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Automakers pursue energy reduction efforts in shift to renewable energy

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The Detroit News

Published 11:00 p.m. ET Aug. 13, 2023 | Updated 8:11 a.m. ET Aug. 14, 2023

The Detroit Three automakers have taken actions to reduce their energy consumption to conserve on costs and help ensure a reliable energy supply as they move toward running their operations fully off renewable electricity sources in the coming years.

These efforts are cutting the need for hundreds of millions of kilowatt hours, preventing thousands of tons of carbon dioxide from being emitted and saving on millions of dollars in Michigan alone. That helps to alleviate demand on the electricity grid, benefitting consumers and southeast Michigan residents.

“To the extent that energy reduction overall is a good thing,” said Thac Nguyen, DTE Energy Co.’s manager of energy efficiency commercial and industrial large business customers, “now more than ever, DTE shares our customers’ goals with how energy is produced and how it’s consumed, and energy efficiency is at the very center of that effort.”

The automakers are investing millions of dollars into renewable energy in Michigan. Ford Motor Co. a year ago announced with DTE’s MIGreenPower program plans to add 650 megawatts of solar energy capacity that would grow the state’s total amount of installed solar energy by 70% by 2025; that’s when Ford’s Michigan operations will run with 100% renewably sourced electricity.

Ford’s operations in the rest of the world will follow by 2035, and the Dearborn automaker plans for emissions from its operations and the power it uses to be carbon neutral by 2050. The company is working on expanding those efforts to its suppliers as well but hasn’t given a target date for reductions around these indirect emissions known as “Scope 3.”

Stellantis NV — the maker of Jeep SUVs, Ram pickup trucks and other vehicles — followed Ford's announcement with plans with DTE to add 400 megawatts of solar energy generation for its operations in southeast Michigan. After completion, the company will have reduced carbon emissions in North America by 50% and across its manufacturing facilities by 30%. By 2026, Stellantis says it will be able to attribute all electricity use at 70 manufacturing and non-manufacturing sites to solar.

The automaker says it will be carbon net-zero by 2038 with single-digit percentage compensation of remaining emissions that would use offsets. That would mandate 100% all-electric light duty and passenger car vehicles sales in the United States, according to Stellantis' Corporate Social Responsibility report for 2022.

General Motors Co. also has made major commitments for renewable energy in Michigan. Last year, it said that by 2025 all of its U.S. operations will be powered by renewably sourced electricity, five years ahead of schedule. It has sourcing agreements from 16 renewable energy plants across 10 states and says it will be carbon neutral by 2040. It aspires to sell only all-electric vehicles by 2035.

These efforts will help the United States and Michigan to become leaders in decarbonization in the industry, though they're behind other regions today. According to Stellantis' CSR, 37% of its energy in North America is decarbonized. That's compared to 49% in South America, where countries like Brazil rely on hydropower, and 72% in Europe, where regulations have pushed for renewables. At Ford, all purchased electricity for manufacturing in Europe and Mexico is carbon-free.

Western tensions with Russia have prompted more investments in zero-emission energy in Europe, another factor highlighting the advantages of renewables, said Parth Vaishnav, assistant professor at the University of Michigan's School for Sustainability and Environment.

"Sunlight isn't going to get more expensive," he said. "To some extent, electrification actually acts to insulate us from price shocks, and one of the reasons why Europe has really accelerated this transition towards electrification is because they are exposed to a price shock because of their exposure to Russian (natural) gas. They've decided that they don't want to play that game anymore."

Energy efficiency

Looking at the full picture of greenhouse gas emissions at automakers, their direct emissions from their operations are relatively small. At Stellantis in 2022, more than 99% of emissions were indirect, coming from parts and material purchasing, vehicle maintenance and end-to-life care and use of the vehicles sold, which alone accounted for almost 88% of emissions, according to the company's CSR. At GM, it was 75%, according to that company's sustainability report.

Still, to encourage decarbonization by customers and suppliers, the effort has to start at home. Stellantis this year received an Innovation Energy Efficiency Award from DTE and the Engineering Society of Detroit. Over nearly two years at nine sites in Michigan, it has reduced its consumption of 15 million kilowatt hours of energy, or the equivalent of almost 949 million charged smartphones. That prevented the release of 7,800 tons of carbon dioxide — the equivalent of 296,000 incandescent lightbulbs being switched to LEDs. It also saved the company \$1 million in energy costs.

“Capital goes to a lot of different things in the company,” said Kevin Dunbar, Stellantis’ director of North America facilities and general services. “Being able to make an impact by behavioral reductions like this is a real win.”

Much of these reductions are accomplished doing something as simple as shutting off lights and equipment when a manufacturing plant isn’t in production or reducing a facility’s temperature. The automaker has implemented an eight-step "Excellent Plant Shutdown" procedure to ensure these savings are being implemented based on best practices from its operations around the world, Dunbar said. These types of steps mostly aren't capital intensive, but behavioral.

A major contributor, he said, is the automaker’s participation in DTE’s Strategic Energy Management program. It’s one of many programs DTE has that takes a “holistic and systematic” approach to energy reductions, Nguyen said.

In the SEM program, a company like Stellantis works with DTE to develop an energy action plan that identifies places where energy reductions can be made such as lighting scheduling, compressed air system improvements, conveyer shutdowns and more.

Once those changes have been implemented and the reductions have been verified, the customer receives a credit on its bill from DTE. The program alone for Stellantis has resulted

in savings of more than 33 million kilowatt hours since 2020, according to DTE, which also has platforms that offer equipment rebates, fixing air leaks and updating existing equipment.

Stellantis is seeking to reduce energy consumption at each of its sites in North America by 20% year-over-year, Dunbar said. That will help provide confidence in the reliability of the move to renewables.

“The sizing that we looked at for this program,” Dunbar said about Stellantis’ solar installations with DTE, “is quite large, so that gives us a little bit of flexibility in terms of the solar power that will be generated. A big piece of this as well is the reduction of energy consumption, so when we sized this, we had in mind projections into the future for the reduction of energy efficiency. Between those two items, the sizing and the efficiency reduction, I think we will be more than covered there.”

GM’s Milford Proving Grounds saved about 4.4 million kilowatt hours from the SEM program since 2020, according to DTE. Since energy reduction efforts began, the company has cut more than 500 million kilowatt hours of energy in Michigan alone since 2019, according to GM. The automaker also has enrolled in rebate programs for more energy efficient equipment with Consumers Energy, said Monica Walker, GM’s renewables and energy strategy manager.

“Similar to at home when you do your air conditioning,” said Rob Threlkeld, director of global energy strategy, “the next model that you typically replace is much more efficient than the one that you had previously.”

GM spends about \$20 million annually on energy efficiency, one of four “pillars” to meet its carbon neutrality target. The others are renewable energy, addressing intermittency, and leveraging policy and scale. GM has 855 megawatts capacity of solar, wind and landfill gas to power its operations in Michigan.

Increasingly, GM has emphasized the fourth pillar to advocate for utilities offering green tariffs for companies to buy renewable energy and advocate for energy investments, Threlkeld said. This work is particularly important in places like South Korea, because its utilities are state-owned.

“How do we directly source renewables in a country where it's a little more challenging?” Threlkeld said. “We're leveraging our policy skill side of the equation with a lot of our other large companies that have set renewable energy targets to form solutions that we can actually source in those countries.”

At Ford, work has been underway for more than a decade on energy efficiency to the point where most of the “low-hanging fruit,” said George Andraos, sustainable energy and innovation director at Ford's real-estate arm, is gone. That includes efforts like installing all LED lights.

Since 2017, Ford has invested \$24 million in facility upgrades, contributing to a reduction in direct emissions and those created by the energy it uses by 35.4% worldwide, according to the automaker.

The next major step is carbon neutrality, and Ford's renewables commitment with DTE is a big part of that. The project is estimated to avoid releasing 661,000 tons of carbon dioxide every year.

“We have a roadmap to get us there,” Andraos said about Ford's 2035 goal for carbon-neutral electricity worldwide by 2035. “When I look at where we are in percentages, we are well on our way to achieving those objectives.”

Natural gas challenge

All three automakers say they expect to be able to source decarbonized electricity for their operations without carbon offsets. What currently doesn't have a full replacement, however, is natural gas, which is used to heat buildings and in the paint shops of assembly plants.

"When you switch something from using natural gas to using electricity," UM's Vaishnav said, "you can cut greenhouse gas emissions immediately in many cases, because when you burn something, it's not particularly efficient. Both for now and for the future, a shift to electrification is a step in the right direction to get us to net zero."

Andraos said the next decade or so will be important for how the development of carbon capture technology and alternatives goes. Ford is designing its new BlueOval City electric-vehicle assembly plant in Tennessee with that in mind by centralizing the natural gas system that will be more conducive to being replaced with hydrogen or whatever alternatives come to the forefront. As for existing plants, the process to retrofit for something new is challenging and costly, he added.

“This is a problem,” Andraos said, “everyone in the world is dealing with.”

Policy changes at the state of Michigan also could help encourage alternatives to natural gas, DTE's Nguyen said. Because utilities are highly regulated, companies like DTE are limited to

offering programs that incentivize energy reductions instead of greenhouse gas emissions overall.

“We have to go in and replace something with like equipment, just more efficient,” Nguyen said. “Whereas in the future, we could leverage exhausting from one process or in the building and literally transport that heat into another part of the building or use instead of exhausting into the atmosphere and vice versa with cooling.”

Changes like the one described could represent an increase in electricity use, but because it could offer a reduction in natural gas consumption, it could decrease emissions overall.

DTE and Consumers Energy themselves have announced plans to switch to cleaner electricity sourcing overall. Consumers Energy will end its use of coal-fired generation by 2025, and DTE will do so by 2032. They both plan to achieve net-zero on greenhouse gas emissions by 2050.

“When you layer on greenhouse gas reduction, or you layer on carbon reduction, and you’re essentially getting credit or benefit or recognition for those reductions,” Nguyen said, “it opens up opportunities for our department and customers.”

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