CHILE’S GREEN TAX

INSTITUTIONAL INFRASTRUCTURE FOR
Institutional Infrastructure for Green Taxes

SUMMARY

The implementation of a tax on 'downstream' atmospheric pollution brings with it a number of technical and institutional challenges. It has required the design and implementation of a system for registering sources subject to taxation and an emissions measurement, reporting, and verification (MRV) mechanism. The process has also entailed expanding and strengthening the capacity of environmental agencies, establishing protocols for determining procedural responsibilities, creating more robust information systems, and improving inter-ministerial coordination. Together, these innovations comprise a new institutional infrastructure that not only implements the tax in an effective manner but also brings with it an institutional shift, allowing the development of new capacities, knowledge, and tools to improve the quality and efficiency of environmental management, which may be used in the future to pursue more sophisticated environmental protection mechanisms.

INTRODUCTION

In 2014, Chile implemented a tax reform to introduce green taxes (Law 20.780). The new levies, the first of their kind in the country, are raised on emissions of local (PM, NOx, SO2) and global (CO2) pollutants from stationary sources featuring boilers and/or turbines, with a total thermal power rating of 50 MW or more at a given location. The tax is calculated based on actual emissions at each source, imposing serious challenges in emissions measurement, reporting, and verification at every site. Indeed, the new tax requires the creation and implementation of robust institutional infrastructure to draw up the basis for the ongoing development of more complex environmental governance mechanisms, such as the introduction of offsets, or even a system of tradable emissions permits linked to markets in other jurisdictions.

The regulatory framework for implementing the taxes was designed based on a number of documents, laws, regulations, and guidelines that specify areas of responsibility for each of the agencies involved. However, quite apart from the applicable legal tools, the process requires the consolidation of new institutional infrastructure in the form of agreements, procedures, arrangements, workflows, and relationships between institutions – both public agencies and in the private sector – as required for the taxes to be applied. The logic behind Chile’s tax implementation strategy can only be understood through an examination of how this institutional infrastructure is designed.

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1. For more details on how the taxes are calculated, see: Pizarro, Rodrigo (2016). Law 20.780, Article 8: Green taxes on stationary sources. Technical note, Environmental Economics and Information Division, Ministry of the Environment. Santiago, Chile.
DOWNSTREAM TAXES

Systems that charge taxes on emissions of global pollutants may be applied through upstream regulation, based on the carbon content of fuels used in production processes; or downstream regulation, based on the emissions generated. In other words, upstream taxes apply to fuel consumption (carbon content), while downstream taxes are levied on the emissions generated when fuels are burned. Either system can be used to tax CO₂ generation, but emissions of local pollutants must be measured at the source so as to capture differences between technologies as well as the effects of process management and efficiency.

The difference between these two methods is significant because different types of monitoring, reporting, and verification systems must be developed depending on whether taxation is applied in the consumption phase (fuel distribution, marketing) or the combustion phase, thus requiring different levels of institutional capacities. Furthermore, the signals and incentives that a tax generates can vary depending on the context in which it is implemented and the method used.

Downstream taxes are calculated based on the actual emissions released by facilities subject to taxation. Around the world, many countries have selected different forms of taxation (see Figure 1). Chile is the only Latin American nation to have opted for a downstream tax, while Colombia and Mexico chose to institute upstream taxation based on carbon content.

Chile decided to employ a downstream taxation mechanism so as to enhance coherence between its mitigation policies for both global and local pollution. The distribution of emissions was also taken into account, as most are released by a small number of facilities – mainly power plants – that feature more advanced direct emissions measurement systems, thus facilitating management and adaptation to the new tax. Furthermore, it was observed that an emissions standard already existed for thermoelectric power plants (for units rated for over 50 MW), serving as a forerunner for the new MRV system.

Implementation of downstream environmental taxes has required the consolidation of institutional infrastructure that hinges on coordinated efforts by a number of ministries and public agencies, both to build develop methodologies and to implement the MRV system, besides drawing on a range of information provided by different state bodies agencies.

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2. The concepts of upstream and downstream regulatory systems refer to the point in the value chain where regulations are imposed: this may be the origin of raw materials and supplies (upstream), or the final products or services (downstream). Chile’s green taxes are applied through intermediate or midstream regulation, but can also be viewed as downstream because it is the emissions that are taxed, not the carbon content of the products or services.

3. Here, regulation, monitoring, and tax collection are applied to the first bodies that market fuels, such as natural gas processing facilities or oil refineries.

4. See part one of this series, on the Green Tax Strategy.
The regulatory framework for implementing the taxes was designed based on a number of factors, including established practices and agreements, form the foundations of the new institutional framework. These documents, together with established practices and agreements, form the foundations of the new institutional framework. The reasoning behind this was to ensure that the regulations are based on actual emissions at each source, imposing serious challenges in emissions measurement. In 2014, Chile implemented a tax reform to introduce green taxes (Law 20.780). The new taxes apply to fuel producers, distributors, and importers of applicable fossil fuels, mainly power plants – that feature more advanced direct emissions measurement systems, serving as a forerunner for the new MRV system.

Figure 1. International implementation of CO₂ taxes, by type

STAGES OF THE GREEN TAX IMPLEMENTATION PROCESS IN CHILE

The taxes came into force on January 1, 2017, following three years of work drawing up regulations, records, and guidelines for calculating taxes payable. These documents, together with established practices and agreements, form the foundations of the new institutional framework. The principal milestones in designing, implementing, and consolidating this process were the following (see Figure 2).

Law 20.780 (Ministry of Finance, September 2014). Approval of the bill to enact green taxes. Article 8 of the law imposes a tax on emissions of particulate matter (PM), nitrogen oxides (NOₓ), sulfur dioxide (SO₂), and carbon dioxide (CO₂) released by facilities with stationary sources comprising boilers or turbines with a total rated thermal power level of 50 MWe (megawatts) or more, calculated from the upper limit of the fuel’s energy content.
Law 20.899, which simplifies the income tax system and amends other provisions of tax legislation (Ministry of Finance, January 2016). The amendments to the taxes set out to simplify the method for calculating the tax on local pollutants at stationary sources of pollution.

Circular 47 (Internal Revenue Service, July 2016). Specifies instructions on declaration and payment of taxes on pollutant compounds released by stationary sources, as stipulated in Law 20.780, Article 8.

Registration manual of boilers and turbines, for payment of green taxes (Ministry of the Environment, October 2016). Specifies the administrative procedure for mandatory record keeping, in accordance with the regulations on boilers and turbines, for stationary sources rated at 5 MWt or more. This regulation also stipulates information for annual specification of which establishments need to declare green tax emissions, via the uniform public service system of the Registry of Emissions and Transfers of Pollutants (RETC).

Exempt Resolution 1053: Instructions for quantifying emissions from stationary sources subject to taxation under Law 20.780, Article 8 (Office of the Superintendent of the Environment, November 2016). Establishes different methodologies for quantifying NOx, SO2, PM, and CO2 emissions, for facilities subject to the tax, and specifies the administrative requirements necessary for correct implementation. These instructions fulfill the provision of the law that mandates the Office of the Superintendent of the Environment to prepare necessary guidelines and documents for monitoring, reporting, and verifying emissions at applicable facilities.

Supreme Decree 18/2016, Regulations (Ministry of the Environment, December 2016). These regulations establish the definitions for specification of facilities subject to green taxes, obligations and procedures for identifying applicable taxpaying bodies, and necessary administrative procedures for applying the tax.

Exempt Resolution 1333 (Ministry of the Environment, December 2016). Determines a list of facilities subject to the tax, and districts declared as saturated or latent to calculate the tax. This is an indicative list of information declared by each establishment.

Emissions Reporting System – Operative platform (Office of the Superintendent of the Environment, 2017). The Office of the Superintendent developed a platform for

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5. The difference between this record and the tax must be emphasized: The obligation to register all boilers and turbines rated at or above 5MWt does not mean that all of these units will be subject to the tax.

6. For more details on how the uniform public service system works, see: http://vu.mma.gob.cl/index.php?c=home
reporting emissions subject to taxation, which covers the establishments that are currently under reporting systems or need to start reporting.

Exempt Resolution 184 ‘Approving instructions for reporting emissions from stationary sources subject to taxation under Law 20.780, Art. 8. (Office of the Superintendent of the Environment, 2017). These instructions set out to establish guidelines for reporting emissions quantified in accordance with Exempt Resolution 1053, whereby the instructions for quantifying emissions from stationary sources subject to the tax are approved.


7. Ministry of the Environment Supreme Decree 13, published in 2011, establishes emissions regulations for thermolectric plants. The implementation of this regulation requires emissions reporting from sources specified in Article 1 as “power plants that feature boilers or turbines with a thermal power rating of 50 MWt (megawatts thermal, as calculated from the upper limit of the fuel’s energy value) or more”
PRINCIPAL INSTITUTIONS INVOLVED IN GREEN TAXES

Ministry of Finance: The agency that defines the country's economic policy and, in particular, fiscal policy. Introducing environmental taxes affects both the form and the quantity of state revenue and creates economic incentives for households and businesses. The Chilean President's announcements of new public investment projects will similarly cover a value of USD 40 /ton of CO₂ as social cost.

Finally, the decision to add these mechanisms to the country's fiscal policy is also in line with the Green Growth Strategy promoted by the OECD, of which Chile is a member state (Government of Chile, 2013). However, it should be made clear that the funds generated through these taxes cannot be earmarked for specific purposes, such as compensation for pollution in the health sector or subsidies for technological change. This is because the Chilean Constitution prohibits such measures affecting taxes. Instead, all revenue must be placed in a national fund, from which it is distributed to meet the country's different needs.

Ministry of the Environment (MMA): The Ministry plays two roles with respect to green taxes. First, it is tasked with designing and coordinating the application of environmental public policies, plans, and programs, and promoting sustainable development in line the country's applicable international commitments (Ministry of the Environment, 2016c). Here, the Ministry of the Environment has taken the lead in implementing environmental taxation, and acts as a coordinating agency for the tax.

Meanwhile, in terms of tax administration, the Ministry is in charge of managing the Register of Boilers and Turbines, for the purpose of preparing an annual record of facilities subject to green taxes.

Office of the Superintendent of the Environment (SMA): In general terms, the SMA has been tasked with drawing up guidelines (protocols) that establish the standards that must be followed by liable facilities in monitoring, reporting, and verifying emissions.

Specifically, the Office of the Superintendent stipulates minimum operating requirements, quality control specifications, and assurance mechanisms for emissions monitoring or estimation systems used for emissions declarations. The SMA uses this information to consolidate annual emissions information for all turbines and boilers at facilities subject to the tax. It is also responsible for compiling all information necessary for calculating the tax payable.

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**Internal Revenue Service (SII):** This is the agency responsible for calculating the net tax payable of each liable facility. Information provided by the SMA is used for this purpose.

**General Treasury of the Republic:** Agency tasked with collecting the tax in April of each year, for emissions released in the previous year.

**National Energy Commission:** This is the agency tasked with setting technical provisions for the application of the final section of Article 8 of the tax reform law (Law 20.780), which stipulates that the tax “must not be included when calculating the marginal cost of power at any given time, when it applies to the system’s marginal generation unit. However, for units with a total unit cost, calculated as the variable cost including transmission plus the unit tax cost, that is greater than or equal to the marginal cost, the difference between the value of power input at marginal cost and said at total unit cost must be paid by the power companies that source electricity from the system, prorated against such withdrawals”.

### STEPS IN THE PROCESS OF CALCULATING COLLECTION OF GREEN TAXES

**Step 1. Identification of establishments subject to taxation.**

The Ministry of the Environment manages a Register of Boilers, kept as part of the PRTR (Pollution Release and Transfer Registry, or RETC in its Spanish acronym), for 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 the Ministry’s uniform public service system to report information to determine whether or not they are subject to the tax; this information includes: Type of source; Power and rated thermal power of the source (MWt); Rated fuel consumption; Fuel(s) used; Description of the source and process undertaken; Operating hours of the source; Emissions control system; Load capacity of the source; Operation start date; and Geo-referenced perimeter of the facility where the source is located.

The Ministry uses this information, duly corrected and cross-referenced with information from other sources, to draw up a list of facilities liable for taxation each year. However, this list is solely for informative purposes; the facilities are ultimately responsible for determining whether or not they are subject to the tax, regardless of whether they appear on the list published by the Ministry of the Environment.

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9. Adapted from the Green Tax Regulations, Supreme Decree 8/2016, and Exempt Resolution 1053.
10. For details, see Exempt Resolution 1053: Instructions for quantifying emissions from stationary sources subject to taxation under Law 20.780, Article 8 (Office of the Superintendent of the Environment, November 2016).
Step 2. Emissions quantification.

All boilers and turbines that belong to a facility subject to the tax must use a pollutant emission monitoring or estimation system. Monitoring is the direct quantification of emission concentrations, by sampling or measurement\(^1\). Meanwhile, estimation is conducted by means of indirect emission quantification mechanisms, based on emission factors and activity levels. Most facilities subject to the tax are currently regulated under a regulatory 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 guidelines 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. Eleven methodological options for emissions quantification have been established, divided into three groups:

- Seven options for emissions quantification with continuous emissions monitoring systems (CEMS) and alternative methods;
- Two options for emissions quantification by sampling and measurement with reference methods;
- Two options for emissions quantification by emission factors.

Additionally, when an establishment subject to the tax is unable to apply any of these options, it may propose an alternative quantification methodology; this methodology must be internationally accepted and supported with the necessary technical background information for it to be evaluated.

Step 3. Emissions declaration

The tax-liable facility must submit an emissions monitoring or estimation report, in accordance with the general guidelines stipulated by the SMA, via the RETC uniform public service system. Reports are made on a quarterly basis, and must be prepared using the applicable systems for each establishment subject to the tax. As shown in Figure 3, thermoelectric power plants, which are subject to Supreme Decree 13, will continue to use the Thermoelectric Plant Information System (SICTER) for reporting. Meanwhile, power plants not covered under that decree and other establishments subject to the tax must use the Green Tax System for reporting.

\(^1\) There are two mechanisms available for sampling or measurement:

- **Measurement with Reference Methods:** Monitoring equipment is used to take a sample, which is then analyzed in a laboratory (PM) or on site (gases) over a given period. This method is used to determine output concentration and representative flow rate at the time when the measurement is taken.
- **Continuous:** Emissions sampling and/or measurement in real time, using a continuous emissions monitoring system (CEMS).
Step 4. Emissions consolidation

As part of its role in applying the taxes established under current legislation, the SMA is tasked with consolidating the emissions declared by each facility subject to the tax in March of each year, and then providing the Internal Revenue Service with all information necessary for calculating the sum payable. This information includes:

- Identification of the applicable establishment and the rated power (in thermal megawatts) of the sources that it operates;
- Tons of PM, NOx, and SO2 emitted;
- Tons of CO2 emitted;
- District and applicable air quality coefficient;
- Population of the district, in accordance with official projections published by the National Institute of Statistics for the year in question;
- List of districts that have been declared as saturated or latent for the purposes of applying the air quality coefficient.

The SMA also submits an individual report to the National Energy Commission and the National Electricity Coordinator12, containing the consolidated and hour-by-hour emissions released at all power plants subject to their coordination, for use in establishing an individual annual prorating for the tax.

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12. Green tax regulations still refer to Economic Load Distribution Centers (CDEC), but these bodies have been replaced with the National Electricity Coordinator, referred to below as the “Coordinator” or “Independent Coordinator”.

Step 5. Tax calculation and payment

The Internal Revenue Service uses the information provided by the SMA to calculate and invoice taxes payable, in the manner and timeline established. Payment must then be made to the General Treasury of the Republic in April of the calendar year following the year in which the emissions in question were released, in Chilean currency, at the current exchange rate on the date of payment, in accordance with the tax invoices issued by the SII (See Circular 47, Internal Taxation Service).

Additionally, in April of each year the Service must send the Independent Coordinator and the National Energy Commission a report that includes tax calculations for each emission source.

Step 6. Payment prorating by the National Electricity Coordinator

As mentioned above, the law establishes the Coordinator must make 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 Independent Coordinator must release a Compensation Balance, containing the amounts for compensation of each power generation company for the previous year\textsuperscript{13}.

INTER-INSTITUTIONAL RELATIONSHIPS

The process of building institutional links has involved the participation of a group of representatives of the Ministry of Finance, the Ministry of Energy, the Ministry of the Environment, and certain related services, as well as the National Electricity Coordinator and the Office of the Superintendent of the Environment. In this framework, the process for implementing green taxes places a challenge on the entire state apparatus, as with no prior experience of applying such mechanisms in Chile, there was a need to enhance professional and technological capacities at all levels. Therefore, an inter-ministerial technical-regulatory team was established, with regular meetings during the stage of drawing up procedural rules (Ministry of the Treasury, 2015).

THE ROLE OF THE PMR

As a member of the Partnership for Market Readiness, Chile has received resources for:

1. 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.
2. Design and implementation of an MRV framework and a recording system for monitoring and online recording of greenhouse gases.
3. Communication and participation strategy for different stakeholders relating to the tools under evaluation.

In this context, the PMR has helped to achieved progress in implementing the CO₂ tax and designing the MRV protocol. It has also aided both local and international discussion opportunities, and dialogue with companies subject to green taxes, so as to raise awareness of the regulations and methodologies that are being designed to implement them.

CONCLUSIONS

The implementation of a green tax system has allowed a number of Chilean to work together to create a new technical mechanism, develop working relationships between ministries and agencies, forge new public-private relationships, and form robust foundations of knowledge and information for implementation of the tax, thus enhancing environmental management and consolidating a more complex and comprehensive institutional framework.

The consolidation of this mechanism involved significant efforts for environmental institutions. Indeed, the downstream taxation system carries with it the challenge of implementing a measurement, reporting, and verification (MRV) system in synchrony with the system's other aspects. Nonetheless, the hope is that the implementation of this tax will mark the beginning of a new suite of environmental management mechanisms to bolster command and control tools.

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implements the tax in an effective manner but also brings with it an institutional
more robust information systems, and improving inter-ministerial coordination.

INTRODUCTION

DOWNSTREAM TAXES

Registration manual of boilers and turbines, for payment of green taxes (Ministry
Specifies instructions on declaration of tax legislation (Ministry of Finance, January 2016).


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INSTITUTIONAL INFRASTRUCTURE FOR

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