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Climate change economics

NATIONAL RESEARCH UNIVERSITY

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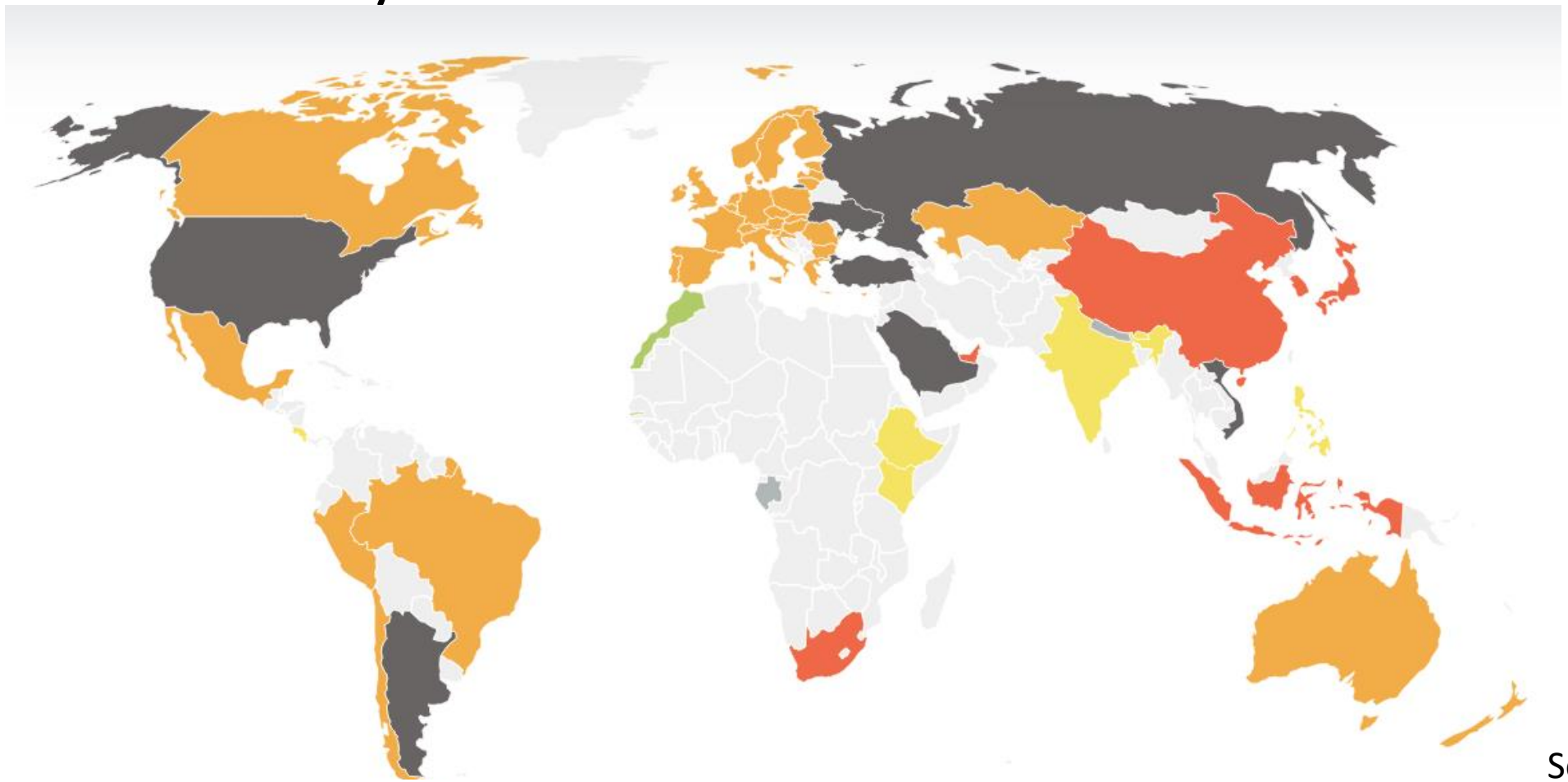
Key concepts

- The asymmetry of countries' climate ambitions
- Carbon leakage
- Transition risks

Paris Agreement

- Bottom-up approach: no commitments, just (non-binding) nationally determined contributions
- Polycentric climate change regime: the major drivers of the regime are specific ‘enthusiastic’ countries, regions, municipalities, companies and financial institutions

The ambitions of climate policy differ dramatically across the world

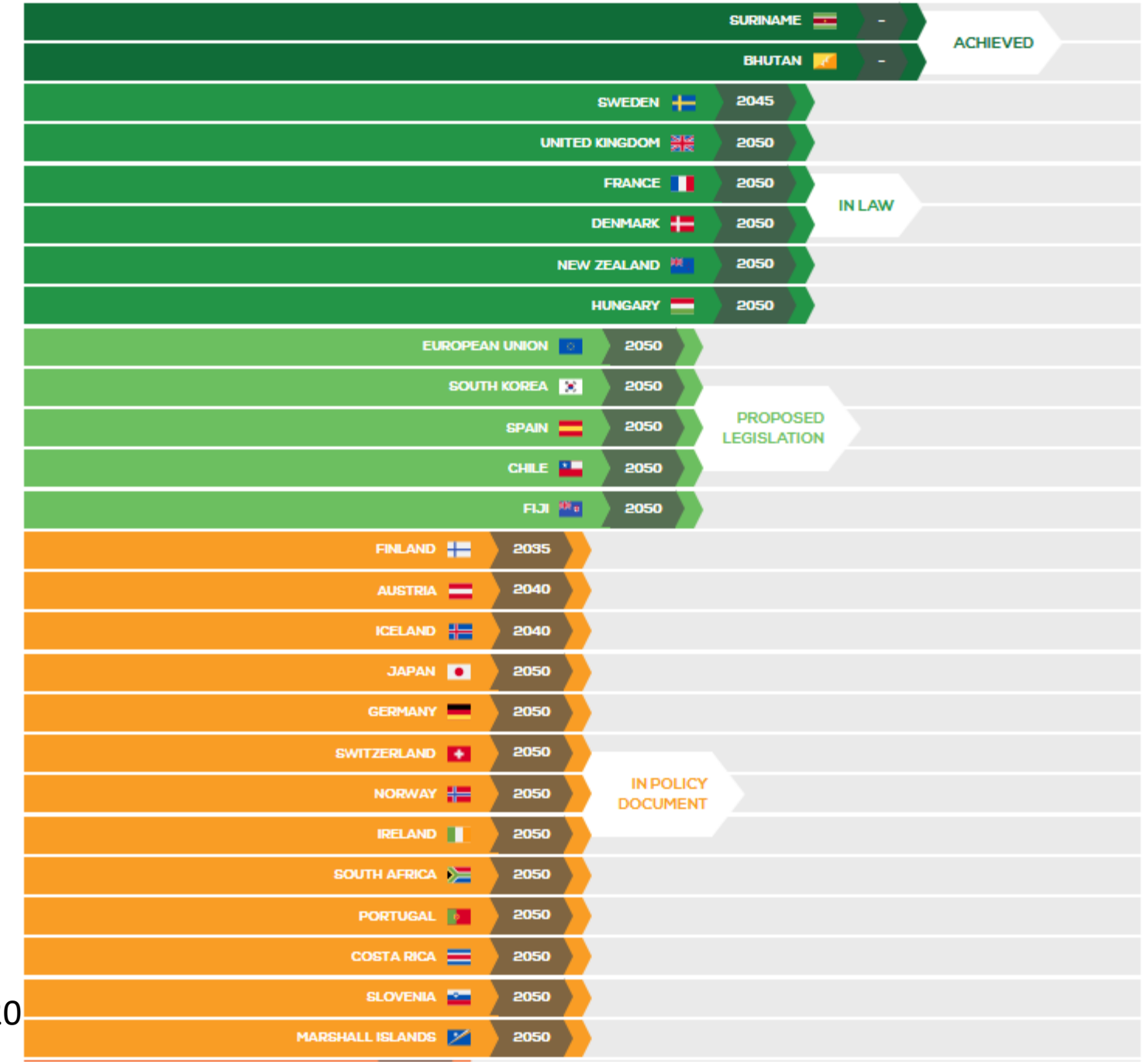


Source: CAT, 2020

CRITICALLY INSUFFICIENT | HIGHLY INSUFFICIENT | INSUFFICIENT | 2°C COMPATIBLE | 1.5°C PARIS AGREEMENT COMPATIBLE | ROLE MODEL

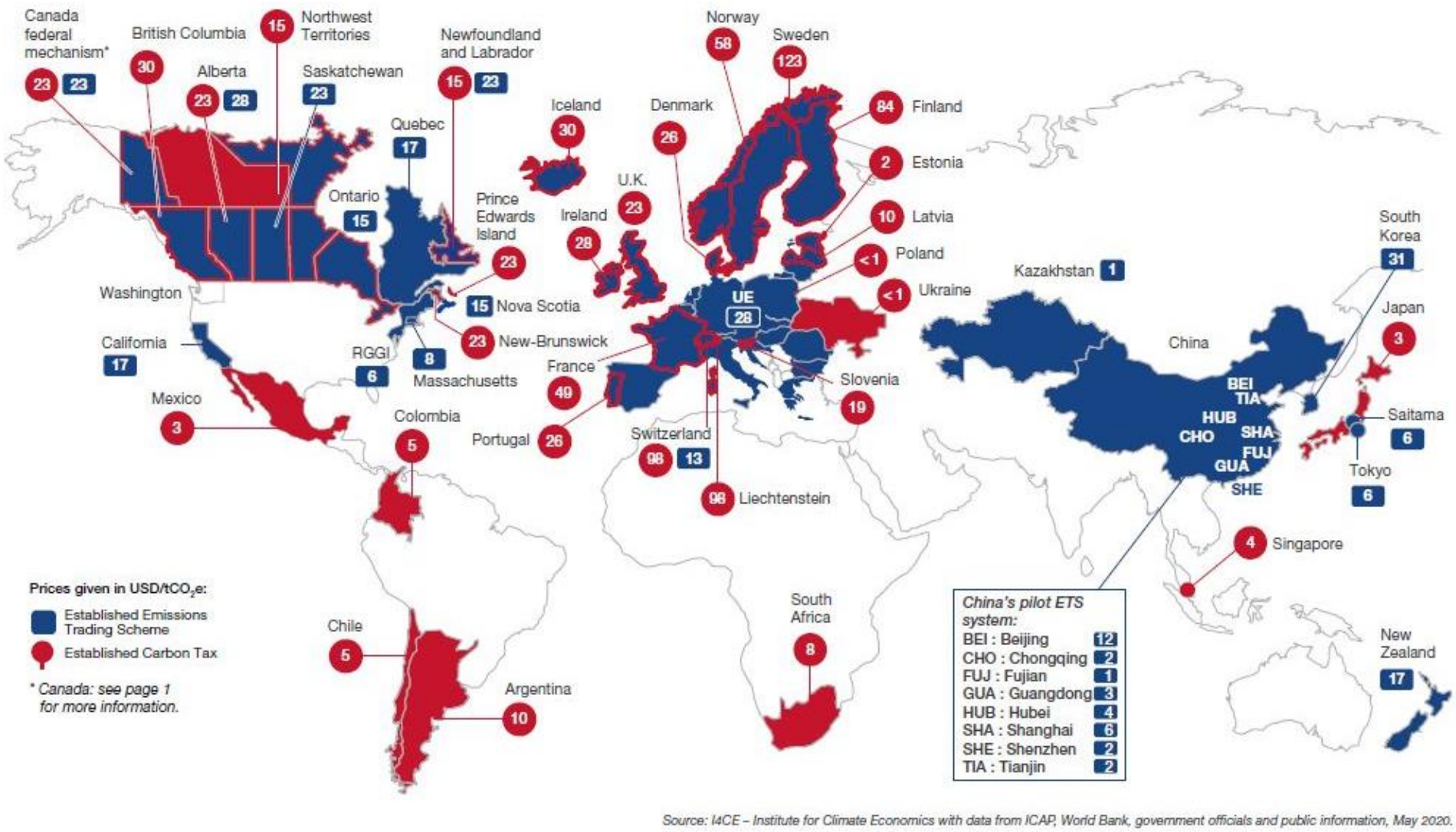
Net zero targets by 2050

- Targets on net zero emissions adopted or discussed by 120 countries amounting to 49% of global GDP
- EU – by 2050
- US – by 2050
- Japan – by 2050
- South Korea – by 2050
- China – by 2060



Source: Energy and Climate Intelligence Unit, 2020

Carbon pricing in the world



Source: I4CE – Institute for Climate Economics with data from ICAP, World Bank, government officials and public information, May 2020.

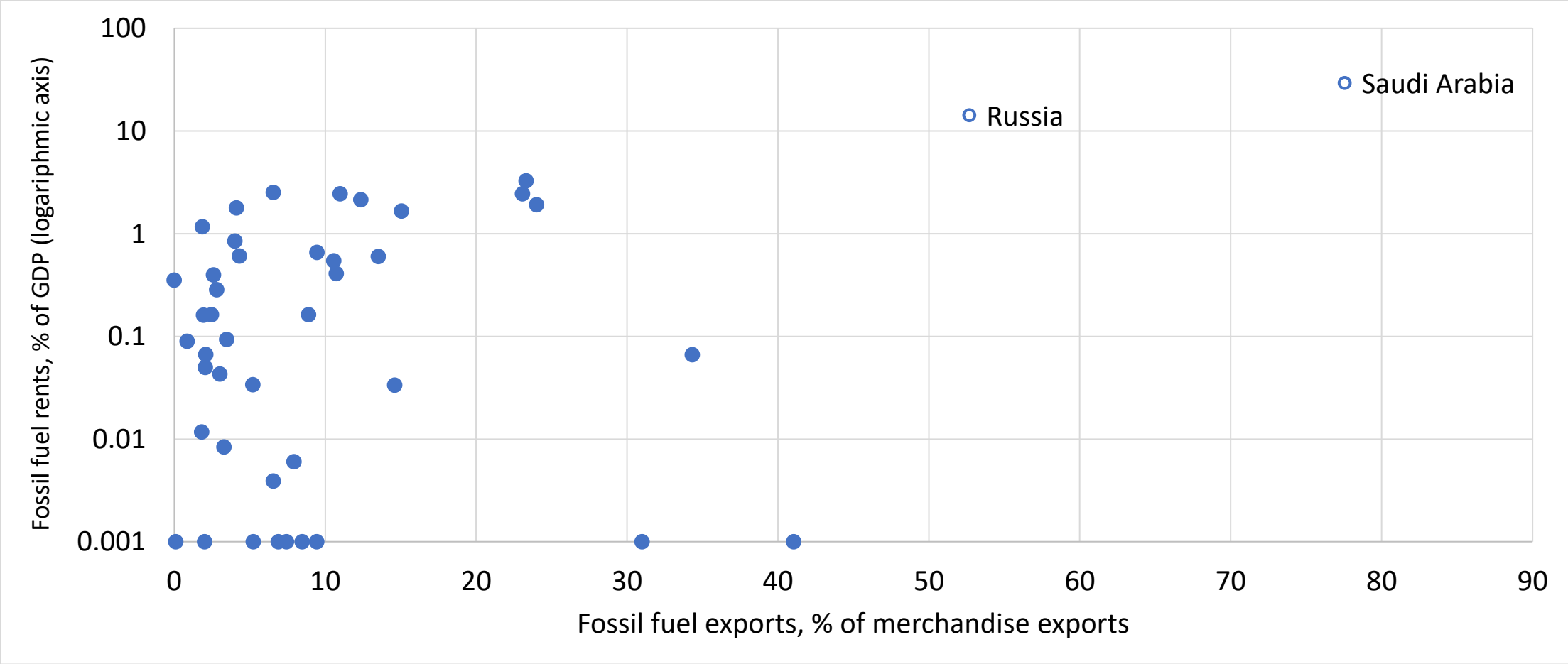
Asymmetry of incentives

'Enthusiastic' countries	'Reluctant' countries	
	Have other development priorities	Significant emissions reduction puts the immediate economic model at risk
EU countries	India	Russia
United States	Brazil	Iran
Japan	South Africa	Saudi Arabia
China	Indonesia	
Australia	Mexico	
New Zealand		

Source: Author's Composition

Factor 1: Fossil fuel dependence

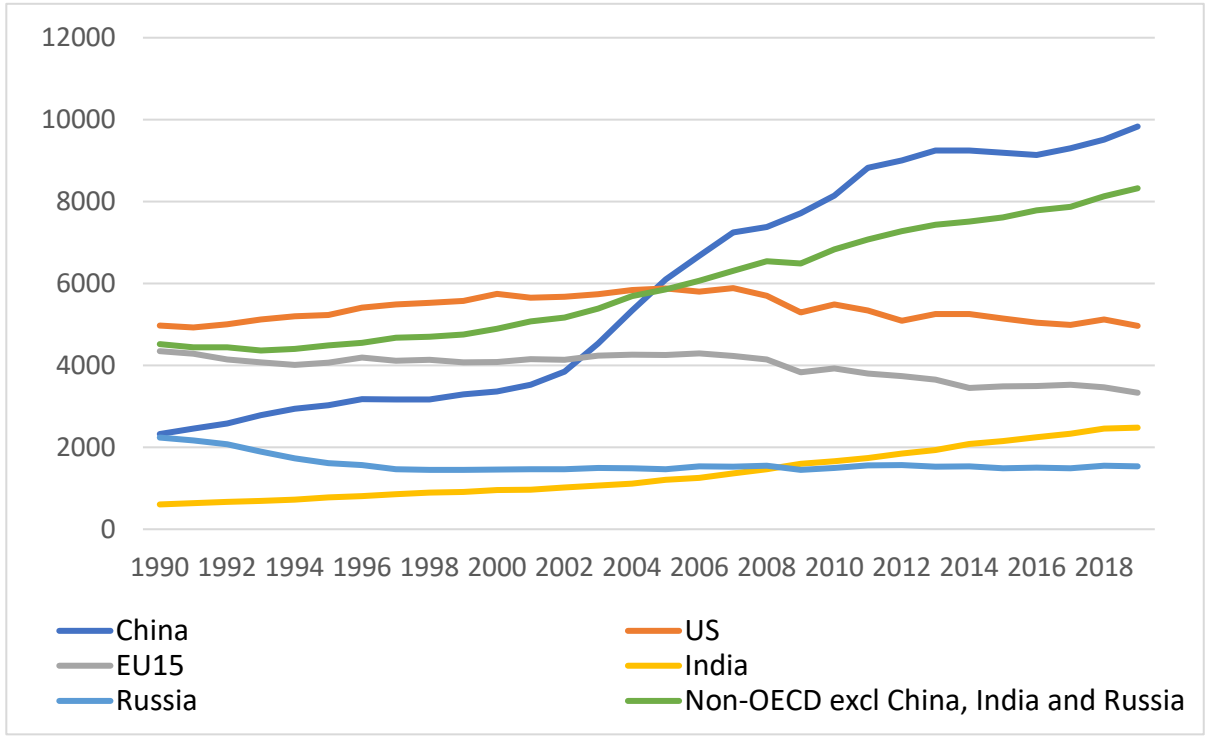
Fossil fuel rents (% of GDP) and fossil fuel exports (% of merchandise exports) in G20 countries



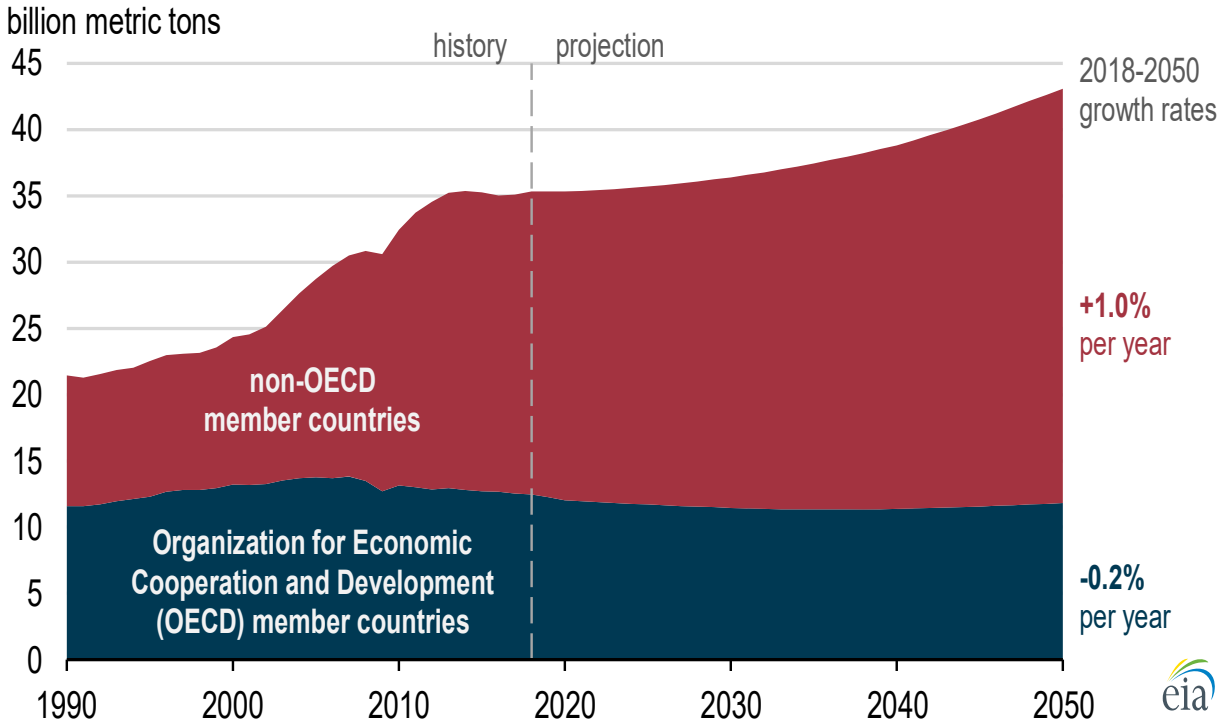
Source: made by the author based on World Bank data

Factor 2: Level of economic development

Energy related CO_2-emissions in 1990-2019 гг.



Global energy-related CO_2 emissions by 2050



Source: BP, EIA

Factor 3: Trade specialization

Consumption- and production-based emissions in OECD and BRICS countries in 2018

Country	Production-based emissions		Consumption-based emissions		Net exports of emissions	
	Mt	% of world	Mt	% of world	Mt	% of national emissions
OECD, total	12 602	34.6%	13 865	38.1%	-1 264	-10.0%
Canada	587	1.6%	588	1.6%	-2	-0.3%
France	332	0.9%	442	1.2%	-110	-33.3%
Germany	755	2.1%	862	2.4%	-106	-14.1%
Italy	348	1.0%	466	1.3%	-118	-33.8%
Japan	1 136	3.1%	1 312	3.6%	-177	-15.6%
Spain	270	0.7%	288	0.8%	-18	-6.6%
Sweden	42	0.1%	71	0.2%	-29	-69.5%
United Kingdom	380	1.0%	540	1.5%	-160	-42.1%
United States	5 425	14.9%	5 767	15.8%	-343	-6.3%

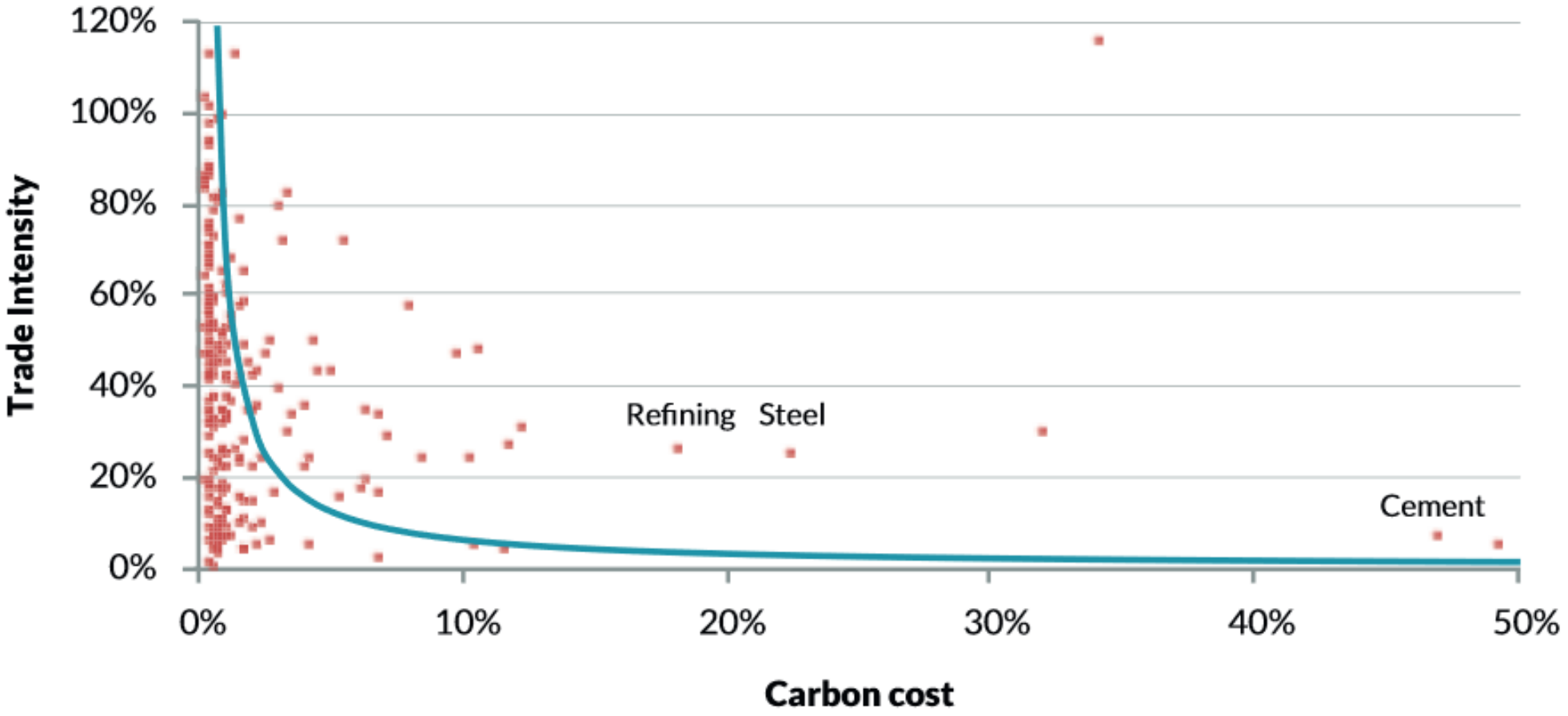
Country	Production-based emissions		Consumption-based emissions		Net exports of emissions	
	Mt	% of world	Mt	% of world	Mt	% of national emissions
BRICS, total	15 178	41.7%	13 554	37.2%	1 624	10.7%
Brazil	467	1.3%	489	1.3%	-22	-4.8%
China	9 957	27.3%	8 960	24.6%	997	10.0%
India	2 591	7.1%	2 355	6.5%	237	9.1%
Russia	1 691	4.6%	1 415	3.9%	277	16.4%
South Africa	472	1.3%	335	0.9%	137	29.0%

Source: OECD

Carbon leakage

- Carbon leakage is the example of spillover effect
- Mechanism: strict emissions regulation in one country increases costs of local producers, as a result their competitiveness relative to foreign producers may decrease
- The most exposed sectors are those that have high carbon intensity and high trade intensity

Carbon leakage exposure of EU economic sectors



Source: I4CE, 2016

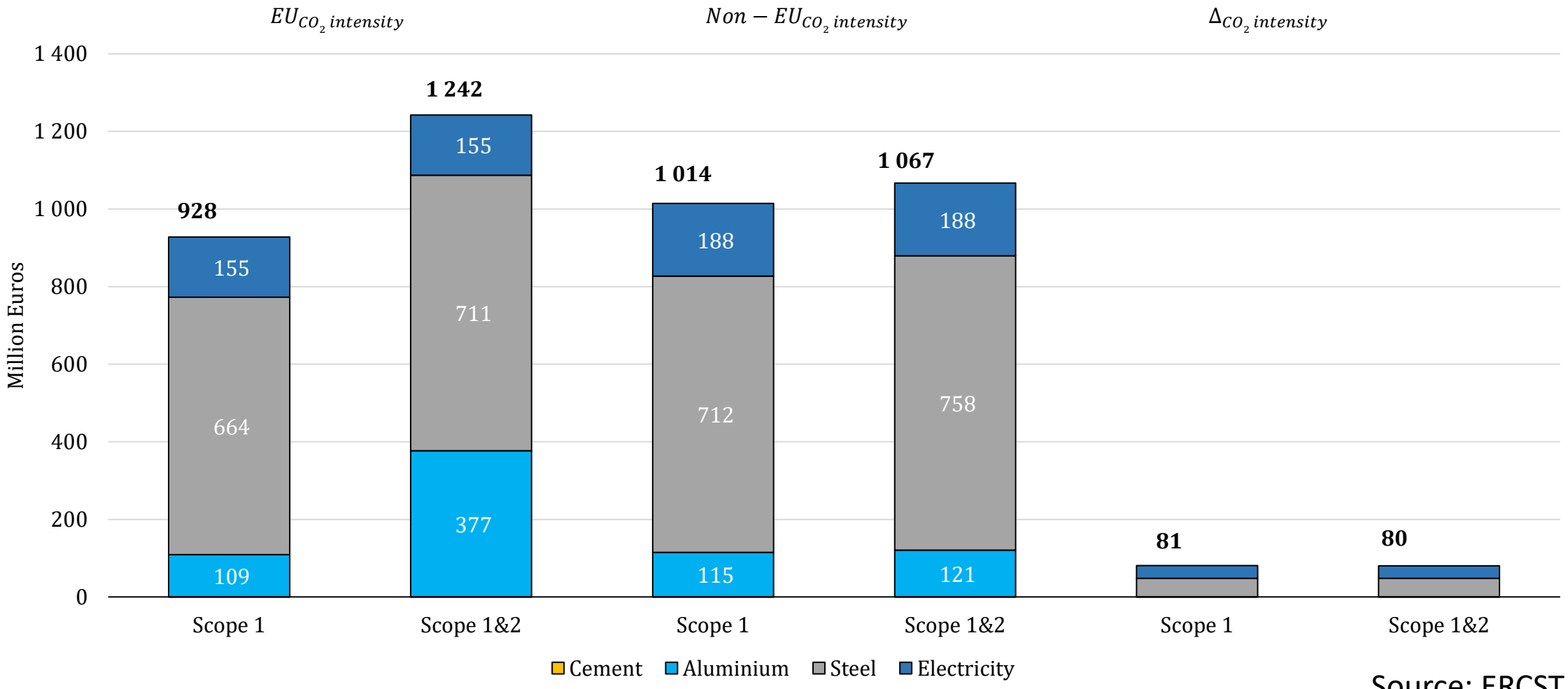
Border carbon adjustment

Idea: to cope with carbon leakage
Mechanism: carbon price should be imposed on the goods imported to the country without any carbon regulation

EU plans: to start carbon border adjustment mechanism in 2022-2023
Details: not clear yet

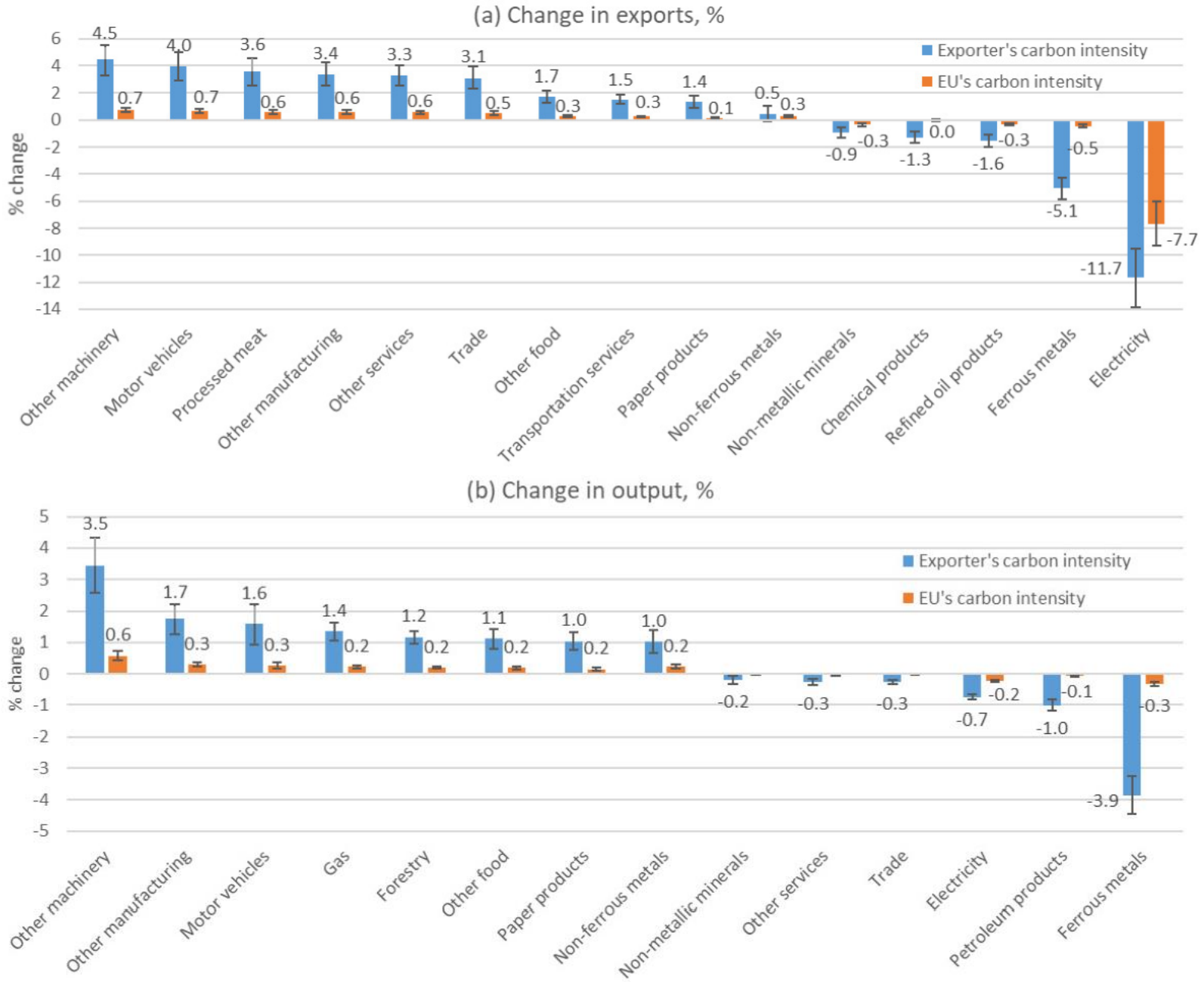
-Sectors (sectors with the largest carbon leakage intensity (trade intensity*emissions intensity): iron and steel, non-ferrous metals, cement?)
-Countries ("all third countries which are not yet part of an effective carbon pricing scheme, or equivalent measures with similar goals and costs to those of the EU ETS")
-Form (buying allowances at the EU ETS?)
-Emissions scope (Scope 1?)
-Part of carbon footprint covered (full emissions or excess over benchmark?)
-Calculation (for each product or based on the average?)

Potential damage to Russia



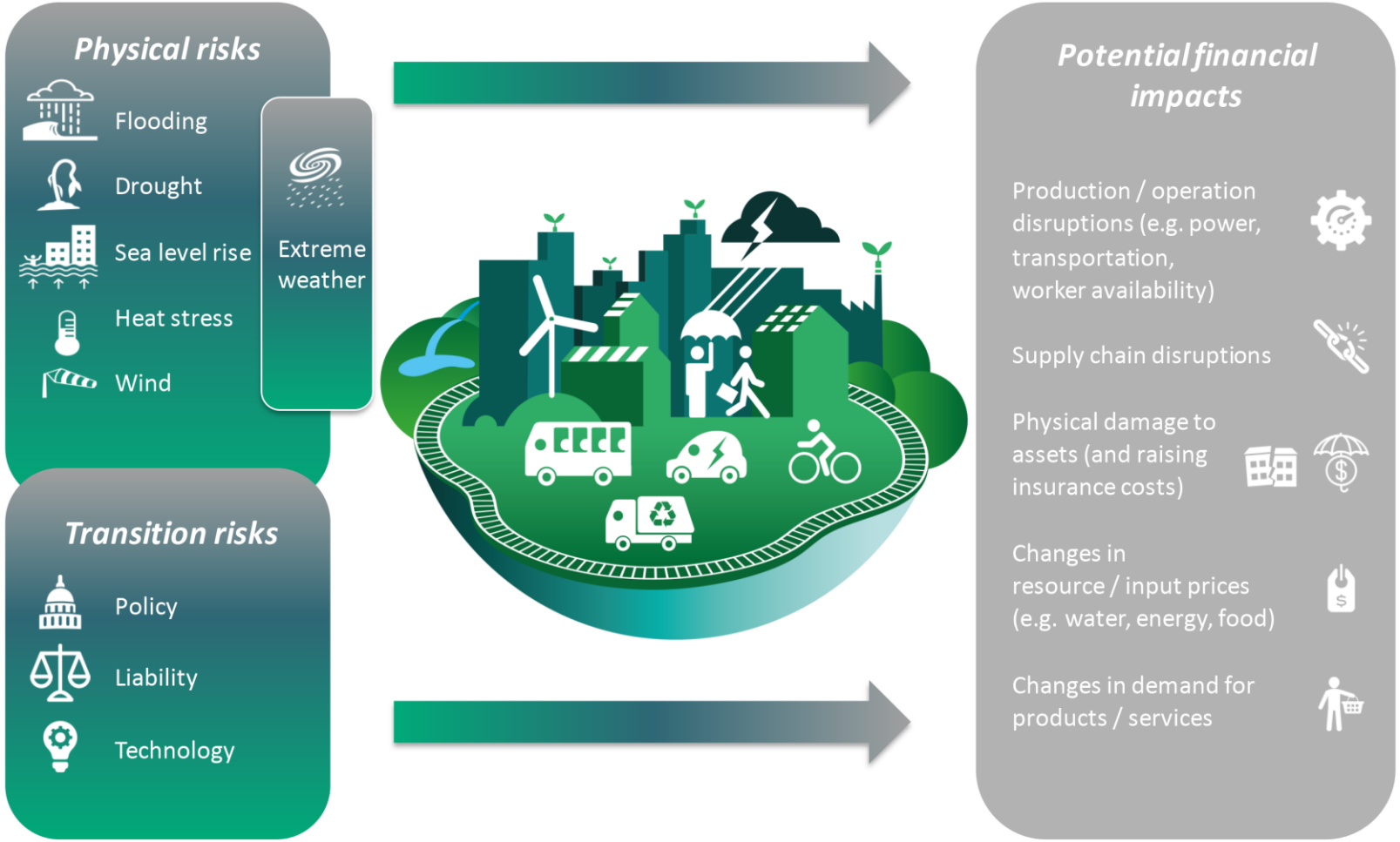
Source: ERCST, 2021

Potential damage to Ukraine



Source: Chepeliev, 2021

Transition risks



Source: CICERO

Transition risks – case for Russia

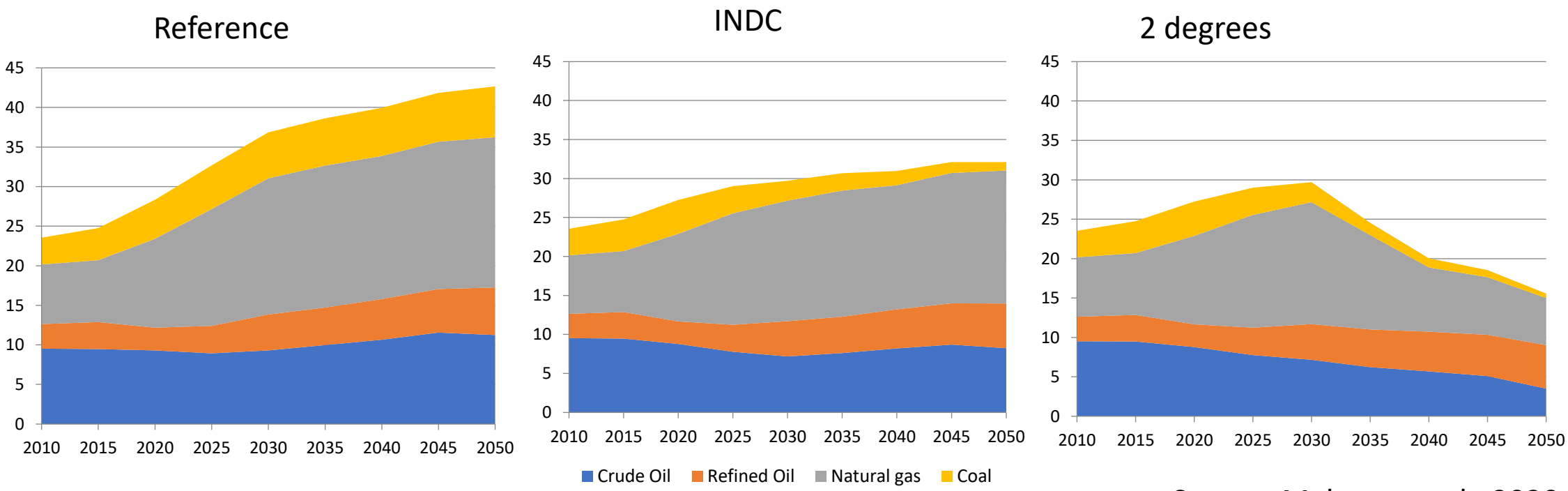
- Reduction of global demand for fossil fuels (problems of stranded assets)
- Barriers to Russian exports of energy-intensive goods
- Risks of technological backwardness

- Important: most of these risks do not depend on Russia itself directly! Climate policy in the country may be an instrument to manage these risks. At the same time, it may provoke the other types of transition risks

The effects of green transition on Russian energy exports

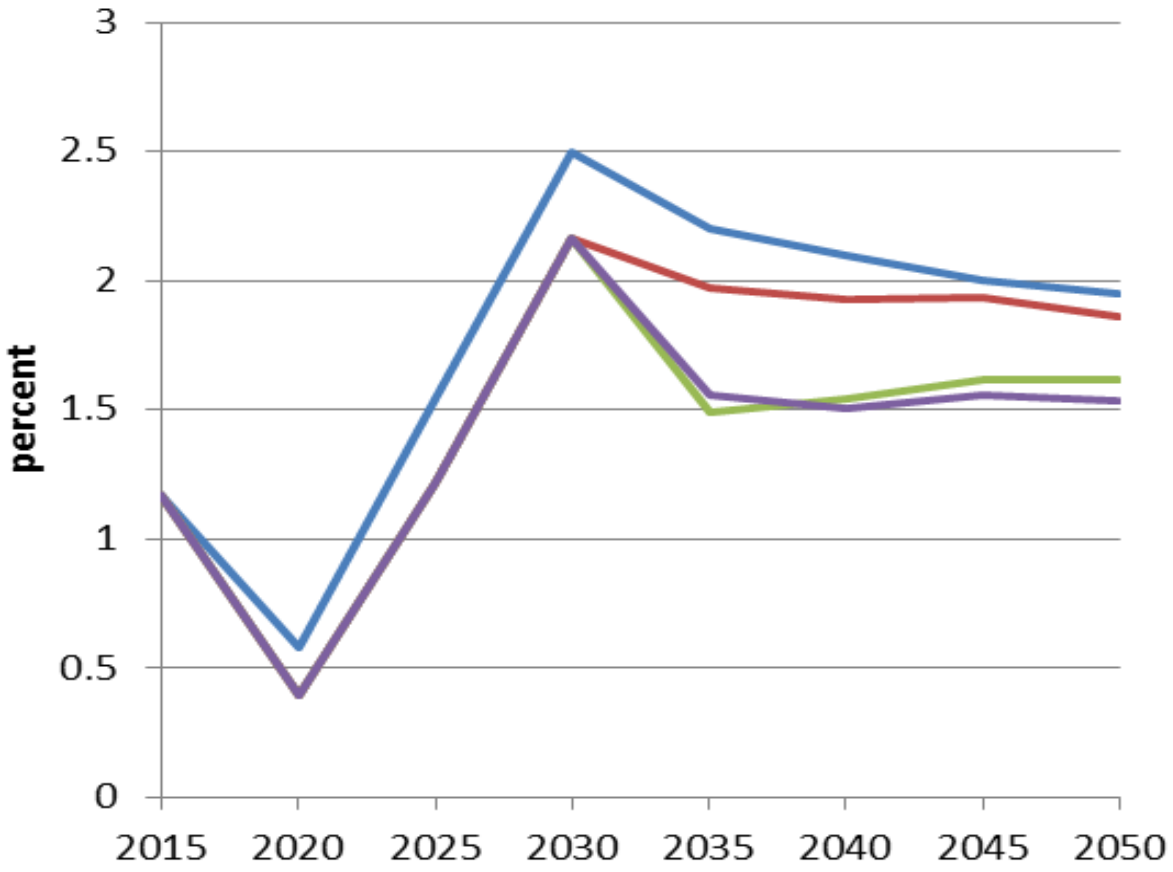
In any scenario taking into account Paris Agreement, Russian energy exports in 2030 are 20% lower (in energy terms) relative to the *Reference* scenario. By 2050 the corresponding reduction reaches 25% for *INDC* and 64% for *2 degrees*

Russia's exports of fossil fuels, EJ



Source: Makarov et al., 2020

Impacts on the (5-year average) real GDP growth rates



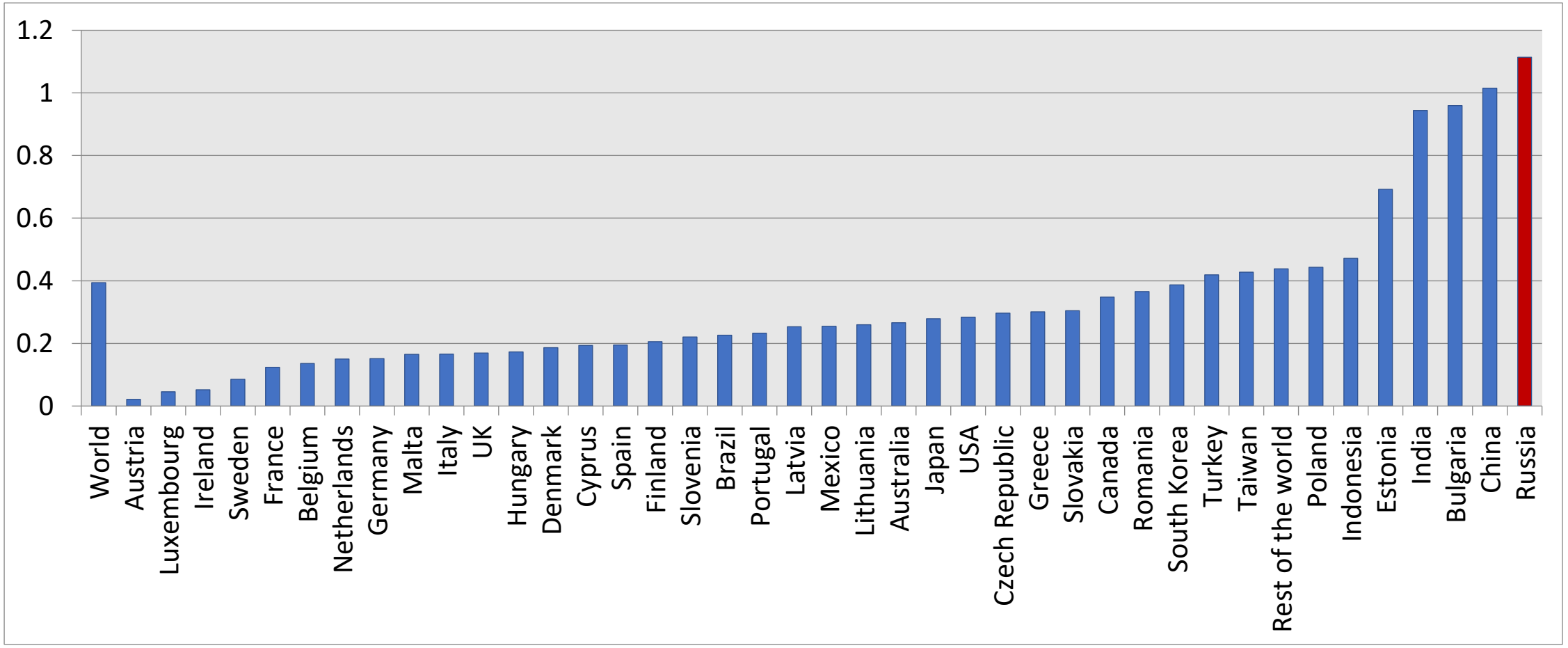
Paris Agreement:
Negative impact of
0.2-0.3 percentage
points of GDP growth
in 2020-2030

More stringent target
(consistent with 2C):
Additional negative
impact of 0.3-0.5
percentage
points of GDP growth
in 2035-2050

Source: Makarov et al., 2020

Russia's exposure to BCAs is very high

Carbon intensity of exports, kg CO_2 per USD



Source: Makarov, Sokolova, 2017

Key take-aways

1. Different countries have different ambitions of climate policies
2. Poorer countries, fossil-fuel dependent countries and exporters of energy-intensive goods are usually more reluctant to ambitious climate policies
3. Carbon leakage appears as a result of asymmetry of climate policies
4. Carbon border adjustment is an attempt to prevent risks of carbon leakage
5. Transition risks appear due to climate policies both within a country and outside it

Thanks for your attention

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