pointed out by the Sierra Club during the 12/2/2020 workshop, many of these legacy facilities are located within disadvantaged communities.

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Because of its high power density and highly scalable design, The DR2500 can be sited where energy is needed most. It is essentially a modular, highly efficient and super flexible distributed energy resource (DER). This can significantly reduce development and interconnection costs and eliminate additional burdens on disadvantaged communities. And, unlike gas turbines, the modular DR2500 can easily be relocated as system needs and flows change.

In a study published in June 2019 by Energy and Environmental Economics, Inc of San Francisco, CA (E3) entitled “Long-Run Resource Adequacy under Deep Decarbonization Pathways for California”, E3 concluded that: **“The least-cost electricity portfolio to meet the 2050 economy-wide GHG goals for California includes 17-35 GW of natural gas generation capacity for reliability. This firm capacity is needed even while adding very large quantities of solar and electric energy storage.”** This suggests that gas fired generation will be a part of the mix for the next 30 years. If this is indeed true, California must be looking towards engineering the future in addition to re-engineering the past.

While upgrading the existing, mature fleet may present a near term opportunity to get us through the next few years, the shutdown of Diablo Canyon and the acceleration of solar installations will only increase the need for highly efficient, fast ramping and flexible gas generation. Additionally, as renewable hydrogen production becomes cost-effective and widely deployed, the ability to efficiently convert the hydrogen back to electricity via gas engines will be the key to long duration and seasonal storage.

The fleet of the future will be distributed , highly flexible, hybridized and environmentally superior to the current fleet. The DR2500 and systems like it will be the building blocks of system resiliency, flexibility, reliability, and long duration capacity.

Peterson Power Systems appreciates the California Energy Commission’s leadership in this critical discussion and the opportunity to participate through the submission of these comments. We look forward to working with all stakeholders to be a positive influence and critical piece of the solution as we work together to decarbonize the energy sector.

Respectfully,

A handwritten signature in blue ink, appearing to read "Greg Lamberg", with a stylized flourish at the end.

Greg Lamberg
Manager, Utility Business Development

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