Unlocking Sunbelt Countries´ Solar Potential

Chile: a bright present and a great potential

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Executive Director

Oh sol,
cristal paterno,
horario
y poderío,
progenitor planeta,
gigante
rosa rubia
siempre
hirviendo de fuego,

Pablo Neruda, Premio Nobel 1971

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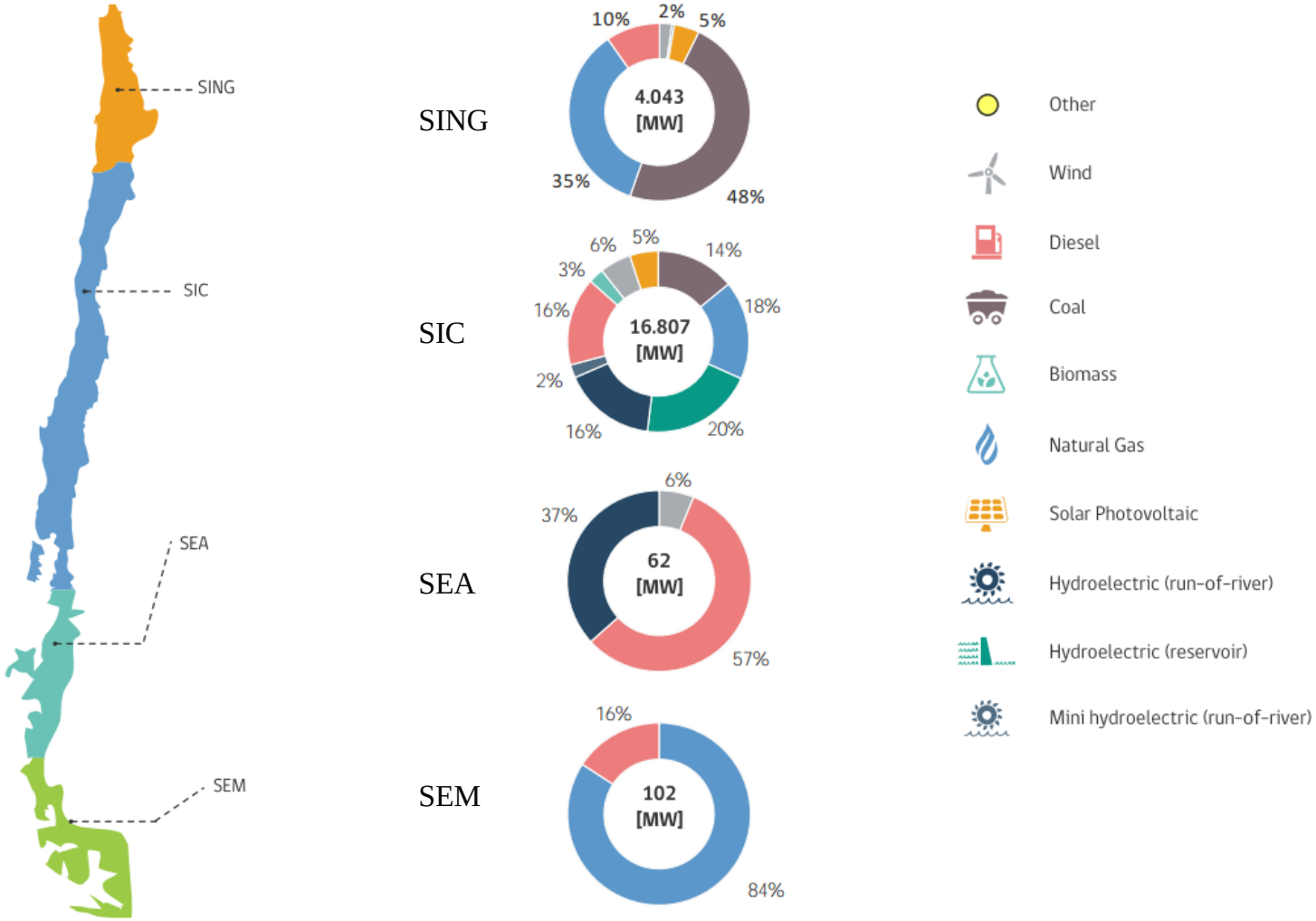
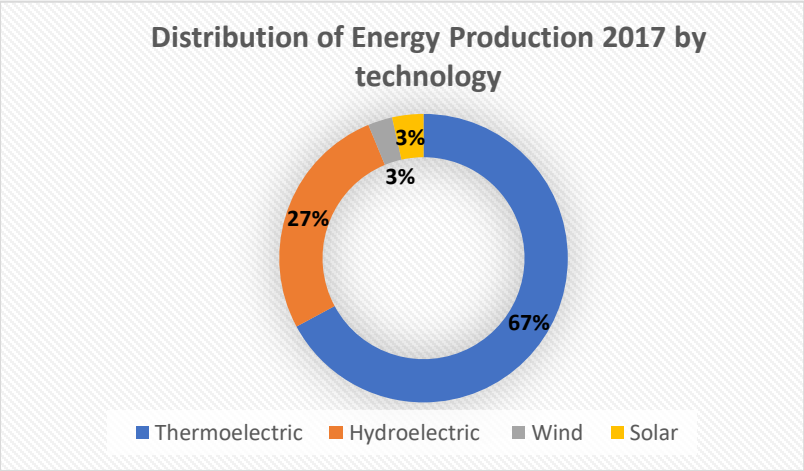
Chilean power system



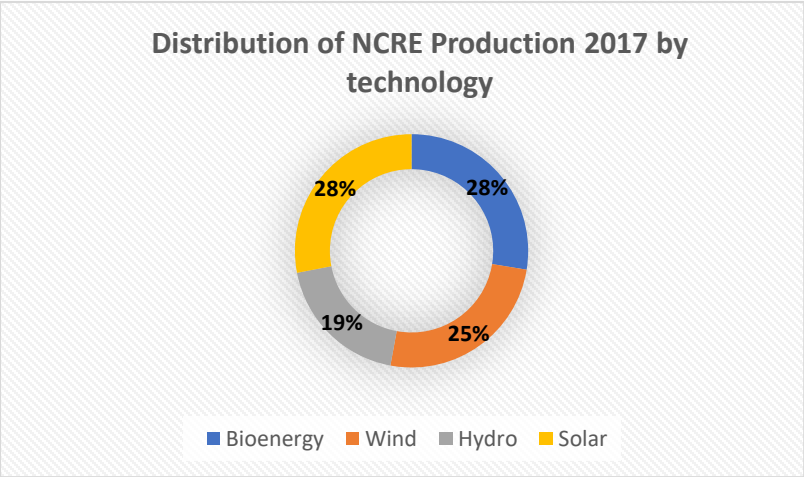
Source: CDECSIC, CDEC-SING and CNE
Date: December 2016

Facts and figures of Chile´s power sector.

Technology	2017 Production (GWh)
Thermoelectric	49094
Hydroelectric	19463
Wind	2005
Solar	2563
Total	**73125**



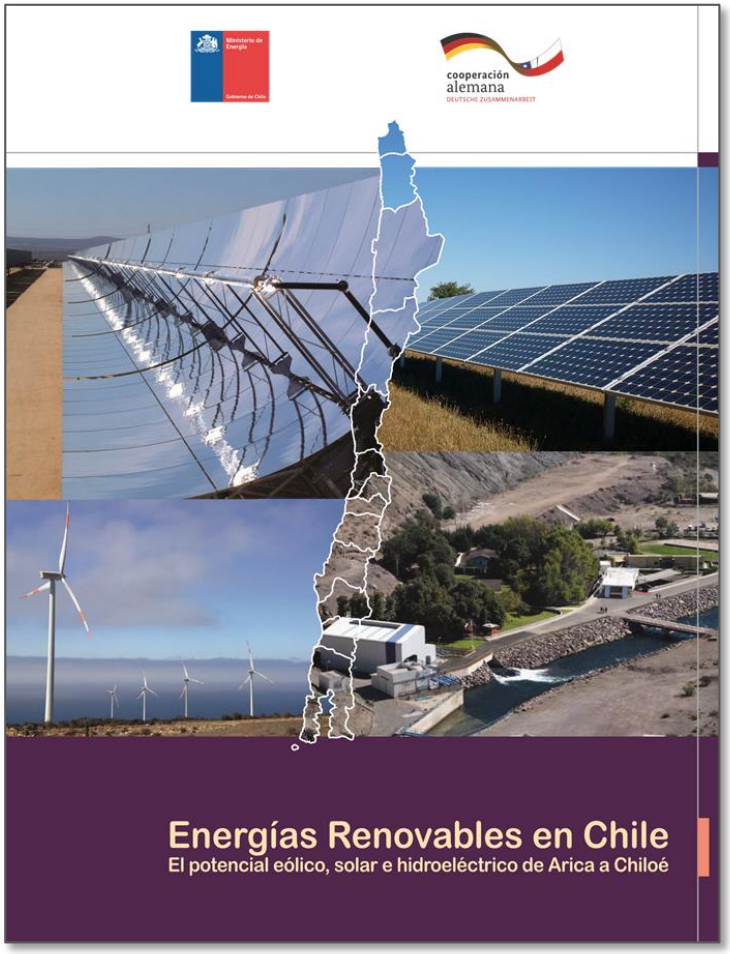
NCRE Technology	2017 Production (GWh)
Bioenergy	2525
Wind	2317
Hydro	1746
Solar	2564
Total	**9151**



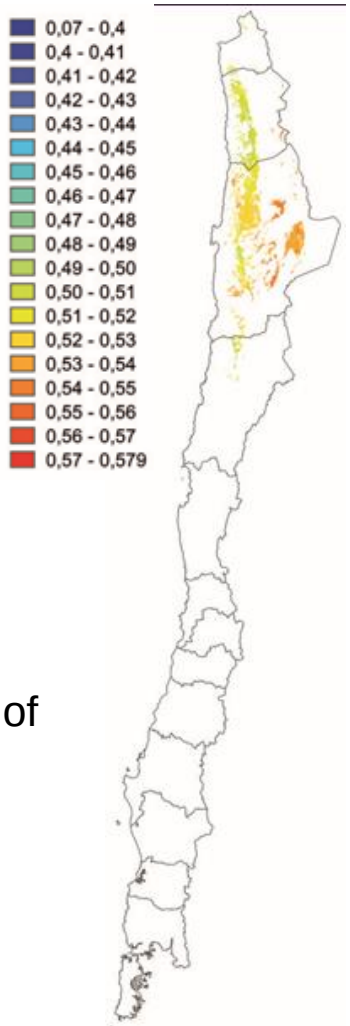
Regulatory overview

- The energy sector regulations are based in the Energy Policy.
- Access to the power generation market is open and new generation is developed by private companies, with no central planning.
- Objectives of the policy are directed to obtain competitive, secure, sustainable and inclusive power supply.
- No subsidies nor feed-in tariffs are available for generation.

Estimated CSP Potential



Region	Available Potential CSP (MW)	Available Potential CSP f.p.
De Arica y Parinacota	6.311	0,51
De Tarapacá	136.085	0,51
De Antofagasta	390.476	0,53
De Atacama	15.607	0,51
Total	**548.479**	**0,52**



CSP potential was estimated mainly by:

- Mapping the radiation level.
- Finding suitable land for power plant of 50 MW or more

Status of CSP in Chile - Projects

- Projects under environmental qualification

Project's Name	Holder	Power (MW)	State
Planta de Concentración Solar de Potencia Likana Solar	Likana Solar SpA (Solar Reserve)	450	Under qualification
Planta de Concentración Solar de Potencia Tamarugal Solar	SolarReserve Chile Ltda (Solar Reserve)	450	Under qualification
FOTOELECTRICIDAD EL LOA	ANDES GREEN ENERGY SPA	300	Under qualification
Trébol Solar Copiapó	Abengoa Solar Chile SpA.	315	Under qualification
		1515	

- Projects approved by environmental authority

Project's Name	Holder	Power (MW)	State
Planta Solar CEME1	CEME1 SpA	70	Approved
Proyecto Planta Termosolar Camarones	ELECNOR Chile S.A.	105	Approved
Planta Solar Atacama 2 CSP	Abengoa Solar Chile SpA.	110	Approved
Planta de Concentración Solar de Potencia Copiapó Solar	Copiapó Energía Solar SpA (Solar Reserve)	240	Approved
Planta Termosolar María Elena	Ibereólica Solar Atacama S.A.	400	Approved
Planta Termosolar Pedro de Valdivia	Ibereólica Solar Atacama S.A.	360	Approved
Planta Termo Solar para Calentamiento de Soluciones	Minera Centinela	7	Approved
		1292	

- Projects under construction

Project's Name	Holder	Power (MW)	State
(Atacama I) “PLANTA SOLAR CERRO DOMINADOR”	Abengoa Solar Chile S.A	**110**	Under Construction

Cerro Dominador solar complex

- Owned by EIG and being built by Abengoa.
- It comprises a 100 MW photovoltaic plant and a 110 MW solar thermal plant.
- Its thermal storage system gives the solar thermal plant the capacity to generate energy during the 24 hours

Cerro Dominador solar complex

- The project was awarded with blocks of 24 hours in the power tender of 2014.
- The project is in the stage of resumption of works.
- In the first instance, the photovoltaic plant will be completed. It is expected to start operating during 2017.
- Subsequently, the completion of the CSP will continue.
- Total investment of the project is more than 1.000 million dollars

Status of CSP in Chile: Market

- CSP projects have participated in energy tenders for distribution companies:
  - Abengoa (Tender 2015-02)
    - Won a contract for 38,8 GWh/yr at a price of 97 US$ MW/h
    - Weighted average price of the tender was 79,3 US$/MWh
  - Solar Reserve (Tender 2015-01)
    - Offered 67,86 USD/MWh for 8.360 GWh/yr
    - Didn´t win energy blocks
    - Offer was 5,97 US$/MWh, below the average of LNG and coal offers.
    - Weighted average price of the contracts that were awarded was 47,6 US$/MWh

Policy related matters

PROGRAMA
ENERGÍA SOLAR

SOLAR TECHNOLOGY CENTER

The main purpose of this project is to strengthen our technology infrastructure and human capital to develop solar technology programs, which will consider the following lines:

MAIN LINES

DESERT PV SYSTEMS

Development of PV components suited for extreme desert conditions

MOLTEN SALTS FOR CSP

Use of minerals like Lithium to test new molten salts for CSP technologies

SOLAR METALLURGY

Development of technological applications to intensify the use of solar energy in metallurgy processes

FUELS

Test of technologies to produce fuels using PV electricity or concentrated solar energy

STC’s main roles

R&D: simulation systems and technology services, development of small-scale prototypes and testing of new materials and technologies

Industry services: product pilot programs, monitoring and certification systems.

Transfer and sale of technology: sale and licensing of technologies and materials.

Creation of spin-offs and design of business models.

Generation of information for the drafting of policies for the development, regulation and strengthening of Chile’s solar power industry.

PROGRAMA
ENERGÍA SOLAR

DESERT MODULE

& SYSTEM TECHNOLOGY PROGRAM

The DMSTP is one of the Solar Road Map initiatives that brings together the government, and national and international companies and technology centers in a partnership to implement a portfolio of R&D&I projects to develop photovoltaic systems created specifically for desert conditions.

DMSTP
OBJECTIVES

- To adapt and/or develop new materials, components and O&M services for photovoltaic systems.
- To ensure their durability and performance under desert climate conditions.
- To contribute to the installation of technological capabilities and to foster the creation of a national business ecosystem for the solar power industry in partnership with international companies.

PROGRAMA ENERGÍA SOLAR

EXPECTED RESULTS

Development of the Desert Module (DEMO) in 4 versions showing growing efficiency and durability.

Technology baselines for the drafting of standards and the creation of compliance evaluation systems for photovoltaic technologies under desert conditions.

Specialized services for the operation and maintenance of these systems.

Development of BoS technology innovations, including component integration, assembly systems, and power inverters.

Reinforced R&D infrastructure and a team of 20 researchers (engineers, MSc and PhD holders) with research skills and inserted into international innovation networks.

PROGRAMA
ENERGÍA SOLAR

SOLAR

TECHNOLOGY DISTRICT

- MEGA SOLAR POWER STATION (750 MW- 1GW)
- TECHNOLOGICAL MIX
- SUPPLY QUALITY (~ 24/7)

COMPONENTS

INDUSTRIAL DEVELOPMENT

In cooperation with GIZ and DLR a mapping of the selected technologies value chain will be made, a survey of local businesses gaps will be held and a competitive development strategy will be defined.

SITE DEVELOPMENT

Development of optimal sites based in its technical characteristics, baselines, electric infrastructure, fitting out perimeter closures and interior roads, concession tendering and granting to generators.

FINANCING

Financing opportunities through Climate Change Funds.

ENERGY SUPPLY

Management with free clients (mining industry) and analysis of opportunities within the next Electrical Bids.

PROGRAMA ENERGÍA SOLAR

STD EXPECTED IMPACTS

TOTAL INVESTMENT

4,000

MM US$

EMPLOYMENT

3,000

direct employment during construction

300

direct employment during operation

~12,000

indirect employment over its life cycle

EMISSIONS REDUCTION

1,000,000

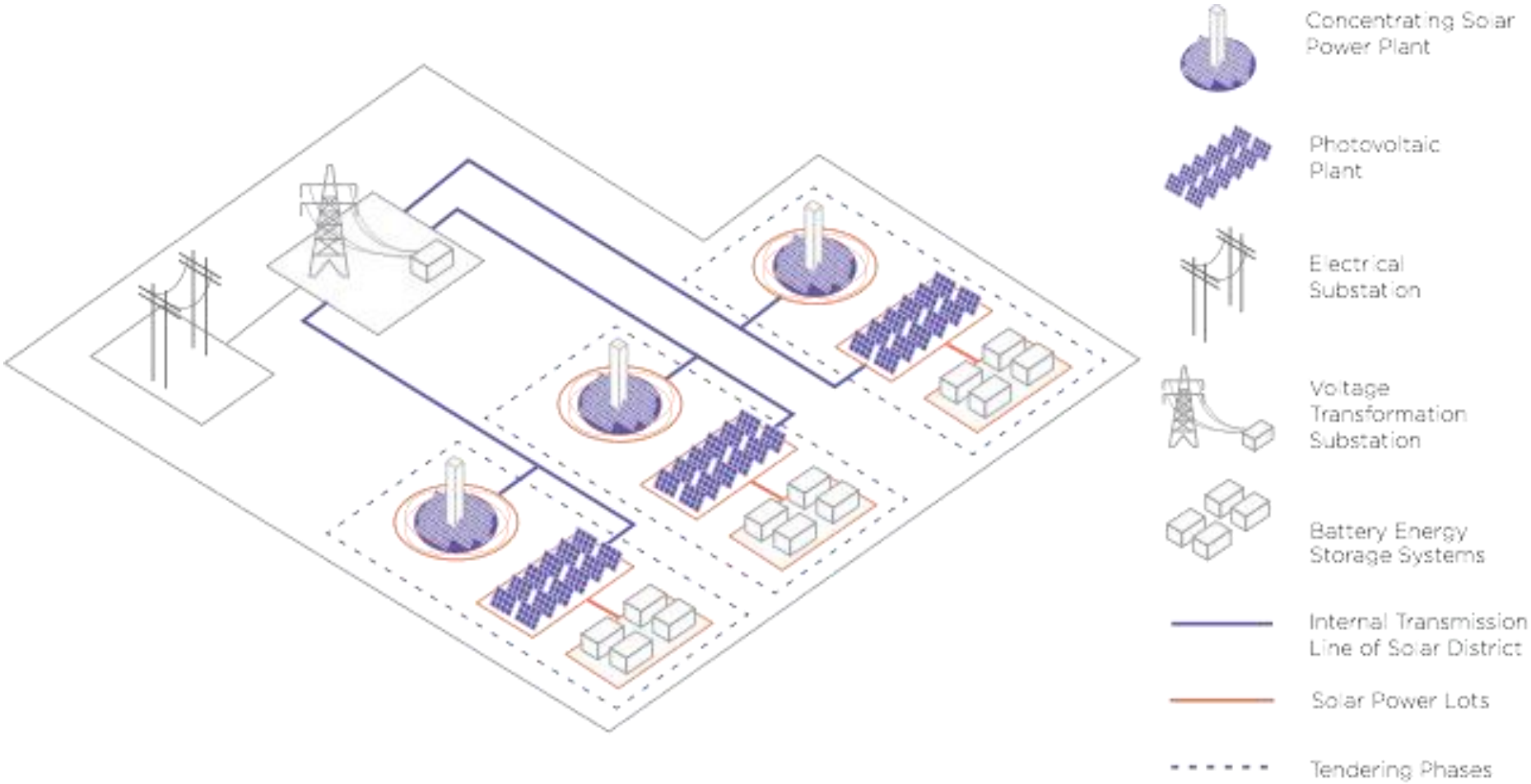
TON CO2 EQ. (REF. COAL)

600,000

TON CO2 EQ. (REF. NG)

PROGRAMA
ENERGÍA SOLAR

CONCEPT



If you want to know more about the Solar programs, please contact

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Resources available from ACERA

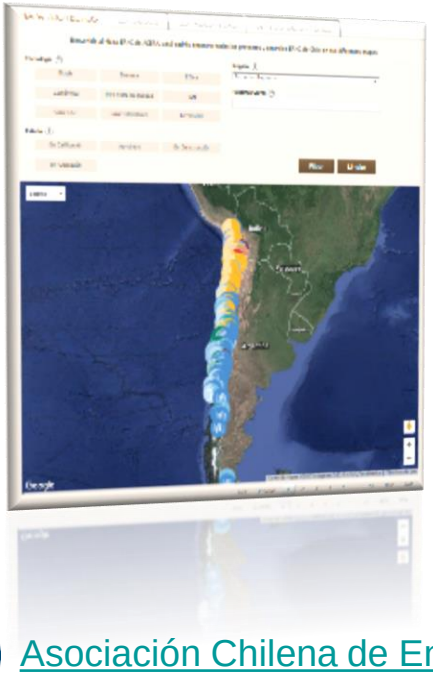
Web

informaciones@acera.cl

Newsletter

@ACERAAG

Mapa de Proyectos



Asociación Chilena de Energías Renovables, ACERA AG.

¡Gracias!

Carlos Finat D.

Director Ejecutivo ACERA

- Ingeniero Civil Electricista
- Director de Operación y Peajes del CDEC-SING -- 1999 – 2008
- Gerente de Energía – Minera Collahuasi -- 2008 – 2012
- Representante de clientes libres en el Directorio del CDEC-SING -- 2010 – 2012
- Presidente del CDEC-SING -- 2011-2012
- Director Ejecutivo de ACERA desde Octubre de 2012