THE INTERNATIONAL REC STANDARD

Country Assessment Report

Country/Region Name- Republic of Chile

Chile is situated in western South America; bordered by Peru, Bolivia and Argentina. It has a population over 18.7 million and GDP worth over $298 billion and population over. Annual growth rate has fluctuated in recent years, dropping to from 3.9% in 2018 to 1.1% in 2019.

(World Bank 2018)

Economic structure and activity:

Chile has a market-based economy with high levels of foreign trade. Investment is high in the region given Chile has one of the highest sovereign credit ratings amongst South America nations. The service sector contributes 57% worth of GDP dominated by tourism, banking and finance. Industry accounts for around 29% and is dominated by mining and refining minerals as well as food processing and chemical manufacturing. Chile has a wealth of copper reserves which constitutes Chile's main export. The price of copper has fluctuated in recent years, exposing the economy's dependency and over reliance on copper trade.
Agriculture contributes very little to overall the economy (3.6%) and exports mainly consist of wine, fruit and seafood.

(Statista 2018; Bloomberg 2019; Santander 2020).

Top private companies with RE commitments:

Generation and demand: (type, MW, TWh)

Figure 5: Chile installed capacity, 2018

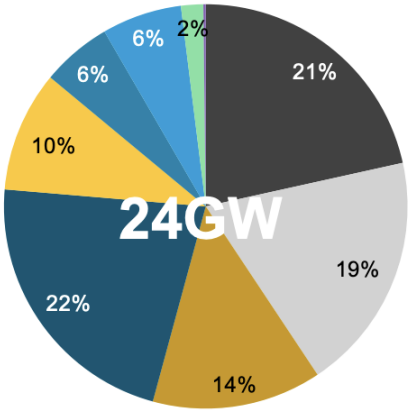
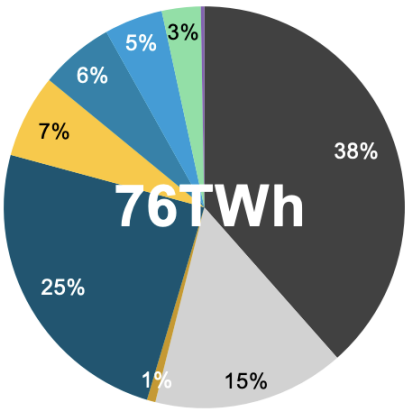


Figure 6: Chile power generation, 2018



Coal Gas Oil Large hydro PV Small hydro Wind onshore Biomass & waste Geothermal

Figure 1. Installed capacity and total power generated by Chilean power generators.

In recent years, the energy regulator's demand forecast for electricity have proven overly optimistic. Comision Nacional de la Energia's (CNE) predictions reduced from 3.9% growth per year in 2015 to 2.3% in 2018 for the period through 2038.

Falling demand for copper, particularly from China, will most likely have a knock-on effect on energy overall demand, given that the copper industry accounts for around 30% of all energy consumed in Chile. Overall electricity consumption growth will most likely be capped if demand for the metal continues to fall.

Electrical Interconnection and import/export:

Chile has electrical transmission with Argentina and are engaged in ongoing discussions with Peru regarding electrical interconnection. In 2011, SINEA (Andean Electrical Interconnection System) was created to establish a roadmap for delivering the integration of energy markets between its member states (Peru, Ecuador, Chile, Colombia and Ecuador).

In 2016 Chile did not import any electricity and exported 2,000 MWh of domestically generated electricity.

Figure 1. Market structure of Chile's power sector.

Figure 1 is the most current depiction of Chile's electricity market structure. Since the 1980s, the power sector has been de-regulated, with generators, operators, distributers all now under private ownership.

Generating companies are remunerated for energy and capacity services. Energy refers to effective consumption and is paid either at marginal cost at the relevant node or as per the agreed on the Power Purchase Agreements (PPA). The Capacity payments reward the generation company for making capacity available to the system. Firm capacity is determined by the National Energy Coordinator (NEC) for each power plant and is paid at marginal system capacity expansion cost.

The generators that produce less than their PPA obligations balance their positions at the spot market buying from companies that produce in excess. On the contrary, generators that have excess of generation can sell their power on the spot market at marginal cost.

Power customers with a capacity demand higher than 2MW are considered non-regulated customers and they can negotiate PPAs directly with power generators. The customers between 500KW and 2 MW can choose to be supplied by distribution companies at a regulated price, fixed periodically by the CNE, or by generators through the signature of PPAs. Smaller clients with capacity demand lower or equal to 500kW are supplied by distribution companies. As per the current regulation, distribution companies must back the projected demand of their regulated clients with long term PPAs. These PPAs are the result of public tenders.

On the other side, transmission facilities have open access. They are remunerated through transmission tolls, paid 100% by customers. Rates are designed through periodic studies by the authorities to secure the efficient expansion of the transmission system and a 10% real annual return of the transmission assets' value. The operation, maintenance and administration costs (COMA) are charged in addition. Distribution companies are obliged to pass these costs through the energy purchase price to their clients. This is called the Distribution Aggregated Value (VAD).

In 2017, Chile's two main electricity systems: Central Interconnected System (SIC, Sistema Interconectado Central) and the Northern Interconnected System (SING, Sistema Interconectado del Norte Grande) merged to form SEN (Sistema Electrico

Nacional). This enabled solar energy produced in the sunny north, struggling with a congested grid network and low sale prices, to provide for those in the centre of the country, where the majority of demand for electricity is concentrated.

Responsible Government Department:

Ministry of Energy has a regulatory and supervisory role, pursuing to establish criteria that favour economic and efficient expansion of electricity infrastructure.
governed by the general electric service law.

The National Energy Commission (CNE), dependent on the Energy Ministry, is a technical agency responsible for fixing the electricity tariffs and elaborating a ten-year indicative guide for the system expansion.

Electricity and Fuels Superintendence (SEC) that sets technical standards and oversees the compliance.

Existing/Planned Energy Legislation: (is there a CPO)
The NEC (National Electrcity Coordinator) started operation on the 1st of January of 2017, one year before the physical connection of the SING and SIC. This new system covers 3,100 km of transmission lines from Arica to Chiloe Island and is expected to reach a total installed capacity of 24.000MW by 2018. The NEC is a non-profit autonomous corporation governed by the Law No. 20,936 and its regulations. It does not form part of the Public Administration; it has its own equity. However, the Board of Directors, the Executive Director and its staff are qualified as public employees only for the purposes of applying Article 260 of the Penal Code.

The NEC performs the operation of the electrical installations that operate interconnected with each other, to:

- Preserve the security of the service in the electrical system;
- Guarantee the most economical operation for all the electrical system installations;
- To ensure open access to all transmission systems, in accordance with the law.

Environmental Legislation for RE[3]:

Law No. 20.257 or "NCREs (non-conventional renewable energy) Law" - passed in 2008 to set an obligation on generators to provide 10% of their supply contracts signed after the 31st of August of 2007, from NCRE sources by 2024. The obligation started in 2010 with 5% and increases gradually up to the 2024. To comply with this obligation, generating companies short on NCRE can buy "NCRE attributes" from other NCRE plants that meet the legal requirement of being interconnected to one of the largest electrical systems (SING or SIC) after January 1st, 2007 or those who have increased the installed capacity from such date. Failure to reach obligation or the absence of proving the purchase of an NRCE attribute, the generators are fined with 0.4 UTM[4] / MWh.

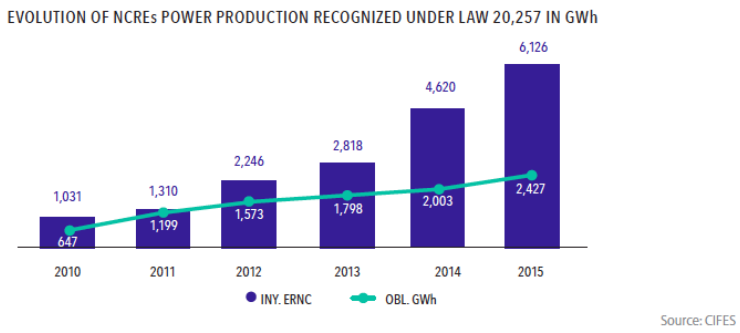
Law No. 20.698 (also known as the "Law 20/25") - passed in 2013 to establish NCRE tenders in case the authority envisages the failure to meet the obligation percentage, and increases the generators obligation to reach up to 20% from NCRE by 2025, starting from 5% in 2014 and increasing gradually. Both obligations are shown in the table below.

REQUIREMENTS ESTABLISHED IN LAWS 20.257 AND 20.698

YEAR	20,257 LAW	20,698 LAW
2010	5.0%	-
2011	5.0%	-
2012	5.0%	-
2013	5.0%	5.0%
2014	5.0%	6.0%
2015	5.5%	7.0%
2016	6.0%	8.0%
2017	6.5%	9.0%
2018	7.0%	10.0%
2019	7.5%	11.0%
2020	8.0%	12.0%
2021	8.5%	13.5%
2022	9.0%	15.0%
2023	9.5%	16.5%
2024	10.0%	18.0%
2025	10.0%	20.0%

Source: CIFES

The NCRE injection has always exceeded the obligation imposed by both laws during the last 6 years. See the following graph.



Source: CIFES

Carbon Tax – passed in 2017 to tax US$5 per tonne of CO_2 on emitters with installed capacity equal to or larger than 50 MW, excluding those that use biomass as a feedstock. The tax is the latest of a series of favorable regulations set in Chile, in addition to net metering, energy auctions and attractive tax policies.

Net billing – passed in 2014 to allow allow those with localized, distributed power-generating capacity such as rooftop PV systems to "sell" their excess generation back to their utility at the retail rate by receiving compensating discounts on their bills. In cases where generation in a given month from a distributed system exceeds the amount a customer receives from the grid, credits can be rolled into the following month's bill. The program is similar to "net metering" schemes in some U.S. states and elsewhere around the world. On 17 November 2018, the net billing law was updated, expanding the size limit for installations from 100kW to 300kW.

Coal moratorium- passed in 2019, unveiling a plan to retire all of its 5GW of coal-fired capacity by 2040, as well as a schedule to retire the first 1GW by 2024 (see Figure 9).

Existing/Planned Certificate Systems:

As per the NCRE Law, any NCRE plant that has been connected to the SING or SIC after the 1st of January of 2007 or has increased its installed capacity from that date is entitled to receive "NCRE Attributes" for its generation.

The National Electricity Coordinator (NEC), specifically the Directorate of Tolls, is responsible by law to manage a public registry available on the NEC website with all the information required to certify the compliance of the NCRE laws. It also prepares a monthly report that includes NCRE injections and energy withdrawals for each generation company. However, the most important is the Annual NCRE Balance Report that is prepared following the Exent Resolution Nº 1278 requirements. This report comprises a summary of the NCRE injections, withdrawals and obligations per generator. The NCRE obligations are informed before the 10th of January of each year through declarations signed by each generator. The NEC can verify such information using the data collected monthly from the meters used as base for the issuance of the Monthly Energy Balance Report.

The NCRE law and its regulations (Decree 29/2014) define the operation framework of the NCRE Attributes. It is important to mention that the NCRE Attributes surplus storage and obligations for one calendar year is allowable.

Therefore, Chile has created a verifiable mechanism to count NCRE Attributes under the NCRE Law and its regulations. It has also set a good market base for tradable Renewable Energy Certificates or NCRE Attributes.

YTD GWh	Ene-16	Feb-16	Mar-16	Abr-16	May-16	Jun-16	Jul-16	Ago-16	Sept-16	Oct-16	Nov-16	Dic-16
Obligation	254	499	762	1.009	1.273	1.534	1.797	2.058	2.303	2.547	2.793	3.045
NCRE generation	540	1.083	1.623	2.176	2.664	3.212	3.824	4.596	5.338	6.197	6.972	7.841

Source: Monthly NCRE December 2016 Report CDEC-SIC

IRECs and NCRE Attributes- avoiding the double counting:

The purpose of the NCRE attributes is to be used by generators to prove before the Authority that they are generating certain percentage of NCRE according to the NCRE regulation.

The IREC certificates purpose is used to prove the origin of the electricity used by consumers.

There are two instruments that goes to two different markets, generation and consumption.

The I-REC Standard is fully operational in the country on a voluntary basis. The local issuer is Bolsa del Clima de Santiago SCX.

RE market potential:

Chile has over the last decade begun to capitalize on other domestic resources, namely gusty coastal winds, strong desert sun, and plate tectonic conditions that have made geothermal power-generation viable in some areas.

The Atacama Desert in the north receives some of the strongest, most consistent sunshine on Earth and has seen substantial solar project development. The SING is home to a quarter of the country's total generating capacity, largely serving mining operations in the region

Chile has built a strong enabling framework as defined by a series of effective policies and relative overall economic stability. It is also home to a more significant manufacturing value chain for clean energy components than many other developing countries.

ACCIONA has two new PV plants and two wind farms under construction with a total capacity of around 400 MW,

From 2019 to 2050, Chile's power system more than doubles in size, from 24GW to 59GW installed capacity

Market risks and challenges:

Slower-than-anticipated demand growth coupled with an increase of approximately 50% in new power-generating capacity in the past decade has not just depressed power prices in Chile, it has also caused curtailment of generation for some clean energy projects.

Large hydro is struggling to grow because of a lack of social license for large hydro plants, environmental concerns, project complexity and site limitations, very long project development lead times and increasing cost competition from wind and PV limit prospects for growth in this study.

Extent of Engagement with Government:

I-REC representatives have worked in different areas with authorities from the Ministry of Energy and the NEC.

- People from the Ministry have participated as speakers in the I-REC workshop.
- I-REC has been invited to participate in the Green Certificate Roundtable organized by the government.
- I-REC is collaborating with NEC on the assessment of the creation of a tracking platform of renewable energy.

Expected response from Government:

The current Government has been very supportive of the development of the renewable energy market. They have launched the Energy 2050 strategy that sets a goal of reaching up to 70% of renewables by 2050.

Current Environmental Reporting in Energy:

Most of the associations involved in the electricity market have their own reports, most of them based on data provided by the CNE or the NEC (former CDEC-SIC and CDEC-SING).

CNE Information Platform- Open Energy

NEC Reports and Documents (CDEC-SIC and CDEC-SING)

The Newsletter of the Asociación Chilena De Energías Renovables (ACERA www.acera.cl) - the association of all organizations promoting Non-Conventional Renewable Energy, uniting companies all generation technologies.

Monthly Electricity Report issued by the Generators Association

Monthly Electric Report issued by the Association of Electricity Companies
Any other Relevant Information:

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1) Non-Conventional Renewable Energy includes generation from all type of renewable sources except for hydroelectric with plants with capacity lower than 20MW. If a hydroelectrical plant has installed capacity between 20 and 40MW then a portion of its generation will be considered as NCRE following an algorithm defined in the Law 20.257.
2) Based on Central Energia website (http://www.centralenergia.cl/en/electric-market-regulation-chile/)
3) Source: 2015 Energy Statistical Yearbook Chile, Chilean National Energy Commission (CNE as in Spanish)
4) UTM: Unidad Tributaria Mensual. 1 UTM is equivalent to US$72 approx.
5) At first the RoW Registry shall serve as Chilean Registry but the ideal case will be to set up a local Registry in Chile.