

Battery Testing
@TÜV SÜD Thailand!

Safe and Clean Battery Testing

For a Safer and Greener Thailand!

24/06/2021

Volker Blandow

Global Head of e-Mobility, TÜV SÜD Thailand Ltd.



**Mehr Wert.
Mehr Vertrauen.**

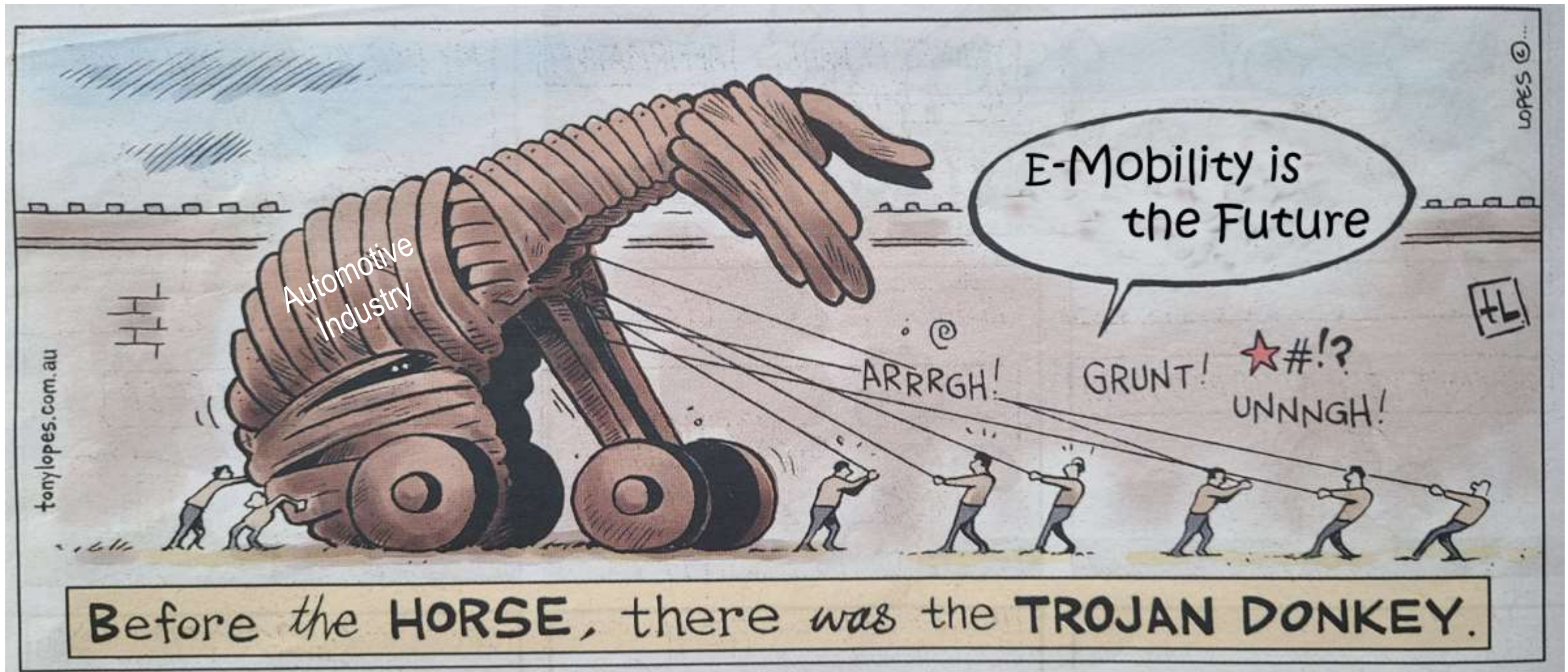
**Add value.
Inspire trust.**

18-08-01

Image: blandow.com 2021

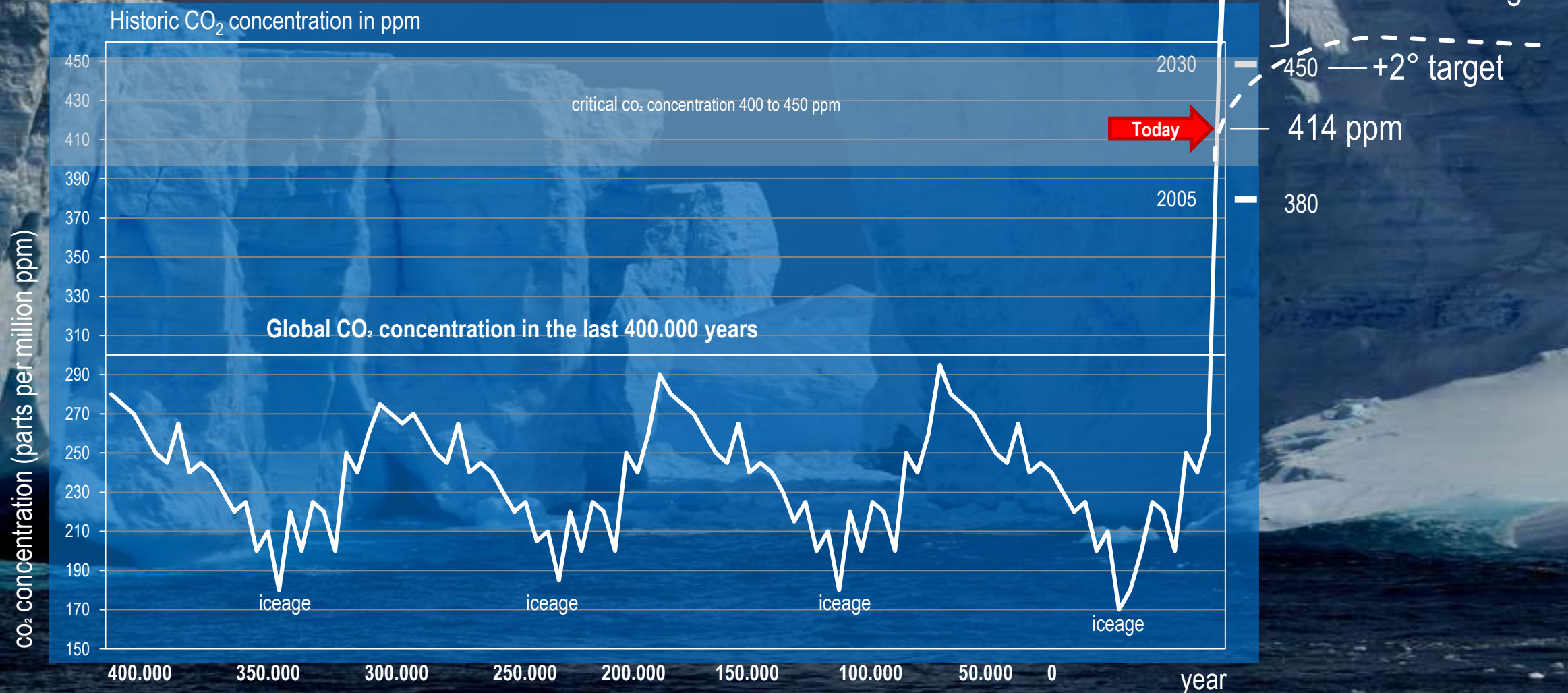
e-Mobility was (and still is) a complete technology transformation. How do we get our people on board?

The beginning was difficult also in Germany / Europe!



The climate change problem remains!

As a rule of thumb: Sea level rise is very similar to temperature rise in m with a time delay!



What to expect from climate change! (IPCC tipping point report JUNE 2021)

Tipping points are very close: After surpassing tipping points the changes are irreversible (melted greenland ice, melted large parts of antarctica, unfreezing permafrost)

Lead to increased:

Weather extrema – tropical storms with extreme wind speeds, flooding, droughts

Sea level rise – up to 7m within this century (Bangkok is 1.5m above sea level, Jakarta is at sea level)

Reduced food production – some regions will lose the ability to grow food at all, others have to change

Marine life will change dramatically, coral reefs are dying above 2 degrees rise, reefs are important fish breeding grounds

10 Years of E-Mobility in TÜV SÜD!



CONSUMER: PV is already today the cheapest electricity, about 0.9 TBaht/kWh
Full „tank“ = 45 TBaht



+



or



@ PV 1.5 kWp (12-14 sqm)

Invest: 2500 US\$

= 10,000 km/a

@ no fuel cost for 25 years!

x 10,000 km/a

Three further very good reasons for electric mobility in Thailand/ASEAN:

Consumer

State of the art products
Better air quality and less noise in urban areas
Lower transportation costs

Industry

Stay competitive – not rely on outdated technology, Europe will stop ICE!
Other regions are ahead already – better be ahead!
Export demands state of the art products

Politics

Secure long term jobs with state of the art products, even grow!
Mobility transition and energy transition reinforce each other!
Fullfil committments to the Paris agreement!

Why Battery Testing?

Thailand/ASEAN/India has to catch up with global players! **In a relatively short time frame!**

Safety

Nobody should get hurt!

Even in severe accidents!

People in ASEAN are very superstitious!

Performance

Early adoptor market is over already!

Customers expect mature products!

Customer want higher performance than with ICE cars!

Quality

Quality must be superior to ICE!

New players have to be especially sensitive – reputation means success

Customers are not very forgiving!
Low quality/performance – low credibility

Two automotive and EV/battery labs in Thailand – Full R100/R136 coverage & way more!

In partnership / cooperation with Thai Automotive Institute (TAI) and TÜV SÜD – Ready in the course of 2021



TÜV SÜD own (automotive testlab / battery lab)
Ready since June 2021!



TÜV SÜD Battery Testing: around the world near to you

Further Investment in
North America in
2021/2022

Newmarket, Canada

Auburn Hills, USA

Garching, Germany

Suwon, South Korea

Utsunomiya, Japan

Singapore

Guangzhou, China

Changzhou, China

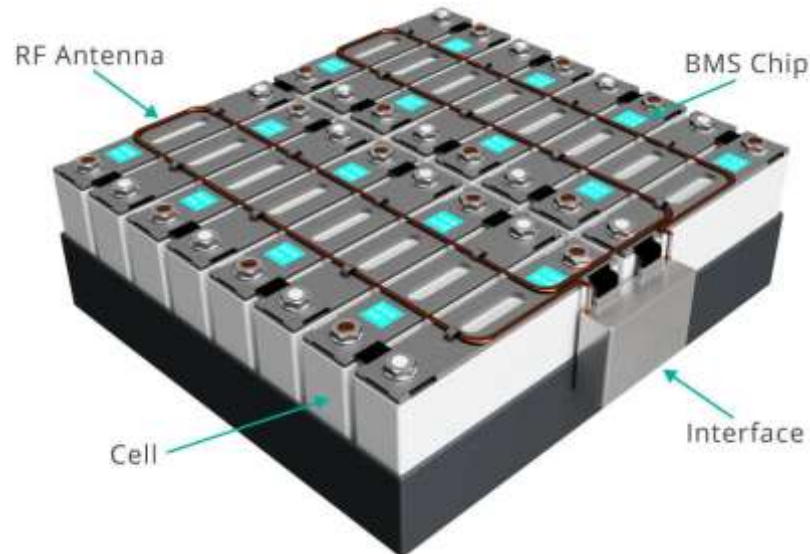
Bangkok, Thailand

Battery homologation / certification and how to develop a safe battery!

Regulations
(e.g. R100 type approval)

Industry standards
(e.g. national automotive standards like VDA)

Vehicle manufacturer standards
&
Product Liability
&
Quality Management
&
Quality Improvement!
(China, ASEAN, India)



Custom Tailored Testing Requirements
Highly Flexible Tests, Highly Customized Tests

We also prepare for the next level in ASEAN: 2nd life – 3rd life and stationary applications

1st life



EV or PHEV

2nd life



Revised battery /
slightly reduced
performance

2nd or 3rd life



REES –grid connected
or residential (outside)

End of Life



Recycling

„2nd Life“ of EV batteries – demo project in Germany



„USED“ Batteries coming from the Daimler Smart Electric EV

Thank you very much for your attention!

TÜV SÜD EMC Lab in Straubing/Germany with 350 kW charging power!



Mehr Wert.
Mehr Vertrauen.

Add value.
Inspire trust.

Contact us:

www.tuv-sud.com/e-mobility

Volker.Blandow@tuvsud.com

For a Safer and Greener ASEAN!



@tuvsud



[linkedin.com/company/tuvsud](https://www.linkedin.com/company/tuvsud)



[youtube.com/tuvsud](https://www.youtube.com/tuvsud)

Backup: 3 x WHY

WHY – e-mobility in Thailand / ASEAN?

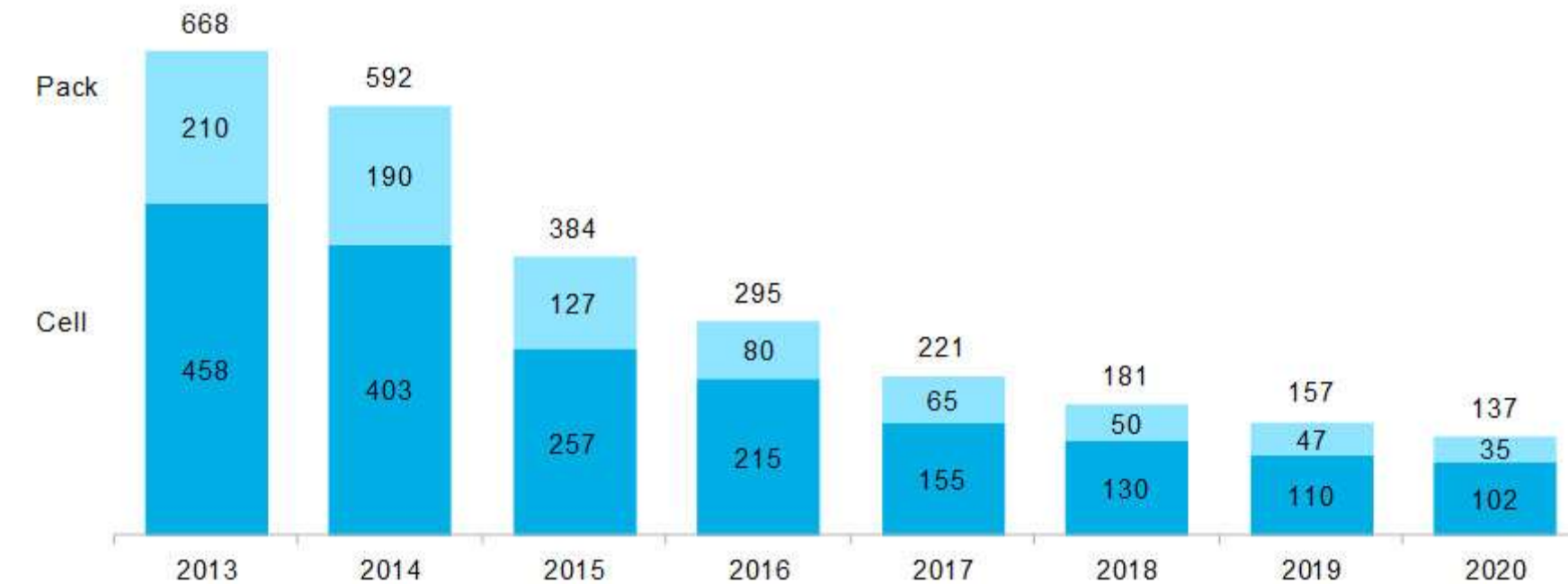
WHY – is battery testing essential for ASEAN and essential for the market success?

WHY – doing it with TÜV SÜD?

Battery cost development - Tesla promised another 50% cost reduction by 2023!

Figure 1: Volume-weighted average pack and cell price split

real 2020 \$/kWh



Source: BloombergNEF

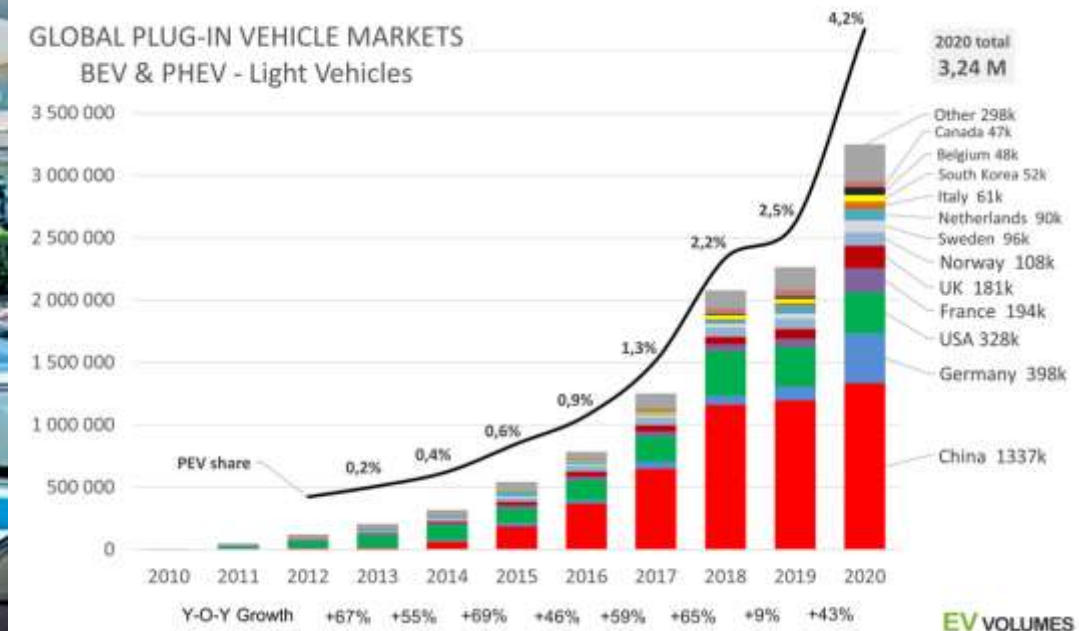
The Global EV market is growing every single day!

4000 Taxi Chargers in Shenzhen – Most drivers never drove a gasoline vehicle!
(17.000 electric buses in Shenzhen and Guangzhou)



The global EV market is growing steady and solid

GLOBAL PLUG-IN VEHICLE MARKETS
BEV & PHEV - Light Vehicles

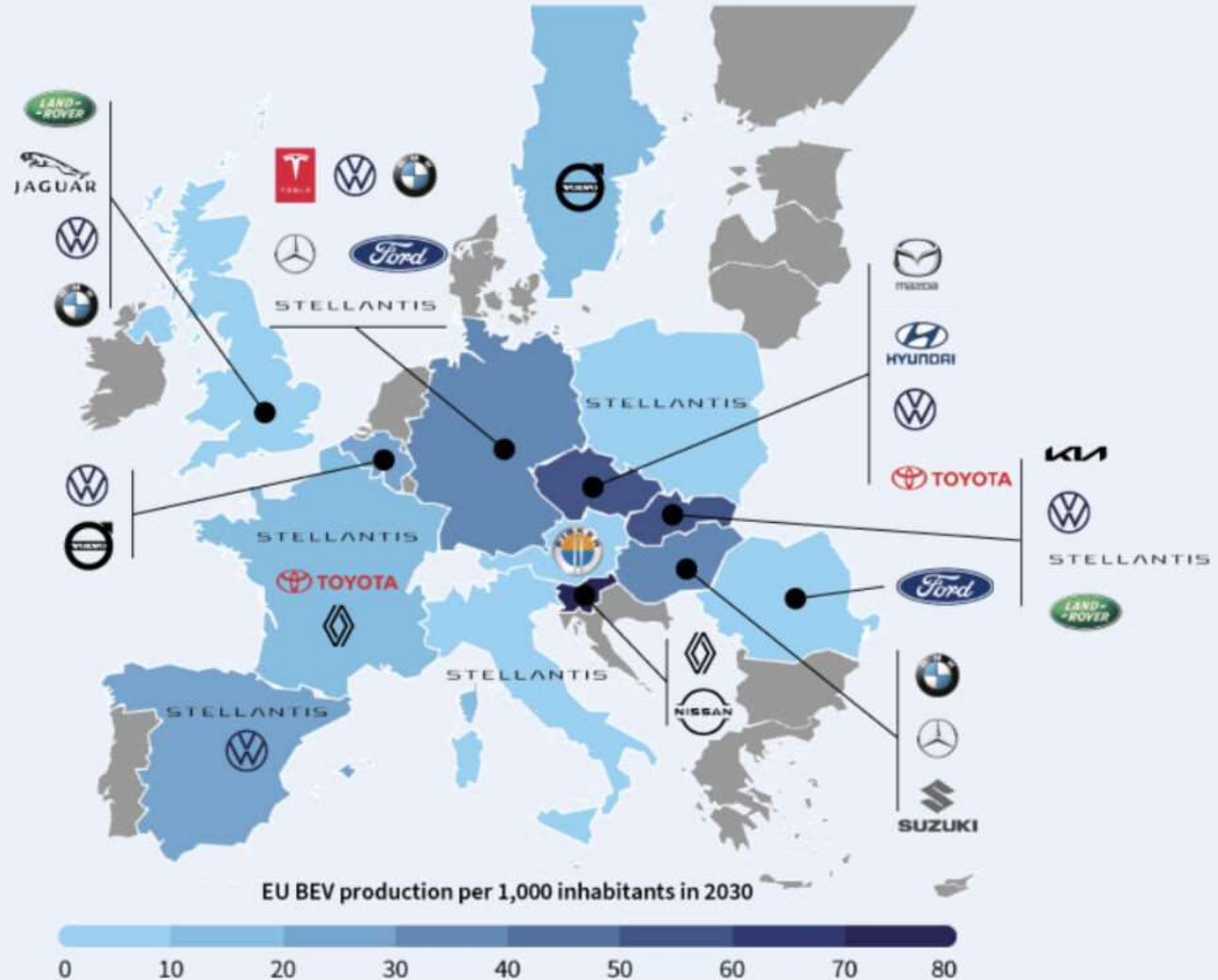


INDUSTRY:

The EU industry and energy systems are transforming:

The **donkey** became a race horse!

Europe's battery electric vehicles production in 2030



Industry:

The EV is just the beginning; the transformation is way more fundamental!



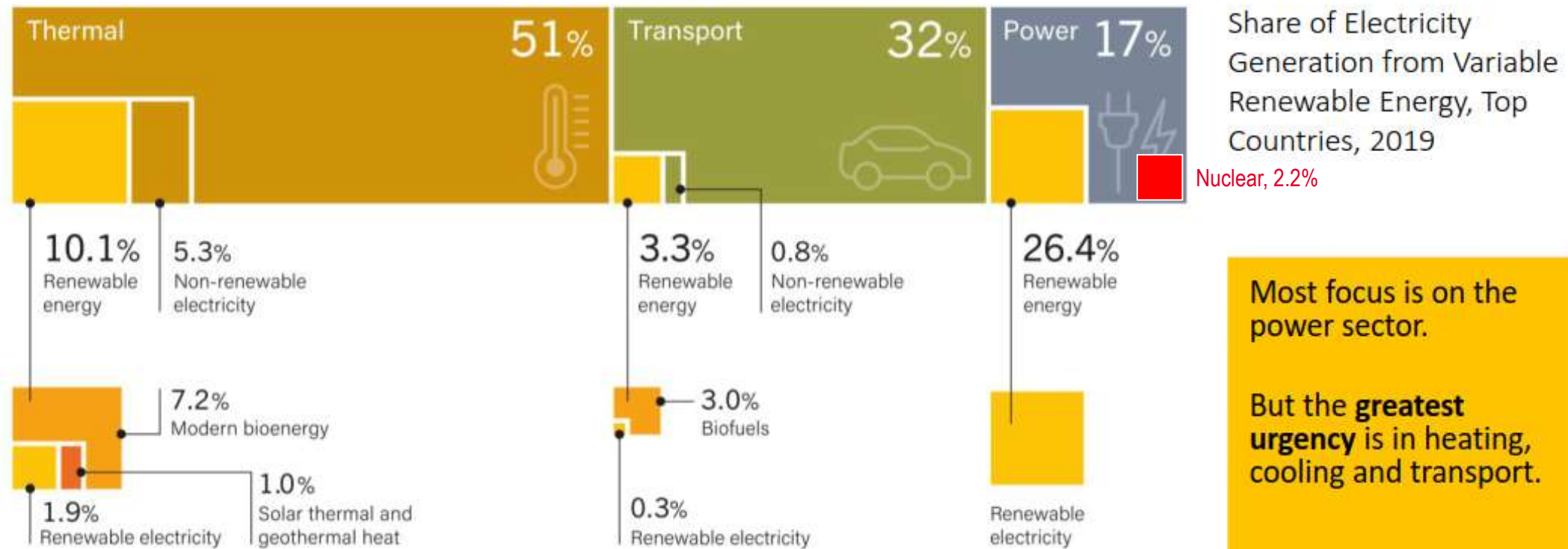
Tesla's are learning by every mile driven!

Vehicle improvement every 16 days!

45% less accidents per km driven since 2018!

Politics: Paris commitment – decarbonization of the energy system, not only of the transport system!

MORE THAN 80% OF OUR ENERGY FOR HEATING, COOLING, TRANSPORT



REN21 RENEWABLES 2020 GLOBAL STATUS REPORT

Source: Based on IEA data.

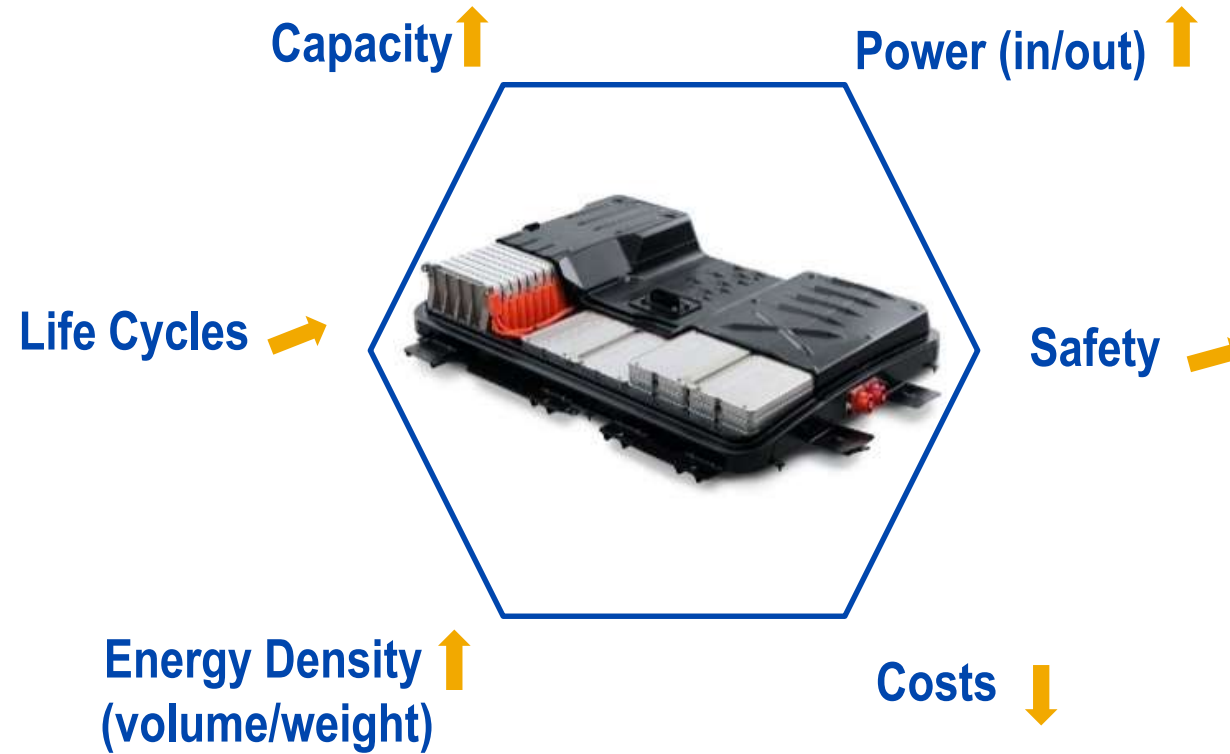
Why going with TÜV SÜD? Our global approach in EV and FCEV safety (incl. their Infrastructures)

- 10+ global labs for battery safety / EV components
- 10+ years plus experience in EV/FCEV testing
- Partner for Homologation and Global Market Access
- Compliance, Safety and **Quality**
- Contributor to global standard development

Mission

- ✓ The transport system has to change fundamentally to comply with the Paris Climate Protection Agreement and global air quality goals!

The battery challenge: Six characteristics equilibrium



Typical range expectation: 300-500 km ... leads to battery capacities of 45–100 kWh!
Fast charging of 150 kW or even 350 kW becomes state of the art in Europe already!

The battery is only one component, we prepare for more! (DIN/ISO/SAE or vehicle manufacturer own standards)

All-Electric Vehicle

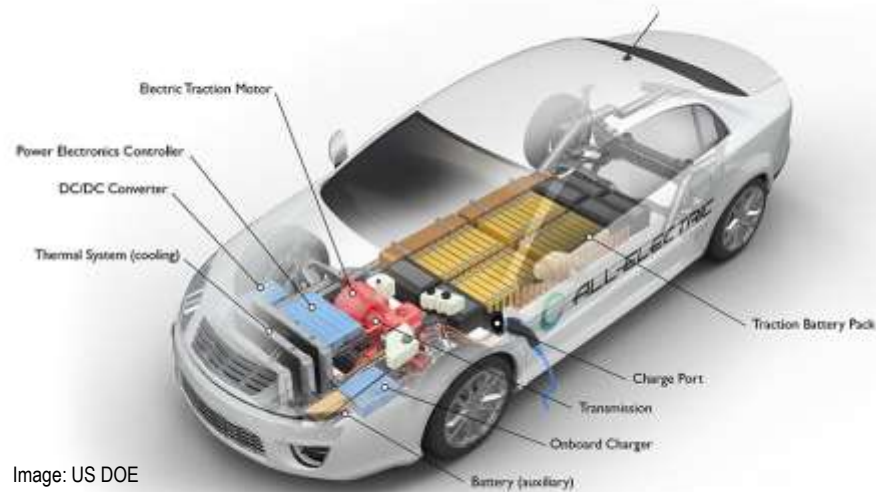


Image: US DOE

Hydrogen Fuel Cell Electric Vehicle

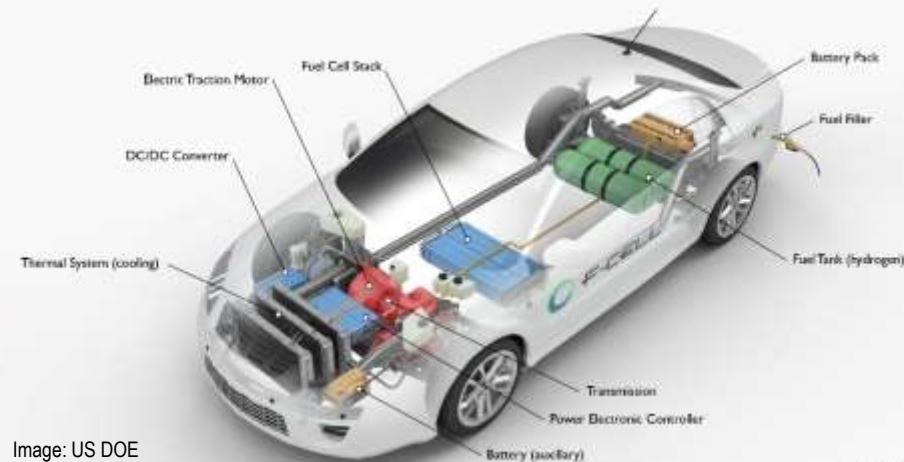
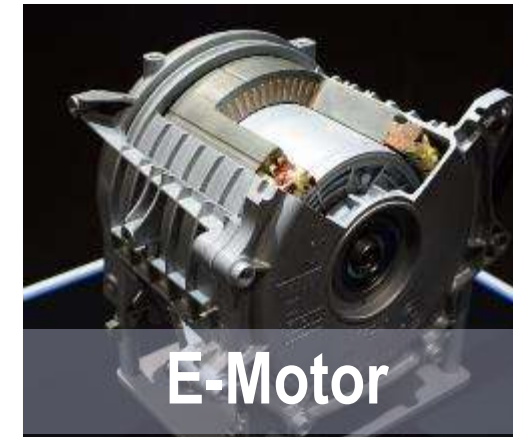


Image: US DOE

afdc.energy.gov



Battery Testing Lab in Changzhou – opened 2020



IP Testing Area



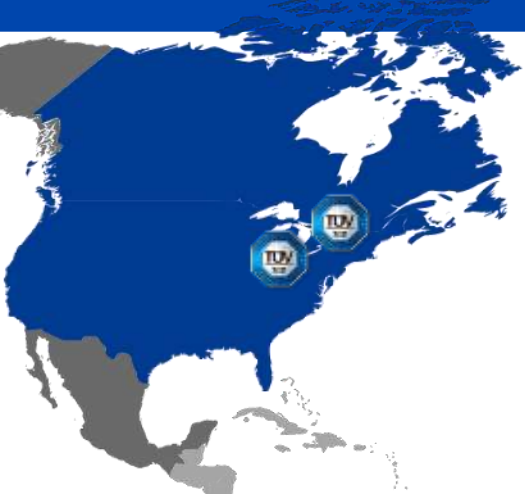
Safety Testing Area



Performance Testing Area

Battery Testing Lab in Guangzhou opened May 2021





Testing Labs in USA&Canada

- Situated in Auburn Hills near to Detroit and Newmarket near to Toronto
- Battery Testing experience since 2008 integrated in automotive testing labs
- Large portfolio of performance and environmental testing
- Experience in specific safety testing
- Specific expertise in cell analysis and chemistry evaluation
- More than 50 testing engineers with automotive component and battery experience
- Significant expansion in the next years

30+ mio USD investment
New location around Detroit
Integrated automotive testing lab
Start of operation towards end of 2022!

