Skagit Valley CLEAN ENERGY ALLIANCE

Nov. 14, 2024

To whom it may concern:

The Skagit Valley Clean Energy Alliance is a 501 c(3) nonprofit organization, headquartered and operated in the town of La Conner. Our mission is to assist Skagit County in moving forward with all possible speed, on all possible elements of the ongoing transition to clean energy.

Our technical advisor, Greg Whiting, is an expert on advanced energy systems. He has worked on the development and introduction of advanced energy technologies since 1987. His employers have included a battery material manufacturer, three major electric utilities (FPL, TXU and Seattle City Light), the Port of Seattle, and two consulting firms that have assigned him to energy technology development projects on behalf of other utilities and the US military. Mr. Whiting was working on the development of lithium-ion battery technology as early as 1993, when the largest available lithium-ion battery would fit into a (brick-sized) cell phone.

Regarding utility-scale battery energy storage systems (BESS), Mr. Whiting advises:

One of the biggest problems faced by the utility industry is that, historically, it has been very difficult to store electric energy on a large scale.

Electricity is not used at exactly the same rate during all 8760 hours of a 365-day year. During a relatively small number of "peak" hours, the amount of electricity that has to be generated and delivered on a typical northwestern grid is three, or even four, times as much as the amount required during "off-peak" hours.

To meet demand during peak hours, the generation and transmission/distribution (T&D) systems have to be very significantly overbuilt, relative to demand during most hours of the year. The industry's generation assets are capable of producing, and the T&D system is capable of delivering, far more total energy than is actually required.

Even so, during the 20 - 200 highest peak hours of the year, generation from little-used backup generators ("peakers") may be required, to supplement the generation systems that are usually running. As peakers are used very infrequently, their owners must charge more, to utilities, for the electricity the peakers produce than typical. Peak energy costs (to utilities) can be orders of magnitude higher than typical. In Washington, these costs are factored into overall rates and contribute to higher rates. (In other markets, like Texas, peak costs can sometimes be passed on to consumers, which occasionally results in well-publicized $10,000/month residential utility bills.)

Additionally, new renewable energy systems, especially wind and solar systems, are capable of producing energy with zero marginal cost and zero fuel. Wind and solar generation costs have fallen more than 99% over the last 20 years and are still falling. In developing new generation plants, wind and solar are now often favored over coal and gas, not just because of environmental considerations, but because of lower total costs. However, wind and solar systems are dependent on immediate weather conditions and are seasonal.

Therefore, installing solar energy on a large scale to, say, help reduce summer utility peaks in California, is having an unusual effect: Energy can be available on wholesale markets at negative costs during other hours. In other words, to maintain grid stability and reliable operation, it is sometimes necessary to actually pay some customers to take energy off the grid - during the very hours during which renewable energy output is at its maximum. In extreme cases, renewable generation can even be curtailed; i.e., renewable generation assets, which have already

been built, and which could produce energy with no fuel consumption and at virtually zero marginal cost, are turned off, instead of being allowed to run and produce this clean, free electricity.

Finally, growth is not uniform in all territories. In places like northwestern Washington, which is electrically connected to southwestern British Columbia, rapid growth in Seattle and Vancouver, and more rural areas like Skagit County, can require construction of new generation and T&D assets, because the existing grid is not necessarily capable of delivering enough energy to the locations in which growth is occurring.

Cost-effective utility-scale energy storage systems, such as battery energy storage systems (BESS) based on lithium-iron phosphate batteries, are a highly desirable technology. If energy can be stored economically:

- Energy from existing generation assets can be stored during off-peak hours and then used during on-peak hours. This would reduce the need for high-cost, fossil-fuel based, often inefficient peakers. BESS systems thus can reduce costs for all customers and reduce emissions, while simultaneously helping generation providers to use existing fossil fuel assets more efficiently instead of building new fossil fuel assets.
- Energy can be stored during periods of negative wholesale pricing, and/or during periods in which renewables would otherwise be curtailed. This also helps to keep overall customer rates down, and captures zero-emission energy that would otherwise be wasted, which can replace energy from plants that have emissions.
- To the extent that grid congestion exists, judiciously located (e.g., near existing infrastructure and within the area in which peaks and grid congestion would otherwise occur) energy storage systems can be used to relieve congestion during peaks, avoiding construction of new fossil-based peak generation systems and avoiding, or at least minimizing, costly and environmentally disruptive construction of new T&D systems (transmission wires, substations, etc.)

Lithium ion (LiON) batteries are a very new technology that has only recently become available to solve this problem. Until recently, the cost of lithium-ion batteries has been too high for BESS systems to be economic. However, as with solar and wind costs, LiON costs have fallen very significantly. In 1994, a lithium ion battery cost around $400,000 per kilowatt-hour of energy storage capacity. Wholesale costs are now in the neighborhood of $100 - $150 and are still falling. There are now situations (notably one in South Australia that has gotten significant publicity within the utility industry) in which BESS systems are the best solution to some or all of the above-described problems.

BESS technologies are an emerging, and extremely important, part of the energy transition. It is in Skagit County's best interests: to keep utility costs down; to avoid major new T&D or generation construction; to take advantage of the availability of negative- or zero-cost, and/or otherwise-curtailed renewable energy; and to minimize emissions, to approve the installation of judiciously-sited, cost-effective battery energy storage systems.

Greg Whiting, BS, MS, MBA, Professional Engineer, Certified Energy Manager
La Conner, WA
greg.whiting@alpineflamingo.com

Terry Nelson, President, Skagit Valley Clean Energy Alliance
terry@svcea.org