

In light of the Paris Agreement: carbon markets, competitiveness and energy policy

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**Seminar, Chair for Sustainable Energy, Universitat de Barcelona
21st April 2016**

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Outline

1. **The climate regime after 2020**
2. **Carbon markets**
3. **Competitiveness issues**
4. **Energy policy**
5. **The Paris Agreement and energy trends**

1 Key features of the Paris Agreement

- *Signing ceremony starts tomorrow in New York (open for signature: 22nd April 2016 – 21st April 2017)*
- Universality
- Three areas covered: mitigation, adaptation, finance
- Bottom-up climate policy: NDCs (pre-Paris: INDCs)
- Industrial countries' responsibilities are documented
- Process-based agreement – review cycles

2 The future of carbon pricing under the Paris Agreement

- Kyoto Protocol included flexible mechanisms: Emissions trading, clean development mechanism and joint implementation
- Paris Agreement: Article 6, future of explicit and implicit carbon pricing
 - different types of mechanisms – subject to further precision under the COP process (2016)
 - Voluntary cooperative approaches in Art 6.1 *recognized when implementing NDCs* – **Clubs** are an option
 - More explicit types
 - 1. Transfers of mitigation outcomes (Art. 6.2 –6.3)
 - **internationally transferred mitigation outcomes (ITMOs)**
 - The CMA stipulates the accounting rules (“shall apply robust accounting”), but the mechanisms are not under the supervision of the COP/CMA. Thus “anything goes”, JCM, REDD+,
 - 2. Mechanisms contributing to mitigation and to sustainability (“SDM”) (Art. 6.4 –6.7) (predecessor: CDM), subject to further negotiations, definitions not clear yet, environmental integrity issues, accounting rules, oversight (baseline and credit mechanism?)
 - 3. Non-market approaches framework

2 Carbon pricing clubs

- Idea from game theory – how to provide a global public good
- Nordhaus (2015), others: incentives and sanctions need to be included – e.g. technology transfer, trade measures
- UNSG summit 2014/World Bank initiative in context with COP21:
 - French Environment minister Royal and Dutch CEO of Royal DSM head the „Carbon Pricing Leadership Coalition“
 - Global goals for a broader coverage of GHG by carbon pricing
 - Regular progress reporting
 - Business support
 - Increasing the overall price level of CO₂, stable and predictable pricing, drive cohesion, not competition

- Article 6 of the Paris Agreement

EU Climate and Energy Agenda 2030 (INDC)

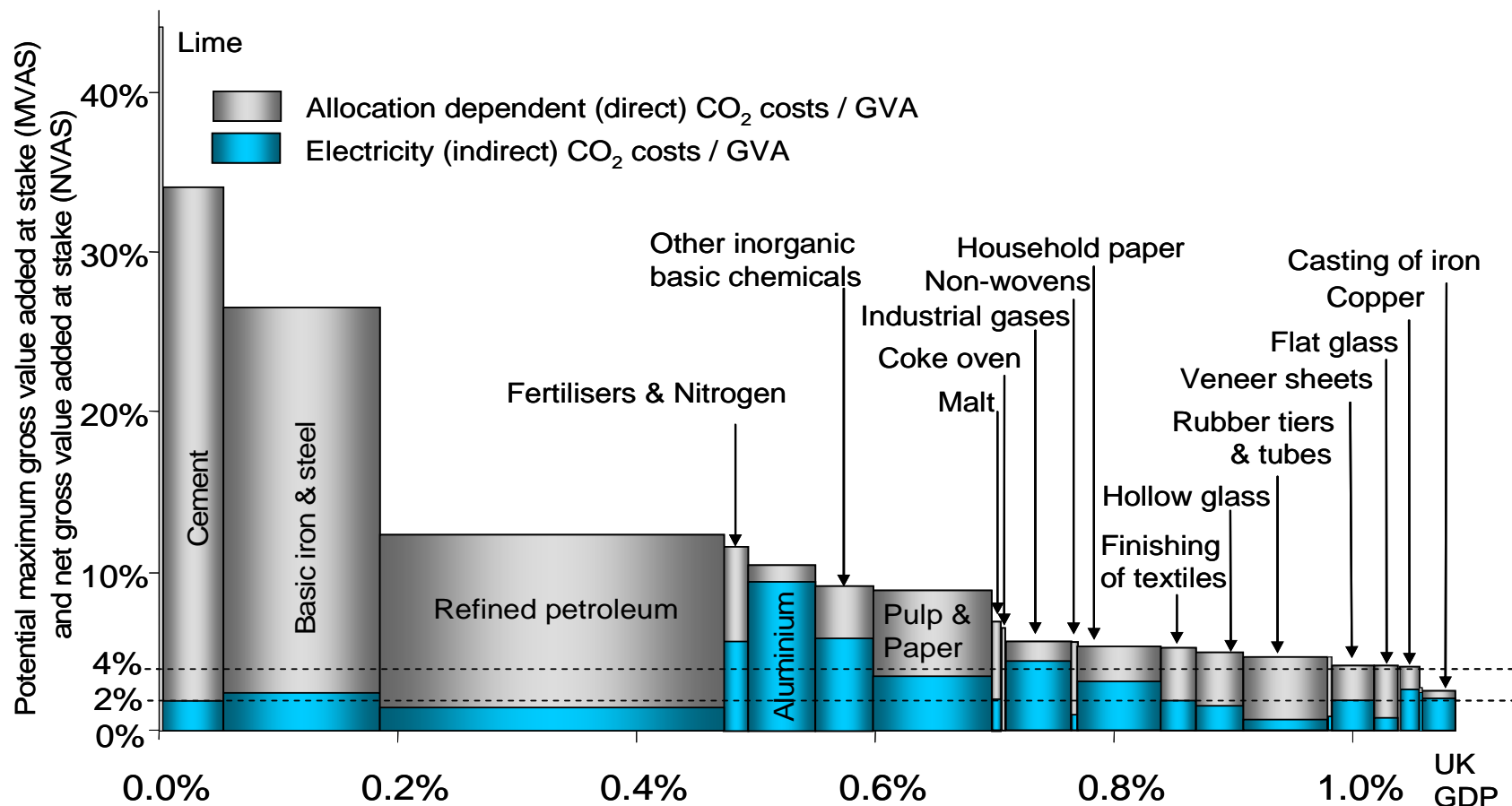
Greenhouse Gases	All sectors	At least -40% from 1990 levels
	Sectors covered by the European Emissions Trading Scheme	-43% from 2005 levels
	Sectors not covered by the European Emissions Trading Scheme	-30% from 2005 levels
Renewable Energy	Renewable energy share in gross final energy consumption	-27% of European level
Energy Efficiency	Absolute reduction in primary energy demand compared to a BAU case	-27% (indicative)

2 Carbon pricing in the EU: ETS

- Target for emission reductions by the EU: „at least“ 40 percent (compared to 1990)
- ETS takes over roughly 40% of this target, covering power sector and manufacturing
- Non-ETS sectors: transport, buildings, agriculture – MS level, EU effort sharing decision 2016
- EU target for 2050: 85-90%
- Reform debate: Backloading, Market Stability Reserve, National or EU-wide floor price(s)

2.1 CO₂ emissions concentrated in a few sectors (UK example)

Electricity cost increase (blue); cost for buying all allowances (grey) - relative to gross value added.

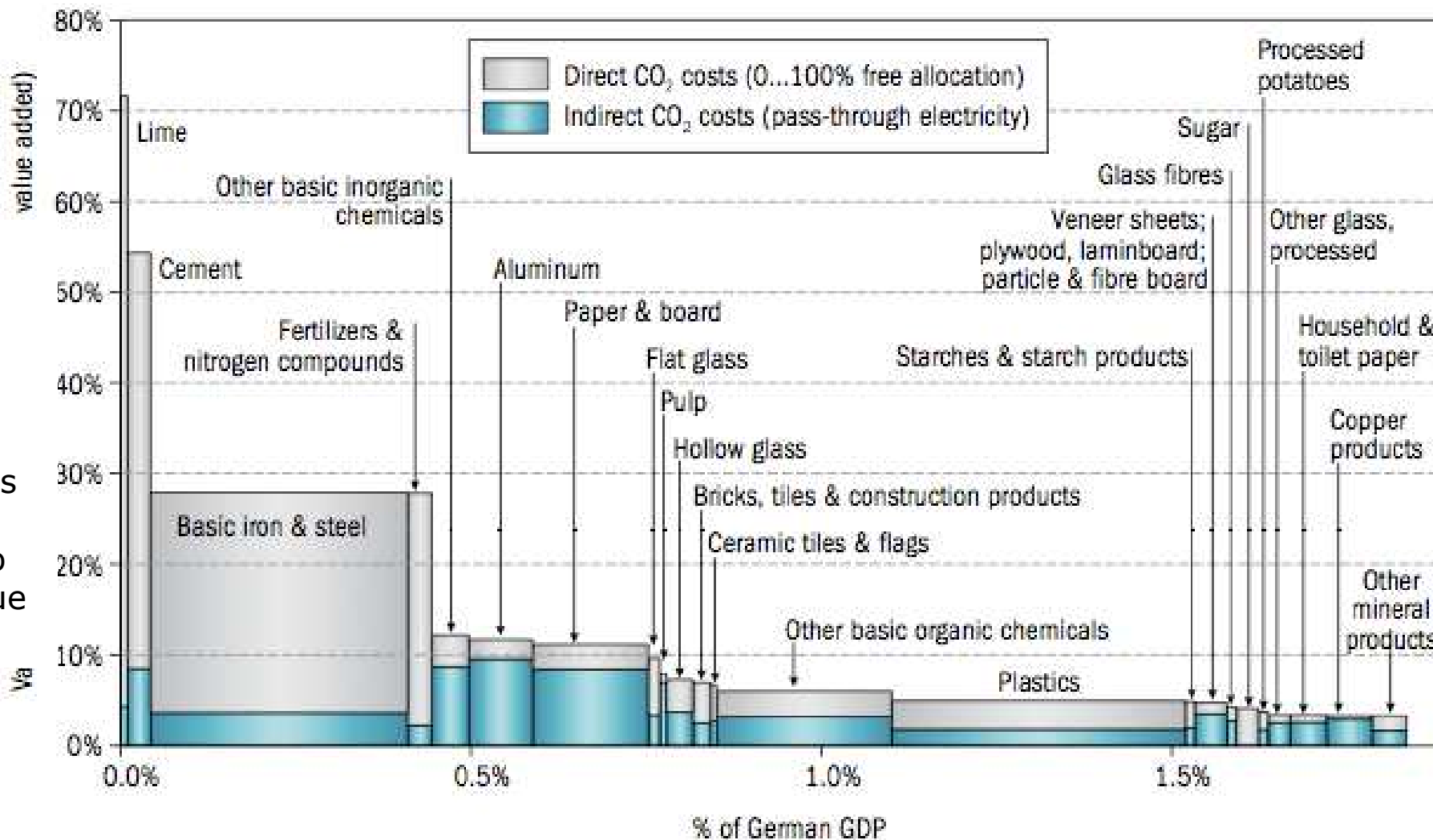


Price increase assumption: CO₂ = €20/t CO₂; Electricity = €10/MWh

UK Study examined 159 subsector activities and identified a “top 20+3” for which combined cost impacts @ €20/tCO₂ exceed 4% of Sector Value Added.

These activities account for 1% of UK GDP (Climate Strategies 2007: Hourcade, Neuhoﬀ, Demailly and Sato, Differentiation and dynamics of EU ETS industrial competitiveness impacts)

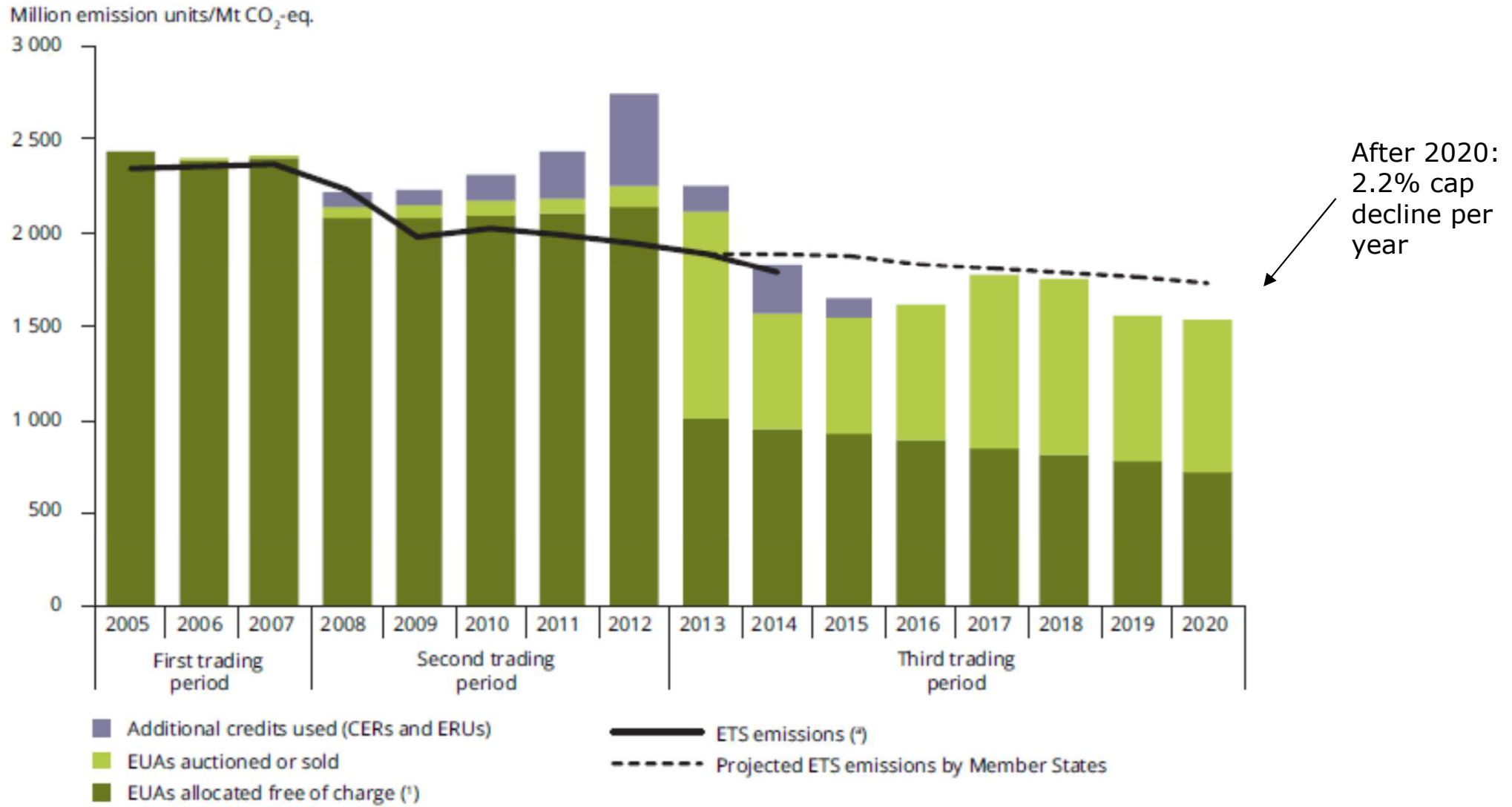
2.1 CO₂ emissions concentrated in a few sectors (German example)



Electricity cost increase (blue); cost for buying all allowances (grey) - relative to gross value added.

Graichen et al. 2009, in: Grubb, Brewer, Houser & Sato, 'Climate policy and industrial competitiveness: ten lessons from the EU ETS', German Marshall Fund – US, Washington DC, 2009; 20€ t/CO₂

2.1 Carbon pricing in the EU



Source: CEPS, 2016 State of the EU ETS Report, based on EEA (2015, Trends and projections in the EU ETS in 2015 p. 30)

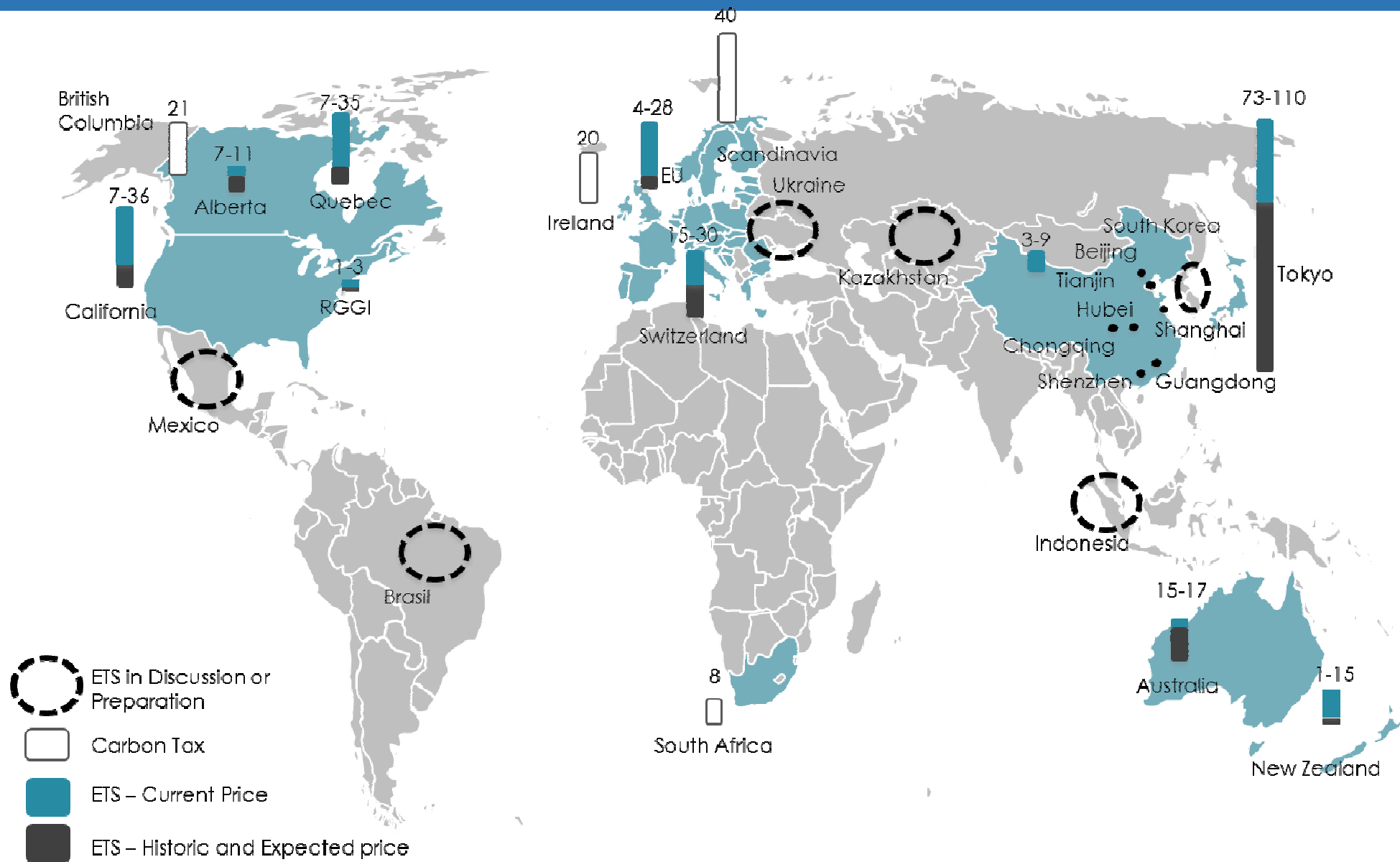
2.1 Reform plans for free allocation under the EU ETS



2 Carbon pricing in China

- Announcement by China in 2015: a **national ETS planned from 2017**
- Targeted industries: **8 sectors** and 18 sub-sectors which consume >10,000 of coal equivalent per year.
 - Power sector
 - Petrochemicals (crude oil, ethylene)
 - Chemicals (methanol, ammonia, carbide)
 - Iron and Steel
 - Non-ferrous metals
 - Building production and materials (clinker, glass)
 - Pulp and paper
 - Aviation
- Market stability reserve and new entrants reserve
- Hybrid allocation system – full auctioning envisaged after 2020
- Carbon leakage list is possible

2 Carbon pricing around the globe



Source: Neuhoff et al. (2014): Staying with the Leaders: Europe's path to a low carbon economy. www.climatestrategies.org DIW Berlin Calculations based on Ecofys, 2013; Sopher, P., Mansell, A., 2013; OECD, 2013; Jotzo, F. et al., 2013; Rudolph, S., Kawatsu, T., 2012; Ptak, M., 2010.

3 Competitiveness implications

- Levelling of the playing field
- Drivers of EII competitiveness – China as a game changer?
- Competitiveness from an environmental point of view: carbon leakage effects

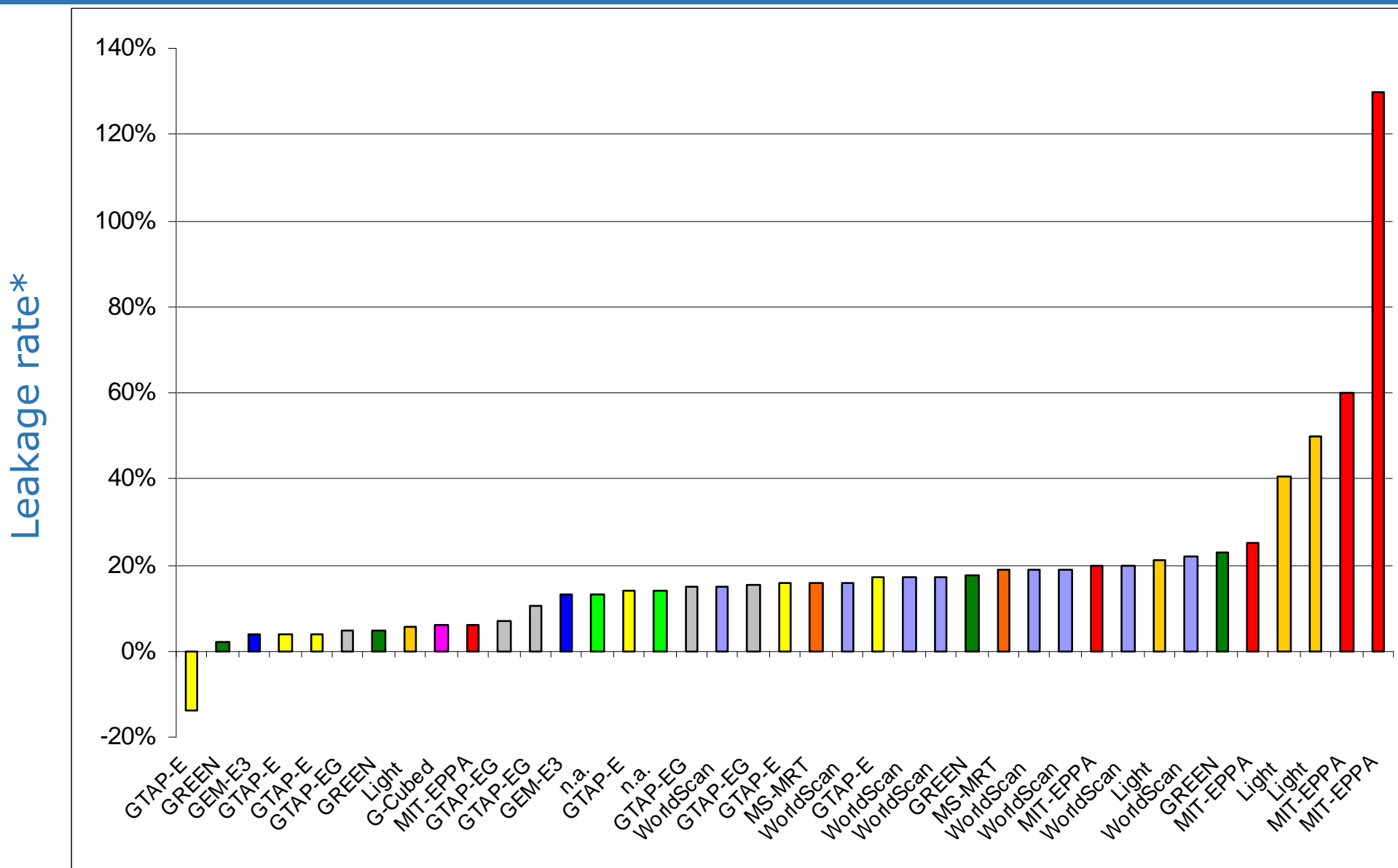
3 Concepts

- **Competitiveness:** of firms and of countries
- **Carbon Leakage:** emissions (re)location
- **Carbon Footprint:** emissions associated with the chain of production, consumption and final disposal of goods
- **Carbon Flows/Embedded Carbon:** CO2 „content“ of traded goods
- **Carbon leakage channels:**
 - Global energy markets
 - Industrial competitiveness: operational and investment decisions
 - Technological spill-overs

3 Carbon leakage – energy markets

- Energy market effects under the Kyoto Protocol, CGE modelling.
- Estimated leakage rates range from -14% to 130%. However, central estimates rather range from approximately 5% to 25%.
- The extreme cases with negative leakage rates or rates above 100% are due to particular assumptions.
- In general, CGE modellers stick to basic assumptions of perfect competition with constant returns to scale as well as an exogenous representation of technological change via autonomous energy efficiency improvement (AEEI) parameters.

3 Carbon leakage – CGE model results for the Kyoto world



CGE-Models with different specifications

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*share of emission reduction in Annex-I-countries that is not a global reduction, but due to an increase of emissions in Non-Annex-I countries

3 Carbon leakage in the energy-intensive industries

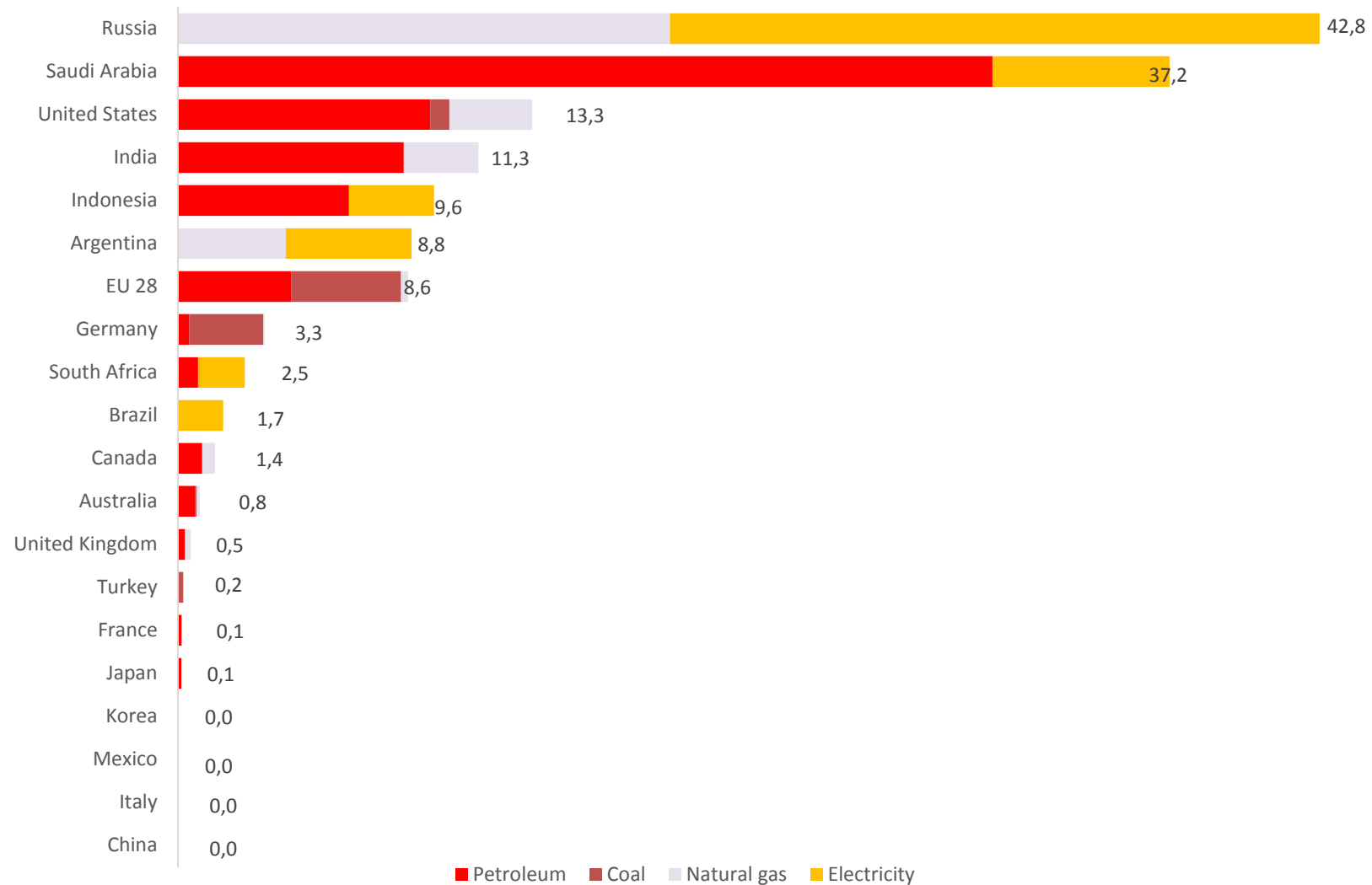
- „Dirty dozen“ prone to leakage if there is a competitive international market situation – cost pass-through differs across sectors
- In Europe a few key sectors deserve (and get) special treatment. **8% of manufacturing industries spend more than 6% of their revenue on energy.** For some of their energy intensive processes, energy price differentials to the rest of the world can matter. (Germany: for 92% of manufacturing, energy bills are on average less than 1.6% of revenue)
- However, energy price differences with competitors due to differences in natural resource endowment can only be compensated for through **additional efforts on energy efficiency and innovation.**

4 Energy policy and energy market trends

- **Questions** in context with INDCs and with the global climate policy agenda:
 - What drives energy policy?
 - Global energy markets (e.g. shale gas, coal price, oil price)
 - Security of supply and geo-politics
 - Economic cycles/employment
 - Environmental policy targets
 - What drives the markets?
 - Demand side trends
 - Investment options
 - Innovation
 - Deployment and economies of scale
 - Carbon pricing
 - energy subsidies
 - regulation in the power sector
 - ...

4 Subsidies for fossil fuels – without externalities (G20)

IMF Pre-Tax Subsidies in USD bn. (nom. 2015)

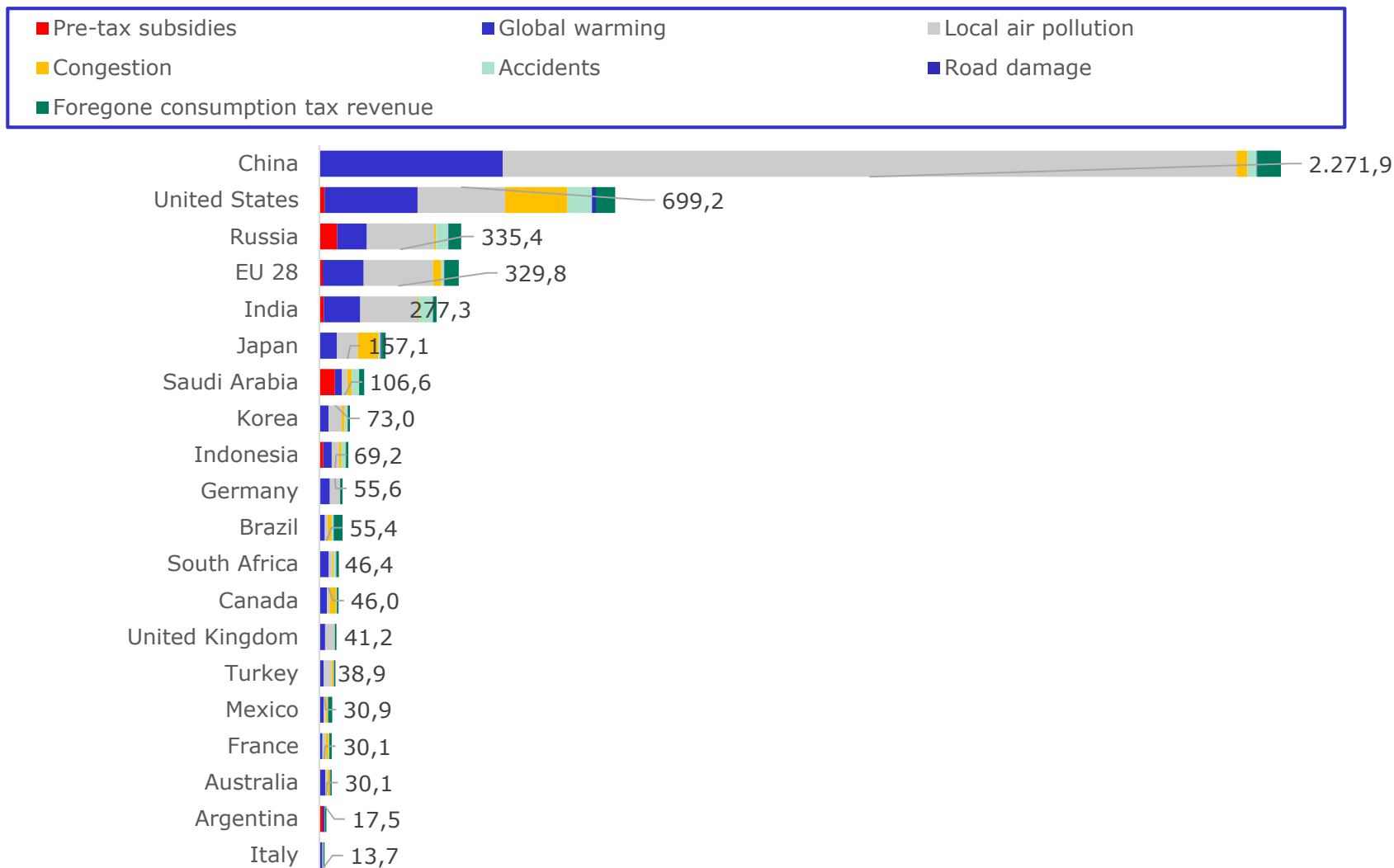


Source: IMF 2015

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4 Subsidies for fossil fuels – external effects (G20)

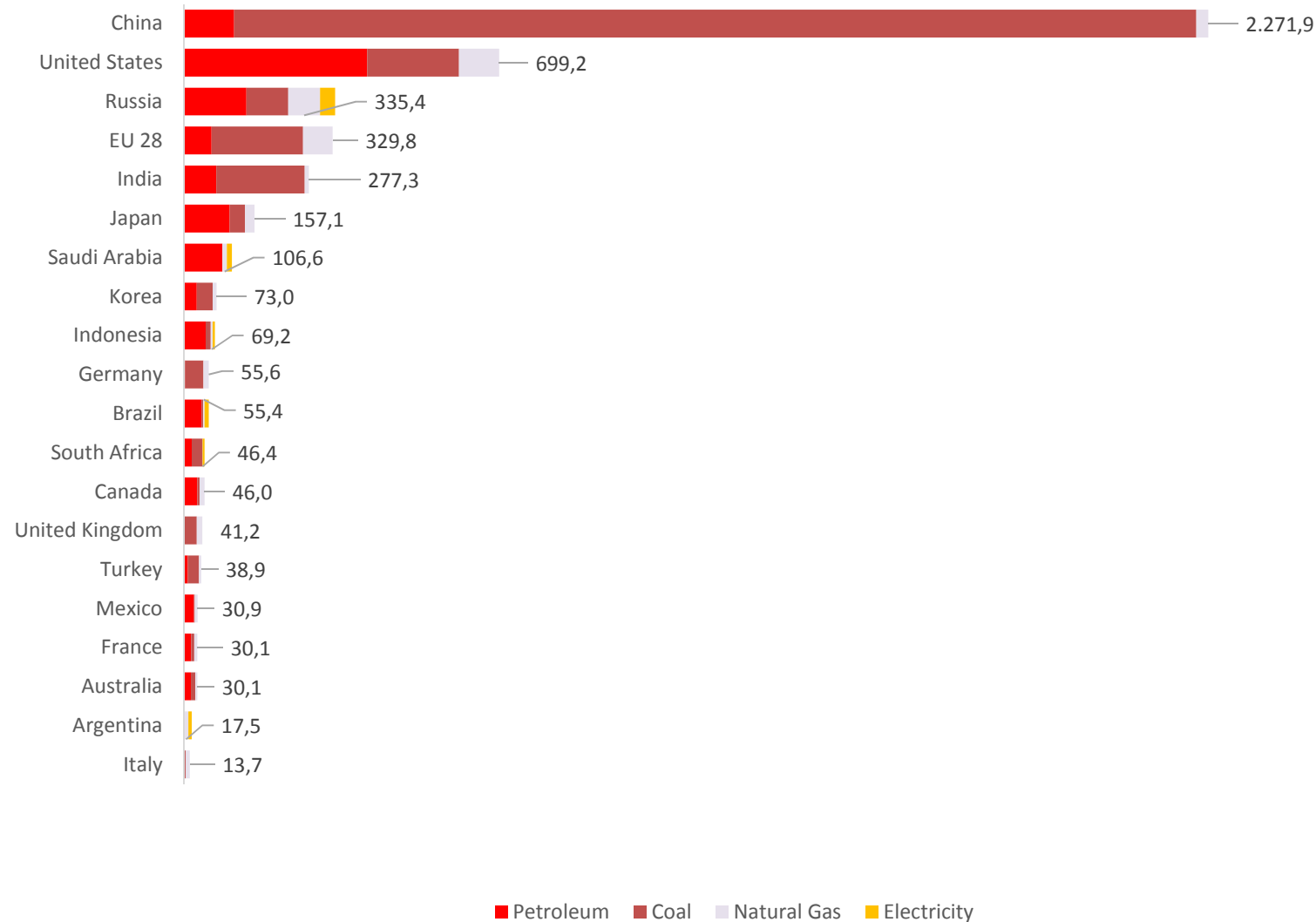
IMF: Post-Tax Subsidies in USD bn (nom. 2015)



Source: IMF 2015

4 Subsidies for fossil fuels – with external effects (G20)

IMF Post-Tax Subsidies in USD bn. (nom. 2015)



Source: IMF 2015

4 Energy trends in the INDCs

- Special WEO by the IEA looks into 2030, considering the INDCs (end of 2015) – **what would the energy sector look like if all INDCs were implemented?**
- **Key messages**
 - No climate solution without changes in the energy system
 - INDCs majority is about **well-known agendas**: efficiency improvements.
 - Only a **few** countries list: phase-out of inefficient coal-fired power plants, lowering methane emissions from oil and gas production, fossil-fuel subsidy reform or carbon pricing
 - **Rarely** mentioned: energy sector technology or policy options that are required for a long term transformation: nuclear power, CCS, alternative vehicle fuels
 - Overall energy-related GHG emission **growth** will slow. **Electricity** demand will **rise by 40 per cent**. Non-fossil fuels share will rise to 25% (compared to 20% 2015)
 - **Decoupling**: OECD electricity demand to rise by 10 per cent, CO2 emissions to drop by one third

5 Paris Agreement – energy emission reductions

What will drive (global) emission reductions and decarbonisation of the energy sector under the Paris Agreement?

- National interest and co-benefits from INDCs implementation: security of supply; cost savings / competitiveness/ comparative advantage
- Review under PA – more transparency/knowledge/policy competition
- Deployment of technologies (via means of implementation, via markets)
- Investments: global context of slow growth, low interest rates, and ROI

Thank you for your attention

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