



CHILE'S CARBON TAX: AN AMBITIOUS STEP TOWARDS ENVIRONMENTALLY FRIENDLY POLICIES AND SIGNIFICANT GREENHOUSE GAS EMISSION REDUCTIONS

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ACTION AREA: Mitigation

FOCUS AREA: Delivering

COUNTRY: Chile

SECTORS

INVOLVED: Energy, Industry

TIMEFRAME: First phase (2017-2018)

CASE SUMMARY: In 2014, Chile passed a large tax reform which notably included the introduction of three new environmental taxes: A carbon tax, a tax for local pollutants and a tax for new vehicles. Chile's environmental framework has been widely strengthened through the introduction of the new green tax regime, procuring additional, cost-effective instruments for the environmental authorities to fulfil their obligations. On January 1st 2017, the green taxes regime came into force. Revenues from green taxes amounted to over USD 298.3 million in 2018, with the greatest contribution from the power generation sector (94%).

The implementation of the carbon tax has involved the establishment of various associated laws, regulations and protocols. Chile has operationalised the carbon tax through a number of steps, including: i) the identification of establishments subject to taxation; ii) the quantification of emissions; iii) emissions declaration; iv) emissions consolidation; v) tax calculation and payment; and lastly, vi) payment prorating by the National Electricity Coordinator. In addition to these steps, the government has secured the establishment of a solid Measurement, Reporting and Verification (MRV) system for the green taxes and built capacity and knowledge throughout these processes.

The case of Chile's carbon tax constitutes a good practice as a result of several factors. The strong political buy-in by the government has ensured the successful implementation of the carbon tax. National capacities have been strengthened by involving multiple public actors in the development of the tax system and through international support. Furthermore, the process has been characterised by strong stakeholder involvement, e.g. by involving the private sector throughout the development of necessary regulations and laws.





BACKGROUND: According to Chile's Report of the National Inventory of Greenhouse Gases on the time series 1990-2013, total greenhouse gas (GHG) emissions in the country (excluding the Forestry and Land Use Sector (or LULUCF)) accounted for 109,908.8 Gigagrams CO₂ equivalent in 2013, increasing by 113.4% since 1990 and by 19.3% since 2010. The main GHGs emitted were CO₂ (78.4%), followed by CH₄ (10.7%), N₂O (10.0%), and fluorinated gases (0.9%) (MMA and SNI, 2017).

Chile signed the Paris Agreement in February 2017. The country's Nationally Determined Contribution (NDC) consists of five pillars: i) mitigation, ii) adaptation, iii) capacity building, iv) development and transfer of technologies, and v) financing (MMA and AGCI, 2016). For the mitigation pillar, Chile chose to present its contribution using the format of a carbon intensity target (CO₂ equivalent tons per unit of gross domestic product (GDP) in millions of Chilean Pesos (CLP) in 2011), excluding the LULUCF sector. Chile committed to 'reduce its CO₂ emissions per GDP unit by 30% below their 2007 levels by 2030, considering a future economic growth that allows for the implementation of adequate measures to reach this commitment' (Gobierno de Chile, 2015). In addition, and conditional upon international monetary support, the country has committed itself to 'reduce its CO₂ emissions per GDP unit by 2030 up to 45% with respect to the 2007 levels, considering a future economic growth which allows to implement adequate measures to achieve this commitment' (ibid).

Chile has continuously searched for new and profitable ways to drive emission reductions and encourage financial flows to support its domestic climate policies, including market-based instruments. According to Chile's 3rd Biennial Update Report (BUR), the country has already used market instruments to manage natural resources, primarily with regards to water rights, fishing and air quality (MMA, 2018). For example, under the Clean Development Mechanism (CDM), Chile has granted a National Approval Letter to 153 projects, 102 of which (61 %) have been successfully registered with the CDM Executive Board.

According to the third 'State of the Environment' Report by the Ministry of Environment (MMA) (MMA, 2017b), the topic of air quality remains one of the priorities and challenges in environmental management, acknowledging that it is not directly linked to GHG emissions. Most of Chile's territory is affected by air pollution. Intensive economic activities, geographic and climatic conditions, and production and consumption patterns contribute to atmospheric emissions affecting more than 10 million people, as well as contributing to Chile's 3,700 premature deaths per year (MMA, 2014b).

Through environmental assessments and associated recommendations, the Organisation for Economic Co-operation and Development (OECD) has encouraged the country to continue to improve its environmental performance by applying new economic instruments, being pioneers in the Latin-American region. In July 2016, the OECD released the Second Environmental Performance Assessment (EPA) to Chile. It provided 54 recommendations for the next ten years towards more sustainable economic development. These recommendations also included a suggestion to revise the new taxes on emissions of local air pollutants and CO₂ from large stationary sources to broaden their scope (MMA and AGCI, 2016).

ACTIVITIES: In 2014, Chile's environmental public policies benefited from a large tax reform, which introduced three new environmental taxes, promoted by the former president Michelle Bachelet:

1. a tax for global pollutants (carbon or carbon dioxide (CO₂) tax)
2. a tax for local pollutants (affecting sulfur dioxide (SO₂), nitrogen oxides (NO_x) and particulate matter (PM) emissions)
3. a tax for new vehicles (which applies only once to new, light and medium cars, depending on their urban performance and NO_x emissions) (MMA and AGCI, 2016)

As of January 1, 2017 the first green tax (or 'pigouvian') regime started to operate in the country. A pigouvian tax pursues the goal to tax the externalities of the productive process or the damage associated with polluting emissions (Pigou, 1932). Pigouvian taxes are considered more efficient than regulatory measures (such as, for example, emission standards) since they reduce pollution at a lower cost and seek to achieve socially optimal levels of pollution (or environmental quality) (Baumol, 1972). The main objectives of the Chilean tax regime are to support and complement efforts to decrease the local air pollution as well as mitigating GHG emissions in a cost-efficient manner.

The following activities were conducted to achieve these objectives:

1) DESIGNING THE CO₂ TAX AS PART OF THE BROADER TAX REGIME

As a complement to the existing tools used for environmental management, the green taxes were designed. The goal during this process was to design the taxes in a way that ensures flexibility for compliance with regulations, creates incentives for greater efficiency and innovation, and fosters technological development for input usage. The main principles behind the environmental taxes are:

- 'Polluter pays' principle
- Goal to correct the behaviour of economic agents, not only collecting taxes
- Downstream nature (i.e. the tax applies to emitters, after emission has been generated)
- Damage approximation (i.e. considering emissions in geographic zones)
- Negative impact taxing (i.e. procuring cost-efficiency to reduce system inefficiencies)
- Scalability of the instrument towards other technologies and emission sources
- Subject construction (i.e. enhancing a debate to reinforce the ethical imperative of the instrument)

The results of applying those principles are reflected in the design of the instruments. The tax on CO₂ emissions affects those businesses that operate stationary sources comprised of boilers or turbines, which individually or together have a thermal power of greater than or equal to 50 megawatts thermal (MWt) of rated thermal input as the upper limit of the energetic value of the fuel (MMA and AGCI, 2016). The tax does not apply to stationary sources which use renewable, non-conventional means in which the primary energy source is biomass.

The CO₂ tax applies a tax of USD 5 for every ton of CO₂ emitted. The tax rate is based on an estimation of the social cost of carbon by the Ministry of Social Development in 2013. In 2017, this methodology was modified to move from the use of market pricing of carbon as an approximation of social cost to a price mechanism based on an analysis of the marginal costs of carbon dioxide abatement to ensure compliance with Chile's mitigation goals under the Paris Agreement. The new methodology increased the cost of CO₂ per ton to CLP 21.687 (Ministerio de Desarrollo Social, 2017). This value, equivalent to USD 32.008, approximates the marginal cost of the damage caused by the pollutant according to the 'Report of the High-Level Commission on Carbon Prices' (Carbon Pricing Leadership Coalition, 2017). It approaches the targets established in the Paris Agreement, which suggest CO₂ costs ranging between USD 40-80 for 2020 and USD 50-100 for 2030.



2) IMPLEMENTING THE CO₂ TAX

The implementation of the carbon tax was possible because of the regulatory framework and institutional infrastructure that was developed. A number of documents, laws, regulations, and guidelines that specify areas of responsibility for each of the agencies involved in the implementation of the green tax regime were elaborated. In addition, a new institutional infrastructure in the form of agreements, procedures, arrangements, workflows, and relationships between institutions – both public agencies and in the private sector – was required for the tax to be applied.

The laws and regulations led, first of all, to an enactment of the green taxes. Furthermore, they specified methodologies for quantifying different types of emissions and gave instructions on the declaration and payment of taxes on polluting compound emissions produced by stationary sources. Administrative procedures for identifying taxpaying bodies, identifying and registering all obligated boilers and turbines and applying the tax were established. Also, definitions for specification of facilities that are subject to green taxes were given. With regards to reporting, guidelines for reporting emissions were put in place and a platform for reporting emissions subject to taxation was further developed by the Superintendence of the Environment, which covers the establishments that are currently included into the reporting systems or need to start reporting (see MMA and GIZ, 2017b for a more detailed overview).

3) OPERATIONALISING THE CO₂ TAX

The operational steps established for the implementation of the CO₂ tax include:

- **IDENTIFICATION OF ESTABLISHMENTS SUBJECT TO TAXATION:** The registry of boilers and turbines, as part of the Pollutant Release and Transfers Registry (RETC, for its Spanish acronym), is managed by the MMA to determine which establishments are subject to taxation. All individuals and legal bodies that own one or more boilers and/or turbines with a rated thermal power level of 5 MWt or more are obliged to register. They must also use MMA's public service system to report information to determine whether or not they are subject to the tax. The MMA will use this information, duly corrected and cross-referenced with information from other sources, to draw up a list of facilities liable for taxation each year. This list is published for informative purposes only since the facilities themselves are obliged to determine whether or not they are subject to the tax, regardless of whether they appear (or not) on the list published by the MMA.
- **EMISSIONS QUANTIFICATION:** All boilers and turbines that belong to a facility subject to the tax must use a pollutant emission monitoring or estimation system for the direct quantification of emission concentrations, either by sampling or by measurement. The estimation is conducted by means of indirect emission quantification mechanisms, based on emission factors and activity levels. Most establishments subject to the tax are currently regulated under a standard that specifies how emissions are to be monitored or estimated, so there is no need to validate new mechanisms. This applies to all facilities subject to thermoelectric plant emissions regulations. The protocol on quantifying emissions stipulates that facilities may select a methodology for each emissions source, regulated parameter, and fuel type, depending on the applicable environmental regulation standard.
- **EMISSIONS DECLARATION:** The establishment subject to a tax must submit an emissions monitoring or estimation report, in accordance with the protocol stipulated by the Superintendence of the Environment (SMA, for its Spanish acronym) for green taxes, via the RETC one-stop window system. Reports are made on a quarterly basis, and must be prepared using the applicable systems for each establishment. Thermoelectric power plants will continue to use the Thermoelectric Plant Information System (SICTER) for reporting. Meanwhile, other power plants and establishments subject to the tax must use the Green Tax System for reporting.

- EMISSIONS CONSOLIDATION:** The SMA is in charge of consolidating the emissions declared by each facility subject to the tax in March of each year, and then providing the Internal Revenue Service (SII, for its Spanish acronym) with all information necessary for calculating the sum payable. This information includes, among others, the identification of the applicable establishment and the rated power (in thermal megawatts) of the sources that it operates and the tons of CO₂ emitted. The SMA also submits an individual report to the National Energy Commission (NEC) and the National Electricity Coordinator (NECO), containing the consolidated and hour-by-hour emissions released at all power plants subject to their coordination. This information is used to establish an individual annual prorating for the tax.
- TAX CALCULATION AND PAYMENT:** The SII uses the information provided by the SMA to calculate and invoice the payable taxes, respectful of the procedure established. The payment must then be made to the General Treasury of the Republic (GTR) in April of the calendar year following the one in which the emissions in question were released, in CLP, at the current exchange rate on the date of payment. In April each year, the SII must send a report that includes tax calculations for each emission source to the NECO and NEC.
- PAYMENT PRORATING BY THE NATIONAL ELECTRICITY COORDINATOR:** The NECO is in charge of calculating suitable estimates so that when the total unit cost for power companies (calculated as the variable cost including transmission plus the unit tax cost) is greater than or equal to the marginal cost, the difference between the value of power input at marginal cost and at said total unit cost must be paid by the power companies that source electricity from the system. Therefore, by June of each year the NECO must release a compensation balance, containing the amounts for compensation of each power generation company for the previous year. Figure 1 illustrates the previously outlined steps.

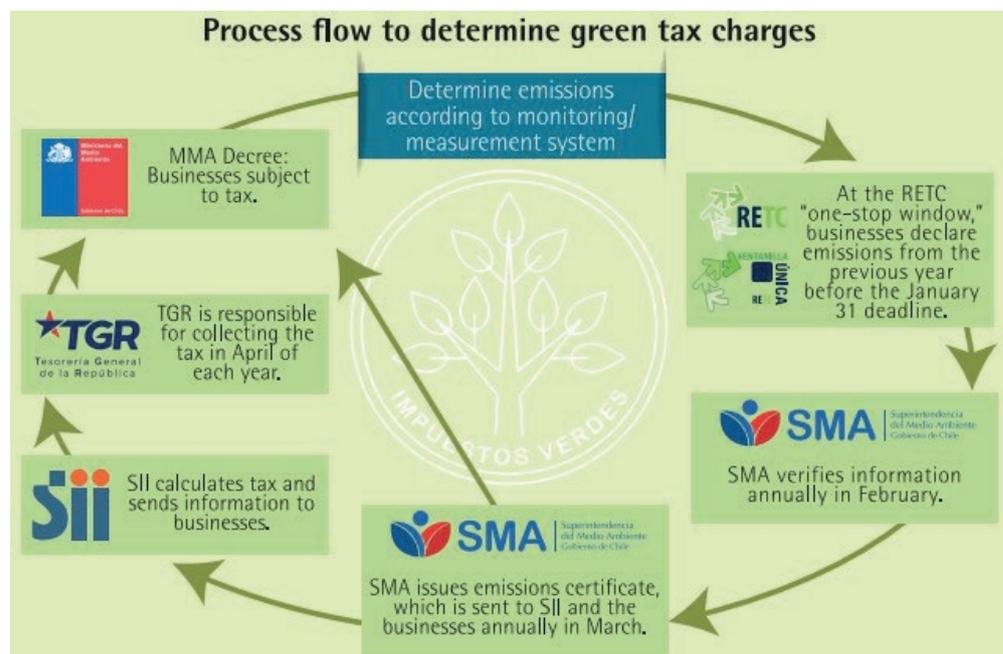


Figure 1: Process flow to determine green tax charges (MMA and GIZ, 2017a)



4) DEVELOPING A MRV SYSTEM

The MMA was in charge of creating a measurement system that is consistent with existing mechanisms, scalable to other areas, and comparable with similar systems in other countries. In addition, the system has been designed to be adaptable to different legal frameworks, problems, and technologies used in other applicable sectors.

- **MEASUREMENT:** The measurement component comprises a wide range of emissions quantification techniques that were designed taking into account existing regulations and the sectors involved to avoid any possible redundancy in regulatory matters. It takes the registry of emission sources as a key element to obtain information.
- **REPORTING:** The reporting component introduces a new reporting obligation while retaining coherence with the current recording and reporting mechanisms that apply to the RETC (by retaining the SICTER for thermoelectric power plants and adding the Green Tax System for facilities that were not previously covered). These steps convert RETC into the main centre of environmental public policy information.
- **VERIFICATION:** The verification component builds on the monitoring for public policy issues, enhancing state oversight capacities. In addition, it allows the tax to be applied and calibrated correctly. In the future, it may also allow it to be expanded to other mechanisms relating to carbon prices, which require third-party verification, in line with the challenges of climate change. Verification is currently implemented through oversight by the Ministry of Health (MINSAL) and the SMA. A summary of the MRV system is illustrated in Figure 2.

BOX 3: DIAGRAM OF THE MRV SYSTEM IN CHILE						
ACTION	WHAT?	WHO?	HOW?	WHEN?	SUPPORT MECHANISM	
REGISTER	Sources: boilers and turbines of 5 MWt or more	Head of facility subject to the tax	PRTR Uniform Public Service System (Ministry of the Environment)	After being stipulated by the Ministry of the Environment as a facility subject to the tax	Registration manual of boilers and turbines	
MRV SYSTEM	MEASUREMENT	Emissions of PM, NO _x , SO ₂ and CO ₂ (tons)	Head of facility subject to the tax	Quantification Instruction, Application (CEMS, Discrete and estimated)	Quarterly	Emissions Quantification Guidelines (Exempt Resolution 1053/SMA, 2016)
	REPORTING	Measured emissions	Head of facility subject to the tax	Submitted to PRTR uniform public service system, forwarded to SICTER or SIV (depending on plant type)**	Quarterly	Emissions Reporting Guidelines (Exempt Resolution 184/SMA, 2017)
	VERIFICATION	Emissions measured and reported are indeed as declared	In the short term SMA oversight personnel, medium and long term potentially third-party verification (by ETFAs or ETCAs)	Digital: QA system Auditing: i) SMA oversight ii) Accredited third party	To be defined	Emissions Verification Instruction (in process)

Figure 2: Diagram of the MRV system in Chile (MMA and GIZ, 2017c)



5) CAPACITY BUILDING

The MMA and SMA were both in charge to design and implement the tax and the MRV system. Both institutions built capacities and developed knowledge through the preparation of guidelines and manuals for the MRV system. For example, to identify the facilities affected by the tax, site visits were required for data collection, which allowed identifying further sectors that were not part of the ongoing system. Measurement capacities were strengthened through the development of a manual for the registration of boilers and turbines, and a guidance document for emission quantification. The emissions reporting required the preparation of a directive and also the design and evaluation of computer systems for reporting. The verification of emissions was supported by the assessment of institutional conditions to comply with the existing framework and developing verification guidelines.

Capacities were also developed for the private sector through political dialogues to promote the social acceptance of the taxes and joint meetings on the development of regulations with people representing diverse economic sectors that may be subject to the tax. Throughout these meetings, the organisers advised the sector representatives on the newly introduced regulations and the reporting systems. At the same time, the representatives could ask questions and raise concerns. Further, workshops were organised to address the administrative and technical aspects of emission quantification and reporting. Lastly, dialogues were realised with operators through workshops and webinars, among others. The goal was to explain the scope of the reforms and possible challenges that could arise in this context (see MMA and GIZ, 2017d).

Through the Partnership for Market Readiness (PMR), the government of Chile benefits from a knowledge exchange on the implementation of the carbon tax and associated issues with other national governments. For example, in 2014, the Chilean Ministry of Energy and the PMR came together to discuss the interaction between carbon pricing and energy policies with high-level government representatives from other countries as well as the private sector (PMR, 2019). This gives Chile the opportunities to benefit from the insights of other knowledgeable actors in that area.

INSTITUTIONS

INVOLVED:

- The Climate Change Office under the Environment Undersecretary within the Ministry of Environment (MMA, for its Spanish acronym) was responsible for generating and collecting technical and scientific information to support the design of climate change policies and plans.
- Among other ministries that currently have units or offices specifically associated to climate change, the most important are:
 - Ministry of Foreign Affairs (MINREL)
 - Ministry of Finance (MINHACIENDA)
 - Ministry of Energy (MINENERGIA)
 - Ministry of Agriculture (MINAGRI)

- The Green Tax Committee is in charge of dealing with urgent matters as well as mid-term and long-term work associated with the implementation of the carbon tax. It is composed of the following organisations:

- Superintendence of the Environment (SMA)
- Internal Revenue Service (SII)
- General Treasury of the Republic (TGR)
- National Energy Commission (CNE)
- Fuel and Electricity Superintendence (SEC)
- Ministry of Health (MINSAL)
- Ministry of Environment (MMA)
- Ministry of Energy (MINENERGIA)
- Ministry of Finance (MINHACIENDA)

COOPERATION WITH: — The Partnership for Market Readiness (PMR) initiative, which is led by the World Bank and implemented by MINENERGIA and MMA in Chile, has been the main source of financial and technical support for the green tax package implementation and specifically for the CO₂ tax. National and regional meetings have been held, in particular with companies that are involved in the payment of green taxes, in order to disseminate the regulations and methodologies that were designed for implementation (MMA and AGCI, 2016). More specifically, Chile has received resources for: i) a feasibility study for one or more tools for setting carbon prices in the energy sector, including regulatory, institutional, and economic analysis necessary for implementation; ii) design and implementation of an MRV framework and a recording system for monitoring and online recording of GHGs; iii) communication and participation strategy for different stakeholders relating to the tools under evaluation.

Other bilateral and multilateral agencies have been involved throughout the years, mainly the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) through its Global Carbon Market (GCM) program.

FINANCE: — Public national finance has been mobilised for the design and implementation of green taxes in general and the CO₂ tax more specifically. The highly specialised experts within the different agencies involved have been the main public resource for this initiative. A calculation of that amount is not available.

International funding, mostly through the PMR initiative has contributed with USD 1.189 million for the years 2016 and 2017. This amount has been distributed through consultancies, MRV system development, equipment and workshops. In 2018, the PMR supported the MRV team within the SMA. In the second phase PMR will support with USD 1.98 million by August 2019.



- IMPACT OF ACTIVITIES:** —
- **IMPACT ON GLOBAL CO₂ EMISSIONS:** Preliminary estimations of the influence of the carbon tax on the reduction of global CO₂ emissions point to first impacts. The first biennial update report by Chile (see MMA, 2014a) mentions a study from the Pontificia Universidad Católica de Chile, that indicates emission reductions of 3 million tons of CO₂ (6% of the total) by 2020 and 6 million by 2030 (11% of the total). Another study mentioned in the report indicates an accumulated reduction potential of 59 million tons over the period 2017-2030 (CCG-UC, 2014). Institutions such as the OECD and the PMR nevertheless recommend that Chile further increases the carbon tax to have an even more tangible impact on GHG emissions.
 - **LAYING THE GROUNDWORK FOR MORE AMBITIOUS POLICIES:** The MMA explains that the first phase of the carbon tax regime with a lower tax rate enabled its implementation and has had several advantages, such as: i) facilitating the adaptation of regulated sectors; ii) increasing social acceptance; and, iii) allowing the implementation of the institutional infrastructure to sustain it, including the capacity building to operationalise it. The carbon tax implementation process in Chile has been considered as a starting point for raising awareness about the damage caused by GHG emissions and has opened the door for further discussions regarding price-based instruments on pollutants in general and carbon in particular. In fact, in January 2018, the Chilean government and the power supply sector agreed that no thermoelectric power plants based on coal will be operating by 2050 (Guía Chile Energía, 2018; Tercera, 2018). A dialogue was initiated to discuss the decarbonisation process of the energy mix. The progress that has been made since the introduction of the carbon tax becomes visible when looking at recent developments: In June 2019, Chile announced its goal to phase out coal by 2040 and become carbon-neutral by 2050. It has furthermore pledged to close eight of its oldest coal-fired power plants by 2024 – an ambitious step towards reaching the goals of the Paris Agreement. Together with other strategies (such as reaching a renewable energy deployment for electricity generation of 60 % by 2035) (Climate Action Tracker, 2019), this shows that further reforms and more ambitious climate policies have followed the introduction of the carbon tax, and are likely to increase its feasibility in the long term.
 - **ENHANCEMENT OF THE MRV SYSTEM:** An additional impact was the enhancement of the MRV system through methodologies, protocols, and guidelines that establish what, how, when, and by whom these emissions are measured, reported, and verified. Information gathered by the MRV system will allow for the improvement of the tax instrument, as well as the scaling and expansion towards more sophisticated carbon credit markets, such as compensation mechanisms, offsets, and/or an emissions trading system. The institutional framework for environmental oversight – mainly within the MMA and SMA – has also been strengthened, creating a setting that promotes the consolidation of emissions monitoring, and builds professional capacities for information system management.
 - **COLLECTION OF TAXES:** Another important impact was the collection of taxes itself. In 2017, the green taxes amounted to over USD 298.3 million. Taxes from mobile sources (i.e. tax for new vehicles) amounted to USD 107 million, and the remaining USD 191.3 million represented the amount from stationary sources (i.e. CO₂ and local pollutants). The CO₂ tax represented the major portion of the total of fixed sources (88%). Taxes on local pollutants explain the final 12% (PM (8%); NO_x (3%); and SO₂ (1%)). With respect to sectors, the greatest contribution came from the power generation sector (94 %). Other sectors contributed marginally (cellulose (2 %); agricultural (1 %); fisheries (1 %), and other (2 %)). Collected tax money will be invested in public goods and services.

WHY IS IT

- GOOD PRACTICE:** ———
- **TECHNICAL FEASIBILITY:** National institutional frameworks and capacities are being strengthened by developing guidelines, protocols, manuals and enhancing the interagency coordination required for the tax operation. The PMR has supported technical and specialised work that was done within the public agencies involved. The whole process of establishing the green tax system has in general led to a significant strengthening of national public capacities.
 - **POLITICAL BUY-IN:** The MMA and SMA formed the backbone of the process, developing the entire institutional framework to operationalise the carbon tax. Other ministries and public agencies also contributed through a coordinated effort. The political ownership of the public institutions built long-term capacities within the latter.
 - **STAKEHOLDER ENGAGEMENT:** A series of workshops and dialogues was held within the government agencies and different actors. The private sector played a particularly strong role in the implementation process (for developing guidelines, protocols, etc.), being potentially affected in a significant way by the tax. This has ensured enhanced buy-in from these stakeholders and secured that their input and expertise could be used for the further development of the tax system.

- SUCCESS FACTORS:** ———
- **INTEGRATED INTO EXISTING PROCESSES:** The adoption of the CO₂ tax has been embedded into a broader tax reform, and its operation built upon the existing institutional infrastructure and public agencies functions and obligations, making the implementation process easier to put into place.
 - **MEASURABLE AND RELIABLE DATA:** The MMA and SMA have invested efforts in building capacities that enhance the existing information obtained from the RETC by incorporating the green tax regulations. Field visits and data verification are examples of the actions that were implemented to obtain better data.
 - **MRV FRAMEWORK:** The national MRV system also includes the green tax operation, allowing the government to build onto existing structures. The MRV has been solidified through additional guidelines, protocols and methodologies. These processes will enable a strong information basis for the measurement of the emissions affected by the tax and provide the groundwork for further improvement of the instruments.
 - **SCALABLE AND TRANSFERABLE:** The green tax system – and especially the information management requirements in that context – was designed in a way that makes it flexible to be scaled up to cover other sources and technologies. This also holds for using other economic instruments. Thus, the Chilean government has ensured that the system is adaptable to changing environmental, economic and social country conditions in the future.



OVERCOMING BARRIERS / CHALLENGES: —————

WHAT WERE THE MAIN BARRIERS / CHALLENGES TO DELIVERY?

CAPACITY:

Public and private actors are needed to create and/or strengthen technical and institutional capacities.

INFORMATIONAL:

The available information on different sources of emissions was insufficient and/or inaccurate.

INSTITUTIONAL:

The institutional infrastructure in all sectors involved was insufficient for the implementation of the carbon tax.

HOW WERE THESE BARRIERS / CHALLENGES OVERCOME?

The specialised officers within the MMA, SMA and other public agencies enhanced different capacities by diving into the entire process of implementing the green taxes. This required field visits, data verification, stakeholder dialogues and expert advice. The PMR offered the main financial and technical support for creating and strengthening capacities.

Dissemination activities were important to share the developed tools more widely and to open up channels of communication between the government and the private sector to increase societal buy-in to the new measures. These communication channels allowed for improved data collection and dialogue about the opportunities and challenges of the system.

The MRV system of emissions that is subject to green taxes was designed and implemented considering: i) the consistency between the challenges of generating the information needed to operate both taxes on local pollutants and global pollutants; ii) sectoral differences among the actors subject to the tax and iii) the regulatory consistency with respect to the rules governing the different sectors (MMA and GIZ, 2017c). The MRV system will allow a smoother potential enlargement of the instrument to other sources of pollution and GHGs as well as further adjustments to the current regulation.

The MMA and SMA led the development of institutional arrangements which were designed to complement the existing procedures. The upgraded infrastructure specifies the responsibilities and relational interchanges between the different public agencies. Different regulations, procedures, protocols, manuals and guidelines were developed to that end.

The Green Tax Committee is in charge of dealing with urgent matters as well as mid-term and long-term work.

LESSONS LEARNED: ——— • **SEND A MARKET SIGNAL TO BUSINESSES:** High carbon tax rates that affect the competitiveness of businesses are not imperative to achieve first tangible results. A symbolic economical sign is crucial to accomplish the public policy objective.

• **CREATE FORWARD-LOOKING ENVIRONMENTAL INSTRUMENTS SUCH AS CARBON TAXES:** The future of environmental policies is directed towards including economic instruments which seek to change the economic agents' behaviour. Carbon taxes are effective, despite the complexity of their operation.

HOW TO REPLICATE

THIS PRACTICE: ————— • **FOSTER SOCIAL ACCEPTANCE FOR CARBON TAX INSTRUMENTS:** As one of the first steps, work on the social acceptance of the carbon tax instrument by socialising information and spreading knowledge on the impacts of GHG emissions.

• **ESTABLISH A ROBUST MRV TO MAKE INFORMED DECISIONS:** Building the necessary institutional infrastructure and a robust and accurate MRV system will provide the tools to make informed decisions regarding the effectiveness of the tax instruments, while also taking into account other ongoing policies.

• **EMBED THE TAX INTRODUCTION INTO ADDITIONAL REFORMS:** Look for opportunities to include a carbon tax within a broader tax or other fiscal reform.

• **BUILD ON NATIONAL COMPETENCIES AND STRUCTURES:** Implement the carbon tax within the existing infrastructure and existing institutional competences. Trust and strengthen the institutional capacities within the national public agencies instead of relying primarily on external consultants.

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FURTHER KEY

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