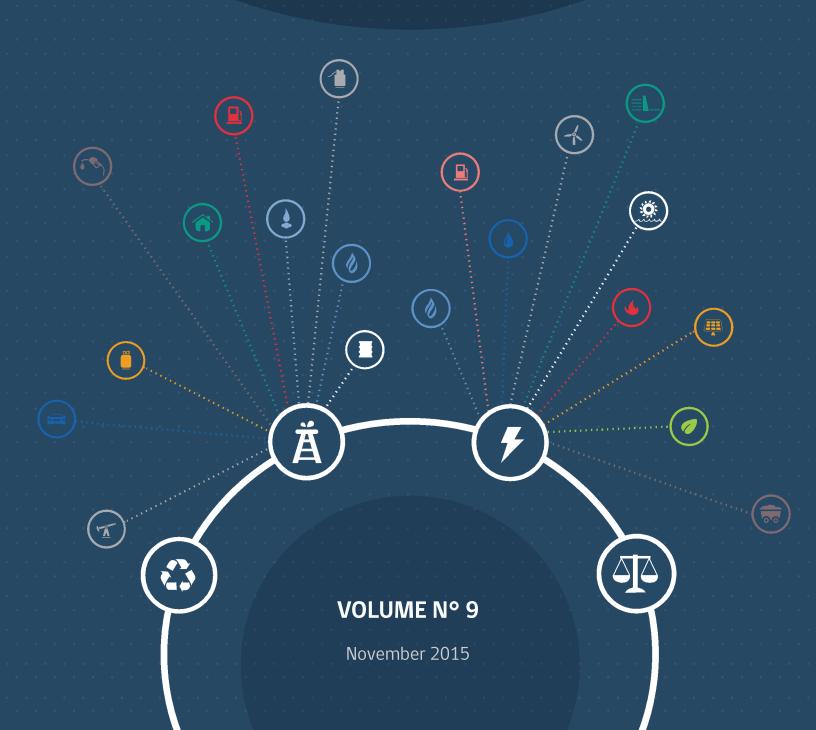
# **MONTHLY ENERGY SECTOR REPORT**

# **NATIONAL ENERGY COMMISSION**



#### **HIGHLIGHTS**

During the last month, the energy sector has witnessed a series of milestones that reflect the hard work of both the National Energy Commission and the Ministry of Energy. The following are among the principal achievements:

# Historical price result for regulated customers in the last tender

On Monday, October 26, the process took place to award the "2015-02 Supply Tender" for regulated customers in the concession areas supplied from the SING and SIC, for a total of 1,200 GWh-year. The event was attended by the Minister of Energy, Máximo Pacheco, and the Executive Secretary of the National Energy Commission, Andrés Romero.

31 companies bid in this tender and it was awarded at an average price of US\$79.3 per MWh. The award brought new players into the electricity market, all of them operators using Non-Conventional Renewable Energies.

The tender was designed to award 20-year supply contracts for the energy associated with three blocks (4-A, 4-B and 4-C). The supply is due to begin on January 1, 2017.

The successful bidders were Aela Generation SA, Abengoa Consortium Lions, Ibereolica Cabo SA, SCB II Amunche SpA and Solar SpA.

The Minister of Energy, Máximo Pacheco, said that "as a government we are pleased because President Bachelet's commitment in the Energy Agenda was to lower tender prices by 25%." He added that "it is a clear sign that the Tender Law is working, that many generators and distributors are making offers, that there are new actors, new technologies and better prices. This shows that this market needed more competition."

Meanwhile, the Executive Secretary of the National Energy Commission, Andrés Romero, said that "the changes we made to the process enabled small, medium and large generators to compete. The real winner is the domestic consumer because we have succeeded in stopping the escalation in prices and we can already see that if this trend continues, in the medium term bills could drop by 7% to 10%."

# Ministry of Energy begins public consultation on long-term energy policy

The Minister of Energy, Máximo Pacheco, this month initiated the public consultation on long-term energy policy, one of the cornerstones of the Energy Agenda. The process will end in December, when a report will be presented to the President, containing the people's concerns and vision of energy for the future.

To participate in the Public Consultation, go to <a href="http://www.energia2050.cl/registro\_consulta">http://www.energia2050.cl/registro\_consulta</a>

# Chilean and Canadian energy regulators share experiences

The CNE made a visit to energy market entities in Canada. CNE representatives met with officials from the Ontario Energy Board, the body that regulates the electricity and natural gas market in that province, in order to find out about the regulatory system there.

They also talked with officials from Natural Resources Canada (Canada's Natural Resources Ministry) and the company Gaz Métro, which distributes gas in Quebec and Vermont.

The CNE highlighted the existence in Canada's electricity market of participation mechanisms, an information system and the development of gas tariff-setting processes.

# CNE presents Energy Agenda and Energía Abierta portal at Universidad Diego Portales

The Executive Secretary of the National Energy Commission, Andrés Romero gave a presentation to students and academics from the Faculty of Engineering at Universidad Diego Portales (UDP) on the Energy Agenda and industry data platform Energía Abierta (www.energiaabierta.cne. cl).

The activity was held at the UDP's Center for Energy and Sustainable Development and was attended by the Dean of the university's Faculty of Engineering, Rodrigo Garrido; academics and students.

As part of its plan to raise awareness about the Energía Abierta portal, the CNE also gave presentations about it in Antofagasta, Concepción and Coyhaigue.

#### **SUMMARY**

This report was prepared in **November 2015** in order to provide energy information and statistics for **October 2015**.

The report's content has been organized into four chapters to facilitate analysis. These four chapters provide information about the electricity sector, international and domestic markets for oil and gas, the status and progress of environmental approvals for energy projects, and finally the main regulatory aspects affecting the sector during the month of May.

This publication contains official information from external sources as well as from the National Energy Commission (NEC).

To prepare the report, an average exchange rate of **685.31** pesos per USD observed in October 2015.

According to Exempt Resolution 594/2015 with date **October 7th**, there were **71** electricity generation projects under construction in the SIC and SING, equivalent to a capacity of **5,410 MW.** 

The installed capacity of the SIC in may was **15,450 MW** and it was **4,324 MW** in the SING, plus the installed capacity in the Aysén (SEA) and Magallanes (SEM) electricity systems. Together, the four systems with Easter Island and *Los Lagos*; in aggregate represent an installed capacity of **19,939 MW**.

Meanwhile, total electric power generation in the SIC in may was **4,410 GWh**, and in the SING it reached **1,684 GWh**. Therefore, the total generated in **October** was **6,094 GWh**, **5.2%** higher than in **September 2015**.

The maximum hourly demand recorded in the SIC and the SING in May were **7,372 MW** and **2,463 MW**, respectively. The maximum in the SIC was recorded on October 5th while the measurement in the SING corresponds to October 9th, 2015.

Regarding electricity tariffs, it is important to note that the average marginal cost in **October** in the SIC was **35.9 USD/MWh**, a -**12.4%** lower than **September 2015**. In the SING meanwhile, the average marginal cost was **71.1 USD/MWh**, **25.6%**higher than the previous month.

It is worth noting the average market prices recorded in October in the SIC and SING which were **90.2 USD/MWh** and **81.7 USD/MWh**, respectively.

In terms of international fuel prices, the Brent crude price in **October** was **48.5 USD/bbl**, **1.9%** lower than the previous month. Meanwhile, the average price of WTI crude was **46.2 USD/bbl**, and **1.6%** higher than the previous month.

The Henry Hub price (international natural gas price reference) decreased -12.6% compared to September, with an average value of 2.32 USD/MBtu.

The average price of coal was **86.2** USD/ton, down -**3.0%** over the previous month.

In terms of gasoline prices, those of 93-octane gasoline (unleaded) and diesel should be noted. In May the average domestic price of the former was CLP 740/liter, while the average price of the latter was CLP 514/liter. In terms of percentages, these represent a fall of -3.2% and falls of -1.1% respectively in comparison to September 2015.

In regard to imports of coal, there was an increase of 7.8% with respect to the previous month, being Colombia the primary country of origin. In the other hand, Brasil was the primary country of origin for the crude oil, which reached up to 14.8% of increment in the importation.

A total of **13** energy sector projects were submitted to the Environmental Impact Evaluation System (Sistema de Evaluación de Impacto Ambiental, SEIA): 9 in electricity generation, and 1 for electricity transmission and 3 about oil and gas energy project. Meanwhile, those already being evaluated represent a total investment of **USD 22,126 million.** In addition, **12** projects related to the energy sector obtained favorable environmental qualification resolutions (*Resolución de Calificación Ambiental*, or RCA) in **October**, and of those, 6 were for electricity generation projects, 4 were for highvoltage electricity transmission line projects and 2 were oil and/or gas energy projects.

Finally, among the most important policy issues that occurred during the month of October, it highlights the discussion, the draft law which establishes **new systems for power transmission and make an independent coordinating body of the national electricity system**, with general approval by the Senate of the bill that modifies the General Law on Electrical Services, to introduce mechanisms for **fairness in electricity rates**. It is also important to consider the publication in the Official Gazette dated October 23, 2015, the DS No. 23 of 2015 approving the Regulation of Operation and Management of the mainframes. It emphasizes the opening of the financial bids for the bidding process 2015/02, which looked at 1,200 GWh / year of energy to tender for the supply of all distribution of the SIC and SING, showing an average price of 79.3 awarded US \$ / MWh for all tendered blocks.



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#### **ELECTRICITY SECTOR**

### 1 Electricity Generation Projects Under Construction

As indicated in Article 31 of the Node Price Setting Regulation (0586/2012), "installations under construction" are defined as generation units, transmission lines and electrical substations that have been granted the respective construction permits for civil works or have been granted the order to proceed in the fabrication and/or installation of the corresponding electrical or electromagnetic equipment for electricity generation, transmission or transformation. For more information about NCRE projects, please go to the CIFES Monthly Energy Report

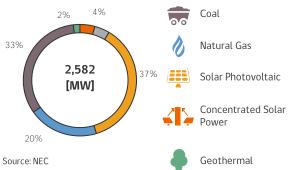
According to Exempt Resolution Num. 385/2015, "Works under Construction Update and Report," as of **September 9th** there were **32** power generation projects under construction in the SING. Together they represent capacity of **2,582 MW** and are projected to begin operation between September 2015 and February 2018.

#### **Projects under Construction in the SING**

Category	Date Proyect Name	Region	Technology	Capac. [MW]
	nov-15 Andes Solar	II Región	Solar Photovoltaic	21
	nov-15 PMGD Pica I	l Región	Solar Photovoltaic	1
	nov-15 Finis Terrae I	II Región	Solar Photovoltaic	69
	nov-15 Quillagua I	II Región	Solar Photovoltaic	23
	dic-15 Atacama I	II Región	Solar Photovoltaic	100
	dic-15 Jama Etapa II	II Región	Solar Photovoltaic	22
	dic-15 Pampa Camarones I	XV Región	Solar Photovoltaic	6
	abr-16 Arica Solar 1 (Etapa I)	XV Región	Solar Photovoltaic	18
	abr-16 Arica Solar 1 (Etapa II)	XV Región	Solar Photovoltaic	22
	abr-16 Pular	II Región	Solar Photovoltaic	29
	abr-16 Paruma	II Región	Solar Photovoltaic	21
	may-16 Bolero Etapa I	II Región	Solar Photovoltaic	42
	jun-16 Bolero Etapa II	II Región	Solar Photovoltaic	42
NCRE	jun-16 Finis Terrae II	II Región	Solar Photovoltaic	69
NCRE	jul-16 Uribe Solar	II Región	Solar Photovoltaic	50
	jul-16 Lascar Etapa I	II Región	Solar Photovoltaic	30
	jul-16 Lascar Etapa II	II Región	Solar Photovoltaic	35
	ago-16 Bolero Etapa III	II Región	Solar Photovoltaic	21
	oct-16 Blue Sky 1	II Región	Solar Photovoltaic	52
	oct-16 Blue Sky 2	II Región	Solar Photovoltaic	34
	oct-16 Bolero Étapa IV	II Región	Solar Photovoltaic	41
	oct-16 Sierra Gorda	II Región	Wind	112
	dic-16 Cerro Dominador	II Región	Cogeneration	110
	dic-16 Quillagua II	II Región	Solar Photovoltaic	27
	dic-16 Cerro Pabellón	II Región	Geothermal	48
	ene-17 Huatacondo	l Región	Solar Photovoltaic	98
	ago-17 Quillagua III	II Región	Solar Photovoltaic	50
	oct-17 Usya	II Región	Solar Photovoltaic	25
	dic-15 Cochrane U1	II Región	Coal	236
Thermoelectric	may-16 Cochrane U2	II Región	Coal	236
membelectric	may-16 Kelar	II Región	NLG	517
	feb-18 Infraestructura Energética Mejillones	II Región	Coal	375

Source: NEC

# Total under construction in the SING, by technology



#### Projected operation start date, SING











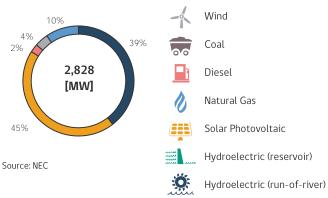
According to Exempt Resolution 385/2015, "Works under Construction Update and Report," as of September 9th there were 39 power generation projects under construction in the SIC. Together they represent capacity of 2,828 MW and are projected to begin operation between September 2015 and Octobre 2020.

#### **Projects under Construction in the SIC**

Category	Date Proyect Name	Region	Technology	Capac. [MW]
	nov-15 Carilafquén	III Region	Mini hydroelectric (run-of-river)	20
	nov-15 Chaka Étapa I	III Region	Solar Photovoltaic	23
	nov-15 Chaka Etapa II	III Region	Solar Photovoltaic	27
	nov-15 Itata	III Region	Mini hydroelectric (run-of-river)	20
	nov-15 Luz del Norte Etapa II	III Region	Solar Photovoltaic	38
	nov-15 Luz del Norte Etapa III	III Region	Solar Photovoltaic	36
	nov-15 Luz del Norte Etapa IV	III Region	Solar Photovoltaic	31
	nov-15 Malalcahuello	III Region	Mini hydroelectric (run-of-river)	9
	nov-15 Panguipulli	III Region	Mini hydroelectric (run-of-river)	0
	nov-15 Conejo Etapa I	III Region	Solar Photovoltaic	105
	nov-15 Lagunilla	III Region	Solar Photovoltaic	3
	dic-15 La Montaña I	III Region	Mini hydroelectric (run-of-river)	3
	dic-15 Carrera Pinto Etapa I	III Region	Solar Photovoltaic	20
	dic-15 Chapeana	III Region	Solar Photovoltaic	3
NCRE	dic-15 Mollacas	III Region	Solar Photovoltaic	3
	ene-16 Renaico	III Region	Wind	88
	ene-16 Valleland	III Region	Solar Photovoltaic	67
	ene-16 Pampa Solar	III Region	Solar Photovoltaic	69
	feb-16 Quilapilun	III Region	Solar Photovoltaic	103
	mar-16 Los Buenos Aires	III Region	Wind	24
	mar-16 PFV Olmué	III Region	Solar Photovoltaic	144
	abr-16 Valle Solar	III Region	Solar Photovoltaic	74
	jun-16 Río Colorado	III Region	Mini hydroelectric (run-of-river)	15
	jun-16 Carrera Pinto Etapa II	III Region	Solar Photovoltaic	77
	jul-16 Pelícano	III Region	Solar Photovoltaic	100
	ago-16 Abasol	III Region	Solar Photovoltaic	62
	sep-16 El Romero	III Region	Solar Photovoltaic	196
	ene-17 Guanaco Solar	III Region	Solar Photovoltaic	50
	abr-17 Malgarida	III Region	Solar Photovoltaic	28
	jun-16 Ancoa	III Region	Hydroelectric (run-of-river)	27
	sep-16 La Mina	III Region	Hydroelectric (run-of-river)	34
Conventional	jul-17 Ñuble	III Region	Hydroelectric (run-of-river)	136
Hydroelectric	feb-18 Alto Maipo - Las Lajas	III Region	Hydroelectric (run-of-river)	267
Tiy di octocario	may-18 Alto Maipo - Alfalfal II	III Region	Hydroelectric (run-of-river)	264
	dic-18 Los Cóndores	III Region	Hydroelectric (run-of-river)	150
	oct-20 San Pedro	III Region	Hydroelectric (run-of-river)	170
	nov-15 CMPC Tissue	III Region	Natural Gas	22
Thermoelectric	mar-16 Doña Carmen	III Region	Diesel	70
	jun-17 CTM-3	III Region	Cogeneration	251

Source: NEC

#### Total under construction in the SIC, by technology



#### Projected operation start date, SIC









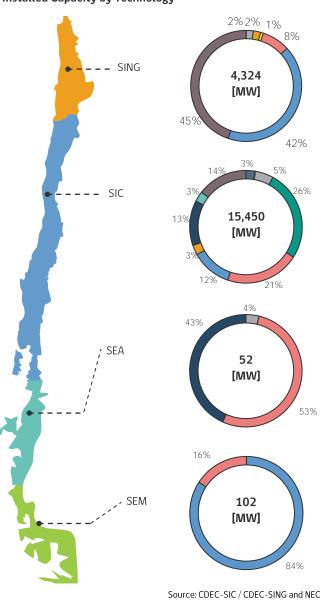




#### 2 Installed Electricity Generation Capacity

The installed electricity generation capacity as of October 2015 was (\*)19,939 MW. Of that, 15,450 MW (77.5%) corresponded to the SIC and 4,324 MW (21.7%) to the SING. The remaining 0.8% was distributed among the Aysén and Magallanes electricity systems. As of May, 58.6% of the country's total installed capacity is represented by thermoelectric generation, while 30.3% is hydroelectric and 11.1% is NCRE. For more information about NCRE projects, please go to the CIFES Monthly Energy Report

#### **Installed Capacity by Technology**



# Installed capacity by system

System	Capacity [MW]	Capacity [%]
SING	4,324	21.7%
• SIC	15,450	77.5%
• SEA	52	0.3%
• SEM	102	0.5%

Source: CDEC-SIC / CDEC-SING and NEC



#### Power generation plants in testing phase

In addition to the total installed capacity, there are **17** synchronous power generation plants with their respective electricity systems that have not yet been approved for dispatch by the CDEC (in the testing phase). Of these, **13** plants are in the SIC (with a total capacity of **381.7 MW**) and **4** are in the SING (with a total capacity of **66.0 MW**). Thus, there is a total of **447.7 MW** in the testing phase.

<sup>\*</sup> The total installed capacity also includes Los Lagos (6 MW) and Easter Island (4 MW) systems.









#### 3 Electricity Generation

Power generation in the SIC during **October 2015** reached a total of **4,410 GWh**, which were classified as **33%** thermoelectric, **52%** conventional hydroelectric and **15%** NCRE. In the SING, **1,684 GWh** of electric power were generated, **95%** from thermoelectric plants and **5%** from NCRE. Together the systems reached a total of **6,094 GWh**, an decrease of **5.2%** over the previous month and **2.2%** higher than October 2014. In resume, if we sort by generation category, we distinguish: **11.9%** NCRE, **37.5%** hydroelectric and **50.5%** thermoelectric generation.

#### Evolution of gross electric power generation, SIC-SING

# 

#### Evolution of gross electric power generation, SIC-SING

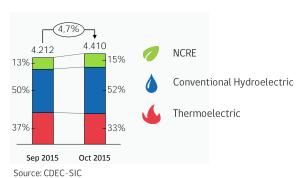
Energy Gener	ation [GWh]	Mo	onthly	Annual
• Total	6,094	_	5.2% _	2.2%
<ul><li>SING</li></ul>	1,684	_	6.4% _	10.5%
• SIC	4,410	_	4.7%	-0.6%

Source: CDEC-SIC / CDEC-SING

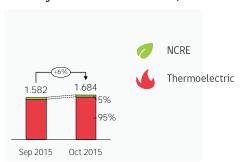
Source: CDEC-SIC / CDEC-SING

Following is a breakdown of power generation by technology in the SIC and SING.

# Monthly Variation in Generation, SIC

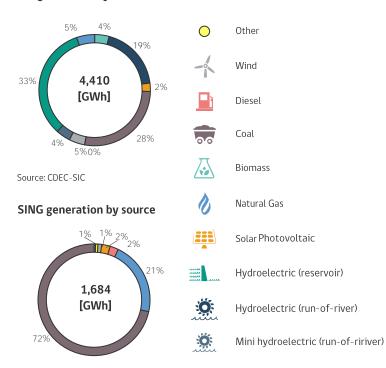


#### Monthly Variation in Generation, SING



Source: CDEC-SIC

#### SIC generation by source



Source: CDEC-SIC







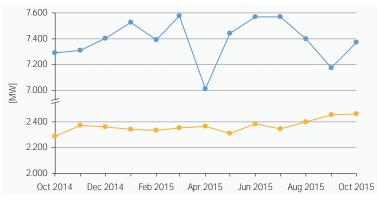


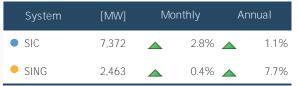
#### 4 Maximum Hourly Demand

The maximum hourly demand recorded on **September 7th** in the SIC was **7,372 MW**, similar to the demand recorded in the previous month and to October 2014. In the SING, the maximum hourly demand recorded on **September 20th** was **2,463MW**, which represented a **0.4%** increase over the maximum hourly demand recorded in the previous month and a **7.7%** increase over the same month of 2014.

#### Evolution of maximum hourly demand, SIC - SING

#### Variation in maximum hourly demand, by system





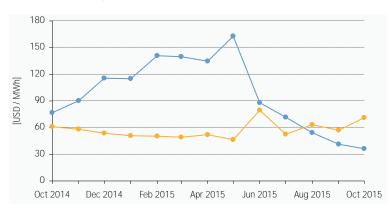
Source: CDEC - SIC / CDEC - SING

Source: CDEC - SIC / CDEC - SING

### **5 Marginal Costs**

The marginal cost is the variable cost of the most expensive generation unit operating at a specific point in time. In this case, the Quillota 220 kV busbar was used as the reference to obtain the marginal cost in the SIC while the Crucero 220 kV busbar was used as the reference in the SING. The value given for each system corresponds to the monthly average of hourly marginal costs. In October, the average marginal cost in the SIC was **35.9 USD/MWh**, **-12.4%** lower than the previous month and **-53.0%** lower than October 2014. In the SING, the average marginal cost was **71.1 USD/MWh**, **25.6%** less than he previous month and **16.9%** from October 2014.

### Evolution of marginal costs, SIC - SING



#### Source: CDEC - SIC / CDEC - SING

#### Variation in marginal costs, SIC - SING

System	[USD/MWh]	Month	nly	Annual
• SIC	35.9	-12	2.4% 🤝	-53.0%
SING	71.1	<u>^</u> 2!	5.6% 🛕	16.9%

Source: CDEC - SIC / CDEC - SING









#### 6 Average Market Price

The average market price (AMP) for each system is based on the average price of free customer contracts and long-term supply contracts held by distribution companies as applicable, reported to the National Energy Commission by the distribution companies operating in the Norte Grande Interconnected System and the Central Interconnected System. The AMP calculation takes into consideration a four-month window ending with the third month prior to the AMP publication date.

The AMP recorded in May for the SIC was **90.2 USD/MWh**, -**5.9%** lower than the previous month and -**11.6%** than October 2014. The AMP in the SING was **81.7 USD/MWh**, -**4.6%** lower tan the previous month and -**19.3%** than the same month in 2014.

#### Evolution of market prices, SIC - SING

# 105 100 95 Sour

Apr 2015

Jun 2015

# Variation in average market prices, by system

System	[USD/MWh]	Mo	onthly	А	nnual
• SIC	90.2	$\overline{}$	-5.9%	$\overline{}$	-11.6%
<ul><li>SING</li></ul>	81.7	abla	-4.6%	abla	-19.3%

Source: CDEC - SIC / CDEC - SING

Source: CDEC - SIC / CDEC - SING

Dec 2014

Feb 2015

80 <del>|</del> Oct 2014

# 7 Short-term Node Prices

Short-term node prices are set twice each year, in May and October. These prices may be indexed monthly, depending on the conditions established in the twice-yearly decree that sets node prices for electricity supply. The prices are calculated by the National Energy Commission (NEC) which submits a technical report with the results to the Energy Ministry. The ministry then proceeds to set the prices via a decree published in the Official Bulletin.

Aug 2015

#### **Node Energy Price**

The node energy price is the average over time of the marginal cost of energy in the electricity system operating at the minimum, updated operation and rationing cost. The node energy price in the SIC in October was **74.2 USD/MWh**, decreased in -**0.5%** compared to the previous month and -**17.2%** to the same month in 2014. In the SING, the node energy price in October was **48.7 USD/MWh**, with a -**0.5%** variation from the previous month and -**32.4%** of decrease compared to last year.

#### Evolution of node energy prices, SIC - SING

#### 92 88 84 80 76 [USD/MWh] 72 68 64 60 56 52 48 Oct 2014 Dec 2014 Feb 2015 Apr 2015 Jun 2015 Aug 2015 Oct 2015

#### Variation in node energy prices, by system

System	[USD/MWh]	Mc	onthly	А	nnual
• PNE SIC	74.2	$\overline{}$	-0.5%	abla	-17.2%
PNE SING	48.7	$\overline{}$	-0.5%	$\overline{}$	-32.4%

Source: NEC

Source: NEC 10





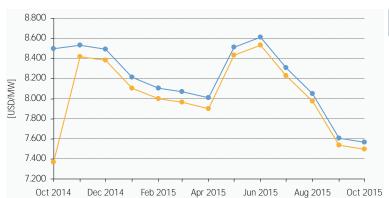




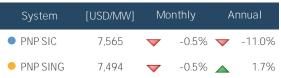
#### **Node Power Price**

The node power price is the annual marginal cost of increasing the installed capacity of the electricity system taking into consideration the most economic generation plants, required to supply additional capacity during the annual maximum hourly demand of the electricity system, increased by a percentage equal to the theoretical capacity reserve margin of the system. The node power price in the SIC in **October** was **7,565 USD/MW**, decreased on -0.5% compared to the previous month and -11.0% lower than the same month in 2014. In the SING, the node power price in **October** was **7,494 USD/MW**, with -0.5% variation from the previous month and 1.7% of decrease compared to last year.

#### Evolution of node power price, SIC - SING



# Variation in node power price



Source: CNE

Source: CNE

#### 8 Node Price in Medium-size Systems

Below we present the node energy price and node power price in medium-size systems for October 2015. These node prices are applied to energy supply at the withdrawal busbars indicated in the following tables:

#### Variation in node energy price, medium-size systems

Busbar	[USD/MWh]	lr	ndex	А	nnual
Pta Arenas	62	_	4.4%	_	3.1%
Tres Puentes	62		4.2%	_	5.7%
Pto Natales	92	_	6.2%	_	5.1%
Porvenir	85	_	6.2%	_	11.3%
Pto Williams	287	_	0.5%	_	6.3%
Aysén 23	88	_	0.5%	$\overline{}$	-11.8%
Chacab23	88	_	0.5%	$\overline{}$	-11.7%
Mañi23	88	_	0.5%	$\overline{}$	-11.7%
Ñire33	88	_	5.0%	$\overline{}$	-11.7%
Tehuel23	88	$\overline{}$	-1.4%		7.2%
Palena	86	_	5.5%	$\overline{}$	-18.8%
G.Carrera	116	_	5.0%		8.8%
Cochamó	185	_	4.0%	$\overline{}$	-13.3%
Hornopirén	161	_	0.0%	_	6.4%

Source: CNE

#### Variation in node power price, medium-size systems

Busbar	[USD/MW-mth]	In	dex	Aı	nnual
Pta Arenas	15,306	_	6.2%	_	11.3%
Tres Puentes	15,306	_	6.2%	_	11.3%
Pto Natales	8,554	_	6.0%	_	9.7%
Porvenir	10,706	_	5.0%	_	8.2%
Pto Williams	20,250	_	4.0%	_	6.3%
Aysén 23	11,279	_	5.5%	_	8.8%
Chacab23	11,279	_	5.5%		8.8%
Mañi23	11,279	_	5.5%		8.8%
Ñire33	11,279		5.5%		8.8%
Tehuel23	11,279	_	5.5%		8.8%
Palena	15,888	_	5.0%		8.0%
G.Carrera	21,531	_	4.0%	_	6.4%
Cochamó	21,227	_	4.0%	_	6.4%
Hornopirén	13,622	_	0.0%	<u> </u>	0.0%

Source: CNE







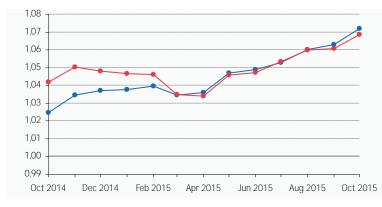


#### 9 Evolution of Variable Distribution Cost Indexes

The distribution added value (DAV)\* is set every four years by the Energy Ministry, based on a technical report prepared by the NEC, and corresponds to the average cost of investment, administration, maintenance and operation of electricity distribution networks calculated for an efficient model company operating in Chile. The DAV has a fixed component and a variable component, both of which were established by Article 182 of the General Electrical Services Law and are indexed monthly. Below we provide the evoluation of the indexator of the variable component both for high and low voltage for October 2015.

For more information, visit Decreto Nº1T/2012 Proceso de Fijación de Tarifas de Distribución 2012-2016.

#### **Evolution of Indexes**



#### **Variation in Indexes**

System	Index	Mc	onthly	Α	ınnual
• CDAT	1.072	_	0.9%	_	4.6%
<ul><li>CDBT</li></ul>	1.068		0.7%	_	2.6%

Source: CNE

Source: CNE

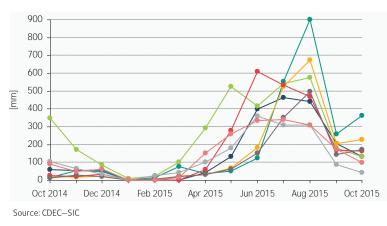
#### 10 Hydrological Statistics

Because of the hydro-thermal nature of the Central Interconnected System, which features large hydroelectric (reservoir) plants with for regulation in different periods of time and thermal plants (as well as other technologies), the use of reservoir water must be optimized in order to minimize the total cost of supplying the system. For this reason, we provide information below from monitoring and recording the important variables associated with hydrology, such as rainfall, and the operational status of infrastructure of the hydroelectric plants in relation to the respective reservoir levels and volumes.

#### **Rainfall Statistics**

The monthly rainfall statistics published by CDEC-SIC and updated as of October 30, 2015 are shown below for the main measurement locations.

# **Evolution of Annual Rainfall**



#### Variation in Annual Rainfall







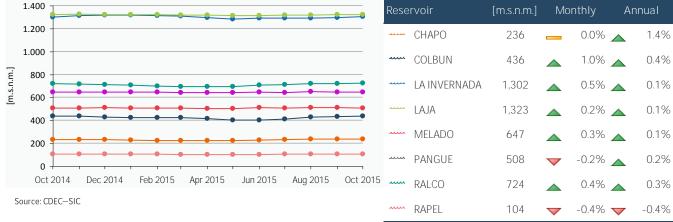




#### Reservoir, Lake and Lagoon Levels

According to information submitted by the CDEC-SIC, in October the final levels were found for the following reservoirs, lakes and lagoons:

#### **Evolution of Reservoir Levels**



Source: CDEC—SIC

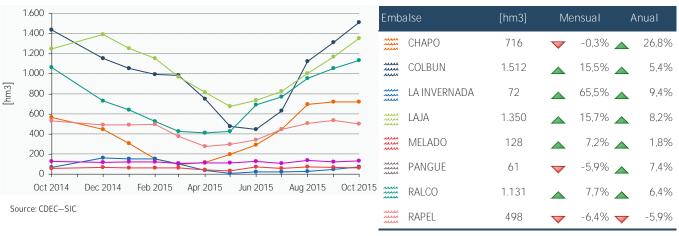
#### Reservoir, Lake and Lagoon Volumes

Based on levels reported by the CDEC-SIC for volumes of water stored in the largest reservoirs, lakes and lagoons, considering the characteristics of each one as of October 2015.

#### **Evolution of Reservoir Volume**

#### Variation in Reservoir Volume

Variation in Reservoir Levels



Source: CDEC-SIC



#### 1 International Fuel Market Prices

The following information details the moving year evolution of the West Texas Intermediate (WTI) crude oil price index, which is used as a reference in the U.S. market, along with the BRENT oil price index which reflects oil prices for European markets. In October 2015, BRENT oil prices averaged 48.5 USD/bbl., which represents an 1.9% increase from the previous month and a -44.5% increase from October 2014. Meanwhile, the average WTI oil prices was 46.2 USD/bbl, a 1.6% increase from the previous month but a -45.3% decrease from the same month the previous year.

#### **Evolution of BRENT and WTI Oil Prices**



#### Crude Oil Variation (USD/bbl.)

Index	USD/bbl.	Monthly	Annual
BRENT DTD	48.5	1.9%	-44.5%
₩TI	46.2	1.6%	<b>-</b> 45.3%

Source: NEC, based on data from Argus Media Inc.

Source: NEC, based on data from Argus Media Inc.

The following information details the evolution of the Henry Hub (Louisiana) price index, which serves as a reference for liquefied natural gas (LNG) imports to Chile. In **October**, Henry Hub averaged **2.32 USD/MMBtu**, an -**12.6%** decrease from the previous month and a -**38.7%** decrease compared to **October 2014**.

#### **Evolution of Natural Gas Price (Henry Hub)**



#### Source: NEC, based on data from the Daily Gas Price Index, NGI Intelligence

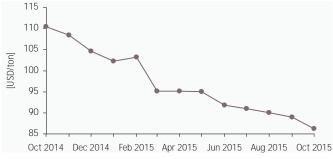
#### Natural Gas Variation (Henry Hub)

	Index	USD/MMBtu	Monthly	Annual
0	HENRY HUB SPOT	2.32	<b>▼</b> -12.6% <b>▼</b>	<b>-</b> -38.7%

Source: NEC, based on data from the Daily Gas Price Index, NGI Intelligence

The following information details the evolution of the price of EQ 7000 steam coal kCal/kg which in October averaged a price of **86.2 USD/ton**, representing an -**3.0%** decrease over the previous month and a -**21.9%** decrease from the same month in **2014**.

### Evolution of EQ 7000 Steam Coal kCal/kg



Source: NEC, based on data from Platts Coal Trader International

# Variation in EQ 7000 Steam Coal kCal/kg

Index	USD/ton	Monthly	Annual
THERMAL COAL EQ. 7.000 KCAL/KG	86.2	-3.0%	<b>▽</b> -21.9%

Source: NEC, based on data from Platts Coal Trader International







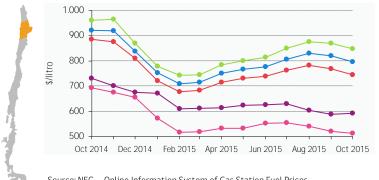


#### 2 Domestic Liquid Fuel Prices

The following information details the evolution of different types of petroleum-derived liquid fuels sold or commercialized at gas stations (93-, 95-, and 97-octane unleaded gas, diesel, household kerosene and diesel oil) during the last 12 months, along with the average monthly price in last month for the cities of Antofagasta, Concepción, Puerto Montt and the Santiago Metropolitan

The information presented is prepared by the National Energy Commission which, as part of its legal functions and powers, developed the Online Information System of Gas Station Fuel Prices, www.bencinaenlinea.cl

#### **Evolution of Liquid Fuel Prices** Antofagasta



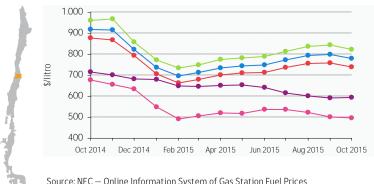
#### Source: NEC - Online Information System of Gas Station Fuel Prices

# **Variation of Liquid Fuel Prices**

Fuel Type	\$/liter Mc	nthly	Annual
🖺 Gasolina 93 SP	744 🔻	-3.0% 🔻	-15.8%
🚨 Gasolina 95 SP	796 🔻	-2.7%	-13.5%
📔 Gasolina 97 SP	848 🔻	-2.5% 🔻	<b>-</b> 11.7%
Kerosene	591	0.6%	-19.0%
Petróleo Diesel	513 🔻	-1.3%	-26.0%

Source: NEC — Online Information System of Gas Station Fuel Prices

#### Santiago Metropolitan



Source: NEC - Online Information System of Gas Station Fuel Prices

FuelType	\$/liter Monthly Annual
Gasolina 93 SP	738 🔻 -2.7% 🔻 -15.9%
🖺 Gasolina 95 SP	778 🔻 -2.6% 🔻 -15.1%
📔 Gasolina 97 SP	822 🔻 -2.4% 🔻 -14.4%
■ Kerosene	594 🛕 0.6% 🔻 -16.9%
Petróleo Diesel	495 🔻 -1.2% 🔻 -26.7%

Source: NEC - Online Information System of Gas Station Fuel Prices

#### Valparaíso



Source: NEC — Online Information System of Gas Station Fuel Prices

FuelType	\$/liter	Monthly	Annual
Gasolina 93 SP	723	<b>-</b> 2.9%	<b>-</b> 16.6%
🖺 Gasolina 95 SP	775	-2.8%	-14.3%
Gasolina 97 SP	838	-2.7%	-12.0%
La Kerosene	606	<u> </u>	-15.8%
Petróleo Diesel	495	<u> </u>	-26.4%

Source: NEC — Online Information System of Gas Station Fuel Prices









#### **Evolution of Liquid Fuel Prices**

#### Concepción



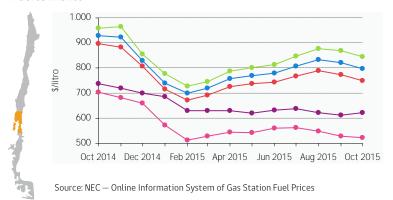
Source: NEC — Online Information System of Gas Station Fuel Prices

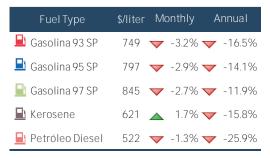
#### **Variation of Liquid Fuel Prices**

Fuel Type	\$/liter	Monthly	Annual
Gasolina 93 SP	735	-3.2%	-16.1%
🖺 Gasolina 95 SP	789	-2.9%	-13.4%
📓 Gasolina 97 SP	831	-2.6%	-12.5%
■ Kerosene	581	<u> </u>	<b>▼</b> -17.9%
Petróleo Diesel	521	<b>-</b> 1.3%	-25.0%

Source: NEC — Online Information System of Gas Station Fuel Prices

#### **Puerto Montt**





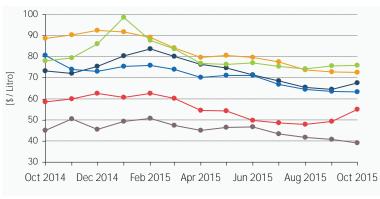
Source: NEC — Online Information System of Gas Station Fuel Prices

#### 3 Fuel Gross Margins

The retail sales price of fuels is structured as follows: sales price at the refinery, sales margin and taxes (VAT and specific tax). The following information shows the evolution of the sales margin for 93-octane gas and diesel in the 5th, 6th, 7th, 8th, 12th and Santiago Metropolitan regions.

### 93-Octane Gasoline

### **Evolution of Gross Sales Margin**



# Variation in Gross Sales Margin



Source: CNE

Source: CNE



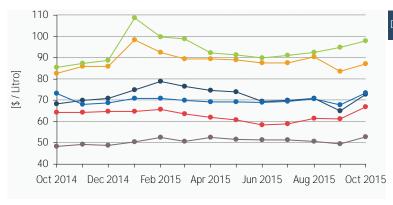






#### Diesel

# **Evolution of Gross Sales Margin**



#### Variation in Gross Sales Margin

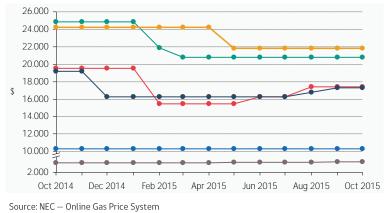
Diesel Oil	\$/liter	Monthly	Annual
5 egion	73	<b>1</b> 2.2%	6.7%
6 <mark>√L</mark> egion	87	4.1%	5.2%
<b>⊅</b> Legion	73	8.3%	0.4%
8 egion	98	3.1%	14.6%
Santiago Metropolitana	67	9.0%	4.0%
1\$ <b>₽</b> 1Region	53	6.6%	9.3%

Source: CNE Source: CNE

# 4 Domestic Prices of Network Gas Supplied through Concessions

The following information shows the price based on the energy equivalence of natural gas, city gas or propane air, whichever is applicable, distributed to the end consumer as network gas under concession equivalent to 15-kg cylinders of liquified petroleum gas. This price also includes fixed costs and meter rental, charged by the network gas distribution companies when applicable.

#### **Evolution of Network Gas Prices**



#### Variation in Network Gas Prices



Source: NEC — Online Gas Price System







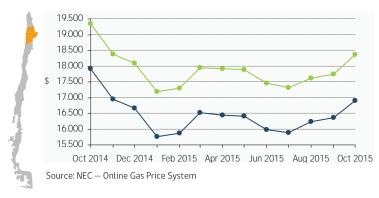


#### 5 Domestic Prices of Bottled Liquefied Petroleum Gas

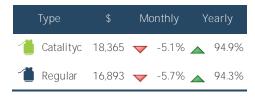
Bottled LPG is liquefied gas fuel, i.e., propane and butane and their blends (with a maximum 30% of butane). The fuel is compressed for bottling in cylinders of varying sizes that are sold to end users for use in heaters, stoves and water heaters/boilers. The cylinders on the local market have a capacity of 2 kg, 5 kg, 11 kg, 15 kg and 45 kg. They are also sold according to quality; one is sold as normal or regular and the other as catalytic, a category required by some heating appliances that only use a fuel with a low content of olefins, diolefins and sulfur. The information below shows the evolution of the average price of bottled LPG in 15-kg cylinders for the cities of Antofagasta, Concepción, Puerto Montt and the Santiago Metropolitan Region.

#### **Evolution of Bottled LPG Prices**

#### Antofagasta

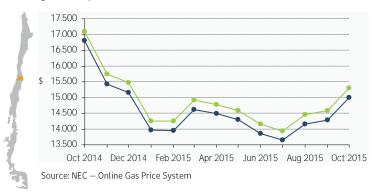


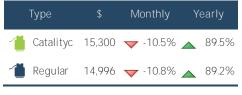
#### **Variation in Bottled LPG Prices**



Source: NEC — Online Gas Price System

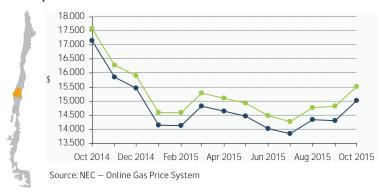
#### Santiago Metropolitan

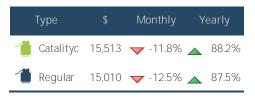




 ${\tt Source: NEC-Online\ Gas\ Price\ System}$ 

#### Concepción





 ${\tt Source: NEC-Online\ Gas\ Price\ System}$ 



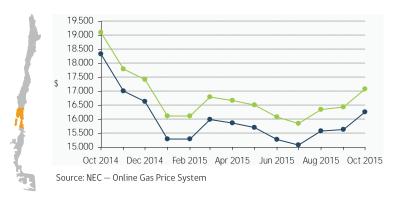






#### **Evolution of Bottled LPG Prices**

#### **Puerto Montt**



#### **Variation in Bottled LPG Prices**



# 6 Fuel imports and exports

Information on imports and exports of primary and secondary fuels corresponds to **September 2015** given that the official information source has a two-month time lag. The information on imports mainly applies to coal, crude oil, diesel and natural gas, equivalent to more than 90% of total national imports (in tons) for September 2015.

The total variation of imports registered an increase of 2.1% over the previous month and 10.7% compared to September 2014. Meanwhile, the total change in exports recorded a considerable decrease compared to the previous month but are higher than September 2014. The main fuel exported during the month of September was IFO representing 67% of total exports in tons.

Imports of the main primary fuels during the month of September are coal from Colombia and the United States; crude oil from Brazil and Ecuador; diesel from the United States and Japan; and liquefied natural gas brought from Trinidad and Tobago and Argentina.

During September the exports of diesel and gasoline recorded as country of destination Bolivia meanwhile the exported IFO went to Panamá.

# Variation in Imports During the Period

Fuel	[Thous- Tons]	Mo	Monthly		nual
Coal	916		7.8%	_	17.5%
Crude Oil	737		14.8%	_	19.6%
Diesel Oil	283	$\overline{}$	-15.0%	$\overline{}$	-6.8%
Natural Gas	176	$\overline{}$	-21.8%	_	0.6%
<b>⇔</b> Gasoline	38		(**)	$\overline{}$	-63.4%
LPG	86	$\overline{}$	-24.9%		36.9%
<b>■</b> IFO	0.0	(*)		(**)	
Household Kerosene	24	$\triangledown$	-8.5%	_	(**)
Overall total	2,260		2.1%	_	10.7%

# Variation in Exports During the Period

Fuel	[Thous-Tons]	Mc	onthly	Annual
Coal	0	(*)		(**)
Diesel Oil	4	$\overline{}$	-47.8%	<b>-</b> 18.3%
<b>⇔</b> Gasoline	5	$\overline{}$	-3.3%	40.9%
GLP	2	$\overline{}$	(*)	-9.7%
<b>₩</b> IFO	23	(*)		(*)
TOTAL	34		138.6%	-87.1%

Source: Aduana by COMEX (<a href="www.comexplusccs.cl">www.comexplusccs.cl</a>)

Source: Aduana by COMEX (www.comexplusccs.cl)

<sup>(\*)</sup> No transactions recorded during the period under review

<sup>(\*\*)</sup> Not recorded during the reference month transactions



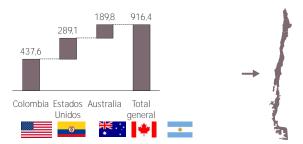






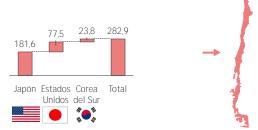
# **Imports by Country of Origin (thousands of tons)**

#### Coal (\*)



Source: Customs, provided by Comex Service, Santiago Chamber of Commerce  $\,$ 

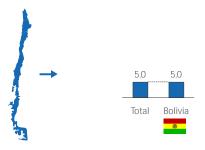
#### Diesel Oil



Source: Customs, provided by Comex Service, Santiago Chamber of

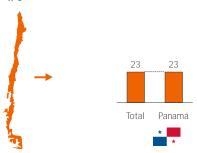
#### **Exports by Country of Origin (thousands of tons)**

#### Gasoline



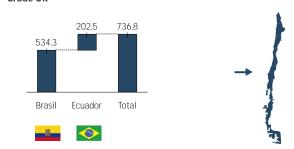
Source: Customs, provided by Comex Service, Santiago Chamber of Commerce

#### IFO



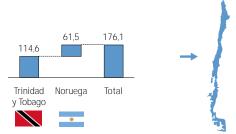
Fuente: Aduana suministrado por Servicio COMEX de la Cámara de Comercio de Santiago

#### Crude Oil



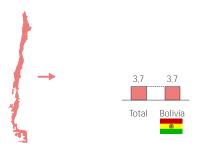
Source: Customs, provided by Comex Service, Santiago Chamber of Commerce

#### **Natural Gas**



Source: Customs, provided by Comex Service, Santiago Chamber of

#### Diesel Oil



Source: Customs, provided by Comex Service, Santiago Chamber of Commerce





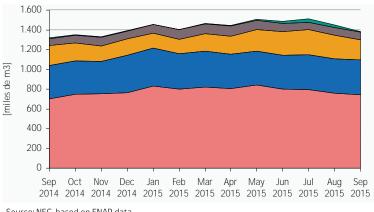




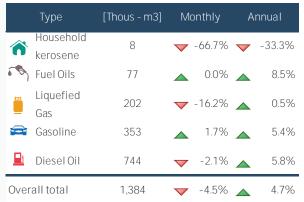
#### 7 Fuel Sales

The following information details the evolution and the variation in the sales of the principal oil-based fuels. The information available is presented with a one-month time lag. The fuels analyzed are: domestic kerosene, fuel oils, liquefied gas, diesel oil and unleaded 93-, 95- and 97-octane gas.

#### Fuel Sales Evolution, by Type



# Fuel Sales Variation, by Type



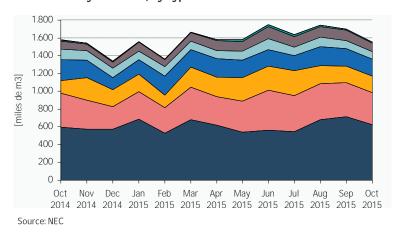
Source: NEC, based on ENAP data

Source: NEC, based on ENAP data

#### 8 Fuel Inventory

The following information presents monthly fuel inventory levels (aviation fuel, household kerosene, fuel oils, aviation kerosene, automotive gas, liquefied gas, diesel oil and crude oil) in thousands of m3 for the entire country. This value corresponds to the last business day of the respective month.

#### Fuel Inventory Evolution, by Type



#### Fuel Inventory Evolution, by Type

Туре	[Thous - m3]	Monthly	Annual
X Aviation gas	0	-61.9%	-66.5%
	8	-21.5%	-32.4%
Fuel Oils	95	-20.7%	4.3%
🕂 Kerosene Av.	88	1.6%	-26.0%
Automotive gas	188	-4.5%	-20.5%
Liquefied gas	185	-0.9%	<b>3</b> 4.0%
Diesel oil	359	-6.4%	-7.0%
Crudo oil	627	<b>-</b> 12.1%	5.6%
Overall total	1,552	-8.7%	-1.7%

Source: NEC



# **ENERGY PROJECTS UNDERGOING ENVIRONMENTAL EVALUATION**

#### 1 Projects Submitted for Environmental Evaluation

In October 2015, **13 energy projects** were submitted to the Environmental Impact Evaluation System (SEIA), representing an investment of **USD 811 million**. Of these, **9** projects are for electric power generation, **1** projects are for electrical transmission growth and **3** about Oil and/or gas energy project.

#### Detail of energy projects submitted for environmental evaluation

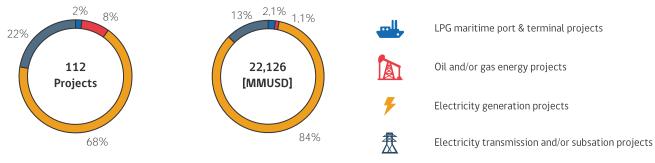
Project Type	Project Owner	Project Name	Presentation Date	Investment [MMUSD]	WEB
Generation	PSF La Tapina S.A.	Planta Solar Fotovoltaica La Tapina	22-oct-2015	140,0	Link
Generation	Inversiones y Servicios SunEdi- son Chile Limitada	Parque Solar Catemu	26-oct-2015	208,0	<u>Link</u>
Generation	Inversiones y Servicios SunEdi- son Chile Limitada	PARQUE SOLAR EL TAPIAL	23-oct-2015	400,0	<u>Link</u>
Generation	Power Train Technologies Chile S.A	Central Hidroeléctrica de Pasada Río Coihueco	29-oct-2015	5,3	<u>Link</u>
Generation	Hidroeléctrica Río Colorado S.A.	Optimización Proyecto Central Hidroeléctrica Río Colorado	21-oct-2015	4,8	<u>Link</u>
Generation	Amunche Solar SpA.	PARQUE SOLAR FOTOVOLTAICO LOS LIBERTADORES	21-oct-2015	31,1	<u>Link</u>
Generation	GR Guayacan SpA	Parque Solar Fotovoltaico Cabilsol	20-oct-2015	11,0	<u>Link</u>
Generation	Lipigas S.A.	PMGD CONCON GNL	19-oct-2015	5,0	<u>Link</u>
Generation	Nueva Degan SPA	Modificación Planta de Respaldo Eléctrico, Sector Degan, ampliando en 14MW su potencia	16-oct-2015	3,0	<u>Link</u>
High-voltage electricity transmission	Parque Solar Fotovoltaico Sol del Desierto SpA	Modificación Línea de Transmisión Parque Solar Fotovoltaico Sol del Desierto	22-oct-2015	1,0	<u>Link</u>
Oil and/or gas energy projects	GeoPark Fell SpA	Construcción de línea de flujo pozo Ache Este 2	16-oct-2015	1,0	<u>Link</u>
Oil and/or gas energy projects	GeoPark Fell SpA	Modificación de Líneas de Flujo Ache 3 y Ache Este x-1	16-oct-2015	0,03	<u>Link</u>
Oil and/or gas energy projects	GeoPark Fell SpA	Modificación de proyectos genéricos Meseta Nor- te, Ampliación Pampa Larga 4, Escorial Norte, Escorial Sur y Ache Este	13-oct-2015	0,5	<u>Link</u>

Source: SEIA

#### 2 Energy Projects Currently Being Evaluated

In October 2015, there were **112** energy projects awaiting approval of their environmental qualification resolutions (RCA). Of these, 68% are projects related to electric power generation, and the remaining are mixed projects. Together they represent a total investment of **22,126 MMUSD**.

# Distribution of Projects and their Investment [millions of USD]



Source: SEIA









# 3 Projects with Approved Environmental Qualification Resolution

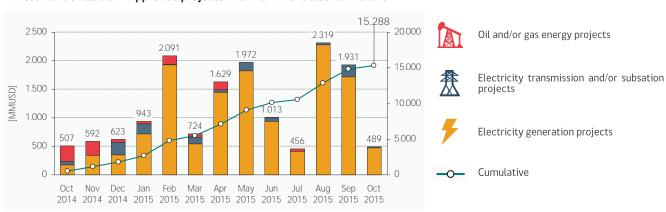
In **October 2015**, the environmental qualification resolutions (RCA) of **12** energy projects were approved. Of these, **6** projects are for electric power generation with total capacity of **462 MW**, **4** other projects are for electricity transmission and/or substations and **2** are Oil and/or gas energy project. Together they represent a total investment of **503** MMUSD.

Presentation Date	Project Type	Region	Project Owner	Investment [MMUSD]	Web
05-oct-2015	Generation	VI	Agrícola Santa Lucía Ltda.	105	<u>Link</u>
14-oct-2015	Oil and/or gas energy projects	XII	Empresa Nacional del Petróleo - Magallanes	2	<u>Link</u>
20-oct-2015	Generation	III	Solar Brothers SpA	18	<u>Link</u>
20-oct-2015	Generation	III	Sinergia Solar SpA	18	<u>Link</u>
20-oct-2015	Generation	III	Sinergia Solar SpA	18	<u>Link</u>
21-oct-2015	Generation	IX	Parque Eólico Piñón Blanco SpA	300	<u>Link</u>
27-oct-2015	Oil and/or gas energy projects	XII	Empresa Nacional del Petróleo - Magallanes	1	<u>Link</u>
28-oct-2015	High-voltage electricity transmission line	Ш	ACCIONA ENERGĨA CHILE SpA	3	<u>Link</u>
28-oct-2015	High-voltage electricity transmission line	VII	LUZPARRAL S.A.	8	<u>Link</u>
30-oct-2015	Generación	III	Solar Brothers SpA	18	<u>Link</u>
02-nov-2015	High-voltage electricity transmission line	IR	Energía de la Patagonia y Aysén	11	<u>Link</u>
05-nov-2015	Subestation	VI	TRANSNET S.A.	2	<u>Link</u>

Source: SEIA

In line with the above table, the evolution is presented for the last mobile year of investment associated to energy projects have received a favorable RCA. The total investment to date totaled **15,288 MMUSD**. In particular, energy power generation projects have a total investment of **13,171 MMUSD** (86.2%), equivalent to **3,619 MW** approved.

#### Investment evolution-Approved projects with RCA in the last 12 months



Source: SEIA



#### **SECTORIAL REGULATIONS**

#### 1 Proposed Legislations in Process

Bulletin Number	Subject of the Proposed Legislation	Initiative and Urgency	Current Status	Bill Submittal Date	WEB
9890-08	Amends Decree-Law No. 323 of 1931 of the Ministry of Interior and other laws.	Simple Urgency	Second Constitutional Procedure (Senate). Now at the Mining and Energy Commission of the Senate, and that of the Treasury.	29/01/2015	<u>Link</u>
10161-08	Modifies the General Electricity Services Law to introduce mechanisms for fairness in electricity rates.	Great Urgency	The first constitutional procedure (the Senate) October 20, 2015. General approval by the Senate The deadline for making observations set at November 9th.	01/07/2015	<u>Link</u>
10240-08	Establishes new systems of power transmission and sets up an independent oversight organism for the national electricity system.	Great Urgency	First constitutional procedure (Chamber of Deputies). October 22, 2015. General discussion in the Chamber's Mining and Energy Commission.	07.08.2015	Link

#### 2 Sectorial Regulations Published in the Official Bulletin

Decree No. N°23, March 12, 2015 that approves the operation and administration regulations for medium-sized electrical systems. Published in the Official Bulletin on November 23, 2015. Link

#### 3 Sectorial Regulations Not Published in the Official Bulletin

Exempt Resolution No. 539, dated October 15, 2015, approving the "SIC-SING Demand Forecast Report 2015-2030", October 2015.  $\underline{\text{Link}}$ 

Exempt Resolution No. 540, dated October 15, 2015, approving the Final Technical Reports to set the short-term node prices for October 2015 for the Central Interconnected System and the Norte Grande Interconnected System. Link

Exempt Resolution No. 541, dated October 15, 2015, which approved "Report on Fuel Price Projections 2015-2030" of August 2015. <u>Link</u>

Exempt Resolution No. 542, dated October 15, 2015, which approved "Report of investment costs for generation technology" of August 2015.  $\underline{\text{Link}}$ 









# **4 Expert Panel Rulings**

Opinion No. 06-2015. Lapsed on disagreement over the Technical Report to Determine the Annual Value and the Expansion of the Trunk Transmission Systems for the 2016-2019 quadrennium. Link

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