Information Matters, Chile

Capacity building through peer exchange for ambitious information and facilitating mutual learning at an international level

Third Capacity Building Mission (Santiago de Chile, April 20 to April 24, 2015)

Third Capacity Building Mission in Chile

Santiago de Chile, April 20 to April 24, 2015

On behalf of:

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

of the Federal Republic of Germany

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Abbreviations Used

AFOLU	Agriculture, Forestry and Other Land Uses

AGCI	Chile International Cooperation Agency
AI	Annex I countries
APL	Clean Production Agreement
BMUB	German Federal Ministry of the Environment, Nature Protection, Public Works and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit)
BUR	Biennial Update Report
CCAP	Center for Clean Air Policy
CER	Certificate of Emissions Reduction
CIFES	National Centre for the Innovation and Promotion of Sustainable Energies
CN	National Contribution
COCHILCO	Chilean Copper Commission
CODELCO	National Copper Corporation
CONAF	National Forestry Corporation
COP	Conference of Parties
CORFO	Corporation for Production Promotion
CPEIR	Climate Public Expenditure and Institutional Review
CPL	Clean Production Board
DCC	Department of Climate Change (unit of the Ministry of the Environment)
DEIA	Department of Economy and Environmental Information (unit of the Ministry of the Environment)
DIPRES	Ministry of Finance, Budget Office
DSS	Ministry of Energy, Sustainable Development Division
ENAP	National Petroleum Corporation, Chile
ERNC	Non conventional Renewable Energy
ERT	Expert Review Team
FIA	Foundation for Agricultural Innovation
GDP	Gross Development Product
GHG	Greenhouse Gases
GHG Protocol	Greenhouse Gas Protocol
GHGINV	Greenhouse Gases Inventory
GHGSINV	Greenhouse Gases Sectoral Inventory
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
ICA	International Consultation and Analysis
IKI	International Climate Initiative (Internationale Klimaschutzinitiative)
IM	Information Matters
IMMA	International Partnership on Mitigation and MRV
INDC	Intended Nationally Determined Contribution
INE	National Statistics Institute
INFOR	Forestry Institute
INIA	Agricultural and Livestock Research Institute
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Products Use
ISO	International Organization for Standardization (ISO)
KfW	*Reconstruction Credit Institute* (Kreditanstalt für Wiederaufbau)
LAC	Latin America and the Caribbean
LECB	Low Emission Capacity Building

LULUCF	Land Use, Land Use Change and Forestry
MAPS	Mitigation Action Plans and Scenarios
MDL	Clean Development Mechanisms
MINAGRI	Ministry of Agriculture
MINENERGIA	Ministry of Energy
MMA	Ministry of the Environment
MOP	Ministry of Public Works
MPS	Manual for Sectoral Procedure
MRV	Measuring, reporting and verification
MUNISTGO	Municipality of Santiago
M&E	Monitoring and Evaluation
NAI	Non Annex I Countries
NAMA	Nationally Appropriate Mitigation Action
NIR	National Inventory Report
OECD	Organization for Economic Cooperation and Development
ODEPA	Agricultural Studies and Policies Office
OSE	Subsidiary Execution Body
PACN	National Communications Support Programme
PMG	Management Improvement Programme
PUC	Catholic University of Chile
PUCV	Catholic University of Valparaíso
PYME	Small and Medium Enterprise
REDD+	Reduction of Emissions for Forest Deforestation and Degradation
RETC	Emissions and Pollutants Transfer Registry
SAG	Agricultural and Livestock Service
SEC	Superintendency of Electricity and Fuel
SII	Internal Revenue Services
SNICHILE	National Greenhouse Gases Inventory System
SRT	Tabular Record System
TTE	Group of International Experts, appointed by the UNFCCC
UBA	German Federal Environment Agency (Umwelt Bundesamt)
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UT	Land Use
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

N.B.: Chilean public entities Acronyms are kept in their original Spanish version along the document

Background

The German Federal Ministry of the Environment, Nature Protection, Public Works and Nuclear Safety of the German Federal Republic (BMUB, in German), The Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ, *German Society for International Cooperation*) has been executing the "Information Matters" project since 2013, through which it is currently providing technical support to four non-Annex I countries (Chile, Philippines, Ghana and Dominican Republic). To improve compliance with commitments, reporting will also be made to the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC).

The main goal of the project is to strengthen national capacities for ambitious reports in these four countries. Following a first activity so as to identify specific country needs, working jointly with national counterparts, the project has been aimed at meeting such needs, focused mainly on the Measurement-Reporting-Verification system and the Monitoring of GHG by means of training sessions as well as capacity building and enhancement workshops.

The MRV system intends to improve transparency in order to increment national ambition and to provide baseline information for planning and implementing mitigation measures. Also, MRV allows for progress follow-up and strengthening ambition at the global level.

This capacity enhancement process is favoured by peer exchange and acquired experiences. Through these training sessions and capacity building and enhancement workshops, counterpart countries must be able to define procedures, methodologies and responsibilities to institutionalize their reporting system, specially focusing on requirements to notify the UNFCCC about all actions related to mitigation at the national level.

The project works together with the United Nations Development Programme (UNDP), the Lowering Emissions Capacity Building Programme (LECB-UNDP) and the National Communications Support Programme (PACN) in each country. The LECB and PACN programmes develop technical and institutional capacities in the countries for compiling and managing the necessary data to plan and implement mitigation actions, among other results.

The aim of this cooperation is to avoid interference or repetition in procedures and maximize both synergies and benefits, by carrying out activities mutually supplemental. During the project, GIZ will work with the World Resources Institute, mainly on monitoring and reporting of information on reduction of greenhouse gas emissions. Additionally, the "Information Matters" project will collaborate with the "International Partnership on Mitigation and MRV" project, also called IMMA.

GIZ is offering technical support to governmental institutions in the counterpart countries in charge of monitoring and reporting at the national level, the relevant climate data –in Chile, is the Ministry of the Environment's Department of Climate Change- and also addressing their specific demands for the creation and development of capacities during the process of preparation of national reports. In order to carry this out, GIZ has subcontracted the British consulting firm Ricardo-AEA, specialized in Measurement-Reporting-Verification methodologies.

As an initial activity, Ricardo-AEA carried out a gap analysis for each of the four selected countries and organized an opening workshop, where the associated national institutions agreed on a working plan for the next two years. In the case of Chile, this plan was formulated one day after the opening workshop held in January 2014.

Overall, the plan consists of up to four capacity building workshops for public-sector employees who are actually in charge of monitoring and reporting activities in the selected country. The workshop content depends on the demands stated by each country. In the Chilean case, it covers the monitoring and reporting of greenhouse gases emissions, mitigation measures (including quantification of mitigation impacts and transformational changes), as well as

technical and financial support, and needs, accounting and preparation for international reporting processes.

To support project implementation, local experts have been incorporated into the local offices of GIZ, in order to be flexible with ad-hoc demands from partner institutions. In addition, the German Federal Environment Agency (UBA, in German) is involved in the project and a staff member of GIZ has been assigned to the UBA in order to facilitate project contribution and providing technical support to partner countries.

The project will also support institutions in partner countries in the analysis of their monitoring and reporting processes, and also on how to close the remaining gaps and improving these processes in line with international standards and to the requirements of the UNFCCC.

Towards the end of the project, GIZ, with the support of Ricardo-AEA, will organize a global workshop for the staff of the institutions of the four countries involved, for peer-exchange regarding experiences on technical challenges and potential solutions for monitoring and reporting at national level. This exchange will also allow participants from the four countries involved to help each other in improving data collection and analysis methods.

The tools developed and tested in the project, were employed so as to include all elements of existing GHG inventories, for collecting data and to install a monitoring and reporting procedure which summarizes lessons learnt. With the purpose that other countries can learn from the four countries participating in the project, set to acquire a certain degree of leadership on monitoring and reporting issues, those tools already tested and developed will be made available to other interested countries on project completion. To achieve this goal, the partner country government institution will have to share their experiences and thus invited to present lessons learnt in meetings organized by the International Partnership on Mitigation and MRV.

At present, the "Information Matters" project has generated the following tools:

a. Gap Analysis Tool

b. Potential BUR format, and

c. Lessons learnt from project activities, presented as knowledge products.

International Climate Initiative

The International Climate Initiative (IKI, in German), the Federal Ministry for the Environment, Nature Conservation, Public Works and Nuclear Safety of the Federal Republic of Germany (BMUB, in German) has provided funding since 2008 on climate and biodiversity projects in developing countries, newly industrialized countries and in countries undergoing a transition process. Based on a decision taken by the German Federal Parliament (Bundestag), the IKI has an annual fund amounting to € 120 million. This budget makes Germany capable of offering long-term funding for projects related to climate and biodiversity worldwide.

IKI operates in four areas: (a) mitigation of greenhouse gas emissions, (b) adapting to climate change impacts, (c) preservation of natural carbon sinks focusing on the reduction of emissions caused by deforestation and forest degradation (REDD +) and (d) conservation of biological diversity.

New projects are selected through a two-step process, which takes place once a year. Priority is given to activities that favour configuring an international climate protection architecture and those that provide innovative and transferable solutions, whose impact may be felt beyond the individual project. IKI cooperates closely with partner-countries and seeks to promote consensus building to achieve a comprehensive international climate agreement.

More information at the IKI webpage (http://www.international-climate-initiative.com/en/)

Document Aims and Scope

The main aim of this paper is to present activities carried out in Chile, in the framework of the Third Capacity Building Mission for the "Information Matters" Project, executed between April 20 and April 24, 2015.

This Third Project Mission was aimed at continuing the consultancy work done for the staff from the Department of Climate Change of the Ministry of the Environment, personnel from other government departments and the private and academic sectors on issues related to MRV systems (Measurement-Report -Verification).

The strategic themes addressed were the following:

- Discuss application of World Resources Institute (WRI) standards to carbon taxes and to the INDC in Chile (intended contribution to the UNFCCC),
- Evaluate the implementation of the WRI "Policy and Action" standard to Chilean NAMAs,
- Clarify the calculation of uncertainty for Greenhouse Gas emissions and capture inventories
- Discuss the strategies for an information system on funding climate change activities, and
- Provide information about the ICA process.

Third Capacity Building Mission, current and proposed future activities in Chile for the "Information Matters" Project

The Third Capacity Building Mission of the Information Matters Project in Chile was carried out during the week of April 20th to April 24th, 2015, corresponding to the last training mission of the project's first phase in the country. In order to develop these activities a large number of key players was convened, mainly from the public sector, but also from various institutions that have a direct impact on the implementation of MRV systems. Table 1 shows the overall agenda, showing activities planned for during this training mission.

Table 1: Working Agenda of the Third Capacity Building Mission of the Information Matters Project.

TIME	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
09:00	Workshop "Intended National Contribution and Carbon Tax" (Session 1)	Workshop "MRV for Nationally Appropriate Mitigation Actions (NAMAS)"	5th Meeting of the GHG National Inventories System	Workshop " MRV for Financial Support"	Workshop "ICA process Analysis"
09:30					
10:00					
10:30					
11:00	Break	Break	Break	Break	Break
11:30	Workshop "Intended National Contribution and Carbon Tax"	Workshop "MRV for Nationally Appropriate Mitigation Actions (NAMAS)"	5th Meeting of the GHG National Inventories System	Workshop " MRV for Financial Support"	Workshop "ICA process Analysis"
12:00					
12:30					
13:00	Lunch	Lunch	Lunch	Lunch	Lunch
13:30					
14:00					
14:30	Workshop "National Contribution and Carbon Tax:" (Session 2)	Workshop "MRV for Nationally Appropriate Mitigation Actions (NAMAS)"	Workshop "MRV for GHG National Inventories: Uncertainty"	Workshop "MRV for Financial Support"	Closing meeting (conclusions and future activities)
15:00					
15:30					
16:00	Break	Break	Break	Break	
16:30	Workshop "National Contribution and Carbon Tax:" (Session 2)	Workshop "MRV for Nationally Appropriate Mitigation Actions (NAMAS)"	Workshop "MRV for GHG National Inventories"	Workshop "MRV for Financial Support"	
17:00					
17:30					
18:00		Closing Reception			

A brief summary of activities carried out followed, including main comments and evaluations generated during the closing meeting and proposals for future activities to be performed during the remaining period of the

project. Further details on each of the activities can be found on Annex A of this document.

1. Workshop "Intended National Contribution and Carbon Tax: Application of the GHG Protocol Standards of the World Resources Institute.

The main axis of the first day was the carbon tax and how the application of the WRI GHG Protocol standards can help in the accounting and control of carbon tax applicable in Chile.

PhD Gilbert Metcalf (Tufts University, US) made a presentation on what is a carbon tax and how it has been applied in other regions of the world, presenting the case study for British Columbia, where the application of this tax is seen as a successful experience. Following, Isabel Rojas (Ministry of Environment, MMA) announced the carbon tax to be implemented in Chile and what their objectives are. Then, PhD Sebastian Vicuña (Catholic University of Chile, PUC), presented a study on the implementation of green taxes in the energy sector, based on the findings provided by the MAPS-Chile project.

In the afternoon, Andrés Pirazzoli (Ministry of the Environment) presented the Intended National Contribution for Chile, its current status and why it is important for Chile to honour the international commitments related to the environment. Then David Rich (WRI) presented and explained how WRI standards would contribute to the application of rules for accounting and reporting on the carbon tax and for implementing policies or regulations based on such results. Finally, Yasna Rojas (INFOR) presented a study aimed at quantifying the impact of GHG emissions and capture in planting 100000 hectares of degraded land with native forest species, for the 2020, 2025 and 2030 goals, as part the national contribution in the forestry sector.

2. Workshop for NAMA MRV: Application of the "Policies and Actions" Standard of the World Resources Institute (WRI) GHG Protocol.

The second day focused on the MRV for Nationally Appropriated Mitigation Actions, with special emphasis on the application of "Policies and Actions" Standard, developed by the WRI Greenhouse Gases Protocol. To address this issue, Mr. David Rich from the WRI was invited to present, thus primary information was delivered from a high-level source. Besides theoretical training regarding the standard, a series of practical exercises were developed, which generated much discussion and participation from the audience.

Additionally, other issues relating to mitigation actions and the implementation of the standard were presented, such as a pilot experience in the application of the standard on mitigation actions related to energy efficiency (Luz Maria Farah, Environmental Poch), and a presentation on a NAMA for energy self-sufficiency, implemented by the National Centre for the Innovation and Promotion of Sustainable Energies (Viviana Huerta, CIFES).

At the end of the day, the project known as "Design of Institutional Arrangements for a Generic Framework for Measurement, Reporting and Verification (MRV) of mitigation actions for Climate Change in Chile" funded by the Fund for Prosperity from the Embassy of the United Kingdom, was officially closed. In this instance, presentations were made by Jenny Mager (MMA) and Felipe Osses (Embassy of the United Kingdom in Chile).

3. Workshop "MRV of Greenhouse Gas Inventories."

The third day focused on the workshop on MRV Greenhouse Gases Inventories (GHGINV). This workshop was attended by experts from all sectors of the inventory.

The first part was the 5th Meeting of the National Inventory System of Chile (SNICHILE), where

lessons learnt from the 2014 inventory survey were analysed and the new 2015-2016 process began (2016 inventory), and where the new tools for managing SNICHILE were introduced. The workshop was led by Paulo Cornejo, in charge of SNICHILE (MMA).

Sina Wartmann (Ricardo AEA) released the experience of England working with a Tabular Registration System (SRT) for data storage. In the second part of the workshop, experts comments to the NIR from UBA and GIZ members were presented; these comments were presented by Oscar Zarzo (GIZ-Germany).

In the afternoon, Sina Wartmann and Raul Salas (Ricardo AEA) made a training session and a practical exercise on how to calculate uncertainty within the GHG sector inventories (GHGSINV).

4. Workshop "MRV for Financial Support".

This activity was led by Jillian van der Gaag (MMA) and was aimed at MRVs for financial support. Some of the attendees had not participated in the workshop held in October 2014, thus it was necessary to initiate the discussion at a more basic level, repeating part of what had been previously discussed. Nevertheless, the discussion was very useful to continue channelling the process of institutionalization and reporting of financial support on climate change issues in Chile. Another important aspect of the workshop was the comments and opinions expressed both by GIZ and Ricardo-AEA, regarding the Systematic Finance Flow on Climate document - internally known as the White Paper, as prepared by the Department of Climate Change (DCC) of the MMA, aiming to lay down the foundations for MRV for financial support to the country. Additionally, and in order to review international experiences and compare working methodologies, Raul Salas (Ricardo-AEA) made a presentation on the Monitoring and Evaluation System in South Africa, which is quite advanced compared to other countries.

The discussion generated among the audience finally allowed to develop a specific working proposal with a high level of commitment from representatives of key institutions, such as the Ministry of Finance.

5. Workshop "ICA Process Analysis"

In this last workshop, professionals from the Department of Climate Change in the MMA participated, and aimed mainly at the staff who prepared the first BUR draft for Chile.

The purpose of the workshop was to learn about the International Consultation and Analysis (ICA) process for non-Annex I countries. To this end, Ricardo AEA professionals demonstrated the differences between reports requested from Annex I countries (AI) and non-Annex I (NAI), along with explaining what the ICA is and the process steps involved. Additionally, they provided indication as to how countries should prepare for the review process, based on experiences had in England, and how Chile may prepare for this year and future ICAs. During this presentation, several concerns were raised by the national team regarding the demand level of this process, in order to be prepared for appropriate consultations and requirements. Finally, Oscar Zarzo (GIZ-Germany) elaborated on the review done for AI countries and how Germany prepares for it. It was noted that the main difference is the mandatory nature of this review for AI countries, while for the NAI countries it is merely a suggestion.

6. Closing Meeting.

The closing meeting was attended by professionals from GIZ, DCC-MMA and Ricardo-AEA. In this meeting, a summary of the activities carried out in the week was made, as well as an evaluation of the attendance and their level of participation. In addition, each member of the Department of Climate Change presented their

assessment on lessons learned during the implementation of this third Information Matters capacity building mission, as well as the whole process undertaken over the years by the GIZ team and Ricardo AEA per activity.

In the future, the MMA Department of Climate Change hopes to continue with the support of the "Information Matters" project through a second project phase, especially in order to assess the lessons learnt and assist countries joining the project, presenting experiences and results of the process as applied in Chile.

On behalf of:
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Annex A. Summary of Activities of the Third Capacity Building Mission for the "Information Matters" Project[1]

A detailed summary of activities carried out by the Third Capacity Building Mission for the "Information Matters" Project is presented (April 20 to April 24, 2015) Workshops on the Intended National Contribution and Carbon Tax, NAMAs, GHGINV, Financial Support and ICA Process (see Table 1 and Appendix C) were developed, closing the week with a general assessment meeting and a proposal for the following stages. At the beginning of each workshop, Oscar Zarzo (GIZ-Germany) made a brief presentation on the "Information Matters" project, basically explaining what the project is about and its main objectives, as well as the roles and responsibilities each partner has in the project and its deadlines. Along with this, he presented a summary of the main activities carried out during the first two training missions in Chile (in May and October 2014) as well as the activities planned for this mission. This presentation was aimed mainly at participants who were attending an activity related to the project for the first time.

[1] *The tables and figures included have been taken from the presentations made by the different authors; it is assumed that presenters have themselves prepared the following material.*

1. **Workshop "National Contribution and Carbon Tax: Application of the GHG Protocol Standards from the World Resources Institute."**

Presentation # 1: "Monitoring and Evaluation of the carbon tax Impact in Chile."

PhD Gilbert E. Metcalf (Tufts University, United States)

In his introductory presentation, PhD Metcalf concisely and briefly stated what the objectives of the workshop were, namely:

- To identify recommendations so as to generate a sound methodology to assess the effectiveness of Chile's carbon tax, using the *"Policy and Action*" Standard from WRI;
- To identify key performance indicators related to carbon tax that need to be followed;
- To identify areas where coordination between ministries and governmental agencies will be necessary so as to improve monitoring of standards and policies; and
- To discuss retrospective analysis roles in updating future forecasts for reducing emissions.

The workshop continued with two presentations, one by Isabel Rojas (Division of Information and Environmental Economics MMA) and Sebastian Vicuña (Director of the Centre for Global Change PUC).

Presentation # 2: "Carbon Tax in Chile: History, Scope and Targets".

Isabel Rojas (Division of Information and Environmental Economics, MMA)

Initially, it was noted that Chile is a socially, economically and environmentally vulnerable country to climate change, thus negative impacts are projected on mining, agriculture, drinking water, hydropower, health, drought and warmer temperatures, especially in the central and northern areas.

Chile has signed binding international agreements on climate change, as in the 2010 Copenhagen COP (voluntary commitment 20/20), by which Chile committed itself to undertake mitigating actions to reducing emissions by 20% by 2020, below the ones projected as BAU, baselined as at 2007. There is also the 2012 Durban COP, where it was agreed that all countries should have binding mitigation commitments applicable from the year 2020 onwards, and these commitments should be defined during 2015.

These are the basis for the carbon tax, where contaminants included are particulate material (PM), SO2, NOX and CO2 for facilities with boilers and/or turbines with power capacity greater than or equal to 50MWt. The objectives for the creation of the carbon tax are: to recognize that pollution and environmental damage have costs that have been borne mainly by those people actually affected by them, generating social cost, thus so-called perverse incentives must be corrected and principles of a national environmental policy must be applied ("polluter pays", "efficiency" and "responsibility"), recognizing the impacts on the environment and contributing towards reducing GHG emissions.

The CO2 tax is estimated based on the social price attributable to carbon, as published by the Ministry of Social Development, and which corresponds to USD 5 / ton CO2. There are exclusions to the carbon tax because they do not apply to stationary sources operating on non-conventional renewable generation and whose primary energy source is biomass.

As for the application of the tax, the MMA will publish annually all those facilities subject to tax, and during the first months of the year (January-February) these facilities or taxpayers must file an emissions report, the Superintendence of the Environment (SMA) will certify these reported emissions by March and finally in April of the same year, payment of taxes should be made.

It is expected that emission reduction will range from zero to 3 million tons of CO_2, by 2020, and in 6 million by 2030 (according to research carried out by the PUC Global Change Centre) while rates would remain unchanged until 2019 for residential customers, but the question of whether there will be a decrease or increase in rates still remains unanswered.

Additionally, it was noted that the Chilean International Cooperation Agency (AGCI), from the Ministry of Foreign Affairs, will have the mission to design and implement an MRV system to strengthen the PRTR. Having this system enables implementing green taxes and to have a register under international standards. And also enable future links with international emission trading markets. The start date is May 2015 and the end date April 2017.

At the end of the presentation, the emphasis is placed on the fact that the purpose of the tax is to explicitly recognize the social cost of emissions attributing them with a tax base; and also to provide a powerful political and economic signal for investment decisions. On the other hand, the carbon tax is complemented by a range of instruments for environmental management and its implementation would lead to strengthening the MRV system and Record Keeping. Finally, there is space for expanding the tax base in future or to move over to an emissions trading system.

Presentation # 3: "Analysis of the carbon tax in Chile."

Sebastian Vicuña (Director of the Centre for Global Change, PUC)

The presenter is of the opinion that tax reform, particularly the carbon tax, add levies to facilities responsible for producing more than 50 thermal MW of energy, because of associated air emissions, thus impacting mainly power plants and industrial boilers. There will be three types of taxes to be applied, namely:

- A USD$5 tax per tonne of CO_2 emitted into the atmosphere,
- A USD$ 0.1 tax per tonne of local pollutant ($PM_{2.5}$, SO_2 and NO_X) emitted into the atmosphere, and
- Tax for any externalities generated by local pollutants ($PM_{2.5}$, SO_2 and NO_X).

These taxes were part of a broader tax package reform, expected to raise around 3% of GDP (USD $8 billion per year), estimated as unlikely that these "green" taxes may have made much progress by themselves.

The tax is applicable to thermo-electrical power plants and industrial installations with over 50 MW capacity from 2017, expected to cover 55% of Chilean CO_2 emissions. 90% of these comes from electricity generation, 70% from other industrial sources and finally, transport (+ 30%), is not affected.

Description of the study model. The model used for the study is the same as that used in the MAPS-Chile project for the electricity sector; the horizon of analysis is 2014-2030 and 2 scenarios were considered; the first was with a 2013 baseline, while the second contains the same 2013 baseline, but carbon tax is added from 2017 onwards.

The main finding of the study is that a price indication in the long-term is given, leading to mitigated CO_2 emissions, with increased wind and hydraulic energy generation and a small proportion attributable to LNG, with a decrease in coal as source of energy (favouring the most efficient strategies). It is important to point out that the CO_2 tax of USD$5 per ton is **assumed** to generate significant reductions in the electricity sector, almost an 11% reduction in sectorial emissions by 2030, while the costs to the final consumer, bound to this tax, ought not to exceed 2%, provided that intermittent wind energy generation has an adequate countermeasure (such as dams or LNG).

Costs and benefits of Carbon taxes (beyond collection). The main benefit is that it helps in building those institutions that the country requires for further, more ambitious mitigation commitments over the next decade. Regarding costs, the electricity sector would have a 2% price hike by 2030, with an apparent impact on CO_2 emissions and on investment decisions in renewable energy.

At the end of the presentation and on a personal note, the indication is that seems reasonable and practical to start off with a carbon tax, but there is much to learn and, in the long run, it would make more sense to move towards a "cap and trade" system involving the entire economy, linked to international markets and to cover all emission sources and seize on every opportunity.

Presentation # 4: "Monitoring and Evaluating the Impact of the Chilean Carbon Tax".

Gilbert E. Metcalf (Tufts University, United States)

Case Study: Carbon Tax in British Columbia (Canada). The carbon tax came into force across the province in 2008, with gradual increases in rates of up to $ 30 Canadian dollars (CAD) per ton (currently standing at US $ 25.50 with a refined fossil fuel tax base). An important aspect of this tax is that proceeds should be refunded to the citizenry; there are no new spending programs financed with these proceeds.

For citizens, the biggest concern was the potential impact of this tax on growth, yet it was seen that growth-inhibiting taxes were mitigated by several factors, such as:

- That tax be levied on carbon consumption and not on production,
- A large proportion of electricity comes from hydroelectric power plants, thus existing fuel taxes make carbon tax increases appear somewhat modest, and
- Increases in revenues from recycling, which enhance this economic niche and foster growth.

An econometric assessment was undertaken, centred on the impacts the policy may have on economic growth. The assessment compares post-policy impact on British Columbia against other Canadian provinces, for data ranging from 1999 to 2013. Main study conclusion were:

- There appears to be a decrease in fossil fuel consumption, fixing carbon prices would therefore seem to be a profitable way of reducing emissions,
- There is no adverse impact on the growth of the provincial economy and
- On there being a positive opinion by the citizenry regarding tax implementation, there is no barrier to bring into law taxes aimed at improving the environmental and economic sector.

Design of an efficient Carbon Tax assessment system for Chile

In the design of such a system, the aims of the assessment mechanism must first be considered, what information is necessary so as to undertake the assessment and lastly to assign assessment responsibilities among the different Ministries.

Regarding assignment of responsibilities, it is proposed that the party responsible for ensuring tributary compliance ought to be the Ministry of Finance, the starting point being the Ministry of the Environment and the creation of performance indicators would be tasked to the Ministries of Finance, Energy, Transport, Environment and Agriculture.

Within the task of assigning responsibilities, the following must be checked:

- What are the design needs and data requirements for assessing carbon tax effectiveness,
- What are the different tasks that should be undertaken by the various institutions or ministries to guarantee a well functioning MRV system, and
- Which ministries and agencies should be responsible for implementing the previously identified assessment policies.

In conclusion, the advice is to define which would be the key coordination areas and cooperation required, within and among the different ministries and government agencies. Another aspect to consider is the data gaps and how to overcome them.

Presentation # 5: "Tentative National Contribution from Chile".

Andrés Pirazzoli (DCC-MMA)

The presenter starts off indicating that the country is highly vulnerable to impacts from climate change. An illustration of this fact was seen in the last few months, namely:

- Forrest fires in the south, due to the high temperatures spanning several days together with high wind velocities, hindering fire control, and
- Floods in the north, as a consequence of intense rain in an area unprepared for such climatic phenomena.

Chile is therefore vulnerable due to climate as also due to natural resources, leading to macroeconomic vulnerability.

Therefore the Tentative National Contribution on Climate Change aims at several axis, the first of which being adaptation, where Chile adheres to the concept of planned adaptation to climate change, conducive towards facilitating the adaptation and resilience of the population, its means of sustenance, services, laws, policies and institutions, something which is already impacting national territory.

A second axis is building and strengthening capacities. Chile already has valuable information and learnings that it can place at the service of not only the Chilean population, but also to its peers at the UNFCCC; it has included the challenges and opportunities that climate change implies within the study curricula of both students and teachers and has also generated platforms for managing and disseminating information in climate change matters.

A third axis is developing and transferring technologies. Chile today does not have a technological strategy for dealing with the national challenges that climate change implies, although it is evident that a relevant portion of the national budget aimed at technological development has in turn created greater resilience and mitigated climate change in the country.

The fourth axis aims at financing and it is here that Chile does not currently have a financial strategy for dealing with climate change. A relevant portion of the national budget has had positive impacts on resilience and mitigation, a significant part of national investments and expenses in these matters have been sourced from international donors, in line with the formulation of our 2020 commitments. In this regard and aiming to make an effective contribution in the context of a post-2020 agreement, Chile requires a diagnosis of funds available and required for contributing to climate action rooted in its own national circumstances and in line with its capacities.

The last axis is mitigation, this being the main axis on which the other axis rest; a set of commitments was analysed and an emission intensity target was defined (CO_2/GDP emitted). The forestry sector has a specific contribution and an example of this is that, using its own resources, Chile has set itself reforesting around

100 thousand hectares of degraded land, with an estimated self-funded investment of close to US$ 250 million, enough for 100 thousand hectares of managed native forest up to 2035.

The forestry contribution, on it being dissociated to the GDP, seeks to promote environmental attributes of forests and not those that are more productive and logging orientated, more associated to commercial exploitations and which are closely correlated to the national GDP.

A significant future reduction is foreseen in the planting of exotic species, seeking to promote nationwide reforesting with native species. The projected decrease in surfaces is based on there being scarce current and future availability of lands having soils sufficiently productive to sustain this type of monoculture.

Furthermore, it is estimated that in 15 to 20 years time commercial plantations of exotic species will be under steady state conditions, with no increases in surfaces under exploitation, harvesting a similar volume to that grown each year for these species, thus its relevance in terms of net GHG captured will tend to cero.

This fact illustrates the need to promote reforestation with native species, without a logging or commercial end in mind, aiming to recover degraded native forest, which is in alignment with contributing toward reforestation.

Although this contribution emphasises mitigation benefits, it clearly has a scope in climate change adaptation, promoting species diversification (mostly native) and the recovery of degraded soils, having a positive impact in regulating the water table at basin level.

Presentation # 6: "Application of the GHG Protocol Standards of the World Resources Institute. Quantifying CNT forestry component".

Yasna Rojas (INFOR – Valdivia)

The general context in which the presentation is set is mentioned at the start: Chile aims to restore around 100 thousand hectares of degraded soils through reforestation with native tree species, with a wholly-owned investment estimated at around US$250 million, encompassing an area of at least 100 thousand hectares of managed native forest up to 2035.

The Chilean MMA, with funding from WRI, requested the Forestry Institute to quantify the impact on GHG emission and capture that reforesting with native tree species of 100 thousand hectares of degraded soil may have for the years 2020, 2025 and 2030. In order to do this, plantations are to be mixed (two or more native species) and managed towards a productive aim.

The methodology employed was to define the areas with a reforestation potential per administrative region to then characterise each site given its potential and of the potential species per region; plantation and management schemes were identified for the selected species and lastly a projection of the CO_2 growth, captured and emitted was prepared.

According to a study made by CONAF[1], areas available for reforestation as at 2013 were the following (in hectares):

Region	Moderate Erosion	Light Erosion	Total
O'Higgins	154,883	16,379	171,262
Maule	96,781	28,890	125,671
Bío-Bío	109.653	69,553	179,206
Araucanía	80,247	65,173	145,420
Los Ríos	21,965	12.259	34,224
Los Lagos	60,611	77,869	72,870
Aysén	123,751	43,398	167,749

When choosing sites and potential species per region, the following were taken into account:

- Site conditions (moderate erosion, a minimum annual precipitation between 600 to 1000 mm and a median temperature ranging from 14 to 17° Celsius, a positive water balance and priority given to hills facing south, south-west and south east),
- Species condition (normal temperature and humidity range for the species in the area detected as having reforestation potential, normal precipitation range and definition of the appropriate densities per site and specific conditions),
- Technical elements (sufficient technical information for each species in the territory, technology at the site chosen is subject to sustenance, plantation techniques, fertilization, type of plant, densities, management, growth rates, etc.),
- Future climatic scenarios, and
- Logistical possibilities (level of expedited access to reforestation areas, closeness to population centres and access to technical and labour supply, possibilities of accessing evaluation and monitoring, sufficient

[1] *"Potential area susceptible to reforestation in region O'Higgins through to Aysén"*

supply of suitable trees).

Selection of sites and potential species per region. For regions O´Higgins and Maule, the Quillay and Peumo species were chosen, as they grow adequately here; for the Araucanía region, Roble and Lingue were chosen; for Biobío, Araucanía and Los Ríos, the Raulí and Ulmo were chosen for the Andean foothill areas; while for Los Ríos and Los Lagos, Coihue was chosen.

In order to manage these plantations, the project owner requires that they be mixed, that they include safety features and for productive purposes, and to include interventions. It is important to point out that in mixed plantations activities deemed as cultural in nature, like thinning, are more complex. Regarding quillay and peumo plantations, low density intermediary thinning were considered for both species, with 15% of the volume extracted at age 20. For roble-lingue, raulí-ulmo and coihue-ulmo plantations, the first thinning is to be at 15 years, with 30% of the volume extracted, with the second one occurring at 25 years with the same percentage extracted. Growth is projected to occur up until 2040. In all cases the cutting of the trees imply an immediate emission in the forestry sector.

Three scenarios were modelled, arising from the combination of the species selected, the region and management type. The first scenario implies a distribution of the selected species and its management from regions Biobío up until Los Lagos, the second ranges from O´Higgins region to Araucanía while the third scenario includes the O'Higgins region up to Los Lagos. The modelling of the three scenarios shows no significant variations in CO_2balance, merely in species distribution in the various regions, always with the same total surface under management.

On assessing the three scenarios in 2035 (20 years after planting), the average net capture under scenario 1 is 0.75 MMt CO_2e/year; that of scenario 2 is 0.61 MMt CO_2e/year while for scenario 3 it is 0.65 MMt CO_2e/year. It must be mentioned that the project owner asked not to model a scenario without plantation management, however in plantations having environmental aims there is the choice of planting without managing for a certain period, in the understanding that an environmental service is being provided which may be valued and paid to the owners. Additionally, this study considers only some native species and so there is a mix of species within plantations, within an array of possibilities to be assessed, including planting a single species on some sites. The present study only took into account land for forestation having a moderate level of erosion, yet there is a large area showing severe and very severe erosion, where there may be other tree species which prove to be successful, and productive land may be less, implying that the net carbon capture figures would be different.

Presentation # 7: "Pilot experience on the "Mitigation Goals" standard, as applied to the Chilean 2020 target."

Maricel Gibbs (Private Consultant)

It was indicated at the start that the general objective of this standard is to provide a methodology to asses and report progress in fulfilling a mitigation target, be this at national or sub-national level. The specific ends of the standard are:

- Follow-up and reporting on progress made towards fulfilling mitigation targets in a precise, coherent, transparent, complete and relevant manner, through the use of standard principles and approaches,
- Helping decision-makers to develop efficient strategies to manage and reduce GHG emissions and,
- Support preparation of reports regarding emission impacts and the efficiency in attaining mitigation targets.

Regarding the exercise on pilot experiences on applying mitigation target standards, first phase results of the MAPS project were used as a baseline, concluding that the standard suggests decoupling "land use" from the reduction estimate, so as to avoid double accounting. Chile participates in the carbon market through the CDM and the voluntary market, which is in turn difficult to ascertain given that there is no centralised and trustworthy record-keeping, while reductions in CDM trades must be subtracted, so a clear and updated CER record is needed.

The presentation ends with the comment that Chile has a voluntary mitigation commitment based on fulfilment through NAMAs and, in this case, the mitigation target standard suggests using standard policies and mitigation actions for follow-up and assessing compliance with national targets.

Regarding follow-up through the national GHGINV, Chile currently applies the IPCC 2006 directive, also using IPPC software and calculation templates for the AFOLU sector. The inventory applies Tier 2 emission factors for limestone production (industrial processes), bovine film-coat fermentation (agriculture), bovine and pork manure management (agriculture) and forest soils (LULUCF), having a time line ranging from 1990 to 2010, using this to implement a comparative exercise between the MAPS base line and the inventory for the period 2007 to 2010.

Presentation # 8: "Proposal for measuring progress on the CNT Chilean Emission Intensity Target, based on the "Mitigation Goals" standard."

David Rich (World Resources Institute)

David Rich started off his presentation mentioning that GHG emissions are producing climate change and its impact is felt throughout the world. A one degree Celsius increase in temperature will lead to ever more unpredictable and dangerous impacts for people and ecosystems. As a result there is an urgent need to accelerate efforts geared towards reducing GHG emissions.

National, regional and local governments are developing and implementing several types of targets for mitigating climate change. Accounting and reporting methods for GHGs are necessary so that governments monitor progress made on targets set and to ensure that these are being met. Transparency is necessary regarding how the target has been reached at, to inform mitigation strategies and provide credibility.

Upon implementation of the standard, it is hoped that the country may honour the following:

- Design a mitigation target that may imply understanding advantages and disadvantages of the various

mitigation objectives and to inform on the choice of mitigation strategy chosen to achieve stated aims.

- Define quantification methods for monitoring progress.
- Calculate permissible emission for the target years, so as to understand emission levels and associated future emission reductions so as to fulfil the objective.
- Asses and inform progress towards goal achievement, including an assessment of the additional actions needed to achieve the objective; report publicly on progress made towards reaching the target and assessment methods employed and to satisfy stakeholder demands for transparency.
- Asses and inform if an objective has been reached.

Mention is also made that, given a lack of international rules, the standard may be useful in designing and assessing aims under the UNFCCC, including contributions to any mitigation sought and defined at national level, commitments made to limit or reduce quantified emissions and nationally appropriate mitigation actions (NAMAs), set as a mitigation target, as well as objectives set within the context of low emission development strategies (LEDS) or other mitigation commitments made at national or international level.

Before selecting a standard, the overall panorama of GHG measuring standards must be considered, so as to determine the most appropriate. GHG emissions must be measured at country, city, industry or facility level, using GHG inventories. GHG count may also be measured to estimate GHG emission reductions starting from specific projects, policies or actions or to asses progress made towards mitigation targets. The methods in conjunction provide a basis for an integral administration of GHG.

The development of a GHG inventory is a first critical steps towards setting GHG reduction targets. Inventories provide information regarding emission size and are the basis for monitoring progress towards target attainment in time. However assessing mitigation targets require additional methods that go beyond inventories, so as to account for transfer of units emitted under market mechanisms (such as compensation mechanisms and marketable concessions) and to keep accounting of mitigations in the soil sector, which may differ from the accounting methods used for national inventories. When supplying these additional methods, the standard may allow, in addition to guiding target design, designing and monitoring progress in a clear and precise manner.

Application of the standard. The standard is designed to help in each stage of the target setting process, from design through to implementation and assessment. Namely:

- Prior to target implementation: design a mitigation aim and define accounting methods for monitoring progress.
- During target period: monitor and report progress towards target.
- At the end of target period: assess and report if target has been reached.

The frequency and timing in applying the standard is dependant on user target and and resources. The more integral approach is to apply the standard when designing an annual (or periodic) objective during implementation and then afterwards, at the end of the target period.

Summary of Stages. Figure 1 measures the stages in the standard and corresponding chapters. The assessment made of target is a iterative process, with accounting and reporting procedures occurring at each step. Not all steps shown in the figure are relevant for all users. For example chapters 8 and 9 will not be relevant for users who are at the start of the target period.

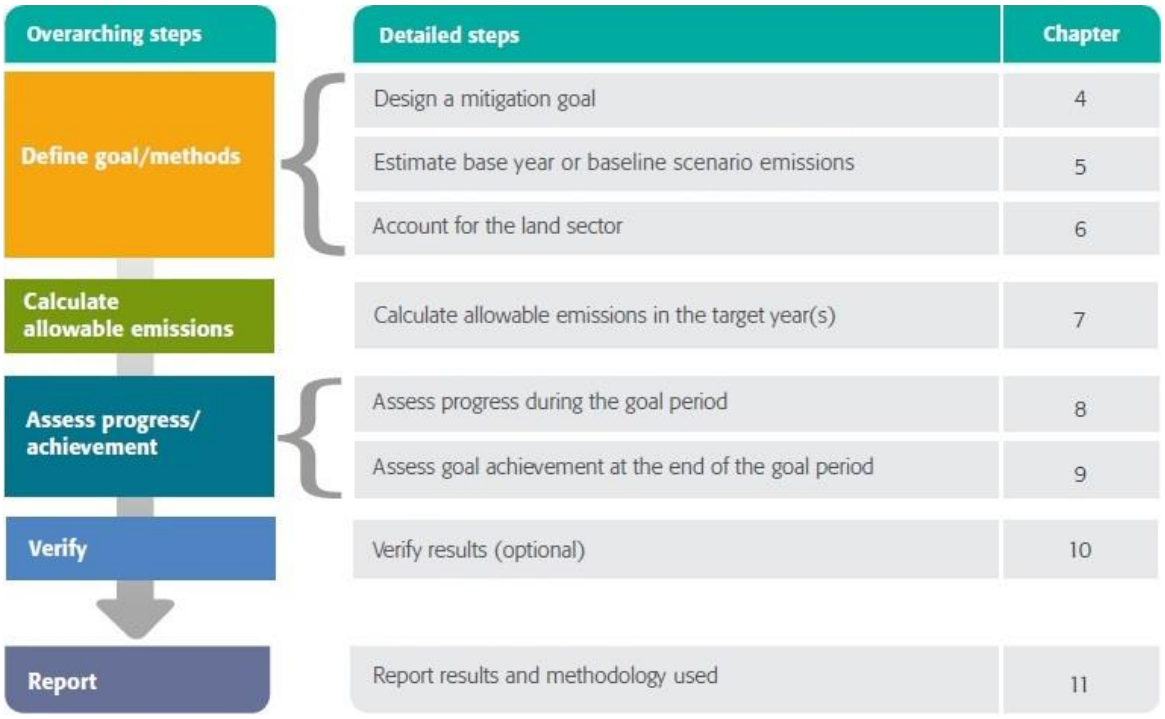

Figure 1, Summary of steps in mitigation target accounting *(taken from WRI Mitigation Goals).*

Mitigation Goals Design. To report on the target design, global mitigation needs must be considered, together with specific mitigation opportunities found in the jurisdiction, as well as development and policy objectives. Recent improvements in how climate change is approached, such as IPCC, may help users to understand the magnitude that emissions must be reduced by so as to limit global warming. Mitigation opportunities may be identified using mitigation assessment methods that may indicate the size of the reduction opportunities available, with potential cost and benefits associated to each.

The design of the objective involves several choices. It includes for example the choice of what emissions to include in target limits, such as the geographical area, sectors, GHG, as well as emissions within and outside the jurisdiction to be covered in the objective. Other fundamental choices include selecting the type of target mitigation and the target period, including if the target spans one or several years.

Goal Type	Description	Reductions in what?	Reductions relative to what?
Base year emissions goal	Reduce, or control the increase of, emissions by a specified quantity relative to a base year. For example, a 25% reduction from 1990 levels by 2020.	Emissions	Historical base year emissions
Fixed-level goal	Reduce, or control the increase of, emissions to an absolute emissions level in a target year. One type of fixed-level goal is a carbon neutrality goal, which is designed to reach zero net emissions by a certain date.	Emissions	No reference level
Base year intensity goal	Reduce emissions intensity (emissions per unit of another variable, typically GDP) by a specified quantity relative to a base year. For example, a 40% reduction from 1990 base year intensity by 2020.	Emissions intensity	Historical base year emissions
Baseline scenario goal	Reduce emissions by a specified quantity relative to a projected emissions baseline scenario. A baseline scenario is a reference case that represents future events or conditions most likely to occur in the absence of activities taken to meet the mitigation goal. For example, a 30% reduction from baseline scenario emissions in 2020.	Emissions	Projected baseline scenario emissions

Table 2. Summary of Mitigation Goals Types *(from WRI Mitigation Goals Standards).*

A decision must be taken whether the target is reached only by reducing emissions within the jurisdiction or through using transferable emission units from market mechanisms. Transferable emission units include compensation credits generated through emission reducing project or programs, such as MDL projects and emission licenses from the emission exchange programs.

Another key selection is that of the target defining general reductions for GHG emission that are associated with achieving said target.

Key considerations in designating a target that may maximise emission integrity, measurement and reduction. If the aim is to maximise emission integrity, measurement and reduction, the following must be considered when designing mitigation targets:

- **Selecting target type:** Year base emission targets and fixed level targets are easier to explain, safer and more transparent than base year intensity targets and reference scenario targets, because permissible emissions in target years may be easily calculated at the start of the target period, and progress follow-up can be made by just using GHGINV, without needing models, socioeconomic data nor additional suppositions. The users seeking to deal with short-term increases in emission should consider incorporating base year emission targets or fixed-level targets that are set as controlled increases of emissions starting from base year.
- **Selecting target level:** The target level should mean a significant reduction in emissions below the emissions threshold for regular operations from the jurisdiction (keeping in mind current and implemented mitigation policies), and which may follow an emission trajectory underneath that required to avoid a dangerous impact on climate change, according to that identified by the most recent climate science research.
- **Selection of target time period:** targets spanning multiple years have greater possibilities of limiting accumulated emissions during the target period than single year targets and allow for understanding anticipated emission levels for several years, rather than a singe year. On incorporating a combination of long and short range targets greater clarity is seen when performing long-range planning and a decreasing emission trajectory is ensured.
- **Use of transferable emission units:** in order to guarantee a greater environmental integrity and enable

consistent accounting, it is important to ensure that any emission unit subject to transfer as applicable to a target satisfies high-quality principles and that it be generated in the target year or period. Mechanisms for tracking units bought and sold may be used to bolster the environmental integrity of mitigation targets and to prevent double accounting.

- **Minimising leaks**: the increase in emissions outside target limits can be minimised by including significant emissions outside of the target jurisdiction, particularly relevant for regional jurisdictions, such as cities.

Estimation of base year or reference scenario emission. The next step is to estimate base year or reference scenario emissions Users having base year emission targets or base year intensity targets need to select a base year for data on historical emissions for use as reference when following-up on any reductions made. Users having reference scenario targets need to develop reference scenarios, meaning a reference case which may represent those future emissions having the highest probability of occurrence, in the absence of mitigation targets.

Developing a reference scenario generally requires many entries, such as data on the factors leading to emissions (economic activity, energy prices and technology and demographic growth), these being suppositions regarding how factors leading to emission are expected to change and data on any relevant policies.

Explanation on land use sector. In most sectors tracking progress with regards to a certain target is achieved through comparing emissions in time to that in the GHG inventory. It is possible, however, that this approach is not appropriate for soil use sector, given the important role that emissions may play regarding non-human actions, such as plagues, natural disturbances and the role that previous land usage may have had on emission and removal during the target period. Further, the way in which sector emissions and removals are incorporated into the mitigation target may have a significant impact on target scope and in achieving reduced emissions. The standard also provides guidance in helping users to choose how to deal with this sector and in explaining its emission and removals.

Calculation of permissible emissions in the target year or period. Permissible emissions are the maximum level permissible for the target year that are consistent with reaching the target. They represent a publication of the target for performance monitoring and are therefore critical for users to asses progress and define target achievement. The standard provides a guide and equations for calculating permissible emissions for each of the three target types, as mentioned in table 2.

Assessment of progress during the target period. Users must assess and regularly report on progress during this period. The standard provides guidance on how to calculate changes in emission during the target period and reporting year. This information will help participants and decision-makers in understanding emission trends during the target period, as well as progress made towards attaining the target. The standard also allows users to calculate additional emission reductions necessary to attain the target, critical in designing mitigation strategies providing sufficient reductions. Lastly, the standard provides a guide to assess why emissions have changed from the start of the target period. This information helps in determining if changes are as a result of mitigation policies or resulting from other factors, such as changes in economic activity. The information which comes up may shed light on the changes that need to be made to an existing target as well as laying down target design and future mitigation policies.

Assessing target achievement upon ending the target period proposed. At the end of the target period both participants and government need to know if the aims have been met. This is done by comparing permissible emissions with emissions accounted for. Emissions accounting include emissions for the target year (emissions and reductions within target limits, in the target year), as well as sale and transfer of applicable transferable emission units, together with any changes in sector net emissions depending on how

the sector is treated when designing the target. If the accounting of emissions is equal or less than permissible emissions, the target would then have been reached. The standard is a guide, as are the equations for emission accounting, seeking to avoid double accounting of transferable emissions and to uphold environmental integrity.

Verification of Results After carrying out target assessment, users can review analysis of results. Although verification is not a requisite, it may increase trust levels in users and stakeholders regarding report findings.

Reporting Results. The final step in the standard is to publicly report on results of target assessment, critical in ensuring transparency in GHG accounting. The standard provides a list of information to be included in the target assessment report, including information on target design, methodological choices and accounting methods.

Annex E has the relationships between these activities, authored by David Rich (WRI).

2. Workshop "MRV for NAMA": Application of the "Policies and Actions" Standard of the WRI GHG Protocol.

The workshop started out with a welcome from the head of the Department of Climate change of the Ministry of the Environment, Fernando Farias, who highlighted the relevance of the support provided by the Information Matters project to the country. The presentations themselves were then given.

Presentation # 9: "Panorama of WRI Standards."

David Rich (World Resources Institute)

The presenter spelled out WRI accounting standards and emissions/capture reports for GHGs. The presentation started out with general background information on the WRI as a relevant global environmental research organization, whose central headquarters is located in Washington DC with numerous smaller branches in several other countries. Its main lines of action are climate, energy, food, forest, water and sustainable cities.

The GHG protocol was described as a joint program from the WRI and the WBCSD, whose mission is to develop standards and internationally accepted tools for measuring, managing and reporting on GHG. The protocol provides accounting and reporting standards for these gases, guidance to the various sectors, tools for calculation purposes and relevant training. The main standards are the following:

- Corporate (for companies and organizations),
- For projects,
- For corporative value chains (emissions accounting when dealing with company supply chains),
- For products (regarding accounting for product life cycle emissions),
- Mitigation Goal Standard,
- National and subnational goal reduction accounting,
- Global Protocol for Cities, and
- Policy and Action Standards, this being the main subject for this presentation.

According to the presenter the use of one standard or another depends, on the one hand, on the type of MRV or GHG measurement wanting to be used (which may be either from emissions inventory, GHG reduction or mitigation targets) and, on the other, on the level of work to be carried out, either at national, city, subnational jurisdictions, or at company or organization level.

The "policies and action standards" in its most recent version was then presented. The basic purpose of the standard is to contribute in assessing effects in GHG emission or reductions that specific policies and actions may have, in a precise, coherent, transparent, complete and relevant manner, also aiming to help decision makers in developing effective strategies for reducing emissions, contributing towards coherent and transparent reporting on emission impacts and policy efficiency, thus creating greater coherency and transparency at an international level regarding estimation methods on the effects of emissions on policies and actions

The standard is also designed to be used before, during and after the implementation of a certain policy or action. It may be used for all types of policies and actions, in all countries, for policies and actions generating increments or decreases in GHG emissions and for all sectors (AFOLU, energy, industry, transport, etc.). The standard may also be applied to make a MRV of the co-benefits or unrelated positive effects that GHGs may have, either in environmental, social or economic terms.

The presenter then proceeded to enumerate the four basic steps defined by the standard, namely:

1. Define the policy or action and its goals.
2. Identify effects.
3. Estimate effects.
4. Report on Results.

In order to explain each of the steps, reference was made to each of the chapters that the standards relate to.

Chapter 2. Goals. Chapter 2 relates to defining assessment goals for policy or action effectiveness, which may include: reporting on policy selection and design, assess effectiveness and profitability of measures applied, report on the effects policies have on GHGs and attract and facilitate financial support for mitigation actions through estimating reductions in GHGs.

Chapter 5. Definition of a policy or action. Chapter 5 provides the bases for defining the policy or action. The suggested steps for this being:

- Selecting the policy or action to be assessed, such as; tax categories, voluntary agreements, subsidies, implementation of new technologies, processes or practices, infrastructure programs, information instruments, financing and investment, among others,
- Clearly and fully defining policies or actions, setting out descriptions, implementation times, targets, responsible institutions, geographical coverage, sectors involved, etc., and
- Definition as to whether an individual or joint measure is to be assessed and define if the measure is to be assessed ex-ante or ex-post.

Chapter 6. Identification of effects and mapping of the causal chain. This chapter presents a standard obliging users to consider all possible types of effects, which may be both within or outside a certain jurisdiction, short or long term in nature, intentional or unintentional, probable, possible or not very probable and whether leading to increases or a decreases of GHGs. A fundamental tool in defining and identifying all possible effects that the implementation of a certain measure may generate, is the causal chain, which basically enables generating a diagram identifying cause-effect relations, starting from the implementation of an action to continue with the possible effects that the implementation of a certain measure may imply.

Chapter 7. Definition of GHG Assessment Thresholds In order to identify the significance of any effects, the present chapter puts forward that users must asses any potential effects of GHG in terms of the probability of occurrence and its relative magnitude. The standard sets out that when making a combined

assessment of both factors, significant effects become those that have magnitude "moderate" or higher, with probability of "possible" or higher, as seen in figure 2.

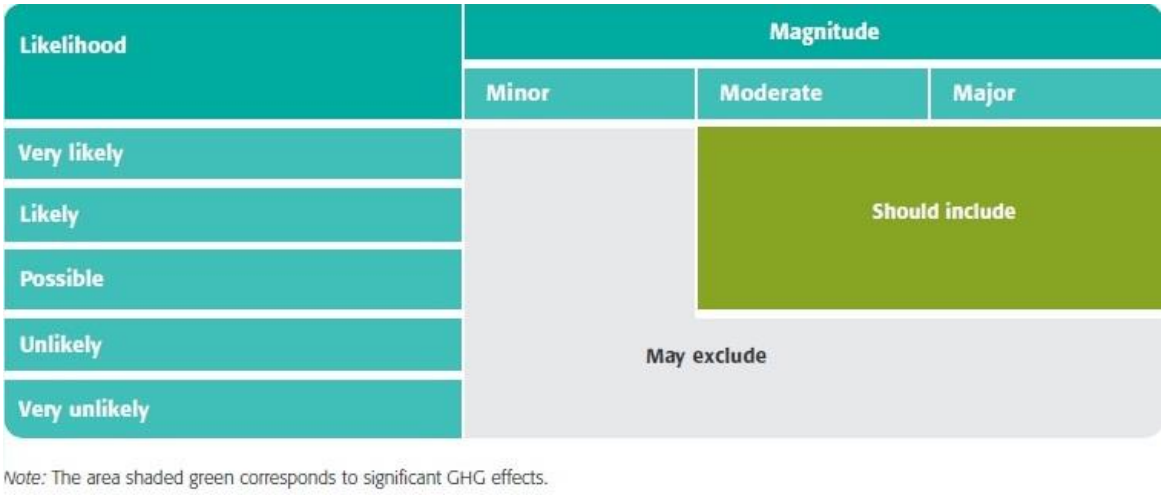

Figure 2. Combination of factors for defining GHG assessment thresholds *(taken from the WRI "Policies and Action" standards).*

Exercise 1. Policies and Actions Standard. Step 1: What GHG should be included in the GHG Assessment Threshold?

David Rich presented a brief first exercise, consisting in determining if certain effects, associated to a certain "housing insulation subsidy" should be included in the GHG Assessment Threshold, in accordance to its relative magnitude and probability levels. In order to do this, work was made with information included in Table 3.

Table 3. Possible effects to include in Assessment Threshold Limits.

GHG Effects	Probability	Relative magnitude	Include?
Reduced emissions due to electricity generation			
CO_2	Probable	High	
CH_4	Probable	Low	
N_2O	Probable	Minor	
Reduced emissions due to domestic electricity generation			
CO_2	Very probable	High	
CH_4	Very probable	Low	
N_2O	Very probable	Low	
Increased emissions given the manufacture of goods and services			
CO_2	Likely	Low	
CH_4	Likely	Low	
N_2O	Likely	Low	
Increased emissions attributable to insulation manufacture			
CO_2	Likely	Moderate	
CH_4	Likely	Low	
N_2O	Likely	Low	
HFCs	Likely	Moderate	

Exercise results were presented; for reduced emissions from electrical generation, only those attributable to CO_2 should be included, similarly, for reduced emissions from usage of natural gas in homes, those attributable to CO_2 should be included; regarding increased emissions from insulation manufacture, significant effects are those attributable to CO_2 and HFCs.

Estimating GHG Effects. Key Concepts. The presenter put forward some key concepts regarding estimating GHG effects. The importance of defining a baseline scenario and a scenario generated from the application of a policy or action was first spelled out, in order to then facilitate identifying effects generated through a specific measure. The baseline scenario is that representing events or conditions with the highest probability of occurrence if the measures were not implemented, while the policy scenario is that representing events or conditions having a higher probability of occurrence if the policy is in place. The basic steps are: estimate baseline scenarios, estimate scenario emissions with policy implemented and lastly calculate the difference between both so as to estimate the effect of the measure. It is desirable to perform predictive emission estimates, an "ex-ante assessment" and estimation after having applied the measure, meaning what really did occur with emissions after implementation, based on actual information. The former is reflected in graphical form in figure 3.

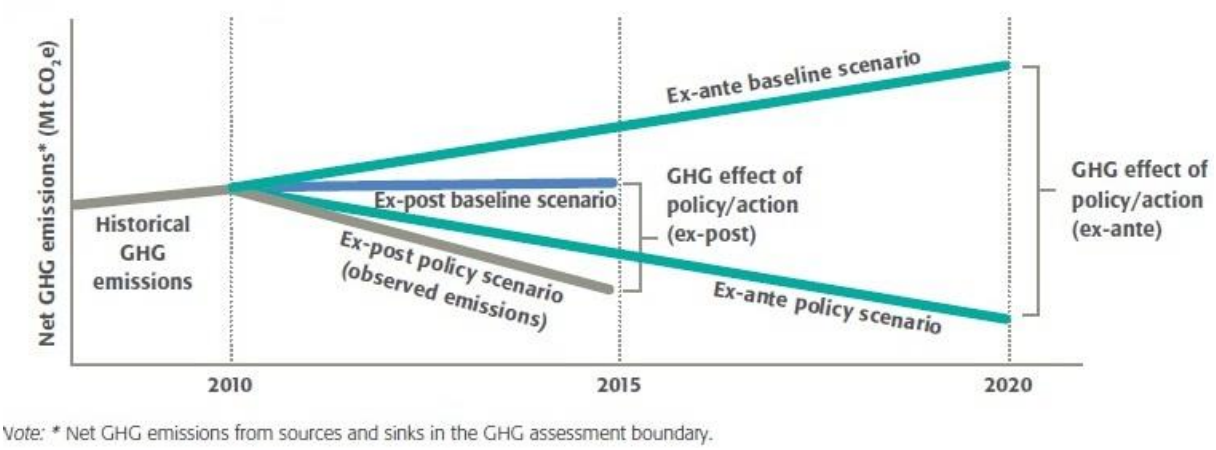

Figure 3. Estimation on the GHG effect of a policy or action *(extracted from the "Policies and Actions" standard of the WRI).*

For estimation of the GHG effects, data can be either "bottom-up" or "top-down". In the first case, information is measured, monitored and gathered from individual sources; in the second case, data correspond to statistics at a macro level, gathered nationally or per sector. In relation to this, the type of method used is "bottom-up" when change is calculated in GHG emissions for each source, project or entity affected by the policy or action, to then be added or summed up; while the "top-down" method will use statistical methods for performing estimations.

Finally, a key concept mentioned was the selection of the required level of accuracy and integrity of the GHG estimation, based on a series of factors, which include: a) the objectives of the assessment, expected uses of the results and level of accuracy required to fulfil the objectives, b) the relative importance of the measure being evaluated, c) data availability and d) the capacities, resources and time available to perform the assessment.

Chapter 8. Estimation of Baseline Emissions This chapter presents two types of approach for making a comparison with the baseline, which are only applicable when a ex-post assessment is performed: a) the scenario method, which is the most common and is basically the comparison between a baseline scenario and a scenario with the implementation of the measure, and b) group comparison method, which is a comparison between a group or region affected by the policy or action and an equivalent group or region which has not been affected by such a measure. In order to determine which method to use, the standard provides the guideline included in Figure 4.

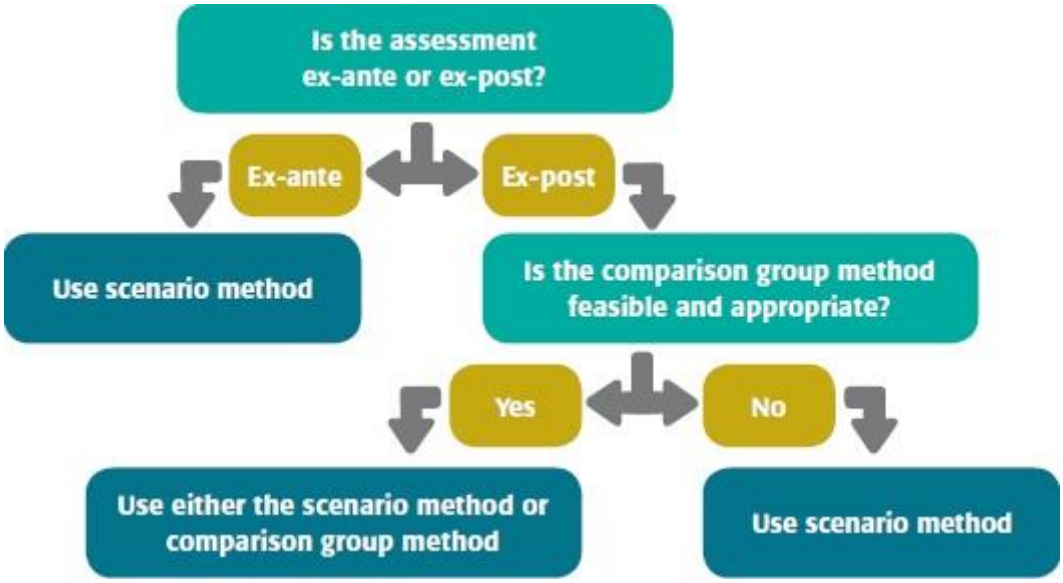

Figure 4. Guide for selecting the type of comparison *(drawn from the WRI "Policies and Actions" standard).*

The most likely baseline scenario depends on the driving variables that might affect emission levels, in the absence of the measure being evaluated. These variables may include other policies, actions or projects which are expected to affect the same emissions sources or driving variables not associated to policies, attributable to other conditions, such as socioeconomic factors and market forces which is expected to affect the same emissions sources. Only significant variables should be considered.

Chapter 9. Estimation of ex-ante GHG effects. The Standard sets out that baseline values should be used for GHG sources not affected by the policy. While for GHG sources not affected by the measure, scenario values should be estimated with the implementation of the measure.

Chapter 10. Performance Monitoring The purpose of monitoring is, on the one side, to follow-up tendencies seen in the indicators to verify if the policy or the action is being implemented according to expectations, and on the other to collect data required for estimating GHG effects. The standard proposes the use of certain types of key performance indicators to do the monitoring, i.e.: a) inputs, which are resources that intervene in the implementation of a policy (for example, financing); b) administrative activities involved in implementing the measure; c) intermediate effects, defined as changes in behaviour, technology, processes or practices generated by the application of the measure; d) GHG effects, corresponding to changes in the emissions generated by intermediate effects and e) non-GHG effects, which are changes in environmental, social or economic conditions.

This chapter also establishes the importance of creating a monitoring plan which may include methods and procedures for measuring and gathering data to be used, information sources, monitoring frequency, level of uncertainty in the measurements and estimations, sampling procedures (if applicable), verification and procedures for verifying data used, entity or person responsible for monitoring, including the roles and responsibilities of the relevant personnel, and finally, procedures of the internal audit, quality assurance and control.

Chapter 11. Estimation of ex-post GHG effects. Unlike the ex-ante assessment, the ex-post assessment already has actual emission data, once the measure has been in place. It is important that every time an ex-

post assessment is done, to recalculate and update the estimated emissions for the baseline that may have been estimated through an ex-ante assessment and, additionally, to perform back assessments to see if the effects identified in the causal chain actually occurred.

Policy Interactions Regarding the interaction between policies, the standard establishes that there are three relevant situations to consider. It should first be decided if the assessment is to be made on an individual or on a set of measures. Then, when estimating any GHG effects of the measure, consider if the measure interacts with other measures. In third place, it is important that when performing multiple evaluations of several different measures, to consider the complexities involved in adding GHG effects of each policy or action. Policies that interact may be independent, overlapping, reinforced and overlapping and in turn reinforced, as illustrated in figure 5.

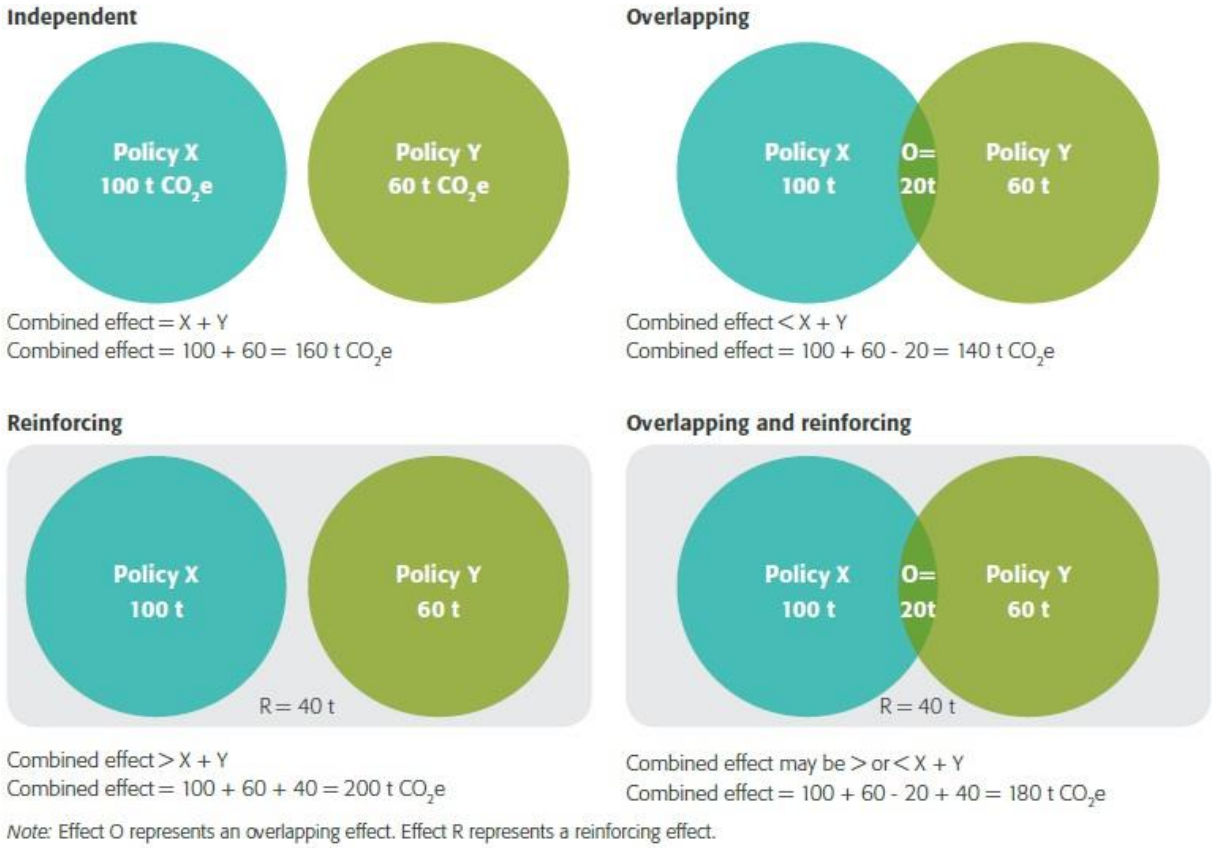

Figure 5. *Types of policy interactions (drawn from the WRI "Policies and Actions" Standard).*

Chapter 14. Reporting. The last chapter relates to reporting, with emphasis on the information to be delivered, so as to make it effectively transparent, to include basic information about the GHG assessment (period considered, ex-ante and/or ex-post assessment, etc.) a description of the policy or action, the estimated change in GHG emissions attributable to the measure, the methodology used and, finally, any additional reporting information.

Exercise 2: Estimation on changes to GHG emissions.

The presenter used Table 4 to illustrate this exercise. A few minutes were given for the exercise and then the speaker explained the results and the calculation method.

Table 4. Calculation of changes in GHG emissions.

GHG effects included	Affected GHG sources	Baseline emissions	Policy scenario emissions	Change (P – B)
Reduced emissions from electricity use	Fossil fuel combustion in grid-connected power plants	100,000 t CO_2e	95,000 t CO_2e	
Reduced emissions from natural gas use	Residential natural gas combustion	60,000 t CO_2e	50,000 t CO_2e	
Increased emissions from insulation manufacturing	Insulation manufacturing processes	5,000 t CO2e	8,000 t CO2e	
Total change in emissions				

The calculation method consisted basically in subtracting baseline emissions from the policy scenario emissions: therefore, results were -5,000 t CO_{2e} in electricity use, -10,000 t CO_{2e} in natural gas use and +3,000 t CO_{2e} in insulation manufacturing, with a total change in emissions of -12,000 t CO_{2e}.

Presentation # 10: "Lessons Learnt within the Pilot Application for Accounting and Reporting on Policies and Actions for GHG Protocol Standards on Energy Efficiency Mitigation Actions".

María Luz Farah (Environmental Poch)

In this presentation, A practical experience on applying WRI Standard on Policies and Actions was given. This pilot application was developed along five national mitigation actions in energy efficiency and was executed by the Environmental Poch, led by the MMA and the Ministry of Energy. The actions selected came from different sectors and evidenced different stages of progress in its implementation and availability of information. The objectives of this exercise was basically to analyse the usefulness of the standard an identify improvements that could be added to the final version of the same standard. The methodology used had the following stages: 1) Selecting and clearly defining actions to be reviewed, establishing limits and scopes; 2) Identifying any effects on GHG emissions associated to each action (causal chain mapping); 3) Definition of GHG review limits and prioritising them; 4) Estimating and reporting on effects these actions may have on GHG emissions; and, finally, 5) Assessment of the uncertainty associated with each of the reported results.

In this pilot application, actions were selected from the Transport, Industry and Mining, Artefacts, Commercial, Public and Residential, and Transversal sectors. Due to time constraints, results presented were only those for actions associated with the Artefacts, corresponding to the "Program for Minimum Standards on Residential Lightning", and for the commercial, public and residential sectors, where the action chosen was "Subsidy for Thermal Reconditioning of Existing Housing".

The aim of the Subsidy for Thermal Reconditioning of Existing Housing is to recondition existing houses in vulnerable sectors of the centre-south zone of the country so they may match the minimum standards required from new houses. For this action, an ex-ante assessment was performed (period 2010-2020) and another ex-post (period 2009-2012). The end effects of the causal chain deemed significant were the decreased GHG emissions from the grid network due to reduced electrical demand and decreased GHG due to the reduction in the use of fuels for heating; the assessment was carried out in order to ascertain the former. As result of the ex-ante assessment, emissions were reduced by 204,368 tCO_2e, while once the actual data was measured, the ex-post assessment showed emissions were reduced by 13,501 tCO_2e. The scenario seen due to the action taken indicates that implementing the action would lead to a 30% energy saving in heating for the houses evaluated. Figure 6 shows the curves for the baseline scenario and for the scenario

given the action, for ex-ante and ex-post assessments. As can be seen, ex-post estimations of the baseline and action scenarios are lower than expected, because less annual subsidies than those initially planned for were actually awarded and also because the energy consumption seen in vulnerable housing was lower than expected.

The second action seen was the Program of Minimum Standards for Residential Lightning, consisting in the gradual elimination of low-efficiency light bulbs from the market, leading to reduced residential energy consumption. In this case only an ex-ante assessment was performed for the 2014-2020 period. Starting from the causal chain, the main effect seen was decreased GHG emission due to a reduction in the electricity use in houses that had replaced their light bulbs. The ex-ante assessment made showed that there was going to be reduced emissions amounting to 1,729,732 tCO_2e, for the 2014-2020 period, as can be seen in Figure 6. The descending curve for emissions in the action scenario depicted indicates the gradual replacement of incandescent bulbs by energy-efficient light bulbs.

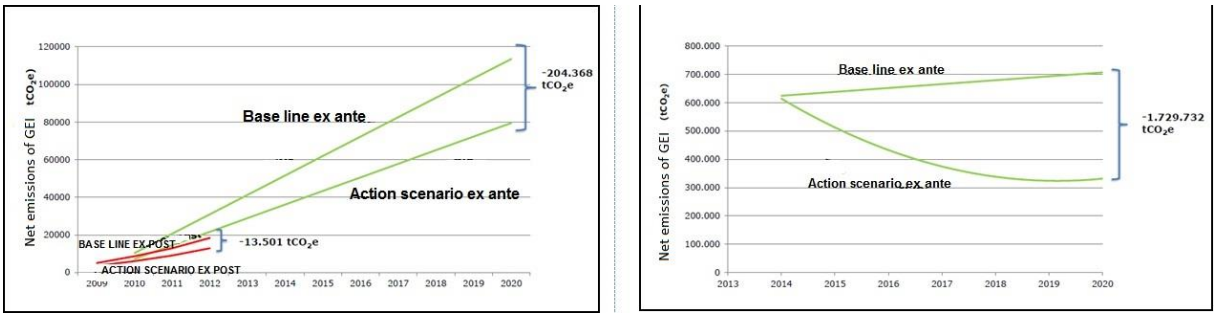

Figure 6. Baseline and standard application action scenario for the "Minimum Standards for Residential Lightning" program and the "Subsidy for Thermal Reconditioning of Existing Housing" program (figure presented by the expositor).

The expositor ended by showing qualitative results of the uncertainty and the sensibility analysis for both measures, which assessed both quality and quantity of available data, and the consensus between the sources consulted. In order to do this the estimated variation range for effects estimated was calculated and those parameters adding greater uncertainty to the estimation were determined.

Starting from this pilot experience, the executing parties identified the following as main challenges: generate further specific information, perform estimations using more exact methods, have enough information allowing quantitatively evaluating uncertainty and defining MRV systems that may constitute a key tool to determine the effects certain actions may have on GHG emissions.

The standard was successfully applied in this pilot assessment, it being a useful tool to identify and estimate GHG effects; their use is recommended in future assessments. However, it is necessary to complement the standard with additional quantification methodologies for co-benefits, as the present standard considers them as optional and treats them in less depth.

Presentation #11: "Self-sufficiency NAMA based on Renewable Energies".

Viviana Huerta (CIFES)

The purpose of this presentation was to disseminate information on the Self-sufficiency NAMA, as managed by the National Centre for Innovation and Promotion of Sustainable Energies and financed by the NAMA Facility. The main focus is to promote the incorporation of power generation systems based in renewable energies, in order to create appropriate technical and financing conditions to further develop this sector. The drivers for creating this NAMA were, on the one hand the high energy costs seen in Chile, in relation

to Latin America, the dependency on fossil fuel imports and the uncertainty level involved in terms of pricing and resource availability, and on the other hand, the challenge of and commitment to reducing GHG emissions. In addition to the above, the country has abundant natural resources and a high potential for all technologies related to renewable energies, which are competitive under Chilean market conditions, there being considerable progress in the technological development of renewable energies.

In an initial stage of this NAMA, work was done in the identification of barriers that prevent self-sufficiency projects to be developed in a full capacity. The information gathered identified that barriers are basically related to financial, human resources and dissemination challenges.

This NAMA has both a financial and a technical component. The financial component, developed together with KfW and CORFO, aims to enable access to financing under appropriate conditions and to develop a portfolio of projects suitable to tender to the banking sector. The program objective is to provide subsidies to approximately 250 projects at pre-investment stage and 30 at the investment stage, and also to develop a guarantee fund to facilitate access to bank loans and to perform trainings and assessment to the financial sector so as to help them with the assessment of investment projects.

The technical component is developed with collaboration from GIZ and is aimed at increasing demand for these types of projects, and also to strengthen technical capacities so as to implement them appropriately. Activities considered by this component are dissemination and sensibilities, so as to increase awareness of opportunities and benefits associated with implementing renewable energy projects, training and development of technical capacities, both for project developers and for installers, the availability of a technical help-desk for project developers and an MRV platform enabling follow-up of NAMA projects and to measure the reduced GHG emissions to be reported both to the MMA and the NAMA Facility.

Exercise 2: Energy Self- sufficiency NAMA based on Renewable Energies

The expositor carried out an exercise on the NAMA for self-sufficiency, for which groups of 4 participants each were set up. The exercise had 4 steps to be performed in 40 minutes. Each group presented results for just one of the steps.

- **Step 1. Identify potential effects the NAMA may have on GHG.**

  In the first stage of the exercise, participants had to identify the potential GHG effects of the Self-sufficiency NAMA based on the information in Table 5, where the expected effects, unexpected effects and effects generated outside Chile should be evaluated, according to whether they are short or long term.

  Table 5. Step 1 of the Exercise on the Self-sufficiency NAMA

Type of effect	Short Term	Long Term
Expected effects (for ex. Decrease of GHG effects in Chile) For the home insulation subsidy example: Reduced emissions from electricity use (less use of domestic electricity)	Example: Reduced emissions from grid-connected power plants (due to replacement by renewable energies)	
Unexpected effects (either an increase or decrease of GHG in Chile) For the home insulation subsidy example: Reduced emissions from upstream coal mining and natural gas systems		
Effects outside national jurisdiction (either an increase or decrease of GHG in Chile) For the home insulation subsidy example: Increased emissions from insulation manufacturing		

  Results:

  Group 1: Short term effect in the expected effects from reduced use of fossil fuels. In the long term, an independent financing system ought to be generated. Regarding unexpected effects, if there are for example biogas plants there may be methane gas leaks due to malfunctioning bio-digesters. Many of the conventional energy generation equipment would be made obsolete, which in turn would generate residues. Regarding effects outside national jurisdiction, there is an increased emission due to the transport of new equipment. Within the long-term effects seen outside the jurisdiction, lesser imports of fossil fuels would be expected.

  Group 2: In the short term, a decrease in emissions associated with conventional sources for industries adopting these technologies is expected. In the long term, this will mean a change in the emissions associated to fossil fuels. Those effects occurring outside the jurisdiction are associated to those caused by whatever replaces conventional sources such as bio digesters, solar panels, etc, which would generate increased emissions in those countries from where they are imported from.

- **Step 2. What GHG effects identified in step 1 are significant and should be included in the GHG Assessment Limit?**

In this step, effects identified in the previous step were reviewed, in terms of probability and relative magnitude, and then an indication given as to whether they should be included or not in the GHG Assessment Limit.

Table 6. Step 2 of the Exercise on NAMA for Self-sufficiency

GHG Effects (from step 1)	Likelihood (Very likely, likely, possible, unlikely, very unlikely)	Relative Magnitude (High, moderate, low)	Include? (Yes, no)
Effect 1 (for example): Reduction of emissions from grid-connected power plants	Probable	High	Yes
Effect 2:			
Effect 3:			

Results:

Group 3: The effect assessed is reduced emissions from grid-connected power plants, considered as a very likely effect of important magnitude and which should be included in the assessment. A secondary effect is that, in the long term, new technologies will be installed for implementing renewable energy plants, which will have a likely effect of moderate magnitude and should also be included in the analysis. Increased emissions due to the installation of these industries would be a likely effect of moderate magnitude, and should be included.

Group 4: The increase in new jobs is considered a likely effect, of moderate magnitude. Another effect is the export of low carbon products produced locally, considered as likely and of low magnitude, therefore it should not be included.

- **Step 3. Developing a Monitoring Plan given NAMA key performance indicator definitions, the possible data sources and the monitoring frequency according to the following table:**

Data provided are displayed in Table 7.

Table 7. Step 3 of the Exercise on the Self-sufficiency NAMA

Types of Indicator	Definitions	Examples of indicators for home insulation subsidy.	Possible indicators for Self-sufficiency NAMA	Possible data sources and monitoring frequency
Inputs	Resources that intervene in the implementation of the measure, such as financing	Money spent to implement the subsidy program		
Activities	Administrative activities involved in implementing the measure (carried out by the authority or entity implementing the measure) such as licenses, permits, acquisitions or compliance and implementation.	N° of energy audits developed, total subsidies provided		

Types of Indicator	Definitions	Examples of indicators for home insulation subsidy.	Possible indicators for Self-sufficiency NAMA	Possible data sources and monitoring frequency
Intermediate Effects	Changes in behaviour, technology, processes or practices derived from the measure or action.	Amount of isolation acquired and installed by consumers, fraction of the homes with insulation, amount of natural gas and electricity consumed in the home.		
GHG Effects	Changes in the GHG emissions or removal resulting from the intermediate effects of the measure.	Reduced CO_2, CH_4, and N_2O emissions due to reduced natural gas and electricity use.		
Non-GHG Effects (co-benefits)	Changes in the relevant environmental, social or economic conditions, different from the GHG emissions or climate change mitigation derived from the measure.	Economic Saving due to energy saving		

Group 5: For input indicators, the monitoring of own and foreign resources, and the number of workers defined for the NAMA operation were considered. As possible data sources, CORFO, government or CIFES were mentioned, with an annual monitoring frequency. As activity indicators, the number of financed projects and the number of implemented projects in the NAMA framework were considered, falling under the CIFES umbrella. Intermediate effects are the monitoring of MW installed per project, the energy generated, type of technology implemented and the type of fuels used in the absence of technological implementation. Given the above, CIFES may act as coordinator, with annual information provided by the projects. Reduced GHG emissions associated to power networks and reduced GHG emissions related to fossil fuel consumption were included as indicators of GHG effects, to be monitored annually.

Group 6: As inputs, NAMA Facility was mentioned, to which CIFES should report together with CORFO. Regarding activities undertaken, the number of technical trainings performed and the number of applied and implemented projects may be monitored, information that should be handled by CIFES. The intermediate effect was the change in the behaviour in the use of conventional energy sources. The associated benefits observed are the generation of employment, increasing technical knowledge and decreasing the use of firewood.

Launching Workshop "General Framework for NAMA MRV" (results of the project financed by the Fund for Prosperity from the United Kingdom Embassy in Chile).

At the end of Tuesday, Information Matters invited the MMA and the United Kingdom Embassy to launch the General Framework for NAMAs MRV in Chile, arising from the "General Framework for NAMAs MRV in Chile", financed by the Fund for Prosperity of this diplomatic entity.

Presentation #12. "**An MRV framework for NAMAs in Chile: Spirit and Benefits of the System"**

Jenny Mager (DCC-MMA).

The presentation showed the groundwork and implications of the work performed jointly with professionals from Ricardo-AEA and supported by the British Embassy, so as to create a generic framework for the MRV of NAMAs. This project sought to provide a more localised point of view on the WRI standards and to create a guide for developing - in a comparable way - the MRV of NAMAs in Chile.

In Chile, several actions and policies have been developed for making progress in reducing GHG. In 2014, the first Biennial Update Report was created to report on the international sphere actions taken in Chile regarding mitigation issues. In order to do this, information was gathered from the various types of mitigation actions that have been developed: Sectorial Actions and Policies (reported: 12 from the Energy sector, 12 from Transport, 3 from LULUCF and 8 from Residues), NAMAs (reported: 9 actions in total, of which 5 have already been recorded in the UNFCCC [NAMAs for Transport, NCRE, Residues, Forest and APLs], and the other 4 are still in a conceptual design), other initiatives and instruments associated to GHG mitigation (Cross actions, Clean Development Mechanisms, Green Taxes) an additional part was aimed at reporting on what has been done in Chile, regarding Measuring, Reporting and Verification issues (MRV).

Chile is a pioneering country in relation to NAMAs, not because of the amount of NAMAs implemented but rather on it being one of the first countries in considering the real importance of the NAMAs and that they will be an effective contribution in the future when fulfilling commitments made by the country. Thus Chile became the first country in registering a NAMA (the one from the Clean Production Council) in the NAMA Registry, which is the official registry of the United Nations for this type of actions.

One of the main requirements that should be considered in developing a NAMA type project is that it be measurable, reportable and verifiable. In the international context, there are different types of MRV, such as a) An International MRV, generated through the National Communications, of the Biennial Update Reports (BUR) and from the International Consultation and Analysis (ICA) process, where update reports are reviewed; b) Domestic MRV, for which there are general terms on how to do a NAMA MRVs, which are used voluntarily; and c) MRV for REDD+ activities.

MRV systems have high demand, basically because they enable follow-up activities on national plans and policies, both for evaluating their effectiveness and to know progress status of their implementation. These systems also allow the country to manage and administrate information to be presented to the UNFCCC, complying in this way with the International MRV. Another relevant aspect is that MRV systems allow monitoring progress on national efforts, in terms of mitigation, allowing for transparent reporting on information regarding the financial support received from foreign countries so as to implement mitigation actions. Other benefits derived from applying MRVs is that they allow avoiding counting reductions twice, prioritizing sectorial efforts, identifying and fixing methodological deficiencies, as well as identifying support needs, both in technical as in financial aspects.

Given the aspects mentioned, the need to have a Generic Framework for MRV NAMAS arises, such that the coordination of NAMA MRV in Chile may improve, increasing the public knowledge of this type of actions and in improving trust in the benefits related to GHG reductions and other related benefits, and thus increase the financial support provided by national or international funds. The purpose of the project was to design an MRV framework in a clear and simple way for Chile, that will allow improving transparency, comparability and quality of the data. A very important aspect of this project is that it was not only focused in the technical area of the MRV but also in the institutional processes that ought to exist so as to be able to validate an MRV system, considering the technical design and requirements common for MRVs, processes design and institutional coordination and its dissemination. This is how this current project will not only enable improving the flow of information for NAMAs in Chile but will, in turn, function as a methodological guide for supporting MRV design, contributing in improving transparency and reporting towards the international community.

Presentation #13. "**An MRV framework for NAMAs in Chile: Spirit and Benefits of the System"**

Felipe Osses (Person responsible for Climate Change Issues at the Embassy of the United Kingdom in Chile).

Mr. Osses started his presentation indicating that climate change has always been a priority for the United Kingdom and also a foreign policy priority, so it maintains a platform of people working around the issues of climate change around the world. The embassy co-financed the MRV framework for the NAMAs through the Prosperity Fund of the British Exchequer, as the MRV system is considered as a very important component, not only for comparability or internal progress of the information within countries, but also for the platform of international contributors.

It also provided continuity to the project known as "Design of an MRV Platform" from CIFES for the energy NAMA, financed by the same fund. This NAMA was then able to access NAMA Facility funds precisely because it had an MRV platform already implemented. Progress in MRV platforms will be very important this year in the Paris COP and for the implementation of the Green Climate Change Fund, requiring that countries have a solid, transparent and comparable information regarding their mitigation actions. The importance of the MRV framework for NAMAs lies in its strategic focus, having a transversal appeal providing guidance in developing an MRV in a standardized and consistent manner among the different sectors.

Finally, Mr. Osses ended his presentation mentioning his satisfaction in having reached the final stage of the project; acknowledged the work of Ricardo AEA in implementing the project, the commitment shown and support given by the MMA also thanking all key players participating in the workshops and consultations during the process.

Presentation #14. "**An MRV framework for NAMAs in Chile: Spirit and Benefits of the System"**

Sina Wartmann (Ricardo AEA – United Kingdom)

Miss Wartmann started her presentation with an introduction on the need for MRVs and NAMAs, highlighting the importance of knowing whether the NAMA implementation has fulfilled all of its objectives, also highlighting its usefulness in detecting during operation process itself, whether or not the NAMA was being properly implemented.

She pointed out that there is a series of NAMAs being developed in the country, but which are not necessarily coherent in relation to their MRV. Coherence is important for the following aspects: GHG inventory methodologies and GHG impacts for NAMA; sectorial assumptions in relation to their baseline when making projections and in the NAMA themselves; the current use of data, experiences, structures and processes; use of data from the NAMA MRV in improving GHG inventories and projections; comparability between NAMAs; and also in exchanging good practices.

In order to have coherence in the focuses of NAMA MRVs, a reference guide was developed based on WRI "Policies and Actions" Standards, which indicates that a common technical approach is required as a starting point, with well-defined processes (roles, responsibilities and deadlines), a centralized coordination involving the appropriate ministries, the participation of sectorial experts and GHG inventory experts, a validation process for the MRV approach and reports, including the use of standardized templates. The project for developing an NAMA MRV framework was implemented between April 2014 and March 2015, with the technical support from Ricardo-AEA and coordinated by the DCC from the MMA. During fielding, parties concerned were constantly involved through two rounds of written comments and at an event where results were presented and discussed (August, 2014), additional bilateral meetings were conducted with the appropriate ministries. Figure 7 below shows the project process followed.

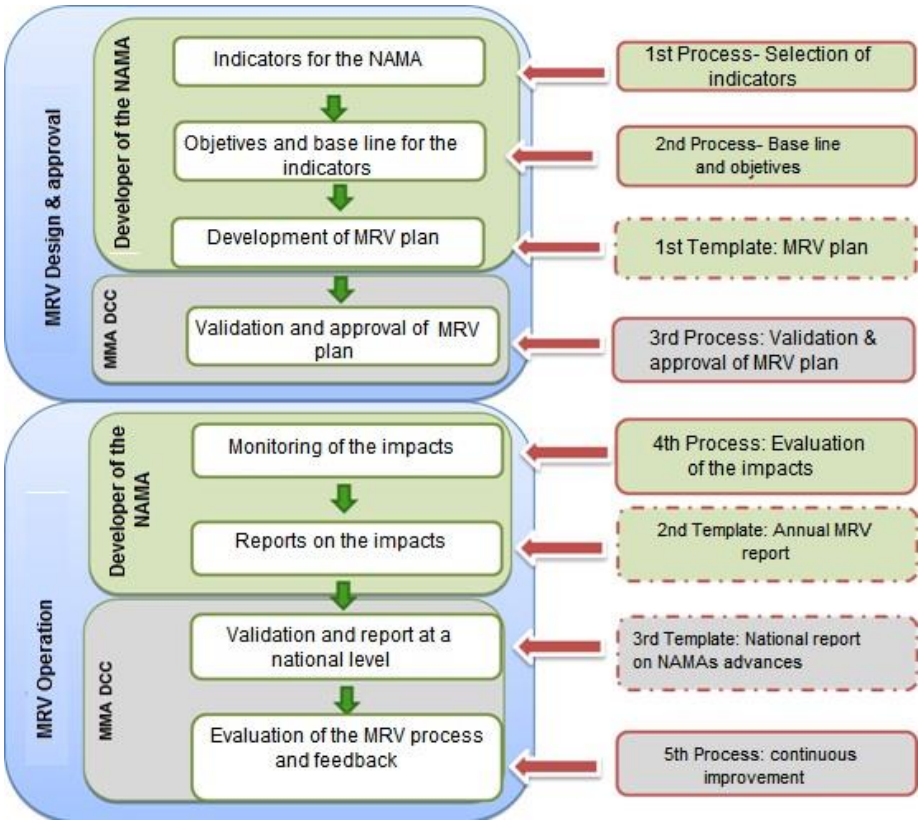

Figure 7. A Generic Framework for a NAMA MRV *(image drawn from the final project report "A NAMA MRV generic framework", financed by the Prosperity Fund).*

The process consists in a MRV design and approval stage and an MRV operational stage. Both stages had the active participation of the NAMA developer in charge of its implementation, and the Ministry of the Environment - through DCC- as a validation and evaluation entity.

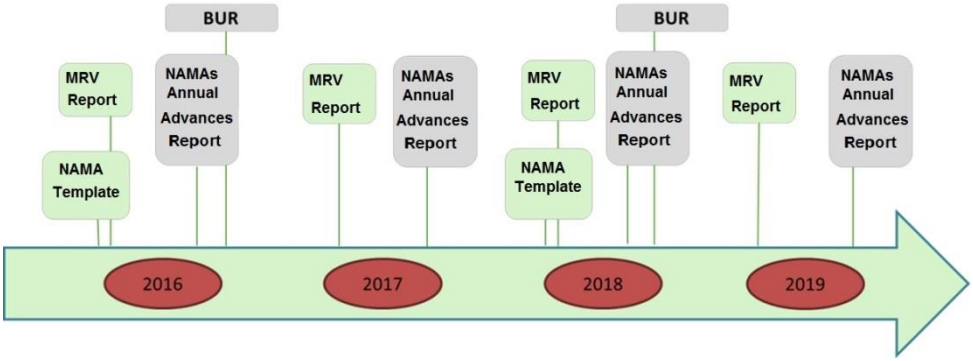

Figure 8. Report Chronology of the NAMA MRV Framework *(image drawn from the final project report "A NAMA MRV generic framework ", financed by the Prosperity Fund).*

Figure 8 identifies the reporting delivery process during the next years. Developers of a NAMA will have to present an annual report for MRV and every two years deliver a template to the DCC with their NAMA information, to serve as input for creating the Biennial Update Report. The DCC will in turn perform a compilation of MRV reports for the different NAMAs, so as to prepare an Annual Report on progress made on NAMAs in Chile.

3. Workshop "MRV for GHG National Inventories"

The workshop started with the Fifth SNICHILE Meeting, an activity sponsored by Information Matters.

Presentation #15. "Fifth SNICHILE Meeting"

Paulo Cornejo, SNICHILE Coordinator, MMA Department of Climate Change.

The aim of the presentation was to analyse the GHGINV 2014 compilation process, see lessons learnt and to initiate the 2015-2016 process, presenting new tools managing SNICHILE. This presentation was divided in two stages: a general review of the updating and compilation process for GHGINV 2014 and review of lessons learnt, and the new 2015-2016 process.

The GHGINV 2014 compilation process contributed towards the elaboration of the country's first Biennial Update Report. It is highlighted that Chile was the fourth country in the world and first in Latin America complying with the delivery deadline set in Durban (COP17, 2011), which according to the SNICHILE coordinator, shows the commitment of the country with the agreements it has underwritten regarding environmental aspects, but also its vision of the future, on matching its standards with those of AI countries.

An important aspect in the presentation was that related to lessons learnt in the GHGINV 2014 compilation process. It highlights the importance of having a common format for the presentation of the information by the sectorial teams, both for numeric information (summary sheet) as for each sector report (text). Mention was also made of the need to comply with deadlines for delivering information to the national entities, and in improving communication between sectors on important issues, such as the use of firewood for heating (Energy and Forestry), unification of criteria for quality control of each of the sectors and in centralizing information flows.

On the other hand, it is indicated that the file with main expert review recommendations made to various institutions and people, such as the German Environmental Federal Agency are pending and currently under review. The expectation is that follow-up of any pending improvements detected in the process are to be carried out.

A point of note is the creation and maintenance of capacities at all levels. It is reported that there are two new inventory experts in Annex I of the Parties of the Convention, namely:

1. Yasna Rojas (INFOR), for the LULUCF sector, and
2. Marta Alfaro (INIA), for the Agriculture sector.

It was also reported that the DCC is the new entity in charge of the Chile Convention List of Experts (UNFCCC Roster), so any person interested in being part of that list should apply to this entity.

The issue of dissemination was also covered. In relation to this, the need is to design, implement and initiate a web platform to manage and disseminate SNICHILE. This platform must accomplish certain functionalities, like disseminating results through a visualization tool that includes an option to download results in numerical archives and graphs; also, it must serve as a reservoir and information archive through an intranet, to which the different sectors may access and deposit relevant information. A training process on intranet management must be provided

SNICHILE'S operations consist in internal coordination, creation and updating of management tools (such as tabulated registry system and the creation of common formats for reporting and procedural manuals) and work accords such as the agreement between the MINAGRI and the MMA; This is a macro agreement covering climate change areas. There is another agreement between MMA and the Ministry of Energy, and in future, many more of these work and co-operation agreements are expected

The process of updating the inventory is summarized and illustrated in figure 9, where the most important points of this process are shown. This process began in January 2015 and is expected to finalize in 2016 in

a SNICHILE meeting, where the next next process of updating and verification of possible improvements will be prepared.

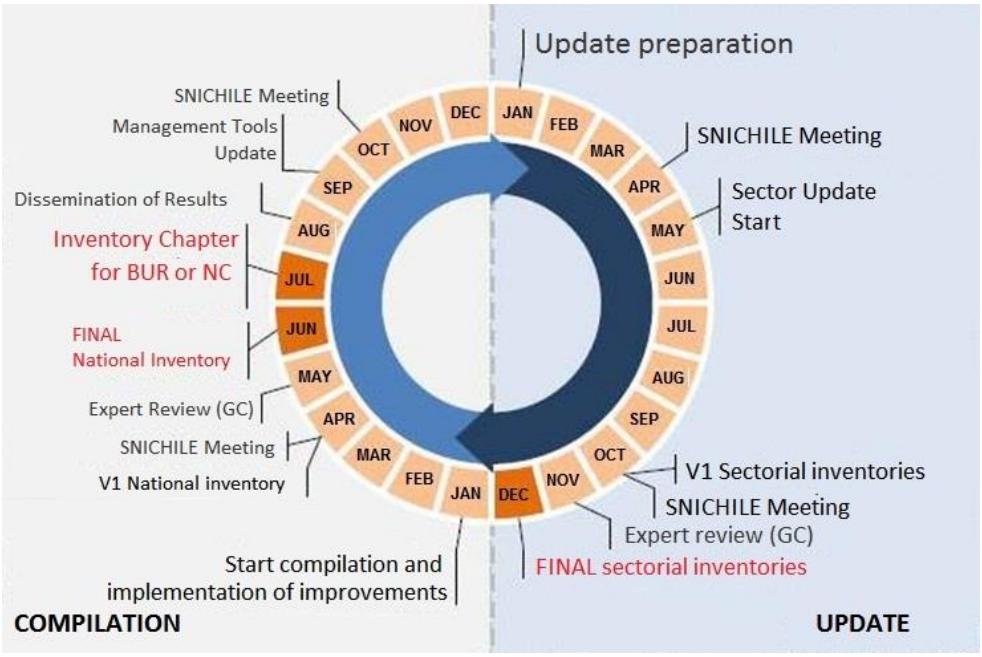

Figure 9. 2015-2016 Greenhouse Effect inventory update process (Figure presented by the speaker).

For the current updating process, we would count on standardised management tools such as the Tabular Record System (SRT), a common reporting format and procedural manuals (MPN). The SRT is born due to the need to improve the quality of national GHG flow reports; it has therefore become necessary to develop a documentation and archive system adequate to SNICHILE's reality. In order to develop and implement this system, it will be necessary to become familiar with GHGINV estimation, report and compiling processes The system will include nomenclature, structure and links to own files

While procedural manuals will consist of documents that detail the methods used by the estimates of emissions/removals from each GHGINV category. This document must include the exact references on methodological levels, calculation equations, emission factors, parametric data, additional information (Scientific articles, reports, others) Each sector will be asked to elaborate a sectoral procedural manual (MPS)

We conclude that Chile's GHGINV is a collective effort and has been successful thus far. The updating process will begin in May, to conclude in October with version 1.0 of the sectoral inventories. While in November, an expert reviewing of these sectoral inventories will be applied. During December, the final versions of the sectoral inventories would be available, allowing for the compilation of inventories during 2016. Thus, it will be necessary to formalize the creation of sectoral work teams, clearly defining each role. It is expected that the sectoral teams include GHG inventory in their estimate for the 2016 budget; it being the national entity's responsibility to accompany the sectoral teams during the update process.

Presentation #16: "Comments from GIZ to NIR".

Oscar Zarzo, GIZ – Germany.

The presentation focused on the commentaries made to NIR, received from the UBA inventory teams.

The UBA team highlighted that it was a very good compilation, especially considering that Chile is not obliged to make this effort as it is not an AI country. Another aspect noted was that it was a really good

report with an impressive graphical presentation, both regarding data and results, having an appropriate treatment of secondary issues such as recalculations, AC/CC, uncertainty and exhaustiveness. The topics were exposed in a simple, yet informative manner. The report is clear, concise and well structured; the suggestion is to include more levels in the index, so the reader may navigate faster through his area of interest.

After general comments, the context in which this review was made is laid out. Firstly, NAI countries are not expected to prepare a NIR or to report inventories as frequently as an AI country has to; therefore, the effort made by Chile is truly noteworthy. Also, the fact that there are no methodological guidelines available for carrying out these inventories in NAI countries; nor is there any reporting format available for these inventories must also be noted. Also there is lack of clarity when incorporating accounting practices to the LULUCF sector of the inventory and on the use of the most recent global warming potentialities (PCG) or IPCC methodological guidelines. The existence of these differences means a challenge to how countries may be compared. In this context and highlighting this fact, the review made by the UBA team to Chile's NIR has been done under the lens of an AI country inventory.

The results of this review are then presented, mentioning that, in the results and evolution sections of the NIR, the balance between emissions and removals of GHG are emphasized; however, this terminology does not exist as such - the guides referring to a national total (without LULUCF) and a national total (including LULUCF) - while at the internal level, the important aspect is the national total (without LULUCF) Another important issue was completeness: Chapter 2 should mention that "ALMOST all sources were included..." due to the exclusion of some sources of emission, as is evidenced in other sections of the report.

A clarification on how key categories are identified and why a more advanced methodology was not used on them is indicated. An option available would be to state that this will be improved upon in future inventories. Continuing with the analysis, the team mentions comparability because 2006 IPCC methodological guidelines were used, however PCGs from 1995 were also used; this being a point that should be clarified and improved upon in the next inventory.

Regarding AC/CC and verification, the commentary alludes as to whether there is an inter-ministry approval process on results, and if there are external reviews made by AI country experts; it is also recommended that these queries also include an additional point under section 1.6 (quality control and system guarantee) with more detailed information regarding peer reviews- and expert review from the LAC network (Latin America and the Caribbean) including the review made by the German team within the Information Matters process, amongst others; these reviews are probably more thorough than those done under the ICA process and this issue is highlighted once again, because Chile is doing much more than what the guidelines for NAI countries require; these activities deserving greater relevance in the report. It must also be clearly established whether the international expert reviews will continue.

Mentions is made that there should be a figure indicating total inventory uncertainty, and this is a detail that must be corrected in future inventories. It has been proposed that, when there is a given range of uncertainty values for emission factors, average values from the methodological guides should be taken into consideration. This approach is used in AI countries like Germany, whenever there are doubts regarding the figure to be considered. It is possible that comments may arise during the ICA process; on there being greater certainty, remaining uncertainties can be calculated more precisely. Lastly, the advice is to fill-in any gaps in the inventory rather than become obsessed with calculating uncertainty (better to cover the first 95% of emission sources and then focus on uncertainty; reviewers value functional structures and completeness of data across all sectors)

The last comments deal with residues, indicating that it is a sound compilation, in spite of some pieces of missing information, such as there being no clarity regarding residue amounts and how they are disposed of

(burning, composting, landfills). It is not specified if only that burnt is subject to sanitary residues or if other forms are subject too. It is also unclear if composting is part of the total residue amount or if its and additional figure. It is advised to clearly indicate the percentage of residue generated by each administrative region. There is also no clear indication if the recovered methane is duly reported or not. It is suggested that, when faced with a lack of data, to reflect this on the report as an area of potential improvement through co-operation. And finally, the recommendation is to seek cooperation agreements between large-scale industry and the MMA, both voluntary and stemming from new laws, to improve upon the data on activity seen in the sector.

Presentation #17: "Uncertainty".

Raúl Salas (Ricardo AEA – United Kingdom)

The workshop began highlighting basic statistical concepts in order to be able to understand and calculate uncertainty. These concepts are: intervals of confidence, precision, bias, variability, systematic error, exactitude and probability density functions.

The objective of the uncertainty analysis for GHG inventories is to quantify the uncertainty of the unknown fixed value from the total emissions, as well as emissions and activity in relation to specific categories. The information sources are the 2006 IPCC guidelines, the 2000 IPCC orientation on good practices and uncertainty management, the GHG protocol guide (WRI) on the evaluation of uncertainty in inventories and, if necessary, the 14069:2013 ISO.

To understand how to calculate uncertainty, we must first answer the question of what is uncertainty? The answer being that is is not knowing the true value of a certain variable, described as a probability density function that characterises the possible range and probability of the unknown variable. Information on uncertainty is not aimed at questioning the validity of inventory estimates, but rather in helping prioritize efforts in improving the precision of future inventories and to guide decision-making on methodological alternatives.

The causes that generate uncertainty are usually the following: lack of thoroughness, the type of model used, missing data and/or how representative they are, statistical random sampling errors, measurement errors, bad data classification, among others.

The uncertainty calculation process can be summarized in the following five steps:

- Preparation for data evaluation (Specify data, identify sources of uncertainty),
- Quantify identified uncertainties,
- Combine uncertainty (activity data and emission factors),
- Calculate added uncertainty, and
- Document

These data can be compiled along with other important ones, for example, activity data - data providers have better knowledge of relevant factors, such as their level of uncertainty. When data is being compiled, the uncertainty for source data and the AC/CC system information should always be estimated.

For uncertainty analysis, we must go through the following steps:

- Step 1: Compile the set of data (for example, activity data),
- Step 2: Develop empirical distribution functionalities
- Step 3: Select the most adequate probability density function model. IPCC guides deliver two methods which are: Error propagation and Monte Carlo.
- Step 4: Characterization of uncertainty in terms of variability distributions
- Step 5: Having correctly specified uncertainties, they can be used as an entry point for a probabilistic analysis.

The rulings or "expert judgments" are commonly used when the facts to be evaluated are not available and the objective of the "expert judgment" application process is to develop a probabilistical density function that may factor in relevant information.

The combination of uncertainty or error propagation is also known as the Gauss method and its use is recommended when the parameter errors have a normal distribution and with no functional bias, in other

words, that the estimated value is the median value and, when parameters are independent. To perform this operation, median estimations and standard deviation for each data is required.

The combination of uncertainty or error propagation can be calculated using two equations. The first one is the multiplication equation (equation 3.1 present in the IPCC methodological guides) and the second is the addition and subtraction equation (equation 3.2, also present in the methodological IPPC guides). Both equations are presented as follows.

- Multiplication equation

3.1 EQUATION
COMBINATION OF UNCERTAINTIES - 1st METHOD - MULTIPLICATION

$$U_{total} = \sqrt{U_1^2 + U_2^2 + \ldots + U_n^2}$$

Where:

U_{total} = is the percentage of uncertainty given when multiplying the quantities (half of the 95% confidence interval, divided by the total and expressed as a percentage)

U_i = is the percentage of uncertainty associated with each one of the quantities.

An example:

- If the uncertainty of the data on activity is: 5.48 %,
- If uncertainty of the emission factor is: 2.65 %,

Then, on applying this equation, the combined uncertainty would be:

$$\text{Combined uncertainty} = \sqrt{5.48^2 + 2.65^2} = 6.1\%$$

- Addition and Subtraction equation

3.2 EQUATION
COMBINATION OF UNCERTAINTIES - 1st METHOD - ADDITION AND SUBTRACTION

$$U_{total} = \frac{\sqrt{(U_1 \bullet x_1)^2 + (U_2 \bullet x_2)^2 + \ldots + (U_n \bullet x_n)^2}}{|x_1 + x_2 + \ldots + x_n|}$$

Where:

U_{total} = is the percentage of uncertainty regarding the sum of the quantities (half of the 95% confidence interval, divided by the total (this being the median) and expressed as a percentage). This term is based on the 95% confidence interval.

x and U_i = The uncertain quantities and the associated uncertainty percentage, respectively.

An example for use of this equation is:

- If an inventory has two sources of CO2 calculated as 100 $\pm$ 4% y 90 $\pm$ 24% tons,
- If the total emission is 200 tons,

then, combined uncertainty is calculated as:

$$\text{Uncertainty} = \frac{\sqrt{(100 * 0{,}04)^2 + (90 * 0{,}24)^2}}{(110 + 90)} = \frac{22.04}{200}$$

Another specific issue is uncertainty in the AFOLU sector, particularly if GHG emissions are dependant on several variables. For example: when CO_2 absorptions are quantified due to increments in biomass, the calculation should consider the following variables: forested areas that remain as such, average annual air and subterranean biomass growth, biomass expansion factor, relation between aerial and subterranean biomass, carbon fractions in the biomass, each of which has its own uncertainties (numeric or percentage wise) and they must be combined. In this case, it would be better to use an expert judgement and assign an uncertainty value to the estimated total emissions or removals. Another option would be the Monte Carlo method.

Mention is made that uncertainty calculations will always be related to any key categories and available resources and, to consider that the expert judgement may be partial or biased, so it is recommendable to consult with various experts, in order to get an average result.

Practical exercise on Uncertainty For the practical exercise, the attendees were divided in three groups: Energy-IPPU-Residues, Agriculture and LULUCF Each group received a page with data and questions (included below) which they answered within a 45 minute time limit. After that, the results were presented as follows:

Agriculture:

1. Q: In the "cultivated land" category, for CH_4 emissions, there is a 1% uncertainty for activity data and 55% for the emission factor. What would the combined uncertainty be?

   A: 55.009% (applying equation 3.1)

2. Q: For 2013, emissions amounting to 1 Gg CO_2e from "cultivated land" were reported. Considering the combined uncertainty for this category and assuming a symmetrical distribution, what would the maximum and minimum emissions be?

   A: 0.44998 (maximum) and 1.5509 (minimum)

3. Q: Draw the emission factor probability function based on the previously calculated information and on the median emission factor (EF = 130 Kg CH_4/ha x d)

   R: Refer to photo 1

4. Q: What would be the reasons behind the uncertainty found in activity data and emission factors?

   A: Regarding factors for N_2O emissions from soils, uncertainty is related to data representativeness as only certain types of soils are known or analysed, which may not be representative for the national territory.

   Another aspect that affects uncertainty for this sector is activity data regarding the use of nitrogen fertilisers and the dosages applied by region and crop. Only general data exists regarding some crops, which can vary depending on the region, sector, soil type and whether it is monoculture or rotation. Another important point on the usage of nitrogen fertilisers is that there are no statistics regarding their agricultural use. Also, genetic variability of animals and husbandry affects certainty in emission factors.

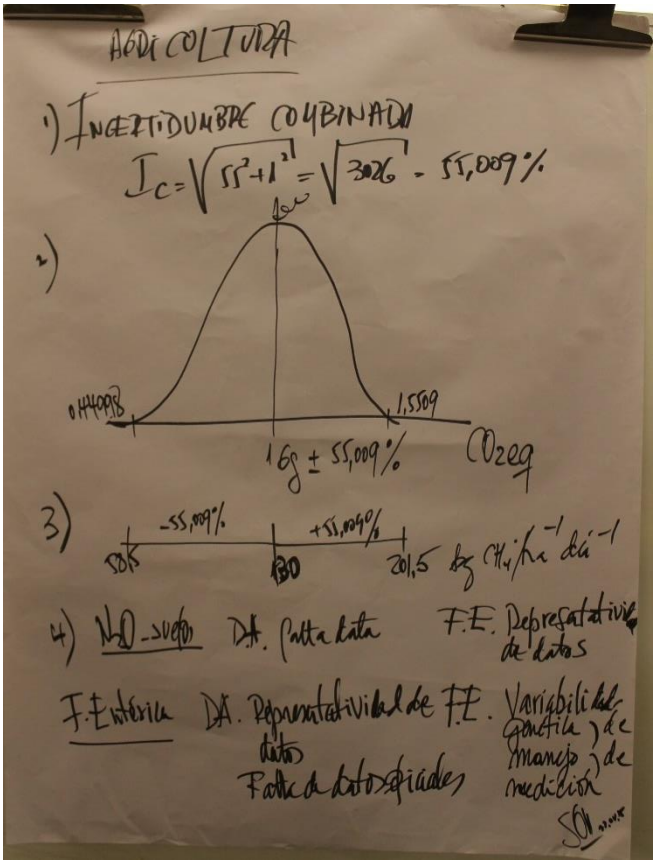

Photo 1. Agricultural group results.

LULUCF:

1. Q: In the "wetlands" category, for CO2 emissions, there is a 1% uncertainty for activity data and 50% for emission factors. What would the combined uncertainty be?

   A: 50.01%

2. Q: For 2013, emissions amounting to 200 Gg CO_2e for the "wetlands" category were reported. Considering the combined uncertainty for this category and assuming a symmetrical distribution. Which could be the maximum and minimum emissions?

   A: 300.02 (as maximum) and 99.98 (as minimum).

3. Draw the emission factor probability function based on the previously calculated information and on the emission factor mean (EF CO2 = 1.1 ton C/ha per year)

   R: Refer to photo 2

4. Q: What are the reasons underlying uncertainty found in activity data and emission factors?

   A: The reason is that there is no data regarding wetlands in Chile, hence they are not included in the inventory. Although there have been some environmental issues with certain wetlands for which studies have been made, there is a possibility that some information exists regarding activity data along with

emission factors, yet these may not be representative of other wetlands, some of them falling under the Ramsar convention.

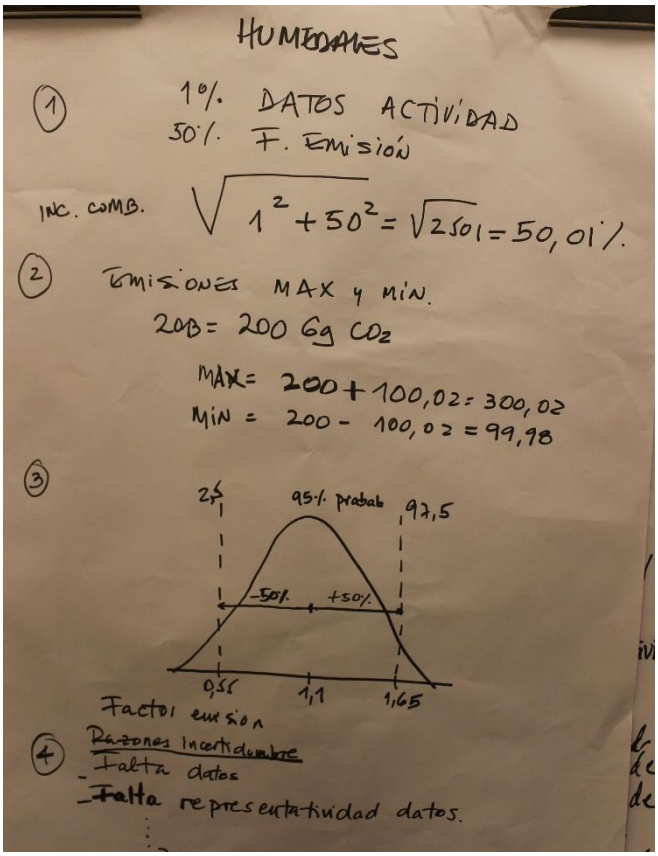

Photo 2. LULUCF group results.

Energy-IPPU-Residues:

1. Q: In the "mobile fuel" category, for CO_2 emissions attributable to the aviation fuel subcategory, uncertainty is 15% for activity data and 3% for emission factors. What is the combined uncertainty?

   A: 15.3%

2. Q: For 2013, emissions amounting to 50 Gg CO_2e for the "aviation fuel" subcategory were reported. Considering combined uncertainty for this category and assuming a symmetrical distribution, what would the maximum and minimum emissions be?

   A: 42.35 as maximum and 57.65 as minimum

3. Q: Draw the emission factor probability function based on the previously calculated information and on the emission factor mean (EF CO_2 = 69.300 kg CO_2e/TJ)

   R: Refer to photo 3

4. Q: What could be the reasons for the uncertainty found in activity data and emission factors?

A: Uncertainty is based on the fact that part of the information on aviation fuel has been retrieved from the Energy Balance calculated by MINENERGIA, with activity data generated by the combination of information from the National Customs Services.

The day closed with a general assessment for the day. The participants stated that the workshop was an excellent activity. The SNICHILE coordinator thanked all participants and expressed that the process was very successful. He also mentioned that he expected the sectors to indicate what inventory information they would like to highlight and use, for further dissemination.

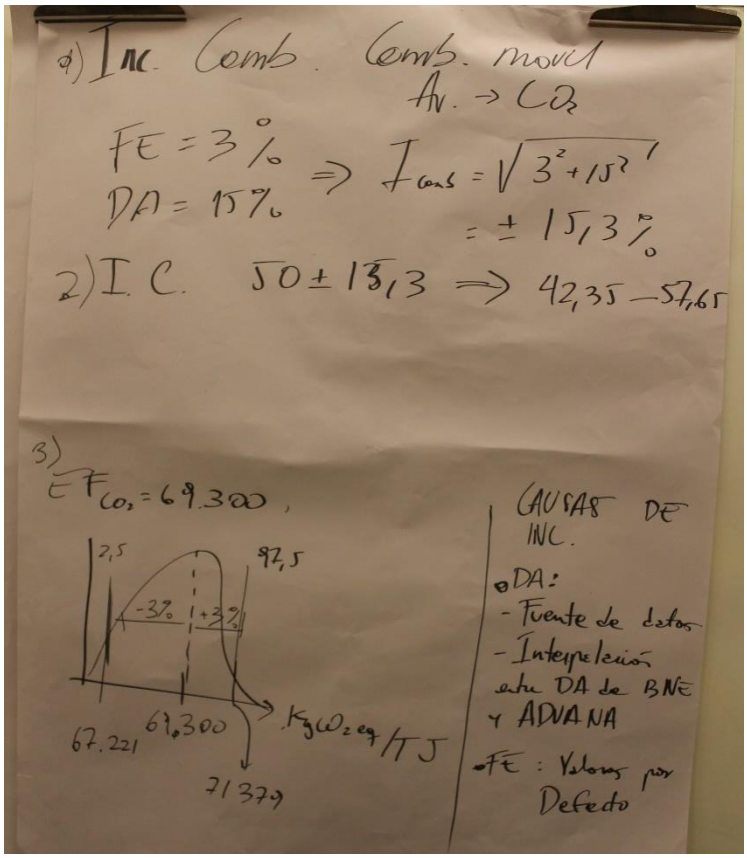

Photo 3. Energy, IPPU and Residues group results.

4. Workshop "MRV for Financial Support".

Presentation #18 "MRV for Climate Financing".

Jillian van der Gaag (DCC-MMA)

The objective of the presentation was to inform the attendees about the document "Climate Financing Flow System" (known internally as the "white paper"), whose elaboration was proposed in the workshop carried out during the last training session. The speaker began talking about the national and international context that justifies the document. Also, she mentioned that "financing" is one of the pillars in the Intended National Contribution: the proposals contained therein are: a) The commitment to communicate by 2018 a national financial strategy for climate change, that would include at least one regular public sector spending analysis, updated annually from 2020; b) A portfolio of financeable projects in adaptation, mitigation,

capacity strengthening and technological development; c) Identification of the GDP percentage that should be destined to said portfolio; and d) A baseline regarding financing of climate change on a national level.

Regarding the system put forward in the white paper, mention was made that it would allow updated information on the source and destination of financial resources, contributing to understanding the climate financing needs vs the received flows in order to enable access specific financial flows that may allow reaching the set national targets. The system operation is outlined as shown in figure 10.

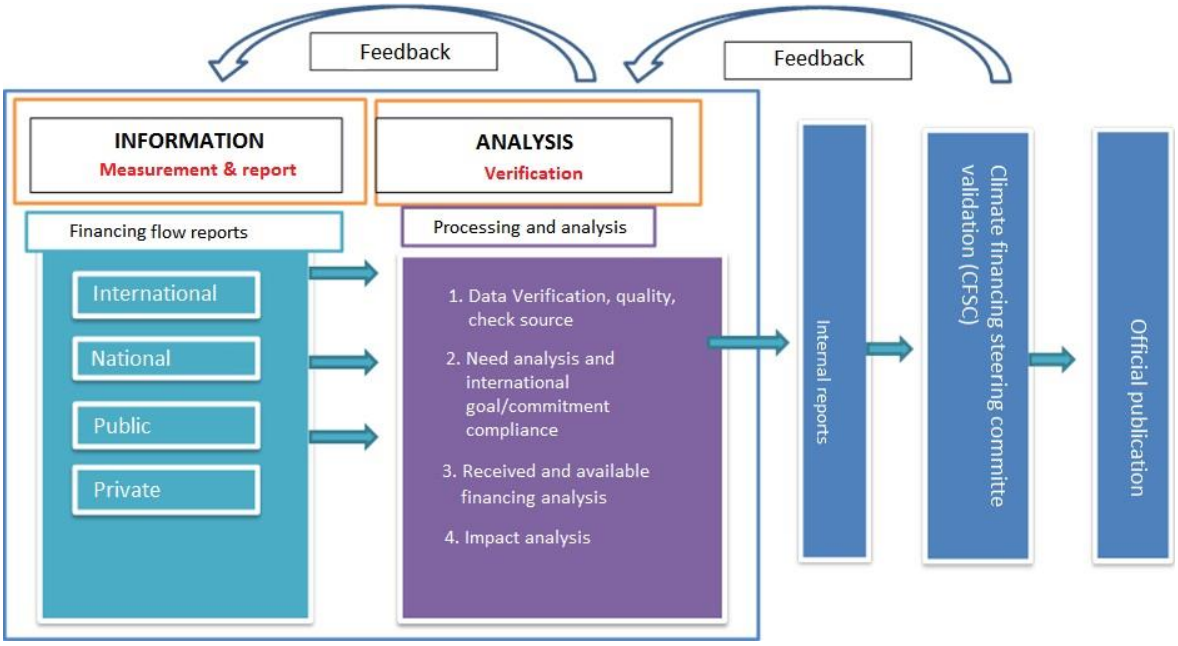

Figure 10. Climate Finance Flow System (*figure presented by the speaker*).

In the same way, the proposed institutional arrangements are structured according to the outline shown in figure 11.

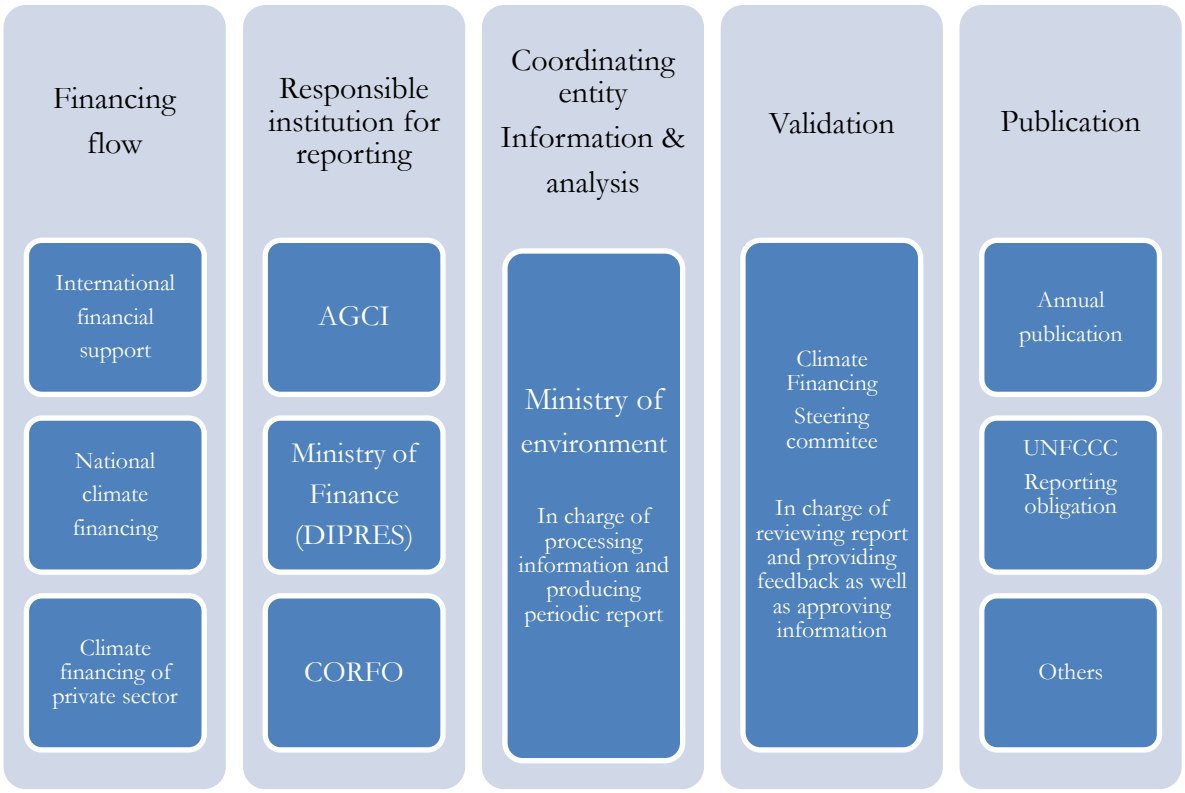

Figure 11. Institutional Arrangements for Climate Finance Flows (*figure presented by the speaker*).

The definition of "Climate Financing" is a key concept in order to define system scope. In the "White Paper" this concept is defined as "the reception and management of financial resources from any source (foreign, international, national- public and/or private), managed internally and whose aim is the execution of actions including:

- Institutional strengthening, capacity enhancement and means of implementation, linked to climate change,
- emission measurement and GHG captures, including national GHG inventories,
- GHG mitigation/abatement, and/or
- adaptation to new climate conditions, including estimation of vulnerabilities.

Later on, the strategic benefits that the implementation of the proposed system would generate were mentioned, which are basically: a) Raising the country transparency, credibility and trustworthiness; b) Strengthen Chile's position as a regional leader by creating an innovative financial reporting system; c) Contribute to the country decision making processes; d) Generate clarity on the country's needs in terms of climate financing; e) Demonstrate a trustworthy governance in climate change and f) provide follow-up to the financing pillar of the INDC.

The presentation concluded with a list of results that the system would generate. They are basically: I) A report with updated information on budget exercises regarding climatic initiatives; II) A document defining gaps, mitigation and adaptation requirements and any identified implementation measures; III) A list of impacts and associated benefits that would be obtained from executing climatic finance resources and IV) awareness of any progress made in the relationship between funding received and that required.

Presentation #19: "Comments by GIZ to the "Systematization on climate funding flow" document."

Oscar Zarzo (GIZ – Germany)

The objective of the presentation was to announce comments made by GIZ-Germany professionals to the document under reference. The general indication is that the text is clear, concise, well-structured and its scope and justification are well thought out. There is a suggestion to improve the format, such as including titles for the figures and to make cross references in the text.

The document-specific commentaries were grouped according to sections. Beginning with the "background and context" section, it is advised to include a list of international supporters and those national actions geared towards the creation of an environment conducive towards the promotion of development investments having low emissions and resilient to climate change. The indication is also made that it would be interesting to include some factors and key measurements that would favour the creation of this conducive environment and institutionalisation of climatic financing aspects; including the national and international efforts that are already in place. It is also advised to improve the level of understanding regarding the drivers that enable switching from "dirty" markets to "green opportunities".

The document mentions elements to consider in raising the importance of the system, where traceability and confidence building are particularly relevant, especially for international donors. It is suggested to mention the improved efficiency in using climatic financing and the creation of common accounting rules, clearly reflecting what is effectively being accounted for and the set of rules being followed.

Another suggestion is to make more relevant the fundamental argument of the text, that of creating an operational follow-up system that demonstrates the responsible use given to funding, making the country more appealing to international donors.

Regarding system challenges, there are common definitions that still need to be incorporated pertaining to climatic financing, parameterization and common standards employed. Another commentary puts forward that this "White Paper" along with the BUR, merely mentions the support received, but does not include information on identifying country needs. Regarding any follow-up made of the private sector, the advise is to review any work done by the OECD on "Collaborative Research on tracking private climate finance".

The "objectives" section of the document mentions that the system will be implemented for financing, the suggestion is to assess whether to include in the proposed structure issues regarding technology transfer and capacity building. Although they are complex reporting matters, they are relevant across-the-board issues for effectively mitigating and/or adapting.

Comments made on the "System Proposal" section are basically three:

1. To clarify if the system only refers to national financing or if it includes international when dealing with actions or measures within Chile.
2. To clarify and define roles and responsibilities of players involved; thus mention is made that as the MMA generates reports delivered to the UNFCCC, it should also input information to this system. It is also suggested that the OECD should be included, due to its possible relevance regarding information and data relevant for climate support to Chile, and
3. Regarding expected results, mention is made that it omits private financing, suggesting that it should be included and also to refer to the previously mentioned work done by the OECD on private financing.

Presentation #20: "Comments from Ricardo-AEA to the White Paper"

Sina Wartmann (Ricardo AEA – United Kingdom)

The feedback is much more general than that presented by GIZ-Germany The speaker began pointing out that there are very good elements in the document, such as the clear link with INDC and the sound arguments explaining why this system is needed. Although there is no clear definition of system scope, nor a definition of "climatic financing", there is a discussion on the possibilities seen. The document provides a very clear overall vision of products and benefits derived from system deployment. There is also a basic proposal made regarding system structure, institutional improvement, data flow and participating institutions that must be improved on in future. Also included are ideas for the various stages of deployment and feedback elements that are very important for improving the system in time and, the fact that the system is defined as having a gradual development is appreciated.

A suggestion is that the introduction and context should be shortened and be more focused, as they are too long, and to only include status and results from CPEIR (Climate Public Expenditure and Institutional Review), along with a brief explanation of why this system is proposed, including its institutional arrangements and processes. Mention is made that institutions delivering data may not be the same as those that verify and validate said data; which is why it is advised that the role of the directive committee ought to be clarified, an issue the document does not address.

Finally, the following questions are posed for debate:

- How to legally establish institutional arrangements?
- What are the most relevant elements to consider in a staged deployment?
- What is needed in an urgent manner?
- Which should be the stages, deadlines and responsibilities?

Discussion session 1. At the beginning, the following basic questions were posed:

- How to ensure the necessary budgets in the long term?
- How can institutional participation be ensured today and in the long term?
- Should more institutions be included? Which ones?
- How to legally establish institutional arrangements?
- How can we ensure validation independence?

The debate began regarding which institutions should be included in the MRV financial support system structure and if the financing associated to the private sector should be included. The consensus reached was that, although information regarding financial flows coming from the private sector can be very complex to collect, it is a relevant issue. The proposal being that only financing associated to the public sector is to be considered initially but, in time, to gradually add private financing into the equation.

Discussions led to an understanding that the difficulty in gathering information was in the productive sector; where we can differentiate public companies whose budgets are approved directly by the Ministry of Finance (such as CODELCO and ENAP for example) and privately-owned companies.

A staff member from the Ministry of Finance mentioned that, considering the close relationship between this ministry and public companies, it is feasible to request information regarding climate change financing. The most complex issue is finding an effective mechanism to obtain this information from private companies.

A participant mentioned that there was a Ministry of Finance project associated to best practices in social responsibility which aims to gradually increase certain sustainability requirements, in line with Global Reporting methodologies; beginning with large public-sector companies, followed by the larger, private sector companies, both subsectors being largely responsible of the most relevant emissions. A process of this kind could be one of the mechanisms used to obtain reports on climate financing from the private sector.

The capacity that CORFO may have in managing this report system was bought into question, lacking strong linkages with the private sector, thus not a relevant party for generating commitments with this sector. The advice is to seek a stronger link that may leverage the private sector into reporting appropriately. In contrast, CORFO may penetrate the SME segment very easily. In order to do this, Corfo programs could be modified so as to include certain information requests from small and middle sized companies linked to them.

Another option for compiling information on private-sector climate financing is to request banks to provide information regarding the financing they deliver on projects associated to climate change; however, it was commonly agreed that banking institutions would find it difficult to accept such a request.

The discussion defines as priority and fundamental the definition of the information to be recollected. The entire MRV financial support system and the information it reports on will be based on the definition used for climate financing; hence the importance of accurately defining this concept.

A classification is proposed that divides national and international flows on the one side and public and private, on the other. It is also advised that the report process should be gradual and staged, as otherwise system implementation would be very complex. Important also is to be able to track funds, requesting both source information (donors), as well as that from intermediaries and the receiving institutions that will implement climate change projects. Collected information can then be cross referenced in order to match income and expenditure.

In addition to the enormous complexity that developing information mechanisms from public, private, national and international institutions entails, there is a further layer of complexity to process: that of categorizing funds. The line distinguishing whether a fund is associated to climate change is often hard to discern.

One of the difficulties lies in that not all international funds necessarily go through the Ministry of Finance or AGCI. Some funds may be received directly by universities; NGO's or even directly by other ministries. It was agreed to include the central bank as a reporting entity, as all current accounts receiving international donations must be processed through this bank so that public institutions may then operate them.

A consensus was reached on the following aspects:

- Regarding institutions liable for reporting, the Ministry of Finance's DIPRES was named as coordinating entity for the national budget, tasked with controlling most of the flows, as it also deals with funds provided by international entities.
- This task would be supported by AGCI and MINREL, as these in turn are in charge of centralizing funds arriving in from international donors. Regarding this last point, mention was made that nominating MINREL as a second reporting entity would be appropriate, given that many of the flows are received in this ministry and not necessarily through AGCI.
- The MMA would retain the information and analysis coordinating role that it has today. The role is limited to coordination and not associated to collecting information.
- Additionally, CORFO is proposed as the entity in charge of validation, rather than on information reporting.

- Once the entities having pivotal roles to play in the system were decided upon, the mechanism used to ensure functionality of these arrangements should be evaluated, for example through mandates, decrees or co-operation agreements.

Presentation #21: "The M&E system as a response to climate change in South Africa".

Raúl Salas (Ricardo AEA – United Kingdom)

Mr. Salas proceeded to present the South African financial support model, known as the "M&E system as a response to climate change", as a source of reference for the model sought to be implemented in Chile. This model has had a gradual deployment and its main objective is to perform follow-up on the progress made towards targets set and national response policies on climate change.

The system features two data recollection levels: one that captures the support received at national scale (Top-down model) and another one that does so at project level (Bottom-up model); both are contrasted and compared, evaluating income and expenses. National Treasury (Ministry of Finance) is in charge of collecting data regarding support at national level, through various sub units trained in climate finance matters. This entity has identified those organizations that receive or provide funds, and for each source it has deployed a specific MRV or tracking system, for example mandates, annual budgets presented to the Ministry of Finance, annual voluntary reports, etc. For data at project level, the entity in charge of data recollection is the Ministry of the Environment, but it also has a committee in permanent contact with private companies and, through the use of regulations and provisions, forces them to report appropriately.

Also, there is the Climate Finance Advisory Committee, conformed by different ministries and banks who interact at an intermediate level, providing advice and guidance at a broad level and at project level. The main role of the committee is to synthesize all information coming from the top-down and bottom-up levels, evaluating information and generating reports on climate finance matters.

This MRV support system was gradually put into practice and consisted of three phases: the first considered international public sources and only a few national sources; in the second all public sources were covered and a few national and international private sectors sources were covered; and in the last one, a more complete coverage of private sector sources using improved methodologies was used.

Finally, Mr. Salas mentioned that, generically speaking, the first step when setting up an MRV support system is to define accurately what information is necessary to cover. Some suggestions to do this are: a) type of support (financing, capacity building, technology transfer); b) ways of financing (subsidies, favourable loans, equity, guarantees, etc.); c) support goal (mitigation/adaptation); d) support distribution (between sectors/activities, geographically); e) support source (public/private, national/bilateral/multilateral); f) pursued/accomplished impacts; and g) comparison with the support agreed by donors and money actually disbursed.

Discussion session 2. Questions to discuss:

- What processes are required for data collection?
- What processes, data, relevant experiences already exist and can be integrated?
- What definitions do we have to agree on?

There is an experience from the Ministry of Social Development for gathering information, called Data Bank, which works in an online platform. There is a suggestion to evaluate the application of an experience

of this kind for the support MRV, in which each ministry and public entity should fill in an information template, in accordance to basic input criteria suggested in the same platform.

An innovative idea to solve the issue of gathering information in the public sector is to take advantage of the Management Improvement System (MIS) as an instrument to collect information in the ministries. Although this system is designed for a completely different objective, associated with improving management in public services and to implement assessments through indicators, it would be very useful to create a MIS that includes the climate financing issue within its performance indicators. This idea is seen as difficult to implement but one that when in operation would be a great help in contributing to climate change finance reporting.

Discussion session 3. Questions to discuss:

- Do we need training? What do we need? What previously acquired knowledge could we use for training?
- What are the more relevant institutional /process /budget steps in the short term?
- Should we create a shared vision of the coming relevant steps in promoting / establishing the system?

The DIPRES requires training - or any other entity defined as responsible for compiling information- on the type of data required, and on what information corresponds to climate financing. An MMA team could be responsible for going to the relevant ministries to train staff. Capacity building will be specially relevant if information is requested through platforms.

Taking advantage of entities already trained, for requesting and compiling information, is suggested. Thus, it was mentioned that information might be demanded in the Environmental Accounts required from each ministry, prior to dissemination and training regarding criteria used in determining which information is necessary.

Participants also analysed the relevance of incorporating the white paper to the INDC, given its approval in May by the Council of Ministers and submitted in June to the UNFCCC. This would give urgency and relevance to financial MRV issues at the decision-making level, deemed to be a strategic move.

With respect to information validation and verification, an internal review should be held, also including a verification to be made by an external institution not involved in the process. This may be the General Comptroller, a consulting company or an audit firm.

Finally, a concrete proposal was generated regarding the steps to be followed, i.e..:

1. Modifying the white paper according to the changes proposed in this workshop (amending institutional arrangements) and presenting it to the Council of Ministers in May.
2. Talking to the entities in charge.
3. Making a detailed list of entities which already exist and that could be used in the process (Example: Environmental Accounts, Data Base, others).
4. Awarding seven days to comment on amendments.
5. Establishing and agreeing definitions (climate financing, among others).
6. Defining roles and responsibilities.
7. Setting up a system structure, defining required capacities, resources, deadlines and a working plan.
8. Designing a methodological guide for a standardized report, which can be provided to all ministries.
9. Establishing cooperation agreements among institutions.

Regarding item 8, the recommendation is checking the guideline developed by Ricardo-AEA on NAMAs that have yet to be launched (in the hands of the MMA team).

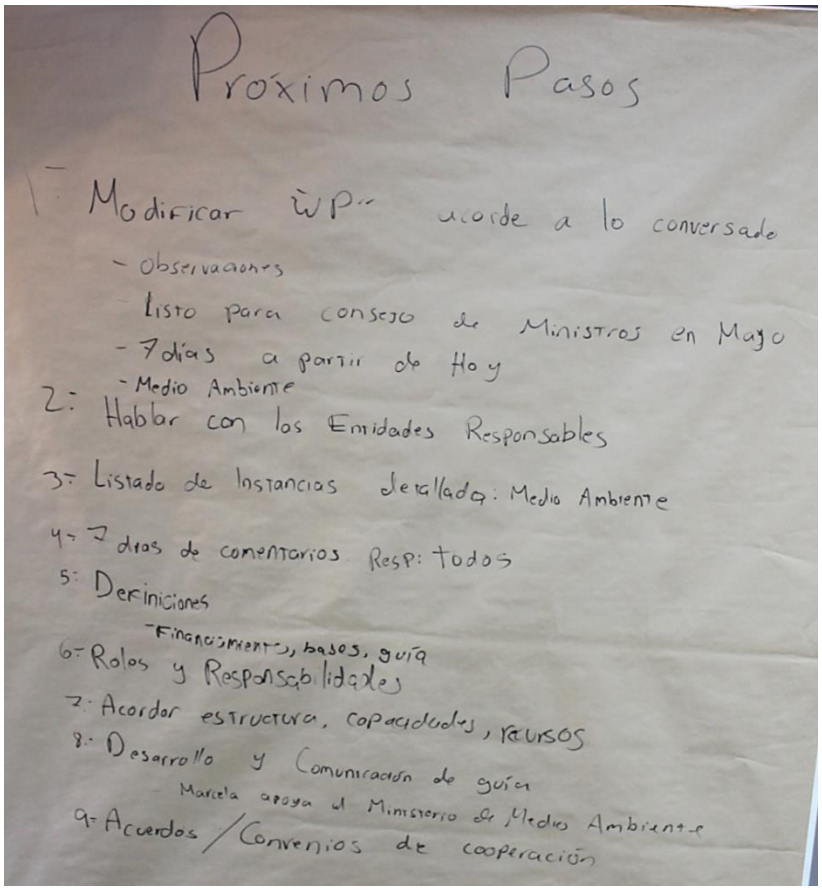

Image 4. Next steps in the Financial Support MRV Proposal.

5. Workshop "ICA process Analysis"

Presentation #22: "Preparation for the International Consultation and Analysis Process".

Sina Wartmann (Ricardo AEA – United Kingdom)

AI countries should report on the National Communication, Biennial Report (BR) and GHG National Inventory, and each one of these have a specific process for international review and consultation. The situation for NAI countries is different, since they only have the international consultation and analysis process (ICA) for the Biennial Update Report (BUR).

The BURs international consultation and analysis process, within the Subsidiary Execution Institution (OSE), will be performed in a non-intrusive, non-punitive way and respecting the national sovereignty: the ICA process goal will be to increase the transparency of the mitigation measures and their effects, through an analysis performed by experts, in consultation with the party concerned and with an exchange of opinions to facilitate this, resulting in a summary report. The debate related to whether national policies and measures are appropriate is not part of the process. The ICA process should not be thought of as the typical review process, it more supportive in nature for making continuous improvements.

The ICA process has the following two parts:

1. The BUR technical analysis: through a technical analysis of the BUR made by a team of technical experts (TTE[3]), where the information reviewed includes: GHG national inventory, information on the mitigation measures together with a description of such measures, an analysis of effects and methodologies, the assumptions in context and the processes performed in its application; information about measurement, notification and internal verification, and finally information on the support received.
2. Enabling peer exchange between parties. It is conducted by the OSE, in regular intervals with sessions lasting one or three hours by each party or group of parties; this session first consists in a brief presentation by the party(ies) on its BUR, and then there are a series of questions and oral answers between the parties and, lastly it is documented (Record of Exchange of Opinions, RIO)

Inputs and results of the different ICA steps are displayed in the following image:

Inputs	ICA Steps	Results
BUR	Step 1: Technical analysis	Summary report
BUR and summary report	Step 2: Exchange of opinions	Recording the exchange of opinions

Preparing for an ICA process

Ensure that appropriate personnel are available for answering any of the issues that might be raised. It is also important to have the information ready and to know from where information, reports, etc. were collected, facilitating efficient access to it. A key step for preparation is to think about what questions are

[3] *TTE is a group of international experts named by the roster of UNFCCC experts of each party. Those experts who have successfully completed the training program will be eligible to participate in the technical analysis.*

going to be raised. In this way, answers to such questions can be prepared, enabling the team to have a vision of future.

How does the United Kingdom get prepared for a review?

All members of the team must be available for the review to answer questions and to benefit from the exchange of experiences. Questions from previous years are reviewed and presentations that explain the steps and procedures used are prepared, all in a transparent manner. The review is also used to learn as much as possible, always having in mind the potential to improve the process, such as the development of the GHGINV, NC, BUR, etc. Enquiries are also made to the team that is doing the audit. All lessons learned from past reviews are documented, considering how to improve the processes.

Presentation # 23: "ICA Process for NAI countries - Experiences and Differences in the Review Process of AI Countries (Example of Germany)".

Oscar Zarzo (GIZ – Germany)

The presentation focuses primarily on the ICA process for NAI countries and, in a second part, on the experiences and differences with the review process for AI countries such as Germany.

Some background on the ICA process: at COP16, the NAI countries agreed to be subject to an international verification process, and during the COP 17 and 18, the methodologies for the analysis process and international consultation for BUR were adapted. All parties acknowledge that the verification process is essential to identify the efforts of each country, to improve transparency, to increase mutual trust between the parties and to recognize that all countries are taking steps in accordance to their possibilities.

The review and facilitation process allows countries to exchange experiences, to identify gaps and needed support, to improve transparency and accounting of emissions and emission reductions.

For the NIR and IAR review process, Germany performs a measuring, reporting and verification process. This is observed in the annual GHG inventory process, which is done by applying the IPCC methodologies, and which includes additional information on the emissions market and CDM, as well as on the actions taken to minimize impacts in developing countries. Also, the annual review is conducted by experts in order to ensure completeness, accuracy and compliance with the guidelines.

In preparation for the NIR review in Germany, an external verification of the NIR is done, for which workshops on the national system are carried out, in which a review by third parties (as organization and as independent associations) is performed. These workshops contribute significantly to improve the data and reports quality.

The fundamental aspects of the review process are: to have a clear allocation of roles and responsibilities for both NIR preparation and BR in order to respond to the reviewers; also to hold meetings with the inter-ministerial committee to approve reports and to address new review processes. Also, it is necessary to have appointed a person or coordinating entity to receive the questions from the ERT[4] and refer them to the entities or competent people. Another important point is to ensure availability of the personnel if rapid responses are required and, also important aspects to consider are the inventory verification process by third parties as well as the continuous improvement process.

[4] ERT = Expert Review Team", appointed by the UNFCCC Secretariat

6. **Closing Meeting.**

At the closing meeting, staff from the Climate Change Department participated. The meeting started with an overall assessment of the week, and then individual assessments per day of the third Capacity Building Mission Information Matters, which is the last activity in the country of this type.

Sergio González (GIZ Chile) indicated that this mission had, in general, a good participation and attendance of key organizations in the workshops (an example of this was the participation of National Customs Service, ODEPA and INE professionals), in the GHGINV workshop. He also stated that the Financial Support MRV workshop had a higher attendance than its equivalent in October, 2014; which provided a very useful debate even though some concepts mentioned in the previous workshop had to be mentioned again. In relation to the ICA process, he mentioned that the BUR translation into English was well advanced and should be ready in early May.

In Mr. González's opinion, the negative aspect was the low attendance to the workshop of Monday, April 20, because he personally expected a higher attendance considering how interesting the subject discussed was, due to the high number of people who confirmed their attendance. Nevertheless and despite the low attendance, the discussion was very valuable. He also thinks appropriate to reconsider full-day workshops, and have the option of half-day workshops.

Oscar Zarzo (GIZ Germany) requested from participants a personal opinion on the workshops they had to conduct or convene. In this way:

- Meike Siemens (DCC-MMA) indicated that the Monday workshop was very good and highlighted the participation of Gilbert Metcalf, a high level expert, with ample knowledge about the area and about Chile's specific case. Just like the IM Focal Point, he agrees that attendance was low, especially regarding specialists from the MMA Department of Environmental Economics. Also, the absence of MAPS-Chile caused him discomfort and he believes that there is no synergy with professionals or teams that do not belong to MMA but have been supported by it: an example is the MAPS-Chile team itself. On the other hand, regarding Tuesday, David Rich (WRI) exercises were very specific and people had no problem with them, thus transmitting what it was meant to be communicated about standards. In a few words, training was successful.
- Paulo Cornejo (DCC-MMA) focused his opinion in the Wednesday workshop: in his own words, everything went on very well. The timing for presentations was good. The first meeting of inventory update as well as uncertainty workshop was excellent and everything was very clear. Regarding this, he thinks there should not be further problems regarding the uncertainty quantification in the inventory, therefore he specifically expressed his appreciation for the participation of Raúl Salas, Consultant of Ricardo AEA.
- Jillian van der Gaag (DCC-MMA) focused on the workshop MRV for financial support. Her general impression was that, despite the low attendance, compared to the other workshops performed during the week, there was a very good participation from people attending, both from MINAGRI and from the Ministries of Defence and Finance, as well as CORFO and consulting firms. Good comments and advices were received about the white paper. An aspect that was very satisfactory too was that, due to the workshop, many concrete proposals were received for this document, indicating also that this is the time and the year to approach the Financial MRV issue. Finally, she expressed her appreciation for the participation and coordination of Ricardo-AEA and GIZ in the workshop and highlights that participants from the different ministries are willing to cooperate in the following stages.

Regarding the Workshop on the ICA process, participants expressed appreciation for the experiences shown about this process since they have now more clarity about the complete process and terms.

Another point discussed were the pending activities before ending the first stage of the program and what is to be done in the second stage. Regarding pending activities, one of them is training for the Residues and Energy teams who will be in charge of the inventory this year. Yet, it is understood that this has been delayed due to the late creation of the respective teams.

On this issue, Oscar Zarzo mentioned that Richard Martínez – DCC specialist – could perform training for the MINENERGIA team. As for Residues, it would be important that Tania Bishara – Specialist from the MMA Residues Division – could participate in this training. Paulo Cornejo indicated that MMA is interested in having German specialists providing support in this new inventory process, especially regarding an in-country type of review of the complete national system (files management, operation, tabular system, etc.)

Also, the preparation of the next BUR was also discussed because there is concern within the team regarding deadlines, which have not been defined yet. They think that once resources required are properly defined, people owning these resources will be able to establish a road map, thus setting deadlines and methods for reporting to generate the BUR in the most efficient and transparent way possible.

It was indicated that the IM team is willing to help in the Financial MRV process but in order to do this they have to know which help is required; it was emphasized that there are pending comments from the German Ministry of the Environment. It was also mentioned that there is certain connection between the South African team - which is already implementing a financial support system- and the Chilean team, to start an experience exchange process. Finally, the IM coordinator commented he was very interested in helping and supporting the RED-LAC initiative in some way.

At the end, it was indicated that the first stage of the IM will end in September, and at that point an experience exchange workshop is expected to be carried out with the participating countries in Dessau (Germany) from September 7 to September 9. Although there is still no clarity about a possible second phase, the idea GIZ have is to replicate the same experience of the first stage with other countries, expecting that the countries of this first stage fulfil an important role in communicating, disseminating and training, without leaving aside the constant support provided by the IM team, but with a different method than the one received during these years and addressing more specific subjects.

Annex B. Working Agenda of the Third Capacity Building Mission, Project "Information Matters".

Table A.1. Workshop Agenda "National contribution and Carbon Tax: Application of the GHG Protocol Standards of the World Resources Institute", Monday April 20, 2015.

DATE/TIME	SUBJECT/ACTIVITY	PARTICIPANT
April 20		
9:00-9:15	Welcome	Fernando Farías (MMA-DCC), Oscar Zarzo (GIZ Germany)
9:15-9:30	Introduction to the Session	Gilbert E. Metcalf (Tufts University)
9:30-9:50	Introduction to the Carbon Tax in Chile: perspective, goals and background information.	Isabel Rojas (MMA-DIEA)
9:50-10:20	CCG-UC Study on Carbon Tax.	Sebastián Vicuña (PUC)
10:20-11:00	Application of the "Policy and Action" Standard to the Carbon Tax.	Gilbert E. Metcalf
11:00-11:30	Break	
11:30-12:00	Lessons learned from other countries.	Gilbert E. Metcalf
12:00-12:30	Issues to consider when designing a MRV system for Carbon Tax in Chile	Gilbert E. Metcalf
12:30-13:00	Comments and conclusions	
13:00-14:30	Lunch	
14:30-14:50	INDC of Chile: Criteria and Goals	Andrés Pirazzoli (MMA-DCC)
15:00-15:45	Quantifying CNT forestry component	Yasna Rojas (INFOR)
15:45-16:15	Break	
16:15-17:30	Proposal for measuring progress on the Chilean CNT, based on the "Mitigation Goals" standard.	David Rich (WRI)
17:30-18:00	Comments and conclusions	
18:00	Closing of Activities	

Table A.2. Workshop Agenda "MRV for NAMAS: Application of the "Policies and Actions" Standard of the GHG Protocol of the World Resources Institute", Tuesday April 21, 2015.

DATE/TIME	SUBJECT/ACTIVITY	PARTICIPANT
April 21		
09:00-09:15	Welcome	Fernando Farías (MMA-DCC), Oscar Zarzo (GIZ Germany)
09:15-9:30	Overview on the World Resources Institute (WRI) Standards	David Rich (WRI)
9:30-10:45	Training on the Policy and Action Standard	David Rich
10:45-11:15	Break	
11:15-12:30	Training on the Policy and Action Standard (Continuation)	David Rich
12:30-13:00	Pilot Program of the Policy and Action Standard in Chile	María Luz Farah (Environmental Poch)
13:00-14:00	Lunch	
14:00-15:30	Practical exercise with a Chilean NAMA (Renewable Energies for Self-Consumption in Chile)	Viviana Huerta (CIFES)
15:30-16:00	Break	
16:00-16:20	A MRV framework for NAMAs in Chile: spirit and benefits of the system	Jenny Mager (MMA/DCC), Felipe Osses (Embassy of the United Kingdom in Chile).
16:20-17:00	Step by Step: introducing the MRV framework for NAMAs	Sina Wartmann (Ricardo-AEA)
17:00-17:30	Questions and answers, comments	
18:00	Closing cocktail	

Table A.3. Workshop Agenda "MRV for Greenhouse Gas Inventories", Wednesday April 22, 2015.

DATE/TIME	SUBJECT/ACTIVITY	PARTICIPANT
April 22		
09:00-09:15	Welcome	Fernando Farías (MMA-DCC), Oscar Zarzo (GIZ Germany)
09:15-10:45	Evaluation of the 2013-2014 process • Lessons learned on update and compilation • Update and compilation improvement system • Capacity building and maintenance • Progress towards institutionalization • Dissemination activities of INGE 2014 results	Paulo Cornejo (MMA-DCC)
10:45-11:15	Break	
11:15-12:20	2015-2016 Working plan • Restructuration of SNICHILE (new working axis) • Proposal for 2015-2016 Working plan • Tabular Record System (SRT) - new tool for managing GHG inventories • Analysis of improvements applicable during 2015 • Capacity building and maintenance activities	Paulo Cornejo
12:20-13:00	Comments from GIZ, the German Federal Agency for the Environment (UBA) and Ricardo-AEA to the Chilean NIR, TRS and others.	Sina Wartmann and Oscar Zarzo
13:00-14:30	Lunch	
14:30-15:00	Uncertainty, linked to the GHGINV	Raúl Salas (Ricardo-AEA)
15:00-15:30	Practical exercise on uncertainty rules	Raúl Salas
15:30-16:00	Uncertainty practical exercise	Sina Wartmann
16:00-16:30	Break	
16:30-17:30	Practical exercise on uncertainty calculation per GHGINV sector	Sina Wartmann
17:30-17:45	Results of the practical exercise	Presentation of results by team leaders
17:45	Workshop closing	

Table A.4. Workshop Agenda "MRV for Financial Support", Thursday April 23, 2015.

DATE/TIME	SUBJECT/ACTIVITY	PARTICIPANT
April 23		
9:00-9:15	Welcome	Oscar Zarzo (GIZ-Germany) and Jillian Van der Gaag (MMA-DCC)
9:15-9:45	Presentation of the support document ("White Paper")	Jillian van der
9:45-10:45	Comments and discussion of the support document ("White Paper")	Oscar Zarzo and Sina Wartmann (Ricardo-AEA)
10:45-11:15	Break	
11.15-13:00	Discussion on the institutional arrangements required	Sina Wartmann
13:00-14:30	Lunch	
14:30-16:00	Discussion on the development of data assessment and compilation processes	Sina Wartmann
16:00-16:30	Break	
16:30-17:30	Discussion on training required and next steps	Sina Wartmann
17:30	Workshop closing	

Table A.5. Workshop Agenda "ICA process Analysis", Friday April 24, 2015

DATE/TIME	SUBJECT/ACTIVITY	PARTICIPANT
17 Oct		
09:00-09:15	Welcome	Oscar Zarzo (GIZ – Germany), Jenny Mager (MMA-DCC)
9:15-9:45	ICA requirements and how to get prepared	Raúl Salas (Ricardo-AEA)
9:45-10:15	How is Germany preparing for the GHGHINV UNFCCC reviews and other Convention reports?	Oscar Zarzo
10:15-11:00	Role-play: practical exercise based on two groups (BUR reviewers and writers)	Sina Wartmann
11:00-11:30	Break	
11:30-13:00	Role-play continuation and further discussion: How to use the quality control processes for the ICA process?	Sina Wartmann
13:00	Workshop closing	
13:00-14:30	Lunch	

Annex C. Follow-up report from Workshop on WRI's *Mitigation Goal Standard* and *Policy and Action Standard* in Santiago, Chile on 20-21 April 2015 (elaborated by David Rich, WRI).

WORLD RESOURCES INSTITUTE

WRI organized three sessions during the workshop:

1. MRV of Chile's carbon tax based on the GHG Protocol *Policy and Action Standard*[5] on Monday 20 April morning
2. MRV of Chile's INDC using the GHG Protocol *Mitigation Goal Standard*[6] on Monday 20 April afternoon
3. MRV of Chile's NAMAs using the GHG Protocol *Policy and Action Standard* on Tuesday 21 April

This report summarizes the activities conducted, main results, and further recommendations for each session.

Session 1: MRV of Chile's carbon tax

Overview of the session: Gilbert Metcalf of Tufts University presented on how Chile can monitor and evaluate the GHG impact of the national CO_2 tax, including sharing examples of evaluating a carbon tax in British Columbia, Canada. The session also included presentations from representatives of the Ministry of Environment on the tax and from the Universidad Católica de Chile on a previous study that has been done of the tax.

Summary of recommendations:

- Purpose of evaluation
  - The results of the evaluation can be used to inform future policy design, including whether to increase the value of the carbon tax over time, whether to change which sources are covered by the tax, etc. Future policy design can be improved based on what the evaluation results show and whether the tax has been as effective as planned in achieving the desired results.
  - To inform policy design, it would be valuable to do both ex-ante analysis and periodic ex-post analysis of the carbon tax.
- Data collection and performance metrics to track
  - Record keeping for energy is straightforward: tracking fossil fuel consumption using national statistics.
  - Chile may want to track emissions reductions as well as other environmental impacts (SO_2, NO_X, PM) and various economic impacts (overall GDP, sectoral GDP, distributional impacts on different income groups to see whether the tax is regressive or progressive).
    - Understanding the effect of the tax on different income groups should take into account how the tax revenue will be spent (e.g., on education programs), since this can make the overall program progressive rather than regressive.

[5] Available online in English and Spanish at http://www.ghgprotocol.org/policy-and-action-standard.

[6] Available online in English and Spanish at http://ghgprotocol.org/mitigation-goal-standard.

- Roles and responsibilities for MRV
    - It is important to ensure coordination and information sharing between the Ministry of Environment (focused on environmental impacts) and the Ministry of Finance (focused on collecting revenue).
    - Possible roles/responsibilities to consider include:
        - Tax compliance: Ministry of Finance
        - Baseline construction: Ministry of Environment
        - Performance indicators: Various ministries
        - Policy feedback mechanism: Ministries of Environment and Finance
- Methods/models that can be used
    - One way to assess performance is to see whether Chile's overall emissions decrease in line with the INDC for 2020, 2025, and 2030 – but it's also useful to assess the impact of carbon tax to determine whether it's effective and working as planned.
    - The most robust approach is to use a computable general equilibrium (CGE) model, which take into account feedbacks between sectors and supply/demand interactions.
        - Chile has access to a CGE model, as mentioned in Andres Pirazzoli's presentation on Chile's INDC.
    - Other methods, such as bottom up engineering models and statistical/regression models are also useful.
    - One approach that could be used is a "difference-in-difference" approach, which involves comparing a policy group that implements a tax (e.g., Chile) to a comparison group that does not implement a tax (e.g., the rest of South America), over two periods of time: a first period in which neither the policy group nor the comparison group implements the tax and a second period in which the policy group implements the tax and the comparison group does not. This method estimates the difference between the groups prior to tax implementation (A1 - B1 = X); the difference between the two groups after tax implementation (A2 - B2 = Y); and the difference between the two differences (Y - X) as a measure of the change attributable to the tax. To control for different population sizes of the groups, it would be preferable to track emissions per capita for both groups. This approach would reveal how the trend in emissions increases or decreases relative to the comparison region after the introduction of the tax in 2017.
        - However, this method requires two assumptions: 1) that the pre-policy trend is similar between both groups and 2) that various factors that may affect energy/emissions in both regions (e.g., GDP, energy prices, etc.) are controlled for using statistical methods.
    - The most difficult methodological question is how to estimate the baseline. It is good practice to use multiple methods to get a range of baselines, since each method will yield different results. Chapter 8 of the Policy and Action Standard (pp. 73-93) provides guidance on how to estimate baseline emissions.
    - Econometric methods can be used to assess the impact of tax on GDP growth (for example, G. Metcalf did a study on the British Colombia carbon tax, which found that the carbon tax had no impact on GDP growth, controlling for other factors).
    - After the impact of the tax on multiple indicators (e.g., GHG emissions, other air pollutants, GDP, other economic impacts, various social impacts) has been assessed, a simple scoring framework can be used to evaluate whether the tax is desirable from multiple perspectives (environmental, economic, social).

Session 2: MRV of Chile's INDC based on the Mitigation Goal Standard

Overview of the session: David Rich of WRI presented the *Mitigation Goal Standard*, focusing on how it can be used to assess progress of Chile's 2020 voluntary national target (relative to BAU emissions) and 2025 and 2030 targets (the emissions intensity targets included in the draft INDC).

As part of the session, the Ministry of the Environment presented Chile's 2025 and 2030 mitigation goals included in the draft INDC. Furthermore, INFOR also presented on the expected quantified GHG impacts of the forestry component in the draft INDC.

Summary of recommendations:

- The *Mitigation Goal Standard* can be used to assess progress for both Chile's national 2020 goal (reduction relative to BAU emissions) and the 2025 and 2030 national targets in the draft INDC (reduction relative to emissions intensity), by 1) applying the equations in the standard (Equations 7.1 and 7.2 on page 91) to translate each goal into a target level of emissions in each target year (2020, 2025, and 2030), then 2) comparing actual emissions (based on the national GHG inventory) to target emissions in each year (using Equations 9.1 and 9.3 on pages 114 and 116 and Table 9.2 on page 117).
- To track progress in a credible way, Chile should track international transfers of offset credits from market mechanisms (including CDM and the voluntary market) and account for both purchases and sales when determining progress toward the national targets, using the equations provided in the standard. Guidance on doing so is provided in Section 4.5 on page 46 and Sections 9.2 and 9.3 on page 113.
- To ensure transparency, the quantified GHG impacts of the forestry component in the draft INDC should be included in Chile's INDC submission and a consistent MRV approach for this component should be developed.

Session 3: MRV of NAMAs based on the Policy and Action Standard

Overview of the session: David Rich of WRI presented the *Policy and Action Standard*, including how it can be used to monitor and quantify the GHG effect of Chile's NAMAs. The session also included a practical exercise of applying the standard to Chile's self-supplied renewable energy (SSRE) NAMA. GIZ will compile the summary of the group work as an input into the MRV plan for the NAMA.

POCH also presented on their application of the standard in 2013 to two NAMAs in the energy sector. At the end of the session, Ricardo-AEA presented the MRV framework for NAMAs. Ricardo-AEA explained that the *Policy and Action Standard* will be the technical and methodological basis of the MRV framework, while the MRV framework will define MRV processes and roles and responsibilities, such as who needs to do what by when.

Summary of recommendations:

- The standard should be used to guide the NAMA MRV design and quantify the GHG effect of NAMAs, through the following steps:
    - Defining objectives for MRV (Chapter 2 of the standard)
        - Recommendation: The accuracy and completeness of the assessment should be guided by the objectives and intended use of the results. Some objectives require comparatively more accuracy, while others require comparatively less.
    - Clearly defining the NAMA (Chapter 5)
        - Recommendation: The NAMA should be defined in sufficient detail to enable quantification. The standard provides a recommended checklist of information to provide on page 38.
    - Identifying the various effects of the NAMA, including effects on GHG emissions and various non-GHG effects (i.e., co-benefits) that are of interest (Chapter 6)
        - Recommendation: To ensure a comprehensive assessment of the net effects of the NAMA, it is important to identify both GHG-increasing and GHG-decreasing effects, which may include intended and unintended effects of the NAMA, short-term and long-term effects of the NAMA, and effects that occur both within and outside of Chile.
    - Defining the GHG assessment boundary around significant effects (Chapter 7)
        - Recommendation: To ensure an accurate assessment, all effects that are significant should be included in the assessment. Significance should be determined by though the expected likelihood and expected size of effects (see Figure 7.2 on page 65).
    - Estimating emissions under the baseline scenario, that is, what is most likely to happen in the absence of the NAMA (Chapter 8)

        - Recommendation: Emissions under the baseline scenario should be estimated by considering both other policies and actions in Chile that affect the same emissions sources and sinks affected by the NAMA, as well as various external or non-policy drivers that would affect those sources or sinks, such as changes in GDP, population, energy prices, weather, costs, etc. (listed in Table 8.3 on page 81).
    - Estimating emissions under the policy scenario ex-ante, that is, what is most likely to happen in the presence of the NAMA, and estimating the GHG effect of the NAMA ex-ante (Chapter 9)
        - Recommendation: All key assumptions related to how the NAMA is expected to affect emissions under the policy scenario should be transparently reported (in tables such as those provided in Table 8.7 on page 87 and Table 9.2 on page 102).
    - Identifying and monitoring key performance indicators to track progress of the NAMA (Chapter 10)
        - Recommendation: Monitoring should be carried out both to 1) track NAMA implementation and effectiveness, and 2) enable ex-post assessment of GHG effects. The former can be achieved by defining key performance indicators of various types (laid out in Table 10.1 on page 113), while the latter will depend on the ex-post methodology used (examples are provided in Tables 10.4 and 10.5). Monitoring of indicators and parameters should be carried out regularly according to a monitoring plan (see Section 10.4 and the example of the monitoring plan for a Tunisian NAMA in Box 10.2 on page 118-119).
    - Estimating emissions under the policy scenario ex-post, that is, what is most likely to happen in the presence of the NAMA, and estimating the GHG effect of the NAMA ex-post (Chapter 11)
        - Recommendation: Ex-post assessment should be carried out, since the results achieved ex-post are likely to differ from the results expected ex-ante (see the South African example in Box 11.2 on page 129). The ex-post baseline scenario should be updated every time an ex-post assessment is carried out, to reflect changes since previous baselines were developed. At the same time, the causal chain should be updated to assess which effects expected to occur actually did occur.
    - Understanding and estimating the uncertainty of the results (Chapter 12)
        - Recommendation: The uncertainty of the results should either be quantified or described and presented with the estimated GHG impact of the NAMA in order to ensure proper interpretation of the results, given that the uncertainty can be high.
    - Verification (Chapter 13)
        - Recommendation: Either first-party or third-party assurance can be used to ensure the data are accurate and complete.
    - Reporting (Chapter 14)
        - Recommendation: All assumptions and methodologies should be transparently communicated in order to ensure proper interpretation of results. Reporting requirements are provided on pages 151-153. A sample reporting template is also available at http://www.ghgprotocol.org/policy-and-action-standard.

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