The Climate Actions and Policies Measurement Framework

Database documentation

The OECD Climate Actions and Policies Measurement Framework (CAPMF) is the most extensive internationally harmonised climate mitigation policy database to date. Developed under the International Programme for Action on Climate, the CAPMF tracks 130 policy variables, aggregated into 56 key climate actions and policies for the 1990-2022 period for OECD and OECD partner countries as well as the European Union as a block. The current edition of the database covers 49 countries.

For each policy, the CAPMF measures policy stringency, defined as the degree to which policies incentivise emissions reductions. The dataset provides the stringency values for all 130 policy variables as well as the average stringency values of the 56 aggregated climate policies for all countries and the entire time-period. It also calculates the average stringency and the number of adopted policies for sectors or policy areas (e.g. electricity, GHG emissions targets) and building block (e.g. sectoral policies, cross-sectoral policies, international policies), following the structure of the CAPMF as laid out in the related working paper. The structure of the CAPMF can be downloaded here.

In some cases the CAPMF also uses a different policy classification according to market-based instruments, non market-based instruments, and climate targets, governance and climate data (see here for a correspondence table).

For more details on the methodology, please refer to:

> Nachtigall et al. (2022): The climate actions and policies measurement framework:
>
> A structured and harmonised climate policy database to monitor countries' mitigation action

Suggested citation:

Nachtigall, D., Lutz, L., Cárdenas Rodríguez, M., Haščič, I., and R. Pizarro (2022), "The climate actions and policies measurement framework: A structured and harmonised climate policy database to monitor countries' mitigation action", OECD Environment Working Papers, No. 203, OECD Publishing, Paris, https://doi.org/10.1787/2caa60ce-en.

Last updated: November, 2023

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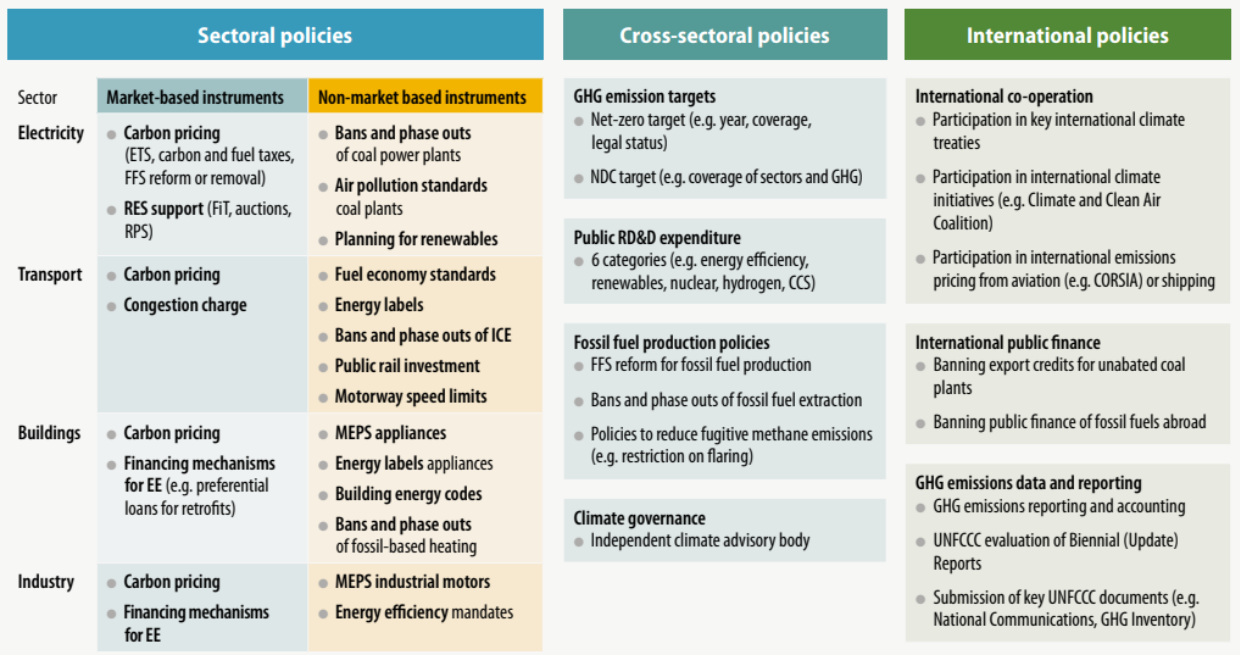
1 Structure

The OECD Climate Actions and Policies Measurement Framework has a number of different aggregation levels (Table 1, Figure 1). Each of the levels that are higher in the hierarchy consist of a number of lower-hierarchy elements. For example, the building block 'sectoral policies' comprises 8 modules; the module 'Electricity – market-based instruments' comprises 7 policies; and the policy 'Feed-in-Tariff' comprises 4 policy variables. Some policies (e.g. Renewable Portfolio Standards) only comprise one policy variable. See the details in Section 3 below.

Table 1. Structure of the Climate Actions and Policies Measurement Framework

Hierarchy level	Name	Number of elements	Example
Level 1	Building block	3	Sectoral Policies
Level 2	Module	15	Electricity – market-based instruments
Level 3	Policy	56	Feed-in-Tariff
Level 4	Policy variable	130	Feed-in-Tariff: Wind, price

Figure 1. Structure of the Climate Actions and Policies Measurement Framework



Note: ETS: Emissions trading system; FFS: Fossil fuel support; FiT: Feed-in-tariff; RPS: Renewable Portfolio Standard; EE: Energy efficiency; ICE: Internal combustion engine; MEPS: Minimum energy performance standard.
Source: (IPAC, 2022[23])

2 Calculating policy stringency

More details on the methodology for calculating policy stringency is provided in the underlying OECD Environment Working Paper. The starting point for calculating policy stringency is the policy variable (level 4).

For each policy variable, the CAPMF operationalises stringency as a relative concept by assigning a stringency value between 0 (not stringent) and 10 (very stringent) for each policy variable based on the in-sample distribution across all countries and years of the policy variables' level (e.g. tax rate, emission limit value, government expenditure) following the methodology of the OECD Environmental Policy Stringency Index. A stringency value of 0 indicates that a policy is not adopted.

For binary variables, a stringency value of 10 is assigned if the policy is in place. Categorical variables are linearly mapped into the space from 1 to 10. For example, a categorical variable with 5 elements would get the stringency values 2, 4, 6, 8, and 10, respectively.

The stringency values for policies (level 3), modules (level 2) and building blocks (level 1) are calculated using the unweighted average of the stringency values of the elements in the underlying hierarchy level. For example, the stringency value of the policy 'Feed-in-Tariffs' is the unweighted average of all 4 elements that underpin the policy 'Feed-in-Tariff'. The stringency value of the module 'Electricity – market-based instruments' is the unweighted average of the 7 policies included in this module.

Missing values are generally considered to have a stringency value of 0 in the calculation of stringency values for level 2, 3 and 4 variables. However, for the years between 2019 and 2022, missing data for policy variables is substituted by the last available observation in this time period. For example, if a policy variable has missing data for the years 2021 and 2022, then the stringency value of the year 2020 will be used for these two years in the calculation of the stringency values of the higher hierarchy levels. Note that this rule is only used for the aggregation to higher hierarchy levels. The CAPMF still reports the policy variables in 2021 and 2022 as missing. In cases where extrapolated values and/or missing values counted as 0s are used for the aggregation, the calculated observation includes a flag 'E' for 'Estimated'. If all sub-level policy instruments are missing in a given country-year, then the aggregated values are also reported as missing and no flag is assigned.

3 Detailed description of policy variables

This Section describes the underlying raw policy data of the CAPMF in more detail. It is ordered along the CAPMF framework (Figure 1). The information is provided at the policy level (level 3). For each policy, this Section highlights the number of underlying policy variables, provides their description and explains where the underlying data is drawn from.

Sectoral policies

Electricity - market-based instruments

Emissions trading schemes

An emissions trading scheme (ETS) or cap-and-trade is a market-based instrument that aims at controlling and reducing emissions in a cost-effective manner.

The CAPMF includes **2 policy variables** on ETS. The first variable captures the average permit price observed in each year in USD per tCO_2e. Currencies other than USD were converted to USD using current exchange rates. The second variable captures the coverage of GHG differentiated by CO_2, CH_4, N_2O and all other GHG. The stringency value of each GHG reflects the contribution of each gas to global GHG emissions: CO_2 gets a stringency value of 6, CH_4 of 2, N_2O of 1. A 1 is assigned if any other GHG is covered by the ETS. The final stringency value is the sum of all gas-specific stringency values.

The CAPMF also includes all sub-national ETSs. For those, the permit price is weighted by the share of the sub-nationals GHG emissions on total national GHG emissions in 2020. If data on sub-national GHG emissions was not available, 2020 GDP data was used.

Data is based on IPAC data collection drawing on data from the Global Status reports of the International Carbon Action Partnership (ICAP) and World Bank's Carbon Pricing Dashboard.

Carbon tax

Carbon taxes are levied on carbon emissions to reduce carbon emissions.

The CAPMF includes **1 policy variable** on carbon taxes. This is the nominal tax rate measured in USD per tCO_2e. Currencies other than USD were converted to USD using current exchange rates.

The CAPMF also includes sub-national carbon taxes. For those, the nominal tax rate was weighted by the share of the sub-nationals GHG emissions on total national GHG emissions in 2020. If data on sub-national GHG emissions was not available, 2020 GDP data was used.

EU countries which exempt electricity-generators covered by the European Union Emissions Trading Scheme from the carbon tax receive a stringency score of zero. The carbon price floor for electricity generators in the United Kingdom and the Netherlands is reflected in the permit price of the ETS variable. All these observations include a flag 'K' as 'Data included in another category'. Spain's tax on

F-gases is not considered because it covers less than 2% of Spain's GHG emissions. These observations include a flag 'N' which stands for 'Not significant'.

Data is based on IPAC data collection drawing on World Bank's Carbon Pricing Dashboard and IEA's energy tax data.

Fuel excise taxes

Fuel excise taxes are levied on fossil fuels, implicitly putting a price on the carbon content of those fuels.

The CAPMF includes taxes on the most commonly used fuels in each sector, i.e. those that account for more than 5% of global sector-specific energy consumption. For the electricity sector, the CAPMF includes **2 policy variables**. These are excise taxes on coal (measured as USD/ton) and natural gas (USD/MWh). Currencies other than USD were converted to USD using current exchange rates. rates. Caloric values to transform some tax rates into the ones above are taken from IEA. If country-specific caloric values were not available, the regional average was used (e.g. for EU countries).

The CAPMF does not include any sub-national fuel excise taxes.

Data is mostly based on IEA's energy tax data with some IPAC data collection for some countries drawing on OECD's PINE database.

Reform of fossil fuel subsidies

Fossil fuel support (FFS) refer to government action that provide a benefit or preference for fossil-fuel consumption.

The CAPMF includes **1 policy variable** for FFS in the electricity sector. This is the share of electricity-related FFS on total government expenditure.

Data on FFS is based on the OECD Inventory on Support for fossil fuels. See Table Annex B1 in the CAPMF working paper for a more detailed description of and caveats related to the use of OECD fossil fuel support data.

Feed-in-tariffs

Feed-in tariffs (FiT) are policy instruments that spur investments into renewable energy by offering fixed long-term contracts to renewable energy producers.

The CAPMF includes **4 policy variables** on FiT. This is the contract length and the price for both solar photovoltaic and wind power. The price of the FiT is normalised by the global levelised cost of electricity to account for falling technology costs, following the 2022 update of the Environmental Policy Stringency Index.

Data for FiT from 2000-2019 come from the OECD feed-in-tariff database. Data before 2000 come from the OECD Environmental Policy Stringency Index. Data on the global levelised cost of electricity comes from the IRENA Renewable Power Generation Cost Report.

Renewable electricity auctions

Renewable energy auctions are competitive tenders issued by the government to install a specific capacity of renewable capacity.

The CAPMF includes **4 policy variables** on auctions. This is the contract length and the strike price for both solar photovoltaic and wind power. The strike price of the auction is normalised by the global levelised cost of electricity to account for falling technology costs. If multiple auctions are held in one year, the contract length and the strike price are calculated as the weighted average (by capacity) of those auctions.

The underlying data on auctions is courtesy of the policy tracking activities of the IEA Renewable Energy Division. Data on the global levelised cost of electricity comes from the IRENA Renewable Power Generation Cost Report.

Renewable energy portfolio standards

Renewable energy portfolio standards (RPS) mandates electricity generators to cover a specific share of their output by renewables. In most cases, RPS allow trading of renewable energy certificates to comply with the standard at lower cost and are thus considered as market-based instruments in the CAPMF.

The CAPMF includes **1 policy variable** on RPS. This is the mandated percentage of renewable production on total production.

The CAPMF also includes sub-national RPS. These are calculated as the weighted average (by total electricity generation) of the RPS in all sub-national jurisdictions, including those that do not have an RPS in place.

Data on RPS comes from the OECD Environmental Policy Stringency Index supplemented with IPAC desk research, drawing on the global status reports from REN21.

Electricity - non market-based instruments

Ban on the construction of new and phase out of existing unabated coal power plants

Bans and phase-outs are regulatory instruments that mandate the cessation of the construction (ban) or the usage (phase out) of certain activities, here unabated coal power plants.

The CAPMF includes **4 policy variables**. The first two variables are the due date for the ban (i.e. the year from which the ban will be effective) and the phase out (i.e. the target year of the phase out). Variables three and four refer to the legal status of both instruments. For bans, the CAPMF distinguishes between announcement (stringency value = 5) and enshrined in law (10). For phase outs, the CAPMF distinguishes between announcement (stringency value = 3), enshrined in law (7), and achieved (10).

Data was collected by the OECD IPAC, drawing on various data sources such as Beyond Coal and the Powering Past Coal Alliance.

Air pollution standards for coal power plants

Air emission standards require coal power plants to observe specific emission limit values.

The CAPMF includes **3 policy variables**. They correspond to the emission limit values of three air pollutants: Nitrous oxide (NOx), Sulfur oxides (SOx), and Particulate Matter (PM).

Data on air pollution standards comes from the OECD Environmental Policy Stringency Index.

Planning for renewables expansion

Planning for renewables refers to integrated transmission and (renewable) generation planning in combination with resource data and siting. It is a key enabling condition to expand generation from renewable energy sources.

The CAPMF includes **1 policy variable**. This is the final score for planning for renewables in the World Bank's Regulatory Indicators for Sustainable Energy (RISE) database to ensure consistency with the underlying data. This score is derived from a questionnaire, containing seven planning-related questions such as whether renewable energy is included in transmission planning or whether there are policies on resource data and siting. See the RISE methodology for further details on the questionnaire.

Data comes from the RISE database developed by the World Bank's Energy Sector Management Assistance Program.

Transport – market-based instruments

Emissions trading schemes

An emissions trading scheme (ETS) or cap-and-trade is a market-based instrument that aims at controlling and reducing emissions in a cost-effective manner.

The CAPMF includes **2 policy variables** on ETS. The first variable captures the average permit price observed in each year in USD per tCO_2e. Currencies other than USD were converted to USD using current exchange rates. The second variable captures the coverage of GHG differentiated by CO_2, CH_4, N_2O and all other GHG. The stringency value of each GHG reflects the contribution of each gas to global GHG emissions: CO_2 gets a stringency value of 6, CH_4 of 2, N_2O of 1. A '1' is assigned if any other GHG is covered by the ETS. The final stringency value is the sum of all gas-specific stringency values.

The CAPMF also includes all sub-national ETSs. For those, the permit price is weighted by the share of the sub-nationals GHG emissions on total national GHG emissions in 2020. If data on sub-national GHG emissions was not available, 2020 GDP data was used.

Data is based on IPAC data collection drawing on data from the Global Status reports of the International Carbon Action Partnership (ICAP) and World Bank's Carbon Pricing Dashboard.

Carbon tax

Carbon taxes are levied on carbon emissions to reduce carbon emissions.

The CAPMF includes **1 policy variable** on carbon taxes. This is the nominal tax rate measured in USD per tCO_2e. Currencies other than USD were converted to USD using current exchange rates.

The CAPMF also includes sub-national carbon taxes. For those, the nominal tax rate was weighted by the share of the sub-nationals GHG emissions on total national GHG emissions in 2020. If data on sub-national GHG emissions was not available, 2020 GDP data was used.

Spain's tax on F-gases is not considered because it covers less than 2% of Spain's GHG emissions. These observations include a flag 'N' as 'Not significant'.

Data is based on IPAC data collection drawing on World Bank's Carbon Pricing Dashboard and IEA's energy tax data.

Fuel excise taxes

Fuel excise taxes are levied on fossil fuels, implicitly putting a price on the carbon content of those fuels.

The CAPMF includes taxes on the most commonly used fuels in each sector, i.e. those that account for more than 5% of global sector-specific energy consumption. For the transport sector, the CAPMF includes **2 policy variables**. These are excise taxes on gasoline and diesel, both measured in USD/litre. Currencies other than USD were converted to USD using current exchange rates. rates. Caloric values to transform some tax rates into the ones above are taken from IEA. If country-specific caloric values were not available, the regional average was used (e.g. for EU countries).

The CAPMF does not include any sub-national fuel excise taxes.

Data is mostly based on IEA's energy tax data with some IPAC data collection for some countries drawing on OECD's PINE database.

Reform of fossil fuel subsidies

Fossil fuel support (FFS) refer to government action that provide a benefit or preference for fossil-fuel consumption.

The CAPMF includes **1 policy variable** for FFS in the transport sector. This is the share of transport-related FFS on total government expenditure.

Data on FFS is based on the OECD Inventory on Support for fossil fuels. See Table Annex B1 in the CAPMF working paper for a more detailed description of and caveats related to the use of OECD fossil fuel support data.

Congestion charges

Congestion charge is a daily levy imposed on drivers who chose to drive within a given area of a city.

The CAPMF includes **1 policy variable**. This is the price at peak hour of a city's congestion charges. The CAPMF only considers so-called 'cordon charge' (i.e. a charge imposed on a private vehicles upon entering a central area of a city within a certain hour of the day), following Croci, 2016. To account for different city sizes, the price is weighted by the 'exposure' (i.e. the share of the population in the functional urban area on the country's total population).

Data was collected by the OECD IPAC, drawing primarily on Croci, 2016 and complemented with other sources.

Transport – non market-based instruments

Ban on the sales of new and phase out of conventional passenger cars

Bans and phase-outs are regulatory instruments that mandate the cessation of the construction (ban) or the usage (phase out) of certain activities, here passenger cars with internal combustion engines.

The CAPMF includes **4 policy variables**. The first two variables are the due date for the ban (i.e. the year from which the ban will be effective) and the phase out (i.e. the target year of the phase out). Variables three and four refer to the legal status of both instruments. For bans, the CAPMF distinguishes between announcement (stringency value = 5) and enshrined in law (10). For phase outs, the CAPMF distinguishes between announcement (stringency value = 3), enshrined in law (7), and achieved (10).

Data was collected by the OECD IPAC, drawing on various data sources such as the International Council on Clean Transportation (ICCT).

Fuel economy standards

Fuel economy standards are regulatory instruments that limit the maximum amount of energy that may be consumed by a product.

The CAPMF includes **2 policy variables**: fuel economy standards for passenger cars and heavy-duty vehicles. The CAPMF reports whether a fuel economy standard is in place (stringency value = 10) or not (value = 0).

The underlying data on fuel economy standards for passenger cars is courtesy of the policy tracking activities of the Energy Efficiency and Inclusive Transitions Office at the IEA. Data on fuel economy standards for heavy-duty vehicles comes from the RISE database developed by the World Bank's Energy Sector Management Assistance Program.

Mandatory fuel economy labels for light duty vehicles

Mandatory energy labels for passenger cars provide information on the fuel economy of passenger cars.

The CAPMF includes **1 policy variable**. This is whether a country adopted a mandatory energy label for passenger cars (stringency value = 10) or not (value =0).

The underlying data on labels is courtesy of the policy tracking activities of the Energy Efficiency and Inclusive Transitions Office at the IEA.

Share of rail on total surface transport public expenditure

Public expenditure in rail infrastructure provides alternatives to private car journeys.

The CAPMF includes **1 policy variable**. This is the share of central government's investment in rail as a share of total central government's investment in surface transport. Public expenditure of sub-national jurisdictions is not included because of data availability.

Data comes from OECD ITF's Investment Spending in Transport Infrastructure.

Motorway speed limits

A speed limit is the maximum speed at which a vehicle may legally travel on a particular stretch of road.

The CAPMF includes **1 policy variable**. This is the general speed limit (e.g. no rain or other extreme weather conditions, summer time, not close to urban areas) on motorway expressed in km/h. If a country includes a range for highways in federal countries, the unweighted average is taken. There are no motor highways in Estonia, Iceland, and Malta. For these countries, the data shows a missing value and a flag 'M' as 'Missing, data cannot exist'.

Data was collected by the OECD, drawing on OECD ITF's Road Safety Annual Reports and WHO's Global status report on road safety.

Buildings – market-based instruments

Emissions trading schemes

An emissions trading scheme (ETS) or cap-and-trade is a market-based instrument that aims at controlling and reducing emissions in a cost-effective manner.

The CAPMF includes **2 policy variables** on ETS. The first variable captures the average permit price observed in each year in USD per tCO_2e. Currencies other than USD were converted to USD using current exchange rates. The second variable captures the coverage of GHG differentiated by CO_2, CH_4, N_2O and all other GHG. The stringency value of each GHG reflects the contribution of each gas to global GHG emissions: CO_2 gets a stringency value of 6, CH_4 of 2, N_2O of 1. A 1 is assigned if any other GHG is covered by the ETS. The final stringency value is the sum of all gas-specific stringency values.

The CAPMF also includes all sub-national ETSs. For those, the permit price is weighted by the share of the sub-nationals GHG emissions on total national GHG emissions in 2020. If data on sub-national GHG emissions was not available, 2020 GDP data was used.

Data is based on IPAC data collection drawing on data from the Global Status reports of the International Carbon Action Partnership (ICAP) and World Bank's Carbon Pricing Dashboard.

Carbon tax

Carbon taxes are levied on carbon emissions to reduce carbon emissions.

The CAPMF includes **1 policy variable** on carbon taxes. This is the nominal tax rate measured in USD per tCO_2e. Currencies other than USD were converted to USD using current exchange rates.

The CAPMF also includes sub-national carbon taxes. For those, the nominal tax rate was weighted by the share of the sub-nationals GHG emissions on total national GHG emissions in 2020. If data on sub-national GHG emissions was not available, 2020 GDP data was used.

Spain's tax on F-gases is not considered because it covers less than 2% of Spain's GHG emissions. These observations include a flag 'N' as 'Not significant'.

Data is based on IPAC data collection drawing on World Bank's Carbon Pricing Dashboard and IEA's energy tax data.

Fuel excise taxes

Fuel excise taxes are levied on fossil fuels, implicitly putting a price on the carbon content of those fuels.

The CAPMF includes taxes on the most commonly used fuels in each sector, i.e. those that account for more than 5% of global sector-specific energy consumption. For the building sector, the CAPMF includes **8 policy variables**. These are excise taxes on coal and LPG (both measured in USD/ton), natural gas (USD/MWh), and diesel (USD/litre) for both residential and commercial buildings. Currencies other than USD were converted to USD using current exchange rates. rates. Caloric values to transform some tax rates into the ones above are taken from IEA. If country-specific caloric values were not available, the regional average was used (e.g. for EU countries).

The CAPMF does not include any sub-national fuel excise taxes.

Data is mostly based on IEA's energy tax data with some IPAC data collection for some countries drawing on OECD's PINE database.

Reform of fossil fuel subsidies

Fossil fuel support (FFS) refer to government action that provide a benefit or preference for fossil-fuel consumption.

The CAPMF includes **1 policy variable** for FFS in the building sector. This is the share of FFS related to residential on total government expenditure.

Data on FFS is based on the OECD Inventory on Support for fossil fuels. See Table Annex B1 in the CAPMF working paper for a more detailed description of and caveats related to the use of OECD fossil fuel support data.

Financing mechanisms for energy efficiency

Financing mechanisms for energy efficiency refer to public financial instruments that help channel finance towards energy efficiency.

The CAPMF includes **1 policy variable**. This is the final score for financing mechanisms in the in the World Bank's RISE database to ensure consistency with the underlying data. This score is derived from a questionnaire, asking about the existence of eight financing mechanisms in each the residential and the commercial sector. Financing mechanisms include, e.g., whether discounted "green" mortgages exist or whether energy services agreements such as pay-for-performance contracts are in place. See the RISE methodology for further details on the questionnaire.

Data comes from the RISE database developed by the World Bank's Energy Sector Management Assistance Program.

Ban and phase out of fossil-fuel heating systems

Bans and phase-outs are regulatory instruments that mandate the cessation of the purchase (ban) or the usage (phase out) of certain activities, here heating with gas or oil.

The CAPMF includes **8 policy variables**. The first four variables are the due date for the ban (i.e. the year from which the ban will be effective) and the phase out (i.e. the target year of the phase out) for both heating with natural gas and with oil. Variables five to eight refer to the legal status of each of the four instrument-fuel combinations. For bans, the CAPMF distinguishes between announcement (stringency value = 5) and enshrined in law (10). For phase outs, the CAPMF distinguishes between announcement (stringency value = 3), enshrined in law (7), and achieved (10).

Data was collected by the OECD IPAC, drawing on various data sources such as Cool Products and EU Member Country's National Energy and Climate Plans (NECP).

Minimum energy performance standards of appliances

Minimum energy performance standards (MEPS) are regulatory instruments that limit the maximum amount of energy that may be consumed by a product.

The CAPMF includes **4 policy variables**: MEPS for (i) Freezer, (ii) Refrigerator, (iii) Lighting, and (iv) Air Conditioner. The CAPMF reports whether a MEPS is in place (stringency value = 10) or not (value = 0).

The underlying data on MEPS is courtesy of the policy tracking activities of the Energy Efficiency and Inclusive Transitions Office at the IEA.

Mandatory energy labels for appliances

Mandatory energy labels for domestic appliances provide information on the energy consumption of those.

The CAPMF includes **4 policy variables**. Mandatory labels for (i) Freezer, (ii) Refrigerator, (iii) Lighting, and (iv) Air Conditioner. The CAPMF reports whether a mandatory label is in place (stringency value = 10) or not (value = 0).

The underlying data on labels is courtesy of the policy tracking activities of the Energy Efficiency and Inclusive Transitions Office at the IEA.

Building energy codes

Building energy codes are regulatory instruments that specify minimum energy efficiency standards for residential and/or commercial buildings.

The CAPMF includes **2 policy variables**: the existence of building energy codes for both residential and commercial buildings. The CAPMF distinguishes between mandatory (stringency value = 10) and voluntary (5) building codes. The CAPMF also includes building codes that were adopted on a sub-national level where data was available.

The underlying data on building energy codes is courtesy of the policy tracking activities of the Energy Efficiency and Inclusive Transitions Office at the IEA.

Industry – market-based instrument

Emissions trading schemes

An emissions trading scheme (ETS) or cap-and-trade is a market-based instrument that aims at controlling and reducing emissions in a cost-effective manner.

The CAPMF includes **2 policy variables** on ETS. The first variable captures the average permit price observed in each year in USD per tCO_2e. Currencies other than USD were converted to USD using current exchange rates. The second variable captures the coverage of GHG differentiated by CO_2, CH_4, N_2O and all other GHG. The stringency value of each GHG reflects the contribution of each gas to global GHG emissions: CO_2 gets a stringency value of 6, CH_4 of 2, N_2O of 1. A 1 is assigned if any other GHG is covered by the ETS. The final stringency value is the sum of all gas-specific stringency values.

The CAPMF also includes all sub-national ETSs. For those, the permit price is weighted by the share of the sub-nationals GHG emissions on total national GHG emissions in 2020. If data on sub-national GHG emissions was not available, 2020 GDP data was used.

Data is based on IPAC data collection drawing on data from the Global Status reports of the International Carbon Action Partnership (ICAP) and World Bank's Carbon Pricing Dashboard.

Carbon tax

Carbon taxes are levied on carbon emissions to reduce carbon emissions.

The CAPMF includes **1 policy variable** on carbon taxes. This is the nominal tax rate measured in USD per tCO_2e. Currencies other than USD were converted to USD using current exchange rates.

The CAPMF also includes sub-national carbon taxes. For those, the nominal tax rate was weighted by the share of the sub-nationals GHG emissions on total national GHG emissions in 2020. If data on sub-national GHG emissions was not available, 2020 GDP data was used.

EU countries which exempt industrial installations covered by the European Union Emissions Trading Scheme from the carbon tax receive a stringency score of zero. The carbon price floor for industrial installations in the Netherlands is reflected in the permit price of the ETS variable. All these observations include a flag 'K' as 'Data included in another category'. Spain's tax on F-gases is not considered because it covers less than 2% of Spain's GHG emissions. These observations include a flag 'N' which stands for 'Not significant'.

Data is based on IPAC data collection drawing on World Bank's Carbon Pricing Dashboard and IEA's energy tax data.

Fuel excise taxes

Fuel excise taxes are levied on fossil fuels, implicitly putting a price on the carbon content of those fuels.

The CAPMF includes taxes on the most commonly used fuels in each sector, i.e. those that account for more than 5% of global sector-specific energy consumption. For the industry sector, the CAPMF includes **3 policy variables**. These are excise taxes on coal (measured as USD/ton), natural gas (USD/MWh), and diesel (USD/litre). Currencies other than USD were converted to USD using current exchange rates. rates. Caloric values to transform some tax rates into the ones above are taken from IEA. If country-specific caloric values were not available, the regional average was used (e.g. for EU countries).

The CAPMF does not include any sub-national fuel excise taxes.

Data is mostly based on IEA's energy tax data with some IPAC data collection for some countries drawing on OECD's PINE database.

Reform of fossil fuel subsidies

Fossil fuel support (FFS) refer to government action that provide a benefit or preference for fossil-fuel consumption.

The CAPMF includes **1 policy variable** for FFS in the industry sector. This is the share of FFS reported under 'other sector' on total government expenditure. The industry sector contributes the biggest share to this category.

Data on FFS is based on the OECD Inventory on Support for fossil fuels. See Table Annex B1 in the CAPMF working paper for a more detailed description of and caveats related to the use of OECD fossil fuel support data.

Financing mechanisms for energy efficiency

Financing mechanisms for energy efficiency refer to public financial instruments that help channel finance towards energy efficiency.

The CAPMF includes **1 policy variable**. This is the final score for financing mechanisms in the World Bank's RISE database to ensure consistency with the underlying data. This score is derived from a questionnaire, asking about the existence of eight financing mechanisms in the industry sector. Financing mechanisms include, e.g., whether energy services agreements such as pay-for-performance contracts are in place or on-bill financing/repayment are in place. See the RISE methodology for further details on the questionnaire.

Data comes from the RISE database developed by the World Bank's Energy Sector Management Assistance Program.

Industry – non market-based instruments

Minimum energy performance standards for industrial motors

Minimum energy performance standards (MEPS) are regulatory instruments that limit the maximum amount of energy that may be consumed by a product.

The CAPMF includes **1 policy variable**: the level of the mandatory MEPS for industrial motors. There are five different levels of stringency, expressed in International Energy efficiency classes (IE), IE1 being the lowest class and IE5 the highest. As of 2022, the highest IE class observed was IE3. Hence, stringency levels are assigned for IE1 (3), IE2 (7), IE3 (10).

The underlying data on MEPS is courtesy of the policy tracking activities of the Energy Efficiency and Inclusive Transitions Office at the IEA.

Energy efficiency mandates

Energy efficiency mandates for large energy users include a range of requirements that must be met to save energy.

The CAPMF includes **1 policy variable**. This is the final score for energy efficiency mandates for large industrial consumers in the World Bank's RISE database to ensure consistency with the underlying data. This score is derived from a questionnaire, containing a total of 11 questions. Topics of these questions include mandatory energy efficiency target, energy audits, energy-management systems or energy manager in the facility. See the RISE methodology for further details on the questionnaire.

Data comes from the RISE database developed by the World Bank's Energy Sector Management Assistance Program.

Cross-sectoral policies

GHG emissions targets

Nationally determined contributions

Nationally Determined Contributions (NDCs) are one of the key elements of the Paris Agreement signed in 2015.

The CAPMF includes **6 policy variables**.

- Separate target for LULUCF: yes (stringency value = 10), no (0)
- Sectoral scope: economy-wide (10), not economy-wide (7), not specified or not applicable (3)
- GHG emissions scope: the sum of GHG-specific stringency values with CO_2 (6), CH_4 (2), N_2O (1), one of any other GHG (1)
- Single or multi-year target: multi-year (10), single-year (5)
- Target type: 10 is assigned to fixed level target, base year target, trajectory target, absolute level target, baseline scenario target; 5 is assigned to intensity target
- Target specificity: minimum, exact, range (all 10), maximum (5; e.g. reduction of at most X% GHG emissions by 2030).

Data was collected by the OECD IPAC.

Net-zero targets

Net-zero emissions targets are long-term targets when a country aims to reach net-zero carbon or GHG emissions.

The CAPMF includes **4 policy variables**:

- Target year: scoring based on in-sample distribution
- Sectoral scope: Stringency value of 10 if all of Energy, IPPU, Agriculture, LULUCF, Waste, Other is covered, 5 if unclear
- GHG emissions scope: the sum of GHG-specific stringency values with CO_2 (stringency value = 6), CH_4 (2), N_2O (1), one of any other GHG (1)
- Legal status: in law (10), in proposed legislation (7), in policy document (5), announcement (2)

Data was collected by the OECD IPAC, complemented by work of the OECD-IEA Climate Change Expert Group.

Public Research, Development and Demonstration

Public expenditure for Research, Development and Demonstration (RD&D) provides financial means for research activities, leading to innovation and new products and services.

The CAPMF includes **6 policies with each policy comprising 1 policy variable**. These represent different energy-related RD&D categories, including (i) Energy Efficiency, (ii) Carbon Capture and Storage, (iii) Renewables, (iv) Nuclear, (v) Hydrogen and Fuel Cells, and (vi) other Power and Storage technologies (e.g. electric power conversion or AC/DC conversion). The CAPMF normalises public expenditure by GDP, following the methodology of the OECD Environmental Policy Stringency Index.

Data comes from the IEA Energy Technology RD&D Statistics.

Fossil fuel production policies

FFS reform for fossil fuel production

Reform of fossil fuel producer support refers to limiting transfers or expenditures to producers of fossil fuels. Fossil fuel production encompasses the following activities along the supply chain such as exploration and extraction, bulk transportation and storage and refining and processing.

The CAPMF includes **1 policy variable**. This is the share of FFS related to fossil fuel production on total government expenditure.

Data on FFS is based on the based on the OECD Inventory on Support for fossil fuels. See Table Annex B1 in the CAPMF working paper for a more detailed description of and caveats related to the use of OECD fossil fuel support data.

Bans and phase outs of fossil fuel extraction

Bans and phase-outs are regulatory instruments that mandate the cessation of new (ban) or existing (phase out) of certain activities or infrastructure, here the extraction of fossil fuels.

The CAPMF includes **4 policy variables**. The first two variables are the due date for the ban (i.e. the year from which the ban will be effective) and the phase out (i.e. the target year of the phase out). Variables three and four refer to the legal status of both instruments. For bans, the CAPMF distinguishes between announcement (stringency value = 5) and enshrined in law (10). For phase outs, the CAPMF distinguishes between announcement (stringency value = 3), enshrined in law (7), and achieved (10).

Data was collected by the OECD IPAC, drawing primarily on information by the Beyond Oil and Gas Alliance (BOGA).

Policies to reduce fugitive methane emissions

Policies to reduce fugitive methane emissions aim to reduce energy-related methane emissions.

The CAPMF includes **1 policy variable**. This is the score for methane policies in the IEA methane tracker database (ranging from 0-7). The score includes policies such as restrictions on flaring or venting, as well as taxes or charges on emissions and mandatory technology use. The underlying methodology developed by the IEA will be publicly available shorty.

Data comes from the IEA methane tracker database.

Climate governance

Independent climate advisory body

Independent climate advisory bodies are councils to assess the countries' climate performance and/or to advise on climate policies.

The CAPMF includes 5 policy variables.

- Existence of a climate advisory body: yes (stringency value = 10), no (0)
- established by law: yes (10), no (0)
- number of members of the council: scoring based on in-sample distribution
- number of secretariat's members: scoring based on in-sample distribution
- annual budget in current EUR. Currencies other than EUR were converted to EUR using current exchange rates. The scoring is based on the in-sample distribution.

Data was collected by the OECD IPAC with support of the International Climate Councils Network (ICCN).

International policies

International climate co-operation

Participation in international climate agreements

International climate agreements are key to tackling climate change as they provide a common understanding of the problem, and its solutions while laying out common targets.

The CAPMF includes **6 policy variables**. These reflect the 6 key international agreements: i) the Montreal Protocol, ii) the Montreal Amendment, iii) the Kigali Amendment to the Montreal Protocol, iv) the UNFCCC framework convention, v) the Kyoto protocol, and vi) the Paris Agreement. The CAPMF assigns a stringency value of 10 if a country participates in the respective agreement and 0 otherwise. Given countries' diversity in legal tradition, the CAPMF considers a country to be participating to an agreement for all legal forms of consenting to be bound to the agreement (ratification, approval, acceptance, accession or succession).

Data was collected by the OECD IPAC, drawing on the United Nations Treaty Collection (UNTC).

Participation in international climate initiatives

Participation in international climate initiatives (ICIs) is a key channel of international co-operation to achieve climate goals.

The CAPMF includes **1 policy variable**. This is the number of selected climate initiatives a country participates in. The CAPMF uses the Global Climate Action portal (NAZCA portal) to help anchor and orient initiatives included in the CAPMF. While the NAZCA portal predominantly lists initiative from non-state actors, the CAPMF only takes initiatives into account for which at least one national government (along other sub-national governments or corporate actors) is a member. This restricts the sample to 57 initiatives.

Data was collected by the OECD IPAC, drawing on the UNFCCC Global Climate Action portal.

Participation in international emissions pricing from aviation or shipping

Pricing of emissions from international aviation and maritime transport refers to market-based instruments intended to lower emissions from those transport modes.

The CAPMF includes **3 policy variables**.

- the price level on emissions from international aviation
- the price level of emissions from international maritime transport
- participation in the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA): yes (stringency value = 10), no (0).

The CAPMF considers the price level of emissions from international transport whenever the price applies for transport routes between different countries, including withing the European Union.

Data on the price levels was collected by the OECD IPAC, drawing on data from the Global Status reports of the International Carbon Action Partnership (ICAP). Data on CORSIA was collected by the OECD IPAC, drawing on ICAO.

International public finance

Banning governments' export credits for new unabated coal power plants

Bans are regulatory instruments that mandate the cessation of an activity, here providing export credits for unabated coal power plants.

The CAPMF includes **1 policy variable**. This is whether such a ban is adopted (stringency value = 10) or not (0).

Data was collected by the OECD IPAC, drawing on the OECD Arrangement on Officially Supported Export Credits.

Banning public finance for unabated fossil fuel infrastructure abroad

Bans are regulatory instruments that mandate the cessation of an activity, here providing public finance for fossil fuel infrastructure abroad.

The CAPMF includes **1 policy variable**. This is whether such a ban is adopted (stringency value = 10) or not (0).

Data was collected by the OECD IPAC, drawing on various data sources such as pledges made during COP26 and IISD.

GHG emissions data and reporting

GHG emissions reporting and accounting

GHG emissions reporting and accounting provide information on countries GHG emissions sources, supporting the identification of priority areas.

The CAPMF includes **2 policy variables**. The first policy variable shows whether countries adopted GHG emissions accounting following the System of Environmental Economic Accounting (SEEA) - an internationally agreed accounting framework (stringency value =10 if yes) or not (0). The second variable assesses countries' submissions of GHG Inventories based on UNFCCC Annual Inventory Review Reports. For Annex I countries, the CAMPF sums the number of issues reported in Table 3 and Table 5 of the Annual Inventory Reviews. For non-Annex I countries, the CAPMF includes the completeness of mandatory components related to GHG inventories in the Biennial Update Reports. If an Inventory Review Report was not published in a year, the CAPMF assigns the value of the previous year.

Data was collected by the OECD IPAC, drawing on OECD Environmental Economic Accounts complemented with the UN Global Assessment of Environmental-Economic Accounting reports for the SEEA and on the UNFCCC Annual Inventory Review Reports for Annex I countries and from Weikmans and Gupta (2021) for non-Annex I countries.

UNFCCC evaluation of Biennial Reports and Biennial Update Reports

Biennial Reports (BRs) and Biennial Update Reports (BURs) are key reports that improve transparency on emissions data and countries' climate action.

The CAPMF includes **1 policy variable**. This is the harmonised score of the transparency and completeness of BR or BURs adopting the methodology of Weikmans and Gupta (2021). The basis of this score is the UNFCCC Technical Assessment. For the BRs the CAPMF considers the adherence to the mandatory requirements of one of four sections of the submitted report. Points are accorded for completeness (50%) and transparency (50%). For the BURs, the score reflects the extent to which

mandatory elements of information are included. As B(U)Rs are only submitted every other year, the values given to each country carry over to the next year.

Data on the evaluation comes from Weikmans and Gupta (2021).

Submission of key UNFCCC documents

Submissions of key documents under the UNFCCC enhance transparency on emissions data and countries' climate action.

The CAMPF includes **5 policy variables**. These include the submission of i) GHG inventories (Annex I countries), ii) Biennial Reports (Annex I countries) or Biennial Update Reports (Non Annex I countries), iii) National Communications (NCs), iv) Nationally Determined Contributions (NDCs), v) Long-Term Low Emission Development Strategies (LT-LEDS). For i), ii), and iii), the CAPMF measures the timeliness of the submission, distinguishing between on time (before the specific due date, stringency value = 10), late (less than two months delay, 7) or very late (more than two months after the due date, 3). The due dates are calculated according to UNFCCC rules stated in the convention and/or in the related in the related international agreement. The values for each of the policy variables carry forward to the next years until the next submission of that document is due. For iv) and v), the CAPMF measures whether the document was submitted (stringency value = 10) or not (0).

Data was collected by the OECD IPAC, drawing on various UNFCCC resources such as those related to GHG Inventories, LT-LEDS or NDCs.

4 Alternative classifications

Besides categorising the climate actions and policies covered by the CAPMF into sectoral, cross-sectoral, and international, the policies can also be categorised by policy type, including market-based instruments (e.g. feed-in-tariffs, emissions trading schemes), non market-based instruments (e.g. emissions limit values, bans or phase outs of fossil fuel equipment and infrastructure) and 'Climate targets, governance and climate data' (e.g. NDCs, ratification of international agreements. Table 2 provides a correspondence table between CAPMF policies and the policy type. This correspondence table can also be found in machine-readable format here. The table includes also information on whether the policies are climate relevant, i.e. those which do not have climate change mitigation as primary objective, but which have a material effect on emissions.

Table 2. Conceptual framework of the CAPMF by policy type

	Market-based instruments	Non market-based instruments	Climate targets, governance and climate data
Components	Carbon pricing (ETS, carbon tax, fuel excise taxes, FFS), congestion charges, Renewable electricity support (auctions, RPS, FiT), Financing mechanisms of energy efficiency, public RD&D expenditure, pricing of emissions from international aviation and maritime transport	Minimum energy performance standards, air pollution standards, fuel economy standards, building energy codes, energy efficiency mandates, bans and phase out of fossil fuel extraction, new coal power plants, and fossil fuel using equipment (e.g. heating, passenger cars with ICE), emission limit values, labels, planning for renewables expansion, motorway speed limits, share of rail on total surface transport public expenditure, ending export credits and public financing of fossil fuels abroad	Net-zero targets, NDCs, independent climate advisory bodies, ratification of key international climate treaties, participation in international climate initiatives, evaluation of biennial (update) reports, Submission of key documents, GHG emissions reporting and accounting

Source: (Nachtigall et al., 2022[16])

5 Flags

E: Estimated value (see Section 2 for details)

K: Data included in another category (see Section 3, carbon taxes for details)

N: Not significant (see Section 3, carbon taxes for details)

M: Missing, data cannot exist

Q: Missing, suppressed

The flag 'missing, data cannot exist' is assigned when a country could not have the chance to adopt the policy. For example, joining the Paris Agreement was only possible from 2015. Hence, all years before 2015 for that policy variable receive this flag. In the calculation of stringency values for higher hierarchy levels (e.g. policies - level 3), these observations are considered to have a stringency value of zero. This flag applies to some or all years of the following policy variables:

- All policy variables of the policy 'Participation in international climate agreements', except for the Montreal Amendment
- All policy variables of the policy 'Nationally Determined Contributions'
- All policy variables of the policy 'Submission of key UNFCCC documents'
- The policy 'Evaluation of Biennial Reports and Biennial Update Reports'
- The policy variable for CORSIA within the policy 'Pricing of emissions from international aviation and maritime transport'
- The policy 'Speed limits on motorways' for Estonia, Iceland, and Malta

The flag 'missing, suppressed' is assigned to all observations of Brazil, the United States of America, and the European Union. As of November 2023, the OECD Secretariat is still working with these countries to validate the underlying climate policy data.

6 List of abbreviations

Table 3. List of abbreviations used in the CAPMF dataset

Acronym	Meaning
BR	Biennial Report
BUR	Biennial Update Report
CCS	Carbon Capture and Storage
CORSIA	Carbon Offsetting and Reduction Scheme for International Aviation
EE	Energy Efficiency
ETS	Emission Trading System
EU	European Union
FFS	Fossil fuel subsidies
GHG	Greenhouse gases
ICE	Internal Combustion Engine
LPG	Liquefied petroleum gas
LT-LEDS	Long-term low emissions development strategies
LULUCF	Land Use, Land Use Change and Forestry
MBI	Market-based instrument
MEPS	Minimum Energy Performance Standards
NC	National Communication
NDC	Nationally Determined Contribution
NO_X	Nitrogen oxides
PM	Particulate Matter
PV	Photovoltaic
RD&D	Research, Development, and Demonstration
RES	Renewable Energy
RPS	Renewable energy Portfolio Standards
SEEA	System of Environmental Economic Accounts
SO_X	Sulphur oxides
UNFCCC	United Nations Framework Convention on Climate Change