



Country Profile for CHILE

Prepared by: *Asesorías Profesionales P. Lehuedé Ltda (APLE), Chile*

Prepared: *February 2009*

Published: *March 2009 revised November 2009*

Contents

1. Introduction.....	2
1.1 SETatWork Country Profiles	2
1.2 SETatWork Sustainable Energy Technology (SET) Priorities.....	2
2. General Country Overview.....	3
3. Legislation	5
4. Financial market	6
5. National Situation in the Carbon Markets.....	7
5.1 European Emission Trading System (EU-ETS) and National Allocation Plan (NAP) ...	8
5.2 Clean Development Mechanism (CDM) opportunities, requirements and SET transfer demand.....	8
5.3 Joint Implementation (JI) opportunities and requirements	8
5.4 Voluntary markets (VER) opportunities and requirements.....	8
6. R&D Priorities	9
7. Links to Relevant and Related Websites.....	11

© SETatWork Consortium Members 2009

Reproduction of this publication is authorised provided the source is acknowledged.



SETatWork is supported by the European Commission under the Seventh Framework Programme (FP7). This publication reflects the author's views. Although the author's best efforts have been made to ensure that the information contained herein is accurate, neither the European Commission, the SETatWork Project Members nor the author are liable for any use that may be made of the information contained herein.

1. Introduction

1.1 SETatWork Country Profiles

This report is one of a set of Country Profiles produced by **SETatWork**. The global society is faced with a huge challenge in order to meet the threat given by global warming. The project **SETatWork - Sustainable Energy Technologies at Work** aims to meet this challenge through the collaboration and partnerships between organisations in EU, Asia and South America, supported by the EU's Seventh Framework Programme (FP7). The activities take place over two years from 1 September 2008 to 31 August 2010.

The aim of this country profile is to provide an overview of the carbon markets in Chile with a focus on RTD (Research & Technological Development) needs, implementation options and perspectives associated with energy efficiency and savings in the carbon market (short term and medium-long term).

The main target groups of this country profile are companies (financial investors, project developers, technology providers, ESCOs, consultants, etc.), organisations and administrations that are interested in a short overview of relevant information in the development of carbon projects and markets in Chile. This information will also be relevant for readers from other countries that are interested in an overview of the country as well as for national readers that need to have information on the national developments.

SETatWork Country Profiles can be found online at: <http://www.setatwork.eu/countries.htm>

1.2 SETatWork Sustainable Energy Technology (SET) Priorities

In each country, companies and organisations were interviewed by SETatWork in order to identify indicative priority rankings for various Sustainable Energy Technologies (SET) and Industrial Sectors. The results of these interviews for each sector can be viewed on the following page: <http://www.setatwork.eu/maps/index.html>

The SETatWork Priorities for Chile are shown below. Where data is not yet available, the bar chart columns are left empty.



Industries in general are very small and composed of a few large companies (cement: 3 - Ceramics: 2 - glass: 2 - chemical: mostly imports - mining: almost all foreign companies, new facilities - pulp: 2 - refineries: 1, public owned - steel: 2). Food processing may be an exception due to the potential for obtaining energy from wastes (pork, poultry, wine, fruit, salmon, etc.)

In relation to renewable technologies, wind energy leads development activities in Chile with around 2500 MM USD in projects being evaluated. Biomass and bioenergy are also of interest interesting, while solar (photovoltaic) is still considered too expensive.

2. General Country Overview

The distribution of the energy consumption according to the latest official survey (2002) covering these sectors is presented in table 1.

Table 1: Energy consumption In Chile by sector (2002).

Sector	Energy consumption (TCal)	% participation
Industrial	47.967	18
Mining	27.705	11
Services	65.828	25
Transport	68.996	27
Residential	49.010	19
TOTAL	259.506	100

Chile has developed a series of strategies and activities and as a result has become an attractive platform for foreign investment. Chile's business environment is the result of a policy-driven strategy that has focused on building a sound macro-economic basis linked to strong institutions, promoting competition and international integration, creating a fairer society in which all citizens benefit from economic development.

Economic growth has been accompanied by decreasing inflation, a sharp drop in public debt, stable external accounts and strong international reserves. This achievement is the result of Chile's commitment to economic liberalization and free-market policies, as well as of its pledge to maintain sound and responsible economic management.

These comparative advantages are further enhanced by Chile's open economy, which has resulted in greater competitiveness, lower tariffs, increasing levels of foreign trade and rapid integration into world markets. Chile currently has free trade agreements with more than 90% of the world's GDP. Moreover, the country's modern telecommunications system, its internationally competitive and solid banking sector, high-standard public infrastructure, excellent quality of services and wide availability of qualified human resources are key factors that also favorably impress foreign investors. As a result, Chile possesses a very attractive and dynamic business environment. Even though Chile does not have emission reduction requirements as established in the Kyoto Protocol, Chilean public and private institutions have made a significant effort to promote the concept that Chile represents a good platform for investment in GHG emission reduction projects.

The institutions most active in this promotion effort have been:

- CONAMA (National Environmental Commission (www.conama.cl))
- Designated National Authority, PROCHILE (www.prochile.cl)
- National Export Promotion Office, SOFOFA (www.sofofa.cl)
- Chilean Industry Federation, and
- AEPA (www.aepa.cl) – Chilean Environmental Consultants Association

This effort has focused on two main activities

- External promotion of Chilean projects and opportunities
- Internal promotion of PK and the opportunities that CDM offer for developing projects that reduce GHG emissions.

The World Economic Forum ranks Chile as Latin America's most competitive economy. Chile's business environment continues to enjoy a favourable position within a selective group of 125 economies worldwide.

On CDM grounds, Chile has been recognized as an active country since the beginning of the system:

- 3rd country in CERs offer (World Bank 2004)
- 2nd place as CDM host country (Point Carbon 2004 - 2005)

Even though Chile has no emission reduction target, the government has set various goals aiming to control GHG emissions in diverse sectors of economic activity. For example, the Ministry of Agriculture has set a goal of achieving a carbon-neutral agricultural activity in the midterm in Chile

Chilean Electricity Market

The electricity market in Chile consists of power generation, transmission and distribution. During recent decades Chile has privatized its electricity sector. Hence, the state currently only controls the functions of regulation and inspection. The principal state organization involved in the regulation of the electricity industry in Chile is the National Energy Commission, CNE. This agency is responsible for preparing and coordinating required plans and standards and suggest general guidelines related to energy generation and transmission systems.

At present, the Chilean electricity system is divided into four sub-systems:

- The SING (Interconnected System of the Greater North – Sistema Interconectado del Norte Grande),
- The SIC (Central Interconnected System – Sistema Interconectado Central, the largest in terms of power and scope), and
- Two additional local systems in the southern regions of Aysen and Magallanes.

The demand for electricity is increasing annually by 7% compared to annual economic growth of 5%. Table 2 shows the distribution of domestic installed capacity for the two largest systems and the share of Non-Conventional Renewable Energy (NCRE) in this matrix:

Energy consumption is increasing at an average rate of 7% annually (with a long-term growth projection of 5-6%). Total electrical energy distribution increased by 21.4% in 2005 with respect to 2002, while production increased 21.8%. Generation rose from 57,555 GWh in 2006 to 60,138 GWh. in 2007) indicating Chile's current high level of economic activity.

Table 2: Distribution of Installed Electricity Capacity in Chile, 2007 (CNE).

Type of Fuel	Gross Installed Power (MW) SIC	Gross Installed Power (%) SIC	Gross Installed Power (MW) SING	Gross Installed Power (%) SING
Non-conventional Renewable Energy	317.2	3.43	12.8	0.36
Run-off-river hydro plant over 20 MW	1,377.3	15.10	0.0	0.0
Dam	3,393.4	37.22	0.0	0.0
Coal	837.7	9.19	1,205.6	33.47
Oil/Diesel	75.0	0.82%	271.8	7.55
Dual (dieselgas/gas – IFO 180)	582.9	6.39	0.0	0.0
Natural gas	2,539.3	27.85	3,601.9	58.63
Total installed Power	9,118.3	100	3,601.9	100

3. Legislation

Incentives for non-conventional renewable energy (NCRE) The rise in fuel prices and the growing energy demand in Chile have encouraged several policies for the development of new energy sources. However, significant barriers are still in place that hinder the introduction of NCRE. These include variations in the information available and differences in negotiating capacities, access to finance for the high investment required for suitable transmission lines, as well as the commercial risk linked to future electricity prices. In order to favor the introduction of NCREs into the electricity generation matrix, amendments have been made to the General Law on Electrical Services, through Law 19.940 and Law 20.018.

In brief, these amendments improve entry conditions for NCRE into electricity systems, by:

- Assuring any renewable energy generation project the right to sell its energy into the electricity market at market price.
- Fully or partially releasing NCRE power stations with power surpluses under 20 MW from transmission tolls.
- Allowing the connection of small power stations (less than 9 MW) into distribution networks.

An important advance during 2008 was the passing of Law No. 20.257, which establishes that any supply contract agreed upon after 2010 must guarantee 5% of energy generated from NCREs. This percentage is required to increase by 0.5% per year as of 2015 to reach 10% in 2024. This provision is expected to result in the development of some 1,600 MW of additional power from NCREs during the next 26 years.

As far as energy efficiency is concerned, there are no regulations that promote related activities. Nevertheless, in 2005 the Ministry of Economy developed the National Program for Energy Efficiency (in Spanish PPEE for Programa País de Eficiencia Energética).

This Programme has established a strategic action map, the principal action lines of which are listed below:

- Generation of an energy efficient culture
- National energy efficiency policy deployment
- National energy efficiency monitoring system
- Economic frame
- Regulatory frame for energy efficiency
- Energy efficiency certification system
- Economic, tributary and financial instruments and incentives for energy efficiency
- Promotion of energy efficiency in industry
- Relations with energy efficiency international mechanisms
- Policy and sectorial energy efficiency for houses, buildings and construction
- Policy and sectorial energy efficiency for transport
- Policy and sectorial energy efficiency for industry (including mining, agriculture and commerce)
- Policy and sectorial energy efficiency for energy generation / transformation
- Policy and sectorial energy efficiency for public sector
- Technological innovation for energy efficiency

This National Program for Energy Efficiency has played an important role in developing tools and promoting the importance of this issue as a priority for Chilean society.

4. Financial market

As indicated previously, Chile has a very good financial situation when compared to similar countries both globally and in relation to neighboring countries. This facilitates investment and project development.

Market opportunities associated with emission reduction are related to the following technologies:

- Geothermal
- Wind energy
- Biomass for energy
- Hydropower
- Waste biodigestion
- Landfill gas
- Reforestation

There are already various projects at various stages of development utilising these technologies. Most projects that have an interesting size in terms of “CDM-potential” are already being developed and hence further medium and small scale projects are attracting attention from market actors. Investment is normally carried out by private project developers including both national and international companies. In general, project structure includes the project developer and investment banking. Some project developers invite other investors (including CDM international companies) to complete equity or to provide total investment.

Historically, energy efficiency has not been an attractive area either for investment or for CDM project development. In the past energy consumption has grown in parallel with national productivity, reflecting the low cost of energy. However, during the last 2 to 3 years

this situation has changed and the energy costs (electricity and fuels) have risen significantly (between 100% and 300%) forcing all sectors to pay more attention to energy consumption.

Further effects are expected in terms of investment to aid reduction in energy consumption. However, financial pressures have had a significant impact on carbon projects, as with all economic activity. So far, the main impact of the present crisis has been a delay in go / no-go decisions. All investors and banks are taking more time and precautions to decide whether or not to invest their money.

5. National Situation in the Carbon Markets

As indicated above the main areas where CDM opportunities may be found are associated with the following types of renewable energy: wind farms, solar energy, biomass to energy, waste to energy and cogeneration using forest biomass as well as through increased efficiency of energy use. Due to the relatively small size of the Chilean market, the development of programmatic project activities offers significant opportunities.

In 2008, the official Chilean CDM project portfolio was as shown in table 3. In addition to these projects, there are a number of other projects that are not included in the official portfolio.

Table 3: *Number of CDM projects using various forms of renewable energy in Chile at the end of 2008.*

Project type	Number of projects
Geothermal	5
Wind farms	12
Biomass	8
Hydro	28
N ₂ O reduction	1
Forestation – reforestation	2
Landfill gas	1
TOTAL	57

A study that looked at energy efficiency, carried out in 2004, indicated the main sectors where energy efficiency measures can have a significant impact nationwide. These were as follows:

- Industrial sector
 - Pulp and paper
 - Steel production
 - Oil refining industry
 - Cement production
 - Sugar production
 - Fishing industry
- Mining sector
- Service sector
- Transport sector
- Residential sector

According to this study, the potential for improvement in energy efficiency in these sectors was estimated as shown in table 4.

Table 4: *Potential for energy savings in various sectors of activity in Chile.*

Sector	Annual energy efficiency improvement (%)
Industry	1,9 – 4,5
Mining	0,8 – 4,1
Services	0,3 – 2,9
Transport	1,9 – 4,5
Residential	0,9

5.1 European Emission Trading System (EU-ETS) and National Allocation Plan (NAP)

No information available at this time

5.2 Clean Development Mechanism (CDM) opportunities, requirements and SET transfer demand

In Chile, the DNA is the National Environmental Authority (CONAMA – Comision Nacional del Medio Ambiente – www.conama.cl). The LoE / LoA approval procedures are linked to the environmental authorization process, which is conducted by the same institution. Thus, every project that has undergone an environmental authorization process and requires a LoE / LoA, will be able to obtain it through a very short and simple process. If the project requiring the LoE / LoA has not undergone an environmental authorization process (for example power plants smaller than 3 MW of installed capacity), there is a simple 'letter request process, through which more information regarding the project may be submitted.

5.3 Joint Implementation (JI) opportunities and requirements

There is no record of a 'Programme of Activities' being developed in Chile at this time.

5.4 Voluntary markets (VER) opportunities and requirements

The VER market in Chile is still at a very early stage. There are no public records of projects generating and selling VERs. In CDM market, all transactions registered are CERs

The key stakeholders for carbon markets in Chile are as follows:

- DNA: CONAMA – Comision Nacional del Medio Ambiente
- Public institutions: Prochile – National export promotion office, CNE – National Energy Commission
- Private institutions: SOFOFA – Chilean industry federation, AEPA – Environmental consulting association
- Brokers and consultants:
 - APPLUS
 - MGM INTERNATIONAL CHILE
 - APLE LTDA
 - POCH & ASOCIADOS

- DEUMAN
- RUDI & RIESCO Y CIA
- CCA QUALITAS
- ECOSECURITIES CHILE S.A.
- ERATECH CHILE LTDA.
- NORDIC AMBIENTAL CONSULTORES
- CARBON MANAGEMENT CONSULTING LTDA.
- ENERCONSUL
- PricewaterhouseCoopers Chile

As far as mapping of trends within each sector with regard to production patterns, fuel types used in the production, possibilities for fuel switch/conversion of production is concerned the National Energy Commission has statistics for fuel consumption separated into the following sectors as shown in table 5:

- Transport
- Industry and mining
- Commercial, public and residential
- Energy generation

Table 5: Consumption statistics for year 2005.

Fuel type	Unit	SECTOR				TOTAL
		Transport	Industry and mining	Commercial, Public and Residential	Energy generation	
Natural Gas	million m ³	37	959	503	6.807	8.306
Plane Kerosene	thousand m ³	761	-	-	-	761
LPG	thousand ton	1	159	822	4	986
House kerosene	thousand m ³	17	28	71	-	116
Gasoline	thousand m ³	2.886	-	-	-	2.886
Diesel	thousand m ³	3.911	1.635	119	272	5.937
Oil	thousand ton	1.257	495	5	151	1.908

In general, there seems to be a high possibility of switching fuels, applying minor changes to installations whilst fulfilling all conditions of the various permits required. The industrial sectors show some interest in participating in climate related activities. However, there is still a generally held view that such actions are difficult for large companies with complex facilities, while medium and small companies require a lot of capacity building to be able to address this subject within their activities.

Management systems are not widely used in Chile. At December 2007, there were 492 ISO 14.001 certificates issued in Chile

6. R&D Priorities

Chile has developed a series of initiatives that relate to the position of energy, particularly renewable energy, as a national priority. Promotion of both R&D and technology transfer are regarded as important within these initiatives.

The Chilean Economic Development Agency (CORFO) and the National Energy Commission (CNE) signed a Memorandum of Understanding in 2005 to facilitate the promotion of NCRE via co-financing of pre-investment studies covering renewable energy projects. This co-financing tool allows a subsidy of up to 50% of the costs of the study as long as this is not in excess of US\$60,000. It also provides up to 2% of the estimated investment. In order to get the grant, a project has to pass through an assessment procedure that not only looks at the project itself, but also at the management capabilities of the developers.

Three calls have been made for applications for matching-funds awarded through competition for NCRE projects. These were made in July 2005, April 2006 and January 2007. In addition, during 2008, further projects have been initiated as a result of an open call for applications. As a result a portfolio of projects has been built up as detailed in table 6.

Table 6: *Number of projects initiated in various sectors of renewable energy as a result of calls for co-funded projects (source: CORFU)*

Competition	Hydro	Wind Power	Biomass	Geothermal	Total
2005	22	12	11	1	46
2006	18	22	6	-	46
2007	13	29	7	5	54
2008 (open application)	8	1		-	9
Total	61	64	24	6	155

There is also a new Matching Fund for Advanced Studies of NCRE during the pre-investment phase. A new instrument will be launched during the last quarter of 2008 jointly financed by the KfW from Germany and the Chilean government. This will provide soft loans to finance investments in renewable energy projects.

In August 2008, the Chilean Government announced the availability of US\$400 million to be allocated as guarantees for renewable energy and energy efficiency projects. These are supplementary to the soft loans and aim to support risk management in energy projects during all stages of development of the activities. These new instruments were at design stage when this report was written and are expected to be operational during the first quarter of 2009.

These new instruments support non-conventional renewable energies (NCREs) and thus complement the new Act for the promotion of renewable energies issued April 2008 strengthening the activities launched in 2005 by the National Energy Commission (CNE) and the Chilean Economic Development Agency (CORFO). They create conditions for the further growth of NCRE projects in order to meet the goal set by the President of increasing the NCRE-based installed capacity.

The latest instrument co-finances part of the costs of basic and detailed engineering studies, studies of electricity connections as well as environmental impact studies and reports, etc. The matching funds can provide up to 50% of the total cost of the study and/or consultancy, with a maximum of 5% of the estimated investment but will not exceed US\$160,000 per project evaluated. The applicant must present evidence that guarantees the ownership of the energy resource. This instrument may be available to projects that have already undergone the preliminary stages of the pre-investment phase, but does not support studies measuring the available resources or pre-feasibility studies.

CORFO also has R&D funding for general purposes which can include SET projects. The scope of these funds include:

- Innovation funding
- Patent process support
- International missions
- Expert consultation

It is not possible to obtain further information concerning projects are currently being developed due to conditions of confidentiality set by the instruments themselves. However, information can be obtained on projects that have already been finished.

7. Links to Relevant and Related Websites

General background information

NAP I http://ec.europa.eu/environment/climat/emission/emission_plans.htm

NAP II http://ec.europa.eu/environment/climat/emission/2nd_phase_ep.htm

EU-ETS http://ec.europa.eu/environment/climat/emission/index_en.htm

CDM, JI, etc. <http://cdm.unfccc.int/index.html> <http://ji.unfccc.int/index.html>

CDM Bazaar <http://www.cdmazaar.net/>

Other websites used for the preparation of this report:

PROCHILE	(National Export Promotion Office)	www.prochile.cl
CONAMA	(National Environmental Authority)	www.conama.cl
SOFOFA	(Chilean Industry Federation)	www.sofofa.cl
AEPA	(Chilean environmental consulting association)	www.aepa.cl
CNE	(National Energy Commission)	www.cne.cl
PPEE	(National Energy Efficiency Program)	www.ppee.cl
APPLUS		www.appluscorp.com
MGM INTERNATIONAL CHILE		www.mgminter.com
APLE LTDA		www.aple.cl
POCH & ASOCIADOS		www.poch.cl
DEUMAN		www.deuman.com
RUDI & RIESCO Y CIA		www.urquidiriesco.cl
CCA QUALITAS		www.ccaqualitas.cl
ECOSECURITIES CHILE S.A.		www.ecosecurities.com
ERATECH CHILE LTDA.		www.eratech.com
NORDIC AMBIENTAL CONSULTORES		www.nordicambiental.com

CARBON MANAGEMENT CONSULTING LTDA.
ENERCONSUL
Pricewaterhouse Coopers Chile

www.carbonmcgroup.com
www.enerconsul.cl
www.pwc.com