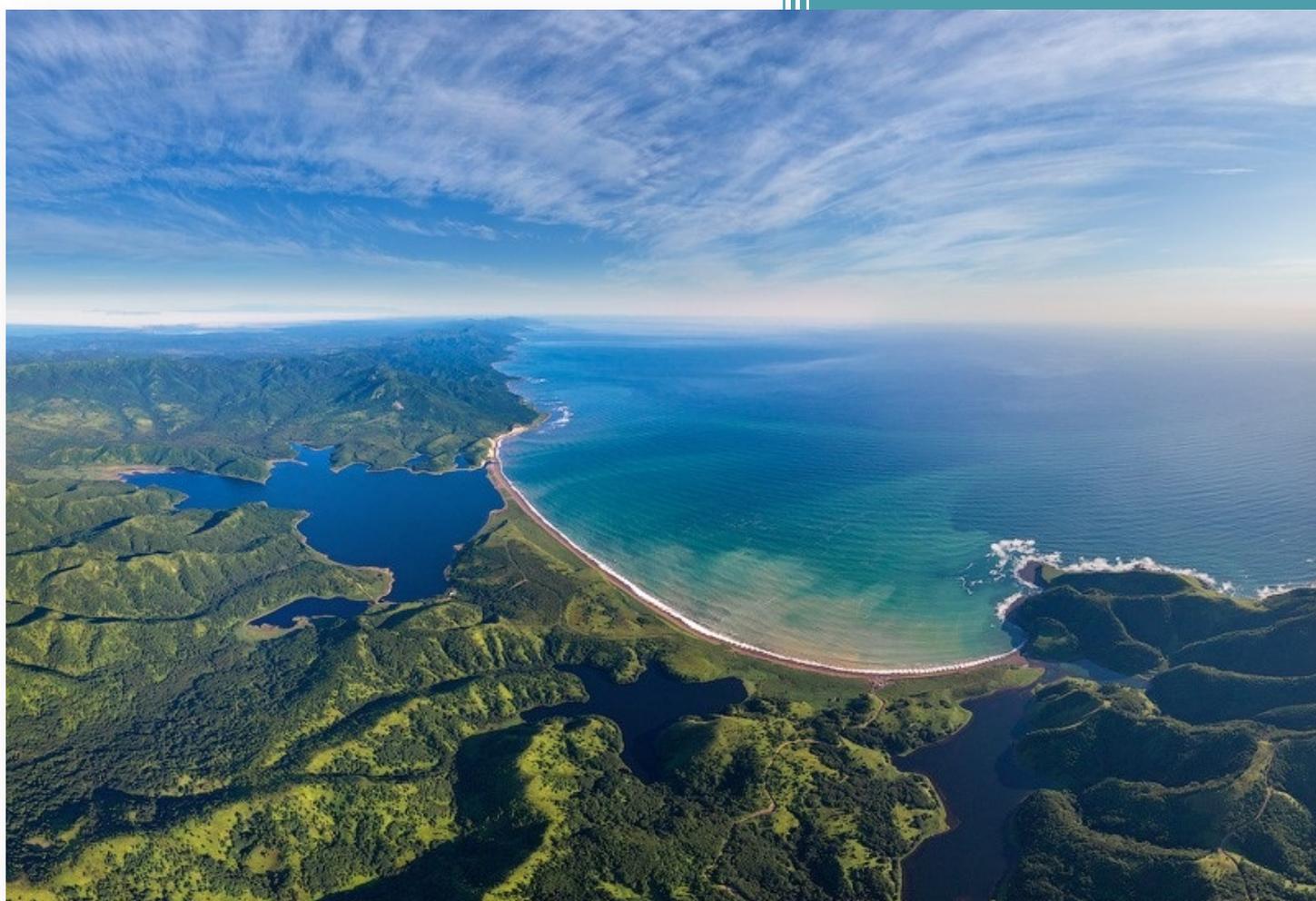




**Asia-Pacific  
Economic Cooperation**

# APEC Stocktake of Carbon Pricing Initiatives



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Produced by Ministry of Economic Development  
of the Russian Federation  
10/2 Presnenskaya Naberezhnaya  
Moscow 123112  
Tel: (7) 495 870 29 21  
Website: [www.economy.gov.ru](http://www.economy.gov.ru)

For Asia-Pacific Economic Cooperation Secretariat  
35 Heng Mui Keng Terrace  
Singapore 119616  
Tel: (65) 68919 600  
Fax: (65) 68919 690  
Email: [info@apec.org](mailto:info@apec.org)  
Website: [www.apec.org](http://www.apec.org)

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# Table of Contents

<b>Foreword</b> .....	3
<b>Climate change in the Asia-Pacific</b> .....	4
<b>Economic instruments for emissions reduction</b> .....	4
<b>Emissions trading systems and other emissions reduction schemes</b> .....	7
Australia.....	10
China .....	12
Indonesia .....	18
Japan .....	20
Republic of Korea .....	30
New Zealand .....	33
Philippines .....	35
Singapore .....	36
Chinese Taipei .....	38
Thailand .....	39
Viet Nam .....	41
<b>Opportunities for regional cooperation</b> .....	43
<b>Glossary</b> .....	466



## Foreword

This summary report accumulates the state of carbon pricing initiatives in the Asia Pacific region. It was prepared as part of a project within the APEC Economic Committee *APEC Stocktake of Carbon Pricing Initiatives* and seeks to compile existing practices of putting a price on greenhouse gas (GHG) emissions in APEC economies. Initiatives within this scope include emissions trading systems or taxes applied primarily to carbon dioxide (CO<sub>2</sub>), generally referred to as “carbon pricing”. Some of these initiatives may also cover other GHG emissions such as methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), sulfur hexafluoride (SF<sub>6</sub>), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs).

As the challenge of climate change comes to the center of global attention, economies are seeking ways to reduce GHG emissions while also creating the necessary environment for development. One approach to achieve this is to create direct economic stimuli for agents to reduce GHG emissions by incorporating the long-term toll on the environment into the cost of economic activity. APEC economies are already using such instruments and are likely to continue to do so in the foreseeable future.

At the same time, the application of carbon pricing instruments all over the world creates a patchwork of regulatory environments, where businesses not only face varying compliance conditions, but also bear different costs for producing the same goods and services. This creates risks for international trade and investment and complications for doing business across the globe and in particular regions.

The aim of this report is to provide a background for further discussion in APEC and other stakeholders, including international fora in the Asia Pacific, of what regulators are doing to economically stimulate GHG emissions reductions and explore opportunities for cooperation to reduce emissions.

This publication presents key trends in economic climate change mitigation instruments in APEC members, overviews general trends and then presents brief case studies on number of economies. This report is based both on open-source desk research and answers of APEC economies to the questionnaires distributed in September 2021.

## Climate change in the Asia-Pacific

The Asia-Pacific region is a **key driver of global economic growth** with its share of population and high economic capacity. At the same time, it is one of the most vulnerable regions in terms of the effects of climate change and with significant developmental needs.

The temperature in the region has been growing **twice as fast as the global average** in recent years. The economies of the region are increasingly exposed to natural disasters that caused an estimated **50 billion dollars** in damage annually over 2010-2019<sup>1</sup>. Sea-level rise can directly affect a billion people in the region, flood large megacities and create a real threat to small island economies in the Asia-Pacific region.

The price of the rapid economic growth in the region is a growing burden on the climate system – **the Asia Pacific is the region with the largest CO<sub>2</sub> emissions in 2020**. Within the Asia-Pacific region the developing economies account for three quarters of regional carbon emissions, while the developed economies of APEC have higher per capita emissions.

### **48%** The share of the Asia Pacific in global CO<sub>2</sub> emissions

Energy generation is the main source of CO<sub>2</sub> emissions in the region, accounting for 40% of emissions<sup>2</sup>, while the Asia-Pacific relies heavily on **coal-based electricity** (according to IEA, coal accounts for 60% of the region's energy mix). Another major source of GHG emissions in the region is **agriculture**, which accounts for 15% of total GHG emissions.<sup>3</sup>

#### Top emissions sources:



**40%**

Energy generation



**15%**

Agriculture

Given its unique position, **the Asia-Pacific region is at the forefront of global efforts on GHG emissions mitigation**. APEC economies use a variety of tools to manage emissions. Most economies in the region have committed themselves to the goals of the Paris Agreement, and some of them have set targets to achieve carbon neutrality (net-zero CO<sub>2</sub> emissions) – China and Russia by 2060; Japan, Hong Kong, China, Korea, and

<sup>1</sup> EM-DAT 2020

<sup>2</sup> European Commission

<sup>3</sup> FAO 2020 <http://www.fao.org/faostat/en/#data>

United States by 2050, New Zealand's target is "net zero emissions of all GHGs other than biogenic methane by 2050".

## Economic instruments for emissions reduction

The issue of climate change mitigation is rapidly becoming one of the determining factors for the long-term international trade and investment environment. Governments and companies are searching for new approaches to this issue, striving to simultaneously solve the global challenge of climate change and maintain – or even enhance – economic competitiveness.

Among the instruments designed to limit and reduce GHG emissions, economic and market instruments are often considered the most flexible and effective since they create an actual emissions price. That allows climate-related externalities – the broader social and environmental impact – to be incorporated into the cost of products, putting a price on the damage to the environment.

### Types of instruments for regulating greenhouse gas (GHG) emissions:



#### Non-market-based (direct limitation of harmful anthropogenic impact on the ecosystem)

- ∇ Technical regulation
- ∇ Resource expenditure rate (gasoline consumption standards, building energy efficiency standards, etc.)
- ∇ Best Available Technologies (compiling a list of technologies that are both technologically accessible and best meet the goals of environmental protection. Technologies from these directories are gradually becoming mandatory for companies)
- ∇ Voluntary environmental agreements between industry and government
- ∇ Quantified emission limitation



#### Economic or market

##### Influencing incentives for emissions reduction:

- ∇ Carbon tax
- ∇ Emissions trading system
- ∇ Subsidies for emissions reduction (including subsidies for the use of renewable energy sources and other low emissions energy sources)
- ∇ Fossil fuel subsidy reforms (balanced by the requirement to provide those in need with essential energy services)
- ∇ Crediting schemes

Influencing incentives for the production or consumption of emissions intensive products:

- ▽ Tax on emissions intensive products
- ▽ Low emissions products subsidies

According to the World Bank (2021), there are currently 65 carbon pricing initiatives – taxes or emissions trading systems (ETS) - in the world (effective or having an effective date). The initiatives comprise 45 **economy-wide (covering the whole geography of economy)** and 34 **domestic regional (e.g. city, prefecture, etc.)** jurisdictions and cover 21.5% of global emissions. In APEC there are 35 carbon pricing initiatives, which cover 5,5% of global emissions.

At the same time, the actual carbon price remains very low, for more than half of all emissions, it does not exceed \$10/tCO<sub>2e</sub><sup>4</sup>. According to the IEA, in order to implement the goals of the Paris Agreement, the price should be in the range of \$75-100 per ton.<sup>5</sup> Currently, this price level is set only for 5% of emissions covered by carbon regulation.

**<10\$ per ton CO<sub>2-e</sub>**

The most common price

**75-100\$ per ton CO<sub>2-e</sub>**

The necessary price for the Paris Agreement implementation

**only 5% emissions**

covered by the required price level

According to the latest IMF forecasts, the Asia-Pacific region could make a significant contribution to global mitigation efforts by systematically introducing a price on carbon. It is estimated that a price on emissions at \$25 per ton, introduced collectively and gradually in the region over the next 10 years, will reduce regional emissions by 21% by 2030, exceeding the region's targets under the Paris Agreement (in total, by 8%).<sup>6</sup>

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<sup>4</sup> Tonnes (t) of carbon dioxide (CO<sub>2</sub>) equivalent (e) is a standard unit for counting greenhouse gas (GHG) emissions regardless of whether they're from carbon dioxide or another gas, such as methane, adjusting other gases for their relative greenhouse effect.

<sup>5</sup> IEA Global Energy Review 2021

<sup>6</sup> IMF Fiscal Policies to Address Climate Change in Asia and the Pacific 2021

<https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2021/03/24/Fiscal-Policies-to-Address-Climate-Change-in-Asia-and-the-Pacific-Opportunities-and-49896>

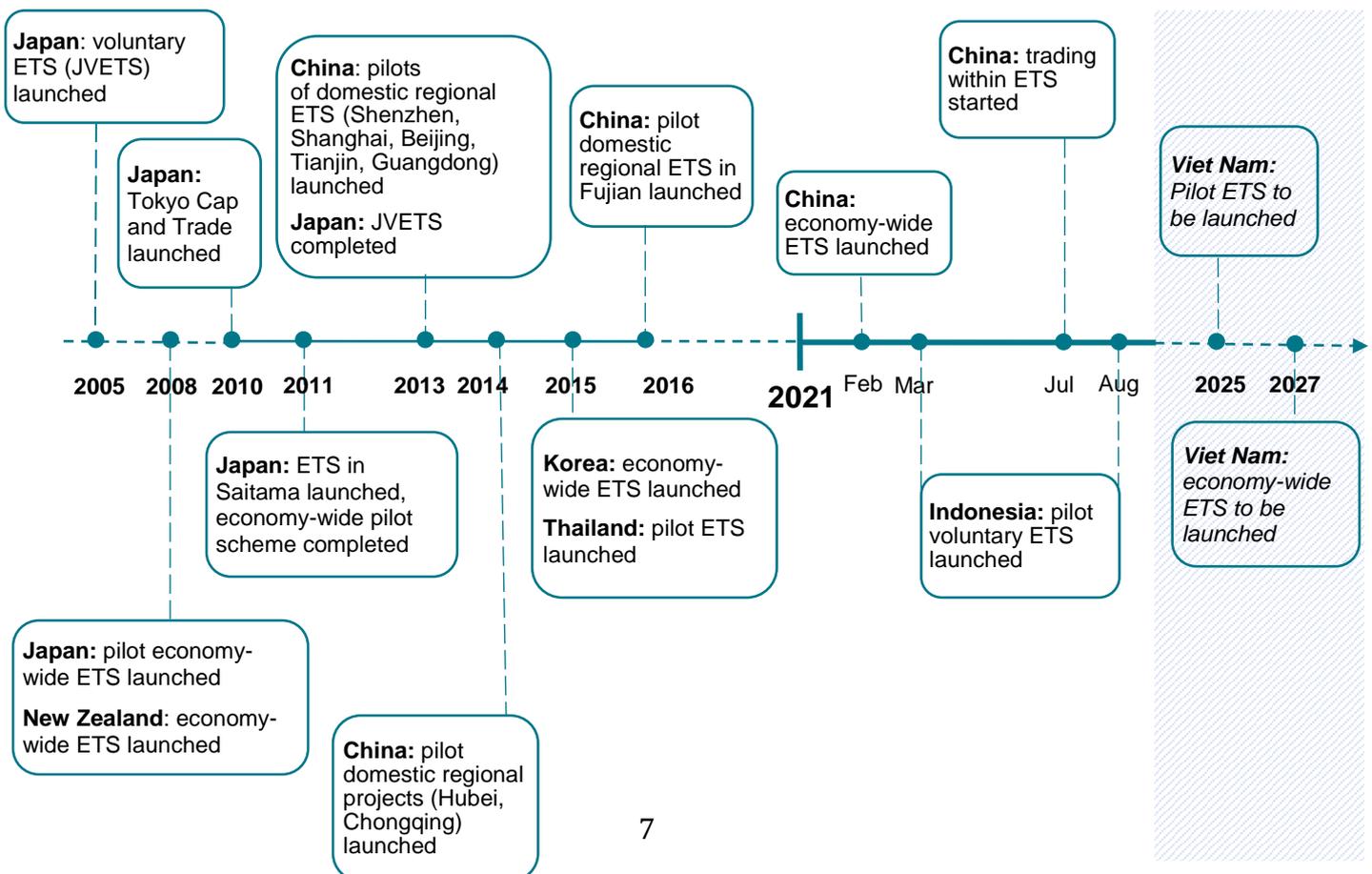
## Emissions trading systems and other emissions reduction schemes

Emissions trading systems (ETS) are recognized as one of the most efficient market-based instruments for greenhouse gas emissions reduction. An ETS typically operates on a ‘cap-and-trade’ principle, where the government sets an emissions cap for the total volume in one or several sectors of the economy (“cap” principle). Emitters must hold allowances for every ton of greenhouse gas they emit. The allowances are then purchased from the government or the companies joining the system (the “trade” principle).

Also, the term *carbon offset* is used in this publication. A *carbon offset* broadly refers to a reduction in GHG emissions that is used to compensate for emissions that occur elsewhere. The growing offset market falls into two categories - voluntary and mandatory (compliance). Governments or companies can buy voluntary offsets at their own discretion and mandatory ones can be part of government climate schemes such as EU ETS or CORSIA.

Emissions trading schemes started to emerge in the early 2000s, however, the launch of ETSs required the development of legal and technical infrastructure, which took quite a long time. The first full-fledged emissions trading system appeared in 2005 in the European Union, followed in 2008 by the ETSs of Switzerland and New Zealand. In the Asia-Pacific, the New Zealand ETS remained the only one for a long time - the next system in the region was launched only in 2015 in the Republic of Korea.

### Timeline of ETS initiatives in the Asia-Pacific region



Today there are 29 ETSs in the world according to the World Bank. In the Asia-Pacific region, there are three economy-wide and 10 domestic regional systems, and four economy-wide and one domestic regional systems are under development. Economy-wide ETSs currently exist only in, China, Korea and New Zealand. Most large economies in the region have prototypes of ETSs or already functioning systems; some economies have developed detailed plans for their implementation.

**Table 1. Current status of pricing instruments in surveyed APEC economies**

<b>Economy</b>	<b>Instrument</b>	<b>Status</b>	<b>Level</b>	<b>Year</b>
<b>China</b>	Economy-wide ETS	Implemented	Economy-wide	2021
	Pilot ETS in Beijing	Implemented	Domestic regional	2013
	Pilot ETS in Chongqing	Implemented	Domestic regional	2014
	Pilot ETS in Fujian	Implemented	Domestic regional	2016
	Pilot ETS in Guangdong	Implemented	Domestic regional	2013
	Pilot ETS in Hubei	Implemented	Domestic regional	2014
	Pilot ETS in Shanghai	Implemented	Domestic regional	2013
	Pilot ETS in Shenzhen	Implemented	Domestic regional	2013
<b>Indonesia</b>	Economy-wide ETS	Scheduled	Economy-wide	2024
	Carbon tax	Scheduled	Economy-wide	2022
<b>Japan</b>	Carbon tax	Implemented	Economy-wide	2012
	Japanese ETS	Under consideration	Economy-wide	-
	Saitama ETS	Implemented	Domestic regional	2011
	Tokyo ETS	Implemented	Domestic regional	2010
<b>Korea</b>	Korean ETS	Implemented	Economy-wide	2015
<b>New Zealand</b>	New Zealand ETS	Implemented	Economy-wide	2008
<b>Philippines</b>	Philippine ETS	Under consideration	Economy-wide	-
<b>Singapore</b>	Carbon tax	Implemented	Economy-wide	2019
<b>Chinese Taipei</b>	Chinese Taipei ETS	Under consideration	Economy-wide	-
	Carbon fee	Scheduled	Economy-wide	
<b>Thailand</b>	Thai ETS	Under consideration	Economy-wide	-
<b>Viet Nam</b>	Vietnamese ETS	Scheduled	Economy-wide	2025

The Chinese ETS is the largest in terms of greenhouse gas emissions covered, but due to its recent launch, the scope and depth of the scheme is still limited. In general, this reflects the gradual approach to the introduction of carbon regulation instruments typical to the Asia-Pacific region.

Before deploying economy-wide systems, some economies took the time to work out the legal and technical aspects of establishing ETSs using pilot projects, limited in terms

of sector coverage or by region of implementation. It took eight years for China to launch the economy-wide system since the start of the first regional pilot projects.

Japan still has not created an economy-wide ETS, although the economy was the first in the Asia-Pacific region to launch a domestic regional system (Tokyo Cap-and Trade, 2010), and also invested a lot in a voluntary ETS (from 2005 to 2013) and an experimental ETS (from 2008 to 2011).

In Southeast Asia, the development of trading schemes has also been underway in recent years, despite the pandemic. Indonesia is conducting pilot projects in 2021 and plans to launch an economy-wide ETS in 2024, Viet Nam plans to launch a pilot program by 2025, and a bill is being discussed in the Philippines that involves the creation of an ETS, with no date specified.

ETSs in the Asia-Pacific region are still nascent – they are being tested in terms of applicability and efficiency. Since carbon markets are mentioned in official economy-wide and sectoral development strategies in most economies of the region, it can be expected that the development of the ETS and other carbon pricing instruments will continue with an increasing pace and growing investments.

The following section presents case studies on carbon pricing instruments in key APEC economies. These profiles describe brief histories of carbon regulation, the policy designs and key features of the instruments used.

The **Russian** law on limiting GHG emissions was adopted at the federal level in July 2021. The law provides for the obligatory GHG (verified) reporting for key emitters:

- $\geq 150\,000$  t CO<sub>2</sub>-eq/year from 2023 and
- $\geq 50\,000$  tones CO<sub>2</sub>-eq from 2024

Also, it sets a framework for climate projects implementation.

In line with this vision, in 2021 Russia is launching its first domestic regional pilot ETS – and is doing so in the far eastern region of Sakhalin. It will be the first case for a carbon pricing scheme in Russia and is expected to be followed by other regions. The ETS is set up to begin operating in mid-2022 with the aim of Sakhalin reaching carbon neutrality by the end of 2025, and an emissions trading scheme will be a key instrument to achieve this goal.

The pilot ETS covers 20+ organizations, mostly CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O emissions and it covers sectors specified in UNFCCC GHG reporting methodologies (mostly energy production). The threshold is 20 000 tCO<sub>2</sub>e/year.

Other measures include the adoption of Climate Strategy and Action Plan for the region until 2035 and the implementation of “climate projects”, which are yet to be defined. Besides emissions trading and a ban on all petrol and diesel cars by 2035, the region also aims to develop blue and green hydrogen production and promote sustainable management of its forests.

## Australia

<b>Economy-wide strategy or emissions reduction plans</b>	Long-term Strategy for emissions reduction (2021) will be presented during COP-26 Economy-wide Hydrogen Strategy 2019 Carbon Farming Initiative Act 2011 Emissions Reduction Fund since 2015 (economy-wide)
<b>Pledges</b>	Reduce GHG emissions to 26-28% below 2005 by 2030

Australia's crediting mechanism was launched with the establishment of the Carbon Farming Initiative Act 2011. The Carbon Farming Initiative (CFI) was used to supply offsets to Australia's Carbon Pricing Mechanism. When the CFI was repealed in 2014, the CFI transitioned to the **Emissions Reduction Fund**. Participants in the scheme can earn Australian Carbon Credits Units (ACCUs) for every tonne of CO<sub>2</sub> equivalent they store or avoid emitting. Businesses can sell ACCUs to generate income, to the Australian government through an auction, and/or to other businesses. The 1,000th project was registered under the scheme in August 2021. The total number of ACCUs issued surpassed 100 million in 2021. As at October 2021, through 13 auctions, the Emissions Reduction Fund has contracted 209 million tonnes of abatement through over 500 carbon abatement contracts, at an average price of \$12.47 per tonne. The current spot price for ACCUs is around \$38.50 (18 November 2021, [Jarden](#)).

Project types involve:

- New technology introduction
- Upgrading equipment
- Changing business practices to improve productivity or energy use
- Changing the way vegetation is managed to store carbon

The ERF covers projects in the field of vegetation management, agriculture, energy consumption, waste, transport, coal and gas production, and industrial processes.

ACCUs issued by the ERF can be used for compliance purposes by entities covered under Australia's **Safeguard Mechanism**. The Safeguard Mechanism requires largest emitters to keep their net emissions below a baseline. The Safeguard Mechanism is underpinned by the National Greenhouse and Energy Reporting Scheme (NGERS). NGERS is a legislated, uniform economy-wide system for the reporting of energy and greenhouse emissions data by companies. Reporting is mandatory for companies that meet specified thresholds for emissions or energy production or consumption. Emissions estimation methods used by NGERS reporters are designed to be consistent with Intergovernmental Panel on Climate Change methods. NGERS is administered by the Clean Energy Regulator, and company reports are subject to verification by external auditors.

The Safeguard Mechanism **applies to NGERS facilities emitting more than 100,000 tons of CO<sub>2</sub>-e per year**. It is applied to around 200 of Australia's largest emitters through

the Safeguard Mechanism. The responsible emitter who has operational control of the facility must ensure the facility's net emissions do not exceed the baseline determined by the Regulator.

If a facility's emissions exceed or are expected to exceed its baseline, the facility operator has a number of options available to them to manage the excess emissions, including:

- applying for a new baseline
- surrendering ACCUs to offset emissions
- applying for a multi-year monitoring period to allow additional time to reduce net emissions
- applying for an exemption where excess emissions are due to exceptional circumstances such as a natural disaster or criminal activity.

There is a range of enforcement options available to the Clean Energy Regulator where a responsible emitter fails to take one of the above actions. These options include entering into an enforceable undertaking, issuing an infringement notice, or initiating court proceedings to seek an injunction or civil penalties.

Australia is partnering with other APEC economies to attract investment, build supply chains and advance research and development. These partnerships include:

- working to [accelerate low emissions technologies](#) with Singapore, in sectors including [maritime and port operations](#)
- partnering with Japan to export clean liquefied hydrogen as part of the world-first [Hydrogen Energy Supply Chain \(HESC\) Pilot Project](#)
- Working with Japan on the Asia Energy Transition Initiative (AETI) to support South East Asian economies to make energy transitions that reduce emissions while considering economic prosperity and sustainable growth
- engaging with the Republic of Korea on a [hydrogen production action plan](#)
- promoting hydrogen safety best practice as a member of the [US Center for Hydrogen Safety](#).

## China

<b>Economy-wide strategy or emissions reduction plans</b>	13 <sup>th</sup> , 14 <sup>th</sup> Five-year Plans (2016-2020, 2021-2025) Adaptation Strategy 2013, Carbon Market Development Plan 2017
<b>Emissions Trading System</b>	2011 – pilot regional ETS launched 2017 - Carbon Market Development Plan released 2021 – Economy-wide ETS launched in power sector
<b>Pledges</b>	Carbon neutrality by 2060, reduce carbon intensity of GDP by 65% by 2030, compared to 2005, peak carbon emissions before 2030.
<b>Carbon price</b>	Economy-wide system price is \$8/tCO <sub>2e</sub> . Pilot prices are \$1,4-11,4/tCO <sub>2e</sub> .

China has been creating and developing an economy-wide carbon market **for more than a decade**. This highlights China’s commitment to tackling climate change.

At present China has launched the 14<sup>th</sup> Five-Year Plan which sets out the Governmental priorities for public expenditure, industrial restructuring and energy balance for 5 years (2021-2025).

At the UN General Assembly on September 22, 2020, President Xi Jinping announced that in addition to reaching the peak of emissions before 2030, China is going to achieve **carbon neutrality by 2060**. At the UN Climate Ambition Summit in December 2020, Xi Jinping announced the goal to reduce **carbon emissions per unit of GDP by a minimum of 65% by 2030** compared to 2005, as well. In February 2021, China announced **commitments to achieve a 40% renewable energy mix by 2030**.

Given the dominance of coal energy in China's energy sector, energy transformations are a key factor in meeting the economy’s climate commitments. Coal accounts for almost half of carbon emissions from the combustion of fossil fuels.

At the same time, China is actively expanding into the global renewable energy markets. Currently, China is the largest investor in the renewable energy sector. Its investments amounted to \$83.4 billion in 2019. (Bloomberg NEF). In 2019-2024 China will account for 40% of the global increase in renewable energy market capacity (IEA, 2019). China also accounts for more than 70% of global production of solar photovoltaic modules (IEA, 2020).

## Establishing an economy-wide ETS

In 2011, the Chinese government announced plans to establish an economy-wide carbon emission trading scheme and in 2013 the first pilot domestic regional systems were launched. In 2017, the Chinese Committee for Development and Reforms issued the **Carbon Market Development Plan (power sector)**.

**The ETS was launched** on February 1, 2021, and trading began on July 16, 2021. To date, the ETS covers only the power sector, and the system is to be extended to other sectors, such as chemical and petrochemical industries, production of construction materials (including cement), iron and steel, non-ferrous metals (aluminum and copper), paper and civil aircraft industry. The system is expected to cover 5 Gt of annual carbon emissions.

### ETS governance

Initially, the Chinese Development and Reform Committee was responsible for the creation of the ETS. In 2018 the responsibility was transferred to the Ministry of Ecology and Environment. The agency determines the types of greenhouse gases and industries that should be included in the program.

The registration system is established in Hubei, and the trading system is established in Shanghai.

The Ministry of Ecology will manage both agencies where they will regularly report on the status of allowances registration, trade, settlement operations, etc. In addition, at the provincial level, **dedicated environmental departments** will operate, which must allocate allowances established by the Ministry of Ecology within their region, as well as carry out control and supervision activities for companies participating in programs.

**Verification bodies** within the framework of the Chinese ETS may be environmental authorities at the provincial or sub-provincial level, government affiliated institutions and other government-selected institutions that provide technical services.

### How the ETS works

The Chinese ETS will cover **1/7** of global fossil fuel combustion carbon emissions (IEA), making it the **largest in the world**. Approximately 2200 companies from the energy sector (including thermal power and industrial power plants from other sectors) fall under the scope of the ETS. To be covered by the system, the company must emit more than 26,000 tons of carbon or consume 10,000 tons of coal equivalent per year. The Chinese system has covered about **4,5 billion tons of CO<sub>2</sub>e** in the energy sector phase, which will account for over 40% of China's emissions.

Trading is intended **only for CO<sub>2</sub> emissions**, without including other GHGs and types of emissions<sup>7</sup>. So far, some key polluting sectors (ferrous and non-ferrous metals, cement, etc.) have not been included in the trading system.

The purpose of the ETS is to reduce specific **carbon emissions per unit of GDP**. Emission allowances in a certain amount is distributed free of charge, only excess is paid by buying them on the exchange. Allowances will be established on the basis of current emissions in 2019 and 2020.

**In the short term**, the ETS is expected to provide incentives for high-emission power stations to improve energy efficiency or use high-quality coal. In the long term, it should motivate companies to transfer investments from subcritical stations (or low-efficiency ones) to supercritical or ultra-supercritical ones.

The amount of allowances paid by companies **in the first year will be 20%** of emissions exceeding the benchmarks. It significantly reduces real costs, and therefore incentives to reduce emissions. Moreover, in the first years, the volume of allowances distributed free of charge is predicted to be so large (8-8.5 billion allowances) that most companies will practically be able not to buy allowances at the start of trade.

The prices of allowances are around **RMB 41-43 (\$6-7) per ton**.

It is assumed that natural gas power plants will become the **main sellers of allowances on the exchange**. Various forms of trading and types of contracts will be allowed on the exchange, including spot transactions with competitive pricing, the purchase of forward and futures contracts, the conclusion of allowance purchase agreements, etc. To do it, companies will have their own accounts on the exchange with different functions.

For violations by market participants, **fin**es are imposed:

- if a company does not buy mandatory allowances, it is fined \$2.89-4.35 thousand + the non-purchased volume is deduced from free allocation of allowances for the next year;
- if a company does not conduct the inspection, it is fined \$1.44-2.89 thousand;
- if a company violates other trading rules, the company's account on the exchange may be restricted.

### **Regional pilot schemes**

The first regional **carbon exchanges** appeared in 2013 in Shenzhen, Shanghai, Beijing, Tianjin and Guangdong Province. In 2014, Hubei Province and Chongqing (the city)

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<sup>7</sup> However, it does not mean that they are not traded: for example, for allowances for SO<sub>2</sub> in China, there have been ETS pilots since 2000s.

were added to them, in 2016 – Fujian. Key coal regions – Shanxi, Hebei and Shandong – were not included in the list of pilot regions, but should join the economy-wide ETS.

The pilot ETSs **cover from 35 to 60%** of GHG emissions in each region and will continue to apply to sectors not covered by the economy-wide system. The ETSs are similar in architecture, but differ in individual parameters. For example, if the region relies on manufacturing, the allowance trading system is predominantly applied to industrial companies. In a region where the ETS is more focused on reducing emissions, innovative financing tools are being applied.

Pilot programs **are managed by municipal or provincial authorities** and impose obligations directly on organizations. Most programs allocate emission limits free of charge and only to CO<sub>2</sub> (except Chongqing, where other greenhouse gases are included in the program<sup>8</sup>).

Pilot schemes **differ in enterprise coverage (both in scope and in type)**. For example, in Shenzhen there is the highest sectoral coverage, and the ETS includes not only industry and construction sectors, but also public transport. Guangdong leads in terms of the total allocated allowances – it accounts for 50% of the aggregated allowances of all seven provinces. Hubei stands out in terms of the volume and turnover of funds in the market for trading allowance, as well as innovative financial instruments.

Also, the pilots differ in the **methods of determining emission limits** (the approach is based on benchmarks or historical emissions<sup>9</sup>) and penalties for violation of allowances

(in Beijing, fines are 3-5 of the average market emission price for the last 6 months for each violation, while in other pilots enterprises are punished only by reducing the limits for the next year).

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<sup>8</sup> In addition to CO<sub>2</sub>: CH<sub>4</sub>, N<sub>2</sub>O, HFC, PFC, SF<sub>6</sub>

<sup>9</sup> **The benchmark approach** involves calculating emission limits for a product unit or cost. It means that the methodology does not change because of technology or fuel, a size of a station or a geographical location. **The approach based on historical emissions** involves allowances distribution based on the historical average emissions of covered enterprises.

## Domestic regional pilot Chinese ETS

Region	Sectors	% of total region's emissions	Allocation principles	Current carbon price, \$/t CO <sub>2</sub> -eq
<b>Beijing</b>	Stationary installations (steel and iron, cement, petrochemicals) that directly emitted 10,000 MtCO <sub>2</sub> e or more in 2009-2011	40%	Annual emission allowances are allocated to those brought back into operation and to those already functioning, and the part is left for adjustment; 5% is reserved for the competent department.	12.62 (average in 2020)
<b>Shanghai</b>	Industries that emit more than 20,000 MtCO <sub>2</sub> e (iron and steel, petrochemicals, chemicals, non-ferrous metals, electricity)	57%	Allowances are distributed free of charge. Three-year allowances are allocated once based on benchmarks.	5.81
<b>Tianjin</b>	The main sources of emissions (iron and steel, chemicals, electric power, thermal power, petrochemicals, oil and gas) and civil engineering with annual emissions of more than 20,000 MtCO <sub>2</sub> e since 2009	55%	Allowances is distributed free of charge. Allowances for the electricity and heat sectors is distributed on the benchmark basis and can be adjusted. Allowances for industries are based on historical emissions. For new and operating stations, different approaches of allowances allocation are used.	3.28
<b>Chongqing</b>	Metals, electric power, chemical industry, construction materials, mechanical engineering and light industry	50%	Allowances are distributed free of charge. Three-year allowances were allocated at a time on a competitive basis, and the Government sets a cap.	3.82
<b>Guangdong</b>	Sectors with emissions of more than 20,000 MtCO <sub>2</sub> e (or energy consumption of 10,000 tce) in any year in 2010-2012 (electricity, cement, petrochemicals, iron and steel)	60%	Only part of the allowances are distributed free of charge. New and existing stations receive allowances based on different criteria. Distribution is applied both on the basis of historical emissions and on the benchmark basis.	4.09
<b>Hubei</b>	12 sectors that consumed energy of at least 60,000 tce in any year in 2010-2012 (iron and steel, chemical, cement)	45%	Allowances are distributed free of charge on the basis of historical emissions, for energy – on the benchmark basis.	3.94
<b>Shenzhen</b>	800 of the largest industrial value creation companies, 400 of the largest energy consumer companies, the largest oil combustion companies and boiler enterprises	40%	Allowances are distributed free of charge. Companies receive allowances for 3 years at a time on competitive terms.	3.46

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<b>Fujian</b>	Electric power industry, petrochemical and chemical industry, construction materials, iron and steel, non-ferrous metallurgy, paper industry, aviation and pottery production	60%	Allowances are distributed free of charge. The benchmark approach is applied to the electric power industry, cement, aluminum, mirror glass. The main ones are based on historical emission intensity.	2.50
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## Indonesia

<b>Economy-wide strategy or emissions reduction plans</b>	Medium-term Development Plan 2020-2024 Long-Term Strategy on Low Carbon and Climate Resilience 2050 (2021)
<b>Emissions Trading System</b>	Pilot ETS (March-August 2021)
<b>Carbon tax</b>	Set to commence in April 2022. Covers coal-fired power plants, with the potential to expand to other sectors in 2025.
<b>Pledges</b>	Carbon neutrality by 2060 Reduce carbon emissions by 29% (without international financial support) or by 41% (with international financial support) by 2030, compared to 2010. Peak carbon emissions by 2030.
<b>Carbon price</b>	Initial rate will be USD 2.1/t CO <sub>2</sub> -e

According to the International Carbon Action Partnership profile<sup>10</sup>, Indonesia passed the ‘Government Regulation on **Environmental Economic Instruments**’, which provides a basis for ETS implementation, in 2017. This regulation sets a mandate for an emissions and/or waste permit trading system to be implemented **by 2024**.

In 2018, Indonesia completed a study outlining the emissions profiles and marginal abatement cost curves of the power and industry sectors, in addition to completing the design and governance framework of a monitoring, reporting and verification (MRV) system. Following this, an **online GHG** reporting platform for electricity generators and a **pilot MRV program** for electricity generators in the **Java-Madura-Bali grid**<sup>11</sup> were launched in late 2018.

The Ministry of Industry of the Republic of Indonesia has also developed an **online GHG emissions reporting system** for industries in Indonesia. Pilot MRV programs are being conducted in the cement and fertilizer sectors.

In March 2021 the Minister of Energy and Mineral Resources of the Republic of Indonesia announced the launch of a **voluntary emissions trading trial** for the power sector, which is set to run from March to August 2021. Eighty coal-fired power plants will participate, of which 59 are owned by the state electricity company PLN.

The voluntary program is considered a pilot and is focused on familiarizing stakeholders with the development of an economy-wide ETS, ETS compliance procedures, and offset mechanisms. Participants can trade allowance units as well as offset credits from renewable energy generation. The voluntary program is set to continue, with yearly trading periods and reviews, until the implementation of an economy-wide ETS.

<sup>10</sup><https://icapcarbonaction.com/en/>

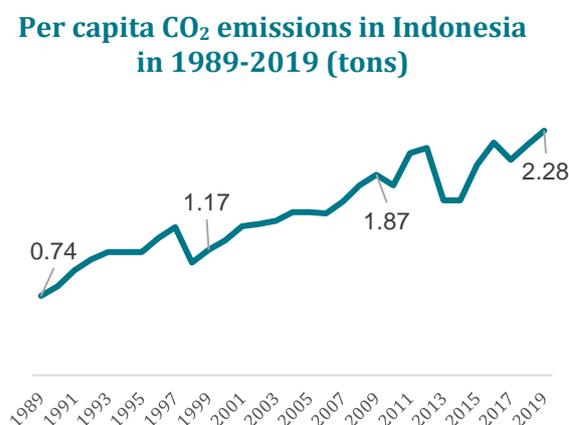
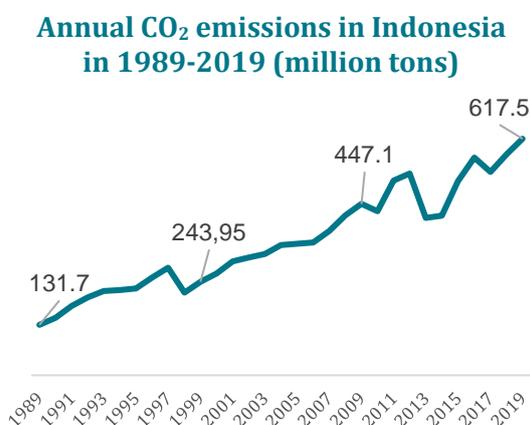
<sup>11</sup> Covering ~70% of Indonesia’s electricity demand

In March 2021 the Long-term Strategy of Low Carbon and Climate Resilience 2050 (LCCP) was submitted to the United Nations Framework Convention on Climate Change (UNFCCC). Indonesia has committed to a net-zero emissions goal by the 2060.

The Government of Indonesia expects the share of renewable energy sources in the structure of Indonesia's energy balance will grow to 23% by 2025 and to 31% by 2030 (18.7% in 2020). It is envisaged that the power situation in 2050 under LCCP will be as follows: renewables – 43%, coal – 38%, natural gas – 10% and BECCS – 8%.

The Government of Indonesia is in the process of drafting a more progressive emissions reduction scheme under a draft Presidential Regulation on Instruments of Carbon Economic Value for NDC (Carbon Economic Value Bill). The proposed scheme would regulate carbon trade, provide payments based on performance in reducing greenhouse gas emissions, and impose a levy on carbon emissions.

In October 2021, Indonesia passed a law (The Bill Concerning Harmonization of Tax Regulations) to introduce a carbon tax on coal-fired power plants, with the potential to be expanded to other sectors based on a readiness assessment in 2025. The carbon tax is set to commence in April 2022 at an initial rate of IDR 30,000 per metric tonne CO<sub>2</sub>-e (USD 2.1/tCO<sub>2</sub>-e).



Source: Our World in Data based on Global Carbon Project; BP; Maddison; UNWPP: <https://ourworldindata.org/co2/country/Indonesia>

## Japan

<b>Economy-wide strategy or emissions reduction plans</b>	Green Growth Strategy to Achieve Carbon Neutrality by 2050 (2021) <sup>12</sup> Carbon Half (2021) Baseline energy plan (6 <sup>th</sup> version 2021)
<b>Emissions Trading System</b>	Economy-wide pilot ETS under consideration Domestic-regional: Tokyo Cap-and-Trade Scheme, 2010 Saitama Prefecture Emissions Trading Scheme, 2011 Joint Credit Mechanism (JCM, 2013, 17 economies). Internal: J-credit (2013)
<b>Pledges<sup>13</sup></b>	2021: reduce emissions by 46% by 2030, compared to 2013 2020: carbon neutrality by 2050 2013: reduce emissions by 26% by 2030 Plans to establish a stable energy mix, including hydrogen and renewable sources
<b>Carbon price</b>	Carbon tax \$2.6-3/tCO <sub>2</sub> e (¥289); Carbon allowance within Tokyo: \$4.8-5.1/tCO <sub>2</sub> e (¥540)

Japan saw the creation of its first emissions trading systems in the early 2000s. Over the last 20 years, **four ETSs** have been successfully established domestically (including one voluntary and one pilot ETS). Two of them are still operating and are highly efficient mechanisms that regulate CO<sub>2</sub> emission quotas, however they hardly cover 0.3% of global emissions.

### Tokyo Cap-and-Trade

The Tokyo Metropolitan Government announced its plans to create an emissions trading system in 2007, after which it spent three years to improve the necessary legal framework. As a result, **Tokyo Cap-and-Trade** (hereinafter - Tokyo ETS) was launched in 2010 and became the first mandatory ETS system in Japan as well as **the first domestic regional ETS in the world**.

Until recently, the greenhouse gas emissions reduction targets set within Tokyo ETS were determined by the Zero Emissions Tokyo Strategy announced "on the sidelines" of U20 Summit of Mayors in Tokyo in May 2019. This strategy aimed to reduce emissions **by 30% by 2030** (as compared to the level of 2000) and reach **carbon neutrality by 2050**.

However, on January 27, 2021, Tokyo Governor Koike Yuriko proclaimed **Carbon Half** – a new policy to reduce CO<sub>2</sub> emissions **by 46% by 2030** as compared to the level of 2000 and to increase the share of renewable energy sources in the energy mix up to 50% by the same period. In this regard, it is possible that the Tokyo ETS goals may be adjusted accordingly.

<sup>12</sup> <https://www.meti.go.jp/press/2021/06/20210618005/20210618005-3.pdf>

<sup>13</sup> Fiscal year targets

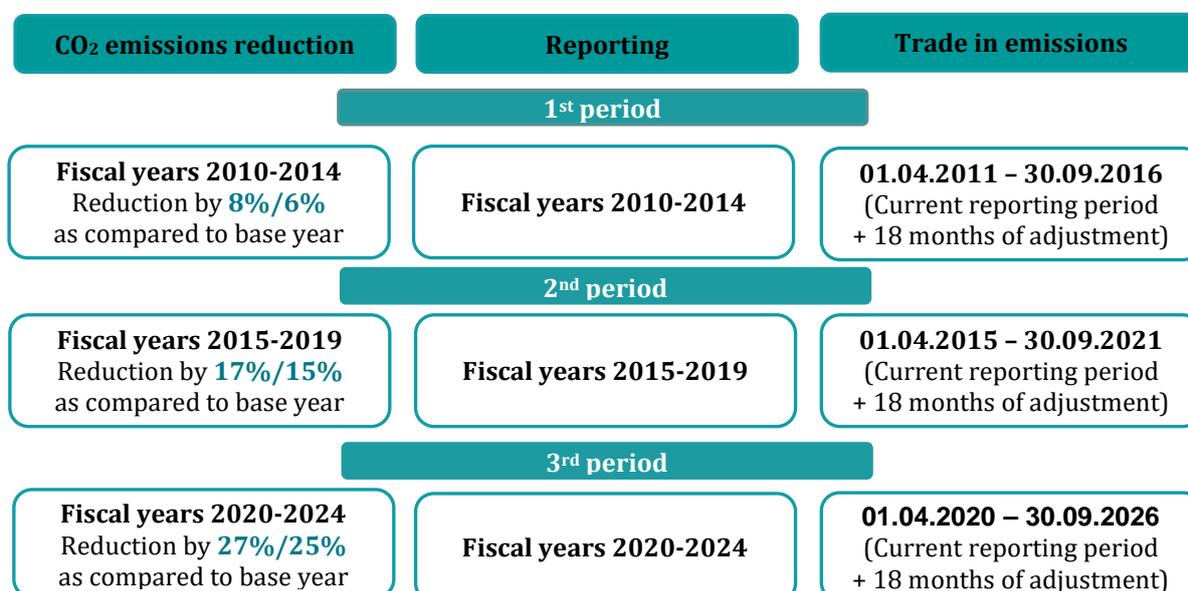
Tokyo ETS targets large buildings, factories, electricity suppliers and other structures that use energy produced from large amounts of fossil fuels. The condition for joining the system is the participant's consumption of energy **equivalent to at least 1,500 kiloliters of crude oil per year**. At the moment, the system includes about **1200 participants**, 1000 of which are office and commercial buildings, and 200 are manufacturing enterprises.

Tokyo ETS only covers **CO<sub>2</sub> emissions**<sup>14</sup>, but due to reporting conditions, its members must monitor emissions of all seven recognized greenhouse gases<sup>15</sup>. In total, the system covers **20% of the CO<sub>2</sub> emissions** of the Tokyo metropolitan area, which is about **0.18% of the global emissions**.

The current carbon allowance price is **540 yen** (\$ 5.06) per ton of CO<sub>2</sub><sup>16</sup>. The Tokyo government does not control carbon prices, they are shaped by the market. However, the government can put out its own offsets for bids as a discretionary control mechanism in case of excessive price increase.

The Tokyo ETS was linked with the ETS of Saitama Prefecture in April 2011 at the very start of the program in Saitama, allowing for trade in emission quotas between the two jurisdictions. During the first reporting period, there were **15 quota deals** between Tokyo and Saitama (nine Tokyo quotas for Saitama, six Saitama quotas for Tokyo).

### Timeline of Tokyo Cap-and-Trade implementation<sup>17</sup>



<sup>14</sup> Only direct sources of CO<sub>2</sub> emissions are regulated (downstream)

<sup>15</sup> Greenhouse gases to be limited under the UNFCCC are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitric oxide (N<sub>2</sub>O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulfur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>).

<sup>16</sup> According to the Tokyo Metropolitan Government (2020)

<sup>17</sup> Fiscal year in Japan begins on April 1 of the current year and finishes on March 31 of the next year

Tokyo ETS implies a gradual reduction of CO<sub>2</sub> emissions. The requirements of each subsequent period are stricter than those of the previous periods. CO<sub>2</sub> reduction percentage' refers to the average annual reduction rate over a five-year period.

Each ETS member has a **basic emissions level** ('cap') calculated, which serves as a baseline to estimate its emissions reduction goals. Those who show outstanding results in emissions reduction and/ or in energy efficiency are certified as **top level facilities**. As an incentive, the rates applied to them are usually 50% or 75% (depending on the actual progress) lower than the standard ones.

A higher target of reduction (e.g. 27% in period 3) is applied to office buildings as well as district heating and cooling (DHC) systems (except for enterprises that use a large amount of DHC). A lower target (e.g. 25% in period 3) applies to factories and office buildings where DHC accounts for more than 20% of their total energy consumption.

For new enterprises which join the system during the third reporting period, the targets are those of the second period – 17% and 15% (the so-called transitional measures). In the third period, for medical institutions, where electricity is critically needed, the ratio is 2% lower than the target of 27% or 25%.

### **Emissions trading under the Tokyo Cap-and-Trade**

The trading periods are equal to the emission reduction periods plus 18 months of adjustment period. The Tokyo ETS permits the issuance and use of special emission reduction credits for **four types of offsets** in addition to the regular credits. The latter are issued to those participants of the Tokyo ETS, whose emissions fall below the baseline.

**Small and Mid-Size Facility Credits** are issued only to SMEs in Tokyo, which are not covered by the Tokyo ETS due to their small size, but which make efforts to reduce their CO<sub>2</sub> emissions. There are no quantitative limits on the issuance and use of these credits.

**Outside Tokyo Credits** can be obtained for emission reductions achieved by large facilities<sup>18</sup> located outside of Tokyo. Credits are issued only for the amount of emission reductions that exceed the compliance factor. These credits can be used to meet up to 1/3 of the emission reduction targets of facilities.

Environmental Value Equivalent and Renewable Energy Certificates are documents that certify **Renewable Energy Credits** obtained as a result of the use of renewable energy sources to reduce CO<sub>2</sub> emissions within the Tokyo ETS. Credits are also issued for electricity generation from renewable energy sources (New Energy Electricity) under the Renewable Portfolio Standard Law.

Credits from solar, wind, geothermal or hydro (up to 1000 kW) electricity generation were valued 1.5 times more than the regular credits until the end of the second compliance period. Starting from the third compliance period, they are converted on the

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<sup>18</sup> Enterprises with energy consumption equivalent to at least 1,500 kiloliters of crude oil in the base year and emissions of no more than 150 thousand tons of CO<sub>2</sub> in the base year

1:1 basis. Units obtained from biomass production (with biomass share of 95% or more) are also converted on the 1:1 basis. There are no quantitative limits on the issuance and use of these credits.

**Saitama Credits** are divided into two groups. Excess Credits have been issued since fiscal year 2015. Their aim is to certify emission reductions at those Saitama facilities that produced no more than 150,000 tons of CO<sub>2</sub> emissions in the base year. There are also credits for SMEs, issued by Saitama since the 2012 fiscal year. There are no quantitative limits on the issuance and use of these credits.

All offsets must be verified by verification authorities. Accumulation of emission credits is only possible between successive accounting periods. Borrowing quotas from future periods is not permitted.

### **Monitoring, Reporting and Verification (MRV) in Tokyo Cap-and-Trade**

Tokyo ETS members submit **annual emissions reports and plans to reduce emissions** for the next year no later than November 30 of the current year. The documents must reflect the emissions of all seven greenhouse gases.

The information about reporting tools should also be provided, and the target set must be achieved by the end of the 18-month adjustment period (until September 30 of the second fiscal year after the end of the reporting period). Annual reports are to be verified by a third party.

**MRV procedures** are regulated by ‘Tokyo Metropolitan Government Monitoring/Reporting Guidelines’ and by ‘Tokyo Metropolitan Government Verification Guidelines’.

In case of non-compliance with obligations, sanctions may be applied to the participants of the Tokyo ETS. In the first phase, the Governor of Tokyo instructs the participant to reduce emissions 1.3 times more the amount of the outstanding reduction. In the second phase, the name of the entity that does not comply with the governor's order is officially published and the entity is subjected to fines (up to 500,000 yen (\$4,683)) and surcharges (1.3 times the outstanding obligations).

Verification agencies are Japanese companies and organizations that meet the requirements for verifiers and are registered in the appropriate list of verifiers of the Tokyo ETS<sup>19</sup>.

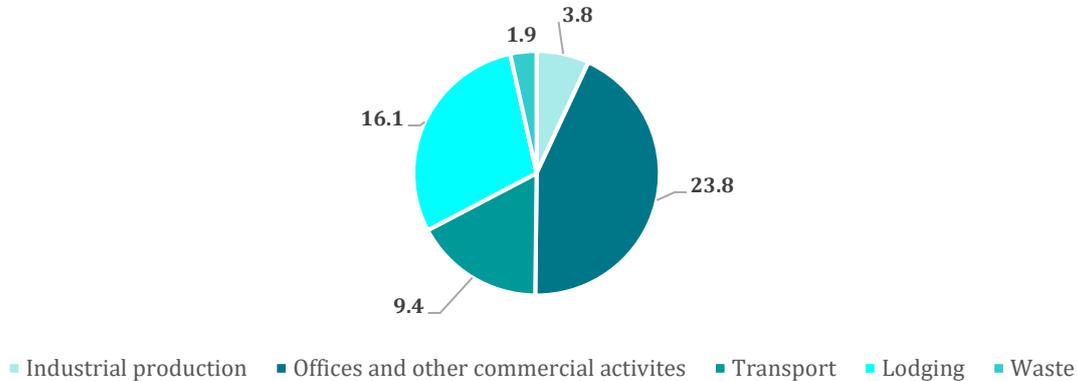
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<sup>19</sup> The current list of verification agencies (in Japanese):  
[https://www.kankyo.metro.tokyo.lg.jp/climate/large\\_scale/authority\\_chief/registered\\_agency.html#cmsno9](https://www.kankyo.metro.tokyo.lg.jp/climate/large_scale/authority_chief/registered_agency.html#cmsno9)

## Tokyo Cap-and-Trade results

According to the 2019 data of the Tokyo Metropolitan Government, the overall GHG emissions in Tokyo amounted to 62.3 million tons (-2,8% compared to 2018; -0,2% to 2000), **55.1 million tons** of which are CO<sub>2</sub> emissions. (-4% to 2018; -6,6 % to 2000).

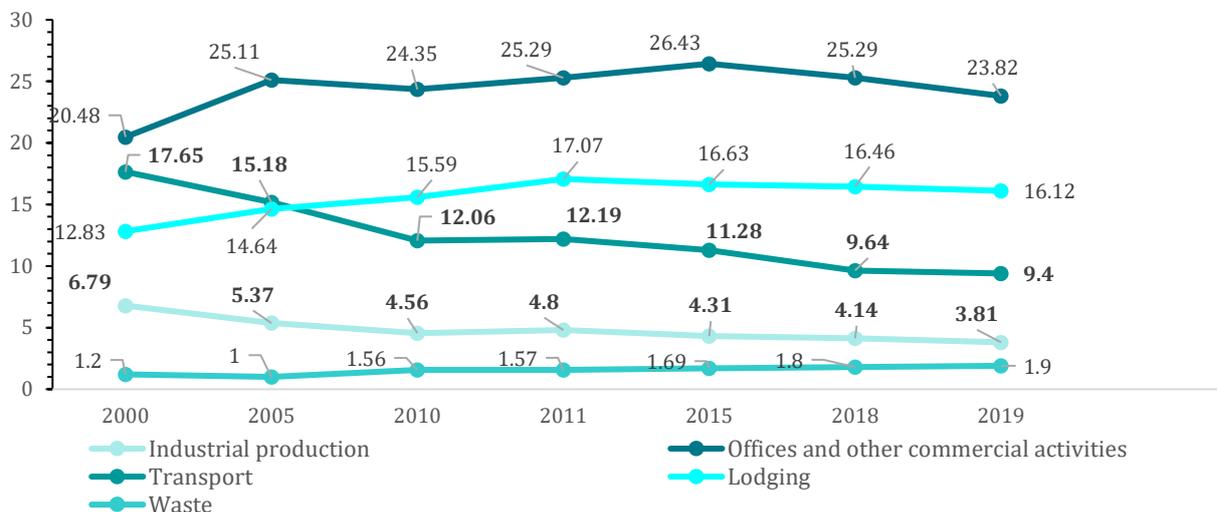
CO<sub>2</sub> emissions in Tokyo by sector (mln t, 2019)



Source: Tokyo Metropolitan Government

Emissions covered by Tokyo ETS dropped by 27%<sup>20</sup> in 2019 fiscal year, which is significantly more than the initial goals set for the second period (2015-2019). At the same time, total carbon emissions in Tokyo were reduced by 11% compared to 2005 levels. This indicates that the efforts of Tokyo ETS alone may not be enough to achieve the goals set for 2030 and 2050 by the Tokyo Metropolitan Government in 2019-2021.

CO<sub>2</sub> emissions in Tokyo, dynamics by sector (mln t, 2000-2019)



Source: Tokyo Metropolitan Government

However, the program keeps developing: international exchange is under way, and collateral initiatives are being implemented. From July 2018 to September 2020, the ETS participants **donated their excess carbon credits to offset carbon emissions** to be

<sup>20</sup> The reduction from the base-year emission levels – the average emissions of three consecutive fiscal years selected by facilities between FY2002-FY2007.

produced during the Tokyo Olympic and Paralympic Games. The goal was to cover 2.93 million tons of CO<sub>2</sub>, but in the end, 153 enterprises donated 4.19 million tons of CO<sub>2</sub>.

### Saitama ETS

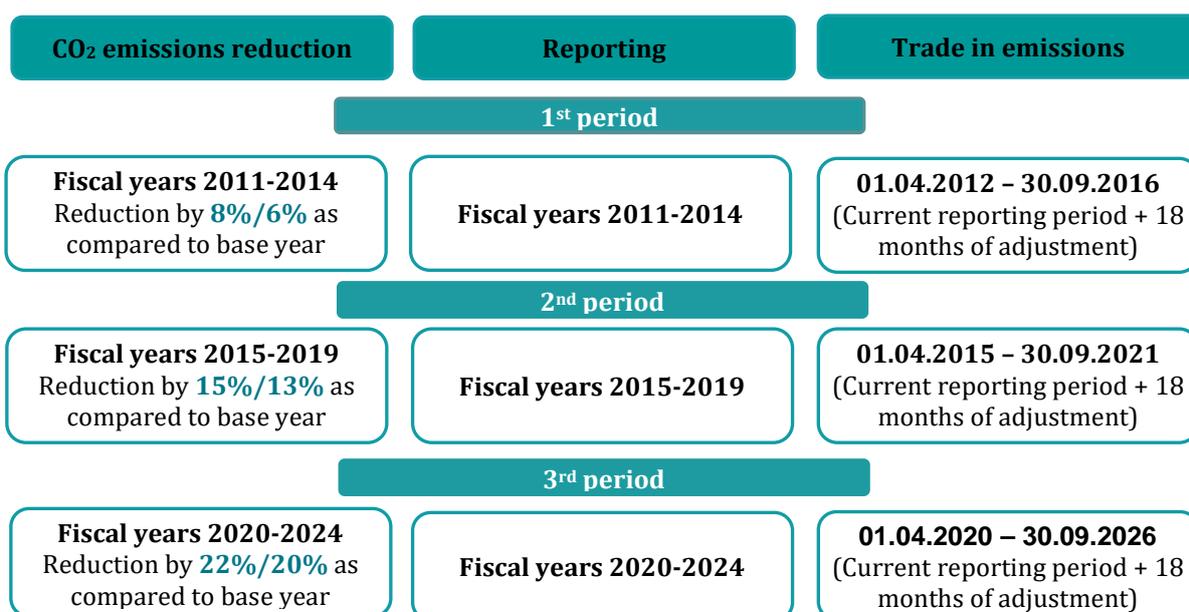
Saitama ETS was launched in April 2011, a year after the launch of Tokyo ETS, as part of the ‘Saitama Prefecture Global Warming Strategy Ordinance’. Saitama Prefecture’s ETS target is to **reduce CO<sub>2</sub> emissions by 26% by 2030 as compared to the 2013 level**, which is consistent with the Phase 2 of the Saitama Prefecture Global Warming Countermeasures Action Plan.

This ETS is focused on large buildings and factories that use fossil fuels extensively. The condition for an entity’s participation is consumption of energy **equivalent to at least 1,500 kiloliters of crude oil per year** for three consecutive years. Currently, the number of participants in the system is estimated around **608**, with **180** of them being offices and commercial buildings, while the remaining **428** are factories.

Saitama ETS only covers **CO<sub>2</sub> emissions**<sup>21</sup>, but due to reporting conditions, its members must monitor emissions off all seven greenhouse gases<sup>22</sup>. In total, the system covers **20% of the CO<sub>2</sub> emissions** of the Saitama Prefecture, which is about **0.11% of the global emissions**. Information on the price of tCO<sub>2</sub>e in Saitama ETS is currently unavailable.

Saitama ETS was linked with the Tokyo ETS in April 2011 – at the very start of the program in Saitama. During the first reporting period, there were **15 quota deals** between Tokyo and Saitama (nine Tokyo quotas for Saitama, six Saitama quotas for Tokyo).

### Timeline of Saitama ETS implementation



<sup>21</sup> Only direct sources of CO<sub>2</sub> emissions are regulated (downstream)

<sup>22</sup> Greenhouse gases to be limited under the UNFCCC are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitric oxide (N<sub>2</sub>O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulfur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>).

## Implementation of Saitama ETS

Saitama ETS implies a gradual reduction of CO<sub>2</sub> emissions. The requirements of each subsequent period are stricter than those of the previous periods. 'CO<sub>2</sub> reduction percentage' refers to the average annual reduction rate over a five-year period. Each ETS member has a **basic emission level** ('cap') calculated, which serves as a baseline to estimate its emissions reduction goals.

A higher target of reduction (e.g. 22% in period 3) is applied to office buildings as well as district heating and cooling (DHC) systems (except for enterprises that use a large amount of DHC). A lower target (e.g. 20% in period 3) applies to factories and office buildings where DHC accounts for more than 20% of their total energy consumption. For period 3, the target for medical institutions, where electricity use is critical, is reduced by 2 percentage points (22% -> 20% or 20% -> 18%).

Those who show outstanding results in emission reduction and/ or in energy efficiency are certified as **top-level facilities**. The rates applied to them are lower than the standard ones.

### Emissions trading under Saitama ETS

The trading periods are equal to the emission reduction periods +18 months of adjustment period. The Saitama ETS permits the issuance and use of special emission reduction credits for **five types of offsets** in addition to the regular credits.

**Small and Mid-Size Facility Credits** are issued only to SMEs in Saitama, which are not covered by the ETS due to their small size, but which make efforts to reduce their CO<sub>2</sub> emissions. There are no quantitative limits on the issuance and use of these credits.

**Outside Saitama Credits** can be obtained for emission reductions achieved by large facilities<sup>23</sup> located outside of Saitama Prefecture. Credits are issued only for the amount of emission reductions that exceed the compliance factor. These credits can be used to meet up to 50% of the emission reduction targets of facilities.

**Saitama Credits** are divided into two groups. Excess Credits have been issued since fiscal year 2015. Their aim is to certify emission reductions at those Saitama facilities that produced no more than 150,000 tons of CO<sub>2</sub> emissions in the base year. There are also credits for SMEs, issued by Tokyo since 2012 fiscal year. There are no quantitative limits on the issuance and use of these credits.

**Forest Absorption Credits** from forests inside Saitama Prefecture are valued 1.5 higher than the regular credits. Others are converted on the 1:1 basis. There are no quantitative limits on the issuance and use of these credits.

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<sup>23</sup> Enterprises with energy consumption equivalent to at least 1,500 kiloliters of crude oil in the base year and emissions of no more than 150 thousand tons of CO<sub>2</sub> in the base year

**Renewable Energy Credits** are also issued. Credits from solar, wind, geothermal or hydro (up to 1000 kW) electricity generation were valued 1.5 times more than the regular credits until the end of the second compliance period. Starting from the third compliance period, they are converted on the 1:1 basis. Units obtained from biomass production (with biomass share of 95% or more) are also converted on the 1:1 basis. There are no quantitative limits on the issuance and use of these credits. All offsets must be verified by verification authorities. Accumulation of emission credits is only possible between successive accounting periods. Borrowing quotas from future periods is not permitted.

### **Monitoring, Reporting and Verification (MRV) in Saitama ETS**

Saitama ETS members submit a **plan of combating global warming measures and its realization report** no later than July 31 the current fiscal year for every compliance period. The documents must reflect the emissions of all seven greenhouse gases. The information about reporting tools should also be provided, and the target set must be achieved by the end of the 18-month adjustment period (until September 30 of the second fiscal year after the end of the reporting period).

Unlike in Tokyo ETS, the facilities of Saitama ETS that do not meet their obligations **are not subject to any sanctions**. The name of the organization that failed to comply with the obligations is simply published on the prefectural website and the lacking amount of reductions is simply added to the target amount of the next compliance period. No penalties or fines are applied.

Verification agencies are Japanese companies and organizations that meet the requirements for verifiers and are registered in the appropriate list of verifiers of the Saitama ETS<sup>24</sup>.

### **Saitama ETS Initiatives: 'Zero Carbon Saitama'**

Like Tokyo, Saitama has its own additional ETS-related initiatives. 'Zero Carbon Saitama' initiative is the common name for two projects: '**3 carbon-free days in 2019**' and '**Carbon Offsets for Tokyo Olympics**'. The first project was aimed at offsetting all carbon emissions within 3 days of the 2019 World Rugby Championship in Kumagaya and collateral events by Saitama ETS members. The second project is a collaboration with the Tokyo Olympic Organizing Committee to fully offset carbon emissions to be generated during the Tokyo Olympic and Paralympic Games.

Through this initiative, which is quite similar to the one of Tokyo ETS, companies were able to **donate excessive carbon credits** from November 2018 to September 2020. Those who had no surplus, but wanted to donate, could buy credits from other members of the ETS.

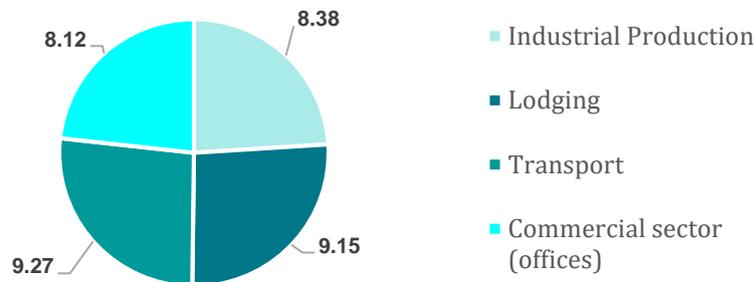
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<sup>24</sup> The current list of verification agencies (in Japanese): <https://www.pref.saitama.lg.jp/a0502/kenshoukikan-ichiran.html>

## Saitama ETS Results

In 2018, the total volume of GHG emissions in Saitama amounted to 41.09 MtCO<sub>2</sub>e. CO<sub>2</sub> emissions from sectors included in Saitama ETS was **34.09 million t**.

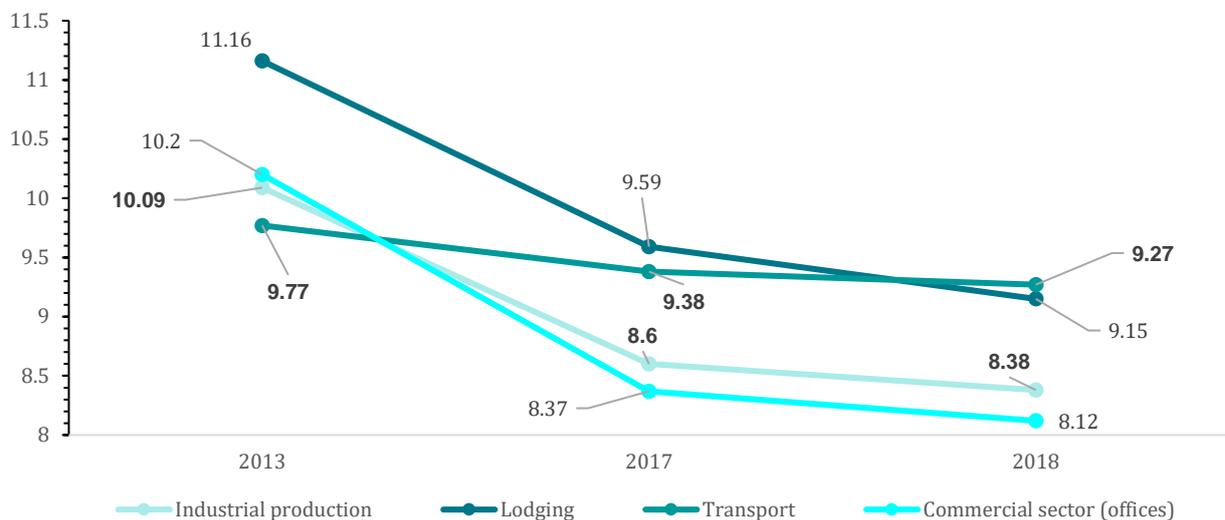
**Saitama ETS CO<sub>2</sub> emissions by sector (mln t, 2018)**



Source: Saitama Prefectural Government

In 2018 fiscal year, the emissions covered by Saitama ETS decreased by 29%, which is significantly more than the target indicator of 15% and 17% set for the 2nd period (2015-2019). The total volume of CO<sub>2</sub> emissions in Saitama Prefecture in 2018 amounted to **38.02** million tons, which is 14.4% less than in the base 2013 year. A steady reduction in CO<sub>2</sub> emissions had been observed for all four ETS sectors throughout the entire period of 2013-2018.

**CO<sub>2</sub> emissions in Saitama, dynamics by sector (mln t, 2013-2018)**



Source: Saitama Prefectural Government

## Economy-wide ETS

The possibility of creating an economy-wide ETS has been considered since 2008 (based on the 3 periods of **Japan Voluntary Emissions Trading System (JVETS)**, as well as the launch of a **pilot emissions trading system** in 2008). At different periods,

there were specialized expert councils on general and legal issues, and in 2017 a special interdepartmental working group was created to develop general principles for the functioning of an ETS. However, as of October 2021, there is no economy-wide ETS in Japan.

## Republic of Korea

<b>Economy-wide strategy or emissions reduction plans</b>	2010 – Framework Act on Low Carbon Green Growth 2012 – Act on Allocation and Trading of GHG Allowances 2010 – Economy-wide Adaptation Plan 5-year green growth plans (since 2009)
<b>Emissions Trading System</b>	2012 – Mandatory GHG and Energy Target Management System 2015 – Economy-wide ETS launched
<b>Pledges</b>	Reduce CO <sub>2</sub> emissions by 40% by 2030, compared to 2017 Carbon neutrality by 2050 Reduce emissions by 30% by 2020
<b>Carbon price</b>	\$27,62/tCO <sub>2</sub>

The Republic of Korea is **the first economy in East Asia and the second in the Asia-Pacific region** that has managed to implement an economy wide ETS.

For the first time, the issue of establishing a Korean emissions trading system was discussed back in 2010 as part of discussions on **Framework Act on the Low Carbon, Green Growth**. The **Act on the Allocation and Trading of GHG Allowances** of 2012 directly provided for the creation of an **economy-wide ETS**.

However, the government faced resistance from businesses, who believed that the target for reducing emissions was too ambitious, and the introduction of the ETS would cause an economic slump. As a result, first, in 2012, the mandatory **GHG and Energy Target Management System** was introduced, and only in 2015 the **Korean Emissions Trading System** was launched.

### How the ETS works

Korean ETS operates within the framework of the **Master Plan for the Emissions Trading Scheme**, and the **Korean Allowances Allocation Plan**.

Korean ETS covers **six GHGs** covered by the United Nations Framework Convention on Climate Change (UNFCCC, 1992) as well as indirect emissions from electricity consumption. Thus, about **74%** of all domestic emissions are covered.

The price for emissions under the Korean ETS ranged from \$8.69/tCO<sub>2</sub>e (9580 won) in September 2015 to \$34.79 (40800 won) in December 2019. The average current price is \$27.62 (32595.83 won). The emission reduction periods coincide with the quota trading periods. The first two periods took 3 years, the third current period is 5 years.

**685 companies** are now participating in the ETS. Participation in the ETS is mandatory for all companies from the sectors approved for each period if the average annual emissions of the sector for three consecutive years are equal to or exceed 125,000 tCO<sub>2</sub>e,

as well as all enterprises where for three consecutive years the average annual emissions were more than 25,000 tCO<sub>2e</sub>. In addition, any company can apply for voluntary participation in the ETS, regardless of the level of emissions.

The Korean ETS involves a **monitoring, reporting and verification (MRV)** procedure. Detailed reports describing all emissions and their sources should be provided by participants annually within three months from the beginning of the year. The emissions are verified by third-party organizations. Verifying organizations must be registered by the Ministry of the Environment and meet a number of requirements, including compliance with the international standard ISO 14065:2020.

The report is checked by the Certification Committee of the Ministry of the Environment within 5 months from the beginning of the year (until the end of May). Accumulation of emission units is possible within one and between several periods with some limitations. Quotas can only be borrowed from the current period.

If the requirements of the Korean ETS are not met, an administrative fine is imposed, the amount of which does not exceed three times the average market price per ton of CO<sub>2e</sub> for the current year. The maximum fine is \$84.73-91 (100,000 won) per t CO<sub>2e</sub>.

### Korean ETS timeline

Phase	Sectors	Emission caps	Emissions allocation	Offsets
<b>Phase 1 (2015-2017)</b>	<b>23 subsectors of 5 key sectors:</b> energy, industry, construction, transport, waste management	Total: <b>1686.3 MtCO<sub>2e</sub></b> + <b>14.3 mln</b> for market stabilization 2015: <b>540.1 MtCO<sub>2e</sub></b> 2016: <b>560.7 MtCO<sub>2e</sub></b> 2017: <b>585.5 MtCO<sub>2e</sub></b>	<b>100%</b> free allocation	Only domestic carbon credits of non-ETS companies <b>Up to 10%</b> of commitments
<b>Phase 2 (2018-2020)</b>	<b>64 subsectors of 6 key sectors:</b> heat and power, industry, construction, transport, waste management, public sector	Total: <b>1796.1 MtCO<sub>2e</sub></b> + <b>5 mln</b> for market markers, <b>14 mln</b> for stabilization, <b>134 mln</b> for new entrants 2018: <b>601 MtCO<sub>2e</sub></b> 2019: <b>587.6 MtCO<sub>2e</sub></b> 2020: <b>545.1 MtCO<sub>2e</sub></b>	<b>97%</b> of free allocation <b>3%</b> to auctioning <b>100%</b> free for Energy-Intensive Trade-Exposed (EITE) sectors	Domestic and international credits <b>Up to 10%</b> of commitments (of which up to 5% - international offset credits)
<b>Phase 3 (2021-2025)</b>	<b>69 subsectors of 6 key sectors:</b> heat and power, industry, construction, transport, waste management, public sector	Total: <b>3048.3 MtCO<sub>2e</sub></b> + <b>20 mln t</b> for market markers, <b>14 mln t</b> for stabilization 2021: <b>589.3 MtCO<sub>2e</sub></b> 2022: <b>589.3 MtCO<sub>2e</sub></b> 2023: <b>589.3 MtCO<sub>2e</sub></b> 2024: <b>567.1 MtCO<sub>2e</sub></b> 2025: <b>567.1 MtCO<sub>2e</sub></b>	<b>90%</b> of free allocation <b>10%</b> to auctioning <b>100%</b> free for EITE sectors	Domestic and international credits <b>Up to 5%</b> of commitments

At the initial stage Korea's ETS faced several difficulties: from January to October 2015 there were no transactions and participants held excess reserves, which affected liquidity. To solve these problems, amendments have been repeatedly made to the Law on the ETS. As a result, the control mechanisms of the Korean ETS were restructured.

Several departments and institutions are responsible for the activities of the ETS. **The Prime Minister's Office** sets targets for reducing the emissions under the ETS. **The Ministry of the Environment** is responsible for managing the ETS, emission efficiency and statistics, as well as for achieving the commitment of the Republic of Korea to reduce greenhouse gas emissions. The allowances allocation plan in the Korean ETS is also the sole responsibility of the Ministry of the Environment, but under the supervision of **the Allocation Decision Review Committee** and **the GHG Emission Committee**. **The Greenhouse Gas Inventory and Research Center** (subordinate to the Ministry of the Environment) systematizes information, and is also responsible for technical support of the ETS.

The **line ministries** are responsible for the implementation of the program, which allows the purchase of carbon credits outside the Korean ETS and their use in achieving goals. These offsets are managed by **the Korea Offset Program**. The Korean Exchange acts as the trading platform of the Korean ETS.

### **Results of the Korean ETS**

The total amount of proceeds under the Korean ETS from the sale of quotas at auction for 5 years of operation amounted to **\$407.3 million** (480.7 billion won), and in 2020 it was \$210.4 million (248.3 billion won). Currently, the government allows several options for using these funds, including the purchase of equipment for managing emissions, the development of low-carbon technologies, etc. Specific rules for using funds are being developed.

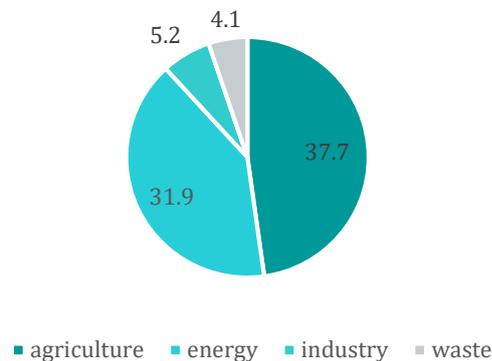
## New Zealand

<b>Economy-wide strategy or emissions reduction plans</b>	Climate Change Response (Zero Carbon Amendment) Act 2019 Climate Change Response Act 2002
<b>Emissions Trading System</b>	Economy-wide ETS since 2008
<b>Pledges</b>	30% reduction of emissions below 2005 levels by 2030 Net zero by 2050 (all GHGs, except for biogenic methane) Reduce biogenic methane emissions by 10% by 2017 and 24-47% by 2050 compared to 2017 levels
<b>Carbon price</b>	\$30,82/tCO <sub>e</sub> (average 2020)

New Zealand ETS was launched in 2008 and is a central policy for climate change mitigation in New Zealand. The Climate Change Response Act 2002 sets the legislative framework for the NZ ETS and incorporates all of New Zealand’s key climate legislation under one Act.

The ETS originally operated under the Kyoto Protocol, and was open to international carbon markets. Since 2015, however, it has become a domestic-only system.

New Zealand CO<sub>2</sub> emissions, millions of tons, 2018



*Source: Icapcarbonaction.com*

Under the ETS enterprises must measure and report their emissions, and surrender units of emissions (NZU) to the government. Entities covered by the ETS and obliged to surrender NZU must purchase and return one NZU for every ton of CO<sub>2</sub> equivalent. Businesses who participate in the NZ ETS can buy and sell units from each other, and may shift the cost of purchasing NZU to the end consumers.

The Government limits the supply of NZU into a trading market which then sets the emission price based on unit supply and demand. The Government reduces the number of units supplied into the scheme over time. This limits the quantity that emitters can emit, in line with New Zealand’s emission reduction targets.

The ETS covers six GHGs according to the UNFCCC and a wide range of sectors, including liquid fossil fuels, forestry, stationary energy, industrial processing, waste and synthetic GHGs. According to new legislation, agricultural emissions will be subject to a carbon price from 2025 onwards. Agricultural emissions, particularly from livestock, are to be

covered preferably at the farm level. This is likely to be by a levy/rebate system – a separate, alternative pricing mechanism to the NZ ETS.

Participation in the ETS may be voluntary or mandatory depending on company's activities. In the ETS 2398 entities are registered, of which 2321 have surrender obligations (218 with mandatory reporting and 2103 with voluntary reporting, 77 with mandatory reporting without surrender obligations).

Within an unregulated voluntary carbon market participants can choose to cancel units as a form of voluntary carbon offset, however this does not officially account for a claim of being carbon neutral and the voluntary offset scheme in New Zealand is currently under further development.

### ***Monitoring, reporting, verification (MRV)***

Most sectors are required to **report annually** under the NZ ETS; deadline of 31 March to submit an emissions report and 31 May to surrender units. For post-1989 forestry participants, annual reporting of emissions and removals is optional, with five-year mandatory reporting periods. As a result, unit allocations and surrenders for these participants occur in the year they choose to report their emissions.

Activities in the New Zealand Emissions Trading Scheme (ETS) are given an emissions factor based on how emissions-intensive they are. When an emissions return is completed, the amount of product produced in a given period is multiplied by the emissions factor to give an emissions total for that time. Some activities in the ETS have been assigned a Default Emissions Factor (DEF), based on an industry-wide average.

Self-reporting is supplemented by a program of **official audits**. Participants in some sectors have the option of obtaining a Unique Emissions Factor (UEF). Using a UEF will usually mean that a participant's emissions total is lowered. Participants must seek third-party verification if they apply for the use of a UEF.

**Enforcement.** An entity that fails to surrender or repay emissions units when required must surrender the units and pay a cash penalty of three times the current market price for each unit that was not surrendered by the due date. Entities can be fined up to NZD 24,000 (USD 15,564) on conviction for failure to collect emissions data or other required information, calculate emissions and/or removals, keep records, register as a participant, submit an emissions return when required, or notify the administering agency or provide information when required to do so.

Entities can also be fined up to NZD 50,000 (USD 32,424) on conviction for knowingly altering, falsifying, or providing incomplete or misleading information about any obligations under the scheme, including in the Annual Emissions Return report. This penalty and/or imprisonment of up to five years also apply to entities that deliberately lie about obligations under the NZ ETS to gain financial benefit or avoid financial loss.

# Philippines

<b>Economy-wide strategy or emissions reduction plans</b>	AmBysion 2040 (2017) is a strategic vision. Climate Change Act (2008) Senate Bill No. 992 and House Bill No. 2184 (in Congress)
<b>Pledges</b>	Reduce GHG emissions by 75% by 2030, compared to 2020
<b>Emissions Trading System</b>	The Bill includes provisions for the creation of ETS without specific deadlines.

The Philippines imposes taxes on fossil fuels. As part of Tax Reform for Acceleration and Inclusion (TRAIN) law (RA10963), the government implements progressive tax on automobiles (except purely electric vehicles) and higher excise taxes on petroleum products (e.g., gasoline, diesel, liquefied petroleum gas) and coal.

In the Philippines two bills on ETS are currently pending in Congress (i.e., Senate Bill No. 992 and House Bill No. 2184). Both bills propose the institutionalization of an emissions cap-and-trade system. The bills do not set a specific timeline for the creation of the system. The ETS would cover different types of GHGs, including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs) or any other gases determined by the Department of Environment and Natural Resources. The Department would set **annual emissions reduction targets** and a cap, distribute allowances, monitor and control the implementation of the system.

The bills also suggest the establishment of a ‘**Climate Reinvestment Fund**’ to be used to exclusively address global warming<sup>25</sup>. In April 2021 the Philippines submitted its first **Nationally Determined Contribution (NDC)** to the UNFCCC, in accordance to which the economy commits to a projected GHG emissions reduction of 75% by the year 2030. However, as NDC notes, the GHG emissions reduction is conditional on the support mechanisms prescribed by the Paris Agreement.

**Philippines’ annual CO<sub>2</sub> emissions in 1989-2019, million t**



**Philippines’ annual per capita CO<sub>2</sub> emissions in 1989-2019, t**



Source: Our World in Data based on Global Carbon Project; BP; Maddison; UNWPP: <https://ourworldindata.org/co2/country/philippines>

<sup>25</sup> According to Icapcarbonaction.com

## Singapore

<b>Economy-wide strategy or emissions reduction plans</b>	Long-Term Low-Emissions Development Strategy (2020), Carbon Pricing Act (2019), Electricity Act (2001), Gas Act (2001), Building Control Act (1989), Energy Conservation Act (2012)
<b>Pledges</b>	<p>According to Singapore's enhanced NDC (March 2020), peak emissions of 65 MtCO<sub>2e</sub> are expected by 2030. Long-Term Low-Emissions Development Strategy envisions halving emissions from peak levels by 2050 (33 MtCO<sub>2e</sub>), and carbon neutrality achieved as soon as possible in the second half of the century.</p> <p>Singapore 4th Biennial Report to the UNFCCC (December 27, 2020) states that Singapore will achieve its Copenhagen pledge (2009) emissions reductions of 16% from business as usual in 2020.</p>
<b>Carbon price</b>	S\$ 5/tCO <sub>2e</sub>

In March 2020 Singapore submitted its enhanced Nationally Determined Contribution and **Long-Term Low-Emissions Development Strategy** to the UNFCCC. Currently Singapore's enhanced NDC provides for **reaching peak emissions at 65 MtCO<sub>2e</sub> by 2030**.

Long-Term Low-Emissions Development Strategy sets the target of **halving the emissions from the peak level by 2050** (down to 33 MtCO<sub>2e</sub>) and achieving net zero emissions as soon as viable in the second half of the century. Currently Singapore produces 0.11% of global CO<sub>2</sub> emissions.

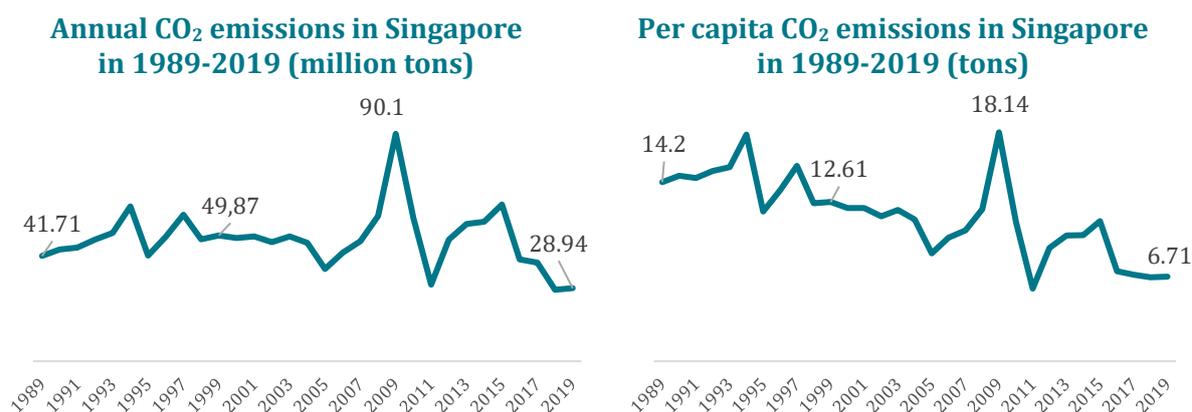
Singapore was the first economy in the South East Asia to introduce a carbon tax, which was done through adopting the **Carbon Pricing Act** (came into operation on January 1, 2019). The regulations of the Act apply to business facilities of two types. Business facilities that produce more than 2,000 tCO<sub>2e</sub> annually are required to register with the Singapore Environmental Agency (SEA) as a reportable facility and submit emissions reports. Business facilities that emit more than 25,000 tCO<sub>2e</sub> in a year are also required to register with the SEA and provide emissions reports, as well as are obliged to pay tax of S\$5/tCO<sub>2e</sub>. By 2030 Singapore plans to raise the tax to S\$10-15/tCO<sub>2e</sub>. In June 2021 the Government of Singapore announced its plan to increase the levy higher than indicated earlier. The new approaches may be presented in February 2022.

Singapore's carbon tax operates under a Fixed-Price Credit-Based (FPCB) system, where companies pay the carbon tax by purchasing and surrendering fixed price carbon credits purchased from the Government. The FPCB system puts in place key building blocks for linking such as a credit registry. This will also help companies build up necessary capabilities to operate in a linked market, if and when Singapore makes the decision to do so in the longer term.

The government has provided grants to help industrial facilities incorporate energy and resource efficiency measures through schemes such as the Resource Efficiency Grant for Energy (REG(E)) and the Energy Efficiency Fund (E2F), which offset up to 50% of qualifying costs for initial capital investments in energy-efficient technologies.

Singapore is also home for a **private digital carbon credits exchange platform** – AirCarbon Exchange. It allows enterprises from the transportation industry to purchase credits in order to acquire carbon dioxide offsets for compliance and voluntary purposes. The platform is blockchain-based.

By the end of 2021 the Singapore Exchange together with Temasek Holdings, DBS Group and Standard Chartered bank are planning to launch **a global exchange and marketplace for carbon credits trade Climate Impact X (CIX)**. It is to provide credits price transparency and credits quality control. CIX will use satellite monitoring, machine learning and blockchain technology to enhance transparency, integrity and quality of carbon credits.



Source: Our World in Data based on Global Carbon Project; BP; Maddison; UNWPP: <https://ourworldindata.org/co2/country/Singapore>

## Chinese Taipei

<b>Economy-wide strategy or emissions reduction plans</b>	Greenhouse Gas Reduction and Management Act (2015) GHG Reduction Action Plan (2018)
<b>Pledges</b>	Carbon neutrality by 2050, previously – reduce GHG emission by 20% by 2030, and by 50% by 2050.
<b>Emissions Trading System</b>	In the process of development since 2015, the implementation timeline has not been specified.
<b>Carbon Tax</b>	It is planned to introduce carbon fee by 2023-2024.

An emissions trading system is still under development. In July 2015, Chinese Taipei introduced **the Greenhouse Gas Reduction and Management Act**, aimed **at 50% of emissions to be reduced by 2050**. The act also introduced a possible ETS. In 2021 Chinese Taipei claimed that the plan to achieve **carbon neutrality by 2050** will be elaborated.

Mandatory reporting of emissions over 25,000 tCO<sub>2e</sub> in certain sectors has been in effect since 2014. Also, since 2018 enterprises have been able to receive **offset (emission) units**.

In 2018, **the GHG emissions reduction plan** was published, contemplating the intention to create an ETS, calculate basic emissions, and set regulatory requirements. However, it does not specify timeframes. Based on this plan, the authorities in six sectors (energy, industry, transport, housing, agriculture, and environment) developed **GHG Emission Control Programs** in the same year.

## Thailand

<b>Economy-wide strategy or emissions reduction plans</b>	Enhancement and Conservation of Environmental Quality Act(1992), Economic and Social Plan (2017-2021), Climate Change Master Plan (2015-2050), Power Development Plan (2018-2037), Alternative Energy Development Plan 2018-2037, Energy Efficiency Plan (2005-2036) Plan to present the Domestic Zero Emissions Plan at the UN Climate Change Conference (COP 26) in November 2021 in Glasgow.
<b>Emissions Trading System</b>	In 2013 the Greenhouse Gas Management Organization has developed the core trading infrastructure under the Thailand V-ETS. In 2021 the development of strategic plan for the implementation of ETS in the Eastern Economic Corridor region of Thailand began.
<b>Pledges</b>	Thailand's approved NDC is to reduce emissions by 20-25% during 2021-2030. As a part of the NAMA 2020 (Nationally Appropriate Mitigation Actions) GHG emission reduction targets, Thailand achieved an emission reduction of 14.09% in 2017.
<b>Carbon Price</b>	Thailand plans to introduce a carbon pricing system by 2030.

In September 2016 the Kingdom of Thailand has confirmed its **Intended Nationally Determined Contribution (INDC) - reduction** of greenhouse gas emissions **by 20.8%** below the normal level (business-as-usual projection) by 2030 <sup>26</sup> . In accordance with the NDC Roadmap adopted by the Cabinet in May 2017, Thailand is committed to **reduce emissions by 113 MtCO<sub>2e</sub> by 2030** – from the previously projected 426 million tons **to 311 million tons** – by cutting emissions in sectors such as industrial production (-43 million tons), transport (-41 million tons), electricity generation (-24 million tons) and construction (-5 million tons).

The economy is currently implementing the 12<sup>th</sup> Economic and Social Development Plan of Thailand (2017-2021), which provides measures to mitigate the effects of climate change, including the development of an internal carbon market.

The **Climate Change Master Plan** (2015-2050) depicts carbon markets as a potential mechanism for reducing greenhouse gas emissions in the private sector. The plan includes development of a cap-and-trade system in order to stimulate the private sector to reduce emissions<sup>27</sup>. A specific instrument will be formed after the approval of the framework **Climate Change Act** by the Cabinet in 2021, which is expected to be ratified in 2022.

Thailand's experience in the use of carbon market mechanisms began **in 2007**, when the Government established the **Thailand Greenhouse Gas Management Organization – TGO** in order to implement and control GHG emissions reducing projects.

<sup>26</sup> According to NDC Registry

[https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Thailand%20First/Thailand\\_INDC.pdf](https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Thailand%20First/Thailand_INDC.pdf)

<sup>27</sup> Text of the National Climate Change Master Plan [https://climate.onep.go.th/wp-content/uploads/2019/07/CCMP\\_english.pdf](https://climate.onep.go.th/wp-content/uploads/2019/07/CCMP_english.pdf)

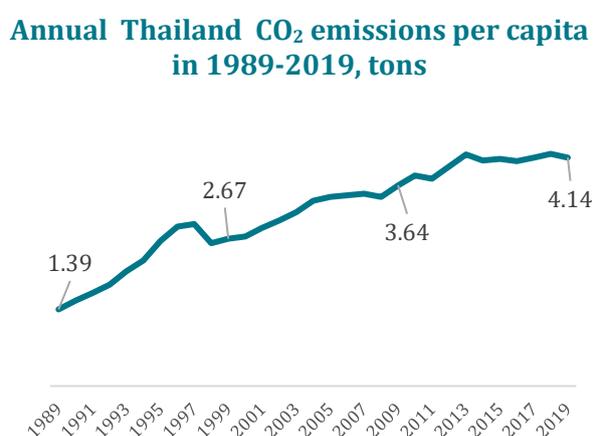
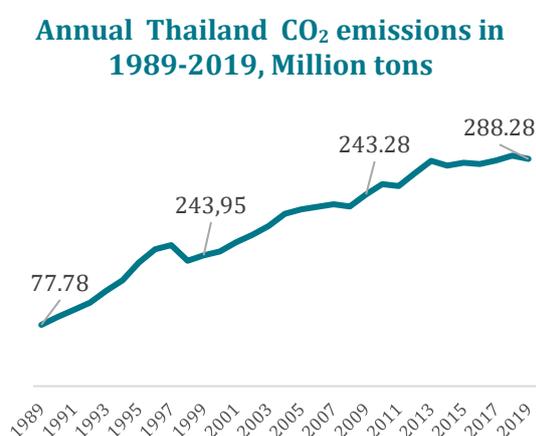
Starting from 2013 TGO launched a system for measurement, reporting and verification (MRV) and developed basic trade infrastructure in accordance with the **Voluntary Emissions Trading scheme in Thailand (Thailand V-ETS)**. By 2020, the number of projects registered in the TGO program was 191. In total, the program participants must **annually reduce emissions by 5.28 MtCO<sub>2e</sub><sup>28</sup>**.

The first phase (2015-2017) of Thailand V-ETS was aimed at **testing the MRV system in four industrial sectors** (cement, paper and pulp, steel and petrochemicals), setting the limit for direct and indirect emissions of enterprises, testing the methods of allocation of quotas.

The second phase (2018-2020) further tested the MRV system, the registry and **trading platform**, and five additional industrial sectors (petroleum refinery, glass, plastic, ceramics, food and feed industries). As in the previous phase, the methods of allocation of quotas were tested; quotas were allocated to each sector in accordance with their GHG reporting and target-setting results. Trading was practiced on the demo version of the trading platform as well.

In 2020, the MRV was developed for three more sectors (beverages and sugar, textiles and flat glass); guidelines for each sector were developed and updated. The MRV for a potential ETS now covers 12 sectors of the economy.

2021 marks the beginning of development of a **Strategic plan for the implementation of ETS trading platform** in the Eastern Economic Corridor of Thailand. As part of this plan, an ETS pilot project, which includes the key ETS functions and a trading platform, will be implemented. The timing of the start of the project has not been approved yet<sup>29</sup>.



Source: Our World in Data based on Global Carbon Project; BP; Maddison; UNWPP:  
<https://ourworldindata.org/co2/country/Thailand>

<sup>28</sup> According to International Energy Agency  
<https://www.iea.org/articles/putting-a-price-on-carbon-an-efficient-way-for-thailand-to-meet-its-bold-emission-target>

<sup>29</sup> According to International Carbon Action Partnership  
[https://icapcarbonaction.com/en/?option=com\\_etsmap&task=export&format=pdf&layout=list&systems%5B%5D=81](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems%5B%5D=81)

## Viet Nam

<b>Economy-wide strategy or emissions reduction plans</b>	Environmental Protection Law 2022 Green Growth Strategy 2012 Viet Nam Climate Change Strategy Viet Nam Renewable Energy Development Strategy up to 2030 with an outlook to 2050
<b>Pledges</b>	Reduce emissions by 9% by 2030 using internal resources and up to 27% with international support, compared to 2010
<b>Emissions Trading System</b>	Pilot ETS In 2025, economy-wide ETS in 2027

In November 2020, Viet Nam adopted the revised **Environmental Protection Law**, which establishes a mandate for the Ministry of Natural Resources and Environment and for the Ministry of Finance to design a domestic emission trading scheme (ETS) and a crediting mechanism.

The framework legislation gives Viet Nam’s Ministry of Natural Resources and Environment a legal mandate to establish an emissions trading scheme, set a cap, and determine the method of allowance allocation, and allows for the inclusion of domestic and international offsets. **A pilot ETS** is expected to start **by 2025** and to become **fully operational by 2027**.

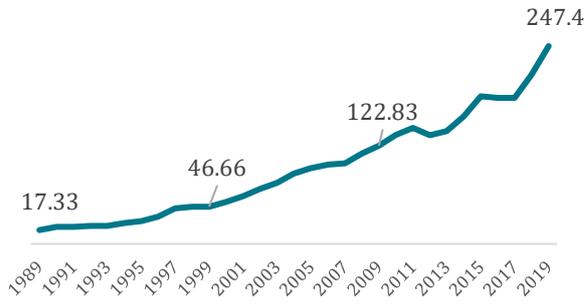
Policy developments have been guided by Viet Nam’s ‘**Green Growth Strategy**’ (2012) and **Viet Nam Strategy on Climate Change** (2011). In line with these strategies, Appropriate Mitigation Actions are being implemented in the agriculture, forestry, waste, industry (steel, cement, chemical), and power sectors.

Since 2015 Viet Nam has been implementing the **Viet Nam Partnership for Market Readiness** project funded by the World Bank. Within the framework of the project, there have been many in-depth studies to propose carbon market policies and tools, including crediting mechanism, emission trading scheme, carbon tax and green certificates.

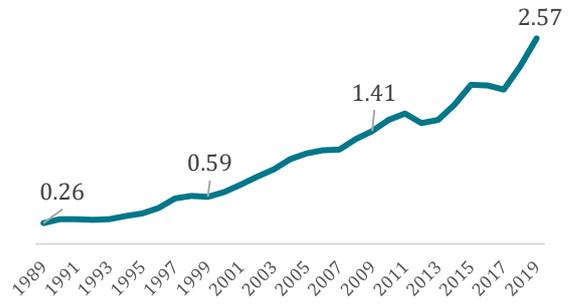
In 2019, Viet Nam's CO<sub>2</sub> emissions amounted to 247.4 million tons, and since 1989, Viet Nam's CO<sub>2</sub> emissions per capita have increased by almost 10 times over 30 years. According to the Ministry of Natural Resources and Environment of Viet Nam, the economy's emissions may amount to **927.9 tCO<sub>2</sub>e by 2030** (business-as-usual scenario).

In accordance with the climate commitments in United Nations Framework Convention on Climate Change (UNFCCC), updated in September 2020, Viet Nam pledged to cut emissions by 8% by 2030, and up to 27% with a condition of international support.

**Annual CO<sub>2</sub> emissions in Viet Nam in 1989-2019 (million tons)**



**Per capita CO<sub>2</sub> emissions in Viet Nam in 1989-2019 (tons)**

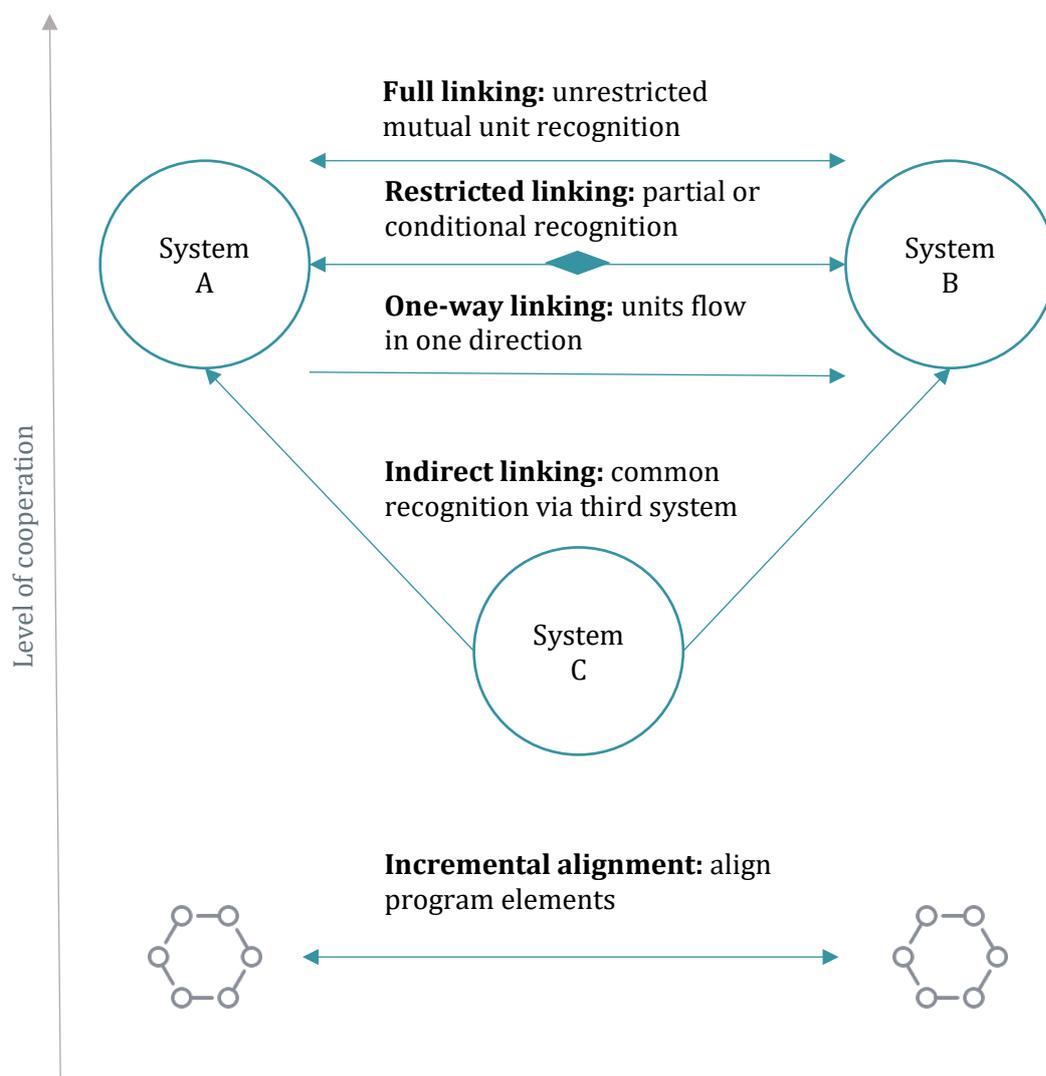


Source: Our World in Data based on Global Carbon Project; BP; Maddison; UNWPP:  
<https://ourworldindata.org/co2/country/vietnam>

## Opportunities for regional cooperation

As carbon pricing in the Asia-Pacific evolves, **opportunities** appear for exchange and **cooperation between economies**. For schemes already underway, closer international ties may become a way to expand their functionality and allow for more emissions reductions at lower prices. For economies that are only developing such schemes, this may prove an opportunity to learn from peers and design systems in a way that would allow for further cooperation and more efficiency.

According to ICAP, several types of linking carbon markets exist:



From an economic point of view, the interconnectedness of carbon markets provides **advantages** to economies with a high degree of integration in trade and commerce. In this case, there are new opportunities to find low-cost ways to reduce emissions and access to liquidity.

**Table 2. Benefits and risks of linking carbon markets**

	Benefits	Risks
<b>Economic</b>	Increases cost efficiency  Increases market liquidity + shock absorption  Levels playing field and reduces leakage	Exposure to external shocks
<b>Environmental</b>	Creates room for ambition	Linking to a less robust system harms environmental ambition
<b>Politic</b>	Momentum for climate action and joint leadership  Administrative efficiencies	Distributional concerns  Contagion of certain non-aligned design features  Partial loss of domestic control over system

Source: ICAP

There is a **high degree of interconnectedness in trade** in the Asia-Pacific region and the links of regional economies with the world are strong. There have been initiatives to create transnational synergies in carbon pricing as well. Australia has interacted with the EU on the integration of the ETS, and also discussed the development of carbon markets with Korea and China. The Australian Government has committed \$104 million to climate action through the **Indo-Pacific Carbon Offsets Scheme**. The scheme will run for 10 years to 2031 operating under Article 6 of the Paris Agreement. The scheme aims to boost public and private investment in investment in high integrity carbon offsetting projects in the Indo-Pacific. It will ensure carbon offsets generated and traded in the region meet high standards of transparency and environmental integrity, and offer real benefits to communities. New Zealand has interacted with China on ETSs under the New Zealand – China Climate Change Action Plan<sup>30</sup>, Korea on regional carbon markets<sup>31</sup> and with several economies through the Asia Pacific Carbon Market Roundtable held since 2011.

The established contacts between the EU and China, as well as between the EU and Korea on climate issues are examples of regional cooperation and exchange of experience. China is also interested in exploring the possibilities of integration with other ETSs. Public statements have mentioned that after the economy-wide system is established, cooperation with other economies to develop integration rules will be explored.

As the key regional forum, APEC aims to combat climate change through various efforts, such as transition to renewable energies, collaborating on ocean and forest conservation, reducing energy consumption, promoting trade in environmental goods and helping farming and fishing communities adapt to changing weather patterns. In November 2021, APEC leaders welcomed the update for reference purposes of the 2012 List of

<sup>30</sup> <https://www.beehive.govt.nz/release/climate-action-plan-china>

<sup>31</sup> <https://www.beehive.govt.nz/release/korea-and-new-zealand-discuss-carbon-markets>

Environmental Goods. This effort aims at improving access to environmental technologies and promoting green growth and trade liberalization.

Also, among other regional initiatives to reduce emissions, in June 2021 the leaders of APEC economies recalled their commitment of 2015 “to rationalise and phase out inefficient fossil fuel subsidies that encourage wasteful consumption, while recognising the importance of providing those in need with essential energy services.” Many APEC economies, being in a position to do so, have made an effort to phase out subsidies, and further regional efforts are underway.

The design of existing ETSs in the Asia Pacific varies, and most likely new differences between systems will become visible as new ones appear. These differences can complicate integration. **Potential barriers** to integration include the varying level of ambition and emission ceilings, differing approaches to limitations on the use of offsets, approach to price control, MRV, etc.

However, overcoming these barriers could unlock the potential for better economy’s policies and cost-efficient emissions reductions in a key economic powerhouse of the world.

## Glossary

**Carbon capture, utilisation and storage (CCUS)** involves the capture of CO<sub>2</sub> from large point sources, including power generation or industrial facilities that use either fossil fuels or biomass for fuel. The CO<sub>2</sub> can also be captured directly from the atmosphere. If not being used on-site, the captured CO<sub>2</sub> is compressed and transported by pipeline, ship, rail or truck to be used in a range of applications, or injected into deep geological formations (including depleted oil and gas reservoirs or saline formations) which trap the CO<sub>2</sub> for permanent storage.

**Carbon dioxide (CO<sub>2</sub>)** is naturally occurring gas, also a by-product of burning fossil fuels from fossil carbon deposits, such as oil, gas and coal, of burning biomass and of land use changes and other industrial processes.

**Carbon markets** aim to reduce greenhouse gas (GHG, or “carbon”) emissions cost-effectively by setting limits on emissions and enabling the trading of emission units, which are instruments representing emission reductions.

**Carbon neutrality (or net-zero carbon emissions)** is the balance between emitting carbon and absorbing carbon emissions from carbon sinks.

**Carbon offset** is a way to compensate for emissions by funding an equivalent carbon dioxide saving elsewhere. Carbon offsetting is used to balance out these emissions by helping to pay for emission savings in other parts of the world.

**Carbon pricing** is an instrument that captures the external costs of greenhouse gas (GHG) emissions—the costs of emissions that the public pays for, such as damage to crops, health care costs from heat waves and droughts, and loss of property from flooding and sea level rise—and ties them to their sources through a price, usually in the form of a price on the carbon dioxide (CO<sub>2</sub>) emitted.

**Carbon sinks** are any systems that absorb more carbon than they emit, such as forests, soils and oceans.

**Carbon tax** directly sets a price on carbon by defining a tax rate on greenhouse gas emissions or – more commonly – on the carbon content of fossil fuels. It is different from an ETS in that the emission reduction outcome of a carbon tax is not pre-defined but the carbon price is.

**Emissions Trading System (ETS)** is a market-based instrument that creates incentives to reduce emissions where these are most cost-effective. In most trading systems, the government sets an emissions cap in one or more sectors, and the entities covered are allowed to trade emissions permits.

**Energy Mix** of an economy is the specific combination of different energy sources it uses to meet its energy consumption needs.

**Green hydrogen** is a hydrogen-produced fuel obtained from electrolysis of water with electricity generated by low-carbon power sources. **Blue hydrogen** is when natural gas is split into hydrogen and CO<sub>2</sub>, but the CO<sub>2</sub> is captured and then stored.

**Greenhouse gases (GHG)** are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth's surface, the atmosphere itself, and by clouds.

**MRV** stands for Measurement (or estimation), Reporting and Verification. The scope of MRV includes:

- MRV of emissions: estimation of emissions at economy-wide, domestic regional, sectoral levels
- MRV of mitigation actions: MRV of the impacts of mitigation policies and actions (this may include the impacts of these actions on greenhouse gas emissions as well as other non-GHG impacts)
- MRV of support: MRV of financial flows/technology transfer/capacity building and their impacts

**Renewable energy** is energy from sources that are naturally replenishing but flow-limited; renewable resources are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time.

**Tonnes (t) of carbon dioxide (CO<sub>2</sub>) equivalent (e)** is a standard unit for counting greenhouse gas (GHG) emissions regardless of whether they are from carbon dioxide or another gas, such as methane, adjusting other gases for their relative greenhouse effect.

**United Nations Framework Convention on Climate Change (UNFCCC).** The Convention was adopted on 9 May 1992 in New York and signed at the 1992 Earth Summit in Rio de Janeiro by more than 150 economies and the European Community. Its ultimate objective is the “stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”. It contains commitments for all Parties.