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Series of Booklets - Carbon Pricing Instruments

CREATION AND IMPLEMENTATION OF
A MEASUREMENT, REPORTING AND
VERIFICATION (MRV) SYSTEM

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Abstract

The design and implementation of the original registry of establishments and emissions measurement, reporting, and verification (MRV) mechanism formed part of a long-term environmental policy that set out to implement a green tax on stationary sources while remaining consistent and coherent with other environmental regulation systems. The successful implementation of the first green taxes, underpinned by the quality of the associated record-keeping and MRV system, allowed the tax system to be enhanced by incorporating new mechanisms such as emissions offsets. The changes introduced under the Tax Modernization Law require an expansion of options for emissions sources/establishments in industry sectors that were not previously subject to green taxes, with complementary adjustments to the institutional structures deployed to implement the MRV system to cover a new MRV system for emissions reductions, leading to the creation of a full system built on both international experience and the offsets projects that have been implemented in the country over the past decade as part of the regulated and voluntary carbon market.



Introduction

The implementation of Chile's first green taxes on emissions of local (MP, NOX, SO₂) and global (CO₂) pollutants from stationary sources. In 2017 (Law 20,780) required the design and implementation of a system for registering establishments and sources subject to taxation and an emissions measurement, reporting, and verification (MRV) mechanism for all regulated units. This took shape in a series of protocols, methodologies, and procedures to answer the questions about what, who, how, and when to register emissions sources/establishments, and to measure, report, and verify applicable emissions.

The Tax Modernization Law (Law 21,210) that was passed in 2020 amended the threshold used to specify what bodies are subject to the tax, moving from a technical threshold (technology/installed capacity) to an emissions threshold, which will lead to the incorporation of new establishments – some of them belonging to industry sectors that were not included in the original tax. It also included offsets as a new mechanism running alongside the tax. The registration and MRV system, therefore, not only must be expanded to cover the new establishments/sources and new industries, but also must establish a system to support the implementation of offsets.

MRV systems fulfill a number of purposes. Over and above goals centering on local and global pollutants, they support the development of inventories, enhance domestic and international comparability, improve management within companies, and even help move towards more sophisticated carbon pricing markets, such as an emissions trading system (ETS). Meanwhile, the implementation of an MRV system offers a number of benefits from a public policy perspective: for instance, it strengthens the institutional framework for environmental oversight, creates a setting that promotes the consolidation of monitoring emissions and reductions, and strengthens professional capacities for information system management.

The MRV System in Chilean Environmental Policy

The Ministry of the Environment (MMA, for its initials in Spanish) is the institution tasked with environmental and climate change policy. With this dual responsibility, it originally drew up a green tax strategy, complementary to environmental oversight³, which is now to be expanded to include new carbon pricing mechanisms as part of the future Climate Change Law, with the goal of achieving climate policy objectives as efficiently as possible.

It should be noted that the MRV system designed for the first green taxes was created as an instrument with general and specific orientation⁴, in line with the different components of emissions control policies:

1 This document is an update and complementary text for the document 'Creation and Implementation of a Measurement, Reporting and Verification (MRV) System', (2017), prepared by Rodrigo Pizarro, Francisco Pinto, and Sebastián Ainzúa. Update prepared by Francisco Pinto.

2 For more details on how the taxes on local pollutants were calculated, see Pizarro (2016). Law 20,780, Article 8: Green taxes on stationary sources. Technical note, Environmental Economics and Information Division, Ministry of the Environment, Santiago, Chile.

3 For more details see Document 1 in this series: 'Impuesto verde: punto de partida para el despliegue de instrumentos de precio al carbono en Chile' (Green Tax: Starting point for the deployment of carbon pricing mechanisms in Chile).

4 In general terms, it seeks to complement other measurement initiatives, such as emissions inventories, that comprise internationally comparable mechanisms.

National Greenhouse Gas Inventory System (SNICHILE)⁵

Chile implements a national emissions inventory by means of a top down approach, based on the IPCC 2006 guidelines. This system permits international comparability and estimation of aggregated annual emissions or emissions disaggregated by industry sector. Like other top-down approaches, it cannot be used to identify emissions for each source. Conversely, an MRV system like the one used for the green taxes complements this information with data prepared using a bottom-up methodology, providing a more precise profile of each source, which can be used in the future to calibrate emissions in the national inventory. This has taken shape in the form of the Registry of Sources and Processes (RFP, for its initials in Spanish) and the Uniform Atmospheric Emissions Report (RUEA, for its initials in Spanish), both of which are stored in the Ministry of the Environment's Registry of Emissions and Transfers of Pollutants (RETC, for its initials in Spanish)⁶.

Green Taxes:

The MRV system permits the implementation of green taxes through protocols that determine what, how, when, and by whom these emissions are measured, reported, and verified.

Production sectors:

A suitable MRV must allow the application of measurement mechanisms that are adapted to the situation of each sector and must allow the evaluation of real-world advances in emissions reduction in different sectors. This is now to be expanded to incorporate establishments/sources in new economic sectors, for which only general measurement parameters were previously available.

Meeting commitments and mitigation actions:

A robust MRV system is necessary to establish precise quantification of mitigation projects and to allow reliable international comparability of nationally appropriate mitigation actions, NAMAs (Ministry of the Environment, 2015), achievement of the National Contribution, and green tax offsets⁷.

In the current specific implementation, the MRV system must be able to be adapted to different legal frameworks, problems, and technologies in use in the applicable sectors for carbon pricing.

MRV for Pricing Instruments

The MRV concept arose from the Bali Action Plan (UNFCCC, 2007), stipulating that greenhouse gas (GHG) mitigation actions must be 'measurable, reportable and verifiable' (MRV). The concept has been extended to other areas relating to climate policy mechanisms, such as GHG inventories and climate financing. In practice, when applied to carbon pricing instruments, the concept underpins an institutional structure that defines roles, specific

5 For more details, see: <http://snichile.mma.gob.cl/>

6 For more details, see: <https://retc.mma.gob.cl/>

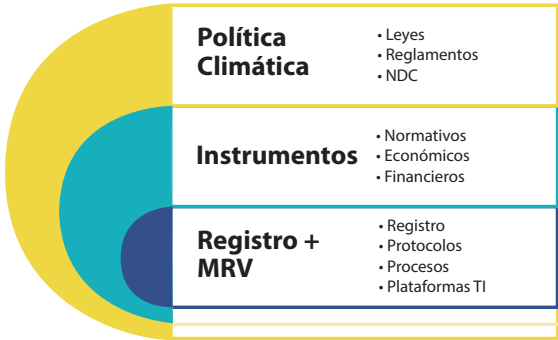
7 In the future, reduction certificates may be used to achieve compliance with the GHG standard proposed in the Climate Change Framework Bill (Art. 13) that is currently under discussion in Congress (Government of Chile, 2020).

procedures, and communication processes between the stakeholders tasked with answering what, who, how, and when applicable emissions are measured, reported, and verified, through regulations, methodologies, and protocols that serve to guide actions that different agents must take: regulators, bodies subject to regulation, and oversight and enforcement bodies. Correct operation of the MRV system not only provides certainty to all parties that the tonnages measured and reported are accurate but also serves as a policy evaluation instrument, as it can be used as a key information source for selecting other GHG reduction measures to be adopted.

It is relevant to note that one essential step is necessary for operating an MRV system for pricing mechanisms. A register must be compiled, containing all bodies subject to the instrument, recording the identity and characteristics of such bodies.

Figure 1 presents a summary of the logical structure behind the Registration + MRV system as a core information system that permits the implementation of an instrument that meets major policy objectives, as expressed in the law, regulations, or other guiding document underpinning a specific public policy commitment.

Figure 1. Structure of key Registration + MRV components



Source: Prepared for this document

Point of regulation

Defining the point of regulation is vital for implementing carbon pricing instruments, as this decision affects the complexity of the system's institutional infrastructure. The further down the production chain, the emissions measurement, reporting, and verification systems operate, the more complex they become. In Chile, the twofold scope of the original tax (both local and global pollutants) required an approach based on direct emissions⁸ (downstream), thus requiring the development of more complex and comprehensive institutional infrastructure, capable of monitoring and measuring emissions at source. Additionally, the type of pollutants to be taxed must be taken into account. Indeed, emissions of local pollutants (MP, NO_x, SO₂)

⁸ Chile's green taxes are applied through 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.

depend on the technologies and processes used for both production and pollution abatement; while carbon dioxide emissions are directly linked to the amount of carbon in the fuel used, which is the same as the amount subsequently released as CO₂.

It is important to note that modification of the tax entails changes in the register of affected establishments (and their emissions sources). Thus, under the technical threshold established, industrial establishments must be registered if they possess turbine or boiler sources with a nominal thermal power level greater than 5 MWt (Ministry of the Environment Supreme Decree 18/2016), with the tax applying to establishments that operate boilers or turbines with a combined nominal thermal power greater than or equal to 50 MWt (Law 20,780 Art. 8). Three years on from the implementation of the first green tax, a full registry has been compiled, with annual emissions and a quantification platform that provides traceability in emissions calculations, which can be used to determine which entities are subject to the new threshold established in the law reform; when an establishment was not previously subject to the tax, a mechanism must be established or referenced to determine emissions in time, to determine whether any taxes are payable⁹. The Ministry of the Environment has certainly achieved progress in this area, creating the new RFP that draws together all entities that need to register or report under one or more environmental regulations, and publishing a methodological guide to emissions quantification that permits the formalization of quantification criteria based on emission factors¹⁰.

Furthermore, the emissions offset system legislation requires the Superintendence of the Environment (SMA) to create new protocols to measure GHG reductions, the applicable reporting and verification mechanism, and a registry of external auditors that are authorized to certify reductions at projects capable of issuing offsets, which are expected to be stored in a national registry of mitigation actions, which will contain green tax offsets as well as other GHG mitigation measured implemented in the country.

MRV System

Prior to the assembly of the MRV system, the registrar is the core element for identifying and surveying which bodies are subject to a carbon pricing instrument. The RETC Uniform Public Service System (VU-RETC, for its initials in Spanish) was designed specifically to allow industrial establishments subject to a wide range of environmental instruments and regulations to be surveyed in a central registry and report on the various regulations.

Meanwhile, the registrar of reduction projects that will operate as offsets (currently under development) will form part of a larger register that will contain a broader array of mitigation actions.

The measurement (M) component comprises a wide range of emissions quantification options (SMA, 2018) designed taking into account current regulations and the sectors involved. Today, the new legal framework requires an expansion of measurement options to cover

9 For example, Ministry of Health Supreme Decree 138/2005, establishing the obligation to report pollutant emissions; Ministry of the Environment Supreme Decree 28/2013, establishing the emission regulations for copper smelters and sources of arsenic emissions; and Ministry of the Environment Supreme Decree 29/2013, establishing the emission regulations for incineration, co-incineration, and co-processing.

10 The new Methodological Guidance for Quantification of Emissions from Point Sources was published in late 2019 and is available at <https://retc.mma.gob.cl/publicaciones/>

establishments/sources in new economic sectors, particularly in the mining and mineral processing sector¹¹. Thus, the measurement system fits with existing infrastructure and regulations so as to avoid any possible redundancy in regulatory matters¹².

The main challenge affecting the reporting (R) component of the first green taxes comprised introducing a new report while retaining coherence with the existing recording and reporting mechanisms that applied to the Pollution Release and Transfer Registry (RETC). The decision was therefore made to retain the existing reports (SICTER, for its initials in Spanish)¹³ and to add a new one: Green Tax System (SIV) for facilities that were not previously covered. These two mechanisms currently make up the green tax reporting system and are consolidated under a new register of boilers and turbines subject to the tax (MMA, 2016b), created to survey establishments subject to the first green taxes, and later expanded to RFP.

This expansion of the existing structure converts the RETC into the main center of environmental public policy information, as the methodologies, protocols, and mechanisms designed for the tax are also useful in other policy areas¹⁴.

The green tax verification (V) component was designed to be used in two roles. Verification functions together with monitoring for public policy issues relating to compliance with the regulation, enhancing state oversight capacities. Under the SMA protocol, the verification process comprises a suite of activities and procedures undertaken to ensure the validity of the information reported. Verification allows:

- Assurance that monitoring procedures and systems are suitable for the stated purposes of quantification.
- Assurance that the measurement/sampling method will be implemented in compliance with the directives of the applicable reference methods.
- Assurance that the data reported are coherent with the operational data also indicated by the establishments.

Meanwhile, verification of emissions reduction projects that can be used to create offsets will be certified by an external auditor authorized by the SMA, subject to methodologies to be established by that body. This will also pave the way for expanding environmental oversight to include other carbon pricing instruments that require third party verification.

MRV systems are tools that play a key role in the design, implementation, and assessment of all public policies, most of all, in the field of climate policy. The options to be selected to address each of these elements depend on local institutional conditions and circumstances. Thus, designing a green tax policy in Chile has demanded the creation and implementation of a multi-purpose MRV system compatible with the country's environmental policy and the type of downstream taxation that was selected. Furthermore, the implementation of offsets will require the MRV system's design to be coherent with the taxes, associated climate policies¹⁵, and the offset mechanisms established in order to achieve compliance with other regulatory instruments, such as those stipulated under the Environmental Impact Assessment System (SEIA, for its initials in Spanish).

11 Alongside Ministry of the Environment Supreme Decree 13/2011, which regulates thermoelectric plants, and Ministry of Health Supreme Decree 138/2005, which regulates all emissions sources covered under the original tax, now Ministry of the Environment Supreme Decree 28/2013, regulating emissions from copper smelters and arsenic emissions sources, and Ministry of the Environment Supreme Decree 29/2013, regulating emissions from incineration, co-incineration, and co-processing, will also be applicable.

12 The new measurement methodologies will be defined by the SMA.

13 The Thermoelectric Plant Information System (SICTER) was established under Ministry of the Environment Supreme Decree 13, which establishes emissions regulations for thermoelectric plants.

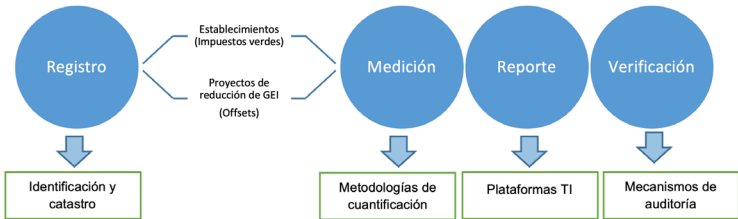
14 The reporting of emissions reduction projects for the offset system will be defined by the SMA.

15 These include the Climate Change Bill (if it is passed into law), and the offset systems that exist within the Environmental Impact Assessment System and the Santiago Atmospheric Decontamination Plan.

Components of the MRV System for Taxes and Offsets

The MRV system is made up of four components (see Figure 2). Registration of establishments subject to the tax, and emissions reduction projects for offsets. The former is derived from the Ministry of the Environment's Registry of Sources and Processes, while the latter is under institutional design and specification; measurement (M), reporting (R), and verification (V) are regulated under instructions issued by the SMA. The components of the system are shown below (see Figure 2).

Figure 2. Summary of Registration and MRV components



Source: Prepared for this document

Registration¹⁶

The register of sources is a key element that forms the foundations of the MRV system, both for establishments subject to green taxes and for atmospheric emission reduction projects. In the former case, the objective is to identify facilities that may be subject to the tax. The RETC Uniform Public Service System (VU, for its initials in Spanish) is used to register all establishments under an obligation to report, under any environmental instrument or regulation.

Establishments provide a number of items of relevant information for identifying them and populating the Registry of Sources and Processes, which comprises the information survey used for all sector-based systems pertaining to atmospheric emissions for the Superintendence of the Environment (SMA) and Ministry of the Environment, as well as the System of Thermoelectric Plants (SICTER, for its initials in Spanish), Green Tax System (SIV, for its initials in Spanish), and Electronic Form (F138)¹⁷. Meanwhile, under the tax reform that was passed in 2020, the Ministry of the Environment uses this information to draw up a list of facilities liable for taxation each year, starting in 2022. It should be noted that until 2021, notification and taxation will continue

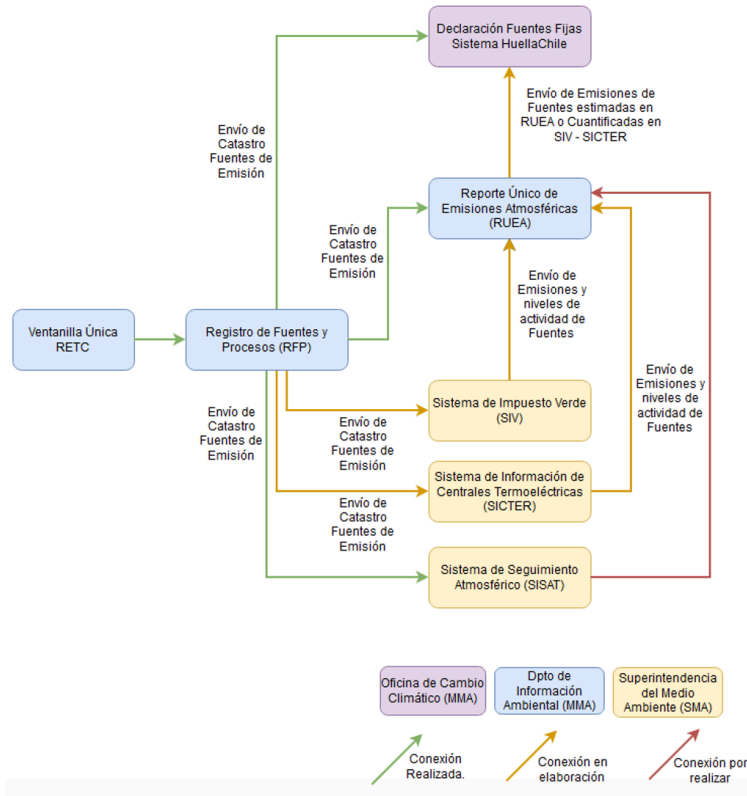
¹⁶ Ministry of the Environment (2020). Manual del usuario. Registro de fuentes y procesos. Available online: <https://vu.mma.gob.cl/manuals/rfp/Manual-Registro-de-Fuentes-y-Procesos.pdf>

¹⁷ Ministry of Health (2005). Decreto Supremo N°138 Establece obligación de declarar emisiones que indica. Available online: [9](#)

to apply to bodies possessing boilers and/or turbines with a total power rating of 50 MWt or higher.

Local and global pollutant emissions reduction projects will be recorded in a registry that is currently under development and is expected to form part of a larger registry that will cover all mitigation actions underway nationwide, stored by the Ministry of the Environment or the SMA.

Figure 3. Sector reporting and registration system



Fuente: MMA (2020)

Measurement¹⁸

Whenever companies and the facilities they operate are subject to the green taxes, they must apply emissions quantification methodologies so as to determine the amount payable. The companies are responsible for selecting the quantification method that they use, choosing from a list of available options in line with rules laid out in Instructions issued by the SMA. Quantification may be implemented by means of sampling and measurement or estimation:

- Sampling and measurement: This comprises the direct quantification of the outlet emissions concentrations, using measurement equipment installed at the facility. Both sampling and continuous measurement are included amongst quantification options.
 - Spot or sampling: Monitoring equipment is used to take a sample, which is then analyzed in a laboratory or on site. This method is used to determine output concentration and representative flow rate at the time when the measurement is taken.
 - Continuous: Emissions sampling and analysis in real time, using a continuous emissions monitoring system (CEMS). This normally provides hour-by-hour emissions averages over the course of the year.
- Estimation: This method comprises the indirect quantification of emissions using emission factors (for the specific production process in question) and annual activity records (such as operating hours and fuel consumption).



¹⁸ Superintendency of the Environment (2018). Resolución Exenta N°55. Aprueba instructivo para el monitoreo, reporte y verificación de las emisiones de fuentes fijas afectas al impuesto del artículo 8° de la ley N° 20780. Available online: <https://portal.sma.gob.cl/index.php/portal-regulados/instructivos-y-guias/impuestos-verdes/>

As well as the methods described above, a number of quantification options are specified in Environmental Regulation Standards (ICAs)¹⁹ that apply to each facility. The Instruction offers 7 + 1 options, divided into three groups (see Table 1).

Table 1. Emissions quantification options, by sector and measurement system

Applicable sectors	Measurement system			In-house methodology
	CEMS*	Discrete	Estimation	
Power plants subject to Supreme Decree 13/2011	1			
			2	
	3			
Power plants not subject to Supreme Decree 13/2011 o Boilers and/or Tur-bines (Not power plants)		4		
		5		
			6	
				7
New sectors**	To be defined			

Source: Prepared for this report, based on SMA (2018a). *CEMS: continuous emission monitoring system

** : Establishments becoming taxable in 2022, which are not power plants and do not operate boilers and/or turbines.

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 authorized in advance by the SMA. Furthermore, establishments that will come under the scope of the green taxes under the new emissions threshold and that will start measuring their emissions in 2022 will be issued with a new SMA instruction including applicable methodologies, with may include new emission factors or new estimation methodologies such as the balance of materials.

The green tax applies to emissions rather than production sectors, so measurement mechanisms used in different industries - some of them already covered under the original green taxes with Law 20,780 - need to be homologated with other sources that are currently covered under regulations and shall fall within the emissions threshold specified in Law 21,210, such as facilities subject to Ministry of the Environment Supreme Decree 28/2013, regulating emissions from copper smelters and arsenic sources, and Ministry of the Environment Supreme Decree 29/2013, regulating emissions from incineration, co-incineration, and co-processing.

During 2021 the SMA will draw up a protocol for measurement of emissions reductions in potential offset projects, coming into force in 2022.

19. Environmental Regulation Standards (ICAs) comprise the Environmental Resolutions, Prevention Plans, Decontamination Plans, Environmental Quality Standards, Emissions Regulations, Management Plans, and other oversight mechanisms operated by the SMA.

Reporting²⁰

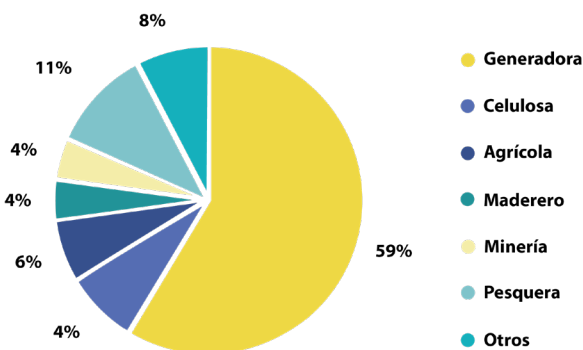
The emissions reporting process is based on a protocol that establishes the conditions and standards that must be met when reporting emissions subject to the tax. For these purposes, the SMA prepared emissions reporting instructions that set out to regulate administrative duties for reporting the data and background information necessary to calculate the tax. This calculation is then performed by the Internal Taxation Service (SII, for its initials in Spanish) on a case by case basis for each source. The SMA instruction also specifies the rules for submitting an individual report to the National Energy Commission (CNE, 2017) and the National Electricity Coordinator (CEN, for its initials in Spanish), containing the consolidated and hour-by-hour emissions released at all power plants subject to their coordination.

Under the instruction, all facilities subject to the tax must make a report, using the RETC uniform public service system. However, the emissions reporting mechanism depends on the type of source, and it may be processed either in SICTER²¹ or in the SIV. These reports are submitted on a quarterly basis, using the method established in Supreme Decree 13.

The following emissions declaration mechanisms exist, depending on establishment type and applicable regulations:

- If the source is a power plant subject to Supreme Decree 13²², reports shall be submitted to SICTER via the uniform public service system.
- If the source is not subject to Supreme Decree 13, reports shall be submitted to the SIV via the uniform public service system.

Figure 4. Distribution of establishments subject to green taxes in 2019 by economic sector



Source: Prepared for this report, based on data provided by the Ministry of the Environment

20 Superintendency of the Environment (2018a). Resolución Exenta N°55. Aprueba instructivo para el monitoreo, reporte y verificación de las emisiones de fuentes fijas afectas al impuesto del artículo 8° de la ley N° 20.780. Available online: <https://portal.sma.gob.cl/index.php/portal-regulados/instructivos-y-guias/impuestos-verdes/>

21 The Thermoelectric Plant Information System (SICTER) was established under the Ministry of the Environment Supreme Decree 13, which establishes emissions regulations for thermoelectric plants.

22 This requirement relates to Ministry of the Environment Supreme Decree 13, which establishes emissions regulations for thermoelectric plants. This regulation applies to 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.

Information reported by the Ministry of the Environment shows that almost 60% of establishments subject to green taxes belong to the power generation sector, almost all of which report via SICTER, while the rest report via the SIV.

During 2021 the SMA will draw up a protocol for reporting emissions reductions in potential offset projects, coming into force in 2023.

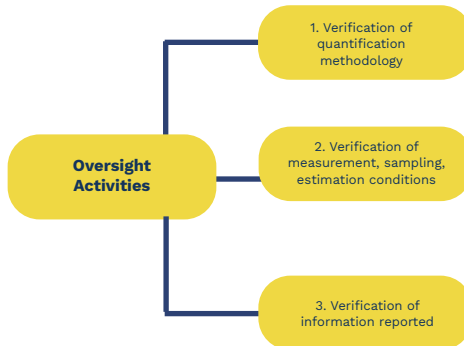
Verification²³

Verification is currently implemented through oversight by the Ministry of Health and the SMA. The Ministry of Health is tasked with compiling the background information submitted by the operators of stationary sources of pollutant atmospheric emissions, for use estimating emissions from each source. These estimates are made using existing domestic or international emission factors, as applicable for each source (Ministry of Health Supreme Decree 138/2005 Article 2). On an annual basis, each source must submit information on its processes, production levels, abatement technologies, and fuel quantities and types used at the sources subject to declaration requirements (Article 3) in order to estimate emissions (Article 4).

Within this framework, regional divisions of the Ministry of Health oversee emissions based on the information provided by applicable facilities in their declarations. Meanwhile, the SMA prepares oversight programs for the different Environmental Regulation Standards, as part of its general oversight role. These oversight programs include activities associated with the emission regulations that comprise the regulations on thermoelectric plants, such as Supreme Decree 13/2011. It should be noted that in 2019 an oversight program was specified for the application of the green tax (SMA, 2018b), establishing 93 oversight processes that included all taxable establishments.

Under the protocol established by the SMA, verification is undertaken on three levels:

Figure 4. Green Tax Verification Levels



Source: SMA (2018a)

²³ Superintendency of the Environment (2018a). Resolución Exenta N°55. Aprueba instructivo para el monitoreo, reporte y verificación de las emisiones de fuentes fijas afectas al impuesto del artículo 8° de la ley N° 20.780. Available online: <https://portal.sma.gob.cl/index.php/portal-regulados/instructivos-y-guias/impuestos-verdes/>

The first level relates to verification that reports that have been submitted were indeed prepared using the quantification methodology authorized by the SMA; the second level reviews measurement, sampling, and/or estimation conditions, in accordance with methodologies approved under an SMA resolution; and the third level compares data reported over the course of time with operational parameters or other relevant complementary data for cross-referencing.

The following table shows the MRV system mechanisms used to answer the core questions associated with the implementation of carbon pricing instruments.

Meanwhile, verification of reductions in pollutant emissions for green tax offsets that will be measured and reported under protocols to be established by the SMA shall be verified by external bodies authorized by the SMA, which will certify their validity using the protocol prepared by the same institution.



Table 2. Carbon pricing R + MRV system components

Component		Instrument	What?	Who?	How?	When?	Support Instrument
Registration		Tax	Establishments that emit 100 tons of PM or 25,000 tons of CO2 per year	Head of facility subject to the tax	RETC Uniform Public Service System (Ministry of the Environment)	After being stipulated by the Ministry of the Environment as a facility subject to the tax	Ministry of Health Supreme Decree 138/2005 and manual for Registration of Sources and Processes (RFP)
		Offset	PM, NOX, SO2, and CO2 emissions reduction projects	Project Owner (individual or legal entity) *.	Application to the Ministry of the Environment, with information established in the Regulations*.	To be defined in the Regulations*	Registry of pollutant emissions reduction projects
MVR	Measurement	Tax	Emissions of PM, NOX, SO2, and CO2 (tons)	Head of facility subject to the tax	Quantification Instruction Application (CEMS, Discrete, and estimated)	Each Quarter	Emissions monitoring, reporting, and verification instruction (RE 1053/SMA, 2018)**
		Offset	Reductions of PM, NOX, SO2, and CO2 (tons)	To be defined under SMA protocol*	Methodology to be defined by the SMA*	To be defined under SMA protocol*	To be defined under SMA protocol*
	Reporting	Tax	Measured emissions	Head of facility subject to the tax	Submitted to RETC uniform public service system, forwarded to SICTER or SIV (depend-ing on plant type)	Each Quarter	Emissions monitoring, reporting, and verification instruction (RE 1053/SMA, 2018)**
		Offset	Measured reductions	To be defined under SMA protocol*	To be defined under SMA protocol*	To be defined under SMA protocol*	To be defined under SMA protocol*
	Verification	Tax	Emissions measured and reported are indeed as declared.	In the short term SMA oversight personnel, medium and long term potentially third-party verification.	Digital: Quality Assurance and Quality Control System (QA/QC). Auditing: i) SMA oversight ii) Accredited third party	Each Quarter	Emissions monitoring, reporting, and verification instruction (RE 1053/SMA, 2018)**
		Offset	Reductions measured and reported are indeed as declared.	External auditors authorized by the SMA.	To be defined under SMA protocol*	To be defined under SMA protocol*	To be defined under SMA protocol*

*: To be defined

**:: Under current instructions. To be modified once new protocols have been established to cover establishments/sources belonging to newly taxable economic sectors.

Conclusions

The implementation of green taxes required the development of new instrument, providing technically robust information monitoring and validation systems consistent with applicable regulations. The MRV system has been consolidated as part of a broader environmental policy that sets out to provide environmental taxation with regulatory coherence, in line with the challenges imposed by local and global pollution; strengthen the institutional structure by means of protocols, instructions, and guidelines that consolidate the role of bodies such as the SMA in the environmental oversight framework; achieve regulatory coherence with regulations in force and the sectors subject to the tax, and allow expansion of the range of carbon pricing instruments available.

The MRV system that was put into place for the original taxes allowed adaptation to the new scenario emerging in the wake of the latest tax reform, which modified the threshold for determining which entities are subject to the tax, thus expanding the system to include establishments in new sectors, entailing an expansion to measurement methodologies, adjustment to reporting mechanisms, and amendment of the verification system in line with regulations applicable to those sectors.

Finally, the new environmental and climate oversight offsets require the development of registration protocols and an MRV system. The former must be compatible with the registries kept by the Ministry of the Environment for monitoring mitigation actions, and the latter must follow SMA guidelines, based on international experience and the implementation of domestic emissions reduction projects.

The MRV systems that have been deployed are not only fundamental for the suitable implementation of the green taxes and offsets; they also comprise an environmental and climate oversight tool that provides relevant information to decision-makers when evaluating, designing, and implementing new policies.

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