



MEASURING CLIMATE CHANGE THE ECONOMIC AND FINANCIAL DIMENSIONS

IMF Climate Change Indicators Dashboard

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<http://climatedata.imf.org>

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ABOUT

Climate Change Indicators Dashboard

A statistical tool linking climate considerations and global economic indicators



Economic Activity Indicators

Greenhouse gas emissions
National Targets
Carbon Emission per unit of Output



Cross Border Indicators

Trade-related
Direct Investment-related



Financial and Risk Indicators

Financial
Physical and Transition Risks



Government Policy Indicators

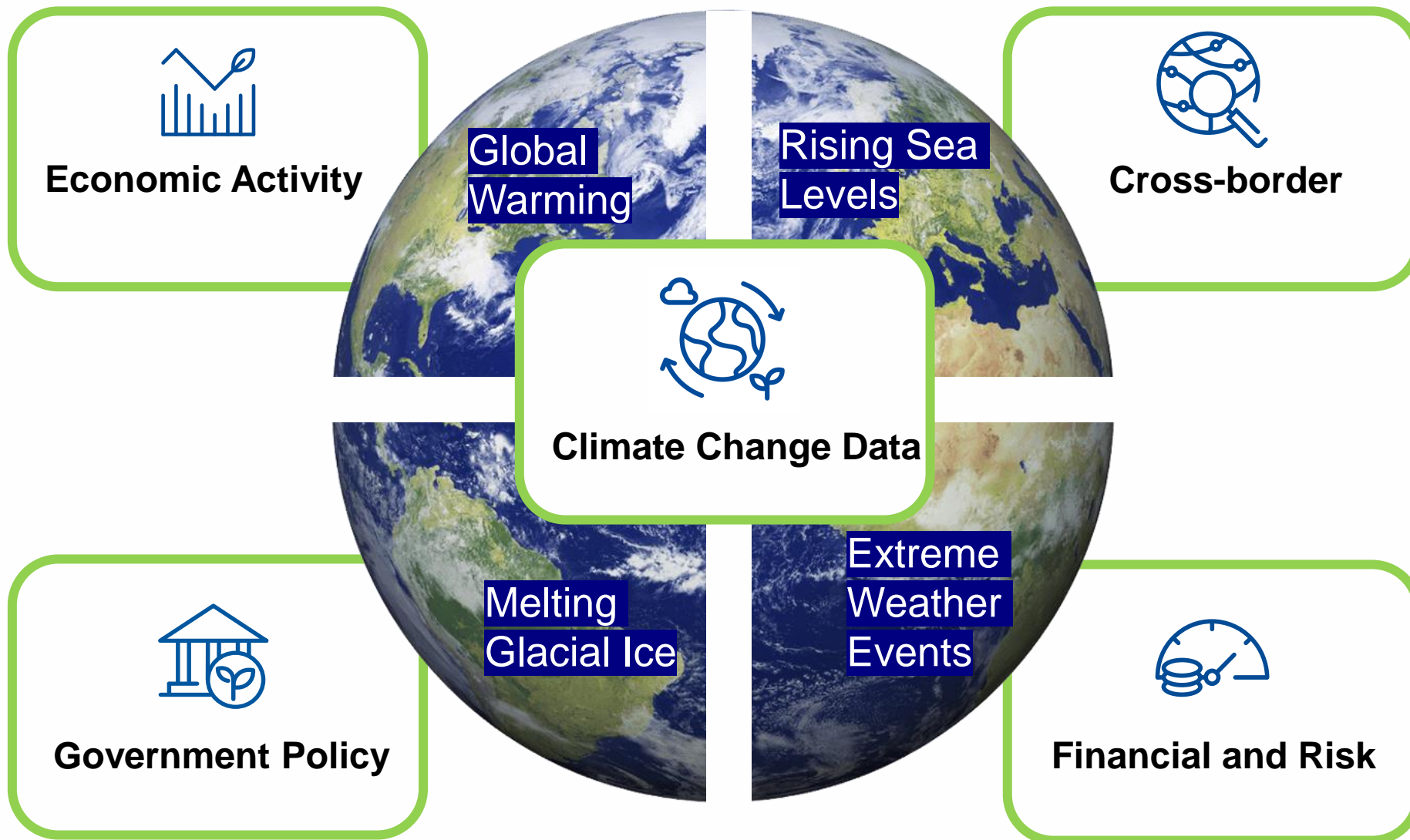
Environmental Taxes
Environmental Protection Expenditures
Fossil Fuel Subsidies



Climate Change Data

Mean Global Surface Temperature
Atmospheric CO₂ Concentrations
Change in Mean Sea Levels
Land Cover Accounts
Climate-related Disasters

Framework

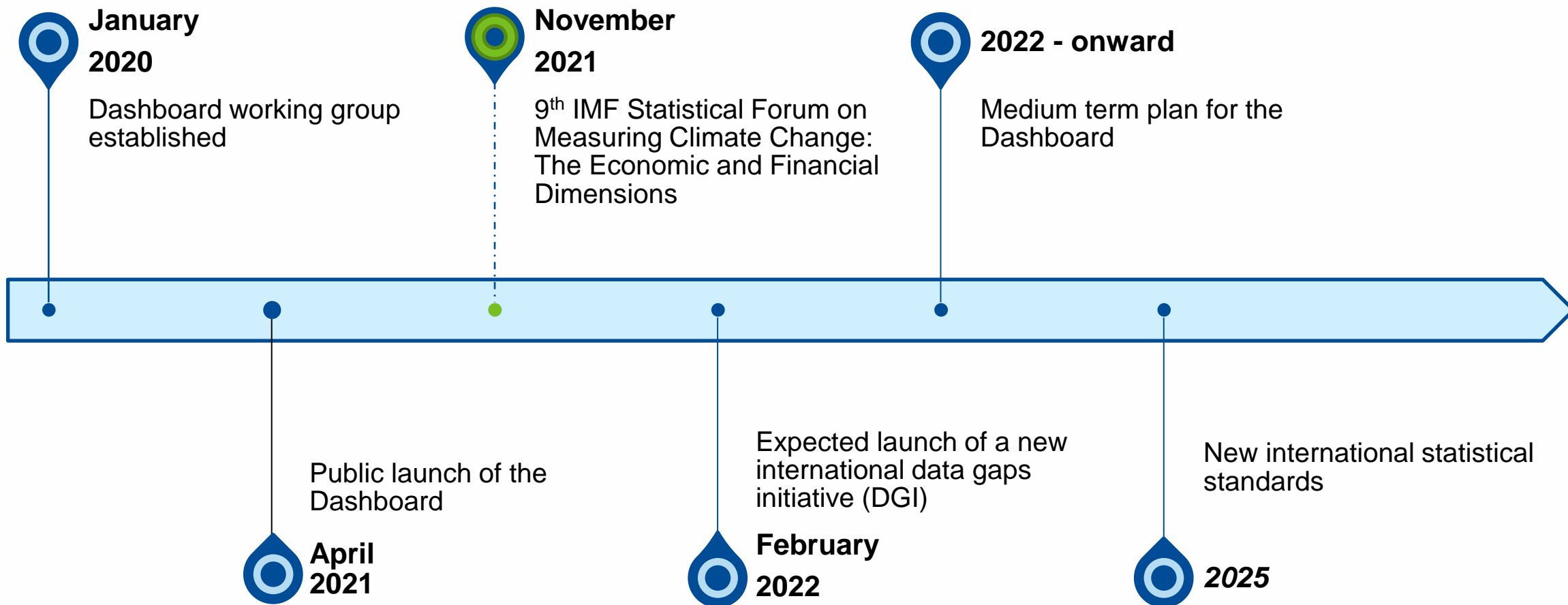


Collaborating Institutions

The Dashboard complements the work of international organizations and other agencies. Details of this collaboration can be found in the Background Information section below as well as the Dashboard Access Data page which includes links to the data and metadata for all indicators.



Timeline



Dashboard Developments: April - November 2021

Additional Indicators

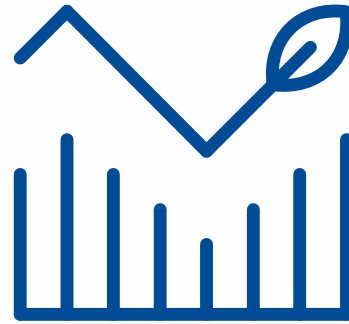
- Nationally Determined Contributions Emissions Targets by Country and Region
- Land cover accounts
- Trade in low carbon technology products
- Trade dimension to the indicator of emissions in the output of MNEs
- Carbon Footprint Adjusted Loans to Total Loans (based on direct and indirect emissions)
- Explicit and implicit fossil fuel subsidies

Restructured and Improved Dashboard

- Introduction of 5th main category: Climate Change Data
- Improved visualizations for green bonds and transition risks

Improved and Updated Data

- Further refinements to environmental goods methodology and addition of bilateral data
- 2021 Update for the Climate Driven INFORM Risk Indicator



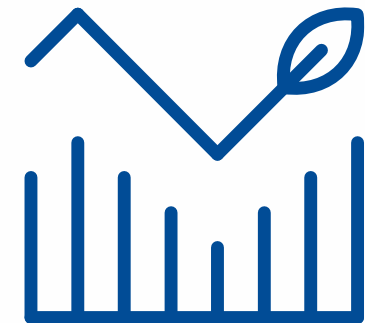
Economic Activity Indicators

Economic Activity Indicators

Greenhouse Gas Emissions

- National greenhouse gas emissions inventories and national mitigation targets
- Quarterly greenhouse gas emissions by activity and for households

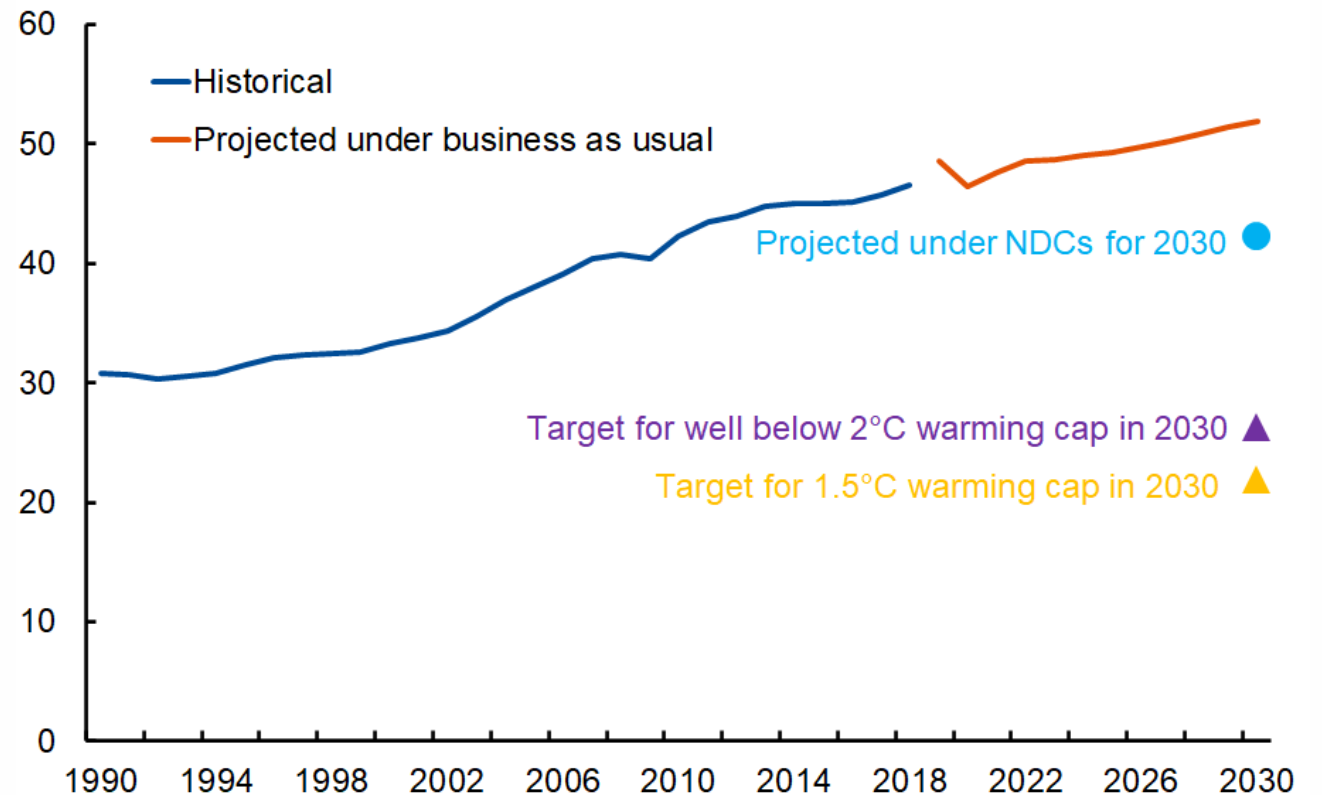
CO2 Emissions per US\$ of Output



Tracking Emission Targets

World greenhouse gas emissions are far in excess of current national commitments, which in turn are not ambitious enough to cap global temperature increase at well below 2 degrees Celsius

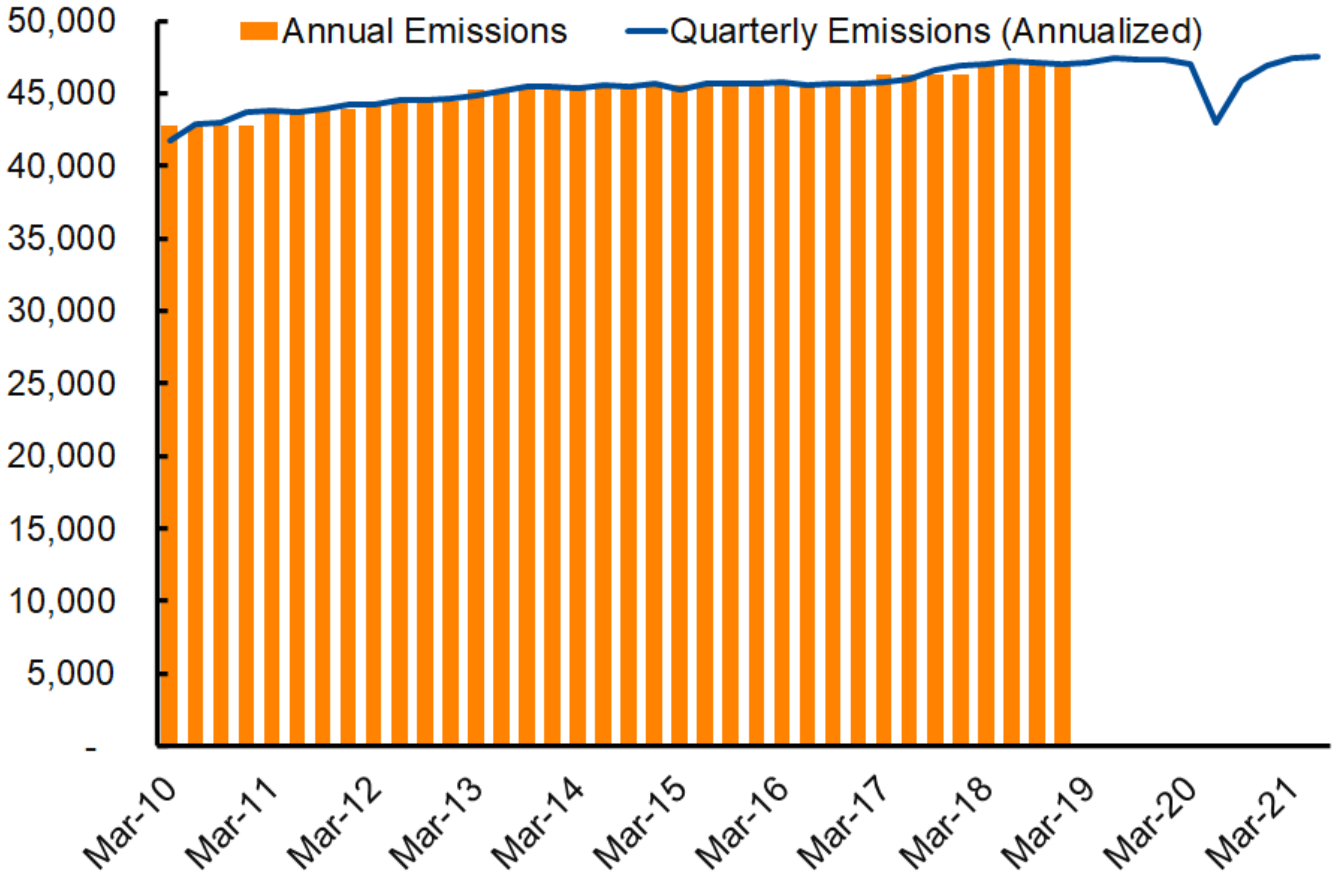
Global total GHG emissions: historical and by scenario
(Billion metric tons of carbon dioxide equivalent)



Quarterly Greenhouse Gas Emissions

COVID-19 resulted in a large temporary(?) decline in GHG emissions worldwide.

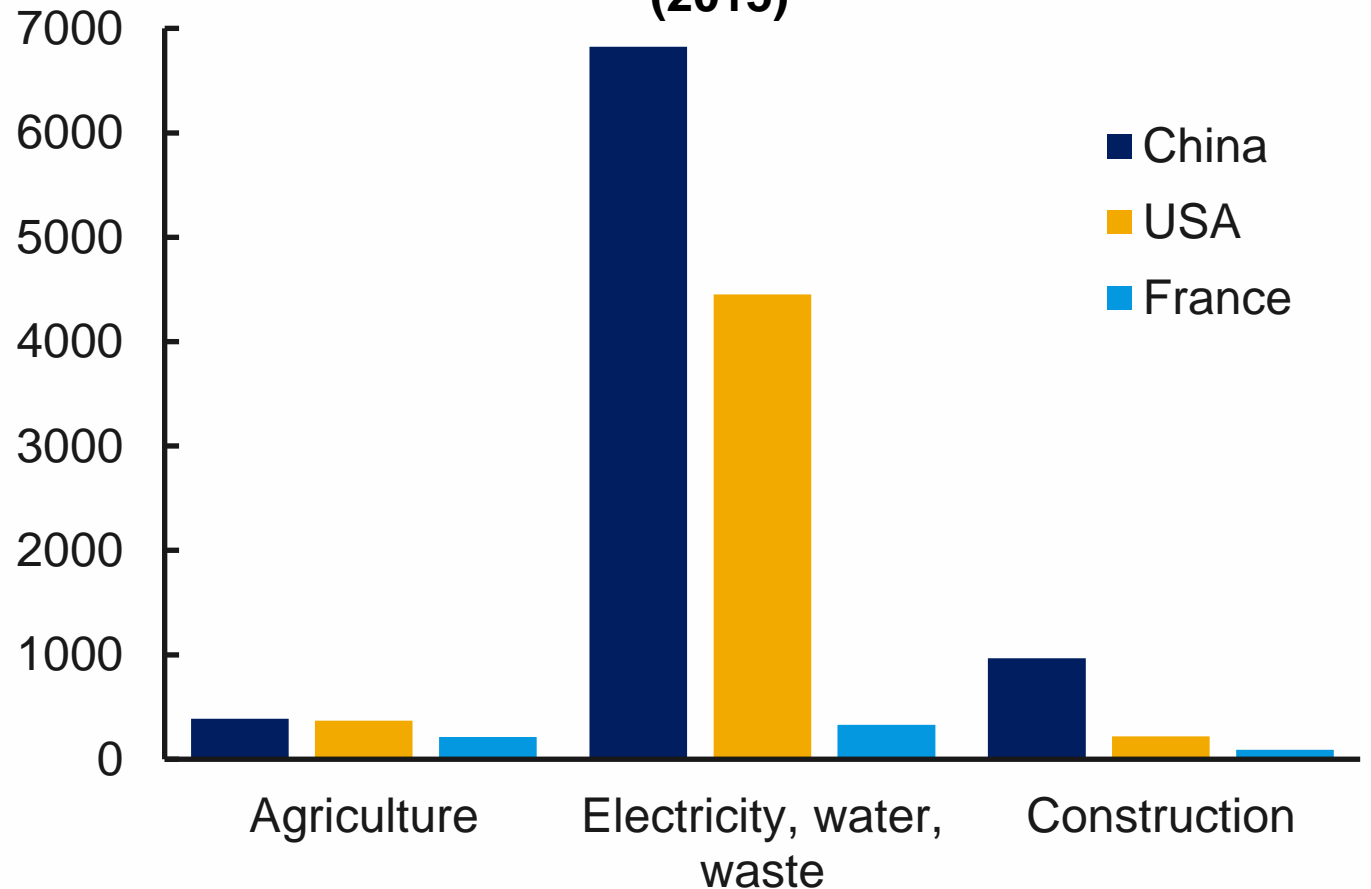
World Annualized Quarterly GHG Emissions



CO2 Emissions

CO2 emissions per unit of output from the electricity, water and waste industry in China and the USA far exceed those in France

CO2 emissions in tons per million \$US of output (2015)





Cross-Border Indicators

Cross-border Indicators

Trade related indicators

- CO2 emissions embodied in domestic final demand, production, and trade
- Trade in environmental goods
- Trade in low carbon technology products

Direct investment (FDI) related indicators

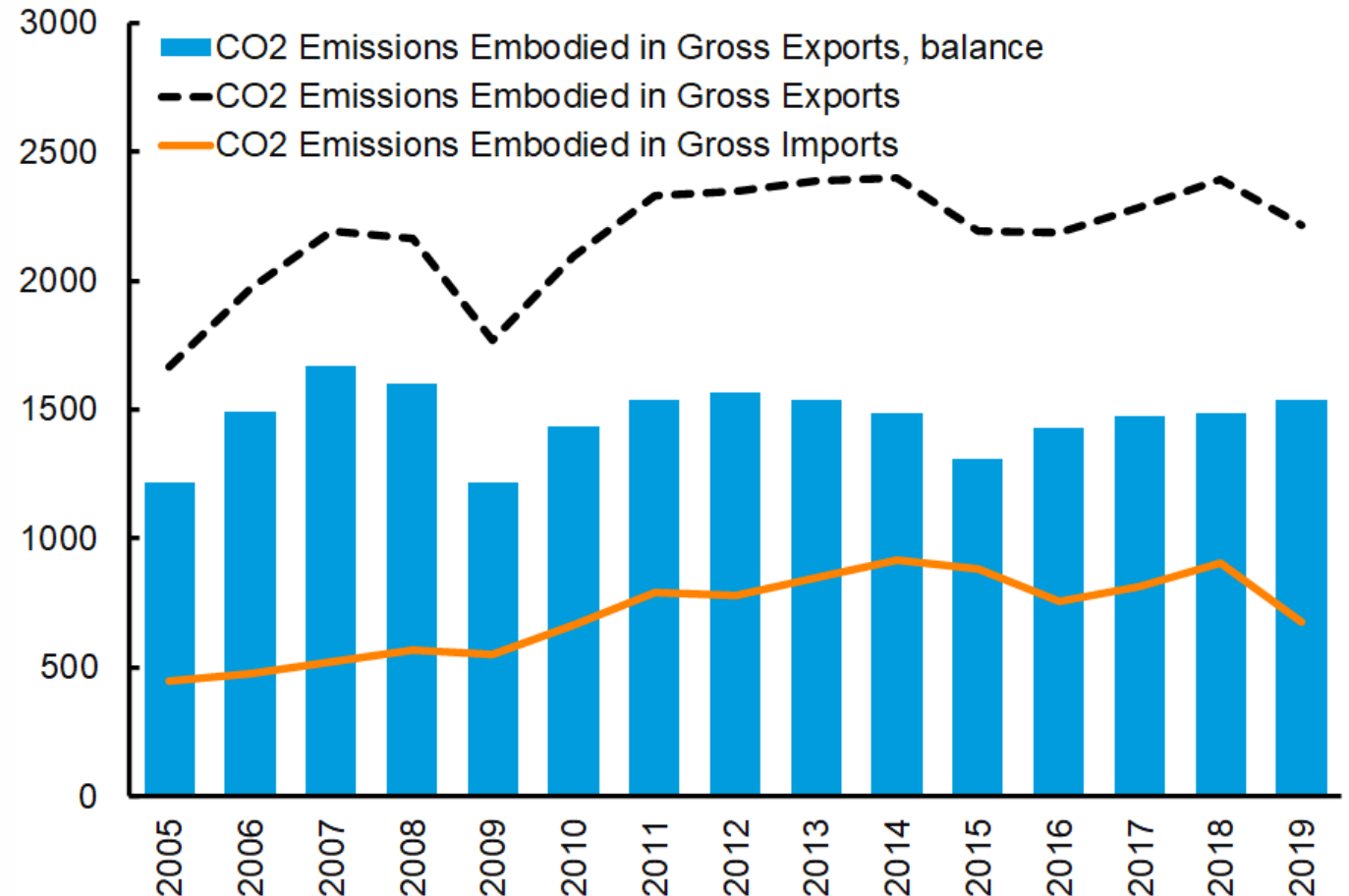
- CO2 emissions in gross fixed capital formation (GFCF)
- CO2 emissions in output and cross border trade



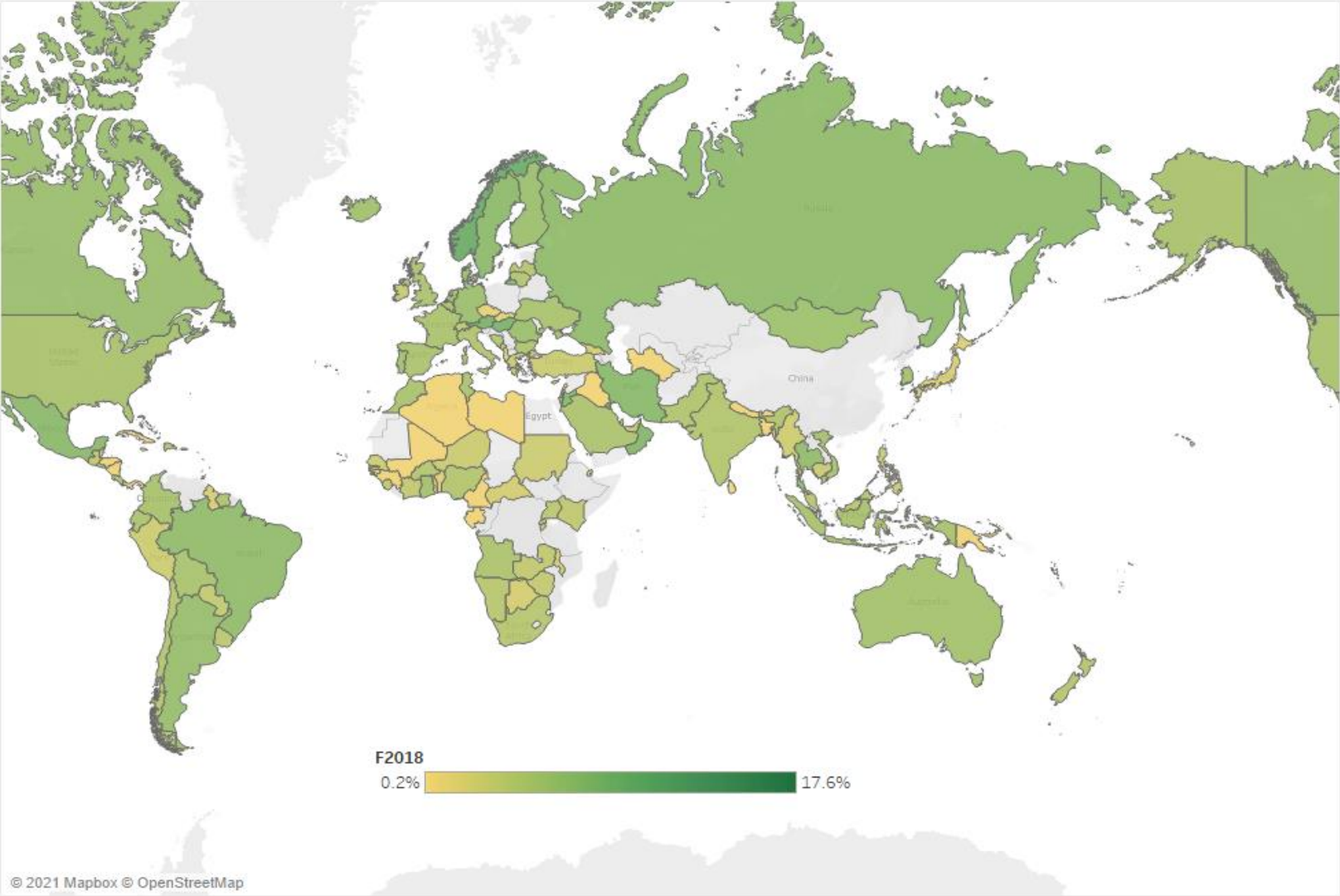
CO2 Emissions Embodied in Trade

- Whether a country is a net exporter or net importer largely reflects the difference between a country's production of CO2 emissions and its demand for them
- Therefore, we need structural changes in both demand and production to reduce global emissions

CO2 emissions embodied in gross imports and exports: China

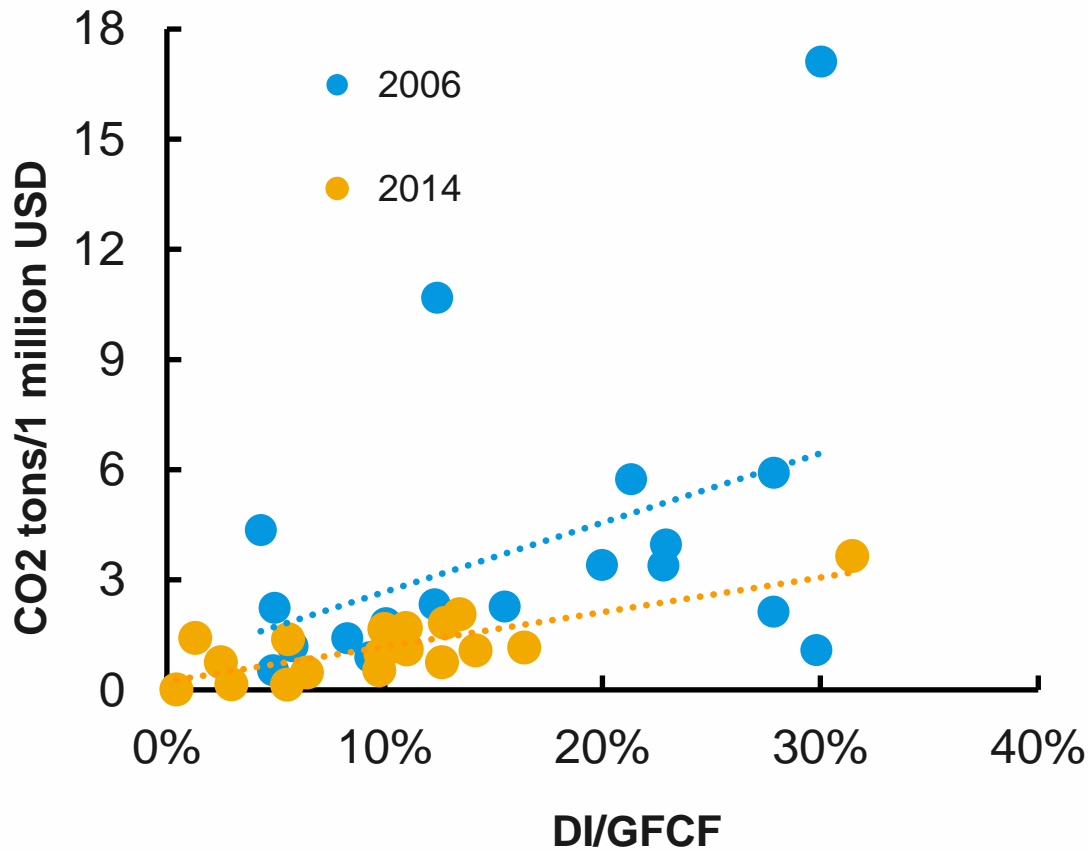


Environmental Goods Imports as Share of Total Imports

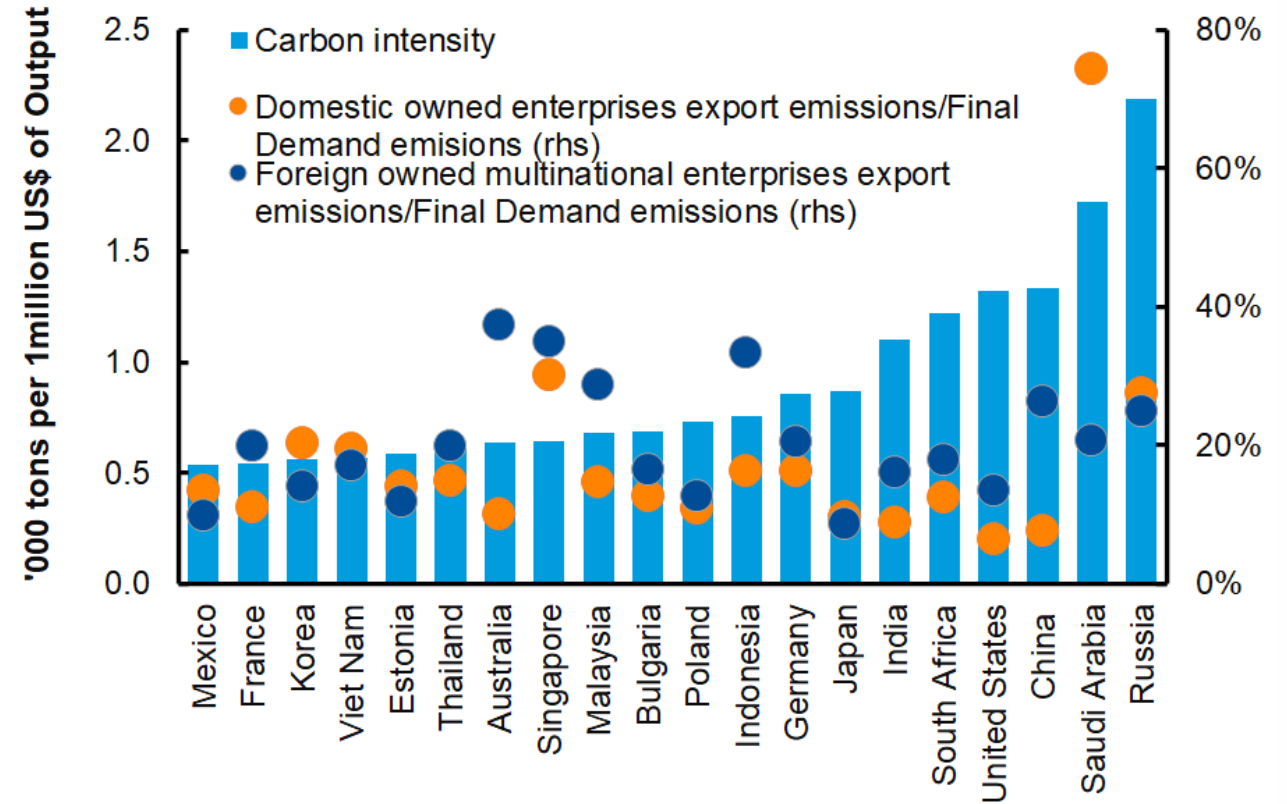


Cross-border Indicators

CO2 emissions in gross fixed capital formation (GFCF) of direct investment (DI) to final demand ratio



Carbon intensity and exports associated emissions (2015)





Financial and Risk Indicators

Financial and Risk Indicators

■ Financial Indicators

- Carbon footprint-adjusted loans to total loans for deposit takers
- Green bonds
- Non-life insurance penetration

■ Risk Indicators

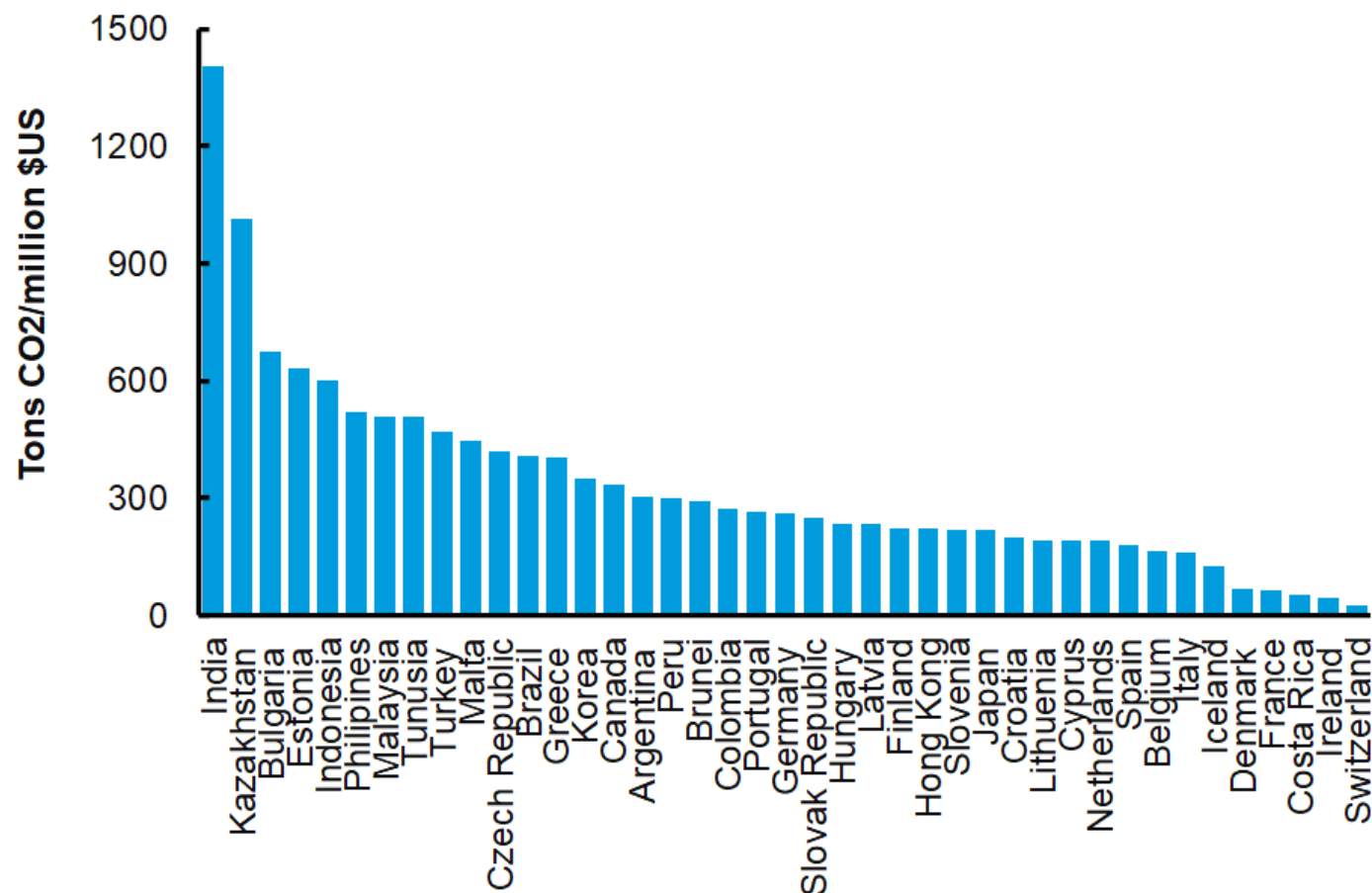
- Transition Risk: Preparedness of countries for a low-carbon transition
- Physical Risk: Climate driven INFORM risk



Carbon Footprint-adjusted Loans to Total Loans (CFALTL)

- CFALTL captures the carbon intensity of domestic loans
- Calculation based on IMF's loans by industry survey and direct and indirect carbon emissions per million \$US of output by industry
- CFALTL aims to contribute to the disclosure of the carbon intensity of domestic loans

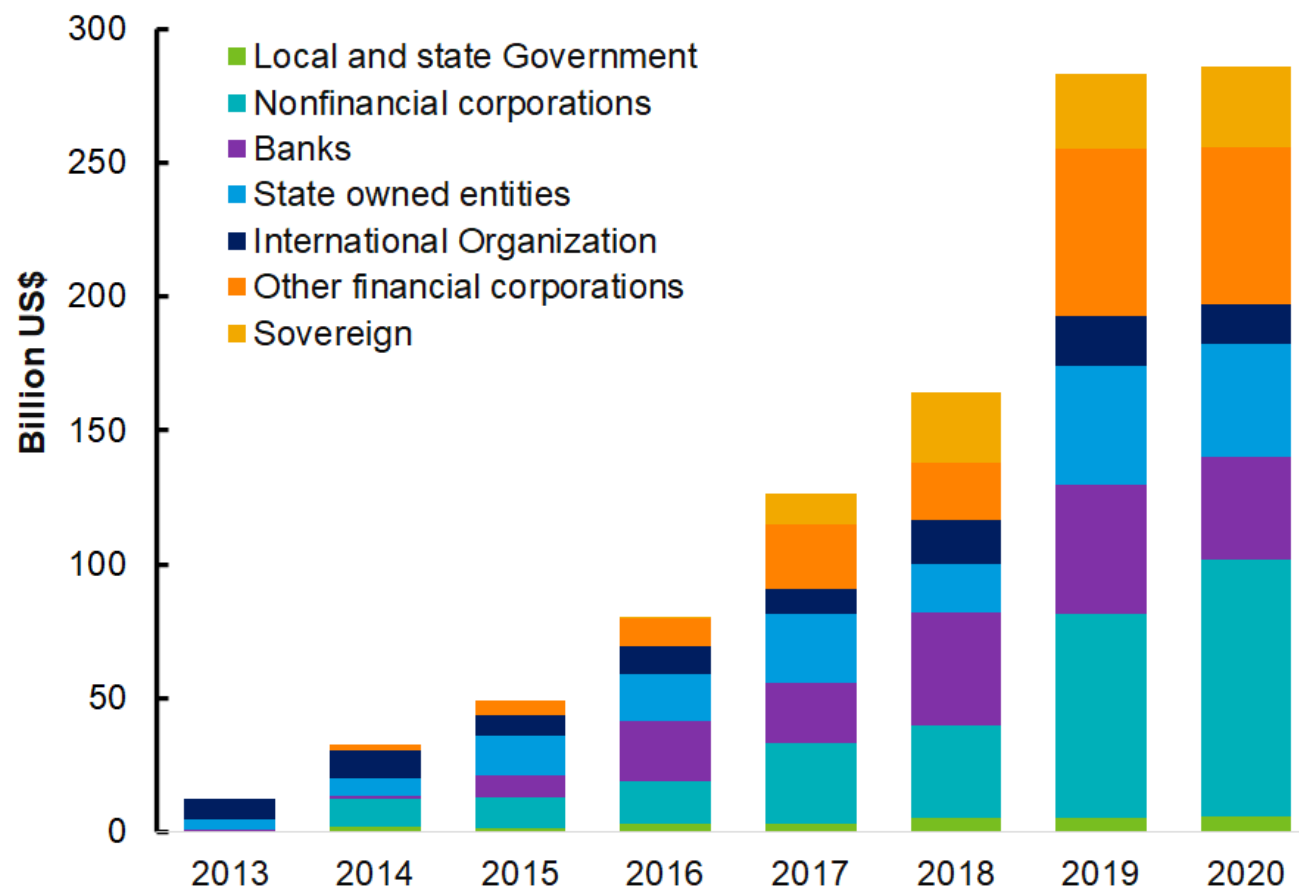
CFALTL based on direct and indirect emissions (2015)



Green Bonds

- Green bonds are the bonds earmarked to fund environmentally friendly projects.
- Green bonds indicators provide insights on the size, geographical breakdown, and trends related to the green bonds.
- The data are aggregated by country of incorporations, use of proceeds, type of currency and type of issuers.

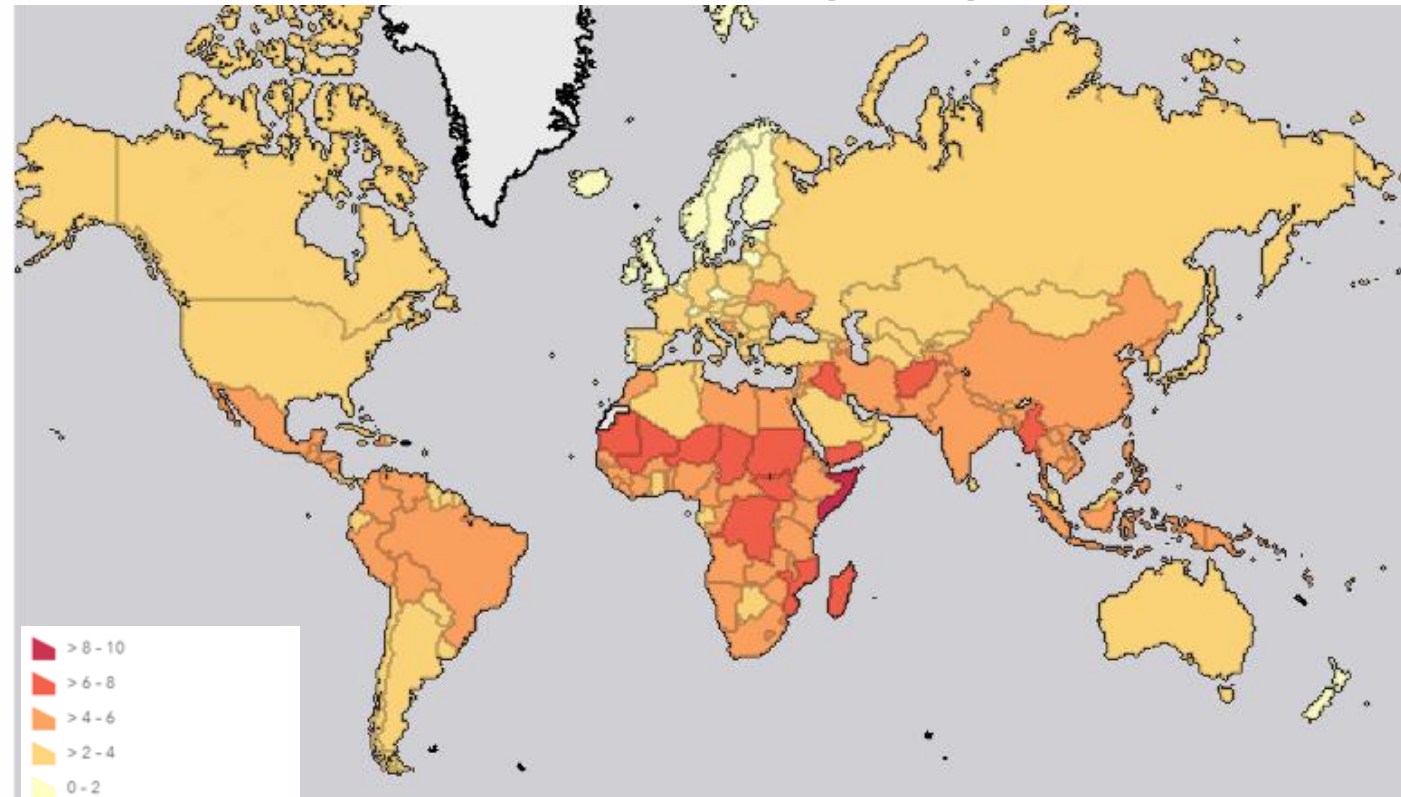
Green bond issuances by type of issuer



Climate-driven INFORM Risk Indicator

- Composite indicator to assess natural disaster exposure risks.
- Three main components:
 - Climate-driven Hazard & Exposure
 - Vulnerability
 - Lack of coping capacity
- Based on INFORM Risk Index developed by European Commission, adjusted by the IMF staff to cover climate related components only.

Climate-driven INFORM risk (2020)



*The higher the indicator the higher the risk



Government Policy Indicators

Government Policy Indicators

Environmental Taxes

- Taxes on energy
- Taxes on transport
- Taxes on pollution
- Taxes on resources

Government Expenditures on Environmental Protection

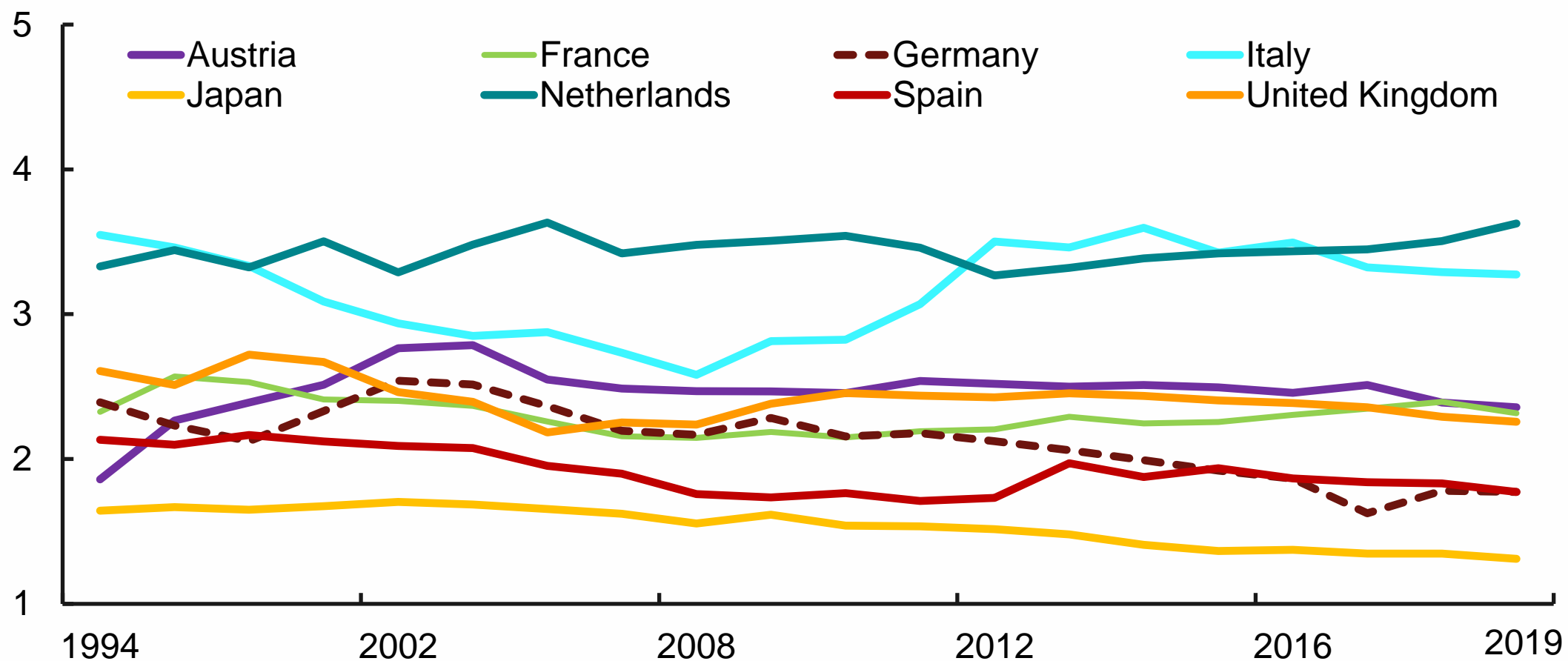
Fossil Fuel Subsidies

- Explicit Fossil Fuel Subsidies
- Implicit Fossil Fuel Subsidies



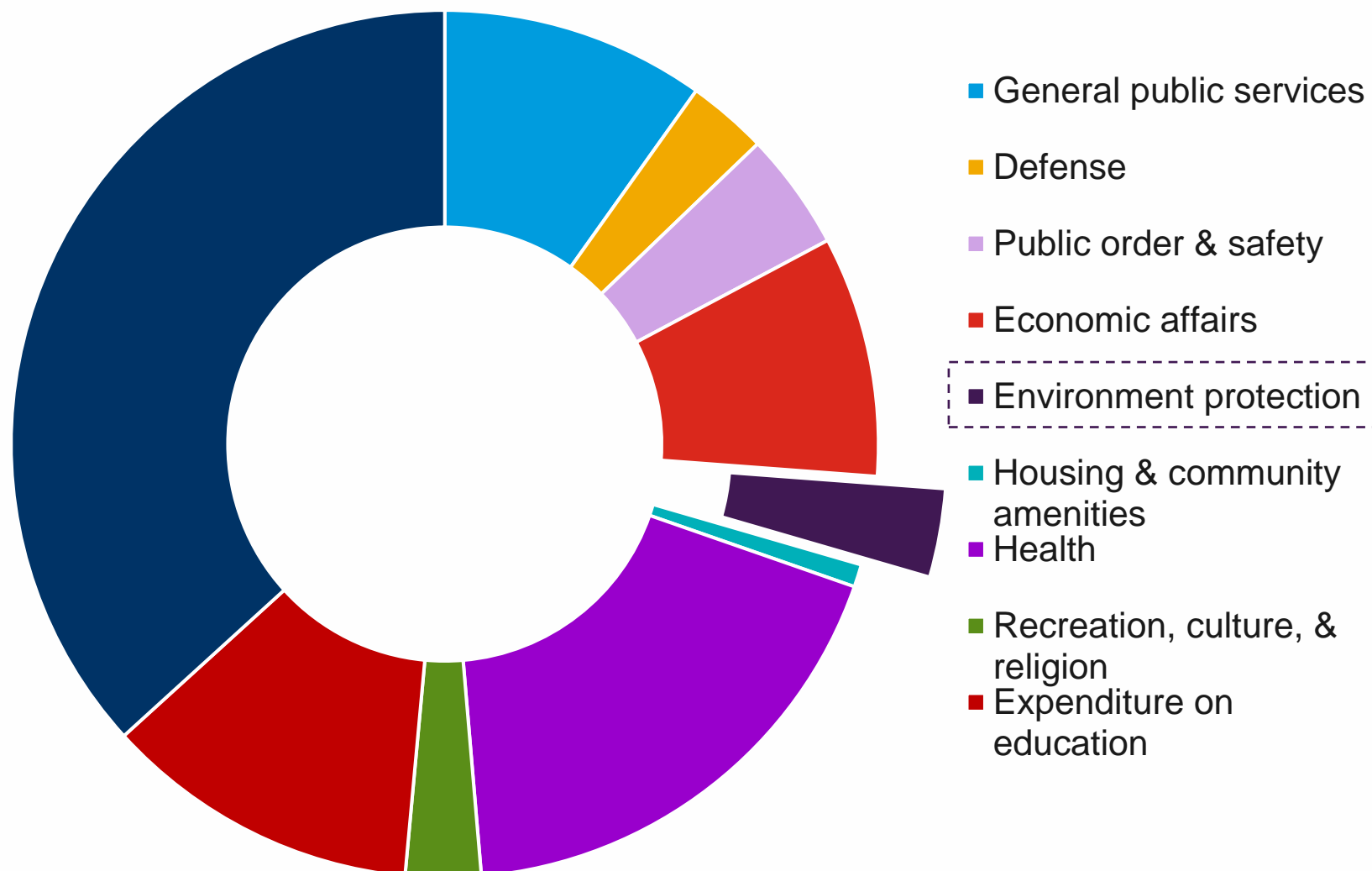
Government Policy Indicators

Total environmental taxes in percent of GDP



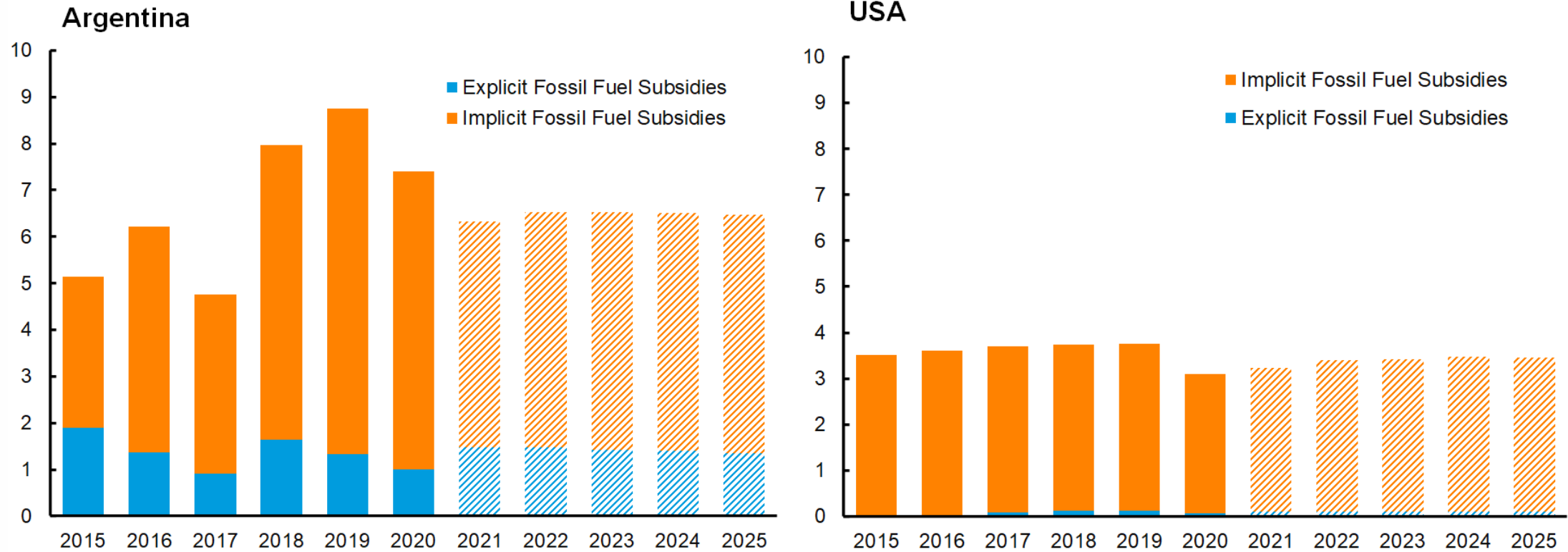
Government Policy Indicators

Netherlands Share of government expenditures, 2019



Government Policy Indicators

Fossil fuel subsidies in percent of constant 2021 price GDP (staff projections for 2021-25)





Climate Change Data

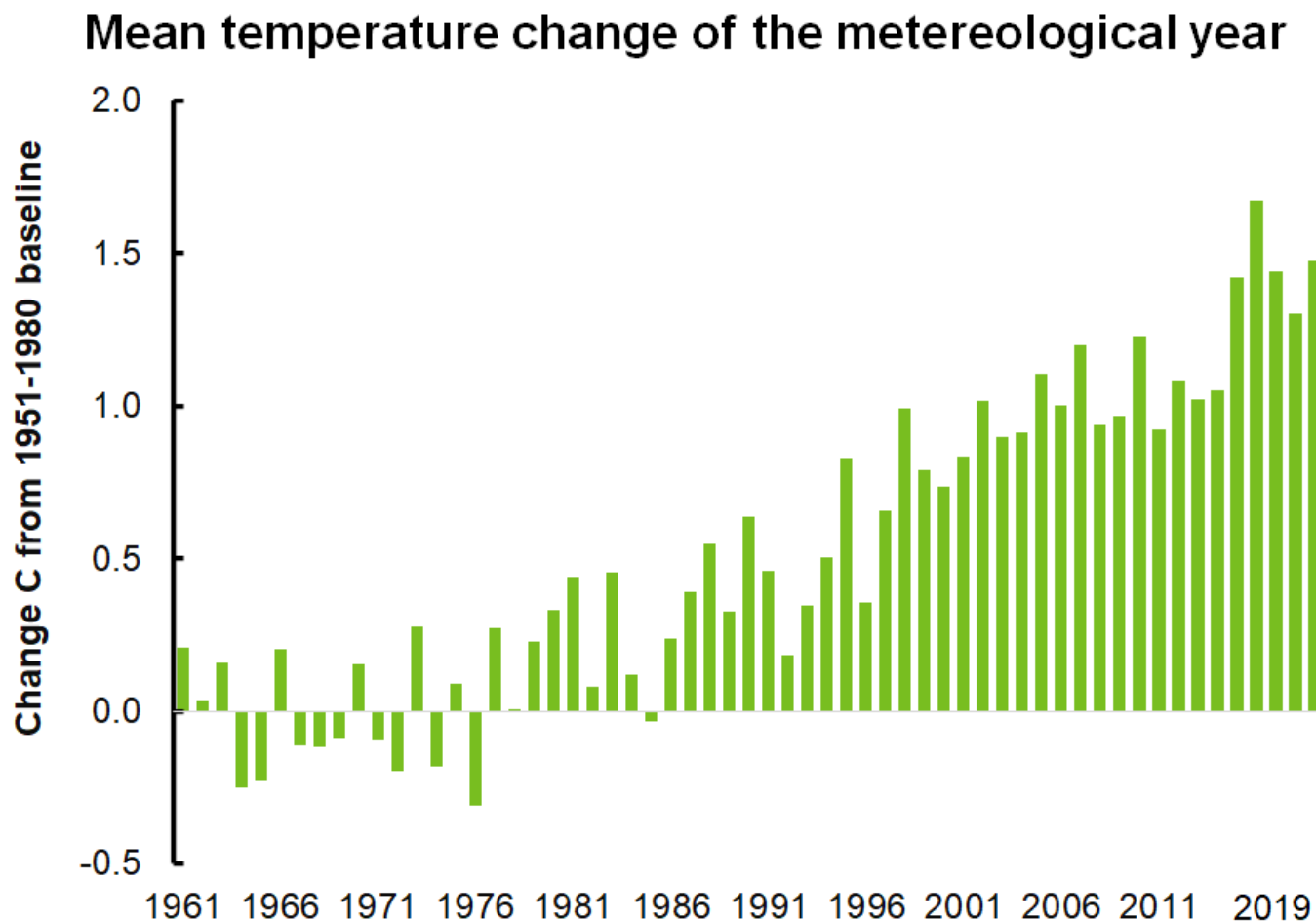
Climate Change Data

- Annual Mean Global Surface Temperature
- World Monthly Atmospheric Carbon Dioxide concentrations
- Change in mean sea level
- Land Cover Accounts
- Climate related disasters frequency



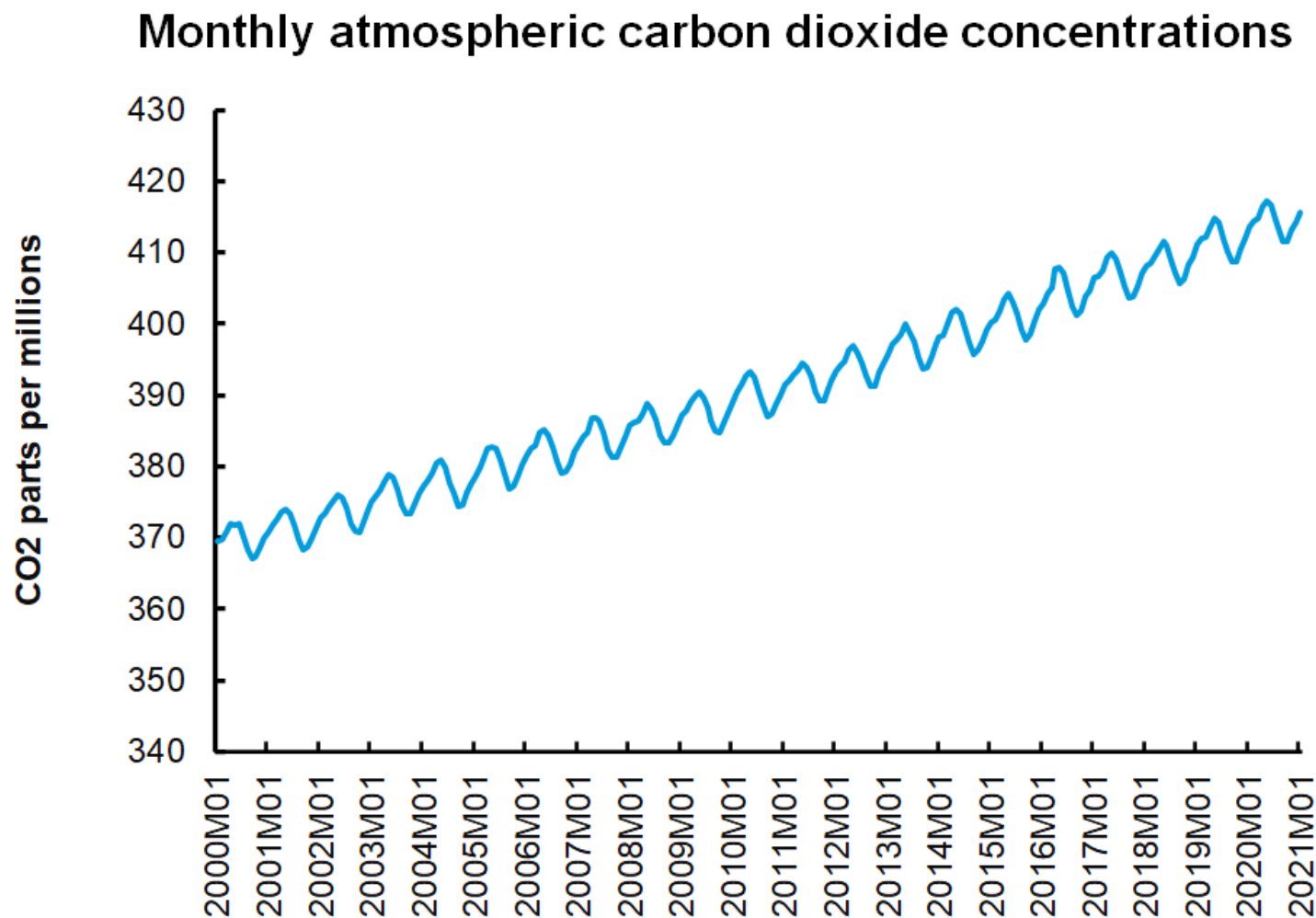
Monitoring Annual Mean Global Surface Temperature

The world average temperature has increased compared to the 1951-1980 baseline.



Monitoring the Concentration of CO₂ in the Atmosphere.

The steady flow of emissions is increasing the “stock” or concentration of CO₂ in the atmosphere.



Future Work

A Continued Effort Going Forward

- Enhance the coverage and methodology of the economic activity and cross-border indicators
- Breakdown of environmental goods by type
- Improve identification of climate related expenditures, as well as government actions through the tax system
- Develop forward looking indicators on climate change related risks

Economic Classifications: Challenges

Climate change is often a secondary objective in the current economic statistics classifications

- ▶ International Standard Industrial Classification (ISIC-Rev 4) does not provide sufficient granularity for climate change analysis.
 - *e.g., Electric power generation does not differentiate between renewable and non-renewable energy.*
- ▶ Some environmental goods are not "visible" in the Harmonized System (HS) for classifying international trade statistics.
- ▶ Need for reliable and comparable indicators for tracking the growth in sustainable financing (bonds and equity instruments).
- ▶ Existing economic and especially functional (COFOG classification of government expenditures does not facilitate a clear identification of climate change related spending.

Economic Classifications: Solutions

Short-term practical approach

- ▶ Explore the possibility of breaking down international economic classifications (e.g., to identify low-carbon energy production) on an ad-hoc basis.

Medium-term collaborative efforts in the international statistical community

- ▶ Upcoming revisions of the ISIC and Central Product Classification with more details on the environment.
- ▶ Development of more comparable indicators of sustainable finance, carbon footprints of financial institutions' asset portfolios and supporting the work on bridging existing taxonomies.
- ▶ Development of supplementary data collection(s) for government expenditures related to climate change adaptation and mitigation.
- ▶ Ongoing update on the System of National Accounts classifications with more focus on environmental issues (next update: 2025).
- ▶ Propose amendments to the HS to better identify environmental goods (next update: 2027).

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Climate-related Disasters



Background Information

Contributing Institutions

Organization	Source Data	Contribution to Indicator
Organisation for Economic Co-operation and Development (OECD)	<ul style="list-style-type: none"> Air Emissions Accounts Trade in Carbon emissions Annual National Accounts Input-Output tables Inward activity of multinationals by industrial sector Direct investment positions Environmentally Related Tax Revenue database 	<ul style="list-style-type: none"> Annual and Quarterly greenhouse gas (GHG) air emissions accounts Carbon emissions per million \$US of output by industry CO2 emissions embodied in domestic final demand, production, and trade Direct investment-related indicators Carbon footprint-adjusted loans to total loans for deposit takers Environmental Taxes
International Energy Agency (IEA)	CO2 emissions from fuel combustion	Annual and Quarterly greenhouse gas (GHG) air emissions accounts
Climate Watch (CAIT)	Data are from the IEA on fuel combustion and FAO	Annual and Quarterly greenhouse gas (GHG) air emissions accounts
World Bank Group	<ul style="list-style-type: none"> Global Financial Development Database Preparedness of Countries to Low-Carbon Transition (Chapter 5). Peszko, Grzegorz et al. 2020 	<ul style="list-style-type: none"> Non-life insurance penetration Preparedness of countries for a low-carbon transition
United Nations	<ul style="list-style-type: none"> National Inventory Submissions to the UN Framework Convention on Climate Change (UNFCCC, CRF tables) COMTRADE Harmonized Commodity Description and Coding System (HS) 2017 	<ul style="list-style-type: none"> GHG emissions national inventories by source Trade in environmental goods Trade in low carbon technology products

Contributing Institutions

Organization	Source Data	Contribution to Indicator
INFORM* / European Commission	INFORM Risk	Climate-driven INFORM Risk
Food and Agriculture Organization (FAO)	Data are based on the publicly available Global Surface Temperature Change (GISTEMP) data distributed by the National Aeronautics and Space Administration Goddard Institute for Space Studies (NASA-GISS).	Annual Mean Global Surface Temperature
National Oceanic and Atmospheric Administration (NOAA)	<ul style="list-style-type: none"> Monthly CO2 concentrations measured at Mauna Loa Satellite Altimetry 	<ul style="list-style-type: none"> Monthly Atmospheric Carbon Dioxide concentrations Change in mean sea level [mm]
University of Louvain /Centre for Research on the Epidemiology of Disasters	The Emergency Events Database (EM-DAT) Only climate related disasters (Wildfire, Storm, Landslide, Flood, Extreme Temperature, Drought, Fog, Wave Action and Glacial Lake Outburst) are covered	Climate related disasters frequency
Refinitiv **	Aggregated from bond-by-bond nominal issuances data	Green Bonds

* INFORM is a collaboration of the Inter-Agency Standing Committee Task Team for Preparedness and Resilience and the European Commission

** Refinitiv is a commercial data provider