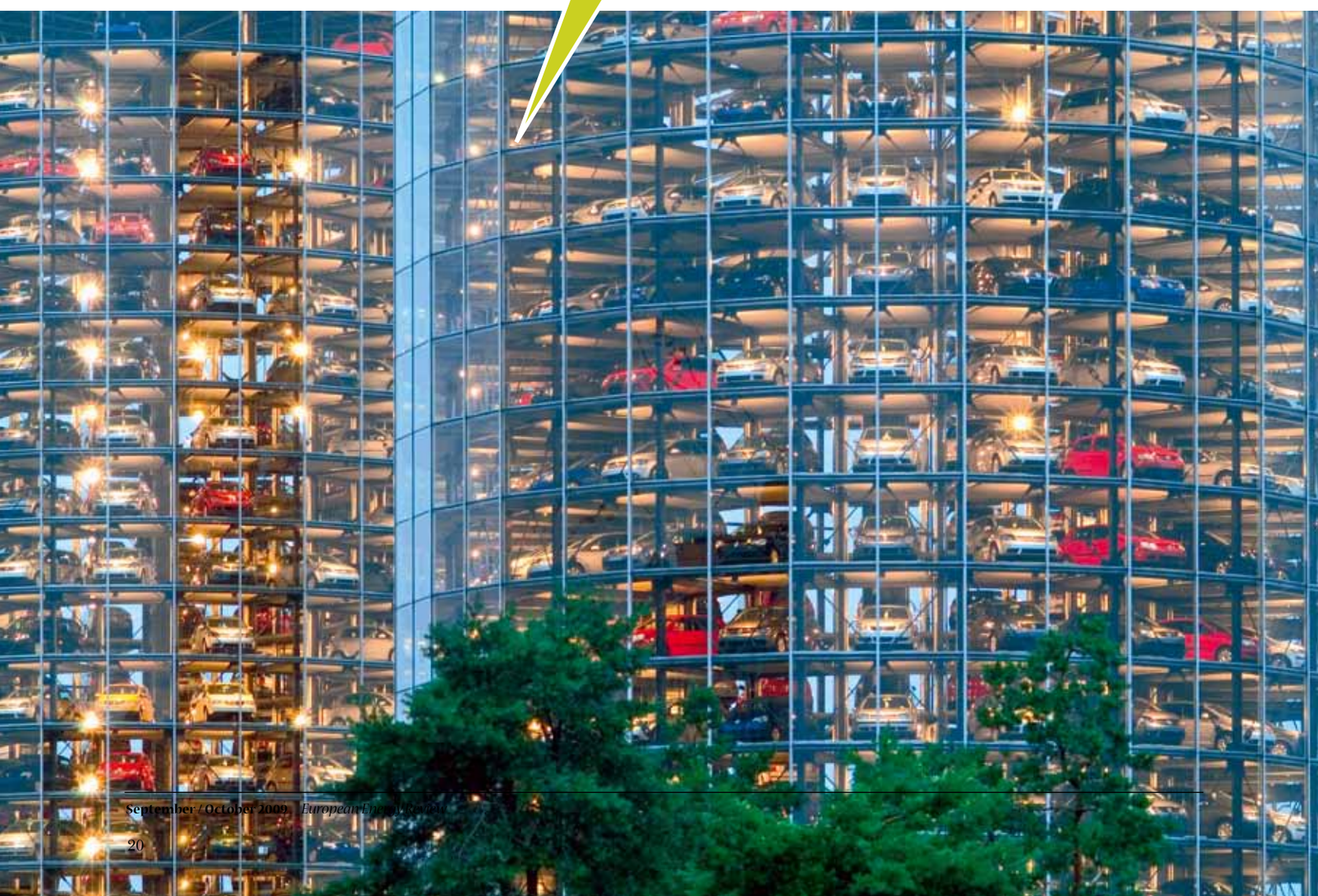
The Autobahn goes electric

Car-crazy Germany has been lagging behind when it comes to making hybrid and electric cars. German car makers have focused too long on protecting their vested interests and the government did too little to make them change their mind. But times are changing. Fahren auf der Autobahn is about to become an electrifying experience.



by Stefan Nicola

'We would like to connect with people through their normal, everyday occurrences. And we aim to inspire our visitors to start thinking about where they could maybe change their behaviour to live more sustainably,' says Maria Schneider.

Schneider is creative director of Autostadt, Volkswagen's huge mobility theme park located right next to its production factories in Wolfsburg. Autostadt currently runs an exhibition called "Level Green". On 1,000 square meters designed by architect Jürgen Mayer-Hahn in a futuristic lime-green, visitors can learn about the size of their ecological footprint, discover how much carbon dioxide emissions they can save per year by eating less meat (6.7 tons of CO_2), or learn how Volkswagen tries to produce cars more sustainably. Given that roughly 2 million people visit Autostadt each year, Level Green might even make a difference.

But of course a sustainability exhibition at Europe's largest carmaker cannot avoid the subject of mobility. Some of the sleek-looking touch screens tell visitors the latest about biofuels, hybrid and electric vehicles, and about exciting mobility concepts of the future. But does this forward-looking attitude really enter the research and production facilities of Volkswagen, Daimler and BMW? Not really, critics say.

'The German car industry has slept through the trend toward electric mobility,' Ferdinand Dudenhöffer, Germany's premier automobile expert, tells EER. He says car companies in Asia and even the US have a head start when it comes to hybrid and electric cars. It took Daimler, a world-leading car giant and the owner of Mercedes-Benz, until late June to launch the German car industry's first hybrid vehicle, almost a decade after market leader Toyota introduced the Prius.

Volkswagen is not out in front, either. Dudenhöffer ranks BMW and Daimler ahead of Volkswagen when it comes to building tomorrow's green cars. 'Of the world's large car companies, Volkswagen has the smallest offering of hybrid cars and they are also behind in producing an electric car,' he says.

The German car companies have over the past years focused on making gasoline and diesel engines more efficient. Admittedly, they are world leaders in this now. Some 120 of the 170 models offered by the Volkswagen group (which includes Audi) have a carbon dioxide footprint of less than 140g per kilometer – a pretty impressive efficiency track record. However, the company has not yet serially produced and sold a modern hybrid or electric car.

Volkswagen head Martin Winterkorn said earlier this month his company would offer its first all-electric vehicle (EV) in 2013 – at least two years after competitors in Europe, Asia and the US. BMW and Daimler are expected to launch all-electric Mini and Smart cars in late 2011 or early 2012.

Mitsubishi launched its electric vehicle, the €34,000 i-MiEV in July of this year. It will start selling in 2010. In August, Japan's Nissan unveiled a mass-market battery-powered car called the Leaf. The Chevrolet Volt, a plug-in hybrid whose combustion engine generates additional electricity to power the car, is to be sold by early 2011. Toyota will soon release a plug-in version of the Prius. Its latest Prius model is selling like crazy in Asia.

German consumers are similarly eager to go electric. According to a recent poll, every fifth German interested in buying an automobile is delaying the purchase to wait for the introduction of electric cars. That means being a year or even two years late could hurt Germany's car industry significantly.

Critics say the carmakers have been pushed too little by the government. As an example, a government plan to colour-code cars according to their level of "sustainability" was blocked by conservatives acting at the behest of the car companies. 'You can't really expect the car makers to bring about this transition to EVs,' says Tomi Engel, a sustainable mobility expert at the German section of the International Solar Energy Society. 'Why invest in new products and strategies when it's simpler to prevent laws and make money with the old products? It's up to the government to change the rules so that a market can develop.' According to Engel, the German motor vehicle tax needs to be altered to help introduce EVs. 'With the current tax, you pay less for a very efficient gasoline car than for an EV. How can you penalize someone for saving significant amounts of CO_2?'

Dudenhöffer agrees: 'The German government has been too hesitant and slow when it comes to supporting electric mobility.' He believes Berlin should pour more money into research and development. Germany's most recent economic aid package includes €500 million earmarked for R&D in sustainable mobility, including €115 million for eight model regions which are expected to look at infrastructure systems, driver behaviour and the integration of the EVs into a renewable energy-based electricity network.

Not an insignificant sum, but much less than the US

Volkswagen Autostadt in Wolfsburg, Germany
Photos: Paul Langrock/Hollandse Hoogte

and China are investing. Washington has earmarked $2 billion for the development of next-generation battery technologies for EVs and funds infrastructure test projects with an additional $400 million. China will soon launch test projects with more than 10,000 EVs for a total amount of $2 billion, and funds electric mobility research with another $1 billion. Moreover, because of Germany's bureaucratic system, the money spent in Germany takes longer to make an impact, Dudenhöffer says.

However, the German government now seems to have woken up to the challenge. On 19 August, it unveiled a strategy to reach its target of 1 million EVs by 2020. The plan does not allocate new money, but it includes funding pledges for battery research and a proposal to pay buyers of EVs up to €5,000 starting in 2012. 'It is our aim to make Germany into the market leader for electric mobility,' Economy Minister Karl-Theodor zu Guttenberg said at the plan's presentation in Berlin.
The politicians did not hesitate to remind the car makers that they had to do their part to help sustainable mobility succeed in Germany. 'We politicians are ready to support this,' said Wolfgang Tiefensee, the German transport minister. 'But it is the German automobile industry that now needs to accelerate its efforts if Germany really wants to be a lead market when it comes to electric mobility.'

One million EVs sounds like a lot, but with 45 million cars on the road right now, the market share would be less than 2%. 'That means we will have to meet Germany's ambitious climate protection targets mainly through efficiency improvements of engines in conventional cars,' Tobias Lösche-ter Horst, who heads Volkswagen's propulsion research department, tells EER. 'Of course electric mobility has a huge potential, and we are researching that with many resources. But it will take some time before EVs can provide long-distance mobility.'

Lösche-ter Horst heads a team of 200 engineers and scientists. Half of them research gasoline and diesel engines, the other half electric mobility, hydrogen fuel cells and biofuels. He says Volkswagen's most efficient diesel cars are already better than the best hybrids when it comes to greenhouse gas emissions. The Blue Motion 2 version of its Polo compact car, to be launched next year, will emit just 87 g of CO_2 per km – that's less than the newest Prius.

'Electric mobility,' says Wolfgang Müller-Pietralla, who heads Volkswagen's future research department and is a big supporter of electric mobility, 'will motivate engineers to even higher efficiency levels and we will soon see that traditional engines will become more sustainable.'
Both Lösche-ter Horst and Müller-Pietralla say an average consumption of 3 liters per 100 km is realistic for a compact car with future technologies. Similar to the other car makers in Germany, Volkswagen also banks on biogas (Germany has an excellent biogas infrastructure and VW has several biogas models on offer) as well as biofuels that don't compete with food production.

That doesn't mean the likes of Volkswagen, Daimler and BMW are neglecting electric vehicles altogether. Most experts agree that German companies are starting to catch up. Daimler and BMW are about to launch EV test trials in several German cities. BMW has announced it would scrap its Formula 1 racing team in a bid to focus on new engine technologies and sustainability.
Daimler has invested $50 million in Tesla, the California-based maker of long-range electric vehicles. It initially bought a stake of 10 percent in the company, but later resold 4 percent to an Abu Dhabi-based investor. Thomas Weber, head of R&D from Daimler, is convinced: 'The cards are being re-dealt now and green technologies will be trumps.'

There is one problem. The heart of an EV is its battery, and Germany has almost no domestic battery production or expertise. That has moved to Asia – Japan and China are today's battery giants. Nowadays, EVs are powered by huge lithium-ion battery packs that are heavy, expensive and some say unsafe. A battery pack for an EV costs between €10,000 and €15,000 and its range usually doesn't extend beyond 150 km. It's clear that

Exhibition "Level Green" at Autostadt Photo: Kai Senf

there is room for significant improvement, and Germany would like to participate in that technology race.

No wonder German car makers are scrambling to enter into cooperations with Asian battery giants. Volkswagen has teamed up with Chinese battery and EV maker BYD. Earlier the company had reached a deal with Japan's Sanyo and Toshiba. BMW has teamed up with auto parts supplier Bosch and its Korean partner Samsung to supply lithium-ion batteries for a future EV. Daimler is even trying to support the creation of a domestic battery production capability. Together with German energy company Evonik, it founded li-Tec, which combines both groups' expertise to produce lithium-ion batteries for Mercedes-Benz EVs.

All those recent activities leave the German car industry optimistic that it can get a significant share of the growing sustainable mobility market. 'Sometimes people behave and talk as if the race for the electric car is already over,' Lösche-ter Horst says. 'But that's not true. No company has a big head start or is far behind. The race is only beginning.' ■

Wolfgang Müller-Pietralla and Tobias Lösche-ter Horst. Photo: Kai Senf

Utilities team up with car makers

Germany's energy utilities support electric mobility because they hope it will increase the demand for electricity. They are involved in several EV test projects with German car makers.

Daimler and RWE: E-mobility Berlin

Energy giant RWE and Daimler have teamed up for Germany's biggest EV test project in Berlin. It will feature 100 electric Smart cars handed out to selected customers, starting in late 2009. Daimler will at a later phase also provide Mercedes-Benz EVs. RWE plans to install some 400 electric charging stations all over the city. The company said it wants to open its charging infrastructure at a later date also for Daimler's competitors. RWE plans to install up to 10,000 charging stations over the coming years, the company said.

BMW and Vattenfall: Mini-E powered by Vattenfall

Fifty Mini-E cars have been driving through Berlin for the past weeks, in Germany's first EV test project. Vattenfall is providing the charging stations and scientists from Technical University Chemnitz are analyzing driving patterns and grid stability. Funded by the German Environment Ministry, the project is special in a way that Vattenfall has vowed that only electricity from renewable sources will be available at its charging stations. BMW runs similar test projects in Britain and California. In February 2010, another 50 cars will join the project.

BMW and Eon: E-mobility in Munich

German energy giant Eon has built 15 charging stations for 15 Mini-E cars that have been handed out to selected drivers. The small project features test drivers who are commuting into Munich from the city's outskirts. A fully-charged battery takes the Mini-E roughly 150 km.

Volkswagen and Eon: Fleet Test Electric Drive

Volkswagen in June 2008 announced a fleet test of its plug-in hybrid Golf Twin Drive. So far, only 2 vehicles have actually made it onto the roads in and around Berlin. More cars are to be added until the end of the year, but Volkswagen has given no details. The company initially said last year it wanted to test up to 20 vehicles. Eon was due to provide the electrical refueling stations.