

Power Up

Is Clean Energy Finally Reaching Its Crucial Tipping Point?

BY SARAH B. HOOD

It seems clean energy has finally hit its tipping point. The University of Michigan's Center for Sustainable Systems finds that about 800 U.S. utilities offer renewable-energy options, and in April 2019, the U.S. Energy Information Administration reported that, for the first time, more electricity was generated in the U.S. through renewable sources (23%) than through coal (20%). Also, the most recent figures from reports conducted by the World Wildlife Federation, Calvert Investments, CDP and Ceres found that just under half of Fortune 500 companies had set climate or clean energy targets, and the numbers continue to grow. More than 100 North American cities have adopted ambitious clean energy goals, including Atlanta, Chicago, Cincinnati, Cleveland, Denver, Kansas City, Los Angeles, Minneapolis, Orlando, Portland, Salt Lake City, San Francisco and St. Louis.

With increasing demand have come cost reductions, and sustainable power sources like solar and wind are reaching parity with conventional power sources in terms of both price and performance. In addition, new technologies are improving efficiency and affordability.

New energy technologies

Advances in energy storage were among the hot topics at recent event like ProMat 2019. For example MHI member Plug Power Inc.'s GenDrive hydrogen fuel cells—a clean, efficient, cost-effective drop-in replacement for forklift batteries that can increase facility efficiency and productivity by up to 15%.

Additionally, Soteria Battery Innovation Group is an Industry Consortium dedicated to enabling portable electric power without the risk of fires. In June, Soteria received \$750,000 in funding from the U.S. Department of Energy through the Office of Technology Transitions Technology Commercialization Fund for Li-ion batteries with safer current collectors.

MHI member Navitas Systems highlighted its Starlifter Lithium Forklift Battery, first introduced about three years ago, which is the industry's only UL-listed family of lithium forklift batteries, available in all three voltages for lift truck classes 1, 2 and 3.

"We stand on the shoulders of our predecessors," said Navitas president and CMO Mil Ovan. "Tesla proved that you could put a really big lithium battery into a car, and not only would it run reliably and safely, but it would also do things that an internal-combustion engine couldn't, like instant-on torque and fast acceleration."

He noted that "the Starlifter takes 25% less energy to charge. You don't have to water the battery or equalize it every week, because it's a sealed battery and there's no sulphuric acid in it. But the biggest 'aha!' moment is that in comparison to lead-acid, you can find anywhere from a 10% to 20% increase in the number of pallets you can move per shift."

Clean energy benefits depend not only on the choice of equipment, but also on how it is used.

This is, according to Ovan, because the Starlifter starts out at a higher voltage and maintains it throughout the shift, he said, allowing for a two-year payback. "Lead-acid batteries still have a strong use in one- to two-shift applications," he said, but for three-shift operations or special applications like food or medicine handling, where there is a concern about introducing lead-acid into the environment, lithium batteries can present clear advantages.

Strategies for facility energy savings

Clean energy benefits depend not only on the choice of equipment, but also on how it is used. Dr. Nasser Kutkut, CTO of MHI member Advanced Charging

Technologies (ACT), offered a presentation at ProMat titled "Through Peak Shaving and Demand Response: New Strategies for Facility Energy Savings through Charger and Battery Fleets." In his talk, he discussed peak shaving and demand response, two strategies that can be employed to reduce usage and cost as well as meeting sustainability goals in the operation of material handling facilities.

ACT develops and produces battery charging and monitoring equipment for conventional and fast-charging industrial batteries. "What is unique is that we were the first industrial IOT [Internet of Things] charging and monitoring solutions company; we can control and monitor our equipment through cloud operations. All our equipment, from Day Zero, was designed to be connected to the internet," he said. ACT also develops and implements energy-efficiency programs for its clients.

Peak shaving is a concept that is already very familiar to residential electricity customers in jurisdictions that have introduced time-of-use (TOU) pricing, like the province of Ontario in Canada, or California, which has been moving toward rolling out the program to some 20 million consumers following



Navitas Systems' lithium forklift battery takes about 25% less energy to charge.

Timely Reflection Cool roofs protect energy bottom lines

Until recently, the definition of a “green” roof was pretty literal: the term generally referred to a rooftop planted with drought-tolerant plants in a growing medium laid over the top of a protective membrane to reduce the building’s energy use as well as its contribution to the heat of its immediate area. But there are challenges (like load-bearing limits) to these types of installations, and they’re not for everyone.

Now, however, with advances in roofing materials, “cool roofs” have expanded the roster of environmentally friendly, cost-effective building exterior finishes. “A cool roof is a roofing system that delivers higher solar reflectance (the ability to reflect the energy of the sun, reducing heat transfer to the building) and higher

thermal emittance (the ability to dissipate any absorbed solar energy) than standard roofing products,” said Alex Pecoria, director of residential product management for the building-materials manufacturer CertainTeed Corporation. “This is typically accomplished through the utilization of solar-reflective paint coatings and/or tightly embedded solar reflective granules.”

CertainTeed uses ceramic-coated mineral granules in its Solaris shingles to achieve this level of solar reflectance. Their Landmark Solaris and their Presidential Shake Solaris shingles resemble traditional wood shakes. They also offer Matterhorn Metal Roofing, a highly energy-efficient product that resembles tile, shake and slate, and comes in many colors.

“As consumers are increasingly concerned about energy efficiency and energy-saving technologies are becoming cheaper to develop, building-product companies are producing wider varieties of energy-efficient products and investing more time into research and development,” Pecoria said.

He noted that “state and municipal governments are following suit, and building codes are becoming stricter in their demand for building features that reduce energy consumption and loss, such as California’s Title 24 regulations. We anticipate the further development of energy-minded building materials throughout the industry as expectations trend toward smarter energy use.”

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a series of smaller pilots. The advantage to utilities is that reducing demand at peak times helps them to provide maximum base-load power without starting expensive-to-operate peaking generators. In fact, jurisdictions that implement TOU pricing tend to see a slight change in energy-usage peaks and lows, since the system changes behaviour.

Essentially, TOU pricing offers lower electricity charges to consumers in off-peak times and, said Kutkut, “peak shaving is available to any customer as long as utilities do what’s called real-time pricing. The utility might divide the week into blocks of off-peak, on-peak and mid-peak usage. “If that’s the kind of billing you’re getting, then you can go ahead and do peak shaving on your own.” Kutkut said. “Typically, if you look at your energy bill, you will see that about 50% is kilowatt hours, but 45% or 50% is what we call demand,” he said. “That 50% is fairly expensive, and it’s there that you have lots of opportunities to reduce that piece.”

Among the strategies to take advantage of peak shaving are reducing the set-point on thermostats.

Among the strategies to take advantage of peak shaving are reducing the set-point on thermostats, “load shedding” (turning off non-crucial equipment) and shifting working hours to off-peak times whenever possible. Careful planning can be a significant cost-saver.

“We work with our customers; we ask to look at their energy bill,” Kutkut said. “With one of our customers, we reduced our chargers’ peak power by 20%, and we were able to reduce that

demand piece by 30%, which resulted in a 20% saving on their electricity bill overall.”

Demand response offers a second level of savings that can be realized by industrial users. In this case, major consumers may opt to sign up with their local power-system operator to receive alerts whenever there is a spike in power usage across the region. If the consumer signals that they will voluntarily reduce consumption, they receive incentives. This action can reduce the utilities’ need to engage backup generators to supply extra power to meet the temporary high demand.

The response time is generally quite quick: “For example, there’s something called Emergency Demand Response: they send you a signal, and you have to commit in minutes. If you don’t reach your commitment, you are penalized,” he said. “Typically, these programs require some level of automation.”

The clean energy movement is not just defined by electric cars, cool roofs,

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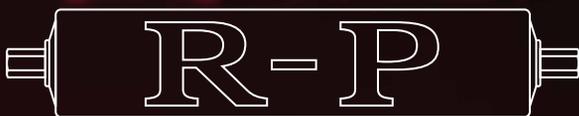


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TOU pricing and batteries—though they have advanced by leaps and bounds in the last 15 years. They are just examples of the cleaner, greener technologies that are reducing operating costs while helping the environment. The scale has finally started to tip in favor of clean energy. ●

It's Only Natural! UPS makes a major commitment to renewable natural gas

Last May, shipping giant UPS took another stride in its comprehensive commitment to sustainability when it made America's largest-ever purchase of renewable natural gas (RNG) with a 170 million gallon-equivalents deal with Clean Energy Fuels Corp. The purchase represents about 25 million gallon equivalents per year through 2026.

"We've got a significant number of vehicles that utilize both LNG [liquefied natural gas] and CNG [compressed natural gas]," said Mike Whitlatch, vice president of global energy and procurement for UPS. "When we built out the fleet, we knew that we would ultimately be able to seamlessly integrate renewable natural gas into the system."

RNG is identical to other forms of natural gas in terms of its performance; what makes it renewable is that it is a product of the natural decomposition of vegetable materials derived from landfills, wastewater plants or agricultural activities. "For us, it was a matter of looking at the fact that biomethane has a significantly lower emissions profile than traditional fossil natural gas," Whitlatch said.

California's rigorous GREET model for calculating greenhouse-gas emissions finds that RNG offers about a 70% reduction in lifecycle GhG emissions compared to traditional diesel and gasoline, and Whitlatch said he hopes this strong support from a major company will spur additional investment in RNG, which is already being used in some applications like electrical generation. "Being able to see renewable natural gas in transportation provides an additional pathway for producers," he said.

By 2025, UPS aims to increase alternative-fuel consumption to 40% of its total ground-fuel purchases and to reduce its ground fleet's GhG emission

by 12%. The company estimates that fueling at its own natural-gas stations will save some 1,074,000 metric tons of GHG over the life of the agreement: the equivalent of planting 17,000,000 trees or taking 228,000 cars off the road.

