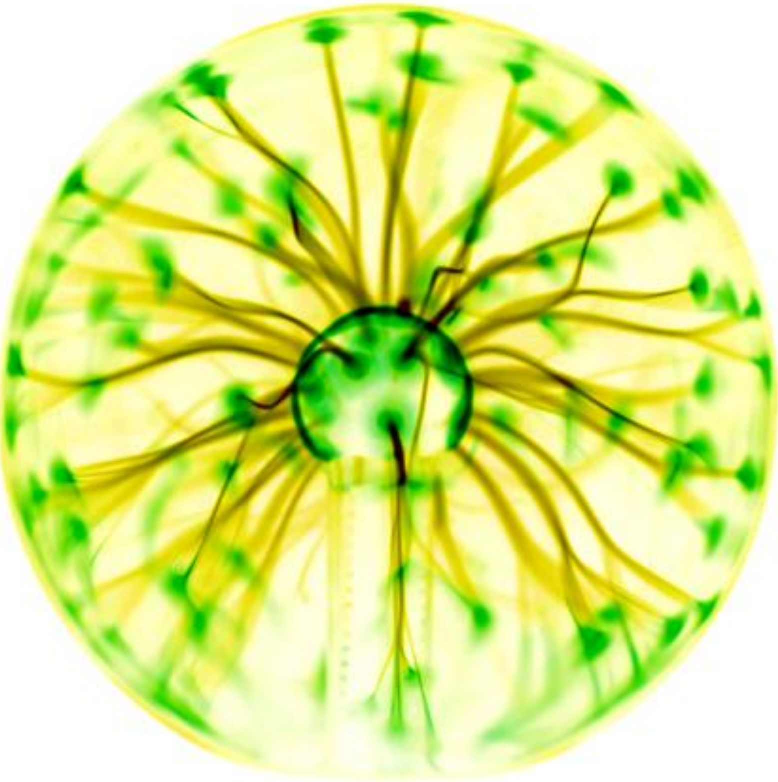
Deloitte.



Point of view

Renewable energies in Chile

November 2016

Point of view

Renewable energies in Chile

Energy sector overview (p.3)

- 19,742 MW installed capacity
- 72,175 GWh gross generation
- 40% from renewable sources

M&A transactions (p.8)

- 48 transactions of the energy sector involved Chile in the last 24 months, 20 of them were NCRE
- 90% of deals with published values were inbounds, essentially from Europe and Latam

Renewable technologies (p.4)

- Very different across regions and climates
- Central zone concentrates 55% of renewable energy vs. Northern zone 5%
- Dominated by conventional hydroelectric plants:
  - Hydroelectric dams ~45%
  - Run-of-the-river ~30%

Players (p.5)

- Operated by the private sector
- Total energy generation is highly concentrated (top3 = 70%)
- Top NCRE players challenge the established order

Legislation (p.7)

- Encourages non conventional renewable energy through toll payment exemption
- Target for participation of renewable energy sources:
  - 20% by 2025
  - 60% by 2035
  - 70% by 2050

Projects in construction (p.6)

- 51 NCRE projects under construction (3,264 MW) as of Sep-16
- NCRE represent ~50% of the total power plant projects

Overview of the energy generation in Chile

19,742 MW installed capacity and 72,175 GWh gross generation, of which 40% is produced by renewable energy technology

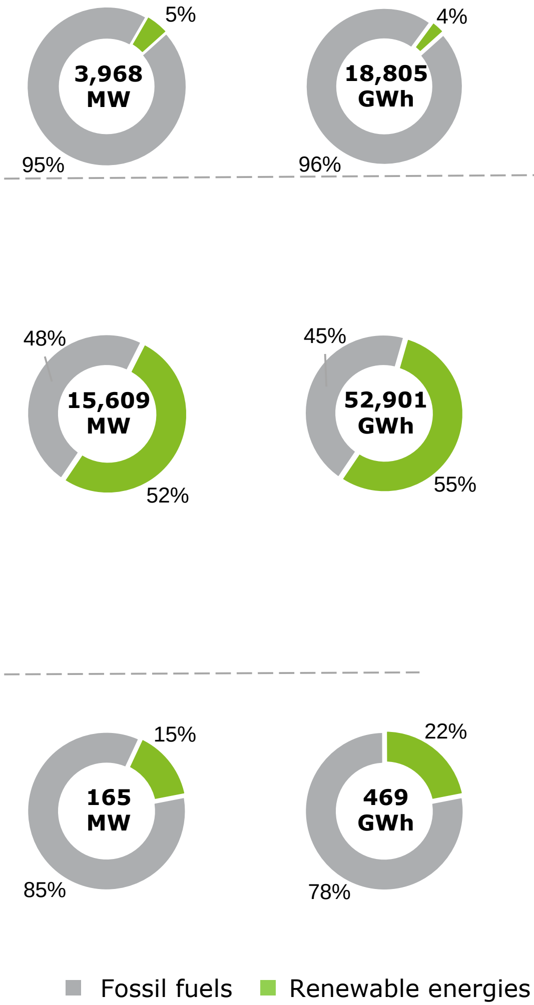
SING –
Sistema Interconectado del Norte Grande

SIC –
Sistema Interconectado Central

SSMM –
Sistemas medianos

Includes:
1.- SEA - Sistema Interconectado Aysén
2.- SEM – Sistema Interconectado Magallanes
3.- Sistema de Isla de Pascua
4.- Sistemas de Cochamó y Hornopirén

Installed capacity and gross generation



- The Chilean national electric system is divided into **several independent networks**. The main two, SING and SIC, are in process of being interconnected, to enhance energy integration with the Cono Sur countries, and an optimal use of resources.
- The electric system is operated by the **private sector, under public tender agreements** of around 30 years. Privatization begun in the 1980s, for the modernization of infrastructure and energetic efficiency.
- Chile distinguishes between:
  - the **conventional renewable energies** ("ER": hydroelectric dam and run-of-the-river power generation), which are the most widespread,
  - the **non conventional renewable energies** ("ERNC": geothermal, wind, solar, biomass technologies, among others), which are encouraged by legislation.

Source: Comisión Nacional de Energía (CNE), 2015

Renewable energy technologies in Chile

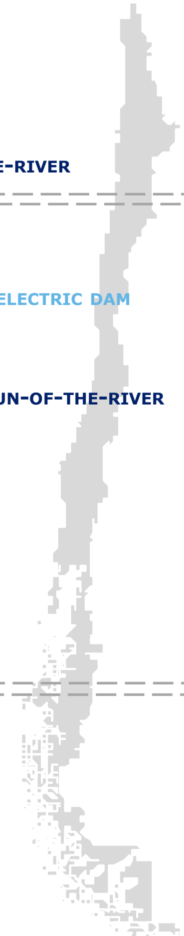
Conventional hydroelectric power stations of the central zone dominate the infrastructure, with 75% of the national capacity and generation

Installed capacity as of FY15

MW	SING	SIC	SSMM	Chile
Hydroelectric dam	-	4,058	-	4,058
Run-of-the-river	1	2,029	23	2,053
Conventional RE [1]	**1**	**6,088**	**23**	**6,111**
Wind	79	780	2	861
Solar	119	468	-	587
Biomass	-	468	-	468
Mini hydro [2]	-	312	-	312
Non conventional RE [1]	**198**	**2,029**	**2**	**2,229**
Fossil fuels	3,770	7,492	140	11,402
Total	**3,968**	**15,609**	**165**	**19,742**
Conventional RE [1]	*0.0%*	*39.0%*	*14.0%*	*31.0%*
Non conventional RE [1]	*5.0%*	*13.0%*	*1.0%*	*11.3%*
Total RE [1]	***5.0%***	***52.0%***	***15.0%***	***42.2%***

Gross generation as of FY15

GWh	SING	SIC	SSMM	Chile
Hydroelectric dam	-	12,696	-	12,696
Run-of-the-river	75	11,109	98	11,283
Conventional RE [1]	**75**	**23,805**	**98**	**23,979**
Wind	226	1,587	5	1,817
Solar	395	1,058	-	1,453
Biomass	-	2,645	-	2,645
Mini hydro [2]	-	-	-	-
Non conventional RE [1]	**621**	**5,290**	**5**	**5,915**
Fossil fuels	18,109	23,805	366	42,281
Total	**18,805**	**52,901**	**469**	**72,175**
Conventional RE [1]	*0.4%*	*45.0%*	*21.0%*	*33.2%*
Non conventional RE [1]	*3.3%*	*10.0%*	*1.0%*	*8.2%*
Total RE [1]	***3.7%***	***55.0%***	***22.0%***	***41.4%***



SING

- #1 Solar
- #2 Wind
- #3 Run-of-the-river

- **Desert climate** with **low population density** (~10%).
- Energy consumption is largely linked to heavy industries such as **mining**.

SIC

- #1 Hydroelectric dam
- #2 Run-of-the-river
- #3 Wind
- #4 Biomass
- #5 Solar
- #6 Mini hydro

- Varied climate which allows **diverse renewable sources of energy**.
- Represents **~90% of the Chilean population**, concentrated in the Santiago region.
- Energy consumption is driven by **residential and business consumers** as well as **industrial consumers**
- Annual generation is subject to the **variability of the hydrologic levels**.

SSMM

- #1 Run-of-the-river

- **Extreme weather conditions** and **difficult connections**.
- Sparsely populated.

Note: the size of the logos is proportional to the average participation of each technology in the national total of installation and generation of renewable energy ("Total RE"). All the figures <2% are represented at the same size.

(1) RE = Renewable energy / (2) Plant < 20 MW

Source: Comisión Nacional de Energía (CNE), 2015

Main players

The development of renewable energy solutions is challenging the historically highly concentrated power sector

Top 10 players FY15 (Generation)

GWh	NCRE	RE	Fossil	Chile	%
Aes Gener	34	1,180	18,358	19,572	*27.1%*
Endesa	132	12,020	6,679	18,831	*26.1%*
Colbún	-	6,465	6,071	12,535	*17.4%*
E-CL	4	46	9,724	9,775	*13.5%*
Enel	1,089	440	-	1,529	*2.1%*
Arauco Bioenergía	1,020	-	7	1,027	*1.4%*
Pacific Hydro	-	557	-	557	*0.8%*
SunEdison	541	-	-	541	*0.7%*
Hidroeléctrica La Higuera	-	537	-	537	*0.7%*
Enap	-	-	508	508	*0.7%*
Top 10 players	**2,820**	**21,245**	**41,347**	**65,412**	***90.6%***
Other 155 players	3,095	2,735	933.61	6,763	*9.4%*
Total	**5,915**	**23,979**	**42,281**	**72,175**	***100.0%***

Top 10	*47.7%*	*88.6%*	*97.8%*	*90.6%*
Other 155 players	*52.3%*	*11.4%*	*2.2%*	*9.4%*

Top 10 NCRE players

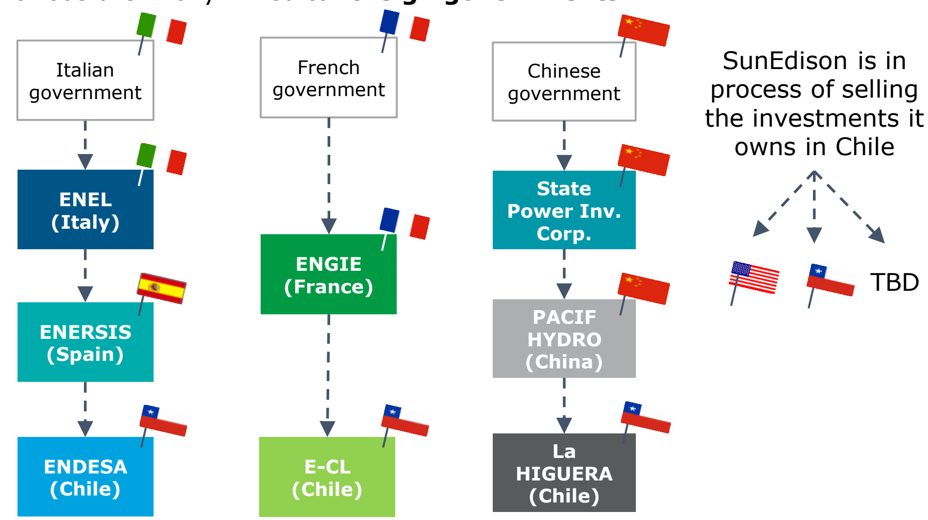
GWh	Solar	Wind	Biom.	NCRE	%
Enel	249	840	-	1,089	*18.7%*
Arauco Bioenergía	-	-	1,020	1,020	*17.5%*
SunEdison	541	-	-	541	*9.3%*
Comasa	-	-	303	303	*5.2%*
Pattern energy	-	277	-	277	*4.8%*
Bioenergías Forestales	-	-	271	271	*4.7%*
EPM Chile	-	258	-	258	*4.4%*
CMPC Celulosa	-	-	209	209	*3.6%*
Total	162	-	-	162	*2.8%*
Endesa	-	132	-	132	*2.3%*
Top 10 players	**952**	**1,507**	**1,804**	**4,263**	***73.2%***
Other 155 players	408	573	580	1,561	*26.8%*
Total	**1,360**	**2,080**	**2,384**	**5,824**	***100.0%***

Top 10	*70.0%*	*72.4%*	*75.7%*	*73.2%*
Other 155 players	*30.0%*	*27.6%*	*24.3%*	*26.8%*

- **Top-3 players** of total power generation add up to ~70%:
  1. Aes Gener
  2. Endesa
  3. Colbún

- The main energy generator, **AES Gener**, **barely complies with the NCRE law**, which requires that 5.5% of the injections be from renewable sources in 2015 (this green energy may be acquired from others).

- Further than direct control, the **main players are strongly related** and various are finally linked to **foreign governments**:



- **NCRE players are generally newcomers**, neither Aes Gener nor Colbun make the top 10, Enel is #1 with 18.4% and Endesa scrapes in at #10 with 2.2% of the generation.

- Top NCRE generators are all typically **specialised in only 1 type** of technology with Enel being the only exception.

Note: SSMM has not been considered
Source: Comisión Nacional de Energía (CNE), 2015

Projects under construction

As of Sep-16, there are 51 projects in construction, representing a total of 3,264 MW. 2,216 MW are NCRE (46% in SING and 54% in SIC)

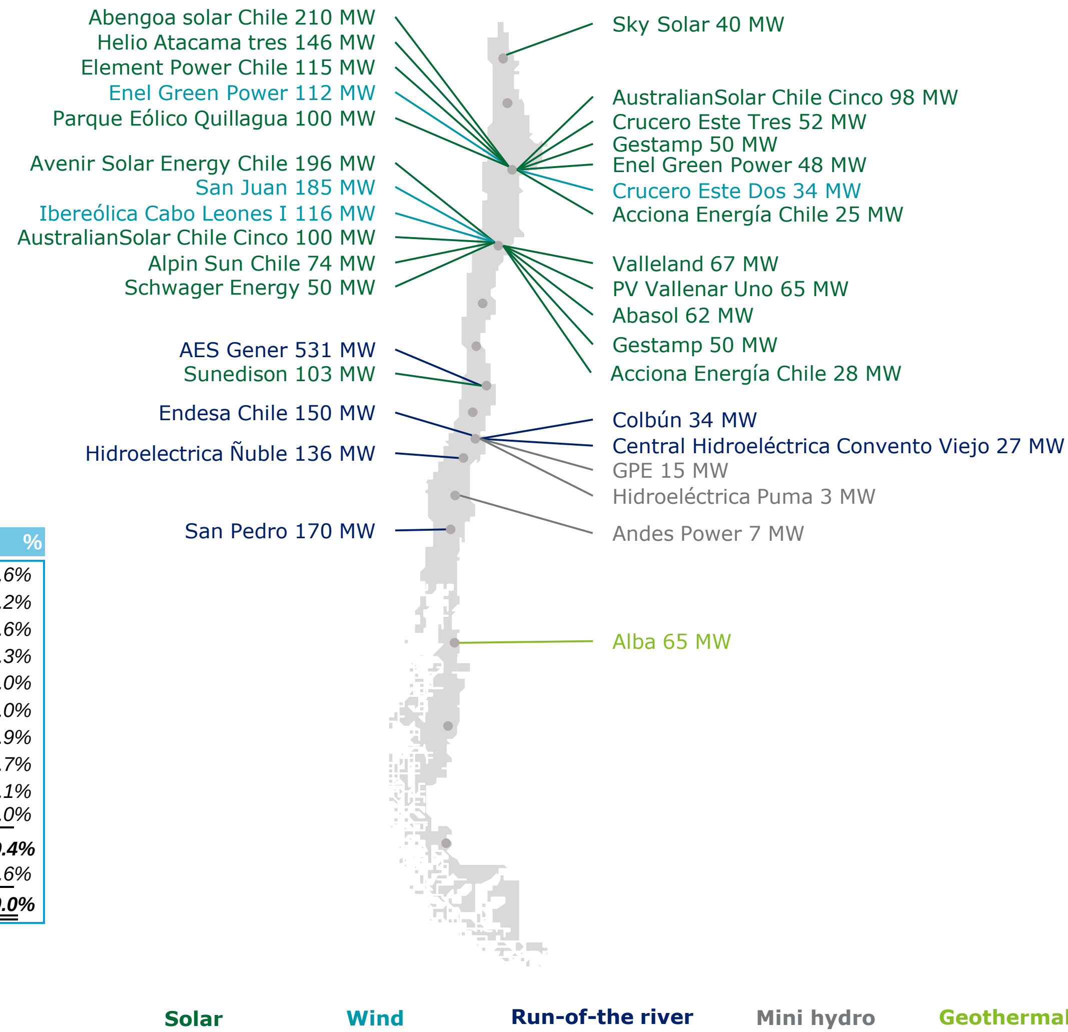
Power plants under construction FY15

MW	SING	SIC	SSMM	Chile
Hydroelectric dam	-	-	-	-
Run-of-the-river	1,082	-	-	1,082
Conventional RE [1]	**1,082**	**-**	**-**	**1,082**
Wind	173	-	-	173
Solar	1,266	1,122	-	2,388
Biomass	-	-	-	-
Mini hydro [2]	93	-	-	93
Non conventional RE [1]	**1,532**	**1,122**	**-**	**2,654**
Fossil fuels	418	753	-	1,171
Total	**3,032**	**1,875**	**-**	**4,907**
Conventional RE [1]	*35.7%*	-	-	*22.1%*
Non conventional RE [1]	*50.5%*	*59.8%*	-	*54.1%*
Total RE [1]	***86.2%***	***59.8%***	**-**	***76.1%***

[1] RE = Renewable energy [2] Plant < 20 MW

Top 10 players FY15

MW	ERNC	ER	Fossil	Chile	%
Enel green power	424	-	-	424	*8.6%*
Sunedison	254	-	-	254	*5.2%*
Acciona	224	-	-	224	*4.6%*
Abengoa	210	-	-	210	*4.3%*
Austrian solar	198	-	-	198	*4.0%*
Helio Atacama tres	146	-	-	146	*3.0%*
First solar energía	141	-	-	141	*2.9%*
RIJN capital	131	-	-	131	*2.7%*
Pattern energy group	104	-	-	104	*2.1%*
Parque eólico quillagua	100	-	-	100	*2.0%*
Total top 10 players	**1,932**	**-**	**-**	**1,932**	***39.4%***
Other 32 players	722	1,082	1,171	2,975	*60.6%*
Total	**2,654**	**1,082**	**1,171**	**4,907**	***100.0%***
Top 10	*72.8%*	-	-	*39.4%*	
Other 32 players	*27.2%*	*100%*	*100%*	*60.6%*	
Total	***100.0%***	***100.0%***	***100.0%***	***100.0%***	



Source: Comisión Nacional de Energía (CNE), 2015

Regulations regarding renewable energies

Law 20.698 establishes that 20% of the energy of generating companies must come from renewable sources by year 2025

Law 20.257

- The authorities established Law 20.257 in order to promote non-conventional energy sources (NCRE). The law came into effect on January 1, 2010 and defined that a certain percentage of the energy sold should come from renewable sources. The law applies to companies that have an installed generation capacity of over 200 MW and supply energy to either SIC or SING.
- The renewable sources of energy can be owned by the company or contracted from a third party. NCREs refer to small hydroelectric plants (< 20 MW) and projects that utilize, among others, biomass, hydraulics, geothermics, solar, wind, and seas.

Law 20.698

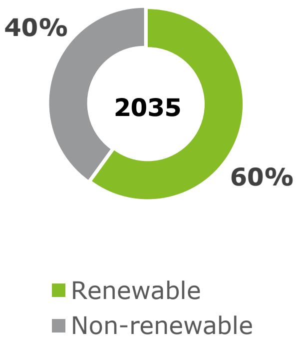
- Law 20.698, also known as Law 20/25, amends the afore-mentioned law by establishing higher quotas on the minimum amount of energy from renewable sources. By 2025 the quota will be 20%, meaning that this percent of each generating company's energy must come from renewable sources.

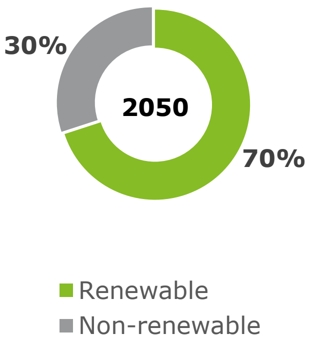
Laws 19.940 and 20.018

- Law 19.940 establishes that NCRE plants are totally (excess power up to 9,000 kW) or partially exempt from payments of tolls for the use of trunk transmission systems and inject their energy to the distribution systems.
- Law 20.018 further assures that NCREs are not discriminated in the energy market by letting them participate in supply tenders and establishing competitive prices.

Energy 2050

- Energy 2050 is a long-term energy policy established by the Chilean government, which aims, among other things, to increase the use of renewable energies and lower the average price of electricity.
- According to the policy, by 2035 renewable sources should represent 60% of total energy generation.
- By 2050 the share of renewable sources of energy should reach 70% of total energy generation.





Established quotas of NCRE per Law 20.698

2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
8.0%	9.0%	10.0%	11.0%	12.0%	13.5%	15.0%	16.5%	18.0%	20.0%

Source: Comisión Nacional de Energía (CNE), 2015

Non conventional renewable energy transactions

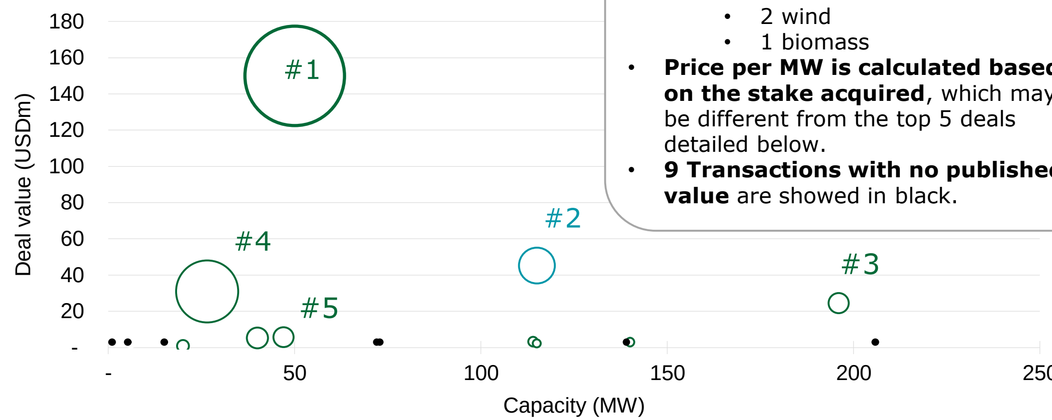
There were 20 NCRE transactions in the last 24 months, 11 with published deal values. They represent 3.6% of total published values.

Transactions in the Chilean energy sector

	Inbound		Outbound	
	No.	**USDm**	**No.**	**USDm**
Strategic buyers	3	291	-	-
Private equity	-	-	-	-
Conventional RE	**3**	**291**	**-**	**-**
Strategic buyers	16	90	1	421
Private equity	3	181	-	-
Non conventional RE	**19**	**271**	**1**	**421**
Strategic buyers	13	14,978	6	1,325
Private equity	5	1,971	1	87
Fossil fuels	**18**	**16,949**	**7**	**1,412**
Total	**40**	**17,511**	**8**	**1,833**
Conventional RE	*7.5%*	*1.7%*	-	-
Non conventional RE	*47.5%*	*1.5%*	*12.5%*	*22.9%*
Total RE	***55.0%***	***3.2%***	***12.5%***	***22.9%***

Note: Only transactions with public deal values are included in the USDm columns
Source: TTR

Price paid per MW, NCRE inbound transactions



- **19 NCRE inbound transactions**
  - 16 solar
  - 2 wind
  - 1 biomass
- **Price per MW is calculated based on the stake acquired**, which may be different from the top 5 deals detailed below.
- **9 Transactions with no published value** are showed in black.

- The combined value of **energy transactions** was **USDm 19,347** (32 transactions out of 48 have public deal values), among which **USDm 694** of **non conventional** renewable energy transactions with announced values. This amount includes assets in Chile and other countries. **41% of the buyers** are **from Europe** and **38% from South America**. The remaining transactions involve the US, Central America and Asia.
- **Price paid per MW varied from 0.03 to 5.26 USDm**, partly influenced by the stage of construction of the project.

#1 SOLAR

Target: San Andrés (CL)
Buyer: Ameris Capital (CL)
Seller: SunEdison (US)
Deal value (USDm): 150
% acquired: 57%
Capacity: 50MW
Price per MW: 5.3 USDm

#2 WIND

Target: Parque Eólico El Arrayán (CL)
Buyer: San Francisco Pattern Energy (US)
Seller: AEI (Cayman Islands)
Deal value (USDm): 45
% acquired: 38,5%
Capacity: 115 MW
Price per MW: 1.2 USDm

#3 SOLAR

Target: El Romero Solar (CL)
Buyer: Acciona (ES)
Seller: Avenir Solar Energy (CL)
Deal value (USDm): 25
% acquired: 100%
Capacity: 196 MW
Price per MW: 0.1 USDm

#4 SOLAR

Target: Pozo Almonte Solar 2 and 3, Calama Solar 3 (CL), Moquegua (PE)
Buyer: Ardian (FR)
Seller: Solarpack (ES)
Deal value (USDm): 31, estimated USDm 18 in Chile
% acquired: 81%
Capacity: 26.5 MW
Price per MW: 0.8 USDm

#5 SOLAR

Target: GR Pacific Ovalle (CL)
Buyer: SunEdison (US)
Seller: Grenergy Renovables (ES)
Deal value (USDm): 6
% acquired: 100%
Capacity: 47 MW
Price per MW: 0.1 USDm

M&A opportunities

Dynamic environment which attracts and will attract foreign investors

01 Challenging present and green future

Present

- Energy dependence due to lack of fossil fuels (60% importation for primary energy)
- Unequal access to energy and high prices to final consumer

Future

- **Security** and quality of supply
- National and international **inclusion**
- **Environmentally** friendly
- Energetic **efficiency**

02 Developing country, developing needs

- As of **2050**, projected population will be 20.205.000 (+31%) and projected **electricity demand will be 144.707 GWh (+100%)**.
- Necessary infrastructure will reach 38.384 MW, of which 70% will be green technology. This represents **18.529 MW of ER and NCRE plants to be built**, plus the current installations that will become obsolete by then.

03 Worldwide rise of alternative technology

- Following the Paris Agreement which aims to finance projects towards low greenhouse gas emissions and climate-resilient development, non conventional energy projects become very attractive to strategic and financial investors around the world.
- **Chile holds privileged climate conditions to become a leading country in non conventional energy production.**

Latest news

"No one in Chile expected that prices would be this low, but it's not too good to be true, it's just that the country has been too conservative."

Maximo Pacheco, Minister of Energy

Bloomberg, Sep16

Strong public opposition have caused various large thermoelectric and hydroelectric projects to be frozen or suspended (6,410 MW in 4 sites).

In Sep-16, Chile signed the Paris agreement on climate change, that will enter into forcé in Nov-16.

United Nations