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STRATEGY

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# CHILE'S GREEN TAX



**giz** Deutsche Gesellschaft  
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# Chile's Green Tax Strategy<sup>1</sup>

## SUMMARY

In 2017, Chile began applying green taxes (or pigouvians) on stationary sources emitting local (PM, NO, SO<sub>2</sub>) and global (CO<sub>2</sub>) pollutants. This mechanism was without precedent in Chile and represents a pioneering effort in the region, which expands the range of tools for environmental management. Its main purpose is to complement existing efforts to reduce local atmospheric pollution –Chile's foremost environmental problem– and to mitigate the effects of greenhouse gases at a lower cost. The new taxes have resulted in the design and construction of a new institutional structure which includes the implementation of a registration system for sources subject to taxation and a system to measure, report, and verify (MRV) emission levels. Once the new measures are in place, the government expects continued discussion over future tax increases or other possibilities such as sophisticated carbon pricing instruments like offsets and/or tradable emission permits.

## INTRODUCTION

Chile is highly vulnerable to the effects of climate change. For this reason, the country has an active climate agenda that includes mitigation and adaptation measures involving various sectoral authorities, coordinated by the Ministry of the Environment and the Council of Ministers for Sustainability, which currently has the know-how in the field of climate change (Government of Chile, 2015, Ministry of the Environment, 2016b).

Together with the challenges associated with climate action, environmental policy should address local pollution problems. With the twofold challenge of developing market instruments has been opted for, and specifically the implementation of a tax on pollutant emissions as a first step to internalize the environmental costs generated by the economic and industrial development, allowing the country to meet its environmental objectives at a lower social cost.

Environmental taxes complement existing regulatory mechanisms by introducing economic incentives into the decision-making process. Their use allows State agencies to consolidate their information exchange mechanisms, creating a new institutional architecture through the development of technical and administrative capabilities which lays the foundation for the development of new and more sophisticated tools in the field of environmental management.

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## The global agenda: Chile, a country committed to climate action

Chile is vulnerable to the effects of climate change, since it presents seven of the nine characteristics established in Article 4 of the United Nations Framework Convention on Climate Change (CMNUCC) which defines it as such (Ministry of the Environment, 2016b). This obliges the country to take an active and pioneering role in climate action efforts, such as pushing for multilateral, international cooperation as the chief mechanisms to deal with the challenges associated with climate change. These efforts and contributions must always be undertaken with an understanding of the principles of equity and shared responsibility, while at the same time recognizing the necessity to differentiate these responsibilities according to capability (Presidency of the Republic 2016).

It was in this spirit that Chile signed the Paris Agreement, in which it committed itself to national action that addresses the threat of climate change, working towards sustainable development and the eradication of poverty (Presidency of the Republic, 2016). This commitment is expressed in the Nationally Determined Contributions (NDC) report ratified by the CMNUCC in February 2017.

### Chile's National Contribution (NDC) to Pollution Mitigation

#### Carbon intensity target, not including the UTCUTS\* sector

- a) Chile commits to reducing its CO<sub>2</sub> emissions per unit of GDP by 30% with respect to 2007 levels by the year 2030.
- b) The country commits to reducing CO<sub>2</sub> emissions per unit of GDP by 35% to 45% with respect to 2007 levels by the year 2030. Targets are subject to the attainment of international monetary contributions.

Source: Government of Chile, 2015

- \* Both commitments assume a level of economic expansion consistent with the country's growth trajectory over the past decade, not including the international financial crisis of 2008-2009.

In terms of emission mitigation efforts, the NDC's agenda is to reduce greenhouse gas emissions, but acting in accordance to issues arising within the national territory.

Climate management in Chile has been assumed as a public policy run by several governmental ministries<sup>2</sup>.

Connecting thus international commitments with national reality and aligning Chile's commitment to a low carbon economy and a green development program to those Interna-

2. Commitment agreements include: the National Climate Change Action Plan (PANCC 2017-2022), the National Plan for Adaptation to Climate Change; and the National Programme for Sustainable Consumption and Production, among others.

tional commitments adopted under the United Nations Framework Convention on Climate Change (UNFCCC) and the Organization for Economic Co-operation in Economic Development (OECD) on climate and sustainable development.

### The challenges of local pollution

Atmospheric pollution is Chile's foremost environmental challenge. Intensive economic activities, geographic and climatic conditions, and patterns of production and consumption contribute to the atmospheric emissions affecting the country's more than 10 million people, as well as contributing to Chile's 3,700 premature deaths per year (Ministry of the Environment, 2014b; 2016).

Chile has air quality standards which regulate maximum concentrations of particulate matter (PM<sub>10</sub> y PM<sub>2,5</sub>), sulfur dioxide, nitrogen dioxide (NO<sub>2</sub>), tropospheric ozone (O<sub>3</sub>), carbon monoxide (CO) and lead (Pb). But regardless of these regulations, many cities exceed the established emission limits. As a result, these areas are declared saturated or latent zones, thus requiring implementation of Environmental Decontamination Plans (PDA in its Spanish acronym) in order to comply with air quality standards. There are currently 16 valid PDAs<sup>3</sup> and new plans are in the making to reach the targeted 20 PDAs by the year 2018 (Ministry of the Environment, 2014b). PDAs require an extended period of time to be implemented and moreover they do not create incentives for additional reductions as a tax would. Economic instruments, as such, can complement the work of the Plans by developing efficiency and flexibility criteria for producer compliance with environmental targets, in addition to raising awareness about the social damage caused by pollutant emissions.

## GREEN TAXES IN CHILE

Within the framework of the 2014 tax reforms<sup>4</sup> (Law 20.780, and its subsequent reform in January 2016 with Law 20.899) a green tax was introduced in order to reduce local and global pollution. A cost for polluting was established to encourage different behavior from actors responsible for emissions.

There is international consensus that market instruments in general, and taxes in particular, comply with the objectives of reducing emissions at a lower social cost. In other words, they are more efficient. With the implementation of these taxes, Chile becomes the first country

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3. For more information on PDAs, see:

<http://portal.mma.gob.cl/planes-de-descontaminacion-atmosferica-estrategia-2014-2018/>

4. The reform also introduced a tax associated with emissions from moving sources. A tax was applied to the sales of light and medium-duty motorized vehicles according to their urban performance and NO<sub>x</sub> emissions. The tax was effective December 29, 2014. The tax amount is based on a formula using **three parameters**: Selling price, performance (kilometers per liter) and nitrogen oxide emissions. It is hoped that this measure will help buyers to seriously consider the polluting capacity of the vehicle they want to purchase and **that they** opt for low-emission vehicle.

For more information: [http://www.sii.cl/portales/reforma\\_tributaria/impuestoverde2015.pdf](http://www.sii.cl/portales/reforma_tributaria/impuestoverde2015.pdf)

in South America and one of the first among developing countries to have adopted a price for carbon. This places the country in a favorable position to take its green agenda further by implementing other, complementary mechanisms to mitigate emissions. Furthermore, from a conceptual standpoint, these taxes allow the State to sanction the evils associated with production and consumption, thus opening the door to future market instruments for environmental management.

### Local Pollution: MP, NO<sub>x</sub> and SO<sub>2</sub> Emissions

The tax establishes a charge on PM, NO<sub>x</sub>, and SO<sub>2</sub> air emissions produced by establishments with stationary sources comprised of boilers or turbines, which individually or together have a thermal power greater than or equal to 50 MW (Thermal Megawatts) of rated thermal input<sup>5</sup> as the upper limit of the energetic value of the fuel.

The tax per tonne is calculated by a formula that considers the specific damage of emissions from industrial processes according to the state of each area where emissions are generated (Pizarro, 2016). This measure thus approximates tax to environmental damage caused by pollution, taking into account the territorial aspect of environmental management. Under this model, the tax per tonne varies depending on the borough where the establishment subject to taxation is located. The formula recognizes, for example, that a tonne of the pollutant emitted in a saturated zone where a large population lives will cause greater damage than if that same tonne was emitted in a zone where the population was smaller and the pollutant concentration was lower. Effectively, the tax is weighted according to the respective air quality coefficients for each zone. Weighting includes a value of 1 for zones below the limit; 1.1 for latent zones; and 1.2 for saturated zones<sup>6</sup>.

### Global Pollution: CO<sub>2</sub> Emissions

Taxes on carbon dioxide (CO<sub>2</sub>) emissions affect the same establishments taxed for local emissions, excepting stationary sources which use renewable, non-conventional means in which the primary energy source is biomass.

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5. Rated thermal input: Thermal power, as calculated based on information on nominal fuel consumption, which depends on the producer's technical design/engineering specifications. The fuel's gross calorific value is determined by using the values published in the annual Energy Balance Sheet of the National Energy Commission (Source: DS No. 18 2016).

6. Establishments may be located in one of three types of zones:

- Zone below the limit: Pollutant concentration (in air, water, or soil) is under 80% of the value of the respective air quality standard.
- Latent zone: Pollutant concentration (in air, water, or soil) ranges between between 80% and 100% of the value of the respective air quality standard.
- Saturated zone: Any area where one or more environmental quality limits have been exceeded.

The Ministry of the Environment is responsible for labeling zones as latent or saturated according to the Supreme Decree (Article No. 43. Law 19.300 on General Bases of the Environment Act).

In the case of CO<sub>2</sub>, a tax of USD \$5.000 is applied for every tonne of pollutants emitted. This value is based on an estimation of the social cost of CO<sub>2</sub> by the Ministry of Social Development<sup>7</sup>. The tax amount is lower than those applied in other countries and jurisdictions (Ecofys 2015, p.13). However, during this first phase, it was considered that a lower tax enables its implementation by: (i) facilitating the adaptation of regulated sectors; (ii) increasing its social acceptability; and, (iii) allowing the implementation of the institutional infrastructure to sustain it. This is to say that the carbon tax as it has been developed in Chile has been considered as a starting point for raising awareness about the damage caused by greenhouse gas (GHG) emissions and allows further discussion regarding price-based instruments on pollutants in general and carbon in particular.

The methodology used to determine the social cost of carbon was recently modified in order 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 CO<sub>2</sub> to CLP 21,687 (Ministry of Social Development, 2017). This value, equivalent to USD \$32.00<sup>8</sup>, approximates the marginal cost of the damage caused by the pollutant according to the 'Report of the High-Level Commission on Carbon Prices' (CPLC, 2017). It is consistent with targets established in the Paris Agreement, which suggest CO<sub>2</sub> costs ranging between USD \$40.00-\$80.00 for 2020 and USD \$50.00-\$100.00 for 2030. President Bachelet recently announced in her 2017 State of the Union speech, a price of USD \$40.00/ tonne of CO<sub>2</sub> emissions as a social cost for the evaluation of all investments by the public sector.

## FEATURES OF THE GREEN TAX SYSTEM IN CHILE

Green taxes are part of a tax system that complements and increases a range of tools used in environmental management, providing flexibility for compliance with regulations, creating incentive for greater efficiency and innovation, and fostering technological development for input usage. Specifically, the system has the following characteristics:

**The principle of responsibility:** Based on the "polluter pays" principle.

**Corrective taxes:** Its objective is not to collect tax, but rather to correct behaviors. In the case of taxes on local pollutants, the levy is intended to charge the social cost of the damage generated, and establish incentives so that the polluting sources introduce technologies which

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7. When the bill was written, the Ministry of Social Development determined that the social cost was equivalent to CLP 2,213 (Ministry of Social Development, 2014), which was approximated as USD \$5.00/tonne. For details on the methodology of social cost and the social cost of CO<sub>2</sub>, please read:

<http://sni.ministeriodesarrollosocial.gob.cl/evaluacion-iniciativas-de-inversion/evaluacion-ex-ante/metodologias-precios-sociales/>

8. The value of the dollar as observed on January 2, 2017 was equal to CLP 667.29.

pollute less and which allows them at the same time to pay lower taxes. In the case of CO<sub>2</sub> taxes, a damage compensation mechanism is being sought which allows the decrease of marginal costs associated with reduction, and at the same time encourage energy efficiency, and the transition towards cleaner technologies that reduce emissions<sup>9</sup>.

**Downstream Taxes:** Taxes may be the "upstream" type –which in the case of carbon is determined on the basis of the 'carbon content' of the fuel used in the production process<sup>10</sup>– or they may be the "downstream" type, which are applied after the emission has been generated. Chile adopted the latter method due to the dual nature of the tax, which addresses both global and local negative impacts of emission, and that requires taxation. This mechanism also permits construction of an MRV system (measuring, reporting, and verification) consistent with a possible move to other price-based instruments such as Offset, ETS (Emission Trading Systems) or a combination of these, which are designed with a special focus on emissions.

**Damage approximation:** Local emission taxes were designed in such a way so they can give an approximation to the specific damage caused by industrial processes in each geographic zone. This way, the tax establishes, on the one hand, a charge associated with the environmental damage caused, while on the other hand it creates an incentive to modify zones where these processes occur, decompressing areas of high emission concentration. That is to say that the tax encourages emission reduction in zones that are already polluted and supports the Atmospheric Decontamination Plans. This differentiates the costs, which, indirectly, decentralize the decisions on productive investments that cause pollution.

**Negative impact taxing:** From a conceptual point of view, green taxes are applied according to the economic value of the environmental damage caused by the polluting emissions of an economic activity. This entails a tax on an "evil" or negative impact. The application of taxes according to this principle allows the development of a platform of cost-effective taxation instruments, which reduce system inefficiencies by incorporating environmental impact into the cost of production or consumption.

**Scalable instrument system:** The development of institutional support for green taxes, especially for the purposes of measuring, reporting, and verification of emissions (MRV system), sets the basis for the extension and scalability of the system: towards other technologies and emission sources, other greenhouse gases (for example, CH<sub>4</sub>) and other carbon pricing systems such as compensations (offset), Emission Trading Systems (ETS), or hybrid systems, amongst others.

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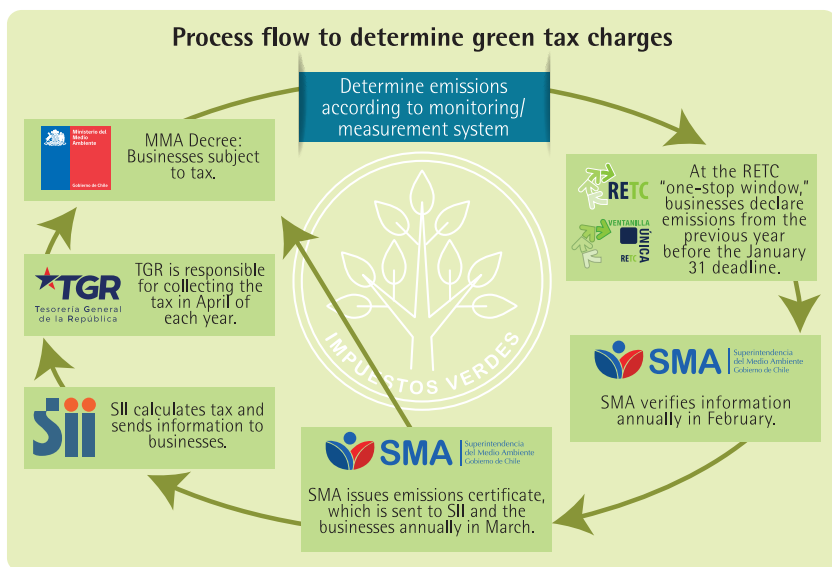
9. Currently, there are no commercially-developed technologies which allow CO<sub>2</sub> abatement. However, it is believed that there is room for process and efficiency improvements through which business can decrease emissions.

10. Countries such as Mexico and South Africa utilize upstream tax mechanisms.

**Subject construction:** The creation of an environmental tax stimulates a debate framework that constructs a new social subject comprised by a common recognition of the principle of responsibility for the burden caused by pollution. Rules are developed to reinforce the ethical imperative behind this new instrument.

## INSTITUTIONAL INFRASTRUCTURE

A pivotal element of the green tax implementation is the development of a complex, comprehensive institutional infrastructure which facilitates the coordination of multiple state departments based on a series of laws, regulations and directives which determine the responsibilities, procedures and flow of inter-institutional relations, thus achieving the consolidation of environmental management.



The Ministry of the Environment is responsible for coordinating the process of implementing the instrument and the development of a registry of the establishments subject to taxation. The first year of implementation of the carbon tax was supported by the project Price the Carbon Chile, within the framework of Partnership for Market Readiness from the World Bank. For its part, the Superintendencia del Medio Ambiente (SMA in its Spanish acronym) is responsible for implementing the MRV systems which provide the information needed for calculating the tax<sup>11</sup>.

The process begins with the MMA decree, which determines which institutions will be taxed; these must be registered in the Registry system of Emissions and Transfer of Pollutants (RETC

11. The first year of implementation of the Carbon Tax was supported by the Precio al Carbono Chile initiative, within the framework of the Partnership for Market Readiness of the World Bank.



in its Spanish acronym)<sup>12</sup>. Afterwards, they must declare their emissions using a quantifying methodology which has been approved by the SMA. The Internal Revenue Service (SII in its Spanish acronym) calculates the amount to be paid using the information above, as well as other variables such as the institutions, boroughs, population involved, and zone type. This data is sent to the businesses, which must submit payment to the General Treasury (General Treasury of the Republic).

## Key laws and standards for the creation of a green tax

**Law 20.780 (Ministry of Finance, 2014):** Tax reform which modifies the current income tax system, introducing changes to the tax system, including green taxes.

**Green Tax Regulation No. 41.646 (Ministry of the Environment, 2016):** Establish obligations and administrative procedures to identify contributing entities and to apply the tax.

**Instructions for quantifying emissions from stationary sources, Article No. 8 of the Law 20.780 (Superintendency of the Environment, 2016):** Establish the quantification methodologies for NO<sub>x</sub>, SO<sub>2</sub>, MP and CO<sub>2</sub> emissions to be applied to establishments (boilers and turbines) subject to the tax, as well as the administrative requirements needed to ensure correct application of the tax.

**Exempt Resolution No. 1333 (Ministry of the Environment, 2016):** Create a list of establishments subject to the taxation.

**Registration Manual: Boilers and Turbines subject to Green Taxes (Ministry of the Environment, 2016):** Create an administrative process to identify and register establishments to be subject to the green tax.

**Circular No. 54 (Internal Revenue Service, 2015):** Instructions for the declaration and payment of taxes on polluting compound emissions produced by stationary sources, as outlined in Article 8 of the Law 20.780.

## IMPACT

According to the Ministry of the Environment's most recent Registry, 93 establishments are subject to the emissions tax, which altogether represents approximately 40% of total CO<sub>2</sub>e<sub>q</sub> in Chile (Ministry of the Environment, 2016a). According to the analysis from the Ministry of Finance, the estimated tax revenue to be collected from stationary sources will reach

12. <http://www.retc.cl/>

approximately USD 168.7 million per year by 2018 (Ministry of Finance, 2014). In accordance with the priorities of national policy and the commitments of the Paris Agreement, CO<sub>2</sub> emissions will be taxed more heavily. Taxes on CO<sub>2</sub> emissions will comprise 85% of the total green tax collected.

In terms of competitive impact and considering the characteristics of the electricity market which establishes the marginal costs as a basis for determining the dispatch orders of generator units, simulations have shown that the application method and current CO<sub>2</sub> taxes do not change the energy matrix in competitive terms, even when considering how the electricity market uses marginal costs to direct generator dispatches. In other words, there have been no changes in dispatch nor investment planning (KAS Engineering, 2016). However, there are already impacts associated with business behavior in the medium term considered as a price signal from the Government. In fact, changes to electricity project options are appreciated when renewable, non-conventional energy sources are given greater importance, though this is detrimental to thermoelectric projects<sup>13</sup>.

## CONCLUSION

Comparatively speaking, Chile has low CO<sub>2</sub> emissions on a global level, but faces significant challenges regarding local environmental pollution. As a medium-income country, open to the world and committed to a multilateral agenda, Chile has adopted the principle of common responsibility. As such, it has recognized the importance of confronting climate change by exploring the use of mechanisms which are consistent with its national reality. In this framework, the Government of Chile decided to apply green taxes as a way of refining environmental management and move forward in the area of decontamination at a lower cost rather than using other measures.

The Government recognizes that, as a country vulnerable to the effects of climate change, Chile must undertake climate change mitigation efforts in tangible ways. However, to do so, a certain combination of instruments is needed. A tool by itself cannot reduce pollution. It was for this reason that green taxes were chosen as a measure to complement existing environmental management mechanisms, which together will work to reduce GHG and local pollutants.

The implementation of an environmental tax system implies substantial effort on the part of environmental legislation. Its introduction as a transitional mechanism opens the door to a range of new environmental management instruments in Chile.

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13. See related press releases:

<http://www.biobiochile.cl/noticias/nacional/chile/2017/05/Otras-cancelacion-de-5-proyectos-termoelectricos-llaman-a-insistir-en-energias-renovables.shtml> and

<http://www.pulso.cl/empresas-mercados/pulso-electrico-como-se-viene-2017-para-las-principales-generadoras/>

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