Solar Energy in Chile
Paola Hartung

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ACERA was created in 2003 to promote the use of Non-Conventional Renewable Energy (NCRE) in the Chilean Energy mix.

- Represents all NCRE and Energy Storage Technologies

- More than 135 companies participating in the whole value chain of NCRE
Chilean Association for Renewable Energy and Energy Storage
Why investing in Solar Energy in Chile?

1st in Innovation in Latin America and the Caribbean (Global Innovation Index 2016)

11th largest recipient of foreign direct investment (UNCTAD World Investment Report 2015)

21th among best placed economies in Transparency (International’s Corruption Perceptions Index 2014)

26th Place out of 60 most talented economies (WEF Global Talent Index 2015)

33th Place out of 144 economies in Competitiveness

6th among best countries to be a social entrepreneur (Thompson Reuters Foundation – 2016)

18th in Dynamic Entrepreneurship Globally (Global Innovation Index 2016)

25 Double Taxation Agreements

30 Place out of 60 most talented economies

21th among best placed economies in Latin America and the Caribbean (Global Innovation Index 2016)

Source: Corfo 2017

Source: Corfo 2017
Solar radiation world map

https://solargis.info/imaps/#_ga=2.22847931.1866160590.1559686358-1075290181.1559686358
Estimation of Economic Feasible Capacity

\[\approx 1.300 \text{ GW}\]

Source: Energías renovables en Chile, Ministerio de Energía 2014.
Non-conventional Renewable Energy
Total Installed Capacity – May 2020

- **LARGE HYDRO**: 6233 MW (24.2%)
- **THERMOELECTRIC**: 25.764 MW (50.4%)
- **NCRE**: 6486 MW (25.2%)
- **BESS**: 54 MW (0.21%)

![Pie chart and bar chart showing the breakdown of total installed capacity for non-conventional renewable energy sources as of May 2020.](attachment:image.png)
Non-conventional renewable energy share – May 2020
## Pipeline – May 2020

<table>
<thead>
<tr>
<th>Tecnología</th>
<th>Under Construction [MW]</th>
<th>Approved [MW]</th>
<th>Submitted for approval [MW]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biogas</td>
<td>5</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>Biomass</td>
<td>166</td>
<td>149</td>
<td>30</td>
</tr>
<tr>
<td>Wind</td>
<td>1.634</td>
<td>4.719</td>
<td>3.820</td>
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<tr>
<td>Run-of-River</td>
<td>33</td>
<td>70</td>
<td>-</td>
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<tr>
<td>Mini Hidráulica Pasada</td>
<td>93</td>
<td>290</td>
<td>58</td>
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<tr>
<td>Photovoltaics</td>
<td>3.080</td>
<td>12.368</td>
<td>11.747</td>
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<tr>
<td>CSP</td>
<td>-</td>
<td>2.192</td>
<td>1.200</td>
</tr>
<tr>
<td>Pumped Hydro</td>
<td>-</td>
<td>300</td>
<td>-</td>
</tr>
<tr>
<td>BESS</td>
<td>-</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5.010</strong></td>
<td><strong>20.102</strong></td>
<td><strong>16.863</strong></td>
</tr>
</tbody>
</table>
Regulatory Framework

2005

Supreme Decret 244
- GX < 9 MW has the option of: Auto dispatch and Stabilized Price
- Release of Transmission tolls up to 9MW (reduction of payment between 9MW and 20MW)

2008

Law 20.257
Electricity companies must prove that 10% of their withdrawals to supply contracts will be injected by NCRE by 2024

2012

Law 20.715 (Netbilling) Residential Generation
It enables Regulated Clients to generate energy with their own sources up to 100 kW.

2013

Law 20.698 (20/25)
Electricity companies must prove that 20% of their withdrawals to supply contracts will be injected by NCRE by 2025 (it goes up from 10 to 20%)

2015

Law 20.805 (Tenders)
- It establishes that the Regulator (CNE) will design regulated supply tenders in accordance with diversification criteria.
- Latest Tenders with hourly and seasonal blocks.

2016

Law 20.936 (Transmission)
Define:
- Energy Storage Systems (ESS)
- Renewable Energy Development Poles
- Transmission Planning with gaps to facilitate greater NCRE offer

2019

Coal Phase Out
- Historic voluntary coal plant retirement agreement between the government and private companies.
- It is agreed to retire around 1,300 MW of coal units from the system before 2025
- Recognition of additional capacity payments to NCRE units that have ESS behind the meter.

2020

Capacity Payment Storage in Gx

Chile Decarbonization Process Policies

Ejes de la Ruta Energética

10 MEGA COMPROMISOS

9. Iniciar el proceso de descarbonización de la matriz energética a través de la elaboración de un cronograma de retiro o reconversión de centrales a carbón, y la introducción de medidas concretas en electromovilidad.

Retiro Centrales 13%

Edificación Sostenible 17%

Eficiencia Energética 7%

Hidrógeno 21%

Electromovilidad 17%
Chile Decarbonization Process
Chilean Coal Phase-Out

Primera fase: 1.383 MW

Tocopilla
Central: Tocopilla U12
Empresa: Engie
Potencia: 85 (MW)
P. Servicio: 1983
Retiro: Jun 2019

Iquique
Central: Tarapacá
Empresa: Enel
Potencia: 158 (MW)
P. Servicio: 1999
Retiro: Dic 2019

Tocopilla
Central: Tocopilla U14
Empresa: Engie
Potencia: 136 (MW)
P. Servicio: 1987
Retiro: Ene 2022

Puchuncaví
Central: Ventanas U2
Empresa: Aes Gener
Potencia: 208 (MW)
P. Servicio: 1977
Retiro: Dic 2022

Mejillones
Central: CTM1
Empresa: Engie
Potencia: 162
P. Servicio: 1996
Retiro: Dic 2024

Tocopilla
Central: Tocopilla U13
Empresa: Engie
Potencia: 86 (MW)
P. Servicio: 1985
Retiro: Jun 2019

Puchuncaví
Central: Ventanas U1
Empresa: Aes Gener
Potencia: 114 (MW)
P. Servicio: 1964
Retiro: Dic 2020

Tocopilla
Central: Tocopilla U15
Empresa: Engie
Potencia: 132 (MW)
P. Servicio: 1989
Retiro: Ene 2022

Coronel
Central: Bocamina U1
Empresa: Enel
Potencia: 128 (MW)
P. Servicio: 1969
Retiro: Dic 2023

Mejillones
Central: CTM2
Empresa: Engie
Potencia: 172
P. Servicio: 1996
Retiro: Dic 2024

Fuente: Ministerio de Energía

Actualización a diciembre 2019
• Normal Gx Expansion Plan 15 GW aprox. In Chile only NCRE tech

• Decarbonization process requires 6 GW of additional new NCRE Capacity

• USD 20.000 Million for 2020-2040 Investment in Gx + Tx adequacy
Ongoing Challenges

- Climate Change
  - 100% NCRE by 2030-2040?
  - Consolidate Storage as 24/7 PV Tool
  - Carbon pricing schemes
  - Transmission expansion planning criteria, consolidate Storage as a Tx Asset
  - Role of Distributed Generation
  - Other Operational Improvements to manage 100% NCRE

- Community Empowerment

- Digitalization of the Industry
THANK YOU- GRACIAS

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WATCH VIDEO HERE

*2017