

# Integrating battery value chains in Europe

## FRDO-CFDD conference

30 May 2023, Budapest

Bela Galgoczi, European Trade Union Institute, Brussels  
[bgalgoczi@etui.org](mailto:bgalgoczi@etui.org)

**etui.**

# Main points

- Electromobility at full speed, but sales are concentrated to north-Western Europe (China, US)
- Current pathway not sustainable
- No future for the combustion engine (even if CEE locations might run longer)
- Labour demand of manufacturing an electric car is significantly lower than it was for a combustion engine
- The battery makes up a high share of the value of an electric car, also its labour content (up to 40%)
- Battery assembly, cell manufacturing is seen as strategic – even if it is a low-value added activity with no particular skills demand

# Fast changing policy and economic environment

- Fast-track transition to electromobility has become reality, it is also a business model for the industry, this is good news (even with the controversial Council decision on synthetic fuels)
- As investments into electromobility have become the dominant part of clean energy investments (BNEF 2023, see table), this means affordability (inequality) becomes a major issue
- New geopolitical constellation, not only with the energy and cost of living crisis, but with the low-carbon technology race in a deglobalising and conflictual world
- IRA, China, EU Net-Zero Industry Plan, Extraction of critical raw materials
- Is the EU automotive ecosystem ready for this challenge?

# New context: a new phase of green tech with more inequality

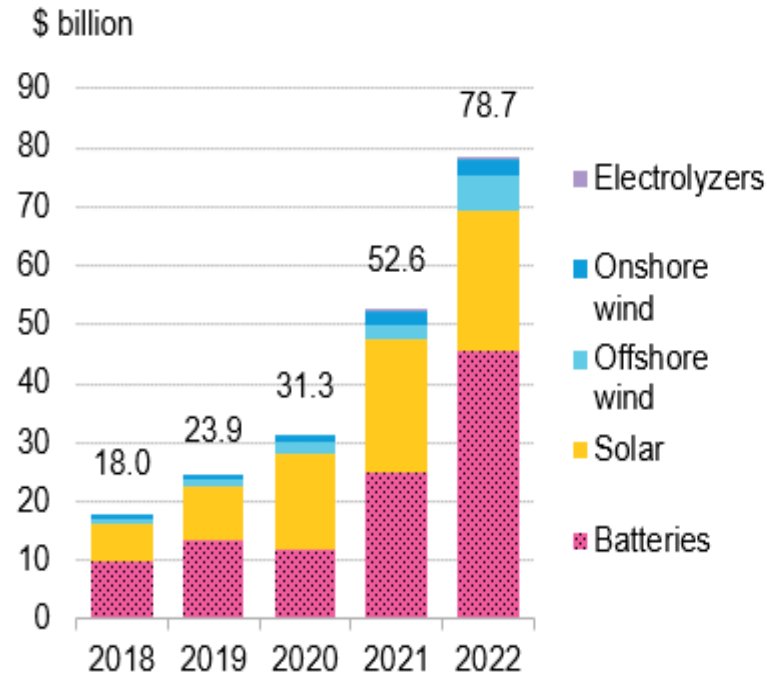
- Global clean energy investments 2022,

Technology/ Sector	Total Investment in 2021 (bn US\$)	Total Investment in 2022 (bn US\$)	% change from 2021
Renewable energy	366	495	17%
Electrified transport	273	466	54%
Electrified heat	52.7	58	10%
Nuclear	31.5	33	4%
Sustainable materials	19.3	36	86%
Energy storage	7.9	...	
CCS	2.3	...	
Hydrogen	2.0	1.1	-45%
<b>Total</b>	<b>754.8B</b>	<b>1,100</b>	<b>45.7%</b>

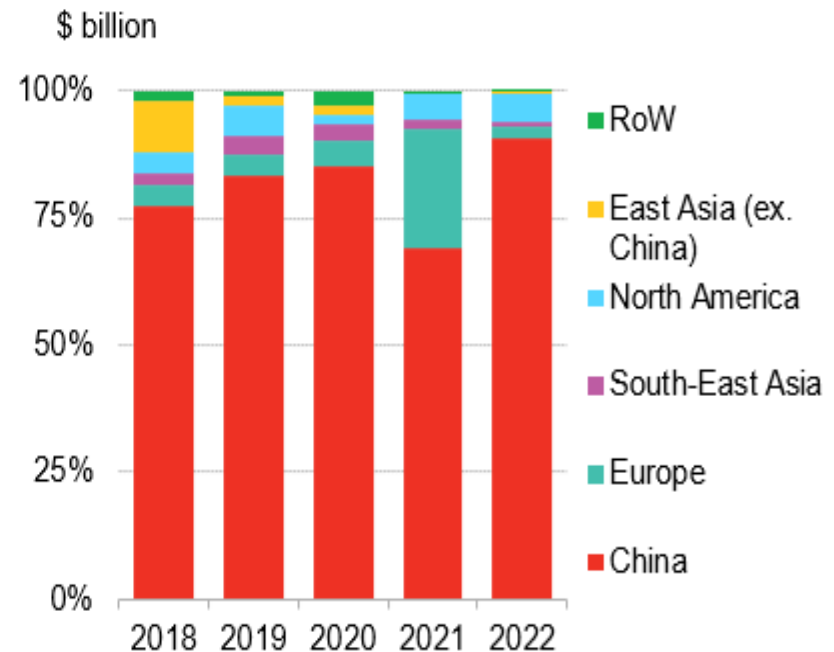
- E-transport investments becoming the dominant part of clean-tech (in EU in 2022 higher than RES investment)
- What we see: 96% of global e-transport investments (EV-s, charging stations) in 2022 were done in China, EU, US
- In the EU, EU14 (‘Western Europe’) had 95%
- New fault-lines, new inequalities
- If this trend continues, we never make it to net-zero mobility

# investments in manufacturing facilities for clean energy technologies, 2022 – China 91%

**Figure 2: Clean energy factory investment**  
**By technology**



**By geography**

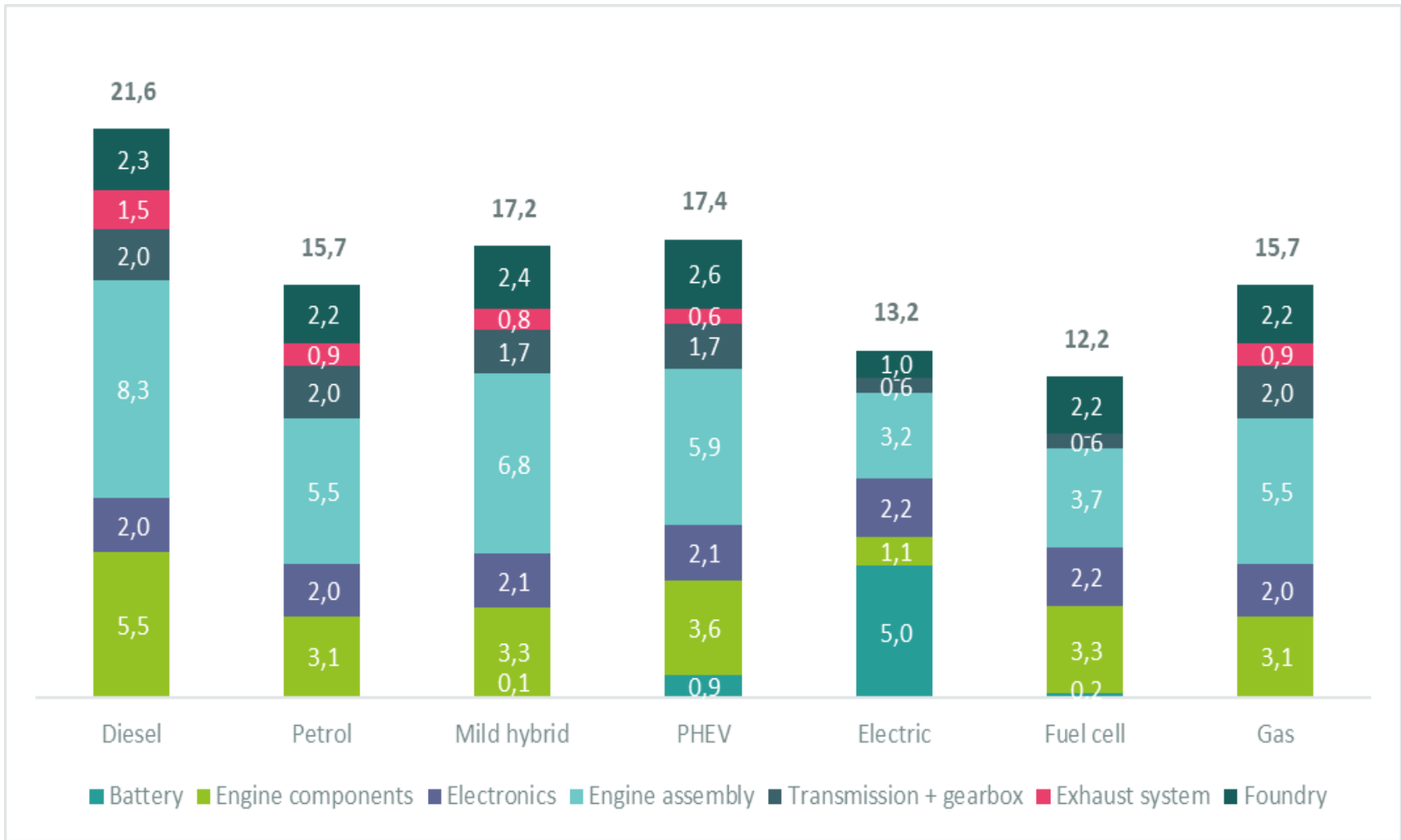


Source: BloombergNEF. Note: Sectors include upstream inputs and components, such as polysilicon for PV and anodes for batteries. No electrolyzer investment recorded before 2022. Solar investment for 2022 may have missed new capacity late in the year. Right-hand chart does not include wind.

# Battery boom and race

- The graph (BNEF 2023) shows that 91% of investments into clean manufacturing facilities in 2022 were made in China
- Slides by SOMO on battery manufacturing and trends up to 2031 show the overwhelming dominance by China, even if EU and US will have increased their capacities to 17 fold by 2031, the dominance by China will remain – this clearly shows that for the US this is all about catching up
- But the entire battery boom is not sustainable on basis of current business model – material and resource demand is enormous
- US and EU only focus on how to get access and control to critical raw materials, but not paying attention to the scarcity of these resources (+water)

# Labour intensity of EV 61% of Diesel, of what 40% battery, so battery matters also for employment

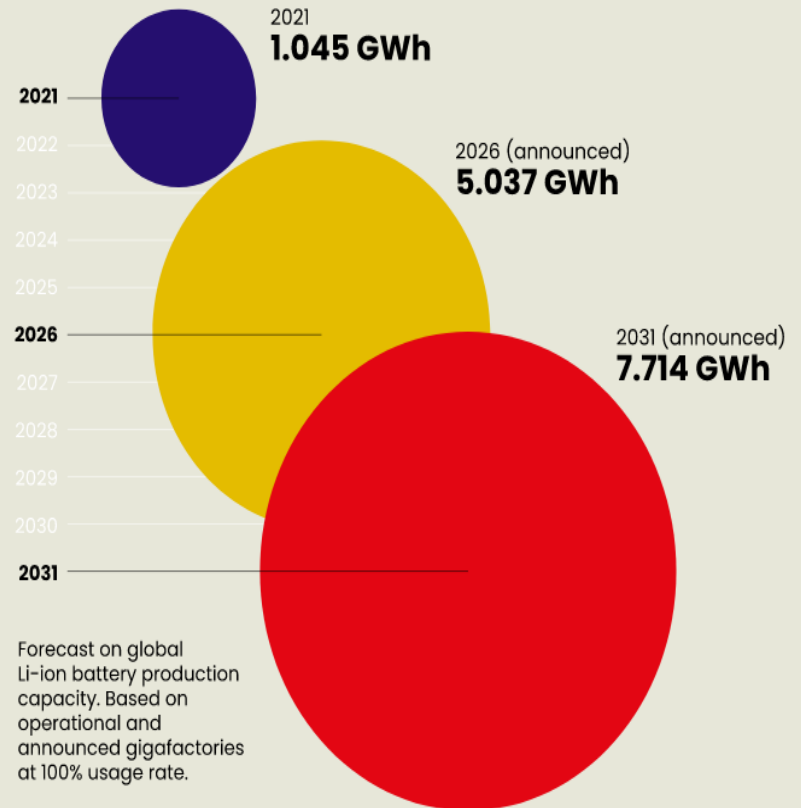


# Global battery boom and race

- |

Worldwide, more than 350 gigafactories are planned by 2031.

**By 2031, worldwide production capacity is set to increase to almost 8.000 GWh**



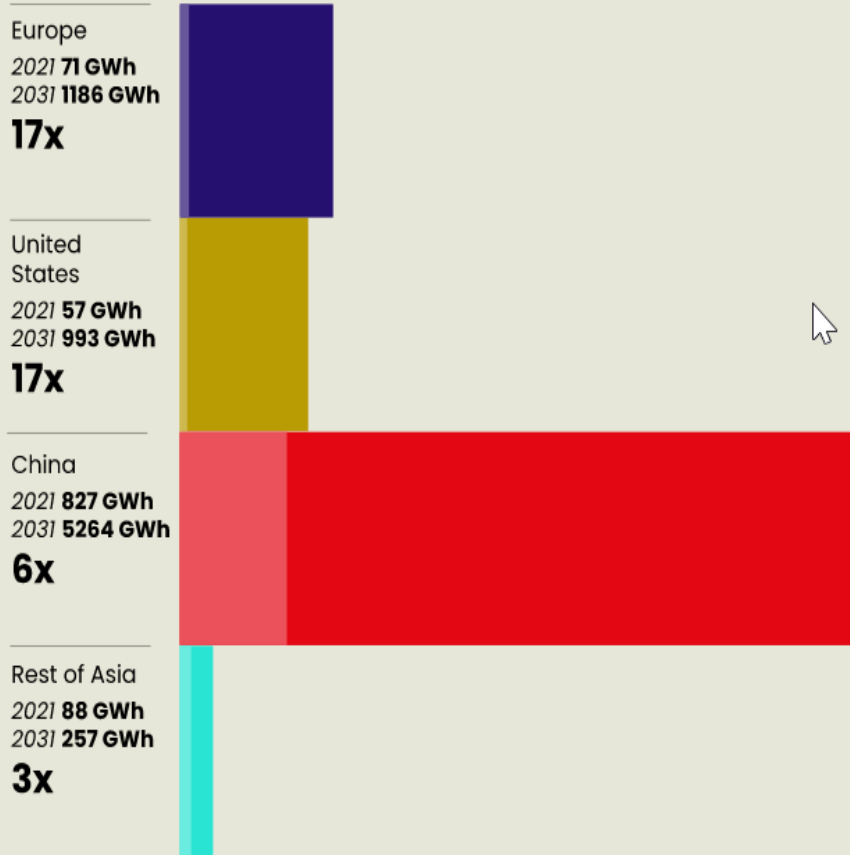
Sources: Benchmark Minerals Intelligence, November 2022



# China dominates the global battery value chain, but Europe is catching up; HU No.2 location in EU

## However, production in Europe and the USA is rapidly growing

Forecasted absolute growth in production capacity between 2021 and 2031



Sources: Benchmark Minerals Intelligence

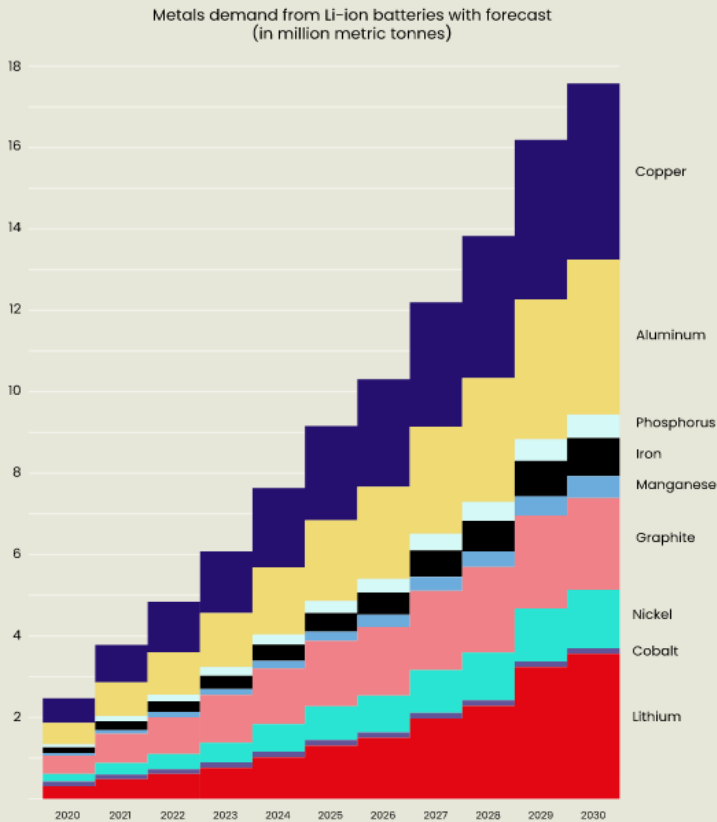
## These are the announced gigafactories for 2031



Source: Benchmark Minerals Intelligence

# The current battery boom is not sustainable

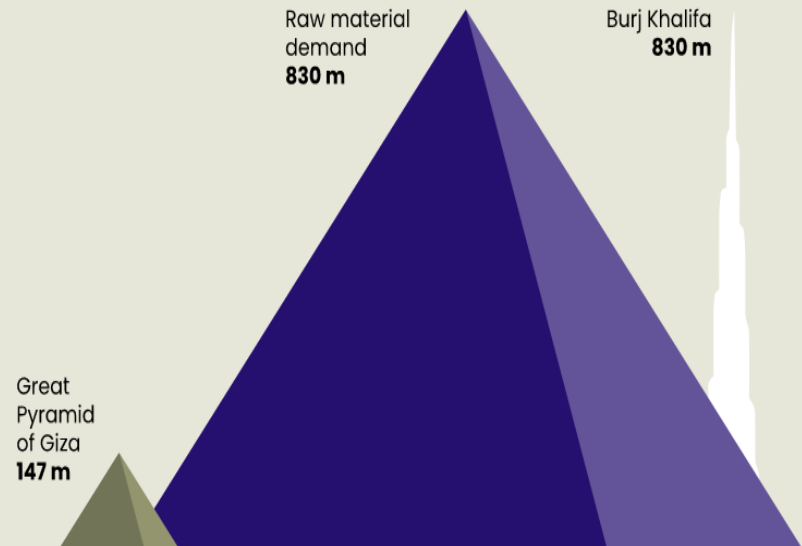
## Raw materials demand from Li-ion batteries skyrockets in the next decade



Source: BloombergNEF

## Cumulative demand of raw materials from 2021 to 2030

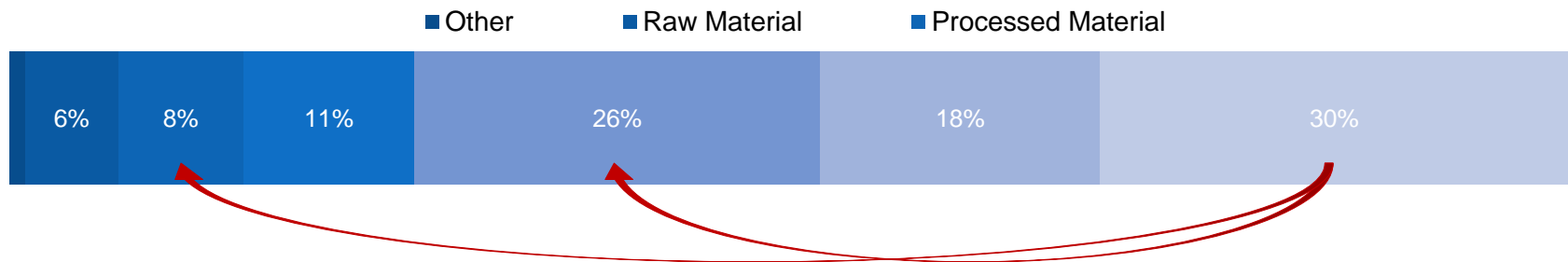
At above 100 million tonnes, raw material cumulative demand for the production of Li-ion batteries from 2021 to 2030 is enough to create a Pyramid of Giza as high as the Burj Khalifa.



Source: SOMO's calculation based on BloombergNEF (for the cumulative demand of metals) and Nassar et al., "Rock-to-Metal Ratio: A Foundational Metric for Understanding Mine Wastes."

# Value chain

vertical and upstream integration observed



Source: M-Five, based on Sharova et al. 2020



## FINDINGS

- Share of value added of individual step in total battery production
- **Pack and cell with highest share of value added**
- Focus expands from pack to cell and further to raw material extraction in Europe
- Increasing control over the value chain to ensure security of supply, independence, high value-added shares and opportunity to build unique technological selling points
- Recycling as important aspect for future independent raw material supply and competitive advantages

# What mobility shift?

- One problem is that both the US and EU strategy towards sustainable mobility is based on the same pattern: no radical shift between modes of transport, not much new in shared mobility services, all focused on engine-switch that is based on the old concept of the car.
- Even worse, EV-s also get bigger, heavier and more expensive (with huge battery and material need) – VW also goes for SUVs and pick-up trucks
- EU battery regulation should not only set energy efficiency and (recycling) criteria, but set limits to carbon footprint (stopping the trend of batteries and cars getting bigger and bigger)

# Hungary as bridgehead of Asian battery investments

- Automotive sector plays an important role → GDP (5%), exports (21%), sustains many companies (740), employment (approx. 175k)
- Battery Giga-factories (Samsung, SK, CATL) with the entire supply chain (but mining)
- Between 2018 and 2022, the HU government has awarded nearly 500 Mn EUR state aid in cash, ca one eighth of battery value chain investments. ICE-specialisation, but many non-drivetrain related activities
- Battery plants and value-chain are relatively low added value, even if there is some R&D
- Having a dense battery supply chain is seen as a locational advantage for further foreign investments into the automotive sector

Photo source: Audi Media Center, 2021, link: <https://www.audi-mediacenter.com/>  
5570



# Hungary: No2 battery location in EU after Germany – 30,000 new jobs (but low job quality)

- Tightness in the labour market (can worsen with more battery projects)
- Many temporary agency workers
- Increasing number of foreign workers (3-rd country nationals);
- Labour regulations have been weakened over time
- Extensive automation already in-place
- Bad working conditions, especially at battery plants
- Demand for more electrical and other highly skilled engineers
- EVs and further automation can lead to further "downshifts" (R&D → manufacturing → maintenance)
- Unions weak, focus on day-to-day activities



Photo source: Techmonitor, 2016, link: <http://www.techmonitor.hu/piacmonitor/vilag-hir/meg-egy-gyarat-epit-kecskemeten-a-mercedes-benz-20160729>

# Problems, risks, and opportunities

- Hungary is part of the integrated periphery: dependent, vulnerable position
- Depends also on continued competitiveness of German OEMs
- Investment into R&D, but education system needs to be developed
- Transition to be gradual, allows for adjustment
- Government strategy reflects a push towards EVs, especially support for Asian battery manufacturers



## Is Hungary a good or a bad example?

- Employing foreign labour to fill up labour market gaps for new battery projects – concerns about working conditions
- It is seen as temporary with limited contract periods
- Having these battery capacities now can secure jobs in the broader automotive sector in the future (incentive for OEMs to bring upscale electric vehicle assembly in Hungary)
- Risk might be that overcapacities will be built up (but if foreign labour is temporary, this is no threat for Hungarian jobs)
- Quality of jobs is important and not only for foreign workers, for all workers – health&safety, working time, wages
- Equal rights and working conditions for foreign workers are crucial (EU due diligence rules will not help – as monitoring and control remains national)
- Trade union organisation and CB coverage for foreign workers?