This MRP will be presented for funding approval during the Fifth Partnership Assembly Meeting to be held in Washington, D.C., on March 11-15 2013.
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1. **PMR focal point**

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Juan Pedro Searle</td>
<td>Ministry of Energy</td>
</tr>
<tr>
<td>Name</td>
<td>Head of Climate Change Unit, Sustainable Development</td>
</tr>
<tr>
<td>Title</td>
<td>Division</td>
</tr>
<tr>
<td>Address</td>
<td>Alameda 1449, Santiago Downtown II, 13th floor</td>
</tr>
<tr>
<td>Telephone</td>
<td>+562 23673711</td>
</tr>
<tr>
<td>Fax</td>
<td>------</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:jsearle@minenergia.cl">jsearle@minenergia.cl</a></td>
</tr>
<tr>
<td>Website</td>
<td><a href="http://www.minenergia.cl">www.minenergia.cl</a></td>
</tr>
</tbody>
</table>

2. **MRP Development Team**

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Ignacio Fernández</td>
<td>Ministry of Energy</td>
</tr>
<tr>
<td>Jaime Bravo</td>
<td>Ministry of Energy</td>
</tr>
<tr>
<td>Juan Pedro Searle</td>
<td>Ministry of Energy</td>
</tr>
<tr>
<td>Andrea Rudnick</td>
<td>Ministry of the Environment</td>
</tr>
<tr>
<td>Isabel Rojas</td>
<td>Ministry of the Environment</td>
</tr>
<tr>
<td>Alexa Kleysteuber</td>
<td>Ministry of the Environment</td>
</tr>
<tr>
<td>Maritza Jadrijevic</td>
<td>Ministry of the Environment</td>
</tr>
<tr>
<td>Cristóbal de la Maza</td>
<td>Ministry of the Environment</td>
</tr>
<tr>
<td>José Antonio Prado</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>Angelo Sartori</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>Angelica Romero</td>
<td>Ministry of Foreign Affairs</td>
</tr>
<tr>
<td>Claudia Ayala</td>
<td>Ministry of Foreign Affairs</td>
</tr>
<tr>
<td>Julio Cordano</td>
<td>Ministry of Foreign Affairs</td>
</tr>
<tr>
<td>Luis Gonzáles</td>
<td>Ministry of Finance</td>
</tr>
<tr>
<td>Pablo Salgado</td>
<td>Ministry of Transport</td>
</tr>
<tr>
<td>Juan Francisco Bustos</td>
<td>Ministry of Mining</td>
</tr>
<tr>
<td>Mª de la Luz Vásquez</td>
<td>Ministry of Mining</td>
</tr>
<tr>
<td>Cristian Gardeweg</td>
<td>Ministry of Economy</td>
</tr>
<tr>
<td>Eduardo Sanhueza</td>
<td>Consultant</td>
</tr>
</tbody>
</table>

The preparation of this Market Readiness Proposal (MRP) was coordinated by the Ministry of Energy acting as Chile’s PMR Focal Point. During its preparation, this proposal received valuable
feedback and suggestions from the following stakeholders: The PMR Steering Committee\(^1\) (which was established on March 2012 for the purpose of reviewing preparation phase studies, MRP drafts and of providing technical information and political guidance to the overall process), the Partnership Assembly Participants, the PMR Secretariat Team; and the Team of Experts appointed by the World Bank.

The base to produce this MRP came from the four consultant reports of the Preparation Phase:

- MRV, Compliance and Registry\(^2\)
- Roadmap for Implementing a Greenhouse Gas Emissions Trading System in Chile: Core Design Options and Policy Decision-Making Considerations\(^3\)
- Options for Scaled-up Crediting Mechanism and Investment Incentives in Chile\(^4\)
- Study on the National Situation: economic and energy profiles\(^5\) (growth, supply and demand, BAU economic and GHG emission scenarios, etc.) and a cost benefit analysis of different mitigation scenarios.

Box A provides a summary of the main findings under the preparation phase and Annexes 1-5 give more insights of this phase and the results of each of the four studies.

**Box A: Main findings under the Preparation Phase**

**ETS**
- Chile has a great potential to develop a GHG ETS. Nevertheless further analysis and discussion among government, researchers and stakeholders is needed in order to decide how to proceed.

- Key decision points/government judgment may arise during the ETS design stage around the following topics: goals & structure, governance, coverage, emissions constraint, linking, phasing, allocation and compliance.

- Core decisions to be considered include ETS objectives, criteria and design options; sectors and points of obligation; cap setting (time frame, adjustments, domestic vs global approach, etc.); role of offsets; feasibility of linking to other carbon markets; price control and role of price containment measures; trading periods, transitional phase; the type of allocation that would be applied, among others.

- Stakeholder consultation and engagement at a very early stage is crucial both to gain knowledge and also to build capability within Chile to understand the issues and contribute to the policy development.

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\(^1\) Formed by the ministries of Foreign Affairs, Finance, Economy, Agriculture, Mining, Transport & Telecommunications, Energy and Environment,

\(^2\) Consortium Lead: INFRAS

\(^3\) Consortium Lead: Motu Economic and Public Policy Research

\(^4\) Consortium Lead: Climate Focus

\(^5\) Consortium Lead: Price-Waterhouse-Coopers
MRV/Registry

- Establishing a measurement, report and verification system (MRV) with a suitable registry system that is consistent with the requirements of international carbon markets, is essential for the implementation of an ETS or any other market-based instrument in the country.

- Further stocktaking and analysis of legal and institutional capacity is needed to establish a policy setting authority or regulatory body for the various components of an ETS MRV system, but similar bodies exist in other contexts.

- There is initial MRV capacity at the level of operators/installations in energy intensive industries and power generation, as a result of current reporting obligations in the country, e.g., pollution and grid database and voluntary GHG reporting of some companies at larger installations.

- There is capacity for verification services for MRV, i.e., several international DOE’s in Chile could provide their services for ETS and or scaled-up mechanisms.

- The capacity to fully develop and administer an MRV framework and registry systems for an ETS needs to be created. This should build off of existing capacities and resources that exist today in the Government associated with the Ministries of Health and Environment.

- Training in MRV approaches in all relevant sectors; stakeholder consultation of interested industry associations on approaches to MRV; capacity building with industry associations related to the opportunities and threats for ETS; and evaluation of availability of data, instrumentation, control and information systems for emissions and activity data, are among the central aspects to be addressed for a proper design and implementation of any market-based approach in the country.

Complementary instruments

- *Scaled-up crediting mechanism:* An SCM could be adopted as a transition to a potential future ETS; could co-exist with an ETS or could be established independently of an ETS.

  Different SCM models could be adopted. Under an SCM umbrella design, a specific SCM window could govern a crediting mechanism that targets the most cost-effective opportunities for greenhouse gas (GHG) reductions. This crediting mechanism could ensure that resulting credits supply a future Chilean domestic emissions trading scheme (ETS) (hence, contributing to Chile’s own mitigation efforts).

- *Stable Investment Incentives.* The choice of suitable investment incentives is inextricably linked to the decision on the introduction of an SCM or ETS in Chile. Recommendations on investment incentives will vary depending on which mechanism will be chosen and which sectors will be covered by it.

- *Price containment measures.* In choosing price containment measures, regulators should keep in mind the parameters that are most likely to influence prices in Chile and try to assess the consequent respective likelihood of different types of price oscillations. Important questions include whether price spikes or falls are more likely, and whether these are likely to be temporary or more long-term. These considerations will influence the type of measures
3. Executive Summary

This document presents a roadmap showing the intended path to the design—and an eventual implementation—of a GHG ETS in the energy sector in Chile. It also describes the specific activities that will be undertaken with PMR and potentially additional funding to deliver the desired outcomes.

In order to prepare the grounds for a sound decision-making process on the potential implementation of a GHG ETS in this sector—which may play a crucial role towards the country’s low carbon economy goal—during the PMR implementation stage a concept ETS will be designed along with complementary instruments that make this market-based instrument operational. This process will also consider the possibility of making this tool an instrument to link with international carbon markets.

From this perspective, the desired outcomes of this Market Readiness Proposal are to:

- Build understanding and technical and institutional capacities across all stakeholders for design and implementation of Market-Based Mechanisms and their MRV systems. This includes the simulation and evaluation of the impacts of the implementation of a GHG ETS in Chile by the use of economic modeling tools and other evaluation instruments.

- Prepare the necessary regulation to implement a GHG ETS in Chile, including a general law allowing for the trading of local and global emissions, as well as for the implementation of an MRV framework and Registry.
- Draft a regulatory decree that regulates the reduction of greenhouse gases, in a phased implementation approach that builds up from a sectoral level to—eventually—the entire economy.

- Design and implement MRV framework and a Registry system for the Chilean GHG ETS that allows for the recording and tracking of emissions and emission permit transactions.

- Study complementary instruments (i.e., energy efficiency and renewable energy certificates, innovative finance, offsetting system) to fit with the proposed ETS to enhance its effectiveness.

**Structure of the MRP**

This Market Readiness Proposal is structured following the Tool for Market Readiness Proposal (MRP), version 2 of November 29, 2012. It addresses each building block as follows:

**Building Block 1: The Big Picture/Policy Context**, sets the stage for understanding key aspects of Chile’s national circumstances by providing relevant economy and energy information. It also outlines climate change policy objectives and goals, including an overview of the country’s GHG emissions and its experience in carbon markets. There is no budget request associated to this building block.

**Building Block 2: Policy Landscape and Objectives and/or Preparatory Work to Support and Inform Policy Decisions**, provides the overall climate policy context, including climate change institutional arrangements and the country’s pledged mitigation actions, and makes the case for suitability of ETS and why it makes sense for Chile to examine ETS as a key policy instrument to meet GHG objectives in the energy sector.

For this building block further work is needed on economic, institutional and regulatory research. The details of the activities and estimated budget can be found on building blocks 3.

**Building Block 3: Core Technical and Institutional/Regulatory Market Readiness Components**, presents the basic components to evaluate a design of a greenhouse gas (GHG) emission trading system (ETS) for the energy sector in Chile, along with the MRV framework and registry system associated with it. These components along with an estimated budget are depicted as follows:

- **Component 1: Regulatory, Economic and Institutional Analyses needed to design a GHG ETS for the energy sector in Chile**, seeks to identify the regulatory capacities required for the implementation and administration of a GHG ETS and its MRV and Registry systems; to perform both, macro and micro economic analyses of the national situation, in order to determine the potential impacts and benefits of a GHG ETS in Chile; and to design an institutional arrangement that is capable to support the implementation and operation of a GHG ETS and the corresponding MRV and Registry systems that can be utilized at a sectorial and national level.

  Estimated budget: US$ 1.81 Million

- **Component 2: Design and implementation of MRV framework and Registry system**, which is divided in two sections: (a) Design and implementation of an MRV framework, and (b)
Development of a Registry. The latter is also divided on two phases: implementation of a bottom-up GHG emissions registry and design of an emissions transaction registry.

This component pursues the following goals:

- to design and implement an MRV system that complies with the criteria of environmental integrity, data availability, transparency, cost efficiency, a sound institutional framework and transferability;
- to support national efforts and implement bottom-up GHG emissions reporting and to enhance national capacities for improving the completeness and accuracy of the information included in this system;
- to design an appropriate registry system that can be utilized at a sectorial level, keeping track of all GHG emissions in the system and additionally having all the necessary elements for a potential implementation of national-level market-based mechanisms in the Country.

Estimated budget: US$ 1.56 Million

**Building Block 4: Planning for a Market-based Instrument**, presents relevant information associated with the energy sector (such as energy demand and GHG emissions highlights and projections), as well as a roadmap showing the intended path to a political decision on the implementation of an ETS and its overall role in Chile’s climate policy. It also outlines key policy and institutional elements of the ETS design that will need decision and development, including steps and processes along with an estimated timeline that highlights key decision points. It also includes a process to identify and work with stakeholders on the design of an ETS.

The overall budget of the roadmap for the PMR Implementation Phase was estimated at US$ 11 million approximately. A detailed timeline of activities and a disaggregated budget is shown on Table 1 of building block 6.

**Building Block 5: Organization, Communication, Consultation and Engagement**, summarizes overall plans for organization, communication consultation and engagement during the MRP implementation phase, including arrangements for direct MRP supervision as well as for overall political guidance.

High level stakeholder’s capacity building and training on MRV and registry issues, as well as public and private sector consultations will be a central part of this component.

The hiring of a project coordinator is also considered.

Estimated budget:

Communication, Consultation and Engagement: US$ 510,000
Administration of the PMR project: US$ 500,000

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6 The details of the list of activities considered for the first two years, which total only US$ 4.8 million (approx.), can be found on building blocks 3 and 5.
Building Block 6: Summary of Activities, Timeline and Budget, describes the activities, timeline and estimated budget to reach the ETS-ready stage detailed on building block 4, as well as the activities and estimated budget for each of the market readiness components which Chile is proposing to pursue in the first two years under PMR funding.

Overall Budget
The overall budget estimated for the ETS-readiness (PMR Implementation Phase), envisaged for a period of four years, is US$ 11.1 million. The estimated budget and activities of building blocks 3 and 5 are included in this overall budget.

PMR Funding Request:
The PMR Funding Request for the first two years, based on the activities described on building blocks 3 and 5, is shown in the following table.7

<table>
<thead>
<tr>
<th>Building Block</th>
<th>Activity</th>
<th>Total cost of activities</th>
<th>PMR Funding Request</th>
<th>National Government</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Component 1: Regulatory, Economic and Institutional Analyses needed to design a GHG ETS for the energy sector in Chile</td>
<td>1,810</td>
<td>1,200</td>
<td>50</td>
<td>560</td>
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<td>3</td>
<td>Component 2: Design and implementation of MRV and Registry systems</td>
<td>1,560</td>
<td>1,100</td>
<td>50</td>
<td>410</td>
</tr>
<tr>
<td>5</td>
<td>Involvement with stakeholders</td>
<td>510</td>
<td>400</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>Budget for the administration of the PMR project</td>
<td>500</td>
<td>300</td>
<td>150</td>
<td>50</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>4,380</td>
<td>3,000</td>
<td>300</td>
<td>1,080</td>
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</tbody>
</table>

Note: Chile will update periodically the PMR Assembly on the progress of the activities listed on this MRP and additional funding will be requested as its implementation proceeds successfully.

7 A more detailed disaggregation of the activities on this table can be found at the end of building blocks 3, 5 and 6 (pp. 37 and 73 respectively)
Building Block 1. The Big Picture: Country Context

A. Main Components

1. Outline of Development and Climate Change objectives

Chile is an emerging economy aspiring to be a fully-developed country within the next decade. In its path to economic development, Chile joined the OECD in 2010 as a high middle income developing country and has complied with most of the relevant policy recommendations issued by that organization.

Like most countries in the world, Chile still has not decoupled its economic development growth from its increase on GHG emissions. In the past 30 years, Chile has experienced rapid economic growth and diversification and increased its reliance on exports. These developments can be explained by the country’s stable government, political institutions capable of generating and maintaining consensus on key issues, and effective public policies. The effects of the country’s export-driven development policy can be seen in its balance of trade, which has been positive since 1999 and grew substantially during the 2002–2007 period. Mining accounts for more than 50% of the total value of all goods exported by Chile. Regarding imports, intermediate goods such as fuel predominate, representing 50% of the total value of imports.

Following there is a description of the economic and energy profile of the country, along with a narrative of its historical GHG emissions and a brief explanation of the overall climate policy goals. More specific information about the projected emissions of the country and the specific targeted sectors can be found on building block 4.

Economy Profile

The Chilean economy is an emerging, small open economy, which growth proved to be one of the fastest ones in Latin America, recording an annual average GDP growth of 4.1% over the past 15 years. During 2011, the Chilean economy grew at a rate of 6%, mainly due to the expansion of business services, commerce, construction, personal services and manufacturing. In spite of these rapid growth rates inflation has remained relatively stable around 3.5% during the past year. GDP growth in 2012 was 5.5%.

Chile’s economy is highly dependent on international trade, having signed 59 trade agreements with other economies. Some of the countries that Chile has signed free trade treaties and agreements are China, Canada, Colombia, Mexico, South Korea, Australia, Peru, United States and Turkey. For the countries that Chile does not share special trade agreements receive a flat-rate tariff of 6% on all imports.

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8 Unofficially was announced that the GDP growth rate for 2012 was 5.4%. The official adjusted number will be announced in the month of April 2013.
The Chilean economic sectors that contribute most to GDP are energy intensive and as a consequence, the country presents a strong link between economic growth and energy consumption pattern.

Chile’s economic profile is heavily dependent on mining exports, especially copper mining, and their contribution to GDP growth. Based on this, Chile’s economic projections are closely tied to existing copper resources, mining production plans and the demand for raw materials. Other sectors such as forestry (about 3.5% of the GDP) and agriculture also have strong participation in the national economy. Projections show an increase in mining production, where the new investment portfolio is valued at US$ 66.9 billion of which 44.1 billion are for the period 2011-2015. From this total amount, 81.2% corresponds to copper mining.

**Energy Profile**

The country’s energy policy is founded on the legal and regulatory role carried out by the State through its Ministry of Energy and related agencies, leaving the investment decision-making in the power generation to the private sector. Under this scenario, some of the Government’s objectives are the following:

- Increase and improve the level of energy security and availability to meet the increase in demand associated to the expected economic average annual growth rate of 6% up to 2020.
- Improve current regulations governing access to energy resources, in order to increase investment in renewable energies in Chile.
- Improve information availability and research programs that promote energy efficiency and energy saving projects, including energy efficiency certification and standards for construction, domestic appliances, lighting and transportation.

**Primary Energy Supply**

The figure below shows the 1990-2009 evolution of total primary energy supply (TPES), expressed as tons of oil equivalent per capita (TOE/capita). As shown in the figure, since 1997 Chile has converged towards the World’s average of 1.75 TOE/capita. This level of TPES is still approximately half of the average European countries (EU-27), which roughly corresponds to the current per capita income gap between Chile and Europe.
Chile has a high level of imported fossil fuel dependency. Given its limited endowment of native fossil energy resources, Chile depends on oil, coal and gas imports for almost 75% of its primary energy supply (TPES), making its economy very vulnerable to both, volatility of international prices and supply disruptions of its fuel imports.

Chile’s energy mix relies predominantly on fossil fuels, with oil representing 34.8%, natural gas 20.0% and coal 18.3%. The share of renewable totaled 26.9% during 2010, with hydro accounting for 7.6% and biomass for 19.2%. Hydropower supply is concentrated in the central part of the country, which is closest to the major load centres.

Electricity Generation and Distribution

Chile’s electricity generation and distribution is characterized by two major systems. The power supply mix of these systems is remarkably different due to the lack of water in the northern part of the country (SING). From north to south, these grids are:

a) The SING interconnected system (Sistema Interconectado del Norte Grande), covering approximately 25% of Chile’s northern continental area, which is home to about 6% of the population and contains the highest concentration of mining operations. Large industrial mining customers represent over 90% of the SING load, which are served mostly by thermal generation with installed capacity approaching 3.700 MW in 2010.

b) The SIC interconnected system (Sistema Interconectado Central). This larger system covers the central and central-southern portion of Chile’s continental area, where 90% of the population is located, including the Santiago Metropolitan Area- the nation’s largest load center. In 2010 installed capacity reached 12.147 MW, supplied by a mix of 45.8% hydroelectricity, 11.5% coal, 15.2% combined cycle (natural gas or diesel), 25% gas turbines, 2.1% cogeneration, and 1.3% wind farms.
Additionally, two smaller regional systems—Aysen and Magallanes—with a combined total capacity of 140 MW provide energy to the smaller, more isolated regions of the country.

Chile’s supply mix has experienced significant changes during the last two decades. The SIC was predominantly hydroelectric between 1990 and 1997 with a low participation of coal-based thermal generation. At the same time, the SING’s thermal supply mix was based on coal with a small portion of fuel oil. With the entry of Argentine gas imports in 1997 the SING’s generation mix veered sharply towards natural gas, reaching 58% of the total generation potential. However, a change in Argentina’s energy exports policy in 2006 led to a gas supply crisis and the rapid installation of an important number of diesel-fuel thermal generation, as well as coal plants in the following years. In the same period, several medium and small hydroelectric facilities were developed and small scale renewable energy projects increased markedly.

This gas import crisis led to a reversion to coal based generation, complemented by diesel-fuel generation to replace falling gas imports. The year 2009 however, saw the renewed availability of natural gas through the construction of two LNG re-gasification terminals and an important part of the diesel-fuel generation has been substituted by imported LNG.

**Final Energy Consumption**

The last two decades of rapid GDP growth rates and successful economic performance have also determined the rapid growth of final energy consumption in Chile. In this period, total final energy consumption has grown at an average annual rate of 4% as shown in the table below. Energy has become the highest growing sector with an average annual growth rate of energy consumption of 8.2% followed by the Industry and Mining sector (2.8%); CPR (Commercial, Residential and Public sectors) (2.1%); and Transportation (1.9%).

In absolute terms, the largest final energy consumption sectors are: Industry and Mining (38.2%) of total final energy consumption (TFC); Transportation (32.9%); and CPR (26.3%). Within the Industry and Mining sector, copper and mining for other minerals account for almost half of the energy consumption (17.5%).

**Average annual growth rates of final energy consumption by sector**

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Energy</td>
<td>3.1%</td>
<td>8.2%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Industry and Mining</td>
<td>6.9%</td>
<td>2.8%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Transportation</td>
<td>6.9%</td>
<td>1.9%</td>
<td>4.2%</td>
</tr>
<tr>
<td>CPR</td>
<td>4.5%</td>
<td>2.1%</td>
<td>3.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6.0%</strong></td>
<td><strong>2.3%</strong></td>
<td><strong>4.0%</strong></td>
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</tbody>
</table>

Final Energy Consumption. Share by sector (%)

<table>
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<tr>
<th></th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>2.5%</td>
<td>5.7%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Industry and Mining</td>
<td>36.5%</td>
<td>34.3%</td>
<td>38.2%</td>
</tr>
<tr>
<td>Transportation</td>
<td>34.3%</td>
<td>34.6%</td>
<td>32.9%</td>
</tr>
<tr>
<td>CPR</td>
<td>26.7%</td>
<td>25.4%</td>
<td>26.3%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>


2. Overview of the country’s GHG emissions

According to the International Energy Agency, Chile ranked 61st in the world for per capita CO₂ emissions in 2008, producing 4.35 tons CO₂ per person, slightly above the global average of 4.23 tons of CO₂ per person. Nevertheless, the country’s emissions are growing significantly, mainly as a result of the country’s rapid economic growth.

In accordance with Chile’s Second National Communication (2011), the country’s GHG emissions increased 37% between 2000 and 2006, where the energy sector accounts for 73% of the country’s non-LULUCF emissions. Energy is also the sector with the highest growth in that period (13%). In 2006, electricity production (36%); mining, manufacture and industry (23%); and transportation (29%) make up most of the country’s energy emissions. On the other hand, the LULUCF sector shows a negative carbon balance nearing 25% of the non-LULUCF sectors, mainly due to captures of exotic forest plantations as Radiata pine and Eucalyptus spp.

3. Chile’s overall climate policy goals and existing and planned major mitigation actions

Chile recognizes the need to stabilize global atmospheric concentrations of GHGs at a level that prevents hazardous anthropogenic interference with the planet’s climate system by reducing total emissions and protecting and improving GHG sinks and deposits through suitable mitigation measures. This way, the country understands the need to contribute to the international efforts in this regard and according to the principle of common but differentiated responsibilities and respective capabilities.

Under this scenario, Chile associated itself with the Copenhagen Accord and by August of 2010, the Government officially communicated to the UNFCCC Secretariat its pledge to achieve a 20% deviation below the BAU emissions growth trajectory by 2020, as projected from year 2007. To accomplish this objective Chile has stated that it will need a relevant level of international support. Energy efficiency, renewable energy, and land use change and forestry measures will be the main focus of Chile’s nationally appropriate mitigations actions.

At the same time, the country recognizes that due to the rate of economic growth over the last decades, which is expected to continue, emissions will increase. For this reason, the Government has the political will to act to limit the increase in GHG emissions, by adopting domestic actions and the creation of new market based mechanisms that enhance the level of mitigation in a cost-effective manner.

In this context, the Chilean Government began working in 2010 on several instruments, for instance, the creation of a carbon footprint web tool, the design and implementation of Nationally Appropriate Mitigation Actions (NAMAs), the enhancement of the “Emissions,
Transference and Contaminants Registry (RETC), and the potential use of new market mechanisms that will provide information for decision-making about mitigation in the country.

Regarding NAMAs, Chile has registered three NAMAs in the UNFCCC NAMA Registry Prototype. The NAMAs seeking support for implementation are the following:

- Implementation of a National Forestry and Climate Change Strategy, including the development and implementation of a Platform for the Generation and Trading of Forest Carbon Credits.
- Expanding self-supply renewable energy systems (SSRES) in Chile.

The NAMA seeking for recognition is the following:

- Clean Production Agreements in Chile

In the next few years, the Government of Chile will enhance and implement a strategy for mitigating its emissions. Some concrete advances that are expected in this area include:

- Strengthening capacities related to the country’s national inventories of GHG through the design and implementation of a top-down permanent system to develop biennially the a national GHG inventory;
- Strengthening capacities related to the emissions per facility in the country through the enhancement of the bottom-up system named “Emissions, Transference and Contaminants Registry (RETC)”;
- Integration of sector-specific efforts to prepare emission projections for the coming years;
- Improve the level of information of the current NAMA portfolio to continue the design and implementation of NAMAs in the short term;
- Improve the level of information regarding mitigation actions at a national level including private and public actions.

Starting this year, the Government of Chile embarked on an extensive exercise to prepare long-term mitigation scenarios, known as Mitigation Action Plans & Scenarios or MAPS Chile. The main objective of MAPS Chile is to project GHG emissions on a national level for the Business as Usual Scenario and different Mitigation Scenarios, considering a time horizon between 2007 and 2050. The results will be considered for Chile to 2020, 2030, and 2050, along with a detailed analysis of possible mitigation actions by sector. Also economic indicators will be projected associated with the different scenarios: GDP growth, employment, among others. In the economic arena, the project will construct a fully operational dynamic stochastic general equilibrium (DSGE) model calibrated for the Chilean economy to perform applications to assess the different scenarios. The model will consider different sectors of interest for analyzing different relevant scenarios of mitigation of GHG emission for the Chilean economy, specially the modeling of the energy sector and the interrelations among all sectors. The model will be used to project energy consumption, GHG emissions and economic indicators. The model will be used to make an assessment of the impact of different mitigation scenarios on projected energy consumption, GHG emissions and economic indicators for different Mitigation Scenarios on a national level, with a time horizon between 2012-2050, detailing the results for years 2020, 2030 y 2050.

Coordination between MAPS and Chile’s MRP is relevant and so, the correspondence between both processes will be ensured.
4. Experience in carbon markets

Since the Kyoto Protocol was adopted in 1997, Chile has remained actively interested in promoting and implementing projects under the Protocol’s Clean Development Mechanism (CDM), taking a leading role in Latin America and globally in terms of the number of projects registered and methodologies approved. True to its interest in making prompt use of the CDM, Chile established its Designated National Authority (DNA)\(^9\) in 2003.

As of January 2013, there were 48 energy-related projects registered with the CDM Executive Board. These projects imply a global reduction of 5,157,828 tons of CO\(_2\) equivalent\(^10\). The main activities covered by the CDM in Chile are run-off-the-river power plants, methane capture, wind farms and biomass.

**B. Activities, deliverables and proposed budget**

There is no budget request associated to this building block.

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\(^9\) Chile’s DNA is composed of representatives from the Environment, Energy, Agriculture and Foreign Affairs ministries and a representative of the National Council of Clean Production

\(^10\) Chile’s Second National Communication (2011)
Building Block 2. Policy Landscape and Objectives and/or Preparatory Work to Support and Inform Policy Decisions

A. Main Components

1. Overall climate policy context and the potential role of GHG market instruments in this policy context

Country's pledged mitigation actions

Chile associated itself with the Copenhagen Accord and by August of 2010, the Government officially communicated to the UNFCCC Secretariat its voluntary commitment of achieving a 20% deviation below the “Business as Usual” emissions growth trajectory by 2020, as projected from year 2007. Energy efficiency, renewable energy, and LULUCF measures will be the main focus of Chile’s nationally appropriate mitigation actions.

To accomplish this objective Chile stated in that communication that will need a relevant level of international support.

In accordance with its commitments under the Convention, which might be inscribed in the near future under a new legally binding climate regime to be adopted in 2015, Chile considers that it is necessary to take firm and concrete steps toward achieving a lower carbon economy.

Institutional basis for climate change work and related decision making

Climate change committees

In 1994, Chile ratified the United Nations’ Framework Convention on Climate Change and ratified its Kyoto Protocol in 2002. Recognizing the need to coordinate local efforts and foreign policy on climate change, in 1996 the Government of Chile issued a Supreme Decree establishing the institution that would address this task. The National Advisory Committee on the Global Climate was composed of representatives of the public and academic sectors and its mandate provided for including other institutions and private entities.

In 2006, the Committee played a key role in preparing the National Climate Change Strategy, the focal areas of which include adaptation, mitigation, and the promotion and creation of capacities. In 2008, the National Climate Change Action Plan was passed, representing a concrete step toward implementing the National Strategy.

In recognition of the issue’s importance, and to strengthen inter-institutional efforts, particularly in the context of international climate change negotiations, in 2009 a presidential instruction led to the creation of the Inter-Ministerial Committee on Climate Change. The members of this Committee include representatives from Chile’s Foreign Affairs, Finance, Economy, Public Works, Agriculture, Mining, Transportation and Telecommunications, Energy, and Environment ministries. The Committee also has a Technical Group that meets more frequently to address technical issues and advise the ministerial representatives.
The Council of Ministers for Sustainability and the Ministry of the Environment

In 2010 Chile has enacted a new law, Law 20,417, amending Law 19,300 of 1994, to create the Ministry of the Environment, the Environmental Evaluation Service and the Superintendence for the Environment. The National Environmental Commission was thereby restructured and converted into the Ministry of Environment.

That same Law 20,417 created the Council of Ministers for Sustainability. This a multi-sectoral body headed by the Ministry of the Environment and integrated by the ministries of Finance, Economy, Social Development, Health, Public Works, Housing and Urbanism, Agriculture, Mining, Transportation and Telecommunications, and Energy and. Among other tasks, the Council is in charge of proposing to the President of the Republic policies for the sustainable management and use of natural resources, for designing sustainability criteria to be introduced in the elaboration of planning policies and processes of ministries, and of commenting on environmentally related draft legislation and administrative acts coming from any ministry.

Regarding climate change, the amended Law 19,300 established as a function of the ministry to “propose policies and formulate plans and programs of action for climate change mitigation and adaptation”. It stipulated that this should be done in collaboration with the different administrative bodies of the state on national, regional and local levels in order to establish the effects of, and the necessary measures for adaptation to and mitigation of climate change. In the current administrative body of the Ministry of Environment there is a Climate Change Office in charge of these functions.

Regarding tradable permits, the amended environmental law 19,300 in Chile allows for environmental management tools including economic instruments, particularly mentioning tradable emissions permits as an option.

Sectoral institutional framework

In the period 2000-2010, several changes in the public sector have strengthened climate change-related actions in Chile. Notable among these are in 2005, the launching of the country’s National Energy Efficiency Program, later renamed the Chilean Energy Efficiency Agency. This public-private institution has the mission of promoting, strengthening and consolidating the efficient use of energy and coordinating and implementing public-private initiatives in different sectors that consume energy at the national and international levels. The creation in 2009 of the Center for Renewable Energy, to serve as a technological antenna for the development of renewable energies in Chile; and the creation of the Ministry of Energy (2010), which was formed to foster the development of a comprehensive energy policy coherent with the objectives of security, quality and competitiveness of the country’s energy supply and local and global environmental protection.

For its part, the Ministry of Agriculture refocused the efforts of some of its agencies toward climate change, and in 2008 the Ministry created the Council on Agriculture and Climate Change, presided by that institution’s highest authority. The Council’s other members include representatives from the public, private and academic sectors. In 2012, its Forest Service (National Forest Corporation CONAF by its initial in Spanish) created a “Platform for the Generation and Trading of Forest Carbon Credits” created by Resolution N°226 (10/06/12) of the Executive Director of CONAF.
2. The role foreseen for an ETS as part of this overall climate policy framework

As thriving as the CDM has been in Chile, the Government recognizes the need for newer and more aggressive market-driven mechanisms that will have a stronger effect in the decision making of investors. This is particularly relevant to Chile because of its rapid growth rate. And for that, the country has been proactive in studying and evaluating the best market based forms to reduce GHG emissions. This is why the Government of Chile seeks to develop market based mechanisms in order to mitigate the GHG emissions coming from this sector of the economy (comprising both energy production and consumption) and conducted a preliminary study on Emissions Trading Systems that helps us visualize for a future Cap & Trade system.

The results of this combined research showed that Chile does have the essential fundamentals to establish an ETS in the country, these being an appropriate and solid institutional and economic foundation, a dynamic private sector and a working legal framework and that we will have to eventually link our ETS to other markets (which poses additional major challenges since nothing similar has ever been implemented in the country). However, as our learning progresses, it becomes more clear that in order to implement a major reform like this one, the country will need additional assistance for further research, capacity building and developing new instruments that will facilitate the implementation of an ETS.

The studies under the MRP Preparation Phase provided even more clarity that Chile has the basis to design and potentially implement market-based instruments such as an ETS, but further analysis and processes to engage and inform decision makers is needed.

In addition to the above, the implementation of any ETS, whether for carbon or for local pollutants purposes, according to the 1994 Law of the Environment in Chile , requires first the approval of a legislation framing the use of tradable permits in the country.

Key challenges to take into account

Given the time necessary to implement an ETS, the Government of Chile faces a double challenge. On the one hand it needs to maintain the interest of the private sector in investing in clean technologies, especially in the energy generation sector. Investments in renewable energy have increased in attractiveness from the mid-2000s, inter alia due to additional revenues from the sale of carbon credits to international markets. The second challenge is to reduce the accelerated growth of emissions before the entry into force of the ETS, so that the overall cost to the economy is reduced compared to a sudden implementation of the ETS.

In a world where not every country faces the same climate change policy, there is a risk that an ETS leads to movement of production solely because of the uneven nature of regulation. In Chile’s context, this means that when a Chilean Emissions Trading Scheme (ETS) is implemented, the resulting increase in production costs for some products may mean that some exported products are no longer competitive, or that products imported from countries with less stringent climate policies are substituted for domestic products. This may cause certain production activities to relocate to countries with weaker climate policies, potentially leading to job losses and to no “real” decrease in global greenhouse gas (GHG) emissions.

Directly and indirectly, the ETS may have a range of positive and negative impacts on the environment, economy, and society more broadly. The nature and timing of these impacts
should be assessed as the phases of the ETS are developed, and measures should be put in place to monitor such impacts over time.

New investments are at the greatest risk from leakage because while an existing plant needs only to cover operating and maintenance costs to make it worthwhile continuing, a new investment must also make a positive return on capital. However, new investments involve only potential jobs, whereas loss of existing capacity leads to identifiable job losses.

Politically, the critical issue will probably be the number of jobs lost when activity moves. Reducing emissions will always involve shifting jobs from one sector to another and this is never costless—an argument for a smooth transition and support for workers and communities facing large adjustments. However, jobs that are lost solely because of leakage are hard to justify. Although, if emission reductions are valuable to Chile (for intrinsic reasons or because they can be sold), the economy as a whole may benefit once the adjustment has occurred, the short-term social cost can be high. This needs to be set against the potentially high cost of protecting jobs for the indefinite future.

In Chile, two sectors that might be vulnerable are copper, and pulp and paper; cement (especially clinker) and steel may also be of concern. Copper may be a sector where the issue could be largely addressed through a sectoral agreement with the US, Peru, and China (given that Australian production is already covered by their ETS). More analysis would also be needed to see to what extent an impact on profit in this sector would lead to movement of production (and future investment) as opposed to a fall in the value of the existing resource.

Given this situation, it would be necessary to carry out a study simulating the implementation of an ETS with different national and global assumptions that would include an evaluation of environmental, economic, and social impacts.

3. Chile’s experience with market mechanisms for environmental improvement (except carbon related)

Chile is unique in the region regarding the use of market-based instruments for the management of natural resources, namely water rights, fisheries, and air quality.

The Water Code of 1981 established a decentralized management system for water allocation in all river basins in the country based on the principle of free trade of water rights. These rights were allocated for free based on historic use or simply given away when claimed if previously unused. New reforms to the code, recently passed, have established the use of auctions for allocating any new water rights in the few places left where water has not been fully claimed. There has been some important amount of work looking at the performance of these water markets in the different basins in terms of presence of transaction costs, price dispersion, exercise of market power, etc.; ultimately, looking at whether the existing allocations have been reasonably efficient or not.11

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Individual Transferable Quotas in fisheries are a more recent introduction (in 2001), and their performance has also been studied in different dimensions. For example, Gomez-Lobo et al. (2011) document the large benefit associated to the reduction in fleet size.\textsuperscript{12}

Finally, Chile has an experience with credit-based systems for controlling particulates in Santiago. As documented by Montero et al. (2002), although transaction costs were high, monitoring imperfect, and enforcement insufficient, the program still delivered some benefits by providing firms with flexibility to save on mitigation costs.\textsuperscript{13}

\textbf{A. Activities, deliverables and proposed budget}

\textbf{Assessment of role of market instruments and interaction with other policy instruments}

\textbf{Current work: Policy integration}

\textit{IEA's Carbon pricing: integrating climate policy packages and energy policy.} The International Energy Agency, along with Chile’s Ministry of Energy will do a generic analysis of issues of policy overlap and interaction for the potential implementation of an ETS in Chile. In this project, the IEA will collaborate with Chile to understand how Chile’s proposed CO2 pricing policies can best integrate with existing energy policies and measures such as those to support renewables and energy efficiency. In addition to conducting specific analyses for Chile, an important output from the project will be a more general "guidance document", to help other countries contemplating the introduction of CO2 pricing to integrate this well with existing and planned energy policies.

\textbf{Further work: ETS Assessment as a first goal for Chile}

Although the primary findings show a great potential to develop an ETS in Chile, further research needs to be done in order to establish the right attributions to the different institutions and to have a more complete picture of what establishing an ETS, as well as complementary mechanisms, implies for the whole economy. Specifically, Chile’s primary focus for further policy making oriented activities and research should be focused on:

- The design of an ETS, including the appropriate type, scope and scale
- Quantifying the emissions reduction that will be achieved by the system
- Determining the potential impact on the economy, paying special attention to impact on economic growth and the structural elements of the economy.
- Developing necessary institutional tools and financial instruments that will facilitate the implementation of the ETS
- Establishing a measurement, report and verification system (MRV) with a suitable registry system that is consistent with the requirements of international carbon markets.
- Complementary mechanisms, such as a carbon tax, boosting programs for energy efficiency and renewable energy markets, scaled-up crediting instruments (such as a NAMA crediting mechanism), etc.
- Create capacity building to carry on further research, deliver and operate the resulting ETS
- Developing a platform to carry on a permanent discussion on all technical issues.


In order to address part of the policy making oriented activities and research needs outlined above, for this building 2 block further work is needed on economic, institutional and regulatory research. This research involves the performance of both, macro and micro economic analyses including the modeling of carbon markets through a quantitative instrument allowing a visual representation of the aggregate impacts of this market mechanism. Similar work will be performed for the other aspects, namely institutional and regulatory research.

**Note:** The details of the activities described on this building block, as well as an aggregate and disaggregated estimated budget for these activities can be found on building blocks 3 and 6.
A. Main Components

Planning for a market based instrument: Roadmap to reach the ETS readiness stage

Introduction

This section presents the basic components to evaluate a design of a greenhouse gas (GHG) emission trading system (ETS) for the energy sector in Chile, along with the MRV and registry systems associated with it. The components include the need to research the institutional and regulatory frameworks needed to be created (either as a modification of existing laws and/or as a new framework), as well as the development of instruments and necessary tools for its implementation. Chile’s ETS system would be designed to be compatible with other international emissions trading systems.

In light of the main findings under the Preparation Phase, which demonstrates the need for further research, the following work plan focuses on the design of a version of an ETS—which characteristics will be defined by this project—and a corresponding MRV and Registry systems, along with other activities to help for its implementation. For organizational purposes, this chapter is divided in the following two components:

I. Component 1: Regulatory, Economic and Institutional Analyses needed to design a GHG ETS for the energy sector in Chile

This component is divided in three sections:

A. Regulatory Analysis for an ETS in Chile

The actions in this section include a revision of the current regulatory framework needed for an ETS and its MRV system, in order to determine what the current laws and regulations allow for and what changes would be necessary to build new needed capacities.

B. Economic Analysis for an ETS in Chile

This set of actions involves the performance of both, macro and micro economic analyses of the national situation in order to determine the potential impacts and benefits of an ETS in Chile.

This research will include modeling that replicates the functioning of the market through a quantitative instrument allowing a visual representation of the aggregate impacts of this market mechanism.

14 This section draws significantly from the market readiness report by Aasrud, Baron and Karousakis, IEA/OECD 2010.
15 PMR preparation phase carried out in 2012.
C. Institutional Analysis for an ETS in Chile

The goal of this section is to explore and design an institutional arrangement that is capable to support the implementation of MRV and Registry with their respective compliance systems; and that can be utilized at a sectorial level with the capacity to scale up to a national level on later phases.

This section will also explore the roles, capabilities and needs that existing financial institutions have in order to oversee the emerging of a carbon market associated to an ETS for the energy sector.

II. Component 2: Design and implementation of MRV and Registry

This component is divided in two sections:

A. Design and implementation of an MRV system

This component includes a revision of the MRV platforms that are used in other countries and the lessons learned in this implementation. It then lays out the legal and technical design and implementation of a platform that takes into account existing capacities and challenges. Component 2A also includes needed steps to train regulated and regulating entities in MRV, and specifically to develop accredited verification entities and train national verifiers.

B. Design and implementation of a Registry

The main objective of this section is to design and implement an appropriate registry system that can be utilized at a sectorial level, keeping track of all greenhouse gas (GHG) emissions and additionally having all the necessary elements for a potential implementation of national-level emission transaction system in the Country.

In order to fulfill these two functions, the registry will be designed in a two-phase approach:

- Phase 1: implementation of a bottom-up emissions registry
- Phase 2: Design of an emissions transaction registry

This registry must fit all international emissions trading systems under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) as well as for other types of GHG ETS currently in place or in the making around the world.
Development of Building Block 3

I. Component 1: Regulatory, Economic and Institutional Analysis to prepare for an ETS in Chile

This component is divided in three sections: (a) regulatory, (b) economic and (c) institutional analyses for an ETS in Chile which are described below.

A. Regulatory Analysis for an ETS in Chile

Introduction

Environmental law in Chile allows for environmental management tools including economic instruments, particularly mentioning tradable emissions permits for pollutants as an option. Consequently, Chile has explored the use of market-based instruments for the control of certain local pollutants. Nevertheless, two attempts to pass a framework law allowing the trading of emission permits on a wider scale failed to gain approval in Congress. On the other hand, the environmental law indicates that there must be a law to "determine the nature and forms of allocation, division, transfer, length and other characteristics of tradable emission permits."

On this regard, the Ministry of Environment is currently working on a framework law to facilitate the broadening of this regulation from local to include global pollutants, which will be presented this year for Congress approval. This situation requires further research in order to review the regulatory bodies and their potential role under a new GHG ETS.

The regulation of the MRV and Registry systems have to comply with issues like, among others, the legal and regulatory status of units to be reported, their verification and enforcement, as well as the regulatory elements associated to the emerging of a carbon market. The endorsement of this regulatory framework will be paramount in order to have a working and validated GHG emission reductions quantifying system.

Objectives

General objective

The main objective of this component is to identify the regulatory capacities required for the implementation and administration of a GHG ETS and its MRV and Registry systems.

Specific objectives

- To identify, from the international experience, the needed regulations to design, implement and operate a GHG ETS and its MRV and Registry systems.
- To identify the needed regulations in the country, in order to design, implement and operate a GHG ETS and its MRV and Registry systems.

Activities

- Perform a thorough analysis of existing regulations in Chile and other countries, identifying and mapping the regulatory capacities required for the implementation and administration of a GHG ETS.
- Identifying and mapping of regulatory capabilities to establish an MRV and Registry systems in Chile by assessing the adaptability of current Chilean regulation to serve the function of a GHG ETS.
• Research and draft the needed protocols and standards for reporting and trading of emission units; a set of norms for verification; and a corresponding compliance scheme.

**Deliverables**

• A comparative study on international and national regulatory systems required for the implementation and administration of an ETS.
• A map of existing and required regulatory capabilities in Chile related to a GHG ETS implementation and administration.
• Definition and specifications of the needed regulatory requirements for a successful implementation of an MRV and registry systems.
• Understanding of a GHG ETS interaction with current and future legislation in the country.
• Legal advice and report on institutional design and core elements of a GHG ETS that should be included in an eventual legislation.

**B. Economic Analysis for an ETS in Chile**

**Introduction**

Like most economic-related public policies, a greenhouse gas emission trading scheme can have significant effect in the economy as a whole or to specific sectors.

The type and timing of these impacts should be assessed as the phases of the ETS develop and the appropriate measures should be applied to lessen the potentially negative effects.

Therefore, it is essential to perform both, macro and micro economic analyses of the national situation in order to determine the range and depth of the potential costs and benefits of the implementation of a GHG ETS in Chile. This analysis will contemplate a scenario of integration with different emission trading schemes in other economies, considering both, national and regional markets.

**Objectives**

**General Objective**

To perform both, macro and micro economic analyses of the national situation, in order to determine the potential impacts and benefits of a GHG ETS in Chile.

**Specific Objectives**

• To understand the broad economic impacts of different ETS models.
• To analyze fiscal impacts, taking into account fiscal policy rule and taxation structure.
• Calculating economic growth and total factor productivity impacts.
• To understand how market structure can affect the ability of Chilean firms to respond and pass on carbon prices and/or explain the existence or not of windfall profits (e.g. particularly in the electricity sector).
• To identify emissions-intensive trade-exposed mobile or expanding activities and the likely scale of leakage from them.
• To better understand the role of complementary measures under an ETS, including domestic offsets, to address non-price barriers and facilitate low-carbon investment.
Activities

- Training in the basic components of an ETS design and on ETS modeling.
- Construct a model that replicates the functioning of the market using a quantitative instrument allowing visual representation of the aggregate impacts of the market mechanism. This model must converse with macroeconomic scenarios for GDP, exchange rate, monetary policy, taxation and alleged rule of checking account interest rate and should be primarily a quantitative tool, which focus will be on its impact on productivity (terms of trade, prices, tax restrictions, etc.).
- Address structural economic issues that arise from stakeholder engagement or on individual design components.
- Measure the elasticity of the reductions of emissions and policy simulations.
- Measure costs and volatility of adopting an ETS and the resulting price on the market.
- Carry out a feasibility study for domestic offsets.
- Perform a study on linking opportunities and implications for ambition and harmonization of ETS design features.
- Assess the effect of different complementary measures to address non-price barriers and facilitate low-carbon investment.
- Preliminary study on linking opportunities and structural economic impact: Study on linking and implications for ambition and harmonization of ETS features.
- Preliminary research on domestic offsets value
- Workshop and dissemination

Deliverables

- Information requirements for the various stages of designing an ETS and its MRV system.
- In depth survey of emitting industries to collect any information necessary to carry out the design of the ETS.
- A baseline data collection as result of the analysis of existing data from the “Emissions, Transference and Contaminants Registry” from all emitting industries in Chile, including information on greenhouse gas emissions, existing technologies and costs per unit production.
- A model that replicates the functioning of the market through a quantitative instrument allowing a visual representation of the aggregate impacts of the market mechanism. This model must interact with macroeconomic scenarios for GDP, exchange rate, monetary policy, taxation and alleged rule of checking account interest rate and should be primarily a quantitative tool, which focus will be on its impact on productivity (terms of trade, prices, tax restrictions, etc.)
- Understanding broad economic impacts of different ETS designs.
- Understanding how market structure can affect the ability of Chilean firms to respond and pass on carbon prices and/or explain the existence or not of windfall profits (e.g. particularly in the electricity sector).
- Identification of emissions-intensive trade-exposed mobile or expanding activities and the likely scale of leakage from them.
- Better understanding of the role of complementary measures under an ETS scheme, including domestic offsets, to address non-price barriers and facilitate low-carbon investment.
- Cost analysis using macroeconomics models. Using the MAPS-Chile macroeconomic models to carry out a cost analysis of the implementation of an ETS will be of great importance for
decision-making. The model being developed in MAPS Chile project is a Dynamic Stochastic General Equilibrium Model.

- Analysis of environmental co-benefits. There will be a study to identify and analyze environmental co-benefits of implementing an ETS in Chile (for example, improvements in air quality) which will generate useful information to influence decision making.
- Inputs for a design for an ETS which will technically address questions related to goals and market structure, sector coverage & gases, linking & offsets, phasing and allocation.

C. Institutional Analysis for an ETS in Chile

Introduction

A successful MRV and registry system will need a sound national institutional arrangement to mandate a public or ministry-affiliated body with the creation and operation of the registry and the administration of accounts. The institutional issues the MRV and the registry have to comply with include also decision of the institutional arrangement for the enforcement of the regulation aspects addressed on section IA. The endorsement of this institutional framework, by all the actors involved in the process, including the stakeholders, will be paramount in order to have a working and validated GHG emission reductions quantifying system.

Objectives

General objective

The main objective of this section is to design an institutional arrangement that is capable to support the implementation and operation of a GHG ETS and the corresponding MRV and Registry systems that can be utilized at a sectorial and national level.

Specific objectives

- To identify the institutional capabilities at the national level and evaluate their needs to reach the necessary capacities to administer a Registry and MRV systems for a GHG ETS in Chile.
- To define the structure, roles and responsibilities of the policymaking institutions, regulatory bodies and the administrating agency with regards to MRV and registry systems, as well as for a GHG ETS.
- To identify the roles, capabilities and needs that existing financial institutions have in order to oversee the emerging of a carbon market associated to an ETS for the energy sector.
- To have an estimate of the necessary budget to operate an ETS.

Activities

- To evaluate the participation and level of involvement of existing agencies, governmental or not, that will be part of this institutional arrangement and establish their roles and responsibilities.
- To review the roles, capabilities and needs that existing financial institutions have in order to oversee the emerging of a carbon market associated to an ETS for the energy sector.
- To design a model for an institutional arrangement that will provide the grounds for the implementation of the MRV and Registry for the regulation of GHG emissions at a sectorial level, keeping track of both the emissions and the reductions in the system.
• To review the existing legal capacity of relevant institutions as related to the implementation of an ETS and its MRV system.
• To evaluate the budgetary needs to operate an ETS in the country.
• To build a budget for the operation of the MRV and Registry institutions in Chile.

Deliverables
• A complete assessment of institutional capacities required and existent for an ETS.
• A design of an institutional arrangement for the implementation of the ETS with the corresponding MRV and registry systems.
• A report with the roles, capabilities and needs that existing financial institutions have in order to oversee the emerging of a carbon market associated to an ETS for the energy sector.
• A full budget with a detailed itemized disaggregation for the institutional design, implementation and operation of a GHG ETS in Chile with a corresponding MRV and Registry systems.

Budget
US$ 1,81 Million
II. Component 2: Design and implementation of MRV Framework and Registry

This component is divided in two sections: (a) Design of an MRV framework (b) Development of a Registry.

A. Design and implementation of an MRV Framework

Introduction

Quantifying GHG emissions using robust systems for their monitoring/measurement, reporting and verification (MRV) are an indispensable pre-requisite to the monetization of greenhouse gas emissions reductions and the creation of carbon markets. For all crediting mechanisms, having a complete MRV system that includes the registration of emissions, reductions and transactions is an indispensable requisite to assure the economic value of credits, to promote the environmental integrity of emissions trading systems and to avoid the double counting of emissions.

The PMR preparation phase in Chile included a study on “MRV, compliance and registry”, which provided a general overview on the different aspects of MRV and a stock-taking of key features of MRV, compliance and registry systems for (i) emissions trading systems and (ii) crediting mechanisms as well as lessons learned from existing systems and defined MRV requirements for these two types of market mechanisms based on the international best practice adopted by several systems around the world. The main findings of this research can be summarized in the following points:

- Further stocktaking and analysis of existing legal and institutional capacity is needed to establish a policy setting authority or regulatory body for the various components of an ETS MRV system, but similar bodies exist in other contexts, e.g., in the regulation of local pollutants in the electricity and industrial sectors.
- There is initial MRV capacity at the level of operators/installations in energy intensive industries and power generation, as a result of current reporting obligations in the country, e.g., pollution and grid database and voluntary GHG reporting of some companies at larger installations.
- There is capacity for verification services for MRV, i.e., several international DOE’s in Chile could provide their services for ETS and or scaled-up mechanisms.
- The capacity to fully develop and administer an MRV framework and registry systems for ETS needs to be created. These should build off the existing capacity and resources that exist today in the Government, particularly those associated with existing legal decree number 138 of the Ministry of Health and the Ministry of Environment’s RETC.
- Training in MRV approaches in all relevant sectors; stakeholder consultation of interested industry associations on approaches to MRV; capacity building with industry associations related to the opportunities and threats for ETS; and evaluation of availability of data, instrumentation, control and information systems for emissions and activity data, are among the central aspects to be addressed for a proper design and implementation of any market-based approach in the country.
Development of the MRV project component

The project component described below is specifically designed to build on the information collected so far and move forward in designing a workable MRV system for Chile for a market-based system, in particular the design and implementation of emissions registries as well as the issue of verification and tracking of emission units that are eventually transferred domestically or internationally.

In addition to the research and activities described in this section, other elements related to MRV framework will be developed in parallel on the other two components of this chapter. These elements are:

- Research for the regulatory framework described as part of the component no. 1
- Information collected from the activities described on both sections of the component no. 3 (involvement with stakeholders), namely political engagement and capacity building.

Objectives

General objective

The main objective of this section is to design an appropriate MRV Framework for the energy sector on future market-based mechanism in Chile, which will enable a transparent accounting of their contribution to GHG emission reductions.

Specific objectives

- Design and implement an MRV framework that will enable a transparent accounting of the energy sector’s contribution to GHG emission reductions based on the national environmental policy. This framework must address issues including, data requirement, accuracy and transparency; double counting and other issues surrounding environmental integrity that apply to MRV.
- Design the established methodologies, rules and organization within a flexible framework that can be applied to any sector.
- Setup of MRV of data at the sectorial level, paying special attention to the flexibility needed, tiered approach of data accuracy, etc.)

Activities

- Definition of the scope and breadth of the MRV system

The MRV Framework should have the flexibility to be utilized for the different aspects of the mechanisms that the country may decide to adopt. From this perspective, there is a need to define the specific features of MRV for the following purposes:

- Sectorial, regional (subnational) and eventually national GHG bottom-up emissions inventories;
- GHG emission reductions, i.e. emissions relative to a baseline (reference) emissions path; and
- GHG emission intensity, i.e. emissions relative to output (e.g. tons of CO₂ per unit of product or tons of CO₂ per GDP), which can be used in the case of adoption of benchmarks.
• Tracking of assigned emissions units and units exchanged between various public and/or private sector actors

• **Definition of types of emission sources**

Even though no decision will be made at this point on the final form of the market based mechanism, the definition on the types of emission sources has to be addressed at the very beginning in order to gauge the levels of complexity between the different approaches. Based on this, it is important to distinguish point sources, such as power plants and factories from non-point sources, like transportation and households.

• **Determining the general requirements for MRV**

This activity involves carrying out an assessment of existing regulatory and institutional frameworks, information sources and capacities for putting in place an MRV platform.¹⁶

  • Establish an overview on available data, transparency and feasibility of implementing emissions and transaction registry systems.
  • Analyze criteria to address issues surrounding environmental integrity.
  • Stakeholder consultation of interested industry associations on approaches to MRV in regards to the elements mentioned in the previous point.¹⁷
  • Assessment of technical capacities with representatives of major industrial associations of potential participating sectors. This capacity building is related to the evaluation of availability of data, instrumentation, control and information systems for emissions and other forms of activity data. A strong emphasis should be put on the following types of evaluation:
    - Assessment of availability of data management processes, information technology, quality assurance and quality control.
    - Assessment of data confidentiality issues and their solutions.
    - Assessment of “verifiability” of data.
    - Assessment of the cost-efficiency of the MRV system.

• **Implementation of a tiered approach to reporting**

  • Evaluate results from reporting and review:
    - Overview on available data and feasibility of MRV, first structures in place and first reports.
    - Enhancement of existing data collection, reporting and verification systems
  • Establish the criteria for the MRV requirements for different sectors based on their different circumstances and capacities as demonstrated in the information previously collected.
  • Carry out a revision of the reporting legal/regulatory framework if necessary.
  • Evaluate availability of data management processes, information technology, quality assurance and quality control.
  • Evaluate data confidentiality issues and their solutions
  • Evaluate “verifiability” of data.

¹⁶ More information on this aspect is developed on Component 1: Regulatory, Economic and Institutional Analyses to prepare for an ETS in Chile.

¹⁷ More on this point on Component 3: Involvement with stakeholders: Political engagement.
• Training of operators for MRV
  • Training in MRV approaches in all relevant sectors. An increasing number of companies/sectors are covered by training.
  • Training of verification companies build-up of verification capacity for ETS.

**Deliverables**

The outcome of these activities will be the design and implementation of an MRV framework that will enable a transparent accounting of the energy sector’s contribution to GHG emission reductions based on the national environmental policy.

Finally, the evaluation of the design and implementation of this MRV framework will be assessed by the level of achievement of the following results:

• Having a complete document with the methodological and technical requirements for a specific and flexible sectorial MRV that ensures environmental integrity and avoids double counting.
• A set of options for the different types of emission sources that will provide all the necessary technical information for the decision makers.
• Reaching a critical mass of trained technicians for the different needs and requirements for a fully functional sectorial MRV.
• A complete design for a tiered approach to reporting.
• A periodic review of the MRV system to guarantee the delivery of its intended objectives, showing adaptability to any emerging circumstances. Some of the elements of this review are timeline, frequency, scope, etc.

**Timing**

Although MRV activities are, by definition continuous, the design of the MRV system will be one of the first products of this initiative and should be completed within the first year of the implementation of the project.
B. Development of a Registry

The main objective of this section is to design and implement an appropriate registry system that can be utilized at a sectorial level, keeping track of all greenhouse gas (GHG) emissions and additionally having all the necessary elements for a potential implementation of national-level emission transaction system in the Country. In order to fulfill these two functions, the registry will be designed in a two-phase approach:

Phase 1: implementation of a bottom-up emissions registry

Phase 2: Design of an emissions transaction registry

This registry must fit all international emissions trading systems under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) as well as for other types of GHG ETS currently in place or in the making around the world.

Phase 1: Enhanced implementation of a bottom-up emissions registry

Introduction

Today in Chile, the Decree 138 by the Ministry of Health and the Ministry of Environment´s Registry of Emissions and Transfers of Contaminants (RETC) collect information from certain industrial installations including primary fossil fuel consumption, geographic location and local pollution emissions.

The RETC currently registers a range of environmental data, including local air pollutants and creates a single platform for national installations to report environmental data. This platform is managed by the Ministry of Environment and contains information required by environmental regulations; tools for generating reports; executive summary reporting; geographic references; among other features. One important component is the emissions calculator, which uses information reported to calculate estimated air emissions, including greenhouse gases. Firms with electricity generators bigger than 20 KW; and industrial and heating boilers with energy consumption greater than 1 Mega Joule per hour are legally required by the 138th Supreme Decree of the Ministry of Health to report every year. The industrial sectors covered are: steel industry, petrochemical industry, primary and secondary smelters, power plants, generators and boilers, as well as the production of pulp and paper, cement, lime and plaster, glass, ceramics and asphalt.

Given the legal attributes associated with data collection for the RETC as well as its ability to serve as a single platform for emissions reporting, the Chilean Government envisions carrying out the necessary activities during the PMR Implementation Phase as the instance to improve and strengthen the reporting and calculation in the specific area of greenhouse gases. The Government has already begun to build upon these existing systems to with the goal of developing a bottom-up GHG emissions registry. Through this action item, the Government of Chile is currently seeking to enhance these national capacities for facility-level emissions reporting in order to improve the completeness and accuracy of this reporting system and to create the a sanctioning system associated with this system.
Objective

To support national efforts and implement bottom-up GHG emissions reporting and to enhance national capacities for improving the completeness and accuracy of the information included in this system, thereby strengthening the country’s capacity to implement a potential GHG ETS in the energy sector in Chile.

Activities

- Establish initiatives to improve the completeness and accuracy of information being reported under the existing RETC registry
  - Training programs to installations
  - Support for verification activities
  - Support for monitoring equipment

- Improvement of the compliance system associated with the GHG emissions reporting within the RETC, including the following:
  - Study to determine legal gaps for the implementation of the compliance system
  - Training for professionals that will be involved in the compliance system
  - Outreach to the private sector on the processes of the compliance system

Timing

The design of the bottom-up emissions registry system will be one of the first products of this initiative and should be completed within the first two years of the implementation of the project.

Phase 2: Design of an emissions transaction registry

Introduction

Electronic registries are key components for international emissions trading under the Kyoto Protocol of the United Nations Framework Convention on Climate Change (UNFCCC) as well as for emissions trading systems (ETS) all over the world.

Objectives

General objective

The main objective of this project is to design an appropriate registry system that can be utilized at a sectorial level, keeping track of all GHG emission reductions in the system and additionally having all the necessary elements for a potential implementation of national-level market-based mechanisms in the Country.

Specific objectives

- Define the technical and regulatory requirements for a transaction registry system for GHG emission reductions.
- Define the technology, both software and hardware needed for the transaction registry.
• Create the capacities in both, the public and private sectors for this system to work properly, addressing the specific technical needs and capabilities of the participating sector.

**Activities**

• Develop the key functions of a sectorial registry system that includes the following characteristics:
  - Manage the accounts of the operators: The registry administration shall be able to create, update and close holding accounts as well as record emissions.
  - Allow demonstrating compliance with national emissions reductions aspirations.
  - Allow account holders (e.g. operators but also private persons) within the same registry to transfer units and allowances between their accounts.

• Establish a logic for the registry system that incorporates a minimum amount of components described by the following operational structure:
  - Holding account: Accounting for valid emission allowances.
  - Surrendering account: For compliance used emission allowances are transferred from the holding account to the surrendering account.
  - Cancellation account: In order to cancel or decommission allowances, they are transferred from the holding account to the cancellation account. These allowances are blocked and cannot be returned to the market.
  - Retirement account: In order to fulfill the compliance, the governmental entity transfers the allowances from the surrendering account to the retirement account. The user is not targeted by this transaction.
  - Work on the estimation of the number of account holders and expected volume transacted.

• Establish the minimum requirements and future/potential nice-to-have options:
  - These include all the elements required for the registry to operate at a sectorial level.
  - Assess and evaluate the feasibility of incorporating nice-to-have options and other elements that would be necessary to implement on later phases, keeping in mind the potential growth of the system in both scope and breadth.
  - Evaluate a phased implementation starting with a simple registry system in the first phases with increasing elaboration and complexity towards later phases.
  - Define a stepwise approach for registry built up, considering coordinating with registries at the international level.
  - A formulation of a final registry design needs the input from the private, public sectors and the project proponents.

• Define and acquire the technical elements for the operation of a registry system:
  - Analyze and propose different registry software products and developers to be implemented at a sector level considering three main options currently available in the market, including off-the-shelf software package that need little process to adapt to a sector level; a hand-made registry, which implies the hiring of a team to develop a system from the ground up; and hybrid products, which are off-the-shelf products with a level of customization done by either the manufacturer or a specialized firm.
  - Evaluate and define the safety and security requirements of tracking system, paying special attention to the lessons learned from the experience by the EU ETS. The choice of technology, as well as the security of the system is a key factor. The technology
chosen shall ensure efficient data quality control as well as security of communications and data protection. Still, transparency shall be assured.

- Having made the decision, acquire, implement and initiate the operation of a registry software system addressing all the technical issues and reviews mentioned in this proposal.

**Deliverables**

Following the activities described above, the result will be the design of a GHG emissions transaction registry system with the following characteristics:

- A set of key functions for a registry system considering the elements listed on the point I of the activities (section 3).
- A system incorporated with enough components for its logical operation as stated on point II of the activities (section 3).
- A set of additional options as described on the point III of the activities (section 3).
- An operating emissions transaction registry software implemented for the energy sector that fulfills all the technical, safety and organizational requirements, including its reliability by guaranteeing uninterrupted access to the registry account.
- A plan with procedures, including its associated costs, for checks, updates and maintenance of the registry system.

**Timing**

The Registry system will be one of the first products of this initiative and should be in place within the first year of the implementation of the project.

**Budget**

US$ 1.56 Million
The following table summarizes the timeline and budget for the activities on this building block:

### PMR Timeline and Budget for first two years

<table>
<thead>
<tr>
<th>PMR Timeline and Budget for first two years</th>
<th>Quarter</th>
<th>Budget (US$ k)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8</td>
<td>Year 1 Year 2 Total</td>
</tr>
<tr>
<td>1. Regulatory, Economic and Institutional Analyses</td>
<td></td>
<td></td>
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<tr>
<td>A. Regulatory Analysis for an ETS in Chile</td>
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<td></td>
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<tr>
<td>i. Comparative analysis of existing regulations</td>
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<td>50 50</td>
</tr>
<tr>
<td>ii. Identification and mapping of regulatory capabilities for MRV &amp; Registry</td>
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<td>100 100</td>
</tr>
<tr>
<td>iii. Draft needed protocols &amp; standards for reporting and trading of emissions</td>
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<td>140 100 240</td>
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<tr>
<td>B. Economic Analysis for an ETS in Chile</td>
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<td></td>
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<tr>
<td>i. In depth survey of emitting industries</td>
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<td>150 150</td>
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<tr>
<td>ii. Analysis of existing data</td>
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<td>60 60</td>
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<tr>
<td>iii. Micro/macroeconomic modelling</td>
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<td>210 280 490</td>
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<tr>
<td>iv. Analysis of cobenefits</td>
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<td>20 100 120</td>
</tr>
<tr>
<td>C. Institutional Analysis for an ETS in Chile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Assessment of existing and required institutional capacities for an ETS</td>
<td></td>
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</tr>
<tr>
<td>ii. Proposed design of institutional arrangements for an ETS</td>
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</tr>
<tr>
<td>iii. Assessment of existing and required capacities of financial institutions</td>
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<td>100 100</td>
</tr>
<tr>
<td>iv. Report with estimated full budget for ETS implementation and operation</td>
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<tr>
<td>Total 1 (US$ Thousands)</td>
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<td>1,810</td>
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</table>

2. Design and implementation of MRV framework and a Registry

<table>
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<tr>
<th>PMR Timeline and Budget for first two years</th>
<th>Quarter</th>
<th>Budget (US$ k)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8</td>
<td>Year 1 Year 2 Total</td>
</tr>
<tr>
<td>A. Design and implementation of an MRV framework</td>
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<tr>
<td>i. Definition of the scope and breadth of the MRV framework</td>
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<tr>
<td>ii. Definition of types of emission sources</td>
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<tr>
<td>iii. Determining general MRV requirements &amp; develop methodologies &amp; technics</td>
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</tr>
<tr>
<td>iv. Design and implementation of a tiered approach to reporting</td>
<td></td>
<td>50 50 100</td>
</tr>
<tr>
<td>B. Enhanced implementation of a bottom-up emissions phase of the registry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Initiatives to increase completeness of information reported under RETC</td>
<td></td>
<td>150 150</td>
</tr>
<tr>
<td>ii. Initiatives to improve accuracy of information reported to RETC</td>
<td></td>
<td>100 100 200</td>
</tr>
<tr>
<td>iii. Improvement of a compliance system associated to GHG emission in RETC</td>
<td></td>
<td>50 50 100</td>
</tr>
<tr>
<td>C. Design of the emission transaction phase of the registry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Develop key functions and components for a transaction registry</td>
<td></td>
<td>50 50 100</td>
</tr>
<tr>
<td>ii. Basic design for transaction phase including logic &amp; minimum requirements</td>
<td></td>
<td>50 150 200</td>
</tr>
<tr>
<td>iii. Software/hardware for an emissions transaction registry</td>
<td></td>
<td>50 150 200</td>
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<tr>
<td>Total 2 (US$ Thousands)</td>
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<td>1,560</td>
</tr>
</tbody>
</table>
Building Block 4. Planning for a Market-based Instrument

PART I - Target Area: Assessment and Rationale for Focus on Sector

A. Main Components

Rationale for focusing on the selected Target Area

Building block 1 of this MRP describes the current situation of the energy sector, including energy production and consumption, as well as its GHG emissions. This information and analysis supports the decision to choose the energy sector as the target area for this proposal.

Economic Modeling

An economic model will be constructed with two objectives:

- To build a rationale to select the specific areas within the energy sector that this ETS design will focus on; and
- To evaluate the economic impact of the implementation of this market mechanism on the economy—at both the macro and micro levels

This model will replicate the functioning of the market using a quantitative instrument allowing visual representation of the aggregate impacts of the market mechanism. This model must converse with macroeconomic scenarios for GDP, exchange rate, monetary policy, taxation and alleged rule of checking account interest rate and should be primarily a quantitative tool, which focus will be on its impact on productivity (terms of trade, prices, tax restrictions, etc.). Given the importance of this model, the results must be in place within the first two quarters of this project. More details on this model, including its objectives, activities and deliverables, are specified on the first component of building block three.

Following, there is a forecast of the Energy sector for the coming years, which provides further proof to back the rationale described above.

Energy Demand Projection

Final energy demand projections by sector over various time horizons have been undertaken by various studies\(^\text{18}\). All of them have used a bottom-up approach for their energy demand projections (except the CADE report on the Electric Power Generation sector) and considered various scenarios based on

econometric projections of historical energy consumption patterns as a function of production and/or activity levels in each sector.

The following Figure shows the final energy demand projections for 2010 - 2020 for all sectors. Total final energy demand is estimated to reach 438,960 TCal in 2020, a sharp rise from its 2010 level of 278,178 TCal implying an average annual growth rate of 4.7%.

The average annual growth rates of sectoral energy demand over the 2010-2020 period implied by this projection are the following: 1.64% for CPR; 4.0% for Energy; 4.96% for Industry and Mining; and 6.03% for Transportation.

**Projected Final Energy Demand by sector 2010 - 2020 and historical data 1990-2009**

![Projected Final Energy Demand by sector 2010 - 2020 and historical data 1990-2009](image)


**Projected Electricity Generation**

The Green Lab (2011) study disaggregated the electric sector at the plant level, and geographically by region, in order to estimate mitigation co-benefits on local pollutant concentrations from power generation. Its projections for the electric power sector are shown below.

As shown in the figure below, projected electricity generation is expected to grow from 65,634 GWh in 2010 to 96,552GWh in 2020; and 143,374GWh in 2030, which implies an average annual growth rate of 4.0% over the 2010-2030 period.

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19 PROGEA (2011)
20 The macroeconomic assumption underlying this projection is an estimated annual GDP growth rate of 5% from 2010 to 2015, and 4 % for 2016-2020.
The projected energy generation by technology is shown in the figure below. The largest shares of projected electricity generation by technology, in both 2020 and 2030, are represented by coal 29.4% and 36.4%, large hydro 42.0% and 37.9%, and run-of-river 14.2% and 10%. As shown in the figure below, between 2020 and 2030 the share of geothermal power generation is expected to increase, as well as wind energy. Nevertheless, the share of wind generation is expected to remain substantially smaller than the expected share of geothermal generation by 2030.

**Energy Policy**

In February 2012, the Ministry of Energy published its new National Energy Strategy 2012-2030 focused primarily on the development of the electricity matrix, establishing the main course of action in the Government’s public policy on this matter.

The National Energy Strategy, which currently analyzes electricity issues, is based on the following fundamental pillars (See Annex 5 for further details):
Economic growth with energy efficiency
Promotion of Non-Conventional Renewable Energy (NCRE)
Diminish the dependence on foreign energy: The role of conventional sources of energy as a promoter of hydropower
Focus on transmission towards a public electricity highway
Increase competitiveness on electricity markets
Explore the options for regional electricity interconnection
Incentives for non-conventional renewable energy production
Energy Efficiency as a goal

The Structure of the Electricity Business in Chile

Chronologically, the first deregulated electricity market world-wide was the one of Chile. As early as 1982 Chile introduced competition into power industry by giving the right to large end users to choose their supplier and negotiate the prices. Beyond this first step Chile realized later explicit market mechanisms in order to determine the generators’ dispatch and the wholesale electricity price. Thus, competition among the producers arose.

The experience with Chile’s deregulation was successful and so other countries in the region followed a similar approach. It is worth noting that this type of market-based energy system is a good fit with a market-based climate policy as envisioned by Chile through participating in the PMR.

In Chile, the electrical industry is divided into three sectors, defined each as a separate market, namely: generation, transmission and distribution to end users, and its interface which is affected by the Short Law I and II. Both laws made minor changes to the original energy law to favor the implementation of NCRE.

Generation: This sector has several private participants and competing technologies. This sector is the most flexible. The enactment of Short Law I and II delivered mechanisms to encourage investment and new entrants.

Transmission: The transmission of electricity has characteristics of a natural monopoly, i.e., it is cheaper to be a company engaged in transmission in a given geographical area that has several competitors in that sector. This characteristic of monopoly is recognized in the Short Law I and as such, all the regular legal safeguards are implemented.

Distribution: End users receive their electricity through distribution companies that transport and sell electricity within their concession area, buying from generators in different parts of the transmission system. Just like in the transmission sector, these firms are regulated as a monopoly. The distributors have two types of customers:

- Small and regulated - where demand is less than 2,000 kW and the price of energy is fixed by the authority.
- Large and free - customers who have claims over 2,000 kW and directly negotiate the price and quality of the energy generators and / or distributors at their convenience.

The Short Law II established that customers between 500 kW and 2,000 kW can choose from either option. This scheme eliminates the spot market, which are energy transactions that occur between
generators or between them and ‘large and free’ clients. See Annex 6 for more details on regulations, incentives and institutional aspects in the energy sector.

**Mitigation actions in the energy sector**

The country’s energy sector has great potential for mitigating GHG emissions in both generation and consumption. However, this is difficult to materialize given the uncertainty of the penetration rates of clean technologies, technical capacity and the uncertainty given by some variables such as the future price of generation and consumption technologies, future international fossil fuel prices, and the rate of national economic growth.

Regardless of these difficulties, in the last decade the Government of Chile has been active in establishing a suitable regulatory framework that contributes to the mitigation efforts of GHG emissions in the energy sector. Notable advances linked to GHG mitigation in this sector include incentives for the use of non-conventional renewable energies (NCRE), the Geothermal Law and the 2008 NCRE law (20,257), which requires electricity generating firms that produce over 200 megawatts, to sell 10% of its energy from renewable sources or unconventional hydroelectric power plants with less than 40 megawatts.

This requirement will apply to generators that supply power to the Central Interconnected System, SIC, and northern grid, SING. The law also states this requirement to be achieved by gradually increasing the volume of this type of energy. Between 2010 and 2014 the obligation is 5%, increasing by 0.5% annually from 2015, reaching 10%-15% by 2024.

Others include a tax exemption for residential solar thermal systems passed in 2009 and a series of energy efficiency regulations, which include energy efficiency labeling for appliances, homes and cars and a series of minimum energy performance standards or MEPS would start operating in 2013 (See Annex 6 for further details on energy related regulations and incentives).

The Government has also developed a policy that supports competitive energy generation based on NCREs by identifying the barriers to their introduction and creating lines of action intended to remove these hurdles. These barriers include lack of information, precarious infrastructure, uncertainty about new technologies and difficulties to access financing.

Nevertheless, in five years Chile has doubled its installed capacity of NCRE for electricity generation, which rose from 286 MW (2.4% of total installed capacity) in late 2005 to 556 MW (4% of installed capacity) by the end of 2010. In this same period, the Environmental Impact Assessment System in Chile approved NCRE projects for a total of 2,512 MW of power, of which 2,000 MW were of wind power.

Chile’s efforts to use its energy efficiently started in 2005, when the Government created the National Energy Efficiency Program (PPEE) as the first public initiative to promote the efficient use of energy within a few years, its budget and programs grew at a rapid pace and by early 2010, along with the creation of the Ministry of Energy, PPEE became Chile’s EE Agency (AChEE), which is now the institution responsible for the implementation of EE programs. Since 2006, these programs allowed the implementation of pre-investment and loan programs, as well as direct technical assistance programs that have advanced energy efficiency in the industrial and CPR sectors. In the years 2010 and 2011 alone, the Ministry of Energy allocated more than US$ 93 million to energy efficiency. Some of the best known achievements of these agencies are:
• EE labeling for light bulbs, refrigerators and other appliances;
• Insulation retrofitting for 9,000 homes in lower income neighborhoods;
• Energy audits for more than 20 public administration buildings including the presidential palace;
• Direct subsidies for the massive replacement of incandescent light bulbs for CFLs.
• Direct subsidies for the replacement of freight trucks with more than 25 years.

Nevertheless, there is still room for improvement on energy efficiency data gathering so the appropriate measures can be implemented in order to: reduce energy consumption by individual processes; construct successful benchmarks, set the right targets; and to continue the growth of EE programs.

GHG emissions and projections

Chile is not a relevant source of greenhouse gas emissions (GHGs) since, according to international statistics, our country only accounts for approximately 0.2% of global GHG emissions. Nevertheless, these emissions are growing significantly, mainly as a result of the country’s rapid economic growth, which is reflected in a study conducted by the International Energy Agency (IEA) showing that Chile ranked 61st in the world for per capita CO₂ emissions in 2008, producing 4.35 tons CO₂ per person, slightly above the global average of 4.23 tons of CO₂ per person.

This rapid growth had an impact on the increase of aggregate GHG emissions in the country that doubled between 1990 and 2010, going from 33 Mton CO₂eq to 68 Mton CO₂eq, which means an average annual growth rate of 3.7%. The contribution of GHG emissions by the different sectors of the economy has remained relatively steady over this period.

![GHG sources and sinks in Chile for 2000 and 2006](image)

GHG sources and sinks in Chile for 2000 and 2006

PwC Chile. Based on Ministry of Environment, 2011

Mitigation potential, options and costs

Electric power generation and transportation sectors are the major GHG emitters in terms of direct emissions caused by fuel combustion for electricity generation, and fuel combustion in vehicles. Forecasts indicate that these sectors will represent 38% and 37% of the total GHG emissions by 2025 in the country respectively. Industry and Mining are expected to make up 17% of direct emissions in the same year. By taking into account both direct and indirect emissions, the Industry and Mining sectors are the largest emitters, which account for 41.3% of total projected emissions.
The mitigation potentials estimated by 2020 range from 13% to 3% and by 2030 from 21% to 11%. The sectors with the greatest potential reductions across studies are from the energy sector. The measures considered within the energy sector generally have a significant impact but they usually bring high cost estimates. Individual energy efficiency measures tend to be less expensive and still provide a relatively significant impact over most sectors.

**Relevant information from existing studies**

- The information used for this analysis was obtained from the Co-benefits study developed by GreenLab UC.
- The penetration potential of the mitigation measures selected for this analysis corresponds to the strong scenario since it allows reaching a higher abatement in 2030. A stronger penetration tends to provide a greater mitigation potential however, at a greater cost.
- The sectors considered for the analysis were energy, transportation, industry and forestry. CPR was excluded since the emissions concerning this sector are commonly associated with final consumers, preventing the application of the most cost-effective mitigation measures.
- The Industry sector mitigation measures, up to its maximum identified potential reduce fewer emissions than the required target.
- The majority of measures have negative costs (i.e. positive benefits).
- The implementation of an ETS has lower costs (11%) than command and control and requires less number of mitigation measures, which comes principally from the transportation sector.
- The co-benefits which may arise as a result of mitigation measures have become an important factor to be estimated in the decision making process as they provide a new dimension to the problem at hand.
- Co-benefits or “Ancillary benefits” which may be generated by carbon policy have been found to occur in local air pollution, congestion, land quality, employment, and fuel security.
- The most recent assessment undertaken in Chile on the co-benefits of mitigation measures was done in 2011 by GreenLab UC (2011). This study focused on the health co-benefits and highlighted the significant economic benefits which can be generated from implementing nearly all mitigation measures assessed by this study.
- Overall economic costs and competitiveness issues arising from pricing emissions are expected to be small compared to ongoing economic growth rates and can be addressed by specific measures. Sectors which are expected to benefit from the implementation of mitigation measures are agriculture, forestry and non-fossil fuel energy generation.
- The mitigation policies assessed in this report also form part of a green growth policy pathway which searches to internalize market failures. Green growth policy pathways are not mutually exclusive and can be implemented as packages to achieve the most cost effective strategy.
- Additional factors to consider when evaluating policy instruments are possible implementation costs, effectiveness of implementation, and political will. Future studies should search to fill this current gap in research.

**Current research activities**

MAPS-Chile is a governmental process of two years, which goal is to estimate baseline emissions of Chile by the years 2020, 2030 and 2050 and to identify actions for the mitigation of GHG emissions in the short, medium and long term for the following sectors: electricity production and transmission; public and private transportation systems; mining; agroforestry; CPR; waste; and industry. This work will also deliver inputs to generate a portfolio of possible NAMAs that could be implemented in Chile by 2020.
Funding sources for MAPS include the Governments of Denmark and Switzerland, CIFF (Children’s Investment Fund Foundation), Caribbean (Climate Development Knowledge Network) and the Government of Chile.

Our goal is to coordinate the information generated from the MAPS and the PMR in order to consolidate criteria and methodologies.

**Willingness to participate in a market instrument**

The country recognizes that due to the rate of economic growth over the last decades, which is expected to continue, emissions will increase and the mitigation costs could be higher if measures to limit the growth in emissions are taken at a very late stage.

Under these circumstances, Chile supports the principle of using cost-effective instruments for limiting the growth of GHG emissions in order to achieve its global environmental goals. Therefore, the country strongly advocates the use of market mechanisms for the mitigation of GHG emissions.

The political will to limit the country’s growth of GHG emissions in a cost-effective manner was first stated in Chile’s National Climate Change Action Plan, approved by the Council of Ministers and launched in 2008. As part of a longer-term strategy for climate change mitigation, this policy instrument encouraged the analysis of a voluntary internal market to limit the growth of GHG emissions, which could be connected to existing international markets.

Consequently, the Government of Chile, represented by its Ministry of Energy, officially expressed its interest in being part of the PMR, recognizing in this initiative a valuable platform for learning and cooperating with countries that have already implemented emission trading schemes (ETS) and other market-based instruments for limiting the growth of their GHG emissions and to learn from their experiences.

We expect that Chile’s participation in the PMR will radically strengthen the domestic capacity to establish new market mechanisms that will contribute the mitigation of greenhouse gas emissions in accordance with Chile’s national sustainable development policies and the associated potential co-benefits.
PART II – Modules for Design of Market Instruments

Module 4b. Domestic Emissions Trading (cap-and-trade)
Components for the design of a domestic emissions trading scheme (ETS)

Introduction

This building block presents a 4-year roadmap for the PMR Implementation Phase, showing the intended path to a political decision on the implementation of an ETS and its overall role in Chile’s climate policy. It also outlines key policy and institutional elements of the ETS design that will need decision and development, including steps and processes along with an estimated timeline that highlights key decision points. It also includes a process to identify and work with stakeholders on the design of an ETS.

Given the fact that Chile is a country seeking to inform a policy decision on a domestic ETS, this roadmap will address the list of components that are essential for the design of a domestic ETS (e.g. scope and coverage, cap setting, allocation of allowances, etc.), as outlined by the MRP Tool version 2.

This entire roadmap will cost an estimated US$ 11 million. In order to start this process, this MRP only requests partial funding for the list of activities considered for the first two years, which total approximately US$ 4.8 million. The details of these—theme based activities—can be found on building blocks 2, 3 and 5. These lists of activities will focus on the execution of the roadmap’s first and second stages.

In terms of key elements to reach an ETS-ready stage, this section highlights the need to address the following:

- Capacity building (public and private sectors)
- Research
- Policy work and stakeholders engagement
- Consideration of supplementary policies and offset schemes
- Key elements for an MRV and registry systems that includes its governance, making clear the link of supporting the overall goal of getting to a GHG ETS ready stage, also noting that such MRV infrastructure will have co-benefits for supporting more informed policy making.

The ETS development process

The overall ETS process is divided into “policy development”, involving research and stakeholder education and engagement and “institutional development”, encompassing technical and legal infrastructure, institutional arrangements and readiness. We assume the following funding objectives linked to the MRP Guidance Tool:

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21 Details, Timeline and Budget of the activities can be found on Table 1 of Building Block 6.
22 Annex 7 describes in detail the “policy and institutional development approach to be carried out under the proposed MRP for Chile.
1) Fill the technical gaps in knowledge, based on economic, institutional and regulatory research, to help Chile better design a GHG ETS.

2) Launch a national conversation on Chile’s preferred carbon policy options and the purposes for which Chile might pursue an ETS – i.e. explore the “why?” question.

3) Build technical, institutional and organizational capacity to design and implement an ETS.

**Sequencing of activities**

For each process we suggest a sequence of activities prioritizing what should start immediately (some of these will be ongoing) and the elements that will start after these first activities have been addressed. We are not suggesting a rigid, linear process but rather a succession of sequential stages. The idea is to prioritize the timely order of both, the political decision-making and the activities associated to the design and implementation of an ETS.

The policy development process, in particular, will be highly iterative. Key policy questions at each stage will shape, and be shaped by, research and stakeholder engagement outcomes. There will be some market readiness foundation or “no regrets” activities that ought to be conducted regardless, such as the activities involving MRV, Registry and some of the activities on institution-building.

We also identify first order policy questions at the start of the process for Chile. These will have a significant bearing on the research and engagement agenda that follows. It is hard to be precise beyond this first stage, as it will depend how the policy process unfolds and what the answers to these questions are.

The different aspects of institutional development would take place in parallel on a related but not necessarily identical timetable. The sequencing of these activities is illustrated on the tables right after this 4.2 section:

**Market Readiness Components for Chile**

This subchapter describes the activities for each of the market readiness components Chile is pursuing. These activities include the necessary steps for the design of an ETS, the design and implementation of an MRV and registry systems for the energy sector and the potential implementation of the ETS design. These above-mentioned steps include regulatory and institutional research, as well as economic modeling.

These activities are organized according to the three-stage approach described in Chapter 4, which comprehends both, policy development and institutional development elements at each stage.

Within these elements, we recognize the following sub-elements:

- key policy issues;
- research;
- outreach & engagement;
- institutional arrangements;
- readiness and capacity building; and
- technical & regulatory capabilities.
Finally, we have included the activities associated to the administration of the ETS design.

1. **Scoping and Research (Stage 1)**

   This very first stage refers to the elements that need to be addressed before anything else, which will set the main policy issues, research elements, as well as the institutional and capacity building aspects that require immediate attention.

   **A. Policy Development Process**

   This area involves research and stakeholder education and engagement. As stated on previous chapters, this process will be highly iterative, where key policy questions will shape, and be shaped by, research and stakeholder engagement outcomes.

1. **Key Policy Issues**

   i. **Policy meetings:**
      Hold meetings with high level government officials in order to study and propose the country’s ETS objectives and the criteria to establish those objectives.

   ii. **Consultation with experts:**
      Hold meetings with experts that will help design the high level parameters in order to establish the regulated sector(s) on the potential implementation of a sectoral ETS, as well as work on basic conceptual aspects of an ETS, such as the roles of linking and offsets.

   iii. **International research and technical visits:**
      Conduct research activities of legislations of countries that have ETS systems in place or that are in the process of implementing one, as well as technical visit to regulatory bodies.

   iv. **Regulatory comparative study:**
      Perform a thorough analysis of existing regulations in Chile, identifying and mapping the regulatory capacities required —compared with the previous international research— for the implementation and administration of a GHG ETS.

2. **Research**

   i. **Economy and financial research:**
      This research involves the performance of both, macro and micro economic analyses including the modeling of carbon markets through a quantitative instrument allowing a visual representation of the aggregate impacts of this market mechanism.

   ii. **Some of the innovative aspects of this research include:**
      a. the estimation of the price-elasticity of GHG emissions and carbon price equilibrium;
      b. the consistency of long term investments and adoptions of new technologies, as well as the power market structure and its incentives;
c. Preliminary analysis for the core elements of an ETS will be performed, including the following components:
   - Goals and market structure
   - Sector coverage & gases
   - Linking and offsets
   - Phasing
   - Allocation

d. The relevance of linking between existing carbon markets with new ones;
e. Consider a variety of tools to estimate and calculate the costs and volatility of some industrial economic series.
f. Preliminary study on linking opportunities and structural economic impact: Study on linking opportunities and implications for ambition and harmonization of ETS design features.
g. Preliminary domestic offsets value: Feasibility study of offsets and their availability for domestic and international markets.

iii. Regulatory and institutional research
   This section includes:
   - A revision of current regulatory frameworks around the world, including the identification and mapping of regulatory capacities, needed for an ETS and MRV systems
   - A review and design of an institutional arrangement that is capable to support the implementation of MRV and Registry with their respective compliance systems
   - An evaluation of the roles, capabilities and needs that existing financial institutions have in order to oversee the emerging of a carbon market associated to an ETS for the energy sector.

iv. Readiness research:
   Engage with government agencies and stakeholders to evaluate the level of preparedness of different sectors to engage on an ETS, as well as assessing the readiness level of key government agencies to eventually administer ETS functions.

v. Lessons learned from others’ experiences:
   Beyond the specific research, it is primordial to learn directly from other countries that have an ETS in place or that are in the process of implementing one. This research will comprehend visits and apprenticeships by specialized technicians.

vi. Design and implement a bottom up data collection GHG emission Registry:
   Establish initiatives to improve the completeness and accuracy of information being reported under the existing RETC registry. Bilateral emitter engagement via early reporting process—appropriate software application will be implemented. Conduct preliminary data collection in order to have a quantifiable and up-to-date assessment of GHG emissions in the different sectors. Improvement of the compliance system associated with the GHG emissions reporting within the RETC. This activity addresses the elements of phase 1 of the GHG Registry that are listed on building block 3, Component 2, section B.
3. Outreach & Engagement

Engagement strategy design: This will include the hiring of strategy/communications consultants that will help develop the most appropriate engagement strategy. This strategy will include, among others, the following activities.

i. Stakeholder engagement:
   Engagement of public and private sector stakeholders.
   This series of activities includes stakeholder consultations on proposed regulations with public and private sectors and the civil society.

ii. Dissemination activities.
   Development of seminars and meetings with directors of industrial associations and have seminars open to broader constituencies within potential sectors for an ETS, in order to engage them, early on, at this research and capabilities-assessment stage.

iii. Public outreach:
   Conduct public education on general aspects of energy and environmental issues, focusing on the characteristics and advantages of potentially implementing an ETS in the country.

iv. Prospective international linking partners:
   Create channels of information with prospective linking partners in order to stay up-to-date on the development of carbon markets.

v. Engagement in other relevant international ETS-related policy processes.

B. Institutional Development and Capacity Building

This process encompasses technical and legal infrastructure, institutional arrangements and readiness.

1. Institutional Arrangements

i. Organizational arrangements:
   The focal point of the PMR advised by the steering committee will design and decide the organizational arrangements to conduct the project, as well as the roles and responsibilities of the steering committee and the consultative group of experts. This will require identifying a project coordinator and establishing a plan for organizing all the PMR activities across the government agencies and the participating stakeholders.

ii. Budget activities:
   Conduct a study in order to assign the appropriate budget for the ETS and other agencies according to their roles and functions. This activity will also include researching and organizing the different sources of funding associated to the design and potential implementation of the ETS.
iii. Institutional involvement
This section includes, among other activities, evaluating the participation and level of involvement of existing agencies, including financial institutions that will be part of this institutional arrangement and establish their roles and responsibilities.

iv. Reporting institutions and requirements:
Identifying which entities should be invited to participate in reporting and create an ETS reporting design with its appropriate requirements and guidelines.

2. Readiness and Capacity Building

These activities will be focused on the training of technical personnel of both public and private sectors.

i. Policy setting for MRV regulatory body:
   - Build-up of MRV institutional system in consultation of all relevant ministries. Definition of role and responsibilities of policy setting authority, Regulatory body and ETS Administrator with regards to MRV.
   - Build-up of MRV regulation for the considered sectors (this is part of regulation for allocation rules and ETS rules).
   - Definition of incentives for actors to participate in the preparatory phase for MRV.
   - Stakeholder consultation processes with businesses, research institutions and NGOs on regulation of MRV.

ii. Training of private sector operators for MRV at source level:
   - Training in MRV approaches in all relevant sectors. An increasing number of companies/sectors are covered by training.
   - Stakeholder consultation of interested industry associations on approaches to MRV.
   - Capacity building with industry associations related to the opportunities and threats for ETS.
   - Evaluation of availability of data, instrumentation, control and information systems for emissions and activity data.
   - Evaluation of availability of data management processes, including information technologies and quality assessment and control.
   - Evaluation of data confidentiality issues and their solutions.
   - Evaluation of verifiability of data.
   - Training of verification companies build-up of verification capacity for ETS.

C. Administration of the project

This section addresses the activities associated to the administration of the project, many of which will be directly on the hands of the government, but some will be delegated to technical and policy-making teams.

i. Project coordination:
A team responsible for all administrative, technical, procedural and other coordinating matters, should be fully in charge of the project for the first two stages (first and next steps), that will report to the focal point.
ii. **Technical teams:**
   These teams will be in charge of carrying out the technical activities of the project that are associated to both, the public and private sectors. Some examples for these activities are:
   - Public sector: the drafting and administration of protocols, certification of agencies, enforcement of firms and private certification agencies, etc.
   - Private sector: certification of firms, conduct site visits, etc.

iii. **Policy-making team:**
   As an outcome of the institutional and regulatory research, policy making teams will be established in order to conduct and promote the policy dialogue within the government agencies and legislators as well as stakeholders.

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2. **Design, Refine and Early Implementation (Stage 2)**

This second stage refers to the elements that will start once the elements on the first stage have been addressed (as described on sequencing paragraph above), which does not necessarily mean that they have been finished.

A. **Policy Development Process**

This area involves research and stakeholder education and engagement. As stated on previous chapters, this process will be highly iterative, where key policy questions will shape, and be shaped by, research and stakeholder engagement outcomes.

1. **Key Policy Issues**

   i. Legislation and regulation:
      Identify processes and timelines for potentially developing an ETS legislation and regulations, as well as institutions including the registry.

   ii. Studies: Specific analysis for all the elements of an ETS.
      Detailed consideration of core design components:
      - Sector coverage & gases (national level)
      - Point of obligation (energy sector)
      - Setting level of ambition
      - Linking and offsets (design level)
      - Phasing
      - Allocation

   iii. High level design parameters
      Design high level design parameters for Chile’s objectives on allocation of units.

2. **Research**

   i. Analysis of technical issues brought forward by stakeholders:
Specific issues brought forward by stakeholders or that come up from individual design components.

ii. Specific Cost-Benefit Analysis for the sectors engaged and the verification of the results of previous economic studies based on real data collected.

iii. Advanced study on linking opportunities and structural economic impact:
Study on linking and implications for ambition and harmonization of ETS features.

iv. Specific research on domestic offsets value

v. In-depth study of complementary instruments:
Complementary measures to address non-price barriers and facilitate low-carbon investment.

3. Outreach & Engagement

i. Participant guidelines:
Create participant guidelines that define the roles and responsibilities of the different actors taking part of the ETS.

ii. Establishment of roundtables with stakeholders from potential sectors:
Establish multi-stakeholder and technical advisory bodies and processes as needed.

iii. Design and development of informational tools:
Bilateral meetings with emitters to discuss information collected on broader surveys.

iv. Official country visits of legislators and government officials:
Meetings of government, regulators and key stakeholders with their counterparts in countries with ETS in place or that are at an advanced level of development, in order to learn from their experience as well as to explore potential linking opportunities.

v. Meetings with private sector participants of other ETS:
Conduct meetings with other ETS constituencies, such as international emissions trading and industry associations, with the aim of understanding the perspective of the regulated sectors in other countries.

B. Institutional Development + Capacity Building

This process encompasses technical and legal infrastructure, institutional arrangements and readiness.

1. Technical & Legal Infrastructure

i. Establishment of new institutions (if applicable):
Depending on the findings from the previous stages and the political decisions taken by then, there will be the need to design and establish new institutions associated to the potential implementation of the ETS design.
ii. Delegation of governance responsibilities:
At this point, the delegation of governance roles and responsibilities will need to be
defined and the activities to do so will have to be designed prior to this stage as it is
explained on the previous steps.

iii. Studies and legislative work:
A series of more focused studies will be conducted on the legislative needs and the gaps
assessment, in order to proceed with the needed policy development process preparing
for early reporting phase.

2. Institutional Arrangements

i. Policy-making processes:
Plan and coordinate the government’s decision-making process for an ETS and
establishing the creation and coordination of bodies and processes.

ii. Institutional arrangements:
Plan for institutional arrangements for ETS rule-making, administration, MRV and market
oversight.

iii. Design of an emissions transaction registry:
- Develop the key functions of a sectorial registry system
- Establish a logic for the registry system that incorporates a minimum amount of
  components
- Establish the minimum requirements and future/potential nice-to-have options
- Define and acquire the technical elements for the operation of a registry system

3. Readiness and Capacity Building

i. Development of reporting protocols:
Development of reporting protocols and standards by government and multilateral
agencies for developing measurement and reporting protocols for early emissions
reporting phase.

ii. Training of public sector:
- Capacity building and training for public sector technicians on the monitoring,
  verification and enforcement aspects of the emissions data management.
- Institutional capacity building for potential ETS implementation.

iii. Training of private sector:
- Training of private sector technicians on the measuring and reporting aspects of the
  emissions data management.
- Sectoral capacity building in MRV for participation on potential ETS implementation.

iv. Training of operators on the private sector for MRV at upstream level (if relevant):
- Training in MRV approaches in all relevant sectors (e.g. electricity, transportation).
- Increasing number of companies/sectors covered by training.
- Stakeholder consultation of interested stakeholders on approaches to upstream MRV (fuel importers/producers, etc.).
- Evaluation of availability of data, instrumentation, control and information systems for NCV, emission factors and activity data.
- Evaluation of availability of data management processes, IT, QA/QC.
- Evaluation of data confidentiality issues and their solutions.
- Evaluation of “verifiability” of data.
- Implementation of a tiered approach to reporting.
- Evaluation of results from reporting, revision of regulatory framework if necessary.

C. Administration of the project

Based on the findings of the previous stage and the political decisions made along the way, the administration of the project will change, most likely, on the direction of increasing its activity level and engagement with the participants on the potential implementation of an ETS.

i. Project coordination:
The team of specialists should remain the same as on the first step

ii. Technical teams:
These teams will be in charge of carrying out the technical activities of the project that are associated to both, the public and private sectors. Some examples for these activities are:
- Public sector: the drafting and administration of protocols, certification of agencies, enforcement of firms and private certification agencies, etc.
- Private sector: certification of firms, conduct site visits, etc.

iii. Policy-making team:
Policy making teams still conduct and promote the policy dialogue within the government agencies and legislators as well as stakeholders.

3. Refine, Consult and Decide (Stage 3)

This last stage of the PMR Implementation Phase refers to the elements that will start once the elements on the second stage have been addressed, which does not necessarily mean that they have finished.

A. Policy Development Process
This area involves research and stakeholder education and engagement. As stated on previous chapters, this process will be highly iterative, where key policy questions will shape, and be shaped by, research and stakeholder engagement outcomes.

1. Key Policy Issues

i. Drafting of additional regulation:
Draft specific GHG ETS legislation and regulations including the registry.

ii. Detailed consideration of core design components:
- Allocation
- Compliance
2. **Research**

   i. **Cost Benefit Analysis:**
      Final and thorough CBA of the developed ETS design with disaggregation of the economic structural impact on the sectors, as well as performing medium and long term analysis of the benefits and impacts of the potential implementation of an ETS at the national level.

3. **Outreach & Engagement**

   i. **Preferred design:**
      Formal consultation with stakeholders, multilateral agencies and other specialists on the government’s comprehensive proposal for an ETS.
B. Institutional Development + Capacity Building

This process encompasses technical and legal infrastructure, institutional arrangements and readiness:

1. Technical & Legal Infrastructure

   i. Budgeting legislation:
      Work on the budgeting within government agencies, incorporating the internal and external sources of financing for the implementation of the GHG ETS.

   ii. Legislation and accreditation:
      Draft the necessary implementing legislation in order to have a fully functional GHG ETS in some sectors, keeping in mind the potential expansion of the model to a national scale, including legislative work needed for verification guidance and accreditation of private technical agencies.

   iii. Compliance regime:
      Following the work on previous stages, a compliance regime will have to be defined for the agreed ETS model (sectoral, national, etc.) along with defined verification guidance and accreditation systems.

2. Readiness and Capacity Building

   i. ETS Administrator:
      - Policy setting and regulatory body will be established.
      - Draft regulation and institutional setting for MRV is road tested in GHG ETS.
      - Evaluation of road test and revision of framework if necessary.
      - Definition of compliance scheme and sanctions in case of insufficient MRV performance of ETS members.
      - Supervision and further training of verification companies.

   ii. Training of private sector operators for MRV at the source level:
      - Advanced training in MRV for all participants in GHG ETS.
      - Verification of monitoring and identification of bottlenecks/problems.
      - Hot line for participants in GHG ETS.
      - Capacity building with representatives from financial industry related to the opportunities and threats for GHG ETS.

   iii. ETS registry system:
      - An electronic registry is developed.
      - Advanced training and capacity building on the role and functioning of registry systems for relevant actors.
      - Registry system and processes are road tested in GHG ETS.
      - Evaluation of road test and revision of registry concept if necessary.

   iv. Training of private sector operators for MRV at the upstream level (if relevant):
      - Advanced training in MRV for all participants in GHG ETS.
- Verification of monitoring and identification of bottlenecks/problems.
- Hotline for participants in GHG ETS.

C. **Administration of GHG ETS**

Based on the findings of the previous stages and the political decisions made along the way, the administration of the ETS should change on the direction of increasing its activity level and engagement with the participants on the potential implementation of the GHG ETS.

i. **Project coordination:**
The team of specialists should increase in comparison to the first two steps.

iv. **Technical teams:**
These teams will be in charge of carrying out the technical activities of the project that are associated to both, the public and private sectors. Some examples for these activities are:
- Public sector: the administration of protocols, certification of agencies, enforcement of firms and private certification agencies, etc.
- Private sector: certification of firms, conduct site visits, etc.

v. **Policy-making team:**
Policy-making teams still conduct and promote the policy dialogue within government agencies and legislators as well as stakeholders.
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<td>protocols</td>
<td>Advanced training of private</td>
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<td>regulatory body</td>
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<td>sector operators for MRV at</td>
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<tr>
<td>Training of private sector</td>
<td>Training of public sector</td>
<td>the source level</td>
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<tr>
<td>operators for MRV at source level</td>
<td>Training of private sector</td>
<td>ETS registry system</td>
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<td>Reporting of emissions</td>
<td>Training of operators on the</td>
<td>Training of private sector</td>
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<td>private sector for MRV at</td>
<td>operators for MRV at the</td>
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<td>upstream level</td>
<td>upstream level</td>
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</table>
**Decision Points**

Throughout the development of these activities there will be a number of decision points to be made, both technical and political, that will guide the development of the ETS design. In this section, we list a number of tentative topics and questions that will serve as a guiding tool for these decisions.

<table>
<thead>
<tr>
<th>Decision Points (DP)</th>
<th>Decisions points to be addressed</th>
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<tbody>
<tr>
<td><strong>Goals &amp; Structure</strong></td>
<td>ETS objectives and criteria</td>
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<td></td>
<td>Identification of ETS design options</td>
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<tr>
<td><strong>Governance</strong></td>
<td>Consultation on government proposal</td>
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<td></td>
<td>Final government policy decisions on ETS design</td>
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<td></td>
<td>Legislative procedure</td>
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<td><strong>Coverage</strong></td>
<td>Which sectors will be regulated under an ETS?</td>
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<td></td>
<td>When will others sectors have sufficient capability to join the ETS?</td>
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<td></td>
<td>What point of obligation will ensure the most effective operation?</td>
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<tr>
<td><strong>Emissions constraint</strong></td>
<td>Does the government want a domestic-only emission target?</td>
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<td>What is the level, trajectory and time frame for the cap, and how should the cap be adjusted over time?</td>
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<td></td>
<td>What is the risk of carbon leakage and what measures are needed to prevent or mitigate carbon leakage?</td>
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<tr>
<td><strong>Linking</strong></td>
<td>What types of offset units should the ETS accept from UNFCCC and non-UNFCCC mechanisms, either domestic or foreign?</td>
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<td>When will sell-only, buy-only or buy-and-sell linkages become feasible at the level of the government and/or the ETS?</td>
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<td></td>
<td>What level of ETS ambition and other ETS design features in Chile will be required to enable sell linkages to other ETS?</td>
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<tr>
<td><strong>Phasing</strong></td>
<td>What kind(s) of transitional phases should be used before trading is feasible?</td>
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<td>Would 5 year periods be appropriate for trading phases?</td>
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<td><strong>Allocation</strong></td>
<td>Which rationales and methods for free allocation or allowance revenue distribution are most applicable to each sector?</td>
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<td>Will the government provide other forms of transitional financial support (e.g. subsidies, tax benefits, etc.)?</td>
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<td>Under what conditions and at what rate will free allocation be phased out over time?</td>
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<td><strong>Compliance</strong></td>
<td>What balance does the government want between facilitative and punitive measures for non-compliance?</td>
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<td>What are the outcomes of non-compliance of a voluntary ETS?</td>
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<td>How can the government monitor scheme compliance efficiently?</td>
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<td></td>
<td>How can the government manage the impacts of non-compliance?</td>
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</table>
Building Block 5: Organization, Communication, Consultation and Engagement

A. Main Components

Communication, Consultation and Stakeholder Engagement Strategy

This section summarizes overall plans for organization, communication, consultation and engagement including the following items:

A. Organization and governance of the PMR implementation phase
B. Communication, consultation and stakeholder engagement strategy

1. Organization and Governance of the PMR Implementation Phase

The following institutional arrangements are envisioned for Chile’s PMR Implementation Phase23.

Focal Point

Given the scope of Chile’s MRP on the energy sector, the Ministry of Energy will act as the Focal Point.24 In this role, the Ministry of Energy will be responsible for the overall day-to-day supervision of the implementation of the PMR tasks described in Building Blocks 4 and 5. The Ministries of Finance and Environment will assist the Focal Point in this overall day-to-day supervision function as part of a newly-created body called Petit Comité.

The Focal Point will also coordinate the work needed with other instances that participate in the implementation phase of this MRP such as the Steering Committee, the project coordinator, the project consultants and the PMR Secretariat Team.

Steering Committee

This Steering Committee (SC) is headed by the Ministry of Energy with the participation of the ministries of Agriculture; Economy; Environment; Finance; Foreign Affairs; Mining; and Transportation and Telecommunications. Given the nature, scope and expected outcomes resulting from the implementation of the PMR project, the SC constitutes the primary engagement, collaboration and consultation body in which key Ministries will continue to provide the necessary policy and technical guidance during the implementation of Chile’s PMR.

The SC was established for the preparation phase of the PMR with a role of providing technical and policy oriented inputs. Under the Chilean MRP process, the SC continues on providing

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23 Please note that these arrangements are related to the managing of the MRP project and so, are different from those when designing and implementing an ETS policy/scheme.
24 The overall objective of the Ministry of Energy is to develop and coordinate plans, policies and standards for the proper functioning and development of the sector, ensure compliance and advise the Government on all matters related to energy.
support on a number of items, such as the formulation of the MRP, the preparation of ToR for activities and the planning for engagement and collaboration with other key stakeholders. Furthermore, the SC will have a vital role on the preparation of the studies required in the PMR implementation phase, provision of sectoral information, as well as reviewing draft and final reports of the implementation phase studies, etc.

If any relevant decision arises during the PMR implementation phase that needs to be addressed at a higher political level, the Steering Committee will submit this decision to the Council of Ministers for Sustainability in its role of liaison to the Council.

High Level Decision Making Arrangements

The Council of Ministers for Sustainability, created in 2010 by Law 20,417, is a multi-sectoral body headed by the Ministry of the Environment and includes the ministries of Agriculture; Finance; Health; Economics; Energy; Public Works; Housing and Urbanism; Transportation and Telecommunications; Mining; and Planning. Among other tasks, the Council is in charge of proposing to the President of the Republic policies for the sustainable management and use of natural resources, for designing sustainability criteria to be introduced in the elaboration of planning policies and processes of ministries, and of pronouncing on environmentally related draft legislation and administrative acts coming from any ministry.

Given its institutional composition and direct link to the President of the Republic, this body will provide high-level policy guidance to the steps planned under this MRP, especially during the roadmap towards a political decision on the implementation of an ETS and its overall role in Chile’s climate policy. The Council of Ministers will have to decide on any bills or administrative acts that could result from the implementation of the project. However, the specificity of issues, the nature and scope of discussions and the timing of these decision-points cannot be advanced at this early stage in the process.

Consultative Group of Experts

A Consultative Group of Experts (CGE) will be established with the goal of bringing other stakeholders to this discussion on market-based instruments and their suitability and applicability to the Chilean situation. This CGE will be made by representatives of industrial associations, research organizations and non-governmental organizations or NGOs. The creation and overall coordination of this group will be done through the Steering Committee, which will set its roles, duties and level of participation.

Project Coordination

In addition to the supervision role of the PMR Project Focal Point, a Project Coordinator (PC) will be hired to help with the numerous tasks and activities that will be performed during the PMR implementation phase. The PC will report directly to the PMR Focal Point and its first task will be the development of a work plan for the implementation of the PMR. A thorough and competitive selection process will be established and discussed by the Steering Committee for the choosing of the Project Coordinator.

25 The law on ETS under preparation, whether national or sectoral will have to be reviewed and approved by the Council of Ministers.
Project consultants

The more specific and technical activities will need to be assigned by a public bidding system. The procurement procedures for these assignments will have to comply with the requirements that rule the entity that will administer the PMR Project’s funding. Project consultants will report directly to the Project Coordinator. A selection process will be established for the appointment of these consultants.

PMR Secretariat Team

Continuing with its role during the preparation phase, the PMR Secretariat Team will provide technical advice for all the stages of Chile’s PMR project. This assistance will include the coordination with the Partnership Assembly, in-country visits, participation in workshops or training activities and in any other activity related to Chile’s PMR project.

The following diagram illustrates the MRP’s institutional arrangements foreseen for this project.
MRP’s Institutional Arrangements

- Consultative Group of Experts
- Steering Committee
- MRP Focal Point (Ministry of Energy)
- Project Coordinator
- Consultants/Tasks
- MoEnv
- MoFin
- PMR Secretariat (Partnership Assembly)
- Council of Ministers for Sustainability
Administration of the PMR project

The ETS Design project will require, in addition to the organizational structure described above, a project coordinator. Building block 4 described in more detail the activities associated to this administration, along with a description of the teams of technical and policy-making experts.

Budget
US$ 500,000

This budget includes the activities associated to the administration of the project and the technical and policy-making teams

2. Communication, Consultation and Stakeholder Engagement Strategy

Introduction

The success of the roadmap towards a political decision of a GHG ETS in Chile, including the early implementation of ancillary instruments such as MRV and Registry systems, will be highly dependent on the communication, consultation and engagement strategy envisaged by the Chilean Government. In order to reach the goals of this MRP, the strategy should include:

- Outreach and coalition building on the PMR project consultation process with stakeholders.
- A process for identifying and working with stakeholders on the concept of an ETS, MRV design and registry design.
- Carefully designed workshops to targeted sectors.
- Technical documentation on matters such as ETS design and implementation, complementary instruments, institutional and regulatory needs, etc.
- Identification of training and capacity building gaps and needs for public and private sectors.
- The use of outreach means such as a PMR website, informational brochures, etc.

For the purpose of designing and implementing the PMR’s outreach and engagement strategy, a communication, consultation and engagement plan will be prepared at the beginning of the implementation phase of this project.

High level stakeholder engagement

An important aspect to ensure the success of this project will be the stakeholder engagement. This involvement can be achieved throughout a series of actions including capacity building activities such as training, as well as policy consulting activities, such as consultations on proposed regulations.

This section does not include in depth technical capacity building for public and private experts, which was included in previous components. This section is expected to focus on a high-level audience. Consequently, for a more clear reading, this section is divided in two main areas: (a) capacity building and (b) political engagement:
Objectives

General objective

The main objective of this component is to engage the stakeholders of this project on both, the private and the public sectors, by learning of their capacities and interests, as well as sharing information on the objectives and technical requirements associated to the design, implementation and operation of an ETS for the energy sector in the country.

Specific objectives

- **Capacity building for public and private sectors:** Strengthen the technical capacity of the private and public sectors on matters related to the design, implementation and operation of an ETS for the energy sector along with its associated MRV and Registry systems. These activities include the training of general technical issues for both, the public and private sectors on topics of ETS, MRV, registry and regulatory aspects. A strong emphasis will be placed on the experience of other ETS systems around the world.

- **Political engagement:** Engage the stakeholders of this project by sharing information on the objectives, basic elements and technical requirements associated to the design, implementation and operation of an ETS for the energy sector in the country. This series of activities includes stakeholder consultations on proposed regulations with public and private sectors and the civil society, as well as conducting workshops with representatives of countries that have already implemented emission trading schemes. This work also includes a series of dissemination and knowledge-sharing activities, such as workshops, seminars and meetings aimed at raising awareness on climate change issues and the role of an ETS in the country.

Activities

1. **Design of the strategy for stakeholder engagement:**

   Identification of potential participating sectors and the appropriate communication and stakeholder engagement strategy.

2. **Public sector consultations**

   This process consists of holding meetings with government representatives from the different sectors that will be involved in the ETS in order to determine the institutional arrangements needed to implement and manage the country’s ETS, including the verification process. Some of the activities include the following:

   - Evaluate the participation and level of involvement of existing agencies, governmental or not, that will be part of this institutional arrangement and establish the roles and responsibilities for each one of them, and
   - Propose a working plan to engage them.
   - Develop a series of dissemination activities such as workshops, technical visits, meetings with other governmental agencies and international experts.
3. Private sector consultations

Hold meetings with private sector representatives from all of the different sectors that will be involved in an emissions trading system. Some of the activities include the following:

- Design and implement a program for sharing the proposed scheme with stakeholders and collecting feedback from them.
- Stakeholder consultation of interested industry associations on approaches to the ETS and MRV.

4. Design and develop informational tools and material.

**Deliverables**

- A proposal of a strategy for stakeholder engagement
- Public, private and political stakeholders better understanding on the ETS, MRV and registry
- Construction of a communication strategy, including the development of informational tools. e.g.: webpage, booklets
- High Level visits of foreign experts to achieve a clear understanding of lessons learned on the ETS design and implementation

**Timing**

The capacity building aspect of this component is, by definition continuous and some of the activities should start at the beginning of the project, as described in the sequencing tables of building block 4 of this proposal.

**Budget**

US$ 510,000

**PMR Timeline and Budget for first two years**

The following table summarizes the timeline and budget for the activities on this building block:

<table>
<thead>
<tr>
<th>Communication, Consultation and Engagement</th>
<th>Budget (US$ k)</th>
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<tbody>
<tr>
<td></td>
<td>Year 1</td>
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<tr>
<td><strong>A. Capacity building for public and private sectors and political engagement</strong></td>
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<tr>
<td>i. Design of strategy for stakeholder engagement</td>
<td></td>
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<tr>
<td>ii. Public/private and political stakeholder consultation on ETS and MRV/Registry</td>
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<tr>
<td>iii. Communication strategy, including the development of informational tools</td>
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<tr>
<td>iv. High level visits to understand lessons learned internationally on ETS</td>
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<tr>
<td><strong>Total (US$ Thousands)</strong></td>
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<table>
<thead>
<tr>
<th>Administration of the PMR project</th>
<th>Budget (US$ k)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Year 1</td>
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<tr>
<td>i. Project coordination</td>
<td>100</td>
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<tr>
<td>ii. Technical teams</td>
<td>100</td>
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<tr>
<td>iii. Policy-making team</td>
<td>50</td>
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<tr>
<td><strong>Total (US$ Thousands)</strong></td>
<td>500</td>
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**Grand Total (US$ Thousands)**

4,380
Building Block 6. Summary of Activities, Timeline and Budget

Table 1
Following the rationale of this MRP and the list of activities described on building block 4, Table 1, which consists of 3 sections, show an overview of activities and a disaggregated budget for the PMR implementation phase. These tables show the activities and their associated budget for a period of four years, which is the estimated duration of the PMR implementation phase.

Table 2
Based on the activities described on building blocks 3 and 5, Table 2 shows our request for funding to the PMR Assembly. It is important to know that not all the activities associated to the PMR implementation phase (building block 4) are itemized in this table.

Table 3
This table summarizes the timeline and budget for the activities described on building blocks 3 and 5.
### Table 1: Overview of activities and budget for MRP Implementation Phase

<table>
<thead>
<tr>
<th>I. Scoping and Research Activities (Stage 1)</th>
<th>Quarter 1</th>
<th>Quarter 2</th>
<th>Quarter 3</th>
<th>Quarter 4</th>
<th>Quarter 5</th>
<th>Quarter 6</th>
<th>Quarter 7</th>
<th>Quarter 8</th>
<th>Quarter 9</th>
<th>Quarter 10</th>
<th>Quarter 11</th>
<th>Quarter 12</th>
<th>Quarter 13</th>
<th>Quarter 14</th>
<th>Quarter 15</th>
<th>Quarter 16</th>
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<tbody>
<tr>
<td><strong>A. Policy Development Process</strong></td>
<td>1.395</td>
<td>935</td>
<td>985</td>
<td>605</td>
<td>3.790</td>
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<td>1. Key Policy Issues</td>
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<td>1. Policy meetings</td>
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<td>2. Consultation with experts</td>
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<td>3. International policy activities</td>
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<td>4. Regulatory comparative study</td>
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<td><strong>2. Research</strong></td>
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<td>1. Modeling of economic impact</td>
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<td>2. Evaluation of economic model and early results</td>
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<td>3. Tracking and evaluation of economic impact</td>
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<td>4. Regulatory and institutional research</td>
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<td>5. Readiness research</td>
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<td>6. Lessons learned from others’ experiences</td>
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<td><strong>3. Outreach &amp; Engagement</strong></td>
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<td>3. Public Outreach</td>
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<td>4. Prospective international linking partners</td>
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<td>5. Engagement in international ETS-related policy processes</td>
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<td><strong>B. Institutional Development + Capacity Building</strong></td>
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<td>4. Reporting institutions and requirements</td>
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<td>1. Policy setting for regulatory body and ETS Administrator</td>
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<td>2. Training of private sector operators for MRV (source level)</td>
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</tbody>
</table>
## II. Design, Refine and Road-test Activities (Stage 2)

### A. Policy Development Process

1. **Key Policy Issues**
   - Legislation and regulation (DP)
   - Studies: specific analysis for all the elements of an ETS (DP)
   - High level design parameters (DP)

2. **Research**
   - Analysis of technical issues brought by stakeholders (DP)
   - Specific Cost-Benefit Analysis for sectors (DP)
   - Preliminary study on economic impact of linking (DP)
   - Domestic offsets value/feasibility (DP)
   - In-depth study of complementary instruments

3. **Outreach & Engagement**
   - Participant guidelines
   - Establishment of roundtables with stakeholders (DP)
   - Design and development of informational tools (DP)
   - Official country visits of legislators
   - Meetings with private sector participants of other ETS (DP)

### B. Institutional Development + Capacity Building

1. **Technical & Legal Infrastructure**
   - Establishment of new institutions (DP)
   - Delegation of governance responsibilities (DP)
   - Studies and legislative work (DP)

2. **Institutional Arrangements**
   - Policy-making processes (DP)
   - Institutional arrangements (DP)
   - ETS registry's regulatory work (DP)

3. **Readiness and Capacity Building**
   - Development of reporting protocols (DP)
   - Training of public sector technicians (DP)
   - Training of private sector technicians (DP)
   - Training of operators at upstream level (MRV) (DP)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>1</th>
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### III. Refine, Consult and Decide Activities (Stage 3)

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<tr>
<td><strong>1. Key Policy Issues</strong></td>
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<tr>
<td>i. Drafting of additional regulation</td>
<td>DP</td>
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<tr>
<td>ii. Core design analysis of allocation and compliance</td>
<td>DP</td>
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<td>i. Cost Benefit Analysis of proposed ETS</td>
<td>DP</td>
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<td><strong>3. Outreach &amp; Engagement</strong></td>
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<td>i. Preferred design</td>
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<td>ii. Early reporting</td>
<td>DP</td>
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</table>

### B. Institutional Development + Capacity Building

| 1. Technical & Legal Infrastructure |       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| i. Budgeting legislation          | DP     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| ii. Legislation and accreditation | DP     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| iii. Compliance regime            | DP     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| 2. Readiness and Capacity Building |       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| i. Reporting of emissions         | DP     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| ii. ETS Administrator             | DP     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| iii. Training of private sector operators for MRV (source level) | DP     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| iv. ETS registry system           | DP     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| v. Training of private sector operators for MRV (upstream) | DP     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Total                             |        | 825 | 1,575 | |

| Total (US$ Mill.) | 2,400 |

| IV. Administration of GHG ETS |       |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| i. Project coordination       | DP     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| ii. Technical teams           | DP     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| iii. Policy-making team       | DP     |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |
| Total                          |        | 300 | 200 | 550 | 750 | |

| Total (US$ Mill.) | 1,800 |

### I. Scoping and Research Activities

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>II. Design, Refine and Road-test Activities</td>
<td>2,980</td>
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<tr>
<td>III. Refine, Consult and Decide Activities</td>
<td>2,400</td>
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<td>IV. Administration of GHG ETS</td>
<td>1,800</td>
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<td>Total (US$ Mill.)</td>
<td>11,100</td>
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</table>
Table 2: PMR Funding Request for first two years

Based on the activities described on building blocks 3 and 5, Table 2 shows our request for funding to the PMR Assembly. It is important to know that not all the activities associated to the PMR implementation phase (BB4) are itemized in this table.

<table>
<thead>
<tr>
<th>Building Block</th>
<th>Activity</th>
<th>Total cost of activities</th>
<th>PMR Funding Request</th>
<th>National Government</th>
<th>Other</th>
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<tbody>
<tr>
<td>3</td>
<td>Component 1: Regulatory, Economic and Institutional Analyses needed to</td>
<td>1,810</td>
<td>1,200</td>
<td>50</td>
<td>560</td>
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<tr>
<td></td>
<td>design a GHG ETS for the energy sector in Chile</td>
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<td>3</td>
<td>Component 2: Design and implementation of MRV and Registry systems</td>
<td>1,560</td>
<td>1,100</td>
<td>50</td>
<td>410</td>
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<td>5</td>
<td>Involvement with stakeholders</td>
<td>510</td>
<td>400</td>
<td>50</td>
<td>60</td>
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<tr>
<td>5</td>
<td>Budget for the administration of the PMR project</td>
<td>500</td>
<td>300</td>
<td>150</td>
<td>50</td>
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<tr>
<td>TOTAL</td>
<td></td>
<td>4,380</td>
<td>3,000</td>
<td>300</td>
<td>1,080</td>
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<tr>
<td>PMR Timeline and Budget for first two years</td>
<td>Quarter</td>
<td>Budget (US$ k)</td>
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<td>1 2 3 4 5 6 7 8 Year 1 Year 2 Total</td>
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### 1. Regulatory, Economic and Institutional Analyses

#### A. Regulatory Analysis for an ETS in Chile

- **i. Comparative analysis of existing regulations**
  - Year 1: 50
  - Year 2: 50
  - Total: 100

- **ii. Identification and mapping of regulatory capabilities for MRV & Registry**
  - Year 1: 100
  - Year 2: 100
  - Total: 200

- **iii. Draft needed protocols & standards for reporting and trading of emissions**
  - Year 1: 140
  - Year 2: 100
  - Total: 240

#### B. Economic Analysis for an ETS in Chile

- **i. In depth survey of emitting industries**
  - Year 1: 150
  - Year 2: 150
  - Total: 300

- **ii. Analysis of existing data**
  - Year 1: 60
  - Year 2: 60
  - Total: 120

- **iii. Micro/macroeconomic modelling**
  - Year 1: 210
  - Year 2: 280
  - Total: 490

- **iv. Analysis of cobenefits**
  - Year 1: 20
  - Year 2: 100
  - Total: 120

#### C. Institutional Analysis for an ETS in Chile

- **i. Assessment of existing and required institutional capacities for an ETS**
  - Year 1: 100
  - Year 2: 100
  - Total: 200

- **ii. Proposed design of institutional arrangements for an ETS**
  - Year 1: 200
  - Year 2: 200
  - Total: 400

- **iii. Assessment of existing and required capacities of financial institutions**
  - Year 1: 100
  - Year 2: 100
  - Total: 200

- **iv. Report with estimated full budget for ETS implementation and operation**
  - Year 1: 200
  - Year 2: 200
  - Total: 400

#### Total 1 (US$ Thousands)

| Total 1 (US$ Thousands) | 1,810 |

### 2. Design and implementation of MRV framework and a Registry

#### A. Design and implementation of an MRV framework

- **i. Definition of the scope and breadth of the MRV framework**
  - Year 1: 30
  - Year 2: 30
  - Total: 60

- **ii. Definition of types of emission sources**
  - Year 1: 25
  - Year 2: 25
  - Total: 50

- **iii. Determining general MRV requirements & develop methodologies & technics**
  - Year 1: 200
  - Year 2: 200
  - Total: 400

- **iv. Design and Implementation of a tiered approach to reporting**
  - Year 1: 50
  - Year 2: 50
  - Total: 100

#### B. Enhanced implementation of a bottom-up emissions phase of the registry

- **i. Initiatives to increase completeness of information reported under RETC**
  - Year 1: 150
  - Year 2: 150
  - Total: 300

- **ii. Initiatives to improve accuracy of information reported to RETC**
  - Year 1: 100
  - Year 2: 100
  - Total: 200

- **iii. Improvement of a compliance system associated to GHG emission in RETC**
  - Year 1: 50
  - Year 2: 50
  - Total: 100

#### Total 2 (US$ Thousands)

| Total 2 (US$ Thousands) | 1,560 |

### 3. Communication, Consultation and Engagement

#### A. Capacity building for public and private sectors and political engagement

- **i. Design of strategy for stakeholder engagement**
  - Year 1: 150
  - Year 2: 150
  - Total: 300

- **ii. Public/private and political stakeholder consultation on ETS and MRV/Registry**
  - Year 1: 25
  - Year 2: 50
  - Total: 75

- **iii. Communication strategy, including the development of informational tools**
  - Year 1: 50
  - Year 2: 100
  - Total: 150

- **iv. High level visits to understand lessons learned internationally on ETS**
  - Year 1: 50
  - Year 2: 85
  - Total: 135

#### Total 3 (US$ Thousands)

| Total 3 (US$ Thousands) | 510 |

### 4. Administration of the PMR project

- **i. Project coordination**
  - Year 1: 100
  - Year 2: 100
  - Total: 200

- **ii. Technical teams**
  - Year 1: 100
  - Year 2: 100
  - Total: 200

- **iii. Policy-making team**
  - Year 1: 50
  - Year 2: 50
  - Total: 100

#### Total 4 (US$ Thousands)

| Total 4 (US$ Thousands) | 500 |

#### Grand Total (US$ Thousands)

| Grand Total (US$ Thousands) | 4,380 |
Annex 1

Preparation Phase: Summary of the Process and main study results

1. Summary of the Process

The PMR Participants Assembly, at its May 2011 meeting, approved the allocation of funding (US$350,000) for Chile’s Preparation Phase under the PMR. On November 2011, the Government of Chile, through a letter signed by the Minister of Energy, formally requested the World Bank to execute the above-mentioned approved PMR funds in order to expedite the implementation of Chile’s market readiness activities. An Application Form outlining the activities, along with the associated budget, was correspondingly attached.

Right after this necessary step, the terms of reference to conduct the listed activities were prepared by the Division of Sustainable Development of the Ministry of Energy, and were circulated for comments from both the PMR Secretariat Team at the World Bank and the Technical Committee on Climate Change.

In essence, the TOR requested specific analyses/outcomes on the following components:

- MRV: basic requirements for an MRV system, an MRV pilot system, a central registry and a local governance body proposal.
- ETS: A proposal for an ETS in Chile (indicators for regulated sectors, entry phases with suggested periods, an appropriate system to allocate allowances and a plan for linking and offset options).
- Scaled-up crediting mechanisms: A scaled-up crediting instrument proposal and complementary instruments that can be potentially implemented in Chile (how they fit and link to ETS and/or scaled-up crediting).
- National situation: Chile’s economic and energy profile (including economic growth and supply and demand projections); primary sources of GHG emissions, an estimate of the reductions and a cost-benefit analysis.

A fifth component was the hiring of a coordinator for the purpose of ensuring consistency both between the proposals and the TOR, as well as during the execution of the corresponding studies, given the interlinkages among the four components described above.

In March 2012, the World Bank called for bids on the 5 components of the proposal. The selection of consultants was done in accordance with the World Bank procurement rules (bidding process, evaluation of proposals, contracts, etc.).

Four proposals were selected by the World Bank, each of them having a local consultant person/firm as part of their teams (this was a requirement posed to the World Bank by the PMR Focal Point).

---

26 Internal arrangements at the PMR Secretariat needed to be done before implementing countries could have full access to the allocated funding.
27 The PMR Steering Committee is derived from the members of this technical committee.
The consultants and the funding allocation to each of the five components are described in the following table:

<table>
<thead>
<tr>
<th>Component</th>
<th>Consultants</th>
<th>Allocated Budget</th>
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<tbody>
<tr>
<td>MRV</td>
<td>INFRAS (lead) Deuman (Chile) Perspectives</td>
<td>US$ 70,000</td>
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<tr>
<td>ETS</td>
<td>Motu (lead) AEA Technology Plc as CCG UC (Chile) EDF Grasty Quintana Majlis (Chile) Nicholas Institute (Duke)</td>
<td>US$ 100,000</td>
</tr>
<tr>
<td>Scaled-up/complementary instruments</td>
<td>Climate Focus Antuko Energy (Chile)</td>
<td>US$ 50,000</td>
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<tr>
<td>National situation</td>
<td>Price Water House (Chile)</td>
<td>US$ 50,000</td>
</tr>
<tr>
<td>Coordinator</td>
<td>Cambio Climático y Desarrollo (Chile)</td>
<td>US$ 60,000</td>
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</tbody>
</table>

In a period of five months, the four technical studies were implemented. The review of draft and final outputs was conducted by the World Bank in close coordination with the PMR’s Focal Point, the PMR’s Steering Committee and the project coordinator.

The scope and main results of the four studies are briefly described below.

**PMR Steering Committee.**

With the purpose of providing technical inputs and policy guidance to Chile’s MRP process, in March 2012 the Minister of Energy forwarded an official note to the Ministries of Agriculture, Economy, Environment, Finance, Mining and Transport & Telecommunication, with the aim of seeking nominations to establish Chile’s PMR Steering Committee. Nominations for a permanent and alternate member were received from each Ministry, so a first SC meeting could take place on May 2012. The TOR for the preparation phase as well as the role of the SC were discussed in that meeting.

It is expected that this Steering Committee will still operate under the PMR’s implementation phase, with the same technical and policy guidance purpose. Nevertheless, given the deeper phase in which Chile is entering regarding the design and potential implementation of market-based mechanisms, the establishment/consideration of a higher level decision-making committee role is envisaged. See Chapter 6 below on institutional arrangements.
2. Results of the Main Studies

Activity I: MRV, Compliance and Registry

The main objective of this study was the development of a draft roadmap for MRV, compliance and registry systems in Chile that follows international best practice and builds on existing MRV related capacities in Chile.

The study provided a short overview on the different aspects of MRV and a stock taking of key features of MRV, compliance and registry systems for (i) crediting mechanisms and (ii) emissions trading systems as well as lessons learned from existing systems and defined MRV requirements for these two strands based on international best practice in many countries.

This was followed by an overview on main existing MRV systems and related technical and institutional capacity and legal framework in Chile. A gap analysis compared the existing MRV capacity to the identified best practices and identified the relevant gaps on technical, institutional and regulatory levels. This forms the basis to formulate a draft MRV roadmap for both (i) crediting mechanisms and (ii) emissions trading.

An important aspect of the introduction of any new market or regulatory framework on a national scale is the cautious planning of the phasing in. The question of how much MRV systems should be introduced and how fast is not primarily a technical, but a political question. In this context, experience e.g. in the EU-ETS has shown that the early inclusion of key stakeholders such as Ministries, industry associations, service providers, universities, NGOs, etc. are key for a successful implementation of MRV systems.

In addition, the proposed roadmap for MRV is to be closely synchronized with similar roadmaps for the underlying Emissions Trading Scheme and Crediting Mechanisms. Hence, a simple four stage approach both for the roadmap of an ETS and a crediting system was envisaged for Chile, which builds loosely on the similar phasing of the roadmap for the installation of these market instruments:

I. Preparatory phase (Capacity building, etc.)
II. Pilot phase – voluntary MRV in pilot sectors, on-going capacity building
III. Introductory phase
IV. Full trading

The main findings of this study regarding gaps in MRV capacity for emission trading system in Chile as well as a roadmap following the above stage approach, can be found in Annex 2.


The specific objective in the terms of reference for this study was to “Propose a detailed roadmap, including its design elements, to inform decision-making for an advanced model of an ETS in Chile”.

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28 The information provided in annexes 2, 3 and 4 represent a summary of the preliminary studies carried out within the PMR preparation phase and was used only as an input for the preparation of this MRP.
The report was a first step in a process that aims to clarify how an ETS could work in Chile and what the environmental, economic, and social impacts would be. This process will allow the Chilean government and key stakeholders to assess, in a more informed way, whether an ETS would be desirable in Chile, as well as the optimal design of an ETS to achieve policy objectives and priorities.

The report addressed each of the core components of an ETS: objectives and criteria; sector coverage; point of obligation for regulated sectors; the level of ambition; linking to other markets and use of (domestic and international) offsets; emissions trading phases; and allocation of units.

Cost containment, price stabilisation and potential use of border carbon adjustments were not covered in detail in the report.

Design options were analysed from a largely conceptual basis, but drawing on lessons learned in operating schemes and taking account of Chile’s national circumstances to the extent of available information, as well as highlighting critical points of divergence in scheme design depending on the underlying policy goals.

Each of the sections on core components of an ETS identified issues where Chile-specific research is needed to better inform key design decisions and technical implementation of the scheme ultimately chosen. Research needs for the next phase of policy development were discussed.

The report concludes with a high-level discussion of process going forward, both in terms of education and learning to enable an informed national debate, and in terms of developing broad (political, industry, and public) support for more serious consideration of ETS as an option for Chile. The authors proposed a final straw man proposal which draws on the design considerations specific to each section, and creates a package of coordinated compromises across issues.

**ETS considerations for Chile**

The following issues will be of fundamental importance for the implementation of a roadmap towards an informed decision on ETS and a Pilot for the country. Consequently, they will be addressed during the implementation of this MRP:

- Chile could have several overlapping objectives for an ETS: cost-effectively contribute to global emission reductions, and lower the carbon-footprint of Chile’s exports in anticipation of potential trade restrictions against high-emitting countries and products; drive sustainable development including stimulation of new technology; profit from sales of units to international buyers; generate co-benefits and avoid perverse outcomes.

- The balance among objectives will affect design decisions so clarity about their relative weight and their implications for design is useful. There was a clear signal in Durban that at some point developing countries will be asked to have commitments. Chile will want to be prepared to respond to this.

- Greenhouse gas emissions trading systems evolved out of domestic cap-and-trade systems that control local pollutants. If there were a global greenhouse gas (GHG)
agreement with a cap, Chile would simply be one entity within the global cap-and-trade market.

- Absent a global GHG agreement with a cap, every ETS is a compromise between a system that contributes cost-effectively to global emissions, and a system that protects local interests in an unstable and uncertain world.

- In a perfect world mitigation is done by the myriad of actors who can influence emissions, at the times and in the places where it is lowest cost. Even in an imperfect global market, if it is possible to link emissions markets across countries, linking facilitates cost-effective location of mitigation effort across countries by equalising prices across markets, and is likely to allow Chile to create a more ambitious system without imposing unacceptable costs on its economy as a whole.

- In the current imperfect world, with an uncertain long-term price and short-term prices that could be quite different from the long-term price, simply linking to the “international price” would impose risk and volatility on Chile and would not necessarily move it effectively toward a low-carbon economy.

- Linking to other ETS (as a seller) may also not be feasible in the near term, since the international market rules post-2012 are still under negotiation in the United Nations Framework Convention on Climate Change (UNFCCC) and bilateral agreements outside this framework are still evolving; linking in order to sell units can be a complex process.

- However, an ETS can benefit Chile even before international ETS linking is possible. It could facilitate financing for a highly credible Nationally Appropriate Mitigation Action (NAMA) or through Reducing Emissions from Deforestation and Degradation (REDD+)\(^{29}\); it can send a price signal that influences long-lived investment decisions and stimulate new technology development, thus placing Chile on a lower-emission sustainable development pathway; establish Chile as a leader; avoid any negative emissions-related trade repercussions from other countries; generate in-country revenue that can support government policy objectives; and produce additional environmental, economic, and social co-benefits.

- As international pressure builds for more ambitious global mitigation, Chile will be better prepared to contribute to international climate change agreements and compete effectively in a carbon-constrained global economy.

- In a world with an agreed global cap-and-trade system, there would be much work involved in designing and negotiating that system, but the domestic implementation would then follow.

- In our present situation, design involves a series of compromises – essentially domestic negotiations – in terms of the domestic cap, international linking and price control and stabilisation and protection against leakage. The aims when making these compromises

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\(^{29}\) Chile participates in the Forest Carbon Partnership Facility (FCPF) of the World Bank, where the Forest Chilean Service (CONAF) is working on a strategy includes the development of pilot areas that generate tradable carbon credits.
are to achieve credibility of emissions reduction effort, a level of carbon price that Chile is comfortable with, and an acceptable overall impact on the Chilean economy.

Activity III: Scaled-up Crediting Mechanism

The overall objective of this study was to support the Government of Chile in the design of a Scaled-up Crediting Mechanism (SCM) that could serve alternative policy objectives in Chile (i.e. a gradual move from an SCM to a domestic ETS, the co-existence of the two mechanisms, or the implementation of a stand-alone SCM) and evaluating complementary policy tools that can help ensure economic efficiency and the environmental integrity of the entire package of potential mitigation measures, such as stable low-carbon investment incentives (and their compatibility with an ETS and/or SCM), and price containment mechanisms that can be used in an ETS.

Scaled-up crediting Mechanism

On SCM the report focused on the national implementation aspects of a Chilean SCM. It discussed possible design features of an SCM at the domestic level and considered a Chilean SCM as one possible measure to implement a voluntary target or non-binding national or sectoral reduction commitment made by Chile at the international level (complementary to other potential domestic measures, such as command-and-control regulations, carbon taxes and/or a domestic ETS).

One purpose of a SCM is to serve as a precursor to the ETS itself, by introducing caps or targets, MRV, and a crediting process. A second purpose may be to feed credits or offsets into the (future) regulated sectors, so that the emission reduction potential of non-regulated sectors of the economy can also be optimally exploited through an ETS.

Among the policies currently being implemented that could serve as precursors for new market mechanisms is the Renewable Portfolio Standard (RPS), in force since 2010. This RPS aims to achieve a 10% market share of NCRE in the power market by 2024. The current requirement is still of 5%\(^{30}\), given that only new Power Purchase Agreements are affected. There is also political consensus to increase the 10% to at least 15%, and possibly to 20% and advance the schedule for reaching that target to 2020, instead of 2024. At January of 2013, the level of compliance for this regulation is 6.9% as of November of 2012.

For the purpose of designing an SCM for the power sector, the experience of the RPS is valuable, as its legal framework allows for the use of tradable Renewable Obligation Certificates (ROCs) for meeting the target and penalties for underperformance.

Carbon Investment Incentives

The price of carbon is determined mainly by supply and demand and reflects fundamental factors like economic growth, fuel prices, rainfall and wind (availability of renewable energy) and temperature (demand for heating and cooling). A degree of uncertainty is inevitable for such factors. While certain price fluctuation is desirable, too much volatility results in risk that deters investments. In order to address this, on carbon investment incentives, options to secure a stable investment climate for investments in low-carbon technologies were assessed.

\(^{30}\) The increase in the percentage requirement starts in 2014
The carbon investment incentives analyzed (i.e., voluntary industry targets on emissions, taxes, subsidies such as FITs, access to capital for selected technologies or types of companies, disclosure of relevant greenhouse gas emissions information, standards, and industry targets with flexibility in compliance), fulfill the function of complementing the price signal of an ETS or an SCM and thereby increasing stability of the overall climate for investment.

In analyzing these incentives, the study paid particular attention to their complementarity with an ETS or SCM to ensure economic efficiency and environmental integrity.

Chile already has a number of mechanisms in place that provide investment incentives to renewable energy projects. The most prominent is the Non-Conventional Renewable Energy (NCRE) Law Nº20,257 from 2008, mandating electricity companies to assure that a minimum share of the electricity they sell to final customers comes from NCRE sources, either directly or indirectly. Chile also offers tax credits to solar thermal systems under Law Nº 20.365.

**Options on ETS Price Stabilization Measures**

Ensuring appropriate pricing is key to ensuring the success of an ETS. In the first place, prices must be kept high enough that there is a sufficient incentive to invest in low carbon technologies. At the same time, excessively high prices may create serious economic difficulties for participants, making compliance difficult and potentially endangering the political acceptability of the ETS. Moreover, avoiding large fluctuations and ensuring a relatively stable price allows investors to adequately assess the viability of (usually long-term) investments in low carbon technology.

There remains debate in policy circles and the economic literature over the value of measures to control pricing in an ETS. While some see them as valuable tools to ensure against excessive fluctuations, others take the view that such measures prevent a clear price signal being sent to market participants, and thus may ultimately dis-incentivize long-term investments in low-carbon technologies.

The study described the various available price containment measures, including measures to prevent price spikes, price drops, or both. Each option (i.e., banking, borrowing, offsets, price floor and ceilings, allowance reserve, and carbon management board) was considered individually with respect to its general features, design, and pros and cons, drawing on existing experience where available. Respective pros and cons, as well as a summary of which measures are applied in existing ETSs were then summarized in comparative tables. This is followed by a discussion of parameters affecting price and their significance for the choice of price containment measures.

A set of considerations and next steps for a SCM, carbon investment incentives and price stabilization measures is provided in Annex 3.

**Activity IV: Study on the Chilean National Situation**

The goal of this study was to diagnose the current economic profile, understand the country’s use of energy and how the country will develop and grow in the coming years, and how this growth will impact the country’s emissions profile. Once the diagnosis is complete, it is necessary to identify the potential emissions reduction with associated cost-benefit analyses of these reductions in order to provide an appropriate market profile.
Its profiling section describes Chile’s economy in terms of its growth, main productive sectors and its trade relations, as well as the major challenges faced by the economy. The section goes on to describe the economic growth projections that the country is likely to undergo in the coming decades, including the likely growth scenarios of its main productive sectors: Industry and Mining and Forestry.

The report goes on to describe the country’s Energy profile in depth, providing relevant information on the country’s primary energy evolution and trends, characterizing the supply and demand aspects of the energy sector, and how demand is distributed among the different productive sectors. The section goes on to describe how the generation matrix may develop under different scenarios and how the energy demand is expected to grow as a whole and per individual sectors.

The country’s economic activity and energy use are closely correlated to GHG emissions and the GHG inventory is detailed and discussed in the context of the country’s need to mitigate emissions and define the most carbon-intensive sectors.

The growth of GHG emissions in the coming years is discussed from the viewpoint of the different studies consulted, all of which provide a Business as Usual (BAU) emissions projection in alignment with the country’s mitigation target approach. These BAU scenarios are presented and the different mitigation scenarios proposed for Chile’s emissions future are discussed and detailed.

Finally, the public policies affecting the energy sector that could be used by a market-based mitigation mechanism are included and discussed, giving particular emphasis to the national energy strategy and the means through which the government aims to fulfil it.

After this diagnosis this study assessed the costs and benefits of implementing different GHG mitigation policies in Chile. As an input to the cost-benefit analysis the marginal abatement cost curves (MAC Curves) undertaken in the country by former studies were considered. The existing set of MAC Curves that has been prepared in the country has tended to focus on the potential of individual measures and not on the global environmental policy for the country.

Therefore, to be able to assess the mitigation potential of different policies the research team established a specific emission reduction objective on the existing MAC Curves and assessed different approaches to achieve the objective.

The relative cost-benefit of achieving a specific national goal of emission reduction through an Emissions Trading Scheme (ETS) is compared with an alternative command-and-control policy to achieve the same amount of emission reductions. The authors stated that the results of this exercise were a preliminary assessment based on available data (MAC Curves) and should in no way be considered an extensive cost-benefit analysis of environmental policies for Chile.

Additionally, based on historical experience, given the amount of time that preparing and establishing an ETS have taken in most countries, it was chosen to assess the cost benefits of the ETS relative to command-and-control policies within a longer time horizon (2030 instead of 2020).

Highlights indicated by the authors in the various section of the report are presented in Annex 4.
Annex 2

Gaps and Step approach for an MRV System in the context of an ETS and/or Scaled-up crediting Mechanism

Gaps.

- Capacity to establish and operate a policy setting authority for MRV in ETS:
  - Not existent yet, but numerous similar bodies exist in other contexts, e.g. the DS 812 for Ministry of health states that the stationary sources may offset emissions from other stationary sources in Santiago City (i.e., quotas of particulate matter can be bought for compensation purposes).
  - There are similar instruments in the context of environmental assessment systems.

- Capacity to establish and operate a regulatory body for MRV in ETS:
  - Not existent yet, but similar bodies exist in other contexts, e.g. The Regional Environment Authority have the capacity to operate like a regulatory body for MVR to local pollutant. It is possible to extend to GHG.

- Capacity to establish and operate an administrator body for MRV in ETS:
  Not existent yet.

- MRV capacity for ETS on level of operators/installations in energy intensive industry:
  - Data on installation level MRV available for some larger installations through two main sources: Data from Ministry of Health and PRTR (pollution) database.
  - Existing industrial associations and research institutes may serve as platform to distribute know-how on MRV

- MRV capacity for ETS on level of operators/installations in power generation:
  - Data on installation level MRV available for some larger installations through two main sources: Data from Ministry of Health and RETC (pollution) database as well as the grid database.
  - Existing industrial associations and research institutes may serve as platform to distribute know-how on MRV

- MRV capacity for ETS on level of fleets/operators in road transport sector:
  Not existent yet.

- MRV capacity for ETS on level of operators/installations in mining and mineral extraction:
  - There are MRV systems for GHG reporting in a voluntary base with some companies in the larger installations.

- MRV capacity for ETS on level of fleets/operators in shipping: Not existent yet.

- MRV capacity for ETS on level of operators in agriculture and forestry:
  There are MRV working already related to the climate change and forest national strategy, included also in the FCPF of the World Bank project about REDD+ and
the Forestry NAMA registered in the official web site of the Convention (http://unfccc.int/cooperation_support/nama/items/6982.php)\(^{31}\).

- **MRV capacity for ETS on level of operators/ installations in industry:**
  - There are legal bodies that establish the requirements to MRV for local gases in the Industry and Power Plants.

- **Capacity to cross-compare MRV in different reduction programs:**
  Not existent yet.

- **General awareness in the business community including main industries and financial sector on opportunities of ETS:**
  Not existent yet.

- **Capacity for Verification services for ETS:**
  - There are several international DOE’s in Chile that provide this service for CDM and could also provide this for ETS.

- **Capacity for built up and administration of Registry for ETS:**
  - There is no existing similar registry.
  - Existing capacity and resources within the governmental entities is limited.
  - As an option, the registry might be developing by Private Sector for which capacity and expertise is available in Chile.

**Roadmap for MRV**

The suggested roadmap for completing/creating an MRV capacity in the country, for the first two phases, is the following:

**1. Preparatory phase:** *Result*: level of knowledge raised, overview on available data and feasibility of MRV, first structures in place and first reporting.

**Operators/private sector MRV at source level**

- Training in MRV approaches in all relevant sectors. An increasing number of companies/sectors are covered by training.
- Stakeholder consultation of interested industry associations on approaches to MRV.
- Capacity building with industry associations related to the opportunities and threats for ETS.
- Evaluation of availability of data, instrumentation, control and information systems for emissions and activity data.
- Evaluation of availability of data management processes, IT, QA/QC.
- Evaluation of data confidentiality issues and their solutions.

\(^{31}\) Chile has robust information from national and permanent forest inventories, aerial monitoring systems (land use and land use change), and also registration about the management plans, firewood statistical, among other data administrated by CONAF
– Evaluation of “verifiability” of data.
– Implementation of a tiered approach to voluntary reporting.
– Evaluation of results from voluntary reporting, revision of regulatory framework, if it is necessary.
– Training of verification companies build-up of verification capacity for ETS.

**Policy setting/ regulatory body, ETS Administrator**

– Build up of MRV institutional system in consultation of all relevant ministries. Definition of role and responsibilities of policy setting authority, Regulatory body and ETS Administrator with regards to MRV.
– Build up of MRV regulation for the considered sectors (this is part of regulation for allocation rules and ETS rules).
– Definition of incentives for actors to participate in the preparatory and pilot phase for MRV.
– Stakeholder consultation processes with businesses, research institutions and NGOs on regulation of MRV.

**ETS registry system**

– Regulatory process maps are developed.
– Technical requirements of ETS registry system to be defined. Define minimum requirements and nice-to-have options. Estimate number of account holders and expected volume transacted.
– Registry software products and developers are proposed and analyzed (e.g. from-the-shelf vs. customized software package).
– Safety and security requirements of tracking system to be defined taking into account lessons learnt in the EU-ETS.
– Consider phased implementation: Simple registry system in periods 1 and 2, more elaborate system in periods 3 and 4.
– Definition of stepwise approach for registry built up. Coordination with international registries may be considered.
– Registry design is formulated with roundtable input from the private sector/project proponents.

2. **Pilot phase:** *Result:* first “stand alone” trading system(s) in different sectors are up and running.

(Traded units have almost no value.)

**Operators/private sector MRV at source level**

– Advanced training in MRV for all participants in pilot scheme.
– Pilot verification of monitoring and identification of bottlenecks/problems.
– Hot line for participants in pilot scheme Capacity building with representatives from financial industry related to the opportunities and threats for ETS.
– Advanced training in MRV for all participants in pilot scheme.
– Pilot verification of monitoring and identification of bottlenecks/problems.
– Hot line for participants in pilot scheme.
Policy setting/ regulatory body, ETS Administrator

- Draft regulation and institutional setting for MRV is road tested in pilot scheme.
- Evaluation of road test and revision of framework if necessary.
- Definition of compliance scheme and sanctions in case of insufficient MRV performance of ETS members Supervision and further training of verification companies

ETS registry system

- An electronic registry for the pilot phase is developed to gain experience.
- Registry for pilot phase can be simper and have somewhat reduced functionality and security.
- Training and capacity building on the role and functioning of registry systems for relevant actors.
- Registry system and processes are road tested in pilot scheme.
- Evaluation of road test and revision of registry concept if necessary.
Annex 3: Considerations and next steps for a SCM, carbon investment incentives and price stabilization measures

Regarding options for a Scaled-up Crediting Mechanism in Chile, issues to be considered are the following:

**Overall design and crediting mechanisms**

Whatever final design is adopted by the Government for an SCM, it would be paramount that such design is flexible enough to accommodate a number of variables. One possible way to achieve this would be to make use of an umbrella SCM institutional design, comprised of different SCM windows, each responsible for the operation a specific type of crediting mechanism. The following benefits are envisaged under this approach:

Creation of options for achieving net emission reductions at home: Under an SCM umbrella design, a specific SCM window could govern a crediting mechanism that targets the most cost-effective opportunities for greenhouse gas (GHG) reductions. This crediting mechanism could ensure that resulting credits supply a future Chilean domestic emissions trading scheme (ETS) (hence, contributing to Chile’s own mitigation efforts).

Adapting crediting mechanisms to Chile’s policy objectives: Making use of different SCM windows would allow Chile to phase-in and phase-out crediting mechanisms in accordance with the Government’s policy objectives. For instance, an SCM window covering the electricity sector could be implemented as a transitional mechanism that would in future be subsumed under a domestic Chilean ETS. In addition, as different SCM windows could cover different sectors, sub-sectors, or groups of point sources, the Government could start out with sectors where baseline setting and MRV are expected to be less complex and gradually move on to other segments of the economy.

Increased chances for marketing and selling SCM credits abroad: The use of SCM windows covering different types of mechanisms in different sectors (or sub-sectors, or group of point sources of emissions) could increase the options for linking with outside regimes as chances of meeting varying eligibility requirements would be enhanced.

Hence the multiple windows approach facilitates different windows being linked to (or being eligible under) different international demand sources.

When choosing sectors for inclusion in the SCM it is recommended that sectors be evaluated against the following list of criteria:

- Emission reduction or sequestration potential of the sector
- MRV-ability
- Sensitivity of actors to carbon price
- International demand restrictions for credits from the sector
- International interest in the sector
- Availability of financing
- Potential co-benefits
Depending on the priorities of the Government and the targeted routes for credit off take (national versus international) these criteria may be further divided into primary and secondary criteria or multiplied by different weights.

In application of the selection criteria, the power sector, a globally competitive industry and the housing sector are used as examples to illustrate how the SCM could work. These illustrations also represent the two scenarios of an SCM serving as a precursor to an ETS (first example) or as a stand-alone mechanism (second and third example). Each illustration represents a different crediting mechanism potentially governed and operated under a specific SCM window:

- Illustration 1: Converting non-conventional renewable energy (NCRE) obligations of the power sector into carbon credit obligations (SCM window 1). This option is suitable for the scenario where an SCM serves as a stepping stone towards an ETS covering the electricity sector and building upon the existing NCRE law as basis for the scheme. It translates the NCRE targets into emission reduction targets. The renewable energy certificates could be converted into SCM credits by calculating the tons of carbon saved using the carbon factor of the grid for conversion.

- Illustration 2: Performance benchmark with binding minimum targets for a leakage-exposed industry sector (SCM window 2). Under this window of the SCM credits are issued to installations which exceed the performance benchmark measured in tons of carbon emissions per unit of output. This illustration is proposed for sectors that are unlikely to become regulated under an ETS or for all sectors in case the Government discards the instrument of an ETS altogether. The example is predominantly proposed for sectors with a high degree of global competition and mobility (e.g. steel, cement) where production may shift abroad as a result of political intervention.

- Illustration 3: Performance based Crediting in the Housing Sector (SCM window 3). A performance based approach is proposed for the housing sector as a potential stand alone SCM window. The housing sector is proposed for an SCM window given its strategic priority to the government and large mitigation potential. In addition, given the scattered nature of emissions and low MRV-ability is unlikely to be covered by an ETS. A standard consumption serving as performance benchmark could be calculated for different types of houses against which energy efficiency enhancements could be credited

Institutional arrangements
Ensure transparency on decision-making and creating clear channels of communication:
Procedures established for making key decisions on the design and implementation of an SCM should incorporate from the start a wide range of stakeholders, including governmental representatives, academics, business, industry, and environmental Non-Government Organizations (NGOs). The importance of participatory decision-making is reflected by the controversy and massive protests that have accompanied the assignment of individual fishing transferable quotas in Chile.
Make sure policy-related decisions are coordinated among the various relevant ministries so as to minimize risks of overlapping or contradictory policies and incentives: Allocating the task of overall supervision and coordination of an SCM to a steering committee comprised of a number of relevant ministries could reduce risks of conflicting decision-making. The Sustainability Council of Ministries, a multi-sectoral body leaded by the Ministry of the Environment and integrated by the ministries of Agriculture, Finance, Health, Economics, Energy, Public Works,
Housing and Urbanism, Transport and Telecommunications, Mining and Planning, could potentially house such overall supervisory and policy-making function.

Establish sectoral regulatory bodies to supervise the daily operation of the different crediting types (under different SCM windows): Where different SCM windows are used to govern and operate different types of crediting mechanisms in different sectors, it could be appropriate to nominate relevant sectoral regulatory bodies to carry-out regulatory functions for each SCM window.

Endow the relevant regulatory body with the mandate and enough independence to make design adjustments throughout the life of the SCM: Ensuring that the relevant SCM regulatory body has delegated powers to initiate procedures for adjustments in the design of the SCM would be beneficial. A mandate containing clear objectives and competencies could allow an SCM regulatory body to more quickly responds to the different needs for adjustments and fine-tuning.

Build upon existing institutional capacities and experience: Where national capacity and relevant experience exist, avoiding the proliferation of new institutions can reduce considerably the costs of implementing an SCM. Chile has a number of institutions which could house a number of important functions and/or provide relevant experience, including the Ministry of Health on reporting requirements, the emissions registry used in the Santiago cap-and-trade system and the the Emission and Contaminant Transfers Registry, on database recording, storing, and management.

**Linking**
Take advantage of a shared regulatory framework with a domestic ETS: Where the Government decides to implement a domestic ETS, both the SCM and the ETS could be designed to share much of the same regulatory framework as well as to exploit numerous synergies. The likelihood of an ETS being adopted has a significant effect on SCM design.

Make use of generally accepted principles, standards, and guidelines: Pending greater certainty on what these requirements will entail, designing the SCM in line with international best practice assures a higher likelihood that the SCM will meet any forthcoming criteria, while similarly increasing the chances that SCM credits will be accepted by a foreign ETS. These could be based, for instance, on eligibility requirements for participating in the Joint Implementation mechanism under the Kyoto Protocol, update IPCC guidelines, measurement, reporting and verification (MRV) principles used under the European Union Emission Trading Scheme (EU-ETS), and/or voluntary protocols and standards for safeguarding environmental integrity.

Reduce reliance on a single foreign market: Pursuing several linking possibilities can be desirable as it would minimize the risk of over-reliance on a single international or foreign recipient regime is lessened and demand predictability increased. On the other hand, selecting carefully which market to link to is necessary to reduce transaction costs (given the package of eligibility requirements that would likely need to be met by an SCM to obtain foreign recognition). Seek endorsement or approval at the United Nations Framework Convention on Climate Change (UNFCCC) level: Obtaining endorsement or approval under a framework for various approaches within the UNFCCC can entail a number of benefits. Existing and emerging ETs may opt to require recognition under the UNFCCC as a precondition for allowing credits to be used in their systems. Similarly, other emerging non-UNFCCC markets may require such recognition, or may
offer easier access for recognized credits. These and other factors may also lead to recognized credits gaining higher prices on international markets than credits that are not recognized.

Closely follow developments abroad: Closely following international developments, including with respect to emerging foreign ETSs and linking between other regimes is crucial. An SCM is likely to compete with other offsetting schemes and over-supplied regimes are unlikely to open up for new sources of supply. New mechanisms under the UNFCCC may still take a long time to be operationalized (although the New Market Mechanism may be implemented sooner than the Framework for Various Approaches).

Provide kick-start funding: Many of the linking options may only be achievable in the medium term rather than the near term. In order to facilitate operationalizing an SCM in the near term, therefore, the Government may consider establishing one or more “kick-start” funding mechanisms.

Stable Investment Incentives
The choice of suitable investment incentives is inextricably linked to the decision on the introduction of an SCM or ETS in Chile. Recommendations on investment incentives will vary depending on which mechanism will be chosen and which sectors will be covered by it. In principle the investment incentives can:
- Function as an alternative to either an SCM or an ETS
- Independently co-exist with an SCM or an ETS and apply to sectors that are not targeted by these mechanisms
- Complement and support the workings of an SCM or an ETS

Decision on the function and design of the stable investment incentives are secondary to Chile’s overall SCM or ETS roadmap. While the roadmap is still under consideration, progress can already be made by further narrowing down the politically viable options from the list above and detailing their application under different scenarios.

One issue that deserves particular attention is the co-existence of Chile’s existing NCRE law with either of the two mechanisms under different scenarios. As Chile’s flagship climate mitigation instrument that is operating successfully it is paramount not to endanger the political consensus around it and compromise its workings. For this, models need to be developed how the NCRE law can effectively leverage the SCM and vice versa or gradually transition into an ETS.

Price Containment Measures
*Keep in mind parameters that are most likely to influence price:* In choosing price containment measures, regulators should keep in mind the parameters that are most likely to influence prices in Chile and try to assess the consequent respective likelihood of different types of price oscillations. Important questions include whether price spikes or falls are more likely, and whether these are likely to be temporary or more long-term. These considerations will influence the type of measures chosen. For example, short term fluctuations may be best addressed by banking and borrowing, while longer term fluctuations would be better addressed by a Carbon Market Board (CMB, also sometimes referred to as a “Carbon Bank” or “Carbon Market Efficiency Board”).

*Consider interaction between various price containment measures:* It is important to consider the interaction between various price containment measures, as well as their interaction with other ETS design features, in choosing which to employ. Banking, for example may incentivize early investments in low-carbon technologies where free allocation is combined with auctioning
and caps are set to quickly increase; however, if combined with free allocation and generous offset provisions banking may encourage postponing compliance for long periods. Similarly, permitting offsetting may be an important means of limiting the risk of sudden fluctuations in an otherwise stand-alone market; however, where the ETS is linked to other systems the role of offsets in this regard is less pronounced.

Making use of banking can provide clear advantages, whereas borrowing may entail substantial risks: Banking can offer valuable flexibility and encourage early investments in low carbon technology. Most systems allow banking without any limitation, and there are strong arguments for Chile adopting a similar approach. This depends, however, on other ETS design features. Where banking is combined with free allocation in early years and generous offset provisions, placing quantitative or temporal limits on banking can decrease the risk that investments in low carbon technology will be deferred for extended periods. Borrowing, in turn, entails substantial risks that may outweigh its benefits, and as such has been subject to much controversy. If borrowing is pursued, it should be accompanied by strict measures to limit potential negative effects, such as clear limits and payback times, interest rates and collateral requirements.

Consider risks of over-interference with the market: A CMB may offer the most comprehensive and dynamic method to ensure price containment in the long term. However, this mechanism comes with several risks, including that over-interference, capture by special interests and difficulties in predicting the effects of measures. If this option is pursued, clear and transparent rules should be adopted to guide its operation and minimize risks, while its independence must be guaranteed. Careful consideration should be given to which measures it may take, under what conditions they may be taken, and subject to what parameters, while keeping its objectives limited can prevent it from needing to make complex and political judgment calls. In addition, the cost of paying salaries to high-level experts to serve on the board should be weighed against its benefits.
Annex 4: Highlights of Chile’s National Situation in the context of Market-Based Instruments

1.1. Chile’s Economic Profile Highlights

- Chile’s average GDP growth was 4.1% for the past 15 years and in 2011 showed a positive growth of 6%.
- Chile shows a sound macroeconomic policy with the best credit risk rating for Latin America.
- Copper mining and international trade are the key components of the Chilean economy’s growth, stability and development.
- The country’s development is reflected in its acceptance to become an OECD member in 2010, being the first South American country to do so.
- Key challenges include the reduction of income inequality, diversification of the economy and development of innovation.

Key Indicators Highlights

- Primary Energy Supply per capita has increased consistently with the country’s development in the past 20 years reaching the world average.
- Energy intensity in the past two decades reflects the continued preponderance of energy intensive industry, while still remaining below the global average.
- Chile’s emissions per capita diverged from the Latin American average level and converged to the World average around 1999.
- Carbon intensity is highly dependent on water availability and was affected by the lack of natural gas.

1.2. Economic Projection Highlights

- In the short term, Chile is expected to maintain a 5% GDP growth, with a recent strong participation of the utilities, commercial, construction and fisheries sector.
- The mining sector is expected to grow consistently, with large investments planned for the coming 3 years.
- A projected long term growth of 5% is not unrealistic for the country and is consistent with the Central Bank’s expectations and the history trend.

1.3. Energy Profile Highlights

- Chile is highly dependent on fossil fuel imports for nearly 75% of its primary energy supply.
- Total primary energy supply (TPES) shares by source in 2010 were: Crude Oil 34.8%, Coal 18.3%, Natural Gas 20.0%, Hydroelectricity 7.6%, Biomass 19.2% and Wind 0.1%.
- The share of coal has steadily risen over the past decade from 12.5% in 2000, to 18.3% of Total primary energy supply (TPES) in 2010.
- The disruption of natural gas import supply from Argentina after 2006 translated into increased imports of coal, fuel oil and diesel for electric power generation.
• Chile has a high hydropower potential but its full development poses challenges: a) hydropower potential concentrated in Central Chile is subject to large hydrological variability and occasional droughts; and b) hydropower potential in Southern Chile is subject to long transmission distances and environmental opposition.

• Final energy consumption in Chile grew at an average annual growth rate of 6.0% from 1990 to 2000, and a more modest 2.3% from 2000 to 2010.

• During the last decade 2000-2010 the Energy Sector (electric power generation and oil refineries) has recorded the highest average growth rate 8.2%, followed by Industry and Mining with 2.8%, Residential/Commercial/Public (CPR) with 2.1%, and Transportation 2.1%.

1.4. Energy Demand Projections Highlights

• Electric generation demand is projected to grow from current 65,634 GWh by 2020 and 143,374 Gwh by 2030.

• Energy demand in Chile is expected to grow at 4.7% annual rate on average over the period 2010-2020 to reach 438,960 TCal by the end of the period.

• The major driver behind this projected energy demand growth is the expected GDP growth rate over the same period. Most studies converge on their macroeconomic assumptions of expected annual GDP growth rate of 5% for 2010-2015, and 4% thereafter.

• The sectors with the highest expected energy demand growth rates during the 2010-2020 period are Transportation and Industry and Mining. Within the Transportation most of the incremental demand is expected from the Road Transport sub-sector. Within the Industry and Mining sector, most of the incremental demand is expected from the Copper industry and general manufacturing (shown as Various Industries and Mining).

• Electricity demand is projected to grow at an average annual rate of 4.0% during 2010-2030. Increasing 50% from current levels by 2020, and further increasing another 50% by 2030.

• Coal and hydroelectricity (Large Hydro and run-of-river) are projected to remain the dominant primary energy sources in the generation mix. The projected shares of Coal and hydroelectricity in the generation mix by 2020 are estimated around 30% and 55% respectively; and by 2030 around 37% for Coal and 48% for Hydroelectricity.

1.5. GHG Inventory Highlights

• The Energy sector, as defined in the inventory, accounts for 73% of the country’s non-LULUCF emissions. It is also the sector with the highest growth (13% between 200-2006).

• Electricity production (36%); Mining, Manufacture and Industry (23%); and Transport (29%) make up most of the country’s energy emissions.

• The LULUCF Sector shows a negative carbon balance nearing 25% of the non-LULUCF sectors.

• The country’s emissions increased by 37% between 200-2006.
1.6. **Emissions Projections Highlights**

- Transportation and Energy Generation is projected to be the most heavily emitting sectors followed by Industry & Mining.
- The projections tend to focus on the emissions generated from energy consumption and there is limited information related with industrial processes, LULUCF, Agriculture and waste.
- The majority of studies are based on econometric model simulated using LEAP software.
- GDP growth is a key variable of these simulation, and range from 4%-6%.

1.7. **Review of BAU Scenario Projections**

- There is significant variation of results among the reviewed studies, reflecting the uncertainty regarding the country’s future emissions.
- BAU scenarios are highly dependent on the country achieving its NCRE goals and following the National Plan for Energy Efficiency Action 2010-2020.
- Only one study (CADE) takes into account these policies, though others address the incorporation of NCRE and EE.
- The need for an official, agreed-upon BAU projection is crucial for the country to make a realistic reduction commitment.

1.8. **Mitigation Potential Higlights**

- The mitigation potentials estimated by 2020 range from 13% to 3% and by 2030 from 21% to 11%. Each study estimates this potential from their BAU.
- The measures assessed focus predominantly on the reduction of emissions from energy consumption.
- The preferred approach for identifying measures is bottom up and the most common modeling tool used has been LEAP.

1.9. **Major Emission Sources Highlights**

- Electric Power Generation and Transportation sectors are the major emitters in terms of direct emissions caused by fuel combustion for electricity generation and fuel combustion in vehicles.
- Predictions indicate that these emissions will increase to 38% and 37% by 2025. Industry and Mining are expected to make up 17% of direct emissions in the same year.
- By taking into account both direct and indirect emissions, the Industry and Mining sectors are the largest emitters, responsible for 41.3% of total projected emissions.

**Cost-benefits analysis Highlights**

- The implementation of an ETS has lower costs (11%) than command and control, and requires less number of mitigation measures, which comes principally from the transportation sector.
• The cost of the last mitigation measures for 2 sectors on the command and control scheme is higher as they have positive costs (33.2 USD/ton CO2e for Forestry sector and 7.6 USD/ton CO2e for Industry sector). The cost of implementing the last mitigation measures with an ETS mechanism is -8.3 USD/ton CO2e.

• Command and control has also been found to be expensive to implement for the regulator as the must monitor all possible polluters and enforce changes occur. However, an ETS requires the estimation of the mitigation potential of measures outside the regulated sectors.

• Measures with negative-costs, considered as net benefit measures, are predominantly found in the Transportation and Energy sector. A deterrent for the implementation of these measures is the significant up-front investment they often require.
Annex 5: The Energy Policy

In February 2012, the Ministry of Energy published its new National Energy Strategy 2012-2030 focused primarily on the development of the electricity matrix, establishing the main course of action in the Government’s public policy on this matter.

The National Energy Strategy, which currently analyzes electricity issues, is based on the following fundamental pillars:

**Growth with Energy Efficiency - A State Policy**

With the aim of reducing consumption and unlinking growth and energy demand, the government released the Energy Efficiency Action Plan 2012-2020 (PAEE20) which has the goal of reaching by 2020 a decrease of 12% of the final energy demand projected for that year. For these purposes the following measures will be adopted:

- Energy Efficiency Seal to identify and award companies that lead the way in developing energy efficiency on a national level.
- Minimum Energy Performance Standards (MEPS) to establish Minimum Energy Performance Standards (MEPS) that must be met by products, equipment, appliances, materials and other products that use any kind of energy, in order to be sold in Chile.
- Efficient Residential and Street Lighting Programs.
- Creation of the Interministerial Commission for the Development of Energy Efficiency Policies to coordinate between public organization and ministries to achieve savings for each consumer sector. The Interministerial Commission reports directly to the President of Chile.

**Take-off of Non-Conventional Renewable Energy**

The Government intends to use a series of measures to accelerate the incorporation of NCRE to increase the share of the total matrix:

- Tender Mechanism to encourage the Development of NCRE
- Geo referenced Platform – Economic Potential for NCRE Projects
- Development and Financing
- New Institutions Decisive Boost of NCRE
- Strategies for Technology

**Role of Traditional Energy: Greater Prevalence of Water Resources, Less External Dependence**

The Government of Chile imputes a strong importance to hydroelectricity in both, reservoir and run-of-river projects and consider it as its main source of electricity for Chile in the coming decades. Special consideration will be given to the potential impacts of the construction and operation of hydroelectricity projects.

Apart of traditional hydroelectricity and NRCE, coal, among other fossil fuels, is considered in the future energy matrix of Chile since it helps in providing technical and economic stability to the electricity system. Nevertheless, new coal-based generation projects must comply with the highest environmental standards and requirements.
A New Focus on Transmission towards a Public Electricity Highway

The Government considers it essential to create a new, more secure and robust scheme for the development of electricity networks, which will facilitate access for all investors in generation projects and foster initiatives using renewable energy sources. Current regulations will be improved and studies carried out to analyze the possibility to interconnect the SIC and the SING Systems in order to increase the security of the system and make better use of energy resources. Other measures are Improving Procedures for Granting Electricity Concession, Creation of Utility Corridors, Regulatory Changes in Additional and Trunk Transmission and in Sub-transmission, Facilitating Connection for Small Generators and Intelligent Networks.

Towards a More Competitive Electricity Market

In order to ensure an electricity market with greater levels of competition, security and reliability, the government will take action on a series of measures in the regulatory framework which should encourage and facilitate the entry of new stakeholders into the system. At the same time, the government will improve the tender mechanisms for regulated clients since the existing mechanism does not provide efficient long-term signals to the end client and has not led to large numbers of new stakeholders entering the market. The measures include the Creation of Independent Operation Centers which will be legal entities with their own assets, an autonomous governing structure and clearly defined responsibilities with the objective will be to guarantee the independence and proper functioning of electricity market operators; Secure and Competitive Electricity for Distribution, where the regulation of supply tenders will be improved, with the objective of generating the most effective mechanisms for granting energy blocks at prices which reflect long-term conditions, damping uncertainty in supply and demand and reducing the negative effects of speculative actions; and Consolidation of net Metering for Residential Generators, where a regulatory design incorporating Net Metering will be implemented after approval by Congress.

Sustained Progress with the Options for Regional Electricity Interconnection

The government recognizes the benefits of regional electricity integration and analyzes interconnection possibilities working together with other countries in the region. Joint operation rules and electricity interchange mechanisms must be designed and a framework of rights and responsibilities must be established to promote investment in international transmission links.

Incentives for Non-Conventional Renewable Energy Production

As part of the new Energy Policy published in 2008, three key pieces of legislation were passed to motivate investment in NCRE. These laws are commonly known as the Short Laws 1 & 2 and the Law for Non-Conventional Renewable Energy (NCRE), and they were developed by the Ministry of Economy, Development and Reconstruction. The basic premise behind them is that companies who produce small amounts of energy using NCRE are the first to dispatch their energy, and they do so without paying fees and tolls associated with energy transmission.

Energy Efficiency as a means to an end

One of the main recommendations made by both the Advisory Committee for Electric Development (CADE) and a platform set up to discuss the different energy scenarios proposed for Chile included the need to make energy efficiency one of the primary focuses for
development concluding that it is convenient to consolidate energy efficiency as government policy. While the creation of the National Energy Efficiency Agency (AChEE) and the Energy Efficiency Division of the Ministry of Energy were steps in the right direction, coordination with relevant market associations, including the main energy generators and natural gas distributors, and other government divisions is deemed relevant.

This policy instrument should have official support and state funding, and be particularly emphatic on education, R&D, data collection and processing, finance mechanisms, and product standards. The program should have measurable goals to be met by the current government and undergo a revisions process.
Annex 6: Regulations, Incentives and Institutional Aspects in the energy sector

Short Law I (Ministry of Economy, 2004)
Regulated the transmission market, with the aim to secure electricity supply and improve the interconnection between the Northern Interconnected System (SING) and the Central Interconnected System (SIC). With this law, some costs were transparently distributed to make the payment of tolls for electrical transmission, which previously had to pay 100% of the generators after negotiations with broadcasters, to be defined more clearly and to be shared with consumers.

The Short Law II (Ministry of Economy, 2005)
It aims to encourage investment in generation by establishing a competitive bidding system to ensure a price for a certain time (Ministry of Economy, 2004). The Short Law II defines that distributors must tender their supply. To provide security for investments, they can be long term (not more than 15 years), and may be coordinated in a joint tender of several players at once. While prices are free, some margins are set with reference to a price band which can be exceeded by up to 20%.

The NCRE Law (Ministry of Economy, 2008)
The ERNC Law (No. 20,257), which came into effect in April 2008 states that large generators (capacity greater than 200MW) have to guarantee that at least 5% of the electricity they sell comes from NCRE sources. The portion of NCRE energy required increases gradually to 10% by 2024. The law is only applicable for energy commercialized from new projects.

Moreover, each company that made withdrawals of energy from an interconnected system exceeding 200 MW must certify that 10% of its use is sourced from NCRE. This can be done through NCRE credits or certificates, which are accumulative over time (i.e. they do not expire), or by agreeing to the transfer of surpluses to another electric utility. Non-compliance with this law results in a fine which is valued at USD 31.29 per MWh until the minimum of 5% is reached.. Large companies have so far been paying the fine, and increasing the cost of electricity to end-users, as there is a lack of NCRE credits and it is currently cost-effective for them to do so, but the price of the fine increases over time. In January 2012, the senate approved a legislative effort to raise NCRE share from 10% in 2024 to 20% in 2020. The modernization of the law No. 20,257 and final enacting is awaited for 2012.

Geothermal Law
The geothermal law 19.657 (Ley N°19.657), published in January 2000 and its regulation published in October 2004, treats the rights for exploration and exploitation about geothermal energy. During 2009 a special system for the permissions of concessions related to exploration and exploitation of geothermal energy was established. Tender processes were realized and 16 areas accepted.

Fiscal incentives for solar thermal collectors
The law 20.365 (LeyN°20.365) was established in August 2010 with the objective to incentive small scale solar thermal technology for sanitary water heating purposes. The tax incentive was mainly created for construction companies to discount the investment made for the ST technology within new housing projects and thereby financing the additional equipment. Depending on the value of the new housing projects, a scale from 20% to 100% of the investment can be discounted. It is obligation by law to realize maintenance and quality reviews.
Labeling
In 2008 energy efficiency labeling started to become obligated in Chile in the first time for electronic devices, beginning with incandescent and fluorescent lamps, refrigerators, inductive electric motors, stand-by systems, air condition devices. There are other product groups which will be incorporated during the upcoming years. New labeling standards will be implemented with help of Chilean standards which contain requirements of international standards ISO 15502 and IEC 60000.

Energy Efficiency in Buildings
Since 2000 a regulation (OGUC, article 4.1.10) is in place which deals to require material and construction related to minimum standards to decrease thermal losses. In 2007 other requirements for new constructions, e.g. window area in function to its thermal transmitting capacity, were aggregated to the regulation.

Minimum Energy Performance Standards
The first steps in this direction were realized in 2010. The ministry of Energy is still working on minimum performance standards.

The Renewable Energy Centre
The renewable energy center (CER – Centro de Energías Renovables) was created in 2009 in dependence of the ministry of energy and the Economic Development Agency (CORFO – Corporación de Fomento de la Producción de Chile). The CER is more likely thought as a platform for capturing sector related know-how and promote renewable energy in the country.

Energy Efficiency Country Program
The Energy Efficiency Country Program (PPEE – Programa País Energética PPEE) was inducted by the government in 2005 involving private and public actors, giving the role for development and implementation to the ministry of economy. In January 2008 the PPEE program changed its dependence to CNE (today Ministry of Energy) and already presented results on its efforts, between March 2008 and March 2009 energy demand in the Interconnected central system (SIC) has been reduced by 2.6% due to implementation of concrete actions in energy efficiency. In 2006 the program received 1 MUSD and funding was increased year by year, in 2009 40 MUSD were spent. Energy Efficiency has a big relevance for Chile and its government which estimates that 12% of the 20% committed GHG reduction goal will be reached by energy efficiency actions.

The Chilean Energy Efficiency Agency
With the attribution in law 20.402 (Ley 20.402) the Ministry of Energy was created, in the same year the Chilean Energy Efficiency Agency (ACHEE by its Spanish acronym ) was created as a successor entity in the PPEE program where are participating the different ministries as well as academic experts and experts from the private sector. The ACHEE has the role to implement specific actions and projects within the PPEE program with special emphasis in the design and establishment of energy efficiency policies in the division of the Ministry of Energy. The mission is to build a bridge between public policies of the ministry of energy and the private energy consuming sectors.
Annex 7: Roadmap for an ETS pilot design for Chile
This section describes in detail the three stages to be carried out under the proposed MRP (as depicted in Tables A and B on Chapter 4).

I. SCOPING AND RESEARCH (FIRST STAGE)

1) Policy Development Process
   a) Key Policy Issues
      i. Definition of Chile ETS objectives

The collective experience to date is that when it comes to designing an effective ETS, one size definitely does not fit all countries or sectors. While the leading design options for the core components of an ETS are well understood and valuable experience has been gained by the design and implementation of ETS in other countries, it will be essential to tailor the design of an ETS to accommodate Chile’s specific national circumstances and to meet Chile’s strategic policy, economic, environmental and social objectives and priorities. A blueprint from another country would be of limited value.

The fundamental question for the Chilean government at the outset is: what are its policy objectives and priorities, and is an ETS the optimal policy instrument to achieve this? If it chooses to pursue the ETS option, then what is the optimal design to meet the government’s policy goals and to avoid some of the pitfalls that have hampered other countries’ schemes in this respect? Chile could have several overlapping objectives for an ETS. For example:

- cost-effectively (a) constrain domestic emissions by regulated sectors at or below a target level or (b) contribute to global GHG emission reductions through domestic action plus international sales and/or purchases;
- drive economic transformation and sustainable development through more efficient production and consumption and investment in lower-emission infrastructure and land uses;
- stimulate research, development and commercialization of new lower-emission technologies;
- generate trade benefits, including benefitting from the sale of units in international markets, avoiding negative trade repercussions and marketing low-emission products;
- generate additional economic, environmental and human health co-benefits and avoid perverse outcomes.

The balance among objectives will affect design decisions so clarity about their relative weight and their implications for design is important.

Objectives for ETS voluntary pilot
- To demonstrate the cost-effectiveness of this market-based mechanism for the mitigation of GHG emissions at a sectoral level and its applicability to the national scale.
- To test the functionality of the different elements necessary to implement an ETS in Chile, such as a comprehensive MRV system and a fully functional registry.
- To increase the technical knowledge on environmental areas associated to the mitigation of GHG emissions in the country (capacity building).
- Create awareness of carbon-efficient modes of production and to quantify their benefits, emphasizing their comparative advantages over other less carbon-efficient methods.
- Finding ways to better internalize the environmental costs to society associated with polluting activities.
Possible Criteria
The following (illustrative) criteria can be applied to guide the consideration and design of an ETS

- Environmental effectiveness: taking account of the relative significance of current and projected emissions, mitigation opportunities and costs, mitigation price responsiveness, and the potential for emissions leakage.
- Economic efficiency and competitiveness impacts: promoting efficient operation of the domestic market and facilitating effective linkages to international markets with low transaction costs; striking the right balance between broad coverage of emissions and creating an incentive to abate emissions where there is most potential to do so as well as managing overall system administrative costs; etc.
- Equitable burden-sharing: understanding and managing the political dimension including: the perceived comparability of effort by other countries and burden across sectors; distribution of costs across the economy; impact on trade-exposed firms and low-income households in particular; and delivery of co-benefits.
- Administrative feasibility and costs: minimizing the MRV and transaction costs imposed on individual firms as well as the administrative costs for the regulatory body.
- Regulatory and other barriers: identifying any significant non-price barriers that are not addressed, and considering the potential interactions between the ETS and other policies, regulations or measures, that could dampen the carbon price signal or lead to perverse outcomes.
- Other economic, environmental and social impacts, including co-benefits: considering the wider social and environmental implications of ETS design – e.g. on employment, health (air and water quality), research and innovation, energy and natural resource consumption and access to energy.
- Durability of the policy framework: providing predictable, stable long term policy to encourage low-carbon innovation, investment and technology deployment.

ii. High-level design parameters: Chile’s objectives for allocation of units

In order to better focus the objectives discussion, there needs to be in place a series of high level design parameters to provide a starting point to the definition of the ETS. Some of these parameters that need to be addressed from the very beginning are:

1. Establishment of the sectors to be regulated and determine the greenhouse gases (GHGs) to be included.
   In relation to the question of sectoral coverage, the approach taken was informed by deliberate choices based on a number of factors. The International Energy Authority (IEA) summarized these as follows:
   - the objectives of the scheme (e.g. to deliver cost-effective economy-wide commitments or to drive investment in specific sectors)
   - the availability of emissions data for the sectors and gases to be included
   - the costs and benefits of including small sectors and sources
   - targeting sectors with the greatest mitigation potential/ability to respond to price signals
   - the desire to achieve least-cost mitigation by extending coverage as widely as possible
   - the political acceptability of including some sectors, including the interaction with existing policies.
2. Linking and offsets
The issue of addressing the topic of linking and offsets early on has to do with the definition of the main objectives for a potential nationwide ETS. This way, some of the objectives associated to the topics are:
- Linking in order to generate trade benefits, including profiting from the sale of units in international markets
- Linking to avoid negative trade repercussions and marketing low-emission products
- Establish an offset market to cost-effectively constrain domestic emissions by regulated sectors at or below a target level
- Contribute to global emission reductions through domestic action plus international sales and/or purchases

b) Research
i. Lessons from experience and emerging economy issues:
Different approaches are required for different countries, sectors, and sometimes even subsectors. Depending on the size distribution of organizations or sites and other characteristics such as trade balance and economic importance, different options may be required in order to balance administration costs and emissions coverage. At this point Chile has conducted a thorough investigation of other existing schemes, through the activities of the PMR that included specific studies and technical visits to the regulating agencies in different countries, in addition to other independent studies. However, given the level of specificity needed at this point, more research will be needed early on.

ii. Sectoral market structures and emissions profiles
Options for where and who could be obligated by a market-based measure in Chile are analyzed in this section. Each sector will be considered in turn, initiated with an overview of supply and demand factors, which is treated by a discussion of its mitigation potential. Based on the studies carried out by the PMR (activity 4) we know that the highest mitigation potential is available in the energy, industry, and transportation sectors.

c) Outreach & engagement
i. Design an engagement strategy
As described in previous sections, the ETS voluntary pilot will, most likely, be focused on a specific sector of the economy, or a given number of firms, which choosing will be based on the highest potential to learn from the exercise as well as the technical feasibilities of implementing the pilot and finally by the willing of sectors to participate in this pilot. This is why the strategy to approach potential candidate sectors for the pilot must be well thought out and consulted with the appropriate representatives. Following this criteria, the following points must be included in this strategy:
- Identify and engage stakeholders and potential pilot sectors
- Education and engagement on Chile’s climate change objectives and preferred policies, including the option of an ETS
- Engagement in other relevant international ETS-related policy processes
2) Institutional Development
   a) Institutional Arrangements
      A successful starting point for the pilot will depend on how well established the
      institutional arrangements are addressed from the beginning, with clear assignment of
      roles and responsibilities of the institutional structure. These tasks can be addressed in
      the following manner:
      i. Define the institutional structure
      - Identification of project leadership
      - Plan for coordinating PMR activities across government
      - Assignment of organizational roles and responsibilities

   b) Readiness + capacity building
      Capacity building and extracting lessons and insights will always be one of the main
      objectives of any pilot and it will usually be an activity that will be present throughout
      the implementation of the project. For this first stage, the level of readiness and needs
      for capacity building need to be established for both, the private firms that will
      participate on the pilot and the public sector, that is, the regulating agency(ies) that will
      be part of the exercise. This can be portrayed in two items:
      i. Assessment of sector: determination of the needs for capacity building on the
         firms of the sector
      ii. Institutional readiness and capacity building and training needs

II. DESIGN, REFINE AND ROAD-TEST (SECOND STAGE)

1) Policy Development Process
   a) Key Policy Issues.
      Chile requires a more complete and comprehensive understanding on all the elements
      and stages that are necessary to put in place and/or implement an ETS, as well as to be
      in position of doing an informed assessment on the value that a market instrument of
      this type could have for helping in the implementation, eventually, of a regulatory policy
      on GHG emissions in the country. Consider design elements for a Chilean ETS and how
      they fit together to deliver the agreed objectives.

      The learning processes identified in order to get an in-country capacity for doing that
      assessment are the following\textsuperscript{32}:

      i. Sector coverage & gases
         - Estimation of GHG mitigation potential
         - Outreach and work with potential stakeholders
         - Responsiveness to price signal
      ii. Linking (design elements)
      iii. Point of obligation
         - Technical analysis of approaches: upstream vs downstream
         - Differentiated approach by sector (empirical evidence)
      iv. Level of ambition (Cap)

\textsuperscript{32} See Box B in Annex 8, which provides a detailed scope of these learning processes.
- Political definition of the targets
- Economic analysis of the different options (straw man)

v. Linking and offsets
   - Economic analysis of different linking approaches
   - Follow up of international markets

vi. Allocation
   - Decision on modality: Auctioning vs free allocation
   - Addressing other issues: entry of new actors, etc.

vii. Options on ETS Price Stabilization Measures
    - Analysis of instruments: banking & borrowing; offsets, etc.

    - Definition of legal framework
    - Design and implementation of regulatory activities

b) Supporting technical analysis (Research)
   At this point, the level and topics for specific technical research and analysis will be more evident for the regulating body in charge of the ETS voluntary pilot. This way, the following issues should be addressed:

   i. Specific issues that arise from stakeholder engagement or on individual design components
   ii. Assessment of Economic Impacts Research
   iii. Study on linking opportunities and implications for ambition and harmonization of ETS design features
   iv. Domestic offsets value and feasibility
   v. Complementary measures to address non-price barriers and facilitate low-carbon investment

   c) Outreach & engagement
   At this level, the pilot should implement the outreach and engagement strategies previously developed on stage 1. The implementation should include the following activities:

   i. Establish multi-stakeholder and technical advisory bodies and processes as needed
   ii. Bilateral meetings and surveys with emitters
   iii. Meetings of government, regulators and stakeholders with their counterparts in countries with or considering an ETS (on design, lessons learned and linking opportunities)
   iv. Meetings with other ETS constituencies (e.g. international emissions trading and industry associations, brokerages, etc.)

2) Institutional Development + capacity building
   Further establishment of responsibilities will be required at this point where, depending on the results of the previous stage, the needs for technical, institutional and capacity building will be easier to address. Although it is too early to know the specific items for each aspect, we provide a general level of questions and issues that should be considered

   a) Technical & Legal Infrastructure
      i. Establishment of new institutions (if applicable)
II. Delegation of governance responsibilities

iii. Legislative needs + gaps assessment, in order to proceed with policy development process – compared to ETS implementing legislation (preparing for Early Reporting phase a priority)

b) Institutional Arrangements
   i. Plan for coordinating the government’s decision-making process for an ETS and establishment of any coordination bodies/processes
   ii. Plan for institutional arrangements for ETS rule-making, administration, MRV and market oversight
   iii. Registry development

c) Readiness + capacity building
   i. Developing measurement and reporting protocols for Early Reporting Phase (emitters) – e.g. begin with survey?
   ii. Institutional capacity building for ETS implementation
   iii. Sectoral capacity building in MRV for ETS participation

III. REFINE, CONSULT AND DECIDE (THIRD STAGE)

Given the vast array of opportunities laid out on earlier stages, it is difficult to anticipate a specific structure for this third stage of the ETS voluntary pilot. In addition, at this point many questions will be answered, options taken and decisions made based on the interactive development of this pilot shedding light on the results of this market-based mechanism. Regardless of this level of uncertainty, we list some items that can only be addressed at this point since they are decisions that will determine the nature of a potential national level ETS.

1) Policy Development Process
   a) Key Policy Issues
      i. Detailed consideration of core design components need to be defined, such as:
         - Allocation
         - Compliance
   b) Research
      The general research done on earlier stages will determine the needs for specific research to be done on later stages.
      i. Cost/benefit analysis of the government’s preferred ETS design proposal: It is highly recommendable that only at this point research on economic impact can be carried out since the theoretical investigation can be checked against some level of empirical evidence (taken from the pilot experience).
   c) Outreach & Engagement
      Depending on the form that the ETS voluntary pilot had evolved, the following two O&E strategies should be pursued:
      i. Formal consultation on the government’s comprehensive proposal for an ETS (preferred design)
      ii. Bilateral emitter engagement via Early Reporting (data collection) process
2) **Institutional Development + Capacity building**

Assuming that an ETS institution was created on earlier stages, there will be few items to be addressed at this decision-making stage. These should be divided among legislative issues, if the decision was to pursue a regulated ETS system, and the testing of trading capabilities.

a) **Technical & Legal Infrastructure**
   i. Draft implementing legislation
   ii. Compliance regime
   iii. Verification guidance + accreditation

b) **Readiness + Capacity Building**
   i. Implementation of Early Reporting (data collection) phase
   ii. Sector capacity building for ETS trading + testing (trading simulations)
Annex 8

Box B: Detailed scope of the ETS learning processes

### Sector Coverage and gases

#### Background

Put simply, an ETS can cover all or only part of a country’s or region’s emissions. In terms of economic theory, the principle advantage of broad coverage is that it increases the chance of realizing the most cost-effective mitigation opportunities. This has been supported by numerous studies that have considered how non-price policies lead to higher costs. In addition, because an ETS provides certainty about the emissions outcome (i.e. global emissions from regulated sectors will be limited to the level of the cap), a “whole-economy” ETS can also provide certainty about the delivery of an absolute reduction target, whether as part of an international commitment or self-imposed. Examples of broad approaches to assist in meeting emission reduction objectives include the New Zealand ETS and the Californian ETS.

However, other ETS aim to play a complementary role alongside other policies with a view to delivering the economy-wide emissions targets collectively. Thus, in the EU, a decision was taken that the EU ETS would focus on certain sectors (principally energy and industry), while others (transport and residential) would be addressed by other policies, principally at the Member State level.

Finally, some schemes have been established as a first step towards more comprehensive emissions trading (e.g. state- and provincial-level schemes in Canada, the US, and Australia), with one of the major benefits intended to be the establishment of institutions including for the measurement, reporting, and verification (MRV) of emissions.

In addition to the objectives of the scheme, in 2010 the IEA and Organization for Economic Co-operation and Development reviewed a series of further factors that have driven decisions on which sectors should be covered in a scheme, namely:

- The availability of emissions data for the sectors and gases to be included.
- The costs and benefits of including small sectors and sources.
- Targeting sectors with the greatest mitigation potential and ability to respond to price signals.
- The political acceptability of including some sectors.
- Interaction with existing policies

#### Point of Obligation

#### Background

The point of obligation refers to the entity – i.e. site or organization – in a supply chain which would be responsible for compliance with any market-based measure for GHG emissions. The simplest example would be the point of emissions, such as an industrial site which uses boilers and perhaps also emits as part of its industrial process. However, often it is worth considering placing the obligation upstream of the point of emissions, for example with fuel suppliers.

Theoretically, in both cases the emissions price would be felt at the same point in the supply chain, with fuel suppliers passing costs through to the emitters in the second case. Finally, it is also possible to place the point of obligation downstream of the point of emissions in order to encourage behavioral change in the demand of energy use. An example of where this may be useful would be to encourage energy efficiency in the commercial sector, requiring office users to pay for the emissions associated with their consumption of electricity.

Placing the obligation at the point of emissions requires the entity that burns the fuel or carries
out activities resulting in release of process emissions to pay the emissions price. For example, in the cement sector the non-energy-related process emissions from manufacture of cement at an industrial facility would be the responsibility of that site, not the limestone supplier which would be considered upstream of the point of emissions.

Likewise, in respect of energy-related emissions, an industrial site burning natural gas in a boiler would be required to calculate the emissions from the combustion of natural gas, and pay an emissions price for those emissions. Standardized emission factors for burning various fuels are often used to ensure consistent reporting. Examples of this “point of emissions” approach are provided by the EU ETS and US Regional Greenhouse Gas Initiative. Making the point of obligation upstream embodies an emissions price in the price of fossil fuels. For example, the price of coal would increase by an amount linked to its emissions when burned, based on standard emission factors. It follows that fossil fuels with higher emissions per unit of energy provided would be coupled with a higher emissions price, encouraging movement towards cleaner fuels. For industrial processes, upstream would relate to attaching an emissions price to materials used in manufacturing. For example, limestone bought for the cement industry would have an associated emissions value.

In summary, we have a mix of issues for which the balance of benefits depends on the policy intent and scope of the measure:

For the regulation of highly numerous and small sources, such as in domestic, transport and small commercial sectors, the upstream approach appears most favorable. If it is a priority to avoid exposing portions of these sectors to carbon costs, then the upstream approach is distinctly disadvantageous, since the costs of applying an upstream approach in a selective way, or compensating diffuse emitters, could be high.

Similarly, if avoiding imposing a carbon price element within electricity prices for certain sectors of the economy is desired, then a downstream approach to accounting for electricity emissions is preferable, with target sectors being required to report and pay a corresponding carbon price. Under a broad and far-reaching approach though, regulation of electricity emission at the point of generation is preferable.

For trade-exposed sectors and those for which process emissions are significant, a “point of emission” approach can bring MRV efficiencies, since MRV associated with compliance, allocation, fuel and process emissions, and creating the behavioral change focus all lie with the same operator. (Note the possible exception discussed above for free allocation associated with electricity consumption.) Where – as in most cases – it is necessary to compensate industry through free allocation, the split requirements under an upstream approach seem to add additional complexity in relation to MRV for a concept intended primarily to deliver MRV savings. So for these sectors a midstream approach appears may have some advantages.

For non-trade exposed sectors and those dominated by fuel emissions (rather than process emissions), there are significant MRV benefits from the upstream approach, with the potentially reduced focus on the actual emitter being the main, although un-quantified, disadvantage. Further understanding of this behavioral aspect would be required to determine if it outweighs the MRV efficiencies on an upstream approach.

A consequence of the above discussion, however, is that differing approaches would be
favorable under particular circumstances and for particular sectors, most likely resulting in a hybrid approach with different systems for different sectors. In summary, different approaches are required for different countries, sectors, and sometimes even subsectors. Depending on the size distribution of organizations or sites and other characteristics such as trade balance and economic importance, different options may be required in order to balance administration costs and emissions coverage.

**Setting Level of Ambition**

**Background**

**1.1 Primary government objectives**

How the government chooses to regulate ETS emission constraints and prices will depend on its primary objectives in implementing the ETS. For example:

- If the primary objective were to *achieve a specific target level of domestic emissions or emission reductions*, then the design focus would be on domestic quantity constraints.

- If the primary objective were to *achieve a “global responsibility target” with least-cost mitigation* through a combination of domestic effort and investment in foreign units, then the level of domestic effort as a percentage of total effort would be less important.

- If the primary objective were to *enable the national economy to adapt to the international price of emissions*, then exposure to the international price signal would take precedence over domestic quantity constraints.

- If the primary objective were to *drive domestic mitigation investment or a technology step-change*, then the government would be most concerned about the stringency, certainty and durability of the emissions price signal.

**1.2 Additional objectives**

The government may wish to define and prioritize additional objectives to be achieved by its approach to setting ambition. Examples include:

- providing for a smooth adjustment of the economy, including the impact on Chile’s emissions-intensive trade-exposed producers

- supporting the operation of a stable and liquid domestic emissions trading market

- incentivizing more efficient domestic production and consumption, lower-emission capital investment (especially in long-lived infrastructure), and lower-emission land uses to avoid locking Chile into an emission-intensive development pathway

- stimulating research, development, and commercialization of new lower-emission technologies

- facilitating linking to other ETS with comparable integrity and stringency

- securing international trade benefits, including profiting from the sale of units in international markets, avoiding negative trade repercussions, and marketing low-emission products.

**1.3 Methodologies for setting the cap on allocation**

Under the ETS established to date, each government has chosen to issue its own emissions unit (also referred to as a permit or allowance) as the primary trading currency. A standard unit has
the value of one ton (metric or short) of CO$_2$ or CO$_2$-e emissions. By capping the number of issued units, the government can limit the contribution to global emissions from regulated sectors under the scheme. As noted above, the government can issue capped units into the market through free allocation, auction, or crediting of removals.

Under a top-down process, the government would set the level of the cap on an ETS-wide or sectoral basis according to its overall emission reduction objectives and sectoral coverage, and then allocate the units within the cap across the various means of disbursement to participants.

To use a dessert analogy, the government would start with a fixed cake and then decide how to slice it. A top-down approach offers the benefits of more easily aligning the ETS cap with a national emissions target, and can be done with high-level emissions data, such as those from a national greenhouse gas inventory, instead of participant-level data (although the latter can certainly be considered if available).

Under a bottom-up process, the government would define free allocation and overall emission constraints at the level of participants (individually or aggregated at the subsector or sector level), and then define the overall cap as the sum of free allocation plus units to be issued at auction or for removals. Continuing the dessert analogy, the bottom-up cap would look like a layer cake built from the various types of allocation needs. A bottom-up approach offers the benefits of more precisely tailoring the cap to the mitigation potential and circumstances of individual participants, subsectors or sectors. However, it requires the availability of disaggregated data in these areas, which could result in the need for a phased approach to implementation. It also raises the risk that the sum of the individual parts will not align with the government’s national emission reduction target, although the government can always adjust the overall outcome of the bottom-up process to fit its broader objectives.

1.4. Evaluating the cap’s ambition
Evaluating the cap relative to a reference point or scenario can be used as a measure of the ambition of emission reductions in comparison to that of other countries. In this context, the government could evaluate the stringency of its cap relative to:

- The level of historical emissions, either in a base year or over a base period.
- An emissions projection for business as usual (BAU).
- A performance benchmark for emissions intensity.
- A scenario with zero emission pricing.

How the government chooses to express the ambition of its ETS targets will have implications for the technical and political judgment of the scheme’s stringency and impact on sell-side linking opportunities (of course, many other sovereign design features will also impact on sell-side linking opportunities, and may be equally, if not more, important). The government may want to consider selecting multiple reference points, instead of a single point, to provide a broader perspective on the stringency of its ETS.

1.5. Modifying the cap over time
The government needs to make careful judgments about how to modify the cap over time. ETS markets operate on the basis of near- to medium-term supply and demand, which are driven by absolute covered emissions and the absolute number of emission units. To date, the major implemented or proposed schemes with domestic caps have defined absolute caps that have been fixed for the length of a defined trading phase. Some have provided for a fixed annual rate
of change extending well into the future, while others have provided for periodic review and adjustment of the cap. Some have included automatic adjustment mechanisms that can strengthen or loosen the cap in response to low or high prices. This approach of defining the cap and rules into the future offers market certainty over the supply of government units in each trading phase. However, this certainty can come at the expense of flexibility to accommodate changes in national circumstances within each phase, unless the government provides for such changes to occur or exercises its legislative power to change the cap. Investors will need to have a reasonable degree of policy certainty over cap setting in order to have confidence in market operation.

1.5.1 Constraints on linking to foreign markets
The effects of the choice of cap depend heavily on how closely the ETS is linked to international markets. If the ETS is linked internationally as a seller, ETS participants can reduce their domestic emissions below the cap and sell the excess units abroad. This will tend to raise emission prices and impacts on consumers but increase the profit to sellers. Similarly, if the ETS is linked internationally as a buyer, then the cap will limit the net global emissions ETS participants are responsible for but will not limit their net domestic emissions. ETS participants will be able to increase their domestic emissions above the cap and purchase approved foreign units to help meet their obligations. This will tend to lower emission prices and impacts on consumers.

With international linking, the stringency of the domestic cap will serve primarily as a distributional mechanism. If Chile is a net seller of units internationally, the cap is a key determinant of the balance between domestic mitigation funded from within Chile versus mitigation funded by foreign sources. If Chile is a net buyer, the cap balances the mitigation within and outside of Chile that is funded by Chileans. If the ETS is not linked internationally, then the cap will limit the net domestic emissions contributed by ETS participants (with the possible addition of units from domestic offset/crediting mechanisms). Without additional measures, a domestic cap will set the price of units.

1.5.2 Defining the relationship between the cap and price stabilization measures
In a pure ETS, the overall constraint on emissions relative to the supply of units sets the market price of emissions. If the government chooses to exert control or constraint over prices in the domestic market, then it may need to relinquish some control over emissions quantity. However, this depends on whether carbon price stabilization mechanisms function within or outside of an established cap on emissions. For example, the government could set aside a unit reserve within the cap that would be available to supply units to the market once a price point was triggered. By setting a price ceiling and price floor at auction, the government can influence prices in the domestic market. When the reserve was exhausted, then the government would no longer be able to operate the mechanism. In this case, total emissions covered by government units would remain within the original cap. Alternatively, under an external price ceiling mechanism, once a price point was triggered the government could choose to issue additional units outside of the original cap in order to increase supply and lower prices. In this case, emissions covered by government units would exceed the original cap. Under an external price-floor mechanism, the government could buy back units from the market and cancel them. It is an important strategic call for the government to decide whether it wants to limit the emissions implications of any price-control or price-constraint mechanisms.

1.5.3 Modifying the obligation to surrender units
The core obligation under an ETS is for the participants with liabilities under the scheme to surrender to the government a number of emission units equivalent to their defined emissions liability. One emission unit corresponds to one ton of CO$_2$ or CO$_2$-equivalent emissions. Under a progressive obligation, the government changes the ratio of units that must be surrendered relative to tons of emissions. For example, the government could transition from the surrender of one unit for every three tons of emissions toward a one-for-one ratio. This approach to moderating the exposure to emissions pricing at the margin would change the relationship between the units issued under the government’s cap and the domestic emissions allowed by ETS participants.

**Linking and Offsets**

**Background**

Linking occurs when one ETS recognizes units from a foreign system as valid currency for complying with its domestic requirements and, potentially, vice versa. Linking can benefit Chile by lowering costs or increasing profits, depending on whether the country is a net buyer or seller internationally, and by improving liquidity and competitiveness of the ETS. However, there can be winners or losers domestically, even if the country gains overall. Also, linking can be a complex process and involves trade-offs in terms of exposure to international prices and loss of sovereign flexibility to determine and change scheme features once links are established. While various ETS design features will affect the attractiveness of Chile’s system as a linkage partner, the impacts of linking to other markets will also raise considerations for design issues relating to caps, competitiveness, and price stability. As a result, the government will want to consider issues relating to linking and offsets in parallel with other scheme features so as to maintain and facilitate desired linkage options as well as address the impacts of linking.

Along with the use of offset credits from both domestic and international sources, linking extends the coverage of the linked systems to include more sources of mitigation. This expands flexibility to find the least-cost opportunities across the economic and geographic landscape. It also extends economic opportunities and incentives for reducing emissions and for low-emissions innovation.

At the international level, combination of linked domestic ETS would help harmonize the price on emissions across countries through the operation of the market, bringing down the costs of meeting emissions targets across the linked schemes. International linkage of ETS schemes is likely to be a far simpler approach to promote cost-effectiveness than attempting to align carbon taxes through political agreements internationally. The gains from trade across linked systems also results in lower costs for buyers of meeting a particular emissions target, as well as greater profits for sellers, which in principle can be reinvested in greater reductions. This means the benefits can be environmental as well as economic, with linking facilitating more ambitious policies to reduce emissions in both buying and selling countries and jurisdictions than if such trading were not possible.

Linking can also improve the functioning of the emissions market within a country. In large, economically diverse nations, the wide range of actors, emissions reduction possibilities, technology development and deployment opportunities, and differentials in marginal costs of control, mean that a wholly domestic ETS market could function well to reduce emissions, reduce cost, drive investment, and spur innovation – even if that market has no link to similar markets elsewhere. However, for a relatively small economy, such as Chile’s, with fewer actors, less competition, and less diversity of covered sources, linking can bring important benefits in
terms of managing costs, providing liquidity, extending incentives, and promoting competition. At the same time, linking and offsets will involve particular challenges to ensure the environmental equivalency of units across schemes, as well as other political challenges and policy trade-offs.

Linking will not require harmonization and coordination over all ETS design elements, but the features that transfer across systems will require harmonization and coordination for establishing market links. For regulators in another country or countries to recognize units from Chile’s ETS, so that Chile can link as a seller to the international market, it is likely that the government of Chile will need to harmonize design features for environmental and economic integrity and comparability (e.g. measurement, reporting, and verification (MRV), type of cap, enforceability, certainty and predictability), as well as price protection (use of offsets, price floors/ceilings, banking/borrowing, third-party links), and agree on an acceptable level of ambition. There will also be a process of political negotiation, including over other potential scheme features. Other systems will evaluate these elements when determining whether to become buyers of units or offsets from Chile. On the other hand, Chile will also want to consider whether it wants to import these transferable elements into its system when deciding whether to be a buyer of overseas units or offsets.

Designing Emissions Trading Phases
1 Background
1.1 General Considerations
Launching an ETS in phases can help to ease the transition into facing an emission price, complying with new regulations, and participating in trading activity for both participants and the government. Phasing can be applied to:

- the entry of regulated sectors into the ETS, accommodating different levels of preparedness to assume ETS obligations
- the ambition of emission reduction and emission price objectives for the ETS, enabling ETS participants, the government, and the economy to adapt more gradually to emission pricing
- the provision of financial support and operation of price protection mechanisms, helping to slow or reduce impacts from stranded assets and leakage of production overseas, and lower the exposure to price volatility, while the domestic and international markets are maturing
- linking to offset/crediting mechanisms and other ETS, allowing time to test and refine the domestic ETS design before entering into complex linking agreements.

Using a phased approach that starts gently but signals increasing stringency over time can avoid excessive costs from rapid transition, allow time for learning, and build public confidence in being able to manage ETS obligations and impacts.

If the rules and stringency of each phase are announced in advance and are credible, then a system that is lenient in the short term can still send a long-term price signal that influences investment decisions in long-lived capital stock, helping to place a country on a lower-carbon development pathway.

However, phasing can also pose challenges and risks that need to be managed. These can include:

- raising equity concerns about the relative timing and stringency of ETS obligations and

economic opportunities for different sectors

- creating disjunctions in participant obligations, supply, and demand across phases that disrupt the market or create perverse outcomes
- creating perverse incentives to bring emitting activities forward in time or stockpile materials before obligations apply or change
- introducing uncertainty about design settings and stringency for later phases.

The government needs to consider very carefully how it can use phasing to its advantage in engineering a smooth introduction of emissions trading into the Chilean economy. When evaluating phasing options, particularly important criteria include cost effectiveness, environmental effectiveness, administrative feasibility, equitable burden sharing, and political acceptability.

1.2 Evaluation of options against key criteria

1.2.1 Environmental effectiveness

Decisions on sectoral coverage and stringency across phases should be compatible with the government’s GHG mitigation and economic transformation objectives, taking into account projected emissions, the mitigation potential of regulated sectors, and the price elasticity of demand in different sectors.

If sectoral coverage and ETS prices are kept low in early phases, then the government will be more dependent on external, complementary measures to achieve its national mitigation objectives.

Starting with a low emission constraint/price but signaling increasing stringency over time may produce fewer emission reductions in the short term but, importantly, could still help to place Chile on a lower-emission development pathway by influencing investment decisions in long-lived capital stock.

1.2.2 Economic efficiency

Exposing participants to the full international price of emissions could produce an economically efficient outcome in the longer term but involve a more abrupt economic adjustment in the short term. To support more gradual adjustment, the government could use transitional phases providing price control and/or price containment.

Phased introduction of different sectors into the ETS and phased use of linking and price stabilization mechanisms should be organized in a way that supports the effective operation of the domestic market.

1.2.3 Competitiveness impacts

Competitiveness impacts are likely to be more significant in earlier phases of the ETS, before trade competitors implement comparable emission pricing mechanisms. Providing more generous free allocation and other transitional assistance in earlier phases could help to safeguard against competitiveness impacts leading to leakage of production and emissions abroad.

Competitiveness impacts can be addressed by moderating impacts of the scheme on all participants or only a subset of participants. Providing targeted support to the most trade-
exposed and emissions-intensive participants (e.g. through output-based free allocation) instead of weakening the entire scheme (e.g. through a progressive obligation) could help to improve the mitigation potential of the ETS as a whole.

1.2.4 Equitable burden sharing

Sectoral coverage has important equity implications. However, broad coverage of an ETS does not necessarily produce an equitable outcome because sectors can differ markedly in their preparedness for trading, mitigation potential, mitigation costs, and price elasticity of demand. Phasing can be used to address some of these concerns.

The government needs to consider which sectors are best suited to participation in an ETS, when different sectors will have sufficient capacity to participate in trading, and what types of mitigation measures should apply to non-ETS sectors so that all sectors bear an appropriate level and timing of responsibility for helping to meet national emission reduction objectives.

1.2.5 Administrative feasibility and costs

Starting the ETS with a limited number of sectors and participants, and expanding it over time, could make it easier to administer while Chile’s ETS institutions and processes are still being developed and tested. An alternative approach is to allow sufficient time for multiple sectors and the government to prepare fully for trading before implementing the ETS; the latter approach could reduce system risk.

Developing a “stand-alone” pilot trading scheme in addition to an ETS could increase the level of effort for the design and legislative processes, and could produce outcomes that are not representative of actual ETS operation.

1.2.6 Regulatory and other barriers

The government needs to consider how the timing of ETS obligations will interact with other environmental and economic regulatory obligations for ETS participants, and how to manage any conflicts or barriers. For example, the government may need to provide for changes to property or tax law, or trading market regulations, to accommodate the ETS, and this could affect the timeline for implementing different phases of the ETS.

The government should seek to align the timing of scheme phases and scheme reviews with other relevant domestic regulatory cycles in key sectors, as well as its policy planning and budget cycles and phases in the international climate change negotiations.

The government may also wish to consider how scheme phases may be affected by national election cycles that impact on scheme review and legislative processes.

1.2.7. Other impacts, including co-benefits

Directly and indirectly, the ETS may have a range of positive and negative impacts on the environment, economy, and society more broadly. The nature and timing of these impacts should be assessed as the phases of the ETS are developed, and measures should be put in place to monitor such impacts over time.

Allocation
1 Background

1.1 Legal nature of the tradable unit
When creating the legal framework for an ETS, consideration should be given to the legal nature and characteristics of the units (e.g. whether a form of property right, financial instrument or otherwise) and whether to define this clearly in legislation (i.e. in more than a technical sense). This is important to give legal security and certainty to both the government and market actors, and to provide security and confidence to the trading system. It will also be a factor for linking of schemes.

How the legal nature of allowances is defined, or construed under existing law, may affect the value of the units and determine associated rights and liabilities depending upon the interaction with other relevant legislation and law. For example, the following issues could turn on their legal status:

- property rights, transfer and rights to compensation upon taking or expropriation;
- treatment under financial services regulation and licensing regimes (e.g. whether a financial license is required to trade units);
- ability to grant and enforce security or take a charge over the allowance;
- competition and international trade law;
- taxation treatment;
- treatment upon insolvency and bankruptcy;
- accounting treatment under international standards;
- enforcement issues, criminal liability and fraud (e.g. stolen allowances in the EU ETS);
- treatment under private law contracts.

Where trading systems are linked but countries define tradable units differently (such as in the EU ETS), the difference in treatment can make one sub-market of the overall system more attractive than others which can lead to distortions of the market.

1.2 Modalities for Allocation

1.2.1 Auctioning
In systems with limited linking and a defined ETS cap, auctioning is part of determining the amount of emissions in the country. The government’s key choice here is whether to allocate the value of the units through grand-parenting, or to auction them and use the revenue. In a fully linked system, the issues are different. An auction is still a way to improve market liquidity and provide regular price signals but is also a way for the government to sell its excess units rather than exporting them directly.

The government can choose to auction units periodically. This is either a way to introduce units that are part of the ETS cap into the market, or a way to raise revenue that can be used either within the ETS for compensation, protection or complementary instruments, or for more general purposes (debt repayment or government spending).

Thus auctions are generally a simple way to allocate units. The arguments for free allocation instead of auctions are largely political and distributional. Auctions give revenue to government and impose the costs on those who purchase units. The ultimate cost bearers and beneficiaries depend on how the auction revenue (or revenue from selling excess units abroad) is used.
One potential use of funds has not only distributional effects but also tax-efficiency effects. Auction revenue can be used to lower taxes that distort economic activity and hence raise the efficiency of the government’s revenue raising. If the alternative to auctioning is free allocation that is not related to current activity (e.g. grand-parenting which simply transfers wealth – or sustains it – thus creating no efficiency benefit), moving to auctions raises extra revenue with no efficiency cost.

1.2.2 Free allocation on the basis of historical data (grand-parenting)
The most common form of allocation in environmental markets is on the basis of historical emissions or output. One, or several years, are chosen as a baseline and allocation is a proportion of emissions/output measured in those years (or sometimes the best of a group of years). The allocation does not necessarily need to go to an entity that is a point of obligation. Grand-parenting can be done on the basis of either emissions or output multiplied by a performance benchmark. “Benchmarking is a principle of allocation whereby some index of historical activity or capacity is multiplied by a usually uniform emission-rate standard to determine allocations to individual installations.” It attempts to reward firms that historically have had emissions-efficient processes and avoid rewarding emissions-inefficient firms.

The grand-parenting approach requires high quality data on historical emissions (and possibly output). It can result in lengthy appeals where data are poor or entities argue that there were special circumstances.(e.g. EU) Once it is complete however, it does not need to be repeated (and ideally is not repeated – to avoid incentives to inflate emissions in order to increase future free allocations).

Generally allocation of units under a grand-parented system is done on a rolling basis for a certain number of years ahead. The rules for them are announced further in advance than actual allocation so firms can anticipate future units. Grand-parented allocations typically phase out over time. In some systems, e.g. the European Union in Phase 1, units are withheld from firms that close. This creates an allocation system that is a mixture between grand-parenting and output-based allocation (discussed below). It can lead to perverse results as inefficient existing firms will persist and potentially crowd out efficient new firms. Under a pure grand-parented system, new entrants to an industry do not receive units. However, this is often felt to be “unfair” or to create competitive disadvantage for new firms. This leads us to allocation modalities that depend on current as well as historical activity and information.

1.2.3 Free allocation on the basis of performance benchmarks – output-based allocation
If new entrants are to be allocated units it cannot be on the basis of their historical emissions. Benchmarks and capacity are usually used to define allocations. If there is a total cap on allocation of units – for example in a system that is not linked, or linked in a limited way – then the government needs to plan how they will provide these units. This has generally been done by holding back a “new entrants reserve” but given that the number and scale of new entrants is unknown, this will not necessarily meet demand. The alternative is for the government to purchase and provide allowances as needed.

Output-based allocation goes one step further than closure rules and new entrant provisions. Instead of using an historical basis for allocation, allocation depends on current or previous year output multiplied by an emissions factor. This factor could be a benchmark for the sector or...
simply a fraction of past emissions per unit of output. The latter approach avoids the need for benchmarks, but “output” still needs to be defined in a meaningful way so that firms with heterogeneous output cannot lower their emissions by changing their mix of output, thus spuriously generating a surplus of units. The definition of output needs to be able to be associated with a subset of historical emissions within the installation or with a benchmark to create the emission factors. Emissions factors based on historical emissions are probably easier to create than benchmarks but output is still challenging to define so this is administratively challenging.

1.3 General Considerations
If Chile designed a system with a carbon price equivalent to US$10 per ton of CO₂e, and covered the entire economy including forestry with a cap at 2006 levels, the total value of units in 2006 surrendered to match emissions would have been US$785.9m, or around $40 per capita, and growing fast. The number of units and the price level will be determined by choices about caps, phasing and linking. Allocation determines how this value is distributed and to what extent the carbon price affects marginal production costs.

The common allocation modalities include auctioning (usually combined with use of some revenue to compensate consumers, fund research, complementary actions to reduce emissions or actions to adapt to climate change or as part of negotiations with key political groups), free allocation on the basis of historical emissions (grand-parenting), free allocation on the basis of a performance benchmark and output levels, or a hybrid of different approaches. The choice of allocation modalities has critical implications for distribution of costs and benefits, can mitigate leakage (movement of activity and emissions to unregulated countries), could affect the efficiency of operation of the market in the short term, and has implications for administrative feasibility.

Under an ETS, emitters retain an incentive to reduce emissions regardless of whether their permits are allocated for free; they still face an opportunity cost from surrendering permits to the government for compliance; they could sell them for cash otherwise. The diverse ETS in operation demonstrate that it is not necessary for the parties receiving freely allocated permits to be the same as those bearing liabilities for their emissions; free allocation can be used to compensate affected non-regulated parties; they then sell their allocation in the secondary market.

The optimal choice of allocation modality is driven largely by the rationales for free allocation, and these determinations in turn drive who receives allowances (or revenue from auctions), on what basis they receive them, how many they receive and for how long they receive them. In the long run consumers bear all costs so allocation is solely a question of wealth distribution. The short run is more complex.

One attractive feature of cap-and-trade systems compared to other regulations is that they offer the potential to separate issues of distribution from issues of efficient mitigation. With no transaction costs, market equilibrium in a cap-and-trade system will be cost-effective and independent of the initial allocation of tradable rights. This “independence property” allows politics and technical issues to be separated. In this chapter we explore the extent to which this holds in emissions trading markets within an incomplete global agreement, and with imperfect short-term markets, and the implications of this for short-term allocation of units. The rationale for free allocation is weakened in a system with a lower price, or a lower marginal
cost. This can be achieved through a loose cap, through decisions on linking, or by “progressive allocation” (requiring fewer than one unit for each unit of emissions). Losses and windfall gains, leakage, pressure for rapid economic and institutional structural change, the value of additional participation and temptations to non-comply will all reduce with a lower price. The value of phasing toward a full price is discussed in Chapter 5.

Allocation decisions typically have complex technical and political elements with significant economic and distributional implications, and often require research to assess what direct and indirect costs industries in different sectors will bear under the scheme, and what costs will be passed through the supply chain, including to consumers. Different modalities and rationales may be appropriate for different sectors and may change across ETS phases.

It is possible to identify four major rationales for allocating permits:
1. **Equity**: Achieve an equitable allocation of costs and any windfall gains
2. **Reduce leakage** of activities and hence emissions to countries not covered by binding targets
3. **Manage a smooth transition** to a long-term low-carbon economy
4. **Encourage participation and compliance** where the point of obligation must involve many small actors.

Existing emissions trading systems have put different weight on these objectives and achieved them in different ways. While balancing the trade-offs among objectives is ultimately a political judgment, it can be informed by analysis and data about the nature of the trade-offs and to identify the affected parties. How research can contribute to an informed allocation decision-making process is explored further in this paper but also synthesized in the separate chapter on research needs. Allocation decisions can also be informed by previous experience with emissions trading and other environmental markets – especially those in Chile (water, air pollutants, and fisheries)\(^{33}\).

Based on the analysis of both rationales and modalities for free allocation conducted above, we now develop a framework for decision making on allocation for each regulated industry and scheme phase that will identify options, criteria and considerations. This framework will help to guide the government as it determines which industries will receive permits for free, on what basis they will receive them, how many they will receive and for how long they will continue to receive them.

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\(^{33}\) Previous experience with allocation modalities in ETS and other environmental applications in Chile and internationally can be found in Annex 9.
Annex 9: Previous experience with allocation modalities in ETS and other environmental applications in Chile and internationally

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<tbody>
<tr>
<td>EU ETS Phase I (2005-7)</td>
<td>Auction / purchase requirement</td>
<td>Grandparent</td>
</tr>
<tr>
<td>EU ETS Phase II (2008-12)</td>
<td>Limited</td>
<td></td>
</tr>
<tr>
<td>New Zealand ETS</td>
<td>Liquid fuels and stationary energy</td>
<td>Fishing and deforestation only</td>
</tr>
<tr>
<td>Regional Greenhouse Gas Initiative, US</td>
<td>Auctioned to support technology programmes</td>
<td></td>
</tr>
<tr>
<td>American Clean Energy and Security Act</td>
<td>15% auctioned</td>
<td>Vulnerable sectors and electricity consumers</td>
</tr>
<tr>
<td>(unsuccessful) Waxman-Markey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>California ETS</td>
<td>50% auctioned</td>
<td>Vulnerable industries and electricity consumers</td>
</tr>
<tr>
<td>Australian ETS</td>
<td></td>
<td>EITE only</td>
</tr>
<tr>
<td>Alberta, Canada</td>
<td></td>
<td>Intensity-based system</td>
</tr>
<tr>
<td>Chilean water markets</td>
<td>Small amount</td>
<td></td>
</tr>
<tr>
<td>Chilean air quality</td>
<td></td>
<td></td>
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<tr>
<td>Chilean fishing quota</td>
<td>In discussion</td>
<td></td>
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</tbody>
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(a) **Chilean experience with allocation within environmental markets**

Chile uses markets to manage water, individual tradable quota for fisheries and air pollutants from stationary sources in Santiago. Overall the experience has been positive. In both water and fisheries markets, all units were initially allocated by grand-parenting. There is some discussion now of auctioning some of the ITQ for industrial buyers in the new law to be approved by the end of the year; water rights in the very few places that have not been claimed yet are to be auctioned off according to the new reforms of the water code of 1981. The air pollutants market is a credit based mechanism rather than a cap-and-trade so they are grand-parented by default. The Program of Control of Emissions Coming from Stationary Sources (PROCEFF), under the Department of Health (SEREMI) was given the responsibility of allocating permits and keeping an up-to-date record of permits, as well as monitoring and enforcing emissions caps. Within a short time, the first general environmental laws were passed, and in 1994 the National Environmental Commission (CONAMA) was created to coordinate all governmental offices involved with environmental jurisdiction and to design new policies to deal with pollution problems. Since then, CONAMA promoted implementation of additional trading programs for other stationary sources and pollutants. The actual implementation and management of these programs did however remain under SEREMI.
When the program was put in place in 1994, the inventory of emissions and sources was quite incomplete, it was work in progress. Grandfathering the “permits” helped the authority greatly in completing the process by creating incentives to unregistered sources to self-declare. Due to the lack of background information, the firms were only given permits “officially” and transactions started to be recorded in 1997. Some firms lost permits because of regulatory changes. As the program progressed, SEREMI came to realize that its initial allocation was too generous. They modified the quantity of allowed emissions to existing large boilers twice (in 2000 and 2005).

The system also includes an offset rate. A new source must buy more than one permit to offset each unit of pollution. Thus new entrants receive no free allocation and additionally face a higher price of pollution than existing firms. The high offset rate provides existing sources with perverse incentives to continue to operate while “taxing” newer and cleaner entrants. This might retard turnover of pollution sources, drive up the cost of environmental protection and even increase pollution levels. The changes in the offsetting rate made firms reluctant to trade since permits are depreciated progressively through trading. The offsetting rate was also modified. Initially, it was set at 1, but in 1998 it was increased to 1.2 and in 2000 to 1.5. Furthermore, in 1998, it was established that those large existing boilers that were not using their permits or those that wanted to exit the market had 2 and 3 years, respectively, to sell their permits before they became void. Therefore, permits had an expiration date, and sources are not allowed to save credits for future use or sale for a long period. In 2007 according to some calculations, the mass of permits lost in the case of particulate matter (PM) was around 40% of the initial allocation.

The institutional arrangement was not successful, but this may have changed already with the creation of the Ministry of the Environment. Overall, one could say that the trading programs have suffered from serious flaws in design and implementation. However, these flaws are not necessarily more severe than some of the flaws in the first phase of the EU ETS. Chile has managed to establish environmental trading schemes and also developed the legal bases and institutions.