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The Battery Race: battery manufacturing in Europe

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Location Matrix

where European battery plants can be expected

INDEX	Weight	Europe						Major Players			
		Germany	France	Hungary	Poland	Czech Republic	Slovak Republic	United States	China	South Korea	Japan
Labour	0,3	4,3	3,8	2,0	2,5	2,1	1,7	3,1	4,1	2,6	2,5
Energy	0,25	2,0	3,0	5,0	4,0	3,0	2,0	5,0	4,0	5,0	1,0
Logistics	0,05	5,0	3,0	1,0	1,0	3,0	1,0	4,0	2,0	2,0	4,0
Country Risk Premium	0,05	5,0	4,0	1,0	2,0	4,0	2,0	5,0	3,0	4,0	3,0
Political Stability	0,05	3,0	1,0	3,0	2,0	4,0	4,0	1,0	1,0	2,0	5,0
Transparency	0,03	5,0	4,0	1,0	2,0	2,0	1,0	3,0	1,0	3,0	4,0
Corporate Tax	0,05	2,0	1,0	5,0	5,0	5,0	4,0	3,0	4,0	3,0	2,0
Investment in Research/ Innovation	0,07	2,0	3,0	1,0	1,0	2,0	1,0	5,0	3,0	4,0	4,0
Score	to 1,00	3,3	3,1	2,9	2,8	2,8	2,0	3,8	3,5	3,5	2,5
Planned GWh 2030		317	74	88	65	0	10				

Calculation by M-Five

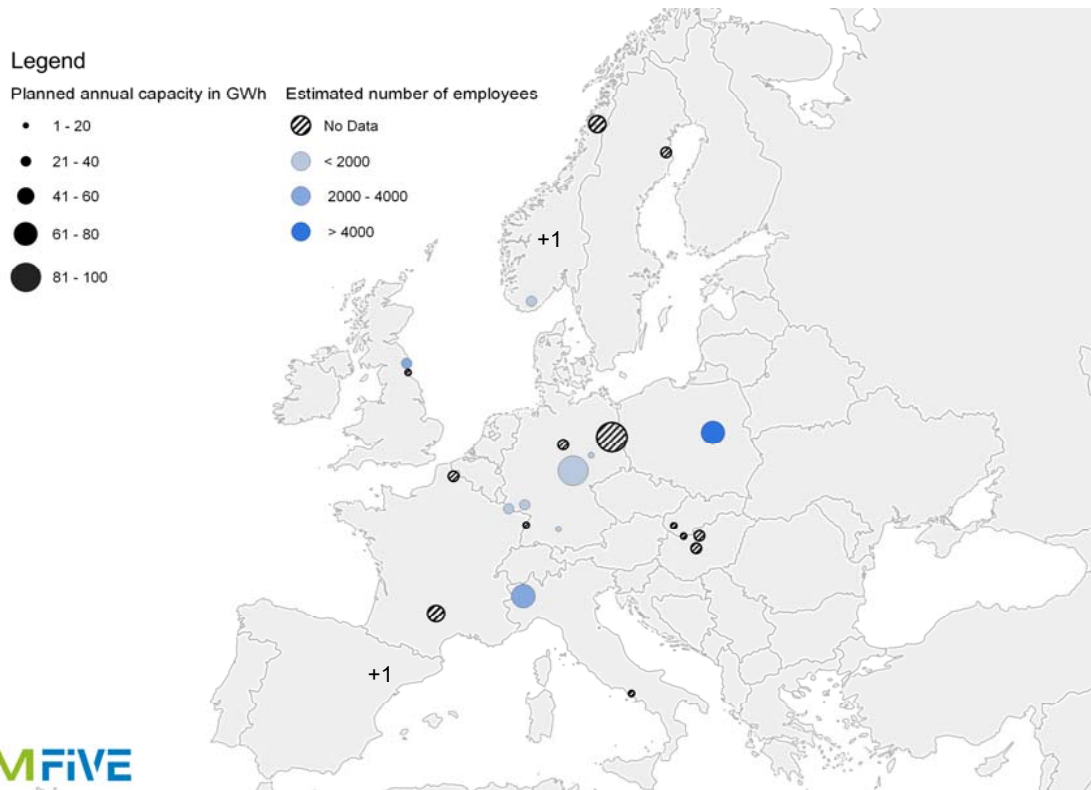
- ✓ High location score matches high announced GWh by 2030
- ✓ Czech Republic is negotiating with VW & CEZ
- ✓ European Union market share expected to rise from 6% in 2019 to 16% in 2029

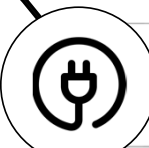
Database


- Labour:
 - Labour cost in manufacturing in 2017 PPP \$/ h (ILO 2018)
 - Education and skills score (WEF 2020)
 - Labour laws and social protection (WEF 2020)
- Energy:
 - Electricity in Pence/ kWh (Gov. UK 2019)
- Logistics:
 - Logistic Performance Index (Worldbank 2018)
- Country Risk Premium:
 - New York University 2021
- Political Stability:
 - The global economy 2019
- Transparency:
 - Corruption perception index 2020
- Corporate Tax:
 - Tax foundation 2020
- Investment in Research/ Innovation:
 - WEF 2020
- Weighting chosen according to reference project


Battery Cell Production Sites

where European battery plants have been announced



- 

760 GWh planned by 2030
- 

Ø 58 employees per GWh
- 

~ 44 000 direct jobs created

Illustration: Calculation by M-Five INACD Database

European Battery Demand and the assumptions made

➤ Cars produced in Europe:	in 2025: 16 Mio	in 2030: 16 Mio
➤ Share BEV/ xEV:	in 2025: 70%	in 2030: 83%
➤ Size battery BEV:	in 2025: 73 kWh	in 2030: 75 kWh
➤ Size battery PHEV:	in 2025: 13 kWh	in 2030: 13 kWh

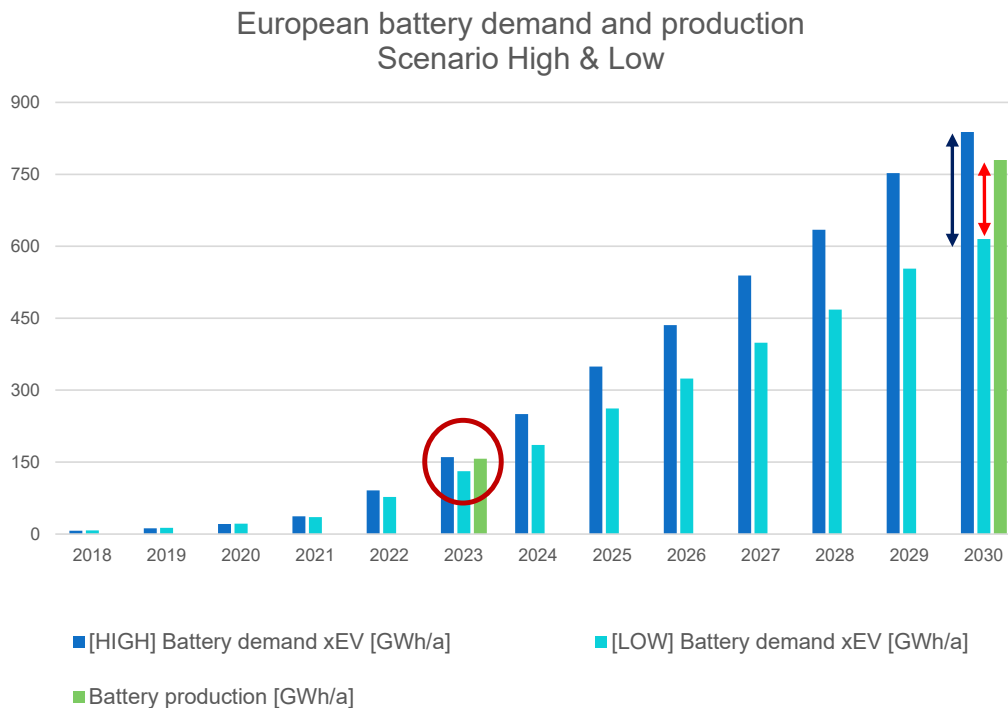
**SCENARIO
High**

Share xEV of total production
in 2025: 40%
In 2030: 82%

**SCENARIO
Low**

Share xEV of total production
in 2025: 30%
in 2030: 60%

European Battery Demand and the European battery production



Source: M-Five own calculations, INACD Database

- Various drivers of xEV demand:
 - Cost decrease
 - Government support
 - Supply of charging infrastructure
 - Increasing model availability on the European market:
 - Over 170 BEV models in 2025
 - Over 140 PHEV models in 2025
- Rising battery production capacity meets rising demand
- Possibility of overcapacity after mid-2020 in lower scenario

Value Chain of lithium-ion batteries

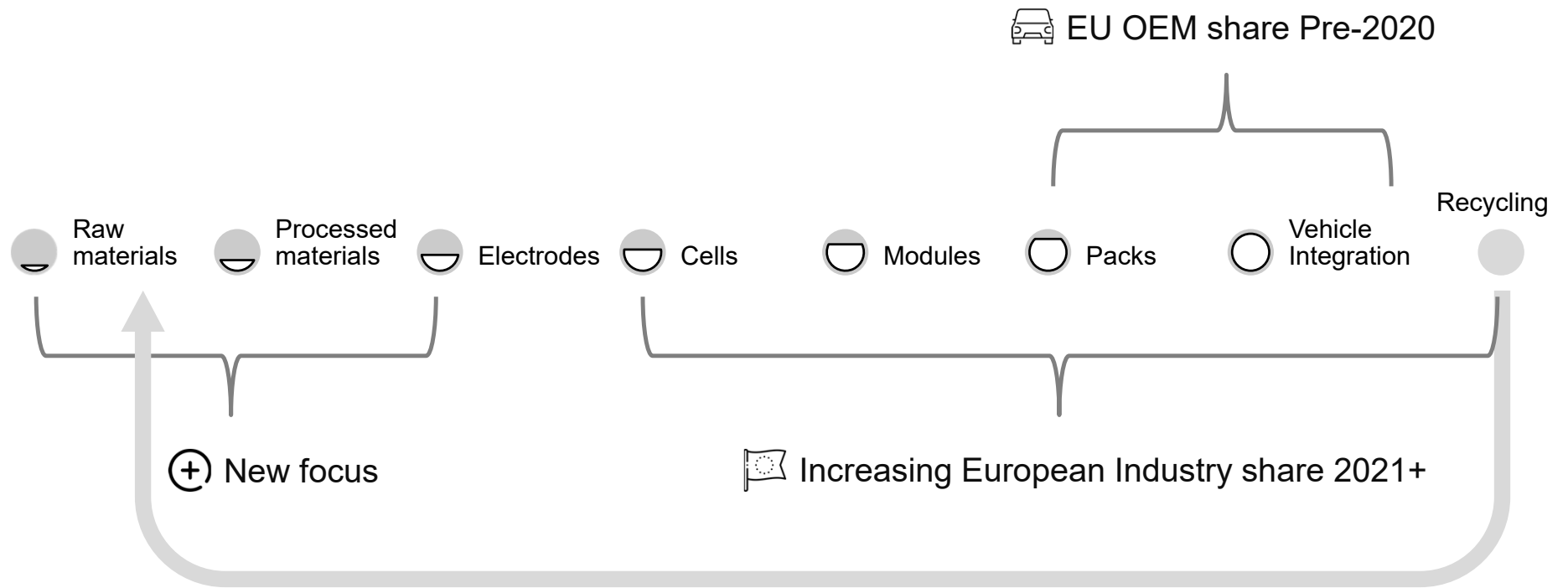


Illustration & Analysis M-Five