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CAPACITY-BUILDING
FOR THE IMPLEMENTATION OF

CHILE'S GREEN TAX



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Capacity-building for the implementation of Chile's green tax

SUMMARY

The green tax brings with it a wide range of regulatory, institutional, and technical challenges which have entailed a significant capacity-building effort both within the public sector (the regulatory agencies) and outside it, among those subject to the tax (the regulated). This has required the development of new channels of communication and training so as to allow stakeholders to build awareness of key aspects of the tax; gather information on how to improve its implementation; and draw on consultation mechanisms to make the system more consistent, workable, and ready for future development. The capacity-building process also involves the creation of a transparent, public, and fair regulatory body which will provide stability to both the private sector and the state officials concerned.

INTRODUCTION

Implementing the green tax has entailed significant institutional efforts, such as making new institutional arrangements in public agencies; formulating standards; designing a measurement, reporting, and verification (MRV) system with its corresponding guidelines and protocols; dialogue with the private sector; and capacity-building, both inside the government and in sectors subject to the tax.

This process has consolidated the new system's technical content and a more standardized conceptualization of the tax. In this framework, the creation of the institutional infrastructure needed to implement the environmental tax has also prompted the development of new bodies, interests, and institutional arrangements based on the formation of a new social subject. This is essential to ensuring the tax's social acceptance as an environmental tool. However, this cannot be achieved without enhancing technical and institutional capacities.

CHALLENGES IN DESIGNING THE TAX

Strategy¹. The green tax is one of a range of economic mechanisms that seek to complement existing regulatory tools with economic incentives to aid decision-making. In the case of Chile, a strategy has been developed to address the twofold challenge of supporting and complementing efforts to decrease local atmospheric pollution while also mitigating greenhouse gases at a lower cost.

1. For more details on the strategy, please see: Part 1, "Chile's Green Tax Strategy."

Formulation. Due to the dual nature of the tax, which addresses both global and local negative externalities, emissions must be taxed. The tax is, therefore, levied on all downstream emission sources. This mechanism harmonizes the design of the MRV system with a possible transition towards other carbon pricing instruments, such as offsets, emissions trading systems (ETS), or a blend of these, now that these mechanisms are being designed with a focus on emissions.

CHALLENGES IN IMPLEMENTING THE TAX

The Ministry of the Environment (MMA) is implementing the tax based on an awareness that taxing each source's emissions brings the challenge of capacity-building in all sectors involved. To meet these challenges, institutional infrastructure has been developed; an MRV system was designed and implemented, and both the private and public sectors have been targeted with capacity-building initiatives.

A. Developing institutional infrastructure

The system is based on institutional arrangements which were designed to complement existing regulations. The new infrastructure specifies the responsibilities, procedures, and the relational interchanges between institutions².

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

2. Protocols and guidelines. The Ministry of the Environment (MMA) and the Office of the Superintendent of the Environment (SMA) have developed a range of protocols and guidelines to standardize the processes for correct application of the tax. This will institutionalize the system, providing it with a body of regulations and capacity-building tools while guiding implementation in the private and public sectors (See Figure 1).

B. MRV emissions system design and implementation³

Basing a green tax on emissions at the source requires a more complete and robust MRV system in order to verify information associated with the emissions. In turn, this entails capacity-building in the regulatory sector (for implementation, monitoring, and management) as well as in the facilities under the regulation to ensure that the information produced is reliable.

2. For more details on downstream taxes, see Part 2 of this series, "Institutional Structure of Chile's Green Tax."

3. For more details on the MRV system, please see: Part 3, "Creation and Implementation of a Measurement, Reporting, and Verification (MRV) System."

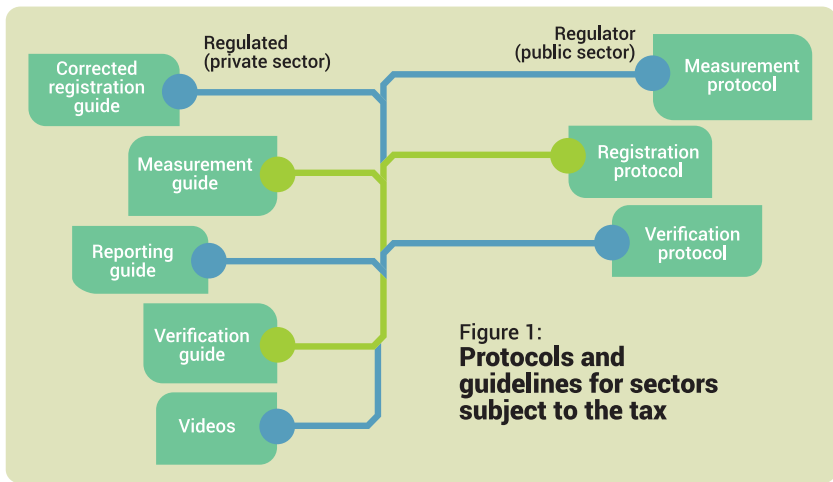


Figure 1:
**Protocols and
guidelines for sectors
subject to the tax**

C. Capacity-building in the public sector

The Ministry of the Environment (MMA) and the Office of the Superintendent of the Environment (SMA) are spearheading this process, together acting as the system's backbone. They are responsible for designing and implementing the tax, as well as the corresponding MRV system. Over the course of the process, public sector capabilities and knowledge were systematized through the preparation of manuals and guidelines for record keeping, measurement, reporting, and verification. The Ministry of the Environment (MMA) and the Office of the Superintendent of the Environment (SMA) found a need to enhance their own technical capacities in order to be able to prepare these protocols.

1. Registration of emissions sources: This stage has two core objectives: i) identifying facilities that may be subject to the tax and ii) establishing the procedures for registering sources.

Identification of facilities that may be subject to the tax

MMA developed the first register of facilities that may be subject to the tax⁴. Information was drawn from the PRTR (Pollutant Release and Transfer Register, RETC, in Spanish acronym) and the Thermolectric Plant Information System (SICTER). This information was used to select facilities for site visits, in order to:

- Identify any facilities that are not power plants but may still be subject to the tax.

4. SISTAM Ingeniería (2017). **Technical note: Catastro y caracterización de establecimientos afectos al impuesto al carbono en Chile**. Study financed by the Partnership for Market Readiness (PMR) at the WorldBank Group.

- Evaluate how emissions were being measured in power plants, where abundant information was available as they were regulated under Supreme Decree 13. These facilities were already reporting emissions through the Thermolectric Plant Information System (SICTER) and hence had experience in measurement and estimation.

During the data collation process, 109 facilities were identified as potentially subject to the tax. 49 of these were selected for site visits. This process allowed sectors that are not part of the current system to be identified. A filtering process narrowed the pool to 79 facilities potentially subject to the tax: 53 (or 67%) power stations and 26 (or 33%) in other industries.

One of the important lessons learned from this process was that the administrative data available was not sufficient to gauge the number of facilities subject to the tax. Existing information needed to be verified through field visits, leading to the detection of errors made in information reported to the (Pollutant Release and Transfer Register, RETC, in Spanish acronym) (PRTR) (SISTAM, 2017).

Developing a manual for registration of boilers and turbines

The Ministry of the Environment (MMA) developed a manual for the registration of boilers and lays out the administrative processes required for all stationary sources rated at 5 MWt⁵ or more. Its contents specify the information requirements needed to draw up an annual list of facilities that must declare taxable emissions. Statements should be made through the (Pollutant Release and Transfer Register, RETC, in Spanish acronym) (PRTR)⁶ uniform public service system (VU).

2. Emissions measurement. Two main actions were taken in the field of emissions measurement and quantification: i) a directive and a guidance document were developed, and ii) an analysis of implementation efficacy was conducted.

Developing a directive and a guidance document on emissions quantification

The SMA developed a directive to be used for quantifying the emissions of stationary sources subject to the tax (SMA Resolution 1053) that establishes different methodologies for quantifying NO_x, SO₂, PM, and CO₂ emissions for facilities subject to the tax, as well as the administrative requirements necessary for correct implementation.

Due to the previous existence of different standards and the characteristics of each sector, the Office of the Superintendent of the Environment (SMA) developed alternatives for quantifying

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 imply that all of these units will be subject to the tax.

6. For more details on the operation of the uniform public service system, please see: <http://vu.mma.gob.cl/index.php?c=home>

emissions which depend upon the environmental tools (ICA in the Spanish acronym)⁷ regulating each facility⁸. In addition, a guidance document was created for facilities under regulation in order to explain the quantification process in simpler terms.

Analysis of implementation efficacy

While the directive was being prepared, two visits were made to each of the 93 facilities. The first visit was made to prepare facilities for protocol implementation, while the second evaluated the efficacy of that implementation⁹.

Technical and operational information was collected during the first visit to each facility, so as to identify the types of difficulties they would encounter when implementing the emissions quantification protocol. The second visit sought to identify difficulties in reporting emissions during the first quarter and to allow operators to suggest proposals and options for emissions quantification.

3. Emissions reporting. This stage featured three main phases of capacity-building: i) the creation of the guidance document and directive for emissions reporting; ii) the design and evaluation of support computer systems for reporting purposes, and iii) assisting the private sector with the implementation process.

Preparation of a directive for emissions reporting

The SMA has developed a directive on the emissions reporting process (Exempt Resolution 184) which stipulates the administrative duties involved in preparing data reports and specifies the type of information needed to calculate the tax on each source. The guidelines establish that all facilities subject to the tax must report through the PRTR uniform public service system. However, the mechanism used to report emissions will depend on the type of source involved, as submissions can be made through Thermolectric Plant Information System (SICTER)¹⁰ or through the Green Tax System.

Design and evaluation of computer systems for reporting

In view of the importance of safeguarding the information provided by facilities, the SMA is implementing safety checks as established by ISO 27001 on information security. These measures will ensure the confidentiality and integrity of data reported by facilities. Third-party security analysis of the data will reveal the physical conditions, logistics, and personnel involved in registering for the carbon tax. An information security protocol is being developed to this end.

7. These environmental tools include environmental evaluation resolutions, impact prevention and decontamination planning, environmental quality standards, management plans, and other oversight tools utilized by the Office of the Superintendent of the Environment (SMA).

8. For more details, please see part 3: "Creation and Implementation of a Measurement, Reporting, and Verification (MRV) System."

9. Consultancy: "**Implementación de un sistema MRV para la aplicación del impuesto, escalable a otros sectores y linkeable a otras jurisdicciones**". In execution. Executing entity: DEUMAN-Esinfra. Study financed by the Partnership for Market Readiness (PMR) at the WorldBank Group.

10. The Thermolectric Plant Information System (SICTER) is the system established by Supreme Decree 13, by which the Ministry of the Environment sets emission standards for thermolectric plants.

Assisting and evaluating the emissions reporting (R) and verification (V) process

Two site visits were made to each facility to assist them in data reporting. The visits had two objectives: i) review the information that facilities would have to report, and ii) identify areas of weakness in the existing protocol.

Thus, the technical support visits sought to¹¹:

- Support facilities during implementation of the protocol; and
- Assess protocol functioning after implementation.

This process allowed facility operators to voice their concerns while learning about the new information requirements.

4. Emissions verification. Capacity-building has three phases: i) analysis of the consistency of previous implementation, ii) development of guidelines to verify emissions and iii) a consultancy to aid the implementation in the private and public sectors.

Regulatory consistency

The first step in capacity-building is to assess the institutional conditions necessary to the national verification system requirements. Facilities must comply with existing legal frameworks: Charter Law of the Office of the Superintendent of the Environment (LOSMA 20417), the supreme degrees from the Ministry of the Environment 38/2013 on the Environmental Oversight of Technical Agencies Standard (ETFAs) and the 39/2013 Standard for the Environmental Certification of Technical Agencies.

Developing the verification guidelines

The Office of the Superintendent of the Environment (SMA) is in the process of developing a protocol for general verification purposes. The protocol specifies the auditing process for facilities. Additionally, a protocol was formulated so as to verify digital data. The protocol defines the quality control standards and compliance rules for information reporting.

Finally, a verification manual is being developed for facilities subject to the green tax. The manual can be consulted by facility operators¹² who are submitting information for the audit.

Assisting and evaluating the emissions verification process

At this stage, an emissions verification system is being proposed. The goal of this stage is to draw up an emissions verification system to address data acquisition and reliability requirements for use in calculating the taxes payable.

11. Negawatt –EBP (2017). *Diseño de un sistema de medición, reporte y verificación para la aplicación del impuesto al carbono, escalable a otras emisiones, sectores e instrumentos linkeable a otras jurisdicciones*– Informe 2. Study financed by the Partnership for Market Readiness (PMR) at the WorldBank Group.

12. According to the SMA, the facility operator is: A user of the uniform public service system and, having maximum authority in the facility, is responsible for making statements on its behalf. (Exempt Resolution 1139/2014 MMA).

D. Capacity-building in the private sector

Capacity-building in the private sector is part of a general strategy involving communication, participation, and general consultation with private sector bodies. The strategy seeks to gather data, close knowledge gaps about the system, promote social acceptance of the tax, improve its applicability in Chile, and establish good conditions for new public-private relationships in the face of future sustainability issues. Other actions include advisement, capacity-building, and follow up to ensure the tax is applied correctly on emission sources.

Political dialogue. Throughout this process, the Ministry of the Environment (MMA) initiated a dialogue with taxable entities to promote social acceptance of the measure and explain the system's scope.

Developing regulations. Once the law had been passed, the state developed regulatory standards and processes for tax application. Meetings were conducted with people representing diverse economic sectors potentially subject to the tax. These representatives were advised on the new regulations and reporting systems. As stakeholders, they were given a chance to ask questions and voice their concerns about the law.

Capacity-building. The Partnership for Market Readiness (PMR) has given workshops on the systems involved, including the registry for boilers and turbines, quantification, and emissions reporting systems. Three workshops were given in the regions with the highest number of facilities subject to the tax: Bio Bio, Antofagasta and Valparaíso. These sessions addressed the administrative and technical aspects of emissions quantification and reporting at facilities subject to the tax.

Dialogue with stakeholders. The Ministry of the Environment (MMA) and the Office of the Superintendent of the Environment (SMA) have taken actions to explain the scope of the reform to the public, dialoguing with operators about system mechanisms and the challenges the new processes might present. Key activities include:

Workshops on "Implementing the Green Tax:" These workshops were given to industrial facility operators that may be subject to the tax in 6 different regions of the country.

Virtual seminars (webinars) on carbon pricing instruments and the CO₂ tax¹³: These meetings addressed the challenges and breakthroughs associated with the carbon pricing instruments, the green tax's design and application, and the MRV system.

Workshop for Public Relations representatives (July 2017)¹⁴: Public relations representatives from various organizations, public agencies, and businesses were invited to a PMR-led session about the progress of the project.

13. For more on the virtual seminars, please see: <http://www.precioalcarbonochile.cl/talleres-eventos>

14. <http://www.precioalcarbonochile.cl/noticias/capacitar-para-comunicar>

PMR's Expert Advisory Group. The Expert Advisory Group (GCE in its Spanish acronym) is a consulting body representing several sectors. Its purpose is to provide input on the design and use of carbon pricing instruments and other auxiliary MRV mechanisms, as well as Chile's registry of greenhouse gas emissions¹⁵.

IDENTIFYING GAPS

During implementation and especially during fieldwork, a number of failures to apply the tax accurately at each stage were identified. Some of these were gradually addressed; however, others present challenges that go beyond facility implementation and thus call for a more comprehensive strategy.

Measurement-related implementation gaps

The majority of gaps were related to the other options for quantifying emissions. One shortcoming that was identified is the lack of available services that comply with quantification protocol in the areas of fuel flow measurement and execution of periodic CEMS tests (continuous emissions monitoring system), among others.

Current documentation of emissions show the most significant gaps¹⁶ in these areas:

Gaps	Technical capabilities
74% of facilities subject to the tax are lacking in content for proposals on validating quantification methodologies.	The agricultural sector has seen a demand for consultants to help prepare facilities' documentation before measurement. Internal and external technical capacity-building should be continued as the internal procedures are being created for the continuous emissions monitoring system (CEMS).
Calculations for determining the calorific value of the fuels used in applicable emissions sources comprised an area of difficulty for 48% of facilities.	Demand has increased demand for consultants who can write quantification proposals. Possible deficiency in technical services for CEMS trial testing. Possible deficiency in laboratories able to certify or otherwise validate the net calorific value of fuels.
19% of the facilities subject to the tax have not fully documented the minimal content pertaining to operational procedure, functioning, and calibration for CEMS.	It is predicted that demand for services associated with CEMS trial testing and operational issues will increase in the future. Consultancy activities for quantification proposal writing and thermal power ratings.

Fuente: Consultoría **"Implementación de un sistema MRV para la aplicación del impuesto, escalable a otros sectores y linkeable a otras jurisdicciones"**. En ejecución. Ente ejecutor: DEUMAN-Esinfra. Estudio elaborado con el financiamiento del Partnership for Market Readiness (PMR) del WorldBank Group.

15. For more on the GCE's meeting agendas and presentations, please see:

<http://www.precioalcarbonochile.cl/reuniones-grupo-consultivo-de-expertos>

16. Source: Consultancy, "Implementación de un sistema MRV para la aplicación del impuesto, escalable a otros sectores y linkeable a otras jurisdicciones." In execution. Executing entity: DEUMAN-Esinfra. Study financed by the Partnership for Market Readiness (PMR) at the WorldBank Group.

The most significant gaps in other options for emissions quantification were in these areas¹⁷:

Gaps	Proposals
CEMS (Options 1,3,4,5,6 and 7)¹⁸	
60% of power plants are not meeting deadlines for annual calibration testing and diagnostics.	Redefining CEMS operational and non-operational periods which facilitate compliance with trial testing deadlines.
60% of power plants experienced technical difficulties due to a lack of data acquisition and handling systems ¹⁹ on the market which offer all of the calculations stipulated in SMA Resolution 33/2016 as automatic functions.	Make the frequency of testing more flexible as a rule. Modify maximum and minimum reference values to replace lost data.
44% of power plants have had technical and operational failures in their continuous emissions monitoring systems (CEMS) due to a lack of technical services which address these types of failures.	
Alternative methods (2,10 and 11)	
30% of facilities subject to the tax using the second, SMA-approved option have declared representative rates which underestimate the true quantity of emissions generated.	Development of national emission factors for CO ₂ (Tiers 2 and 3 of the International Panel on Climate Change, or IPCC).
28% of option 2 users do not correctly apply the alternative methods according to the Exempt Resolution No. 438/2013.	Suitability of variables for emission factor calculations of MP, SO ₂ y NO _x (Tiers 2 and 3 of the IPCC).
30% of facilities subject to the tax do not comply with flow meters defined by the protocol	Develop quality assurance & quality control (QA/QC) ²⁰ plans for emission factors.
23% of facilities subject to the tax do not have defined periods of operation nor have they quantified inactivity periods for the purposes of the abatement equipment being used.	
Reference methods (Options 8 and 9)	
4% of facilities subject to the tax have failed to comply with deadlines for testing to determine taxes payable.	Suitable quantification options through reference methods to quality assurance/quality control plans for fugitive emissions verification.

Fuente: Consultoría **"Implementación de un sistema MRV para la aplicación del impuesto, escalable a otros sectores y linkable a otras jurisdicciones"**. En ejecución. Ente ejecutor: DEUMAN-Esinfra. Estudio elaborado con el financiamiento del Partnership for Market Readiness (PMR) del WorldBank Group.

17. Source: Consultancy, "Implementación de un sistema MRV para la aplicación del impuesto, escalable a otros sectores y linkable a otras jurisdicciones." In execution. Executing entity: DEUMAN-Esinfra. Study financed by the Partnership for Market Readiness (PMR) at the WorldBank Group.
18. For more details on quantification methodologies, please see: Part 3, Creation and Implementation of a Measurement, Reporting, and Verification (MRV) System.
19. Data Acquisition Handling System or "Sistema de adquisición y manejo de datos" in the original Spanish.
20. QA/QC (quality assurance & quality control) refers to quality assurance standards for reported information.

Gaps in reporting (R) and verification (V)

Analysis has shown that facility operators are familiar with reporting mechanisms overall. Concerns raised indicate that “operators responsible for reporting information monitored by the SIV have questions regarding how to report according to authority standards and want more precise information about the criteria to be used in reports (Negawatt – EBP, 2017). To improve reporting modules, solutions are being developed to: simplifying the data requirements when information has already been entered into other uniform public service systems (to improve system coherence); creating clear error messages for the Registry of Emissions and Transfers of Pollutants; and developing procedures for changing system operators.

FUTURE CHALLENGES

A key challenge of capacity building for public policy is guiding the process such that the climate change and local pollution policies converge into a unified framework. Such an effort involves creating procedures and mechanisms. This begs the question: What must the government do in the future to improve the system, besides applying the tax? Several future challenges present themselves in response to this question:

- Professional capacity building within the Ministry of the Environment and the Office of the Superintendent of the Environment is needed for those who will pilot the system and eventually expand it to include other mechanisms in the future.
- Development of computer-based systems. External agents will be used to consolidate a structure based on MRV system requirements. Information on security gaps must also be addressed.
- Developing tools to create laboratories specializing in emissions quantification so as to improve information servicing; increasing geographic coverage of the service, and offering services that could eventually be exported.
- Create continuous capacity-building mechanisms for facility operators to close gaps in the measurement and reporting processes.
- Develop mechanisms to complement the inspection process of governmental bodies such as the Environmental Oversight of Technical Agencies Standards (ETFAs) and Environmental Certification Technical Agencies (ETCAs).
- Develop national CO₂ emissions factors.

CONCLUSIONS

Successful implementation of the green tax system entails capacity building in in the regulated and public sectors as well as the development of new technical mechanisms. The challenge is to create a strategy that harmonizes with Chile's current reality, design the appropriate instrument and finally, implement the tax in such a way that it takes into account the true capacities of involved bodies as well as existing regulations.

The new mechanisms associated with the green tax provide new opportunities to improve public policy and environmental management. Acquired knowledge will strengthen the information systems (PRTR) as well as the Office of the Superintendent of the Environment (SMA) as a depository body for management tools and environmental oversight.

From a socio-political perspective, applying the tax has had several effects, such as disseminating tools more widely and opening 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 in Chile's environmental management.

Updating operator knowledge on carbon pricing instruments (IPC) is essential for understanding the role of the economic mechanisms in environmental policy and Chile's commitment to having a low-carbon economy. Such actions form part of a global movement to address climate change as expressed in the Paris Agreement.

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