

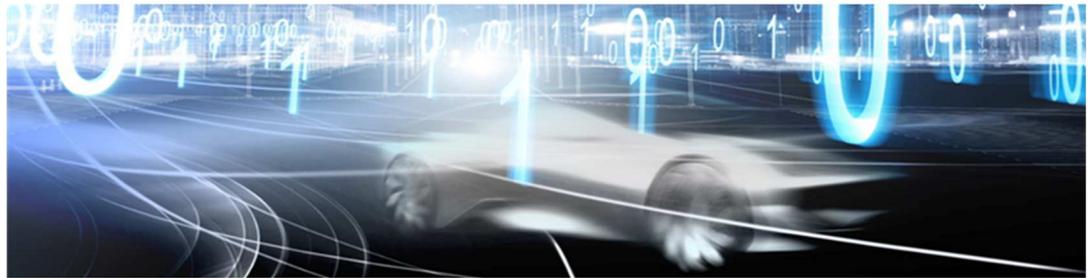
Interview Trilogy | Smart Mobility | 10/2018

For professional investors only

## All Systems Go



**An interview series devoted to exploring the present realities and expanding possibilities of electric vehicles for mobility, transport, and urban design.**



Dr. Thiemo Lang, Senior Portfolio Manager of the RobecoSAM Smart Mobility Strategy leads us through the unprecedented changes and disruptive forces shaking the automotive industry and why smart mobility is about more than creating clean cars.

### Driving Forces — A closer look at growth trends in the EV market

**Q: Electric vehicles are not widely used and are currently more costly than petrol-powered cars. What's going to change to stoke consumer demand?**

**TL:** In the coming years the global automotive industry will go through its most radical change as new technologies and changing consumer habits challenge current business models. More than one million electric or hybrid vehicles were sold in 2017 around the globe—that's 50% year-over-year growth and figures for 2018 shows no signs of slacking. Electric cars are even expected to outsell fossil-fuel powered vehicles well before 2040.

Multiple factors are driving this adoption. The cost of building electric cars is likely to fall much faster than initially anticipated. For one, battery costs (one of the largest cost components of EVs) will halve in the next 3 years. In addition, the realization of economies of scale and the simplicity of design versus traditional car models are driving down manufacturing costs. An EV has fewer moving parts than a traditional car—more precisely, less than 1 moving part for every 10 in a traditional car. This makes factory assembly faster and owner maintenance easier.

**“By 2022, we expect the total cost of ownership for consumers to favor electric vehicles over petrol-powered cars.”**

Electricity is cheaper than gas, so keeping the car fueled will be cheaper. Moreover, fueling costs will continue to fall as renewables (solar, wind power) make up more of the electricity mix. By 2022, we expect the total cost of ownership for consumers to favor electric vehicles over petrol-powered cars.

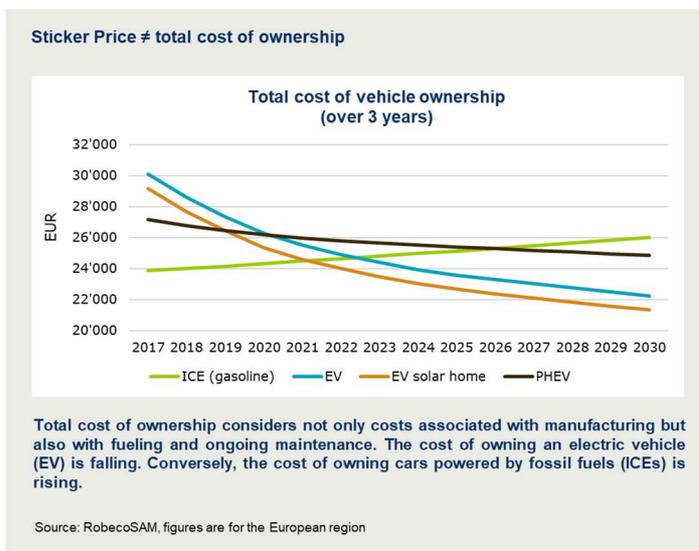
**Q: Headlines are humming with announcements of new electric car models from well-known, lesser known and even unknown manufacturers. What’s driving this race? Are there other drivers beyond costs propelling EV demand?**

**TL:** Regulation in virtually every major developed and developing market is becoming a major tailwind for EV production. More and more we are seeing governments at the city, state and national levels setting ambitious targets regarding the reduction of carbon emissions.

Optimization of the internal combustion engine (ICE) has reduced emissions generated but will soon reach its limits. Fleet electrification is the only way forward for car manufacturers.

Still, it’s important to stress that while regulation has been supportive of consumer demand until now, pure economics will soon be the biggest force pushing EVs forward as the cost of ownership for consumers falls to parity with gas-powered cars.

That makes announcements like those of France and Great Britain to completely ban sales of combustion engine vehicles by 2040 rather symbolic—by then, it won’t make any economic sense to drive anything but electric. Fleet electrification is the only way forward for car manufacturers.



**“Fleet electrification is the only way forward for car manufacturers.”**

**Q: It’s clear that governments and activists are interested in EVs as a solution to pollution, but is there real consumer demand for EVs?**

**TL:** Consumer demand is solid and growing, especially in countries where governments have taken concrete action. The global leader is Norway where, already in 2017, 40% of all new cars were EVs (Norwegian Road Federation (OFV) Report, 2018). Even more relevant is China; currently 50% of all electric vehicles worldwide are sold there and most of these in the middle-class friendly price range.

One concern that stifled consumer demand in many developed markets was the lack of models to serve the wide range of consumer price segments and feature preferences, especially in Europe and the US. A broad and affordable EV offering for a middle-class segment is still missing in Europe, the US and the rest of Asia, but we expect this situation to change considerably in the coming years. At the lower end of the price spectrum, consumers can expect more launches like those of Hyundai with its Kona Electric and Kia with its Niro EV, both of which debuted in markets this year.

Mid-priced models are already available from many major automakers (like Ford’s Focus, Chevrolet’s Volt, Nissan’s Leaf and Volkswagen’s e-Golf). And the luxury end is surprisingly well populated with models from Tesla, Audi, Mercedes-Benz, Volvo and Jaguar for starters.

Soon everyone will be able to find a model with the right price, style, and features to suit their individual tastes.

**Q: How do EVs compare to other fuel-efficient alternatives like hydrogen vehicles? Why do you expect EVs to win the race to the mainstream market?**

**TL:** Hydrogen vehicles provide longer ranges per fuel up, which is a sizeable advantage compared to EVs. Also, tanking up with hydrogen is similar to filling up with gas or diesel which means fully fueling is finished in a matter of minutes. The average EV takes much longer, especially if using slower charging levels.

On the flip side, the hydrogen vehicle is expensive. In addition to that, we haven't seen the buildout of a competitive hydrogen-fueling infrastructure.

We do not categorically exclude the long-term potential of hydrogen cars but remain cautious on timelines. Hydrogen-powered vehicles could first be deployed in transit contexts where long distances are of primary importance, for example, for long-haul transport on buses, trucks, and trains.

**“Soon everyone will be able to find a model with the right price, style, and features to suit their individual tastes.”**

A look inside future mobility



The interior of an autonomous concept car.

Autonomous, driverless cars will free up vehicle space and passenger time. Future vehicles could be cross-functional serving as home office, social venue, or sleeping quarters where passengers can stay professionally productive, socially connected, relaxed and rested while on the move.

Source: Daimler-Chrysler, 2018

**Q: Government subsidies and price incentives are being phased out, evidence that the EV market is economically viable to sustain its own profitability and growth. But that leads to another question that will impact future EV demand, the variable costs of future fueling.**

**How important are low electricity prices for the relative competitiveness of EVs?**

**TL:** Electricity prices are to EVs as gas prices to combustion engine vehicles. Fortunately, as an electric motor is 3x more efficient than a combustion engine, the relative costs are already lower.

While it's true that electricity prices in many places like California or Germany are high, there is ample room to improve this cost contributor going forward. We have high hopes that cheap, renewable and decentralized energy generated from solar and wind will be an important factor in driving down future electricity costs. Future applications and services in this area could see EV users participating in "solar communities," allowing them to charge their EVs cheaply at charging points supplied by members of the same community.

**“Cheap, renewable, and decentralized energy generated from solar and wind will be an important factor in driving down future electricity costs.”**

**Q: This theme of the “prosumer” and the smart grid are gaining traction along with EVs. How are these markets related?**

**TL:** The idea behind what is sometimes known as the “prosumer” or vehicle-to-grid (V2G) technology is basically when an EV is no longer in extended use (for example when the owner parks it overnight), the electricity stored in the battery might be sold back to the grid at a higher price leading to additional revenue streams and cost savings for the producing household or consumer, or the “prosumer.”

As smart grid technologies and vehicle-to-grid concepts develop, EV owners can even participate in new revenue sources and business models like electricity trading.

**“New business models surrounding car sharing and connectivity will create an additional US \$1.5 trillion market by 2030.”**

**Q: How will the popularity of ride-sharing and government policies to reduce vehicles in cities affect EV demand?**

**TL:** Urban congestion as well as noise and air pollution are all plaguing the modern metropolis. Ride-sharing is certainly a viable alternative for reducing these problems. It will also improve mobility for many who can't afford it today.

Market estimates show that car sharing will most likely have a more pronounced impact from the late-2020s onwards and could impact worldwide car sales more meaningfully starting from 2030.

Beyond 2030, the absolute number of cars sold might begin to flatten out. By then, we expect new business models developing from car sharing and shared mobility to outweigh any “maturation effects” of flagging unit car sales. Research from McKinsey, for example, shows new business models surrounding car sharing and connectivity will create an additional \$1.5 trillion market by 2030.



**The next installment in the Smart Mobility Trilogy:  
Concerns and controversies—Barriers and blind spots on the EV landscape**

---

> For more information, visit: [www.robecosam.com/en/professionals/strategies-services](http://www.robecosam.com/en/professionals/strategies-services)

---

**About RobecoSAM**

Founded in 1995, RobecoSAM is an investment specialist focused exclusively on Sustainability Investing. It offers asset management, indices, impact analysis and investment, sustainability assessments, and benchmarking services. Together with S&P Dow Jones Indices, RobecoSAM publishes the globally recognized Dow Jones Sustainability Indices (DJSI) as well as the S&P ESG Factor Weighted Index Series, the first index family to treat ESG as a standalone performance factor using the RobecoSAM Smart ESG methodology. As of June 30, 2018, RobecoSAM had client assets under management, advice and/or license of approximately USD 21.5 billion.

**No warranty** This publication is derived from sources believed to be accurate and reliable, but neither its accuracy nor completeness is guaranteed. The material and information in this publication are provided "as is" and without warranties of any kind, either expressed or implied. RobecoSAM AG and its related, affiliated and subsidiary companies disclaim all warranties, expressed or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose. Any opinions and views in this publication reflect the current judgment of the authors and may change without notice. It is each reader's responsibility to evaluate the accuracy, completeness and usefulness of any opinions, advice, services or other information provided in this publication.

**Limitation of liability** All information contained in this publication is distributed with the understanding that the authors, publishers and distributors are not rendering legal, accounting or other professional advice or opinions on specific facts or matters and accordingly assume no liability whatsoever in connection with its use. In no event shall RobecoSAM AG and its related, affiliated and subsidiary companies be liable for any direct, indirect, special, incidental or consequential damages arising out of the use of any opinion or information expressly or implicitly contained in this publication.

**Copyright** Unless otherwise noted, text, images and layout of this publication are the exclusive property of RobecoSAM AG and/or its related, affiliated and subsidiary companies and may not be copied or distributed, in whole or in part, without the express written consent of RobecoSAM AG or its related, affiliated and subsidiary companies.

**No Offer** The information and opinions contained in this publication constitutes neither a solicitation, nor a recommendation, nor an offer to buy or sell investment instruments or other services, or to engage in any other kind of transaction. The information described in this publication is not directed to persons in any jurisdiction where the provision of such information would run counter to local laws and regulation.

© 2018 RobecoSAM AG

**RobecoSAM** | Josefstrasse 218 | 8005 Zurich | Switzerland | T +41 44 653 10 10 | F + 41 44 653 10 80 | [www.robecosam.com](http://www.robecosam.com) | [info@robecosam.com](mailto:info@robecosam.com)