International Carbon Action Partnership

# THE USE OF AUCTION REVENUE FROM EMISSIONS TRADING SYSTEMS

## Delivering environmental, economic, and social benefits

July 2019. Berlin, Germany

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## Cite as

Santikarn, M., Kardish, C., Ackva, J. & Haug, C. (2019). The use of auction revenue from emissions trading systems: delivering environmental, economic, and social benefits. Berlin: ICAP

## Acknowledgments

ICAP would like to acknowledge the advice and insights by ICAP members and other partners that contributed to this report: Rajinder Sahota (California), William Space (Massachusetts), Ruben Vermeeren (European Commission), Stefanie Hiesinger (European Commission), Peter Zapfel (European Commission), Julia Ziemann (European Commission), Catherine Gauthier (Québec), Kathrin Gansera (Germany), Alexander Handke (Germany), Sophie Wenger (Switzerland), and Hugh Salway (United Kingdom).

We also acknowledge the contributions to this report from the staff at the ICAP Secretariat: the authors (Marissa Santikarn, Christopher Kardish, Johannes Ackva, and Constanze Haug), William Acworth, Katrin Schambil, and Hannah Prawitz.

# Table of contents

## Acronyms

| | |
|---|---|
| CARB | California Air Resources Board |
| CCAP | Climate Change Action Plan |
| CCS | Carbon Capture and Sequestration |
| CCU | Carbon Capture and Utilization |
| COP | Conference of the Parties |
| EC | European Commission |
| EHR | Swiss Emissions Trading Registry |
| ETS | Emissions Trading System |
| EU ETS | European Union Emissions Trading System |
| EXX | European Energy Exchange |
| GGRF | Greenhouse Gas Reduction Fund |
| GHG | Greenhouse Gas |
| ICE | Intercontinental Exchange |
| IPCC | Intergovernmental Panel on Climate Change |
| LIHEAP | Low-Income Home Energy Assistance Program |
| MELCC | Québec Ministry of Sustainable Development, Environment and the Fight against Climate Change |
| NER | New Entrants Reserve |
| RGGI | Regional Greenhouse Gas Initiative |
| WCI | Western Climate Initiative |

# List of tables and figures

# 1 Rationale for generating revenue from auctions

Putting a price on carbon is a central part of mitigation pathways (IPCC Special Report on Global Warming of 1.5°C). However, the political acceptability of an emissions trading system (ETS) can be challenging because the benefits of mitigation can be diffuse and the costs for specific stakeholders (e.g. imposing a direct price on carbon) can be high. One way to increase the political and social acceptability is through the use of revenue from auctioning allowances. Revenue can be directed to projects that generate tangible benefits that can be directly associated with the ETS, such as installing solar panels or expanding public transport networks. In addition, revenue can also help address equity concerns for households or communities that may result from the introduction of a carbon price, such as increasing energy bills. It can also be used to seed investment in capital-intensive solutions such as energy efficiency or emerging technologies such as electric vehicles. Finally, reinvestment of auction proceeds can generate jobs and economic benefits directly to local economies. By delivering environmental, economic, and social benefits the policies and projects funded by auctioning revenue can increase political and societal support for emissions trading.

This paper uses real-world examples and explores how auctioning revenue can help to fund additional climate and energy programs and compensate vulnerable groups.

# 2 Auctioning allowances

Auctioning is an efficient way of getting allowances to those who value them most. Auctioning also preserves incentives for cost-effective abatement, as companies would either have to purchase their allowances or reduce their emissions. Holding frequent auctions also supports price discovery and sends a transparent and current price signal to regulated entities and consumers. Contrary to auctioning, free allocation can create an opportunity for certain companies and sectors to lobby the government for generous and differential treatment. Allocating allowances through auctioning, on the other hand, can reduce opportunities for lobbying and creates a level playing field for new entrants, helping ensure all market participants – new or old – play by the same rules. Finally, auctioning generates an income stream for governments through which they can achieve other policy goals or priorities. This last element is the focus of this paper.[1]

Most systems auction a share of their allowances or intend to introduce auctioning (see Figure 1). The European Union Emissions Trading System (EU ETS)[2], the linked programs of the Western Climate Initiative (WCI; this includes California and Québec)[3], as well as the Regional Greenhouse Gas Initiative (RGGI[4]) and Switzerland[5] all hold regular allowance auctions. Over time, total auctioning revenue has increased as systems have either introduced auctioning or increased their share of auctioned allowances, alongside uneven but generally upward-trending allowance prices across the different systems. This paper focuses on these systems and how they manage and use any revenue raised. The Republic of Korea just started auctioning a small share of

[1] This paper draws on and builds upon a paper prepared, in cooperation with the European Commission, as input to a Carbon Market Workshop held in Florence in May 2018.

[2] For 2019 the European Energy Exchange auctions general allowances three times a week (Mondays, Tuesdays and Thursdays), as well as six auctions for domestic aviation allowances. A separate calendar is available for Poland and Germany for 2019.

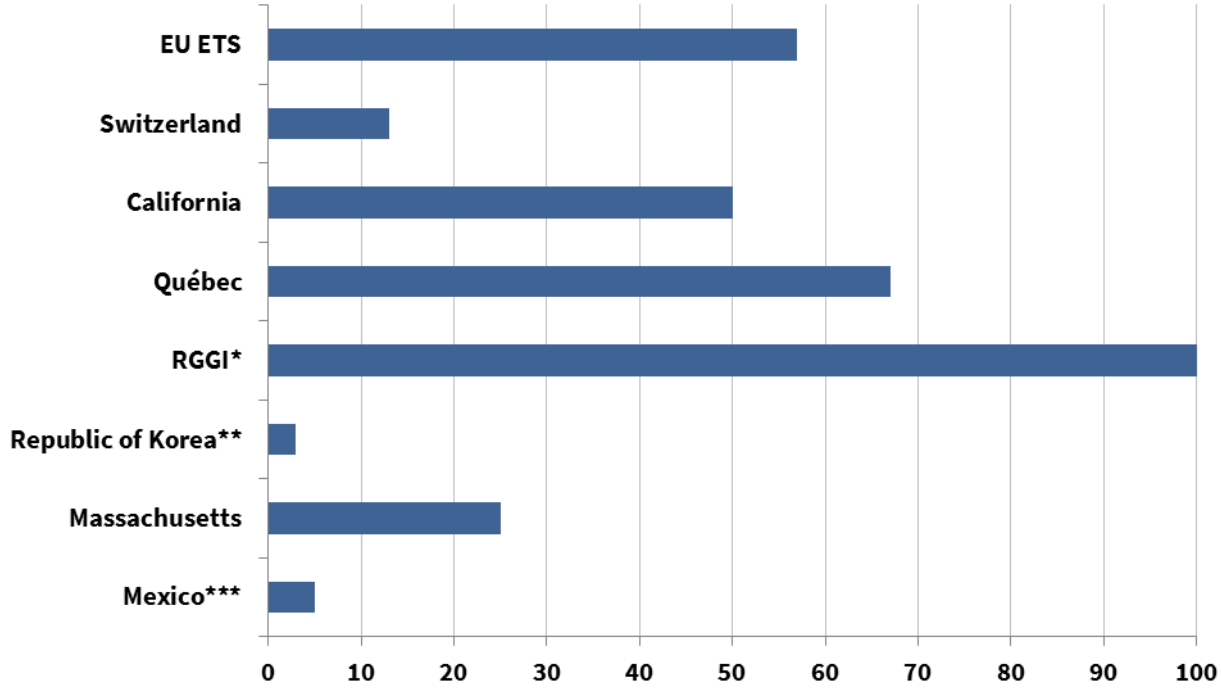
[3] California and Québec hold joint quarterly auctions.

[4] RGGI allowances are distributed through quarterly, regional auctions.

[5] Switzerland auctions only an allowance reserve of 5% (auctioning only what remains of the reserve after first providing free allocation to new or growing entities) and any allowances that were freely allocated to entities that have since reduced or ceased operations. The Federal Office for the Environment of Switzerland can hold auctions several times a year through the Swiss Emissions Trading Registry (EHR). On average, four auctions are held each year. All revenue from the Swiss ETS flows into the general budget. Given that ETS revenue is not allocated to a particular purpose, Switzerland is not considered in detail in this paper.

allowances for some subsectors in January 2019. The Canadian province of Nova Scotia will start auctioning allowances in 2020. The New Zealand government is also preparing for the introduction of an auctioning mechanism by 2020 for its national ETS. The proposed design for the pilot phase of the national ETS in Mexico foresees setting aside a reserve equivalent to 5% of the cap for auctioning.

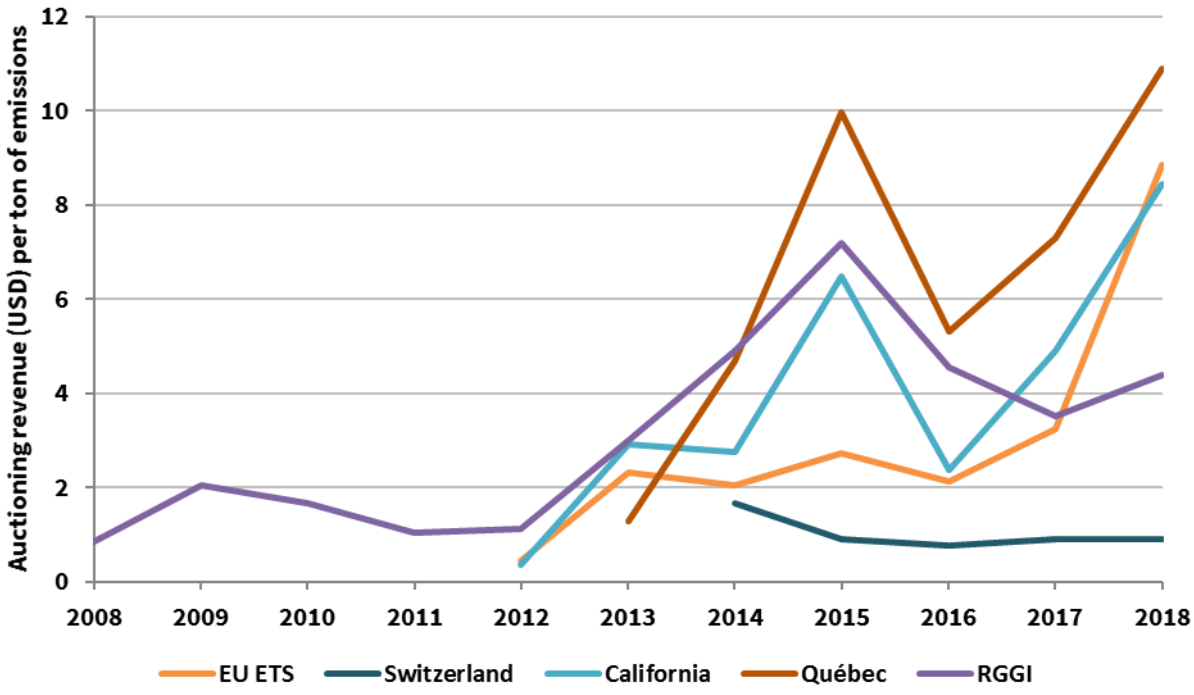
Figure 1: Share of auctioning across ETSs




Notes: * Auctioning is the only RGGI-wide allocation approach, but the actual percentage is less than 100% because some states have small dedicated "set-aside" accounts.
** While entities in the Korea Emissions Trading Scheme are generally required to purchase 3% of their allowances at auction, sub-sectors that are considered vulnerable to international competitiveness and carbon leakage are exempted. This means auctioning system-wide is currently below 3%.
*** Mexico is yet to launch its pilot ETS.

Sources: ICAP Status Report (2019) and EHR.

Figure 2: Auctioning revenue (USD) per ton of emissions capped by system over time

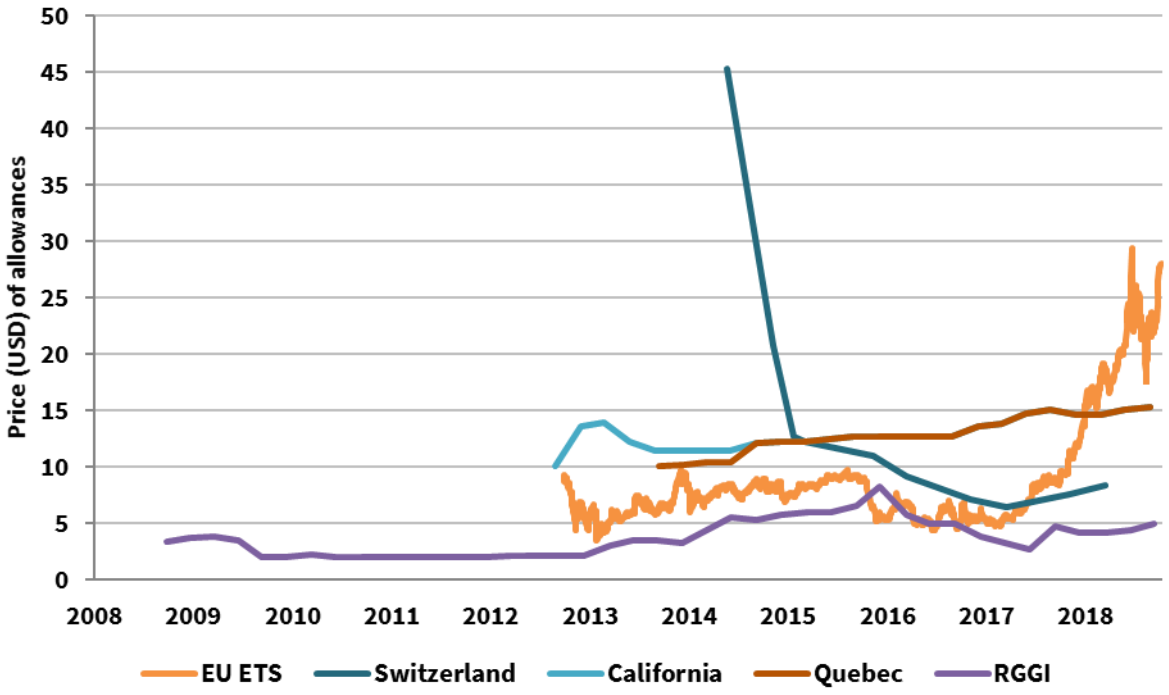



Sources: EC, ICAP Status Report, MELCC, CARB, RGGI, EEX, and ICE

By the end of 2018, the EU ETS[6] as well as the systems of Switzerland, California[7], Québec, and RGGI had raised revenue totaling just over USD 57 billion (see Figure 4). Total auctioning revenue raised by each system is a function of a number of variables including, among others, the cap (number of emissions covered), share of allowances auctioned, allowance price, as well as any market stability mechanisms in place (e.g. auction floor price). Figure 2 highlights how much auctioning revenue has been raised in each system annually per ton of emissions capped, whereas Figure 3 tracks the allowance prices in each system over time. As prices and auctioning shares have increased, so too has the total revenue raised by the ETS (see Figure 5).

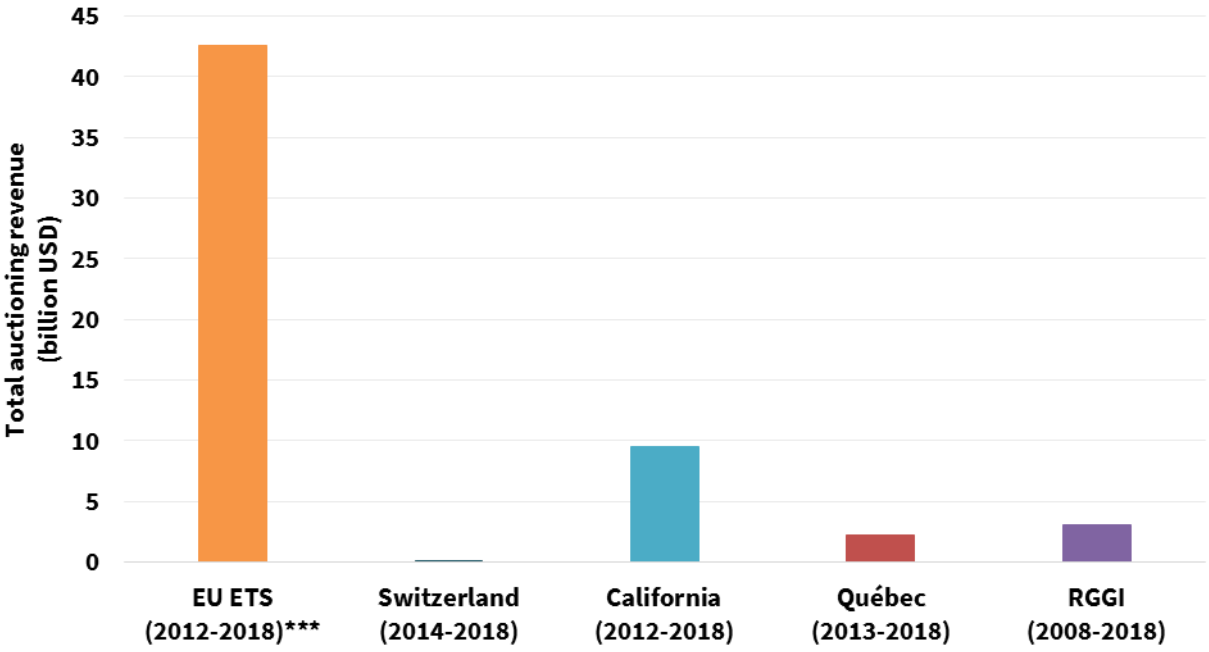
[6] Auctioning revenue figures for the EU ETS exclude revenue from the domestic aviation sector.
[7] For the California cap-and-trade system, the estimated percentage of auctioned permits and total auction revenue account for state-owned permits only.

Figure 3: Price (USD) of allowances in each system over time




Source: ICAP Allowance Price Explorer

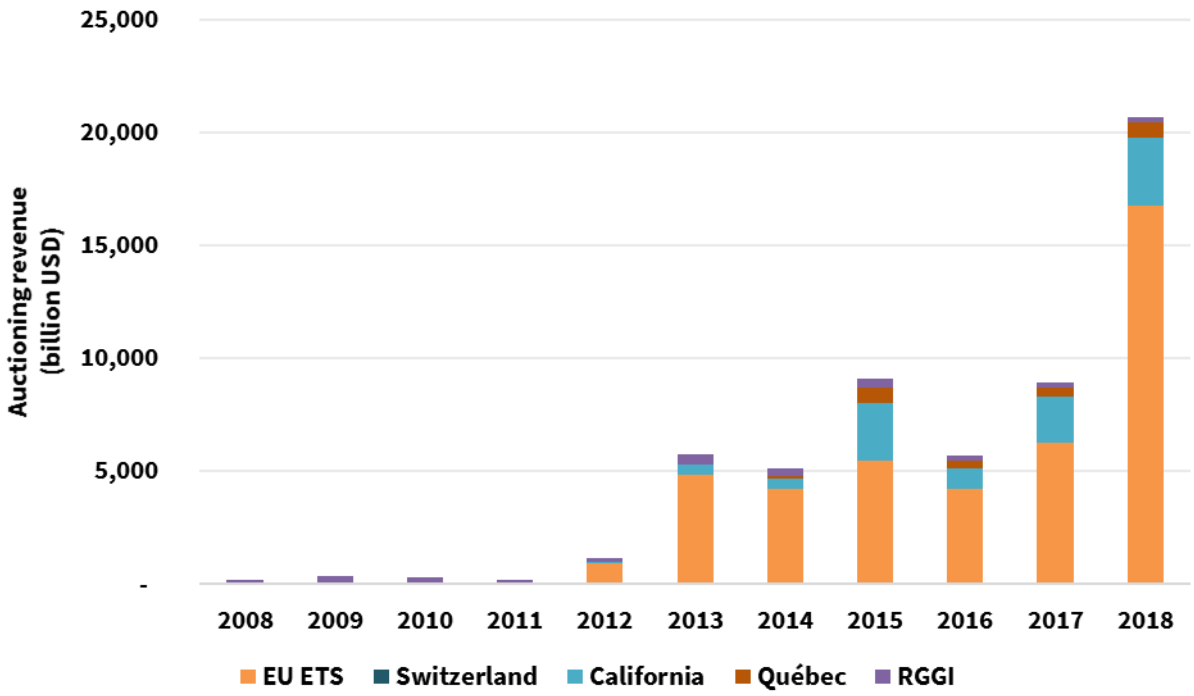
Figure 4: Auctioning revenue by system until end of 2018



Notes: ***Eight EU member states held auctions during phase 2 of the EU ETS (2008-2012), but there is no consolidated and comprehensive source of data available. For some member states, the auctioning revenue generated during this period was substantial. Germany for instance raised about €3.2 billion, according to the German Emissions Trading Authority (DEHSt).

Sources: Own calculation with figures from the EC, CARB, MELCC, RGGI, EXX, ICE, and EHR

**Figure 5:** Auctioning revenue by year and system[8]




Sources: EEX, ICE, RGGI, ARB, MELCC, and EHR

## 3 Management and use of auctioning revenue

How auctioning revenue is used depends on the jurisdiction's priorities and circumstances[9], which may also shift over time. In many cases, stakeholder consultations have helped to identify or tailor funding needs. ETS revenue can be **earmarked** for specific purposes. In practice, it is often used to further climate action or to compensate particularly vulnerable groups. While some jurisdictions have created separate funds to collect and distribute auctioning revenue according to an overarching investment plan or spending priorities , revenue can also go into the **general budget** with no earmarking, as is the case with Switzerland (for more details on the management of revenue by jurisdiction, see Table 1).[10]

In the EU, California, Québec, and the RGGI states, the main rationale for revenue expenditure is to fund additional **climate and energy programs.** Supporting households and communities that are disproportionately

[8] Ibid.

[9] There may also be legal limitations. For instance, the state of Oregon, which is considering a cap-and-trade program, is restricted by its constitution in how freely it can use revenue from transportation fuels.

[10] Nine member states in the EU direct their revenue to the general budget, and California authorized a one-time loan from a portion of its auction proceeds to the state's General Fund. Around 4% of total RGGI proceeds since 2009 have also been directed to the public budget of the participating RGGI states (USD 90 million by New York State in 2009 and USD 3.1 million by New Hampshire in 2010).

affected by carbon pricing has also been a key consideration in how auctioning revenue is used. Spending focuses not only on sectors covered by the ETS but those outside its scope as well. One consideration for earmarking auctioning proceeds for specific programs or purposes is accounting for year-to-year variability in revenue generated because of external factors, particularly fluctuations in allowance prices (Vaidyula & Alberola, 2015). This can be an obstacle to the long-term sustainability of spending programs that rely heavily on auctioning revenue.[11]

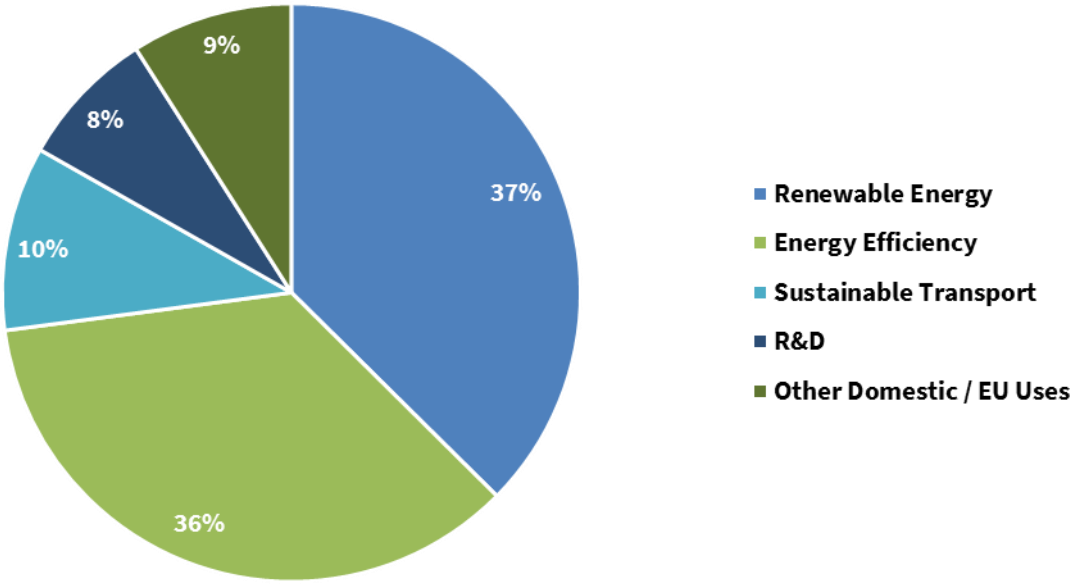
# 4 A snapshot of revenue use

The following sections provide an overview of how ETS revenue is used across the major systems.

## 4.1 EU ETS: encouraging climate action and supporting lower-income member states

Under the EU ETS, member states have the competence to decide how to use their share of the auctioning revenue[12]. However, the EU ETS Directive does encourage member states to use at least half of their auctioning revenue for climate and energy related purposes. Around 80% of the revenue from 2013-2017 was used or is planned to be used for climate and energy purposes (European Commission, 2018). At the EU level, the EU has also established a fund (NER300) to support low-carbon innovation (explored in more detail in section 5.3). In phase 4 (2021-2030) the NER300 will be replaced by the Innovation Fund. In addition, the next phase also sees a new Modernisation Fund that helps lower-income member states[13] to modernize their power sector. Lower-income member states also receive a higher share of the auctioning proceeds.

Figure 6: EU member states' domestic use of auctioning revenue 2013-2017



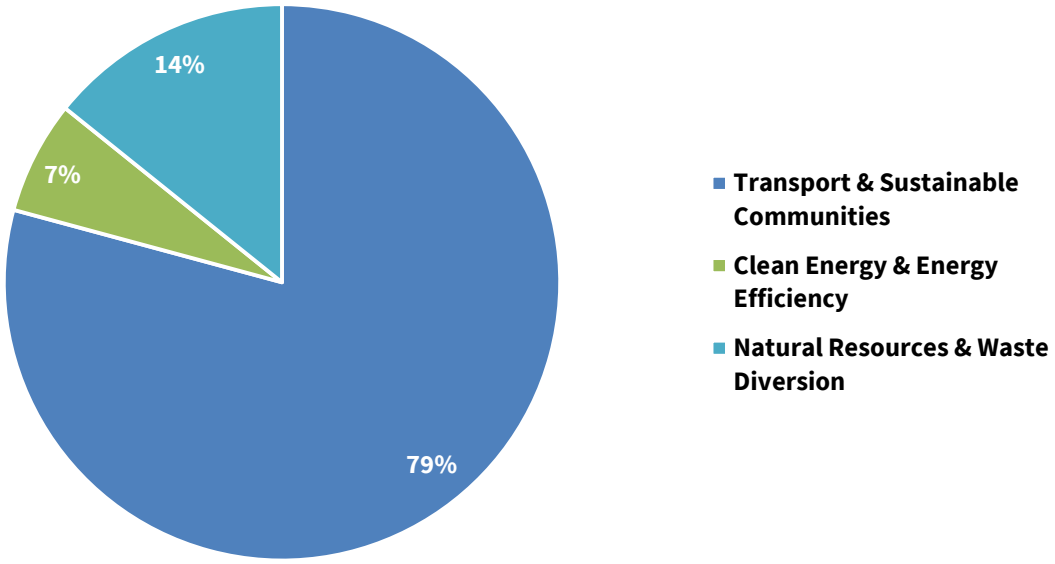

[11] France was forced in 2013 to find other sources of revenue for a large housing-renovation program that relied heavily on auctioning revenue after market fluctuations cut expected funding from the EU ETS in half (Vaidyula & Alberola, 2015).
[12] See Table 1 for more details on how the share of revenue per member state is determined.
[13] 10 member states with incomes below 60% of the EU average in 2013: Bulgaria, Estonia, Latvia, Lithuania, Hungary, Romania, Poland, the Czech Republic, Slovakia, and Croatia.

Notes: this only represents the share of revenue directed toward domestic or EU uses. Around 20-25% of revenue is put toward international climate and energy purposes or not used for climate and energy purposes.
Source: Report from the EC to the European Parliament and the Council EU and the Paris Climate Agreement: Taking stock of progress at Katowice COP, 2018

## 4.2 California: climate investments and low-income support from cap-and-trade

California uses auctioning revenue to fund activities that help achieve the objectives of its broader climate legislation. All proceeds from the sale of state-owned allowances go to the Greenhouse Gas Reductions Fund to support emission-reduction projects (collectively referred to as "California Climate Investments"). These programs also create additional economic and public-health benefits for California. At least 35% of this funding must benefit low-income and disadvantaged communities. By law, 60% of proceeds from the Greenhouse Gas Reduction Fund in California are continuously appropriated to transport and sustainable community programs. Overall, these investments can be grouped into three categories: (i) transportation and sustainable communities; (ii) clean energy and energy efficiency; and (iii) natural resources and waste diversion.

**Figure 7:** California's use of auctioning revenue (CARB, 2018)

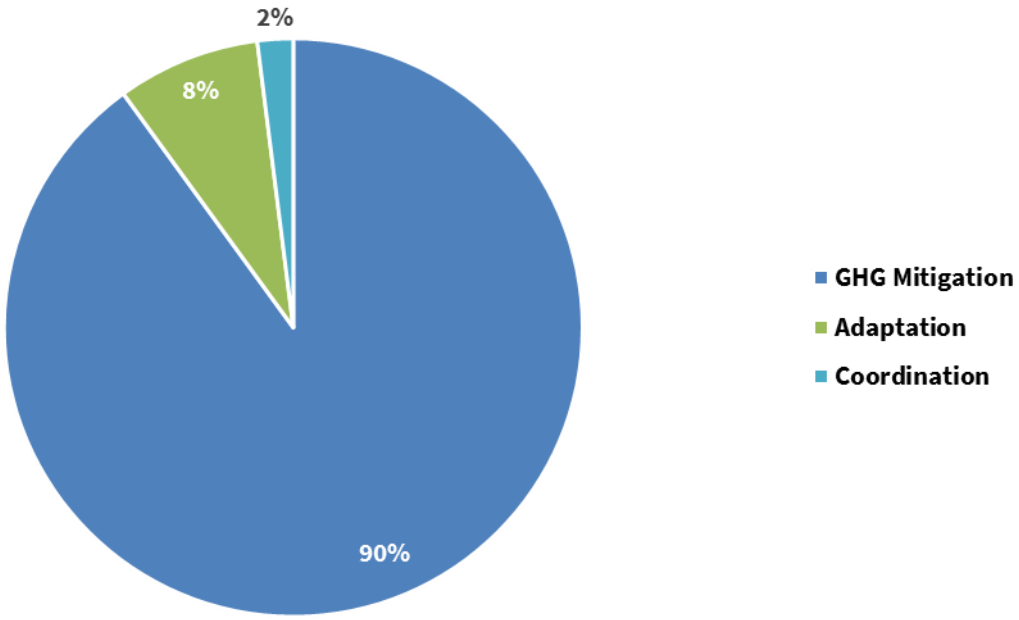



Source: California Climate Investments 2018 Annual Report

## 4.3 Québec: Green Fund for the low-carbon transition

Québec's auctioning revenue goes to the Green Fund, which has helped launch a wide range of climate change projects outlined in the province's Climate Change Action Plan (CCAP). This Plan emphasizes crosscutting initiatives that reinforce the necessity to reduce GHG emissions and increase Québec's resiliency to the effects of climate change.

**Figure 8:** Québec's use of auctioning revenue

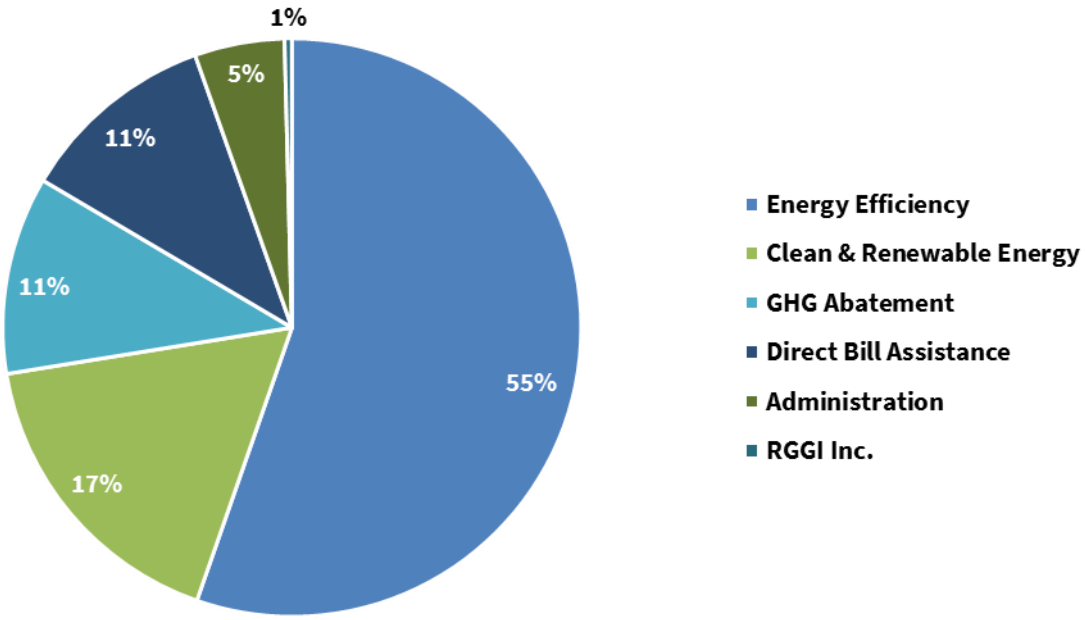



Source: Québec Climate Change Action Plan

## 4.4 RGGI: A Cap-and-Invest Program

RGGI was launched as a cap-and-invest program where the focus is not only on reducing emissions but also on the additional benefits this can bring the region, including job creation, energy bill savings, and cleaner air. Thus, for RGGI, although the program only covers power-sector emissions, the focus of the investments of the auction revenue is on creating benefits for the whole economy. This has also helped build support for the program. In RGGI, how participating states spend their revenue is at their discretion. Expenditure by the participating states can be classified into four areas: (i) energy efficiency; (ii) clean and renewable energy; (iii) mitigation; and (iv) direct bill assistance (e.g. energy bill rebates).

**Figure 9:** Use of auctioning revenue by the participating states (RGGI Inc., 2018)




Source: The Investment of RGGI Proceeds in 2018

## 5 Climate and energy programs

Investing revenue into additional climate and energy programs can strengthen the impact an ETS has on reducing emissions and help jurisdictions reach their mitigation targets. Auctioning revenue can help fund programs that address other market failures or stimulate behavior that the allowance price cannot achieve on its own. Spending on sectors outside the ETS could also encourage reductions among entities that otherwise face no cap or carbon price. Revenue use linked to the broader rationale for the instrument (reducing emissions to fight climate change) is intuitively easy to understand for the general public, such as using tolls or gasoline taxes for road maintenance and highway construction (Esch, 2013). Such expenditure can help build public support to turn carbon pricing from "burden to benefit" (Vaidyula & Alberola, 2016), encouraging its policy lock-in and longevity (Carratini, Carvalho & Fankhauser, 2017; Carl & Fedor, 2016).

Most systems have directed a large share of their revenue toward such measures. While EU member states are only encouraged to spend half their auctioning proceeds on climate and energy related purposes, over 2013-2017 they had or planned to use 80% of their revenue for such purposes (European Commission, 2018).

The additional climate outcomes of reduction projects funded through auction revenue can be sizeable: activities funded from ETS revenue in California are forecast to reduce 25 million $MtCO_2e$ over the projects' respective timeframes (ARB, 2018), while RGGI's 2016 investments alone are projected to reduce 6.4 million short tons of $CO_2$ and save participants of their revenue-funded programs USD 1.7 billion on their energy bills over their lifetime (RGGI Inc., 2018).[14]

[14] This includes future benefits. The lifetime of measures will vary by type and project, most measure lifespans in the RGGI report range from 5-25 years.

Looking at this spending category in more detail, systems devote a large share of spending to a wide variety of climate and energy programs, ranging from investments in renewable energy, adaptation, and sustainable land-use to energy efficiency programs, investments in the transport sector, and encouraging low-carbon innovation.

## 5.1 Energy efficiency programs

In 2016, more than half of the revenue raised by RGGI was directed to energy efficiency programs. These programs are not only projected to deliver significant energy bill savings for participating households and businesses but also reduce 3.3 million short tons of $CO_2$ pollution over the lifetime of the installed measures (RGGI Inc., 2018). Projects like home retrofitting have also generated jobs in the housing and construction sectors across the RGGI participating states.

Auctioning revenue also plays a key role in funding domestic energy efficiency programs in the EU member states. From 2013-2015, energy efficiency made up the second-largest category of revenue expenditure, and all EU member states that reported on how they spent the funds directed a portion of it to supporting energy efficiency programs. For instance, the Czech Republic and France both have programs to improve energy efficiency measures in households, while Bulgaria focuses on financing energy saving measures in public buildings. In California, the state has implemented 60,000 energy efficiency projects, ranging from the installation of efficiency measures in households to programs coordinating energy efficiency with water efficiency. These activities also help California achieve its 2030 goal of doubling energy efficiency savings in electricity and natural gas as outlined in the legislation SB 350 (2015). Québec also devotes a share of revenue to energy efficiency programs for the building sector, as well as improving the energy efficiency of Québec businesses more broadly. Québec's Energy Transition Master Plan also emphasizes energy efficiency through new regulation, supporting innovation and deployment of energy-efficiency measures, and setting out targets for efficiency gains.

## 5.2 Transforming the transport sector

Channeling auctioning revenue into public infrastructure programs can deliver additional emissions reductions, increase mobility, decrease congestion, result in cleaner air, and productivity gains for the economy. Auctioning revenue has been spent on either promoting low/zero-emissions vehicles, which also supports those jurisdictions in reaching specific electric vehicle deployment targets, as well as the expansion and improvement of the public transport system.

Québec and California fund a variety of transport programs through auctioning revenue, from rail and transit projects to incentives for low-/zero-carbon-electric vehicle programs and education programs. Québec also targets a wide range of transport programs, focusing not only on road transport, but also on rail and maritime.

In the EU, more than 10% of auctioning revenue is spent on sustainable transport, making up the third largest spending category for member states under the EU ETS (Le Den et al., 2017). Austria, Croatia, Germany, Hungary and Portugal all provide financial incentives to adopt electric vehicles. Italy, Poland, and Spain also focus on sustainable mobility, while Spain directs a share of revenue for climate change adaptation projects in the transport sector. Some RGGI States have also spent a portion of ETS revenue to provide consumer rebates for electric vehicles.

## 5.3 Innovation

Programs targeted to support research and development in low-carbon technologies can trigger additional private-sector investment and alleviate regulatory uncertainty. Promoting early-stage technology can help the longer-term transition to a low-carbon economy, because such technologies need time to reach large-scale deployment. This can also enhance the political power of an ETS by encouraging new businesses and spurring new jobs, establishing a supportive "green economy" constituency in favor of emissions trading.

The EU's NER300 program (EUR 2.1 billion in accumulated funding) is financed through the sale of 300 million allowances in support of commercial-scale demonstration of carbon capture and sequestration (CCS) projects and innovative renewable energy schemes. The 38 projects funded by the NER300 program, which are also co-financed by the respective member states, are predicted to increase renewable energy production in the EU by 18 TWh and significantly reduce emissions. In the next phase of the ETS (2021-2030), NER300 will be replaced by the Innovation Fund to support the large-scale demonstration of CCS, carbon capture and utilization (CCU), renewable energy, and low-carbon innovation in energy intensive industries. It will be funded by the sale of 450-500 million allowances.

Québec also encourages the use of innovative mitigation technology, including carbon sequestration, as well as intelligent logistics and the electrification of transport. The province funds research projects that maximize collaboration among the public sector, researchers, and businesses interested in testing or adapting new technologies. In California, funding is allocated to pre-commercial demonstrations of advanced mitigation technologies for heavy-duty vehicles and equipment in the freight sector. Programs are also in place to accelerate the commercialization of zero-emission or near zero-emission trucks, buses, and heavy-duty vehicles. Other programs fund innovative healthy soils and manure management practices in the agricultural sector; advanced, on-farm waste-to-fuel-generation projects; and low carbon intensity fuels research.

# 6 Compensating households, communities, and industries

The costs and benefits that come with the introduction of a carbon price are unevenly distributed across different groups in society. Auctioning revenue is an important tool to achieve a fairer distribution and to protect vulnerable groups from potentially negative effects (Haug, Eden & Montes de Oca, 2018). There is also a correlation between voter acceptability and a progressive carbon price, i.e., one that imposes a smaller burden on lower-income households (Carattini et al., 2017).

## 6.1 Households

Households may be affected by a carbon price in two ways. First and foremost, it can increase the cost of carbon-intensive goods or services, including electricity, heating, and transport costs. While this may encourage a switch to goods or services with lower carbon intensity, this is contingent on the availability and cost of such alternative options. As lower-income households tend to spend a greater share of their income on fossil energy- or carbon-intensive goods compared to higher-income households, carbon pricing is typically considered to be regressive[15], which means an ETS may impose a relatively greater financial burden on lower-income households (Haug et al, 2018). However, carbon pricing revenue can be directed to alleviate some of these concerns through policies and projects that explicitly benefit lower- and middle-income households or disadvantaged communities, making the policy more progressive.

Around half of the RGGI States provide direct bill assistance to households.[16] [17] In 2016, over 800,000 households benefitted from these programs (RGGI Inc., 2018). Some states target the assistance specifically at low-income

[15] While carbon pricing – unless explicitly designed otherwise – is typically regressive in industrialized countries, this may not always be the case for developing countries.

[16] Participation in RGGI direct bill assistance also included over 100,000 businesses in 2016 (RGGI Inc., 2018). Such assistance is also funded through other programs apart from RGGI, including statewide benefit charges and some federal funds, such as the Low-Income Home Energy Assistance Program (LIHEAP) (ibid).

[17] California has also designed its program to buffer utility rate payers from cost increases as a result of the carbon price; however, this is not done through the use of auctioning revenue.

households while other states provide a general credit on consumers' electricity bills.[18] Within the EU, France directs almost all of its revenue to the National Housing Agency to retrofit social housing, delivering both energy efficiency gains and supporting lower-income households. California is required to direct at least 25% of its revenue to benefit disadvantaged and low-income communities (as outlined in the legislation AB 1550 and SB 535). In practice this means that California's climate programs and policies that are funded by the auctioning revenue also aim to improve the lives of people in these communities. Examples include lowering local air pollutants through cleaner transportation options; increasing quality of life by planting trees and providing active transportation options; reducing energy bills by installing rooftop solar; and locating affordable homes near jobs, reducing commute times and household expenses. As of November 2017, about half of California's projects are benefiting disadvantaged communities and over 30% are located within those communities (CARB, 2018).

## 6.2 Regional disparities

Revenue can also be directed to ease the transition to a low-carbon economy for lower-income regions. In the EU, 10% of auctioning revenue is distributed to lower-income member states, where they can be used for the purposes of solidarity, growth, and interconnections. Additionally, a new Modernisation Fund (starting in phase four of the EU ETS funded by 310 million allowances) will support the transition and modernization of energy systems in lower-income member states.[19] In addition to efficiency improvements, it will fund investments such as worker-retraining programs to help facilitate a socially just transition to a low-carbon economy. This may be particularly important for fossil-fuel intensive sectors, which will find such a transition particularly challenging given the reduction in fossil fuel resources and demand for labor as the economic base shifts (ILO & OECD, 2012).

## 6.3 Industry

EU member states can choose to compensate electro-intensive industries for higher electricity costs resulting from electricity suppliers passing on the costs of carbon pricing. Such compensation constitutes state aid[20] and therefore must accord with the European Commission's EU ETS State Aid Guidelines (2013-2020)[21], which ensure compensation is proportionate to the incurred cost and is applied in a consistent manner across the EU to limit any competitive distortions. The Guidelines outline the eligible sectors and a formula to calculate the maximum amount[22] of compensation per unit. As of 2018, the Commission has approved 12 such schemes[23] in 11 member states for 2013-2020. The maximum share of eligible costs for these industries also declines over time, from 85% over 2013-2015 to 75% by 2019-2020. The EU ETS Directive determines that member states should seek to limit their expenditure on the compensation of indirect carbon costs to 25% of their auction revenue.

Québec also directs a small share of funds to sectoral climate risk assessments to support business' adapting to potential climate impacts and to protect the jobs of workers in vulnerable sectors (forestry, agriculture, tourism, and mining). In the forestry sector, Québec is working with community stakeholders to develop and implement forestry management practices that are both preventative and adaptive. In the agriculture sector, the focus is on

[18] Note: the relief is only partially funded by RGGI's auctioning revenue; it is also funded by proceeds from other statewide and federal programs.
[19] Bulgaria, the Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovakia.
[20] EU rules on State aid were put in place to ensure that state-owned resources are not deployed to distort competition or create unfair advantage in the European single market. State aid is an advantage given by a government that may provide a company with an unfair competitive edge over its commercial rivals. EU rules generally prohibit state aid unless it can be justified under certain circumstances related to general economic development. The European Commission is charged with ensuring that State aid rules are applied and observed equally across all the member states.
[21] The Commission is currently revising the Guidelines for the next trading period.
[22] The maximum amount of eligible costs is 85% from 2013-2015, decreasing to 80% for 2016-2018 and 75% for 2019-2020.
[23] These schemes operate in Belgium, Finland, France, Germany, Greece, the Netherlands, Lithuania, Luxembourg, Slovakia, Spain, and the UK.

adaptive solutions that reduce climate vulnerability, including water resource management, soil conservation, and pest surveillance. Regional vulnerability analyses are being conducted to inform tourism businesses, alongside recommendations for adaptation solutions. Finally, a similar approach is being taken toward the mining industry in Northern Québec, where risk analyses will play a key role in understanding the vulnerabilities of the industry to better target adaptation solutions.

# 7 Conclusion

The primary purpose of an ETS is to reduce emissions in a cost-efficient manner. Auctioning is the most straightforward way to achieve this because it holds polluters accountable for their environmental costs while creating the clearest incentives for efficient abatement decisions. The additional income stream governments can generate by auctioning a share of the allowances can deliver additional co-benefits to the environment and the economy. How jurisdictions use this revenue stream will likely vary on a case-by-case basis. Most jurisdictions have used the revenue to fund additional climate and energy programs as part of a comprehensive approach to climate change that strengthens the positive climate impact of an ETS and also tends to mitigate carbon prices. A smaller share of revenue has gone to assist low-income households or disadvantaged communities. In this way, an ETS works not only to reduce emissions but can also increase economic opportunities and public health outcomes across the jurisdiction. Stakeholder involvement in shaping these spending priorities, alongside transparent and clear accounting of how such proceeds are spent, can also help build up public support and the acceptability of ETSs.

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**Table 1:** Overview of revenue use for emissions trading systems

| | Rationale for revenue use | Share of auctioning and market size | Auction revenue use | Management of revenue |
|---|---|---|---|---|
| EU | Achieve jurisdiction's reduction target and act in solidarity with least wealthy member states | 57% of allowances from 2013-2020 from stationary installations, of which:<br><br>90% of allowances will be distributed to member states based on verified emissions for 2005 or the average from 2005-2007 (whichever is the highest).<br><br>10% is distributed to less wealthy states for the purposes of solidarity, growth and interconnections.<br><br>By the end of 2018, an estimated USD 42.55 billion in auction revenue was raised from the ETS, which covers a total of 1,839 $MtCO_2e$. | At least 50% of auction revenue or the equivalent in financial value should be used by member states for climate and energy related purposes (see Directive 2003/87/EC Article 10(3) for a list of such purposes). On average around 80% of auction revenue is spent for climate-related purposes.<br><br>For more, see section 2 in the 2016 report from the European Commission to the European Parliament and Council on the EU's progress in meeting Europe's 2020 targets. | The management and decisions on revenue expenditure rest with the respective member states. From 2013-2015, nine member states did not earmark funding[24] and eleven member states have established specific investment funds that are mostly managed by their respective environmental ministries. |
| California (WCI) | Further the objectives of California Global Warming Solutions Act (AB32), provide benefits to disadvantaged and low-income communities and households, and – where applicable and to the extent feasible – to maximize | For the 2015-2020 period, shares range from 41-46% annually.<br><br>By the end of 2018, an estimated USD 9.49 billion in auction revenue was raised from the cap-and-trade program, which covers a total of 358.3 $MtCO_2e$. | Revenue from auctioning California state-owned allowances goes to emission reduction projects that support the goals of AB 32. At least 25% of the projects must be located in and benefit the most disadvantaged communities[25]. An additional 5% must be invested in projects benefiting low-income households or communities in California and another 5% | Revenue is deposited in the Greenhouse Gas Reduction Fund (GGRF). The governor and legislature appropriate money from the GGRF to state agencies and programs through the budget process. These administering agencies develop and implement programs within three policy areas: |

[24] Austria, Bulgaria, Denmark, Finland, Ireland, Luxembourg, Malta, Netherlands, Poland, Portugal, Sweden and the United Kingdom

[25] Disadvantaged communities are identified by the California Environmental Protection Agency.

| | Rationale for revenue use | Share of auctioning and market size | Auction revenue use | Management of revenue |
|---|---|---|---|---|
| | additional benefits from these investments. | | in projects benefiting low-income households or communities within 0.5 miles of a disadvantaged community (SB 535; AB 1550). The Budget Act trailer Bill (SB 862) also outlines appropriations for 60% of the Greenhouse Gas Reduction Fund for various transport and sustainable communities programs.<br><br>For more, see the 2018 annual report on California Climate Investments. | transportation and sustainable communities; clean energy and energy efficiency; natural resources and waste diversion.<br><br>A triennial investment plan identifies state investment priorities to achieve GHG reduction goals, benefit disadvantaged communities and other environmental co-benefits. |
| Québec (WCI) | Revenue is fully invested in the implementation of the measures of Québec's climate Change Action Plan (CCAP) with the objective of fighting climate change either through mitigation or adaptation measures. | For the compliance period 2015-2017, the average share is 67% annually.<br><br>By the end of 2018, an estimated USD 2.23 billion in auction revenue was raised from the cap-and-trade program, which allowed for a total of 58.96 $MtCO_2e$ in 2018. | The Green Fund allocates funding to the fight against climate change: 1) mitigation; 2). adaptation and; 3) public awareness.<br><br>By law, two-thirds of the Green Fund's revenue must be directed to the transport sector, the province's largest emitter, particularly to develop public transport and to electrify transport modes.<br><br>For more, see the 2018-2019 expenditure budget for the Green Fund and the mid-term Report on Québec's Climate Change Action Plans (French). | The revenue goes to the Green Fund, which funds the 2013-2020 Climate Change Action Plan. The spending of the funds from the Green Fund is supervised by the Green Fund management committee (*Conseil de gestion du Fonds vert*). |
| RGGI | Provide additional regional benefits like stimulating economic growth and addressing equity concerns. | Auctioning is only RGGI-wide allocation approach, but the actual percentage is less than 100% because some states have small dedicated "set-aside" accounts. By the end of 2018, an estimated USD 3.08 billion in auction revenue was raised from the RGGI market, which covers a total of 82.3 million short tons. | There are no RGGI guidelines.<br><br>For more, see the report on proceeds of revenue. | Participating RGGI States have ultimate discretion as to how the revenue is managed and invested. |