Centre for Energy & Climate

Geopolitics of the Energy Transition: what implications for the external energy policy of France, Germany and the EU?

OFATE, 24 October 2019, Berlin

Carole Mathieu

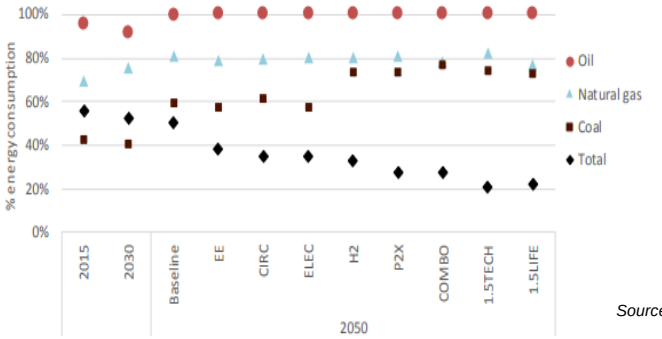
2019: a turning point for the EU's low-carbon energy transition?

- **Low-hanging fruits have been picked up, need to overcome significant challenges by 2030**
  - Need for a step-change in energy efficiency efforts
  - Local acceptance issues can slow down low-carbon infrastructures deployment
  - Carbon pricing cannot be strengthened, if seen as contributing to social inequalities
- **Targeting climate neutrality by 2050 will require fundamental changes in the way our energy systems and economies work**
  - Achieve major emissions reduction in ALL sectors
  - Avoid carbon lock-in while promoting the development of breakthrough solutions
  - Mainstream green finance to deliver the EUR142-199 billion/yr additional investment needed between 2030-2050
- **Socio-economic challenges cannot be underestimated:**
  - Supporting structural change in high-emiting sectors/regions
  - From a focus on the CO_2 footprint of the use phase of products to environmental life-cycle assessments
  - Challenges in becoming the first climate neutral continent, if the rest of the world continues with *business-as-usual*

High decarbonization scenarios and implications for the EU's energy dependency

- **Over the long-term, energy imports can be reduced thanks to:**
  - Energy efficiency, circular economy & lifestyle changes
  - Switch to domestically produced low-carbon energy

- **Dependence on energy imports (mostly fossil fuels) will remain acute over the next decades:**
  - EU energy dependency rate in 2017: 55%
  - Projected at 52% in 2030
  - Could fall to bw 38% and 20% by 2050



Source: European Commission, 2018

- **Opportunity to develop imports of decarbonized energy (electricity, hydrogen, e-fuels) will depend on several factors:**
  - Pressures on domestic resources (land, sea) linked to renewables
  - Availability of affordable globally-traded zero carbon fuels
  - Assessments in terms of impact on the EU's security

Dealing with new forms of dependencies and threats to energy security

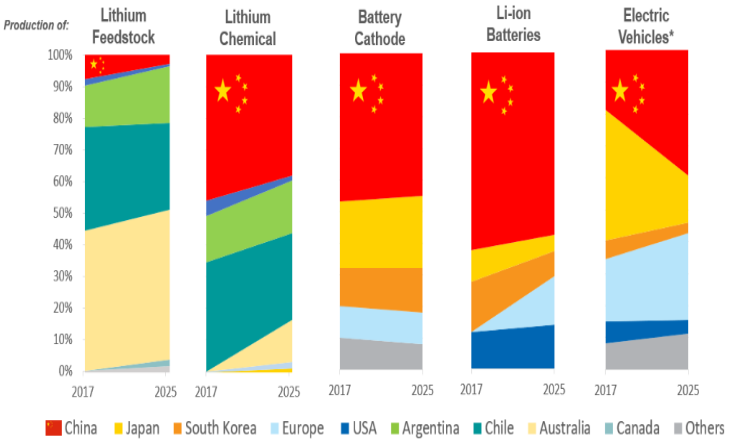
- **Digitization and decentralization may facilitate cyber attacks on critical energy infrastructures**

- **Replacing a reliance on fuels by a reliance on technologies may imply *inter alia* the following risks**
  - Foreign powers investing in EU energy companies to control assets that are critical for the EU's security
  - Vulnerability stemming from a higher dependence on raw materials for key low-carbon technologies
  - Losing technological sovereignty by meeting the EU's demand for low-carbon solutions with mostly products imported from non-EU suppliers

- **Beyond security concerns, technological dependency is a threat to the EU's industrial leadership and to the energy transition process as such**
  - A stable policy framework cannot be established without a robust political consensus
  - Support to the energy transition is partly based on the promise that new economic opportunities will be seized and that collective welfare will increase

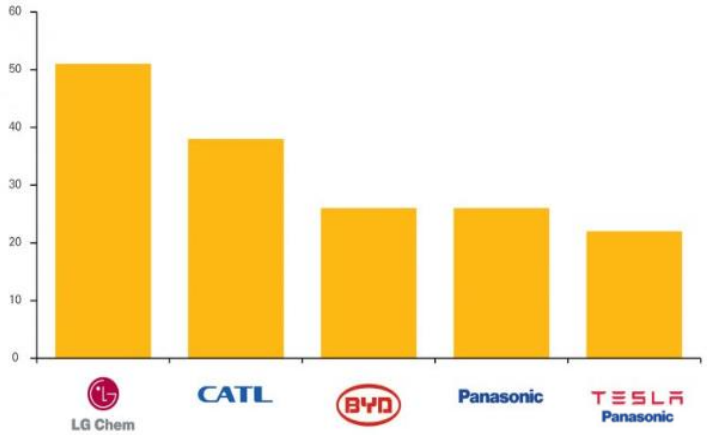
The market for electrical batteries is set to boom, and to be dominated by Japanese, Korean and Chinese companies

Production capacities by country for each segment of the battery value chain



Source: IHS Markit 2019

Battery cell production capacity of the five biggest producing companies (Q1 2019)

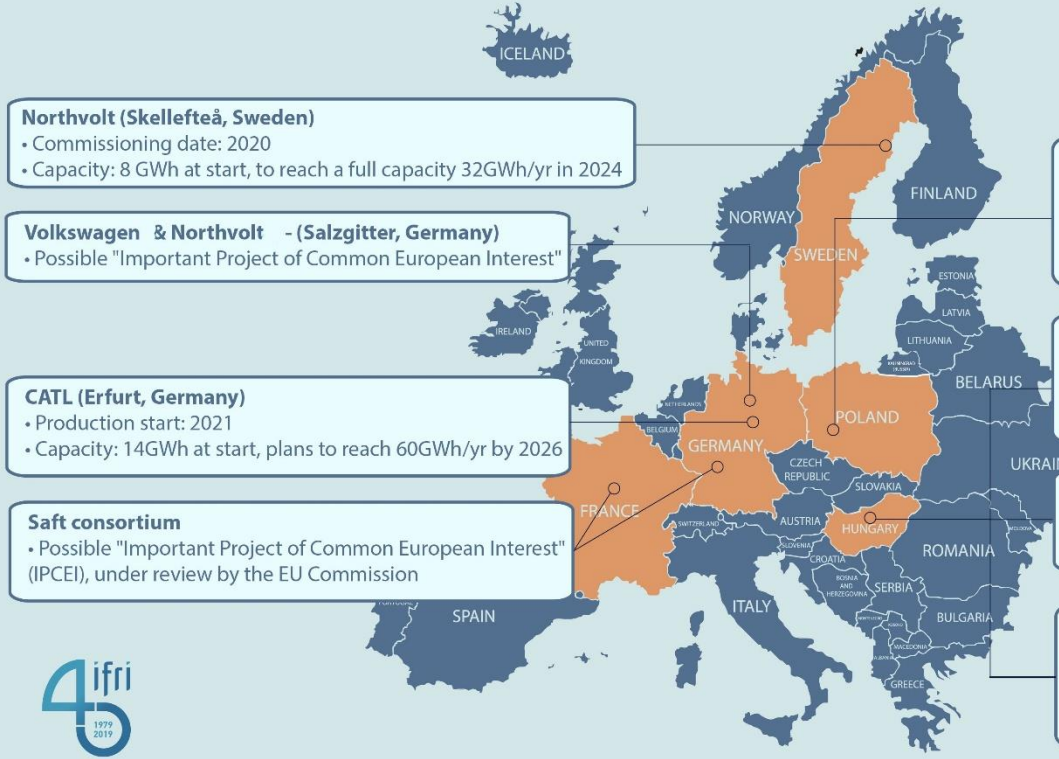


Source: Benchmark Mineral Intelligence

Lithium-ion battery cells market trends:

- Production 2019e: 160GWh ➔ Projectd global demand 2028: 1100GWh/yr
- Production capacity in 2019: 278GWh + 68 Gigafactory projects (+1,45TWh d'ici 2028?)
- China's share in global production expected to remain stable by 2030: 60%

Main projects of battery cell production factories in Europe



Northvolt (Skellefteå, Sweden)
- Commissioning date: 2020
- Capacity: 8 GWh at start, to reach a full capacity 32GWh/yr in 2024

Volkswagen & Northvolt - (Salzgitter, Germany)
- Possible "Important Project of Common European Interest"

CATL (Erfurt, Germany)
- Production start: 2021
- Capacity: 14GWh at start, plans to reach 60GWh/yr by 2026

Saft consortium
- Possible "Important Project of Common European Interest" (IPCEI), under review by the EU Commission

LG Chem (Wroclaw, Poland)
- Production start: Dec. 2018
- Capacity : 6GWh/yr today, under expansion to reach 15GWh/yr in the next few years, plans up to 70GWh/yr

Samsung SDI (Göd, Hungary)
- Production start: 2016
- Capacity: 2-3GWh/yr at start, under expansion to reach 15GWh/yr in 2020

SK Innovation (Komárom Factory 1, Hungary)
- Production start: 2020
- Capacity: 7.5GWh/yr as of 2022

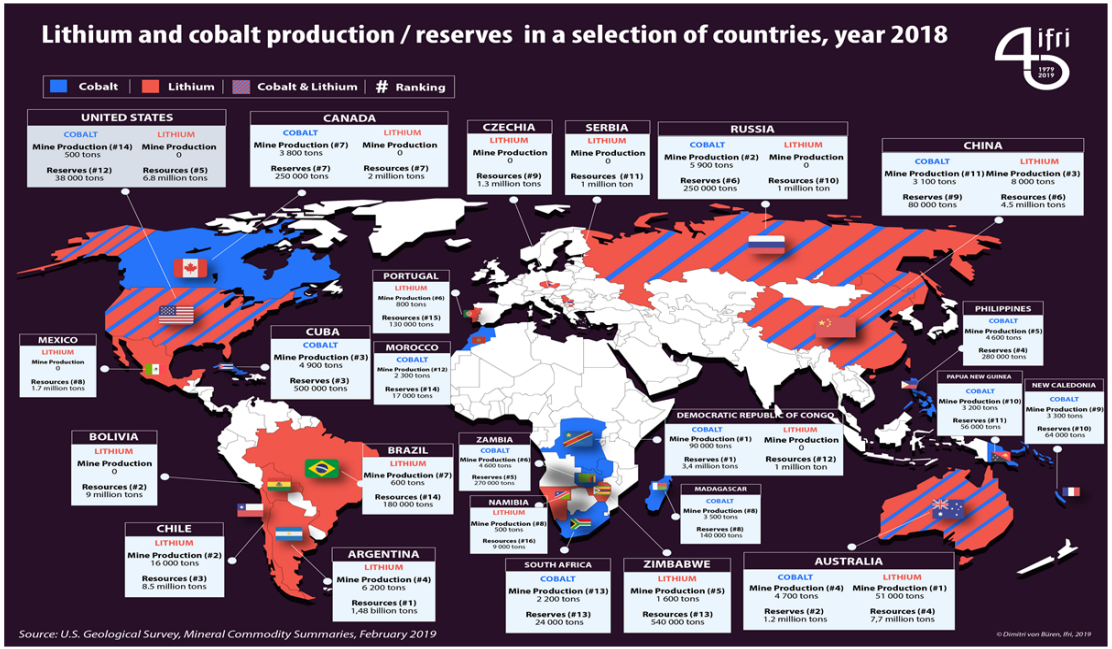
SK Innovation (Komárom Factory 2, Hungary)
- Construction of a second plant announced in February 2019.
- Production start: late 2021, early 2022
- Capacity: unknown

Source : Carole Mathieu, "The European Battery Alliance is moving up a gear", Édito Énergie, Ifri, May 2019.

Strengths and weaknesses of an "EU offer" of battery cells for car manufacturers

Strengths	Weaknesses
▪Enabling a tighter control on cells supply / protection against the risk of anti-competitive behaviours & nationalistic reactions from non-EU suppliers ▪ Avoiding shortfalls: up to 500-600GWh/yr of predicted demand for 2030, need for >10 *Gigafactories* in Europe? ▪Benefitting from political and financial support from the EU and Member States (EIB loans, IPCEI status and state aid) ▪Opportunity to develop differentiation strategies around sustainability of the manufacturing process (green battery)	▪ New entrant status, lack of experience in mass production, risks in terms of cost overruns and delays ▪High upfront capital requirements: no FID possible without commitments from EU OEMs (direct investment or offtake commitments) ▪HR challenge: gap in industrial engineering skills ▪An « EU battery alliance » but competition between 27 Member States to have industrial developments on their national territory ▪No robust EU strategy for securing stable and affordable supplies in raw materials

Dependency on raw materials imports: availability of resources and geographical distribution



Six countries (Australia, Chile, DRC, China, Brazil and Russia) together hold a large share of cobalt (66%), copper (33%), lithium (84%), nickel (52%), rare earth (70%) and silver (33%) reserves – but very limited potential for a producer cartel given diversity of country profiles and interests

China: a near monopoly supplier of critical raw materials

- **Cobalt:**
  - 40% of the DRC's cobalt production is controlled by Chinese mining companies (CMOC, Huayou, Jinchuan)
  - 60% of cobalt production is refined in China (70kt/yr)
  - 60% of the new cobalt mining capacity available by 2025 will be developed by Chinese companies

- **Lithium:**
  - 50% of global lithium production is controlled by Chinese mining companies
  - 65% of lithium production is refined in China

- **Rare earths:**
  - 80% of global rare earths produced by China today
  - CN companies seeking out resource supplies from abroad, due to limited domestic reserves & more stringent environmental regulation

➔Primary objective of CN's raw materials strategy has not been to fight diplomatic battles but to seek a competitive advantage in high-tech industries

- Raw materials: 65% of battery cells costs

Considerations for the EU's raw material strategy

- **A highly-capital intensive industry in which EU mining companies are not as well-equipped as their Chinese counterparts**
  - Lower access to public finance
  - Lack of integrated approaches / partnerships along the value chains

- **Pursuing a dual objective: not only ensure stable and affordable supplies but also fulfil ethical and environmental standards**
  - labour conditions, air & water pollution, community relations in mining regions

- **Substitution strategies can lead to displacing, rather than solving, perceived issues**
  - From NCM 622 to NCM 811 cathodes: a tight nickel market by 2025? / all greenfield projects located in one country, Indonesia / water pollution concerns

- **Developing the EU's recycling capacities is imperative, but many challenges ahead**
  - Existing EU li-ion battery recycling capacity: 15 000t/yr, while 50 000t/yr of batteries could reach end of life by 2030
  - High up-front costs and no profitability ensured against current price levels

Geopolitics of the energy transition: priorities for the new EU political cycle

- **Developing an EU industrial strategy for low-carbon technologies**
  - Conduct regular in-depth assessments of our needs / dependency risks
  - Favour value chain approaches /IPCEIs
  - Encourage R&D research, industrial partnerships, local experiments & pilot projects
  - Encourage differentiation strategies through norms and standards: eco-design/safety
  - Coordinate national ambitions and ensure that the EU low carbon industries benefit all MS and regions
  - Ensure reciprocal access to the domestic markets of our main trade partners

- **Going on the offensive in climate diplomacy**
  - Involve the EU's neighbours & partners in the energy transition; focus on Russia, Ukraine, Turkey, Egypt, Algeria & Morocco especially
  - Ensure that the decline in domestic emissions is not offset by an increase in imported emissions; remove the many practical obstacles to carbon border tax adjustments

- **Maintain EU unity & solidarity in pursuing our climate goals: being divided will be tantamount to losing the war on carbon**

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