


TRADE IN ENERGY TECHNOLOGY GOODS – GERMANY AND ITS TARGET MARKETS

1st IAEE Online Conference, 2021

Maximilian Banning, Ulrike Lehr, Markus Flaute

The Project

- ▶ “Analysis of German exports and imports of technology goods for the use of renewable energy and energy technology goods”
- ▶ Funded by German Ministry of Economic Affairs 
- ▶ Carried out by GWS in cooperation with J. Blazejczak and D. Edler (DIW) between 2018 and 2020



SPECIALISTS IN
EMPIRICAL ECONOMIC
RESEARCH



Motivation

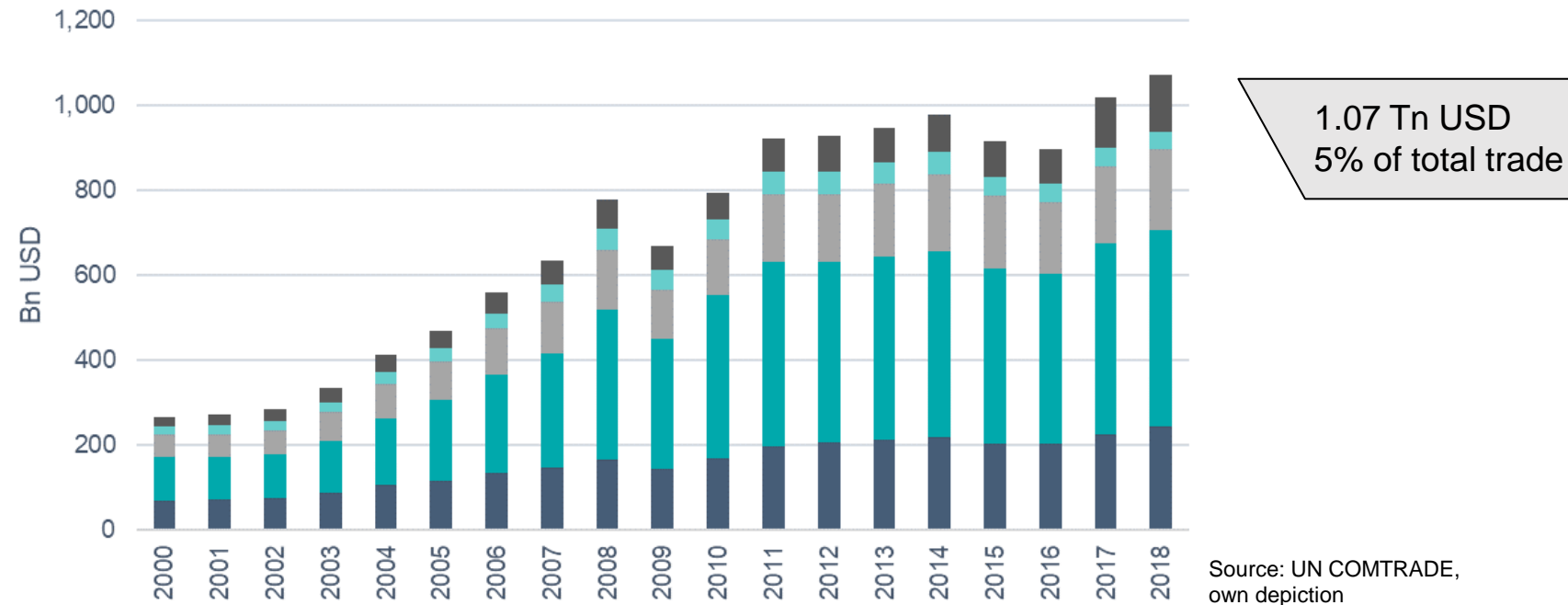
- ▶ In public debate, energy transition is often discussed focussing on costs
- ▶ It does, however, yield advantages to individual firms as well as regions or countries to provide the necessary goods
- ▶ Who trades what with whom? Where lie competitive advantages? What is Germany's role in supplying and receiving energy technology goods?
- ▶ Challenge: Energy Technology Goods (ETG) cannot easily be found in official statistics

Energy Technology Goods

- ▶ Identification: Usage of Combined List of Environmental Goods (CLEG) from OECD and list of environmental protection goods (NIW)
 - ⇒ 222 goods at the 6-digit HS classification level
 - ⇒ 109 combined good positions
 - ⇒ 5 groups of goods
- ▶ UN COMTRADE provides detailed trade data at sufficient granularity (237 individual countries or regions)
- ▶ Multiple use problem: categories are not homogenous and goods might serve multiple purposes
 - ⇒ we can only identify “potential” ETG

World Market Trends

Global trade volume of ETG

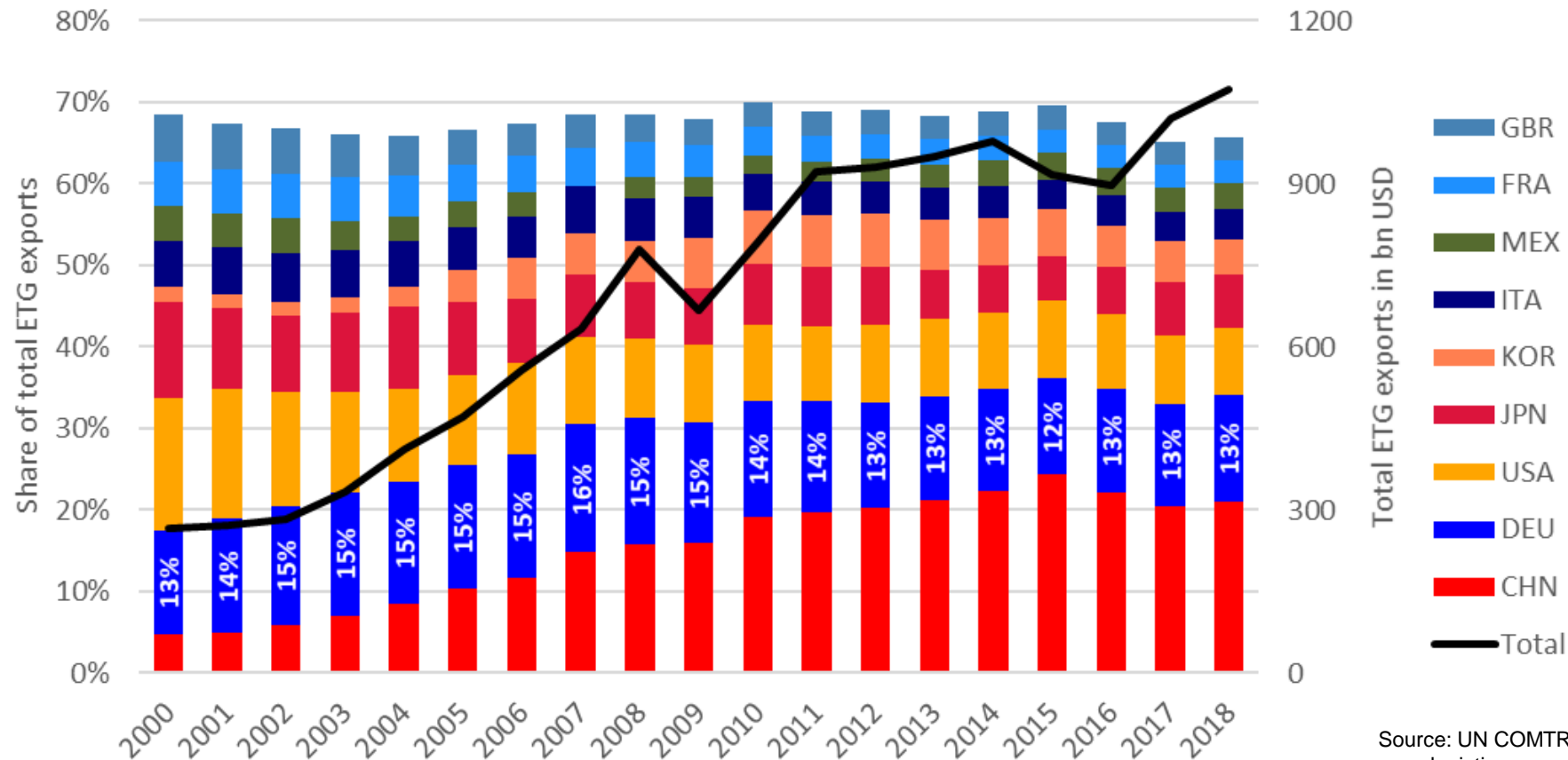


Examples of
included goods

| Measurement and control systems | Usage of renewable energy | Efficient use of energy | Energy transformation | Efficient processes and products |
|---|---------------------------|--------------------------------|-----------------------|----------------------------------|
| Thermometers (liquid filled) | PV cells and modules | Mineral insulating materials | Generators | Batteries |
| Instruments and apparatus for physical or chemical analysis [...] | Wind turbines | Glas fibre insulation products | Steam turbines | Non-fossil vehicles |
| Manostats | Hydraulic turbines | Heat exchangers | Gas turbines | Rail-bound wagons |

Germany's export position

Share of total ETG exports of 2018's top exporters
and total trade in ETG in bn USD (right axis) over time

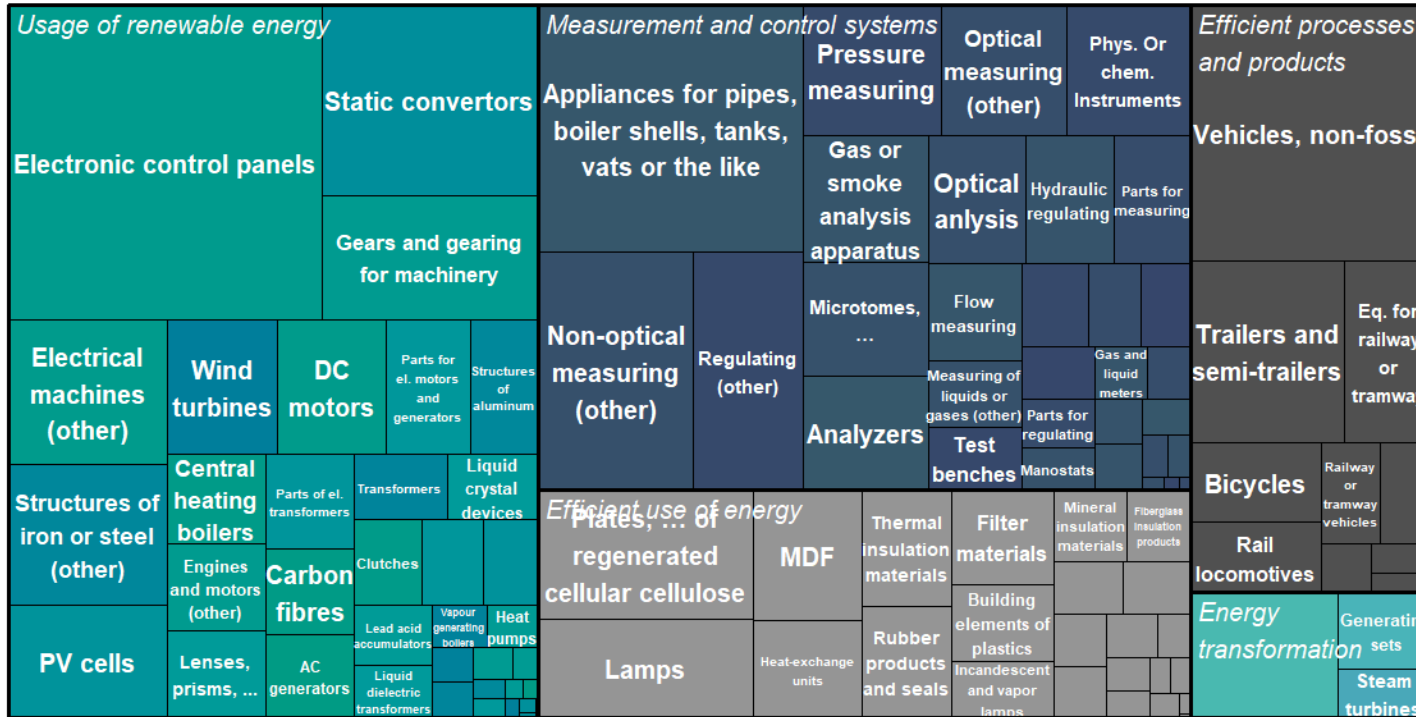


Source: UN COMTRADE,
own depiction

- Germany was able to hold its market share over the observation period, while China increased its share in a growing market

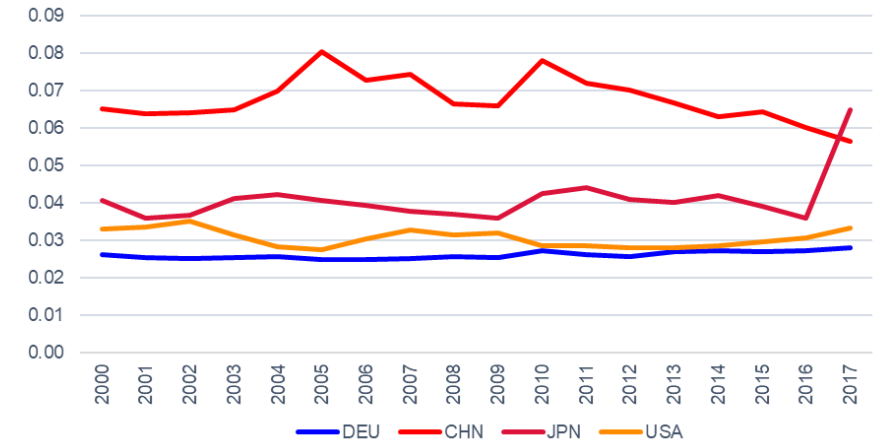
German exports by type of good

German export composition of ETG in 2018



Source: UN COMTRADE, own depiction

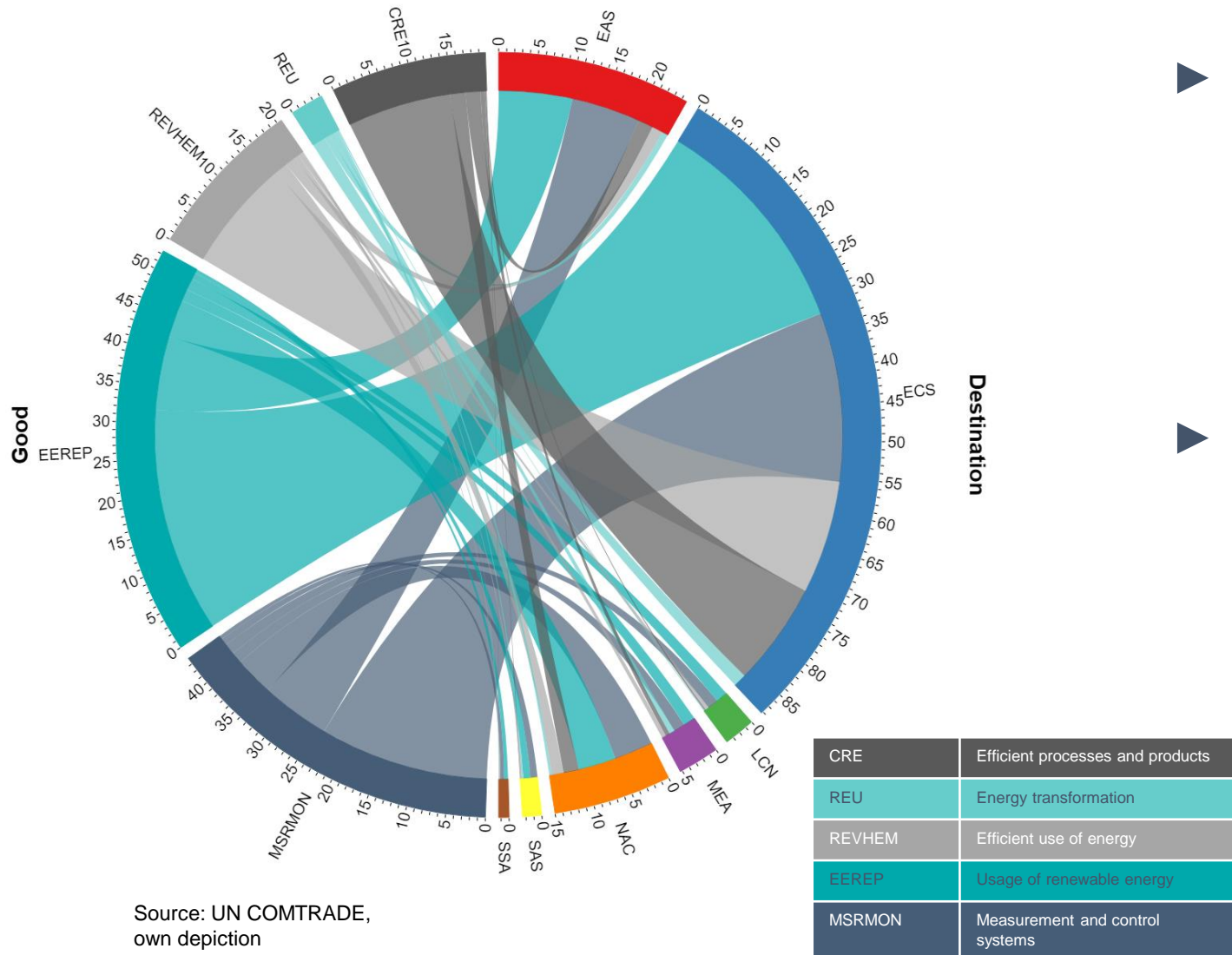
HHI: concentration on groups of goods



► German exports are less concentrated on categories of goods than those of its large competitors

German exports by regions

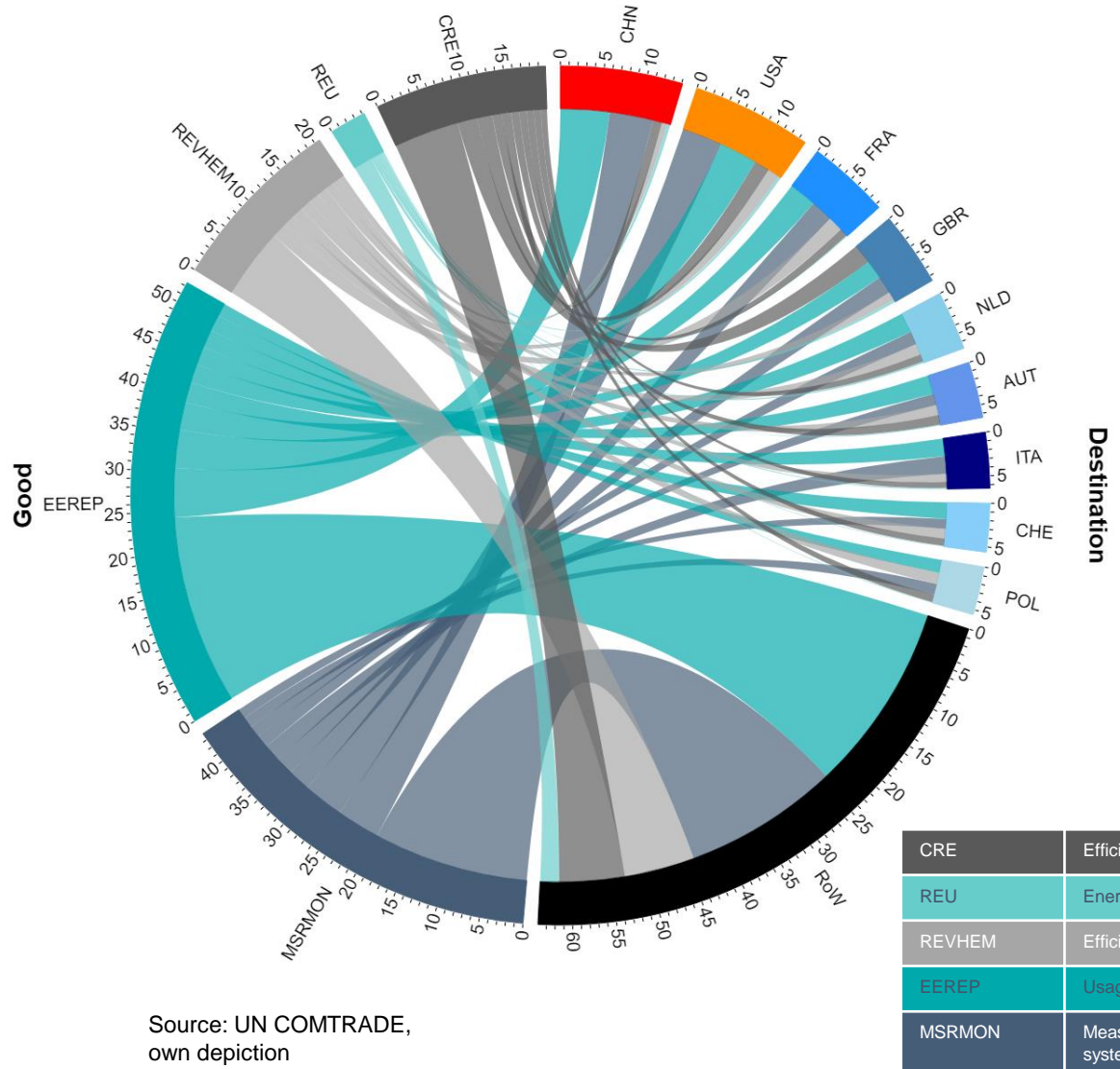
German ETG exports by group of good and destination, 2018, bn USD



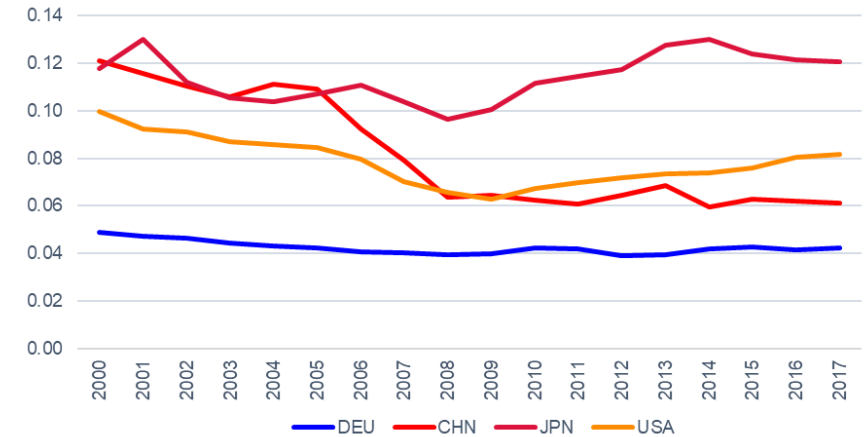
- ▶ Europe (ECS) is the main destination for German exports and is the receiver of the largest share of all technology groups
- ▶ Goods for the usage of renewable energy are exported most overall and account for the largest share in most regions (notable exceptions are North America (NAC) and South Asia (SAS))

German exports by countries

German ETG exports by group of good and destination, 2018, bn USD



HHI of geographical concentration



► China is largest recipient of ETG, with renewable energy and measurement systems accounting for nearly equal shares

► German exports are less concentrated on countries than those of its large competitors

Global German export performance

Export volume in bn USD

- 5
- 10

Region

- EAST ASIA AND PACIFIC
- EUROPE AND CENTRAL ASIA
- LATIN AMERICA AND THE CARIBBEAN
- MIDDLE EAST AND NORTH AFRICA
- NORTH AMERICA
- SOUTH ASIA
- SUB-SAHARAN AFRICA

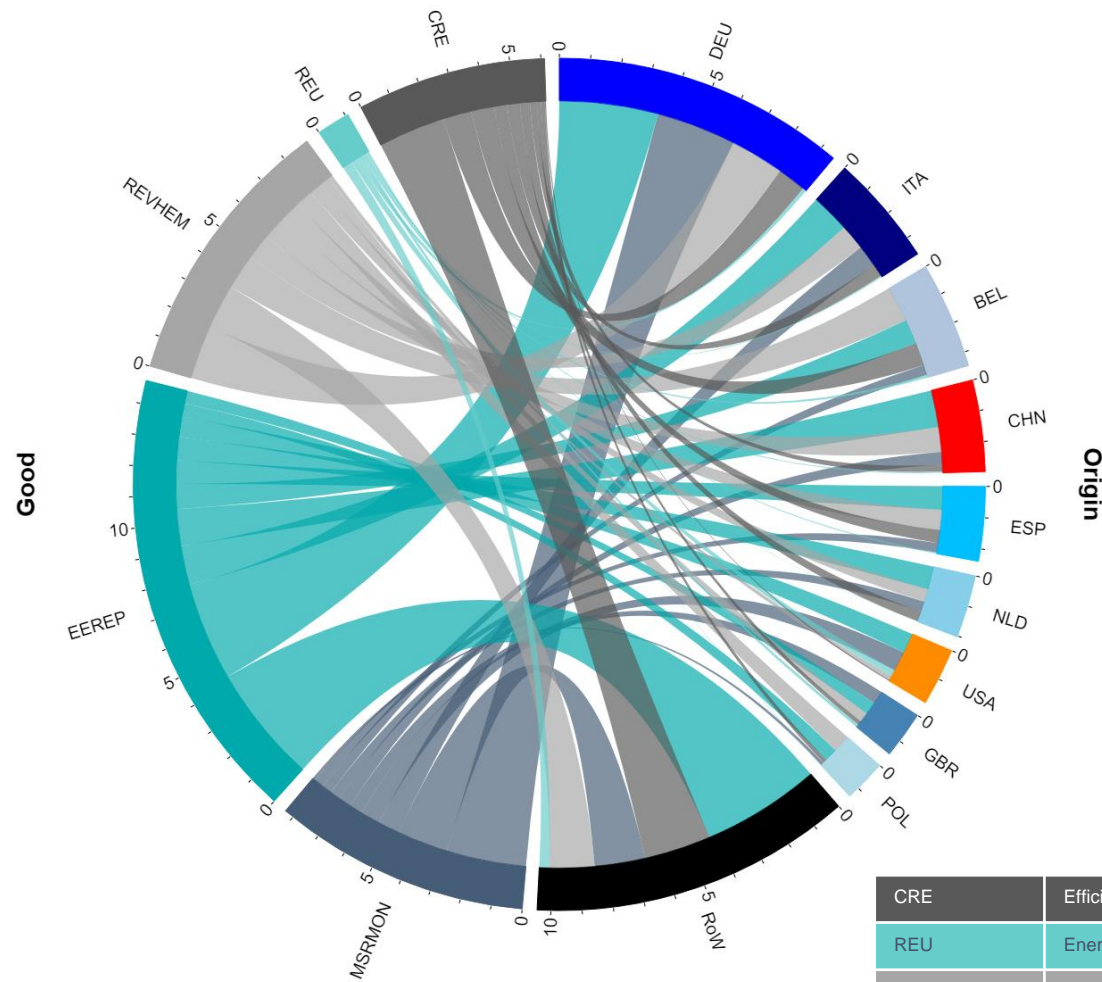
AAGR of imports from Germany – 2012–2018 in %

AAGR of overall imports – 2012–2018 in %

Source: UN COMTRADE, own depiction

Target market: France

French ETG imports by group of good and destination, 2018, bn USD



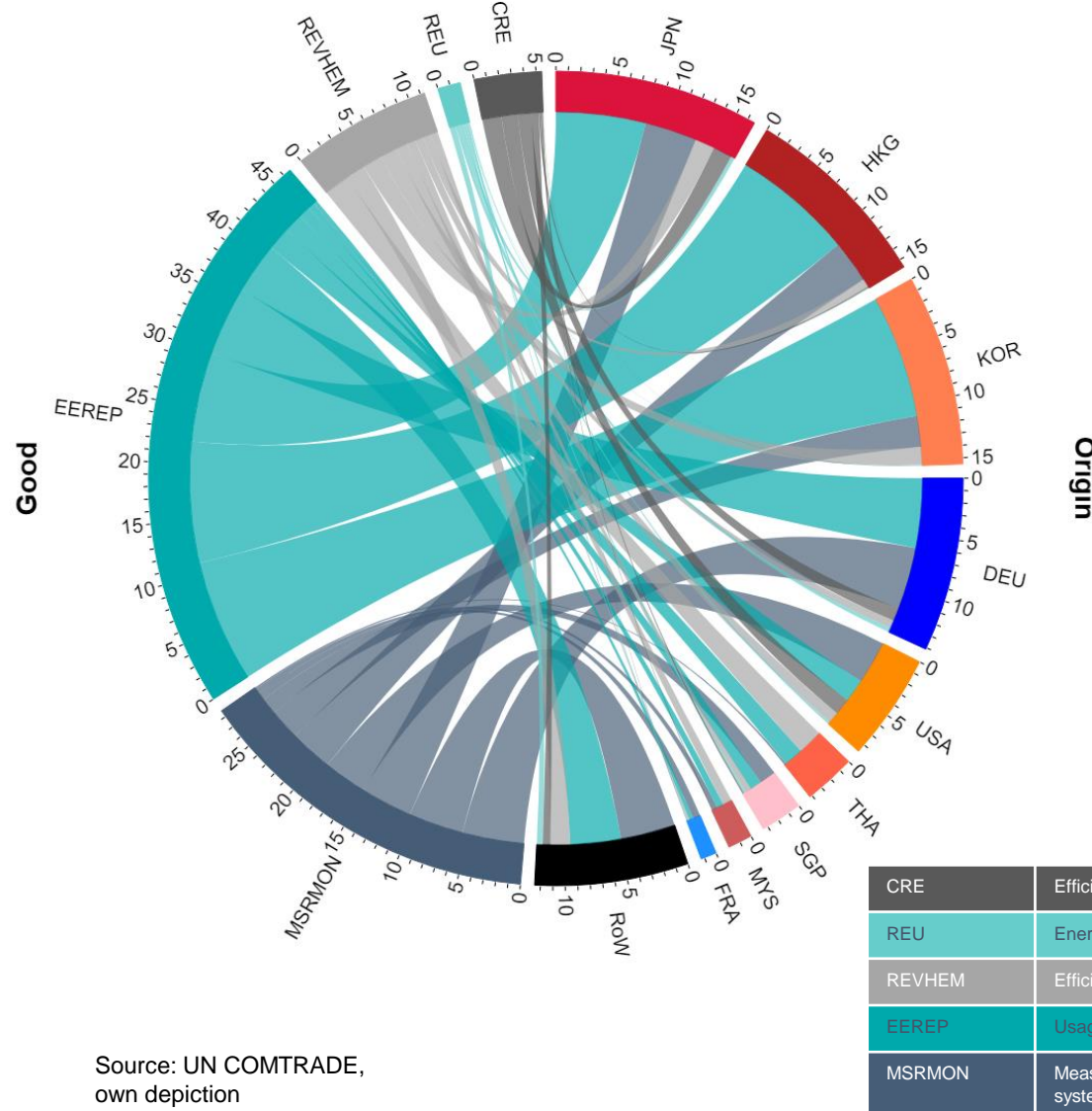
Source: UN COMTRADE,
own depiction

- ▶ France imported \$39B of ETG in 2018
- ▶ France is mainly receiving ETG from neighboring European countries
- ▶ Germany is the main individual source of goods from all groups except energy transformation, where the US are leading

| | |
|--------|----------------------------------|
| CRE | Efficient processes and products |
| REU | Energy transformation |
| REVHEM | Efficient use of energy |
| EEREP | Usage of renewable energy |
| MSRMON | Measurement and control systems |

Target market: China

Chinese ETG imports by group of good and destination, 2018, bn USD



- ▶ China imported \$94B in 2018
- ▶ Nearly half of all Chinese imports are goods for the usage of renewable energy
- ▶ Main countries of origin are bordering the Pacific Ocean
- ▶ German provides the main source of measurement and control systems
 - ▶ Germany's most exported goods are for the usage of renewable energy

Conclusions and outlook

- ▶ We are able to identify a set of potential energy technology goods that can be distinguished into several thematic groups, building on existing definitions
- ▶ Numerous indicators suggest that diversification of the German ETG export portfolio is one of the main reasons the country was able stay competitive
- ▶ When interpreting the results, the multiple-use problem is to be kept in mind, as should changing technology costs
- ▶ Trade in energy related services are also of interest, data coverage, however, is sparse

Thank you for your attention!



Maximilian Banning

T +49 (0) 541 40933 - 286

E banning@gws-os.com

Researcher, Energy & Climate

Sources

- ▶ Lehr, U., Banning, M., Flaute, M., Edler, D. & Blazejczak, J. (2020): Analyse der deutschen Exporte und Importe von Technologiesgütern zur Nutzung erneuerbarer Energien und anderer Energietechnologiesgüter. GWS Research Report 2020/02, Osnabrück.
- ▶ UN COMTRADE: United Nations Commodity Trade Statistics database, <https://comtrade.un.org/data/>
- ▶ Gehrke, B., Schasse, U. 2013: Umweltschutzgüter – wie abgrenzen? Methodik und Liste der Umweltschutzgüter 2013. Reihe Umwelt, Innovation, Beschäftigung des Umweltbundesamtes 01/2013.
- ▶ Sauvage, J. 2014: The Stringency of Environmental Regulations and Trade in Environmental Goods, OECD Trade and Environment Working Papers, 2014/03, OECD Publishing, <http://dx.doi.org/10.1787/5jxrjn7xsnmq-en>.
- ▶ R package chorddiag by Mattflor, <https://github.com/mattflor/chorddiag>



SPECIALISTS IN
EMPIRICAL ECONOMIC
RESEARCH

www.gws-os.com

Gesellschaft für Wirtschaftliche Strukturforschung mbH

Heinrichstr. 30

49080 Osnabrück

Tel + 49 (0) 541 40933-286

Fax + 49 (0) 541 40933-110

banning @ gws-os.com