Box ES.1 / Carbon pricing in numbers

61 carbon pricing initiatives implemented/scheduled

31 ETS and 30 carbon taxes

46 national, 32 subnational jurisdictions

Covering 12 GtCO₂e (22% of global GHG emissions)

US$45 billion raised in carbon pricing revenues in 2019

More than 14,500 registered crediting projects to date, generating almost 4 billion tCO₂e of cumulative carbon credits

Forestry sector credits make up 42% of all credits issued in last five years
The large circles represent cooperation initiatives on carbon pricing between subnational jurisdictions. The small circles represent carbon pricing initiatives in cities.

Note: Carbon pricing initiatives are considered “scheduled for implementation” once they have been formally adopted through legislation and have an official, planned start date. Carbon pricing initiatives are considered “under consideration” if the government has announced its intention to work towards the implementation of a carbon pricing initiative and this has been formally confirmed by official government sources. The carbon pricing initiatives have been classified in ETSs and carbon taxes according to how they operate technically. ETS not only refers to cap-and-trade systems, but also baseline-and-credit systems as seen in British Columbia and baseline-and-offset systems as seen in Australia. The authors recognize that other classifications are possible.

Figure ES.1 / Carbon pricing initiatives implemented, scheduled for implementation and under consideration (ETS and carbon tax)
Figure ES.2 / Share of global emissions covered by carbon pricing initiatives (ETS and carbon tax)

Note: Only the introduction or removal of an ETS or carbon tax is shown. Emissions are presented as a share of global GHG emissions from (EDGAR) version 5.0 including biofuels emissions. Annual changes in GHG emissions are not shown in the graph from 2015 onwards. In 2020, the Technology Innovation and Emissions Reduction Regulation (TIER) replaced the Alberta Carbon Competitiveness Incentive Regulation, which in 2018 had replaced the Alberta Specified Gas Emitters Regulation. The information on the China national ETS represents early unofficial estimates based on the announcement of China’s National Development and Reform Commission on the launch of the national ETS of December 2017.
Figure ES.3 / Prices in implemented carbon pricing initiatives

Note: Nominal prices on April 1, 2020, shown for illustrative purpose only. The British Columbia GGIRCA, Canada federal OBPS, Kazakhstan ETS, Mexico pilot ETS, Nova Scotia CaT, Newfoundand and Labrador PSS, Saskatchewan OBPS and Washington CAR are not shown in this graph as price information is not available for those initiatives. Prices are not necessarily comparable between carbon pricing initiatives because of differences in the sectors covered and allocation methods applied, specific exemptions, and different compensation methods.
Figure ES.4 / Carbon price, share of emissions covered and carbon pricing revenues of implemented carbon pricing initiatives

Note: Government revenues from carbon taxes, auctioned allowances and direct payments to meet compliance obligations. The size of the circles is proportional to the amount of government revenues except for initiatives with government revenues below US$100 million in 2019; the circles of these initiatives have an equal size. For illustrative purposes only, the nominal prices on April 1, 2020 and the coverages in 2020 are shown. The carbon tax rate applied in Argentina, Finland, Ireland, Mexico and Norway varies with the fossil fuel type and use. The carbon tax rate applied in Denmark and Iceland varies with the GHG type. The graph shows the average carbon tax rate weighted by the amount of emissions covered at the different tax rates in those jurisdictions. The middle point of each circle corresponds to the price and coverage of that initiative.
The large circles represent cooperation initiatives on carbon pricing between subnational jurisdictions. The small circles represent carbon pricing initiatives in cities.

Note:
RGGI = Regional Greenhouse Gas Initiative. TCI = Transportation and Climate Initiative. Carbon pricing initiatives are considered “scheduled for implementation” once they have been formally adopted through legislation and have an official, planned start date. Carbon pricing initiatives are considered “under consideration” if the government has announced its intention to work towards the implementation of a carbon pricing initiative and this has been formally confirmed by official government sources. The carbon pricing initiatives have been classified in ETSs and carbon taxes according to how they operate technically. ETS not only refers to cap-and-trade systems, but also baseline-and-credit systems as seen in British Columbia and baseline-and-offset systems as seen in Australia. The authors recognize that other classifications are possible.

Initiatives implemented or scheduled for implementation:
- National ETSs: Australia, Austria, Belgium, Bulgaria, China, Croatia, Cyprus, Czech Republic, Germany, Greece, Hungary, Italy, Kazakhstan, Lithuania, Luxembourg, Malta, the Netherlands, New Zealand, the Republic of Korea, Romania, and Slovakia.
- National carbon taxes: Argentina, Chile, Colombia, Japan, Singapore, South Africa, and Ukraine.
- Both national ETSs and carbon taxes: Canada, Denmark, Estonia, Finland, France, Ireland, Iceland, Latvia, Liechtenstein, Mexico, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.
- Subnational ETSs: Beijing, California, Chongqing, Connecticut, Delaware, Fujian, Guangdong, Hubei, Maine, Maryland, Massachusetts, New Hampshire, New York, Nova Scotia, Quebec, Rhode Island, Saitama, Saskatchewan, Shanghai, Shenzhen, Tianjin, Tokyo, Vermont, Virginia, and Washington State.
- Subnational carbon taxes: New Brunswick, Northwest Territories, Prince Edward Island.
- Both subnational ETSs and carbon taxes: Alberta, British Columbia, Newfoundland and Labrador.

Initiatives under consideration:
- National ETS or carbon tax: Austria, Brazil, Chile, Colombia, Côte d’Ivoire, Indonesia, Japan, Luxembourg, Montenegro, the Netherlands, Senegal, Thailand, Turkey, Ukraine, United Kingdom, and Vietnam.
- Subnational ETS and/or carbon tax: Argentina, Brazil, Chile, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Liechtenstein, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.
- Both subnational ETSs and carbon taxes: Argentina, Brazil, Chile, Colombia, Côte d’Ivoire, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Liechtenstein, Luxembourg, Malta, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom.

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

Figure 2.1 / Carbon pricing initiatives implemented, scheduled for implementation and under consideration (ETS and carbon tax)
Figure 2.2 / Share of global emissions covered by carbon pricing initiatives (ETS and carbon tax)

Note: Only the introduction or removal of an ETS or carbon tax is shown. Emissions are presented as a share of global GHG emissions from (EDGAR) version 5.0 including biofuels emissions. Annual changes in GHG emissions are not shown in the graph from 2015 onwards. In 2020, the Technology Innovation and Emissions Reduction Regulation (TIER) replaced the Alberta Carbon Competitiveness Incentive Regulation, which in 2018 had replaced the Alberta Specified Gas Emitters Regulation. The information on the China national ETS represents early unofficial estimates based on the announcement of China’s National Development and Reform Commission on the launch of the national ETS of December 2017.
Figure 2.3 / Prices in implemented carbon pricing initiatives

Note: Nominal prices on April 1, 2020, shown for illustrative purpose only. The British Columbia GGIRCA, Canada federal OBPS, Kazakhstan ETS, Mexico pilot ETS, Nova Scotia CaT, Newfoundland and Labrador PSS, Saskatchewan OBPS and Washington CAR are not shown in this graph as price information is not available for those initiatives. Prices are not necessarily comparable between carbon pricing initiatives because of differences in the sectors covered and allocation methods applied, specific exemptions, and different compensation methods.
Figure 2.4 / Carbon price and emissions coverage of implemented carbon pricing initiatives

Note: The British Columbia GGIRCA, Canada federal DBIPS, Kazakhstan ETS, Nova Scotia CaT, Newfoundland and Labrador PSS, Saskatchewan OBPS, and Washington CAI are not shown in this graph as price information is not available for those initiatives. The carbon tax rate applied in Argentina, Finland, Ireland, Mexico and Norway varies with the fossil fuel type and use. The carbon tax rate applied in Denmark and Iceland varies with the GHG type. The graph shows the average carbon tax rate weighted by the amount of emissions covered at the different tax rates in those jurisdictions.
Figure 2.5 / Carbon price, share of emissions covered and carbon pricing revenues of implemented carbon pricing initiatives

Note: The size of the circles is proportional to the amount of government revenues except for initiatives with government revenues below US$100 million in 2019; the circles of these initiatives have an equal size. For illustrative purposes only, the nominal prices on April 1, 2020 and the coverages in 2020 are shown. The carbon tax rate applied in Argentina, Finland, Ireland, Mexico and Norway varies with the fossil fuel type and use. The carbon tax rate applied in Denmark and Iceland varies with the GHG type. The graph shows the average carbon tax rate weighted by the amount of emissions covered at the different tax rates in those jurisdictions. The middle point of each circle corresponds to the price and coverage of that initiative.
Figure 2.6 / Carbon pricing initiatives implemented or scheduled for implementation, with sectoral coverage and GHG emissions covered

Note: The size of the circles reflects the volume of GHG emissions in each jurisdiction. Symbols show the sectors and/or fuels covered under the respective carbon pricing initiatives. The largest circle (China) is equivalent to 13.2 GtCO₂e and the smallest circle (Switzerland) to 0.05 GtCO₂e. The carbon pricing initiatives have been classified in ETSs and carbon taxes according to how they operate technically. ETS does not only refer to cap-and-trade systems, but also baseline-and-credit systems such as British Columbia and baseline-and-offset systems such as in Australia. Carbon pricing has evolved over the years and they do not necessarily follow the two categories in a strict sense. The authors recognize that other classifications are possible.

The coverage includes the China national ETS and eight ETS pilots. The coverage represents early unofficial estimates based on the announcement of China’s National Development and Reform Commission on the launch of the national ETS of December 2017 and takes into account the GHG emissions that will be covered under the national ETS and are already covered under the ETS pilots. The sector symbol refers to the covered sectors in the national ETS or (one of the) ETS pilots. The national ETS will initially cover the power sector only. The covered sectors vary per ETS pilot.

** Also includes Norway, Iceland and Liechtenstein. Carbon tax emissions are the emissions covered under various national carbon taxes; the scope varies per tax.

*** ETS emissions are the emissions covered under the Tokyo CaT and Saitama ETS.

**** The coverage includes both components of the Canada federal backstop system and the subnational carbon pricing initiatives.
Figure 3.1 / High-level example of how carbon crediting works

Business as usual (BAU)
Waste water plant, methane is being vented

Implementation of emission reduction project

Emission reduction project
Methane captured and combusted to generate electricity

Issuance of carbon credits

Carbon credits generation
Creation of carbon credits equal to the emissions reduced in tCO₂

Carbon credits can be sold as offsets or to determine RBCF payments
Figure 3.2 / Total credit issuance volumes by registry, sector, and region as of December 31, 2019

Note: To ensure consistency between the information presented from the different crediting mechanisms, the cut-off date for the data on the crediting mechanisms is December 31, 2019. Only the largest independent carbon crediting mechanisms which issue credits that can be used for compliance obligations have been considered in this report. The authors recognize that numerous other independent crediting mechanisms exist that generate credits sold on the voluntary carbon market. Credits generated under the Saitama crediting mechanism, the Saitama forest absorption certification system, the Switzerland CO2 attestation crediting mechanism and Tokyo offset mechanism are not shown due to data limitations.
Figure 3.3 / Annual number of projects and issuances of covered crediting mechanisms for 2002–2019

Historical trends do not include mechanisms where chronological data on crediting activities are not available. These mechanisms are those under the Chinese pilot ETS's (Beijing, Fujian and Guangdong), Tokyo ETS and Saitama ETS. The volume of credits involved are small and their exclusion does not impact the overall trends shown.
Figure 3.4 / Annual volume of issuances by crediting mechanism for 2015–2019

Number of projects

250,000 —
200,000 —
150,000 —
100,000 —
50,000 —
0 —

2015 2016 2017 2018 2019

CDM
JI
VCS
California Compliance Offset Program
GS
Australia ERF
CAR
Alberta Emission Offset System
ACR
China GHG Voluntary Emission Reduction Program
Republic of Korea Offset Credit Mechanism
British Columbia Offset Program
J-Credit Scheme
Fujian Forestry Offset Crediting Mechanism
Guangdong
Québec Offset Crediting Mechanism
Beijing Forestry Offset Mechanism
RGGI
JCM
Figure 3.5 / Issuance volumes in ktonCO$_2$e by sector and type of mechanism for 2015–2019
Figure 3.6 / Status of regional, national and subnational crediting mechanisms

Note: The large circles represent cooperation initiatives on crediting between subnational jurisdictions. The small circles represent crediting mechanisms in cities. JCM = Joint Crediting Mechanism. RGGI = Regional Greenhouse Gas Initiative.

Implemented crediting mechanisms have the required legislative mandate as well as the supporting procedures, emission reduction protocols and registry systems in place to allow for crediting to take place. Crediting mechanisms are considered to be under development if they have legislature in place allowing for the future implementation of carbon crediting system but has currently not issued any credits either due to missing components such as registries and protocols. The authors recognize that numerous other independent crediting mechanisms exist that generate credits sold on the voluntary carbon market.

Crediting mechanisms implemented: National: China GHG Voluntary Emission Reduction Program, J-Credit Scheme, Republic of Korea Offset Credit Mechanism, Switzerland CO₂ Attestations Crediting Mechanism. Subnational: Fujian Forestry Offset Crediting Mechanism, Guangdong Pu Hui Offset Crediting Mechanism, Québec Offset Crediting Mechanism, Saitama crediting mechanism, Saitama forest absorption certification system, Tokyo offset mechanism.

Figure 4.1 / Status of net zero CO₂ emissions targets by country

Adopted in legislation
- Bhutan
- Suriname

Achieved
- Denmark
- France
- New Zealand
- Sweden
- United Kingdom
- Fiji
- China

Proposed in legislation
- Spain
- Chile
- Belize
- Suriname

241 countries which, as of April 1, 2020, are developing plans to achieve net zero CO₂ emissions are not shown in this figure.
Figure 5.1 / Objectives for implementing an internal carbon price

- Change internal behavior: 50.1%, 350 companies
- Drive energy efficiency: 58.4%, 408 companies
- Drive low-carbon investment: 61.1%, 427 companies
- Identify and seize low-carbon opportunities: 42.3%, 296 companies
- Navigate GHG regulations: 42.1%, 294 companies
- Stakeholder expectations: 29.5%, 206 companies
- Stress test investments: 25.2%, 176 companies
- Supplier engagement: 8.7%, 61 companies
- Other: 9.6%, 67 companies