



Mitigation Action Plans & Scenarios

RESEARCH PAPER

Country Study

Mitigation Actions in Chile

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Developing
countries exploring
pathways to climate
compatibility

Country Study

Mitigation Actions in Chile

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1. INTRODUCTION

One of the fundamental principles underpinning the international agreement signed at the United Nations Framework Convention on Climate Change (UNFCCC) in 1992, is the principle of common but differentiated responsibilities. This meant at the time that, inter alia; developed countries were exclusively responsible for taking mitigation actions to address the problem of climate change. Developing countries could voluntarily contribute to these efforts, to the extent that they were supported financially by developed countries.

It therefore follows that participation by the developing world in climate change mitigation actions has been slow and limited to i) implementation of mitigation activities financed by the Global Environment Facility (GEF) and ii) actions implemented by private bodies, facilitated by the Clean Development Mechanism (CDM) of the Kyoto Protocol.

A significant shift was made at the Conference of the Parties (COP) to the international agreement, at its 13th gathering, which took place in Bali, Indonesia in 2007. The situation for developing nations shifted at these negotiations on the necessary elements for reaching an agreement on long-term international co-operation towards achieving the goals of the convention. Developing countries agreed ‘to take mitigation actions appropriate to each of the parties and to take actions for sustainable development that would be supported and facilitated by technologies, by financing and by capacity building activities in measurable, reportable and variable ways’.

At the 2007 conference, the principles of common but differentiated responsibilities were redefined, and since then there has been a considerable increase in the number of proposals for mitigation actions in the developing world that seek internationally pledged support for quantifiable targets of emission reductions.

The following sections provide a brief outline of Chile’s participation in mitigation actions, focussing on the most relevant work but also taking note of other work which has been and will be functional to mitigation tasks and which are either in implementation phases now or will be in the future. An extensive review of this can be found in the country’s recently published Second National Communication to the UNFCCC.

2. CONCEPTUAL APPROACH TO MITIGATION ACTIONS IN CHILE

2.1. Contextual Framework

As has been established, Chile's involvement in addressing the challenge of climate change, which is a problem caused by current patterns of development, has been no different to that of most developing nations, they have been responses to international agreements signed at the UNFCCC and the Kyoto Protocol.

The country's participation in addressing the problem of climate change began upon signing the Framework Convention in 1992 at the summit in Rio, and its commitment was ratified in 1994. Since 1994 to date, specific phases of development can be distinguished. These are described in this section focussing on aspects of development that relate to mitigation actions.

2.1.1 *First Phase*

The first phase, between the year of signing the convention and 2001, is characterised by the following: a) use of the Global Environment Facility (a financing body available to developing nations to simultaneously assist mitigation efforts and aid in accomplishing goals of the First National Communication), and b) the development of an institution for creating a country position on the issues discussed at the convention.

In 1992, only a few months after signing the convention and during the second pilot phase of the facility, Chile received funding from the Global Environment Facility for two projects.. The first project dealt with promoting installation of services supporting efficient use of energy, using Energy Service Companies (ESCO) and pilot projects which focussed mainly on copper mining in the country. The second project consisted of a study on the economic feasibility of producing methanol from lignocellulosic material, which is in abundance in the country, and which could have a great impact on CO₂ emissions originating in the transport sector.

Unfortunately both initiatives fell short of their targets. This was due to a lack of local ownership. Both project concepts were identified by international consultants who were interested in promoting participation of developing countries in mitigation actions through the use of the Global Environment Facility. While the projects were well received by the national authorities involved (in Environment and Energy), endorsed by them and presented to the facility as their proposals, a lack of integration of the projects into national policy or programmes resulted in their eventual isolation. Eventually, it was concluded that the administrative difficulties with implementation could not be overcome, and therefore the projects would not be able to reach their goals.

A second proposal for mitigation actions to the Global Environment Facility in 1999 was more successful. The project was titled 'Removal of obstacles to electrification of rural areas using renewable energies'. This project proposed aligning goals of the convention with a successful policy of rural electrification which the government had already been implementing in the 90s and applied for funding from the fund to cover the incremental costs of the policy using renewable energy sources. The project was implemented in the first part of 2000 and most of the goals were reached.

In 2001, the Global Environment Facility approved two of the country's new projects on climate change mitigation. One of them was a small scale project to build capacity for assessing technological needs and promoting integration of climate

change concerns into development planning and goal setting. The other project consisted of carrying out a series of studies to promote the reduction of GHG emissions in land transport in Santiago, which involved promoting the use of bicycles, modernizing the public bus system and improving traffic flow.

In 1996, the country applied to the Global Environment Facility for resources in order to fulfil its commitment to prepare its First National Communication for the convention. In this, the country presented an inventory of emissions in Chile for 1994, some studies concerning vulnerability and adaptation in some of the key sectors of the economy, such as agriculture and forestry and fishing, a first GHG emission forecast for 2020, and possible scenarios, with some mitigation actions, which could curb the current emission growth trend.

The scenarios take macro-economic trends and demographics into consideration, and make an analysis of the international context in terms of technological transfer, growth forecasts for Chile's relevant markets and energy prices trends.

It must be mentioned that in the framework of this communication, a calculation of national emissions of GHG was also made for both the energy sector and non-energy sector for the period between 1984 and 1998. This is historic information and of paramount value for mapping out trends. It has been periodically updated to date.

Considering that the issue of climate change was becoming increasingly relevant to the country, both in terms of international negotiation processes and initiation of cooperative projects, it became necessary to set up an institutional authority to facilitate debate and government consultation in decision making.

Therefore, the National Advisory Committee on Global Change (NAGC) was set up in 1996. With representatives from the National Environmental Commission, The Ministry of Foreign Affairs, The Ministry of Agriculture, The National Energy Commission, The General Directorate of Maritime Territory and Merchant Marine, the Meteorological Directorate of Chile, the Hydrographic and Oceanographic Service of Chilean Navy, the National Commission for Scientific and Technological Research and the Chilean Academy of Sciences.

The committee only began to operate on a regular basis from the beginning of 1998, from which point specific work groups had been established and an agenda for short and medium term activities had been drawn up.

In a short time, the committee achieved more active participation within the country in discussions concerning modalities and procedures of the Kyoto Protocol, particularly in that of the Clean Development Mechanism (CDM), which is an instrument linking national development tasks to the conditions of climate change.

Focussing on the medium-term, another central task of the committee was to develop strategic guidelines for climate change in Chile, with the aim of establishing a framework for government action in order to realise the commitments made at the convention and to the Protocol.

These guidelines were approved by the Board of the National Environment Commission in 1998. They served to reaffirm the commitments established at the convention, to promote ratification of the Kyoto Protocol and to promote participation by relevant sectors and by Chilean experts in the discussion on economic mechanisms and the use of the CDM. Moreover, they raised the need for the following; a) basic guidance on designing new ways of limiting and/or reducing GHG emissions in developing countries, b) for creating a special national fund for scientific and technological research and training on climate change in the country and c) for generating and implementing a National Action Plan on Climate Change.

2.1.2 Second Phase

The second distinguishable phase of actions dealing with climate change dates between 2002 and 2005 and is characterised by extensive use of the Clean Development Mechanism (CDM). It began with a study on strategic use of financial instruments in the market, followed by installing a Designated National Authority and an intense campaign promoting opportunities for implementing projects using this instrument of emission compensations. The Designated National Agency which promotes national products in international markets (PROCHILE) participated in the campaign which showcased at the Carbon Fair.

The study was successful in that Chile was ranked the country with the most registered CDM projects and important capacity was developed to support preparation of these projects according to modalities and procedures governing the market.

It is important to note that a number of conditions contributed to this situation. These are; the confidence the first investors had in the emerging carbon market, political stability in the country, the security offered in legislation on foreign investment and the simplicity of the procedures set out by the Designated National Authority for endorsing CDM proposals. This was reduced to provide proof of an environmental permit issued for the project, which is required by national legislation before implementation begins.

In spite of attempts made by leadership to integrate these developments into national policies, mainly in the energy sector (by issuing subsidies for studies such as a technical feasibility study of renewable energy initiatives and a pilot project to promote the use of the instrument in both small and medium national industry) progress was marginal.

2.1.3 Third Phase

The third phase dates between 2006 and 2009. It is characterised by; wide scale work on laying the foundations for national awareness, to providing climate change policy and to establishing a procedure for structuring and implementing policy.

The country's reasons for readdressing the issue of climate change are similar to the reasons sparking a revival of the process of national negotiations in the Framework Convention. These were:

- (i) an increase in the frequency and intensity of extreme hydro-meteorological events which also affected industrial nations,
- (ii) an increased 'popularity of the issue' from the global population created by the media success of the documentary made by the ex-presidential candidate, Al Gore, entitled 'An inconvenient Truth',
- (iii) an initiative by the British ex-Prime Minister Tony Blair and Stern evaluating the economic cost of inaction to climate change versus action,
- (iv) the new Secretary General of the United Nations giving priority to the issue – expressed in special general assembly meetings called discussion on of the topic,
- (v) publication of the Fourth Report of the IPCC and its calls to action, and the agreements made at the conventions in Montreal and Bali, inter alia.

There were also national reasons for this including:

- i) a difficult situation due to unreliable supply of energy, exacerbated by periods of pronounced droughts and problems with accessing natural gas from neighbouring countries which highlighted the extreme fragility of Chile's energy system,
- ii) publication of a study of climate variability in Chile in the 21st century. The study used the PRECIS model, which was developed by the Meteorological Office in the UK, and illustrated in detail, the effects that uncontrolled increase in global temperature could have on the economy and population in an area of 25km,
- iii) and finally, Chile's proposal to become a member of the Organisation for Economic Co-operation and Development (OECD) and the guidelines set out for members of the organisation.

The unreliability of energy supply in the country, accompanied by rapid economic growth gave rise to the need to increase efforts to secure a more efficient energy supply and to use alternative and renewable sources. In order to achieve this, the basis was established, between 2006 and 2009, for the establishment of two appropriate policies, which are currently being developed.

Firstly, the Country Energy Efficiency Programme (CPEE) was instituted at the beginning of 2005, under the wing of the Ministry of Economy, Development and Reconstruction. However, it only began to operate and from the 1st December 2008 when administration was handed over by the National Energy Commission (NEC), the predecessor to the current Ministry of Energy to the Chilean Agency for Energy Efficiency, an implementation body of the Ministry of Energy which integrates the goal of energy efficiency across activities.

The main aim of the CPEE is to increase energy efficiency in the highest energy consuming sectors in the country through promoting better habits and technologies for saving energy. The programme operates nationally and serves all regions in Chile.

A strategic pillar of intervention of the CPEE are the techno-economic evaluations in sectors, which assess energy consumption, potential improvements to energy efficiency and existing technical, legal and institutional options. Each intervention is regulated, promoted and supported with technical assistance, awareness and education. Each initiative is monitored by performance reports which are carried out at performance meetings with the respective ministers from each sector.

The second policy encourages the use of renewable energy sources available in the country. The government has taken a two pronged approach to achieving this; one of legal character and the other of support for legislation.

The new law approved in Chile, promoting non-conventional renewable energies (Law No. 20.257), came into practice in 2010 and states that energy generating companies in the country, with a capacity from and above 200MW, must ensure that 10% of their energy withdrawals each year originate from non-conventional renewable energy sources. These can be either owned by the company or contracted in.

This legislation will be phased in with the required quota starting at 5% between 2010 and 2014, with an increase of 0.5% in 2015 and the final quota of 10% set for 2024. This does not apply to electrical energy distributors supplying to regular consumers; which are required to reach the 10% quota by 2010.

Non-compliance with these target quotas will be penalised using the UTM system at 0.4 UTM for every MW/hour below the quota. In the case of continued non-compliance after 3 years, the fine will be increased to 0.6 UTM for every MW/hour

below the target quota. At the current exchange rate (close to \$450), the charge of 0.4 UTM translates to approximately 30 US\$ for every MW/hour below the target. This compared to the current energy price of around 80 US\$ per MWh, is almost 40% above the sale price by energy distributors.

Simultaneous to processing and promulgating the legislation, the Government established the Centre for Renewable Energies (CRE). The aim is to promote and facilitate development of the Non-conventional Renewable Energy (NCRE) industry and to coordinate both public and private efforts that optimise the vast potential of non-conventional renewable energies existing in Chile, thus contributing to an economically, socially and environmentally secure and sustainable energy supply.

The CRE coordinates three main areas of action. These are; support for NCRE projects, awareness building of NCRE and providing a centre of information for the development of NCRE.

The country submitted two proposals to the Global Environment Facility in support of these policies. One proposal was to promote and strengthen the energy efficiency market in the country's industrial sector, and was approved in 2008. The second proposal focussed on promoting and developing solar technologies for heating water and generating electricity, and was approved in 2009.

Parallel to these developments, other proposals were analyzed in this period. The first of them began in 2006, when the Council of Ministers of the National Environment Commission (CONAMA), the environmental institution that existed prior to the current Ministry of Environment (ME), was entrusted with preparing the first 'National Action Plan on Climate Change'. This was completed at the end of 2008, and lays out plans for the period between 2008 and 2012.

This Action Plan is a frame of reference for assessment activities of the impacts of climate change and vulnerability and adaptation to climate change, including mitigation of GHG emissions in the country. It was drawn up through a process of consultation with participants such as technical personnel from institutions, members of the CONAMA Council of Ministers, participants from the academic world and national researchers. It aims to address climate change in the light of the most recent scientific forecasts for the 21st century, and to accomplish the commitments added upon ratification of the UNFCCC.

The Action Plan was conceived of as an instrument for articulating a collection of policy guidelines, to be carried out by public organisms which are competent in dealing with climate change material and the adverse effects thereof.

On the other hand, the Action Plan is meant as a directive tool for productive sectors, academic sectors and non-governmental organisations, as it outlines what needs to be addressed in order to deal with the impacts of climate change.

The structure of the Action Plan is based on a diagnosis of the national and international climate change situation, on the strategic considerations that will guide its implementation, and the prioritised guidelines for action that will facilitate the development of a baseline of knowledge about adaptation, mitigation and capacity building with a focus primarily on decision taking for the long term.

Regarding mitigation guidelines, the plan outlines the approach as having the 'goal of creating a lower carbon economy, which will contribute to sustainable development in the country and to global efforts to reduce emissions'.

Another development during 2006-2009 was the completion of various studies that illustrated the existing potentials for reducing GHG emissions in the country.

The Research and Studies on Energy Programme at the University of Chile (PRIEN), was titled 'Estimations of Energy Saving Potentials in the Various Sectors through Improved Energy Efficiency'. It developed aggregated and sector specific indicators of energy efficiency. The aim is to evaluate the development of the use of energy resources in terms of its efficiency and to apply these indicators to the period between 1990 and 2006. In addition, an estimation of the theoretical improvements in energy efficiency was made in each sector and subsector.

The aim of the study initiated by the CPEE was to identify relations between energy efficiency and economic efficiency on national, sectoral and sub-sectoral levels in order to evaluate the development of efficient use of energy resources and to establish a theoretical potential of improvement in energy efficiency in the country.

The CONAMA conducted a study titled 'Analysis of Future GHG mitigation options for Chile in the Energy Sector'. Mitigation scenarios for a timeframe of 20 years (2010-2030) were constructed. They considered sectoral energy demands and supply options post 2000. The study defined technological mitigation options, options for generating energy and changing combustibles. The study was strengthened by the use of the scenario simulation tool, LEAP.

The study defined in detail a reference scenario for the energy sector during this period, taking electricity demand forecasts derived from economic growth into account, and also the current and forecasted capacity of the country's electricity grids namely; SINC, SIC, Aysén and Magallanes.

A third study was commissioned by the company *Endesa Latinoamérica* to the Environmental Economics Management Programme at the University Of Chile (PROGEA). The study was titled 'Energy Consumption and GHG Emissions in Chile 2007-2030 and Mitigation Options', PROGEA forecasted the country's GHG emissions for this period and evaluated policies as instruments for reducing emissions.

In the study, the major GHG reduction measures were identified and evaluated for the following sectors; transport, commerce, public and residential, industry and mining and electric energy generation. In addition, the economic and regulatory instruments for promoting and implementing the proposed measures were identified.

An estimation of the costs of implementation and reduction potentials were based on expert opinion and information from companies and regulatory bodies, using, inter alia, literature collected on the topic from national and international sources.

The study was also supported by the scenario simulation tool, LEAP.

Based on these developments and resulting studies, and with the opportunity provided by COP15 held in Copenhagen in December 2009, the country, via the Ministry of Environment, made a national announcement of its goal of countering the trend of growing GHG emissions and achieving a 20% reduction thereof by 2020.

2.1.4 Fourth Phase

The fourth phase of climate change mitigation activities began with this declaration in Copenhagen and is characterised by formalisation of the declaration found in Appendix II of the Copenhagen Agreement. In the declaration the country commits

to carrying out an active process of identifying mitigation options in order to accomplish goals, including NAMAs (Ministries of Environment) and important national institutional developments tackling climate change.

Developments:

- Enactment of the law to create the Ministry of Environment. This replaced the National Commission of Environment which was the driving force of environmental policy between 1994 and 1999. It increased the level of political significance of environmental issues in the country, in particular establishing 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, and
- Regulation of the Inter-Ministerial Climate Change Committee, consisting of the ministries of Environment, Agriculture, Housing, Foreign Affairs and the Presidential General Secretary. The committee was created mid-2009 as a response to the need to coordinate Chile's position in international negotiations on Climate Change, particularly in light of the Conference of Parties held that year in Copenhagen, and has now been stated the highest ranking body dealing with climate change in the country.

While the negotiations in Bali were not finished by the target date, several key agreements were made. And a new approach to climate change was agreed upon. This consisted of agreement on reducing emissions on both local and international levels and important industrialised countries signed the agreement as did many developing countries.

In the Copenhagen Agreement the main features of future guidelines are outlined, and developing countries were invited to join global efforts and make proposals to contribute to the global task of reducing emissions.

In addition to the announcement made at COP to actively contribute to climate change mitigation tasks, our country adhered to this agreement and based on emission growth forecasts associated with economic development for the next few years, set goals (Appendix II of the proposal) to reverse the trajectory of emissions by 20% by 2020 beginning in 2007. In light of this, it was recognised that Chile would need a significant level of international support in order to fulfil its commitments and that it would focus its interventions on energy efficiency, renewable energies, forestry and land use change.

Upon formalisation of the commitment, research and studies to identify, plan and implement mitigation measures have been conducted (Nationally Appropriate Mitigation Actions, NAMAs). Specific to this phase are those called 'support and international' which are part of mitigation actions that the country has unilaterally designed, particularly in areas of energy efficiency and renewable energies, as described in the previous section.

These initiatives are being carried out by the sectors that are responsible for major GHG emissions and which therefore present great potentials for achieving important reductions. These are, the Ministries of Energy, Transport and Agriculture. The Ministry of Environment is playing an active role in promoting and coordinating these efforts.

The country has not conducted a formal discussion to achieve a common approach to NAMAs, nor to establish criteria for prioritization and the various aspects required for their implementation, including issues of measurement, reporting and

verification (MRV) of their results. Under these circumstances the activities that have been carried out so far have relied primarily on the progress made in international negotiations on the matter, which fit into the arena of the UNFCCC.

This has in some cases affected progress in identifying and structuring possible NAMAs. An example of this is what is happening in the Ministry of Transport. It has been working with the Ministry of Environment on the Climate Change Action Plan as it lacks its own specialized unit to manage these issues and construct policies. In addition, the members of the Ministry of Transport are not involved in international negotiations on the issue.

As a result, there was a lack of reflexion in the process of identifying possible NAMAs within the sector and the response was fundamentally guided by the professional capacities existing in the ministry and by the Ministry of Environment through information, experiences and visions it provided.

Despite this, the Ministry of Transport is very clear on its critical role in mitigation tasks. According to historical inventories of GHG emissions, the Transport Sector is one of the main sources of emissions. As growth of this sector is directly related to economic growth, the forecasted increase of emissions is very significant (Salgado, 2011).

Consequently, it has actively taken on the task of identifying NAMAs which could change this trend. However, progress to date is limited to stating of objectives, defining advances and quantifying impacts, this is presented in part 3 of the report.

In terms of advances achieved, the situation in the Ministry of Agriculture is quite similar to that of the Ministry of Transport, also presented in the next section of the report. This is a result of the governmental administrative change which took place in the beginning of 2010; the change of important personnel in the ministry momentarily diminished existing capacities for dealing with the topic at hand.

However, since the administrative change, an intra-ministerial structure has been put into place for developing climate change policy for the sector. Moreover, some of its members have been linked to the negotiation process for more than 10 years.

In addition, the following two studies provided the Ministry of Transport with the basic information for designing mitigation actions in the sector. These studies were i) conducted in collaboration with the Ministry of Environment on an 'Analysis of future GHG mitigation options for Chile associated with programmes promoting the agriculture and forestry sector', done during 2010 and ii) about 'Potential climate change mitigation associated with the recuperation of native forest and forestry development law' .

The situation in the Ministry of Energy is different. The ministry has a specialized unit dealing with climate change in the Sustainable Development Division and is staffed with personnel who have long-term experience in climate change issues and in the process of international negotiations.

Amongst the various studies being conducted in the sector, about indicators of sustainable energy, carbon footprint emission factors or the potential use of market mechanisms for controlling GHG emissions, a study which stands out for the purpose of this report is one which identifies a group of NAMAs for the energy sector in Chile.

The study is called 'A system of Identification, Evaluation, Reporting and Verification of National Climate Change Mitigations in the Energy Sector'. It proposes a methodology for; a) prioritizing sub-sectors that need special attention for developing

mitigation actions, b) prioritizing particular mitigation measures in the selected sub-sectors, and c) making proposals on the details of a system for measuring, verifying and reporting on the results of mitigation actions.

Prioritization of the sub-sectors was done based on the following criteria; a) contribution to GHG emissions, b) contribution to forecasted economic development and energy in the country, c) contribution to economic competitiveness in exports, d) opportunities offered for financing and technological transfer, e) pertinence to national programmes and policies in the energy sector with impacts on GHG mitigation and the frequency with which they appear in international literature.

In order to prioritize specific mitigation measures in the selected sub-sectors, a list of possible NAMAs was drawn up using mitigation options identified in older studies, previously mentioned in this report. Each of these were categorised into one of the following groups; a) similarity to its type of technological generic and regulations for implementation, b) coherence with the typology of reported NAMAs on international levels, and c) where the first two groups are irrelevant, compatibility with the understanding shown in the international debate on the topic.

Secondly, the following criteria for evaluation were used to prioritize the possible NAMAs; a) amount of feasible emission reductions through implementation of a NAMA, b) degree of ease for establishing a reference scenario and monitoring plan of potential reductions, c) compatibility with sector and regional plans, and legal aspects related to the sector that could eventually exist in the country, d) marginal abatement cost of each unit of CO₂ equivalent (USD/ton CO₂eq) resulting from implementation of the NAMA, e) significance of technological transfer involved in implementation, f) technical and technological requirements for implementation, contrasted to feasibility of application in light of existing professional capacities, g) institutional aspects which could affect the measures and capacities for internal management by bodies or institutions in charge, h) level of acceptance or rejection by social society of the measures to be implemented, i) level of acceptance or rejection by the private bodies involved in implementation of the measures, j) positive socio-economic and environmental impacts upon implementation.

Additionally, based on revision and evaluation of international experiences with MRV material, this report proposes elements for a MRV system for national NAMAs not only for aspects related to interests of the international community but also for existing national interests.

A first draft of five NAMAs prioritized according to the here mentioned system are presented in the report, called NAMA Design Document (DDN) which organises the information according to the following sections;

- (i) aim of the NAMA,
- (ii) rationalization,
- (iii) description of activities involved,
- (iv) institutional arrangements required,
- (v) expected reductions and costs,
- (vi) expected national impacts,
- (vii) measurement, verification and reporting, and
- (viii) type of support sought.

The results of the report were accompanied by a design proposal for a Web format system. The system allows for public sharing of detailed information on NAMAs seeking international support and of NAMAs which are in the process of

implementation in the country. The model includes information on NAMAs as according to the Design Document (DDN), as well as the results, verification and impacts on emission trends in the country.

The selected NAMAs applied to this methodology are discussed in more detail in the following section of the report.

In conclusion of the description of activities related to climate change mitigation carried out in this period, it must be added that at the beginning of 2010, the Global Environment Facility approved resources for the continuation of work on creating an energy efficient market in Chile via promotion of engineering firms and energy service companies as intermediaries in the development of energy saving and energy efficiency projects.

3. JOINT MITIGATION ACTIONS IN CHILE

As discussed in the previous section, a number of studies have recently been conducted to identify and formulate NAMAs in the country. These have focussed on economic sectors which make the most significant contribution to GHG emissions, and they are complimentary to mitigation actions currently in development in the country, especially in the energy sector. The current status of these initiatives is discussed in this section of the report.

3.1. Stage of Development

Each initiative in the transport, agriculture and energy sector is at a different phase of development in terms of formulating NAMAs. All of them have reached a first project phase of formulating clearly defined goals, setting estimations for reducing targets and drawing up preliminary proposals for achieving them. Only the energy sector has drawn up proposals for other essential aspects concerning implementation.

3.1.1. Transport Sector

The NAMAs identified in the Transport Sector are as follows:

Energy Efficiency in Transport in Chile Programme

The aim of the programme is to promote energy efficiency in transport as an effective tool for achieving GHG reductions, ensuring that a sustainable balance between the system load and passengers is maintained.

Measure	Estimated annual CO ₂ e reductions
Improvements in aviation	6% annual saving
Training in efficient driving	Between 9 and 15% annual savings
Good maintenance practices	Between 7 and 10% annual savings
Improved fleet (traffic) management	Between 5 and 15% annual savings

Promoting zero and low emission vehicles

The aim of this proposal is to generate incentives for an increase in zero and low emission vehicles in the vehicle fleet, to continue initiatives such as extending the payment for circulation permits or implementation of new systems such as the 'feebates' system.

Measure	Estimated annual CO ₂ e reductions
Promotion of zero and low emission vehicles	Between 2 and 3% annual savings

Promotion of sustainable change of mode of transport Programme

The main aim of this programme is to promote a change in the mode of transport, from private to public transport, from motorized to non-motorized transport.

Measure	Estimated annual CO ₂ e reductions
Promotion of non-motorized transport	Between 0.5 and 1% annual savings
Design of bicycles bays in strategic service locations	Between 0.5 and 1% annual savings
Design and construction of underground stations in the Metro system and at stations accommodating different modes of transport	Between 1 and 2% annual savings

Overall improvement of traffic management

The main aim of this programme is to implement measures to manage traffic in the cities, with the goal of optimising road operation and at the same time mitigating CO₂-e emissions.

Measure	Estimated annual CO ₂ e reductions
Analysis and development of SCAT networks (Centralized System of Transit Area)	Between 5% and 7% corresponding to 853-1,194 M ton in 2006
Analysis and development of traffic calming- area projects	Between 0.5 and 1% annual savings
Analysis and development of one-way, separate and single-way roads	Between 1% and 2% annual savings

3.1.2. Agriculture Sector

The NAMAs identified in the Agriculture Sector are based on information collected in two completed studies. One on future mitigation options in the sector and the other on potential mitigation associated with legal regulations.

Sustainable Management and Recuperation of Native Forest in Chile, towards GHG mitigation Programme.

The aim is to contribute to GHG emission mitigation in Chile through promoting sustainable management and recuperation of native forest in Chile.

Measure	Estimated CO ₂ e reductions
Sustainable management and recuperation of the native forest in Chile	Period 2011-2050: 234 M tonnes

An area of 693.507ha should be reached, with an approximate cost of USD 3,06 per tonne of CO₂e reduced and a total implementation cost of USD 716 million.

Programme Promoting forestation in areas of degraded soils and soils suitable for forestry as a GHG emission mitigation action.

The aim of this NAMA is to contribute to mitigation of Chile’s GHG emissions via promotion of forestation in areas of degraded soils and soils suitable for forestry.

Measure	Estimated CO ₂ e reductions
Forestation in areas of degraded soils and soils suitable for forestry	Period 2011-2020: between 15.2 and 30.2 M tonnes
	Period 2011-2030: between 19 and 67 M tonnes

The costs of reduction are estimated at 13US\$/ tCO₂e for the first period and 11 US\$/tCO₂e for the second.

3.1.3. Energy Sector

Five NAMAs of particular interest have been selected in a first round of selections of actions of this type in the energy sector. Similar to the agriculture sector, these were developed based on information from previous studies on opportunities for mitigation actions in the country and were discussed in the previous section. Two of these NAMAs promote an increase in the integration of renewable energies in the country’s energy grid. Three of them promote energy efficiency in the copper mining sector, the industrial sector in general and the cement subsector.

Energy Efficiency in Copper Mining

There is vast potential for improving energy efficiency in copper mining through the production of cathodes (which round off to 15%).

This NAMA focuses on incentivising efforts towards creating energy efficiency in one of the most important productive areas in the country and the main source of emissions in the sector. The final aim of this programme is to reduce CO₂ emissions in the sector by approximately 4.8 % by 2020, subject to continuation of the programme after this date.

Measure	Estimated annual CO ₂ e reductions
Replacement of SAG Wind Turbines with high pressure crushers	With the 3 measures together, the estimated reduction is 4.7 M tones annually
Parabolic Solar Collectors and heat pumps to control temperature of electrolytes and other heat sources for adjustment of temperature of electrolyte and other heat inputs	
Bio fuel in the transport of mining materials	



Use of Electric Motors for industrial and mining purposes

The aim of this NAMA is to reduce the intensity of energy use in industry and mining by 1% of what would exist without the 2020 programme.

Measure	Estimated annual CO ₂ e reductions
Replacement by electric motors: Investment in efficient motors and of obsolete motors (with more than two reparations)	The 2 measures are expected to achieve, on average, a reduction of 1.2 M tons
Installation of inverters for the functioning of pumps and ventilators.	

Renewable Energy Programme

This programme aims to increase renewable energies in the country's energy grid. The sources considered in this programme are competitively priced and have not been developed due to economic or financial restrictions.

The aim of this programme to create an extra 850MW of non-conventional renewable energies in Chile by 2020. This will result in a reduction of GHG emissions of 2 million tonnes, calculated as if the programme did not exist.

Measure	Estimated annual CO ₂ e reductions
Installation of mini-hydraulics	With the three measures, the forecasted reductions are approximately 2 M tonnes annually, by 2020.
Installation of biomass energy	
Installation of wind energy	

Improvements in processes in the cement industry

The aim of this NAMA is to reduce emissions in the industry via energy efficiency and the use of alternative energies, reaching a reduction of 240 KT CO₂e as in the 2020 forecasts.

Measure	Estimated annual CO ₂ e reductions
Placement of fuels in cement ovens.	With the two measures a reduction of approximately 0.2 M Tonnes is forecasted annually by 2020.
Energy efficiency in systems of processing primary materials and in grinding/milling.	

Policy for developing geothermal energy

The aim of this NAMA is to incentivise the development of energy generation using geothermal energy through national policy. This to reach a potential capacity for 320 additional MW, for the scenario based on 2020.

Measure	Estimated annual CO ₂ e reductions
Reduce obstacles to entering the central grid as far as possible	With the three measures together, the reduction anticipated is approximately 3 M tonnes by 2020.
Create temporary financial incentives to promote entry of certain technologies	
Develop policies that consider externalities in decision making in the electricity sector.	

3.2. Planning Context: Policies and Regulations

From the information available on the NAMAs listed in this section, with exception to those in the energy sector, there is no mention of the policies and regulations that support and sustain them. However, this must not be taken to mean that they do not exist but should rather be understood in terms of the phase of development which they are in at present.

This is different for NAMAs in the energy sector, as the topic has been given special attention in the preliminary documents. Moreover, the identified NAMAs set major goals in the specific sectors, in line with the goals set in governmental policies for achieving increases in the efficient use of energy in the country's energy grid, as described in the previous section. Therefore, if these NAMAs are implemented, they will play an integral role in achieving governmental goals.

It will be necessary, as noted in the NAMA proposals, to develop additional regulatory frameworks in order to ensure that the goals of each are indeed achieved.

3.3. Institutional Capacity

At the current stage of development of the NAMAs identified in the energy sector, proposals have been made for institutional arrangements for implementation.

In these cases, the proposed institutional arrangements have similar structures and consist of two bodies.

A Coordinating Body with the following responsibilities and attributes:

- To propose policies and regulations that will facilitate implementation of NAMAs throughout each phase and create the necessary tools for implementation, within the corresponding ministry, the ministry of energy in this case,
- To obtain and administrate the financial resources for supporting the NAMA and act as a liaison office.
- To act as the authority to administer spending of loans and subsidies to promote participation of public or private entities in the NAMA. These could be managed by the entity itself or through another financial organization such as CORFO (Production Development Corporation) or banks.
- To be responsible for general administration of the NAMA, ensuring compliance with the NAMA, supervising public and private entities involved in implementation and facilitating the MRV process.

The second body focuses on implementation and has the following responsibilities:

- Take charge of communication, dissemination, awareness and motivating and incentivising public and private participation in achieving the goals of the NAMA. It must be able to integrate the capacities and opinions of different institutions linked to the NAMA actions, including that of connecting with providers of different technologies that could be needed for implementation.
- Manage the process of implementation of the NAMA being implemented by public or private bodies, as is convenient and avoiding any operational risks.
- Act as facilitator and interlocutor between the field organizations which implement the NAMA and the coordinating body which is responsible for monitoring the MRV process, to ensure that the process is rigorous and timely.

The task still remains of identifying the regulatory changes necessary for successfully carrying out the proposal and accomplishing the aims of these NAMAs. Existing bodies in public administration in this sector are equipped with the capacity for this.

3.4. Monitoring, Reporting and Verification (MRV)

To date, only the Ministry of Energy has made proposals for MRV on progresses made in the NAMAs. Since each NAMA is different and consists of a variety of actions, a unique systems of MRV needs to be applied for each.

There is an abundance of literature and international experience on constructing national GHG emission inventories. These include inventories of countries, corporations and their production lines. There is also information on implementing systems for entering the Carbon Market and on good practices for using MRV systems. These should be used as guidelines for standards setting and designing NAMAs. It would be useful to the process in terms of design and in terms of finding international support for them.

It is in the government's interest to ensure that good practices are applied in monitoring and verifying the NAMAs. The baseline scenario and the plan for monitoring results during implementation need to be verified in terms of their soundness.

In the case of verification of mitigation actions specifically, there are no prescribed guidelines, therefore industrialized countries will likely recommend that it be done using an internationally recognised system, such as those in the Kyoto Protocol framework. This refers to verification of MDL results as well as other systems in the future, such as the ISO (ISO14.966).

Reporting on implementation of the NAMAs is extremely important in the international system, particularly for industrialised countries. Evolution of the impacts a NAMA has on patterns of GHG emissions in developing countries and annual progress must be tracked. The information must be sufficient for evaluating the effectiveness or lack thereof of a NAMA and in turn the effectiveness or ineffectiveness of assigning recourses to it.

The private sector can also initiate NAMAs that need international support. A national institution needs to be set up to process these initiatives. In addition to evaluating their appropriateness for national interests and circumstances, the

baseline scenario, the monitoring process and the verification methods must be tested for soundness. A nationally recognised verification body must issue a technical report on these proposals.

The national authority must keep a record of recognised verification bodies that can match the standards and capacities of internationally accredited systems, such as those in the Kyoto Protocol for verifying MDL results and the coming ISO system (ISO 14.066).

The national authority is also responsible for maintaining an online service, accessible to anybody, which publishes information on advancements and the results of NAMA activities. The information will be displayed as reader-friendly as possible, making it possible for the reader to focus on any aspect of the activities. An additional advantage of this system is that it serves as a means for promoting proposals for NAMAs which seek international support.

3.5. Financing

Information on financing is the weakest aspect of the NAMAs included in this section. This information is not available for the NAMAs in the Transport Sector. Information in the Agriculture and Energy Sectors is derived from previous studies on possible mitigation measures. The estimations made in each sector are subject to fluctuation in the long-term due to the fragility of the predicted scenarios. What is more, the scenarios are changing rapidly on both national and international levels.

Firstly, they are changing in the industrialised world due to a new drive to replace technologies in economies that will reduce dependence on fossil fuels, petrol in particular. Secondly, they are changing nationally due to the major energy policies currently in place in the country.

In addition, the administrative costs of the NAMAs have not been calculated. Nor is there information on what amounts of international aid will be sought. Developing countries are, officially, committed to assisting with the NAMAs.

Despite these shortcomings, the NAMA design documents in the energy sector include a proposal for management of the financial resources required for implementation.

The bulk of financial resources required will be used to establish revolving funds for granting soft loans to finance technological replacements that are in line with the NAMAs. For programmes promoting minor market entry of renewable energies, such as solar energy, part of the funds could be used to create subsidies to generate economic competitiveness of these technologies.

3.6. Ownership

As established in section 2 of this document, the decision to initiate a process of identifying NAMAs was the logical result of the commitments the country made to curbing emission growth in the country. From this point of view, all of the NAMAs identified to date have a clear national motivation.

Despite this fact, formulation of the NAMAs is not complete as they are yet to be integrated into sector policies. This is a necessary condition for ensuring governmental ownership.

3.7. Technical Capacity for Developing NAMAs

With exception of the NAMAs in the energy sector, there has not been sufficient focus on this crucial aspect. However, both the transport and agriculture sector have in practice a professional record that affirms the existing basic capacity for managing NAMAs, considering too that the NAMAs in these sectors do not involve major technological replacements.

The NAMA design documents in the energy sector confirm that it has the basic technical capacity for implementing the NAMAs, but that for certain measures in some NAMAs, specialized technical capacity needs to be improved.

3.8. Socio-Economic Co-Benefits of NAMAs

The information on the NAMAs identified in the Ministries of Agriculture and Transport do not make mention of the socio-economic co-benefits of NAMAs. However, the implementation of the rigorous plans for forestation proposed in the NAMAs in the agriculture sector would have a significant impact on employment in the sector.

In the transport sector, measures to improve efficiency in management of transport could have important co-benefits for public health by contributing to a reduction of local air pollution, which is a growing problem in the main cities.

In the energy sector, the methodological approximation used for identifying and prioritizing the NAMAs considers in detail the socio-economic impacts that they may have. Therefore, in the design document, a proposal is made for measuring and monitoring a group of indicators which reflect these impacts. A proposal is also made for the inclusion of these in the MRV system that the country is to establish.

Due to the nature of the identified NAMAs, even though they can have clear impacts on the country's economy, a benefit that will affect the population; these were not considered during the process of structuring the mitigation actions.

4. CONCLUSION

From the information in this report, it is evident that the development of NAMAs is incipient. The identified NAMAs in this report are still in a stage of conceptualisation and of making initial estimations on impacts and costs. In a few cases attempts have been made to develop the NAMAs further. Ideas on institutional regulatory requirements, on management, on financing and on aspects of MRV have been put forward. This information can form a base for a more structured discussion on NAMAs in the country. As indicated, there has yet to be such a discussion and understanding of NAMAs has been based on developments made in the context of the negotiation framework on a new international regime for addressing climate change.

This has been sufficient until now as there has not been a need for a national understanding the on outcomes of international discussions. However, in light of the new advancements on an international level, there will unlikely be further adjustments and it is therefore necessary to make progress in finalising the work that has been started. There is therefore an urgent need to convene around NAMAs in the country so that they can be finalised and integrated into national strategies. National strategies need to clearly state motivation for the NAMAs both nationally and internationally, which is to support mitigations in process or futures ones and to support the commitment for reducing GHG emissions.

There are multiple benefits to this policy. The development of certain communal services, those relating to a regulatory framework for aspects of MRV and the NAMAs. Prioritization of requests for financial support needed and a formal definition of the role played by the country in each case. Most importantly, it expresses political will by the government to move forward with the NAMAs. Without fierce Governmental commitment to implementing the NAMAs, it will not be possible to overcome the usual obstacles that threaten innovative programmes.

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