



**CDEC-SING** Operation Statistics 2000 / 2009





Companies of the  
CDEC-SING

AES GENER  
ATACAMA AGUA  
ATACAMA MINERALS  
CARENPA  
CELTA  
CERRO COLORADO  
CODELCO NORTE  
COLLAHUASI  
EDELNOR  
EL ABRA  
EL TESORO  
ELECTROANDINA  
ENAEX  
ENORCHILE  
ESCONDIDA  
GABY  
GASATACAMA  
GRACE  
HALDEMAN  
LOMAS BAYAS  
MANTOS BLANCOS  
MERIDIAN  
MICHILLA  
MOLY-COP  
NORGENER  
QUEBRADA BLANCA  
RAYROCK  
SIERRA MIRANDA  
SPENCE  
SQM  
TRANSELEC NORTE  
TRANSEMEL  
XSTRATA COPPER - ALTONORTE  
ZALDÍVAR



*This document encloses a CD containing the published information and also includes statistics since 1993. Detailed information of charts and tables is available for spreadsheets. The information contained on the CD is also published on [www.cdec-sing.cl](http://www.cdec-sing.cl)*

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## LETTER FROM THE PRESIDENT OF THE CDEC-SING BOARD OF DIRECTORS

*In representation of the Board of Directors of the Economic Dispatch Center (CDEC in Spanish acronym) of the Interconnected System of Norte Grande (SING in its Spanish acronym) (CDEC-SING), I have the pleasure of presenting a new version of the Operational Statistics for the Sistema Interconectado del Norte Grande (SING). Through this publication, the CDEC-SING presents the operational information related to the decade of 2000 - 2009, to all the interested parties. This information corresponds to the Electricity Generation, Transmission and Consumption segments under the coordination of the CDEC-SING.*

*2009 for CDEC-SING was a year of consolidation for the new structure, which started with the application of the Supreme Decree N° 291 (DS291/2007) from the Ministry of Economy, Foment and Reconstruction.*

*In fulfillment of that set forth in the stated Decree, this Board of Directors elaborated and presented to the National Energy Commission, the Internal Regulations, which are awaiting a favorable report on behalf of this Commission and the procedure for the Designation of the Directors of the Directions, which already has a favorable report.*

*This latter Procedure allowed for the carrying out of the election of the new Operations and Tolls Director of the CDEC-SING, who began his role starting from October 2009.*



In the operational area, as has been in previous years, the operation was marked by tight supply conditions, which generated an operation with minimal reserve margins, which even motivated the application of short term consumption restrictions, which reached levels between 5% and 20% of the system consumption.

The SING operation during 2009 reached a maximum gross hourly generation of 1,907MW, while the annual gross energy given was 14,907 GWh, which meant an annual increase of 2.8% in relation with 2008. In terms of physical energy sales to end clients, these accumulated a total of 13,656 GWh during 2009, which represented a 3.3% increase in respect to the previous year.

As for the distribution per fuel type, the generation of energy injected into the SING during 2009, came in 56.6% from generating plants using coal, 22.8% from plants using diesel and 20.1% from plants that used natural gas. The rest of the supply was from hydroelectric plants with 0.5%.

When evaluating the previous figures, it must be considered that from 2004 onwards, the SING has been subject to serious restrictions in the supply of natural gas coming from Argentina, which were particularly severe during 2009. Consequently, the operation of the system had to be done under a scenario that required an elevated consumption of diesel, which meant a greater effort both for the units that use this fuel as well as from the supplying companies.

In terms of the projects carried out in 2009, new power plants whose supplies totaled 105MW were incorporated in the SING as well as BESS equipment with 12.8MW capacity. With this, the total installed capacity of the SING on December 31<sup>st</sup> 2009, reached 3,698.7 MW. This amount represents an increase of 2.9% in the installed capacity of SING in respect to the generating field that existed at the same date in 2008.

In addition, from January 2009 and as a result of the promulgation of Decree 320, The Toll Direction of the CDEC-SING proceeded to determine the payments for the usage of the sub-transmission system, monthly.

From the point of view of the continuity of supply, the performance of the SING during 2009 showed good results, not registering any total or partial loss of supply in the system, nor were there relevant events that would have affected important areas, reaching a total of 4,883 MWh of Energy Not Supplied (ENS) this year due to failures.

During 2009, 3 Discrepancies were submitted for the consideration of the Panel of Experts in line with the mechanisms and procedures that are established by the norms of the electricity sector, related with the topics that are listed below:

- Definitive Calculation of the Fixed Power 2008.  
Resolved via Ruling N° 3 - 2009.
- "Treatment of Bess Type Devices" Procedures.  
Resolved via Ruling N° 3 - 2009.
- Definitive Transfer Recovery Report corresponding to April 2009.  
Resolved via Ruling N° 11 - 2009.

For 2010, it is projected that, from the startup of the GNL Terminal's operation in Mejillones and the coal projects that are currently being built, the SING will substantially increase its sufficiency level, leaving behind a period of scarcity and high operation costs that have accompanied the SING since 2004. In the institutional framework, we must renew our Board of Directors, as in November this year the current Directory completes 2 years, formed in line with the ruling of the Supreme Decree N° 291.

On the other hand, the catastrophe that occurred in the central-southern area of the country at the beginning of the year, becomes an opportunity and challenge so that, through the Boards of Directors and the member companies of the CDEC-SING, can be perfected our contingency plans and safety criteria, both in our facilities as well as for the teams that work in them.

Finally I want to express, in the name of the Directory, thanks to the team of professionals of the CDEC-SING, led by the Operations and Toll Director and the Administration and Budget Director and to all the member companies of the CDEC-SING who collaboratively make a fundamental support to reach higher standards of quality and security in the electrical service in such an important area of the country improve the SING covers stating that, at the same time, 2010 will be a year in which important projects will be incorporated which will as the one the conditions of supply for the system substantially, added to the consolidation of the new organizational structure of the CDEC-SING, with challenges both for the Board of Directors and for the Directories of the CDEC-SING.

Rodrigo López Vergara  
President of the Board of Directors  
CDEC-SING

## BOARD OF DIRECTORS OF THE CDEC-SING

CHAIRMAN  
Rodrigo López Vergara  
TRANSELEC NORTE S.A.



SUBSTITUTE CHAIRMAN  
Carlos Aguirre Pallavicini  
AES GENER S.A.



### DIRECTORS

Segment A  
Eduardo Soto Trincado  
CELTA S.A.



Segment C  
Raúl Valpuesta Araya  
TRANSELEC NORTE S.A.



Segment A  
Juan Pablo Cárdenas Pérez  
NORGENER S.A.



Segment D  
Alfredo Cárdenas Ocampo  
TRANSELEC NORTE S.A.



Segment B  
Enzo Quezada Zapata  
ELECTROANDINA S.A.



Segment D  
Robin Cuevas Canales  
EDELNOR S.A.



Segment B  
Pedro De la Sotta Sánchez  
GASATACAMA CHILE S.A.



Segment E  
Ramón Cifuentes Baeza  
MINERA ESCONDIDA LTDA.



SECRETARY  
Alvaro Grondona Camp  
CDEC-SING LTDA.



## SUBSTITUTE DIRECTORS

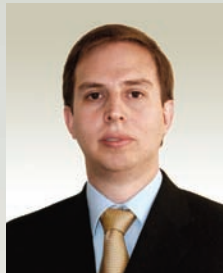
Segment A  
Miguel Buzunáriz Ramos  
CELTA S.A.



Segment A  
Jorge Andaur Rodríguez  
NORGENER S.A.



Segment B  
Ignacio Matus Brinck  
AES GENER S.A.



Segment B  
Francisco Promis Baeza  
ELECTROANDINA S.A.



Segment B  
Javier Alemany Martínez  
GASATACAMA CHILE S.A.



Segment C  
Jaime Cancino Castro  
TRANSELEC NORTE S.A.



Segment C  
Christian Perigault Sanguinetti  
TRANSELEC NORTE S.A.



Segment D  
Belisario Maldonado Molina  
TRANSELEC NORTE S.A.



Segment D  
Patricio Carmona Rojas  
EDELNOR S.A.



Segment E  
Carlos Finat Díaz  
CIA. MINERA  
DOÑA INÉS DE COLLAHUASI S.A.



## LETTER FROM THE OPERATIONS AND TOLLS DIRECTOR OF CDEC-SING

*I have the pleasure of presenting the Operational Statistics that the Economic Load Dispatch Center of the Sistema Interconectado del Norte, CDEC-SING provide annually to the agents of the sector. The statistical compendium comprises the publication of the most relevant indicators and elements of the SING's operation for the 2000 - 2009 period.*

*Product of the severe restrictions in the supply of natural gas coming from Argentina to which the SING has been subject since 2004, the operation of the system during 2009 was marked by tight supply conditions, which generated an operation with minimal reserve margins, which led to the application of short lasting consumption restrictions that reached levels of between 5% and 20% of the system's total, an operation that had to be done additionally under a scenario that required an elevated diesel requirement.*

*In terms of the projects carried out during 2009, it is worth noting the installation of 103.68MW with the Diesel Power Plant Tamaya, the extension of the Zofri Diesel Power Plant, with 4.8MW, the extension of the U15, with 2.1 MW and the addition of the BESS equipment, with 8 modules of 1.6MW each.*

*Also, during 2009 important advances were reached in the integration of free clients of the SCADA system, which have allowed for an advancement in the observing of our information system in real time, a project which we expect will continue advancing, product of the importance that this tool has for the operation of the system.*

*Along the same lines, the use of an optimization tool for the development of the short term and pre-dispatch program has been consolidated. As a result, the system has today the latest pre-dispatch model that achieves a suitable representation of the technical restrictions existing in the SING.*

*On the other hand, during 2009, the Dispatch and Control Center in Antofagasta has made important advances in the usage of the resources available in the organization; in particular, it has finished the implementation process of the tools used for the operation programming successfully, reaching autonomy in the tasks and roles associated with the re-dispatch.*

*A relevant effort during 2009, which has been based on the work of our organization, refers to the development of the diverse applications available on our website, such as support in the operation and administration of the electrical system, as well as a general statistical information platform.*

*In particular, the application created for analyzing the conditions of system sufficiency, which has a detailed record of the Greater Maintenance Program of the generating park, where one can obtain in detail the indexes of trustworthiness of the system, prevision of the demand and reserves expected among others, stands out. In this same context, and always with the view of making the processes more efficient, during 2009 new web developments that intend to ease the purchasing process and information delivery for programming have been worked on, developments that are expected to be implemented during 2010.*



*In the transmission area, Decree 320 published on January 9th 2009, that fixes the Sub-transmission Fees and its indexation formulas, which define the corresponding payments to the different user types of this segment in the transmission system, entered operation in 2009.*

*During 2009, the new version of the Technical Norm for Service Security and Quality entered operation, a normative body that incorporates adjustments and improvements in different matters, which represent an important challenge for the tasks that this CDEC must face.*

*The application and implementation of the Supreme Decree N° 291 (DS291/2007) from the Ministry of Economy, Development and Reconstruction in the CDEC-SING requires a special mention. In this context, for the fulfillment of the roles and obligations that belong to each Direction, diverse Procedures have been developed and formulated to determine the criteria, considerations and requirements in detail of the diverse matters that these Directions must face as part of the fulfillment of their roles and responsibilities. In 2010, this effort will continue, an area where important advances are expected.*

*In 2009, the technical background of an important number of projects for the modification and interconnection of SING facilities were known, at a generation, transmission and consumption level, in order to verify and authorize the tests and connections of the startup of these, something which has required important resources to attend the revision of the necessary Studies to verify the impact of the interconnection or modification in the security and quality of the SING service.*

*At the operation programming level, new operation policies were implemented for the northern zone of the SING, with the objective of keeping the security when facing simple contingencies in the transmission lines that interconnect the Central Zone with the Northern Zone. Another relevant achievement reached during the first semester of 2009, is the new overload Automatic Generation Disconnection Schematics at the Mejillones Thermoelectric Power Plant, which has allowed for an important increase in the availability of power in the system.*

*For 2010, an increase in the availability of Natural Gas resulting from the startup of the GNL Terminal's operation in Mejillones, added to the advances of the projects based on coal that are currently being built, will lead us to see an improvement in the sufficiency of the system, leaving behind a period of scarcity and high operation costs that have accompanied SING since 2004.*

*I finish by praising the collaboration and commitment of the companies represented in the CDEC-SING as well as the effort and professionalism of those who are part of our work team. I have the confidence that the coordinated work with the integrated companies as well as the professional capacities of those who accompany me, will allow our organization to successfully face the challenges of 2010.*

Daniel Salazar Jaque  
Operations and Toll Director  
CDEC-SING

## STRUCTURE OF THE CDEC-SING

DIRECTOR OF OPERATIONS AND WHEELING  
Daniel Salazar Jaque

ADMINISTRATION AND BUDGET DIRECTOR  
Alvaro Grondona Camp

SUBDIRECTOR OF OPERATIONS  
Patricio Troncoso Romero

SUBDIRECTOR OF WHEELING  
Claudia Carrasco Arancibia

HEAD OF THE DISPATCH AND CONTROL CENTER  
Raúl Moreno Tornería

HEAD OF OPERATIONS DEPARTMENT  
Patricio Valenzuela Vásquez

HEAD OF TOLLS DEPARTMENT  
José Arévalo Araneda

HEAD OF ELECTRICAL SYSTEMS DEPARTMENT  
Felipe Morales Silva







CDEC-SING ANTOFAGASTA





## INTRODUCTION AND BRIEF HISTORY

### GENERAL DESCRIPTION

The Sistema Interconectado del Norte Grande (SING) runs between Arica - Parinacota, Tarapacá and Antofagasta, the First, Second and Fifteenth regions of Chile, respectively, covering a surface area of 185,142 km<sup>2</sup>, which corresponds to 24.5% of the continental territory. The zone is characterized by an extremely dry climate, which accounts for an arid landscape that can be quite diversified in terms of relief cross-section and height. This has greatly affected population distribution and density; people definitely favor the coastal edge. The present population, based on the 2002 Census, accounts for 6.1 percent of the national total and is concentrated in a handful of widely spaced cities and villages. SING highlights:

- Scant supply of water for electric power generation.
- Electric consumption centers located far apart.
- Energy used mainly by mining companies.





## HISTORICAL BACKGROUND

Based on the SING's hydrological, climatic and geographical conditions, electric supply to consumption centers was first provided by unrelated local systems designed to meet their own needs. In late 1987 some of these systems were interconnected, giving birth to the Norte Grande Interconnected System.

Coordinated operation of the SING facilities began on July 30, 1993, when the Economic Load Dispatch Center (CDEC) of the SING (CDEC-SING) set to work. Initially the CDEC-SING was made up of three generating companies, EDELNOR S.A., ENDESA and the former Tocopilla Division of CODELCO-CHILE, today ELECTROANDINA S.A.

With the publication of DS291 in August 2008, the CDEC-SING increased to 35 members, an amount that is explained fundamentally by the incorporation of free or unregulated clients.

## CONTENTS OF THIS DOCUMENT

This document contains some of the most relevant information for the SING from January 1999 to December 2009. It is arranged in five chapters, as follows:

- The first chapter contains the letter from the President of the Board of Directors, the composition of the Directory, the letter from the Operations and Tolls Director and the structures of the Directions of the CDEC-SING.
- The second chapter shows a brief history of the CDEC-SING's creation.
- The third chapter presents the Structure and Workings of the CDEC-SING, including the regulatory framework which applies to the Members, Directory and Directions.
- The fourth chapter shows the background of the facilities and the relevant events that have occurred in the operation of the SING during 2009.
- The fifth chapter illustrates system operation statistics, from January 2000 to December 2009, with charts and tables explaining the evolution of generation and consumption, along with the amounts and prices of energy and power transfers between member companies

## BRIEF HISTORY

Initially, the electric supply needs of the Norte Grande region were met with electric systems that evolved along separate ways.

In 1980 the National Energy Commission (NEC), convinced of the benefits of interconnected electric systems, conducted a study on the feasibility of connecting the Tocopilla-Chuquicamata system of CODELCO-CHILE's Chuquicamata Division with EDELNOR's systems in the Norte Grande region. EDELNOR, CODELCO, ENDESA and SOQUIMICH were of great help.

The study yielded extremely positive results, and the NEC gave the project a decided boost.

The first steps were taken in 1983: CODELCO and EDELNOR agreed on the construction work required for Unit N° 12, the first coal-steam unit to operate within the SING. Later, in 1984, a contract provided that CODELCO-CHILE's Tocopilla Division should supply 56 MW to EDELNOR as from November 1987. This amount would subsequently grow to 101 MW.

## INTRODUCTION AND BRIEF HISTORY



With the decisive support of the National Energy Commission (NEC) and the joint efforts of EDELNOR, CODELCO-CHILE and ENDESA, the SING saw the light in November 1987. The next logical step for CODELCO was to add a modern Load Dispatch Center in Tocopilla, equipped with a Supervisory Control and Data Acquisition (SCADA) system. Besides, CODELCO expanded its Tocopilla Power Plant by installing two 125-MW coal-steam units, No. 14 and No. 15, and built 220-kV transmission lines running from the Tocopilla to the Crucero and Chuquicamata Substations.

EDELNOR, in turn, set up 220-kV lines connecting the Tarapacá and Antofagasta systems. Additionally, it erected the Mejillones and Pozo Almonte Terminal Substations, together with the Crucero Substation, which provided a link to the CODELCO system. EDELNOR, furthermore, raised the Arica-Pozo Almonte voltage to 110 kV and reinforced the Iquique-Pozo Almonte connection. Mejillones was also connected with Antofagasta in 110 kV and a Load Dispatch Center located in Antofagasta, equipped with SCADA resources was added.

In 1993 ENDESA set into operation its 74-MW Mejillones Power Plant in the city of the same name. ENDESA joined the system on July 30, 1993, giving origin to the coordinated operation of generation and transmission facilities, under the provisions of the 1982 Chilean Electricity Law (Decree Law N° 1 of 1982) and the Coordination Regulations set forth in Supreme Decree (SD) N°6 of 1985 (SD N°6/1985). By the time the CDEC-SING came to life, total installed power amounted to 745.1 MW.

NORGENER was added to the CDEC-SING in February 1995 through the commercial operation of Unit N° 1, located in the city of Tocopilla.

EDELNOR rented the Mantos Blancos Diesel Power Plant in September 1995. Besides, it signed a contract with EEC-SA for the total output of the Cavancho Power Plant as from November 1995.

Also in 1995, ENDESA began to operate Gas Turbine N° 3 at the Mejillones Substation. EDELNOR's Unit N° 1, at the Mejillones Thermoelectric Power Plant, was integrated in 1995. EDELNOR contracted the total production of the ENAEX Power Plant as from February 1996. During 1996 as well, CODELCO-CHILE's Tocopilla Division changed its corporate name to ELECTROANDINA. NORGENER's Unit N° 2 was connected to the system in 1997. The NORGENER substation was also interconnected to the system, in addition to the 220-kV, double circuit transmission line extending from the NORGENER Substation to the Crucero Substation. ENDESA's gas turbine N° 3 was removed from the system on January 1, 1997. In 1998, EDELNOR activated Unit N° 2 of the Mejillones Thermal Power Plant. CELTA, in turn, joined the CDEC-SING through the commercial operation of a gas turbine called TGTAR. In October 1998, NOPEL was added to the CDEC-SING.

During 1999, the CDEC-SING allowed the following interconnections: CELTA's coal steam Unit N° 1 at its Tarapacá Thermal Power Plant; NOPEL's combined cycles N° 1 and N° 2 at its Atacama Power Plant; and GENER's gas turbines N° 11 and N° 12 at its Salta Power Plant (in April 1999).

ENDESA's gas turbines in Mejillones were removed from the SING on January 3, 1999, to be transferred to the Interconnected Central System (SIC). On May 12, 1999, ENDESA's diesel gas turbine in Patache was also removed from the SING to be transferred to the SIC. ENDESA, therefore, left the CDEC-SING. On November 29, 1999, this diesel gas turbine, then owned by CELTA, was reconnected to the SING. A number of lines were connected to the transmission system in 1999: NOPEL's 220-kV Atacama-Encuentro and Encuentro-Crucero lines in February; GENER's 220-kV Andes-Oeste line, the two circuits of its 220-kV Andes-Nueva Zaldívar line, and its 345-kV Salta-Andes line, in April; GENER's Laberinto-Mantos Blancos line in May; and EDELNOR's 110-kV Capricornio-Alto Norte and Capricornio-Antofagasta lines in November.



Steam turbine N° 10 at GENER's Salta Power Plant joined the generating system in April 2000, while EDELNOR's combined cycle Unit N° 3 at its Mejillones Power Plant started commercial operations in June 2000.

ELECTROANDINA's combined cycle Unit U16 at the Tocopilla Thermoelectric Power Plant was put into service in February 2001.

In July 2001, the National Energy Commission, via the Exempt Resolution N° 236, in line with the regimen of the DS N° 327, favorably reported the Internal Regulations of the CDEC-SING.

GENER changed its corporate name to AES GENER in August 2001.

In late 2001 and early 2002, NOPEL's 220-kV Atacama-Esmeralda, Tarapacá-Cóndores, and Cóndores-Parinacota lines were connected, in order to supply electricity to the Antofagasta, Iquique and Arica distribution companies, respectively. For this purpose a new company, TRANSEMEL, was created. TRANSEMEL is not a member of the CDEC-SING; it is affiliated to the distribution companies whose transmission facilities were used. In this way new substation and transmission lines were put into service, while some existing ones were modified.

In October 2002 NOPEL changed its corporate name to GASATACAMA GENERACIÓN.

GASATACAMA GENERACIÓN initiated the commercial operations of the TG2A gas turbine of combined cycle N° 2 in November 2002.

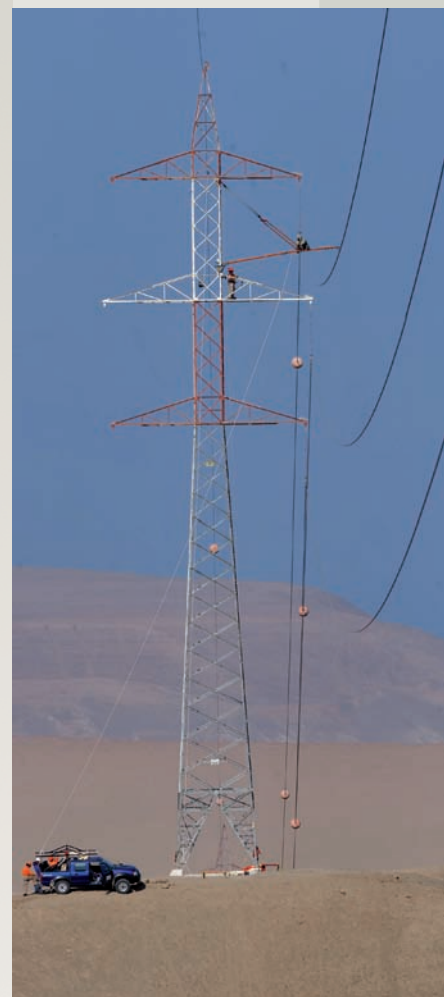
In June 2003, under the provisions contained in Article N° 168 of SD N° 327, HQI TRANSELEC NORTE S.A. joined the CDEC-SING upon acquiring transmission assets, first from CELTA and then from GASATACAMA GENERACIÓN.

The 220-kV Encuentro-Collahuasi line owned by the Doña Inés de Collahuasi mining company was connected in June 2004.

As from December 10, 2004, ELECTROANDINA announced the removal from service of its Unit U09.

In 2005, transmission facilities owned by mining companies were placed into service, as follows:

- 220/69/13.8 kV Sulfuros Substation (Minera Escondida).
- 220 kV Domeyko - Sulfuros Line (Minera Escondida).
- 220/23 kV Spence Substation (Minera Spence).
- 220 kV Encuentro - Spence Line (Minera Spence).
- 220/100/13.8 kV Salar Substation (Codelco Norte).
- 220 kV Crucero Salar, Tower N° 323 - Salar Line (Codelco Norte).
- 220 kV Salar - Chuquicamata, Salar - Tower N° 323 Line (Codelco Norte).
- 110 kV Salar - km6 Line (Codelco Norte).



## INTRODUCTION AND BRIEF HISTORY

HQI TRANSELEC NORTE S.A. changed its corporate name to TRANSELEC NORTE S.A. in October 2006.

During 2006, new transmission facilities owned by mining companies were set into service, as follows:

- 220 kV Atacama - O'Higgins Line was changed into 220 kV Mejillones - O'Higgins Line (Minera Escondida).
- Nueva Victoria Substation (SQM).
- Tap Off Barriles Substation (Grace).
- Mantos de la Luna Substation (Grace).
- 110 kV Tap Off Barriles - Mantos de la Luna Line (Grace).

In February 2007, ENORCHILE's Zofri Diesel Power Plant connected at the Iquique 13.8kV bar was incorporated. This Power Plant is represented in the CDEC-SING by NORGENER.

In September 2007, the project that makes feasible the connection of the steam turbine of Salta Power Plant, TV10, to the Sistema Argentino de Interconexión (Argentinean Interconnected System or SADI) was carried out. This way, the units of the combined cycle of the Salta Power Plant add to the existing configurations declared in the SING operation, those corresponding to one or two gas turbines connected to the SING and the steam turbine connected to the SADI.

Additionally, during 2007, new transmission installations were put into service, which are indicated as follows:

- SE021-A Substation(SQM)
- 66kV Tap Off Line La Cruz - SE021; Mobile Substation . SE021 (SQM)
- 66kV Tap Off Line La Cruz - SE021; La Cruz Tap Off - Mobile Substation (SQM)
- Capricornio - Sierra Miranda 110 kV Line (EDELNOR).
- Zofri Diesel Power Plant - Iquique 13.8 kV Line (ENORCHILE)
- Zofri Diesel Power Plant 13.2/0.4 kV Transformer N°1 and N°2 (ENORCHILE).
- Laberinto - Gaby 220 kV Line (ELECTROANDINA)

During 2008, the following startups were registered:

- Gaby Substation.
- Llanos and Aguas Blancas Substations (Aguas Blancas).
- Aggreko Diesel Power Plant (Minera Escondida).
- Backup generating units for DMC (Cerro Colorado).

From January 2008, product of the enactment of the Supreme Decree N° 207 that fixed the facilities of the trunk transmission system and the area of common influence, the Toll Direction of the CDEC-SING began to make the calculations and liquidations that the current norm entrusts in the area of tolls for the trunk transmission system.

In August 2008, the SD 291 of the Ministry of Economy, Development and Reconstruction was published in the Official Journal, marking a substantial change in the workings of the CDEC: Within the changes, the most relevant are the incorporation of free or non-regulated clients as members, the creation of a new Administration and Budget Authority, the determination of five segments within the members of the CDEC, and the obligation of the authorities to elaborate their own procedures that adjust to the new norm.

During 2009, the following service startups were registered:

- Tamaya Diesel Power Plant: Facility with 10 Units with a total of 103.68 MW.
- Zofri Diesel Power Plant: Extension of the Zofri Power Plant, 6 units with a total of 4.8 MW.
- Tocopilla Power Plant: Extension of the U15 with 2.1 MW.
- BESS Devices: Installation of 8 modules of 1.6MW each.
- Mejillones - Enaex 110 kV line.
- Minera Meridian Diesel Power Plant (El Peñón): Five 1.2 MW units for own usage.

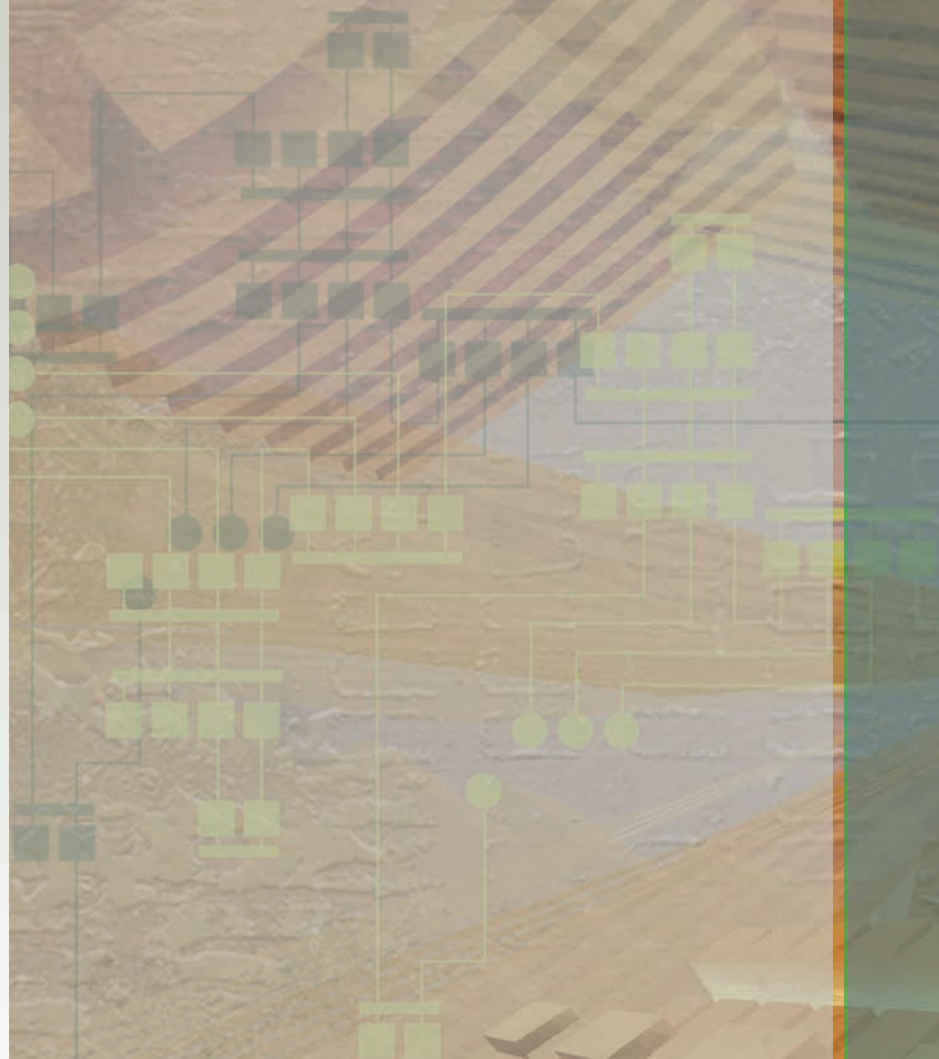
Finally, the gross installed power of the SING to December 2009 reached 3,698.7 MW.

From January 2009 and product of the enactment of the Supreme Decree N° 320, that fixed the sub-transmission fees and its indexation formulas, the Toll Direction of the CDEC-SING began to make the calculations and liquidations that the Decree N° 291 entrusts in the toll area for the sub-transmission segment.





## STRUCTURE AND OPERATIONS OF THE CDEC-SING



## STRUCTURE AND OPERATIONS OF THE CDEC-SING

### REGULATORY FRAMEWORK

The normative framework that regulates the CDEC-SING, current to December 31st 2009, is found in the DFL4/2006, General Law for Electrical Services, and the current regulation, in particular the DS 291/2007, from which the CDEC-SING is responsible for:

- a) Maintaining reliable electric service within the SING.
- b) Guaranteeing the most economic operation to SING facilities as a whole.
- c) Guaranteeing open access to trunk transmission and subtransmission systems.
- d) Guaranteeing the open access to the additional transmission systems.
- e) Determining the economic transfers between the members.
- f) Making the studies and reports required by the National Energy Commission, the Electricity and Fuels Superintendence, or the Ministry of Economy, within the scope of their respective attributions, and the rest that the current norm establishes.

In line with that established in the General Law for Electrical Services, this coordination must be done according to the norms and regulations that the National Energy Commission (CNE in its Spanish acronym) proposes.

Also, coordination instructions issued by the CDEC-SING are mandatory for all system facilities, including electric power generation plants; trunk transmission, subtransmission and additional lines; and electric substations, including primary distribution substations and consumption bars of customers not subject to price regulations and directly supplied from a transmission system's facility, interconnected among them, allowing the generation, transportation and distribution of electric power within the system.





## MEMBER COMPANIES

In accordance with SD N°6/1985, which was in effect when the CDEC-SING was incorporated but is now repealed, electric companies with an installed generating capacity exceeding the CDEC-SING's total installed capacity by 2 percent at the time of its creation were entitled to join. Also eligible were autoproducers with an installed generation capacity that under normal conditions would surpass the sum of their peak annual demand or 2 percent of the system's installed power at the time.

When the CDEC-SING was incorporated, the system had an installed power of 745.1 MW, so the minimum installed power required for membership totaled 14.90 MW.

SD N° 327 added other companies to the CDEC-SING as well: those whose main line of business was the management of electric power transmission systems with a voltage level equal to or higher than 23 kV, and at least one stretch of line measuring more than 100 km in length. Likewise, membership was extended to electric power companies with an installed generating capacity of over 9 MW.

Additionally, the SD 291, issued during 2008, includes as members, the segment named free clients, defining them as those whose consumption bars are not submitted to price regulation, and that are supplied directly from transmission facilities.

Up to December 2009, the number of members, with the incorporation of the free clients, increased from seven to thirty five.

Currently, the CDEC-SING comprises the owners of the electrical generation power plants, the transmission, sub-transmission and additional lines at trunk level, electrical substations, including the primary distribution substations and consumption bars of the users that are not subject to the regulation of prices supplied directly from facilities of a transmission system.

The members of the CDEC-SING have, as their main rights, to attend the election of the member(s) of the Board of Directors, and to go directly to the Panel of Experts to resolve the Discrepancies. In the same way, they must be subject to the instructions for the coordination of the operation that comes from the Directions and attend the financing of the budget of the CDEC-SING.

Additionally, every member of the Economic Load Dispatch Center, separately, is responsible for the fulfillment of the obligations from the General Law of Electrical Services and its regulations. The rest of the entities that must subject the operation of their facilities to the coordination of the CDEC-SING, respond in the same way for the fulfillment of the instructions and programs that the latter establishes.



## STRUCTURE AND OPERATIONS OF THE CDEC-SING

### CDEC-SING BOARD OF DIRECTORS

The Board of Directors of the CDEC-SING is made up of representatives of the generating, trunk transmission, and sub-transmission companies, as well as a representative of the free clients, according to the following structure:

- a) 2 representatives of owners of the electrical power plants whose total installed capacity is lower than 300 MW;
- b) 3 representatives of owners of electrical power plants whose total installed capacity is equal to or above 300 MW;
- c) 2 representatives of owners of trunk transmission facilities;
- d) 2 representatives of sub-transmission facility owners, and
- e) 1 representative of free clients.

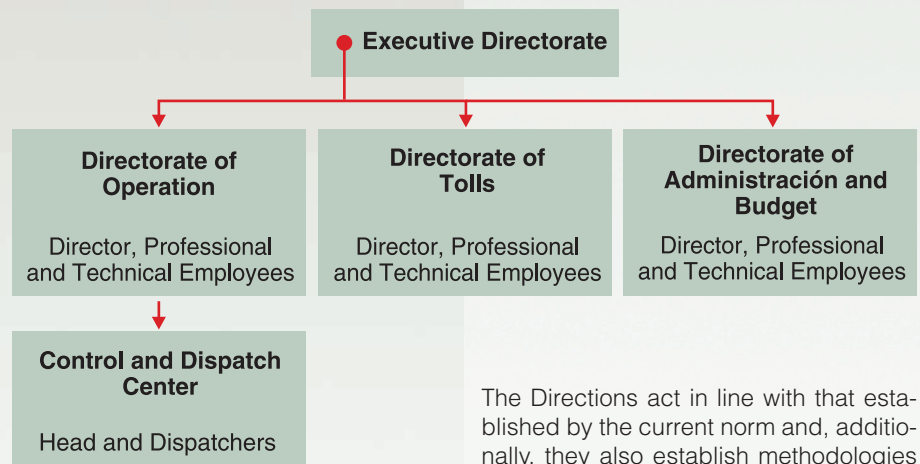
The main roles of the Directory are: to watch over the compliance with the norm aspects, check the proper workings of the Operations, Tolls, Administrative, and Budget Directions. Among their main activities is the designation of the Directors of the Directions, the creation of the Internal Regulations and the approval of the Annual Budget.



### CDEC-SING DIRECTIONS

The CDEC-SING has 3 Directions, which are defined as entities that are eminently technical and executive, that carry out their roles in line with the current norm. These are the Operation Direction, the Tolls Direction and the Administration and Budget Direction.

The responsible parties of the Directions are named for four years, by agreement of the Directory, and may be removed and reelected by the Directory, for only one more period.



The Directions act in line with that established by the current norm and, additionally, they also establish methodologies and mechanisms for work through the so called "Procedures", which are destined to determine the criteria, considerations and requirements in detail that each Direction needs to fulfill their roles and obligations.



## CDEC-SING OPERATION DIRECTION

The Operation Direction is responsible, among other roles, for:

- a) Establishing, coordinating and preserving the system's global service security, in line with the corresponding technical norms;
- b) Making the planning of the short, medium and long term operations, and informing this duly to the respective Dispatch and Control Center;
- c) Making the planning and coordination of the maintenance of the facilities subject to coordination;
- d) Controlling the fulfillment of the programs established in operation planning, noting the deviations and their causes and setting the measures that lead to the correction of these deviations;
- e) Coordinating the load disconnection in the consumption bars, as well as other measures that are necessary to preserve the security of the service; and
- f) Calculating the instantaneous marginal costs of the electrical energy in all the bars and verifying the respective balances between generating companies.

## CDEC-SING TOLLS DIRECTION

The Tolls Direction is responsible, among other roles, for:

- a) Determining the balances and transfers of energy, power and complementary services among the companies that participate in each case;
- b) Determining the incomes from each section of the trunk transmission system, through the valuing of electrical transfers between members, which are done monthly;
- c) Making the calculations and payments of tolls from facilities of the trunk transmission system, the sub-transmission system and additional transmission systems, from all electrical companies that inject or withdraw energy and power,
- d) Making and awarding international public bids for new lines and trunk substations;
- e) Annually analyzing the consistency of the facilities to develop and expand the trunk transmission system, with the effective developments in generation, interconnections and the evolution of the demand; and
- f) Calculating the unit tolls applicable to the electricity withdrawal to supply the consumption of users or clients.



## STRUCTURE AND OPERATIONS OF THE CDEC-SING

### CDEC-SING ADMINISTRATION AND BUDGET DIRECTION

The Administration and Budget Direction is responsible, among other roles, for:

- a) Calculating the amount to be financed by the members for the effects of CDEC-SING's annual budget;
- b) Creating, coordinating, executing and administering the CDEC-SING's annual budget, including the disaggregations corresponding to the Directory, the Directions and the Dispatch and Control Center;
- c) Administering the regimen of the hiring of members of the Directory and of personnel of the Directions and Control and Dispatch Center as well as the external third parties for the effects of studies and consultancy;
- d) Administering the regimen of purchases of the Directory, Directions and Control and Dispatch Center;
- e) Informing about the non-compliance of any obligation in relation to the financing of CDEC-SING to the Commission and to the Superintendence;
- f) Calculating, receiving and administering, in line with the annual budget, the amounts of the financing that correspond for every member, according to the mechanism established in this regulation; and
- g) Reporting to the Directory, half-yearly, about the advance of the execution and budget planning of the CDEC-SING.

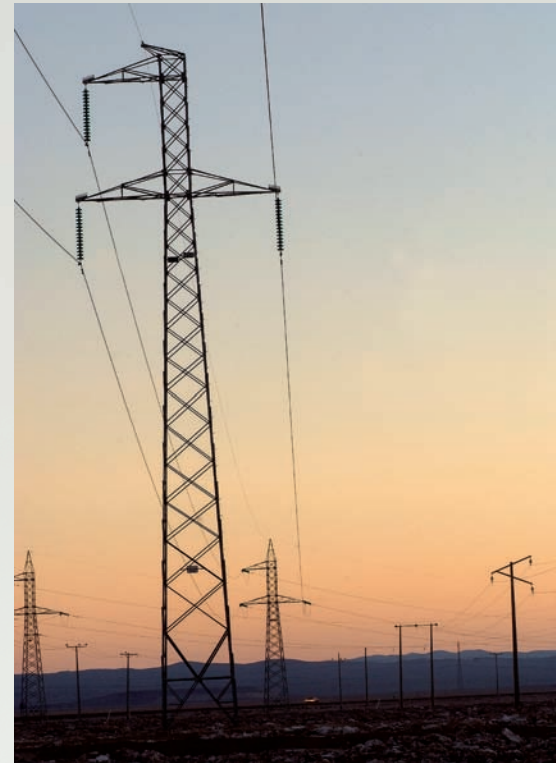
### ECONOMIC OPERATION OF THE SING

The economic operation of the SING assigns priority to dispatch from units with the lowest variable production costs. The variable production cost of a generating unit is defined as specific fuel consumption multiplied by fuel price, plus a non-fuel variable cost that is chiefly accounted for by spare parts, chemical additives and lubricants.

For an appropriate comparison of generation costs at each generating unit, a variable cost table is applied. The table shows the variable production costs of each generating unit as related to the system's load center or basic node, through factors that encompass marginal losses in the transmission grid (penalty factors). The present load center is the 220-kV Crucero node.

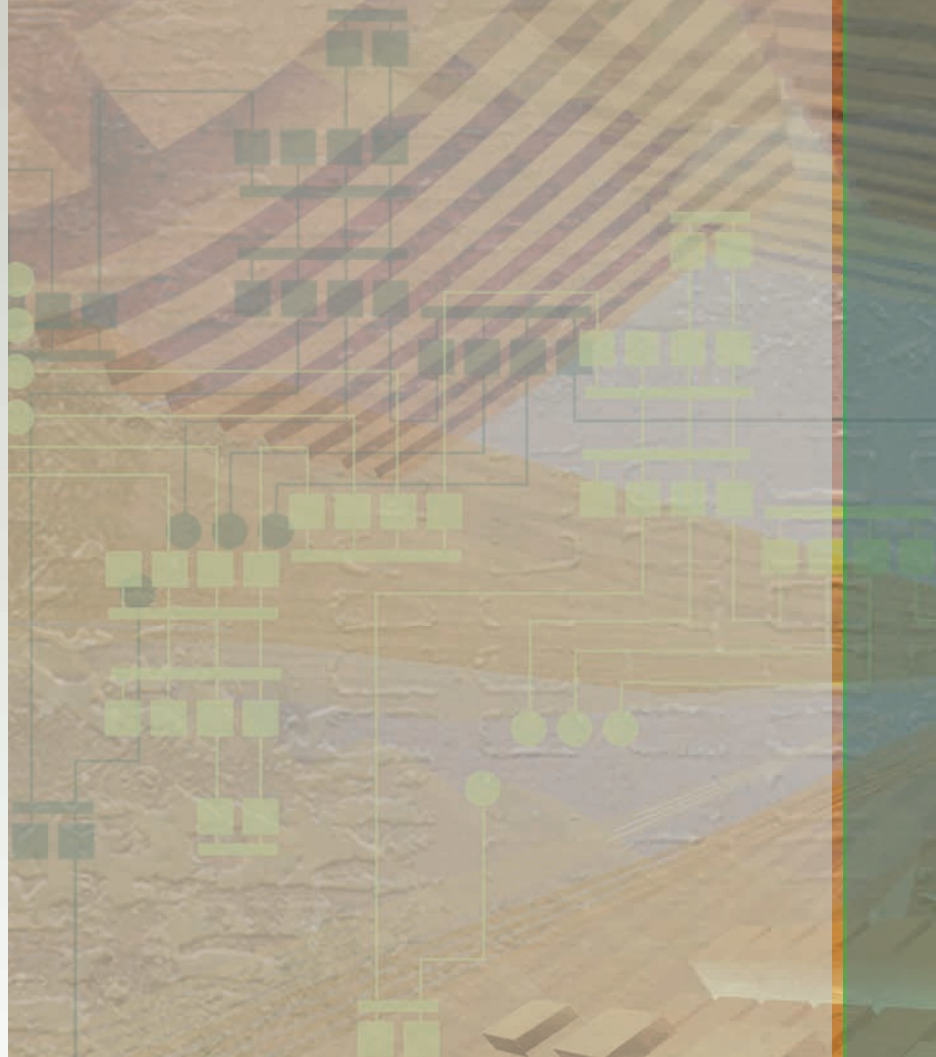
Operations are planned and marginal costs determined on a weekly basis. The result is a generation schedule that considers hourly demand forecasts, generating unit maintenance and transmission systems. Also taken into account are the technical restrictions of generating units, such as maximum and minimum power limits, startup times and minimum operating times.

The CDEC-SING Dispatch and Control Center provides real-time coordination of the daily schedule with the corresponding Control Centers, making any real-time operation corrections required to absorb variations or deviations.





## INFORMATION ABOUT THE FACILITIES



## SING GENERATING UNITS 2009

Owner	Name of Power Plant	Unit	Nº of Components	Gross Total Power [MW]
Celta	Termoeléctrica Tarapacá	TGTAR (1)	1	23,750
		CTTAR	1	158,000
Edelnor	Chapiquiña	CHAP	2	10,200
		Diesel Arica	M1AR	2,997
			M2AR	2,924
			GMAR	8,400
	Diesel Iquique	SUIQ	3	4,200
		MIIQ	2	2,924
		MAIQ	1	5,936
		TGIQ	1	23,750
		MSIQ	1	6,200
	Termoeléctrica Mejillones	CTM1	1	165,900
		CTM2	1	175,000
		CTM3	2	250,750
	Diesel Mantos Blancos (2)	MIMB	10	28,640
	Diesel Enaex (5)	DEUTZ	3	1,959
		CUMMINS	1	0,722
Electroandina	Termoeléctrica Tocopilla	U10	1	37,500
		U11	1	37,500
		U12	1	85,300
		U13	1	85,500
		U14 (8)	1	136,400
		U15	1	132,400
		U16	2	400,000
		TG1	1	24,698
		TG2	1	24,931
		TG3 (4)	1	37,500
	Diesel Tamaya	SUTA	10	103,680
AES Gener	Salta	CC SALTA (6)	3	642,800
Gasatacama Generación	Atacama	CC1	3	395,900
		CC2	3	384,700
Norgener	Termoeléctrica Norgener	NT01	1	136,300
		NT02	1	141,040
Cavancha	Cavancha (3)	CAVA	1	2,602
Enorchile	Diesel Estandartes	ZOFRI_1-6	2	0,900
		ZOFRI_2-5	4	5,160
		ZOFRI 7-12	6	4,800
Inacal	Diesel Inacal	INACAL	4	6,800
<b>SYSTEM TOTAL AT DECEMBER 31<sup>ST</sup> 2009</b>				<b>3.698,663</b>

Notes: abbreviations will be used in tables and charts for the names of member companies, as follows:

Celta: Celta S.A.  
 Edelnor: Edelnor S.A.  
 Electroandina: Electroandina S.A.  
 AES Gener: AES Gener S.A.  
 Gasatacama: Gasatacama Generación S.A.

Norgener: Norgener S.A.  
 Cavancha: Cavancha S.A.  
 Enorchile: Enorchile S.A.  
 Inacal: Inacal S.A.



Injection Busbar	Type of Unit	Year Put into Service in the System
Tarapacá 220 kV	Diesel-Gas Turbine	1998
Tarapacá 220 kV	Steam-Coal	1999
Arica 66 kV	Run-of-the-river hydro plant	1967
Arica 66 kV	Diesel Engine	1953
Arica 66 kV	Diesel Engine	1961-63
Arica 66 kV	Diesel Engine	1973
Iquique 66 kV	Diesel Engine	1957
Iquique 66 kV	Diesel Engine	1963-64
Iquique 66 kV	No. 6 FO Engine	1972
Iquique 66 kV	Diesel-Gas Turbine	1978
Iquique 66 kV	No. 6 FO Engine	1985
Chacaya 220 kV	Steam-Coal	1995
Chacaya 220 kV	Steam-Coal	1998
Chacaya 220 kV	Natural Gas Combined Cycle	2000
Mantos Blancos 23 kV	No. 6 FO Engine	1995
Enaex 110 kV	Diesel Engine	1996
Enaex 110 kV	Diesel Engine	1996
Central Tocopilla 110 kV	Vapor-FO 6	1970
Central Tocopilla 110 kV	Vapor-FO 6	1970
Central Tocopilla 110 kV	Steam-Coal	1983
Central Tocopilla 110 kV	Steam-Coal	1985
Central Tocopilla 220 kV	Steam-Coal	1987
Central Tocopilla 220 kV	Steam-Coal	1990
Central Tocopilla 220 kV	Diesel - Natural Gas Turbine	2001
Central Tocopilla 110 kV	Diesel-Gas Turbine	1975
Central Tocopilla 110 kV	Diesel-Gas Turbine	1975
Central Tocopilla 220 kV	Diesel - Natural Gas Turbine	1993
Central Tamaya 110 kV	No. 6 FO Engine	2009
Central Salta 345 kV	Natural Gas Combined Cycle	2000
Central Atacama 220 kV	Natural Gas Combined Cycle	1999
Central Atacama 220 kV	Natural Gas Combined Cycle	1999
Norgener 220 kV	Steam-Coal	1995
Norgener 220 kV	Steam-Coal	1997
Iquique 66 kV	Run-of-the-river hydro plant	1995
Iquique 13.8 kV	Diesel Engine	2007
Iquique 13.8 kV	Diesel Engine	2007
Iquique 66 kV	Diesel Engine	2009
La Negra 23 kV	No. 6 FO Engine	2009

- (1) During the period January - November 1999 the TGTAR Unit belonged to Endesa. From May 12<sup>th</sup> 1999 it was transferred to SIC and was reintegrated to SING on November 29<sup>th</sup> 1999, as property of Celta.
- (2) The Diesel Mantos Blancos Power Plant is represented at the CDEC-SING by Edelnor.
- (3) The Cavancho Power Plant is represented at the CDEC-SING by Edelnor.
- (4) The Gas Turbine has been available for natural gas operation since September 2000.
- (5) The Enaex Diesel Power Plant is represented in the CDEC-SING by Gasatagama until May 2007. From June 2007 it is represented by Edelnor.
- (6) The steam turbine TV10 of the CC Salta unit, upon requirement of the Organism In Charge of the Dispatch (OCD) of the Argentinean Republic, may be connected to the Argentinean Interconnection System (SADI in its Spanish acronym) supplying a maximum power of 226.8 MW.
- (7) The GMAN Unit was withdrawn from the Antofagasta Diesel Power Plant on January 17<sup>th</sup> 2008.
- (8) The U14 Unit increased its gross power from 128,300 to 136,400 MW on April 29<sup>th</sup> 2008.
- (9) The U15 Unit increased its gross power from 130,300 to 132,400 MW on June 12<sup>th</sup> 2009.

## SING TRANSMISSION LINES

Owner	Transmission Line	Voltage (kV)	N° of Circuits	Approx. Legth (km)	Capacity (MVA)	Type of systems	Year Put into service
Edelnor	Crucero - Lagunas 1	220	1	174,0	328	Additional	1987
	Chacaya - Crucero	220	1	152,7	328	Additional	1987
	Chacaya - Mantos Blancos	220	1	66,0	377	Additional	1996
	Chacaya - Mejillones	220	1	1,3	377	Subtransmission	1987
	Lagunas - Pozo Almonte	220	1	70,0	328	Additional	1987
	Arica - Pozo Almonte	110	1	216,0	35	Subtransmission	1987
	Capricornio - Alto Norte	110	1	44,1	137	Additional	2000
	Capricornio - Antofagasta	110	1	28,0	137	Subtransmission	2000
	Capricornio - Sierra Miranda	110	1	25,1	23	Additional	2007
	Chacaya - Mejillones	110	1	1,4	122	Additional	1995
	Salar - Calama	110	1	14,1	69	Subtransmission	1982
	Mejillones - Antofagasta	110	1	63,3	91	Subtransmission	1987
	Central Chapiquiña - Arica	66	1	84,0	48	Additional	1967
	Central Diesel Arica - Arica	66	1	6,8	41	Subtransmission / Additional	1964
	Central Diesel Iquique - Iquique	66	1	1,6	48		1970
	Iquique - Pozo Almonte 1	66	1	44,0	41	Subtransmission	1964
	Iquique - Pozo Almonte 2	66	1	39,2	56	Subtransmission	1987
	Pozo Almonte - Tamarugal	66	1	20,8	10	Subtransmission	1968
Electroandina	Central Tocopilla - Crucero	220	2	71.4x2	330x2	Additional	1986
	Crucero - Chuquicamata	220	1	69,8	330	Additional	1986
	Crucero - Salar (ver nota 1)	220	1	75,4	330	Additional	2005
	Salar - Chuquicamata (ver nota 2)	220	1	19,3	330	Additional	2005
	Crucero - El Abra	220	1	101,0	330	Additional	1995
	Crucero - Radomiro Tomic	220	1	82,0	450	Additional	1996
	Laberinto - Gaby	220	1	62,0	183	Additional	2007
	Tap Off El Loa - El Loa	220	1	8,4	91,4	Additional	2000
	Central Diesel Tamaya - A	110	1	127	90	Additional	2009
	Central Diesel Tamaya - Salar	110	1	138	90	Additional	2009
	Central Tocopilla - A.Circuito N°1	110	1	141	90	Additional	1910
	Central Tocopilla - A.Circuito N°2	110	1	141	90	Additional	1910
	Central Tocopilla - Central Diesel Tamaya	110	2	14x2	90x2	Additional	2009
AES Gener	Central Salta - Andes	345	1	408,0	777	Additional	1999
	Andes - Oeste	220	1	38,0	290	Additional	1999
	Andes - Nueva Zaldívar	220	2	63.3x2	740	Additional	1999
	Nueva Zaldívar - Zaldívar	220	1	0,2	360	Additional	1994
	Laberinto - Mantos Blancos	220	1	70,0	290	Additional	1999
Norgener	Norgener - Crucero	220	2	72x2	948	Additional	1997
	Laberinto - Oeste	220	1	85,0	290	Additional	1998
	Laberinto - Lomas Bayas	220	1	10,0	209	Additional	1997
	Oeste - Minsal	110	1	33,0	50	Additional	1997
Transelect Norte	Atacama - Encuentro	220	2	153x2	416x2	Additional	1999
	Atacama - Esmeralda	220	1	70,0	189	Subtransmission	2001
	Crucero - Encuentro 1	220	1	0,8	404	Trunk	1999
	Crucero - Encuentro 2	220	1	0,8	404	Trunk	2000
	Crucero - Lagunas 2	220	1	173,2	183	Additional	1998
	Tarapacá - Lagunas	220	2	56x2	200x2	Additional	1998
	Tarapacá - Cóndores	220	1	70,0	189	Subtransmission	2002
	Cóndores - Paríacota	220	1	225,0	189	Subtransmission	2002
Minera Zaldívar	Crucero - Laberinto	220	1	133,0	330	Additional	1994
	Laberinto - Nueva Zaldívar	220	1	75,0	330	Additional	1994

Notes: (1) Ownership of the line is shared, as detailed below:

Crucero - Tower 340 Stretch owned by Electroandina; Tower 340 - Salar Stretch owned by Codelco Norte.

(2) Ownership of the line is shared, as detailed below:

Salar - Tower 340 Stretch owned by Codelco Norte; Tower 340 - Chuquicamata Stretch owned by Electroandina.



Owner	Transmission Line	Voltage (kV)	N° of Circuits	Approx. Length (km)	Capacity (MVA)	Type of systems	Year Put into service
Minera Escondida	Atacama - Domeyko	220	2	205x2	203x2	Additional	1999
	Mejillones - O'Higgins	220	1	73,0	183	Additional	2006
	Crucero - Escondida	220	1	236,0	270	Additional	1995
	Domeyko - Escondida	220	1	7,0	180	Additional	1999
	Domeyko - Laguna Seca	220	1	13,0	256	Additional	2001
	Domeyko - Planta Óxidos	220	1	1,0	100	Additional	1998
	Domeyko - Sulfuros	220	1	1,0	293	Additional	2005
	Nueva Zaldívar - Sulfuros	220	1	13,0	293	Additional	2006
	O'Higgins - Coloso	220	1	32,0	163	Additional	1993
	O'Higgins - Domeyko	220	1	128,0	180	Additional	1999
	Zaldívar - Escondida	220	1	14,0	300	Additional	1995
Codelco Norte	Chuquicamata - A	100	2	9x2	100x2	Additional	-
	Chuquicamata - Km6	100	1	5,9	100	Additional	-
	Salar - Km6	100	2	2,2x2	2x62	Additional	-
Minera Collahuasi	Lagunas - Collahuasi 1	220	1	118,0	180	Additional	1996
	Lagunas - Collahuasi 2	220	1	118,0	180	Additional	1998
	Encuentro - Collahuasi	220	1	201,0	109	Additional	2004
Minera Quebrada Blanca	Collahuasi - Quebrada Blanca	220	1	18,0	180	Additional	2002
Minera El Tesoro	Encuentro - El Tesoro	220	1	90,0	125	Additional	2000
Minera Spence	Encuentro - Spence	220	1	67,0	318	Additional	2005
Planta Molycop	Chacaya - Molycop	220	1	0,8	291	Additional	2004
Fundición Alto Norte	Antofagasta - Alto Norte	110	1	24,0	122	Subtransmission/Additional	1993
Minera Michilla	Mejillones - El Lince	110	1	72,0	30	Additional	1991
Minera Cerro Colorado	Pozo Almonte - Cerro Colorado	110	1	61,0	164	Additional	1993
Grace	Barriles - Mantos de la Luna	110	1	27,0	70	Additional	2005
Minera Meridian	Tap Off Palestina - El Peñón	66	1	65,7	60	Additional	1999
Enaex	Endesa - Enaex	110	1	1,4	93	Additional	1999
Endesa	Mejillones - Endesa	110	1	0,08	93	Additional	1999
Minera Rayrock	Tap Off Pampa - Iván Zar	66	1	17	8	Additional	1994
Minera Haldeman	Pozo Almonte - Sagasca	66	1	55,0	5	Additional	1971
Emelari	Tap Off Quiani - Quiani	66	1	3,97	16	Subtransmission	1998
Transemel	Esmeralda - La Portada	110	1	17,1	73	Subtransmission	2001
	Esmeralda - Centro	110	1	0,6	73	Subtransmission	2001
	Esmeralda - Uribe	110	1	16,2	73	Subtransmission	2001
	Esmeralda - Sur	110	1	6,7	73	Subtransmission	2002
	Cóndores - Alto Hospicio	110	1	2,7	80	Subtransmission	2002
	Alto Hospicio - Dragón	110	1	2,2	80	Subtransmission	2002
	Cóndores - Palafitos	110	1	8,6	73	Subtransmission	2002
	Cóndores - Pacífico	110	1	10,5	73	Subtransmission	2002
	Parinacota - Quiani	66	1	3,9	44	Subtransmission	2002
	Parinacota - Chinchorro	66	1	3,5	44	Subtransmission	2002
	Parinacota - Pukará	66	1	2,5	44	Subtransmission	2002
Total 66 kV Lines				348,2	465		
Total 110 kV Lines				1.241,0	2.366		
Total 220 kV Lines				4.199,2	15.026		
Total 345 kV Lines				408,0	777		

**TOTAL SING****6.196,4****18.634**

## MAJOR SING CUSTOMERS AT DECEMBER 2009

CUSTOMER	CATEGORY	SUPPLY BUSBAR	SUPPLIER
ACF Minera	Mining	Lagunas 220 kV	Celta
Aguas Blancas	Mining	Mejillones 220 kV	Edelnor
Aguas del Altiplano	Industrial	Pozo Almonte 23 kV - Tamarugal 66 kV - Arica 66 kV	AES Gener
Altonorte	Industrial	Alto Norte 110 kV	Edelnor
Atacama Agua	Industrial	Antofagasta 110 kV	Edelnor
Camíña	Distribution	Dolores 110 kV	Edelnor
Cerro Colorado	Mining	Pozo Almonte 220 kV	Edelnor
Cerro Dominador	Mining	Encuentro 220 kV	Edelnor
Chuquicamata	Mining	Crucero 220 kV - C.Tocopilla 110 kV	Electroandina
Cia. Portuaria Mejillones	Industrial	Mejillones 110 kV	Edelnor
Collahuasi	Mining	Collahuasi 220 kV	Celta - Gasatacamá
Collahuasi Puerto	Industrial	Tarapacá 220 kV	Celta
Cosayach	Mining	Pozo Almonte 23 kV - Dolores 110 kV - Tamarugal 66 kV	Edelnor
DSM Minera	Mining	Lagunas 220 kV	Celta
El Abra	Mining	Crucero 220 kV	Electroandina
El Peñón	Mining	C. Atacama 220 kV	Gasatacamá
El Tesoro	Mining	Encuentro 220 kV	Gasatacamá
Eledda	Distribution	Esmeralda 220 kV - Mantos Blancos 220 kV - Calama 110 kV La Negra 23 kV - Mejillones 110 kV - Mejillones 23 kV - Tocopilla 5 kV	Gasatacamá
Eliqsa	Distribution	Tarapacá 220 kV - Pozo Almonte 23 kV - Lagunas 220 kV - Tamarugal 66 kV Dolores 110 kV	Gasatacamá
Emelari	Distribution	Tarapacá 220 kV - Arica 110 kV	Gasatacamá
Enaex	Industrial	Mejillones 110 kV	Edelnor
Escondida	Mining	Mejillones 220 kV - Zaldivar 220 kV - Crucero 220 kV - C. Atacama 220 kV	Norgener - Gasatacamá
Esperanza	Mining	Encuentro 220 kV	Electroandina
Gaby	Mining	Laberinto 220 kV	Edelnor
Grace	Mining	Barriles 220 kV	AES Gener
Haldeman	Mining	Pozo Almonte 66 kV	Edelnor
Interacid	Industrial	Tarapacá 220 kV	Celta
Lomas Bayas	Mining	Laberinto 220 kV	Edelnor
Mall Plaza Antofagasta	Industrial	CD Antofagasta 13,8 kV	Edelnor
Mamiña	Mining	Pozo Almonte 220 kV	Edelnor
Mantos Blancos	Mining	Mantos Blancos 220 kV	Edelnor
Megapuerto	Industrial	Mejillones 23 kV	Edelnor
Michilla	Mining	Mejillones 110 kV	Edelnor
Minsal	Mining	Oeste 220 kV	Norgener
Molycop	Industrial	Chacaya 220 kV	Edelnor
Molynor	Industrial	Mejillones 23 kV	Edelnor
Polpaico	Industrial	Mejillones 23 kV	Edelnor
Quebrada Blanca	Mining	Collahuasi 220 kV	Gasatacamá
Quiborax	Mining	El Águila 66 kV	Edelnor
Radomiro Tomic	Mining	Crucero 220 kV	Electroandina
Rayrock	Mining	Pampa 110 kV	Edelnor
Santa Margarita	Mining	Calama 100 kV	Electroandina
Sierra Miranda	Mining	Capricornio 110 kV	Edelnor
Spence	Mining	Encuentro 220 kV	Edelnor
SQM El Loa	Mining	El Loa 220 kV	Electroandina
SQM Nitratos	Mining	La Cruz 220 kV	Norgener
SQM Nva.Victoria	Mining	Nva.Victoria 220 kV	Electroandina
SQM Salar	Mining	El Negro 110 kV	Electroandina
Zaldívar	Mining	Zaldivar 220 kV	Edelnor



## SING SIMPLIFIED LINE DIAGRAM - 2008



Source: HQI Translec Chile S.A.

## REFERENCES

- Important Nodes
- Substation
- ▲ Thermal Power Plant
- Hydro Power Plant
- 345 kV Line
- 220 kV Line
- 110 kV Line
- Minor Lines

## RELEVANT FACTS OF THE OPERATION OF THE SING DURING 2009



### GENERATION AND TRANSMISSION PROJECTS

During 2009 the startups of the following facilities were registered:

- Company: Electroandina S.A.
  - Project: Tamaya Diesel Plant Facilities and start up: December 11<sup>th</sup> 2009
    - 10 generating units with a total of 103,68 MW.
- Company: Enorchile S.A.
  - Project: Extension of Zofri Diesel Plant Facilities and start up: December 22<sup>th</sup> 2009.
    - 6 generating units with a total of 4,8 MW.
- Company: Norgener
  - Project: BESS Devices Facilities and start up: December 18<sup>th</sup> 2009
    - 8 modules 1,6 MW each.
- Company: Minera Meridian.
  - Project: Diesel Power Plant El Peñón. Facilities and start up: May 5<sup>th</sup> 2009.
    - 5 generating units of 1,2 MW power each one. For own usage.
- Company: Edelnor S.A.
  - Project: Mejillones - Enaex 110 kV line.
    - Facilities and start up: July 3<sup>th</sup> 2009.

### OPERATION

The annual gross production of the SING in 2009, reached 14.907 GWh this is detailed according to the first input in:

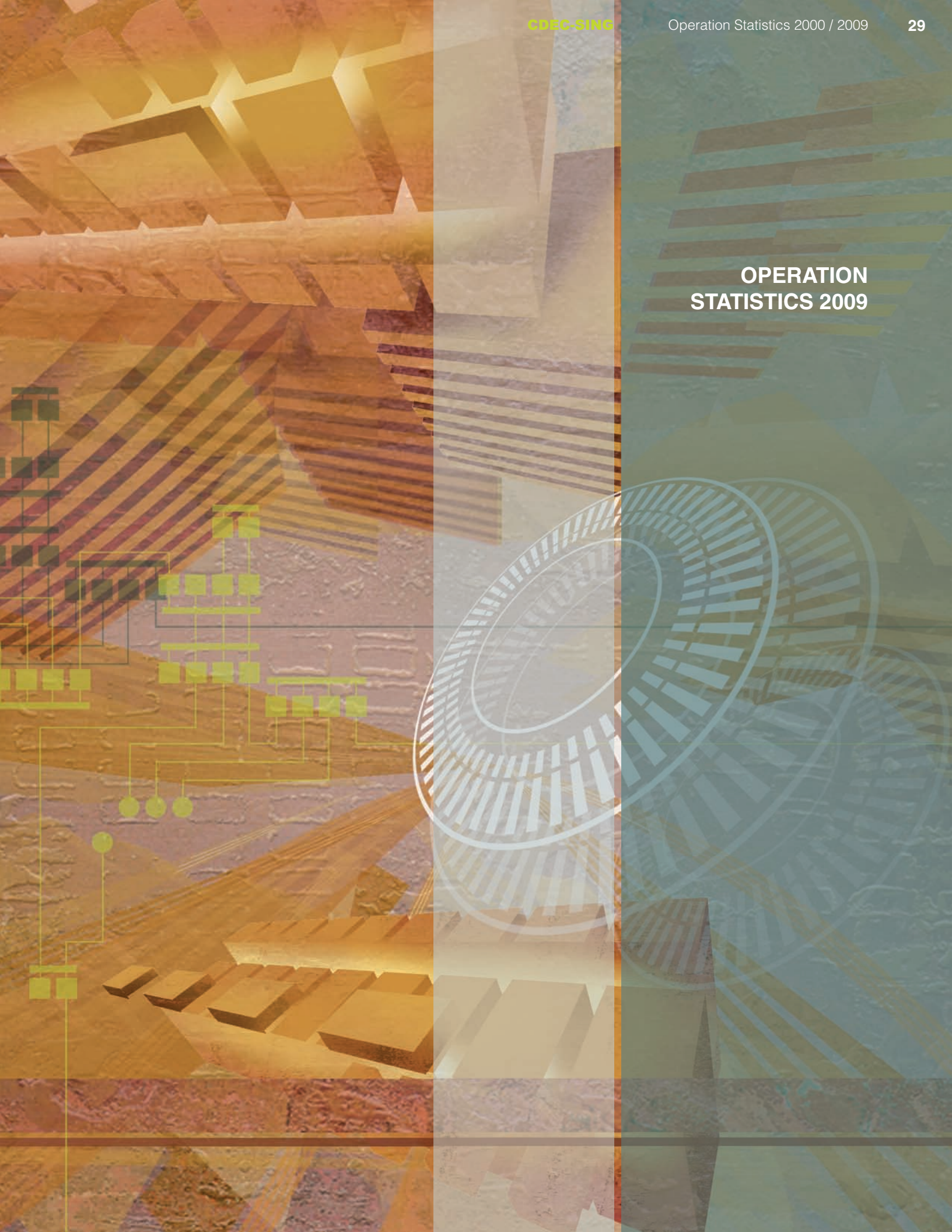
- 56,6 % Coal.
- 20,1 % Natural Gas.
- 22,8 % Heavy Oil and Diesel.
- 0,4 % Hydraulic generation.

The growth of consumption compared to 2008 reflects an increase of 2,8 % of the gross energy generation and of 3,3 % in the total energy sales. Divided by client type, 89,6% corresponds to free clients (mining and industrial consumption), and 10,4% to regulated clients (distribution companies).

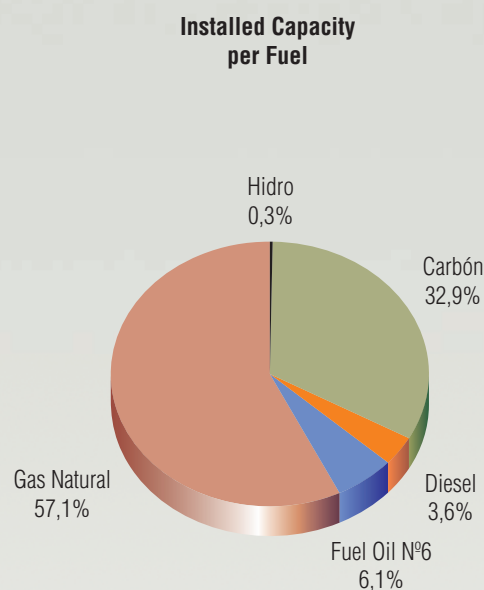
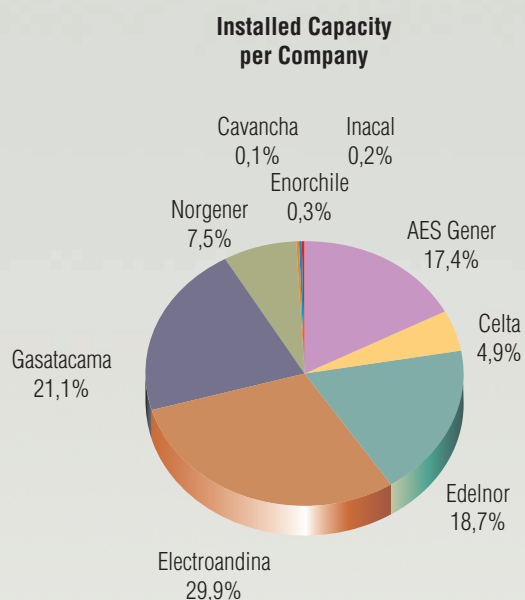
The maximum demand of the system occurred on September 27<sup>th</sup> 2009 at 10 PM, which is reflected by a gross generation value of 1.907 MW, representing an increase of 0,53% over 2008.



## OPERATION STATISTICS 2009



## INSTALLED CAPACITY (MW), 2009



## INSTALLED CAPACITY PER COMPANY, 2000-2009

IN PHYSICAL UNITS (MW)

Company \ Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Celta	182	182	182	182	182	182	182	182	182	182
Edelnor	722	719	719	719	719	719	719	722	705	691
Electroandina	629	1.029	1.029	1.037	992	992	992	992	1.000	1.105
Endesa										
AES Gener	643	643	643	643	643	643	643	643	643	643
Gasatacama	588	590	783	783	783	783	783	781	781	781
Norgener	277	277	277	277	277	277	277	283	283	277
Cavancha										3
Enorchile										11
Inacal										7
TOTAL	3.040	3.440	3.633	3.641	3.596	3.596	3.596	3.602	3.593	3.699

IN PERCENTAGES (%)

[illegible]



## INSTALLED CAPACITY PER TYPE OF FUEL 2000 - 2009

IN PHYSICAL UNITS (MW)

Fuel	Company	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Hidro	Edelnor Cavancha	13	13	13	13	13	13	13	13	13	10 3
Subtotal		13	13	13	13	13	13	13	13	13	13
Carbón	Celta	158	158	158	158	158	158	158	158	158	158
	Edelnor	341	341	341	341	341	341	341	341	341	341
	Electroandina	429	429	429	429	429	429	429	429	438	440
	Norgener	277	277	277	277	277	277	277	277	277	277
Subtotal		1.206	1.206	1.206	1.206	1.206	1.206	1.206	1.206	1.214	1.216
Diesel	Celta	24	24	24	24	24	24	24	24	24	24
	Edelnor	65	62	62	62	62	62	62	65	48	48
	Electroandina	42	42	42	50	50	50	50	50	50	50
	Endesa										
	Gasatacama		3	3	3	3	3	3			
	Enorchile								6	6	11
Subtotal		130	130	130	138	138	138	138	144	127	132
Fuel Oil	Edelnor	53	53	53	53	53	53	53	53	53	41
	Electroandina	120	120	120	120	75	75	75	75	75	179 7
Subtotal		173	173	173	173	128	128	128	128	128	226
Gas Natural	Edelnor	251	251	251	251	251	251	251	251	251	251
	AES Gener	643	643	643	643	643	643	643	643	643	643
	Gasatacama	588	588	781	781	781	781	781	781	781	781
	Electroandina	38	438	438	438	438	438	438	438	438	438
Subtotal		1.519	1.919	2.112	2.112	2.112	2.112	2.112	2.112	2.112	2.112
<b>TOTAL</b>		<b>3.040</b>	<b>3.440</b>	<b>3.633</b>	<b>3.641</b>	<b>3.596</b>	<b>3.596</b>	<b>3.596</b>	<b>3.602</b>	<b>3.593</b>	<b>3.699</b>

Notes: \* Starting 2000, Electroandina's TG3 Unit is considered to be fueled with natural gas.

\* Edelnor's generating units using Diesel-Fuel Oil mixtures are associated to Fuel Oil.

EN PERCENTAGES (%)

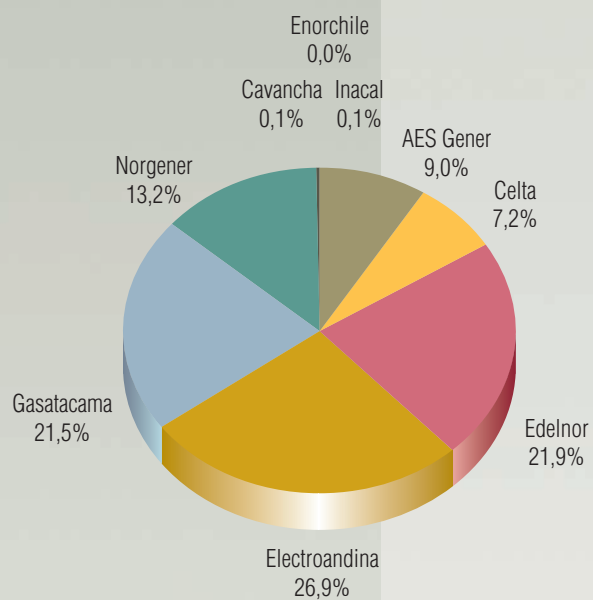
Fuel	Company	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Hidro	Edelnor Cavancha	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,3% 0,1%
Subtotal		0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,3%
Carbón	Celta	5,2%	4,6%	4,3%	4,3%	4,4%	4,4%	4,4%	4,4%	4,4%	4,3%
	Edelnor	11,2%	9,9%	9,4%	9,4%	9,5%	9,5%	9,5%	9,5%	9,5%	9,2%
	Electroandina	14,1%	12,5%	11,8%	11,8%	11,9%	11,9%	11,9%	11,9%	12,2%	11,9%
	Norgener	9,1%	8,1%	7,6%	7,6%	7,7%	7,7%	7,7%	7,7%	7,7%	7,5%
Subtotal		39,7%	35,0%	33,2%	33,1%	33,5%	33,5%	33,5%	33,5%	33,8%	32,9%
Diesel	Celta	0,8%	0,7%	0,7%	0,7%	0,7%	0,7%	0,7%	0,7%	0,7%	0,6%
	Edelnor	2,1%	1,8%	1,7%	1,7%	1,7%	1,7%	1,7%	1,8%	1,3%	1,3%
	Electroandina	1,4%	1,2%	1,2%	1,4%	1,4%	1,4%	1,4%	1,4%	1,4%	1,3%
	Endesa										
	Gasatacama		0,1%	0,1%	0,1%	0,1%	0,1%	0,1%			
	Enorchile								0,2%	0,2%	0,3%
Subtotal		4,3%	3,8%	3,6%	3,8%	3,8%	3,8%	3,8%	4,0%	3,5%	3,6%
Fuel Oil	Edelnor	1,7%	1,5%	1,4%	1,4%	1,5%	1,5%	1,5%	1,5%	1,5%	1,1%
	Electroandina	3,9%	3,5%	3,3%	3,3%	2,1%	2,1%	2,1%	2,1%	2,1%	4,9% 0,2%
Subtotal		5,7%	5,0%	4,8%	4,7%	3,5%	3,5%	3,5%	3,5%	3,6%	6,1%
Gas Natural	Edelnor	8,2%	7,3%	6,9%	6,9%	7,0%	7,0%	7,0%	7,0%	7,0%	6,8%
	AES Gener	21,1%	18,7%	17,7%	17,7%	17,9%	17,9%	17,9%	17,8%	17,9%	17,4%
	Gasatacama	19,3%	17,1%	21,5%	21,4%	21,7%	21,7%	21,7%	21,7%	21,7%	21,1%
	Electroandina	1,2%	12,7%	12,0%	12,0%	12,2%	12,2%	12,2%	12,1%	12,2%	11,8%
Subtotal		50,0%	55,8%	58,1%	58,0%	58,7%	58,7%	58,7%	58,6%	58,8%	57,1%
<b>TOTAL</b>		<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>	<b>100,0%</b>

Notes: \* Starting 2000, Electroandina's TG3 Unit is considered to be fueled with natural gas.

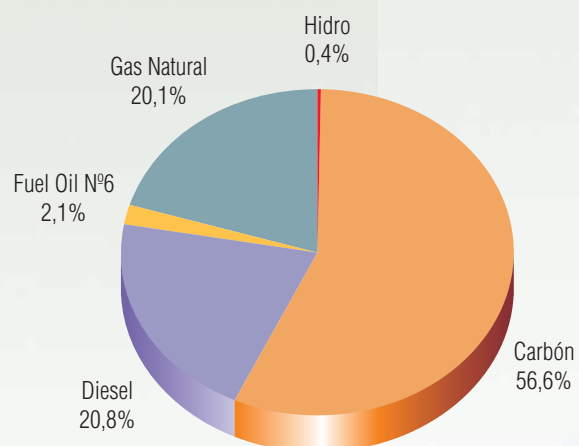
\* Edelnor's generating units using Diesel-Fuel Oil mixtures are associated to Fuel Oil.

## GROSS GENERATION 2009

### Gross Generation by Companies Total: 14.906,8 GWh



### Gross Generation by Fuels Total: 14.906,8 GWh





## GENERATION BY SING POWER PLANTS 2009 (GWh)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
<b>ELECTROANDINA</b>													
U10 - U11	29,6	2,3	8,1	21,9	18,5	11,1	4,6	5,5	4,5	0,0	0,0	6,2	112,4
U12 - U13	90,4	92,0	112,0	103,8	99,5	87,9	64,4	68,5	101,0	104,2	100,2	97,4	1.121,3
U14 - U15	175,3	102,7	76,7	137,8	91,9	166,3	183,6	184,4	166,6	179,6	171,6	183,7	1.820,0
U16	128,6	160,0	165,8	31,1	32,1	0,0	0,0	0,0	0,0	0,0	70,4	143,5	731,5
TG1	1,0	0,2	0,3	1,1	0,7	0,2	0,4	0,5	1,2	0,1	0,4	0,1	6,1
TG2	0,9	0,2	0,3	1,2	1,0	0,1	0,4	0,2	0,8	0,1	0,3	0,1	5,7
TG3	3,5	0,7	1,4	5,5	4,1	3,0	2,6	2,7	4,2	1,3	2,8	1,3	33,0
SUTA	0,0	0,0	0,0	1,1	9,5	19,9	22,3	46,7	37,7	21,1	15,7	9,6	183,5
Total Gross Generation	429,2	358,1	364,6	303,5	257,2	288,4	278,2	308,5	316,0	306,5	361,3	441,9	4.013,6
Plant Consumption	26,3	17,1	16,8	19,9	15,8	19,5	19,1	21,5	21,6	22,1	23,6	26,1	249,4
<b>Total Net Generation</b>	<b>402,9</b>	<b>341,0</b>	<b>347,8</b>	<b>283,6</b>	<b>241,4</b>	<b>268,9</b>	<b>259,1</b>	<b>287,0</b>	<b>294,4</b>	<b>284,4</b>	<b>337,7</b>	<b>415,8</b>	<b>3.764,2</b>
<b>EDELNOR</b>													
CHAPIQUÍÑA	4,5	3,5	4,0	4,8	3,9	3,5	3,4	3,7	4,2	3,7	3,6	4,2	47,2
CD ARICA	1,8	0,6	0,7	1,9	1,6	1,4	1,6	1,4	1,9	0,9	2,1	1,0	16,7
CD IQUIQUE	2,9	1,1	1,7	4,9	5,0	2,7	3,6	4,3	2,1	1,0	0,8	1,2	31,3
CD MANTOS BLANCOS	0,3	0,4	3,6	7,3	3,1	9,2	10,3	9,7	7,2	5,3	7,8	4,6	68,9
CTM3	66,3	69,3	30,7	29,8	44,0	18,2	28,9	19,4	79,5	136,6	63,1	46,5	632,2
CTM2	30,5	109,0	106,6	107,0	120,4	116,0	107,7	116,9	116,9	115,2	116,9	119,2	1.282,2
CTM1	105,6	89,1	98,3	76,3	109,7	110,1	103,8	111,7	77,5	89,4	104,9	114,5	1.190,8
DEUTZ	0,1	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,4
CUMMINS	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,3
Total Gross Generation	212,1	273,1	245,7	232,0	287,8	261,0	259,3	267,0	289,5	352,0	299,2	291,3	3.269,9
Plant Consumption	14,3	18,4	18,4	16,4	20,4	18,8	18,6	19,1	18,9	21,1	20,1	20,1	224,6
<b>Total Net Generation</b>	<b>197,8</b>	<b>254,7</b>	<b>227,3</b>	<b>215,6</b>	<b>267,4</b>	<b>242,2</b>	<b>240,7</b>	<b>247,9</b>	<b>270,6</b>	<b>330,9</b>	<b>279,1</b>	<b>271,2</b>	<b>3.045,3</b>
<b>CELTA</b>													
CTTAR	0,0	59,3	104,7	101,2	101,4	101,4	104,5	84,4	99,5	105,2	101,7	102,0	1.065,2
TGTAR	1,6	0,4	0,5	1,2	1,2	0,7	0,4	0,7	1,8	0,3	1,1	0,5	10,5
Total Gross Generation	1,6	59,8	105,1	102,4	102,6	102,1	104,9	85,1	101,3	105,5	102,9	102,5	1.075,8
Plant Consumption	7,9	7,5	7,2	7,8	8,5	8,3	8,6	8,3	8,3	8,2	0,3	0,0	80,7
<b>Total Net Generation</b>	<b>-6,3</b>	<b>52,3</b>	<b>98,0</b>	<b>94,6</b>	<b>94,1</b>	<b>93,8</b>	<b>96,3</b>	<b>76,8</b>	<b>93,0</b>	<b>97,3</b>	<b>102,6</b>	<b>102,5</b>	<b>995,1</b>
<b>NORGENER</b>													
NT01	93,7	73,3	82,6	89,6	92,9	91,3	94,3	93,7	70,4	82,4	91,1	94,0	1.049,2
NT02	58,7	82,9	96,9	91,5	84,0	94,2	97,2	96,5	93,5	46,7	0,0	69,1	911,1
Total Gross Generation	152,4	156,2	179,4	181,1	176,9	185,5	191,5	190,2	163,8	129,2	91,1	163,0	1.960,3
Plant Consumption	10,9	10,7	12,2	12,6	13,0	13,2	13,5	12,4	10,7	8,4	6,1	10,6	134,3
<b>Total Net Generation</b>	<b>141,5</b>	<b>145,5</b>	<b>167,2</b>	<b>168,5</b>	<b>163,8</b>	<b>172,3</b>	<b>178,0</b>	<b>177,8</b>	<b>153,2</b>	<b>120,7</b>	<b>84,9</b>	<b>152,4</b>	<b>1.826,0</b>
<b>GASATACAMA</b>													
TG1A	53,1	9,1	38,2	29,5	54,7	49,3	63,0	61,9	62,4	54,2	0,0	0,0	475,4
TG1B	65,1	19,6	52,9	53,9	39,2	0,0	0,0	19,3	66,1	43,1	27,7	18,2	404,9
TV1C	71,5	17,3	57,4	50,6	56,8	27,9	35,5	46,7	76,5	58,8	15,1	10,1	524,3
TG2A	54,3	56,3	21,0	43,8	44,8	65,2	68,3	63,7	22,7	21,9	60,9	32,2	555,1
TG2B	50,8	30,5	43,6	44,5	48,6	65,8	59,5	69,1	34,3	28,8	52,5	47,6	575,6
TV2C	62,3	53,0	40,3	52,5	54,5	78,0	75,8	79,8	27,6	28,9	69,5	48,0	670,2
Total Gross Generation	357,0	185,8	253,4	274,8	298,6	286,2	301,9	340,5	289,6	235,7	225,8	156,1	3.205,5
Plant Consumption	8,9	6,5	7,8	6,9	7,0	7,5	7,8	8,6	7,8	8,3	7,0	5,9	89,9
<b>Total Net Generation</b>	<b>348,1</b>	<b>179,3</b>	<b>245,6</b>	<b>267,9</b>	<b>291,6</b>	<b>278,7</b>	<b>294,1</b>	<b>332,0</b>	<b>281,9</b>	<b>227,3</b>	<b>218,8</b>	<b>150,2</b>	<b>3.115,6</b>

## GENERATION BY SING POWER PLANTS 2009 (GWh)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
<b>AES GENER</b>													
Central Salta	130,1	128,1	124,3	138,8	133,0	109,7	37,4	75,1	93,3	129,2	129,8	119,3	1.348,2
Total Gross Generation	130,1	128,1	124,3	138,8	133,0	109,7	37,4	75,1	93,3	129,2	129,8	119,3	1.348,2
Plant Consumption	1,0	0,6	0,7	0,7	0,8	0,1	0,4	0,5	0,7	0,7	0,6	0,6	7,4
<b>Total Net Generation</b>	<b>129,1</b>	<b>127,5</b>	<b>123,6</b>	<b>138,1</b>	<b>132,2</b>	<b>109,6</b>	<b>37,0</b>	<b>74,6</b>	<b>92,6</b>	<b>128,5</b>	<b>129,2</b>	<b>118,7</b>	<b>1.340,8</b>
<b>CAVANCHA</b>													
Cavancha	1,2	1,2	1,3	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,3	14,7
Total Gross Generation	1,2	1,2	1,3	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,3	14,7
Plant Consumption	1,0	0,6	0,7	0,7	0,8	0,1	0,4	0,5	0,7	0,7	0,6	0,6	7,4
<b>Total Net Generation</b>	<b>0,2</b>	<b>0,6</b>	<b>0,6</b>	<b>0,5</b>	<b>0,4</b>	<b>1,1</b>	<b>0,8</b>	<b>0,7</b>	<b>0,5</b>	<b>0,5</b>	<b>0,6</b>	<b>0,7</b>	<b>7,3</b>
<b>ENORCHILE</b>													
ZOFRI_1-6	0,1	0,0	0,0	0,1	0,1	0,1	0,0	0,1	0,1	0,0	0,1	0,0	0,9
ZOFRI_2-5	0,7	0,2	0,2	0,8	0,6	0,5	0,3	0,3	0,8	0,2	0,4	0,2	5,2
ZOFRI_7-12	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Total Gross Generation	0,8	0,2	0,3	1,0	0,7	0,5	0,3	0,4	0,9	0,3	0,5	0,2	6,1
Plant Consumption	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
<b>Total Net Generation</b>	<b>0,8</b>	<b>0,2</b>	<b>0,3</b>	<b>1,0</b>	<b>0,7</b>	<b>0,5</b>	<b>0,3</b>	<b>0,4</b>	<b>0,9</b>	<b>0,3</b>	<b>0,5</b>	<b>0,2</b>	<b>6,1</b>
<b>INACAL</b>													
Diesel Inacal	0,0	0,0	0,0	0,0	0,3	0,0	1,2	0,5	2,1	3,2	3,5	1,9	12,7
Total Gross Generation	0,0	0,0	0,0	0,0	0,3	0,0	1,2	0,5	2,1	3,2	3,5	1,9	12,7
Plant Consumption	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1
<b>Total Net Generation</b>	<b>0,0</b>	<b>0,0</b>	<b>0,0</b>	<b>0,0</b>	<b>0,3</b>	<b>0,0</b>	<b>1,2</b>	<b>0,5</b>	<b>2,1</b>	<b>3,2</b>	<b>3,5</b>	<b>1,8</b>	<b>12,6</b>
<b>TOTAL SING</b>													
<b>Gross Generation</b>	<b>1.284,5</b>	<b>1.162,4</b>	<b>1.274,2</b>	<b>1.234,9</b>	<b>1.258,3</b>	<b>1.234,7</b>	<b>1.175,9</b>	<b>1.268,7</b>	<b>1.257,7</b>	<b>1.262,7</b>	<b>1.215,3</b>	<b>1.277,4</b>	<b>14.906,7</b>
Plant Consumption	70,2	61,3	63,8	65,0	66,3	67,5	68,3	70,8	68,6	69,5	58,3	64,1	793,8
<b>Net Generation</b>	<b>1.214,2</b>	<b>1.101,1</b>	<b>1.210,4</b>	<b>1.170,0</b>	<b>1.192,0</b>	<b>1.167,2</b>	<b>1.107,6</b>	<b>1.197,9</b>	<b>1.189,1</b>	<b>1.193,2</b>	<b>1.156,9</b>	<b>1.213,4</b>	<b>14.112,9</b>
Transmission Losses	36,8	34,5	42,0	37,6	37,9	32,9	33,6	34,9	32,5	36,7	47,6	49,3	456,5
Sales to Unregulated Customers	1.061,7	957,3	1.044,9	1.014,5	1.036,3	1.016,8	955,8	1.044,5	1.042,0	1.036,5	990,4	1.038,9	12.239,6
Sales to Regulated Customers	115,7	109,3	123,4	117,9	117,9	117,4	118,2	118,5	114,5	120,0	118,9	125,1	1.416,8
<b>Total Sales</b>	<b>1.177,5</b>	<b>1.066,6</b>	<b>1.168,3</b>	<b>1.132,4</b>	<b>1.154,2</b>	<b>1.134,2</b>	<b>1.073,9</b>	<b>1.163,0</b>	<b>1.156,6</b>	<b>1.156,5</b>	<b>1.109,3</b>	<b>1.164,0</b>	<b>13.656,4</b>
<b>TOTAL SING (en %)</b>													
<b>Gross Generation</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
Plant Consumption	5%	5%	5%	5%	5%	5%	6%	6%	5%	6%	5%	5%	5%
<b>Net Generation</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>94%</b>	<b>94%</b>	<b>95%</b>	<b>94%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>
Transmission Losses	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	4%	4%	3%
Sales to Unregulated Customers	83%	82%	82%	82%	82%	82%	81%	82%	83%	82%	81%	81%	82%
Sales to Regulated Customers	9%	9%	10%	10%	9%	10%	10%	9%	9%	10%	10%	10%	10%
<b>Total Sales</b>	<b>92%</b>	<b>92%</b>	<b>92%</b>	<b>92%</b>	<b>92%</b>	<b>92%</b>	<b>91%</b>	<b>92%</b>	<b>92%</b>	<b>92%</b>	<b>91%</b>	<b>91%</b>	<b>92%</b>



## GENERATION BY SING POWER PLANTS 2000 - 2009 (GWh)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>CELTA</b>										
CTTAR	1.061	760	639	435	435	422	830	1012	981,0	1.065
TGTAR	17	3	1	1	1	0	2	14	17,9	11
Total Gross Generation	1.079	763	640	436	436	423	832	1026	999	1.076
Plant Consumption	84	67	61	40	39	39	72	84	81	81
<b>Total Net Generation</b>	<b>994</b>	<b>696</b>	<b>579</b>	<b>397</b>	<b>398</b>	<b>383</b>	<b>760</b>	<b>941</b>	<b>918</b>	<b>995</b>

<b>EDELNOR</b>										
CHAPIQUIÑA	43	53	54	51	51	45	55	53	53	47
CAVANCHA (*)	13	12	13	14	15	15	15	15	15	
CD ARICA	6	5	2	1	5	2	7	33	32	17
CD IQUIQUE	31	14	8	6	11	4	13	50	60	31
CD MANTOS BLANCOS	9	7	6	7	16	4	25	7	0	69
CD ENAEX	0							1	0	1
CTM1	618	257	18	144	498,7	446,6	880	1057	1202	1.191
CTM2	984	774	918	575	1.003	849	1033	1188	1298	1.282
CTM3	711	1.131	849	1.695	1.449	1.601	600	400	814	632
Total Gross Generation	2.424	2.257	1.870	2.495	3.054	2.970	2643	2837	3480	3.285
Plant Consumption	173	131	111	113	162	159	169	200	230	225
<b>Total Net Generation</b>	<b>2.251</b>	<b>2.125</b>	<b>1.759</b>	<b>2.382</b>	<b>2.892</b>	<b>2.810</b>	<b>2475</b>	<b>2637</b>	<b>3250</b>	<b>3.060</b>

<b>ELECTROANDINA</b>										
U09	0	0	0	0	0	0				
U10 - U11	56	29	1	0	7	0	19	187	322	112
U12 - U13	503	338	663	455	478	207	463	1052	1125	1.121
U14 - U15	1.509	664	1.266	1.304	1.409	1.549	1.688	1905	1784	1.820
U16	192	1.458	1.174	1.627	1.458	1.753	1.884	936	474	732
TG1 - TG2	22	16	7	2	2	1	0	12	25	12
TG3	32	43	4	11	91	43	12	40	56	33
SUTA										184
Total Gross Generation	2.315	2.548	3.115	3.398	3.444	3.553	4.066	4.132	3.785	4.014
Plant Consumption	178	139	199	198	194	191	218	255	254	249
<b>Total Net Generation</b>	<b>2.137</b>	<b>2.409</b>	<b>2.917</b>	<b>3.201</b>	<b>3.250</b>	<b>3.361</b>	<b>3.848</b>	<b>3.877</b>	<b>3.531</b>	<b>3.764</b>

<b>AES GENER</b>										
CC Salta	1.217	1.386	1.813	1.950	1.903	2.154	2.285	1.628	1.154	1.348
Total Gross Generation	1.217	1.386	1.813	1.950	1.903	2.154	2.285	1.628	1.154	1.348
Plant Consumption	27	35	45	46	43	44	46	38	22	7
<b>Total Net Generation</b>	<b>1.191</b>	<b>1.351</b>	<b>1.768</b>	<b>1.904</b>	<b>1.860</b>	<b>2.110</b>	<b>2.239</b>	<b>1.590</b>	<b>1.132</b>	<b>1.341</b>

<b>GASATACAMA</b>										
CC1	970	1.462	1.431	1.434	1.168	1.144	411	1.002	2.331,3	1.405
CC2	812	1.368	1.216	1.568	1.530	1.338	1.285	1.311	639,6	1.801
ENAEX		0	0	0	0	0	0	0		
Total Gross Generation	1.782	2.830	2.647	3.002	2.698	2.482	1.696	2.313	2.971	3.205
Plant Consumption	70	91	77	82	82	69	61	75	73	90
<b>Total Net Generation</b>	<b>1.711</b>	<b>2.739</b>	<b>2.570</b>	<b>2.920</b>	<b>2.615</b>	<b>2.413</b>	<b>1.635</b>	<b>2.237</b>	<b>2.898</b>	<b>3.116</b>

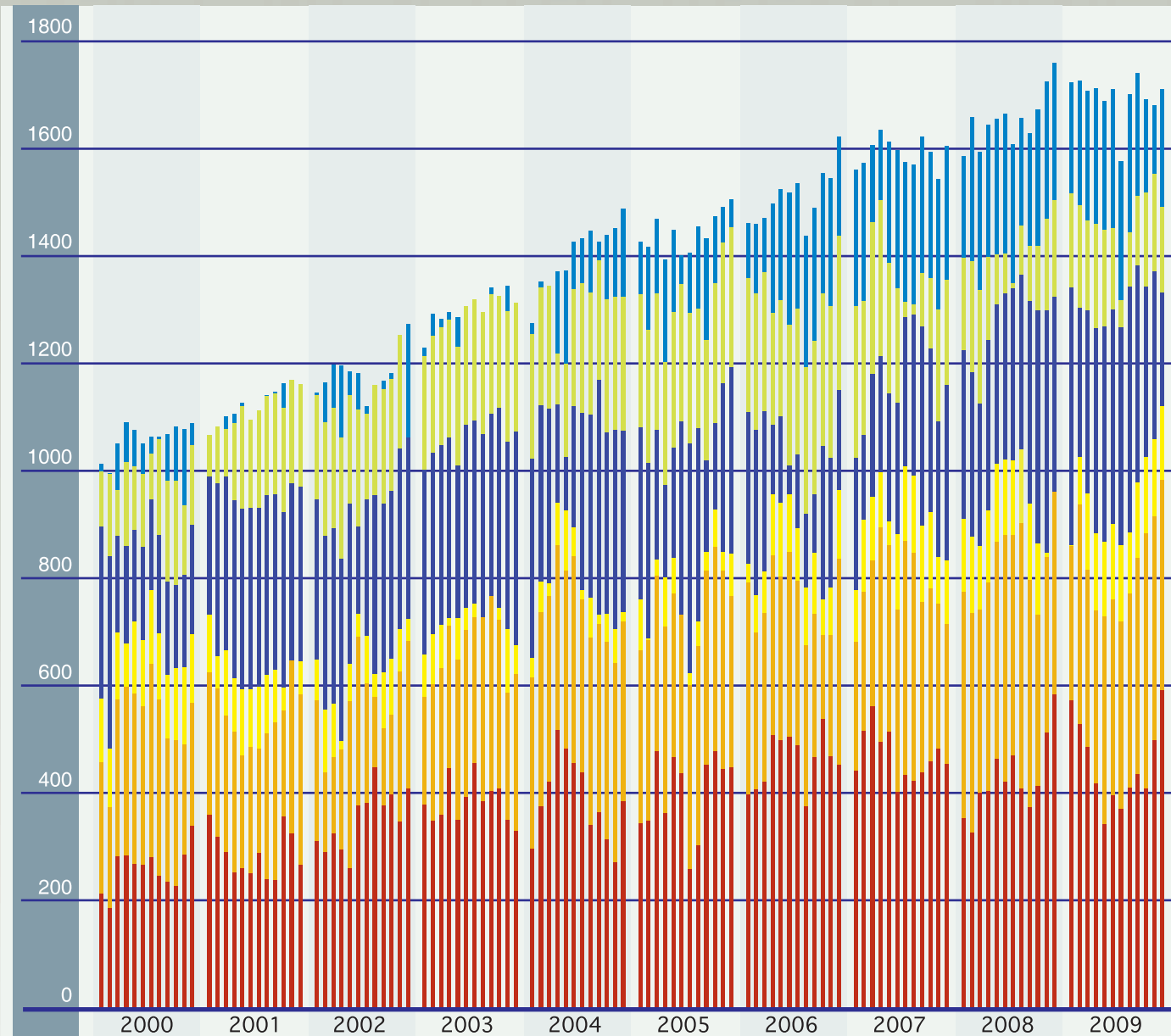
<b>CAVANCHA</b>	
Cavancha	15
Total Gross Generation	15
Plant Consumption	7
<b>Total Net Generation</b>	<b>7</b>

ENORCHILE	
Central Estandartes	6
Total Gross Generation	6
Plant Consumption	0
<b>Total Net Generation</b>	<b>6</b>

TOTAL SING (%)										
Gross Generation	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Plant Consumption	6%	5%	5%	4%	5%	5%	5%	6%	6%	5%
Net Generation	94%	95%	95%	96%	95%	95%	95%	94%	94%	95%
Transmission Losses	4%	4%	4%	4%	4%	4%	4%	3%	3%	3%
Sales to Unregulated Customers	80%	82%	81%	83%	82%	82%	81%	81%	82%	82%
Sales to Regulated Customers	10%	10%	10%	9%	9%	9%	9%	10%	10%	10%
Total Sales	90%	91%	91%	92%	91%	91%	91%	91%	91%	92%



## AVERAGE HOURLY GENERATION PER MONTHS (MW) 2000 - 2009



- ELECTROANDINA
- EDELNOR
- CAVANCHA & INACAL & ENORCHILE
- CELTA
- GASATACAMA
- AES GENER
- NORGENER

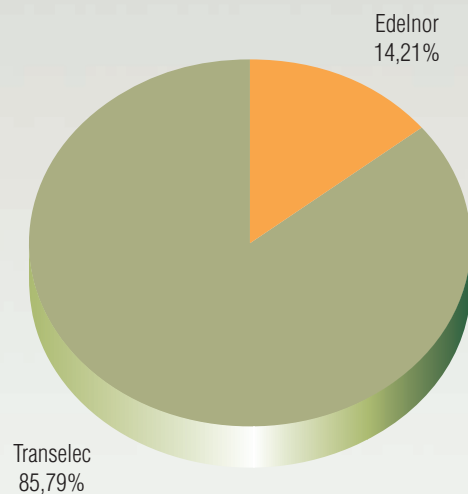
## TOLLS FOR THE TRUNK SYSTEM 2009

### PAYMENTS FROM GENERATORS TO TRUNK COMPANIES [\$] - 2009

FROM/TO	EDELNOR			TRANSELEC			TOTAL
	Injection Toll	Withdrawal Toll	BUT & EUC Adjustment	Injection Toll	Withdrawal Toll	BUT & EUC Adjustment	
AES GENER	657.637	89.442	-15.657	3.970.982	540.075	-94.539	5.147.941
CELTA	700.942	7.981	10.709	4.232.474	48.188	64.662	5.064.956
EDELNOR	3.951.977	1.992.144	25.055	23.863.072	12.029.087	151.291	42.012.628
ELECTROANDINA	14.486.878	1.213.432	-18.346	87.475.557	7.327.020	-110.779	110.373.762
GASATACAMA	36.320.605	1.578.650	-1.761	219.313.307	9.532.299	-10.636	266.732.464
INACAL	26.901			162.436			189.337
NORGENER	6.931.935	211.573	0	41.856.838	1.277.535	0	50.277.882
<b>General Total</b>	<b>63.076.876</b>	<b>5.093.222</b>	<b>0</b>	<b>380.874.666</b>	<b>30.754.205</b>	<b>0</b>	<b>479.798.969</b>

\* BUP Bar Unit Toll, EUC: Expected Unique Charge

### Receipts VATT SING 2009

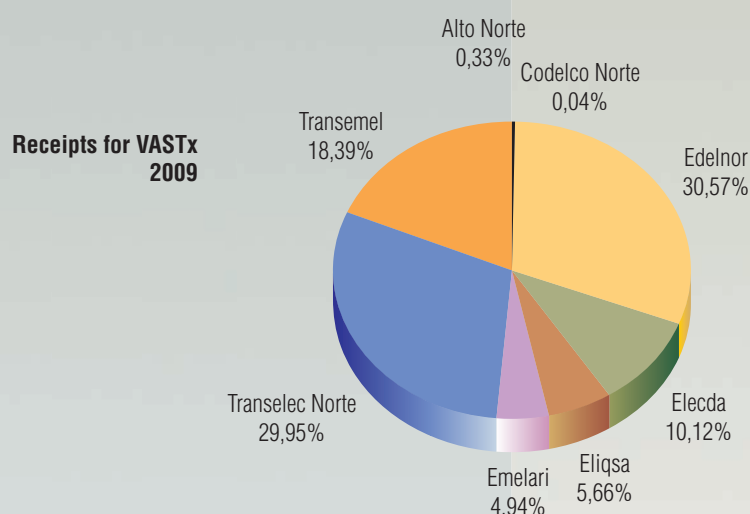




## TOLLS FOR THE SUBTRANSMISSION SYSTEM 2009

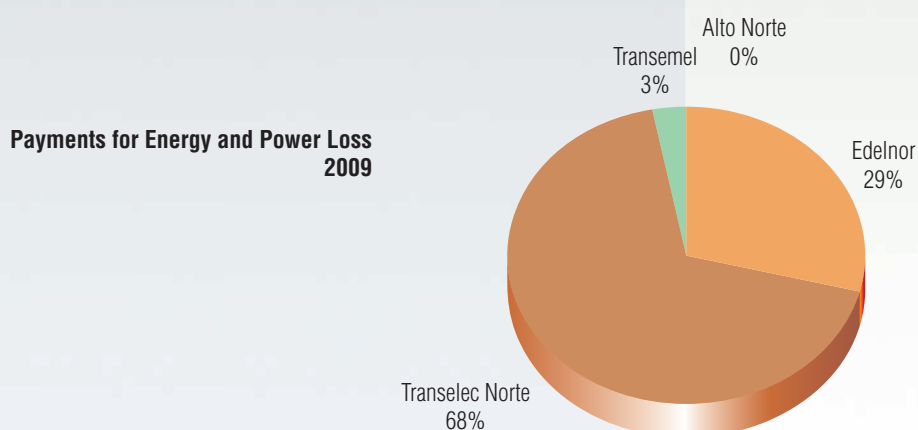
### PAYMENTS OF VASTx FROM GENERATORS TO SUBTRANSMITTOES [\$] - 2009

TO/FROM	AES GENER	EDELNOR	ELECTROANDINA	GASATACAMA	NORGENER	TOTAL
ALTO NORTE	817.625	5.907.569	65.433	41.449.684	5.996	48.246.307
CODELCO NORTE	79.485	847.905	10.966	5.590.781	699	6.529.836
EDELNOR	54.986.811	589.383.183	7.633.670	3.883.685.305	484.461	4.536.173.430
ELECDA	18.285.261	195.057.297	2.522.745	1.286.138.028	160.707	1.502.164.038
ELIQSA	10.222.612	109.050.333	1.410.391	719.037.973	89.846	839.811.154
EMELARI	8.931.063	95.272.481	1.232.196	628.192.019	78.494	733.706.253
TRANSELEC NORTE	54.107.567	577.191.458	7.465.026	3.805.792.957	475.544	4.445.032.553
TRANSEMEL	33.217.447	354.346.606	4.582.893	2.336.434.023	291.944	2.728.872.914
<b>General Total</b>	<b>180.647.871</b>	<b>1.927.056.833</b>	<b>24.923.320</b>	<b>12.706.320.771</b>	<b>1.587.690</b>	<b>14.840.536.484</b>



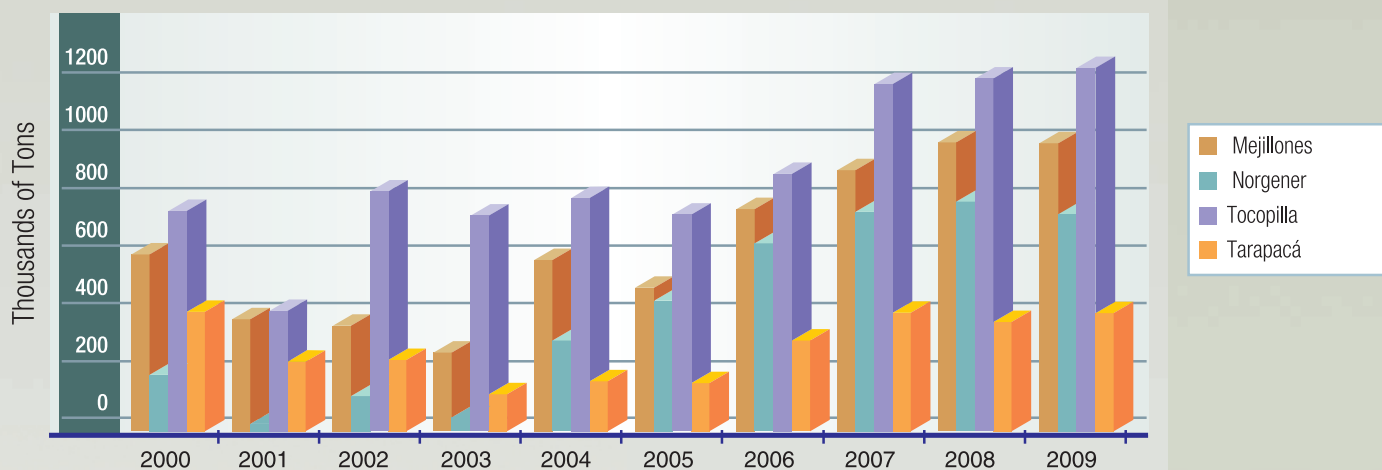
### PAYMENTS FROM SUBTRANSMITTOES TO GENERATORS FOR ENERGY AND POWER LOSS - 2009

TO/FROM [\$]	EDELNOR	ELECTROANDINA	GASATACAMA	NORGENER	AES GENER	General Total
ALTO NORTE	1.648.518	80.280	6.198.521	147.438	156.628	8.231.386
EDELNOR	103.024.475	5.950.720	374.558.009	9.514.600	7.550.958	500.598.763
TRANSELEC NORTE	241.047.185	14.070.641	862.223.431	21.560.744	15.370.338	1.154.272.338
TRANSEMEL	12.308.550	718.142	44.092.031	1.102.902	806.539	59.028.163
<b>General Total</b>	<b>358.028.729</b>	<b>20.819.783</b>	<b>1.287.071.991</b>	<b>32.325.684</b>	<b>23.884.463</b>	<b>1.722.130.650</b>



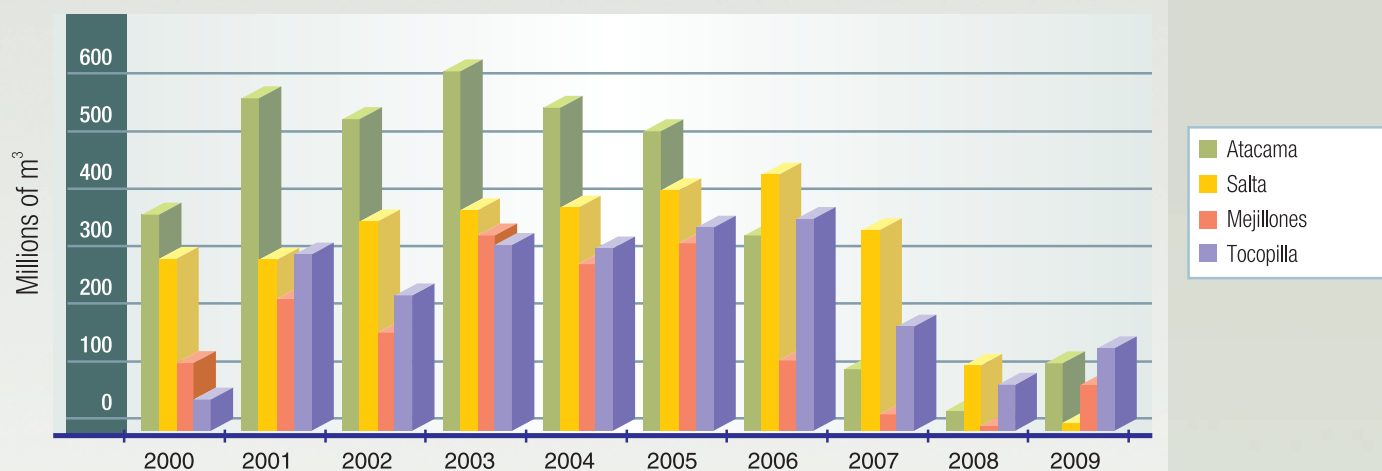
## ANNUAL FUEL CONSUMPTION BY POWER PLANTS 2000 - 2009

### ANNUAL CONSUMPTION OF COAL PER PLANT



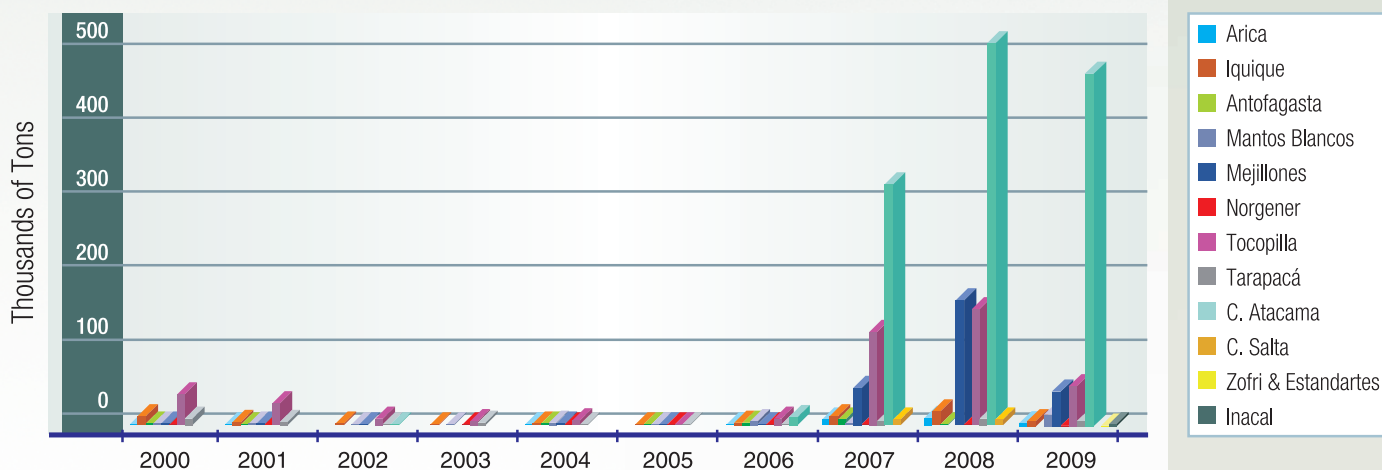
Note: Starting from 2001, the consumption of the Mejillones Power Plant is based on a Coal-Petcoke mix.  
Starting from 2004, the consumption of the Tocopilla and Norgener Power Plants is based on a Coal-Petcoke mix.

### ANNUAL CONSUMPTION OF NATURAL GAS PER PLANT



Note: The use of natural gas as fuel for generation started in 1999.

### ANNUAL CONSUMPTION OF LIQUID FUEL PER PLANT



Note: The consumption of liquid fuel corresponds to Diesel Oil and Fuel Oil Nº 6.



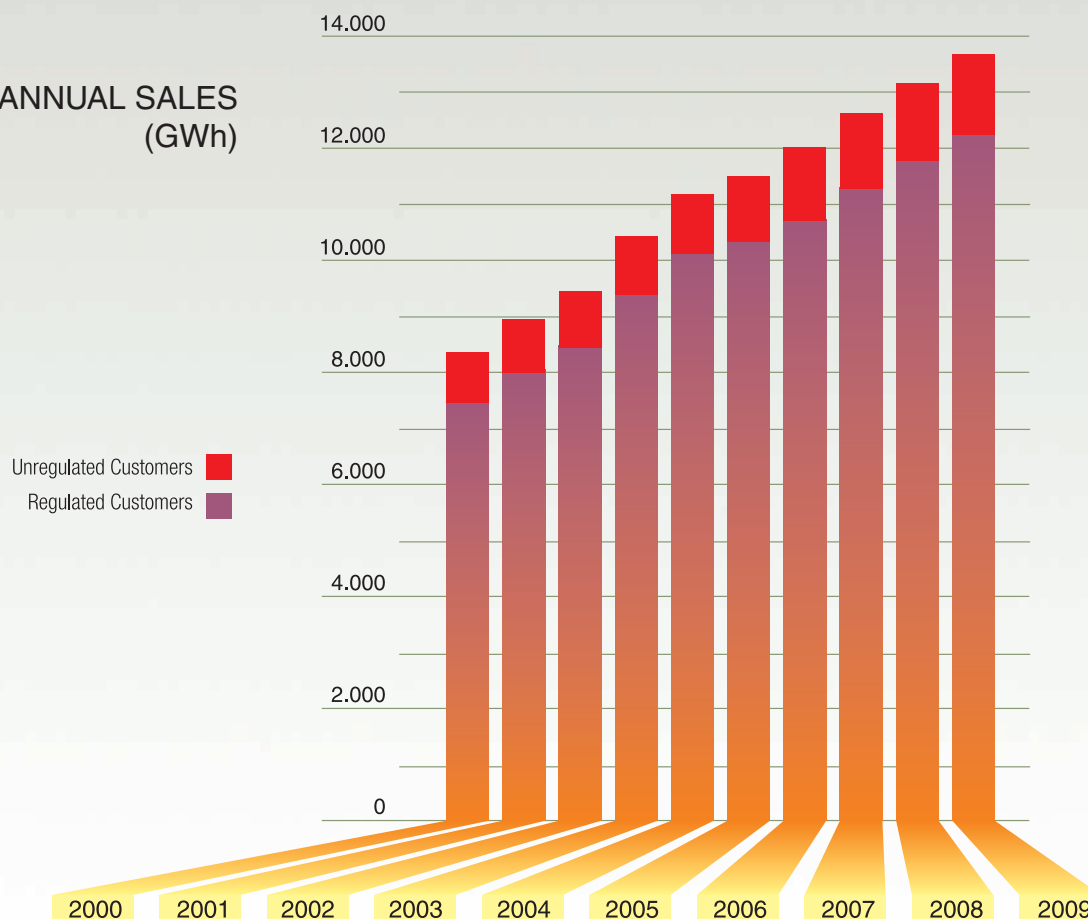
## ANNUAL SING SALES (GWh) 2000 - 2009

Year	Sales			Growth		
	Unregulated Customers	Regulated Customers	Total	Annual	Average Growth	Accumulated
2000	7.499	899	8.398	3,4%	16,5%	147,4%
2001	8.046	945	8.991	7,1%	15,2%	164,9%
2002	8.473	1.009	9.482	5,5%	13,9%	179,3%
2003	9.433	1.047	10.480	10,5%	13,6%	208,8%
2004	10.164	1.075	11.240	7,2%	12,9%	231,1%
2005	10.401	1.159	11.560	2,8%	12,0%	240,6%
2006	10.774	1.256	12.029	4,1%	11,4%	254,4%
2007	11.343	1.332	12.674	5,4%	10,9%	273,4%
2008	11.832	1.387	13.219	4,3%	10,4%	289,4%
2009	12.240	1.417	13.656	3,3%	9,9%	302,3%

Note: The accumulated percent growth refers to 1994 sales (3,394.4 GWh).

Annual sales equal net generation minus transmission losses.

### ANNUAL SALES (GWh)

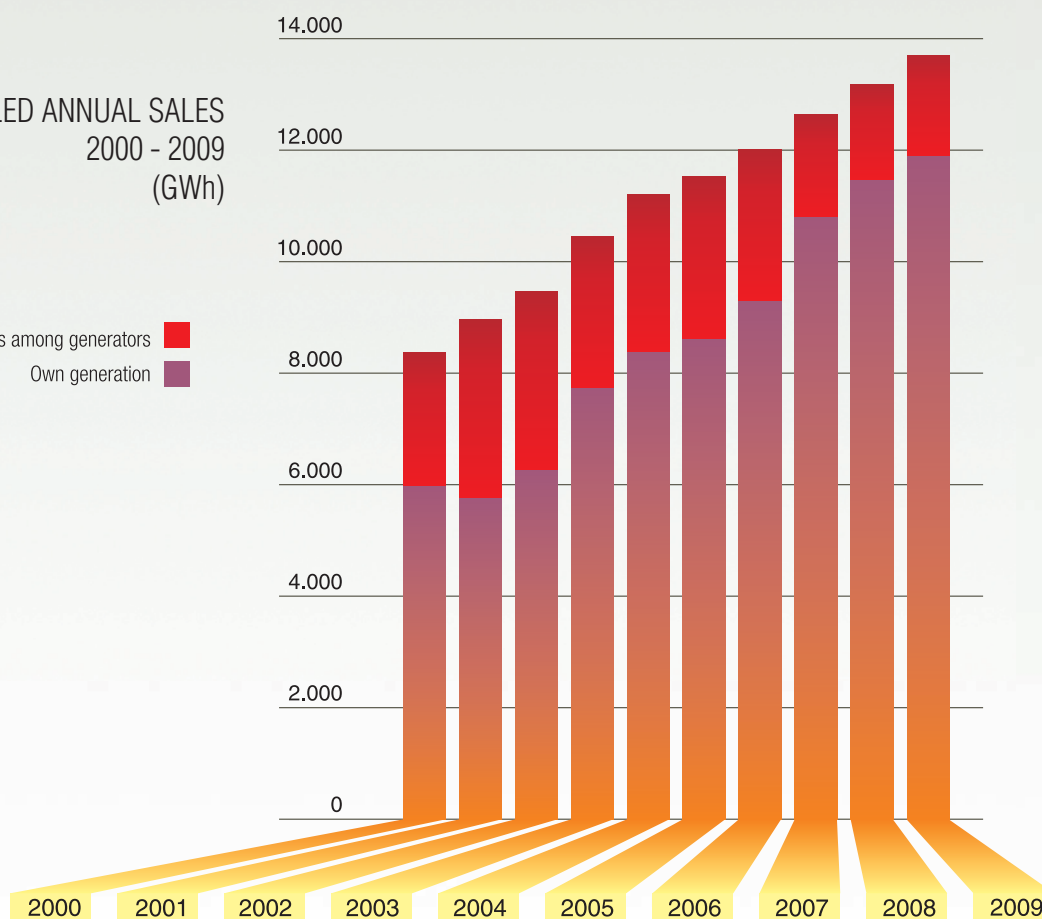


## DETAILED ANNUAL SING SALES 2000 - 2009

Year	Energy Sales (GWh)	Own Generation (GWh)	Transfers among Generators (GWh)	Transfers Sales/Percentage (%)
2000	8.398	6.007	2.391	28%
2001	8.991	5.808	3.183	35%
2002	9.482	6.299	3.183	34%
2003	10.480	7.777	2.703	26%
2004	11.240	8.407	2.832	25%
2005	11.560	8.654	2.905	25%
2006	12.029	9.332	2.698	22%
2007	12.674	10.838	1.836	14%
2008	13.219	11.513	1.706	13%
2009	13.656	11.890	1.766	13%

DETAILED ANNUAL SALES  
2000 - 2009  
(GWh)

Transfers among generators  
Own generation



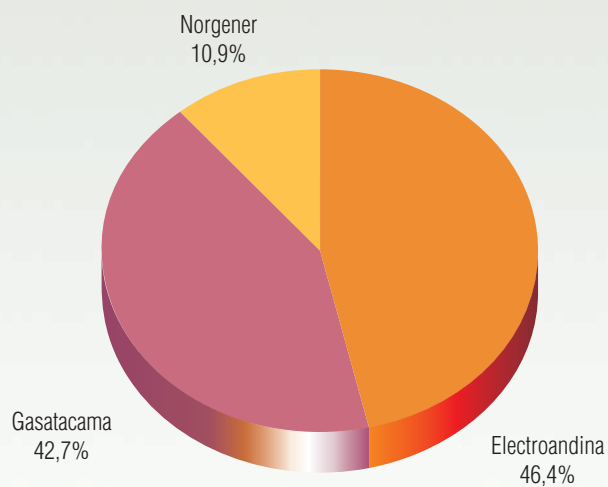


## ENERGY TRANSFERS AMONG CDEC-SING GENERATORS (GWh) 2009

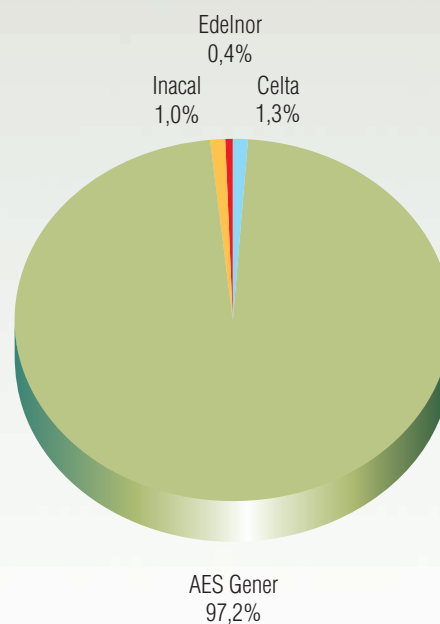
COMPANY		JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
CELTA	Purchases	80,5	22,3											102,8
	Sales			13,5	12,1	12,9	15,9	16,3	0,8	10,6	14,0	18,0	5,2	119,3
EDELNOR	Purchases	75,7		40,1	36,1		5,3	18,4	12,9					188,5
	Sales		7,5			17,7				10,0	74,9	44,9	38,9	193,9
ELECTROANDINA	Purchases			29,3	79,4	126,0	87,8	92,2	84,0	59,6	83,5	21,8		663,6
	Sales	35,9	4,9										49,0	89,8
AES GENER	Purchases													
	Sales	119,7	119,2	115,0	126,5	119,5	96,9	27,3	63,7	80,5	114,3	114,5	104,3	1.201,4
GASATACAMA	Purchases		97,9	60,2	31,1	15,8	23,7			26,3	77,3	84,0	177,7	594,0
	Sales	38,9						4,8	23,3					67,0
NORGENER	Purchases	38,3	11,4			8,5				17,2	45,5	74,9	21,5	217,3
	Sales			1,1	8,0		4,0	61,1	8,5					82,7
INACAL	Purchases													
	Sales					0,3		1,1	0,5	2,0	3,1	3,3	1,8	12,1

Note: The amounts indicated do not include the Purchases-sales operations contracted between generators.

**Net Energy Purchases**



**Net Energy Sales**



## ENERGY TRANSFERS AMONG CDEC-SING GENERATORS (GWh) 2000 - 2009

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CELTA	Purchases	21,2	263,6	390,8	601,4	663,2	628,5	343,1	160,0	162,0	102,8
	Sales	116,0	10,4	0,0	0,0	0,0	0,0	0,2	45,2	162,0	119,3
EDELNOR	Purchases	97,8	54,9	0,0	0,0	0,0	0,0	26,2	0,0	115,0	188,5
	Sales	255,3	292,1	801,1	1.263,8	1.637,3	1.522,8	1.057,6	714,9	695,0	193,9
ELECTROANDINA	Purchases	1.438,0	1.497,4	1.109,5	831,7	1.000,1	968,1	540,8	382,3	740,0	663,6
	Sales	0,0	0,0	0,0	0,0	18,9	0,0	23,0	69,8	41,0	89,8
AES GENER	Purchases	0,0	2,7	0,0	0,0	0,0	0,0	0,0	121,0	13,0	
	Sales	473,7	629,2	997,8	1.088,9	1.050,3	1.335,6	1.357,0	812,2	676,0	1.201,4
GASATACAMA	Purchases	0,0	0,0	24,0	3,5	430,2	806,1	1.638,1	1.126,2	617,0	594,0
	Sales	1.549,6	2.251,5	792,7	350,1	126,3	36,1	0,0	0,0	29,0	67,0
NORGENER	Purchases	833,9	1.364,7	1.067,2	1.266,1	739,2	503,1	150,3	104,4	60,0	217,3
	Sales	0,0	0,0	0,0	0,0	0,0	11,3	260,7	251,7	103,0	82,7
INACAL	Purchases										
	Sales										12,1

Note: Provisional values from May 2000 to December 2009.

## POWER TRANSFERS AMONG CDEC-SING GENERATORS (MW) 2009

### FIRM POWER BALANCE 2009

	EDELNOR	ELECTROANDINA	NORGENER	CELTA	GASATACAMA	AES GENER	INACAL	ENORCHILE	TOTAL SING
Injections [MW]	989,9	511,0	201,0	262,3	744,0	380,6	1,3	0,1	3.090,3
Withdrawals [MW]	1.010,1	451,8	303,9	283,1	770,2	271,2	0,0	0,0	3.090,3
Balance [MW]	-20,2	59,3	-102,9	-20,8	-26,2	109,4	1,3	0,1	

### FIRM POWER TRANSFER 2009

	EDELNOR	ELECTROANDINA	NORGENER	CELTA	GASATACAMA	AES GENER	INACAL	ENORCHILE	TOTAL SING
PURCHASES (MW)	20,2	0,0	102,9	20,8	26,2	0,0	0,0	0,0	170,1
SALES (MW)	0,0	59,3	0,0	0,0	0,0	109,4	1,3	0,1	170,1

## PRICE OF THE POWER OF THE CRUCERO 220kV NODE

Tariff Setting Date	Term		Price of Power [\$ /kW-month]
	From	To	
oct-08	1/11/08	18/1/09	4.198,66
Oct-08 (index jan)	19/1/09	30/4/09	5.053,92
Apr-09	1/5/09	15/8/09	5.054,71
Apr-09 (index Aug)	16/8/09	31/10/09	4.762,80
Oct-09	1/11/09	31/12/09	4.662,80



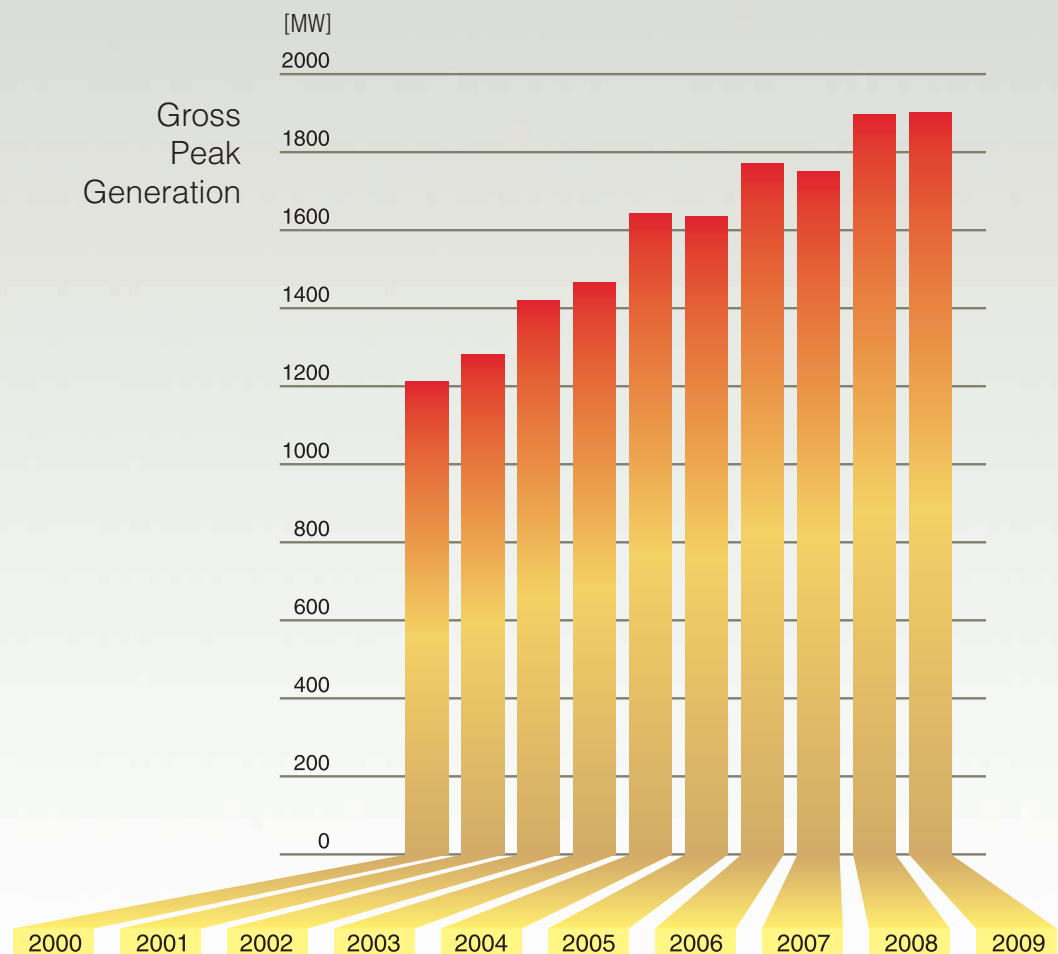
## POWER TRANSFER AMONG CDEC-SING GENERATORS (MW) 2000 - 2009

	EDELNOR		ELECTROANDINA		NORGENER		CELTA		GASATACAMA		AES GENER		INACAL		ENORCHILE	
	Purchases	Sales	Purchases	Sales	Purchases	Sales	Purchases	Sales	Purchases	Sales	Purchases	Sales	Purchases	Sales	Purchases	Sales
2000	81,3		206,0		66,8		45,3			242,8		156,6				
2001	33,5		146,6		85,3		59,4			172,8		152,0				
2002 (January-March)		145,8	138,0		69,4		48,5		73,0			183,2				
2002 (April-December)		141,7	174,0		81,7		55,1		9,8			178,9				
2003		123,9	117,5		83,1		52,9		34,9			164,4				
2004		132,3	119,3		84,2		65,5		43,0			179,6				
2005		140,1	124,2		82,7		56,4		61,4			184,6				
2006		159,1	86,8		80,4		71,8		122,9			202,9				
2007		64,8	41,8		91,0		55,6		55,1			178,8				
2008		33,5	5,5		81,6		27,0			14,3		66,3				
2009	20,2			59,3	102,9		20,8		26,2			109,4		1,3		0,1

## SING'S PEAK ANNUAL DEMAND 2000 - 2009

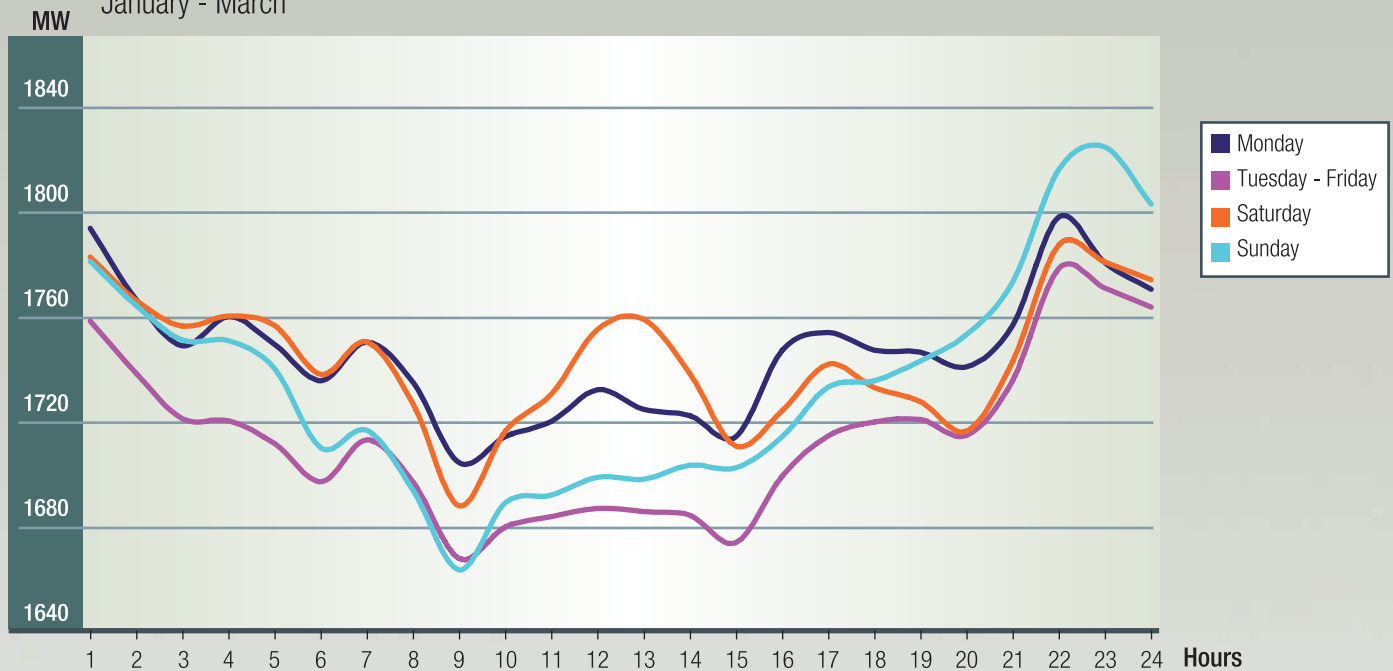
Year	Day	Time	Gross Peak Generation (MW)	Gross Peak Demand (MW)
2000	15-dec-00	22	1.213	1.153
2001	5-nov-01	22	1.281	1.221
2002	23-dec-02	22	1.420	1.360
2003	14-dec-03	22	1.467	1.416
2004	19-dec-04	23	1.644	1.567
2005	27-nov-05	22	1.635	1.566
2006	15-dec-06	23	1.770	1.676
2007	24-apr-07	22	1.751	1.665
2008	21-dec-08	22	1.897	1.805
2009	27-mar-09	22	1.907	1.816

Note: Gross Peak Demand is equivalent to the power plants' gross generation minus consumption.

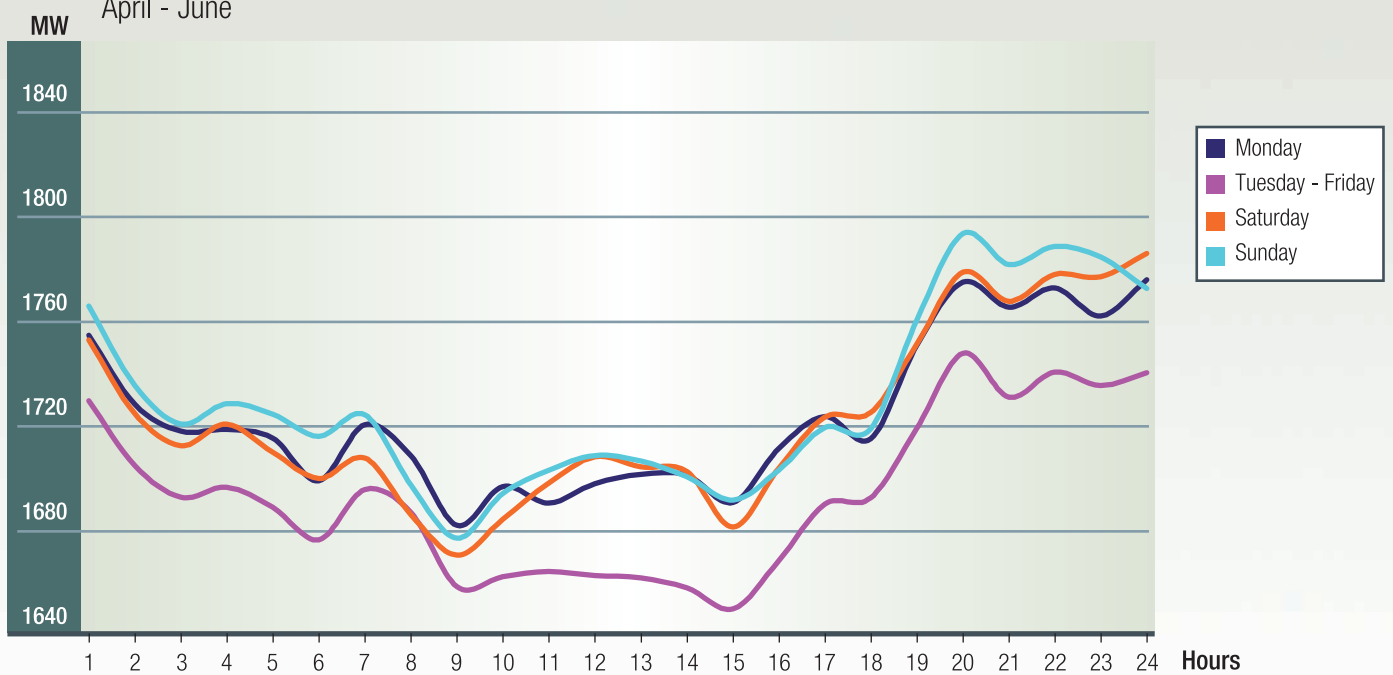


## GROSS HOURLY GENERATION TYPICAL DAILY CURVES 2009

Gross Average Hourly Generation 2009  
January - March

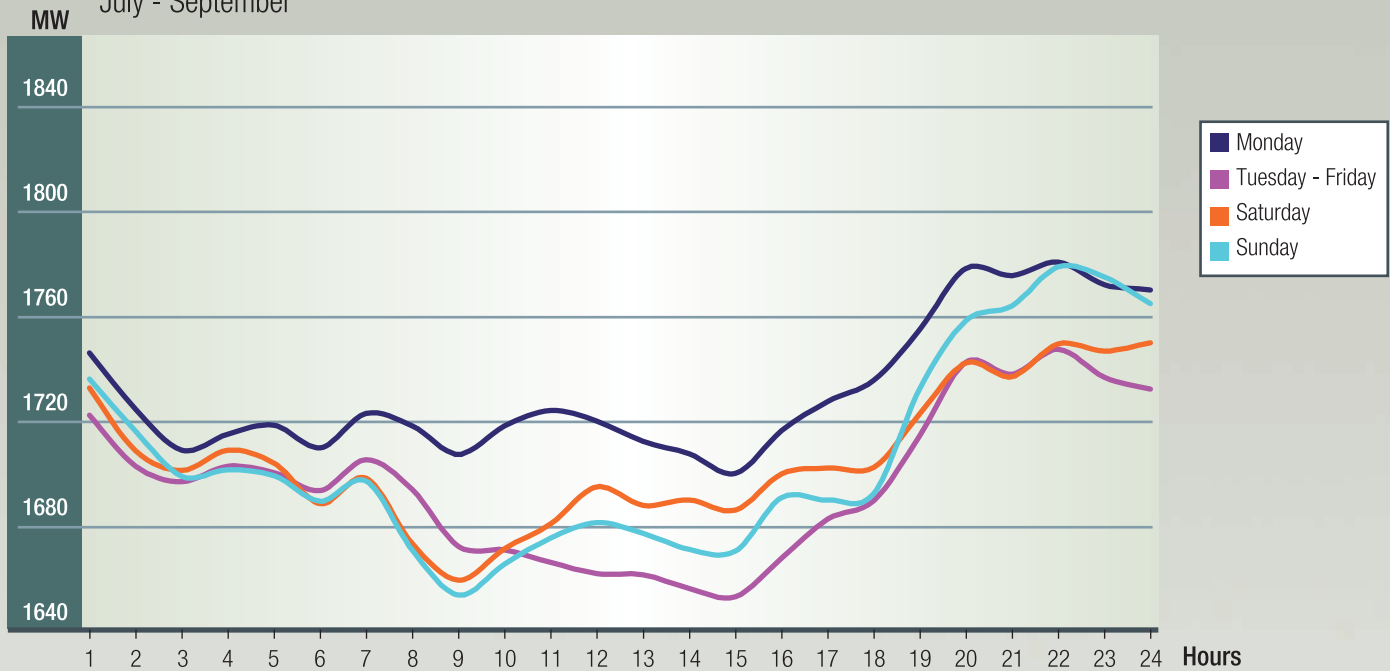


Gross Average Hourly Generation 2009  
April - June

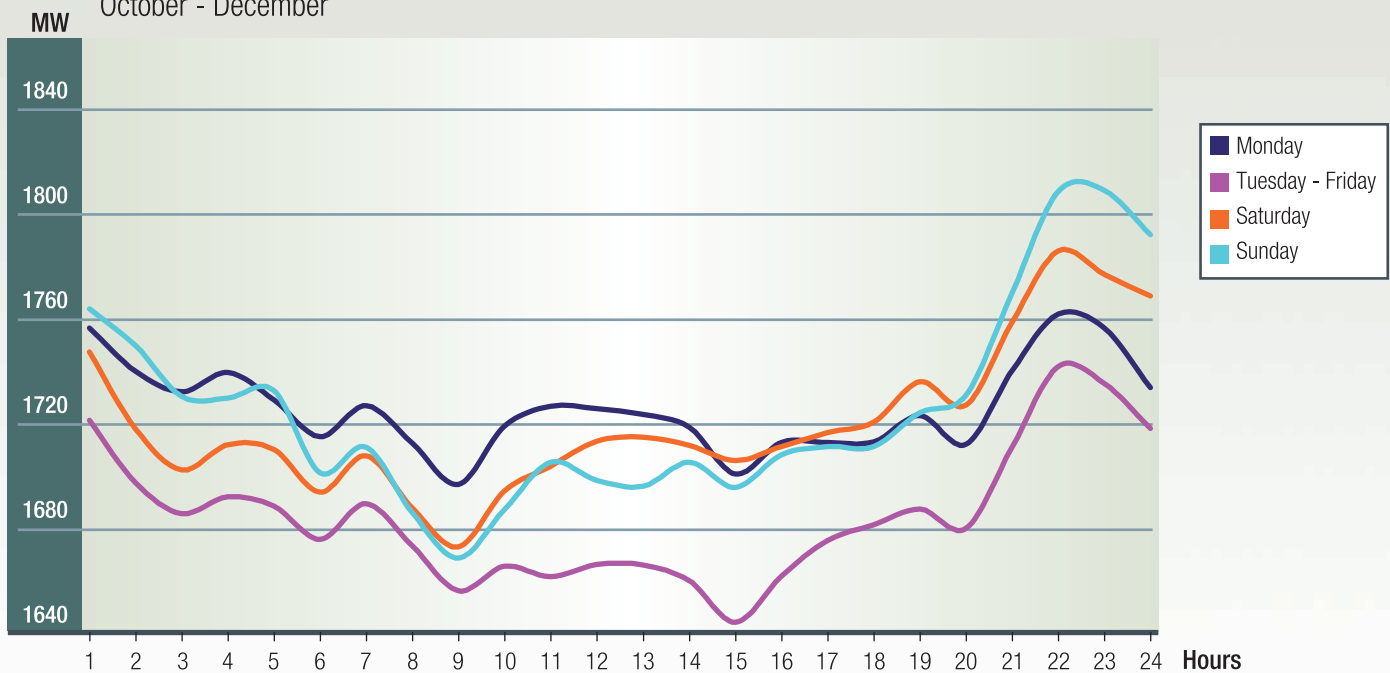




Gross Average Hourly Generation 2009  
July - September



Gross Average Hourly Generation 2009  
October - December



## MARGINAL ENERGY COSTS - 220 kV CRUCERO NODE - 2009

Day	January	February	March	April	May	June
1	42,42888	91,13260	52,89607	48,85139	86,61939	62,22015
2	43,92039	59,89518	66,22915	55,69940	65,74791	68,76632
3	51,86066	71,64724	56,23535	71,02668	51,26447	61,25965
4	49,69951	62,17007	61,05892	62,63681	61,15783	65,50108
5	58,02708	67,66786	42,81367	61,05992	55,21314	71,13085
6	49,20028	61,54134	50,60868	41,39867	46,67278	62,21460
7	54,51290	61,34629	48,10663	39,16917	53,19059	63,35720
8	90,13775	61,07542	52,23455	53,60370	51,13929	66,79174
9	66,85675	53,97690	56,24530	66,62464	46,94733	54,35740
10	72,38021	52,77886	52,21244	69,84652	53,37386	51,66103
11	72,92354	47,99391	52,82623	58,48808	49,86183	53,67626
12	62,83702	59,95574	51,68524	62,31032	45,19887	69,18874
13	52,99384	58,19952	48,29962	50,78012	45,19602	65,34393
14	67,41009	56,70796	49,44105	57,43243	57,18673	63,10398
15	69,97106	58,28869	51,32273	56,59638	69,10636	65,06797
16	67,46792	61,13719	49,98423	50,72169	65,62227	65,59783
17	80,85144	51,46463	51,03237	58,81705	55,89733	68,77682
18	74,72256	49,03909	51,53825	64,39067	62,24582	68,21041
19	77,16075	45,70697	61,91886	64,32359	60,70058	68,86476
20	73,36594	44,37312	60,14472	62,19201	57,05411	70,29476
21	75,04440	41,93518	53,88369	66,23042	41,59447	68,92172
22	85,38691	45,97196	67,44792	59,30834	60,35886	70,49330
23	85,93141	45,66909	68,08338	62,10082	64,65374	70,86705
24	74,85305	43,67331	62,46767	67,68145	79,34353	74,12621
25	72,17362	35,67689	60,57052	62,43806	67,38333	71,17175
26	68,93715	37,58257	47,69802	61,40004	40,99089	75,92721
27	82,81805	49,62490	51,08117	70,97366	66,71743	69,93740
28	87,80284	48,44443	55,96506	84,43738	63,66209	72,51102
29	89,70780		58,63286	78,24044	67,96798	68,85902
30	79,29934		54,32218	63,09995	75,13510	69,02571
31	77,75813		41,16982		73,24021	
<b>Average</b>	<b>69,62714</b>	<b>54,45275</b>	<b>54,45666</b>	<b>61,06266</b>	<b>59,36917</b>	<b>66,57420</b>

Note: Provisional values  
Daily average in \$/KWh per day.

July	August	September	October	November	December
61,10962	63,25023	67,39712	65,20383	78,09199	72,33992
60,97265	61,24526	64,50705	70,89406	72,02771	72,03065
65,74211	65,62376	72,47332	83,18706	54,20571	72,20350
65,61272	62,59832	81,87369	73,41735	57,53353	76,15548
60,48871	66,08609	81,73611	71,71395	45,77744	76,63426
69,53755	67,70623	69,52625	67,64755	61,97956	81,72209
64,88731	66,38422	76,43632	55,54778	57,50338	72,00407
71,93271	65,39938	78,25452	44,09447	48,05894	70,65483
65,57916	65,21693	74,95833	51,96908	74,86648	31,73419
67,83706	68,44267	76,27371	60,42268	73,08692	29,64761
69,56999	82,56525	74,71289	41,17015	43,71653	48,64840
67,87036	65,48959	74,97140	48,29162	47,69014	39,50598
72,26167	66,37042	75,13946	56,88218	51,40771	32,08570
72,33029	70,50805	68,04824	50,37154	60,31581	32,99411
75,36984	69,60702	54,71309	47,35341	37,38893	32,94034
72,48475	71,74537	62,73684	66,10718	59,57488	43,44231
72,40144	72,63523	43,23031	70,34828	37,97656	31,07353
65,36106	61,70446	60,58490	65,52309	43,03874	45,27658
65,03413	71,51240	71,93534	48,11764	39,95347	26,94317
65,90968	70,90054	94,15031	46,50847	57,52777	27,17922
65,33423	76,69156	79,06191	61,81954	40,26317	48,17827
72,67822	72,88763	87,23986	48,06161	80,97400	32,41625
69,38085	72,76852	92,07858	62,06922	73,43751	31,66234
66,95071	86,30509	94,84089	72,13784	110,57403	36,58304
59,58607	72,42144	82,58132	56,72911	72,08656	32,49375
56,39988	73,41082	75,58205	51,67337	74,78265	32,27885
65,08802	72,57388	95,68409	55,70396	71,33084	33,84630
61,31477	73,45939	73,23942	60,39619	72,91299	32,19165
57,98968	66,95771	80,01739	72,12466	72,64796	34,26161
70,31844	74,31461	123,50891	69,50952	71,26122	35,10531
64,35985	62,26121		69,85982		24,48721
<b>66,50624</b>	<b>69,64656</b>	<b>76,91645</b>	<b>60,15665</b>	<b>61,39977</b>	<b>44,79744</b>



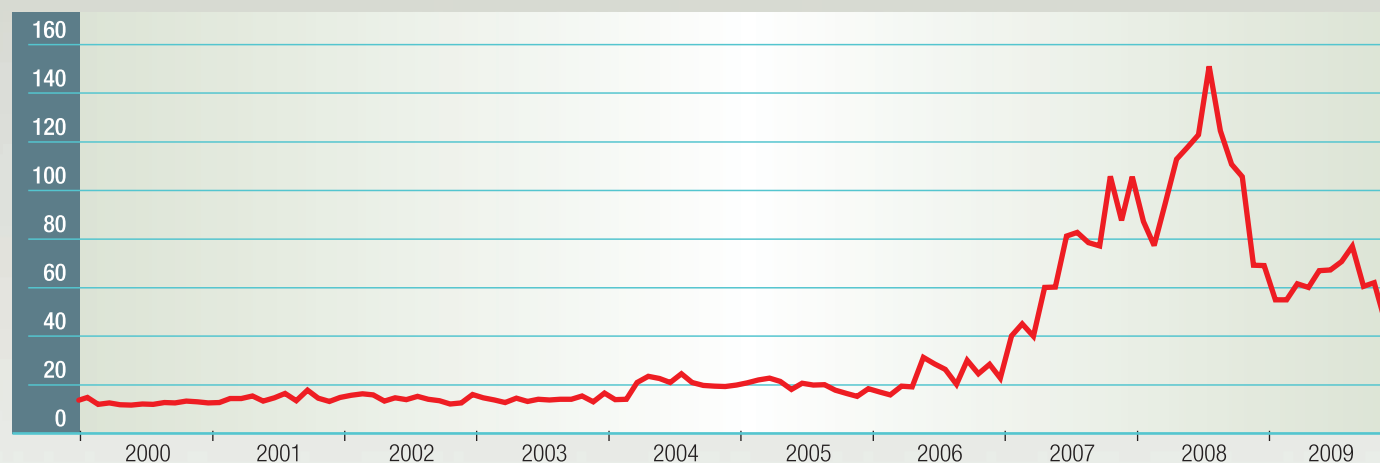
## MARGINAL ENERGY COSTS - 220 kV CRUCERO NODE 2000 - 2009

Month \ Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
January	8,9	8,8	10,7	12,0	12,6	15,5	14,9	19,2	98,3	69,6
February	10,1	8,9	11,4	11,0	10,4	16,3	13,8	34,2	81,4	54,5
March	8,1	10,2	11,9	10,4	10,6	17,3	12,9	38,7	72,6	54,5
April	8,6	10,2	11,6	9,5	16,2	18,2	16,0	34,5	89,8	61,1
May	8,1	11,0	9,7	11,0	18,3	17,1	15,7	52,5	108,2	59,4
June	7,9	9,5	10,7	9,8	17,7	14,4	26,4	53,1	114,4	66,6
July	8,3	10,5	10,1	10,6	16,4	16,6	24,2	72,7	120,9	66,5
August	8,2	12,0	11,3	10,4	19,3	16,1	22,2	74,9	150,3	69,6
September	8,8	9,7	10,5	10,6	16,4	16,4	16,9	71,9	125,0	76,9
October	8,8	13,1	10,1	10,6	15,5	14,5	25,5	70,9	112,0	60,2
November	9,3	10,6	8,9	11,7	15,3	13,2	20,6	98,1	106,7	61,4
December	9,1	9,5	9,3	9,7	15,1	12,3	24,0	81,5	68,9	44,8
<b>Average</b>	<b>8,7</b>	<b>10,3</b>	<b>10,5</b>	<b>10,6</b>	<b>15,3</b>	<b>15,6</b>	<b>19,4</b>	<b>58,5</b>	<b>104,0</b>	<b>62,1</b>

Note: Provisional values for April and May 1998, and from May 2000 to December 2009.  
Monthly averages in nominal \$/kWh.

## MARGINAL ENERGY COSTS MONTHLY AVERAGES

MARGINAL ENERGY COSTS AT CRUCERO NODE - MONTHLY AVERAGES (\$/kWh)



Note: Provisional values for April and May 1998, and from May 2000 to December 2009.  
Marginal costs updated by CPI of December 2009.

MARGINAL ENERGY COSTS AT CRUCERO NODE - MONTHLY AVERAGES (US\$/MWh)



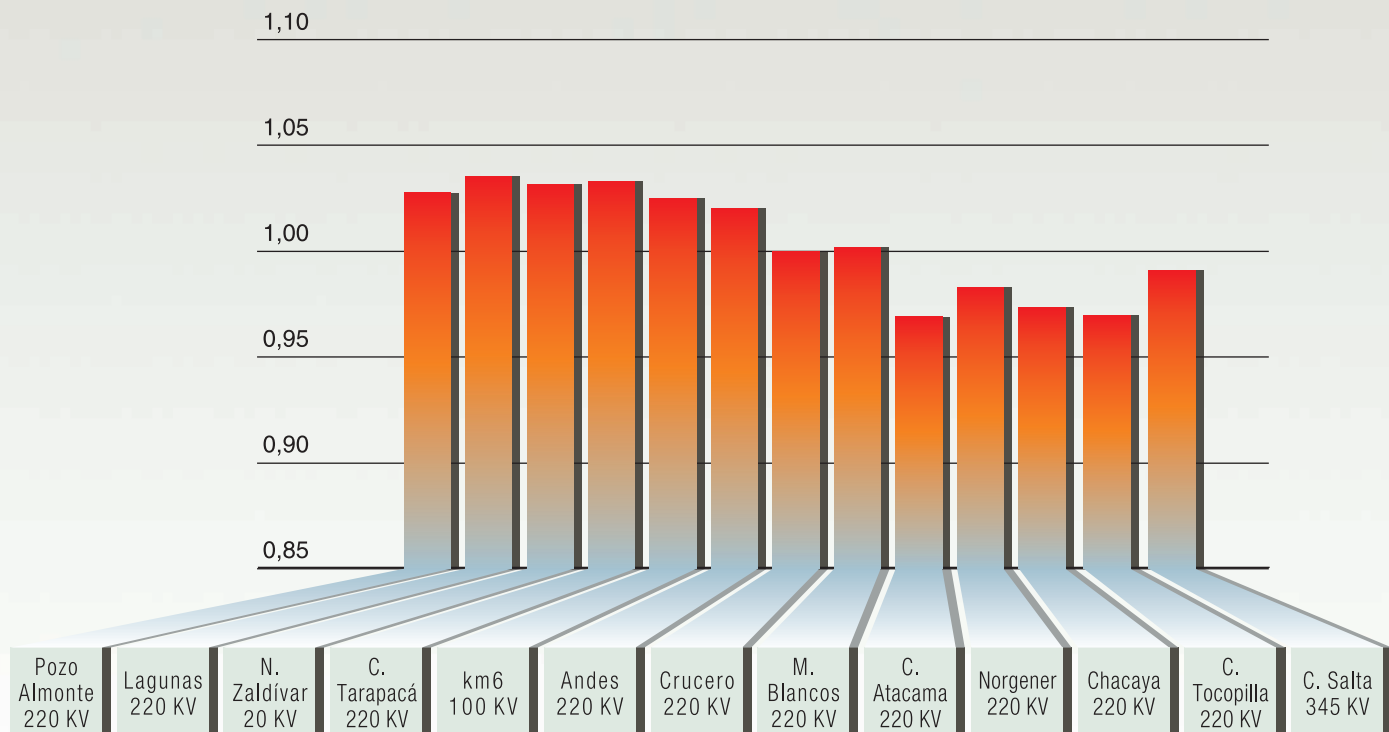
Note: Provisional values for April and May 1998, and from May 2000 to December 2009.  
Marginal costs updated by CPI of December 2009 and converted to USD using the exchange rate current for December 31<sup>st</sup> 2009.

## ENERGY PENALTY FACTORS 2009

Busbar	Average	Maximum	Minimum
Pozo Almonte 220 kV	1,02747	1,08055	0,99884
Lagunas 220 kV	1,03538	1,06552	1,02936
N.Zaldívar 220 kV	1,03165	1,03863	1,02391
C.Tarapacá 220 kV	1,03267	1,06980	1,02518
km6 100 kV	1,02501	1,03425	1,01806
Andes 220 kV	1,02042	1,03174	1,01138
Crucero 220 kV	1,00000	1,00000	1,00000
M.Blancos 220 kV	1,00223	1,01515	0,99500
C.Atacama 220 kV	0,96907	0,98626	0,95594
Norgener 220 kV	0,98299	0,98765	0,97967
Chacaya 220 kV	0,97367	0,98914	0,96678
C.Tocopilla 220 kV	0,96961	0,97725	0,96011
C.Salta 345 kV	0,98971	1,01662	0,96981

Note: Values from weekly scheduling.

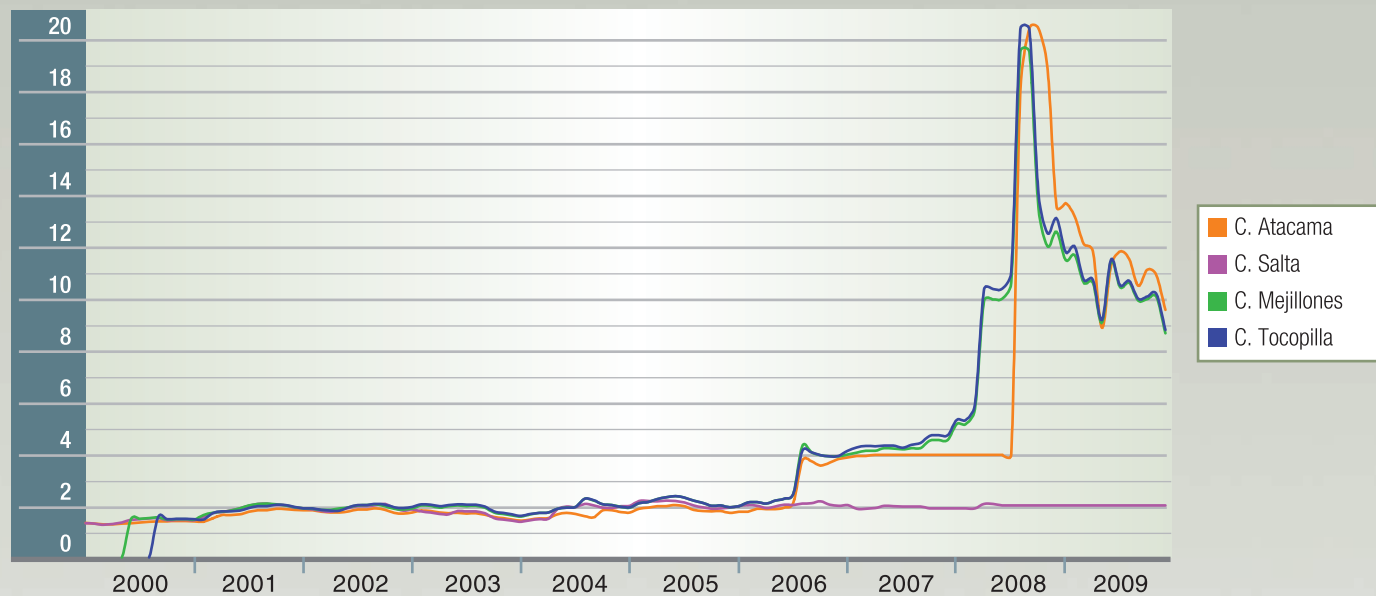
Energy Penalty Factors 2009



## FUEL PRICES PER POWER PLANTS

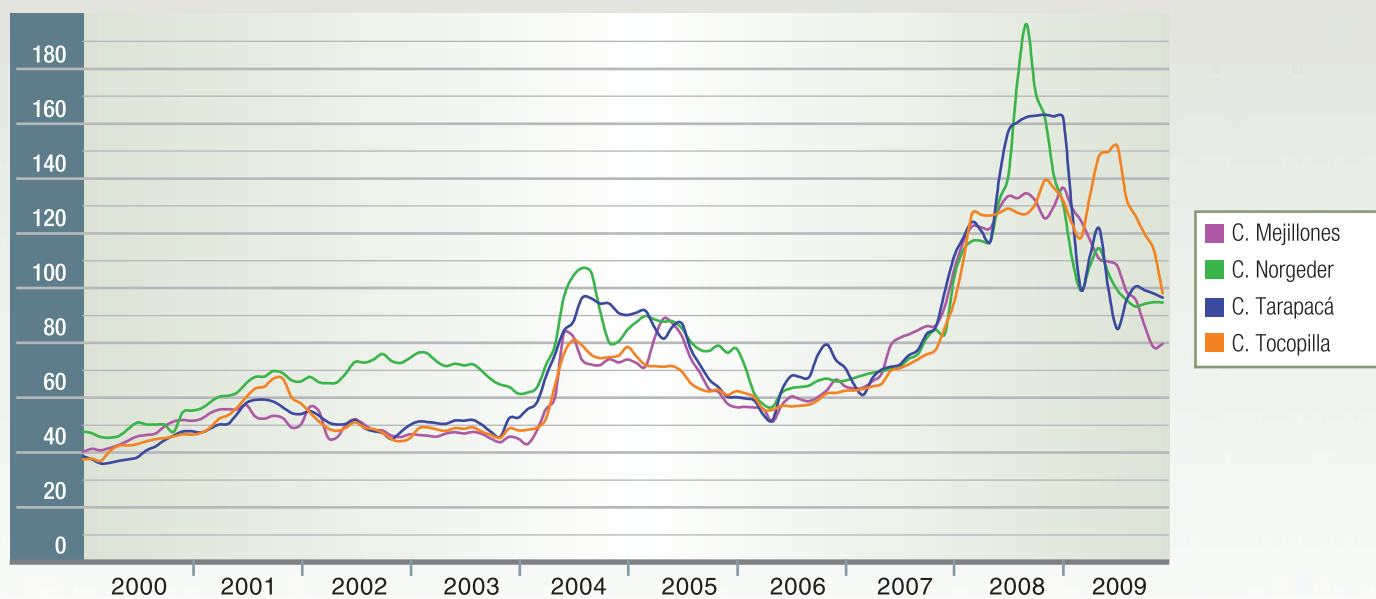
### NATURAL GAS PRICES

Average monthly values updated to December 2009 ( US\$ / Mbtu )



### COAL PRICES

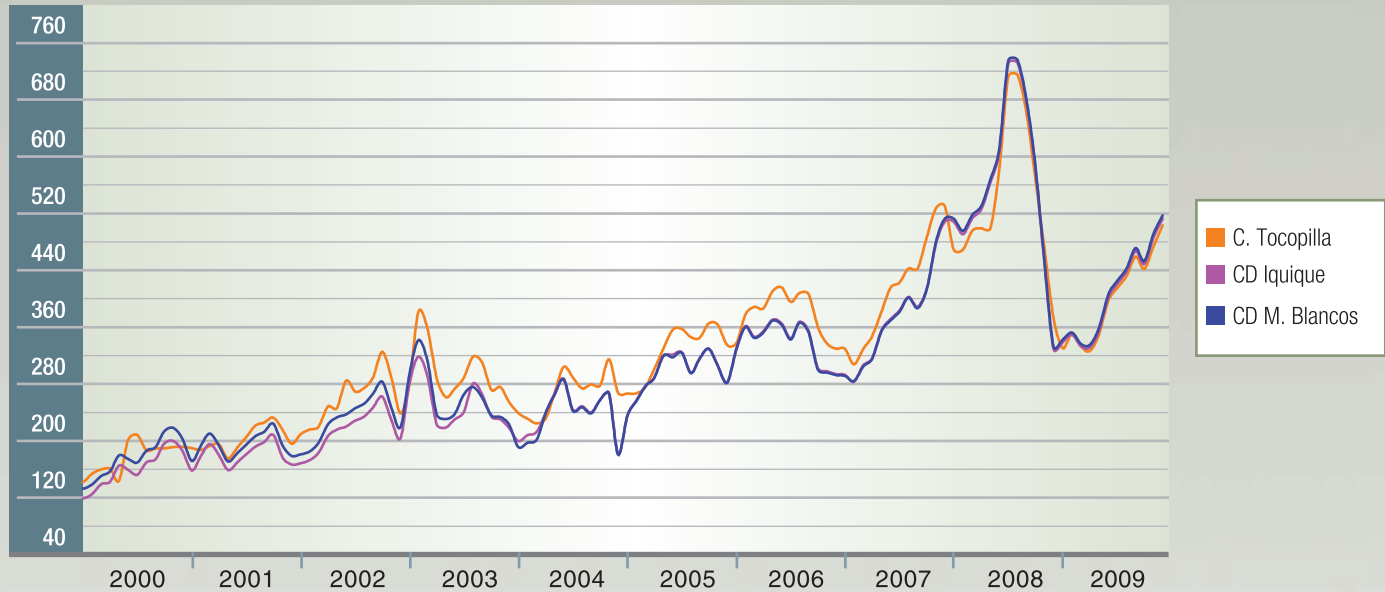
Average monthly values updated to December 2009 ( US\$ / ton )



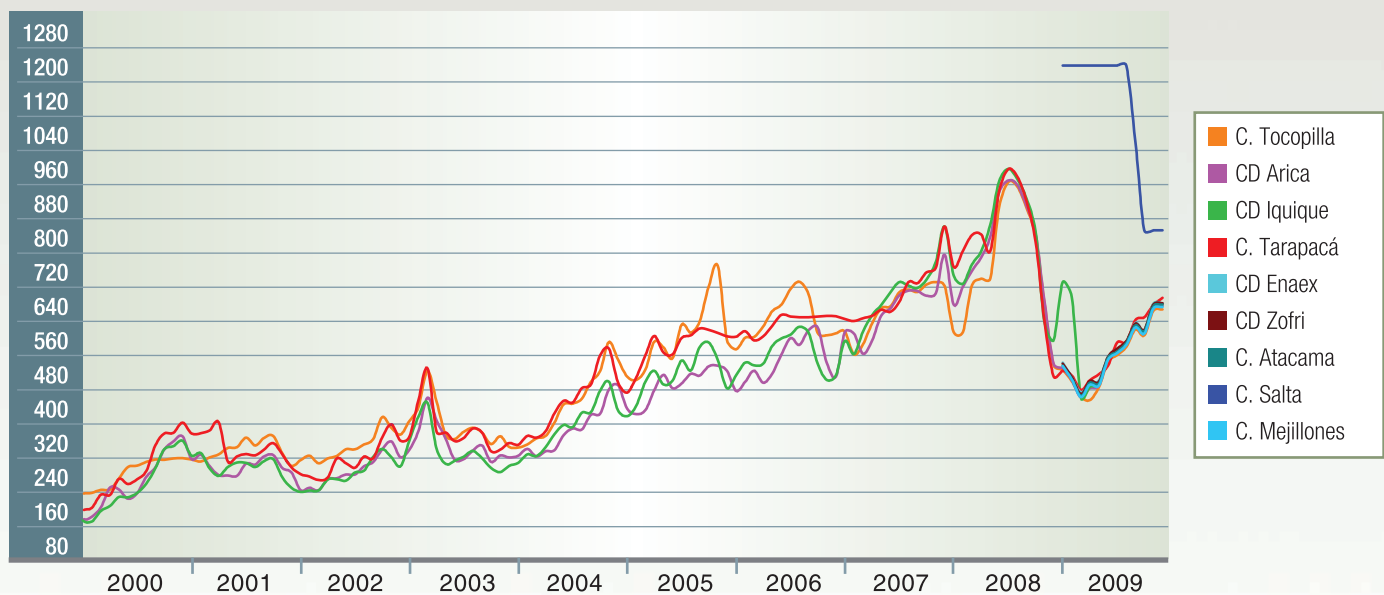


## N°6 FUEL OIL PRICES

Average monthly values updated to December 2009 ( US\$ / ton )



## DIESEL OIL PRICES

Average monthly values updated to December 2009 ( US\$ / m<sup>3</sup> )









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