

Evolution of carbon pricing in Taiwan

Carbon fee revenue use options

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Summary

In 2024 the Taiwanese Government launched a carbon fee under [the Climate Change Response Act](#).¹ This fee has applied to covered emissions since January 2025, with the first payments based on 2025 emissions occurring in May 2026. By considering international experiences, and in accordance with the 13 use cases specified in Article 33 of the Climate Change Response Act, the implementation of the carbon fee creates an opportunity to study how the revenues collected could be used.

Globally, jurisdictions have used revenues from carbon pricing in different ways. Based on analysis from the Institute for Climate Economics, the World Bank observes that in 2024, 56% of global carbon pricing revenues were used for environmental and development goals. Another 19% were used in direct transfers to households and companies impacted by carbon pricing, and 6% to provide tax relief.

Approaches to carbon pricing revenue use

The economic literature identifies three fundamental approaches to carbon pricing revenue use: changing the tax mix, changing spending patterns and changing the fiscal balance sheet.

- **Changing the tax mix** seeks to enhance overall fiscal efficiency, mostly through revenue recycling that reduces pre-existing distortionary taxes and more fundamental green fiscal reform that replaces distortionary tax instruments with proceeds from carbon pricing.
- **Changing spending patterns** includes both public capital investment in long-term assets (e.g. electric vehicle [EV] charging networks, port and road infrastructure maintenance, climate adaptation) and current expenditure on programmes, operations and services (e.g. feed-in tariffs, general welfare and social security expenditures, information and awareness campaigns). Recent empirical evidence indicates that green spending can be critical in increasing public support for carbon pricing by identifying it as the only revenue-recycling option that does so in a statistically significant way among the options considered.
- **Changing the fiscal balance sheet** emphasises future fiscal flexibility over immediate economic effects. Two principal approaches are possible: retiring public debt to strengthen fiscal sustainability and lower the current and future interest burden, and establishing a fund that supports intergenerational equity and provides reserves to manage volatility.

We compare these three options based on economic efficiency, environmental impact and political feasibility.

International case studies of carbon revenue use

We consider four case studies to examine revenue use in other jurisdictions, focussing on governance, beneficiaries, communication mechanisms and results. Two cases from Japan explore carbon pricing revenue use through the Special Account for Energy Measures and the Japan GX Economic Transition Bonds. A third case study covers EU ETS auction revenue use through the EU Innovation Fund. Finally, the fourth reviews the California Cap-and-Invest auction revenue use through the California Climate Investments.

The cases studied offer valuable insights for Taiwan. They link revenue use to achieving legislated climate targets while supporting economic transformation. For example, the Japan GX Bonds

¹ Version in Chinese: <https://oaout.moeenv.gov.tw/law/EngLawContent.aspx?lan=C&id=303>

aim to mobilise JPY 150 trillion in investment to meet Japan's 2030 and 2050 commitments while strengthening industrial competitiveness. California's legislation requires funded projects to contribute to jurisdictional climate goals while maximising economic, environmental and public health co-benefits, with explicit prioritisation of disadvantaged communities and households.

Moreover, all cases establish dedicated funds or accounts separate from general budgets, with defined eligibility criteria, competitive or rules-based allocation processes, and legislative or council-level oversight. Japan channels revenues through the Special Account for Energy Measures managed by multiple ministries, and the GX Bonds overseen by a Liaison Conference reporting to the GX Implementation Council. California's Air Resources Board develops three-year investment plans through mandatory stakeholder consultation, and the State Legislature annually distributes funds from the Greenhouse Gas Reduction Fund to 27 state agencies, administering 117 programmes through the California Climate Investments.

Additionally, the three jurisdictions combine annual formal reporting to legislative or oversight bodies with public-facing project-level transparency. Japan's Ministry of Environment publishes detailed project case studies including assessment of emissions reductions, costs, co-benefits and beneficiary testimonials. The EU Innovation Fund produces annual progress reports to the European Parliament and Council with key performance indicators, cost-effectiveness metrics and project-level knowledge-sharing requirements embedded in grant agreements. California demonstrates particularly comprehensive transparency through a dedicated website, interactive data dashboard with geolocation, annual legislative reports, and factsheets providing granular information on investments, emissions reductions, cost per tonne of carbon dioxide equivalent (tCO₂e), and benefits to priority populations.

Recommendations

Based on the analysis of the carbon pricing revenue use in the literature and four cases explored, we make ten recommendations on the use and governance of revenues from carbon pricing in Taiwan:

Recommendation 1: Based on our findings, the following revenue-use shares are recommended for consideration by the Fund Management Committee (FMC) of the Greenhouse Gas Management Fund (GGMF) as plausible and balanced (see also Figure S1):

- 65% for environmental investment and expenditure (of which 60% is allocated to mitigation and 40% to adaptation)
- 25% for transition support measures
- 10% for administrative, capacity-building, communication and evaluation functions.

Recommendation 2: Build on the existing GGMF structure, which already operates as a hybrid between a dedicated fund and line-ministry execution. This will help to ensure that the Ministry of Environment and FMC provide strategic direction and oversight, while the line ministries implement programmes within clearly defined funding windows.

Recommendation 3: Establish an online public revenue-use tracker, modelled on California's Climate Investments Dashboard, or an information portal like the EU ETS Innovation Fund's Knowledge-Sharing Portal. The tracker should serve as a single point of access for citizens, businesses and legislators.

Recommendation 4: The governance structure of the GGMF should be anchored in strong inter-ministerial coordination and high-level political oversight. The Ministry of Environment and FMC already play a central coordinating role and should remain the core body providing strategic direction on the use of carbon fee revenues.

Figure S1. Suggested revenue use balance for the Taiwan Carbon Levy



Source: Authors' own elaboration

Recommendation 5: To maintain accountability and public trust, the Fund's operations would be subject to regular independent auditing – maintaining and strengthening the existing mechanism under the Climate Change Response Act's reporting obligations.

Recommendation 6: The revenue allocation framework of the GGMF should be organised around four dedicated funding windows, each addressing a specific dimension of Taiwan's climate transition while ensuring balance across economic, environmental, social and institutional priorities.

Recommendation 7: In accordance with article 9 of the regulation establishing the GGMF, FMC members should institute a system of regular ex-post performance evaluation, conducted by designated members of FMC alongside independent experts appointed by it.

Recommendation 8: To promote transparency and comparability, a concise set of key performance indicators should be published annually through the public tracker and the Climate Change Response Act's reporting mechanism.

Recommendation 9: The government should establish a public website and interactive dashboard providing frequent information on carbon-revenue inflows, allocations and project outcomes, modelled on the California Climate Investments Map.

Recommendation 10: In addition to continuous online transparency, the Ministry of Environment should maintain and strengthen the existing reporting mechanisms by preparing an annual 'Carbon Revenue Report'.

1. Introduction

1.1. Study context and objectives

Taiwan has made significant progress in recent years in developing a suite of carbon pricing instruments to reduce its greenhouse gas emissions and to contribute to the global fight against climate change. The efforts of the Taiwanese Government have culminated in the launch of the carbon fee under the Climate Change Response Act (Ministry of Environment, Taiwan, 2025). From January 2025, the carbon fee applies to covered emissions with the first fee payments based on 2025 emissions occurring in May 2026.

The Government is also considering the development and launch of a Taiwan carbon border adjustment mechanism (T-CBAM) and an emissions trading system (T-ETS). In line with current international practice, the T-CBAM would prevent goods produced elsewhere and imported into Taiwan gaining an undue competitive advantage due to exporters facing lower carbon prices than a domestic producer. The planned transition from a carbon levy to a T-ETS would provide more direct control over emission reductions by setting clear caps for regulated sectors, helping them achieve their targets in line with national greenhouse gas reduction goals while enhancing cost-effectiveness.

Since 2020, the government of Taiwan has been supported by international experts in the development of their carbon pricing instruments. The report 'Carbon Pricing Options for Taiwan' (The Grantham Research Institute and Vivid Economics, 2020), commissioned by the Environmental Protection Administration and completed in 2020, recommended the implementation of a carbon fee. Subsequently, the study 'Policy Measures to Respond to Carbon Fee Impacts on Industry in Taiwan' (The Grantham Research Institute and Adelphi, 2024), commissioned by the Climate Change Administration and completed in 2024, provided recommendations on design elements that could be incorporated into the carbon fee to manage the political economy of its implementation. Against this background, the present study reviews carbon fee revenue use options which are relevant and advisable in the Taiwanese context. In doing so, the goal of the study is to inform the Government's decision-making with the latest academic knowledge and international experiences on the topic. This is critical for the allocation of revenues across the use cases as specified in Article 33 of the Climate Change Response Act.

The study has three primary objectives:

- To review and summarise the theoretical options for carbon pricing revenue use
- To review and describe the options utilised in practice in other jurisdictions regarding revenue use
- To make recommendations considering the pros and cons of various options considering the expected evolution of Taiwanese carbon pricing.

In meeting these objectives, we are mindful of potential interactions between revenue use options and the continued evolution of the carbon pricing landscape, with T-CBAM and T-ETS. For instance, the selected examples are not developed in a way that is unique to a type of carbon pricing instrument, and therefore the lessons that can be learned from them can be applied to carbon taxes, ETSs or border carbon adjustments. Moreover, provided that any revenue collected from the T-ETS and the T-CBAM are subject to Article 33 of the Climate Change Response Act, the cases analysed here will be relevant for those instruments as well.

The rest of this report is structured as follows. **Section 1.2** provides an overview of the international evidence and experiences on carbon pricing revenue use. **Section 1.3** describes the state of play in Taiwan regarding carbon pricing.

Section 2 presents the three broad approaches to carbon pricing revenue use as identified in the literature, namely: (1) using revenues for tax reform; (2) increasing expenditure, either general or earmarked to achieve specific goals; and (3) using revenues to change the fiscal balance sheet of the jurisdiction. The section focuses on option (2) and presents a typology of revenue uses by recipient, noting where impacts are likely positive, negative or ambiguous.

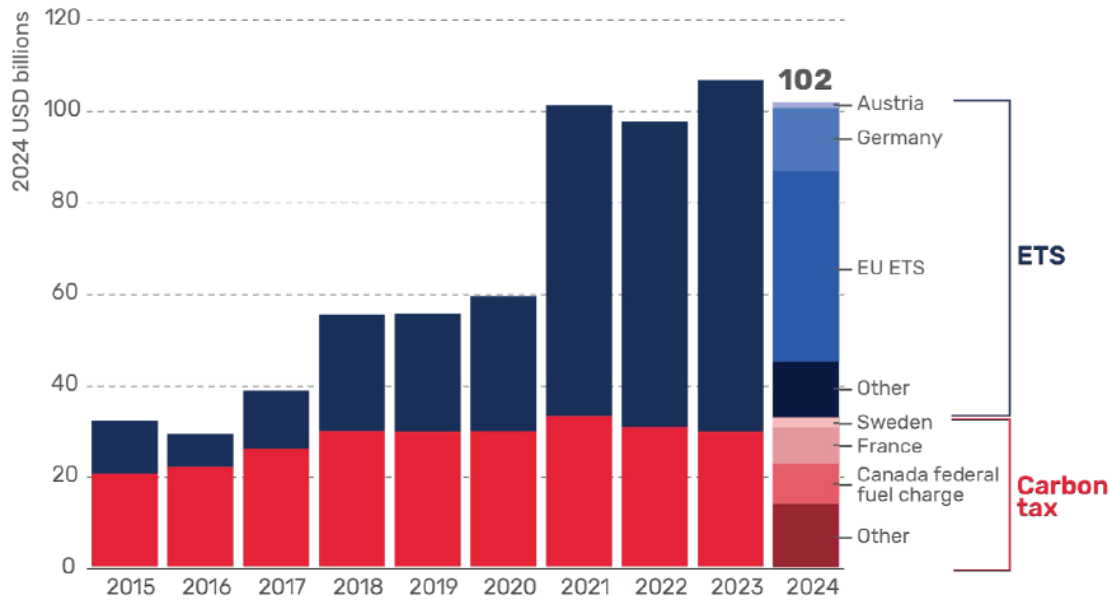
Section 3 presents real-world examples of how revenues are allocated and managed, using four case studies relevant to Taiwan (the EU Innovation Fund, the Special Account for Energy Measures in Japan, the Japan GX Environment Transition Bonds, and the Greenhouse Gas Reduction Fund in California). For each case, the section explains who benefits directly and indirectly, what the objectives are that the revenue use case seeks to address, which regulatory and institutional arrangements have been established to deliver the objectives, as well as how revenue uses are communicated.

Section 4 examines trade-offs when selecting revenue-use options and institutional arrangements for the Taiwanese context. It also maps the roles of key actors to operationalise the options. Finally, it makes recommendations for implementation in the Taiwanese context, considering legal, regulatory and institutional constraints.

1.2. Magnitude of revenues raised using CPI and revenue use categories

Carbon pricing instruments have generated significant revenues since they were first introduced over three decades ago.² According to data from the World Bank's *State and Trends of Carbon Pricing 2025* (World Bank, 2025) over the last ten years revenues collected by both carbon taxes and ETSs have increased from over US\$30 billion to over US\$100 billion (in 2024 US\$, see Figure 1.1). The increase is largely driven by high allowance prices in existing ETSs and new ETSs, in particular in European and North American jurisdictions which feature much larger auctioning shares. Since 2021, global revenues have remained stable at around US\$100 billion (in 2024 US\$).

Figure 1.1. Global revenues from carbon pricing in 2024 US\$ between 2015 and 2024

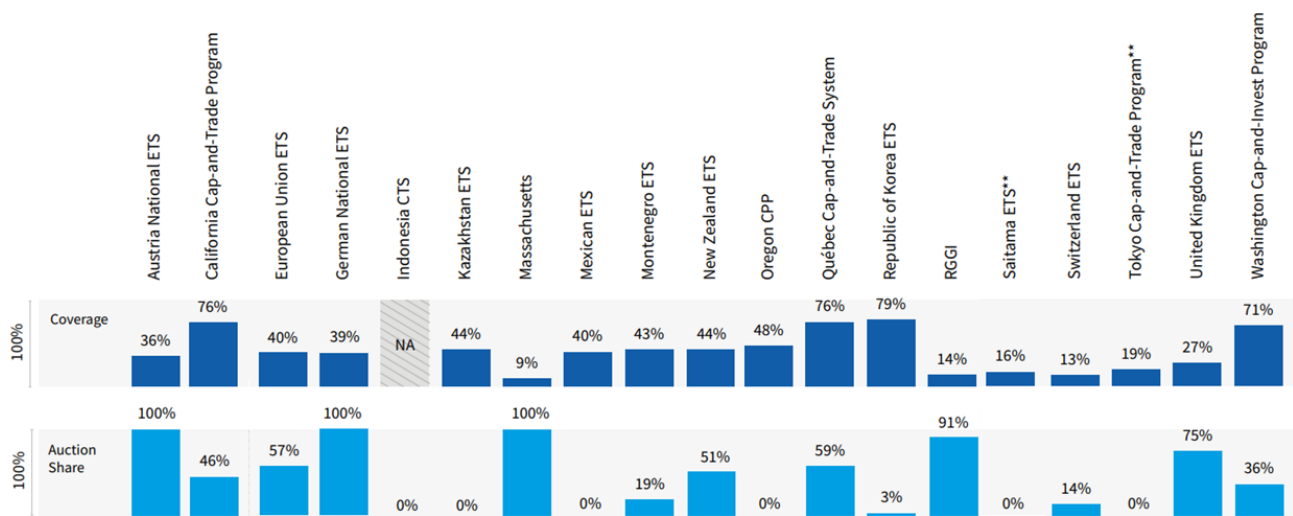


Source: World Bank (2025); Figure 9. License: Creative Commons Attribution CC BY 3.0 IGO

² The first carbon taxes were implemented in 1990, in Finland and Poland. Both are still operational. They are applied upstream and at the point source level, respectively.

It is noteworthy that, whereas carbon taxes typically collect revenues from all regulated emissions that don't receive an exemption or in which the compliance obligation is fulfilled through different means (such as offsets), ETSs collect revenues only on the allowances that are auctioned or in other payments that regulated entities can make to fulfil their compliance obligations. For example, the Mexican and Indonesian ETSs don't currently auction any of their allowances,³ whereas the Austrian, German and Massachusetts ETSs auction 100% of their allowances (see Figure 1.2). The Austrian and the German ETSs both currently cover emissions from fuel use, currently not covered in the EU ETS (e.g. in buildings and road transport), and will be largely replaced by the EU ETS 2, when it becomes operational in 2027. The EU ETS 2 will also auction all its allowances which is likely to increase global total revenues substantially starting in 2027.

Figure 1.2. Coverage and percentage of allowances that are auctioned in selected ETSs in 2024

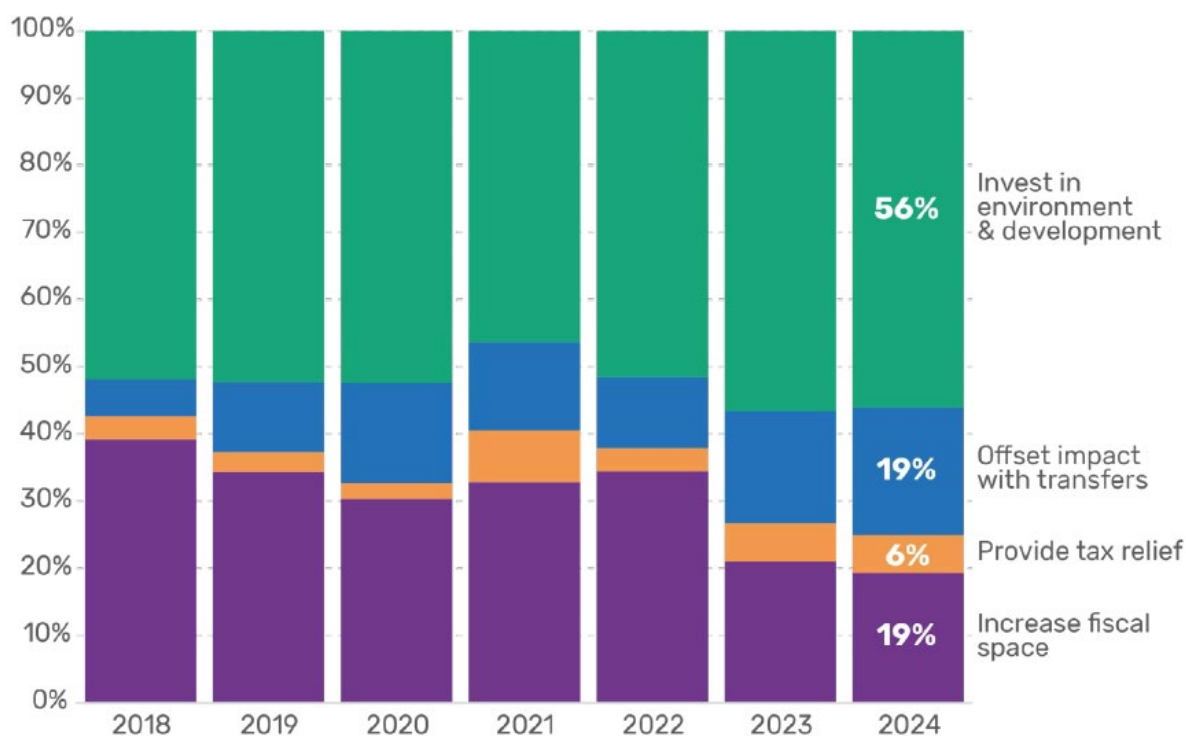


Source: Adapted from ICAP (2025b)

Jurisdictions have used these revenues in different ways, given their regulatory constraints and informed by their policy priorities. Based on analysis from Institute for Climate Economics (ICE), the World Bank observes that in 2024, 56% of the carbon pricing revenues were used for investment in environment and development (see Figure 1.3). Another 19% was used in direct transfers to households and companies impacted by carbon pricing, and 6% to provide tax relief. The rest, 19% of revenues, was used to increase fiscal space, following a decreasing trend of revenue use in this category, down from almost 40% in 2018. It is, however, important to note that, in practice, these categories are too broad to encompass all the goals that carbon pricing revenues seek to achieve, and that the same funded initiatives, programmes or projects can serve several purposes (such as transfers or subsidies for lower-carbon alternatives, as is discussed in the case studies, below).

³ China National ETS (not shown in Figure 1.2) which covers the power and selected industrial sectors does not currently auction any allowances but is expected to introduce auctions in due course.

Figure 1.3. Share of carbon pricing revenue use by use category between 2018 and 2024



Source: World Bank (2025); Figure 10. License: Creative Commons Attribution CC BY 3.0 IGO

A system-specific perspective can provide a complementary view of the variety of objectives that jurisdictions seek to achieve with the use of the revenues that they collect from carbon pricing instruments. A recent study from I4CE provides this overview for both ETSs and carbon taxes (see Table 1.1 and Table 1.2), classifying revenue use cases by whether they are directed to environmental, social, economic and/or unspecified goals.

It is notable that the only instances in which carbon pricing revenues are used in a single category is when they accrue to the general budget ('Unspecified'), which suggests that they are not earmarked in a broad sense. Moreover, of all the analysed instruments, only Argentina, Ireland and Norway (all carbon taxes) direct their revenues to the general budget and to at least one of the earmarked options: to environmental, social and/or economic goals. Four out of 14 ETSs, and eight out of 16 carbon taxes, direct (at least part of) their revenues to the general budget.

For ETSs, the two most common categories are environmental and economic, whereas for carbon taxes all three specified categories are equally common. Five out of 14 ETSs, and five out of 16 carbon taxes, use their revenues for environmental, social and economic goals, including the Regional Greenhouse Gas Initiative (RGGI), the South Korean ETS, the Colombia carbon tax, and the Swiss carbon tax. For systems that use their revenues in two categories, the most common pair in ETSs is environmental and economic (four cases). There is wider diversity in carbon taxes, with two cases each for social and economic (Argentina and Norway, both of which also direct some revenues to the general budget), environmental and economic, and social and environmental.

Table 1.1. Policy objectives for revenue use of selected ETSs in 2022

Jurisdiction	Stated policy objectives (2022)	Objectives per category			
		Environment	Social	Economic	Unspecified
Alberta	Climate resilience, support industry to reduce emissions and invest in clean technology to stay competitive, job creation, debt reduction.				
Austria	Redistribution to individuals with a consideration for geographical circumstances.				
California	While pursuing environmental goals, maximising co-benefits of green investments to deliver economic, environmental and public health benefits for citizens. By state law, a minimum percentage must go to disadvantaged and low-income communities and households.				
Canada	To incentivise the long-term decarbonisation of Canada's industrial sectors by supporting clean technology and electricity projects.				
EU	To tackle climate change in the Union and third countries, inter alia, for mitigation, adaptation – especially in developing countries, R&D, low-emission transport, just transition, and to cover administrative costs of the EU ETS. Most revenues go to Member States, which should spend at least 50% of revenues on specific purposes detailed in the Directive and can use up to 25% for financial measures supporting industries to address carbon leakage risks due to indirect costs.				
Germany	To invest in energy, transport and industry decarbonisation, and alleviate electricity prices for energy-intensive industries.				
Hubei	No stated objective. Only feeds the general budget.				
New Zealand	To support mitigation and adaptation measures, and initiatives that address the distributional impacts of these measures, including support for households and businesses/industry.				
Quebec	To support companies and citizens to reduce greenhouse gas emissions, adapt the economy and become more resilient to climate change.				
Regional Greenhouse Gas Initiative (RGGI)	To support businesses and households through investments in energy efficiency, renewable energy, direct bill assistance, beneficial electrification, greenhouse gas abatement and climate change adaptation. Only limited strategic guidance is provided by RGGI to its participating members on the use of funds.				
Shanghai	No stated objective. Only feeds the general budget.				
South Korea	To reduce greenhouse gas emissions (support industry, public sector), build a low-carbon ecosystem (green finance, support start-ups, professional manpower training), guarantee a just transition (support vulnerable territories and population groups), and foundation for carbon neutrality (finance R&D and regulatory support).				
Switzerland	No stated objective. Only feeds the general budget.				
UK	No stated objective. Only feeds the general budget.				

Source: Adapted from I4CE (2024); Table 4. Licensed under CC BY-NC-SA 4.0

Table 1.2. Policy objectives for revenue use of selected carbon taxes in 2022

Jurisdiction	Stated policy objectives (2022)	Objectives per category			
		Environment	Social	Economic	Unspecified
Argentina	To support infrastructure (water and transport) and social housing development, mitigate the increased cost of public transport, support the social security system, and feed national and provinces' budgets.				
British Columbia (Canada)	To provide relief for households from increased costs linked to the carbon tax, and work with industry to reduce pollution, improve efficiency and adopt new technologies.				
Canada	To return proceeds to provinces of origin, offset the cost of the federal pollution pricing for households, and support small- and medium-sized enterprises (SMEs), and Indigenous peoples, farmers and other recipients to reduce their energy use, costs and greenhouse gas emissions.				
Colombia	To support actions for environmental protection, and substitution of illicit crops.				
France	No stated objective. Only feeds the general budget and some parts are allocated to local authorities.				
Ireland	To support social welfare and prevent fuel poverty to ensure a just transition, invest in retrofitting and green farming. This applies only to part of revenues collected and the rest feeds the general budget.				
Japan	To support renewable energy projects and enhance energy-saving measures and clean and efficient use of fossil fuels. Explicitly stated targeted groups include businesses, SMEs and local governments.				
Mexico	No stated objective. Only feeds the general budget.				
Norway	To offset tax increase by reducing other taxes. Only for a share of revenues.				
South Africa	Soft revenue recycling in place with three axes: (i) tax shifting: reducing or not increasing other taxes, (ii) tax incentives: including the Energy Efficiency Savings Tax Allowance, (iii) budget allocations: to enhance free basic energy, electricity programme, and improved public transport. Support focused on businesses.				
Sweden	No stated objective. Only feeds the general budget.				
Switzerland	To redistribute revenues to the population through transfers, promote energy efficiency measures in buildings, and support for technology development through the promotion of innovative companies.				
UK	No stated objective. Only feeds the general budget.				
Ukraine	No stated objective. Only feeds the general budget.				

Yucatan (Mexico)	To support actions to provide a healthy environment for the population and to protect them from natural disasters.				
Zacatecas (Mexico)	To invest in areas with the greatest environmental vulnerability and social needs, including on disaster risk management.				

Source: Adapted from I4CE (2024); Table 5. Licensed under CC BY-NC-SA 4.0

1.3. Carbon pricing in Taiwan

In 2025, the Government of Taiwan put the carbon fee system into effect. It covers around 260 companies from the power and industry sectors emitting over 25,000 tonnes of carbon dioxide equivalent (tCO₂e) annually, which account for around 55% of Taiwan's greenhouse gas emissions.

The fee has three rates: the standard rate, of TWD 300 (US\$9)⁴; the preferential rate A, of TWD 50 (US\$1.5), for entities that apply for a self-determined emissions reduction plan and meet an industry-specific designated reduction rate; and the preferential rate B, of TWD 100 (US\$3), for entities that apply for a self-determined emissions reduction plan and meet a technology-specific designated reduction rate.

Emissions-intensive, trade-exposed entities that have submitted a self-determined reduction plan that has been reviewed and approved get an emission adjustment coefficient applied to their chargeable emissions. Initially, this coefficient is 0.2. In the second phase, the coefficient will increase to 0.4, and to 0.6 in the third phase. Entities that are not emissions-intensive, trade exposed, or that don't have a self-determined reduction plan, only pay for the emissions above the inclusion threshold (25,000 tCO₂e annually).

Offsets are allowed for compliance with the fee: domestic credits can be used for up to 10% of the entity's compliance obligations. International credits can only be used by industries that are not at a high carbon leakage risk and must be approved by the Ministry of Environment.

Article 33 of the Climate Change Response Act specifies that revenues from the carbon fee should be used exclusively for greenhouse gas reductions and climate change adaptation. Specifically, they may be used to support action on greenhouse gas reduction, for administration, organisation or personnel expenses, to support action on adaptation or just transition, to carry out research in climate change adaptation and greenhouse gas reduction, and for other domestic or international cooperation, knowledge sharing and capacity building. Appendix I provides a list of the specific use categories provided for in Article 33. Appendices II and III map these cases to examples from Japan and international experiences.

In the medium-to-long-term, Taiwan is planning to implement a T-ETS. In addition, T-CBAM is being developed and a reporting system for product carbon emissions was piloted in 2025.⁵ In 2026, the government will formalise the regulations and start applying them, in view of the first reporting obligations in the first quarter of 2027.

⁴ Mentioned exchange rates are based on the most recent data by the International Monetary Fund (IMF). See: [https://data.imf.org/en/Data-Explorer?datasetUrn=IMF.STA:ER\(4.0.1\)](https://data.imf.org/en/Data-Explorer?datasetUrn=IMF.STA:ER(4.0.1))

⁵ In 2025, the development of the Taiwan CBAM proceeded across four different dimensions: identifying the reporting entities, the reportable products, the calculation method and the reporting method.

2. Theoretical options for revenue use

Carbon pricing revenues present governments with strategic choices that extend beyond simple fiscal allocation decisions. Economic literature, particularly insights from public economics, identifies three fundamental approaches to revenue use, each with distinct implications for economic efficiency, environmental effectiveness and political feasibility (Bowen, 2015; Siegmeier et al., 2015). These options include changing the tax mix, changing spending patterns, and changing the fiscal balance sheet. In practice, governments may combine elements across these approaches or vary the timing of revenue use, but this three-way framework captures the essential theoretical distinctions in how carbon pricing revenues interact with broader fiscal policy.

In Sections 2.1–2.3, these theoretical options are introduced and examined through a review of the relevant literature, drawing not only on academic sources in public finance, environmental economics and political economy, but also on grey literature analyses by international organisations focusing on real-world implementation experiences. Impacts on greenhouse gas emissions (including rebound effects), low-carbon innovation incentives, broader economic performance, and public acceptability of carbon pricing policies are assessed in Section 2.4.

2.1. Option 1: Changing the tax mix

A core strand in public economics motivates the use of carbon pricing revenues to change the tax mix in ways that enhance overall fiscal efficiency. Two strategies dominate: revenue recycling that reduces rates on pre-existing distortionary taxes (notably labour or corporate income), and more fundamental green fiscal reform that replaces some distortionary tax instruments with carbon proceeds. The analytical foundations are set out in Bovenberg and Goulder's (2002) second-best treatment (in other words, where distortions exist) of environmental taxation and regulation, with the debate originating in mid-1990s work on the 'double dividend' and the interaction between environmental levies and distortionary taxation. While the theory is compelling, empirical magnitudes and the conditions under which recycling delivers net efficiency gains remain contested across economic contexts (Pareliussen et al., 2022).

On efficiency, using carbon revenues to reduce labour-tax wedges is consistently shown to lower the excess burden of taxation relative to lump-sum returns. The October 2019 issue of IMF Fiscal Monitor (IMF, 2019) sets out simulated macro outcomes under alternative recycling designs and finds that using the revenues to cut income taxes generates the most favourable efficiency outcomes compared to other recycling designs.

More fundamental green fiscal reform – eliminating selected distortionary taxes and funding them with carbon revenues – faces an important design constraint in carbon pricing contexts: revenue adequacy over time. As decarbonisation progresses towards net zero by mid-century, the carbon tax base tends to decline substantially. In other words, revenues are significant for as long as the carbon tax base remains significant. This cautions against permanently replacing broad-based taxes, however distortionary, with carbon pricing revenues. Moreover, the broader decline in fossil fuel use as decarbonisation progresses shrinks the tax base for other fuel and excise taxes whose revenues are significant in many countries (French Directorate General of the Treasury, 2023). This leaves a substantial gap in government budgets. At the same time, revenues from carbon pricing can be an important transitional measure, especially if coordinated at the international level.

Cross-cutting impacts of tax-mix changes are design-sensitive. Environmental effectiveness can be weakened if undifferentiated transfers blunt the behavioural response to higher energy prices through income and rebound effects (Pareliussen et al., 2022). Conversely, careful targeting of transfers helps maintain the carbon price signal, enhance the public acceptability of (or weaken opposition to) carbon pricing, and mitigate leakage and competitiveness concerns (Carattini et

al., 2019). In sum, within the second-best framework where pre-existing distortionary taxes interact with carbon prices, changing the tax mix is most compelling where carbon revenues can credibly reduce substantial pre-existing distortions while preserving the environmental signal and equity objectives. Successful implementation depends on transparent recycling commitments, careful targeting, and explicit planning for revenue adequacy as the carbon base declines.

2.2. Option 2: Changing the spending patterns

Market failures provide the core economic rationale for government intervention through public expenditure and investment to address inadequate private provision of public goods, innovation spillovers and distributional concerns. In the context of carbon pricing revenues, this approach includes both public capital investment in long-term assets (e.g. EV charging networks, maintaining port and road infrastructure, climate adaptation), and current expenditure on programmes, operations and services (e.g. feed-in tariffs, general welfare and social security expenditures, information and awareness campaigns). Recent evidence indicates that green spending is the only carbon pricing revenue-recycling option that increases public support for carbon pricing in a statistically significant way (Carattini et al., 2019; Mohammadzadeh Valencia et al., 2024).

Both the expenditure and investment approaches cover a wide spectrum of measures, from climate-specific capital investments in mitigation and adaptation infrastructure to broader public spending that leverages carbon revenues for general economic and social purposes (Klenert et al., 2018). Climate-focused programmes directly support decarbonisation objectives, while approaches without a climate-specific focus use carbon revenues as a flexible fiscal tool. This categorisation reflects fundamental choices in revenue use on whether and how to maintain the environmental focus of revenue use. Measures that keep the environmental focus include climate-related investment and climate-related current expenditure. Measures that don't keep an environmental focus include deploying revenues for general public capital investment and services and providing direct redistribution to citizens through various spending and transfer programmes. Measures that could, but don't necessarily, keep a focus on climate, include utilising hybrid financing mechanisms that blend public and private resources.

Climate-related capital spending allocates carbon revenues to mitigation and adaptation assets and targeted programmes that directly shift technology and infrastructure trajectories towards low-carbon and climate-resilient paths. Such spending could be directed to electricity grid modernisation and interconnection, electric vehicle (EV) charging networks (IEA, 2023), public transit and active mobility, industrial process upgrades that reduce direct and indirect emissions, building retrofits that improve energy efficiency, and nature-based solutions for both mitigation and adaptation. These investments can complement the carbon price signal and deliver durable emissions reductions by addressing network bottlenecks, coordination failures, liquidity constraints and technology diffusion barriers. Adaptation assets reduce climate risk and protect welfare even where they do not lower emissions. Research and development (R&D) and demonstration funding expand the innovation frontier and generate spillovers that accelerate cost declines and adoption, especially when paired with deployment support that bridges the so-called "valley of death", that is, the funding gap between technology development and commercialisation (Popp, 2019; Calel and Dechezleprêtre, 2016). To safeguard efficiency, investment decisions should be guided by transparent appraisal, including a thorough social cost-benefit analysis, competitive procurement and independent evaluation with clear performance metrics. To preserve asset productivity over time, dedicated funding for operations and maintenance and performance monitoring is necessary for networked and public-good assets (e.g. EV charging, public transit, electricity grid), and a share of revenues should be reserved for public sector administrative and oversight capacity to ensure effective implementation.

Climate-focused spending programmes face additionality and lock-in risks if carbon revenues displace planned budgets, subsidise non-additional projects or entrench technologies inconsistent with long-term decarbonisation. These risks are mitigated by competitive, technology-neutral allocation mechanisms, with targeted, time-bound support where path dependence or strategic importance warrants (e.g. long-duration storage, industrial heat decarbonisation, carbon capture and storage), performance-based grants or contracts, and sunset clauses aligned with the secular decline of the revenue base. For discrete, firm-level assets, public support should be time-bound and decline as projects mature, with monitoring, reporting and verification (MRV) and performance guarantees embedded in contracts – not recurring public operational subsidies. Implementation capacity is often the binding constraint. Accordingly, a portion of revenues should support institutional strengthening, capacity building in the public and private sectors, and MRV systems that underpin not only the fair application of carbon pricing but also the mitigation impact of the spending programmes. Finally, design choices must preserve the carbon price signal (e.g. avoid broad energy-price offsets) while sequencing investments to minimise transition costs and manage distributional effects across sectors and regions.

General public expenditure and capital investment can deploy carbon pricing revenues to high-return public goods that raise productivity, resilience and welfare beyond climate-specific sectors. Priorities include maintaining critical assets, upgrading enabling infrastructure (ports, rail, transmission corridors, and digital infrastructure), and investing in human capital. The efficiency case is to correct chronic underinvestment caused by fiscal constraints and externalities. The trade-off is a diluted climate focus and the risk of building permanent programmes on a temporary revenue stream. To manage this, funds may be channelled to one-off or transitional projects with strong economic returns. It is important to screen for climate consistency to avoid induced emissions and lock in low-carbon choices, and to integrate decisions into the budget with additionality safeguards so carbon revenues supplement, rather than displace, planned capital (ECB, 2022).

Direct redistribution uses carbon revenues to return value to households through lump-sum dividends, refundable tax credits, or targeted transfers, delivered via the tax/benefit system. Unlike Option 1's tax mix changes, this approach does not reduce statutory tax rates or marginal tax wedges; it returns revenue as payments or credits (Klenert et al., 2018; Mildenerberger et al., 2022). The primary objective is to offset distributional burdens while preserving the carbon price signal by avoiding relative price suppression in energy products and more carbon-intensive products. Design choices (universal vs targeted, per-capita vs income-tested, and payment frequency) shape equity, salience and administrative cost. Targeting energy-burdened and low-income households, and affected workers or regions, can reduce hardship and strengthen political acceptability, but increases complexity and the risk of exclusion errors. When possible, delivering payments via existing tax/benefit systems improves timeliness and integrity. To limit rebound, it is necessary to decouple benefits from energy consumption and communicate the link to carbon revenues transparently.

Leveraging private finance through co-financing, guarantees and de-risking facilities can amplify impact but requires careful calibration to avoid crowding out and ensure genuine risk transfer (UNCTAD, 2023). Instruments include guarantees, concessional or subordinated debt, carbon contracts for difference (CCFDs), and offtake or availability contracts to improve bankability for novel technologies and infrastructure. Support should be priced to underlying risk, targeted at specific market failures (e.g. early-stage technology or regulatory risk, coordination failures, high cost of capital), and limited where markets already function well. Allocation should be competitive and transparent, with additionality tests, caps on public exposure and defined exit pathways as technologies mature. Contingent liabilities should be incorporated into the medium-term fiscal framework and actively monitored (ECB, 2022). Disbursement should be performance-based, using standardised metrics for private capital mobilisation and project

delivery. Blended instruments should alleviate financing frictions rather than reduce prices of carbon-intensive goods or fund ongoing operating costs.

Environmental effectiveness is likely to be highest when funds relieve binding constraints to abatement, insufficient network infrastructure, R&D and knowledge externalities, and barriers to early deployment, while general public goods require climate screens to avoid induced emissions. Innovation incentives are strongest where instruments de-risk first-of-a-kind projects (e.g. CCFDs, guarantees) and complement, rather than offset, the carbon price. Macro performance improves when investments raise productivity and resilience; however, contingent liabilities from blended finance must be disclosed, capped, priced and integrated into fiscal planning. While statistical evidence is so far lacking, anecdotal evidence and programme reviews suggest political acceptability rises with visible local benefits and well-targeted household support. Effective communication is a success factor: make benefits salient, brand programmes clearly, publish regular revenue-use and impact reports, and avoid mixed signals from energy price suppression.

2.3. Option 3: Changing the fiscal balance sheet

Using carbon pricing revenues to manage the public balance sheet emphasises future fiscal flexibility over immediate economic intervention, framing the policy choice as a trade-off between two core objectives of optimal fiscal policy. Two principal approaches are possible: retiring public debt to strengthen fiscal sustainability and lower future interest burdens, a priority when current debt levels are high and pose a risk to macroeconomic stability (Barro, 1979; Reinhart and Rogoff, 2010; Herndon et al., 2014),⁶ and establishing a fund that supports intergenerational equity and provides reserves to manage volatility, which aligns with the tax-smoothing principle of using temporary revenue streams to avoid future fiscal disruptions. The choice between them, and their relative weights, depends on existing debt levels, macroeconomic uncertainty, and political preferences over the timing of benefits.

Debt reduction can deliver macro-efficiency gains by lowering sovereign risk premia and easing future consolidation pressures. This approach uses the temporary revenue windfall to create a durable buffer against future fiscal shocks, avoiding the economic distortions of having to suddenly raise taxes or cut spending later. This can be implemented either by recording carbon revenues as general receipts that strengthen the primary balance, or, where signalling and commitment are paramount, by using a time-limited, rules-based Dedicated Debt Reduction Account. This latter approach, while a form of soft earmarking, is increasingly seen as a pragmatic tool to build the political consensus necessary for carbon pricing, provided it has clear sunset clauses tied to the declining revenue base and is fully integrated into the medium-term fiscal framework (IMF Fiscal Affairs Department, 2019).

Fund creation can take stabilisation, savings or hybrid forms. Effectiveness hinges on several factors, which are grounded in extensive experience with natural resource funds and codified in international best practices. First, the fund's mandate should be clear, whether it is smoothing fluctuations in macroeconomic variables over the business cycle, preserving wealth or financing priority programmes. This helps to reduce mission creep and political drift. Second, deposit and withdrawal mechanisms should be strictly rules-based to discipline use over the business and electoral cycles and guard against the pro-cyclical spending of a temporary windfall. Third, a robust and transparent governance framework is essential to make these rules credible and ensure accountability for how carbon revenues are managed. Finally, the fund must be fully integrated with the budget to maintain fiscal coherence. This means its operations should be aligned with the medium-term budget framework, with all transactions recorded in fiscal

⁶ For the theoretical arguments underpinning the two approaches, see Barro (1979) and Reinhart and Rogoff (2010), respectively. The specific quantitative conclusions of the latter were successfully challenged by Herndon et al (2014), though the broader principle of a negative correlation between high debt and growth is still widely acknowledged.

aggregates, and its projects must supplement, not displace, planned spending. The fund's design must also anticipate the revenue's volatility and secular decline, incorporating features like sunset clauses for deposit rules and explicit drawdown triggers (Bernstein et al., 2013; International Working Group of Sovereign Wealth Funds, 2008).

Cross-cutting impacts of these balance sheet options are mixed. They do not abate emissions per se, but they can enable future green investment by creating fiscal space and lowering long-term borrowing costs. However, the distributional and political implications of 'saving' can be challenging without visible concurrent relief or spending. Macroeconomic performance is expected to improve through the reduced sovereign risk from lower debt and the enhanced shock-absorption capacity of a fund, while direct innovation incentives are limited unless the fund explicitly supports R&D and deployment. Overall, this approach is most compelling where fiscal sustainability and volatility management are binding concerns, provided governance is credible and communication is clear, and always with a clear strategy to manage the revenue's eventual decline.

2.4. Overview of options and their effects

Table 2.1 below synthesises how the three revenue use options compare on economic efficiency, environmental impact and political feasibility, while flagging the most salient design risks. Option 2 is disaggregated into four sub-options to reflect the heterogeneity of spending instruments discussed above. Ratings use a simple 0/+ to +++ scale and indicate ranges where outcomes are design- or context-dependent. They are indicative rather than additive and assume the carbon price signal is preserved and the revenue base declines over time consistently with decarbonisation. The 'Key risks/notes' column presents recurring considerations such as additionality, implementation capacity and MRV, competitiveness/leakage in energy-intensive and trade-exposed (EITE) sectors, contingent liabilities, and rules-based governance so choices can be sequenced and communicated coherently.

Table 2.1. Overview of revenue use case options and their indicative effects on economic efficiency, environmental impact and political feasibility

Option	Economic efficiency	Environmental impact	Political feasibility	Key risks/notes
Option 1: Changing the tax mix	+++	++ (design-sensitive)	++	• Avoid permanent cuts due to declining base • Preserve price signal • Target transfers • Address competitiveness/leakage in EITE sectors
Option 2: Changing the spending patterns	++	+++ (if climate-focused)	+++	• Heterogeneous • Strongest if relieving binding constraints • High MRV/implementation demands • Implementation capacity often binding
2a: Climate-focused investment/programmes	++	+++	++ to +++	• Additionality safeguards • Competitive, performance-based allocation • Time-bound with sunset clauses • Ensure robust MRV
2b: General public expenditure/capital	+ to ++	+	++	• Diluted climate focus • Prioritise one-off/transitional projects

(non-climate-specific)				• Apply climate screens
2c: Direct redistribution (dividends, credits, transfers)	+	+(preserves price signal)	++ to +++	• Targeting complexity/exclusion • Delivery via tax/benefit system • Avoid energy-price suppression
2d: Blended finance/de-risking (guarantees, CCfDs, etc.)	++	++(target early-stage risk)	++	• Contingent liabilities • Priced to risk and competitive allocation • Define caps and clear exit paths
Option 3: Changing the fiscal balance sheet	++	0 to +(indirect only)	+ to ++	• Indirect only • Rules-based governance integrated with MTBF • Sunset/volatility; communicate

Notes: 0 = no direct effect; + = modest effect; ++ = moderate effect; +++ = strong effect; ranges indicate design/context dependence. EITE = energy-intensive and trade-exposed; MRV = monitoring, reporting and verification; CCfD = carbon contracts for difference; MTBF = medium-term budget framework.

Source: Authors' own elaboration

3. Revenue use in practice

In this section, we present four case studies on revenue use in other jurisdictions. These are relevant to the Taiwan carbon fee given the uses that they make of their revenues, how they govern them or how they report them. Each case study contains information on the rationale for the revenue use, the recipients/indirect beneficiaries of selected options, the regulatory and institutional governance needed to achieve the stated objectives, how revenue use is reported and communicated, and findings from regulatory or independent reviews (when available).

3.1. Japan Carbon Tax revenue use through the ‘Special Account for Energy Measures’

Japan’s carbon tax (‘Tax for Climate Change Mitigation’, 「地球温暖化対策のための税」) was implemented through the Act on Partial Revision of the Act on Special Measures Concerning Taxation, etc. (Act No. 16 of 2012), which introduced the ‘Special Provisions for Taxation for Climate Change Mitigation’ in the Act on Special Measures Concerning Taxation (Ota, 2024; Hattori and Kondo, 2024; Ministry of the Environment, Japan, 2011). This tax is a component of the Oil and Coal Tax and was gradually introduced over three years, starting in 2012, up to a rate of JPY 289 per tCO₂e on crude oil and oil products, gaseous fossil fuels (liquefied petroleum gas [LPG] and liquefied natural gas [LNG]), and coal. The revenue for the first year of operation (fiscal year 2012) was estimated at JPY 39 billion (US\$263.64 million), whereas the yearly revenue in a year when the full tax rate applied (starting in fiscal year 2016) was estimated at JPY 260 billion (US\$1.76 billion) (Committee to Green the Tax System, Ministry of Environment, Japan, 2017; IMF, 2026).⁷

Rationale for revenue use

The tax was introduced as part of an effort to ‘green’ the tax system (Committee to Green the Tax System, Ministry of Environment, Japan, 2017); specifically, to incentivise emissions reductions by “imposing [an] appropriate and fair economic burden”. The revenue use cases are specified in the Basic Environment Plan: the 4th Basic Environment Plan (2012) specified that the government would use revenues to “implement energy-efficiency measures, expansion of renewable energy, and promotion of clean fossil fuel and its efficient use”. The 6th Basic Environment Plan (2024) specifies that revenues will be used to “implement measures to control energy-originated CO₂ emissions”.⁸

Potential revenue use cases were an important consideration from the early stages of the design of the tax, as the government discussed whether the main impact of the tax should be through the ‘price effect’ (i.e. incentivising emissions reductions and investment in low-carbon technologies by making carbon-intensive alternatives expensive) or through the ‘revenue effect’ (i.e. using revenues to invest in low-carbon technologies). The Ministry of Economy, Trade and Industry’s (METI) Policy Measures Working Group argued that the price effect of a high tax rate would be limited, as the marginal abatement costs were higher than in European developed economies and in the US. As such, the focus centred on the potential role of the tax-funded the ‘revenue effect’ (Kawakatsu et al., 2017; Gokhale, 2021).

Regulatory and institutional governance to achieve the stated objectives

Revenues from the Tax for Climate Change Mitigation, as well as revenues coming from the Oil and Coal Tax in general, are first directed to the general budget. From the general budget, these, and additional resources (when needed), flow into the Energy Demand/Supply Account

⁷ Based on data from the IMF, the annual average exchange rate at the time that the tax was first implemented (2012) was JPY 79.79 per US\$, implying a carbon tax rate of US\$3.62. The same rate in 2024 was JPY 151.37 per US\$ implying a carbon tax rate of US\$1.91.

⁸ See, in particular, p. 252.

(エネルギー需給勘定) of the Special Account for Energy Measures (エネルギー対策特別会計). The Energy Demand/Supply Account is divided into two parts: one for Stable Supply of Fuel Measures (Ministry of Finance, Japan, 2024), and the other for the Modernization of Energy Demand/Supply Structure Measures. Of the latter, most of the resources are managed by METI (Ministry of Economy, Trade and Industry and Ministry of the Environment, Japan, 2025) and a smaller component is managed by the Ministry of Environment (MOE) (Ministry of the Environment, Japan, 2025). The revenues from the Tax for Climate Change Mitigation are meant to achieve emissions reductions through the Modernization of Energy Demand/Supply Structure component of the Energy Demand/Supply Account of the Special Account for Energy Measures (Ministry of the Environment, Environment and Economy Division, Japan, 2017).

Revenues managed by METI then fund projects and initiatives that are implemented through different bureaus, offices and agencies of the Ministry, such as the Manufacturing Industries Bureau (製造産業局) and the Agency for Natural Resources and Energy (資源エネルギー庁). A limited number of funded initiatives focused on implementing measures to control energy-originated CO₂ emissions have local governments as their (partial) beneficiaries (e.g. research support project aimed at expanding the introduction of offshore wind; subsidies for projects to rationalise energy use related to preventing mine pollution by former mines; or subsidies for the closure of abandoned oil wells). Also, a very limited number of these initiatives are developed in conjunction with other ministries (specifically, the domestic greenhouse gas reduction and removal certification (J-Credit) implementation costs, together with the Ministry of Environment, and the Ministry of Agriculture, Forestry, and Fisheries).

Revenues managed by the MOE also fund projects and initiatives that are implemented through different bureaus and offices of the Ministry, such as the Regional Policy Division (地域政策課), the Regional Decarbonisation Project Promotion Division (地域脱炭素事業推進課), and the Global Environment Bureau (地球環境局). Some of the initiatives channel resources through subnational governments (such as the Regional Decarbonisation Promotion Subsidy, or the Support Project for Regional Renewable Energy Introduction), or are developed in conjunction with other ministries (e.g. the Public-Private Project to Accelerate the Regional Introduction of Renewables is jointly developed with the Ministry of Internal Affairs and Communications, the Ministry of Agriculture, Forestry and Fisheries, and the Ministry of Economy, Trade and Industry). Out of 40 initiatives listed for fiscal year 2025, 16 had local governments as (partial) beneficiaries, and seven were developed jointly with other ministries.

Recipients/indirect beneficiaries of selected option

Most of the initiatives and projects aimed at controlling energy-originated CO₂ emissions managed by METI or by the MOE have private companies as their ultimate beneficiaries (see Table 3.1 and Table 3.2). Examples of these are: a programme managed by METI, called 'Interest subsidy programme to promote the transition towards carbon neutrality' that functions through the Japan Finance Corporation (株式会社日本政策金融公庫) which approves 10-year mitigation or decarbonisation plans developed by private companies, so that they receive performance-linked interest subsidies to support their efforts.

A substantial number of resources managed by METI, particularly those focused on supporting research or innovation, also support universities and research institutions. Some of these are undertaken through the National Research and Development Agencies (国立研究開発法人). One particularly relevant project, that uses funding managed by the MOE, invests in the own greenhouse gas emissions management infrastructure. It seeks to improve the infrastructure of the Electronic Reporting System for Energy Conservation, Global Warming Countermeasures and Fluorocarbons Act (EEGS), which aims to integrate reporting based on the Global Warming Countermeasures Act and information on greenhouse gas emissions.

A limited amount of revenues also supports international climate negotiations and action. The project 'UNFCCC Negotiations' provides a contribution to the Technology Executive Committee, an organ of the Technology Mechanism of the United Nations Framework Convention on Climate Change (UNFCCC). It also serves to secure experienced personnel to support participation in and the process of climate negotiations. Moreover, some projects provide contributions to international organisations or cooperation forums, such as the Asia-Pacific Energy Research Centre and the International Renewable Energy Agency. Still others provide support for decarbonisation in emerging economies in Asia and elsewhere, for example through the Joint Crediting Mechanism, by supporting equipment subsidies, development of studies, roadmaps, participation in events, etc.

Some projects have local communities or the public as their ultimate beneficiaries. These include communication campaigns to promote energy saving measures, and the development of human resources to introduce offshore wind energy or to develop decarbonisation plans. They also include receiving support for the installation of equipment for solar generation or providing support to implement insulation renovations.

Finally, local governments are also beneficiaries of some of the funded projects managed by METI, and of a substantial amount of the funded projects managed by the MOE. Examples include being beneficiaries of flow surveys to expand hydropower, geothermal energy or solar generation, as well as resources to support the introduction of renewable energy facilities that can supply energy to public facilities.

Table 3.1. Fiscal year 2025 budget expenditure sub-categories and sub-subcategories reported by the Ministry of Economy, Trade and Industry for the 'Modernization of Energy Demand/Supply Structure Measures' category of the 'Energy Demand/Supply Account' of the 'Special Account for Energy Measures'^a

Expenditure sub-category ^b	JPY 1,000	Expenditure sub-subcategory	JPY 1,000
Global warming countermeasures	157,072,220	Subsidies for CO ₂ reduction measures	84,052,755
		CO ₂ control measures, etc., contract expenses	38,481,274
		CO ₂ reduction project grants	31,139,730
		Commissioned research on global warming countermeasures	2,667,576
		Contributions to the International Energy Agency, etc.	650,885
		Subsidies for global warming countermeasures promotion projects	80,000
Diversification of energy sources	58,918,864	Subsidies to promote the introduction of non-fossil energy, etc.	50,305,719
		Commissioned surveys to promote the introduction of non-fossil energy, etc.	8,364,634
		Contributions to the International Energy Agency, etc.	248,511
Energy conservation	47,205,434	Subsidies to promote energy-efficient equipment	23,801,818
		Commissioned expenses to promote energy-efficient equipment	21,103,834
		Contributions to the International Energy Agency, etc.	2,299,782
Total		263,196,518	

Notes: a. The items 'Cost of converting national treasury debt obligations into expenditures' and 'Interest rate subsidies for funds for specific facilities for rationalising energy use' (the latter for a total of JPY 44,000) are not included here. b. An indicative mapping of how the expenditure items (i.e. the items one level of disaggregation below the sub-subcategory) of this account correspond to the revenue use cases established in Article 33 of the Taiwan Climate Change Response Act can be found in the accompanying Excel sheet.

Source: Authors' own elaboration with information from METI (2025a)

Table 3.2. Fiscal year 2025 budget expenditure beneficiaries reported by the Ministry of Economy, Trade and Industry for the ‘Modernization of Energy Demand/Supply Structure Measures’ category of the ‘Energy Demand/Supply Account’ of the ‘Special Account for Energy Measures’^a

Beneficiaries (all sub-categories)	JPY 1,000
Private organisations, etc.	181,169,264
Local public organisations/local governments, etc.	70,428,076
Organization for Cross-regional Coordination of Transmission Operators ^b	8,000,000
International organisations	3,199,178
Financial Institutions	400,000
Total	263,196,518

Notes: a. The items ‘Cost of converting national treasury debt obligations into expenditures’ and ‘Interest rate subsidies for funds for specific facilities for rationalising energy use’ (the latter for a total of JPY 44,000) are not included here. b. The Organisation for Cross-regional Coordination of Transmission Operators (OCCTO, no date) is a private organisation established under the Electricity Business Act. Its goals are to maintain a stable supply of electricity and render power supply systems as efficient as possible from a neutral and impartial position.

Source: METI (2025a)

How revenue use is reported and communicated.

This section pertains to information published on the resources managed by the MOE. The MOE’s Decarbonization Project Support Information Site (Energy Special Portal) publishes case studies of projects that have been supported by the resources of the Special Accounting for Energy Measures which is managed by the MOE (Ministry of the Environment, Japan, no date; Ministry of the Environment, Japan, 2025). Included are cases from all of the initiatives, measures and programmes supported. The following information is provided in each case:

- Name and location of the beneficiary (recipient) of the support
- Amount of the support or subsidy
- Project period, nature of the project or support
- Documentary evidence of the project (such as pictures)
- Quantification of costs
- Quantification of CO₂ emissions reduced by the project
- Secondary effects (or co-benefits) of the project
- Timeline of the project
- Quotes from the beneficiaries.

The CO₂ emissions reductions that are quantified in the projects are then used to report on the overall emissions reductions achieved by the tax through the budget effect (see below).

Findings from regulatory or independent reviews

The Committee to Green the Tax System (税制全体のグリーン化推進検討会) and the Subcommittee on the Use of Carbon Pricing (カーボンプライシングの活用に関する小委員会) (both consisting of external experts and experts from the MOE) have published assessments irregularly on the impacts of the tax on emissions coming from the price effect and from the revenue effect.⁹ In an assessment made in 2017, they estimated a price elasticity of energy demand of –0.02 to –0.26 in the short term and –0.15 to –0.61 in the long term, leading to an

⁹ See, for example, documentation from the 2nd meeting of 2016 and of the 4th meeting of fiscal year 2016 of the Committee to Green the Tax System (Committee to Green the Tax System, Ministry of Environment, Japan, 2016, 2017), as well as the 8th and 15th meetings of the Subcommittee on the Use of Carbon Pricing (Subcommittee on the Use of Carbon Pricing, Ministry of Environment, Japan, 2019, 2021).

expected greenhouse gas reduction from the price effect of 2.42 metric tonnes of carbon dioxide equivalent (MtCO₂e) by 2030. They also calculate an expected emission reduction from the revenue effect of 51.66 MtCO₂e by 2030. In the most recent assessment by the Subcommittee on the Use of Carbon Pricing (2021), while a reduction of 3.2 MtCO₂ is estimated from the price effect in 2019, a reduction of 3.55 MtCO₂ is estimated from the budget effect in fiscal year 2019.

Similarly, Gokhale (2021) notes a study undertaken by Kawakatsu et al. (2017), and modelling by Lee et al. (2012), that indicate that the carbon tax has had small effects on emissions reductions and economic growth, and suggest that a higher tax rate, coupled with appropriate revenue-generating measures, could produce a positive double-dividend for the Japanese economy. Besstremyannaya et al. (2025) employ Acemoglu et al.'s (2016) model which incorporates path dependency of dirty and clean innovation and find that, with a combination of carbon taxes and research subsidies, there is a temporary decline of economic output associated with the development of carbon neutral technologies, but that these costs can be offset against long-term economic gains. They also find that the optimal carbon tax rate in Japan should not be below that of the US.

3.2. Japan ETS and Carbon Levy use of revenues through the GX Economic Transition Bonds

The Green Transformation (GX) initiative is Japan's comprehensive national strategy to shift its industrial and social structure from being centred on fossil fuels to being centred on clean energy. It was kick-started in 2022, when the Japanese Government established the GX Implementation Council as a body to guide and formulate the GX Basic Policy, which was adopted in February 2023 by the Cabinet. The GX initiative is further supported by, among others, the GX Promotion Act (approved in early May 2023), and the GX Promotion Strategy (approved in July 2023). It incorporates a Growth-Oriented Carbon Pricing Concept and GX Economy Transition Bonds as mechanisms to help mobilise part of a JPY 150 trillion (US\$1.014 trillion) investment drive over the next decade to achieve this transformation.

Rationale for revenue use

The GX Basic Policy observes that Japan is estimated to require over JPY 150 trillion in public and private funds over the next decade to achieve its international commitments of a 46% reduction in emissions by FY2030 compared to FY2013 and carbon neutrality by 2050, and strengthen its industrial competitiveness and economic growth (Cabinet Secretariat of Japan, 2023). To support the realisation of this investment, the GX initiative introduced the GX Economy Transition Bonds and a Growth-Oriented Carbon Pricing Concept.¹⁰

The GX Economy Transition Bonds are meant to support 'first movers' for projects that aim to transition towards decarbonisation (Government of Japan, 2023). Through the Bonds, Japan aims to implement JPY 20 trillion (US\$135.2 billion) in upfront investments to increase policy predictability, signal commitment and facilitate the mobilisation of private funding. Priority is given to hard-to-abate sectors, and specifically power generation, industry (such as the iron and chemical industries), and sectors that are highly relevant for citizens, such as households and transportation. The framework specifies the projects eligible for the bonds (Government of Japan, 2023) (see Figure 3.1).¹¹

¹⁰ The entirety of the estimated JPY 150 trillion in public-private investment is also expected to be achieved through other complementary measures not linked to carbon pricing or the GX Economy Transition Bonds, such as the implementation of "investment promotion measures that combine regulatory and fiscal support", the "Promotion of decarbonization and generation of new industries by strengthening of regulations", the development and implementation of blended finance, and the development of a friendly market environment. For a visual representation, see p. 15 of the *Japan Climate Transition Bond Framework* (Government of Japan, 2023).

¹¹ See Section 3.2 for further details on the framework.

The Growth-Oriented Carbon Pricing Concept includes two carbon pricing instruments: an ETS, which started on a voluntary basis in FY2023 and is planned to move to the mandatory phase in FY2026, and a GX Surcharge (Carbon Levy), which is planned to start in FY2028. These carbon pricing instruments are planned as the redemption resource for the GX Economy Transition Bonds (Government of Japan, 2023).¹² As such, this case study discusses the functioning of the Bonds.

Figure 3.1. Classification of the projects eligible for the GX Economy Transition Bonds

	Main Category (Green category)	Sub-category Eligibility criteria	Typical use of proceeds (eligible projects)
1	Energy efficiency 	Promotion of thorough energy efficiency improvement	Promote the spread of energy-efficient appliances
		Houses and buildings	- Support for building new houses and buildings with high energy efficiency and retrofitting to improve energy efficiency - Replacing windows with thermal insulated models with higher energy efficiency
		Digital investment aimed at decarbonization	Facilitating the development of and investment in energy efficient semiconductors, photonics electronics convergence technologies
		Battery industry	Investments in plants manufacturing batteries together with their material and components
2	Renewable energy 	Making renewable energy a major power source	- Floating offshore wind - Next-generation solar cells (perovskite)
		Infrastructure	Development of cities and communities contributing to decarbonization
3	Low-carbon and decarbonized energy 	Utilization of nuclear power	Next-generation advanced reactors with built-in new safety mechanisms
		Establishing electricity and gas markets to achieve carbon neutrality	- Promoting zero-emission thermal power - Development of submarine DC transmission systems
4	Clean transportation 	GX in transport sector	- Support for the introduction of next-generation vehicles - Developing demonstration aircraft by 2030s and spreading the use of zero-emissions ships
		Infrastructure (repost)	Development of cities and communities contributing to decarbonization
5	Circular economy adapted products, production technologies and processes 	Restructuring the manufacturing industry (fuel and feedstocks transition)	- Development and introduction of innovative technologies such as hydrogen reduction steelmaking - Conversion to Carbon-Recycling production systems
		Facilitating introduction of hydrogen and ammonia	- Building supply chain both domestically and internationally - Research and development as well as the introduction support of production and usage of hydrogen derived from excess renewable energy sources
		Carbon Recycling and CCS	Support for research and development of Carbon Recycling fuel
6	Environmentally sustainable management of living natural resources and land use, Circular economy 	Food, agriculture, forestry, and fisheries industry	Decarbonization of agriculture, forestry and fisheries
		Resource circulation	Investment to accelerate resource circulation including plastics, metals, sustainable aviation fuel (SAF)

Source: Government of Japan (2023)

¹² For more detailed information on the repayment of the GX Economy Transition Bonds, see Document 3 of Part II of the Reiwa 6th edition special accounting guidebook (Ministry of Finance, Japan, 2024).

Regulatory and institutional governance to achieve the stated objectives

The Japan Climate Transition Bond Framework specifies the priorities, eligibility criteria, eligible projects, evaluation criteria, governance structures, and reporting requirements, and evaluates the performance of the bonds.

Section 3.2 of the framework indicates that each relevant ministry or agency confirms the compatibility of projects with the eligibility criteria. Moreover, a governance body (the Government-Related Ministries and Agencies Liaison Conference on GX Economy Transition Bond Issuance, or 'Liaison Conference'¹³), which consists of director-level officials, confirms adherence to the eligibility criteria and conducts consultations when needed. Findings are then reported to the GX Implementation Council.

Similar to the Japan Carbon Tax, the resources from the bonds flow into the Energy Supply and Demand account of the Special Account for Energy Measures, from where they are allocated to projects and managed. From the Energy Supply and Demand account, some of the resources may be transferred to other accounts (such as JPY 88.9 billion [US\$601 million] transferred to the Account for Promoting Power Source Development, and JPY 179.7 billion [US\$1.216 billion] transferred to the Account for Cutting-Edge Semiconductor and Artificial Intelligence-Related Technologies)¹⁴ to support some of the financed projects. Each financed project is ultimately approved by the National Diet as part of the annual approval of the government budget. The Liaison Conference conducts confirmation and evaluation of the allocation status.

The framework itself is set to be reviewed in five-year intervals. The Liaison Conference formulates the revision draft, "taking into account evaluations and opinions from private sector insights of capital market participants and experts". Moreover, the framework foresees engagement with external reviewers to evaluate its alignment with relevant principles and guidelines.

The allocation of proceeds is also subject to review from independent external reviewers. These "provide annual external verifications on the allocation of the net proceeds financed based on the Framework to the eligible projects and assessment of their environmental impacts until full allocation of the proceeds".

Recipients/indirect beneficiaries of selected option

The framework provides an overview of the goals that the government is expected to support with the JPY 20 trillion (US\$135.2 billion) in investment from the GX Economy Transition Bonds, as well as the approximate investment in each of these goals, and examples of the types of investments to be supported. It identifies three goals to be supported: transformation of the industrial structure (both on the demand and supply sides) and strengthening of energy saving measures, expansion of non-fossil energy, and resource recycling and carbon fixation. The approximate investment and examples of types of investments to be supported are presented below¹⁵:

Transformation of the industrial structure and energy saving measures:

- Approximate investment: Between JPY 9 (US\$60.84 billion) and JPY 12 trillion (US\$81.12 billion)
- Examples of types of investments to be supported:
 - Energy conservation and fuel conversion

¹³ Members of the Liaison Conference are the Cabinet Secretariat, Financial Services Agency, Ministry of Finance, Ministry of Economy, Trade and Industry, and the Ministry of the Environment.

¹⁴ See the budget information on the special account for energy measures for Reiwa 7 on the website of the Agency for Natural Resources and Energy (ANRE, 2025).

¹⁵ For more information, see p. 20 of the *Japan Climate Transition Bond Framework* (Government of Japan, 2023).

- Energy demand measures
- Energy saving measures.

Expansion of non-fossil energy:

- Approximate investment: Between JPY 6 (US\$40.56 billion) and JPY 8 trillion (US\$54.08 billion)
- Examples of types of investments to be supported:
 - Demand expansion for hydrogen and ammonia
 - R&D for new technologies on renewable energies.

Resource recycling and carbon fixation:

- Approximate investment: Between JPY 2 (US\$13.52 billion) and JPY 4 trillion (US\$27.04 billion)
- Examples of types of investments to be supported:
 - R&D and implementation of new technologies.

The website of the Ministry of Finance on the Japan Climate Transition Bonds contains an overview of potential allocation of projects in FY2025 (see Table 3.3). This potential allocation includes capital investments for emissions reductions and economic growth (potentially supporting projects such as the construction of net zero ships, clean energy vehicles, and renovations for insulated windows in households) of JPY 686 billion (US\$4.64 billion); support for innovative R&D to gain new markets (potentially financing projects such as next-generation edge AI semiconductors and next-generation advance reactors) of JPY 642.1 billion (US\$4.34 billion); and cross-cutting efforts to realise the green transformation (focused on projects to build supply chains for hydrogen and its derivatives, and supporting the Hydrogen Hub Development Program).¹⁶

Most of the resources¹⁷ in the expenditure sub-subcategories reported by the Ministry of Economy, Trade and Industry as 'Measures for the transition to a decarbonised growth-oriented economic structure' category of the Special Account for Energy Measures in the FY2025 budget (almost 60%) have private entities as their beneficiaries (see Table 3.4). Around 31% of the resources flow into the National Research and Development Agency. Slightly over 7% of the resources flow as subsidies to the Japan Energy Agency. Only 1.5% of the resources flow as grants from the Energy Demand and Supply account to local public organisations and local governments. Only a minimal amount is allocated from origin as operational expenses (such as staff or committee member travel expenses, meeting expenses or miscellaneous services expenses).

¹⁶ An indicative mapping of how these projects correspond to the revenue use cases established in Article 33 of the Taiwan Climate Change Response Act can be found in the accompanying Excel sheet.

¹⁷ Not accounting for the resources to support Deep-Tech Startups or the capital for the GX Acceleration Agency. See the note accompanying Table 3.4.

Table 3.3. Overview of potential allocation projects in FY2025, from the FY2024 supplemental budget, the FY2025 initial budget and in total

Category	Project	FY2024 supplemental budget (JPY billion)	FY2025 initial budget (JPY billion)	FY2024 and FY2025 (JPY billion)	FY2024 and FY2025 (JPY billion)
Capital investment for emissions reduction and economic growth	Support for energy/manufacturing process conversion for hard-to-abate industries		25.6	25.6	686
	Support for sustainable aviation fuel (SAF) – production and supply chain development		27.8	27.8	
	Industry-government-academia collaboration – enhancing the resilience and autonomy of circular economy systems		3	3	
	Support for building GX supply chains		61	61	
	Investment for advanced resource circulation		15	15	
	Promotion of the construction of zero-emission ships, etc.		10.2	10.2	
	Subsidy for energy saving investments/ demand structure conversion	30	76	106	
	Support to install CO ₂ -saving facilities to reduce Scope 3 emissions through collaboration among companies		2	2	
	Installation support for electricity storage systems such as grid-scale batteries		15	15	
	Promotion of social implementation models of perovskite solar cells		5	5	
	Regional decarbonisation promotion grant	1.5	8.5	10	
	Subsidy to install high-efficiency water heaters in households	58		58	
	Subsidy to introduce clean energy vehicles	110		110	
	Supporting renovations for insulated windows in households	135		135	
	Accelerating decarbonising renovations for buildings	11.2	1.2	12.4	
	Support for the introduction of GX-oriented housing	50		50	
	Promoting electrification of commercial vehicles, etc.	40		40	
Innovative R&D to gain new markets	Support for strengthening manufacturing supply chains of batteries	177.8		177.8	642.1
	Development of next-generation advanced reactors and support to strengthen industrial basis		88.9	88.9	
	Deep-Tech Startups Support Program in the green transformation field		30	30	
	Research and development of AI foundation models, advanced semiconductor, and technologies and related projects	157.6		157.6	
	R&D for enhanced infrastructure for post-5G information and communication systems		150.2	150.2	
	R&D for next-generation edge AI semiconductor		29.5	29.5	
	Next-generation aircraft development and related areas		8.1	8.1	
Cross-cutting efforts to realise GX	Support focused on the price difference to build supply chains for hydrogen and its derivatives		35.7	35.7	111.4
	Hydrogen Hub Development Program		5.7	5.7	
	Capital for GX Acceleration Agency		70	70	
Total		771.1	668.4	1439.5	

Source: Ministry of Finance, Japan (2025)

Table 3.4. Fiscal year 2025 budget expenditure sub-subcategories reported by the Ministry of Economy, Trade and Industry on the ‘Measures for the transition to a decarbonised growth-oriented economic structure’ of the Special Account for Energy Measures^a

Account	Expenditure sub-category	Beneficiary	JPY 1,000
Energy supply and demand	Subsidies – Measures for the structural transition to a decarbonised growth economy	Private organisations, etc.	249,962,000
		Japan Energy Agency	41,400,000
	Grants – Measures for the structural transition to a decarbonised growth economy	Local public organisations/ local governments, etc.	8,500,000
	Commissioning expenses – Measures for the structural transition to a decarbonised growth economy	Private organisations, etc.	4,130,000
Cutting-edge semiconductor and AI	R&D for enhanced infrastructure for post-5G information and communication systems, and R&D for next-generation edge AI semiconductor	National Research and Development Agency	179,700,000
Power source development	Fast reactor development and demonstration, and high-temperature gas reactor development and demonstration	Private organisations, etc.	82,880,000
Various	Operational expenses (various accounts)	Operational expenses	81,851
Total			566,653,851

Notes: a. The item ‘Cost of converting national treasury debt obligations into expenditures’ is not included here. The table includes JPY 88.9 billion (US\$600 million) transferred from the Energy Supply and Demand account to the Account for Promoting Power Source Development (used to support the project ‘Development of next-generation advanced reactors and support to strengthen industrial basis’ listed in Table 3.3 above), and JPY 179.7 billion (US\$1.2 billion) transferred to the Account for Cutting-Edge Semiconductor and Artificial Intelligence-Related Technologies (used as ‘R&D for enhanced infrastructure for post-5G information and communication systems’ and as ‘R&D for next-generation edge AI semiconductor’ listed in Table 3.3 above). Both transfers are listed as ‘Measures for the transition to a decarbonised growth-oriented economic structure’.

The table is, however, not a precise mapping of the activities described in Table 3.1, as two items were not identified in either the Energy Supply and Demand account, namely the Account for Cutting-Edge Semiconductor and Artificial Intelligence-Related Technologies, or the Account for Promoting Power Source Development: JPY 70 billion (US\$470 million) as ‘Capital for GX Acceleration Agency’ nor JPY 30 billion (US\$200 million) for ‘Deep-Tech Startups Support Program in the green transformation field’. This accounts for around 18% of the total resources presented in Table 3.4. Slide 16 of the PR materials of the GX promotion expenses in FY2025 specifies that resources for Deep-Tech Startup Support are to flow in the form of grants through the National Research and Development Agency, in the form of investments through the GX Acceleration Agency, and in the form of consignment resources directly to private entities (Ministry of Economy, Trade and Industry, 2025b). The ultimate beneficiaries of these resources are research institutions and private entities. Slide 17 of the same document specifies that the resources for the GX Acceleration Agency are to support private entities’ GX investments in the form of debt guarantees (through financial institutions) and investments. For further information on the GX Acceleration Agency, see METI (2024).

Source: Authors’ own elaboration with information from the Ministry of Economy, Trade and Industry (2025a)

Table 3.5. Fiscal year 2025 budget expenditure beneficiaries reported by the Ministry of Economy, Trade and Industry on the ‘Measures for the transition to a decarbonised growth-oriented economic structure’ of the Special Account for Energy Measures^a

Beneficiary	JPY 1,000	Percentage
Private organisations, etc.	336,972,000	59.47
National Research and Development Agency	179,700,000	31.71
Japan Energy Agency	41,400,000	7.31
Local public organisations/local governments, etc.	8,500,000	1.50
Operational expenses	81,851	0.01
Total	566,653,851	100.00

Notes: a. Not accounting for the resources to support deep-tech startups or the capital for the GX Acceleration Agency. The item ‘Cost of converting national treasury debt obligations into expenditures’ is not included here. See the note accompanying Table 3.4.

Source: Authors’ own elaboration with information from the Ministry of Economy, Trade and Industry (2025b)

How revenue use is reported and communicated

The Japan Climate Transition Bond Framework specifies that the Liaison Conference (see footnote 13 for its composition) is in charge of discussing allocation and impact reporting. Allocation reporting should take place annually on the GX Finance website and should include: the amount of net proceeds allocated to the eligible projects, the amount of unallocated proceeds, and the estimated amount (or percentage) of the proceeds allocated to the projects in the fiscal year ending before the issuance date. Project reporting should incorporate progress of eligible projects, environmental impacts and anticipated impacts (where possible), among others. Impact reporting should also take place annually and should report on environmental improvements (including greenhouse gas emissions reductions) and an overview of the main financed projects. Results are also reported to the GX Implementation Council.

The website of the Ministry of Finance on the Japan Climate Transition Bonds contains the allocation report on FY2023 issuance (published in December 2024). This report contains an overview of the auction results for the FY2023 issuance, an overview of the projects funded from that issuance, the eligibility criteria and eligibility process for those projects, the selection process, and management of proceeds. It also contains case studies for some of the projects funded. They provide information on the goals of each project, results, prospects, and the greenhouse gas emissions reductions achieved. They also contain methodological notes on these calculations, such as the approach, parameters and formulas used.

Findings from regulatory or independent reviews

The website of the Ministry of Finance on the Japan Climate Transition Bonds contains the independent assessment by DNV Business Assurance of the framework. The assessment found that the framework is aligned with Climate Transition Finance (CTF) and Green Bond (GB) standards.¹⁸

Moreover, the website also contains the independent review by the external party (the Japan Credit Rating Agency) of the FY2023 allocation. In line with the specifications of the framework, the review evaluates the alignment of the bonds issued with the standards set in the GB Principles, the GB Guidelines, the CTF Handbook, and the Basic Guidelines for CTF. It gave an

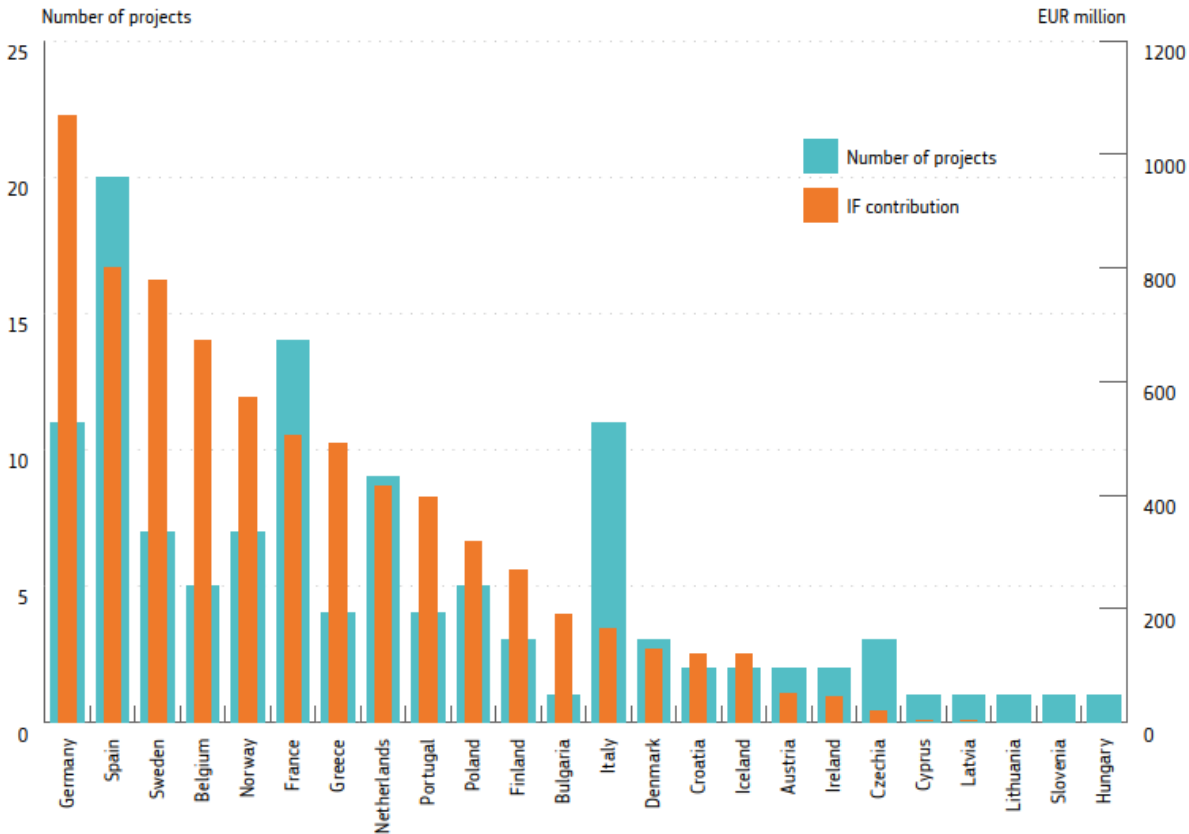
¹⁸ This includes that it is directed towards achieving a greenhouse gas reduction strategy in line with the goals of the Paris Agreement, that the transition strategy is based on science-based targets and pathways towards transition, that the proceeds are used for eligible projects that provide clear environmental benefits, and that the issuer must track and manage the proceeds, and disclose how unallocated proceeds are treated, etc.

overall evaluation of “Green 1(T)” (the highest overall rating on JCR’s Green/Climate-transition evaluation scale), a Use of Proceeds Evaluation (Greenness/ Transition) of “gt1”, and a Management, Operation, and Transparency Evaluation of “m1” (both the highest in the respective scales). As such, “JCR concluded that the Bonds met the standards for the items required in the Green Bond Principles, the Green Bond Guidelines, the Climate Transition Finance Handbook and the Basic Guidelines for Climate Transition Finance”.

3.3. EU ETS auction revenue use through the Innovation Fund

The EU Innovation Fund is one of the world’s largest programmes funding low-carbon technologies and innovation. Operational since 2020, the Innovation Fund is financed by revenues from the auction of around 530 million allowances (EUAs) under the European Union Emissions Trading System (EU ETS), designated as Innovation Fund funding between 2020 and 2030. This translates to an estimated endowment of about EUR 40 billion (US\$46.8 billion) during the decade.¹⁹ For reference, a total of 35.4 million EUAs were auctioned for the Innovation Fund in 2024 (see Figure 3.2). This can be compared to a total of about 449 million EUAs that were auctioned by all Member States, about 84 million of which were on behalf of Germany, and about 59 million of which were on behalf of Poland, according to the European Energy Exchange (EEX).

Figure 3.2. Innovation Fund project and funding distribution by main country of implementation



Source: European Commission: European Climate, Infrastructure and Environment Executive Agency, et al. (2025)

The Innovation Fund replaced the NER 300 programme, in the process improving risk sharing for project implementers and giving more funding through a simpler selection process, which was

¹⁹ The ten-year total endowment is an estimate because the IF’s funding depends on the carbon price level.

also opened up to energy-intensive industries. Unspent revenue from the second call of NER 300 also contributes to the Innovation Fund endowment. The Fund has financed around 120 large- and small-scale projects that were under implementation at the end of 2024, accounting for 452 million tonnes of planned CO₂e reduction over the first 10 years of those projects' implementation.

Rationale for revenue use

The Innovation Fund was established by Article 10a (8) of Directive 2003/87/EC to support innovation across all EEA Member States,²⁰ representing one of the key programmes under the European Green Deal Industrial Plan (European Parliament and Council of the European Union, 2003). The implementation of the Fund is laid out in Delegated Regulation (EU) 2019/856 of 26 February 2019, supplementing Directive 2003/87/EC on the operation of the Innovation Fund (European Commission, 2019).

The Innovation Fund (see Figure 3.3) aims to bring solutions to the market that can decarbonise European energy and industry while fostering competitiveness. Its stated objectives are to use its EU ETS designated revenues to: "help businesses invest in clean energy and industry, boost economic growth, create future-proof jobs, and reinforce European technological leadership on a global scale" (European Commission, 2025d). To do so, it funds projects focusing on: "innovative low-carbon technologies and processes in energy-intensive industries, including products that can substitute carbon-intensive ones; carbon capture and utilization (CCU); construction and operation of carbon capture and storage (CCS) facilities; innovative renewable energy generation; and energy storage" (European Commission, 2025d).

Recipients/indirect beneficiaries of selected option

As its name suggests, Innovation Fund revenues are intended to support innovative technologies and flagship projects in Europe that hold potential to catalyse significant emissions reductions. Eligible entity partners can include education and training institutions, research institutions, public bodies, non-governmental organisations (NGOs), small- and medium-sized enterprises (SMEs), private institutions (including for-profit companies) and international organisations. However, beneficiaries are typically private institutions. As of the end of 2023, the 213 participants that were implementing the 104 ongoing Innovation Fund projects consisted of 202 privately owned, for-profit entities, five public entities, four research institutions, one higher education establishment, and one NGO.

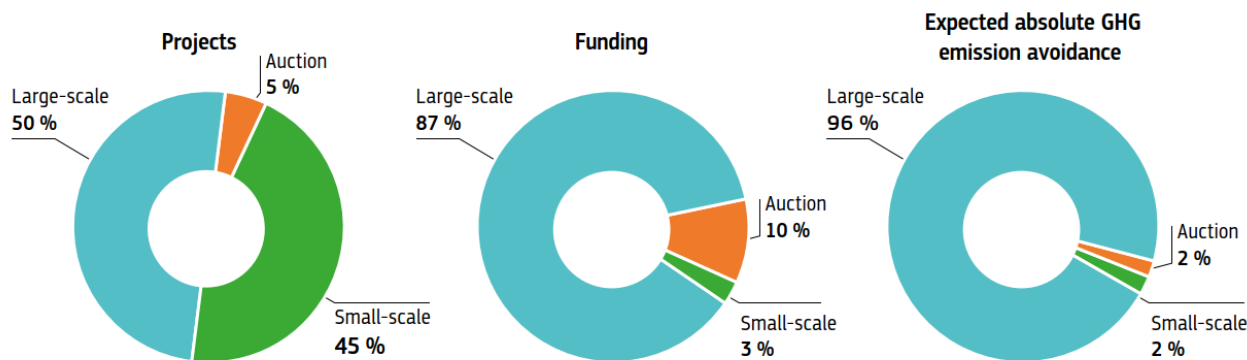
Revenues are distributed through calls for proposals and competitive bidding auctions (European Commission 2026a; European Commission 2026b). Projects that are awarded through the call for proposal (grant) process are selected based on the following criteria: effectiveness of greenhouse gas emissions avoidance, degree of innovation, project maturity, replicability and cost efficiency. The methodology for scoring, ranking, and any potential additional criteria that may pertain to sectoral or geographical fairness, are set in each call for proposals. The Fund aims to support projects that vary across types of technology, sectors and countries (European Commission, 2025d).

Projects that are awarded via the competitive bidding auction procedure are first checked to meet auction-specific qualification criteria (such as displaying a "credible plan and pre-contractual steps towards securing renewable electricity that in volumes and time profile matches at least the 60% of volumes of RFNBO hydrogen" for hydrogen auctions) before being ranked in accordance with their proposed bid price (European Commissions 2026b; European Commission 2025a). The Innovation Fund 2024 Auction Q&A document describes how bids are priced per unit, and each bid should be formulated as the top-up (to the market revenue a

²⁰ EEA Member States consist of the 27 EU Member States in addition to Iceland, Liechtenstein and Norway.

project can expect to achieve) needed to make a project financially viable (European Commission, 2024). As the product being auctioned is subsidy support for a specific activity or product, bidders that require the least support for their decarbonisation activity or product typically benefit from this market-based process. This can be effective in minimising the overall costs to the public.

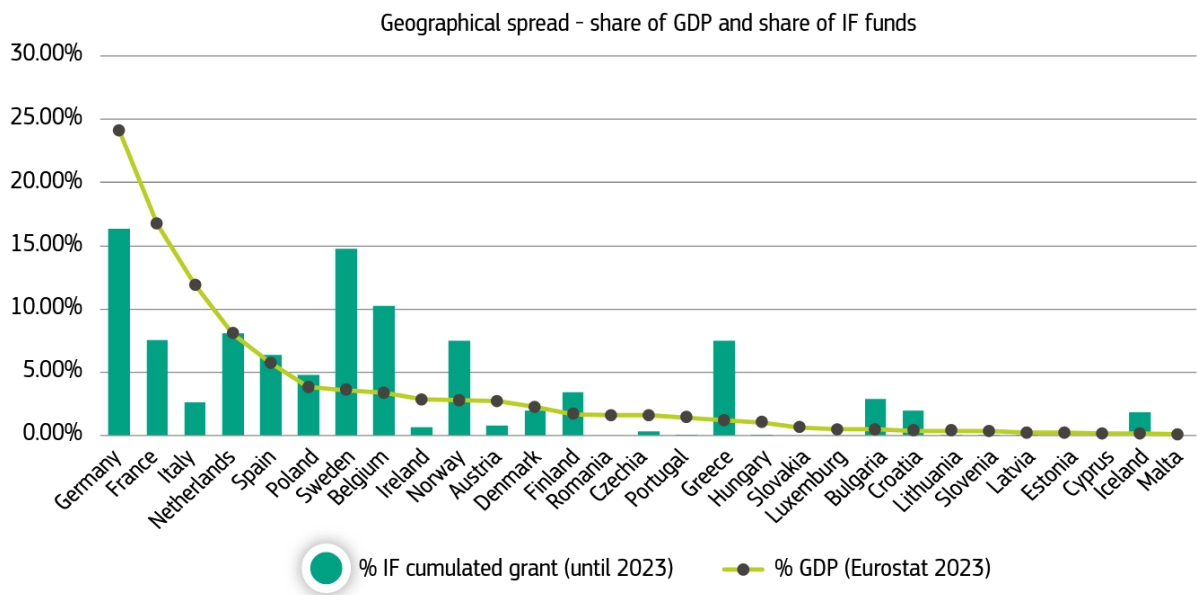
Figure 3.3. Overview of Innovation Fund portfolio – distribution of projects, funding and expected absolute greenhouse gas emission avoidances between large-scale, small-scale and auction projects



Source: European Commission: European Climate, Infrastructure and Environment Executive Agency et al. (2025)

In terms of the geographic distribution, the 2023 Innovation Fund Progress Report notes that 55% of the projects are located in five countries: Spain, Sweden, Germany, France and the Netherlands. The report also notes that the number of projects from eastern and central Europe remained low. Moreover, in terms of funding, the projects from the following Member States had received the largest amount of funding: Germany, Sweden and Belgium (European Commission, 2025b) (see Figure 3.4).

Figure 3.4. Comparison between grants awarded per country (cumulative until 2023) and each country's share of the EU's GDP



Source: European Commission (2025b)

Regulatory and institutional governance to achieve the stated objectives

The European Commission handles the overall management of the Innovation Fund with specific elements of its implementation delegated to the European Climate, Infrastructure, and Environment Agency (CINEA) and the European Investment Bank (EIB).

CINEA's responsibilities include administration and support during the application stage, evaluation of submissions, administration of grant agreements and disbursements, monitoring and oversight, as well as communications and public relations for the overall programme. CINEA regularly reports back to the EU Commission on these areas of implementation.

The EIB plays a distinct but complementary role in the implementation of the Fund. It is tasked with monetising the EU ETS allowances allocated to the Fund, effectively converting auctioned allowances into financial resources. In addition, the EIB manages project development assistance (PDA), offering technical and financial advisory services to help improve the maturity and feasibility of project proposals (such as technical due diligence and financial pre-due diligence, business plan and market analysis, capital structuring, financing roadmap or bankability assessment, and concept development support, engineering, procurement and implementation support). PDA is offered to especially benefit small-scale projects and lower-income EU Member States. Selection of applicants which will receive PDA is done by the EIB and before approval from the EU Commission. The EIB also works with Breakthrough Energy Catalyst to create a blueprint for how blended public-private finance can accelerate the deployment of projects like those sourced through the Innovation Fund.

How revenue use is reported and communicated.

Annual progress reports from the EU Commission to the European Parliament and Council (which are also made publicly available) are a key feature of the Innovation Fund's communication approach. These reports include key performance indicators (see the next section). This reporting is important in enabling policymakers and the public to assess the effectiveness of the revenue use.

At the project level, project implementers are required to report on their projects and actively take part in the dissemination of their acquired knowledge, including engaging in activities that support the upscaling and accelerated deployment and commercialisation of their proposed technologies. The knowledge sharing element can be conducted through closed- and open-door events that strengthen synergies with other projects while protecting commercially sensitive information. Unless agreed otherwise, grant agreements typically include the requirement for beneficiaries to promote project results to multiple audiences (the media and the public).

Grant agreements also include articles outlining requirements of continuous reporting of project progress (e.g. deliverables, milestones, outputs/outcomes, critical risks and indicators) in an online Portal Continuous Reporting tool, and in line with the schedule agreed with the grant authority. Agreements also lay out provisions for periodic reporting, including technical reports and financial statements, prepared using a template from a provided Portal Periodic Reporting tool. Agreements also typically include requirements for the provision of any information requested to verify the implementation of the project, during or after its execution. More specific detail can be found in each call for proposals and grant agreement.

Findings from regulatory or independent reviews

The annual progress reports highlight progress made towards key performance indicators. As of the end of 2023,²¹ the Innovation Fund had organised seven calls for proposals and one competitive bidding procedure, resulting in 104 signed grant agreements for projects. These 104

²¹ Once published, the 2025 version of the progress report, with 2024 values, will be published on the Innovation Fund website (European Commission, 2025d).

projects are expected to avoid 442 MtCO₂e of emissions during the first decade of operations. In the same period, the Fund had disbursed a total of EUR 120.9 million (US\$141.45 million) worth of grants to projects, and the sectors with the most projects in the Innovation Fund portfolio were: hydrogen (16), cement and lime (12), manufacturing of renewable energy components (11), and chemicals (10).

Performance reporting of Innovation Fund revenue use is also summarised on the European Commission website, including values for the amount invested, number of large- and small-scale projects, amount of CO₂ reduced, number of proposals that were awarded project development assistance, and the number of projects that reached financial close during the most recent year. The website also includes assessments of the metrics that measure if the Fund is deemed to be 'on track' including the number of participants in knowledge events on clean-tech solutions (1,309 in 2024 compared to target of 2,000), the technology sectors covered by the Fund (19 in 2024 compared to the target of 22), and the geographical balance of funded projects (24 compared to the target of 29).²²

The Institute for Climate Economics (I4CE) published a report in 2023 which highlights the importance of the Innovation Fund in European climate action and identifies risks in over-reliance on public funds, asserting that it can lead to inefficiencies, market distortions, and that it can precipitate a subsidy race that benefits wealthy EU Member States over others with less fiscal flexibility (Humphreys, 2023). The report calls for the Innovation Fund to be improved in five key areas to support long-term cleantech investment in the EU: (1) increase its size, (2) introduce a new process for "cleantech manufacturing calls" aimed at supporting competitiveness and energy security, (3) reform the application and assessment process to make all calls "always open", (4) increase the resources and staffing for CINEA, and (5) use the Innovation Fund as a launch pad for a broader and more ambitious Cleantech Investment Plan (ibid.).

3.4. California Cap-and-Invest auction revenue use through the 'California Climate Investments'

California's Cap-and-Invest (C&I) programme started operating in 2012, with compliance obligations starting in January 2013.²³ In 2024, around two-thirds of allowances in the system were auctioned, with close to half of those allowances being owned by the California Air Resources Board (CARB).²⁴ Most of the revenues from the auction of these allowances flow into the Greenhouse Gas Reduction Fund (GGRF) and are later disbursed as California Climate Investments. Cumulatively, revenues collected from the auctioning of CARB-owned allowances have amounted to US\$31.38 billion, whereas the California Legislature has awarded US\$18.4 billion, and funding recipients have implemented US\$12.8 billion (ICAP, 2025b; California Climate Investments, no date a).²⁵

²² See European Commission (no date). Other areas of assessment are labelled N/A in the assessment if they are on track. The EU Commission generates and publishes performance data tables in its MFF Performance Results Reports, which include transparent indicators of progress towards the goals of the IF, along with other EU climate, environment and infrastructure initiatives. See pp. 957–970 for IF data (European Commission, 2025c).

²³ The system was previously known as 'Cap-and-Trade'. In September 2025 it was amended and renamed 'California Cap-and-Invest' (ICAP, 2025a). This case study focuses on how the system used to operate before it was amended.

²⁴ California also auctions consigned allowances that have been allocated to investor-owned utilities and natural gas suppliers. The revenues of these allowances must be used to benefit ratepayers and for greenhouse gas emissions reductions. They are predominantly returned to ratepayers under a programme called California Climate Credit, and so are not covered in this case study (California Public Utilities Commission, no date).

²⁵ Money appropriated refers to the resources that the Legislature has authorised for agencies to make in expenditures from the GGRF. Resources awarded refer to the amount that agencies have committed for projects. Resources implemented refers to the money that recipients have received and executed in funded projects.

Rationale for revenue use

California's Health and Safety Code, Sections 39710–39723, specifies that funded projects need to contribute to the goals of the California Global Warming Solutions Act of 2006 and be consistent with other laws and with the mechanisms defined in the Government Code, Sections 16428.8–16428.95 (see below). Additionally, and to the extent feasible, funded projects should also contribute to: maximising economic, environmental and public health benefits to the state; fostering job creation; contributing to improved air quality; directly investing in disadvantaged communities and households in the state; providing opportunities for state stakeholders (such as businesses, communities, Native American tribes) to participate and benefit from greenhouse gas emissions reductions; and mitigating the impacts of climate change on the state.

The same sections of the Health and Safety Code also specify a non-exhaustive list of project types that may receive investments, including projects around energy efficiency, clean and renewable energy generation, or distributed renewable energy generation; development of state-of-the-art systems to move goods and freight; reduction of greenhouse gas emissions related to water use and supply, land and natural resource conservation and management, forestry, and sustainable agriculture; strategic planning and development of sustainable infrastructure projects; etc.

Regulatory and institutional governance to achieve the stated objectives

California's Government Code, Sections 16428.8–16428.95, specifies that all the money collected by CARB from the sale of CARB-owned allowances is to be deposited in the GGRF, and that no other monies are allowed to be deposited in it. Under California's Health and Safety Code, Sections 39710–39723, the Department of Finance, in coordination with CARB and other relevant state agencies, must present to the Legislature a three-year investment plan for the GGRF. The investment plan must:

- Identify the state's greenhouse gas targets by sector
- Analyse gaps in strategies to meet these goals
- Identify priority investments to achieve greenhouse reductions to achieve the goals
- Assess how the proposed investments interact with current policies and regulations
- Evaluate how the proposed investments could be incorporated into existing programmes
- Recommend metrics to measure progress and benefits from these investments.

CARB is required to undertake a stakeholder consultation prior to the submission of the investment plan, which includes public workshops, a public hearing, and a consultation with the Public Utilities Commission. The State Legislature then distributes the GGRF resources to programmes (known as 'California Climate Investments') administered by different government agencies on a yearly basis.

For competitive financing programmes,²⁶ state agencies that administer GGRF funds are required to publish guidelines on how the resources are allocated. The guidelines must include, among others: eligibility criteria for award opportunities, application timelines, information on technical assistance, contact information for the agency, and the amount of money required to be allocated to projects located in disadvantaged communities. Before expenditures are made, state agencies are also required to describe, among others: what expenditures they propose to make, how these expenditures will contribute to the goals of the California Global Warming Solutions Act of 2006, and how they will document the results achieved from the expenditure, in compliance with the same Act.

²⁶ Not all programmes need to be competitive. They may also be 'first come, first served', or based on non-competitive formulas.

CARB is required to develop guidelines on reporting and quantification methods for the state agencies on the aforementioned requirements. The guidelines support administering agencies on how to design the programmes, how to implement them (and how to implement them in a way that benefits priority populations or to support job development or job quality), and what and how to report on them. Administering agencies then select projects to be funded and award funding to the projects. Recipients then implement them and need to report back on key, standardised metrics.

Recipients/indirect beneficiaries of selected option

California's Health and Safety Code, Sections 39710–39723, defines that at least 25% of the resources of the fund must be allocated to projects located in and benefitting “disadvantaged communities”. An additional 5% must be allocated to projects that benefit low-income households, or that are located in and benefit individuals in low-income communities. An additional 5% must be allocated to low-income households or communities in the vicinity of disadvantaged communities.²⁷ Collectively, disadvantaged communities and low-income households and communities are known as “priority populations”.

The Health and Safety Code further specifies shares of the GGRF that are to be appropriated for specific ends: 35% of the annual proceeds of the fund are to be appropriated for transit, affordable housing, and sustainable communities programmes (10% to the Transportation Agency for the Transit and Intercity Rail Capital Program, 5% to the Low Carbon Transit Operations Program, 20% to the Strategic Growth Council for the Affordable Housing and Sustainable Communities Program); 25% to the High-Speed Rail Authority; 5% (up to US\$130 million) to the Safe and Affordable Drinking Water Fund; and US\$200 million per fiscal year (from fiscal year 2022–2023 to fiscal year 2028–2029) to the Department of Forestry and Fire Protection.

There are currently 117 California Climate Investments programmes being administered by 27 state agencies. A wide variety of stakeholders may apply to these programmes, and several programmes accept applications from more than one type of stakeholder (California Climate Investments, no date b). As of early September 2025, 16 programmes had accepted applications from businesses, 14 from individuals, 12 from local governments, 12 from tribal governments, 11 from non-profits, 5 from land conservancies, 5 from public schools and school districts, 5 from transit agencies, 4 from farmers, and 2 from universities and research institutions (California Climate Investments, no date b).

How revenue use is reported and communicated

California uses several mechanisms to report and communicate revenue use and California Climate Investments programme achievements. The California Climate Investments website provides comprehensive information to applicants, agencies and the public. The website provides information per programme (including cumulative statistics and statistics for the most recent year on, for example, achieved emissions reductions, number of projects implemented and reported jobs) (California Climate Investments, no date c). They also present profiles on selected funded projects, which contain high-level descriptions of the projects' aims and achievements (California Climate Investments, no date e).

California also has two other online resources to communicate how the revenues are being used: the first one is a Data dashboard, which provides information on resources invested (including how many benefit priority populations), emissions reduced, air pollutants reduced (such as black

²⁷ “Disadvantaged communities” are defined by the California Environmental Protection Agency. A definition of these, and of low-income communities and households, can be found on the California Climate Investment website (California Climate Investments, no date c). An interactive map where priority populations can be identified can be found on the California Air Resources Board website (CARB, no date) .

carbon, nitrogen oxides [NO_x] or particulate matter reductions), associated health benefits, and other co-benefits, among others (California Climate Investments, 2025b). The second additional online resource is a project map, which geolocates all projects that have been implemented, and provides summary information on each of the projects (California Climate Investments, no date d). These resources provide a high degree of transparency of the use of the revenues and of the benefits that the funded projects are delivering.

Every year, a report is submitted to the Legislature, with key figures on investments, beneficiaries and achievements. This report also includes figures on funded programmes, administering agencies, number of funded projects, funding status, resources benefitting priority populations, greenhouse gas emissions reductions and cost per metric tonne of greenhouse gas emissions reduction. Key figures from the annual report are also communicated through email and in a factsheet with key figures (California Climate Investments, 2025a; CARB, 2025b).

Findings from regulatory or independent reviews

The latest annual report submitted to the legislature states that, since its first appropriation in 2014 and up to 2024, California Climate Investments programmes have funded US\$12.8 billion (US\$9.2 billion benefitting priority populations), which have represented

- Around 116 MtCO_{2e} in greenhouse gas emissions reductions²⁸
- Over 13,000 affordable housing units under contract
- US\$30 billion in cost savings
- Over 120,000 modelled jobs, among others (CARB, 2025a).

In 2024 alone, California Climate Investments programmes implemented almost US\$1.9 billion, out of which ca. US\$1.2 billion benefit priority populations. These are expected to reduce 7 MtCO_{2e} emissions over their lifetimes and support over 16,000 jobs (CARB, 2025a).

Independent research, which includes analysis of California Climate Investments projects, has found sufficient evidence that the California C&I Program enhances social and environmental equity. However, it has not found conclusive evidence that the programme enhances economic equity. Moreover, there is insufficient evidence that it reduces greenhouse gas emissions in a sustainable manner. Another analysis used data from the 2025 annual report to assess the cost-effectiveness of the California Climate Investments projects in reducing emissions. It concludes that the weighted-average cost-effectiveness of the GGRF portfolio as a whole is US\$1,740/tCO_{2e} (including a project with an estimated cost of US\$164,000/tCO_{2e}) or US\$1,268/tCO_{2e} (excluding this outlying observation).

²⁸ For comparison, the 2025 cap of the programme was 267.4 MtCO_{2e}.

4. Recommendations

4.1. Balancing economic, environmental and social objectives

The design of Taiwan's carbon fee revenue-use strategy should be guided by three objectives:

1. **Environmental effectiveness** – accelerating mitigation and adaptation consistent with the emission reduction target
2. **Economic transformation** – maintaining competitiveness of export-oriented sectors while stimulating innovation and productivity
3. **Social fairness** – ensuring that vulnerable groups and regions share in the benefits of decarbonisation and are protected from regressive cost impacts.

International practice suggests that allocation of carbon revenues across these pillars yields the greatest long-term political and economic stability. Based on a discussion of the trade-offs between revenue-use options, experience from relevant jurisdictions and domestic priorities, we then suggest a proportion of revenue to be allocated to each pillar.

4.2. Trade-offs among revenue-use options

Designing options for carbon pricing revenue use requires striking a balance between environmental effectiveness, social equity and fiscal credibility. Each option offers distinct advantages but also imposes constraints that must be weighed carefully against Taiwan's institutional constraints and capacity, as well as its industrial structure.

Environmental investment and expenditures deliver the most immediate and measurable mitigation gains while generating long-term innovation spillovers. Funding for industrial decarbonisation, grid upgrades, carbon capture, utilisation and storage (CCUS) demonstration, and low-carbon R&D can accelerate the diffusion of new technologies and help maintain competitiveness in export-oriented sectors such as steel, cement and semiconductors. Evidence from the case studies focusing on the EU and Japan demonstrate the benefits of competitive, technology-neutral allocation processes, transparent scoring based on cost-effectiveness (tCO₂ reduced per NTD spent), and built-in knowledge-sharing obligations that disseminate lessons across industries. The main trade-off is administrative complexity: these programmes require rigorous project appraisal, risk management and technical oversight capacity within government. Weak implementation can delay disbursement or create perceptions of favouritism and regulatory capture. Strengthening institutional capacity, through dedicated project-finance units or partnerships with development banks, will therefore be essential if Taiwan pursues this option at scale.

Carbon fee revenue disbursed to competent authorities to support research, planning or implementation of transition support measures (such as worker retraining, local economic regeneration, or targeted energy-efficiency upgrades for low-income households) is likely to reduce fewer emissions in the short term but can substantially increase political acceptability and address regionally concentrated adverse impacts. Such spending supports the legitimacy of carbon pricing, especially in a context where energy-intensive exports are central to employment. The trade-off here lies in the potential diluted mitigation impact, through possible rebound effects and potential overlaps with existing social-welfare programmes. Clear eligibility criteria and performance indicators (e.g. jobs created, residential units insulated, or retraining outcomes) can help maintain accountability and ensure these expenditures complement, not substitute or overlap with, broader social policy.

Fiscal and administrative uses, such as debt reduction, contingency reserves, or system administration, contribute to policy credibility and long-term sustainability by ensuring that temporary revenue streams are managed prudently. However, these uses can appear intangible

or politically remote, risking public scepticism if citizens do not perceive salient local benefits. To counter this, allocating a small but explicit share of revenues to oversight, monitoring and independent ex-post evaluation can make these fiscal functions visible, demonstrating that the system is well-governed, and that performance is continuously scrutinised.

Overall, the trade-offs suggest that Taiwan should pursue a dual-track strategy:

1. Earmark most revenues for time-bound mitigation and adaptation programmes that deliver visible, results-based and measurable outcomes in emissions reduction, technology deployment and resilience building.
2. Dedicate a stable fraction to relevant competent authorities for supporting affected sectors', workers', communities' and SMEs' transition to a low-carbon economy through targeted and, where appropriate, locally delivered projects.

Considering the effective implementation of this strategy requires robust governance and sufficient administrative capacity for ongoing oversight and evaluation, the use of carbon fee revenue can be grouped under the three aggregate categories described in Box 4.1. The categories also provide an approximate mapping to the 13 use cases identified in Article 33 of the Climate Change Response Act (see Appendix I). The inclusion of individual use cases under both the environmental investment and expenditure category on the one hand, and the transition support measures category on the other, is deliberate. These are not mutually exclusive categories but are defined by their primary objectives: achieve environmental outcomes, minimise transition burdens and support governance and effective delivery. Put differently, the Article 33 use cases serve as the legal framework to fund a given category depending on the objective and design of the expenditure programme, and function as the legal envelope within which these expenditures may be made.

Box 4.1. Categories of carbon fee revenue use

- **Environmental investment and expenditure:** spending whose primary objective is to deliver direct, measurable climate-relevant outcomes (tCO₂e reduced/avoided, energy intensity reduced, clean capacity deployed, industrial process change) and adaptation/resilience outcomes. This could be anchored in, but not limited to, Article 33 use cases 2, 3, 4, 5, 8 and 13.
- **Transition support measures:** spending whose primary objective is to manage transition costs and distributional impacts arising from decarbonisation and carbon pricing like affordability/energy poverty alleviation, worker/community adjustment (e.g. skills, redeployment), and SME transition/compliance capability. This could be anchored in, but not limited to, Article 33 use cases 2, 3, 4, 5 and 12, and delivered via competent authorities and local governments.
- **Administration and governance:** spending aimed at managing, implementing and overseeing climate programmes and policies, including monitoring, reporting, enforcement and institutional capacity. This could be anchored in, but not limited to, Article 33 use cases 1, 6, 7, 9, 10 and 11.

Recommendation 1: Based on the findings from the literature review in Section 2 and the international case studies from Japan, the EU and California in Section 3, the authors of this report recommend the following as plausible and balanced revenue-use shares for Taiwan for consideration by the Fund Management Committee (FMC) of the Greenhouse Gas Management Fund (GGMF) (see also Figure 4.1):

- ~65% for environmental investment and expenditure (of which 60% would be allocated to mitigation and 40% to adaptation)
- ~25% for transition support measures
- ~10% for administrative, capacity-building, communication and evaluation functions.

Figure 4.1. Suggested revenue use balance for the Taiwan Carbon Levy



Source: Authors' own elaboration

This balanced approach would maximise environmental impact while sustaining political support, linking each dollar of carbon revenue to outcomes that citizens and industry can see, measure and trust.

While the recommended approach aims to approximate a first-best outcome under ideal conditions, there are legitimate practical reasons why policymakers may need to deviate from the recommended budget splits. Fixing allocations too rigidly in advance may unduly constrain policymakers' ability to respond to changing circumstances, such as unexpected economic shocks, evolving labour market conditions or the emergence of new abatement technologies requiring rapid capital deployment and support. The composition, scale and scope of environmental investment and expenditure programmes and transition support measures may require a reassessment of the share of resources devoted to administration and governance. Maintaining a degree of discretionary authority allows the FMC to adjust spending patterns as needed as the relative urgency of different policy objectives changes/evolves over time.

4.3. Trade-offs among institutional arrangements

Three main institutional models can operationalise carbon-revenue use:

1. **Line-ministry allocation (budgetary integration)** – as used in Japan’s Special Account for Energy Measures for the revenues from the Tax for Climate Change Mitigation. This ensures fiscal control, coherence with sectoral policies and uses existing budgetary channels, minimising the need for new institutions or oversight structures. However, this could result in fragmentation risks, with dispersed spending across ministries which can reduce coherence of climate objectives, dilute efficacy and limit visibility.
2. **Dedicated fund model** – exemplified by California’s Greenhouse Gas Reduction Fund and the EU Innovation Fund. It centralises management, allows earmarking within clear legal boundaries, provides legal and procedural clarity and enhances public communication through unified branding. The trade-off is the need for a strong secretariat and coordination across ministries, and rigid allocation rules can limit flexibility to adjust spending in response to changing policy needs or fiscal contexts.
3. **Hybrid model with a supervisory board** – combining a central fund with line-ministry implementation, similar to the case of the GX Economy Transition Bonds.

In practice, these institutional models are not completely separate. Indeed, the existing GGMF, which has responsibility for collecting and managing carbon fee funds, appears to take elements from Model 2 (dedicated fund model) and Model 3 (hybrid model). It therefore makes practical sense to build on existing measures. The benefits of the current approach include the potential to maintain strategic independence and mission integrity through the supervisory board, while ministries execute with administrative capacity. The current structure of the GGMF may also enhance financial resilience since the FMC can authorise the use of bonds or short-term fiscal instruments to stabilise funding flows.

At the same time, it is important to note that this kind of institutional model requires sophisticated governance, including clear legal mandates and delineation of powers. There are also transaction costs and complexity that need to be considered alongside potential frictions on fund disbursement rules. Aligning fiduciary rules across the central fund and ministry budgets (procurement, audit cycles) is non-trivial.

Recommendation 2: Building on the existing architecture is recommended for Taiwan as it balances accountability and flexibility by maintaining oversight under the Ministry of Environment while allowing line ministries and agencies to execute projects through existing channels.

Rather than moving to an entirely new institutional model, Taiwan can utilise and strengthen the existing GGMF structure, which already operates as a hybrid between a dedicated fund and line-ministry execution. This helps ensure that the Ministry of Environment and the FMC provide strategic direction and oversight, while line ministries implement programmes within clearly defined funding windows.

Such an approach preserves accountability, avoids fragmentation across multiple funds and leverages existing administrative capacity. At the same time, simplification of rules, clearer division of responsibilities and more transparent communication of revenue use can reduce transaction costs and strengthen public and political support for the carbon fee.

Under any institutional model, transparency and communication are decisive for legitimacy. As evidenced in the previous sections, public confidence in carbon pricing depends not only on how revenues are spent, but also on how clearly their use and impact are communicated.

Recommendation 3: To that end, the government should establish an online public revenue-use tracker, modelled on California’s Climate Investments Dashboard, or an information portal like the EU ETS Innovation Fund’s Knowledge-Sharing Portal. The tracker should serve as a single point of access for citizens, businesses and legislators to view:

1. Total revenues collected, disaggregated by source (carbon fee currently and in the future T-ETS auctions, or T-CBAM proceeds)
2. Allocations by major spending category, including mitigation, adaptation, transition support measures and capacity building
3. Project-level disbursements, showing the implementing agency, location, beneficiaries and implementation status
4. Estimated greenhouse gas emissions reductions and adaptation outcomes (e.g. tCO₂e avoided, households protected from flooding, renewable capacity installed)
5. Quantified social and economic co-benefits, such as jobs created, private capital mobilised or training programmes supported.

The platform should allow users to generate visual summaries and access annual and mid-term evaluation reports. Ideally, it would also include a map interface displaying project locations (similar to California’s project-mapping tool) to highlight the geographic distribution of benefits across Taiwan’s regions. Annual updates of the tracker should feed directly into the Climate Change Response Act’s reporting obligations and be subject to independent audit and public review, ensuring consistency between fiscal reporting, environmental accounting and Taiwan’s progress towards its national climate targets.

4.4. Operationalisation in the Taiwanese context

Given the legal constraints of Article 33 (limiting revenue use to support for greenhouse gas reduction, action on adaption or transition support as well as support for R&D on mitigation and adaptation) and the existence of the GGMF, this section focuses on measures to strengthen the governance of the GGMF (hereafter referred to as the ‘Fund’). It focuses on the following operational aspects: (i) governance, (ii) revenue allocation, (iii) evaluation framework, and (iv) communication and stakeholder engagement.

Governance

Recommendation 4: The governance structure of the Fund should be anchored in strong inter-ministerial coordination and high-level political oversight. The current FMC already plays a central coordinating role and should remain the core body providing strategic direction on the use of carbon fee revenues. Its mandate could be reinforced by ensuring strong inter-ministerial representation, in particular the Ministry of Finance and Ministry of Economic Affairs, as well as relevant sub-national authorities. This would help ensure that decisions on the use of carbon revenues are aligned with fiscal prudence, long-term climate objectives and local implementation realities. The Committee, chaired by the Minister of Environment in line with the Climate Change Response Act, would thus continue to act as the central forum for steering Taiwan’s transition to net zero.

Each year, the committee shall review the annual (or multi-year) spending plan and ensure that all expenditures comply with legal and regulatory requirements. This process would map the investment plan to the 13 revenue use cases established in the Climate Change Response Act, in a similar way to how the Japan Climate Transition Bond Framework maps the priorities and eligibility criteria of the potential investments from the GX Economy Transition Bonds. As such, this process would ensure that all proposed expenditures are consistent with Taiwan’s National Climate Change Action Guidelines and integrated with broader economic development and industrial innovation policies. Such approval would also help harmonise climate investment

decisions with the government's budgetary cycle and guarantee coherence between national and local priorities.

Recommendation 5: To maintain accountability and public trust, the Fund's operations would be subject to regular independent auditing by the National Audit Office – maintaining and strengthening the existing mechanism under the Climate Change Response Act's reporting obligations. Key financial and performance data (covering allocations, disbursements and project outcomes) would be disclosed through the online revenue-use tracker, allowing the public, legislators and civil-society organisations to monitor in real time how revenues are collected and spent. This governance framework combines strong oversight, cross-government coordination and transparent reporting, thereby reinforcing the legitimacy and effectiveness of Taiwan's carbon-revenue system.

Revenue allocation framework

Recommendation 6: The revenue allocation framework of the Fund would be organised around four dedicated funding windows, each addressing a specific dimension of Taiwan's climate transition while ensuring balance across economic, environmental, social and institutional priorities. The development of specific funding windows allows companies to plan, de-risk and mobilise capital in ways that ad hoc or unpredictable calls may not do.

The largest share of resources (around 40%) would flow through the Mitigation Window, supporting projects that directly reduce greenhouse gas emissions and accelerate industrial transformation. Funds in this window would be deployed through competitive grants and blended-finance instruments, drawing on the experience of the EU Innovation Fund and the California Climate Investments programme. Priority areas would include industrial decarbonisation, including CCUS clusters and carbon dioxide removals, renewable energy expansion, and low-carbon research and development. The Taiwan Carbon Solution Exchange (TCX) could play a facilitative role, for example by hosting innovation auctions or carbon-contracts-for-difference pilots that crowd in private capital and reward measurable emissions reductions and carbon removals.

A second stream (approximately 25%) would be channelled through the Adaptation and Resilience Window, co-funding projects with local governments to strengthen Taiwan's resilience to climate impacts. Eligible activities could include climate-proof infrastructure such as flood-defence systems, disaster-risk prevention programmes, and ecosystem restoration initiatives that protect biodiversity while delivering adaptation benefits. These investments would not only safeguard communities but also support local economic development and job creation.

The transition support window, representing 25% of total revenues, would focus on community-level initiatives that cushion households, SMEs, and workers affected by carbon pricing policies. Rather than direct household transfers, which are not permitted under current legislation, the funds would be disbursed to competent authorities to "assist the central competent agency to execute just transition" (use case 12). These funds could finance energy-efficiency upgrades for low-income households and SMEs, reskilling programmes for carbon-intensive sectors, or local cooperatives providing low-carbon services (use cases 2, 3, 4 and 5), thereby achieving the social-equity objectives of redistribution without breaching the legal earmarking restrictions.

Finally, around 10% of revenues would be reserved for a Governance and Evaluation and Communication Window. This stream would finance the administration of the carbon-revenue system, the maintenance of monitoring, reporting and verification infrastructure, capacity-building and staff development, and critically, ex-post evaluation of funded projects. This dedicated window would ensure that implementation remains efficient, learning is continuous, and results are transparently reported through the public online tracker.

Evaluation framework

A robust evaluation framework is essential to ensure that carbon revenue spending delivers measurable climate, social and economic value.

Recommendation 7: In accordance with article 9 of the regulation establishing the Fund, FMC members should institute a system of regular ex-post performance evaluation, conducted by the designated members of the FMC and independent experts from academia, research institutes and policy think tanks. These reviews would assess the environmental effectiveness of funded programmes (in terms of verified greenhouse gas reductions), their economic multipliers (such as private investment leveraged and productivity gains), and their social co-benefits (including employment creation and improvements in community resilience).

Recommendation 8: To promote transparency and comparability, a concise set of key performance indicators would be published annually through the public tracker and the Climate Change Response Act's reporting mechanism. These indicators should include, at minimum: total emissions avoided, private capital mobilised, jobs created or sustained, households and communities benefitted, and the estimated cost per tonne of CO₂ reduced. These metrics should be reported in a consistent format which would make it easier for policymakers, legislators and the public to gauge progress over time.

All evaluations and annual reporting should rely on standardised monitoring, reporting and verification templates compatible with data collected through the Taiwan Carbon Solution Exchange (TCX) and the forthcoming Taiwan Emissions Trading System (T-ETS). This integration would ensure methodological consistency across instruments, avoid duplication of reporting and strengthen the overall integrity of Taiwan's carbon pricing framework.

Communication and stakeholder engagement

An effective communication and stakeholder engagement strategy is crucial to build trust and ensure that carbon revenue use remains transparent, participatory and responsive to public priorities. As seen in the case studies of the California Climate Investments and of the Japanese Tax for Climate Change Mitigation, citizen-facing communication and reporting mechanisms help visualise the social benefits of carbon pricing revenue use.

Recommendation 9: The government should therefore establish a public website and interactive dashboard providing frequent information on carbon revenue inflows, allocations and project outcomes, modelled on the California Climate Investments Map. This platform would visualise where and how revenues are being spent, highlight key performance indicators such as emissions reductions or jobs created, and offer downloadable datasets to encourage independent analysis.

Recommendation 10: In addition to continuous online transparency, the Ministry of Environment should maintain and strengthen the existing reporting mechanisms by preparing an annual 'Carbon Revenue Report'. The report would summarise the Fund's financial performance, detail the projects supported under each revenue window, and assess their environmental, economic and social impacts. Integrating this report into existing legislative oversight processes would help embed accountability and allow lawmakers to scrutinise progress towards Taiwan's climate objectives.

5. Looking ahead: revenue use in an evolving carbon pricing landscape

This report has moved from the theoretical foundations of carbon pricing revenue use (Section 2), through international case studies drawn from Japan, the European Union and California illustrating how those options have been operationalised in practice (Section 3), to a set of recommendations tailored to the Taiwanese context (Section 4). Taken together, the analysis points to a coherent direction of travel: revenue use is most effective when it is anchored in clear strategic priorities, delivered through transparent and accountable institutions, and communicated in ways that build and sustain public trust.

The recommendations in Section 4 are calibrated to the carbon fee as it stands today. Yet, Taiwan's carbon pricing landscape is unlikely to remain static. As the carbon fee evolves and matures, the revenue base can be expected to grow. The T-CBAM, once operational, will likely add a further revenue stream, and depending on its eventual design, a T-ETS may in time generate auction revenues alongside, or in place of, fee receipts. Each of these developments would alter both the volume and the composition of revenues flowing into the Greenhouse Gas Management Fund.

This evolution does not call for a different revenue use framework, but it does place a premium on design choices that remain robust as circumstances change. Three features of the approach set out in Section 4 are particularly relevant in this respect. First, funding windows should be able to be rebalanced as priorities shift over time. Second, time-bound commitments and periodic review can help ensure that temporary revenue streams are not used to finance permanent obligations. Third, a regular evaluation cycle can feed lessons learned back into successive allocation decisions. Provided these features are preserved, the framework proposed here should accommodate the carbon fee, the T-CBAM and a potential future T-ETS as the instrument mix evolves, without requiring fundamental redesign.

A final consideration concerns the wider international context. The evidence reviewed in Section 1.2 shows a clear shift over the past decade away from using carbon pricing revenues primarily to expand fiscal space, and towards earmarked, climate-aligned and transparently governed use. The case studies in Section 3 illustrate how this shift has been translated into practice through dedicated funds, defined eligibility criteria and structured oversight and reporting arrangements. Taiwan's carbon fee, and the institutional architecture being developed around it, place the country well within this emerging mainstream. The decisions taken in the early years of the Fund's operation will shape the institutional foundations on which subsequent revenue flows from the T-CBAM and a potential future T-ETS can be managed.

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Appendix I. Categorisation of revenue use cases specified in Article 33

Table A1. Categorisation of revenue use cases as specified in Article 33 of the Climate Change Response Act (Ministry of Environment, Taiwan, 2023)

	Use cases\categories	Support for action on greenhouse gas reduction	Support for action on adaptation or just transition	Support R&D on mitigation/adaptation	Administration, organisation or personnel expenses	Other domestic or international cooperation, knowledge sharing and capacity building
1	Inspect emission sources					
2	Subsidies to special municipalities, counties and cities for implementation of greenhouse gas reduction					
3	Subsidies to the central industry competent authorities for implementation of greenhouse gas reduction					
4	Subsidies and grants to entities for investment in greenhouse gas reduction technologies					
5	Providing assistance, subsidies, and grants for efforts to reduce greenhouse gas emissions other than the three items mentioned above, and research and develop greenhouse gas reduction technologies					
6	Administrative affairs for holding accounts establishment in the Registry, auctions, sales and allowance trading					
7	Employ staff to carry out administrative services in greenhouse gas reduction and management					
8	Coordinate, plan and implement adaptation to climate change					
9	Promote related matters concerning carbon footprint management mechanisms					
10	Educate the public and promote related matters concerning climate change and greenhouse gas reduction					
11	Conduct climate change and greenhouse gas reduction related international affairs					
12	Assist the central competent agency to execute just transition					
13	Carry out research in climate change adaptation and greenhouse gas reduction					

Source: Authors' own elaboration

Appendix II. Indicative mapping of the revenue use categories and investment projects in the Japan case studies to the 13 revenue use cases of the Taiwan Climate Change Response Act

The following snapshot provides an overview of two tables contained in the accompanying Excel sheet. The tables seek to provide an indicative analysis of how the 13 revenue use cases under the Taiwan Climate Change Response Act map against the investment categories and the investment projects supported by the Japan Tax for Climate Change Mitigation and by the Japan GX Economy Transition Bonds, as discussed in the case studies above. It is important to note that the tables only provide a high-level link between the revenue use cases in Taiwan and those in Japan. For example, whereas not many specific projects in Japan fund 'Employ staff to carry out administrative services in greenhouse gas reduction and management' in a way that is visible at this level of aggregation, we cannot rule out that some of the resources of the supported projects may be used towards this end. Similarly, a large number of projects in Japan map to more than one use case defined in the Climate Change Response Act.

Figure A1. Snapshot of the mapping of revenue use categories and investment projects in the Japan case studies to the 13 revenue cases of the Taiwan Climate Change Response Act

Expenditure category	Expenditure item	Type of beneficiary	1,000 yen (Item)	Relevant Article 33 Categories (Taiwan Climate Change Act)												
				1	2	3	4	5	6	7	8	9	10	11	12	13
	Expenses for efficient and stable operation of the Feed-in Tariff System, etc.	Private organizations, etc.	3,100,000													
	Expenses for surveys on the development of energy supply and demand statistics, etc.	Private organizations, etc.	604,162													
	Expenses for public relations projects to promote the introduction of new energy sources, etc.	Private organizations, etc.	610,000													
	Expenses for projects to enhance safety regulations for new energy sources, etc.	Private organizations, etc.	306,000													
	Expenses for surveys on measures to enhance the energy supply and demand structure, etc.	Private organizations, etc.	1,860,386													
	Expenses for comprehensive support projects to improve the safety capabilities of small-scale power generation facilities, etc.	Private organizations, etc.	266,000													
	Expenses for international cooperation projects	Private organizations, etc.	477,000													
	Expenses for support projects for research on the expansion of offshore wind power generation	Private organizations, etc.	213,946													
	Expenses for research projects to collect and collect information on hydroelectric power generation technologies, etc.	Private organizations, etc.	200,000													
	Expenses for projects to support the expansion of renewable energy introduction and the introduction of distributed energy resources, etc.	Private organizations, etc.	200,000													
	Project Expenses for Surveys on the Introduction of Regionally Symbiotic Renewable Energy Power Generation Facilities	Private organizations, etc.	357,140													
	Project Expenses for Surveys on the Development of Practical Renewable Energy Personnel	Private organizations, etc.	50,000													
	Project Expenses for Research on Support for Decarbonization and Energy Conversion Technologies in Resource-Rich Countries	Private organizations, etc.	120,000													
	Expenses for the Geothermal Power Generation Understanding Promotion Project	Private organizations, etc.	200,000													

Source: Authors' own elaboration with data from the Ministries of Finance and of Economy, Trade and Industry. The full table can be found in the accompanying Excel sheet.

Appendix III. Examples in the international experience of revenue use cases specified in Article 33

Table A2 contains examples of carbon pricing instruments that use some of their revenues in a similar or suitable way to the use cases specified in Article 33 of the Climate Change Response Act (Ministry of Environment, Taiwan, 2023).

The table contains examples for the following CPIs: California C&T, EU ETS, Germany ETS, New Zealand ETS, RGGI, Washington C&I (ETS); Baja California, Guanajuato, Japan, Switzerland, Tamaulipas, Zacatecas (Carbon Taxes). Additionally, it includes information on the Panama National Program 'Reduce your Footprint', and the Ecuador 'Zero Carbon Program'. These are not CPIs and therefore don't collect carbon pricing revenues, but the programmes themselves have similarities to use case 9 ('Promote related matters concerning carbon footprint management mechanisms').

It is important to mention that, for each category and for each CPI that we are presenting, the examples that are displayed are not exhaustive for that CPI; they are rather illustrative examples which show that such a use case is also present in the corresponding CPI.

Table A2. Examples in the international experience of revenue use cases specified in Article 33

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
1	Inspect emission sources	Zacatecas Carbon Tax	Zacatecas Carbon Tax Regulation	Revenues raised from these environmental taxes may be directed with priority to: health infrastructure and services, environmental improvement activities, pollution monitoring activities , environmental disaster management, sustainable development projects, housing, and other environmental activities as specified in fraction II, Article 8 of the General Law on Climate Change.	https://www.congresozaac.gob.mx/f/articulo&art=49157&ley=57&tit=1&cqp=1&sec=0
		Guanajuato Carbon Tax	Guanajuato Carbon Tax Regulation	Revenues raised from these environmental taxes may be directed with priority to areas that have been more environmentally impacted and that are at an economic disadvantage, for: environment projects and programmes; public works, infrastructure or investment for the improvement or restoration of the environment; pollution monitoring activities ; environmental disaster management; sustainable development projects; housing, for the people in risk zones; and other environmental activities as specified in fraction II, Article 8 of the General Law on Climate Change.	https://congreso-gto.s3.amazonaws.com/uploads/reforma/pdf/3605/LHEG_REF_27Dic2024.pdf

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
2	<i>Subsidies to special municipalities, counties and cities for implementation of greenhouse gas reduction</i>	California Cap-and-Trade Program	California Climate Investments (CCI) for local governments – Affordable Housing and Sustainable Communities Program	This measure entails affordable housing loans and other capital grants for housing-related infrastructure, sustainable transportation infrastructure, transportation-related amenities, and related programmes.	https://www.caclimateinvestments.ca.gov/ahsc
		Japan Carbon Tax	Special Account for Energy Measures	This measure includes funding for regional decarbonisation promotion subsidies: the government provides support through the Regional Decarbonization Promotion Subsidy to local governments and other entities that are taking ambitious decarbonisation initiatives.	https://www.env.go.jp/earth/ondanka/biz_local.html
		Switzerland Carbon Tax	Buildings programme	The funds for the buildings programme are paid to the cantons in the form of general financial aid. To qualify for receipt of the funding, the cantons must have a building envelope subsidy programme, which is based on the cantons' harmonised funding model.	https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/funding-measures-climate/foerderung-im-gebauedebereich.html
		Baja California Carbon Tax (now abolished)	Baja California Carbon Tax Regulation Art. 136-7 (now abolished)	20% of the revenue collected went to municipalities, distributed in proportion to the amount that was collected in each of the municipalities in the previous fiscal year. Those resources had to be used to promote and develop programmes to benefit the environment.	https://www.congresobc.gob.mx/Documentos/ProcesoParlamentario/Dictamenes/20200424_65_HACIENDA.pdf
		Washington State Cap-and-Invest Program	Carbon Emissions Reduction Account (CERA); Climate Investment Account (CIA); Climate Commitment Account	Climate Commitment Account investments include funding for greenhouse gas reductions targeted to areas of overburdened communities and tribal areas .	https://ecology.wa.gov/air-climate/climate-commitment-act/auction-revenue

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
3	<i>Subsidies to the central industry competent authorities for implementation of greenhouse gas reduction</i>	Washington State Cap-and-Invest Program	Carbon Emissions Reduction Account (CERA); Climate Investment Account (CIA); Air Quality & Health Disparities Improvement Account (AQHDIA)	Appropriated dollars from forecasted amounts of revenues from auctions flow through state agencies to projects around the state. Following each fiscal year, the Department of Ecology reports back to the Legislature about how auction revenue was invested.	https://ecology.wa.gov/air-climate/climate-commitment-act/auction-revenue and see Appendix B: https://apps.ecology.wa.gov/publications/documents/2414076.pdf
		Japan Carbon Tax	Special Account for Energy Measures	This measure includes support projects for the creation of a social implementation model for perovskite solar cells, through local governments and private companies that contribute to the creation of social implementation models.	https://www.env.go.jp/earth/ondanka/biz_local.html
		California Cap-and-Trade Program	California Climate Investments (CCI)	California Climate Investments are funded by proceeds from the sale of state-owned allowances from quarterly Cap-and-Trade auctions that are deposited into the Greenhouse Gas Reduction Fund (GGRF). On a yearly basis, the Legislature distributes the money from the GGRF to programmes administered by different State agencies . Any programme that is paid for using money from the GGRF is a California Climate Investments programme. Once State agencies receive funds, they conduct a variety of tasks such as engaging communities, determining the type of projects to fund, releasing and reviewing project proposals, and carefully selecting recipients. Awarded recipients then implement projects based on criteria and timelines developed by the State agency.	https://www.caclimateinvestments.ca.gov/about-cci
4	<i>Subsidies and grants to entities for investment in greenhouse gas reduction technologies</i>	EU ETS	Innovation Fund	The EU Innovation Fund funds projects focusing on: (1) innovative low-carbon technologies and processes in energy-intensive industries, including products that can substitute carbon-intensive ones (2) carbon capture and utilisation (CCU) (3) construction and operation of carbon capture and storage (CCS) facilities (4) innovative renewable energy generation (5) energy storage	https://climate.ec.europa.eu/eu-action/eu-funding-climate-action/innovation-fund/what-innovation-fund_en

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
		Japan Carbon Tax	Special Account for Energy Measures	This measure includes funding for projects to accelerate the introduction of renewable energy: specifically, the introduction of self-consumption and locally produced and locally consumed renewable energy by private companies and other entities.	https://www.env.go.jp/earth/ondanka/biz_local.html
		New Zealand ETS	New Zealand Climate Emergency Response Fund (now closed) – Enhancing Energy Resilience for New Zealand Communities through Distributed Renewable Energy	Includes provision of funding for purchase of renewable energy solutions.	https://www.treasury.govt.nz/sites/default/files/2024-11/reporting-cerf-q4-2024-performance.pdf Category: "Provision of Funding for Purchase of Renewable Energy Solutions"
		Washington State Cap-and-Invest Program	Climate Commitment Account (CCA) – 26C – Clean Buildings – Home Elec App Rebate Prog FY23-25	The State Home Electrification and Appliance Rebates Program provides grants to eligible third-party administrators to provide rebates and incentives to households and small businesses to purchase and install high-efficiency electric equipment and appliances.	https://apps.ecology.wa.gov/publications/documents/2414076.pdf see Annex B, Appropriation Title "Clean Buildings - Home Elec App Rebate Prog FY23-25"
		California Cap-and-Trade Program	High-Speed Rail Authority (HSRA), transit and inter-city rail (CalSTA), and low carbon transit operations (Caltrans)	25% of annual cap-and-trade revenues are appropriated to the HSRA project.	https://lao.ca.gov/Publications/Report/4811

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
5	<i>Providing assistance, subsidies and grants for efforts to reduce greenhouse gas emissions other than the three items mentioned above, and research and develop greenhouse gas reduction technologies</i>	Washington State Cap-and-Invest Program	Climate Commitment Act	This sub-account focuses on projects that support Washington's transition to a low-carbon economy, improve air quality and increase access to clean energy for Washington residents including (but not limited to): (1) Supporting renewable energy technology and infrastructure (2) Investing in energy efficiency for industry and agriculture (3) Increasing building energy efficiency and supporting electrification (4) Supporting appliance energy efficiency (5) Assisting affected workers during the transition to a clean energy economy (6) Capturing methane and diverting organics at landfills (7) Deploying carbon dioxide removal.	https://ecology.wa.gov/air-climate/climate-commitment-act/auction-revenue
		Japan Carbon Tax	Special Account for Energy Measures	This measure includes support for the introduction of renewable energy facilities that can supply energy to public facilities during disasters and power outages.	https://www.env.go.jp/earth/ondanka/biz_local.html
		Switzerland Carbon Tax	Buildings programme – Incentives for green retrofit	The following construction measures are supported under the building programme: (1) Thermal insulation of the building envelope (2) Replacement of fossil or electric heating systems with heating systems that use renewable energies or connection to a heating network (3) Comprehensive, energy-efficient renovations or renovations in larger stages (4) New buildings that meet certain Minergie standards https://resourcehub.bakermckenzie.com/en/resources/global-sustainable-buildings/europe-middle-east-and-africa/switzerland/topics/incentives-for-green-retrofit	https://www.bafu.admin.ch/bafu/en/home/topics/climate/info-specialists/reduction-measures/co2-abgabe.html
6	<i>Administrative affairs for holding accounts establishment in the Registry, auctions, sales and allowance trading</i>	EU ETS	Administrative purposes	The EU ETS directive enables Member States to use part of accrued revenue to cover administrative expenses of the management of the EU ETS.	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02003L0087-20240301
		Washington State Cap-and-Invest Program	Climate Investment Account	Auction revenue deposited in the Climate Investment Account (CIA) is first used to fund the administration of the Cap-and-Invest Program, but these expenses can't exceed 5% of total auction revenue.	https://ecology.wa.gov/air-climate/climate-commitment-act/auction-revenue

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
		RGGI	Administrative purposes	Individual RGGI states can withhold part of accrued revenue for administrative purposes. For example, in 2023, Connecticut withheld 7.5% (\$3.28 million) for administrative purposes.	https://www.rggi.org/sites/default/files/Uploads/Proceeds/RGGI_Proceeds_Report_2023.pdf
7	<i>Employ staff to carry out administrative services in greenhouse gas reduction and management</i>	EU ETS	Administrative purposes	The EU ETS directive enables Member States to use part of accrued revenue to cover administrative expenses of the management of the EU ETS.	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02003L0087-20240301
		California Cap-and-Trade Program	AB 32 Cost of Implementation Fee Regulation	Fees collected under the AB 32 Cost of Implementation (COI) Fee Regulation fund the development, administration and implementation of AB 32 programmes by state agencies to achieve reductions in greenhouse gas emissions.	https://ww2.arb.ca.gov/our-work/programs/ab-32-cost-implementation-fee-regulation
		Japan Carbon Tax	Special Account for Energy Measures	This special account includes funding to secure and develop core human resources who will be responsible for creating plans, building consensus and operating projects to achieve decarbonisation in the region.	https://www.env.go.jp/earth/ondanka/biz_local.html
		Washington State Cap-and-Invest Program	Climate Commitment Account (CCA) – 26C – Transmission Planning – ESB 5128 Incremental Energy	The account includes agency staff and expert service costs. Funding supports efforts to reduce barriers to planning, siting and constructing electric power transmission projects to support development of new clean energy resources and improve grid reliability.	https://apps.ecology.wa.gov/publications/documents/2414076.pdf see Annex B, Appropriation Title "Transmission Planning - ESB 5128 Incremental Energy"

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
		New Zealand ETS	New Zealand Climate Emergency Response Fund (now closed) – Agriculture Emissions Reduction – Supporting Producers and Māori Entities Transition to a Low Emissions Future	A portion of the resources was used on implementation and administration.	https://www.treasury.govt.nz/sites/default/files/2024-11/reporting-cerf-q4-2024-performance.pdf Initiative: "Agriculture Emissions Reduction - Supporting Producers and Maori Entities Transition to a Low Emissions Future" Category: "Climate Emergency Response Implementation and Administration"
		RGGI	Administrative purposes	Individual RGGI states can withhold part of accrued revenue for administrative purposes. For example, in 2023, Connecticut withheld 7.5% (US\$3.28 million) for administrative purposes.	https://www.rggi.org/sites/default/files/Uploads/Proceeds/RGGI_Proceeds_Report_2023.pdf
8	Coordinate, plan and implement adaptation to climate change	California Cap-and-Trade Program	California Climate Investments (CCI) – Sea Level Rise Adaptation Planning Grant Program	The overall goal of the Grant Program is to provide funding to develop sea level rise adaptation plans and projects to build resilience to sea level rise along the entire coast of California and San Francisco Bay.	https://www.caclimateinvestments.ca.gov/sb-1-sea-level-rise-adaptation-planning-grant-program
		California Cap-and-Trade Program	California Climate Investments (CCI) – Climate Adaptation and Resiliency Program	This programme funds development and implementation of climate adaptation and resiliency projects that prioritise conservation and management of natural and working lands, provide technical assistance for natural and working land managers, and support efforts that improve rural and urban coordination on climate change adaptation.	https://www.caclimateinvestments.ca.gov/adaptation-easements
		California Cap-and-Trade Program	California Climate Investments (CCI) – Wildfire prevention grants	This grant supports projects in and near fire-threatened communities to improve public health and safety while reducing greenhouse gas emissions.	https://www.fire.ca.gov/what-we-do/grants/wildfire-prevention-grants

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
		Guanajuato Carbon Tax (part of the green tax suite)	Guanajuato Carbon Tax Regulation (and General Law on Climate Change)	Revenues raised from these environmental taxes may be directed with priority to areas that have been more environmentally impacted and that are at an economic disadvantage for: environmental project and programmes; public works, infrastructure or investment for the improvement or restoration of the environment; pollution monitoring activities; environmental disaster management; sustainable development projects; housing, for the people in risk zones; and other environmental activities as specified in fraction II, Article 8 of the General Law on Climate Change (these include 'Formulate, regulate, direct, and implement climate change mitigation and adaptation actions').	https://congreso-gto.s3.amazonaws.com/uploads/reforma/pdf/3605/LHEG_REF_27Dic2024.pdf and http://www.ordenjuridico.gob.mx/Documentos/Federal/html/wo71395.html
		Washington State Cap-and-Invest Program	Climate Commitment Account	Climate Commitment Account investments include assisting affected workers during the transition to a clean energy economy, supporting efforts to mitigate and adapt to the effects of climate change affecting Tribes , implementing the working families tax rebate, and reducing greenhouse gas emissions in overburdened communities.	https://ecology.wa.gov/air-climate/climate-commitment-act/auction-revenue
		Zacatecas Carbon Tax (part of the green tax suite)	Zacatecas Carbon Tax Regulation (and General Law on Climate Change)	Revenues raised from these environmental taxes may be directed with priority to: health infrastructure and services, environmental improvement activities, pollution monitoring activities, environmental disaster management, sustainable development projects, housing, and other environmental activities as specified in fraction II, Article 8 of the General Law on Climate Change (these include 'Formulate, regulate, direct, and implement climate change mitigation and adaptation actions').	https://www.congresozaq.gob.mx/f/articulo&art=49157&ley=57&tit=1&cap=1&sec=0 and http://www.ordenjuridico.gob.mx/Documentos/Federal/html/wo71395.html
9	Promote related matters concerning carbon footprint management mechanisms	NOT A CPI – Panama National Program Reduce your Footprint	Corporate Carbon RTH	Reduce Your Corporate Footprint – Carbon (RTH Corporativo – Carbono) is the first voluntary state programme for managing carbon footprints at the organisational level in the Republic of Panama. This programme establishes a standardised process for identifying, calculating, reporting and verifying information related to greenhouse gases generated within the operational limits of public, private and civil society organisations that are legally constituted in the national territory.	https://transparencia-climatica.miambiente.gob.pa/rene-rth-corporativo-carbono/

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
		NOT A CPI – Ecuador Zero Carbon Program (PECC)	Ecuador Zero Carbon Program (PECC) – Level 1	This programme aims to encourage the productive and service sectors to take action against climate change by managing their carbon footprint, allowing them to report on their commitments and access environmental and tax incentives. The PECC is a voluntary and progressive scheme that rewards continuous improvement through different levels of implementation. It contains three levels: emissions quantification, emissions reduction, and carbon neutrality.	https://www.ambiente.gob.ec/programa-ecuador-carbono-cero/
		Japan Carbon Tax	Special Account for Energy Measures	The special account includes funding for projects to advance decarbonised management of small- and medium-sized enterprises throughout the value chain: These projects create guidebooks and promote decarbonisation management in companies across the value chain. For instance, they include projects for product and service emissions visualisation and reduction ; and projects for decarbonisation management strategy formulation and information disclosure .	https://www.env.go.jp/earth/ondanka/biz_local.html
10	Educate the public and promote related matters concerning	German ETS	International Climate Initiative (IKI)	Some of IKI's projects address climate education such as through support for the Climate Action School Contest (https://www.international-climate-initiative.com/en/iki-media/news/empowering-indonesian-students-as-climate-change-action-leaders/).	https://www.international-climate-initiative.com/en/

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
	<i>climate change and greenhouse gas reduction</i>	Tamaulipas Carbon Tax	Tamaulipas Carbon Tax	Revenues from the tax may be used preferably for: adaptation, with a focus on social groups in vulnerable areas of the state; projects that contribute to adaptation and mitigation simultaneously (deforestation and degradation reduction, carbon sinks, sustainable agricultural practices, recharge of aquifers, protect wetlands, promote biological corridors, etc.); mitigation, reduction or compensation projects according to the priorities in the State Climate Change Strategy the Climate Change State Program, and municipal programmes; projects to reduce vulnerability of the state against climate change; education ; research, innovation and technological development; studies and evaluations on climate change; environmental inspection and oversight; and other activities considered strategic by the Inter-secretarial Commission on Climate Change of the State.	https://www.congresotamaulipas.gob.mx/Parlamentario/Archivos/Leyes/Ley%20de%20Hacienda%2016-ENE-2025-.pdf
		California Cap-and-Trade Program	California Climate Investments (CCI) – Outreach, Education, and Awareness	California Climate Investments funds Administration of Access Clean California, a multi-faceted outreach effort that helps streamline access to California Climate Investments’ consumer-facing, equity-focused clean transportation and clean energy incentive programmes for low-income and disadvantaged communities. This programme also helps to coordinate related outreach efforts across the state, provide technical assistance and capacity building for community-based organisations, and supports continued implementation of CARB’s SB 350 Barriers Study Priority Recommendations and Outreach Strategic Roadmap.	https://www.caclimateinvestments.ca.gov/outreach-education-and-awareness
		Zacatecas Carbon Tax (part of the green tax suite)	Zacatecas Carbon Tax Regulation (and General Law on Climate Change)	Revenues raised from these environmental taxes may be directed with priority to: health infrastructure and services, environmental improvement activities, pollution monitoring activities, environmental disaster management, sustainable development projects, housing, and other environmental activities as specified in fraction II, Article 8 of the General Law on Climate Change (these include education activities on mitigation and adaptation).	https://www.congresozac.gob.mx/f/articulo&art=49157&ley=57&tit=1&cap=1&sec=0 and http://www.ordenjuridico.gob.mx/Documentos/Federal/html/wo71395.html

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
		Japan Carbon Tax	Special Account for Energy Measures	The special account supports a Project to Promote Decarbonization of Remote Islands – For regions aiming for local production and consumption of energy, support is provided for the implementation of field surveys and fostering understanding among stakeholders of the importance of introducing off-shore wind power.	https://www.env.go.jp/earth/ondanka/biz_local.html
		Guanajuato Carbon Tax (part of the green tax suite)	Guanajuato Carbon Tax Regulation (and General Law on Climate Change)	Revenues raised from these environmental taxes may be directed with priority to areas that have been more environmentally impacted and that are at an economic disadvantage, for: environment projects and programmes; public works, infrastructure or investment for the improvement or restoration of the environment; pollution monitoring activities; environmental disaster management; sustainable development projects; housing, for the people in risk zones; and other environmental activities as specified in fraction II, Article 8 of the General Law on Climate Change (these include education activities on mitigation and adaptation).	https://congreso-gto.s3.amazonaws.com/uploads/reforma/pdf/3605/LHEG_REF_27Dic2024.pdf and http://www.ordenjuridico.gob.mx/Documentos/Federal/html/wo71395.html
		EU ETS	Innovation Fund	The Innovation Fund projects are required to actively disseminate the acquired knowledge and to carry out activities to support the scaling up to a commercial size and to accelerate deployment and commercialisation of the proposed technologies. This includes open door events to share knowledge , strengthen synergies with other EU funded projects and Member States and support the dissemination of the generated knowledge.	https://cinea.ec.europa.eu/programmes/innovation-fund/knowledge-sharing_en
11	Conduct climate change and greenhouse gas reduction related international affairs	German ETS	International Climate Initiative (IKI)	The IKI aims to: (1) Promote a climate-friendly economy by supporting partner countries in establishing a climate-friendly economic structure that prevents climate-damaging greenhouse gas emissions (2) Promote measures for climate change adaptation by supporting appropriate national programmes in selected partner countries that are especially vulnerable to climate change (3) Promote and finance measures for preservation and sustainable use of carbon reservoirs/Reducing Emissions from Deforestation and Degradation (REDD).	https://www.international-climate-initiative.com/en/about-iki

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
		Japan Carbon Tax	Special Account for Energy Measures	This measure includes support for Joint Crediting Mechanism (JCM) promotion projects, specifically by providing financial support to JCM projects that introduce excellent decarbonisation facilities in JCM partner countries , to achieve the goal of securing a cumulative reduction and removal of 100 million tonnes of CO ₂ e by FY2030.	https://www.env.go.jp/earth/ondanka/biz_local.html
		New Zealand ETS	New Zealand Climate Emergency Response Fund (now closed)	In 2021, the Government announced the establishment of a new 'Climate Emergency Response Fund' (CERF). The CERF was intended to provide a dedicated funding source for public investment on climate-related initiatives distinct from the main Budget allowances. It contained a foreign affairs component on New Zealand's International Development Cooperation.	https://www.treasury.govt.nz/information-and-services/nz-economy/climate-change/climate-emergency-response-fund
12	Assist the central competent agency to execute just transition	California Cap-and-Trade Program	California Climate Investments (CCI) – Workforce development	California Climate Investments helps facilitate the transition through dedicated workforce development and training , establishing partnerships with training programmes and academic institutions, and investing in projects that provide employment opportunities while facilitating greenhouse gas emissions reductions. For example, some programmes are focused specifically on developing the workforce for a low carbon future, funding job training, and workforce development in building energy efficiency and forestry sectors.	https://www.caclimateinvestments.ca.gov/resource-portal-workforce
		EU ETS	Modernisation Fund – Just Transition in Carbon Dependent Regions	Among the Modernisation Fund's six priority investment areas are: (1) just transition in carbon-dependent regions to support redeployment, reskilling and upskilling of workers, education, job-seeking initiatives and start-ups, and (2) support for low-income households, including in rural and remote areas, to address energy poverty and to modernise their heating systems and infrastructure for zero-emission mobility.	https://climate.ec.europa.eu/eu-action/eu-funding-climate-action/modernisation-fund_en

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
		Washington State Cap-and-Invest Program	Climate Commitment Account	Climate Commitment Account investments include assisting affected workers during the transition to a clean energy economy , supporting efforts to mitigate and adapt to the effects of climate change affecting Tribes, implementing the working families tax rebate, and reducing greenhouse gas emissions in overburdened communities.	https://ecology.wa.gov/air-climate/climate-commitment-act/auction-revenue
13	Carry out research in climate change adaptation and greenhouse gas reduction	California Cap-and-Trade Program	California Climate Investments (CCI) – Planning and research	Some funds are dedicated to planning and research projects to help local governments, non-profits, communities and academic institutions understand climate change impacts and develop tailored mitigation and adaptation strategies.	https://ww2.arb.ca.gov/sites/default/files/auction-proceeds/ccl_annual_report_2025.pdf
		Japan Carbon Tax	Special Account for Energy Measures	‘Decarbonization x Reconstruction Town Development’ is a project supported by the special account that funds research and studies that contribute to decarbonisation efforts and renewable energy expansion in specific municipalities.	https://www.env.go.jp/earth/ondanka/biz_local.html

	Use cases of the carbon fee in Taiwan as per Article 33	Other CPIs that use revenue for similar purpose	Measure name(s)	Descriptive notes	Link
		Tamaulipas Carbon Tax	Tamaulipas Carbon Tax Regulation	Revenues may be used preferably for: adaptation, with a focus on social groups in vulnerable areas of the state; projects that contribute to adaptation and mitigation simultaneously (deforestation and degradation reduction, carbon sinks, sustainable agricultural practices, recharge of aquifers, protect wetlands, promote biological corridors ...); mitigation, reduction or compensation projects according to the priorities in the State Climate Change Strategy the Climate Change State Program, and municipal programmes; projects to reduce vulnerability of the state against climate change; education; research , innovation and technological development; studies and evaluations on climate change; environmental inspection and oversight; and other activities considered strategic by the Inter-secretarial Commission on Climate Change of the State.	https://www.congresotamaulipas.gob.mx/Parlamentario/Archivos/Leyes/Ley%20de%20Hacienda%2016-ENE-2025-.pdf
		Washington State Cap-and-Invest Program	Natural Climate Solutions Account (NCSA) – 26D – Agricultural Climate Storage and Sequestration	This account supports the implementation of a grant programme to distribute grants to small farms to support activities that improve carbon storage and sequestration, including agricultural management practices that improve soil health, research that supports carbon storage and emissions reductions on farms , and projects using live native algae, with prioritisation for historically underserved producers, including farmers and ranchers who are beginning, socially disadvantaged, veterans, and have limited resources.	https://apps.ecology.wa.gov/publications/documents/2414076.pdf see Annex B, Appropriation Title "Agricultural Climate Storage and Sequestration "
		EU ETS	Research and Development	Article 10(3) paragraph (g) of the EU ETS Directive outlines how revenues can be used to “finance research and development in energy efficiency and clean technologies in the sectors covered by this Directive”.	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02003L0087-20230605

Source: Authors' own elaboration with data from multiple sources (referenced above)