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PREFACE
This Market Readiness Proposal was prepared by the Ministry of Energy, i.e., Chile’s PMR Focal Point.

The proposal also received feedback from its Steering Committee, 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.

It will be presented for feedback during the Partnership Assembly Participants Meeting to be held in Sydney, Australia, on October 21-25 2012.

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

- MRV, Compliance and Registry
- Options for Scaled-up Crediting Mechanism and Investment Incentives in Chile
- Study on the National Situation: economic and energy profiles (growth, supply and demand, BAU economic and GHG emission scenarios, etc.) and a cost benefit analysis of different mitigation scenarios.

Outline of this document
Chapter 1: Executive Summary describes the context, goals and expected outcomes of the MRP proposal;

Chapter 2: Preparation Phase indicates some administrative/managerial highlights during the MRP Preparation Phase and briefly describes the main results of each of the four studies which provided strong technical background for drafting this MRP;

Chapter 3: Policy Context for the Implementation of Chile’s MRP, sets the stage for understanding key aspects of Chile’s national circumstances 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;

Chapter 4: Roadmap to Reach the ETS “Pilot-Ready” Stage, presents a roadmap showing the intended path to a political decision on the overall role of an ETS in Chile’s climate policy, and on a decision to proceed with a voluntary pilot of the ETS. It includes the overall budget estimated for this “Pilot-Ready” Stage.

Chapter 5: Timeline of Activities, Budget and Decision Points, shows a timeline of the activities, budget and decision points of this roadmap in order to reach the ETS “pilot-ready” stage.

1 Conformed by the Ministries of Agriculture, Economy, Energy, Environment, Finance, Mining and Transport&Telecommunications.
2 Consortium Lead: INFRAS
3 Consortium Lead: Motu Economic and Public Policy Research
4 Consortium Lead: Climate Focus
5 Consortium Lead: Price-Waterhouse-Coopers
Chapter 6: Organization, Communication, Consultation and Engagement, summarizes overall plans for organization and communication during the MRP implementation phase, including arrangements for direct MRP supervision as well as for overall political guidance.

ACKNOWLEDGMENTS

We would like to acknowledge the PMR Secretariat Team and the Team of Experts who provided useful feedback and suggestions for the drafting of this proposal.
1. EXECUTIVE SUMMARY

Chile is an economy in transition with a target of reaching economic indicators of a 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 is adopting a series of policy recommendations issued by that organization. Abiding by the OECDs “Declaration on Green Growth” (2009) and its “Green Growth Strategy” (2011), Chile is in the process of defining the fundamental basis for a National Green Growth Strategy.

Since 1990, 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.

Chile is not a relevant source (GHGs). According to international statistics, Chile only accounts for approximately 0.2% of global GHG emissions (excluding LULUCF related emissions), a percentage that has remained stable in recent years.

According to the International Energy Agency (IEA, 2010) the country 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 by 37% between 2000 and 2006, period in which the energy sector accounts for 73% of the country’s non-LULUCF emissions. It is also the sector with the highest growth in that period (13%). In 2006, electricity production (36%); mining, manufacture and industry (23%); and transport (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.

In spite of this scenario, 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 clearly 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.

At the same time, the country recognizes that due to the rate of economic growth over the last decades (its average GDP growth was 4.1% for the past 15 years)⁶, which is expected to continue,

⁶ In 2011 the country showed a positive growth of 6%.
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.

In this context, Chile fully supports the principle of using cost-effective instruments for limiting
GHG emissions and in that context, in order to achieve its global environmental goals, the country
strongly advocate the use of market mechanisms for the mitigation of GHG emissions.

The political will to act to limit the country’s increase in GHG emissions in a cost-effective manner
was first stated in Chile’s ongoing 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, in order to view it as a way to improve quality of growth, reduce overall greenhouse
gas emissions and decrease adaptation costs, this policy instrument encouraged the analysis of a
voluntary internal market to reduce GHG emissions, which would be connected to existing
markets (as a contribution to worldwide mitigation requirements).

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 their GHG emissions and learn from their
experiences.

In order to scale this project at the presidential level, as part of the annual ministerial accounting
to the President of the Republic\(^7\), on May 2012 the Minister of Energy highlighted the
participation of Chile in the PMR and the role this initiative will play in creating capacities and
sound knowledge for the design and implementation of market based instruments in the country,
including an ETS.

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.

Hence, the PMR offers an invaluable opportunity for promoting and implementing a learning-by-
doing process for both, decision-makers and implementers, at public and private levels, that
creates the necessary knowledge basis and information for allowing an assessment and
evaluation of implementing an ETS and complementary instruments (i.e., scaled-up crediting
mechanisms) as a real alternative, for GHG emissions mitigation in Chile.

The transition to implement an ETS is not easy and the first steps should be aimed at removing
the barriers that impede an adequate access to learning from the necessary options that this
instrument offers to facilitate technological and behavioural changes at both, public and private
levels.

In order to prepare the ground for a sound decision making process on the potential
implementation of a nation-wide ETS in the future —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 the ancillary instruments that make this market-based instrument
operational.

\(^7\) This is an instance in which each ministry delivers to the President of the Republic the objectives and
achievements of their ministerial work. All the other ministers, the media and other stakeholders are invited.
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.

- Design a concept ETS for Chile and a concrete, voluntary pilot of this with a sector or cross-sectoral group of companies.

- Design an MRV system for Chile, and pilot this with a voluntary group of companies/sectors.

- Design a registry system for the proposed Chilean ETS to be implemented alongside the voluntary pilot ETS.

- Design (and potentially trial) complementary instruments\(^8\) (i.e., energy efficiency and renewable energy certificates, innovative finance, offsetting system) to fit with the proposed voluntary pilot ETS to enhance its effectiveness.

This document therefore presents a roadmap showing the intended path to a political decision on the overall role of an ETS in Chile’s climate policy, and on a decision to proceed with a voluntary pilot of the ETS. It also describes the specific activities that will be undertaken with PMR and potentially additional funding to deliver the outcomes above.

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\(^8\) Domestic offsets and other complementary measures to address non-price barriers and facilitate low-carbon investment will be assessed during the second stage of Chile’s ETS—“Pilot Ready” stage (See Chapter 4).
2. PREPARATION PHASE

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).

The consultants and the funding allocation to each of the five components are described in the following table:

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9 Internal arrangements at the PMR Secretariat needed to be done before implementing countries could have full access to the allocated funding.
10 The PMR Steering Committee is derived from the members of this technical committee.
<table>
<thead>
<tr>
<th>Component</th>
<th>Consultants</th>
<th>Allocated Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRV</td>
<td>INFRAS (lead) Deuman (Chile) Perspectives</td>
<td>US$ 70,000</td>
</tr>
<tr>
<td>ETS</td>
<td>Motu (lead) AEA Technology Plc as CCG UC (Chile) EDF</td>
<td>US$ 100,000</td>
</tr>
<tr>
<td></td>
<td>Grasty Quintana Majlis (Chile) Nicholas Institute (Duke)</td>
<td></td>
</tr>
<tr>
<td>Scaled-up/complementary instruments</td>
<td>Climate Focus Antuko Energy (Chile)</td>
<td>US$ 50,000</td>
</tr>
<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>
</tr>
</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.
Scope and main results of the four studies\textsuperscript{11}

\textbf{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:

\begin{enumerate}
  \item Preparatory phase (Capacity building, etc.)
  \item Pilot phase – voluntary MRV in pilot sectors, on-going capacity building
  \item Introductory phase
  \item Full trading
\end{enumerate}

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 1.

\textsuperscript{11} Box A at the end of this section summarizes the main findings of the Preparation Phase.

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”.

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); 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 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.

Section 4 Roadmap to Reach the ETS “Pilot-Ready” Stage includes these considerations as main topics to be discussed and/or addressed during the ETS decision-making process.
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 quota is only 3%, 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.

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 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.

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 N° 20.365. In addition, Chile is proposing the implementation of a Price Stabilization Fund under a supported NAMA which would insure renewable energy projects against spot market price fluctuation.

**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 2.
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.

Based on the estimates of the country’s mitigation potential presented in the diagnosis sections of this Report, it is not possible to achieve a 20% deviation from BAU target with the measures
identified in the chosen time frame of 2020. This may be due to an underestimation of mitigation potentials in the MAC Curve studies available to date, limitations in the scope of measures assessed, errors in the BAU or because the target is simply un-achievable given current economic growth projections during the period up to 2020.

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) which is considered an achievable time frame for the 20% deviation from national BAU.

Highlights indicated by the authors in the various section of the report are presented in Annex 3.

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

<table>
<thead>
<tr>
<th>ETS</th>
</tr>
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<tbody>
<tr>
<td>• Chile has a great potential to develop a pilot ETS, for what it needs further analysis and discussion among government, researchers and stakeholders.</td>
</tr>
<tr>
<td>• Key decision points/government judgment may arise during the ETS pilot design stage around the following topics: goals &amp; structure, governance, coverage, emissions constraint, linking, price stabilization, phasing, allocation and compliance.</td>
</tr>
<tr>
<td>• Core decisions to be considered include pilot 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.</td>
</tr>
<tr>
<td>• 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.</td>
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<table>
<thead>
<tr>
<th>MRV/Registry</th>
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<td>• 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-pilot or any other market-based instrument in the country.</td>
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<tr>
<td>• The capacity to establish and operate a policy setting authority or regulatory body for MRV is not existent yet, but similar bodies exist in other contexts, e.g., in the regulation of local pollutants in the electricity and industrial sectors.</td>
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<tr>
<td>• 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.</td>
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<tr>
<td>• 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.</td>
</tr>
<tr>
<td>• The capacity to build up and administer a Registry for ETS needs to be created. There is no existing similar registry and existing capacity and resources within the governmental entities is...</td>
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</table>
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 (ETS pilot); 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 pilot 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 chosen.

Research needs
The following research needs are essential to build capacity, improve knowledge and contribute to policy development/decision making on pilot ETS and complementary measures:

- Understanding how an ETS would interact with the rest of existing and future environmental legislation in the country.
- Improving understanding of the scale of mitigation opportunities (in both the different carbon-emitting sectors and in the forestry sector).
- 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).
- Identifying emissions-intensive trade-exposed mobile or expanding activities and the likely scale of leakage from them.
- Understanding better the role of complementary measures under an ETS pilot scheme, including domestic offsets, to address non-price barriers and facilitate low-carbon investment.
3. POLICY CONTEXT FOR THE IMPLEMENTATION OF CHILE’S MRP

This section sets the stage for understanding key aspects of Chile’s national circumstances 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.

ECONOMIC PROFILE

The Chilean economy is an emerging, small and open economy, which has shown to be one of the fastest growing in Latin America, recording an average GDP growth of 4.1% over the past 15 years. During 2011, the Chilean economy had a positive growth 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.

Chile’s economy is characterized by a high level of dependency on international trade, with the country having signed 59 trade agreements. Countries with which Chile currently has Free Trade Treaties and Agreements (FTA) include: China, Canada, Colombia, Mexico, South Korea, E.F.T.A. (Iceland, Liechtenstein, Norway and Switzerland), Central America (Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua), Australia, Panama, Peru, the United States of America and Turkey. Other countries which do not share special trade agreements with Chile receive a flat-rate tariff of 6% on all imports.

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 and agriculture also have strong participation in the national economy.

Considering the significance of the mining sector, the behavior of world copper demand is crucial to the country’s economic wellbeing. China has become one of the most important consumers of copper due to the increasing industrialization of the Chinese economy and also the higher investment in infrastructure. This rapid growth and the world demand for Chinese manufacture has led to a steady demand of raw materials that has been one of the main drivers of the national economy. The projections in the Chilean Mining Investment report shows an increase in production, and goes on to explain that this projection is a direct consequence of the process of ongoing investment in copper mining, where the new investment portfolio is valued at 66.9 billion dollars of which 44.1 billion are considered for the period 2011-2015. From the 66.9 billion dollars, 81.2% corresponds to copper mining.

In terms of short term economic growth projections, the Monetary Policy Report developed by the Central Bank of Chile (June 2012), indicates that the base scenario shows that the GDP will grow between 4% and 5% in 2012.

Several recent studies have attempted to model Chile’s future economic growth and energy demand considering different timeframes and a wide range of assumptions. The range of annual GDP growth defined as the basis for projection varies from 4%-6% in the long term (2030), leading to markedly different results. It is important to note that the projections proposed by the studies does not correspond to official values, since the Treasury Department does not publish projection of the GDP, however, the GDP uses were consulted to the Treasury Department and were validated for the objectives of the studies.
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, with the private sector taking responsibility for the investments in electricity generation. Under this scenario, the Government has a series of goals, among which we can highlight the following:

- Increase and improve the level of energy security and availability to meet the rise in demand associated to the objective of maintaining an economic average growth rate of 6% per year up to 2020.
- Achieve greater energy independence from foreign sources and increase private investment in hydrocarbon exploration and development.
- Improve current regulations governing access to energy resources, in order to increase investment in renewable energies in Chile.
- Improve information available and promote research programs about the country’s energy resources in order to formulate a policy to promote energy efficiency and energy saving projects, including energy efficiency certification and standards for construction, domestic appliances, lighting and transportation.

Primary Energy Supply

Figure below shows the 1990-2009 evolution of primary energy supply per capita, expressed as tons of oil equivalent (toe) per person. As shown in the figure, Chile since 1997, along with China more recently, has converged towards the World’s average in this indicator of 1.75 toe/capita. This level of primary energy supply per capita is still approximately half of the average European (EU-27) level, and can be considered to be roughly proportional to the current per capita income gap between Chile and Europe.

During most of these two decades Chile’s energy intensity tends to follow the same trend as Brazil and Latin America in general, which is a rather stable level of energy intensity with a
modest decreasing trend after 2000. This behavior of energy intensity contrasts with the consistent and faster decrease of energy intensity experienced by Europe and other high income countries since 1990.

Chile is characterized by a high degree of fossil fuel import 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). This leads to a high vulnerability to both volatility of international fossil fuel prices and incidences of supply disruptions in its fossil 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%. The growth of natural gas between 1997-2005 displaced the share of coal in total primary energy supply. The external supply of natural gas used to be concentrated exclusively on natural gas imports from Argentina, which peaked in 2004 and rapidly declined from 2005 until 2008, when imports barely reached 1 Mcm/day, representing the progressive disruption and final cut-off of Argentinean gas imports. The disruption of natural gas supply from Argentina has translated into increased imports of coal, fuel oil, and diesel for power generation and final consumption during a period of relatively high international prices.

Hydropower potential is plentiful in both the central and Southern portions of Chile. However the hydropower supply concentrated in the central part of the country, and which is closest to the major load centers, is vulnerable to periodic droughts and weather patterns which cause a high degree of inter-annual hydrological variability affecting the stability of hydropower’s share in primary energy supply. The large and undeveloped hydropower potential in the southern regions of Chile also faces a number of challenges, including overcoming long transmission distances to the major national grid and environmental opposition.

Electricity Generation and Distribution

Chile’s electricity generation and distribution is characterized by two major systems distributing electricity to primarily industrial users in the desert regions of the country and another, larger system that supplies both industrial and residential users. Additionally, two small regional systems provide energy to the smaller, more isolated regions of the country. The generations mix of the two major systems SING and SIC are markedly different due to the non-availability of hydroelectricity 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.

c) Two small-scale systems: Magallanes, with an installed capacity of 98.8 MW and 100% thermal generation; and Aysén, with its installed capacity of 40.2 MW, (20.6 MW thermal, 17.6 MW hidro, and 2 MW wind) covering the southern pockets of demand around the cities of Punta Arenas and Coyhaique in Patagonia.
Chile’s generation mix has experienced significant changes during the last two decades. The SIC system was predominantly hydroelectric between 1990 and 1997 with a low participation of coal-based thermal generation. Changes in Argentina’s energy exports policy in 2006 led to the Argentine gas supply crisis and the rapid installation of an important number of diesel-fuel thermal generation, and 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.

The year 2009 saw the renewed availability of Natural Gas through the construction of the Quintero LNG re-gasification terminal, and an important part of the diesel-fuel generation has been substituted by imported LNG.

In the SING system from 1990 to 1997 the majority of the thermal generation mix was based on coal, with a small portion of fuel oil mainly for backup during high demand peaks. 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.

The gas import crisis of 2004-2006 led to a reversion to coal based generation, complemented by diesel-fuel generation to replace falling gas imports. Since 2010, the LNG imports have been again substituting the diesel-fuel generation, driven by mining companies to sustain energy supply in joint venture with power generation companies.

**Final Energy Consumptions**

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. During the last decade 2000-2010 the growth rate of total final energy consumption has tapered off to an average annual rate of 2.3% (Figure 19 below). The Energy sector 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%), the Commercial/Residential/Public sector (2.1%) and Transportation sector (1.9%).

In absolute terms, the largest final energy consuming sectors are: Industry and Mining (38.2% of total final energy consumption) and Transportation (32.9% of TFC), followed by Commercial/Residential (26.3% of TFC). Within the Industry and Mining category, cooper and other mining account for almost half of consumption (equivalent to 17.5% of TFC).

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

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<tr>
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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>Total</td>
<td>6.0%</td>
<td>2.3%</td>
<td>4.0%</td>
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## Final Energy Consumption. Share by sector (%)

<table>
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<tr>
<th></th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
</tr>
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<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>
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### Energy Demand Projection

Final energy demand projections by sector over various time horizons have been undertaken by various studies\(^\text{12}\). All them have used a bottom-up approach for their energy demand projections (except the CADE report on the Electric Power Generation sector, which undertook a top-down approach), 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 PROGEA (2011) study on final energy demand projections for 2010-2020 for all sectors. Total final energy demand is estimated to reach 438,960 TCalories in 2020, a sharp rise from its current 2010 level of 278,178 TCal implying an average annual growth rate of 4.7% . 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 average annual growth rates of sectoral energy demand implied by this projection are the following: 1.64% for the Residential/Commercial/Public (CPR) sector, 4.0% for the Energy sector, 4.96% for the Industry and Mining sector, and 6.03% for Transportation as the sector with the higher expected growth rate over the 2010-2020 period.

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Projected Final Energy Demand by sector 2010 - 2020 (PROGEA 2011) and historical data 1990-2009


Projected Electric Generation

This section examines projections for electric power generation on the basis of a set of relevant studies. 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 Figure below projected electric power generation is expected to grow from the current 65,634 GWh to 96,552GWh in 2020, and 143,374GWh in 2030; implying an average annual growth rate over the 2010-2030 period of 4,06%.

Projected electric power generation— All Electric systems (Gwh)
The projected energy generation by technology is shown in the figure below. The projected generation largest shares 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, between 2020 and 2030 geothermal generation is expected to gain an increasing share, 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.

**Projected Electric generation by Technology— All Electric systems (GWh)**

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 (See Annex 4 for further details).

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 and the only one that is not considered monopolistic. The enactment of Short Law I and II delivered mechanisms to encourage investment and new entrants.
Transmission: The transmission of electricity has natural monopoly characteristics, 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.

Distribution: End users receive their electricity through distribution companies such as Chillectra, Chilquinta, CONAFE and CGE. These concessionaries transport and sell electricity within their concession area, buying from generators in different parts of the transmission system. They are regulated as a monopoly. The distributors have two types of customers:

- Small and regulated - where demand is less than 2000 kW and the price of energy is fixed by the authority.
- Large and free - customers who have claims over 2000 kW and directly negotiate the price and quality of the energy generators and / or distributors at their convenience.

The Short Law II determined that customers of between 500 kW and 2000 kW can choose from any of these modalities. This scheme eliminates the spot market (also called “instant market”), which are energy transactions that occur between generators or between them and ‘large and free’ clients. See Annex 5 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 about the penetration rates of clean technologies that are associated to this potential. Technical capacity is another aspect that needs improvement in order to fully deploy these technologies and to be taken advantage of in Chile. Some variables that contribute to this uncertainty include 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 the energy sector include incentives for the use of non-conventional renewable energies, the Geothermal Law and the 2008 Law on Non-conventional Renewable Energies (NCRE). Others include the tax exemption for residential solar thermal systems in 2009 and a series of energy efficiency regulations, which include energy efficiency labelling, home heating performance, and minimum energy performance standards.

In regards to Non-conventional Renewable Energy (NCRE), the Government has developed a policy that supports competitive energy generation based on these energy sources by identifying the barriers to their introduction and creating lines of action intended to remove these hurdles. The barriers themselves include lack of information, precarious infrastructure, uncertainty about new technologies and difficulties in accessing credit.

Nevertheless, in five years Chile has doubled its installed capacity of NCRE for electricity generation, which rose from 286 MW (representing 2.4% of total installed capacity) in late 2005 to 556 MW (4% of the total installed capacity) by the end of 2010. In this same period, the Environmental Impact Assessment System in Chile approved NCRE projects that totalled 2512 MW of power, of which 2000 MW were for wind power.
Chile’s efforts to use its energy efficiently have been significant in recent years. In 2005, the Government created the National Energy Efficiency Program (PPEE) as the first public initiative to promote the efficient use of energy with a through the 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 public policies on EE. Since 2006, these programs have enabled the implementation of pre-investment and loan programs, as well as direct technical assistance programs that have advanced energy efficiency in the industrial, residential, public and commercial sectors. In the years 2010 and 2011 alone, the amount allocated to energy efficiency by the Ministry of Energy was more than US$ 93 million.

Some of the most recognizable programs achieved by these agencies are:

- EE labelling for light bulbs, refrigerators and other appliances;
- Insulation retrofitting for 9,000 homes in lower income neighbourhoods;
- Energy audits to 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 older 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**

Even though 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 development had an impact on the growth on 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.
Regarding GHG emissions growth projections there are several studies which estimate long term projections in Chile. Differences in results are explained by different assumptions considered on GDP growth projections; the methodology applied for energy consumption projections; the estimation of GHG emissions; the types of emissions considered and the alternative scenarios proposed, among others.

Regarding the types of emissions included, it is important to note that some of the studies (POCH) only considered emissions from the energy sector (according to the “energy sector” definition of the IPCC methodology), excluding other sectors such as industrial processes, agriculture, waste, land use change and forestry. This information was complemented in the PROGEA studies, as they included the industrial sector.

The following figure shows the participation of each sub-sector in each study, showing the CO$_2$e contribution and percentage participation for each sector. This figure shows the different situation for each scenario in the year 2020, as this is the last common year for all three studies.
Chile’s overall climate policy goals (including 2020 target, potential international commitments), 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 in the principle of common but differentiated responsibilities.

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 and the development of studies about NAMAs and the potential use of new market mechanisms that will provide information for decision-making about mitigation in the country.

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 emissions inventories through the implementation of a national GHG Inventory Office;
- Integration of sector-specific efforts to prepare emission projections for the coming years;
- Improve the level of information to continue the creation of NAMAs in the short term.

Starting this year, the Government of Chile embarked on an extensive exercise to prepare long-term mitigation scenarios. This exercise, known as Mitigation Action Plans & Scenarios or MAPS, will organize the work already in progress and complement it with new lines of action and inputs from different stakeholders. Coordination between MAPS and Chile’s MRP is relevant and so, the correspondence between both processes will be ensured.

Institutional basis for climate change work and related decision making

Interministerial processes

Climate change committees

In 1994, Chile ratified the United Nations’ Framework Convention on Climate Change and subscribed to its Kyoto Protocol. 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 Environment, Foreign Affairs, Agriculture, Energy, Economy, Finance, Mining, Public Works, and Transportation and Telecommunications ministries. The Committee also has a Technical Group that meets more frequently to address technical issues and advise the ministerial representatives.

**Council of Ministers for Sustainability**

In 2010 Chile has enacted a new law, Law 20,417, amending Law 19,300 of 1993, to create the country’s authority on sustainability matters, i.e., the Council of Ministers for Sustainability. This a multi-sectoral body headed 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. 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.

That same Law 20,417 created 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.

Regarding climate change, the amended Law 19,300 established as a function of the ministry to “propose policies and formulate plans and programmes of action for climate change mitigation”. 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.

**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 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; 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 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.
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 Forestry Corporation (CONAF) started open discussions on an initiative to create and sell carbon credits from the forestry sector.

Concerning the above, depending on how the primary policy objective of a Chilean ETS is understood, the coordination tasks could be housed within different institutions. For instance, if the ETS is understood primarily as a provider of environmental benefits, the coordination tasks could be based within the Ministry of the Environment. More specifically, this role might be assigned to its Climate Change Division. If the ETS is understood as mainly as a producer of financial instruments, the coordination responsibilities could be assigned to a public body of a more economic character under the Ministry of Finance (such as the Securities and Insurance Supervisor – Superintendencia de Valores y Seguros - SVS). But an alternative could be, also, to allocate the task of overall supervision to the Council of Ministers for Sustainability.

**Chile’s experience with and suitability for market mechanisms**

Chile is unique in the region in regard to the use of market-based instruments for the management of natural resources, namely water, 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.

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.

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.

On the other hand, 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

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13 Plataforma de generación y comercio de bonos de carbono forestales de Chile.
projects registered and methodologies approved. True to its interest in making prompt use of the CDM, in 2003 Chile established its Designated National Authority (DNA)\textsuperscript{17}.

The promotion of the CDM in Chile and abroad, the DNA’s review of projects, and Chile’s array of cooperation agreements with industrialized nations in areas related to the CDM have helped Chile, as of December 2010, in establishing 73 projects approved by the DNA, 42 of which are registered with the CDM Executive Board. These projects imply a global reduction of 4,957,224 tons of CO\textsubscript{2} equivalents\textsuperscript{18}. The main activities covered by the CDM in Chile have been run-off-the-river plants, methane capture, wind farms and biomass.

**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 Ministry of Energy 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 bases 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\textsuperscript{19}, requires first the approval of a legislation framing the use of tradable permits in the country.

**ETS Piloting 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

\textsuperscript{17} 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

\textsuperscript{18} Chile’s Second National Communication (2001)

\textsuperscript{19} Ley No. 19300 de 1994: Ley de Bases del Medio Ambiente.
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.

The government is also convinced that major programs like this one will need a voluntary pilot to be deployed prior to the final execution (see Chapters 4 for more details on a roadmap to an ETS decision making process and on a voluntary pilot ETS).

Key challenges to take into account/address (e.g. industry competitiveness, impact on poor households etc.).

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.
4. PLANNING FOR A MARKET BASED INSTRUMENT: ROADMAP TO REACH THE ETS “PILOT-READY” STAGE

Introduction

This section presents a roadmap showing the intended path to a political decision on the overall role of an ETS in Chile’s climate policy and on a decision to proceed with a voluntary ETS pilot.

The chapter also outlines key policy and institutional elements of the ETS voluntary pilot 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 a voluntary ETS pilot.

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

- Capacity building (public and private sectors)
- Research
- Policy work
- 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 an ETS pilot ready, also noting that such MRV infrastructure will have co-benefits for supporting more informed policy making.

Whereas the main objective of an ETS voluntary pilot in the country will be to test the technical and institutional capabilities of implementing an economy-wide ETS, the design of this experimental model must incorporate the main objectives of a national-level scheme.

4.1 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:

1) Fill the technical gaps in knowledge to help Chile to make a decision on ETS/ETS design.
2) Launch a national conversation on Chile’s preferred climate policy package (including the ETS option and the purposes for which Chile might pursue an ETS – i.e. explore the “why?” question).
3) Build technical, institutional and organizational capacity to implement an ETS.

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20 Annex 6 describes in detail the “policy and institutional development approach to be carried out under the proposed MRP for Chile.
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 implementation of this ETS voluntary pilot.

In other words, regardless of the amount of time each stage will take and the final accomplishment of each activity, the items on a given stage cannot start before the items on the previous stage have been addressed. It is important to understand that the items on a previous stage can be ongoing so the emphasis is on the addressing and not the finalization of the item.

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 following tables:
| TABLE A: PREPARATION & EARLY REPORTING PHASES - POLICY DEVELOPMENT PROCESS |
|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| **Scoping and Research**                      | **Design, Refine and Road-test**               | **Refine, Consult and Decide**                 |
| First stage                                    | Second stage                                   | Later stages                                   |
| **KEY POLICY ISSUES**                         | **KEY POLICY ISSUES**                         | **KEY POLICY ISSUES**                         |
| • Chile ETS objectives + criteria             | • Detailed consideration of core design       | • Detailed consideration of core design       |
| • High-level design parameters:               |   components:                                  |   components:                                  |
|   - Establishment of the sectors to be        |     - Sector coverage & gases (national level) |     - Allocation                               |
|   regulated (pilot level)                     |     - Point of obligation (energy sector)     |     - Compliance                               |
|   - Linking and offsets (concept level)       |     - Setting level of ambition                |                                               |
|                                               |     - Linking and offsets (design level)       |                                               |
|                                               |     - Phasing                                  |                                               |
|                                               |     - Allocation                               |                                               |
|                                               | • High level design parameters:                |                                               |
|                                               |   - Chile’s objectives for allocation of units |                                               |
| **RESEARCH (supporting technical analysis)**  | **RESEARCH (supporting technical analysis)**  | **RESEARCH (supporting technical analysis)**  |
| • Lessons from experience and emerging        | • Specific issues that arise from stakeholder  | • Cost/benefit analysis of the government’s    |
| economy issues                                |   engagement or on individual design          |   preferred ETS design proposal                |
| • Sectorial market structures and emissions   |   components:                                  |                                               |
|   profiles                                     |     - Assessment of Economic Impacts Research  |                                               |
|                                               |     - Study on linking opportunities and       |                                               |
|                                               |   implications for ambition and harmonization  |                                               |
|                                               |   of ETS design features                      |                                               |
|                                               |   - Domestic offsets value/feasibility         |                                               |
|                                               |   - Complementary measures to address non-price|                                               |
|                                               |   barriers and facilitate low-carbon          |                                               |
|                                               |   investment                                    |                                               |
| **OUTREACH & ENGAGEMENT**                     | **OUTREACH & ENGAGEMENT**                     | **OUTREACH & ENGAGEMENT**                     |
| • Design an engagement strategy               | • Establish multi-stakeholder and technical    | • Formal consultation on the government’s     |
|   - Identify and engage stakeholders          |   advisory bodies/processes as needed          |   comprehensive proposal for an ETS (preferred |
|   and potential pilot sectors                 |   - Bilateral meetings with emitters (survey)  |   design)                                     |
|   - Education and engagement on              |   - Meetings of government, regulators +      | • Bilateral emitter                            |
|   Chile’s climate change objectives and       |   stakeholders with their counterparts in      |   engagement via Early                       |
|   preferred policies, including               |   countries with or considering an ETS (on    |   Reporting (data collection)                |
|   the option of an ETS                       |   design, lessons learned and linking          |   process                                       |
|   - Engagement in other relevant              |   opportunities)                              |                                               |
|   international ETS-related policy processes  |                                               |                                               |
|                                               |                                               |                                               |
### Table B: Preparation & Early Reporting Phase - Institutional Development + Capacity Building

<table>
<thead>
<tr>
<th></th>
<th>Scoping and Research First stage</th>
<th>Design, Refine and Road-test Second stage</th>
<th>Refine, Consult and Decide Later stages</th>
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</table>
| Technical & Legal Infrastructure |  | • Establishment of new institutions (if applicable)  
• Delegation of governance responsibilities  
• Legislative needs + gaps assessment (to proceed with policy development process (preparing for early reporting phase a priority) |  
• Draft implementing legislation  
• Compliance regime  
• Verification guidance + accreditation |
| Institutional Arrangements | • Define the institutional structure<sup>21</sup>  
- Identification of project leadership  
- Plan for coordinating PMR activities across government  
- Assignment of organizational roles and responsibilities | • Plan for coordinating the government’s decision-making process for an ETS and establishment of any coordination bodies/processes  
• Plan for institutional arrangements for ETS rule-making, administration, MRV and market oversight  
• Registry development |  |
| Readiness + Capacity Building | • Assessment of sector + institutional readiness and capacity building/training needs | • Developing measurement and reporting protocols for Early Reporting Phase (emitters) – e.g. begin with survey?  
• Institutional capacity building for ETS implementation  
• Sectorial capacity building in MRV for ETS participation | • Implementation of Early Reporting (data collection) phase  
• Sector capacity building for ETS trading + testing (mockup trading) |

<sup>21</sup> The institutional structure to manage the PMR project has been already established. See Chapter 6 on Organization, Communication, Consultation and Engagement.
4.2 Market Readiness Components for Chile

This subchapter describes the activities for each of the market readiness components Chile is pursuing. These activities include the design of a pilot for a sectorial ETS; the design of an MRV and registry systems for the country; and the potential implementation of the ETS voluntary pilot.

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 & legal infrastructure.

Finally, we have included the activities associated to the administration of the ETS voluntary Pilot.

I. 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 and legislative agents (ministers and congress people) in order to determine the country’s ETS objectives and setting 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 pilot, as well as
work on basic conceptual aspects of an ETS for the country, such as the roles of linking and offsets.

iii. International policy activities:
Conduct informative activities of legislations with regulators of countries that have ETS systems in place or that are in the process of implementing one.

2. Research

i. Academic research:
Conduct further academic research of the necessary elements to implement an ETS in the country.

ii. Readiness research:
Engage with government departments 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 departments to eventually administer ETS functions.

iii. Learning from experience:
Beyond the academic research, it is primordial to learn directly from other economies 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. Special attention should be made to “train the trainers” modalities.

iv. Data collection:
Identify data collection and research needs and developing implementation plans.
Conduct preliminary data collection in order to have a more tangible and up-to-date assessment of GHG emissions in the different sectors.

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:
Identification of potential participating sectors and the appropriate stakeholders.

ii. Development of seminars and meetings:
We will carry out strategic meetings with directors of industrial associations and have seminars open to broader constituencies within sectors that are candidates for a potential ETS voluntary pilot, 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. Linking partners:
Hold early discussions with prospective linking partners in order to keep them up to date on our progress.
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. Establishment of an ETS agency:
Identifying which entities should be the one conducting this exercise, setting early on its roles and responsibilities. This will require identifying the project leadership and establishing a plan for coordinating 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 voluntary pilot.

iii. Reporting institutions:
Identifying which entities should be invited to participate in voluntary reporting and which should be required to participate in mandatory reporting.

iv. Reporting requirements:
Designing ETS reporting 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 regulatory body and 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.

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.
- 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.

C. Administration of ETS voluntary Pilot

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

i. Administrative agency:
   An initial team of three specialists should be fully in charge of the design of the ETS pilot for the first two stages (first and next steps).

ii. Technical teams:
   Activities associated to public agencies that will administer protocols, certification of agencies, enforcement of firms and private certification agencies, etc.
   Activities associated to private agencies that will do the certification of firms, conduct site visits, etc.

iii. Policy-making team: Budget allocation to public sector agency:
   Activities associated to public agencies that will conduct the policy dialogue within the government agencies and legislators as well as stakeholders.
II. Design, Refine and Road-test (Stage 2)

As described on chapter four, this second stage refers to the elements that will start once the elements on the first stage have been addressed, 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 that arise from stakeholder engagement or on individual design components.

ii. Preliminary CBA for the sectors engaged:
    Assessment of Economic Impacts Research.

iii. Preliminary study on linking opportunities and structural economic impact:
    Study on linking opportunities and implications for ambition and harmonization of ETS design features.
iv. Domestic offsets value:
Feasibility study on availability of offsets for domestic and international markets.

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:
Meetings with other ETS constituencies, such as international emissions trading and industry associations to have 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 voluntary pilot.

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 for coordinating the government’s decision-making process for an ETS and establishment of any coordination bodies/processes.

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

iii. 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 phase 1 and 2, more elaborate system in phase 3 and 4.
   - Definition of stepwise approach for registry build up:
     - Coordination with international registries may be considered.
   - Registry design is formulated with roundtable input from the private sector/project proponents.

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 voluntary pilot implementation.

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

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, transport).
- 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 voluntary reporting.
- Evaluation of results from voluntary reporting, revision of regulatory framework if necessary.

C. Administration of ETS Voluntary Pilot

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

i. Administrative agency:
The team of specialists should remain the same as on the first step.

ii. Technical teams:
Activities associated to public agencies that will administer protocols, certification of agencies, enforcement of firms and private certification agencies, etc.
Activities associated to private agencies that will do the certification of firms, conduct site visits, etc.

iii. Policy-making team: Budget allocation to public sector agency:
Activities associated to public agencies that will conduct the policy dialogue within the government agencies and legislators as well as stakeholders.

III. Refine, Consult and Decide (Stage 3)

As described on chapter four, this last stage 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 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 drafting (if applicable):
      Develop ETS legislation and regulations, participant guidelines, and institutions, 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 pilot 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 both, the pilot and a 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.
   ii. Early reporting:
      Bilateral emitter engagement via early reporting (data collection) process.

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 ETS voluntary pilot.
ii. Legislation and accreditation:
Draft the necessary implementing legislation in order to have a fully functional ETS voluntary pilot 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 (sectorial, national, voluntary, regulated, etc.) along with defined verification guidance and accreditation systems.

2. Readiness and Capacity Building

i. Reporting of emissions:
- Appropriate software application and reporting of emissions system will be implemented.
- Implementation of early reporting phase for data collection.

ii. ETS Administrator:
- Policy setting and regulatory body will be established.
- 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.

iii. Training of private sector operators for MRV at the 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.

iv. 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.

v. Training of private sector operators for MRV at the upstream level (if relevant).
- Advanced training in MRV for all participants in pilot scheme.
- Pilot verification of monitoring and identification of bottlenecks/problems.
- Hotline for participants in pilot scheme.
C. Administration of ETS Voluntary Pilot

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 ETS voluntary pilot.

i. Administrative agency:
The team of specialists should increase in comparison to the first two steps.

ii. Technical teams:
Activities associated to public agencies that will administer protocols, certification of agencies, enforcement of firms and private certification agencies, etc.
Activities associated to private agencies that will do the certification of firms, conduct site visits, etc.

iii. Policy-making team: Budget allocation to public sector agency:
Activities associated to public agencies that will conduct the policy dialogue within the government agencies and legislators as well as stakeholders.

4.3 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 pilot 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>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goals &amp; Structure</strong></td>
<td>ETS pilot objectives and criteria</td>
</tr>
<tr>
<td></td>
<td>Identification of ETS pilot design options</td>
</tr>
<tr>
<td><strong>Governance</strong></td>
<td>Consultation on government proposal</td>
</tr>
<tr>
<td></td>
<td>Final government policy decisions on ETS pilot design</td>
</tr>
<tr>
<td></td>
<td>Legislative procedure</td>
</tr>
<tr>
<td><strong>Coverage</strong></td>
<td>Which sectors will be regulated under an ETS pilot?</td>
</tr>
<tr>
<td></td>
<td>When will others sectors have sufficient capability to join the pilot?</td>
</tr>
<tr>
<td></td>
<td>What point of obligation will ensure the most effective operation?</td>
</tr>
<tr>
<td><strong>Emissions constraint</strong></td>
<td>Does the government want a domestic-only emission target?</td>
</tr>
<tr>
<td></td>
<td>What is the level, trajectory and time frame for the cap, and how should the cap be adjusted over time?</td>
</tr>
<tr>
<td></td>
<td>What is the risk of carbon leakage and what measures are needed to prevent or mitigate carbon leakage?</td>
</tr>
<tr>
<td><strong>Linking</strong></td>
<td>What types of offset units should the ETS pilot accept from UNFCCC and non-UNFCCC mechanisms, either domestic or foreign?</td>
</tr>
<tr>
<td></td>
<td>When will sell-only, buy-only or buy-and-sell linkages become feasible at the level of the government and/or the ETS pilot?</td>
</tr>
</tbody>
</table>
What level of ETS ambition and other ETS pilot design features in Chile will be required to enable sell linkages to other ETS?

<table>
<thead>
<tr>
<th>Price stabilization</th>
<th>Does the government want to control the domestic price of emissions relative to the market or international price?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Will the quantity of emissions or the price of emissions take precedence as the ultimate constraint of the ETS pilot?</td>
</tr>
<tr>
<td></td>
<td>Under what conditions would using price stabilization measures take precedence over linking to other ETS that prohibit them?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phasing</th>
<th>What kind(s) of transitional phase should be used before linked trading is feasible and desirable?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Would five-year periods be appropriate for trading phases, with annual compliance periods?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Allocation</th>
<th>Which rationales and methods for free allocation or allowance revenue distribution are most applicable to each sector?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Will the government provide other forms of transitional financial support (e.g. subsidies, tax benefits, etc.)?</td>
</tr>
<tr>
<td></td>
<td>Under what conditions and at what rate will free allocation be phased out over time?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compliance</th>
<th>What balance does the government want between facilitative and punitive measures for non-compliance?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What are the outcomes of non-compliance on a voluntary ETS pilot level?</td>
</tr>
<tr>
<td></td>
<td>How can the government monitor scheme compliance efficiently?</td>
</tr>
<tr>
<td></td>
<td>How can the government manage the impacts of non-compliance?</td>
</tr>
</tbody>
</table>
5. TIMELINE OF ACTIVITIES, BUDGET AND DECISION POINTS

The following section shows a timeline of the activities, budget and decision points of this roadmap in order to reach the ETS “pilot-ready” stage. This timeline is a chronological organization of the activities described on section 4.2.

<table>
<thead>
<tr>
<th>I. Scoping and Research Activities</th>
<th>Quarter</th>
<th>Yearly Budget (US$ Thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Policy Development Process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Key Policy Issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Policy meetings</td>
<td>DP</td>
<td></td>
</tr>
<tr>
<td>ii. Consultation with experts</td>
<td>DP</td>
<td></td>
</tr>
<tr>
<td>iii. International policy activities</td>
<td>DP</td>
<td>40 40</td>
</tr>
<tr>
<td>2. Research</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Academic research</td>
<td>DP</td>
<td>50 50 50 50 200</td>
</tr>
<tr>
<td>ii. Readiness research</td>
<td>DP</td>
<td>50</td>
</tr>
<tr>
<td>iii. Learning from experience</td>
<td>DP</td>
<td>100 100 100 100 400</td>
</tr>
<tr>
<td>iv. Data collection</td>
<td>DP</td>
<td>35 55 55 55 200</td>
</tr>
<tr>
<td>3. Outreach &amp; Engagement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Hiring of strategy group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. Stakeholder engagement</td>
<td>DP</td>
<td></td>
</tr>
<tr>
<td>iii. Development of seminars and meetings</td>
<td>DP</td>
<td>20 10 10 10 50</td>
</tr>
<tr>
<td>iv. Public Outreach</td>
<td>DP</td>
<td>20</td>
</tr>
<tr>
<td>v. Linking partners</td>
<td>DP</td>
<td>40</td>
</tr>
<tr>
<td>B. Institutional Development + Capacity Building</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Institutional Arrangements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Establishment of ETS agency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. Budget activities</td>
<td>DP</td>
<td>150 150 200 500</td>
</tr>
<tr>
<td>iii. Reporting institutions</td>
<td>DP</td>
<td>20</td>
</tr>
<tr>
<td>iv. Reporting requirements</td>
<td>DP</td>
<td>20</td>
</tr>
<tr>
<td>2. Readiness and Capacity Building</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. Policy setting for regulatory body and ETS Administrator</td>
<td>DP</td>
<td>200 200 200 200 800</td>
</tr>
<tr>
<td>ii. Training of private sector operators for MRV (source level)</td>
<td>DP</td>
<td>50 150 150 150 500</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1.045 865 965 565 3.440</td>
</tr>
</tbody>
</table>

Yearly Budget (US$ Thousands)
<table>
<thead>
<tr>
<th>A. Policy Development Process</th>
<th>Quarter</th>
<th>Yearly Budget (US$ Thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Legislation and regulation</td>
<td>DP</td>
<td></td>
</tr>
<tr>
<td>ii. Studies: specific analysis for all the elements of an ETS</td>
<td>DP</td>
<td>100 100 200 400</td>
</tr>
<tr>
<td>iii. High level design parameters</td>
<td>DP</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. Institutional Development + Capacity Building</th>
<th>Quarter</th>
<th>Yearly Budget (US$ Thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Technical &amp; Legal Infrastructure</td>
<td>i. Establishment of new institutions</td>
<td>DP</td>
</tr>
<tr>
<td>ii. Delegation of governance responsibilities</td>
<td>DP</td>
<td>150 150 150</td>
</tr>
<tr>
<td>iii. Studies and legislative work</td>
<td>DP</td>
<td>200 200 200</td>
</tr>
</tbody>
</table>

| 2. Institutional Arrangements | i. Policy-making processes | DP | 20 20 20         |
| ii. Institutional arrangements | DP | 200 200 200     |
| iii. ETS registry system | DP | 200 200 200     |

| 3. Readiness and Capacity Building | i. Development of reporting protocols | DP | 50 50 50 150 |
| ii. Training of public sector technicians | DP | 100 100 200 400 |
| iii. Training of private sector technicians | DP | 100 100 200 400 |
| iv. Training of operators at upstream level | DP | 50 50 100 200 |

**Total** 350 1,440 620 570 2,980
### A. Policy Development Process

#### 1. Key Policy Issues
- **i. Legislation Drafting**
- **ii. Detailed consideration of core design components**

#### 2. Research
- **i. Cost Benefit Analysis**

#### 3. Outreach & Engagement
- **i. Preferred design**
- **ii. Early reporting**

### B. Institutional Development + Capacity Building

#### 1. Technical & Legal Infrastructure
- **i. Budgeting legislation**
- **ii. Legislation and accreditation**
- **iii. Compliance regime**

#### 2. Readiness and Capacity Building
- **i. Reporting of emissions**
- **ii. ETS Administrator**
- **iii. Training of private sector operators for MRV (source level)**
- **iv. ETS registry system**
- **v. Training of private sector operators for MRV (upstream)**

### IV. Administration of ETS Pilot

### III. Refine, Consult and Decide Activities

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Yearly Budget (US$ Thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

#### I. Scoping and Research Activities
- **1.045 865 965 565 3.440**

#### II. Design, Refine and Road-test Activities
- **350 1.440 620 570 2.980**

#### III. Refine, Consult and Decide Activities
- **825 1.575 2.400**

#### IV. Administration of ETS Pilot
- **300 200 550 750 1.800**

**Total**: 1.695 2.505 2.960 3.460 10.620
Ministry of Energy, Chile

6. ORGANIZATION, COMMUNICATION, CONSULTATION AND ENGAGEMENT

This short section summarizes overall plans for organization, communication, consultation and engagement:

Organization/Project Governance

The following institutional arrangements are envisioned for Chile’s MRP Implementation Phase.

MRP Focal Point.

The Sustainable Development Division at the Ministry of Energy will act as the Focal Point of the MRP. It will be responsible for the overall day-to-day supervision of the implementation of the MRP tasks described in Chapters 4 and 5.

The Focal Point will also coordinate the work needed with other stakeholders/instances that will participate in the implementation phase of this MRP i.e., Steering Committee, Council of Ministers for Sustainability, Consultative Group of Experts, project coordinator, project consultants, PMR Secretariat Team, Ministry of Finance, others. The expected role of these stakeholders is described below:

Steering Committee.

The Steering Committee was established for the preparation phase and will continue its role of providing technical and policy oriented inputs to the MRP process on different matters relevant to the Chilean MRP, such as the formulation of the MRP, the preparation of TOR for different activities including plans for engagement/collaboration with other key stakeholders and studies required in the implementation phase, provision of basic/sectoral information, review of draft and final reports of the implementation phase studies, among others.

This body, headed by the Ministry of Energy, comprises the participation of the ministries of Agriculture, Economy, Environment, Finance, Mining and Transport/Telecommunications. Given the nature, scope and expected outcomes resulting from the implementation of this project, the SC constitutes the primary engagement/collaboration/consultation body already established in which key Ministries will continue to provide the necessary policy and technical guidance during the implementation of Chile’s MRP.

High Level Decision Making Arrangements.

The Council of Ministers for Sustainability, created in 2010 by Law 20, 417 (see Chapter 3), will provide a higher-level policy guidance to all the steps planned under this MRP, especially during the roadmap towards a political decision on the overall role of an ETS in Chile’s climate policy, and on a decision to proceed with a voluntary pilot of the ETS.

22 Activities for which funding is sought have already been included in Section 4, but this information might be pulled all together in the communication, consultation and engagement plan proposed at the end of this section.

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.
As learnt from the preparation phase studies, key decision points/government judgment needs on, *inter alia*, coverage (sector, subsectors, and gases), emissions constraint, linking, phasing, allocation and compliance may arise during the ETS decision-making process.

A central role during discussions on key decision points is foreseen for this Council of Ministers. 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.**

The establishment of a Consultative Group of Experts is hereby proposed with the objective of bringing other —equally important— members of society to the discussion on market-based instruments and their suitability and applicability in the Chilean context. It will be integrated by representatives of business associations, research organizations and NGOs. Its establishment and overall coordination will be done through the MRP Focal Point. Meetings with the CGE will be convened as needed. Depending on the topics, the Steering Committee may participate in these meetings.

If required, members of the CGE may meet bilaterally with MRP Focal Point to address specific/strategic issues related to this project.

**Project Coordinator.**

In addition to the supervision role of the MRP Focal Point, a project coordinator is highly desirable given the tasks and numerous activities that will be performed during the MRP implementation phase. On this regard, the PC will report directly to the MRP Focal Point and will develop activities which are inherent to this type of assignments. A workplan will be prepared by the PC at the beginning of his/her term.

A selection process will be carefully established for the appointment of this expert.

**Project consultants.**

In order to perform specific activities and/or tasks of a more technical nature, public biddings will be conducted accordingly. The procurement procedures for this will be done in accordance with specific requirements established by the entity that will administer the MRP funding (to be resolved at a later stage).

Project consultants will report directly to the Project Coordinator.

A selection process will be carefully established for the appointment of these consultants.

**PMR Secretariat Team.**

As done during the preparation phase, the PMR Secretariat Team will provide technical advice in the different stages of Chile’s MRP, as deemed necessary, including coordination with the Partnership Assembly. In-country visits, participation in workshops or training activities and in any other activity related to Chile’s MRP may constitute part of its involvement.

Further specifications/clarifications of the PMR Secretariat Team could be addressed for the final MRP version.
The following diagram illustrates the MRP’s institutional arrangements foreseen for this project:

**MRP’s Institutional Arrangements**

---

**Communication, Consultation and Engagement**

The success of the roadmap towards a political decision on a voluntary pilot ETS in Chile’s, including the early implementation of ancillary pilot instruments such as a MRV system and a Registry, 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/consider:

- Outreach and coalition building on the MRP/consultation process with stakeholders.
• A process for identifying and working with stakeholders on concept ETS, ETS voluntary pilot, MRV Design and pilot, and registry design.

• Carefully designed workshops to targeted sectors (of a general or more specific nature).

• Technical documentation on matters such as ETS design and piloting, complementary instruments, institutional and regulatory needs, etc.

• Identification of training and capacity building gaps and needs (for public and private sector).

• The use of outreach means such as an MRP web page, MRP informative brochures, etc.

For the purpose of designing and implementing the MRP’s outreach and engagement strategy, a communication, consultation and engagement plan will be prepared at the beginning of the implementation phase of this project.
7. ANNEXES
Annex 1: 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**: Not existent yet.
• 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.
– 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 phase 1 and 2, more elaborate system in phase 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.

**ETS registry system**

- An electronic registry for the pilot phase is developed to gain experience.
- Registry for pilot phase can be simpler 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 2: 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 led 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 respond 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 ETSs 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 off 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 3: 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 Highlights

• 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 4: 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 5: 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 (Ley N°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 6: 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 sectorial 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 sectorial 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. Sectorial 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{24}:

      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)

\textsuperscript{24} See Box B in Annex 7, which provides a detailed scope of these learning processes.
iv. Level of ambition (Cap)
   - 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.
   - Political economic discussion of options: price floors & ceilings, 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. Sectorial 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 7

**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 CO₂ or CO₂-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 sectorial basis according to its overall emission reduction objectives and sectorial 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 CO₂ or CO₂-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 sectorial 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 sectorial 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
Sectorial 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 CO\textsubscript{2}e, 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)\(^{25}\).

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.

\(^{25}\) Previous experience with allocation modalities in ETS and other environmental applications in Chile and internationally can be found in Annex 8.
Annex 8: Previous experience with allocation modalities in ETS and other environmental applications in Chile and internationally

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<thead>
<tr>
<th>Scheme</th>
<th>Modality used</th>
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<td>EU ETS Phase I (2005-7)</td>
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<td>New Zealand ETS</td>
<td>Liquid fuels and stationary energy</td>
<td>Fishing and deforestation only</td>
<td>Emissions-intensive, trade-exposed sectors</td>
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<tr>
<td>Regional Greenhouse Gas Initiative, US</td>
<td>Auctioned to support technology programmes</td>
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<tr>
<td>American Clean Energy and Security Act</td>
<td>15% auctioned</td>
<td>Vulnerable sectors and electricity consumers</td>
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<td>Waxman-Markey</td>
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<tr>
<td>alifornia ETS</td>
<td>50% auctioned</td>
<td>Vulnerable industries and electricity consumers</td>
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<td>Alberta, Canada</td>
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<td>Intensity-based system</td>
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<td>Chilean water markets</td>
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<td>Chilean fishing quota</td>
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**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.