Automotive World MAGAZINE

Issue 6 | June 2020

Chinese start-up eyes robotaxi leadership

How **Ford** put its own Spin on micromobility | Why **Nikola** believes data will ultimately fuel its trucks | **Pininfarina** CEO draws on history for the future of mobility | **GM**'s Chief Sustainability Officer on electrification | **Einride** CEO discusses truck electrificatione | **Intel** doubles down on robotaxi bet with Moovit buy |

Published in June 2020 by:

Automotive World est. 1992

Automotive World
1-3 Washington Buildings
Stanwell Road, Penarth,
CF64 2AD, UK

www.automotiveworld.com
T: +44 (0) 2920 707 021
support@automotiveworld.com

Registered number: 04242884
VAT number: GB 815 220 173

CEO & Managing Director:
Gareth Davies

Editor-in-Chief:
Martin Kahl

Editor-at-large:
Megan Lampinen

Editorial team:
Freddie Holmes
Jack Hunsley
Xavier Boucherat

Production:
Anmol Mothy

Subscriptions:
Gavin Dobson

T: +44 (0) 2921 287 116
gavin.dobson@automotiveworld.com

Editor's note

'Chinese consumers celebrate the idea of AVs'

The coronavirus pandemic has highlighted the need for automotive industry stakeholders to balance liquidity and near-term survival with investment in long-term sustainability. Strategic leadership is essential–but so too is seizing the right opportunity.

"In big crisis there is always the biggest opportunity," says Pininfarina's Chief Executive in an exclusive *Automotive World* interview, offering much-needed optimism for an industry so heavily affected by the virus.

The industry giants may be struggling in the face of the pandemic, but they still command substantial war chests, and remain focused on the future. GM's Chief Sustainability Officer talks to *Automotive World* about the importance not just of electrifying vehicles, but also their surroundings; and we take a closer look at how and why Ford is going about securing its place in the micromobility race. We hear, too, of the opportunities being pursued by newer players such as Waymo, Nikola and Einride.

Despite the currently challenging business environment, the autonomous vehicle race is gathering pace, particularly in China where Baidu and Didi have long had their sights set on leadership–but they now face serious competition from one of the most exciting companies in the AV space, AutoX. There may be apprehension about AVs in Europe and in North America–just look at PAVE's recent research findings–but in China there's a major opportunity. As Megan Lampinen learned when she spoke to Jewel Li, AutoX's Chief Operating Officer, "Chinese consumers celebrate the idea of AVs".

Martin Kahl

Editor-in-Chief, Automotive World

IN THIS ISSUE


autoX
autoX

Chinese start-up eyes robotaxi leadership

AutoX Chief Operating Officer Jewel Li speaks to Megan Lampinen about the company's bullish vision for autonomous ride-hailing

A small Chinese start-up is about to make big waves in the world of robotaxis. AutoX is not a manufacturer of autonomous vehicles (AVs); it makes the technology that allows vehicles to drive autonomously. The company was founded in 2016 by Jianxionx Xiao, known as Professor X, with the aim of democratising autonomy. The few years since have been busy, and developments are gaining pace.

Engineers have taken the AutoX Driver platform into some of the most challenging urban environments. Headquartered in Shenzhen, AutoX has eight offices and five R&D centres around the world and has attracted investment from some major corporations, such as Alibaba, Shanghai Auto and Dongfeng Motor. It has now opened a new self-driving operations centre in Shanghai and partnered with China's largest mobility operator, Amap, in a groundbreaking robotaxi trial. "Shanghai is an international metropolitan city with a lot of influence and a good market for autonomous driving, especially robotaxis," explains Jewel Li, AutoX Chief Operating Officer.

Taking on passengers

A fleet of AutoX AVs has been running in Shanghai for some time now, honing their capabilities along the city's busy roads and accumulating vast amounts of data. They are now being put to work carrying passengers. This started with employees and employees' friends and families, but opened up to a seed batch of early riders on 27 April. After that it will open to the wider public, provided they have an Amap app.

> "Shanghai is an international metropolitan city with a lot of influence and a good market for autonomous driving, especially robotaxis

Amap, also known as AutoNavi, launched the first mobility aggregation service in the country in 2017. It allows users to hail a ride from more than 40 different operators. Recent data shows that Amap has 478 million active users as of March 2020—considerable exposure for AutoX. The partnership between the

AutoX has been testing AVs in various regions, including Las Vegas

two marks the first time that robotaxis will be available on a major ride-hailing platform in China.

Hailing a ride from one of the AVs is a pretty straightforward process. As a user enters his or her pick up and drop off locations, the Amap app lists all vehicles that can meet their request, including the AVs from AutoX. Riders have the choice of an AV or a traditional human-driven vehicle.

Notably, the partners have had to make some concessions in light of the COVID-19 outbreak, including the provision of disinfectant wipes and cleaning procedures after every passenger. They also offer a completely contactless process for identity confirmation and ride initiation. “We never thought about this before the outbreak,” Li concedes. “On the engineering side, we were able to design the whole process to be as touchless as possible. In the future, it would be great to have some kind of automatic disinfecting mechanism.”

Behind the wheel of every robotaxi sits a safety driver, as required by law. “Their main job is to anticipate the limitations of the self-driving system,” explains Li. These specialists need to predict situations which might be challenging for the system and intervene. Training for the job takes place at a new facility in Shanghai, the largest robotaxi operations centre in the city and the largest data hub for AV data in all of China.

The ppartnership between AutoX and Amap marks the first time that robotaxis will be available on a major ride-hailing platform in China

A 'Gigafactory' for data

AutoX likes to refer to this new operations centre as a 'Gigafactory' for the storage of self-driving car data–and there is plenty of it. The AutoX fleet of AVs generate petabytes of real-world data every week in Shanghai alone. The city has become the largest operational hub for the start-up, which will soon have a fleet of 100 AVs running on public roads as part of an agreement with the Shanghai municipal authorities. "We are one of very few companies in the world operating such large fleets," she notes. "As they grow, we see a need for a specialised centre, not just for operations but also to serve as a central data hub."

This centre only handles the data for Shanghai testing, as feedback from any other pilots will be stored locally.

The AutoX fleet in Shanghai generates petabytes of real-world data every week

"Moving such high volumes of data is very expensive, so we avoid that as much as possible," Li explains. "On top of that, the road conditions in Shanghai–in Asia in general–are very different from the driving styles and road conditions of the US, so mixing the data is not necessarily the best approach."

There are a couple of ways to download the data from the cars. One is for the safety driver to physically swap data drives at the end of the day, uploading what he gathered during his shift. The other, faster, approach is to go through the high-speed network that AutoX has built inside the operations centre.

"We designed the system to be clever," says Li. "Because there are so many terabytes of data, transferring the raw data would be a very heavy burden on the server. Instead, we compress the data on the vehicle, utilising the very powerful computer onboard, which reduces the size that needs to be transferred."

Some of the data from real world driving is harnessed as a source for simulation, which can then amplify it many times over. Within the Shanghai centre, simulation cloud computers run 24/7, creating varied and complex scenarios for the AVs. "There are several types of scenarios that we would pay attention to when

the car is on the road," she says. "One is when the safety driver has to intervene. We also have a system that automatically mines valuable data, such as when crowds of pedestrians cross the road. Scenarios like this are automatically tagged and used as a source for the simulation."

But is all this enough to determine when a system is safe enough? "Driver disengagements and miles driven are fairly important metrics of capability, but they are very coarse," cautions Li. "Data will be key to reaching a point where the industry has a relatively large size of AVs on the road." And that is not far away. Li points to the current fleet of Waymo AVs operating in Arizona as a sign of how quickly things could move. "In about one year, we will see the pioneers offering a fairly large autonomous fleet. Our internal goal is designed to a similar timeline," she confirms.

China leads the way

While AutoX has tested its AVs in a dozen cities around the world, its focus is on the Asian market. China in particular could prove a good fit for robotaxis. "The car ownership ratio per 1,000 people is very low in China, and yet everyone battles with traffic jams," Li points out. "It would be impossible for China to have the same ownership levels as in the US, so people are culturally accepting of ride-sharing and they celebrate the idea of AVs."

> "We are one of very few companies in the world operating such large fleets. We see a need for a specialised centre, not just for operations but also to serve as a central data hub

China also has supporting infrastructure for connected vehicle communication. For instance, the AutoX fleet of AVs is connected to Shanghai's 5G-based vehicle-to-everything (V2X) technology, allowing the vehicles to communicate with road infrastructure for additional sources of information proactively. In fact, AutoX's robotaxi service is

AutoX will soon have a fleet of 100 AVs running on public roads as part of an agreement with the Shanghai municipal authorities

the first real-world application of Shanghai's V2X infrastructure, which was recently built as part of China's national New Infrastructure Initiative.

"In the area where we operate in Shanghai, our V2X connection means the vehicles can receive traffic signals way ahead of time, even if the traffic light is obstructed from view," comments Li. "This is turning out to be a real problem for some operators, which frequently encounter traffic lights or stop signs covered by things like tree branches. They often need to go through lengthy negotiations with the city around whether they can cut the branches. If not, they are faced with a challenging technical problem to solve."

China also has a worrying road fatality record; it is estimated that 700 people die every day in road traffic incidents, equating to 255,500 deaths a year, compared to 38,800 road deaths recorded in the US last year. "The real bar we need to pass with AV technology is how it compares to a human driver," Li emphasises. "In China, the bar is definitely lower, and the benefit of having the technology is bigger."

Ford's collaborative approach to micromobility pleases city planners

A strategy to partner with city authorities leaves Spin well placed to take on start-ups that have gained an early lead. By Freddie Holmes

In many ways, cities have already prepared for micromobility. Streets were originally designed for self-propelled and low-speed forms of transportation, but the rise of privately owned cars, as well as commercial vans and trucks, has meant that the bicycle now plays second fiddle in most cities around the world.

Over the years, dedicated bike lanes have been introduced to better accommodate vulnerable road users, and in cities like Amsterdam and Copenhagen, these users arguably take priority over the motor vehicle. Many cities have built up fleets of bicycles that are open to anyone, too. According to the 2019 Here Urban Mobility Index, Brussels boasts 4.17 docked city bicycles per 1,000 residents in the city. To put this in context, that is more than double the number of shared bikes available in Amsterdam, although most locals own their own.

However, advances in electric propulsion have meant that the humble bicycle or kick scooter can travel faster and further, and existing infrastructure and regulations may no longer be suitable. Bike lanes currently in place may not be wide enough for an increase in faster moving traffic, and the number of protected lanes may be too few in general. And with a lack of rules in place to govern where these e-scooters can go, many riders take to the pavement or mix with cars and trucks on the road. The dangers were no more apparent than during the e-scooter craze in 2018, and the trend grew so quickly that many cities struggled to cope, leading to impounded vehicles and eventually, outright bans.

In hindsight, it is fairly obvious why things did not go to plan. These start-ups launched seemingly overnight, and with no prior authorisation. Had city planners been given the opportunity to discuss how such services should be rolled out, much of the conflict may have been avoided. Most start-ups come with no prior reputation, and cities will have had to establish a relationship from scratch—but could automaker-led services bring a new level of trust and responsibility to the table?

Why should cities partner with automakers?

Ford Motor Company acquired San Francisco start-up Spin back in November 2018. It began working with Zagster, which specialises in managing shared bike services, to better understand how scooter equivalents could be run in a safe and compliant manner. Spin services have since expanded across various cities in the US, and will soon be launching in Europe.

The start-up had initially been praised by members of the Ford board for its collaborative approach with cities, and Brett Wheatley, Director of Mobility Businesses, Autonomous Vehicles LLC & Mobility Partnerships at Ford Motor Company, says that collaborative spirit has continued.

"Spin has a talented team of experienced professionals from government and private sectors, and the transportation advocacy world, who understand the perspectives of both government and business. This team uses its combined knowledge to work with cities to meet shared goals–keeping the micromobility business viable while meeting the needs of cities," he told *Automotive World*. "It is this partnership approach and shared vision with cities and stakeholders that has enabled Spin to win permits for key markets that other scooter companies couldn't secure."

For example, he credits Spin's approach for securing permits in both Washington, D.C. and San Francisco in 2019. Of the three largest players in the shared e-scooter business, says Wheatley, Ford is the only provider to win permits with both cities. "Spin prides itself on partnering and working closely with cities rather than acting first and asking for forgiveness later," he emphasised. This turn of phrase has become synonymous with early e-scooter start-ups.

Ann Arbor, MI

In May 2019, Spin rolled out 200 e-scooters in Ann Arbor, a college town not far from Detroit. Private car travel is the dominant form of transport, with elevation rising highest around the University of Michigan's north campus. Around 122,000 people live here, according to official estimates from July 2018.

A significant launch took place that month in partnership with the University of Michigan and Ann Arbor– a number of city officials even donned

helmets for the event. It tied in nicely with an earlier agreement to introduce a protected lane on William Street, a long straight road that branches off from the university campus. It was not simply a case of making lanes wider, but also resurfacing the road, consolidating water mains to make space, adding new lane markings to facilitate two-way travel, and barriers to separate cars from bikes and scooters.

The idea was originally to accommodate an increase in bicycle traffic, and has since been well received by locals. But as Raymond Hess, Ann Arbor's Transportation Manager, told the Ann Arbor Observer in November, more changes would likely need to be introduced across the city, and not necessarily in terms of infrastructure. Part of the challenge is accommodating scooters in the first place, but also ensuring they are ridden in a safe and responsible manner. "Because electric scooters are a relatively new form of mobility, our laws don't fit them," Hess explained.

For example, drivers on William Street have been told by the Downtown Development Authority to avoid turning on red lights in a bid to provide greater security for vulnerable road users in the area. Michigan is one of many states that allows vehicles to make a right turn at certain intersections with a red light, on the basis that drivers yield for oncoming traffic or pedestrians. Cyclists are harder to spot, however, and thus the city is looking to avoid any nasty collisions.

Spin has partnered with Phoenix, Arizona to introduce safe and convenient areas for charging

Phoenix, AZ

In February 2020, Spin partnered with the city of Phoenix, Arizona, to launch public charging and parking stations known as 'Spin Hubs'. These hubs, supported by Swiftmile, have been strategically located in high-use areas, and are stationed away from the sidewalk and roadside in a specially marked-out area. These hubs can reduce clutter, says Wheatley, "and provide more reliability so people can integrate scooters into their everyday routines including connecting with other forms of transportation like mass transit."

Ford's Wheatley explained that understanding a city's infrastructure is ultimately vital for a successful micromobility operation. "Markets that are key to Spin are those that have a physical layout suitable for e-scooters," he explained, "as well as demand from their residents to embrace such forms of transportation." Put simply, people are more likely to use e-scooters if the terrain supports their use.

It builds on an existing relationship that had been established through the city's e-scooter pilot programme, a 12-month study launched in September 2019. The city has not been lax with restrictions; scooters cannot operate outside of specific boundaries and 'no-ride' zones. They must be parked in specific areas within the boundary map, and must only be ridden on the street or within bike lanes. E-scooter operators must apply for a permit, and will be

> Markets that are key to Spin are those that have a physical layout suitable for e-scooters, as well as demand from their residents to embrace such forms of transportation

© Spin

evaluated on how they will meet those requirements.

During the COVID-19 pandemic, free 30-minute rides have been offered to healthcare workers in all 13 US cities in which Spin continues to operate, but Phoenix is not one of those cities. On 23 March, Tim Alborg, Director of Government Partnerships at Spin, wrote to the city of Phoenix's Smart Transportation Department to advise that its service would be temporarily paused. "For the time being," said Alborg, "we plan to only remain in cities where we feel scooters are needed the most and where we are most capable of ensuring the safety of our employees and the public." It is understandable given the service remains in the early stages at this point.

Marathon, not a sprint

A couple of years on from the initial havoc, cities are now seeking to establish a positive working relationship with micromobility providers. A focus has been placed on companies that are willing to invest, collaborate and understand the specific needs of the city in question. All this creates a more affordable, accessible and useful service for locals.

Start-ups can no longer dump vehicles on the street looking for a quick buck–they'll need to play by the rules, and cities may also favour those with the financial stability to ensure a continued reliable service. It is why automaker-backed services may prove particularly successful in the long haul, and Ford's strategy to work closely with city planners via Spin has left it in good stead to take on the start-ups who have already gained a healthy lead.

Ultimately, cities are preparing for micromobility both physically and mentally. Roads are being made smoother and separated from heavy traffic, including the relocation of obstacles such as drains, but users are also being encouraged to adopt responsible riding practices, i.e. sticking to designated lanes and roads, avoiding sidewalks and wearing a helmet. For cities that once tussled with unregulated start-ups, the opportunity to work with esteemed industry names would seem too good to pass up.

INTERVIEW

Dane Parker, Chief Sustainability Officer, General Motors

Jack Hunsley speaks to GM's sustainability lead, Dane Parker, to learn more about how the automaker is tackling climate change

Decarbonising transport will play a significant role in fighting climate change. However, green potential also lies beyond the vehicles themselves, and one of the most commonly referenced examples is the need for green infrastructure. Although electric vehicles (EV) emit no harmful gases, a full zero emissions lifecycle can only be achieved if the energy used to recharge the vehicle comes from renewable sources. As such, in addition to initiatives including increased use of recyclable materials in production cycles, and development and deployment of on-site renewable energy, automakers are beginning to extend their expertise into the utility sector.

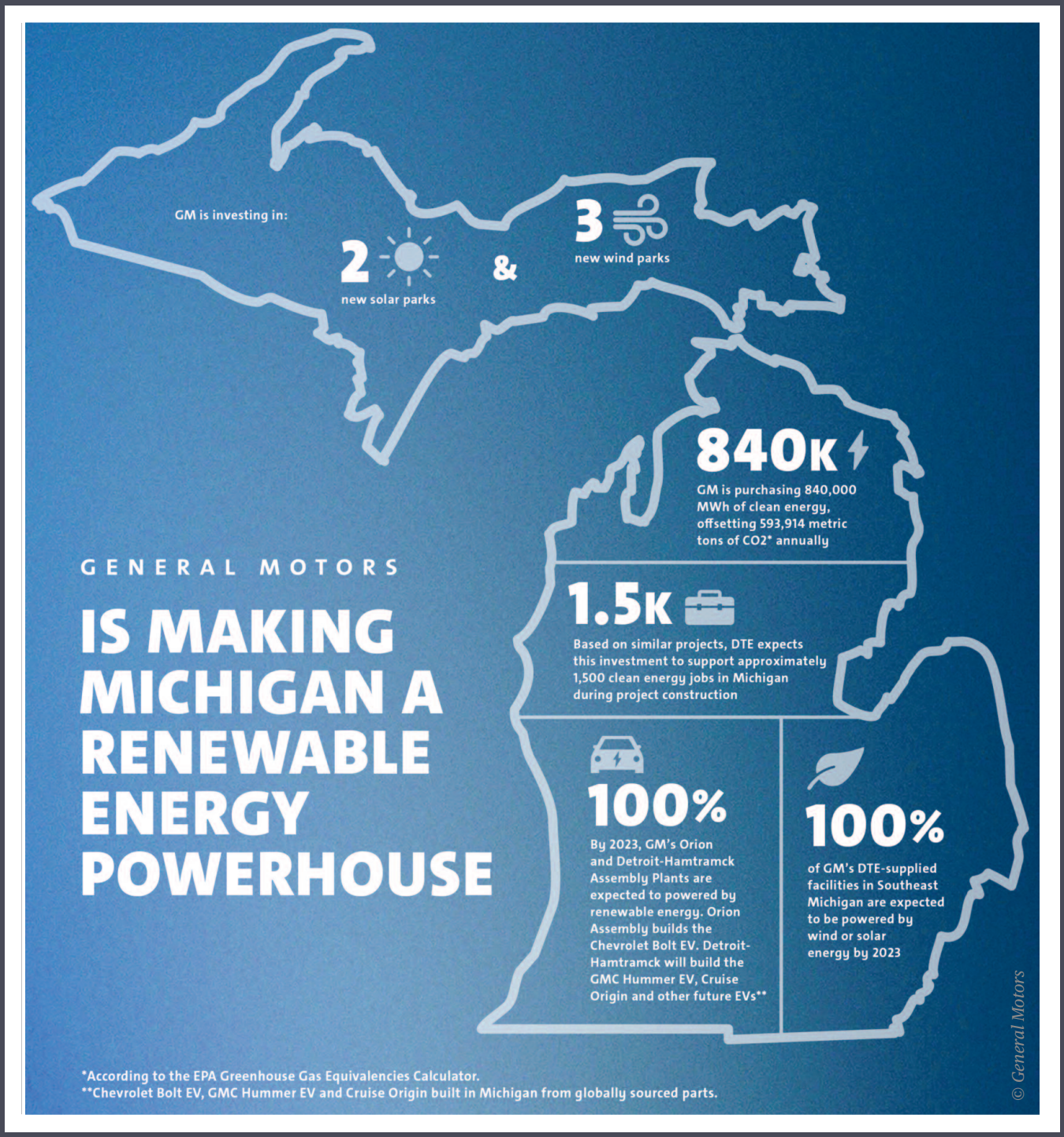
One of the most recent examples comes from General Motors. In cooperation with DTE Energy, the automaker closed a deal in April 2020 to invest in 500,000-megawatt-hours (MWh) of solar energy in Michigan, with GM's investment allowing DTE to build two new solar parks. In total, the commitment increases GM's total renewable investment to more than 800,000 MWh, the equivalent of 63 million gallons of gasoline in CO2 emissions.

To learn more about the project and how it ties in with GM's broader climate change goals, *Automotive World* spoke with the automaker's Chief Sustainability Officer, Dane Parker about renewables, smart charging and EVs.

> "Our goal is to have 100% renewable energy in our US footprint in 2030, and globally by 2040, as a part of our overall image of a zero-emissions future

Can you walk me through this latest investment in Michigan?

This has been the latest and largest step we've taken on our journey to 100% renewable. Our goal is to have 100% renewable energy in our US footprint in 2030, and globally by 2040, as a part of our overall image of a zero-emissions future and recognising that we need both EVs and a green grid. This for us is a big step in that direction.



It more than doubles the existing commitment we had with DTE. It gets us up to just over a terawatt hour of renewable energy per year in Michigan and is a big step towards that goal. It also gets us to a place where our global headquarters and main engineering campus, as well as the two assembly plants where we make EVs, will all be run on renewable energy.

How does this tie into your future climate change projects in this space?

We'll continue on this path with all of our main utility partners to try to have green tariffs or direct power purchase agreements to enable the net growth of primarily wind and solar in the US.

In the longer term, we believe that effective energy storage will be an important element. Through our investments in batteries, we're also doing some work on energy storage options and alternatives. We think that

In 2019, General Motors announced plans to collaborate with EVgo, ChargePoint and Greenlots to better understand and improve the EV user charging experience

© General Motors

will be an important enabler for a longer-term transition to 100% renewable.

As an automaker, what do you bring to these kinds of energy projects?

The first thing we bring is scale. The electricity demand we have and the scale that brings can give a certainty that utilities and investors need in order to make investments with the confidence that the demand will exist. We also bring expertise in EVs and what the potential there is in integrating a smart grid with those vehicles.

We've worked for a while with our utility partners on demand and peak shaving programmes for our operations, proactively managing overall energy demand to eliminate short-term demand spikes. As EVs grow in scale, there are plenty of reasons to manage those more smartly. The utilities have appreciated those dialogues because it is important for them to make sure that as the demand for charging grows, it grows at the right time and in a way that helps them avoid problems during peak times.

How important is the role of clean energy for charging?

To get to a zero-emission future, we recognise both green grids and EVs are required. It isn't an 'either-or' situation; we need

General Motors is making hefty investments into electric vehicles

transport of the vehicle itself to be electric, and the grid to be low carbon or renewable.

Are smart charging initiatives just as important? What progress has GM made here?

We have some pilots ongoing now so it isn't that far away, and our current EVs enable their owners to plug them in and tell the vehicle when they want it to charge. We're already in pilots with some energy providers to allow the vehicle and the grid to talk to each other so that the grid can help dictate when the best time to charge is.

We recognise today that most people charge at home and a much smaller percentage charge at work. The two combined account for more than 90% of charging, with homes accounting for 70% to 80%. That allows a great opportunity where you can shift demand to off-peak hours, which is better for the utilities as they can do peak shaving. In some cases, they can also shed load and take advantage of excess energy at night to put into vehicles, and effectively store that energy for use during the day in those vehicles. It is integral to the overall

> "To get to a zero-emission future, we recognise both green grids and EVs are required. It isn't an 'either-or' situation

In February 2020, GM's Detroit Hamtramck factory produced the last Chevrolet Impala ahead of the plant's conversion into a dedicated electric vehicle production facility by late 2021

strategy that we need in the utility and transportation industries.

What has been your experience in working with policymakers?

In our case, we've had very good experiences working with regulators and have found increasing support in both regulated and, in some cases, deregulated markets with some of the things that are important elements.

Now as the cost of renewable energy has come down to a point where it is competitive with more traditional carbon-intensive energy sources, it gets easier for regulators to be supportive. They are absolutely a key constituent in any kind of a push towards renewable energy.

How challenging is it to plan now for future regulations?

It has not been too great a challenge because we know that these things take planning, and to implement and execute any energy project takes a couple of years. One of the key things for us is to always have discussions that focus three, four, five or even ten years into the future. This provides the opportunity to shape things far enough in advance so that if there are hurdles you can find them early.

We have regular reviews with policymakers and with the utilities. We haven't had any major, negative experiences

> "In vehicle production, energy is the number one impact. More aluminium is good, because it is lighter and so your EV can go further on a single charge

where plans were shelved, interrupted or impacted because of a surprise. We've been able to work through those in advance.

What developments do you anticipate in manufacturing?

One big opportunity is the circular economy and the content of the vehicle. If we can get to a point where the energy that we use in production-consumption areas of the economy is renewable, and we can make some major strides in the material used and in recycling post-consumer and industrial materials, we will be in a place where we can truly stay sustainable.

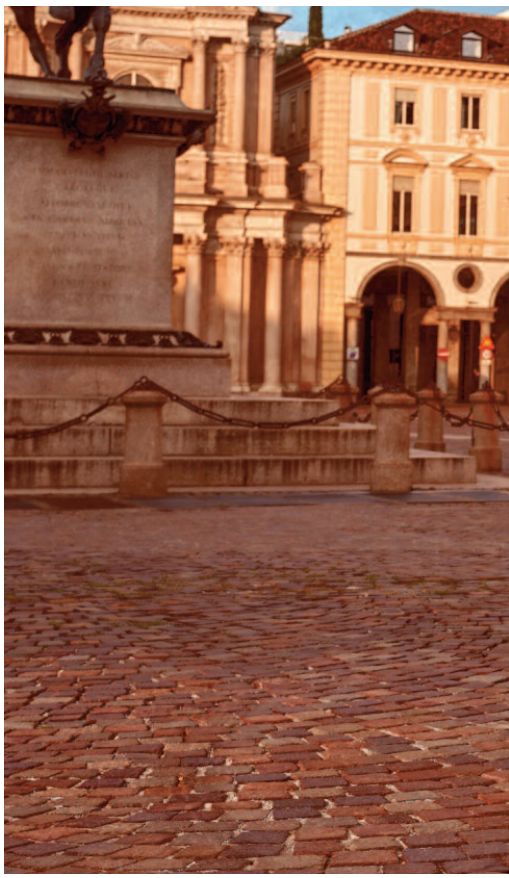
In vehicle production, energy is the number one impact. More aluminium is good, because it is lighter and so your EV can go further on a single charge, but recycled aluminium is orders of magnitude more energy-efficient than virgin aluminium.

When you think about batteries, it is between ten and 30 times more cost-effective and less energy-intensive to recycle materials. It is a huge opportunity for us to not just reduce the direct environmental impact, but also the indirect energy consumption and climate impact. If we get energy right, and if we can get materials and that circular economy right, we will be in for a great next decade.

Pininfarina draws on history to prepare for the future of motoring

Chief Executive Silvio Angori shares Pininfarina's strategy for surviving these unprecedented challenges. By Megan Lampinen

Pininfarina epitomises the enduring allure of Italian design, and its 90th anniversary celebrations this year put it squarely in the spotlight. The company has designed vehicles for some of the biggest names in the industry, including home-grown favourites such as Ferrari, Alfa Romeo and Fiat, as well as other international brands including Bentley, BMW and Rolls-Royce and even new disruptors like Karma Automotive.



> “In big crisis there is always the biggest opportunity

But today’s automotive industry, with a growing focus on clean mobility and multi-modal transport, poses serious questions about the future of vehicle design and the role of companies like Pininfarina. The current novel coronavirus pandemic, which hit Italy particularly hard, has also thrown the wider industry into uncharted territory. And yet, Pininfarina’s Chief Executive Silvio Angori anticipates not just a solid future for the company, but even a potential Renaissance.

Drawing hope from history

Italy, along with most of the world’s major markets, is currently bracing for a serious economic downturn in the wake of the pandemic, but Angori draws hope from the history books. “In big crisis there is always the biggest opportunity,” he tells *Automotive World*. “The Renaissance period followed the plague of 1350, which wiped out almost two-thirds of the population in parts of Europe. After this, there was an abundance of wealth created across the region.”

Today’s pandemic is nothing close to what happened during the Great Mortality, but Angori still believes parallels can be drawn. “In any event that has a major impact on humankind, there is always a period afterwards in which some major advancements take place, either in culture or technology,” he asserts.

It’s not just history that gives Angori confidence. Unlike the financial crisis in 2008, the exact cause of the coming recession is known. And this time, the banks have plenty of funding. “The financial institutions have mobilised vast amounts of money, which will help certain markets get through the crisis quickly,” he says.

Practical measures

While the long-term future may be promising, the near-term challenges clearly demand some strategy adjustment. At

Pininfarina designs cars for automakers around the world

Pininfarina, crisis management initially entailed enhanced hygiene and social distancing measures to mitigate the spread of the virus. It then dialled up the response and directed everyone to work from home. That includes employees in Italy, China, Germany and the US. Shifting to remote working practices early on proved a real advantage. “The impact on our people has not been that large, as none of our 700-strong team has been hit by the virus,” Angori pointed out.

It also helps that the company has invested heavily in digital tools, particularly around virtual reality (VR). The company’s Chief Creative Officer sits in Turin, Italy and conducts design reviews with teams not only in Turin but also in overseas locations like Shanghai and Miami. “For this we make Wextensive use of VR,” he added. “We also use it with our clients. We’ve been using these techniques for about two years and have perfected them over time. When the travel ban was enacted at the end of January, we could carry on conducting business remotely because we had those features already in place. From that standpoint, technology has helped us to get through the crisis.” Not everyone has poured money into VR or other forms of distance working. In the current crisis, this sort of early start on investment and experience could serve as a solid competitive advantage.

It could also prove a more permanent strategy, as one that saves both time and money. “How many times we have we said to ourselves, ‘Maybe that one-hour meeting in Germany could have been done with a video call’? Some of the changes this crisis has created will stay with us. People are getting over the psychological hurdle of believing you need to have everyone in the same room. Companies are going to adopt new and different ways of working. It is all about changing habits,” he said.

This thinking could be extrapolated into the wider supply chain and relationships with contractors and partners. As Angori suggested: “Whether the other company is a kilometre away from the head office or 10,000 km, it doesn’t really matter at all.”

The name Battista refers to the company's founder Battista Farina

Preserving customer experience

Legacy investment in digital technology is also proving advantageous when it comes to selling vehicles. The retail sector has been dabbling in online sales and virtual showrooms for years, but the current pandemic will accelerate that trend. "I think we will see considerable changes in the way that vehicles are sold," predicted Angori. He points to the way that used-car dealers have been leading the charge on this front, and suggests automakers follow their lead. With lockdowns in place and persistent concerns about social interactions, contactless car purchases and test drives could stick around for some time.

© Pininfarina

"The key will be how the buying experience is going to be preserved for clients, and this is where design comes into play," he added. This is a key area of investment for Pininfarina. It was one of the first to create a virtual dealership and is applying these today for certain partners. But work on this front is much more involved than simply 'click to buy' capability–it is about preserving the experience that a consumer has when he or she walks into a dealership.

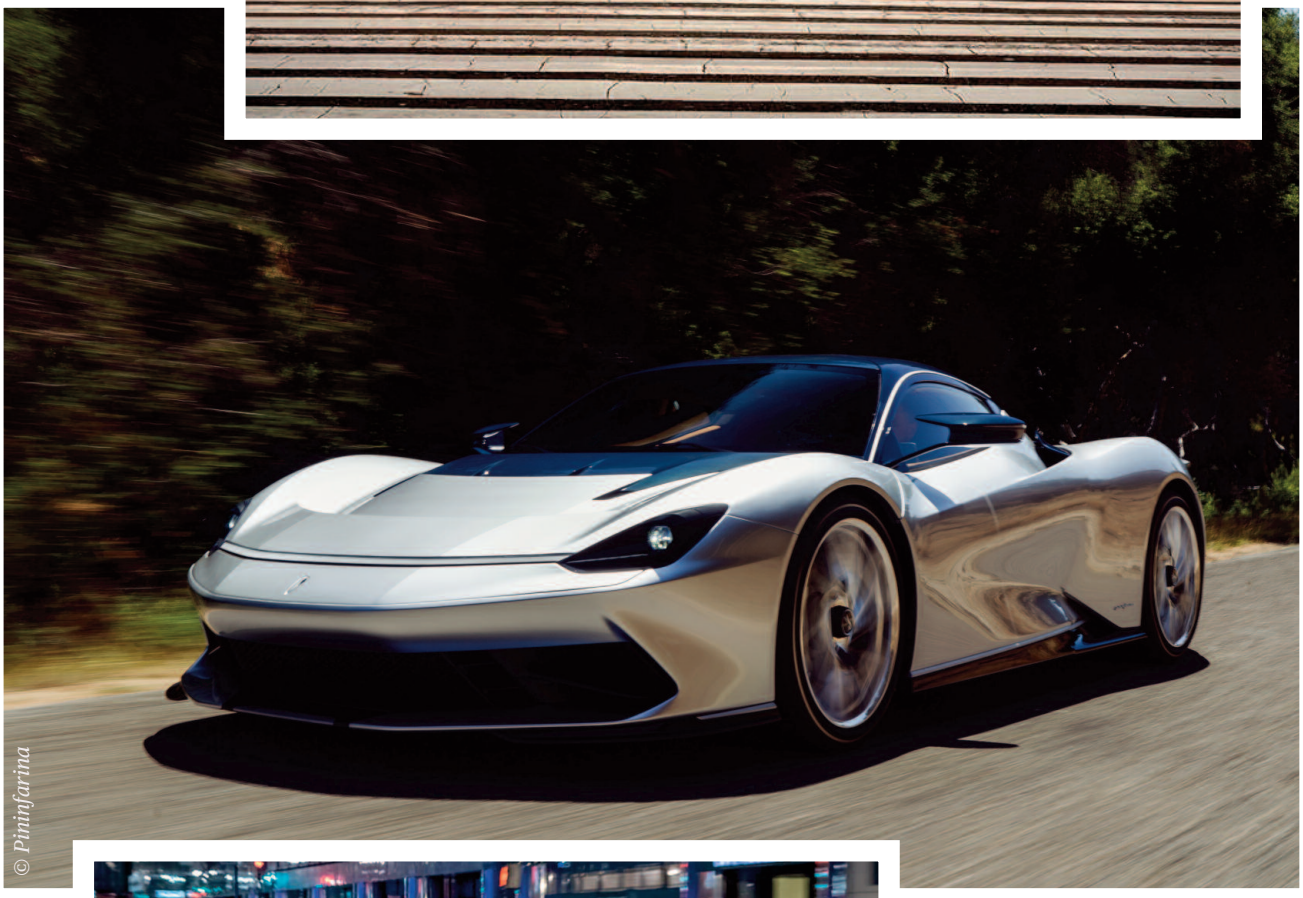
"Then you need to mix up the two sides, and this is where virtual and augmented reality come into play," he noted.

"Artificial intelligence is used here as well, and the aim is to design an experience that will make your clients loyal to your brand. That is going to be the major differentiator. This is where we as designers have to get it right."

The next 90 years

Pininfarina is taking steps in this direction in terms of investments, technology adoption and brand reinvention. "We will be directing our efforts towards keeping up the pace of development and innovation, running faster than we are today, adopting new technologies," promised Angori.

In March 2020, the sister company Automobili Pininfarina, a new luxury brand owned by Mahindra & Mahindra, unveiled the first of its own brand models. This is a limited edition electric hypercar called the Battista, named after Pininfarina's founder. Automobili Pininfarina claims that it marks the most powerful car ever made in Italy, delivering up to 1,900 bhp and 1,696 lb ft of torque. "My grandfather always had the vision that one day there would be a stand-alone range of


© Pininfarina

Pininfarina-branded cars," commented Chairman Paolo Pininfarina. He goes on to suggest that this model effectively links the company's "glorious past with the future of motoring." The production run will be limited to just 150 vehicles and deliveries are scheduled to begin in late 2020.

Automobili Pininfarina's plan is to follow this up with three additional electric SUVs in the years after its launch, and has invested more than €20m in Pininfarina design services to support development of the range. However, Angori concedes that investing heavily in EVs could be a gamble. "There are plenty of unanswered questions around vehicle powertrains. Some people think that internal combustion engines (ICE) might continue, and maybe there is still plenty of life left in diesel. There are discussions going on but this is a big unknown."

Navigating this sort of uncertainty is nothing new for the legendary design house, and it will take more than a pandemic, growing environmental concerns or even an economic downturn to get the better of it. While the 90th anniversary celebrations planned for this year are no longer possible, they have been rescheduled for 2021. And this could prove a year of celebration for more than just Pininfarina, as all of the industry's survivors will have cause to celebrate. "There is going to be a natural selection going on, as the crisis will further weaken those companies that were already struggling," he warned.

> "We are facing the worst global crisis outside of the two world wars. There is nothing comparable to it. But with that said, I still take a positive view of the future

Angori anticipates a return "almost to normal" for the automotive industry in nine to 18 months. Within 24 months, he thinks the market will have returned to the sort of volumes seen last year. "At the moment, we are facing the worst global crisis outside of the two world wars," he added. "There is nothing comparable to it. But with that said, I still take a positive view of the future."

‘Jeep hack’ dismissed on the basis of speculation


© FCA

The infamous Jeep hack has been tossed out of court, setting a precedent for future automotive cyber security lawsuits. Freddie Holmes reports

There has long been a fear that vehicle connectivity could result in a wide-scale cyber attack on a fleet of cars, causing harm to human life and financial damage to the companies involved. The infamous hack on a 2014 Jeep Cherokee, reported by *Wired* in 2015, became a landmark moment for the industry, as researchers showed just how easy that could be.

The automaker involved, Fiat Chrysler Automobiles (FCA), issued a voluntary recall of 1.4 million vehicles in the US—a staggering concession that its Uconnect infotainment system, supplied by Harman International, was at risk of an attack. The story made the news not only in automotive circles, but also mainstream media. In August 2015, owners of the affected vehicles, manufactured between 2013 and 2015, took legal action. That month, Harman’s head of infotainment at the time, Phil Eyler, told *Automotive World* that the hack “underscores the importance of cyber security in the car.”

The four plaintiffs alleged consumer fraud, arguing that they would never have purchased their vehicles had they known there was a security defect. FCA and Harman had appealed against the class-action lawsuit—once in February 2016 and again in January 2018. In January 2019, that motion for dismissal was declined, and the pair became embroiled in the first-ever legal battle related to automotive cyber security.

The case bounced around the legal system for quite a while, with a handful of amendments to the original complaint. Now, nearly five years after the original lawsuit was filed, the case has been dismissed.

A focus on potential risks

The allegations against FCA and Harman rested on the idea that the owners of those vehicles were essentially mis-sold vehicles with defective technology, and which presented a direct threat to their safety as a result. Hackers looking to take remote control of their vehicles could do so because of shortcomings from FCA and Harman, they alleged.

But importantly, the hack was not really a malicious attack—it was a research activity. The researchers involved—Charlie Miller and Chris Valasek—soon

The Uconnect infotainment system was the subject of the researchers' attack

went on to work at Uber's Advanced Technologies Group in Pittsburgh, before joining Cruise Automation. Following the retirement of the judge that had been presiding over the case, it was reassigned to a new judge. The US District Court for the Southern District of Illinois ruled that as there had been no real attack on the system, and no injury to consumers, FCA and Harman were in the clear.

The plaintiffs' case leaned almost entirely on the hack reported by Wired in 2015, and in the latter stages focused on the idea that the owners had overpaid for their cars. The prosecution also made reference to a similar case where a group of parents had successfully sued a toy manufacturer for selling a potentially dangerous product, even though their children had not been harmed. In the case of the defective toys, the court found that the plaintiffs had paid more for the product than they would have, had they known the potential risks. The same thinking was applied to the Jeep hacking case: while the vehicles had not caused the drivers harm, the value of the product had been mis-sold, they argued.

"There are no foolproof products"

A document dated 27 March 2020 and signed by District Judge Staci M. Yandle showed that these arguments carried little weight in court.

The first distinction between the allegations against FCA and Harman and the case with the defective toy, the judge explained, is that "it is unclear whether the Uconnect system is defective at all... One occurrence took place when two highly trained researchers hacked a

vehicle in a controlled setting." She added that "theoretically, any product can be made safer or better–there are no foolproof products."

The allegations were picked apart further, with the court finding that a future risk of hacking was "too speculative" and could not support allegations of possible economic loss to the plaintiffs. "The entire threat [alleged] rests on the speculative premise that a sophisticated third-party cybercriminal may one day successfully hack one of [the] plaintiff's vehicles," reads the court document. "Simply stated, plaintiffs do not have a standing. Plaintiffs have not suffered any injury in fact. They received what they bargained for–vehicles equipped with infotainment services–and do not plausibly allege that they were financially harmed by virtue of their vehicle purchases."

A new precedent

Steve Wernikoff is a litigation partner at Detroit-headquartered law firm Honigman, and previously served as a senior enforcement attorney at the Federal Trade Commission (FTC). He now co-leads the firm's Data Security and Privacy Litigation and Autonomous Vehicle practices, and has followed the case closely.

"It was a little surprising to me that the case went as far as it did," he told *Automotive World*. "To have standing for a case to proceed in US federal court, plaintiffs must demonstrate that they suffered an injury in fact. In this case, there was only a hack conducted in a controlled environment by researchers. A judge initially found that that was enough to demonstrate an injury in fact–particularly, that there was a claim that the architecture of the vehicle was dangerously vulnerable to cyberattacks."

> "The entire threat [alleged] rests on the speculative premise that a sophisticated third-party cybercriminal may one day successfully hack one of [the] plaintiff's vehicles

But the reassignment of a new judge took the case in a different direction, and provides a baseline for the automotive industry to work with on future cyber security cases. "The judge found that the fact that the product had vulnerabilities and could have been made safer did not make it defective when no vehicles had ever manifested the alleged defect. This opinion provides precedent for the position that a future risk of hacking is too speculative to establish standing in court," he explained. "The fact that researchers are able to identify potential vulnerabilities in a vehicle is not likely to land manufacturers in hot water. But the result likely would be different if a vehicle actually is hacked in the wild."

Indeed, this is the real concern for the industry, and the Jeep hack is not the only research-led case to highlight vulnerabilities. A malicious attack is unlikely to lean in the defendants' favour, concluded Wernikoff: "If there was an actual hack, and it tangentially affected the product and resulted in concrete financial harm, there is a higher chance that legal standing would exist."

© Waymo

For Waymo, taking the AV mainstream relies on public acceptance

As it expands into logistics as well as ride-hailing, Waymo firmly believes the future success of AVs will rely on getting the public on board in more ways than one. By Jack Hunsley

The highly technical nature of the future of mobility has left industry incumbents looking over their shoulders. What was once an industry dominated by mechanical competency, is now also a playground for the biggest names in computer technology. In the short term, much of that expertise is being dedicated to the connected car. In the long run, however, the goal is a truly driverless mobility ecosystem.

A moonshot project

One of the most significant players in this space is Waymo. Originally formed in 2009 as Google's Self-Driving Car Project, the technology developer has become one of the leading players in the space. In 2015, it provided "the world's first fully driverless ride on public roads," with then Principle Engineer, Nathaniel Fairfield, demonstrating the technology with a legally blind friend of his in the vehicle. At the time, it was quite the feat, the product of six years of work, according to Fairfield. It also helped usher in a new era at the company: a year later the project was officially renamed 'Waymo'–derived from its motto: "a new way forward in mobility"–and became its own subsidiary within Google's parent company Alphabet.

> "We are still solidly in the testing phase, where we are designing a solution in partnership with the industry, and it's coming in the next several years
>
> *Charlie Jatt, Waymo*

Enabling this future is no mean feat. Although the 2010s saw huge strides in autonomy maturity, it was also littered with significant obstacles. Some came in the form of disputes over regulation, others in the form of high profile crashes. However, the fact that autonomy development continues even amidst the novel coronavirus (COVID-19) pandemic is indicative of the potential on offer for the first company to truly crack the autonomous vehicle (AV).

"When we were founded back in 2009, we were the quintessential

Originally formed in 2009 as Google's Self-Driving Car Project, the technology developer has become one of the leading players in the autonomous vehicle space

moonshot project," a Waymo spokesperson told *Automotive World*. "We were tasked with working on something that most considered impossible. Today, our technology is benefiting riders across Metro Phoenix every day; we have thousands of riders across Waymo One, including our early rider program, using our technology to get around."

To date, the company claims to have solved much of the core technical challenges presented by passenger AVs, although opportunities do still reportedly remain in integrating modern artificial intelligence (AI) and machine learning (ML) methods which could unlock even faster progress. Focus also remains on understanding weather patterns which will allow Waymo to scale into more diverse geographies, and, crucially, increasing public acceptance: "Getting both the general public as well as potential customers educated and on board with this technology will be critical to the continued success of self-driving technology," the company added.

Public acceptance

It is this latter part of the puzzle on which the company maintains significant focus. To date, it has seen both sides of the coin in the court of public

> "One of the main obstacles to consider is public acceptance and overcoming misconceptions about the technology

Waymo has ordered 62,000 minivans from FCA and 20,000 Jaguar I-Pace vehicles, which will be converted into fully driverless vehicles

© Waymo

opinion: although, as reported by *The Information*, 70% of Waymo rides had received a five-star rating as of 2019, following Uber's testing crash in 2018 it did attract unwanted attention. In total, it reported 21 separate incidents where members of the public threatened or attacked its test vehicles in the aftermath of the Uber crash. One particularly concerning scenario, reported by the *New York Times*, was that of a man issued with a police warning for attempting to ram Waymo vehicles off the road multiple times. According to his wife, he "found it entertaining to brake hard" in front of a self-driving vehicle, and, in part at least, she seemed to emphathise with her husband's mission–"They did not ask us to be part of their safety test," she said.

To counter this, Waymo is "engaging with communities to help educate and answer questions." It has also made some educational resources publicly available, such as its Safety Report first published in 2018. In addition, although the end goal is a truly driverless vehicle, safety operators will continue to be used in Waymo vehicles: "For the foreseeable future, as we expand and are driving in some of these new areas, it's critical that we have vehicle operators," said Rocky Garff, Head of Central Operations at Waymo. "They're part of the equation that gets us to fully self-driving."

In early 2020, Waymo announced that its autonomous vehicles had driven 20 million miles on public roads in 25 cities

Waymo Via

Although Waymo has invested heavily in ride-hailing development, in recent months, it has also stepped up its interest in autonomous trucking.

It's a move that's not entirely surprising. As many of the initial industry-set deadlines for mainstream fully driverless vehicle deployments have been and gone with little real success, many in the industry have turned their attention instead to trucking as the first frontier of true real-world AV deployment. After all, it is simply far easier to teach a truck to stick in the outside lane on the motorway than to navigate a dense and chaotic city centre.

Simplicity aside, however, the current environment has significantly increased interest in automated delivery, with, at the height of the COVID-19 pandemic in March 2020, Waymo formally launching Waymo Via. The project, which Waymo Chief Executive, John Krafcik, described as a natural extension of Waymo's AV technology, marked the company's first step into goods delivery. Although a headline turner, Waymo appears eager to be seen as a collaborator, not an outright disruptor in this space.

"The idea is not to disrupt the existing ecosystem of OEMs, Tier 1s, drivers, maintenance partners and the whole trucking industry," Vijaysai Patnaik, Waymo's Trucking Product Lead told *FreightWaves*. "It's about how we can partner with them. Because at its core, Waymo is a technology company. Our focus is on building the Waymo Driver, the self-driving technology that can enable safe and efficient movement of goods. And so, we want to work with folks who are already best at what they do and bring this technology to market."

"We are still solidly in the testing phase, where we are designing a solution in partnership with the industry, and it's coming in the next several years," noted Charlie Jatt, Trucking Commercial Lead, in a Waymo blog post. "You'll see certain use cases, certain types of fleets, certain geographies, and certain routes deployed much sooner. It's not going to be an overnight transition."

Indeed, although the belief is that Waymo's trucking programme can benefit from its passenger development, the two sectors do throw up different autonomy problems. For the most part, this complexity comes from the different practical challenges of operating a truck, such as the need for increased response time in trucks travelling at high speeds, and the impracticality of performing certain road manoeuvres with a large vehicle. However, Waymo's trucks use the same suite of custom-built sensors, albeit configured differently, and also benefit from the same advanced self-driving software as its passenger cars and the millions of real-world, and billions of simulated, miles covered.

> Delivery is also an important opportunity, something we're testing now with partners like AutoNation and UPS

The future

As for Waymo's broader AV goals, the next decade promises much. With ride-hailing remaining the company's primary focus, Waymo Via will also add goods delivery to the company's repertoire: "Delivery is also an important opportunity, something we're testing now with partners like AutoNation, to deliver car parts rapidly to their dealerships, and UPS, where we're transporting parcels from their stores across Metro Phoenix to their Tempe hub," Waymo told *Automotive World*. "We've also previously had a partnership with Walmart for grocery deliveries to consumers."

Some focus will also be dedicated to collaboration and cooperation. On one hand, that involves sharing the Waymo Drive, with Waymo's OEM partners noting interest in sharing the platform with their customers. A continued commitment to increasing public acceptance of technology will also be crucial.

"One of the main obstacles to consider is public acceptance and overcoming misconceptions about the technology. Next on the agenda is getting more people exposed to the technology through education," the company added. "This year and into the future, we're excited to further expand Waymo One, bringing it to more riders and responsibly ramping up our fully driverless operations. In addition, we're focused on deploying our driver in trucking and continuing our local delivery efforts."

Interview: Isaac Sloan, Chief Information Officer, Nikola Motor Company

It might make headlines with hydrogen, but Nikola Motor is also eager to master truck connectivity. By Jack Hunsley

Electrification is already reshaping many urban commercial applications. The short, regular routes most urban trucks, buses and vans follow make it easy to account for energy usage. However, on longer distances, the long-term expectation is that hydrogen will rule the roost.

This is a theory which has allowed Nikola Motor to grow into one of the industry's most valuable start-ups. In September, the truck maker's valuation shot up to US$3bn following investment from CNH Industrial. It has since outlined a detailed roadmap, alongside its new partners Iveco and FTP, which could see hydrogen trucks out on roads by as early as 2023. However, while its vision of a fuel cell future might be what grabs the headlines, Nikola is also pushing connectivity boundaries in the cabin.

To learn more about how the truck maker is approaching the world of truck connectivity, *Automotive World* sat down with its Chief Information Officer, Isaac Sloan.

How important is connectivity for the modern-day truck maker?

Communication is everything. Now we have the technology for vehicles to communicate, both with the infrastructure and their surroundings. In essence, that allows vehicles to function longer and function better, and provide a safer experience for their drivers.

© Nikola Motors

> Communication is everything. Now we have the technology for vehicles to communicate, both with the infrastructure and their surroundings
>
> *Isaac Sloan, Nikola*

What are the key questions that remain unanswered in this space?

There are plenty of gaps right now. Many limitations surround how much data we can store and how much data we can transfer. Once those bottlenecks are resolved, there are plenty of possibilities, such as real-time 3D mapping of environments through sensor fusion, which could allow for much more accurate navigation, avoiding dangerous situations or allowing emergency personnel to respond to an accident almost immediately.

Another thing that's going to come up there is concern over privacy and data ownership. You hear so much today that data is money. People are reluctant to sacrifice their privacy for some functionality which is undeniably useful, but some people would rather not have someone always knowing what they're doing. That's definitely going to come up as time goes on.

How difficult has it been to communicate that trust to your customers?

It's important to make it clear what the data is being used for and why the data is being collected. From a truck perspective, it should be less about capturing user patterns and more about creating better vehicles based upon how the vehicles perform in specific scenarios.

Much of that comes just from an honest conversation. In any human to human conversation, it's generally understood what the point of that conversation is. Being clear about what it is that is being communicated and what that data's being used for is extremely valuable.

The cockpit of the Nikola One

How can truck data be put to use?

From a software technology perspective, we want the data as it allows us to push the limits for new functionality within our vehicles and try things that have never been tried before. If we can get real-time data back on those trials, it can allow us to figure out if something's going to fail and push out a fix for it before it does fail. If it's a physical part that needs to be replaced, it can get somebody into a service station before they end up stuck on the road or perhaps even involved in a dangerous accident.

The other side of connectivity involves us pushing data to the vehicle. That could be anything from communicating to the driver that they need to pull over for some reason, or sending a message in conjunction with fleet management systems. Messages could be sent directly to the screen to say: 'you need to go pick up this message'. Or, in terms of tracking driver patterns and whether or not they're in dangerous conditions or there's wheel slippage on the road, we could send a message to advise them to slow down or warn of hazardous conditions up ahead.

Bosch, one of Nikola's technology partners, supplies the Vehicle Control Unit (VCU), which connects Nikola trucks via a secure operating system that enables real-time, over-the-air updates and monitoring. Pictured: Nikola Two cockpit

All Nikola trucks will be fully connected, with the driver experience centred around a 17" touchscreen. Pictured: Nikola Tre cockpit

Those concepts are very valuable, and make the slight loss of privacy worthwhile, as long as that's communicated very clearly.

How much of your in-truck infotainment experience will remain Nikola-based? Are you open to letting third parties put their software and applications on top of your infotainment systems?

For security reasons, I would like to keep that as close to 100% Nikola-created or approved. If you go back ten, 15 years you saw that battle between iOS, Android and BlackBerry, where BlackBerry was convinced that users cared more about privacy and security than they did about functionality. It turns out they were wrong about that, but, in the case of a vehicle, where you're not just talking about the life of the person driving or the value of the load or the vehicle, but also the property and life all around them, I do not think we can be as cavalier. We cannot just say: 'the user doesn't care much about security? Great, let them use whatever app they want.'

There will be cases, specifically with large fleets, where we will say 'we need to run this application'. We'll run the communication

through a VPN and proxy it for them and we'll put that in a sandbox where it cannot touch any of the rest of the vehicle. That is a very real possibility, but it's not going to be as straightforward as just releasing an app to the App Store.

electric vehicles, with analysis and simulation we can predict reliability pretty well. But nothing is a substitute for real-world data.

I would almost say that connectivity is more important here because it allows us to

systems functioning in the next year and a half, and some of them already are. But much of this progress will depend upon how we communicate by then. What are the communication protocols, will it be 5G, satellite or something beyond that?

> "There are plenty of possibilities, such as real-time 3D mapping of environments through sensor fusion, which could allow for much more accurate navigation

Where does connectivity tie into low emission technology?

The differentiation there with conventional vehicles is that you're generally using legacy components, either purchased from a Tier 1 or directly created by the OEM, that have decades or more of testing behind them. Many vehicles and multiple brands are using those parts so plenty of research has already been done on those components. But, when you're at the beginning of a new technology, it's not necessarily very reliable.

When we're at the beginning of a new field like this, talking about not just green energy but hydrogen or massive battery

quickly learn from the vehicles that we do have on the road as we're producing them, and quickly make modifications so that the ones being produced even a month or two later are better.

What do you believe to be the future of truck connectivity, and what role will Nikola play here in the coming years?

I would like to have full real-time diagnostics available completely remotely, including information from sensor fusion. This could be invaluable for so many reasons, from navigation to safety and emergency response, just to name a few. I honestly hope to have many of these

As that increases and as our storage medium increases, whether that's better SSDs or whatever else lies beyond that, the amount of data that we would like to collect, analyse and utilise through machine learning is huge.

One could imagine a time where you have such low latency, over 5G or satellite, for example, that somebody could fully remotely control a vehicle in the case that a driver that is unable to respond, for instance if they fall asleep or have a stroke. That plays into autonomy and ADAS as well, but currently, much of that is impossible just because latency is too high and connectivity is unpredictable.

German court ruling keeps Volkswagen Dieselgate going strong

Five years on and Volkswagen Group's Dieselgate scandal still refuses to go away. By Megan Lampinen

A recent ruling by Germany's highest civil court offers clarity into key aspects of compensation for customers impacted by the Dieselgate scandal. At the same time, it sets a benchmark for thousands of other cases in the country.

With an estimated 11 million vehicles impacted, the financial hit from this saga on Volkswagen Group has already been hefty. Since the scandal broke in 2015, fines, customer compensation and buyback schemes have amounted to more than €30bn (US$33bn) globally. In its home market of Germany, VW had previously settled an €830m class action lawsuit covering around 235,000 owners of vehicles with defeat devices installed. Payouts in this settlement varied depending on the specific vehicle model and its age, but generally hovered between €1,350 and €6,250. That was not good enough for one disgruntled customer.

The Gilbert case

Herbert Gilbert refused to settle. He purchased a VW Sharan second-hand in 2014. This vehicle, like many thousands of others, contained an EA 189 diesel engine with software that manipulated emissions performance during testing.

"Volkswagen generally settles by calling owners and offering them some money but our client refused," explained Claus Goldenstein, lawyer and partner at the law firm Goldstein & Partner representing Gilbert. "He's a real German who insisted on getting his rights."

What Gilbert wanted was a full refund and for VW to take back the vehicle. The case went all the way to the Federal Court of Justice, the Bundesgerichtshof (BGH). In a decision announced on 25 May, the court agreed to a partial reimbursement, deducting some of the original purchase price for the mileage put on the vehicle. In total, Gilbert was granted €28,257.74 in compensation–decidedly more than owners that settled under the class action lawsuit.

Plenty of other customers will want their money back as well. Volkswagen has now promised to make "appropriate offers" to other owners affected. "The ruling means legal certainty for millions of consumers in Germany and shows once again that even a large corporation is not above the law," said Goldenstein.

Notably, this is the highest court of Germany, which makes decisions for all the country and sets a precedent for about 60,000 other regional cases. "Before this high court ruling there had been numerous judgements and processes taking place all over Germany," observed Christian Brade, Project Manager Dieselgate at Goldenstein & Partner. "Interestingly, one court in Germany–the executive court in Braunschweig, Volkswagen's home seat–never once ruled against it."

With the BGH, presiding judge Stephan Seiters was clear in his condemnation of the automaker's actions, describing them as "unethical". As Brade emphasised: "The legal basis for the ruling was quite clear. It was obvious VW defrauded those people and the federal court of Germany wasn't able to deny it."

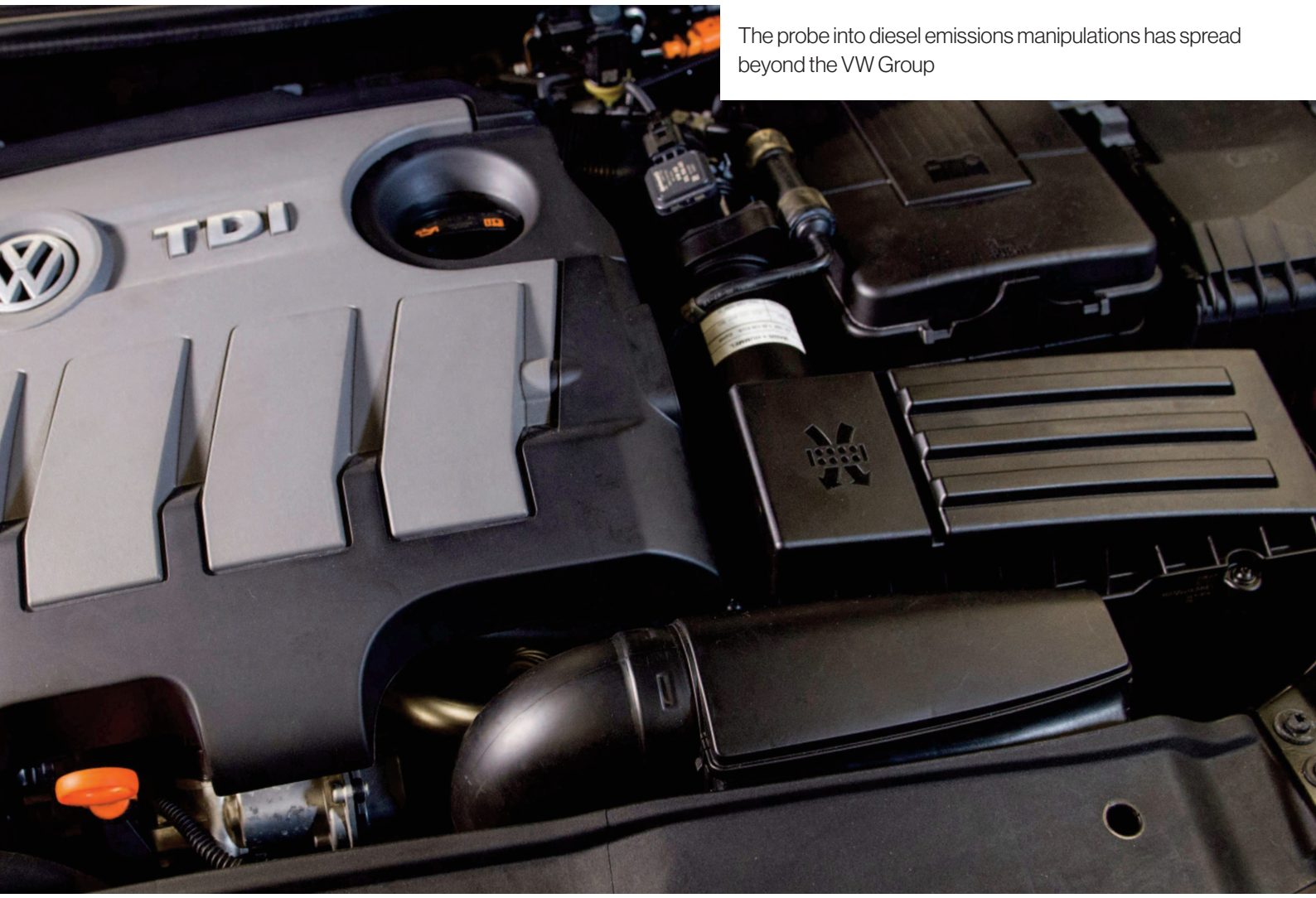
This ruling could also set a precedent for litigation against other manufacturers accused of using similar emissions manipulation technology. "In principle, this also applies to other brands like Daimler and BMW," clarified Goldenstein. "We are already fighting around 650 cases against Daimler. That company's strategy is a little different from Volkswagen, as they fight more," he added. Goldenstein currently represents 21,000 other Dieselgate claimants.

> "The federal German court has made it clear that customers with a defeat device in their vehicle have the right to receive damages. Now the European level will qualify what constitutes a defeat device

Broader legal challenges

Meanwhile, developments at the European level could pave the way for an onslaught of additional litigation. The Court of Justice of the European Union has been asked to rule on what constitutes a defeat device, specifically whether it should include any device that influences both upstream and downstream emissions during testing. While VW is pushing for a more restrictive interpretation, Advocate General Eleanor Sharpston is urging a broader definition.

"The federal German court has made it clear that customers with a defeat device in their vehicle have the right to receive damages," said Brade. "Now the European level will qualify what constitutes a defeat device. If the European Court agrees with Sharpston, then we will have a really big case." The European court is expected to announce a decision within the next two months.



The probe into diesel emissions manipulations has spread beyond the VW Group

While Europe has been hit hard by the novel coronavirus, the current restrictions on personal movement should not impact proceedings. Goldenstein noted that the pandemic in no way delayed developments in Germany. "This case has a real political and economic impact on Germany, and you get the feeling they know how important it is," he said. The hearing date was set in December 2019 and went ahead as scheduled on 5 May, with the verdict announced on 25 May as expected. The European case should proceed similarly smoothly.

VW's transformation

Since the scandal broke five years ago, Volkswagen Group has worked hard to reposition itself as a trustworthy, transparent company. Speaking at the annual media conference in April this year, Chief Executive Herbert Diess emphasised the progress it has made on the "process of transformation." That involves a major focus on electrification.

Keen to emerge from the shadow of Dieselgate, Volkswagen Group has pledged to electrify its entire model line-up by 2030. This multi-brand group shifts 10 million vehicles a year across almost all segments, and the industry impact could be significant. So too the financial investment: over the next few years, VW plans to invest €33bn in its electrification strategy, with €11bn for the Volkswagen brand alone.

The question now is whether the potential expense around consumer compensation eats into these investment plans. The lawyers believe these claims could be substantial. As Goldenstein warned: "This diesel scandal is far from over. In fact, it's just the beginning."

Intel doubles down on robotaxi bet

Megan Lampinen takes a closer look at the implications of Intel's acquisition of Moovit


© Intel

Intel's aspirations on the autonomous mobility front are clear, and the chip giant has steadily been building up expertise across various aspects of the ecosystem. A significant move came in 2017 with the acquisition of Israel-based Mobileye, which provides a complete autonomous vehicle (AV) solution stack. This includes everything from front-facing cameras for advanced driver assistance systems (ADAS) to the self-driving system (SDS) behind autonomous shuttles and robotaxis.

Now the company has invested in Moovit, another Israeli start-up and one of the pioneers in the Mobility as a Service (MaaS) space. Intel has announced a full acquisition of the company, which will join the Mobileye business while retaining its own brand and current partnerships.

The rationale

Moovit may have started as a small technology player, but it has grown into one of the largest urban mobility applications in the world. It specialises in multimodal trip planning, bringing together a wide range of public transport, micromobility and shared mobility options which can be tailored to individual journeys. The app relies heavily on artificial intelligence and Big Data analytics and has access to a transit data repository of more than 7,500 transport agencies and operators.

A massive global user base of 800 million people across 102 countries is another major draw. none of this comes cheap: Intel paid US$900m to bring such expertise into its fold, but believes the prospects are worth it. Intel's long-term aim is to serve new data-rich market opportunities. With Mobileye, it is pushing hard on the automated vehicle front, and the potential opportunity around robotaxis alone is estimated at US$160bn by 2030. "With today's acquisition of Moovit, we have added another critical piece to our mobility stack and accelerated our way towards becoming a complete mobility provider," asserted Mobileye Chief Executive Amnon Shashua.

> "With today's acquisition of Moovit, we have added another critical piece to our mobility stack and accelerated our way towards becoming a complete mobility provider

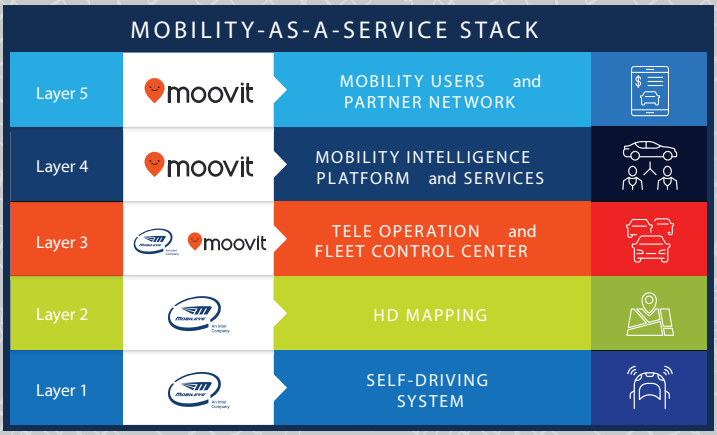
This is no easy feat. The company aims to offer capabilities all the way from the intelligent driving system in an AV to the customer-facing technology of a ride-hailing app.

THE FUTURE OF MOBILITY:
INTEL ACQUIRES MOOVIT

Mobileye An Intel Company | moovit

" Moovit is a strong brand trusted by hundreds of millions of people globally. Together with Mobileye's extensive capabilities in mapping and self-driving technology, we will be able to accelerate our timeline to transform the future of mobility."

– Professor Amnon Shashua, CEO of Mobileye



Mobileye An Intel Company

~60 M EyeQ Chips Shipped

300 Car Models

25 Car Makers

$879 M 2019 Revenue

+

moovit

800M Users

100+ Countries

Data from

7,500 Transit Agencies and Operators

3,100 Cities

= $230 B TAM

FOR ADAS, DATA AND MAAS

© Moovit

Moovit's Mobility as a Service (MaaS) solutions make it simple for cities, transit agencies, campuses, and corporations to introduce MaaS using a range of tools

Some of these aspects it already has, and some of them it does not.

"Number one is the self-driving vehicles themselves, and for this we have supply partnerships in place with Volkswagen and Chinese automaker Nio," Shashua told *Automotive World*. Teleoperation is the next key area of competence, as Mobileye believes it will be essential to remotely observe an AV and offer guidance in certain cases. "We are very active here, working with start-ups," he said. However, it has no real capabilities in-house at the moment. Does that suggest potential M&A down the road? "We may or may not need inorganic growth for teleoperations," was all Shashua would say.

The next layer in the complete mobility stack is mobility intelligence, and this is where Moovit comes in. It also ticks the boxes for requirements around customer-facing and fleet optimisation technology. "In total, there are about nine layers in the stack and through inorganic growth, like we did with Moovit, we believe we have all that we need to meet a robotaxi service launch in 2022," Shashua confirmed.

2020 launch date

Mobileye is targeting a 2022 launch date for a completely driverless taxi service. The first one, in collaboration with Volkswagen, is focussed on Tel-Aviv. Others are pegged for South Korea, China and France–all with a 2022 start date. To meet this deadline, it needed to act on the Moovit deal now. "In terms of timeline, it came down to the maturing of our self-driving stack and our growing confidence," he said. "We give ourselves a year

and a half to integrate Moovit. If we waited any longer, it would jeopardise our readiness for 2022."

Mobileye's initial robotaxi service is designed as a Level 4 operation in geofenced areas within certain cities. By the end of the decade, this will ramp up to "hundreds of cities". At some point, Moovit will begin offering the Mobileye robotaxis on its journey planner. Taxis are just the beginning of the driverless journey, though. They make a good starting point, as fleets are easier to regulate than private vehicles and they can absorb the higher cost of the technology more easily than a private car. Their role, said Shashua, is to serve as a bridge to consumer AVs. "We imagine one day you can buy your own AV and then sit in the back and have it take you wherever you want. That is part of our roadmap vision, too," he added.

Post-pandemic mobility

Moovit has its own vision for future mobility as well. The new ownership model will not impact current consumer applications and user

© Intel

experience, which will continue under its own brand. But the company has been busy exploring new ways in which individuals might wish to consume transport in the future.

Today, people are focussed on the time, cost and convenience of a trip. Optimising that for various options, such as incorporating the most scenic route or a route that allows for some period of exercise, will be commonplace. The current app allows for some basic preferences to be set towards more or less exercise; it also considers whether or not a certain route is hilly, and hence more difficult to incorporate bike-share, and such features will only increase moving forward. “We are taking care of the bread and butter side of things first, and that’s helping users understand the best way to get from A to B,” explained Nir Erez, Co-Founder and Chief Executive of Moovit.

However, these visions could face significant obstacles in the wake of the pandemic. Some industry watchers are warning that contagion concerns and social distancing practices could result in long-term changes in consumer behaviour and mobility preferences. Specifically, it could push people into ‘private’ mobility solutions like personally owned cars, bikes, scooters and foot travel. “We are likely to see a strong increase in private (motorised) mobility and a slow recovery of public transit,” predicts Markus Hagenmaier, Associate Director at Boston Consulting Group (BCG). He warns that mobility providers will “have to work hard to regain trust and win back even the most deterred users.”

What does this mean for Mobileye and Moovit’s roadmap? “With taxis, the driver is the source of concern but there is no driver in a robotaxi,” pointed out Shashua. “That should make it a better COVID-19 value proposition.” While the service launches in 2022, that is only the start. Demand is not expected to peak for many years after that, and Mobileye sees no reason to slow down plans. In fact, it’s doubling down.

Other players in this field have been forced to halt road testing of AVs and Ford has confirmed it is delaying plans for its own AV service due to the impact of the pandemic. “In this respect, COVID-19 is immaterial,” asserted Shashua. “In times of crisis, you either pull back or you lean in. This is us leaning in.” As he went on to explain, two fundamental trends will not change: people still need to move about and AVs represent the safest, most effective means of transport. “These are unstoppable trends... I would not over-stress the value of COVID-19 in the long term.”

> “With taxis, the driver is the source of concern but there is no driver in a robotaxi. That should make it a better COVID-19 value proposition

Trucking already on the fast-track to electrification, says Einride

Swedish start-up Einride believes that an electric trucking future will come sooner than most think. Jack Hunsley speaks to Chief Executive Robert Falck

The long-term future of trucking may rest on cleaner powertrain technology, but building this future is no simple process. In the short-term, the expectation is that this sector, perhaps more than any other, will continue to leverage the internal combustion engine (ICE).

"It can definitely be said that at some point there will be no role for the combustion engine, but if that day is 50 or 100 years in the future it is difficult to say," Lars Mårtensson, Environment and Innovation Director at Volvo Trucks told *Automotive World* in January 2020. "It will take time before we have other alternatives to combustion engines in all segments."

The hang-up for trucking and heavy duty, in particular, is power density. With the challenges surrounding infrastructure installation and regulation put to one side, it is not economically effective to use greener technology to run most current heavy trucks. As such, work is ongoing to turn the tide away from the ICE.

Swapping diesel for electric

A recent example comes from Sweden, where retailer Lidl has partnered with electric, autonomous truck developer Einride with the ambition to eventually electrify and automate deliveries to Lidl locations in the country. Having joined forces in 2017, the duo has pencilled in October 2020 as the start date for electric deliveries.

"We have been engaging in tests focused on the [Einride Pod] with Lidl since the beginning of the partnership. Now, we are both taking the first step to electrify Lidl's transport network and bring it entirely online through the Freight Mobility Platform, allowing us to optimise for both current and future shipping needs," Einride Chief Executive, Robert Falck, told *Automotive World*. "The ultimate goal is to replace diesel vehicles with electric, as well as pave the way for automation of certain parts of the route."

The immediate focus will be on electrifying transport between Lidl's central warehouse and stores in the area, which will begin in October. However, there are also plans to scale quickly: "At Lidl, we intend to be the industry leader for sustainable and completely fossil-free transport by 2025. To enable this, we will now begin the transition to fully electric transport together with Einride," said Carl Seder, Logistics Manager of Lidl Sweden. By this point, the hope is that "a significant proportion of all Lidl transport will take place with Einride electric vehicles (EVs)," as well as many shipments being completed with driverless vehicles.

> "By electrifying road freight networks entirely, we have the potential to reduce emissions by 90% compared to current levels in this industry
>
> *Robert Falck, Enride*

Einride Pod with teleoperator

> At Lidl, we intend to be the industry leader for sustainable and completely fossil-free transport by 2025. To enable this, we will now begin the transition to fully electric transport together with Einride
>
> *Carl Seder, Lidl Sweden*

"We will be providing an initial number of e-trucks to begin operations at Lidl facilities around Stockholm, which will use existing and new charging infrastructure," added Falck. "We will also optimise these vehicles, as well as those that are already tracked by our platform, to generate data so that the system can optimise Lidl's transport for further electrification."

Data-driven sustainability

Although the end goal is an eco-friendly approach to freight, enabling this future at Lidl will not solely rely on electric powertrain technology. Einride envisages the use of its Freight Mobility Platform playing a key role; the company describes the platform as "an intelligent transport planning and execution engine." More specifically, the platform is built to handle transport procedures with all types of vehicles–although with a focus on EVs–with or without a driver. That involves automatically optimising routes and schedules, providing detailed plans for how to introduce electric transport to a fleet, and also serving as a digital interface to interact and communicate with Einride's driverless vehicles.

> The ultimate goal is to replace diesel vehicles with electric, as well as pave the way for automation of certain parts of the route
>
> *Robert Falck, Enride*

© Enride

"The transport solutions of the future are no longer simply pipe dreams. The technology exists today, and forward-thinking companies like Einride and Lidl will lead the implementation," said Jonas Hernlund, Chief Commercial Officer at Einride. "We are proud to work with Lidl in their goal towards 2025 and together we must not only minimise their environmental impact but also reduce their transport costs substantially."

"By electrifying road freight networks entirely, we have the potential to reduce emissions by 90% compared to current levels in this industry," added Falck. "Considering that road freight accounts for over 7% of global emissions, this is a crucial action that needs to be taken to halt and ultimately reverse the effects of climate change."

Whether the pair can stick to schedule remains to be seen. In recent months, the heavy duty sector has seen some ambitious targets rolled out, none perhaps more so than Nikola's plan to have hydrogen trucks operational in Europe by 2023. However, even amidst uncertain economic times, there appears to be growing optimism that a greener trucking future might be closer than some think.

"If anything, [the novel coronavirus] makes the case for switching to Autonomous Electric Transport (AET) as soon as possible stronger than ever," said Falck. "We expect the electric freight segment to take off in the very near future, but traditional manufacturers have been slow to act in this area, relying on the favourable profit margins of developing and producing diesel vehicles. Einride is proud to be a first-mover in this space together with Lidl, and we expect more routes to be electrified entirely soon."

Toyota braces for 80% drop in profit

The novel coronavirus pandemic is set to hit the automaker where it hurts, but it is not the first crisis Toyota has weathered. By Freddie Holmes

The world's largest automaker has warned that its operating income could plummet by 79.5% over the next fiscal year (FY), which ends in March 2021. It also forecasts a decrease in vehicle sales to 1.95 million units, which would mark a year-over-year decrease of more than 20%. This, said company President Akio Toyoda, would be a worse performance than during the global financial crisis of 2008.

> "The company is rather stable, [and] not panicking at all
>
> *Akio Toyoda, Toyota*

Even with such a downward forecast in place, Toyoda suggested that the company will still need to closely manage its liquidity this year to meet that target. "If we are somehow able to achieve this level of earnings, I believe that it would be the result of our having been able to strengthen our corporate composition," he explained in a call to analysts on 12 May. At one stage it was unclear whether this forecast would even be released, he noted, but the decision was made to be "honest" and to "show what we can".

Toyota's FY 2020 results, released on 12 May, appear to show resilience during the pandemic so far, with net revenue only down by 1%. Vehicle sales in Japan and Europe grew slightly, while North American sales fell by 32,000 units. Sales in Asia as a whole fell by nearly 80,000 units– Toyota's worst affected market during FY 2020.

Toyoda emphasised that, under his leadership, the company has weathered various crises and will continue to do so. In the year that followed the start of the global financial crisis, for example, Toyota's vehicle sales fell by 1.35 million units. A series of negative earnings forecasts made between 2008 and

2009 were coined the 'Toyota Shock' by Japanese media at the time. In 2009, Toyoda had warned that the company was in such poor shape that it was on the brink of 'irrelevance.' But ten years on from the financial crisis, he reflected that there has always been some form of challenge to overcome: "No years [since] have been peaceful... Year-on-year we have witnessed and experienced a large, drastic change."

Toyoda has long been accustomed to spending much of his week travelling, both within Japan and to Toyota's many global facilities. A preference for face-to-face meetings has always eaten into the company's productivity, and employees have been burdened with administrative duties. Those meetings would also make use of 'old data,' as Toyoda puts it.

> "Confidence in the forecast will be much lower than usual–note that Toyota has only offered a forecast of operating profit, saying conditions are too uncertain to offer forecasts for pre-tax and net profit figures

Documents would be prepared for briefings a week or two in advance, he explained, and often with an unnecessarily long chain of command. Video conferencing has meant that discussions now happen as and when they are needed, with the latest information to hand. Since lockdown rules have been enforced, Toyoda advised that his work schedule has changed dramatically, spending 30% less time in meetings and preparing 50% less in the way of paper documents. Since moving out

of the main office, his personal travel has also fallen by 80%, by his estimates.

Toyota reborn

Like other industry executives, Toyoda pointed to a post-COVID-19 era–"we will move more rapidly toward a society that has less physical contact"–and suggested that the automaker itself will be "reborn into a new Toyota". While partnerships will be vital in order to get through the crisis, he suggested that Toyota aims to be the 'leader' of economic recovery. "The company is rather stable, [and] not panicking at all," he added. "Several years ago, I declared that we will be changing Toyota from an automobile company into a mobility company. This change we are aiming for is becoming closer to a reality."

It is also worth noting that while the forecasted profit plummet looks severe, the company still expects to make some money at least. As Jonathan Storey, Director of industry consultancy Automotive Reports, told *Automotive World*: "Any forecast which sees earnings in the black is encouraging, but brave. Confidence in the forecast will be much lower than usual–note that Toyota has only offered a forecast of operating profit, saying conditions are too uncertain to offer forecasts for pre-tax and net profit figures."

Following the company's earnings results, analysts from equity research firm Jeffries wrote that Toyota "stands out with its stability in crisis management," and that its "fundamental mobility strategy stays intact, despite some headwind from COVID-19."

Could the UK lead the hydrogen fuel cell bus charge?

Wrightbus owner Jo Bamford speaks to Megan Lampinen about his vision for zero emission transport

The UK could easily position itself as a global powerhouse for hydrogen buses, if only the government would offer some early-phase financial support. That, at least, is the message from Jo Bamford, who leads hydrogen production company Ryse Hydrogen and recently acquired UK bus manufacturer Wrightbus. Bamford claims his companies are ready and able to provide both the vehicles and the hydrogen for them to run on. His aim is to bring 3,000 hydrogen buses–10% of the total fleet–to UK roads by 2024.

A good fit for hydrogen

Hydrogen fuel cell buses are not exactly new to the UK. They have been operating in London since 2003. The Scottish city of Aberdeen wrapped up a five-year pilot project in January 2020, which saw a fleet of hydrogen fuel cell buses operated by First Aberdeen and Stagecoach. The project was deemed "phenomenally successful" by Aberdeen City Council's hydrogen spokesman Philip Bell. On the whole, though, volumes are minimal, something which needs to change if any significant benefits are to be realised.

When it comes to zero-emission propulsion solutions, there are two choices: battery or hydrogen fuel cell. Batteries work well in certain applications, including city centre buses, but they are not so well-suited to longer routes such as those bringing in commuters from the suburbs or travelling between major cities. Not only do the batteries represent a substantial weight, but current technologies also feature expensive and rare materials like cobalt, which pose their own challenges around ethical sourcing. Hydrogen offers an alternative, with the same zero-emission and silent operational benefits, but without the associated obstacles around battery weight and materials.

"As you go bigger and heavier, battery propulsion becomes less attractive," says Bamford. "At the moment there are just under 40,000 buses running around the UK. About 20% of those buses cannot be powered by batteries. That could be a clear market for hydrogen."

The key to this transition will be cost and operational performance. "The world will only switch to a zero-emission solution if it costs the same and operates the same as the incumbent," he tells *Automotive World*. As far as operations are concerned, Bamford insists his hydrogen buses are on par with diesel. With a filling time of just seven minutes, there is a clear advantage over battery charging requirements. However, there is the issue of hydrogen infrastructure. "The only way you get hydrogen going in transport is to build the fuelling and production infrastructure. You have to make hydrogen." Ryse does just that; the company operates hydrogen

> At the moment there are just under 40,000 buses running around the UK. About 20% of those buses cannot be powered by batteries. That could be a clear market for hydrogen
>
> *Jo Bamford , Ryse Hydrogen*

distribution and dispensing assets as well as renewable-powered electrolysers. Its focus today is squarely on providing hydrogen fuel for buses.

The buses themselves will come from Wrightbus, which has plenty of capacity to turn out the envisioned 3,000 units from its factory in Ballymena, Northern Ireland. The combination of fuel and buses looks like a winning one, providing there is government support–and Bamford is asking for £500m (US$540m).

Government support and interest

"You need some government support to get the cost down to a point where this can fly," emphasises Bamford. "The only way to get it to cost the same is to have sufficient volume, and you need some way to pay for that."

He suggests £300m of government funding goes towards subsidising fleet purchases of hydrogen buses, covering the cost difference from diesel. The industry generally replaces 10% of the fleet every year. Another £200m would go towards the hydrogen infrastructure. The total £500m requested represents 10% of the UK's National Bus Strategy fund and would be spread over five years.

The potential benefits to the economy and the environment are considerable. Bamford estimates that this funding would allow it to set up five new zero-emission hydrogen production plants, which would all be deployed in disadvantaged coastal parts of the UK. It would also establish 30 new hydrogen refuelling stations that will deliver hydrogen to bus depots at a cost below the price of diesel. At the same time, switching these 3,000 buses from diesel to hydrogen would save an estimated 238,000 tons of carbon dioxide a year. Another issue is job creation, with a projected 1,000 new jobs to be added at Wrightbus and 150 at Ryse Hydrogen and other supply chain partners.

The UK government, however, has yet to agree to any of this. "The business department thinks hydrogen is the future. The transport department seem to be wedded to batteries as the only solution," Bamford comments. "Maybe it's because they haven't seen enough of the hydrogen vehicles running around."

Europe in general is making big strides in this area. The H2Bus Consortium, whose members

Bamford is calling for £300m in government funding to subsidise fleet purchases of hydrogen buses

include Wrightbus, Ryse, Everfuel, Ballard Power Systems, Hexagon Composites and Nel Hydrogen are committed to deploying 1,000 hydrogen fuel cell electric buses, along with supporting infrastructure, in European cities at competitive prices. The first phase of the project is supported by €40m from the EU's Connecting Europe Facility (CEF) and will enable the deployment of 200 hydrogen fuel cell electric buses and supporting infrastructure in Denmark, Latvia and the UK by 2023.

"The consortium gave me the idea for 3,000 buses in the UK," he notes. "The European government thinks hydrogen is the future and gives some funding on all the different parts of the process to get it going." Wrightbus has already received orders for 60 buses across three key UK cities: 20 each in Aberdeen, London, and Birmingham. "These orders are government supported," he confirms. "While I think it's possible for a hydrogen bus fleet to succeed without government support in the long run, you need to get the volumes first."

Just the start

Buses are just the starting point for Bamford's long-term hydrogen vision: "This is how you manage to get the hydrogen infrastructure going. Buses are the best way to start, and if you can do it for them, then you can also do it with trucks and ferries."

The heavy truck segment has seen growing interest in hydrogen fuel cells. Daimler Trucks and Volvo Group recently joined forces on this front and are pooling resources to develop their own fuel cell technology. Nikola Motors has a decided head start, though, and plans to launch its first heavy truck powered by hydrogen fuel cells by 2023.

Bamford is determined that buses will pave the way for later applications–but is public transport really the best focal point just now in light of the novel coronavirus? After all, the pandemic has left many commuters hesitant to travel on any form of shared mobility, including buses, for fear of contracting the virus. Bamford concedes that this could prove a stumbling block, but at the same time points to a strong tailwind from the health crisis. "Just look at the press coverage around the improvement in air quality," he points out. "In some cities, like Delhi, it has been pretty amazing. Wouldn't it be cool if we could harness this crisis to make some positivity about the world, like going zero-emission. Green is positive, and that's really what we need right now."

Auto industry urged to take proactive stance on climate change

Manufacturers are expanding their sustainability strategies, but Capgemini believes the focus is currently too narrow. By Freddie Holmes

Climate change is a subject where responsibility cannot be levelled solely at one particular sector, but the automotive industry has found itself at the centre of discussions. Be it the obvious impact of tailpipe emissions, the carbon footprint created by global manufacturing chains, or avoidable scandals such as dieselgate, the entire industry is now hard pressed to contribute to a sustainable future.

To understand the current state of play, global consultancy Capgemini recently produced a new report: 'The Automotive Industry in the Era of Sustainability.' The firm is well placed to perform such a study, working with most of the industry's major automakers and Tier 1 suppliers, but also retail chains and mobility players. It is also a sponsor of the World Climate Summit, an annual side event to the United Nations Climate Change Conference, better known as the COP Summit.

"We know how automotive manufacturers normally address the topic of climate change, and we have seen that how they are acting has gained more and more attention," observed Markus Winkler, Global Automotive Lead at Capgemini. "We also see that the automotive industry has always been behind the discussion; they have had to react to discoveries around particulate matter emissions, NOx and CO2, and have had to come to terms with the fact that they are partly responsible for climate change."

Now, says Winkler, it is time for the automotive industry to get ahead of the curve and proactively reduce its carbon footprint.

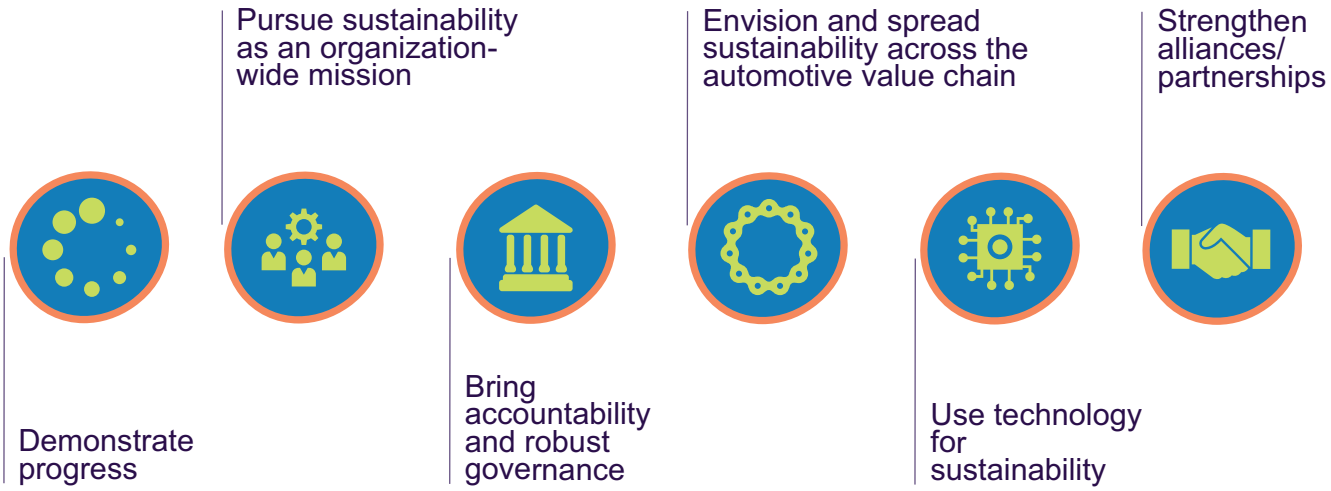
A lack of alignment

The spotlight rests on the automotive industry for good reason. Road transportation accounted for 18% of the world's global CO2 emissions in 2016, and particulate matter from vehicle tailpipes has been linked directly to an increase in respiratory illnesses in many cities. Waste materials that currently cannot be recycled have to go somewhere, leading to both land and water pollution.

Producing a vehicle from scratch also requires raw materials to be dragged from the earth and transformed into usable metals, rubbers, textiles and lubricants. This consumes a significant amount of resources; the Society of Motor Manufacturers and Traders' (SSMT) 2019 UK Automotive Sustainability Report, published in June 2019, found that the UK automotive industry alone uses 5.2 billion litres of water and produces 1 million tonnes of CO2 from manufacturing new cars and components each year.

Clearly, things need to change, and Winkler has observed that there is indeed a clear effort

Sustainability best practices for the automotive industry



Source: Capgemini Research Institute analysis.

from the automotive industry to "embark on the journey of decarbonisation." Most of the automakers and suppliers surveyed (62%) currently have a defined sustainability strategy in place, and policies are typically well aligned with the priorities set out by climate change experts–the most common being to promote a 'circular economy' through reduced waste and increased recycling. However, only half of organisations have deployed circular economy initiatives, the report finds, with only 32% of their supply chain contributing to the circular economy. Capgemini expects this figure to increase to 51% in five years' time.

> "Even if these companies have a designated sustainability officer, many of those different actions do not fall under one coherent governance

However, Winkler noted that there is a lack of alignment between a company's individual sustainability initiatives. As the study found, only 44% of automotive organisations surveyed have a central governing body to oversee their sustainability objectives, and only two in five combine central governance with an 'empowered sustainability team'. "Even if these companies have a designated sustainability officer,

Recycling and 're-manufacturing' is increasing

many of those different actions do not fall under one coherent governance," Winkler explained. The overall impact of a company's sustainability efforts is weakened as a result, he says.

A dedicated sustainability division can implement best practices throughout the organisation, and ultimately provide oversight to ensure that the right steps are being taken. Some manufacturers do have this, but it is not industry wide. As things stand, automakers have prioritised a circular economy, sustainable manufacturing, and to a lesser extent sustainable R&D. Manufacturers in Germany and France are leading the way on the sustainability front, followed by the US and Sweden. Manufacturers in India lag on all bases, the study found.

Automakers leading the way on sustainability

Annual sustainability reports have become common practice among automakers today. They provide a roundup of the company's long-term and short-term targets, and how they are being achieved. They are a big deal, and most are produced almost like a magazine.

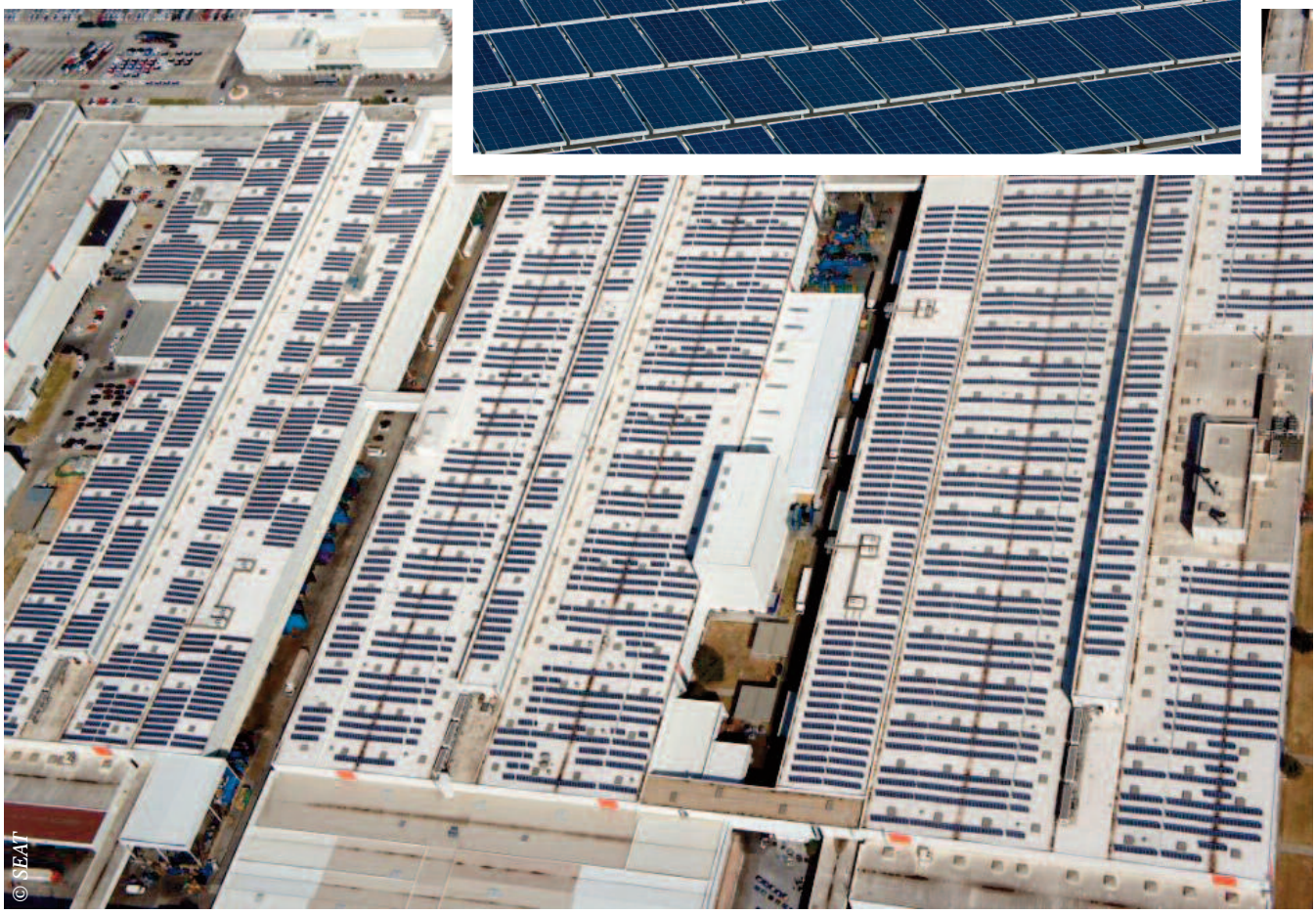
Automakers clearly wish to make clear efforts to shrink their carbon footprint, and there are too many reports to list in detail.

BMW Group, for example, speaks of not only reducing the emissions of its vehicle fleet, but also increasing the responsible sourcing of materials such as cobalt and lithium used in its electrified vehicles. The manufacturer's European facilities have obtained 'externally purchased' electricity–i.e. that which is not developed on site–from renewable sources since 2017, and in 1973 became the first automaker to appoint a dedicated environmental officer.

Alongside more conventional decarbonisation initiatives–using 100% renewable energy across all its plants globally by 2035, for example–Ford Motor Company intends to use only recycled and renewable plastics in its vehicles, and is investigating alternative materials derived from soy, bamboo, agave fibre and algae. The acquisition of an e-scooter company in 2018 also signalled a move to provide more sustainable transport solutions. Most manufacturers by this stage have also found ways to source renewable energy and cut water use, be it reusing old EV batteries to power certain buildings or burning local food waste. Renault's sprawling Tangier factory in Morocco utilises biomass sources such as olive pulp to heat the ovens in its paint shop, for example.

Even relative newcomers to the automotive industry are making an effort to tout their sustainability initiatives, although the focus is primarily on product. BYD's 2017

Solar power reduces the amount of 'virgin' energy used to keep plants running (Pictured: SEAT al Sol)



Corporate Social Responsibility (CSR) report, for example, emphasises the company's advances in e-mobility and green procurement, and notes that new suppliers are selected based on their environmental impact. It also adheres with industry guidelines to avoid 'deliberately' sourcing minerals from the Democratic Republic of the Congo, or other countries known for child labour.

While Tier 1s are also making concerted efforts–Bosch recently used its annual press conference to promote a raft of new climate change initiatives–Capgemini found that most suppliers have to this point been outperformed by automakers when it comes to implementing sustainability initiatives. Moving forward, Winkler suggested that suppliers may be awarded contracts based on their approach to climate change, and some may lose out if their green initiatives are found lagging.

But as the Capgemini report concludes, the automotive industry is too focussed on areas that are close to its core competencies. Companies across the value chain should look past product development and

manufacturing strategy, and begin to introduce more expansive sustainability initiatives, it says.

A good start, but it's time to ramp up

Climate change has become a strategic priority for the automotive industry, and is perhaps evidenced by the rhetoric of industry events.

losers in climate change initiatives, but to provide a broad view of the main trends. The work that has been done so far should be applauded, concluded Winkler, but more must be done moving forward. "Seeing the world change around us illustrates that the car industry cannot carry on like it always has," he explained. "Manufacturers have to embark on a much wider journey,"

> "Seeing the world change around us illustrates that the car industry cannot carry on like it always has. Manufacturers have to embark on a much wider journey

Capgemini found that between 2015 and 2019, the number of conferences, shareholder meetings and similar platforms that included a focus on sustainability more than doubled from 142 to 320. The clearing of skies above previously polluted cities as a result of social distancing measures has also illustrated the impact to which industrial manufacturing and polluting vehicles can have on local air quality.

It is important to highlight that Capgemini's report did not set out to highlight the winners and

The automotive industry is addressing climate change from a number of key angles, be it the generation of renewable energy for global manufacturing sites, limiting the use of rare earth metals or ramping up the production of zero emissions vehicles. Some are even branching into stationary storage solutions to harness solar power, and many interiors now adopting bio-materials in place of synthetic fabrics. However, these efforts come as the industry has played catch up, and manufacturers are now urged to become increasingly proactive in addressing climate change.

COMMENT:

Uber needs to deliver to overcome its profit dilemma

If Uber fails to push into new and exciting areas, it risks continuing to lose money and investor backing, as well as consumer interest, writes Alyssa Altman

Earlier this year, Uber's Chief Executive announced that the ride-hailing company would finally become profitable by the end of 2020. Announced at the time of Uber's Q4 results, this was a revision of Dara Khosrowshahi's claim last year that Uber would become profitable by 2021, and a clear sign that Uber had begun to move past the rocky terrain of 2019.

A few months later, such a target seems overly optimistic; it is also understandable why Uber cannot currently achieve that target. The coronavirus and subsequent stay at home orders have all but put rides at a standstill. Uber's daily active users fell almost 40% year-over-year in March and for the first quarter of 2020 the company recorded its lowest quarterly count of daily active users since mid-2017.

To make matters worse, Uber's biggest competitor—Lyft—has fared better than expected during the COVID-19 crisis. In the first quarter of 2019, Uber had 42% more downloads than Lyft, but in the current quarter, Uber's lead has more than halved, to its smallest margin in at least two years. Furthermore, Uber has shown that the crisis is seriously impacting its ability to operate, as illustrated by the recent announcement to lay off a further 3,000 employees in addition to the 3,700 job cuts announced in early May.

In the midst of the pandemic, it might be difficult to see how Uber can turn itself around. However, the company's potential acquisition of food delivery app Grubhub is a smart move and speaks to how the ride-hailing app can eventually produce a profit.

With demand for taxi rides severely impacted during the pandemic, and likely for the foreseeable future, the Grubhub deal allows Uber to further cement its position in the food delivery market—the deal would reportedly give Uber a 50% share of the US food delivery market. Unlike the ride-hailing sector, food delivery has continued to grow during the COVID-19 crisis, as consumers look to buy fast food and have groceries delivered to their homes.

The Grubhub deal also reflects the fact that Uber needs to diversify from its ride-sharing roots into a broader operating system. From consumer services such as food

delivery and ride-hail, Uber needs to expand and promote its other services such as UberFreight to demonstrate potential to monetise at scale. Diversification will help to ensure Uber can ride out any future crises by building a strong portfolio that relies on more than just one service to drive the business.

The COVID-19 pandemic has also changed the nature of transport. With major cities in Europe and North America—including key Uber cities such as London—deciding to ban cars in large areas, Uber needs to re-evaluate its ride-hailing business if it wants to generate a profit any time soon.

Following restrictions, the company needs to double down on its mission to become the 'Amazon of transportation' through new initiatives such as self-driving cars, e-scooters, bikes and possibly even helicopters. While these schemes may seem outlandish, Uber cannot afford to not enter new markets: one of these technologies may be the golden ticket to ultimate success.

> “Following restrictions, Uber needs to double down on its mission to become the 'Amazon of transportation' through new initiatives such as self-driving cars, e-scooters, bikes and possibly even helicopters

Fundamentally, Uber needs to diversify its offering if it intends to see profit in 2020 or 2021. The COVID-19 crisis may represent a serious challenge to the company's future, but it also allows Uber to re-evaluate its business model and pursue new avenues. If it fails to push into new and exciting areas, then the ride-hailing company may find that it continues to lose money and investor backing, as well as consumer interest.

The opinions expressed here are those of the author and do not necessarily reflect the positions of Automotive World Ltd.

***Alyssa Altman** is Transportation Lead at Publicis Sapient*