In Norway, the Electric Vehicle Future Has Already Arrived

About 80 percent of new cars sold in Norway are battery-powered. As a result, the air is cleaner, the streets are quieter and the grid hasn't collapsed. But problems with unreliable chargers persist.



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BAMBLE, Norway — About 110 miles south of Oslo, along a highway lined with pine and birch trees, a shiny fueling station offers a glimpse of a future where electric vehicles rule.

Chargers far outnumber gasoline pumps at the service area operated by Circle K, a retail chain that got its start in Texas. During summer weekends, when Oslo residents flee to country cottages, the line to recharge sometimes backs up down the off-ramp.

Marit Bergsland, who works at the store, has had to learn how to help frustrated customers connect to chargers in addition to her regular duties flipping burgers and ringing up purchases of salty licorice, a popular treat.

"Sometimes we have to give them a coffee to calm down," she said.

Last year, 80 percent of new-car sales in Norway were electric, putting the country at the vanguard of the shift to battery-powered mobility. It has also turned Norway into an observatory for figuring out what the electric vehicle revolution might mean for the environment, workers and life in general. The country will end the sales of internal combustion engine cars in 2025.

Norway's experience suggests that electric vehicles bring benefits without the dire consequences predicted by some critics. There are problems, of course, including unreliable chargers and long waits during periods of high demand. Auto dealers and retailers have had to adapt. The switch has reordered the auto industry, making Tesla the best-selling brand and marginalizing established carmakers like Renault and Fiat.



Electric vehicle owners tend to spend more time at Circle K because charging takes longer than filling a gas tank. David B. Torch for The New York Times



Guro Stordal, an executive with Circle K, has the difficult task of developing charging infrastructure that works flawlessly with the different software used by dozens of kinds of vehicles. David B. Torch for The New York Times

But the air in Oslo, Norway's capital, is measurably cleaner. The city is also quieter as noisier gasoline and diesel vehicles are scrapped. Oslo's greenhouse gas emissions have fallen 30 percent since 2009, yet there has not been mass unemployment among gas station workers and the electrical grid has not collapsed.

Some lawmakers and corporate executives portray the fight against climate change as requiring grim sacrifice. "With E.V.s, it's not like that," said Christina Bu, secretary general of the Norwegian E.V. Association, which represents owners. "It's actually something that people embrace."

Norway began promoting electric vehicles in the 1990s to support Think, a homegrown electric vehicle start-up that Ford Motor owned for a few years. Battery-powered vehicles were exempted from value-added and import taxes and from highway tolls.

The government also subsidized the construction of fast charging stations, crucial in a country nearly as big as California with just 5.5 million people. The combination of incentives and ubiquitous charging "took away all the friction factors," said Jim Rowan, the chief executive of Volvo Cars, based in neighboring Sweden.

The policies put Norway more than a decade ahead of the United States. The Biden administration aims for 50 percent of new-vehicle sales to be electric by 2030, a milestone Norway passed in 2019.

A few feet from a six-lane highway that skirts Oslo's waterfront, metal pipes jut from the roof of a prefabricated shed. The building measures pollution from the traffic zooming by, a stone's throw from a bicycle path and a marina.



Oslo officials say that the shift to electric cars has noticeably reduced the levels of nitrogen oxides, air pollutants that cause smog and asthma. David B. Torch for The New York Times

Levels of nitrogen oxides, byproducts of burning gasoline and diesel that cause smog, asthma and other ailments, have fallen sharply as electric vehicle ownership has risen. "We are on the verge of solving the NOx problem," said Tobias Wolf, Oslo's chief engineer for air quality, referring to nitrogen oxides.

But there is still a problem where the rubber meets the road. Oslo's air has unhealthy levels of microscopic particles generated partly by the abrasion of tires and asphalt. Electric vehicles, which account for about one-third of the registered vehicles in the city but a higher proportion of traffic, may even aggravate that problem.

"They're really a lot heavier than internal combustion engine cars, and that means that they are causing more abrasion," said Mr. Wolf, who, like many Oslo residents, prefers to get around by bicycle.

Another persistent problem: Apartment residents say finding a place to plug in their cars remains a challenge. In the basement of an Oslo restaurant recently, local lawmakers and residents gathered to discuss the issue.



An electric charging station for ferries on the Oslo Fjord, just south of the city. David B. Torch for The New York Times

Sirin Hellvin Stav, Oslo's vice mayor for environment and transport, said at the event that the city wants to install more public chargers but also reduce the number of cars by a third to make streets safer and free space for walking and cycling.

"The goal is to cut emissions, which is why E.V.s are so important, but also to make the city better to live in," Ms. Stav, a member of the Green Party, said in an interview later.

Electric vehicles are part of a broader plan by Oslo to reduce its carbon dioxide emissions to almost zero by 2030. All city buses will be electric by the end of the year.

Oslo is also targeting construction, the source of more than a quarter of its greenhouse gas emissions. Contractors bidding on public projects have a better chance of winning if they use equipment that runs on electricity or biofuels.

At a park in a working-class Oslo neighborhood last month, an excavator scooped out earth for a decorative pond. A thick cable connected the excavator to a power source, driving its electric motor. Later, an electric dump truck hauled away the soil.

Normally, the crew would have been required to stop working when the children in a nearby kindergarten napped. But the electric equipment was quiet enough that work could continue. (Children in Norway nap outdoors, weather permitting.)



Espen Hauge, left, who manages city construction projects, at a site with electric-powered equipment. David B. Torch for The New York Times

Espen Hauge, who manages city construction projects, said he was surprised at how quickly contractors substituted hard-to-find electric equipment for diesel machinery. "Some projects that we thought were impossible or very difficult to do zero emission, we still got the tender for zero emission," he said.

Ms. Stav acknowledged what she called the hypocrisy of Norway's drive to reduce greenhouse gases while producing lots of oil and gas. Fossil-fuel exports generated revenue of \$180 billion last year. "We're exporting that pollution," Ms. Stav said, noting that her party has called for oil and gas production to be phased out by 2035.

But Norway's government has not pulled back on oil and gas production. "We have several fields in production, or under development, providing energy security to Europe," Amund Vik, state secretary in the Norwegian Ministry of Petroleum and Energy, said in a statement.

Elsewhere, Norway's power grid has held up fine even with more demand for electricity. It helps that the country has abundant hydropower. Even so, electric vehicles have increased the demand for electricity modestly, according to calculations by the E.V. Association, and most owners are charging cars at night, when demand is lower and power is cheaper.

Elvia, which supplies electricity to Oslo and the surrounding area, has had to install new substations and transformers in some places, said Anne Nysæther, the company's managing director. But, she added, "we haven't seen any issue of the grid collapsing."



Petter Hellman, the chief executive of Moller Mobility, predicts that traditional brands will regain ground because customers trust them and they have extensive service networks. David B. Torch for The New York Times



Sindre Dranberg, who has worked at a Volkswagen dealer in Oslo since the 1980s, underwent training to service electric-vehicle batteries. David B. Torch for The New York Times

Nor has there been a rise in unemployment among auto mechanics. Electric vehicles don't need oil changes and require less maintenance than gasoline cars, but they still break down. And there are plenty of gasoline cars that will need maintenance for years.

Sindre Dranberg, who has worked at a Volkswagen dealership in Oslo since the 1980s, underwent training to service electric-vehicle batteries. Was it difficult to make the switch? "No," he said, as he replaced defective cells in a Volkswagen e-Golf.

Electric vehicles are creating jobs in other industries. In Fredrikstad, 55 miles south of Oslo, a former steel plant has become a battery recycling center. Workers, including some who worked at the steel plant, dismantle battery packs. A machine then shreds the packs to separate plastic, aluminum and copper from a black mass that contains crucial ingredients such as lithium, nickel, cobalt, manganese and graphite.

The factory, owned by Hydrovolt, is the first of several the company plans to build in Europe and the United States. So far, there is not much to recycle, but eventually recycled batteries could greatly reduce the need for mining.

"If we can take the active material that already is within the product and create new ones, then we create a shortcut," said Peter Qvarfordt, the chief executive of Hydrovolt, a joint venture of the aluminum producer Norsk Hydro and Northvolt, a battery maker.

If anyone has to worry about their jobs, it's car dealers. The almost complete disappearance of gasoline and diesel vehicles from showrooms has reordered the industry.

The Moller Mobility Group has long been Norway's biggest auto retailer, with sales last year of \$3.7 billion and dealerships in Sweden and the Baltic countries. Moller's Oslo outlet is filled with electric Volkswagens like the ID.4 and the ID.Buzz. There are only a few internal combustion cars.

Yet, Tesla is greatly outselling Volkswagen in Norway, grabbing 30 percent of the market compared to 19 percent for Volkswagen and its Skoda and Audi brands, according to the Road Information Council.

Sales of electric cars from Chinese companies like BYD and Xpeng are also growing. If that pattern repeats itself elsewhere in Europe and in the United States, some established carmakers might not survive.



Electric vehicles are part of a broader plan by Oslo to reduce its carbon dioxide emissions to almost zero by 2030. David B. Torch for The New York Times

Petter Hellman, the chief executive of Moller Mobility, predicted that traditional brands would regain ground because customers trust them and they have extensive service networks. "But clearly," he added, "Tesla has shaken the industry."

Circle K, which bought gas stations that had belonged to a Norwegian government-owned oil company, is using the country to learn how to serve electric car owners in the United States and Europe. The chain, now owned by Alimentation Couche-Tard, a company based near Montreal, has more than 9,000 stores in North America.

Guro Stordal, a Circle K executive, has the difficult task of developing charging infrastructure that works with dozens of vehicle brands, each with its own software.

Electric vehicle owners tend to spend more time at Circle K because charging takes longer than filling a gasoline tank. That's good for food sales. But gasoline remains an important source of revenue.

"We do see it as an opportunity," Hakon Stiksrud, Circle K's head of global e-mobility, said of electric vehicles. "But if we are not capable of grasping those opportunities, it quickly becomes a threat."

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