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High Energy Ports



■ Trade and Transportation

By Thomas O'Brien

This month, the Port of Los Angeles and Pasha Stevedoring and Terminals announced that the Pasha terminal will begin the final design and construction of a solar power microgrid. This will allow the 40-acre cargo terminal to rely upon solar power and other low- or zero-emission energy sources. If all goes as planned, the terminal will generate all of its own energy needs from renewable sources, allowing it to operate completely off the grid if ever required. The environmental benefits come in the form of reduced pollutants.

The Port of LA's efforts are not in isolation. The Port of Long Beach has its own Energy Island systems approach; and the California Energy Commission is working with ports across the state as part of a Ports Energy Collaborative to discuss opportunities for transitioning to alternative and renewable energy sources.

As the San Pedro Bay ports move toward (near) zero-emission goals, reliance on electrical power has dramatically increased, and on-terminal electricity usage is predicted to quadruple by 2030 compared to 2005 according to the Port of Long Beach. The use of microgrids and energy storage systems provide one response to the ports' increasing demand for electricity as they transition to more environmentally sustainable operations.

Microgrids are subsets of a greater grid and usually include their own energy generation, demand, and the ability to modulate priority energy distribution or storage. At the ports, a true smart microgrid will allow for reverse utilization of shore-to-ship or ship-to-shore electrical power or storage. In the future, docked ships may be local generators that can supply great quantities of energy to the port grid or regional main grid.

Smart microgrids also coordinate and balance different energy production technologies. When the microgrid detects a drop in solar generation for example, it can increase production elsewhere or reduce energy distributed in noncritical areas of the port to make up for the

difference. Similarly if wind generation exceeds demand, the microgrid can charge additional electrical vehicles or store the excess energy for later uses. The benefits of microgrids also extend to hybrid and electric trucks. Hybrid and battery-electric trucks have expanded body or chassis combinations that allow for greater freight efficiency, and the use of microgrids at ports and other distribution nodes can direct power to charge them.

This will not be an easy process however. The challenges start with regulatory hurdles. The development of a microgrid will require not only the cooperation of the port and terminal operator but with local and state agencies, including utility commissions. New York is easing the public sector's burden to supply energy by making it possible for small businesses to build microgrids and generate revenue, thereby producing jobs and jump starting the local economy. But similar incentives are not in place here yet.

There will also be a steep learning curve for the ports which are not traditionally in the energy management business. On top of that, ports have the unique challenge of limited potential onsite renewable power generation. This is due to the fact that land area is dedicated first and foremost to maritime goods movement operations. And don't forget the investment and replacement costs.

The success of the two ports' efforts in energy management will be measured in a number of ways and depend upon the audience. For some, this is the next step in the evolution of a true green port approach. For others, self-generated energy with microgrid connectivity provides energy security and sustainability. In a world where key transportation facilities are considered targets for terrorists or are simply vulnerable to the forces of nature, the microgrid provides a means of ensuring continued operations and helps to minimize economic disruptions.

For port tenants, the microgrid may provide cost-effective, advanced fueling opportunities, thereby improving energy and energy-related operational efficiencies. Finally, as improved energy efficiency contributes to overall port efficiency, the regional supply chain benefits. The hope is that more efficient operations produce higher revenues or cost savings, attract new businesses, and create new jobs.

The ports' energy strategies are still a work in progress. But we shouldn't be surprised that the leaders in the green port movement are still trying to stay one step ahead of the curve. Surviving the rapidly changing dynamics of global trade means figuring out how to do things better than your competitors. Certainly port productivity matters, but our ports are also betting that power can come from power.

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