Climate Change

Aims, Actions, Targets

Area **3** – **Social and Economic Aspects**

Lesson **10** – **Policy and Management**

Sequence ID – **40**

AUTH

SPARKLE

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A3.L10.T9 Climate Change

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Overview

- Incentivizing action on climate change
- Putting a price on carbon
- Trends in carbon pricing
- Social cost of carbon
- Carbon tax vs cap-and-trade
- Carbon tax in Greece (case study)
- Conclusions

Incentivizing action on climate change

- Paris Agreement: central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century **well below 2°C above the pre-industrial levels** and to pursue efforts to limit the temperature increase even further to only 1.5°C
  - This is the first-ever universal, legally binding global climate deal (Dec 2015)
- Meeting the Paris Agreement objective requires the **right policies**.
- That means **creating incentives for change**
  - Removing fossil fuel subsidies, introducing carbon pricing, increasing energy efficiency standards and implementing auctions for lowest cost renewable energy

Latest developments in climate change

- The United Nations (UN) Intergovernmental Panel on Climate Change (IPCC) report of August 8th, 2019, highlights the importance of land management in combatting climate change
- COP 25 (25th Conference of the Parties) of the UN Framework Convention on Climate Change Conference will take place in Madrid, Spain in December 2019 and is expected to further drive the global climate agenda

Explore the World's Greenhouse Gas Emissions

Find the newest data on global greenhouse gas emissions on **CAIT Climate Data Explorer**

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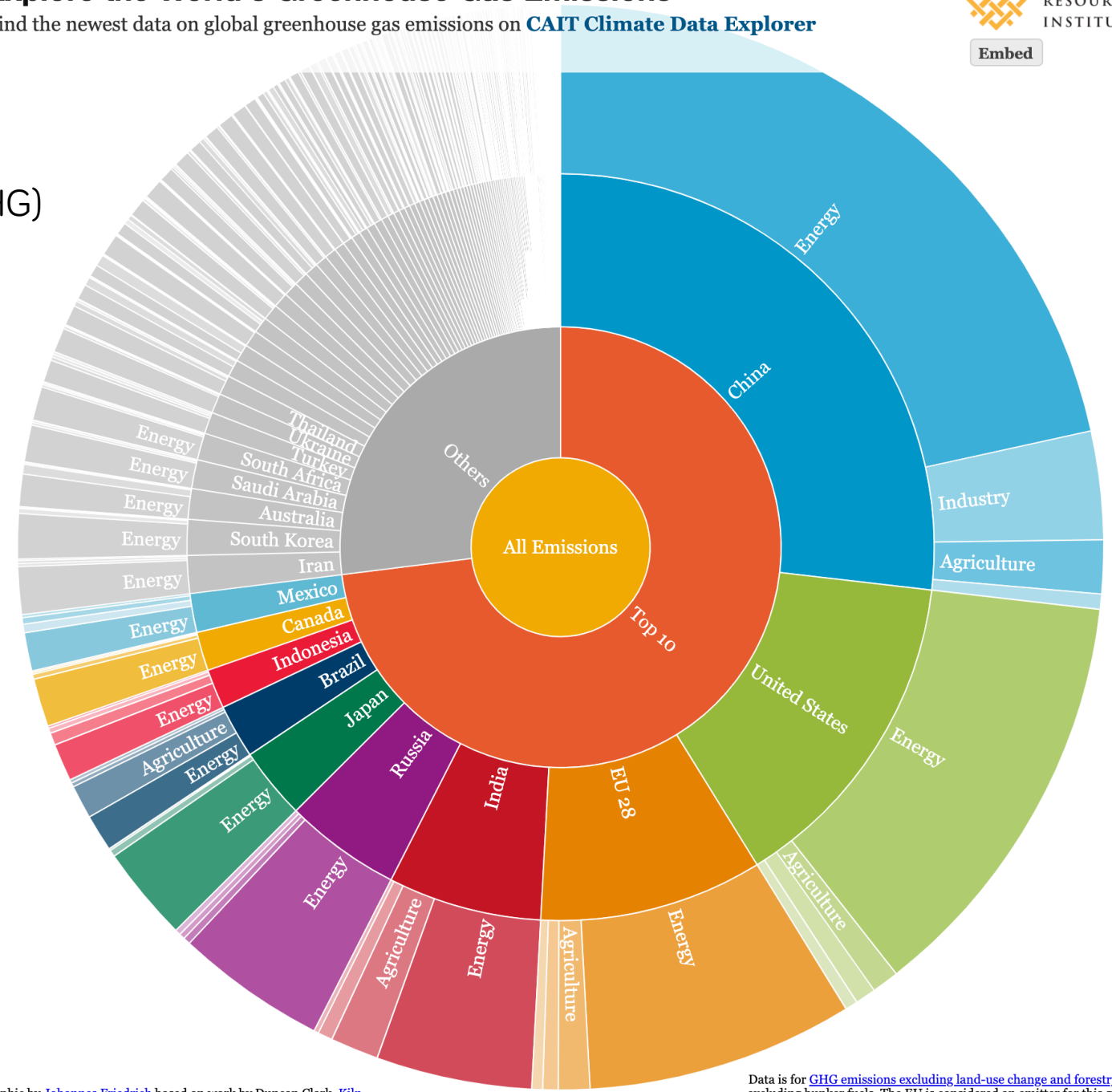
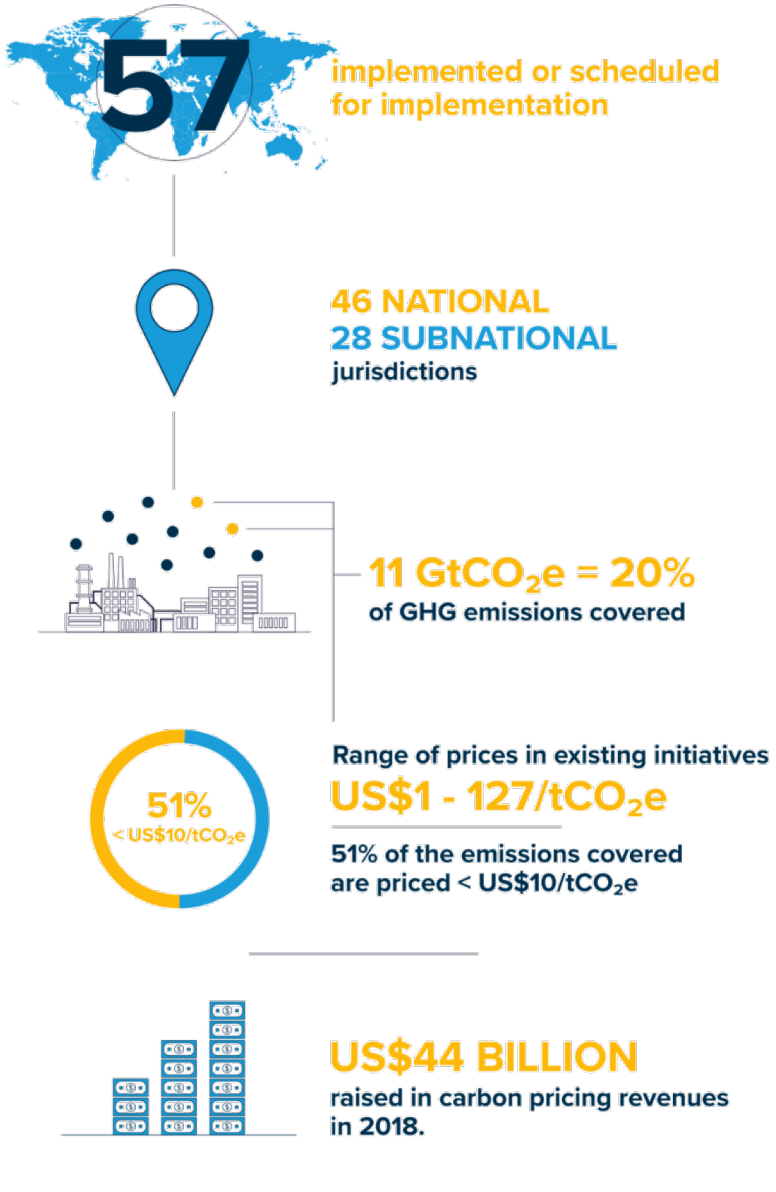
Greenhouse Gas Emissions (GHG)



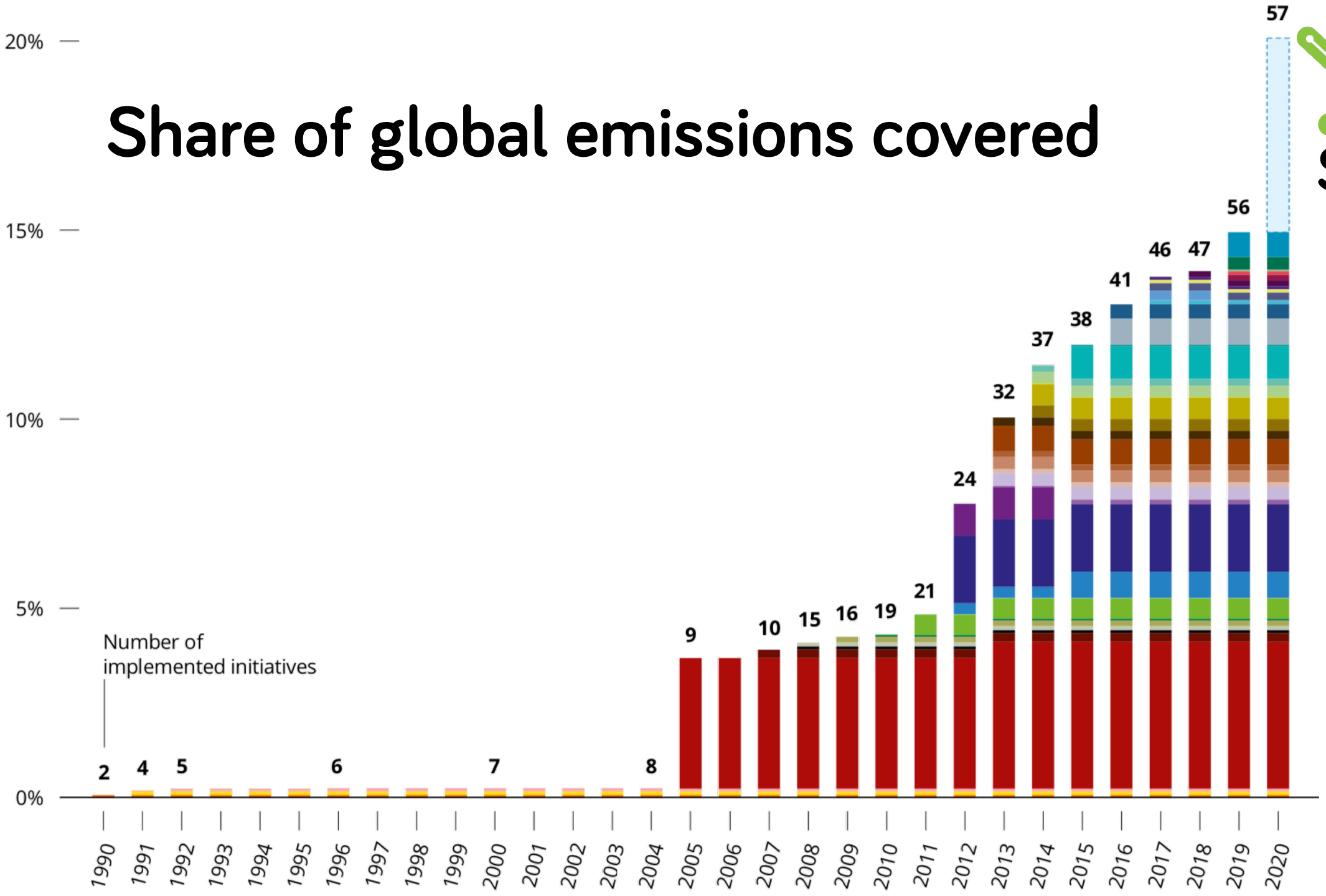
Graphic by Johannes Friedrich based on work by Duncan Clark, Kiln, Mike Bostock and Jason Davies. Thanks also to Jamie Cotta.

Data is for GHG emissions excluding land-use change and forestry and excluding bunker fuels. The EU is considered an emitter for this graph. For more information visit our WRI blog.

Carbon Pricing Initiatives Around the World



Share of global emissions covered



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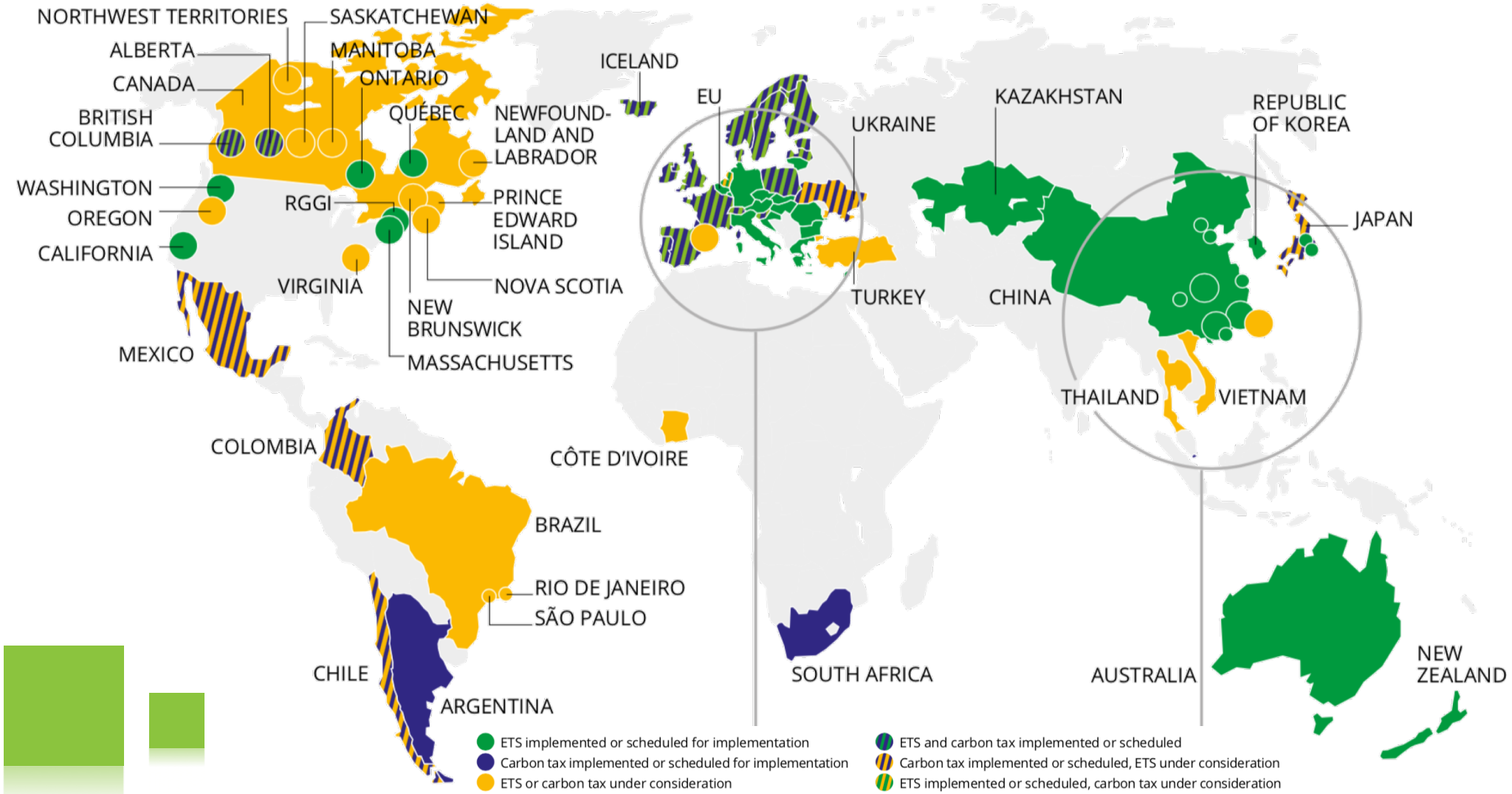
Source: World Bank and Ecofys, "State and Trends of Carbon Pricing 2018"

Regional, national and subnational carbon pricing initiatives



ETS: Emissions Trading System
Source: World Bank and Ecofys, "State and Trends of Carbon Pricing 2018"

Regional, national and subnational carbon pricing initiatives

- ETS implemented or scheduled for implementation
- Carbon tax implemented or scheduled for implementation
- ETS or carbon tax under consideration
- ETS and carbon tax implemented or scheduled
- Carbon tax implemented or scheduled, ETS under consideration
- ETS implemented or scheduled, carbon tax under consideration

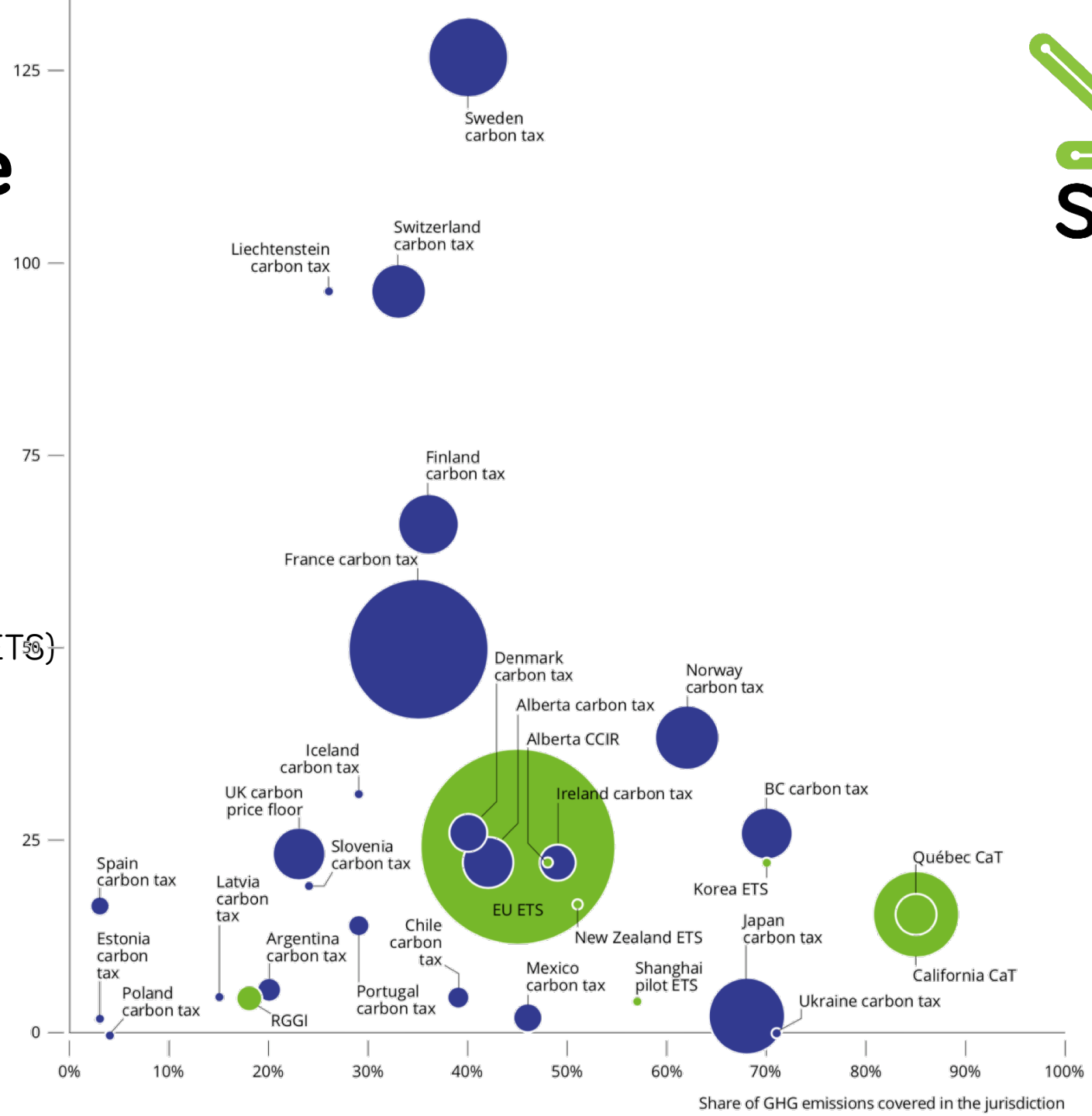
Source: World Bank and Ecofys, "State and Trends of Carbon Pricing 2018"

Carbon price

Carbon price, share of emissions covered and carbon pricing revenues of implemented carbon pricing schemes

Highest revenue from:

1. EU Emissions Trading System (ETS)
2. France carbon tax
3. Sweden carbon tax
4. California carbon tax



Source: World Bank and Ecofys, "State and Trends of Carbon Pricing 2019"

The ETS revenues scoreboard

Who spent how much on what?

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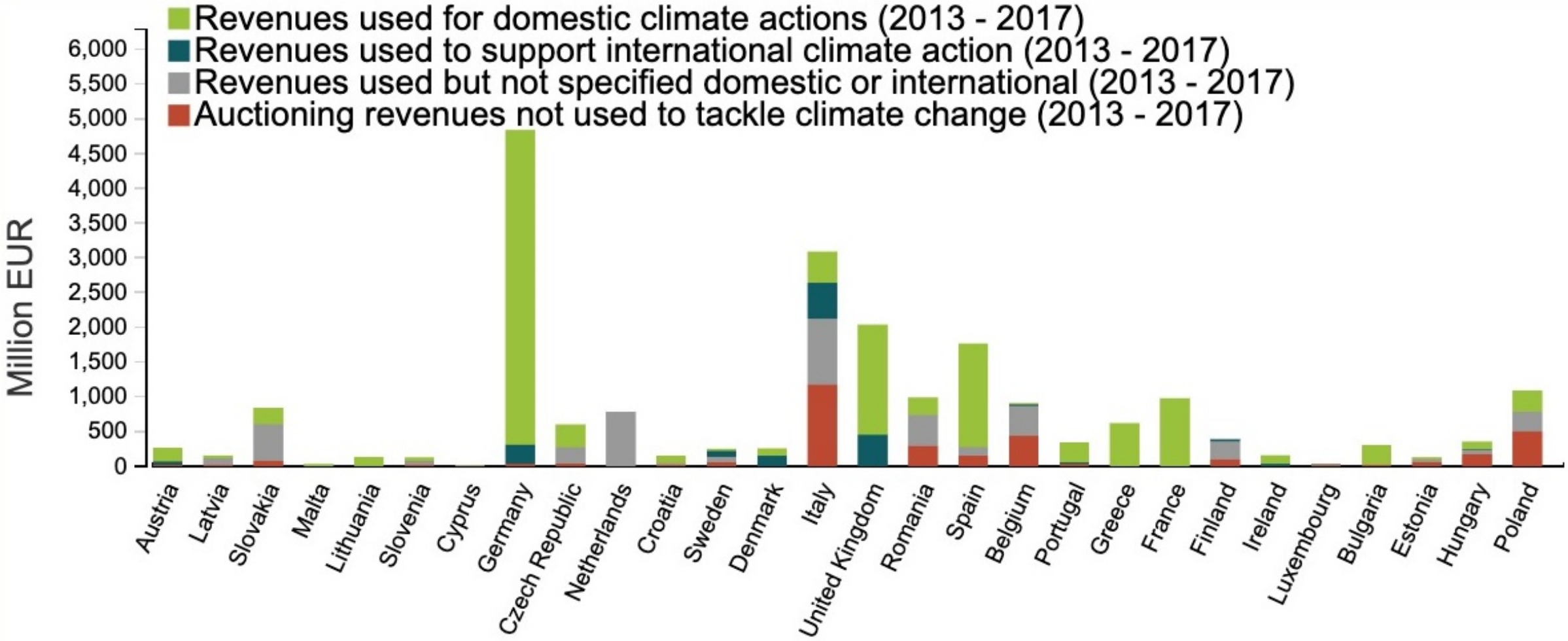

created by EU ETS Auctioning Revenues Scoreboard

Carbon Tax:

How much will you pay vs. how much will you get back?

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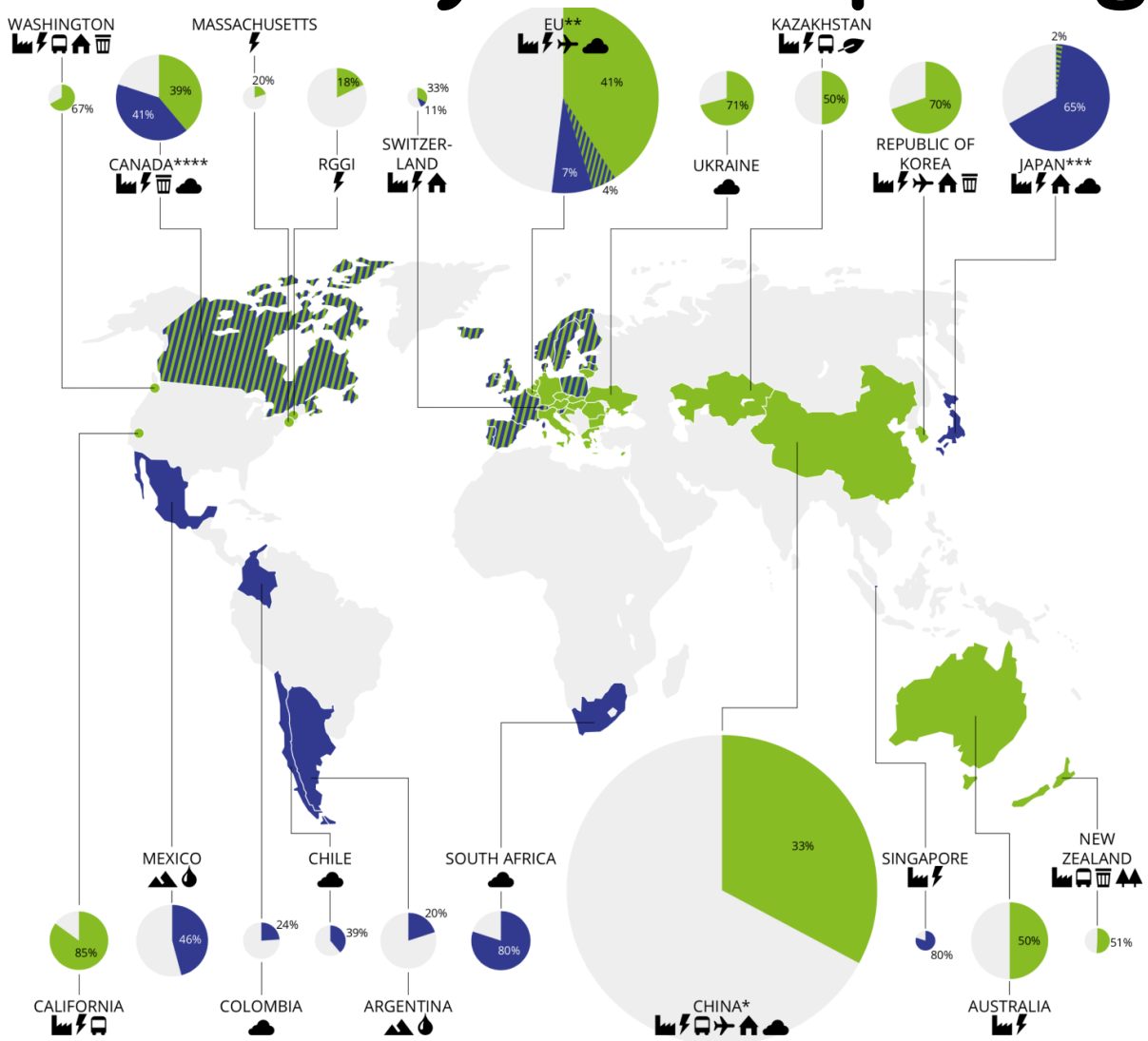
	2019	2020	2021	2022	
ON	$244	$357	$463	$564	Average cost per household*
	$300	$439	$571	$697	Rebate
	$56	**$82**	**$108**	**$133**	**Difference**
NB	$202	$296	$386	$470	Average cost per household*
	$248	$365	$476	$583	Rebate
	$46	**$69**	**$90**	**$113**	**Difference**
MB	$232	$342	$447	$547	Average cost per household*
	$336	$495	$649	$797	Rebate
	$104	**$153**	**$202**	**$250**	**Difference**
SK	$403	$588	$768	$946	Average cost per household*
	$598	$883	$1,161	$1,419	Rebate
	$195	**$295**	**$393**	**$473**	**Difference**

Sectoral coverage and % of GHGs covered by carbon pricing



ETS implemented or scheduled for implementation

Carbon tax implemented or scheduled for implementation

ETS and carbon tax implemented or scheduled

40% Estimated coverage

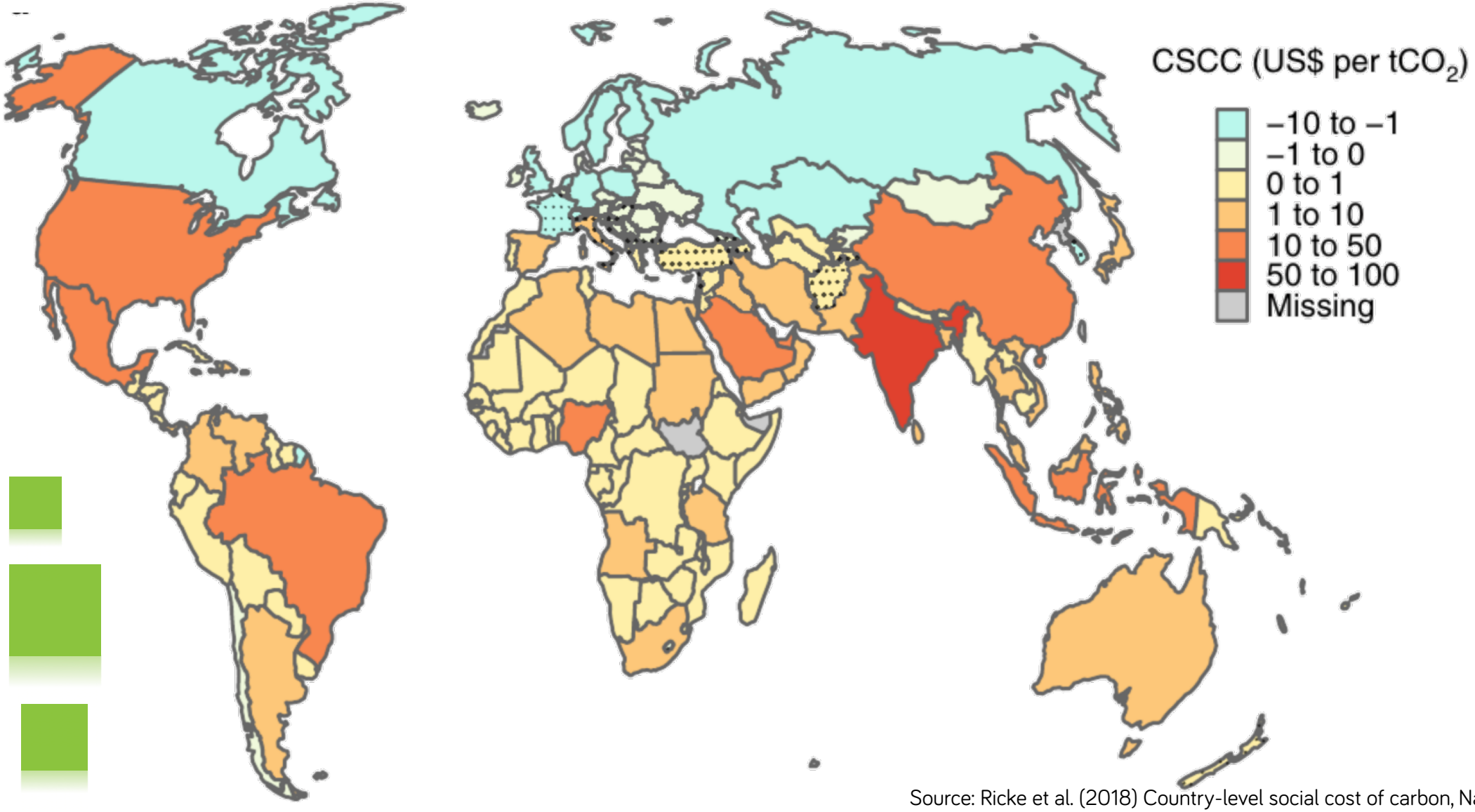
Industry	Buildings	All fossil fuels (tax only)
Power	Waste	Solid fossil fuels
Transport	Forestry	Liquid fossil fuels
Aviation	Agriculture	Shipping

Source: *State and Trends of Carbon Pricing 2019, World Bank, 2019*

Social cost of carbon (SCC)

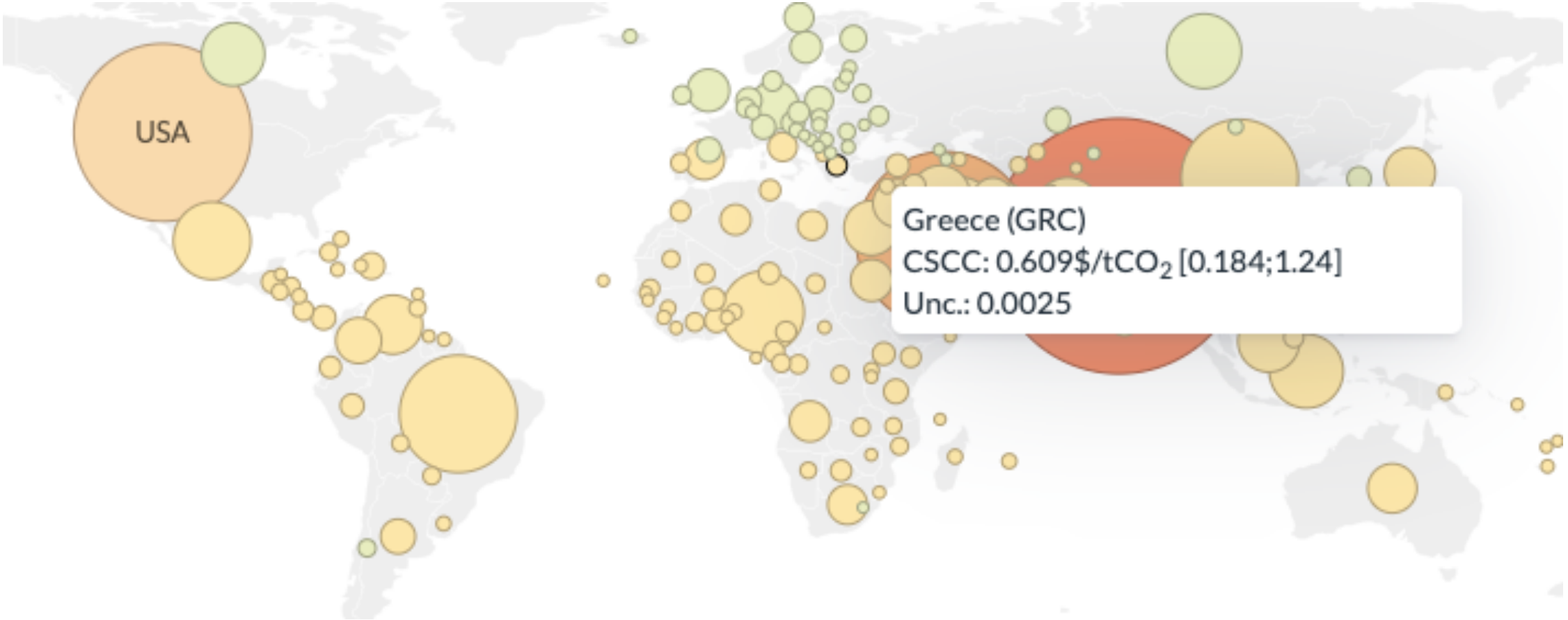
- **Is the present value of the marginal cost of the impacts caused by emitting one extra ton of carbon, inclusive of 'non-market' impacts on the environment and human health**
- It is a commonly employed metric of the expected economic damages from GHG emissions
- These estimates are used to inform environmental policy making
- Estimates of the SCC are highly uncertain. Recent estimates of SCC range from \$10 to \$1000 per tCO_2
- They are also highly heterogeneous among regions/countries

Country-level SCC



Source: Ricke et al. (2018) Country-level social cost of carbon, Nature Climate Change 8, 895-900

Country-level SCC: Greece



Source: https://country-level-scc.github.io/explorer/

Carbon tax vs Cap-and-trade (ETS)

- Both systems aim at reducing GHG emissions
- A carbon tax sets a price directly and provides certainty regarding emission prices
- A cap-and-trade sets a price indirectly through the trade of limited pollution permits
  - A common challenge facing ETSs is market imbalance, which could be due to a mismatch between the cap or emission baseline that was set on one hand and expected emissions on the other, to the introduction of other policies that affect emissions covered by an ETS, or to unforeseen circumstances such as an economic downturn.
- The choice between the two remains ambiguous. In the absence of uncertainty these two systems will achieve the same effect.

EU ETS vs national carbon taxes

- EU ETS is the largest in the world. It trades permits for GHG emitted from large-scale facilities in aviation, industry and power sectors
- EU ETS covers ~45% of the EU's GHG emissions

- Sectors not in the EU ETS: **agriculture**, housing, transport and waste

Conclusions

- Climate change is climbing the political and social agenda
- Further rises in carbon prices and coverage are needed to stimulate emission reductions in line with the Paris Agreement
- Regional effects of climate change differ and so will mitigation and adaptation actions