

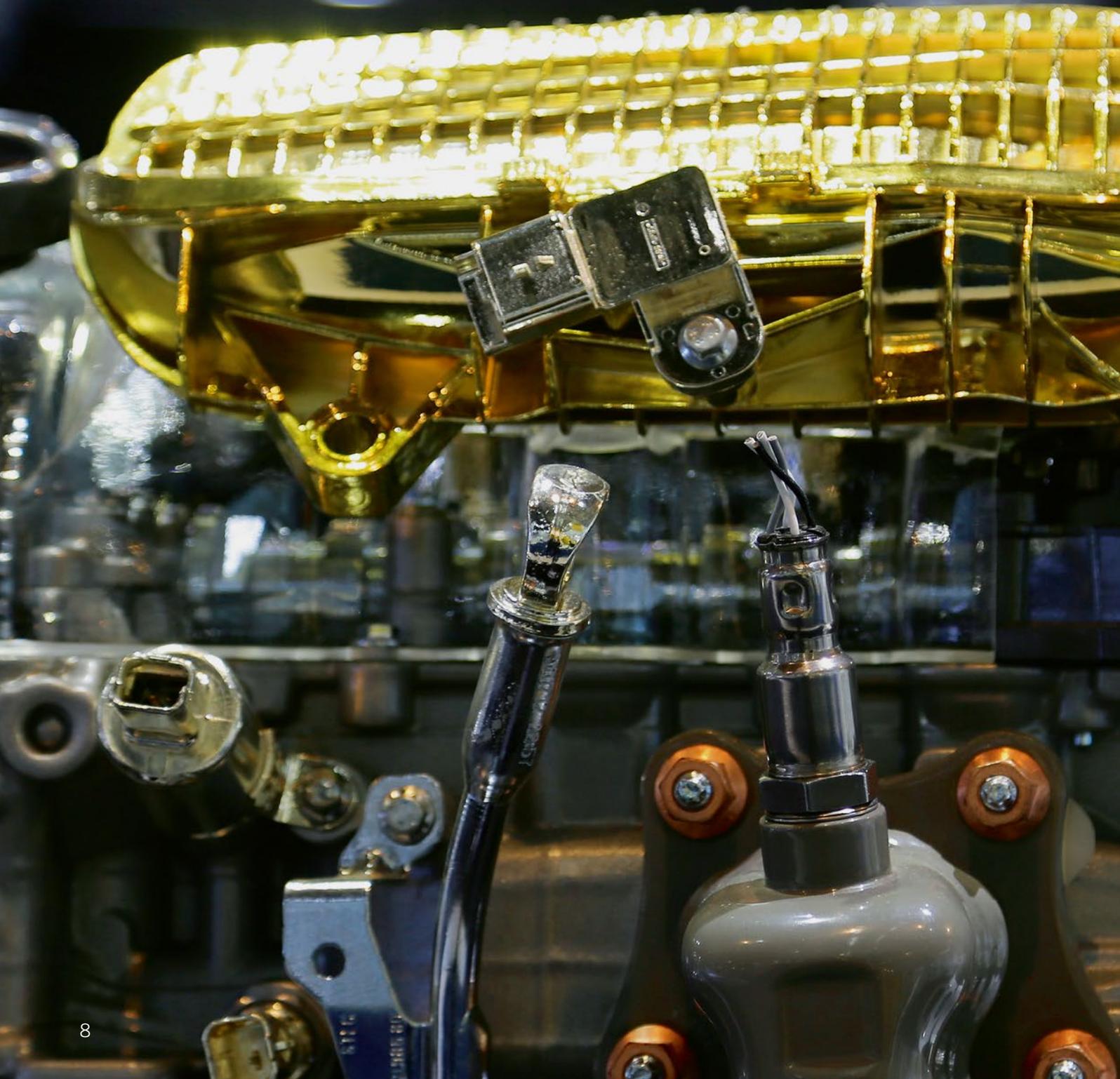
IN THE SPOTLIGHT

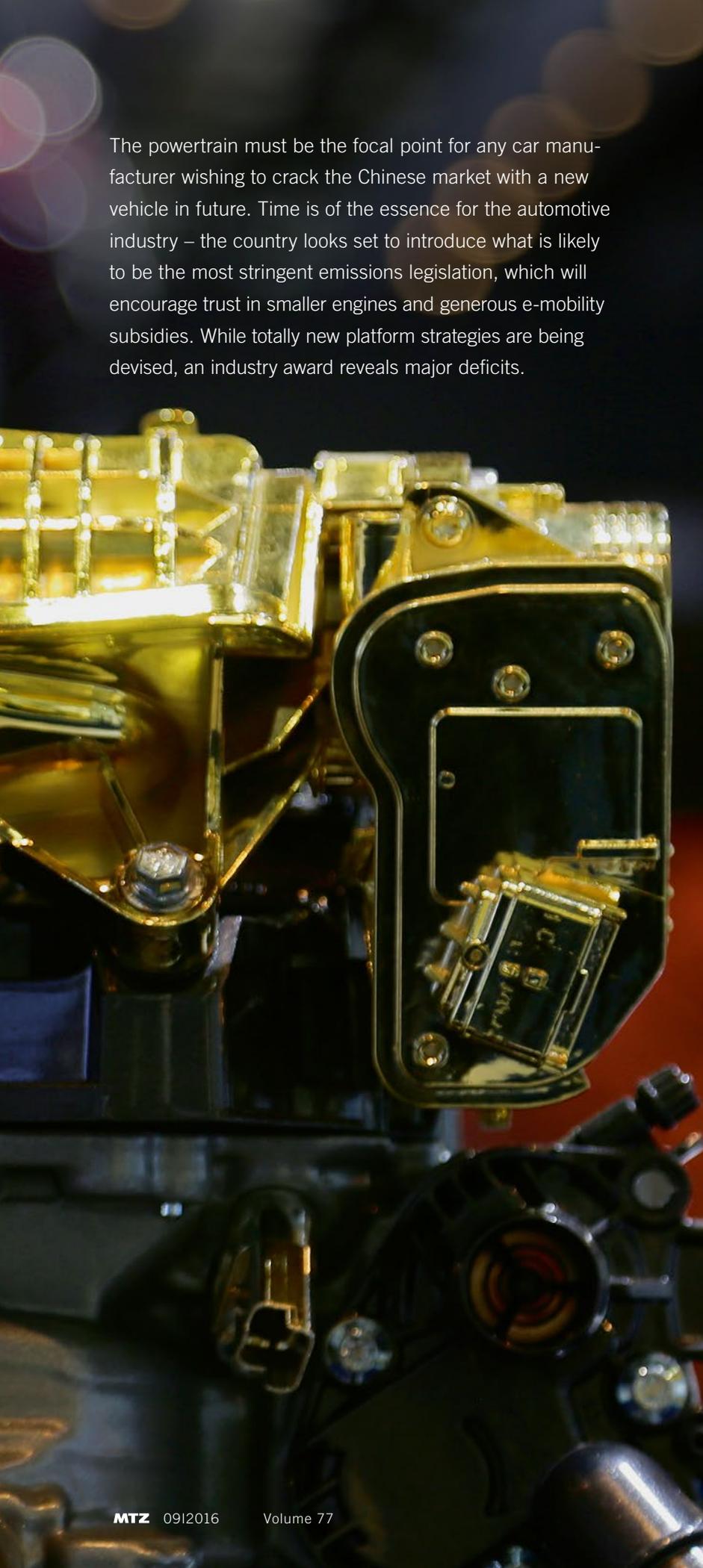
# China's Future Mobility

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## It's All About the Drive System

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The powertrain must be the focal point for any car manufacturer wishing to crack the Chinese market with a new vehicle in future. Time is of the essence for the automotive industry – the country looks set to introduce what is likely to be the most stringent emissions legislation, which will encourage trust in smaller engines and generous e-mobility subsidies. While totally new platform strategies are being devised, an industry award reveals major deficits.

## CHINA'S BOOMING CAR MARKET

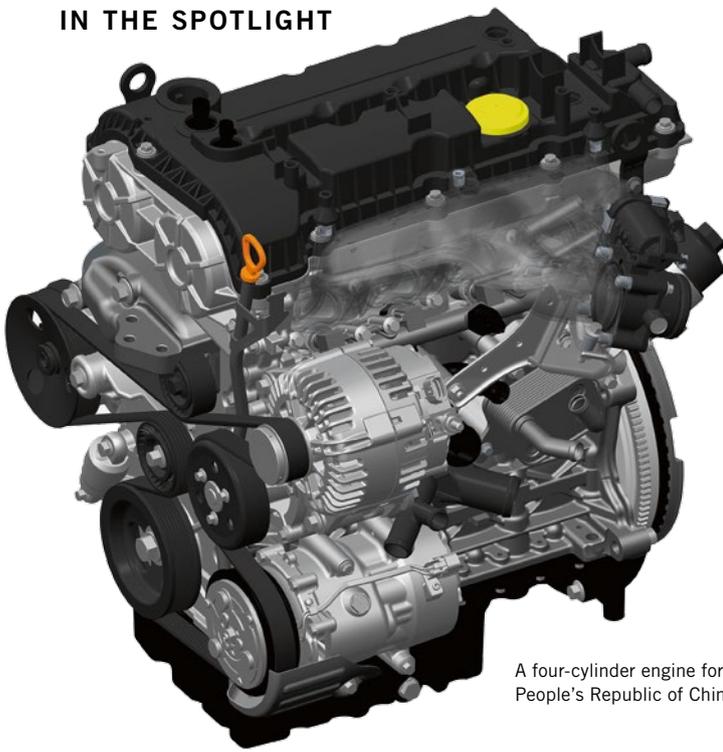
The view over Beijing would be fantastic, were it not obscured by the grey veil of smog that plagues its residents almost daily. Whether Shanghai, Chongqing or Shenyang, air pollution has rocketed in all of China's crowded metropolises. One of the main culprits are the many millions of cars that jostle through their streets. This is the case for Beijing, at least [1]. No end appears imminent, even if the city authorities intend to only register 150,000 new cars in the coming year. [2]

However, revisiting the statistics reveals a low nationwide vehicle density – at least outside the large cities. There are only 100 cars for every 1000 citizens in China, as opposed to 600 in the EU. Given that not even 30 % of Chinese households even own a car, the market potential has huge appeal, for German car makers in particular. Mercedes-Benz has announced, for example, “For the first time, China became our largest car market in 2015, ahead of the USA and Germany.” However, thoughts of a golden age are premature. “The Chinese car market will change more radically than ever before over the next few years,” says Clemens Wasner in an interview with MTZ. Wasner is partner and Chief Asia Representative at Vienna-based business consultants EFS Unternehmensberatung, where he analyses factors such as the impact of international developments on the Chinese automotive industry.

## CHINA'S HIGHLY DYNAMIC MARKET POSES A CHALLENGE FOR EUROPEAN OEMS

Driven by advances in automotive technology, particularly by the potential of networking vehicles and running them on electricity alone, “the Chinese Market with its framework conditions, its consumer purchasing behaviour, and laws relating to fuel consumption and emissions, as well as control measures taken by the state is already characterised by a high level of dynamism”. This is the explanation given by AVL CEO Professor Helmut List and AVL Executive Vice President Dr. Robert Fischer, who heads the Engine and Technology Powertrain Systems division. [3] And what is the outcome? “China is becoming a dom-

## IN THE SPOTLIGHT



A four-cylinder engine for the People's Republic of China (© AVL)

inant driver in global technological development.”

This is already having an effect on engine development, since experts predict China will respond to its extremely critical urban pollution problems by passing the world's most stringent emissions legislation. The consequences for developers of combustion-engine powertrains are immediate and the time pressures immense. The strict China 6b standard is due to apply from 2017, initially only for Beijing but later, from 2023, for the whole People's Republic. One obvious upshot of China's regulatory zeal is the fact that China 5 and 6 emissions standards existed in parallel until 2018. [4] This is causing costs of vehicles allowed to operate in the capital to spiral. Conversely, cars that fail to comply with the stricter emissions standard cannot be sold in every region. The situation is even more complicated than it seems,

however, as Professor Jun Li has analysed. Li is President of China FAW R&D Centre, China's largest diesel engine manufacturer, based in Changchun.

### E-MOBILITY IN CHINA WOULD BE AN OPPORTUNITY

First, Li thinks that the period between the publication of the regulations and their coming into effect is too short. Second, the considerable variation in quality of fuel between Europe and China will cause engine developers major problems. And one more thing is adding to the pressure. Chinese customers prefer large SUVs and MPVs. “The inherent disadvantage of vehicle weight plus tractional resistance makes complying with fuel consumption targets even harder,” as explained by AVL. Given that fuel consumption in China is supposed to sink to 5 l/100 km by

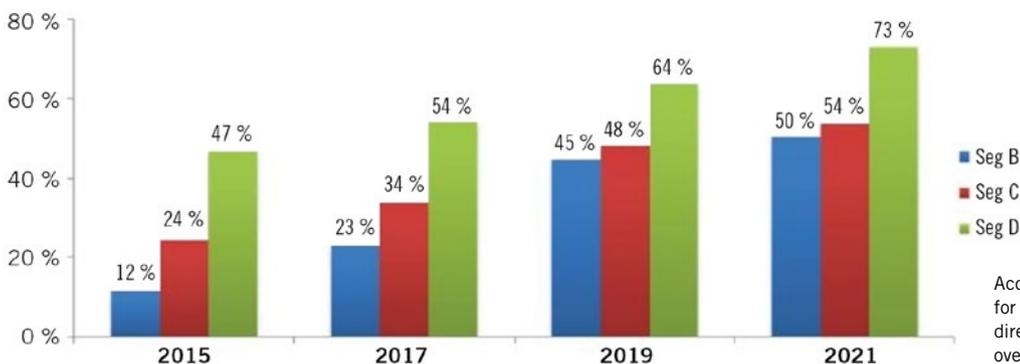
2020 and 4 l/100 km by 2025, a further hurdle remains.

Vehicle manufacturers are currently struggling on two fronts because now battery electric vehicles (BEVs) and new energy vehicles (NEVs – i.e. those with alternative drives) are being supported financially and via simplified registration rules in the largest cities. Nevertheless, car makers remain confident that they can keep pace with e-mobility. While the combustion engine will remain the drive of choice for the foreseeable future, a considerable share of the market is opening up to the plug-in hybrid (PHEV) and the battery electric car (BEV),” says Ralf Dennissen, Director of Product Communication at Volkswagen Group China. He expects this share to be between 8 and 10 % by 2020 and around 20 % five years later. The Volkswagen Group intends to be part of this growth by introducing “15 locally produced PHEVs/BEVs over the coming three to four years,” Dennissen explains.

### INDUSTRY AWARD REVEALS WEAKNESSES

However, Wasner doubts whether the majority of manufacturers are well prepared in the e-mobility segment. “Given the ambitious targets, the question arises as to whether this can be maintained, and if so, what the objectives are. Market-pull with the objective of building up infrastructure or developing competences in China to take a leading role,” he wonders. In his view, “To date, NEVs have been used as a fig leaf and not pursued as a serious business opportunity.”

This is a bold theory, but one the China expert can substantiate. In



According to the forecast, the market for turbocharged gasoline engines with direct injection in China will grow to over 50 % in a few years (© GM)



The Wuling Hongguang built by General Motors and SAIC shows how the Chinese like large cars, even in the megacities (© GM)



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**Dr. Robert Fischer**  
Business Manager,  
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## 2 QUESTIONS FOR ...

**MTZ** \_ What type of engine is best-suited for China in the light of strict emissions standards in future?

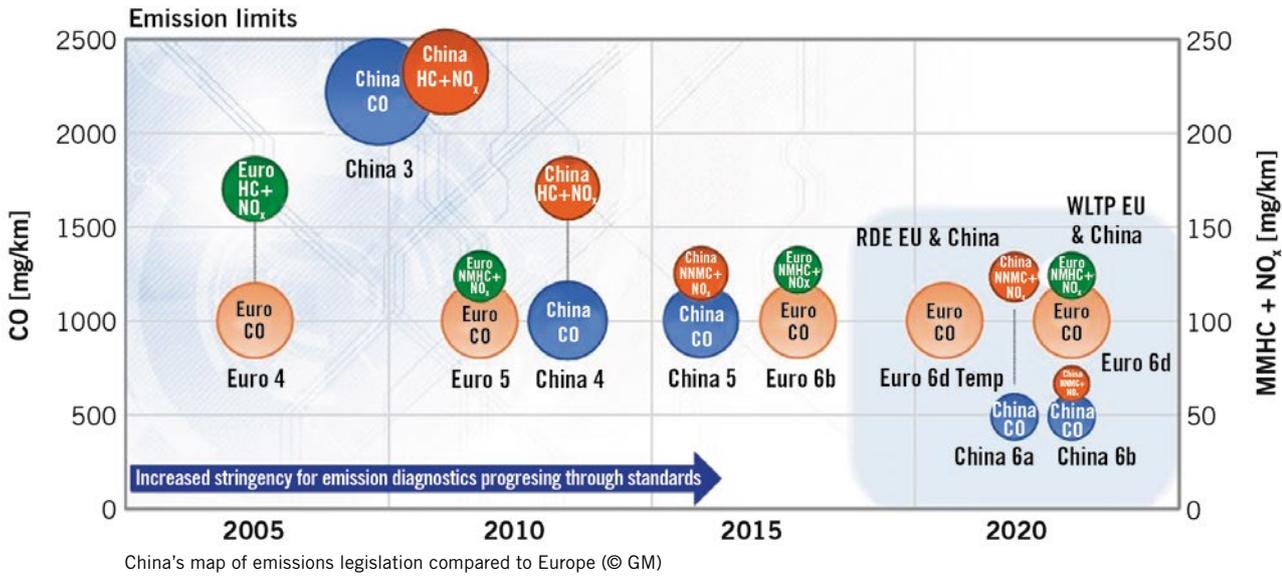
**FISCHER** \_ We believe that TDGI Miller engines are currently the best choice to meet the demands in terms of emissions and fuel consumption. Moreover, the continuing electrification of the powertrain, initially with 12-V/48-V systems as well as high-voltage systems, will help. It is crucial to offer the right combination of available powertrain technologies for the vehicle in question and its positioning to achieve market success. Growth will

emerge, particularly with TGDI engines in combination with easy-to-drive DCT, AT and CVT systems.

**Including various electrification concepts?**

Yes. This also includes DHT (dedicated hybrid transmission) systems that integrate an electric motor with the gearbox to achieve a functional advantage cost-effectively. The proportion of battery electric cars will also continue to grow, owing to the aforementioned subsidies, but will tend to be concentrated in the largest Chinese metropolises.

## IN THE SPOTLIGHT



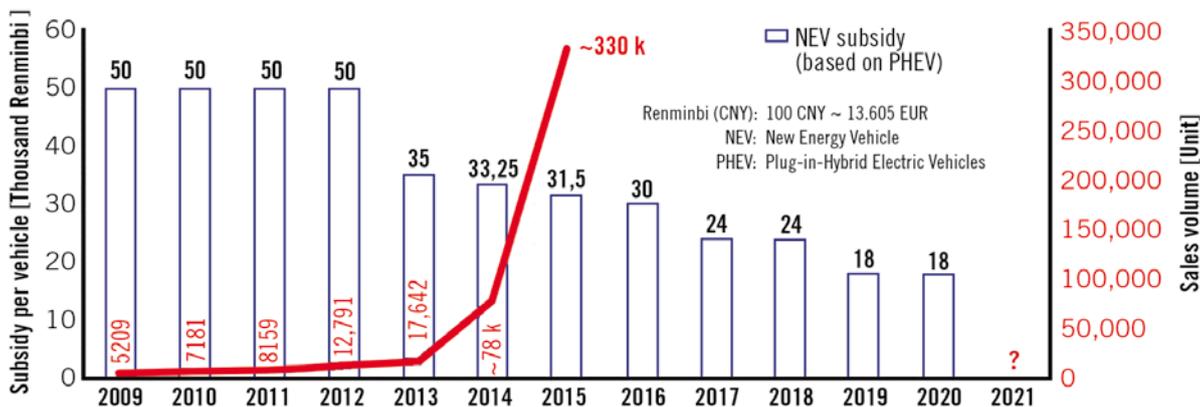
the context of the Xuanyuan Award, for business and established three years ago by EFS Unternehmensberatung and the Chinese journal Auto Business Review, he has been observing the very dynamic Chinese market, “which requires both local and international manufacturers to adapt to constantly changing circumstances.” Wasner, who together with Truls Thorstensen, CEO of the Vienna-based business consultancy, and Jack Yu, Editor of the Auto Business Review, is a co-initiator of the award, explains: “Whereas localising successful foreign cars in China used to suffice in the past, you now have to develop special versions and vehicles for the Chinese market.” The 2016 award, for example, demonstrated that “despite numerous NEVs that are outstanding in many respects, they are not able to provide a convincing overall concept.”

### BUSINESS MODELS AND STRATEGIES ARE ALSO CRUCIAL

Incidentally, whether the manufacturers are local or international is irrelevant when choosing the winner. “Chery, Geely and Chang’an are measured against the same criteria as BMW, Daimler and Audi,” Wasner explains. Moreover, according to EFS, the assessment criteria differ greatly from those used for conventional awards. For example, the scope includes innovative technology applications, new product approaches, business models and strategies. Furthermore, the issue of to what extent a China-specific contribution is being made towards styling, product development and manufacturing engineering is also addressed.

Another hugely significant factor for the international jury is whether

the vehicle or manufacturer is contributing sustainably to mobility in China. “For example, by providing an affordable and economical vehicle.” And this particular criterion is where the Chinese market needs to rethink things. For example, it is not just the volume of BEVs sold that has grown impressively in just a few years. Smaller engines have also become increasingly fashionable. Even if manufacturers assume “that it will take at least until 2020 until the market as a whole accepts that lower engine capacity will not result in a decline in driving performance,” says Wasner. “Thanks to ongoing advertising, our urban customers understand that there is more to it than engine capacity alone. But it will take a few more years for customers in tier 2 and 3 cities to get the message.”



Huge growth for vehicles with alternative drives (© China Association of Automotive Manufacturers 2015)

## RIGHTSIZING AS A BLUEPRINT FOR SUCCESS

Nevertheless, most current combustion engines are still affordable MPFI engines and will still comprise a large proportion of the engine portfolio in AVL's view. The company thinks, however, that fuel consumption targets will necessitate "a clear switch to modern TDGI engines". AVL, for example, is working with OEMs to develop this type of engine and has developed its own technological prototype in China using the latest 1.6-l TDGI Miller technology. "Besides offering fuel consumption of 4.7 l/100 km, it has been possible to optimise this powertrain in line with the special requirements of the Chinese market."

The automotive supplier also believes TDGI Miller engines, with their high proportion of EGR for favourable specific consumption, are well-placed to supply the Chinese market successfully. The powertrain specialist, however, considers it crucial to offer the right combination of available powertrain technologies for the vehicle in question and its positioning to achieve market success. "Growth will emerge, particularly with TGDI engines combined with easy-to-drive DCT, AT and CVT systems and various electrification concepts. This also includes DHT (dedicated hybrid transmission) systems that integrate an electric motor with the gearbox to achieve a functional advantage while at the same time reducing costs."

All of this has to be considered in the context of emissions legislation. Wasner also agrees on this point: "The key issue for the Chinese is emissions." The problem here, he thinks, is that "unlike with trucks, passenger cars have no effective correlation between test cycles and actual fuel consumption".

## XUANYUAN AWARD 2017

The award was presented for the first time in 2014 and in the first two years was based on the procedure: nomination by the OEM, shortlisting by the jury and final decision on the winner over a two-day jury session.

The procedure for 2016 also involved a qualitative assessment of all nominated vehicles, which a pair of international experts conducted on site. This assessment is unique in this form and helps indicate an OEM's competence. The 2017 awards procedure will include a range test conducted in accordance with WLTP for all nominated NEVs that will clearly reveal the actual range of the Chinese NEVs. This could well prove controversial as subsidies in China are linked to minimum ranges.

Andreas Burkert

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- [1] <http://english.mep.gov.cn>, accessed: June 2016
- [2] Jin, H.; Qian, Zh.: Beijing to cut new car registration quota by 37.5 pct. Online: <http://en.people.cn/90882/8448948.html>, accessed: June 2016
- [3] List, H.; Fischer R.: Powertrains for the Chinese Market. 28<sup>th</sup> International AVL Conference "Engine & Environment", June 2016, p. 3
- [4] Li, J.: The drivers for Technology development of passenger car power trains in China. 28<sup>th</sup> International AVL Conference "Engine & Environment", June 2016, p. 7

WHAT DO WE THINK?

## "China's Path to Clean Mobility"

China's car drivers are never likely to give up their desire for large vehicles. It is only trust in smaller engines and e-mobility that is growing. However, this is a necessary development owing to the immense impact on the environment and one to which the automotive industry must respond immediately – with a platform strategy tailored to the country's distinctive characteristics, rather than a quick rehash of European ideas.



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