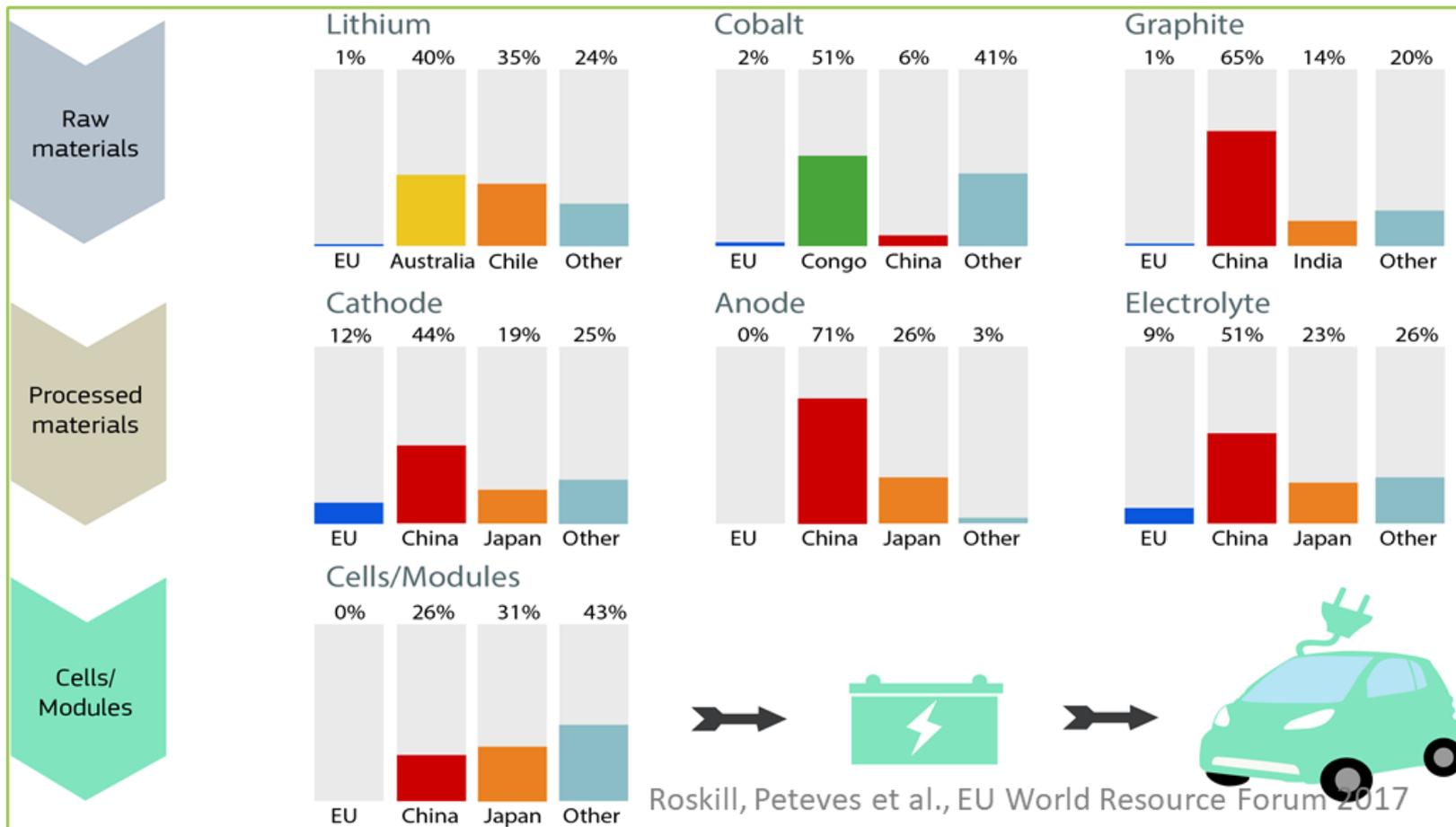


Battery Initiatives in Europe

Johan Söderbom, EIT Innoenergy and EBA250

How did it start and where are we today?

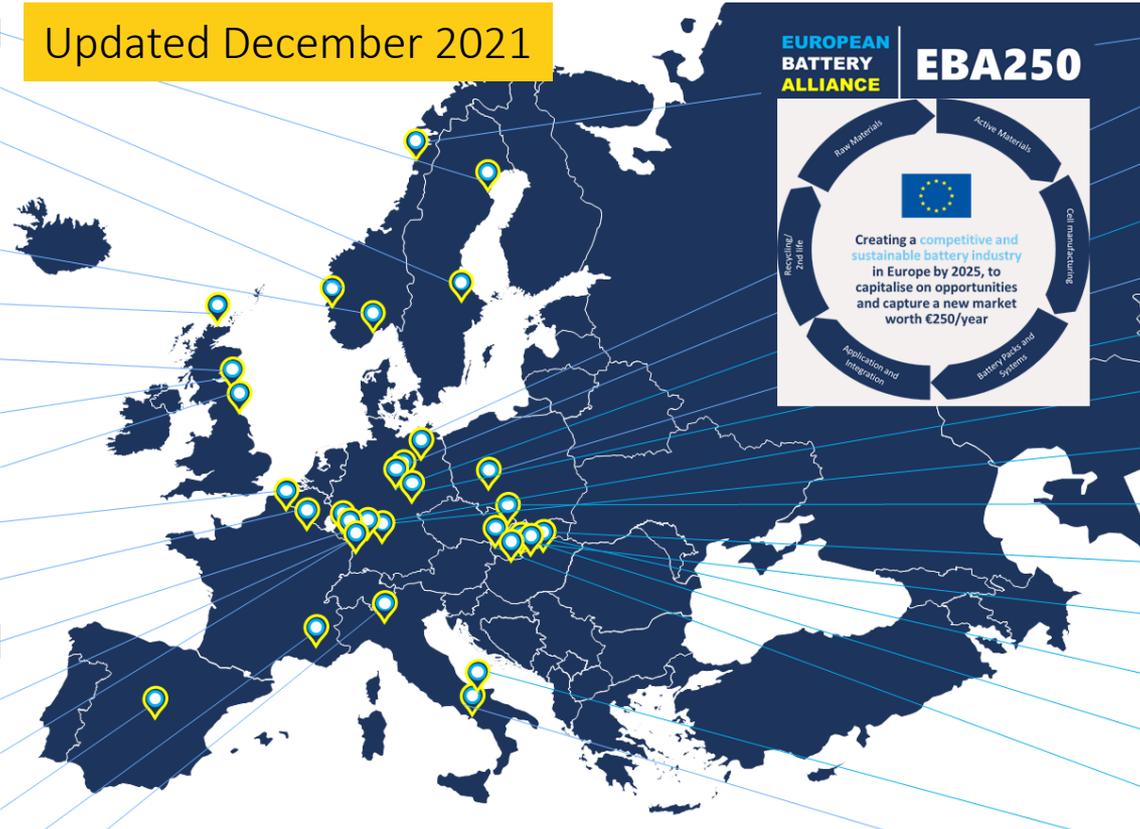
How did it all start- Battery value chain in 2017



Ongoing and Planned Li-ion Battery Cell Factories in Europe

Updated December 2021

- NORTHVOLT ETT**
Under construction, Start 2022, up to 60 GWh
- NORTHVOLT Labs**
In operation, 0,5 GWh
- NORTHVOLT/Volvo**
Announced, up to 32 GWh
- Beyonder**
Announced, up to 10 GWh
- MORROW**
Announced, planned start 2021, up to 32 GWh
- AMTE Power**
announced, up to 2 GWh
- ENVISION AESC**
in operation, 1,9 GWh
- ENVISION AESC/Nissan**
Announced, up to 25 GWh
- BRITISHVOLT**
Announced, planned start 2021, up to 30 GWh
- ENVISION AESC/Renault**
Announced, up to 24 GWh
- ACC France (Total/Stellantis/Mercedes)**
IPCEI project, Start 2022, up to 24 GWh
- ACC Germany (Total/Stellantis/Mercedes)**
IPCEI project, Start 2021, up to 24 GWh
- SVOLT**
Planned start 2023, up to 24 GWh
- LECLANCHÉ/ENERIS**
Small scale operation (0,3 GWh), up to 1 GWh
- VW, Spain**
Announced, up to 20 GWh
- VERKOR/Renault**
up to 50 GWh
- ITALVOLT**
Announced, up to 70 GWh



- Under construction/ in operation
- Planned, partially financed
- Announced, financial status unclear



- FREYR**
Announced, planned start 2023, up to 20 GWh
- TESLA**
Start 2021, up to 125 GWh
- CATL**
Start 2022, up to 80 GWh
- Volkswagen**
Start 2022, up to 40 GWh
- LG ES**
in operation, 24 GWh, up to 67 GWh
- FARASIS/Mercedes**
Announced, delayed to 2024 up to 10 GWh
- CELLFORCE/Porsche**
Announced, up to 1 GWh
- VARTA**
IPCEI project, Start 2021, up to 5 GWh
- MES**
Start 2020, up to 15 GWh
- SAMSUNG**
Start 2018, up to 30 GWh
- SK Innovation**
in operation, 7,5 GWh
- SK Innovation**
Start 2021, up to 10 GWh
- SK Innovation**
Announced, start 2028, up to 30 GWh
- INOBAT**
Announced, up to 30 GWh
- ACC Italy (Total/Stellantis/Mercedes)**
Announced, up to 16 GWh
- FAAM/FIB**
IPCEI project, Production started small scale, up to 8 GWh

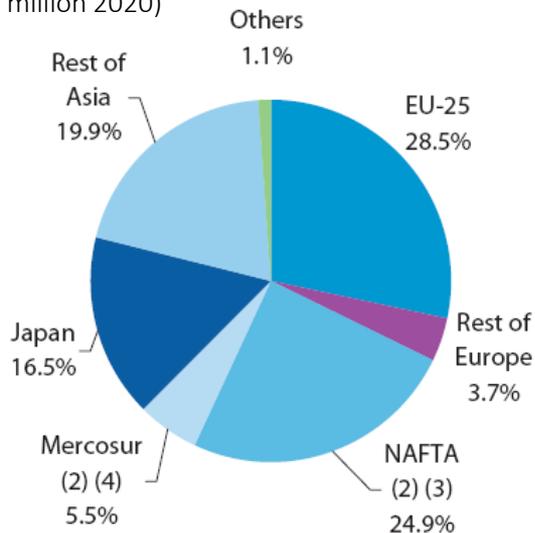
Source: EBA250 Observatory monitoring of public announcements on Li-ion cell production capacity

How did we end up here?

- Sense of urgency for the Automotive sector
- Strong development of renewables in Europe
- Outstanding cost reduction of batteries
- Commitment from Industry and European commission

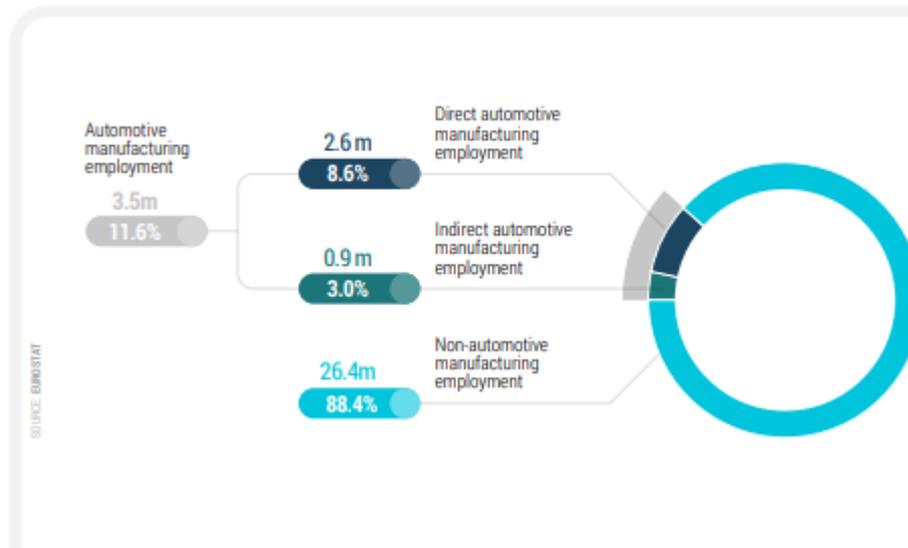
Global vehicle manufacturing

(78 million 2020)



MANUFACTURING JOBS IN THE EU AUTO SECTOR

% share / 2018



(1) Including interim or estimated figures.

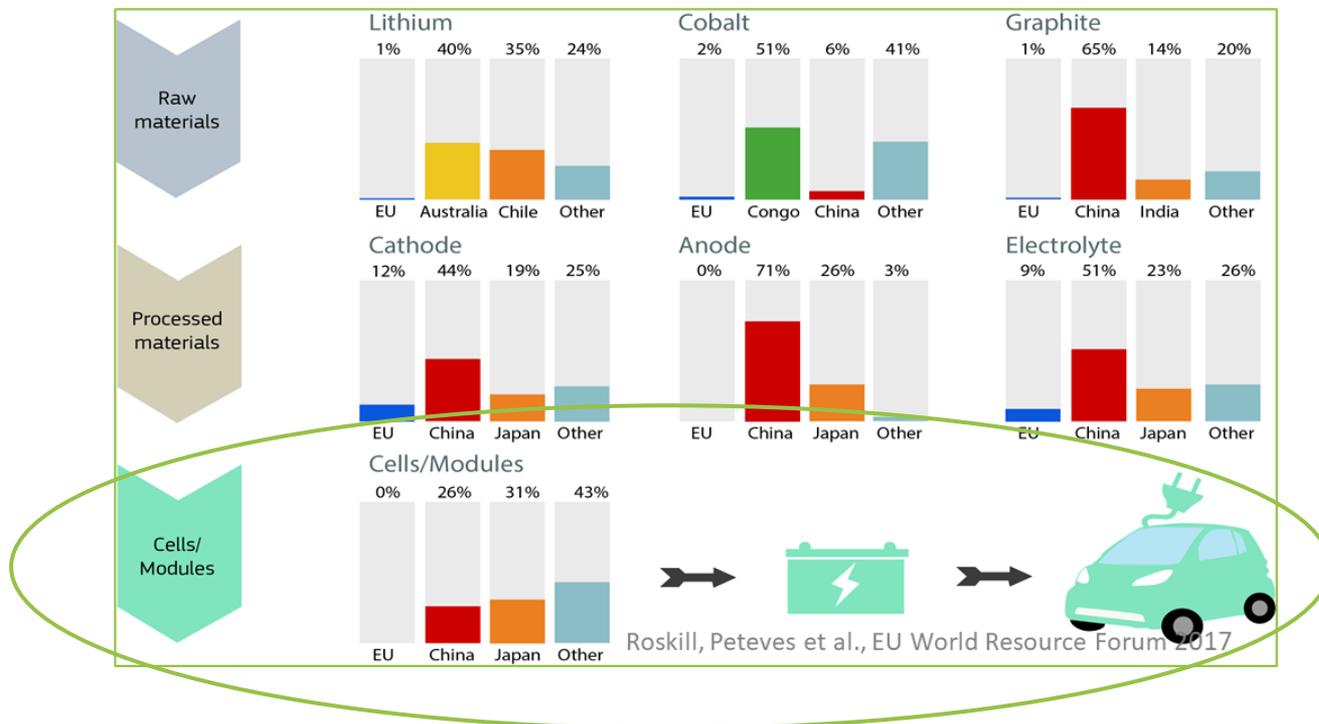
(2) Including light trucks.

(3) North American Free Trade Agreement covering Canada, the United States and Mexico.

(4) Southern Common Market covering Argentina, Brazil, Paraguay and Uruguay.

Source: VDA, <http://www.vda.de>

Many jobs at stake in the automotive sector in Europe



European batteries necessary to support the transition

Lithium-ion battery price survey: pack and cell split



Source: BloombergNEF. Note: Forecast prices are in nominal terms, observed prices are in real 2021 \$/kWh.

- Dramatic drop in the cost of battery packs for vehicles.
- Both cost for cells as well as for the packing has levelled out
- Further costs reductions to be expected on the vehicle integration

Boom in battery production in Europe catalysed by concerted policy and investment effort



Securing Access to Raw Materials

- Communication on critical raw materials
- Raw Materials Alliance with a focus on upstream supply chain elements



Accelerate R&D Innovation

- Various programs such as Horizon 2020, Batteries Europe, Horizon Europe, Battery 2030+ promoting technology leadership



Sustainability Focus

- Battery Regulation Proposal (Dec 2020) as part of a Circular Economy Action Plan



Supporting Cell Manufacturing

- Important Projects of Common European Interest to the tune of €3.2bn (Dec 2019) and €2.9 BN (Jan 2021) launched and funded



Securing Skilled Workforce

- Dedicated projects such as ALBATTs, DRIVES, and COSME
- Automotive Skills Alliance launched (Nov 2020)
- EBA ACADEMY**



Policy Consistency

- Aligning broader frameworks like EU's trade policy, clean energy strategy, mobility packages, and Green Deal

Mercedes-Benz to go all-electric for vehicles by 2030

26 July 2021, source [edie newsroom](#)

Mercedes-Benz has announced plans to move its entire product portfolio to electric vehicles (EVs) by 2030, to be supported by a £34bn investment and plans to run eight gigafactories for battery production.

Renault says electric cars will dominate sales by 2030

June 30, 2021 | by Jack Ewing / The New York Times | Copyright © 2021

ELECTRIFICATION MARCH 02, 2021

Volvo plans to be fully electric by 2030

VW plans to go all-electric in Europe as soon as 2033, US later

MOTORS / CARS

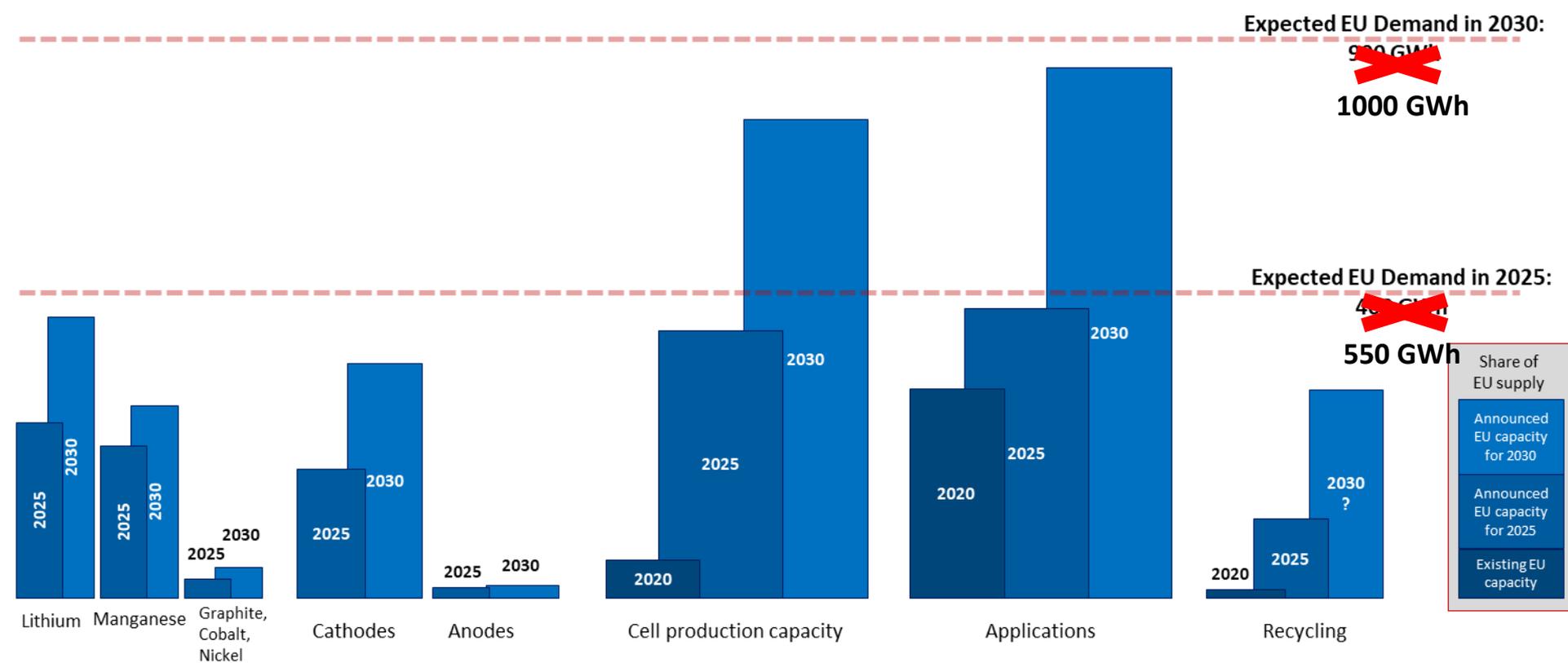
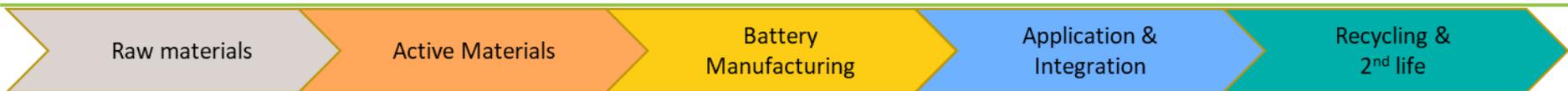
MARCH 17, 2021

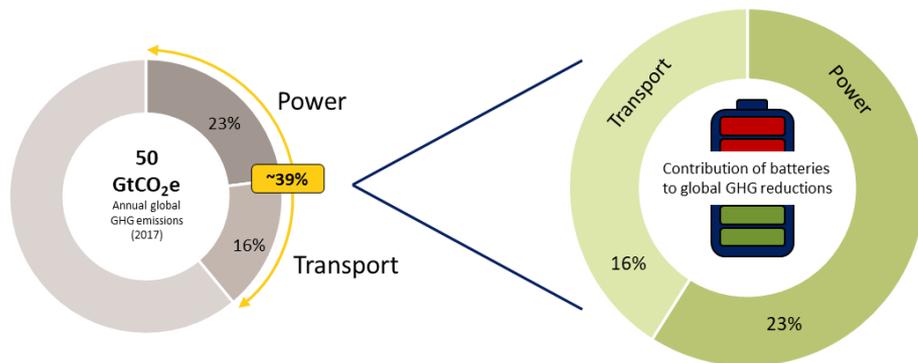
Audi Will No Longer Develop Internal Combustion Engines

Sep 7, 2021 - 10:59 am

Daimler is done with plug-in hybrids

What challenges do we see in the future?





Applications in the transport sector where batteries can contribute to emission reductions:

- EV's
- Electrified public transport
- Rail
- Waterborne transport
- Air transport
- « off road » industrial vehicles

Applications in the power where batteries can contribute to emission reductions:

- EV charging infrastructure
- Transmission and distribution grid infrastructure
- Telecoms
- Wind
- Solar PV
- Smart self-consuming homes and buildings
- Communities
- Industries

Source: EU Publications Office; PBL Netherlands Environmental Assessment Agency, 2019; IEA, IRENA, UN Statistics Division, World Bank Group, WHO, 2019; World Economic Forum, Global Battery Alliance

Batteries support the transition to a transformation of the energy and transport system through significant reductions in greenhouse gas emissions and contribute to several of the UN's sustainability goals

But only if they are produced with the lowest possible environmental impact possible!

For electric vehicle energy storage batteries

the EU would need 18 times more lithium in 2030

almost 60 times more lithium in 2050

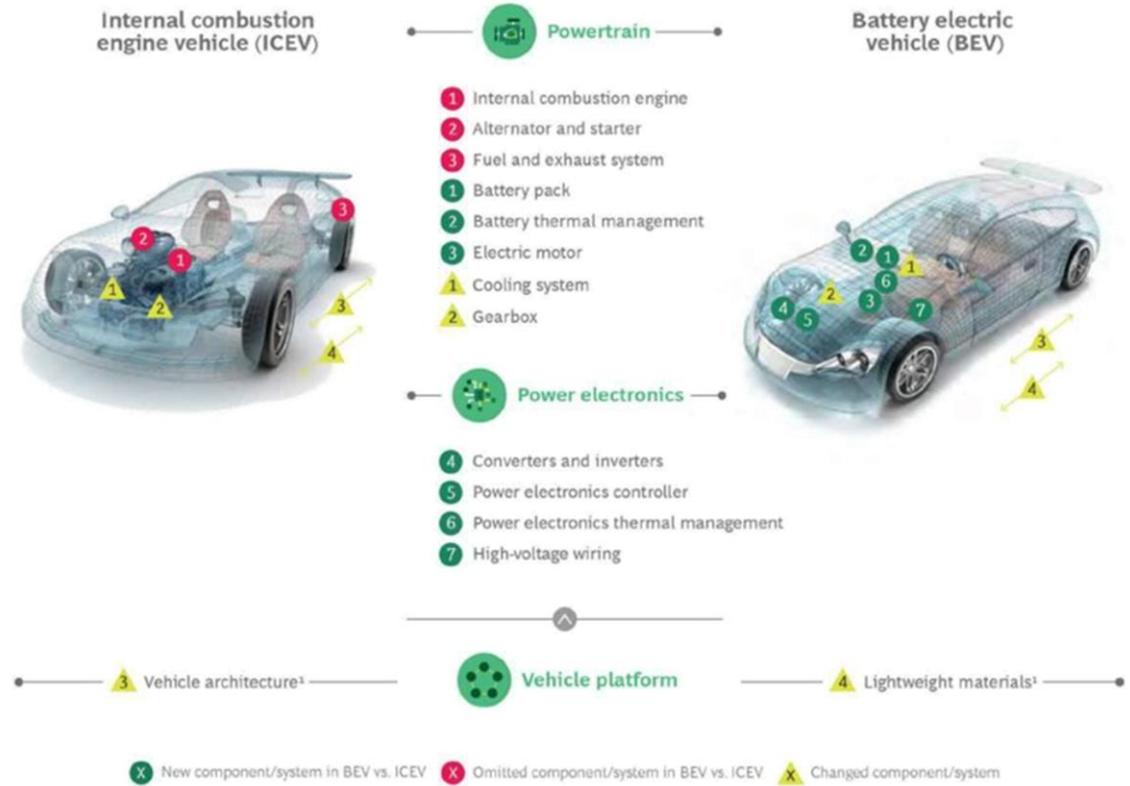


5 times more cobalt in 2030

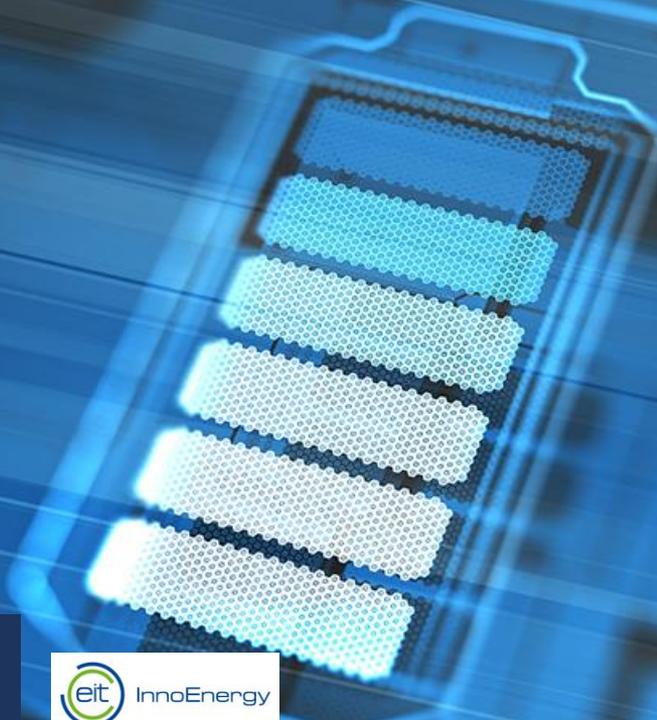
15 times more cobalt in 2050

and for rare earths used in magnets for e.g. electric vehicles, digital technologies or wind generators could increase tenfold by 2050.

The need for new competences- it is not only about replacing the combustion engine with a battery!



Source: BCG analysis.



In collaboration:

**EUROPEAN
BATTERY
ALLIANCE**

EBA250

