對歐盟碳交易市場之觀察—如何克服製造業低碳化的挑戰

Observation on EU ETS: How to overcome the challenges of decarbonizing the manufacturing industry

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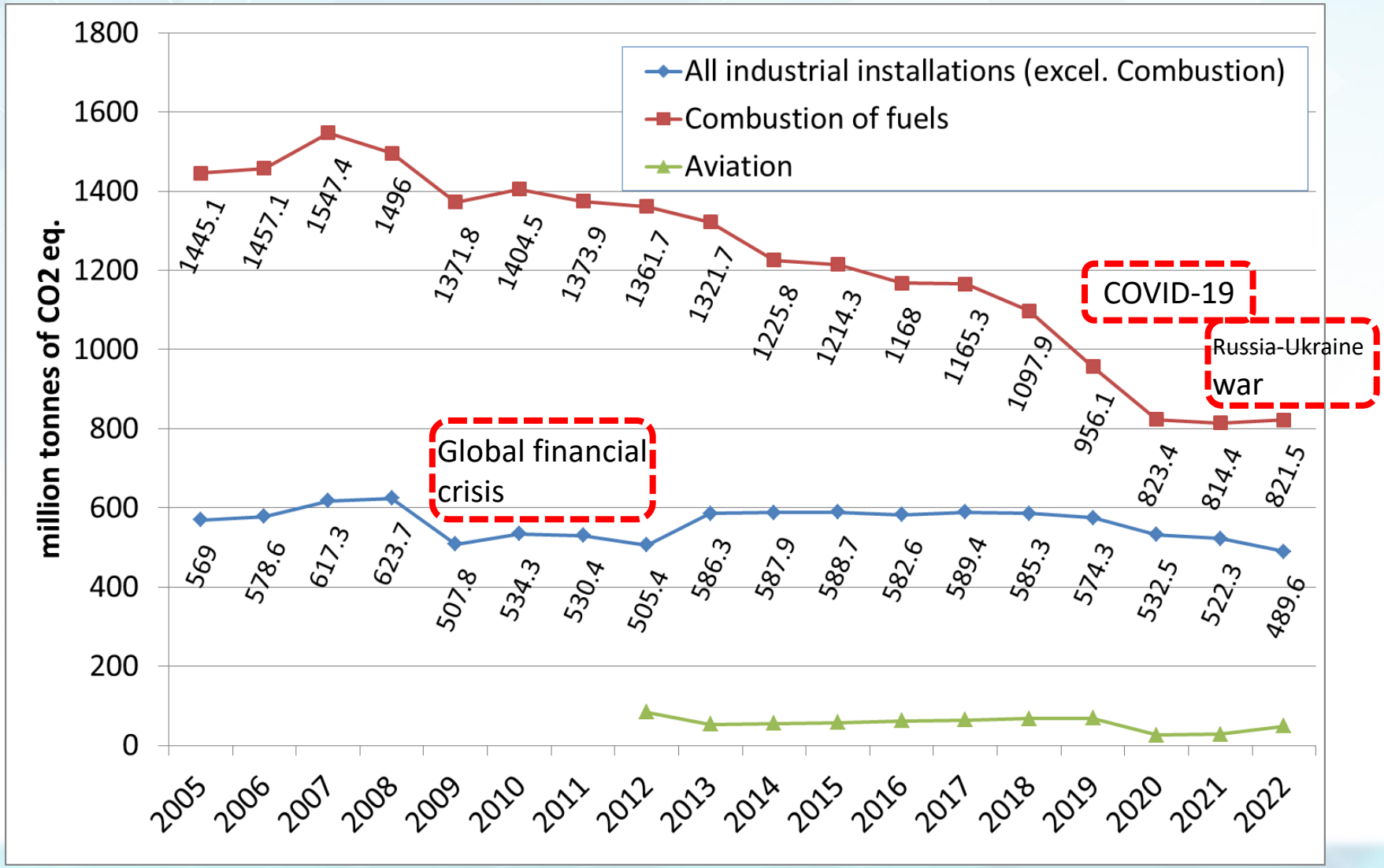
Verified GHG Emissions under the EU ETS from 2005 to 2022, by activity sector

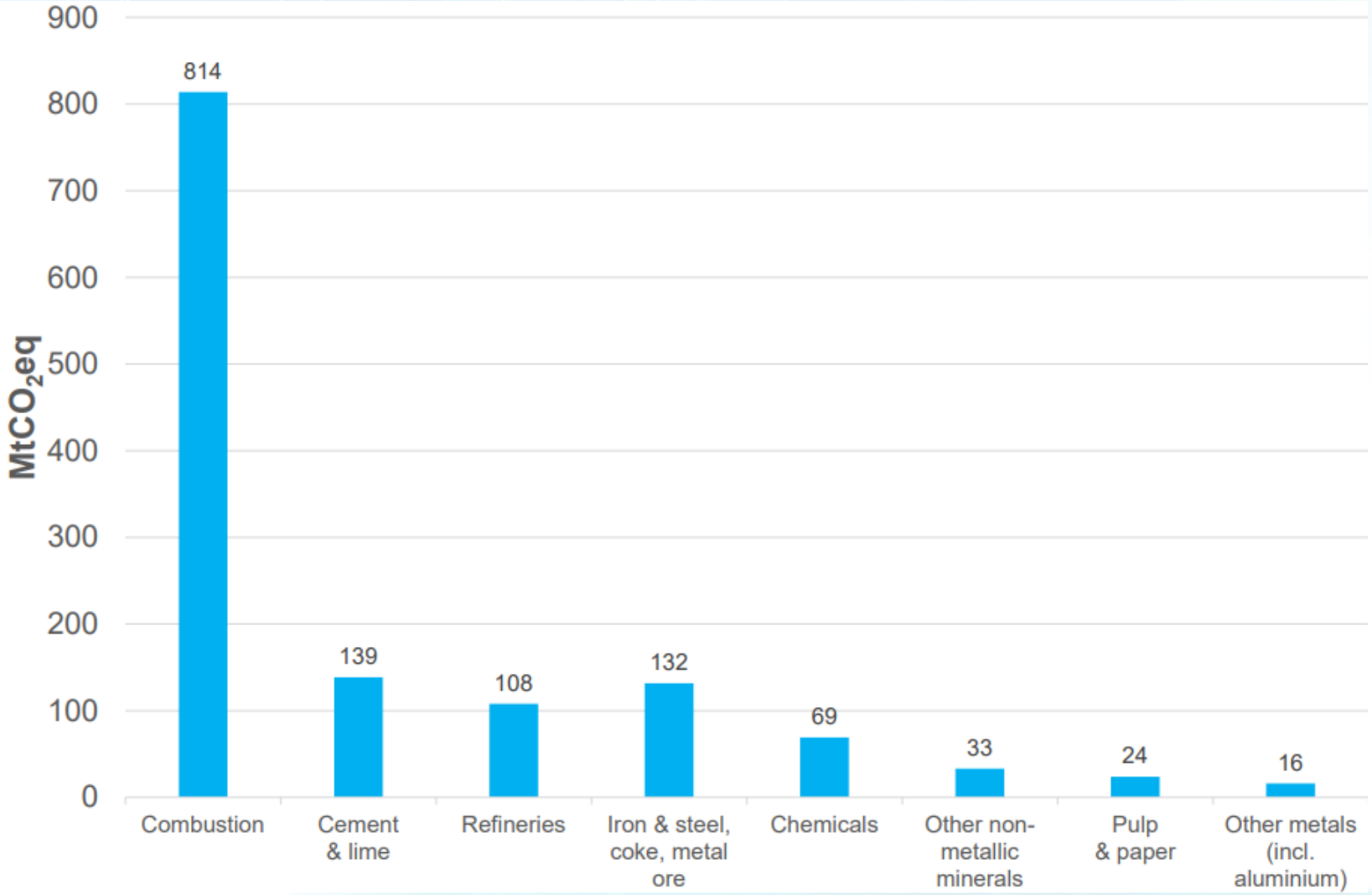
- The EU ETS covers about 38% of total EU GHG emissions.
- Industrial emissions were significantly affected by the financial crisis, COVID-19, and the Russia-Ukraine war

Note: According to EUTL attribution, emissions originating from the combustion of blast furnace gases are included in the sector 'combustion' (explained by Nissen et al. (2022, December))



資料來源：Statista. (2023)

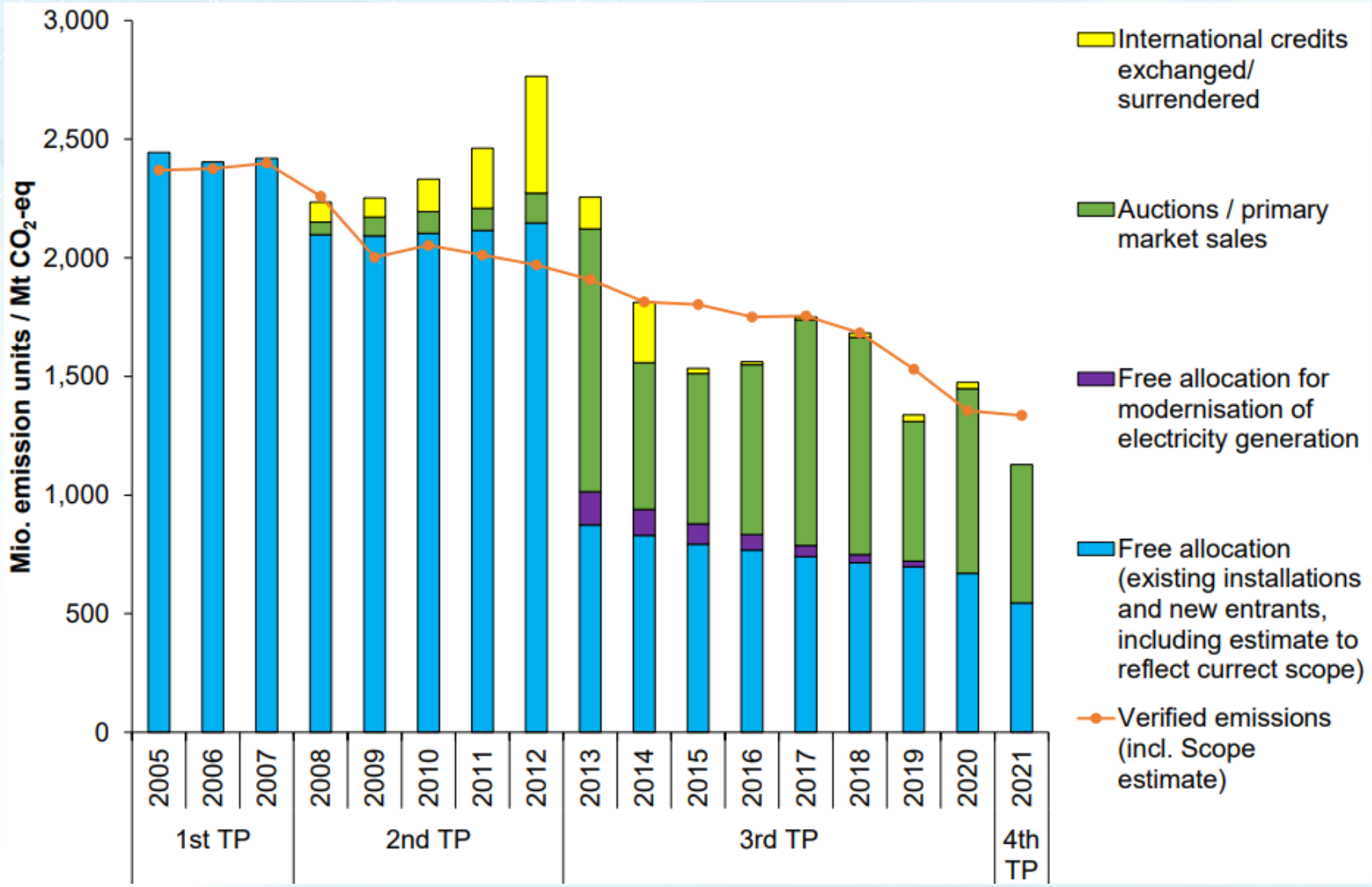
EU ETS verified emissions by main activity type in 2021



- Note 1: Numbers cover all 31 countries that currently participate in the EU ETS
- Note 2: Emissions originating from the combustion of blast furnace gases are included in the sector ‘combustion’

資料來源：Nissen, et al. (2022)

Supply and demand balance for stationary installations (2005-2021)



- Notes: the data include those in the UK

資料來源：Nissen, et al. (2022)

The Challenge of GHG Emission Reduction in European Industries

Hard-to-abate industries: steel, cement, chemicals…

(Major manufacturing industry in the EU ETS)

- Global overcapacity & intense international competition
- Low profits & the need for dividend payments
- Highly capital-intensive, energy-intensive and carbon-intensive
- Substantial capital requirements for equipment replacement
- Significant carbon abatement costs for green transition

  (For hydrogen or CCS solutions, typically > $USD100 per tonne of CO_2)

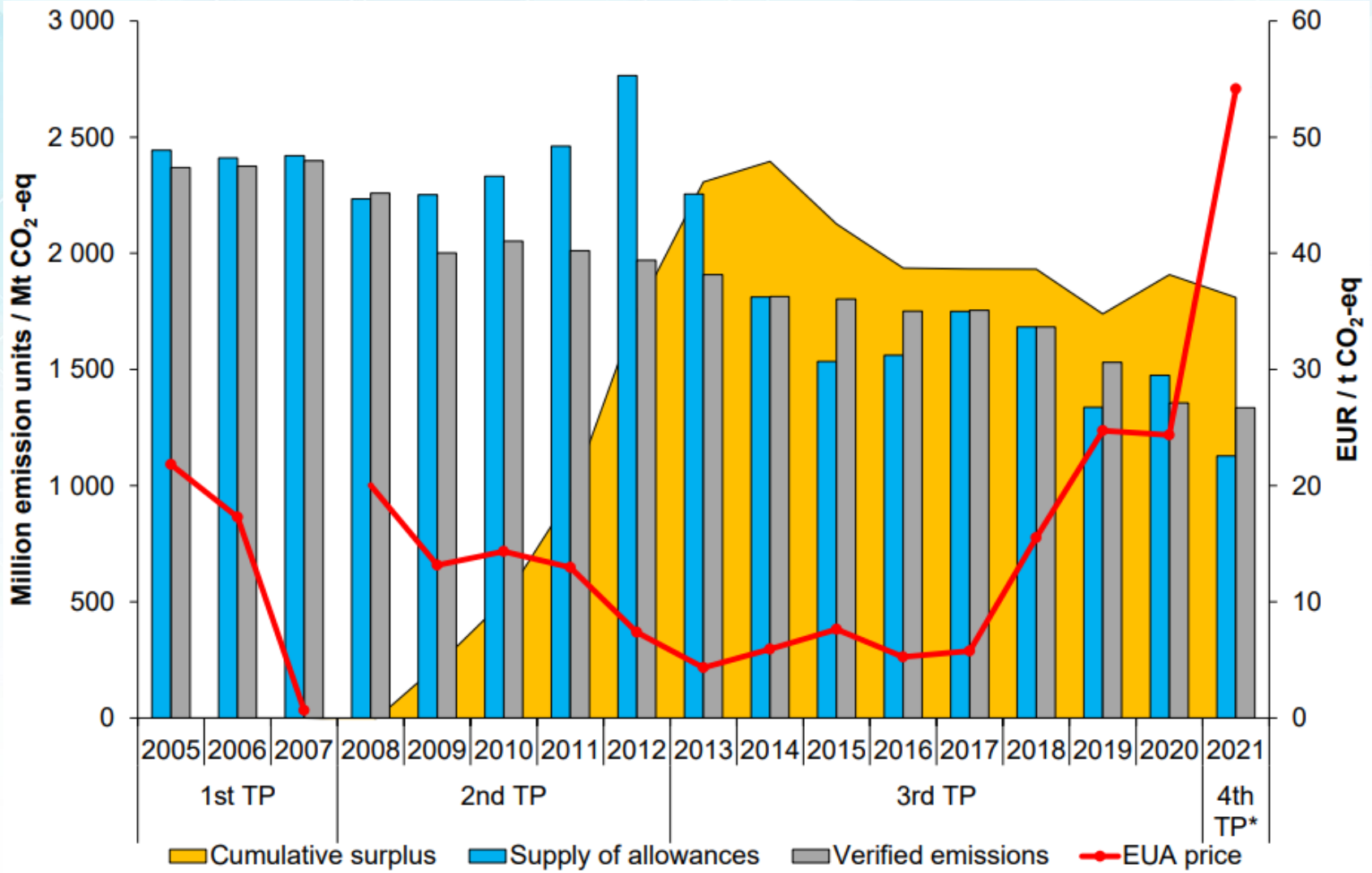
The Challenge of GHG Emission Reduction in European Industries

Hard-to-abate industries: steel, cement, chemicals…

(Major manufacturing industries in the EU ETS)

- ☐ Any additional cost burden is very likely to result in a loss of competitiveness
  - ✓ How will the governments **impose charges for the cost of carbon** on these hard-to-abate industries? Or will they not?
- ☐ Without government funding, industries are unlikely to invest in high-cost carbon reduction measures
  - ✓ How can the government design mechanisms to encourage industries to **implement economically feasible measures**?
  - ✓ How can the government design mechanisms to support industries in **making investments in high-cost carbon reduction measures**?

Emissions, allowances, surplus and prices in the EU ETS, 2005-2019

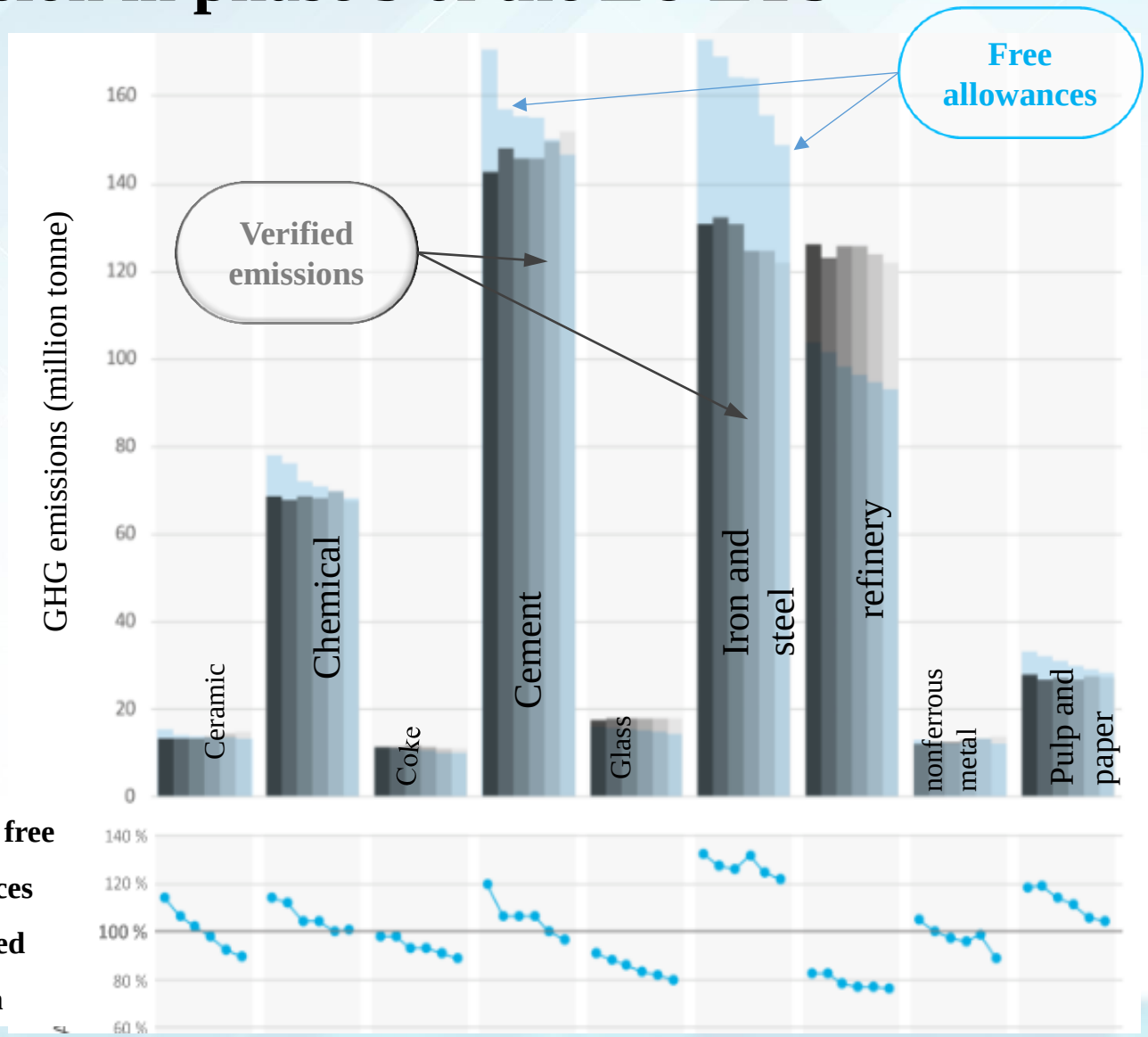


Notes: **The cumulative surplus** represents the difference between allowances allocated for free, auctioned or sold plus international credits surrendered or exchanged from 2008 to date minus the cumulative emissions.

資料來源：Nissen, et al. (2022)

Free allowances and verified emission in phase 3 of the EU ETS

- **European Court of Auditors: industrial emissions mostly covered by free allowances in phase 3 of the EU ETS**



資料來源: European Court of Auditors, 2020

The steel and cement companies benefited from the surplus of free emission allowances under the EU ETS

	ArcelorMittal (EU's largest steel company)	Lafarge (EU's largest cement company)
2010	$USD 140 million	$USD 158 million
2011	$USD 93 million	$USD 177 million
2012	$USD 220 million	$USD 99 million
2013	$USD 32 million	$USD 14 million
2014	$USD 14 million	$USD 37 million

資料來源: Information taken from ArcelorMittal's and Lafarge's annual reports (2010~2014)

Free allowances and verified emissions for the top 10 steel plants in the EU ETS in 2019 and 2020

- **Ratios of free allowances to verified emissions for 4 German steel plants:**

  A: 194% (2019); 217% (2020)

  B: 121% (2019); 153% (2020)

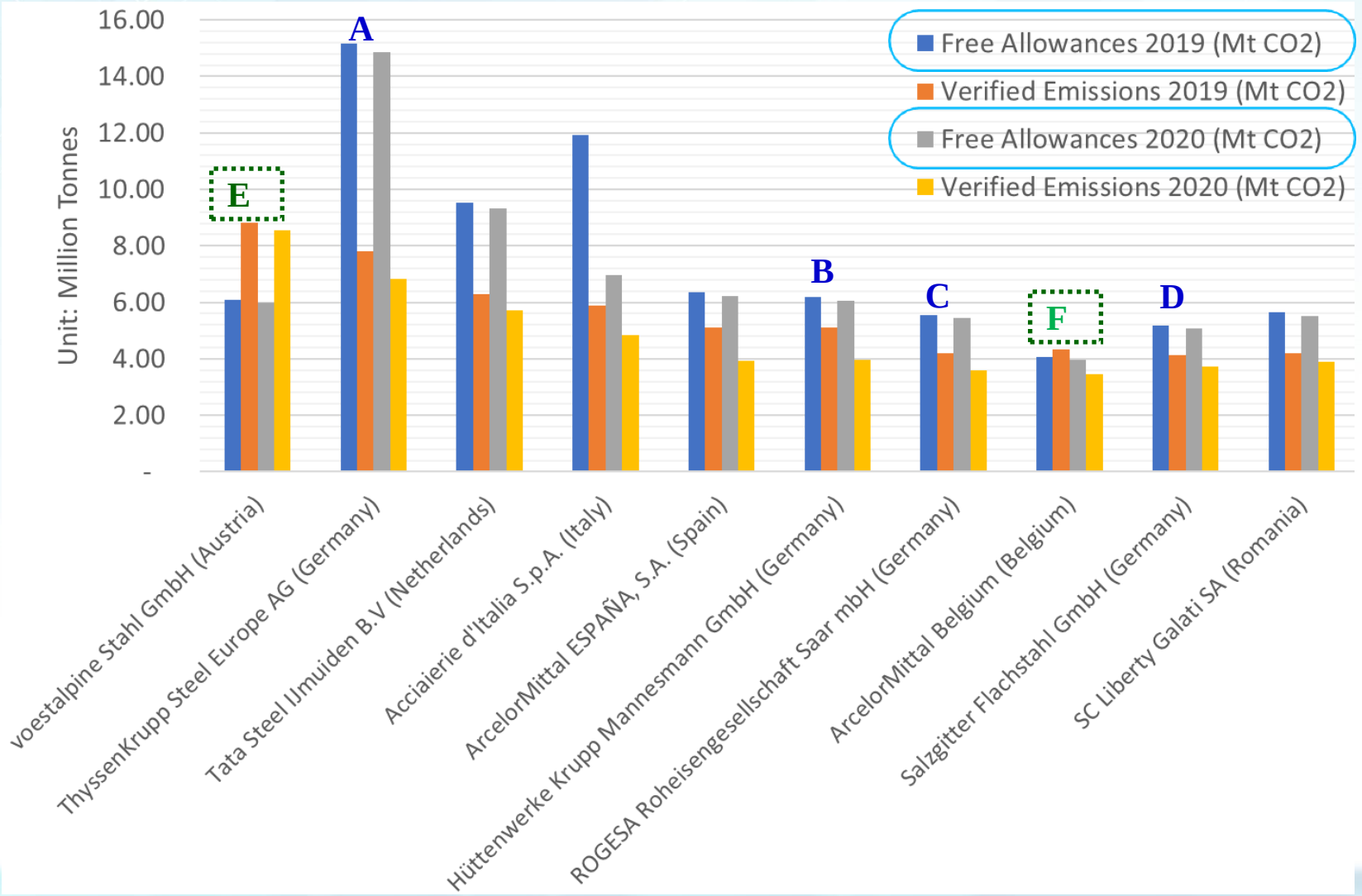
  C: 132% (2019); 151% (2020)

  D: 126% (2019); 136% (2020)

- **Ratios of free allowances to verified emissions for two steel plants in Austria and Belgium:**

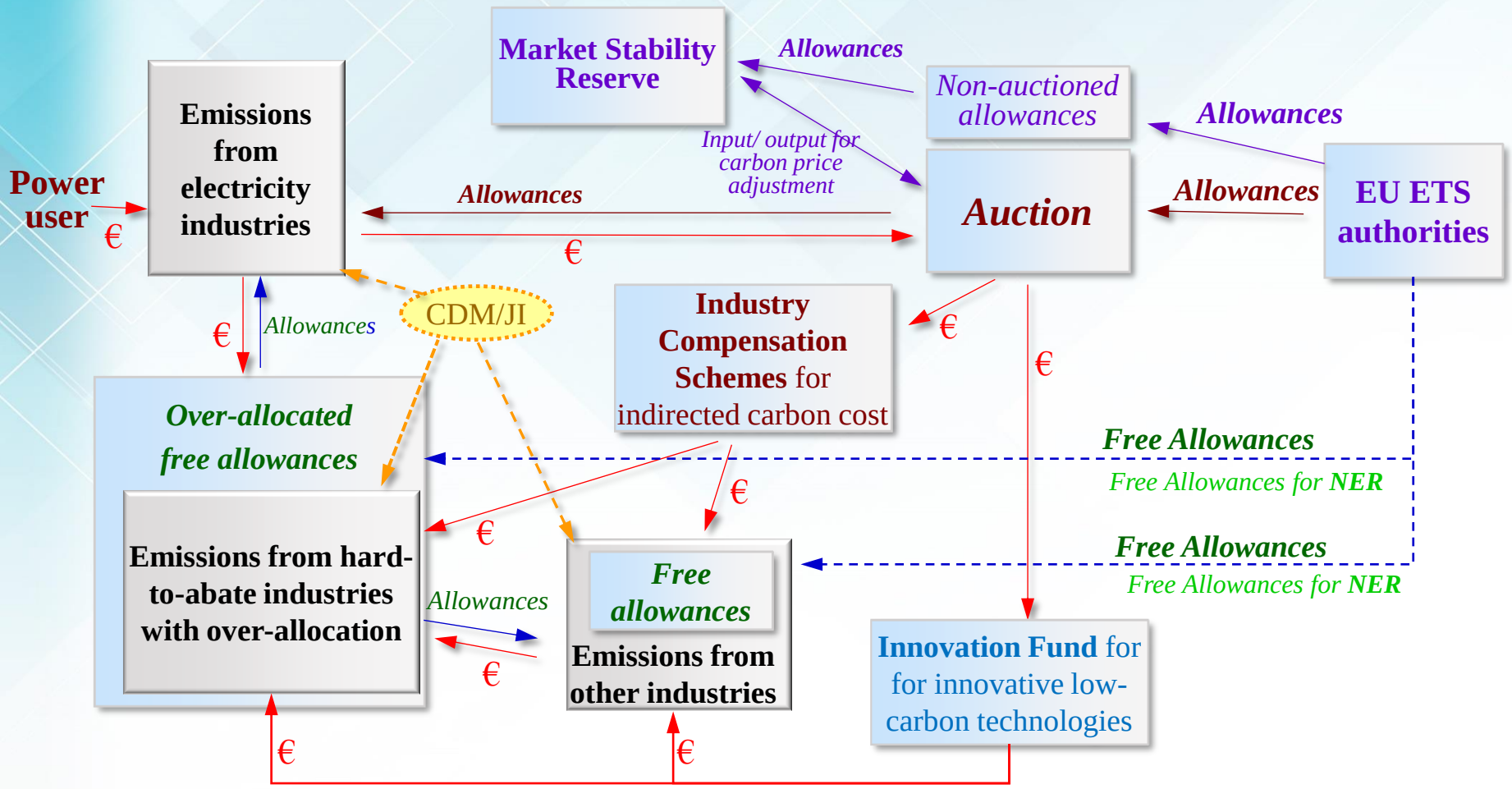
  E: 69% (2019); 70% (2020)

  F: 94% (2019); 115% (2020)



資料來源: Carbon Market Watch. (2022)

Energy-intensive industry decarbonization supported through the EU ETS



Note:

*** Verified industrial emissions: 0.522 billion tonnes CO_2 eq. in 2021**

[1]. Total number of CO_2 emission allowances in circulation (TNAC, mostly from **cumulative surplus of free allowances for hard-to-abate industries**) stood at 1.449 billion allowances in 2021

[2]. New Entrants Reserve (**NER**): 0.183 billion allowances were used during the 3rd phase (2013-2020); 0.2 billion allowances in the 4th phase (2021-2030).

[3]. International credit **(CDM/JI):** 1.568 billion credits (2008-2020)

[4]. From 2021-2030, **Germany's Industry Compensation Scheme** allocated €27.5 billion for companies facing emission-related electricity hikes, with a portion mandated for economically feasible decarbonizing measures

[5]. The **Innovation Fund's** provided over €1.1 billion in 2021 for industrial first-of-a-kind decarbonization projects, €1.5 billion in 2022 and €3 billion in 2023

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激勵措施，可使「難以減碳產業」加速行動!