

# GET ON THE GRID WITH RENEWABLE ENERGY OPPORTUNITIES

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CHILE & ARGENTINA

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Business Sweden, South America



# RENEWABLE ENERGY IS BOOMING IN SOUTH AMERICA

## ARGENTINA AND CHILE ARE SETTING AMBITIOUS GOALS FOR THE NEXT YEARS



# 20%

 goal for renewable energy generation in **Chile** and **Argentina** by 2025

- ▶ Argentina and Chile intend to become less dependent on conventional thermal sources such as diesel and natural gas
- ▶ Argentina expects investments of more than 5 BUSD in renewable energy by 2025
- ▶ Solar energy is competitive in Chile without government subsidies. Solar generation capacity grew almost 400% in 3 years
- ▶ New energy tenders are coming out

# AGENDA

- ▶ Argentina's energy sector overview
- ▶ Chile's energy sector overview
- ▶ Opportunities and challenges



# ARGENTINA'S NEW GOVERNMENT IS SEEKING TO DEVELOP ITS ENERGY SECTOR



## ARGENTINA

Government	Presidential Republic
President	Mauricio Macri
Population	43.4 million
GDP 2015	585.6 BUSD
GDP per capita	13 500 USD
Energy generation capacity	32 GW
Energy generation market	72% private (fragmented)
Energy transmission market	100% private (Transener)
Energy distribution market	75% private (Edesur, Edenor, Edelpap)

## BACKGROUND

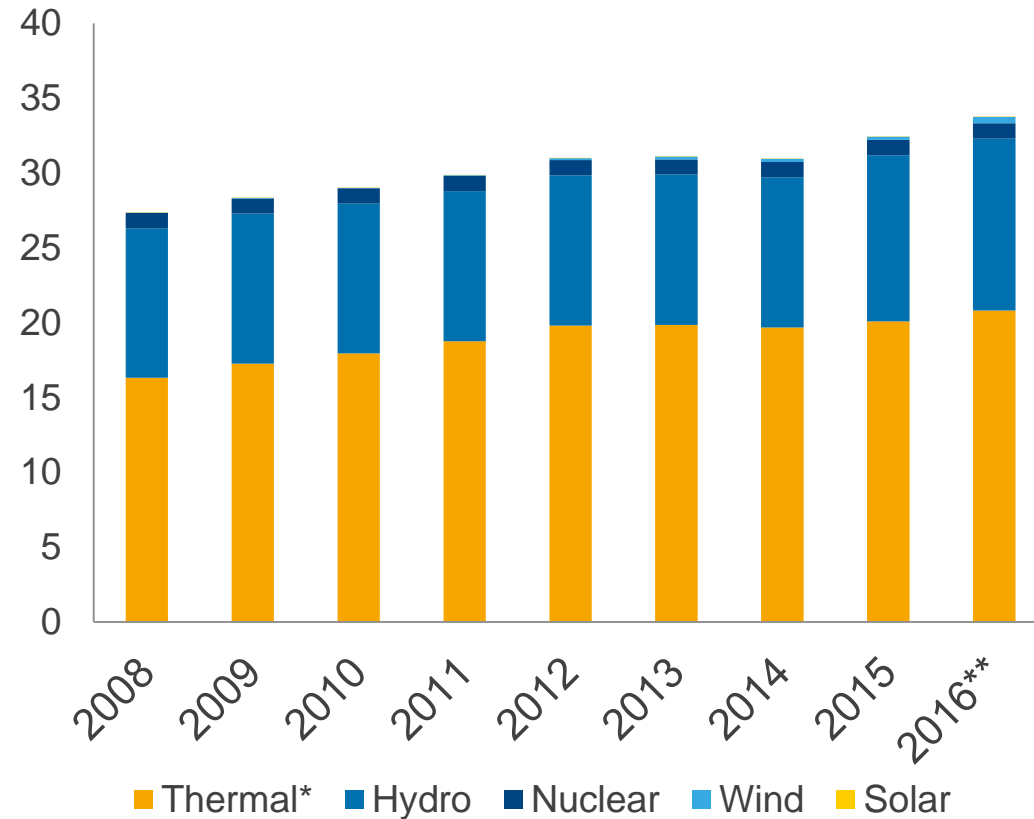
- ▶ Argentina's new government has been ambitious in establishing a reform plan to attract foreign investment to the country, simultaneously abolishing various protectionist barriers such as exchange controls, restrictions on withdrawals of earned income and dividends, as well as restrictions on the imports of capital goods
- ▶ President Mauricio Macri is turning to foreign investors in order to develop the Argentinian infrastructure
- ▶ In the energy sector there is the need for investment in order to decrease the reliance on fossil fuels for generation (67%), increase energy supply and reduce energy tariffs. Renewable sources represent only 2% of Argentina's matrix\*
- ▶ The government has increased the goal for the share of renewable energy in total capacity from 2% to 8% by December 2017 and to 20% by December 2025
- ▶ Ministry of Energy and Mining's (MINEM) program RenovAr has recently announced tenders to increase generation by 1 000 MW from sources such as wind and solar

\*NOT INCLUDING LARGE HYDROELECTRIC PLANTS



# ARGENTINA NEEDS TO DEVELOP RENEWABLE ENERGY SOURCES TO COMPLY WITH GOALS

ARGENTINA'S ENERGY GENERATION CAPACITY, BY SOURCE



Source	Current Capacity 2015 (MW)	Share of matrix 2015	CAGR 2008-2015
Solar	8	0,1%	128%
Wind	215	0,7%	34%
Nuclear	1 018	3,2%	0%
Hydro	11 108	34%	2%
Thermal*	20 083	62%	3%
Total	32 432	100 %	2%

FOSSIL FREE SOURCES SUCH AS SOLAR AND WIND ARE GAINING GROUND IN ARGENTINA'S MATRIX

SOURCE: ARGENTINA'S MINISTRY OF ENERGY AND MINING

\* THERMAL GENERATION TRANSFORMS HEAT ENERGY FROM THE COMBUSTION OF FUELS INTO ELECTRICITY. FUELS CAN BE FOSSIL SUCH AS OIL DERIVATIVES, DIESEL, NATURAL GAS AND COAL, AS WELL AS RENEWABLE SUCH AS BIOMASS AND BIOGAS. \*\* FORECAST



# GOVERNMENT EXPECTS INVESTMENTS OF 5 BUSD IN RENEWABLE ENERGY BY 2025

Source	In Operation (MW)	RenovAr Tender (MW)
Wind	215	600
Solar	8	300
Biomass	720	65
Small Hydro	400	20
Biogas	15	15
Total	1 358	1 000

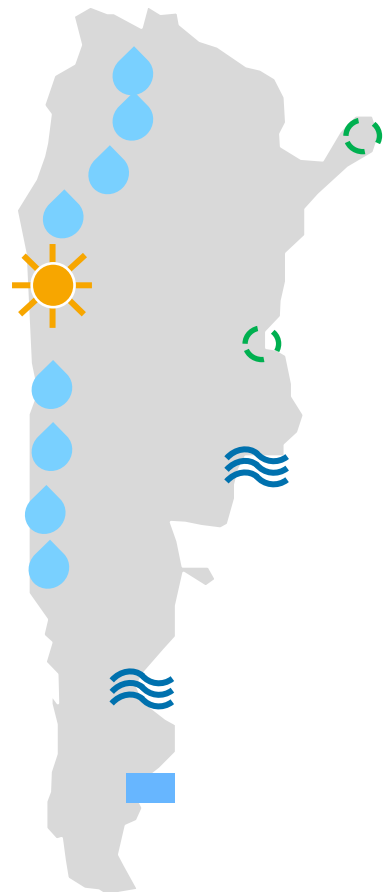
- ▶ Law 27.191 establishes a goal that 8% of energy capacity needs to come from renewable sources by December 2017. Currently, the share of renewable energy in the matrix is around 2%
- ▶ The RenovAr Program will raise renewable energy share to approximately 3% by adding 1 000 MW of renewable energy to the generation capacity. The government expects this will require an investment of around 1.7 BUSD
- ▶ RenovAr will be supported by public fund Foder (Fondo Fiduciario para el Desarrollo de Energias Renovables) of approximately 400 Million USD to finance renewable energy projects
- ▶ For the goal of 20% in renewable sources by 2025, the government expects investments of 5 BUSD in new capacity
- ▶ Another key aspect of Law 27.191 is the legal requirement for heavy energy consumers (more than 300 kW) to contribute on an individual basis with the renewable energy targets by having a share of their consumption from renewable energy. Although it is not clear how those consumers should comply, they will be investing in renewable generation

## NEW PUBLIC GENERATION TENDERS ARE PUSHING FOR INVESTMENTS IN RENEWABLE SOURCES

SOURCE: CAMMESA, ARGENTINA'S MINISTRY OF ENERGY AND MINING



# HIGH POTENTIAL FOR DIFFERENT RENEWABLE ENERGY SOURCES IN ARGENTINA



Solar

- ▶ Ministry of Energy's program PERMER offers subsidies for the installation of small solar energy systems for households and smaller producers. There is also large scale potential in northwest Argentina



Wind

- ▶ Potential for wind energy in Argentina is approximately 2 000 GW, concentrated mainly in the Patagonia region. Argentinian companies such as Impsa and Invap are producing wind energy generators



Small Hydro

- ▶ Potential for small hydroelectric plants is of around 430 GW, mainly in areas such as the Northwest and Central regions along the Andes mountains



Biofuels

- ▶ Currently between 60 and 80 biogas plants, including mini-digesters, but only 20 are large installations. High potential for new plants in large urban areas, as well as agricultural areas. PROBIOMASA program stimulates new projects



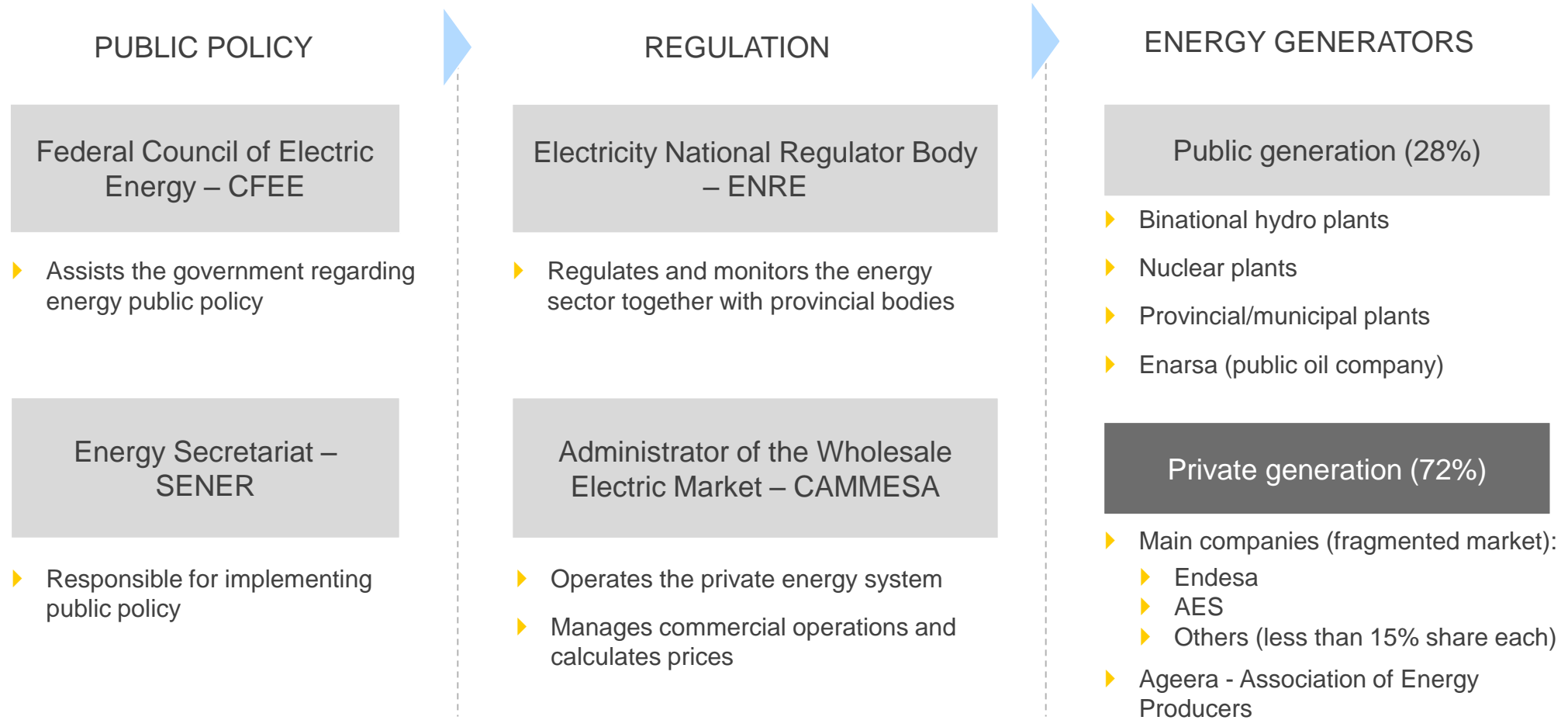
Tidal

- ▶ Argentinian oil companies are developing tidal energy studies in the Southern Argentinian coast, in the Santa Cruz province. Potential is estimated at around 40 GW

INITIAL FOCUS ON SOLAR AND WIND ENERGY; ARGENTINA ALREADY HAS A DEVELOPED WIND ENERGY INDUSTRY



# 72% OF ENERGY GENERATION CURRENTLY DONE BY PRIVATE COMPANIES IN ARGENTINA



## ENERGY GENERATION MARKET IN ARGENTINA IS FRAGMENTED





# DIFFERENT ARGENTINIAN INSTITUTIONS INFLUENCE THE AREA OF RENEWABLE ENERGIES

Secretariat of Environment and Sustainable Development - S AyDS

- ▶ Responsible for the implementation and management of environmental policies

National Directory of Promotion – DNPROM (SENER)

- ▶ Within the Federal Energy Secretariat (SENER), the DNPROM is a directory responsible for the design of programs and actions concerning the development of renewable energy and energy efficiency initiatives

Argentinian Network of Municipalities Against Climate Change - RAMCC

- ▶ Network for coordination of local public policies against climate change. Also offers technical support to local governments for solutions of sustainable development

Argentinian Chamber of Renewable Energy - CADER

- ▶ A non-profit association of companies within the segment of renewable energy. It facilitates dialogue between public and private segments for the development of renewable energy projects

Argentinian Association of Renewable Energy and Environment - Asades

- ▶ Association of universities, labs, NGOs and companies that push for the implementation and use of renewable energy. It was created on 1974, with a primary focus on solar energy

THE NATIONAL DIRECTORY OF PROMOTION WITHIN THE FEDERAL ENERGY SECRETARIAT PLAYS AN IMPORTANT ROLE

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# CHILE HAS BEEN SUCCESSFUL IN INTRODUCING CLEAN SOURCES TO ITS ENERGY MATRIX



## CHILE

Government	Presidential Republic
President	Michelle Bachelet
Population	18.2 million
GDP 2015	240 BUSD
GDP per capita	13 200 USD
Energy generation capacity	20 GW
Energy generation market	100% private (concentrated)
Energy transmission market	100% private (5 companies)
Energy distribution market	100% private (36 companies)

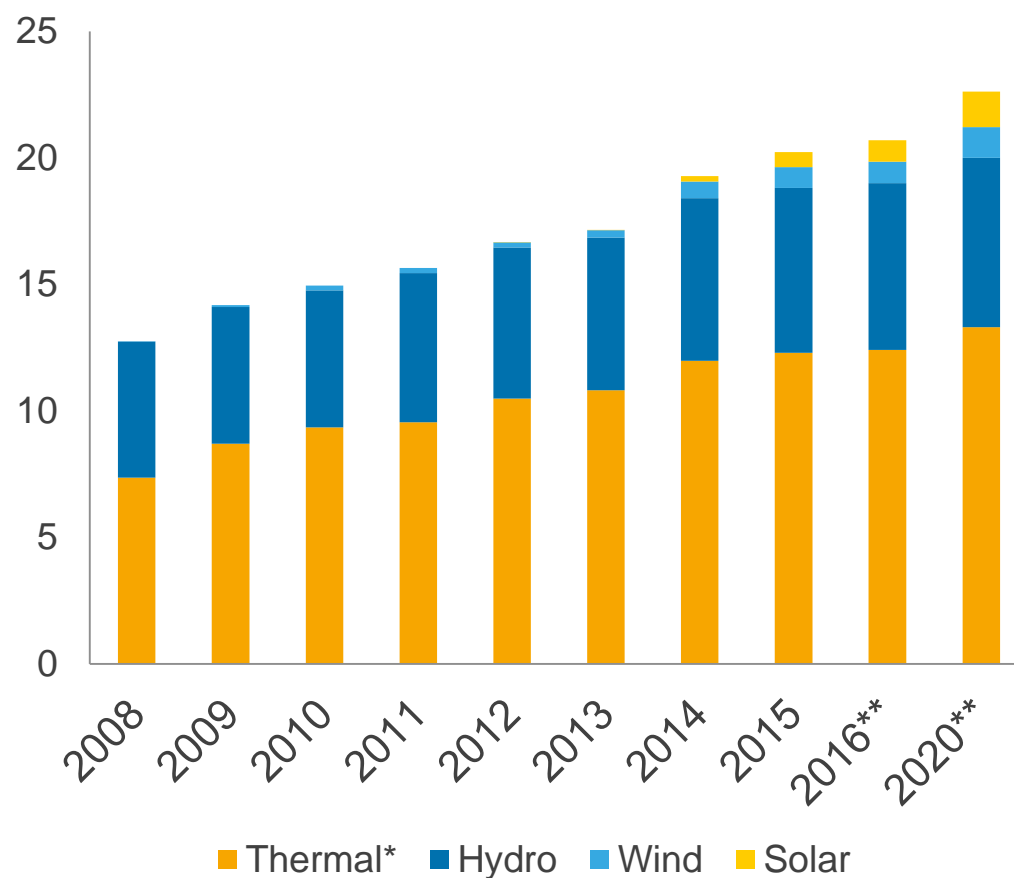
## BACKGROUND

- ▶ Chile's economy has presented consistent growth in the last decade, although it has experienced a recession in the last two years mainly due to the drop of copper prices in the international market
- ▶ Expected economy growth for 2016 is 2,5%. For 2017-2020 growth forecast is more promising, around 4% per year
- ▶ Chile's energy matrix is highly dependent on thermoelectric energy and fossil fuels. Since Chile's national fossil resources are limited, it presents a growing external dependency (70% are imported), mainly from Argentina, which also creates an exposure to price volatility
- ▶ Chile has legally established a new objective of generating 20% of its energy from non-conventional renewable energy\* (NCRE) by 2025. By 2035 this rate must reach 60% of the energy matrix, and by 2050, 70%
- ▶ In the last three years Chile has been able to effectively introduce renewable sources such as solar and wind as a relevant share of its energy generation
- ▶ Chile's grid is composed by four systems which are not yet optimally integrated: SING, SIC, Aysén and Magallanes. Currently, solar energy produced in SING (North) cannot be completely transported to SIC (Center), where 92% of Chile's population live. The integration of SIC and SING is ongoing and expected to be completed around 2018-2020

\* INCLUDING SOLAR, WIND, WAVE AND GEOTHERMAL ENERGY FROM VOLCANOES  
(DEFINITION OF NCRE SPECIFICALLY EXCLUDES LARGE HYDROELECTRIC PROJECTS)



# SOLAR AND WIND ENERGY ALREADY REPRESENT 7% OF ENERGY GENERATION CAPACITY IN CHILE



Source	Current Capacity 2015 (MW)	Share of matrix 2015	CAGR 2008-2015
Solar	600	3%	114%
Wind	822	4%	70%
Hydro	6 512	32%	3%
Thermal*	12 409	61%	8%
Total	20 343	100 %	7%

RENEWABLE SOURCES MARKET IS DEVELOPING RAPIDLY IN CHILE, BUT FOSSIL FUELS ARE STILL 60% OF MATRIX



# NEW PROJECTS WILL MULTIPLY RENEWABLE ENERGY GENERATION IN CHILE

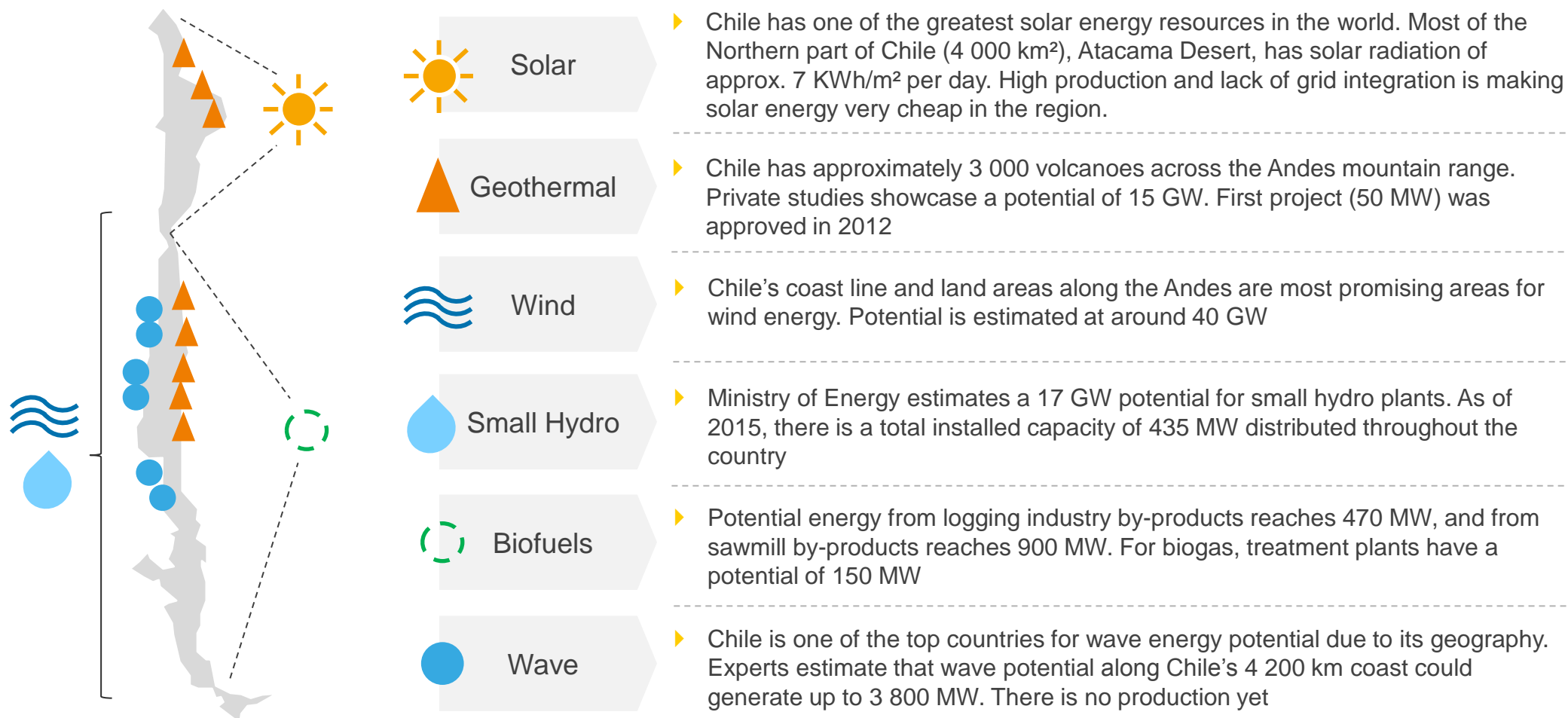
Source	In Operation (MW)	Under Construction (MW)	Approved Project (MW)	Under Approval (MW)
Solar - Photovoltaic	1 267	1 676	12 038	5 434
Solar – Concentrated Power	0	110	1 085	1 270
Wind	947	477	6 500	1 949
Small Hydro	435	25	455	95
Geothermal	0	48	120	0
Biomass	417	0	112	67
Biogas	53	0	8	0
Total	3 119	2 336	20 318	8 815

- ▶ Chile aims to have 20% of its energy generation based on NCRE\* sources by 2025, according to Law 20/25
- ▶ CORFO (Corporation of Production Promotion – Ministry of Economy) provides accessible long term credit loans for up to 5 MUSD destined to renewables projects. It also provides support in looking for potential partners and investors
- ▶ Large projects are being carried out, such as the Los Andes solar park (AES Gener), which will have 550 000 solar panels for the generation of 220 MW with an investment of 572 MUSD over 14 years, and 528 MW Loa wind park (Ibèreólica) with an investment of 932 MUSD

## SOLAR AND WIND SECTORS ARE BECOMING MORE COMPETITIVE AND ATTRACTING NEW INVESTMENTS



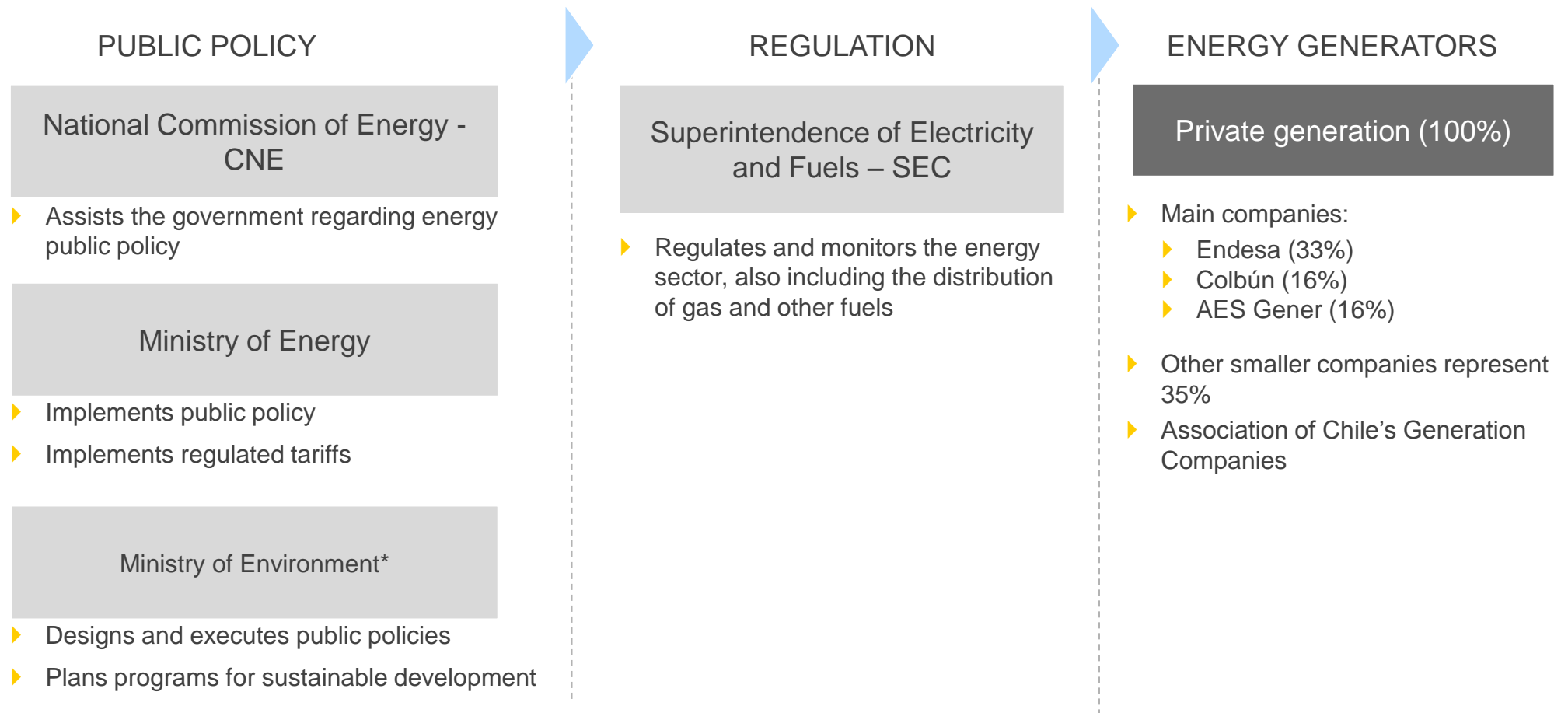
# CHILE'S GEOGRAPHY FAVORS THE GENERATION OF SOLAR AND GEOTHERMAL ENERGY



SOURCES SUCH AS BIOMASS ALSO HAVE GREAT POTENTIAL DUE TO CHILE'S FOREST INDUSTRY



# CHILE'S ENERGY SYSTEM WAS PRIVATIZED IN THE EARLY 1980



## ENERGY GENERATION SECTOR IS CONCENTRATED TO THREE MAJOR COMPANIES

\* IN 2010, THE FORMER NATIONAL COMMISSION OF THE ENVIRONMENT WAS REPLACED BY THE MINISTRY OF ENVIRONMENT

Public Institutions

Private Institutions



# IN CHILE, CORFO PROVIDES LONG TERM CREDIT LOANS FOR RENEWABLE ENERGY PROJECTS

Corporation of  
Production Promotion -  
CORFO

- ▶ Agency that promotes Chilean productivity and competitiveness through innovation and sustainable development. This institution also provides long term credit loans to renewables projects

Chilean Association of  
Renewable Energy -  
ACERA

- ▶ Association of companies that push for the promotion of non conventional renewable energies, such as solar, biomass, wind, etc.

Chilean Association of  
Solar Energy -  
ACESOL

- ▶ Association that gathers civil society and companies interested in promoting the development of solar energy in Chile



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# PUBLIC TENDER OPPORTUNITIES

## VARIED OPPORTUNITIES

### ARGENTINA

- ▶ Due to the big push to develop renewable energy projects in Argentina, The Ministry of Energy and mining has instructed CAMMESA to take charge of the tender process.
- ▶ CAMMESA – Electric Wholesale Market Administration Company: [www.cammesa.com](http://www.cammesa.com)
- ▶ The tenders are released in batches on a rolling basis from 2016 – 2025
- ▶ We recommend that Swedish companies partner with local firms if they do not have Spanish-speaking employees in their company.

### CHILE

- ▶ Chile's ambitious renewable energy plan also creates good opportunities for Swedish companies
- ▶ Whilst the main focus has been on solar and wind energy, there will be a need to diversify and strengthen other renewable energy projects in the near future.
- ▶ Public tenders are issued in batches on the following website: <http://www.licitacioneselectricas.cl/>
- ▶ Important opportunities as part of the interconnection of Peru and Chile's energy grids will also prove interesting to Swedish companies. More information will be released by the Ministry of Energy during 2017





# SWEDISH COMPANIES CAN BENEFIT FROM BUSINESS OPPORTUNITIES WITHIN RENEWABLE ENERGY

## Argentina

- ▶ 8% (2018) and 20% (2025) goals for renewable energy
- ▶ High potential for clean sources, mainly wind
- ▶ New public tenders and government incentives
- ▶ Less protectionist government, open to foreign investment
- ▶ Mostly privatized generation sector

## Argentina

- ▶ Sectors such as solar are still developing
- ▶ Energy matrix still focused on fossil fuels
- ▶ Still lower investments when compared to Chile

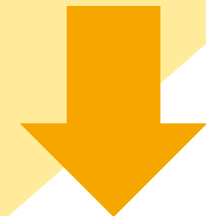


Which **opportunities** make South America interesting?

## Chile

- ▶ 20% (2025) and 70% (2050) goals for renewable energy
- ▶ Competitiveness of clean sources such as solar and wind
- ▶ New projects and investments
- ▶ High potential for other clean sources
- ▶ Totally privatized generation sector

What **challenges** should companies be ready to face?



## Chile

- ▶ Recent economic slow down
- ▶ Suboptimal interconnection of national grids
- ▶ Energy matrix still focused on fossil fuels
- ▶ Generation sector concentrated to three main companies



# CONTACT US

Business Sweden – The Swedish Trade & Invest Council  
Rosario Norte 615, Las Condes, Santiago

+56 2 2925 1900

[chile@business-sweden.se](mailto:chile@business-sweden.se)

[www.business-sweden.se/chile](http://www.business-sweden.se/chile)