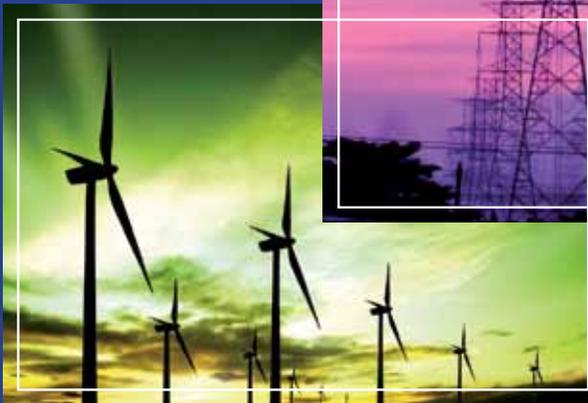


# NATIONAL ENERGY STRATEGY 2012-2030



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# **NATIONAL ENERGY STRATEGY**

# 2012-2030

FEBRUARY 2012







Introduction

# **Chile's Energy Challenge** The Foundations of a Developed Country

# Chile's Energy Challenge

## The Foundations of a Developed Country



Chile is at a critical moment in its history. It is faced by the enormous challenge and the noble task of generating the right conditions to achieve development over the coming decades. This is the objective that this Government has set itself and represents the serious aspiration of our country to bring greater and better opportunities to our fellow Chileans.

Transforming Chile into a developed country not only implies achieving certain macroeconomic goals, but also making a significant step forward, both quantitatively and qualitatively in education, strengthening healthcare guarantees; making decisive progress in the access to and quality of housing; and putting an end, once and for all, to extreme poverty so as to improve the circumstances of thousands of Chileans who currently live in poverty.

Our development requires sustained growth by the Chilean economy. In effect, Chile grew at a rate of 5.4% between 1986 and 2010 (7.4% between 1986 and 1998 and 3.3% between 1999 and 2009). Since 2009 – particularly in 2010 and 2011 – our country has recovered its ability to grow quickly. The productive sector has reacted vigorously and the economy has become very active and this in turn has resulted in positive employment figures. In effect, the projected growth of the

Chilean economy in 2011 was 6.3%, with most sectors showing strong expansion.

As our country grows, it needs more energy, so there is a natural linkage between the economy and energy. Therefore, the challenge for Chile today is to have sufficient and competitive energy resources to support this development. Energy is an essential material for society. Its availability and supply directly affect social and economic growth and consequently the reduction of poverty. The lack of access to reliable energy sources and networks constitutes a dangerous limitation to sustained social progress, to economic growth and to the wellbeing of the population.

This being the case, when it comes to forecasting growth, Chile must be clear that it can sustain it with clean, safe, economical energy.



# How much Energy do we Need and at what Cost?

## Demand in a Developed Society

Central, SIC), 25.6% from the Norte Grande Interconnected System (Sistema Interconectado del Norte Grande, SING) and 0.8% from the medium-sized systems in Aysén and Magallanes.

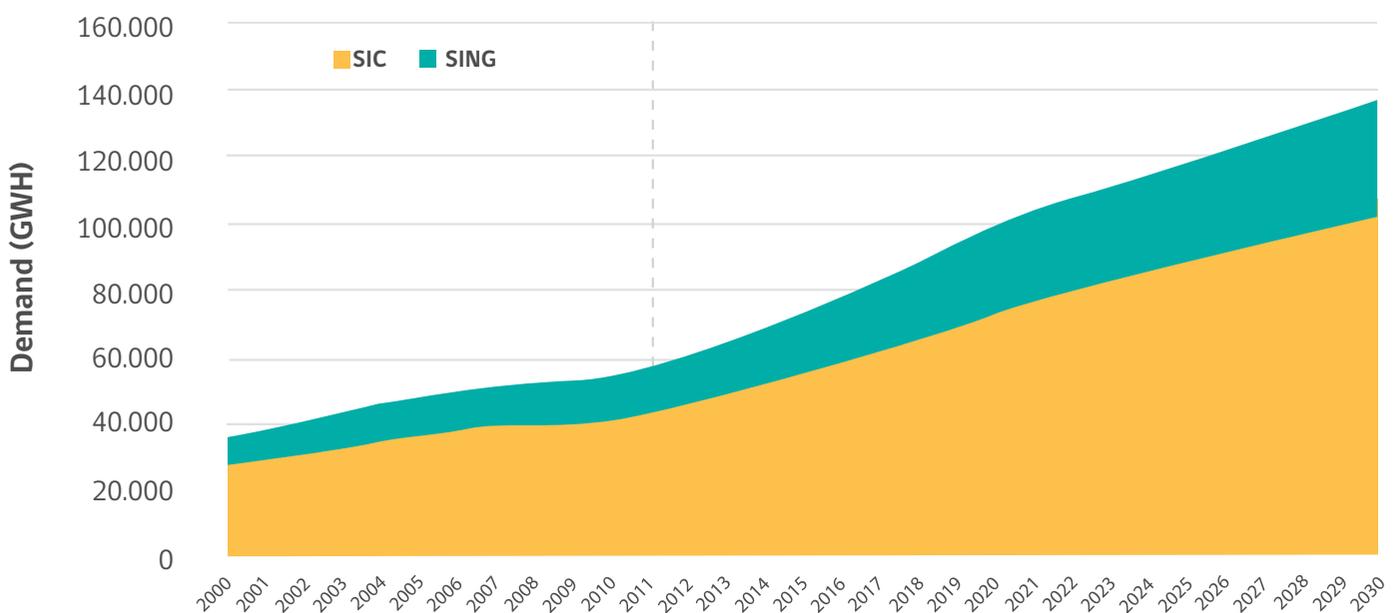
The maximum demand during the year just gone was 6,881 MW from the SIC, and 2,162 MW from the SING.

On analyzing gross generation during 2011, the SIC produced 46,095 GWh, which represents 6.8% growth compared to 2010, while the SING generated a gross total of 15,878 GWh, 5.2% more than the previous year.

Between now and 2020, growth rates of around 6% to 7% are projected for electricity consumption in Chile, which means almost 100,000 GWh of total electricity demand by that year. That means that an increase in supply of some 8,000 MW of new generation projects would be needed to satisfy the demand.

This is a mammoth undertaking, particularly considering that Chile is predominantly an importer of energy resources and that it has in recent years been particularly dependant on fossil fuels, the prices for which have increased the marginal costs of energy generation, leading to higher electricity prices.

### SIC and SING Demand 2000 – 2030

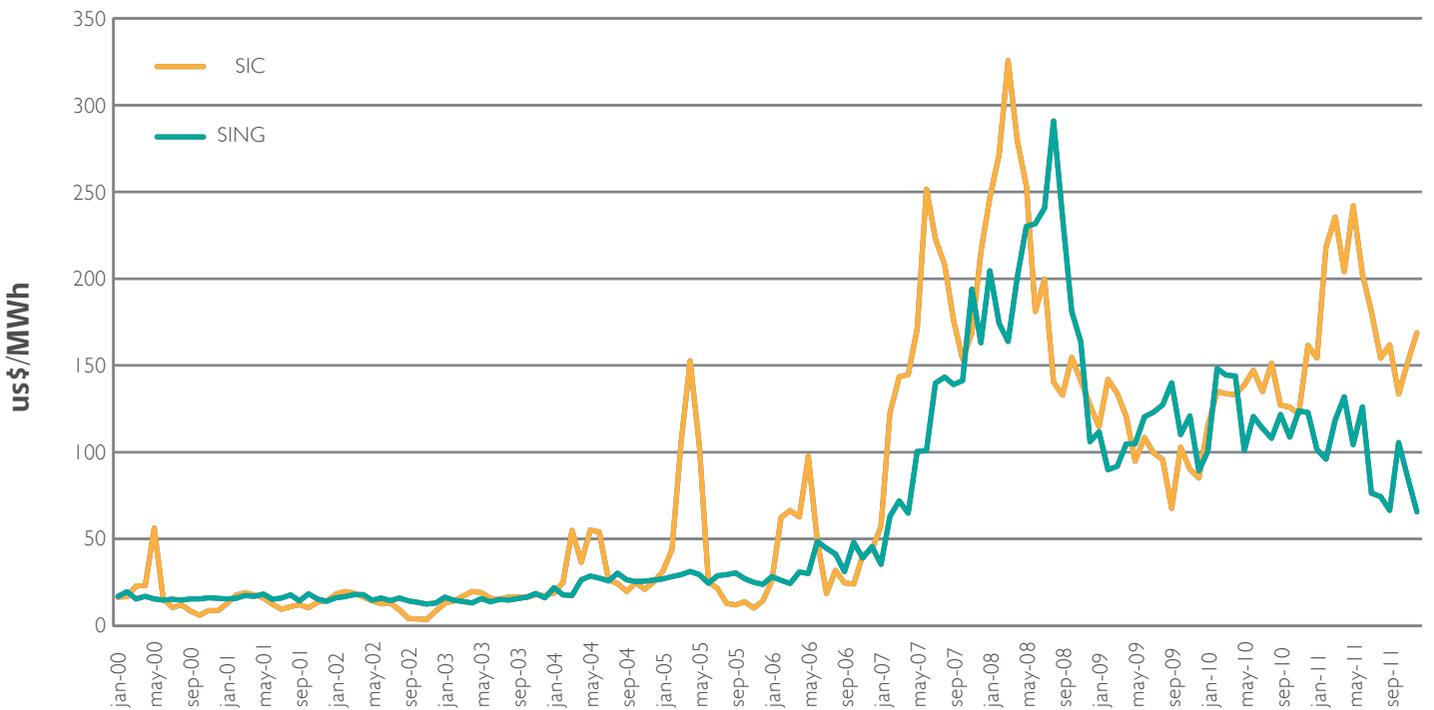


Source: CNE and the Energy Ministry

The price of electricity, both in the spot market and for contracts for free and regulated clients, has also been impacted by the abrupt change in the conditions of gas supply from Argentina, as well as the increase in investment costs for conventional technologies. Electricity prices in Chile are in fact among the highest in Latin America and higher than the OECD average. It can therefore be seen that Chile is very exposed with regard to energy and one of our challenges must be to have sufficient and competitive energy resources to sustain our growth.



## Evolution of marginal costs for the SIC y SING



Source: Energy Ministry, CDEC-SIC and CDEC-SING.

# ¿What Energy do we Want?

## A Sustainable Challenge

Undoubtedly our country needs more energy, but not irrespective of type. Our Government has from the beginning made a fundamental commitment that Chile will develop energy sources that enable the country to have sustainable economic growth while providing adequate safeguards in terms of health and environmental protection. One clear example, among other measures, are the emission standards for thermoelectric plants brought in by our Government in 2011. As a result, Chile is now applying similar standards to those applied in the European Union.

Our first commitment is therefore to develop clean, renewable energy sources, which are, moreover, abundant in our country. Water is a major component of our electricity matrix, and in 2011 represented almost 35% of the energy produced. We are therefore decidedly promoting its development because of the great potential offered by this resource.

Non-conventional renewable energy (NCRE) sources are another option. The development of this type of project depends on the characteristics inherent in each of the available

technologies and the different obstacles they face. Therefore our challenge will be to sustainably boost their development, taking account of the degree of maturity of the projects and this will increase over the years to come.

Despite our commitment to this area, we realize that we cannot discount fossil fuels as a source of energy generation.

They are important to security of supply, as long as the plant factor is high and the costs are more or less competitive with respect to the other technologies. However, we must extend the regulations regarding the use of these types of fuel and demand the highest standards of environmental compliance.

Our objective is therefore to achieve development within the framework of an absolute commitment to protecting the environment, but bearing in mind that no energy alternative, with the exception of energy efficiency measures, has a zero environmental effect. We therefore need an energy supply from clean, safe and economically efficient sources, incorporating the lowest possible costs with a view to the growth of the different productive sectors.



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# Development of the Electricity Sector

## The need for a Long-Term Vision

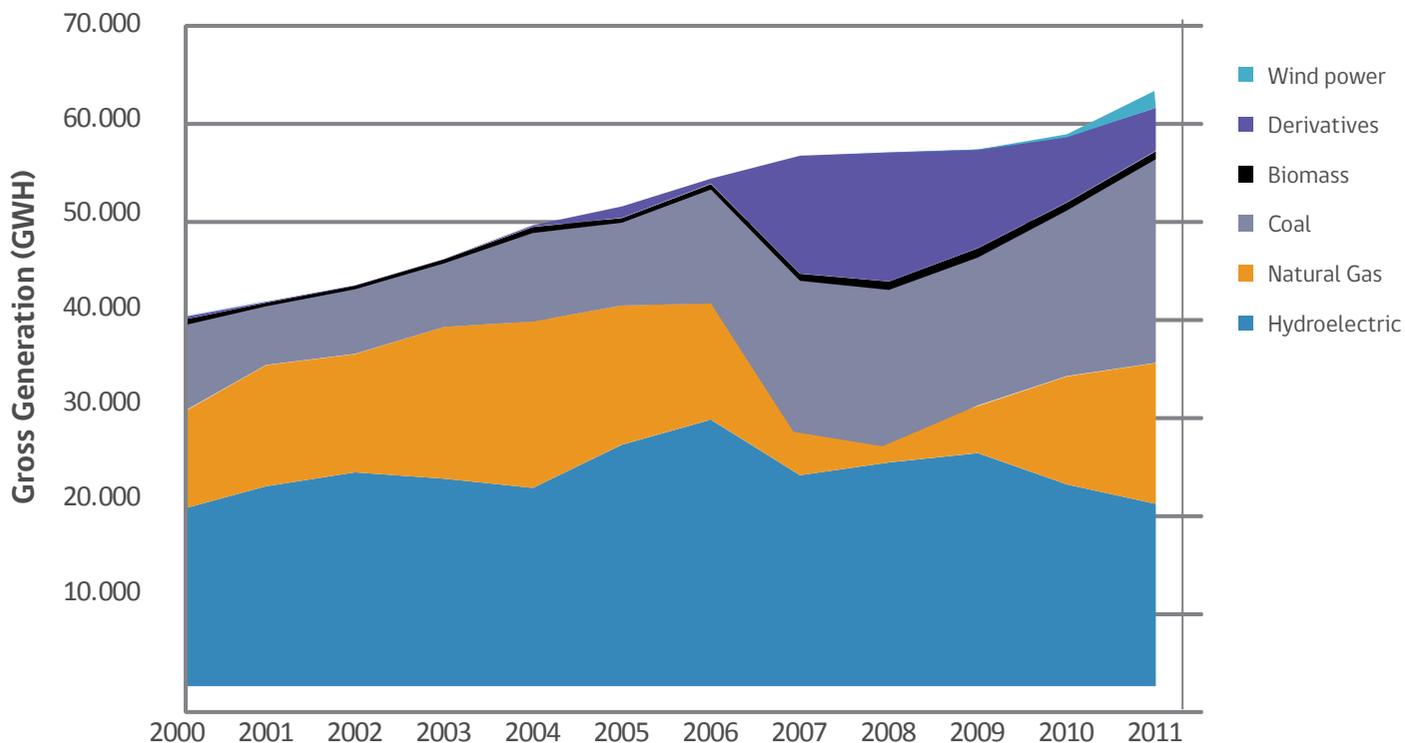
The Chilean electricity sector was a global pioneer in establishing competitive conditions in the generation and sale of electricity, maintaining the transmission and distribution segments under a system of financial regulation. In addition, private investment in generation, transmission and distribution assets led to significant expansion in the capacity of each of our electricity systems, thus satisfying the maximum demand of the country.

However the regulatory framework of the sector has shown significant weaknesses, which have become clear when particular situations have needed to be addressed, such as the severe drought which resulted in electricity rationing in the late 1990s, the unexpected restrictions in the supply of natural gas from Argentina from 2004 onwards and the

lower rainfall of recent years. In the face of these events, our country has gone through a period of switching to generation by power plants mainly based on coal and diesel. Thus coal has come to represent an increasing proportion of our energy matrix. This was the sector's response to the complex energy situation which has arisen in Chile over the last decade. However, it was not a long-term strategy or plan.

Similarly, the temporary dependence of our matrix on particular sources of fuel, in particular Argentine gas, meant that the planning and development of our electricity transmission infrastructure did not take into account long-term guidelines or the expansion of other sources of generation.

### Generation by the SIC and the SING 2000-2011



Source: Energy Ministry, CDEC-SIC and CDEC-SING.

This made the fragility of our electricity system very clear. At the same time, the Chilean public began to show increased concern about the configuration of our electricity matrix. Electricity projects began to attract a growing level of conflict and this increased the timeframes for implementing investments in the sector. As a result, there was a delay in important electricity infrastructure projects coming online, and this delay brought risks from the perspective of the security of our energy matrix. Thus we are now faced with an ongoing scenario of litigation on electricity matters, with the consequent uncertainty both for investors and for the public.

All of these facts have led us to the conclusion that it is imperative to focus our efforts and work hard on developing an action plan to deal with the different challenges presented by this sector in the medium- and long-term, without neglecting the issues we are now facing, which must be addressed in good time. We have made it a priority to work in partnership with the Environment Ministry to review the existing environmental processes and instruments

in this area with a view to integrating new parameters, incorporating greater information about the real possibilities of electricity development, the costs involved and the impacts and to deepen the dialogue and information available to the public. This will enable environmental management in the area to be improved, improve the decisions about the location of projects, protect our environmental heritage, generate informed debate and provide a greater level of legal certainty to the approval processes.

Meanwhile, also with the aim of strengthening our electricity system in the long-term, we must continuously review the design and functioning of the existing institutions. This is to ensure that these institutions are effectively fulfilling the purpose assigned them by the regulations. The complexity of our electricity systems, the growing need to incorporate competency, transparency, increased safety and reliability and the conviction that is motivating us to push forward the development of clean and efficient energy sources mean that the structure, functions and roles of the various important entities in the sector must be reviewed.





Looking to the long-term, we need to move forward in creating the conditions for making our matrix ever-cleaner, more diverse and safer, in ensuring there is the greatest possible number of actors in each segment and that the networks are sufficiently robust and have enough slack. It is therefore essential to have a national strategy which holistically includes each of the elements necessary for achieving a clean, secure and economical electricity matrix in the long-term. This is the commitment we made when we developed this National Energy Strategy (Estrategia Nacional de Energía, ENE).

The objective of the National Energy Strategy or ENE is to adopt a clear position with regard to the future development of our energy matrix, as well as outline the main orientations and measures which we will adopt in order to make it happen. The ENE we are presenting today is focussed primarily on the development of our electricity matrix, establishing the principle guidelines of our Government's public policy in this area. The ENE is about generating a commitment by the State in the definition

and the future of electricity in Chile, taking account of the public participation forums, the balance between national and regional growth and the required safeguarding of the environment.

Taking the SIC and SING together, 3% of our current electricity matrix comes from NCRE sources, 34% from hydroelectricity and 63% from thermoelectric plants. Our objective for the future composition of the matrix is to accelerate the incorporation of NCRE sources and to strengthen the development of hydroelectricity.

Law 20.257 to promote Non Conventional Renewable Energy sources sets the target of 10% for NCRE by 2024 (in the nominal frameworks included in this law). Our Government regards this target is inadequate. We will therefore perfect the current legislation, progressing in the design and implementation of alternative promotion mechanisms, as well as building Pilot Projects. With the measures defined in this strategy, we are looking to more than double this share of NCRE sources in our matrix in the next decade.

Similarly, we aim for traditional hydroelectricity to achieve 45% to 48% share of the matrix in the same period, with the remaining share coming from thermoelectric sources.

Our Government has decided that it will not take any decision regarding the use of nuclear energy for generating electricity. However, we realize that it is responsible and necessary to continue the studies and technical exchanges with developed countries so that future Governments will be able to take decisions in this area with the participation and adequate knowledge of the public.

In order to guide the electricity matrix of the SIC and SING in this way - without forgetting the particular aspects of our medium-sized systems in Aysén and Magallanes - and in the conviction that we must address the current weaknesses and fragilities, the National Energy Strategy is based on the following fundamental pillars.

First, to make a real commitment to energy efficiency establishing it as a highly important public policy through which we will seek to reduce consumption and unlink growth and energy demand.

Second, to ratify the need to increasingly incorporate non conventional renewable energy sources into the Chilean electricity matrix.

Third, to clearly and decidedly strengthen traditional renewable energy sources. To this end, our country must make the most of its comparative advantages, reducing its external dependence and limiting the increase in greenhouse gas emissions.

Fourth, to strengthen the design and solidity and boost the development of our transmission system.

Fifth, to address the different challenges presented by the market and electricity distribution.

Six, to promote sustained progress with developing international inter-connections.

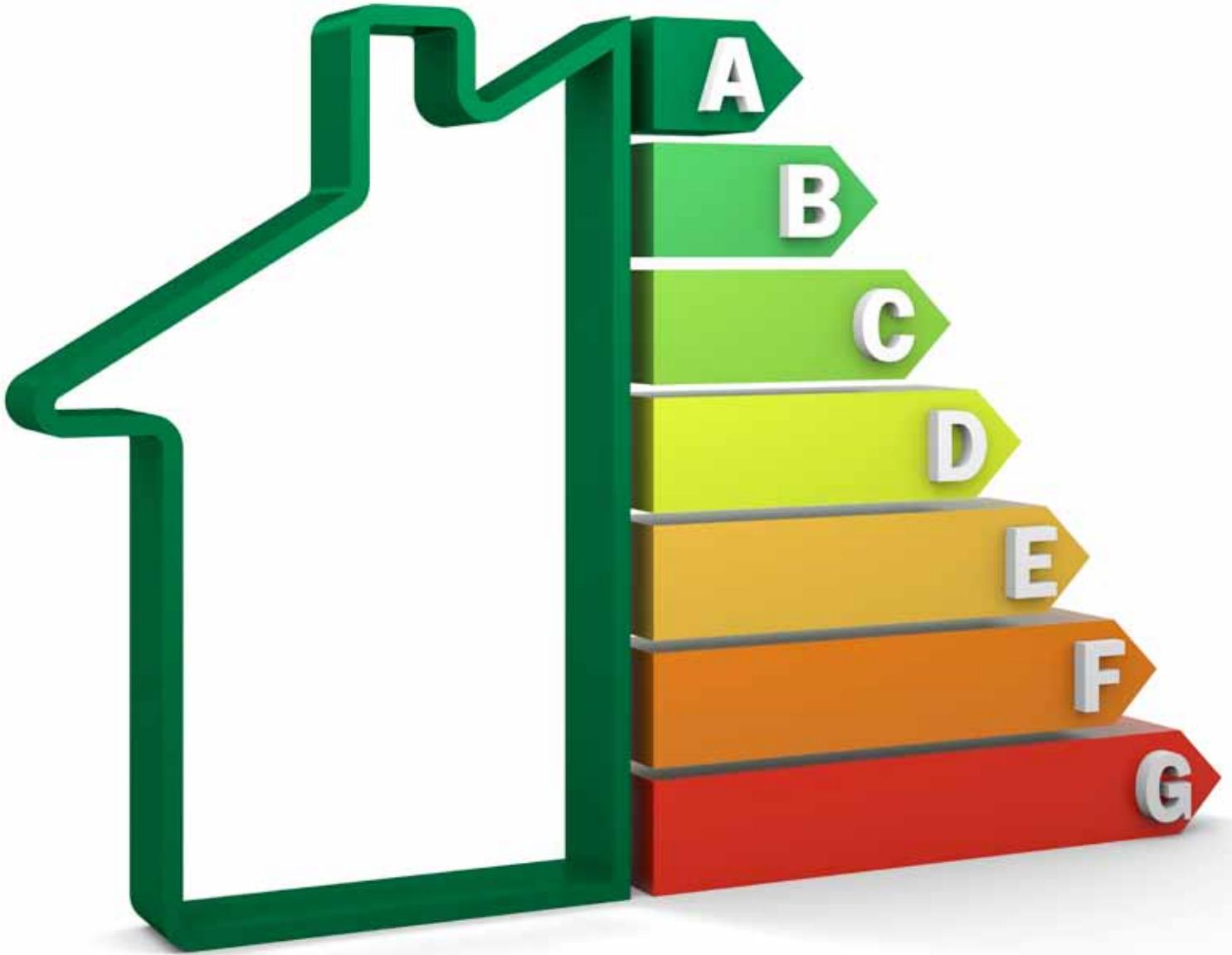


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The design of each of these pillars is inspired by fundamental principles, such as the long-term reliability of the system; access and equity for everyone in Chile; the vision of the regions; the promotion of a market with greater levels of competition and lower prices; national energy security and independence; efficiency and social commitment; environmental protection; spaces for international integration and technological innovation, among others.

This document introduces the key characteristics of each of the pillars and also includes some of the legal, regulatory and administrative measures and certain public-private initiatives which are necessary for its implementation.



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# I.

## **Growth with Energy Efficiency** State Policy



The need for greater levels of energy efficiency (EE) has never been as clear as it is now. Factors such as the high costs of energy, growing concern for the environment and energy security in Chile have contributed to a growing awareness of the need for further developing EE.

However, this awareness must translate into concrete actions and energy efficiency must become a normal habit for all public and private stakeholders and throughout the residential, commercial, mining, transport and industrial sectors.

Recent experience demonstrates efforts to develop energy efficiency. Firstly, the National Energy Efficiency Program (Programa País de Eficiencia Energética, PPEE) which was implemented between 2005 and 2010, put EE on the agenda as an issue of national importance. Secondly, the recent creation of the Chilean Agency for Energy Efficiency (Agencia Chilena de Eficiencia Energética) strengthened public-private commitment in this area. However, making energy efficiency one of the cornerstones of this strategy requires a strong institutionalization with greater public engagement in order to meet the new challenges. Technical reports and key stakeholders agree on one fun-

damental point: energy efficiency must become an active pillar in the national strategy in order to address growing energy demand, and only through the Government's effective commitment during the implementation stages will it be possible to contribute to its development.

For this reason, the Government's energy strategy cannot be limited solely to facing the challenges presented by traditional energy generation, nor to exclusively promoting the development of new sources of energy. It is essential for this strategy to incorporate, as a fundamental principle, the efficient use of energy, which will allow us to begin to separate economic growth from increased consumer demand.

To achieve this, we believe it is essential to set a specific goal for energy efficiency that coordinates all the available measures for its attainment. In accordance with studies and an adequate safeguarding of productivity, our proposal is that in 2020 we are able to decrease by 12% the final energy demand projected for that year.

To do this, we believe it is necessary to adopt the following measures:

## Energy Efficiency Action Plan 2012–2020 (PAEE20)

The Energy Efficiency Action Plan is intended to be a guide for the public and private sectors so that they can take the necessary actions to realize the great potential of Energy Efficiency identified for this decade and the next.

As indicated, the Action Plan has as its goal a 12% decrease in the projected energy demand for 2020. This will allow for an estimated decrease of over 41,500 Tcal (Teracalories) in the year 2020, which represents 1,122 MW of displaced electricity and 4,150,000 non-consumed Toe (Tonnes of Oil Equivalent), with the consequent economic benefits for Chile. Achieving this goal will generate additional benefits such as job creation, higher levels of industrial output and lower levels of CO2 emissions, among others.

The Action Plan measures aim to incorporate elements of energy efficiency into the different productive sectors. In the construction sector, including social housing, the Plan aims to improve the energy values for buildings built without energy efficiency criteria, to design buildings to high EE standards and to offer construction products and services with efficiency criteria, etc.

For the industry and mining sector, the Action Plan will encourage the adoption of energy efficiency measures through developing and implementing energy management systems, promoting cogeneration and the incorporation of efficient technology and technical assistance into projects.

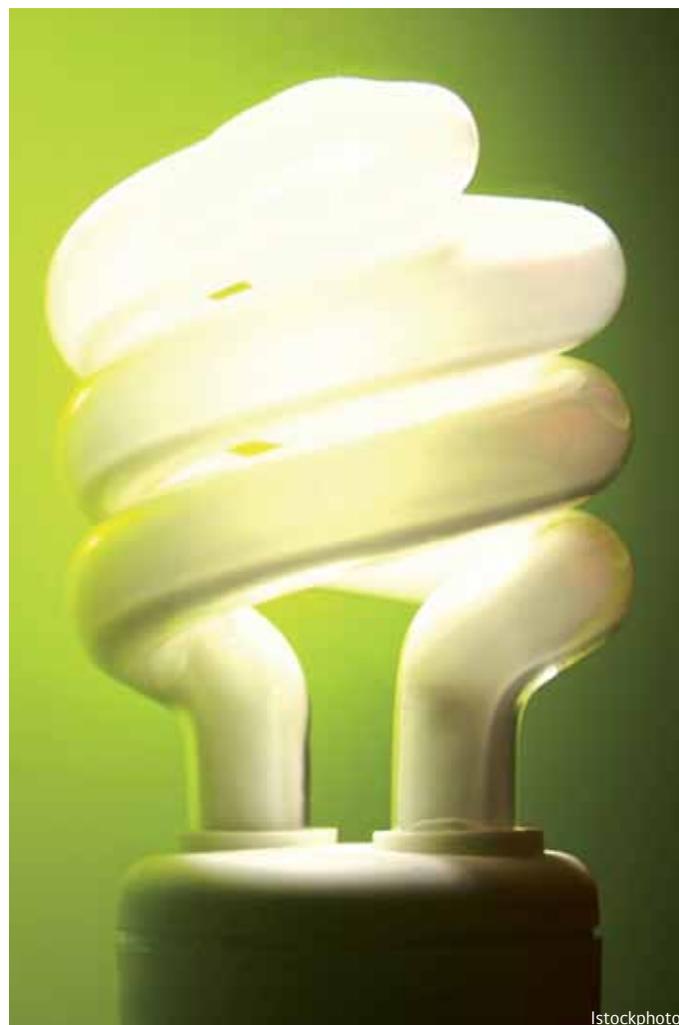
In the transport sector, data on energy use will be compiled and systematized, in order to encourage greater efficiency in passenger transport and freight. A vehicle labeling system and the setting of minimum energy efficiency standards for vehicles will also be put in place.

The demand for modern appliances with low energy consumption will be promoted, through the establishment of applicable minimum efficiency standards and incentives for replacing old appliances with more energy efficient ones.

## Energy Efficiency Seal

An Energy Efficiency Seal will be created which will be awarded to those companies who lead the way in developing energy efficiency on a national level. This will allow them to reduce their energy costs, increase their competitiveness and reduce their emissions.

Our aim is to make this seal the registered trademark for efficient companies. The attainment and category of the seal will be determined by parameters such as the implementation of energy management systems, the quantity and type of projects developed and the proportional reduction in energy consumption. This seal will cover specific categories, depending on the productive sector of the company.



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## Minimum Energy Performance Standards (MEPS)

We will establish Minimum Energy Performance Standards (MEPS) with which products, equipment, appliances, materials and other products that utilize any kind of energy, must comply for them to be sold in Chile. This measure will limit the maximum amount of energy that can be consumed by a specific product, while ensuring optimum performance and that user satisfaction is not affected.

We will also increase the labeling of appliances so as to inform the public about the energy performance of the products on sale, thus incorporating energy efficiency into consumer decisions.

## Efficient Residential and Street Lighting Programs

These programs, complementing the Minimum Energy Performance Standards, seek to accelerate the transition to more efficient lighting technologies for the residential and public sectors (especially municipalities). Different stages of the plan are envisaged aimed at the poorest households and the public in general. The goal will be to promote and educate the public on the benefits of adequate energy consumption and to stimulate and accelerate the transition to more efficient technologies and appliances.

## The Creation of the Interministerial Commission for the Development of Energy Efficiency Policies

Public energy efficiency policies cannot be conceived in isolation, but should instead be established across sectors. Coordination between public organizations and ministries is key to achieving the estimated potential energy saving for each of the areas which consume it, such as the public, residential, commercial and transportation sectors.

For this purpose, we will create an Interministerial Commission for the Development of Energy Efficiency Policies, through which the measures or agreements adopted will be integrated into the policies of each participating entity or institution. This authority will periodically report on its management directly to the President of Chile.





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## II. **The Take-off of Non-Conventional Renewable Energy** A Pending Challenge

Chile shows significant potential in renewable resources, which can be exploited to generate electricity, heat and biofuel. However, the non conventional renewable energy (NCRE) sources have not yet adequately developed as they currently only account for some 3% of electricity production. In fact, despite being approved by Chile's Environmental Impact Assessment System (Sistema de Evaluación de Impacto Ambiental, SEIA), many investment projects associated with these kinds of technologies have not materialized, for a variety of reasons.

Indeed, the development of NCRE in Chile is faced with a number of obstacles that have prevented or hindered the realization of such projects on a large scale. Among the most common barriers or obstacles is the high cost of the initial investment, the limited possibilities for financing, difficulties in the access and connection to transmission lines and in signing long-term contracts.

In conclusion, the use of NCRE presents economic and technical challenges that must be addressed without delay, so the matrix can successfully make greater use of these energy sources.

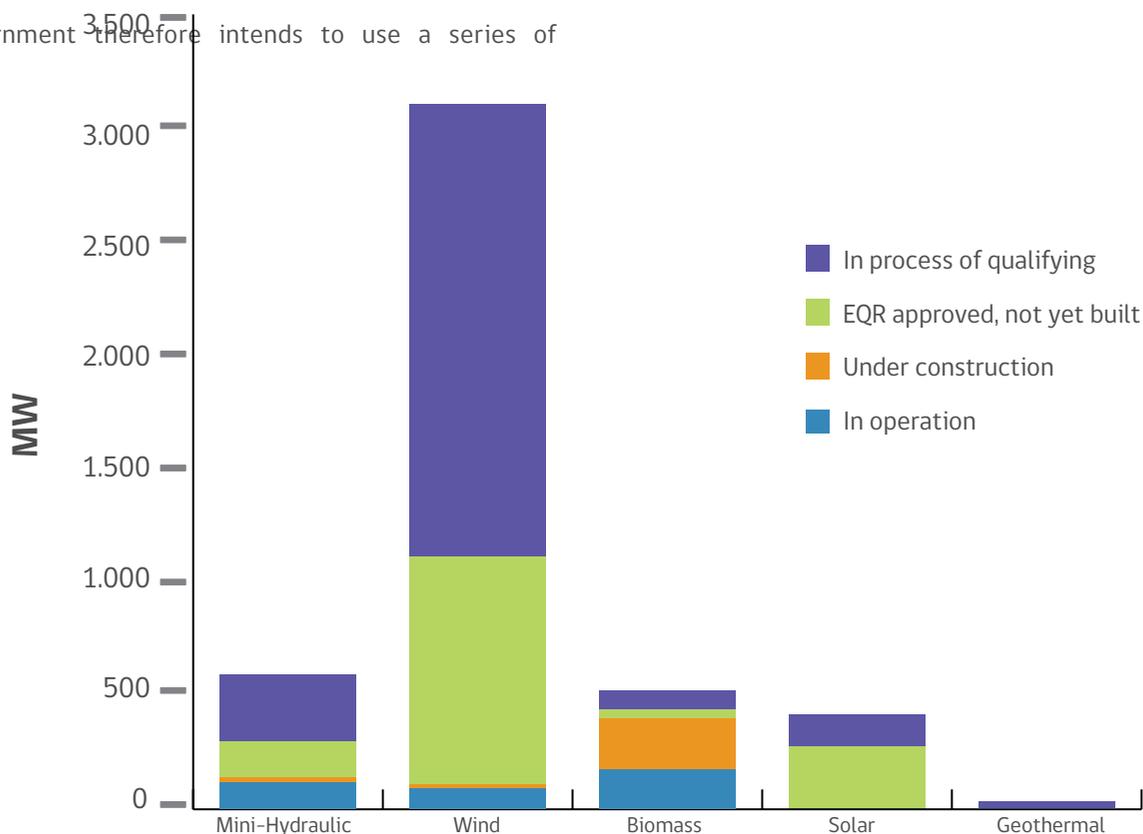
measures to accelerate the incorporation of NCRE so they can come to represent a larger share of the total matrix.

However, we must bear in mind that these energy sources must be integrated in a serious and responsible manner, and their effects must be measured. Therefore this goal must be tempered by balancing the foundations and technical projects and bearing in mind important parallel objectives, such as ensuring an accessible, secure and economical supply of energy through competitive projects and technologies.

In this sense, it is also necessary to consider other variables such as not stretching the generation investment plan too thin, and likewise for the transmission investment plan; and to analyze the potential cost overruns in terms of system investment, operations and development.

To achieve this goal, we propose the following measures in the National Energy Strategy:

The Government therefore intends to use a series of



Source: Renewable Energies Center, Noviembre 2011

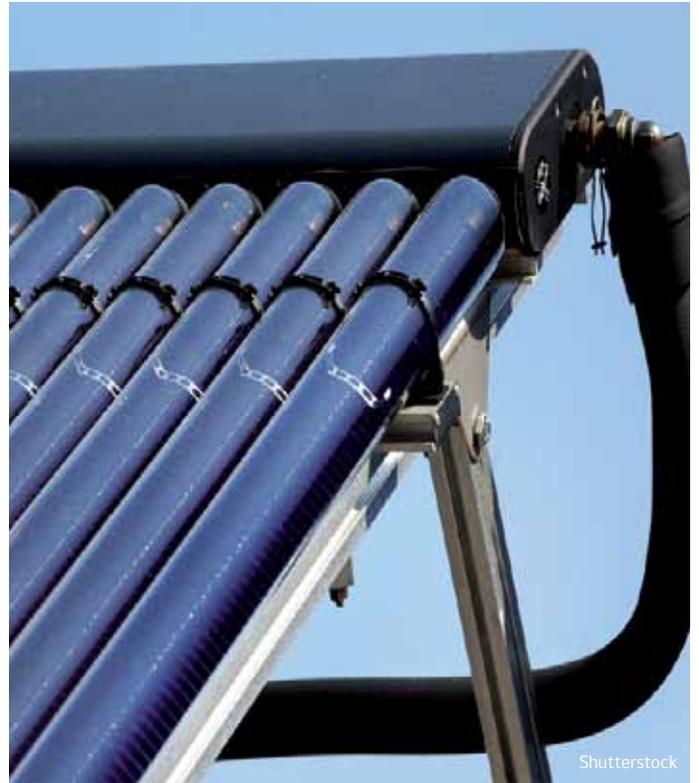
## Tender Mechanism to encourage the Development of NCRE

In order to give further impetus to the development of NCRE, we will improve upon current legislation.

Parallel to the scheme included in the laws in this area, and with the goal of attracting investors interested in developing NCRE projects, open tenders will be carried out by NCRE block, in which the generators who participate could be awarded a State subsidy to improve the conditions of energy sales. This will be defined according to the bids submitted. This will decrease the risks to which such projects are currently exposed. Through this measure, we will support those new technologies that are not currently competitive enough to enable them to develop. This mechanism will complement current legislation.

## Geo referenced Platform – Economic Potential for NCRE Projects

Public tools providing up-to-date information will be strengthened and implemented to guide and facilitate private investment in NCRE projects. A geo referenced platform will be created that will compile dynamic information so the viability of an NCRE project can be assessed. This will include a portfolio of NCRE projects; a database of potential resources and State land available for the development of such projects; detail of energy demand at an industrial, commercial and residential level; information on roads and electricity infrastructure; environmental protection areas and available information on land planning so as to identify the availability of compatible lands with other productive uses. This platform will be integrated with the platforms of other State organizations that have the authority to manage national land, such as that of the National Assets Ministry and those available on the SEIA. The goal will be to offer certainty regarding the feasibility of NCRE projects and to take greater advantage of public lands for energy development.





## Development and Financing

This line of action will focus on working with other public institutions to design and strengthen development mechanisms, consisting of the creation of effective coverage, insurance, new lines of credit with international financing, feasibility studies, among other economic incentive measures.

## New Institutions to Boost NCRE

As it is important and necessary that the Government establishes policies regarding NCRE and that these policies are implemented for the benefit of Chile, we propose, in addition to the current tasks of the Renewable Energy Center (Centro de Energías Renovables, CER), a new public institutional structure to promote and facilitate the conditions for establishing non-conventional renewable energy in Chile.

## Strategies for Technology

There are different obstacles to the implementation of each type of NCRE technology, so a different long-term strategy is needed for each of the energy sources: solar, wind, bioenergy, biomass, geothermal, mini-hydro and tidal. Under this strategy, we will work together with the public and private sectors, researchers and public representatives so as to develop measures to address the obstacles to each of these technologies, taking into account aspects such as research, development and innovation (R+D+i), resource exploration, development tools, funding and regulatory framework.

From this perspective, and recognizing the great attraction of geothermal energy for our country due to its potential and high plant factor, we are preparing a new regulatory base to encourage investment based on this renewable resource.

Furthermore, a new subsidy and incentives plan will be implemented for pilot NCRE projects to further develop various technologies in a national context, thus attaining fundamental practical knowledge to recognize the technical and economic benefits of Chile taking advantage of its own renewable resources. It is hoped that the development of such pilot projects will enable the experience and knowledge of international companies to be integrated with the development of local technologies, driving innovation in Chile's NCRE industry.



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### III.

**The Role of Traditional Energy**  
Greater Prevalence of Water Resources,  
Decreased External Dependence



From the far north to the south, Chile's water resources have great potential - in particular, from the Maule region to the basins separating the Aysén region from Magallanes. It is estimated that Chile's hydro potential, both in reservoir and run-of-river projects, could easily exceed 9,000 MW. This is a clean and renewable resource which we cannot ignore and which, is and will continue to be a fundamental component of our electricity matrix.

We are firmly convinced that the hydroelectric component of the matrix must continue to grow steadily and that hydroelectricity will continue to be the principal source of electricity in Chile for the decades to come.

The development of projects must be accompanied by mitigating measures and requirements of the highest level. Building any kind of electricity generation project today entails much greater consideration of the fundamental environmental, social and economic variables than used to be the case. Specifically, we believe that in order to continue developing hydroelectricity, not only must projects comply with current environmental regulations, but there must also be a review of the processes for ensuring transparency of information and we must work with local communities, so as to continue to strengthen their participation.

Because of the exceptional conditions characterizing the area from Palena towards the south - with its environmental heritage and high tourist and economic potential - special consideration must be given to the potential impact of the

construction and operation of hydro-electric projects. It is therefore necessary to extend the mitigation measures required for projects to develop and to minimize the impact of the transmission lines which transfer the energy to the large centers of consumption. The different investors and administrators of projects developed in the southern region of Chile must also consider transferring energy using the most modern technology, including submarine or underground cables as far as the geographical, social, technical and economic conditions permit, thus minimizing the environmental and physical impact involved in the development of such projects.

A special plan will therefore be developed to safeguard Chilean Patagonia, broadening protection and excluding any generation and transmission initiatives from areas with vast resources of an exceptional nature.

Without a doubt, the development of hydroelectricity requires greater coordination and planning with regard to transmission. This not only involves decisions regarding the large electricity generation centers, but also practical solutions for the delays to smaller projects trying to connect to the grid, which is currently very difficult for them.

Thus, as a part of reforms to the transmission system, we will generate the conditions to overcome these shortcomings and adopt all the measures that will enable us to have a more robust, coordinated and coherent system.

## The Role of Fossil Fuels in a Cleaner Electricity Matrix

This Government's decision to confirm the importance of hydroelectricity for Chile and consider it a key sector in the development of our electricity matrix, together with the development of NCRE, goes hand-in-hand with the goal of having a cleaner, more autonomous matrix which is less dependent on imported fossil fuels. Chile must exploit its comparative advantage and prioritize energy development, from both traditional renewable energy sources such as water, and non conventional renewable energy sources such as geothermal, solar and wind energy.

However, our vision of the matrix in the future cannot dispense with coal, among other fossil fuels. Coal provides both technical and economic stability to our electricity system, thereby bringing certainty to the adequate development of the electricity matrix. Indeed, coal-based electricity generation has been with us for a large part of our history and this will continue to be the case in the coming decades. In the past five years, a number of coal-based electricity generation projects were approved, and they are now in operation or under construction. Additionally, various projects are in the pipeline for the coming years, and these will be necessary to ensure an adequate supply to cover the projected demand in the short-term, as well as providing security of supply and market competition.

All of these projects must comply with the highest environmental standards and requirements.

Regardless of the progress made with the environmental regulations applicable to these projects, such as the emission standards for power plants issued in 2011 by our Government, as well as technological progress, we must strengthen our action on CO2 emissions and increase our efforts to mitigate the influence of the global economy on the price of energy in Chile.

Parallel to this, it is important in the medium- and long-term to advance with the technical and economic validation of technologies for CO2 capture and storage, as well as introducing coal gasification technologies for use in combined cycle plants, with a view to the use of coal in Chile's electricity matrix becoming more efficient and sustainable.

In recognition of the fact that thermoelectric technology is used to produce electricity in Chile, platforms containing information about land must be implemented. These will enable areas of land to be defined for excluding or developing thermoelectric power plants. This will ensure that the environment and areas of tourist, social or economic interest are adequately safeguarded and at the



same time provide investors with a greater degree of certainty that they will be able to obtain permits for projects that comply with the respective standards. To this end, we will work together with the Environment Ministry and National Assets Ministry.

An important decision by this Government is to design mechanisms that will encourage the adoption of increasingly clean and efficient technologies. We will also study the possibility of incorporating tax instruments to dampen the disadvantages and promote the advantages and social benefits of projects, so as to reorientate our electricity matrix.

We must also recognize the growing presence of liquefied natural gas (LNG) as an alternative source of energy in the long-term. There is in fact significant potential for further developing our LNG regasification plants. The availability of this resource and its growing global share, together with new techniques and processes of exploration and production, show that LNG is an attractive alternative for the decades to come. Also in this field, new techniques and processes for exploration and production and non-conventional resources show new alternatives for the future. For this reason, we will also promote both traditional and innovative exploration processes in Chile.





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# IV.

## A New Focus on Transmission Towards a Public Electricity Highway



Electricity transmission infrastructure is fundamental for energy development, both for reliable electricity supply and for competition and access to various generation sources. Electricity transmission in Chile today presents significant degrees of fragility, and the completion of projects in this area faces serious difficulties, potentially affecting the whole system. This situation has brought considerable delays in the completion of important transmission projects, resulting in a complex scenario both for those who wish to invest in generation and for the overall security of the country's electricity system.

At the same time, small generators, and in particular renewable resource generators located far from the main transmission lines, as well as others who wish to be connected to the distribution networks, suffer difficult and limited access to electrical networks in a scenario where there is an ever-increasing need for their contribution to the electricity supply.

This makes it essential for us to have a long-term vision which takes into account all the electricity networks needed by the country over its whole length and breadth, with sufficient security margins to guarantee the various projects and which will allow NCRE generation sources to be connected.

In this context the Government considers it fundamental to create a new, more secure and robust scheme for the development of electricity networks, which will facilitate access for all investors in generation projects and foster initiatives using renewable energy sources.

In such a framework the State will play a key role in the planning of transmission systems, the dimensioning of networks and definition of their territorial scope, the creation of utility corridors, and the improvement of legislation governing concessions and easements.

It is therefore essential to improve our current regulations governing trunk transmission, sub-transmission and additional transmission, in order to ensure the coherence necessary to achieve this new focus on transmission.

In this new design, the studies which we are carrying out regarding whether it would be advisable to interconnect the Central Interconnected System (SIC) and the Norte Grande Interconnected System (SING) are of great importance, with the object of increasing the security of the system and making better use of energy resources. Our Government is analyzing this possibility with special interest, considering the probable economic and institutional advantages for the sector.



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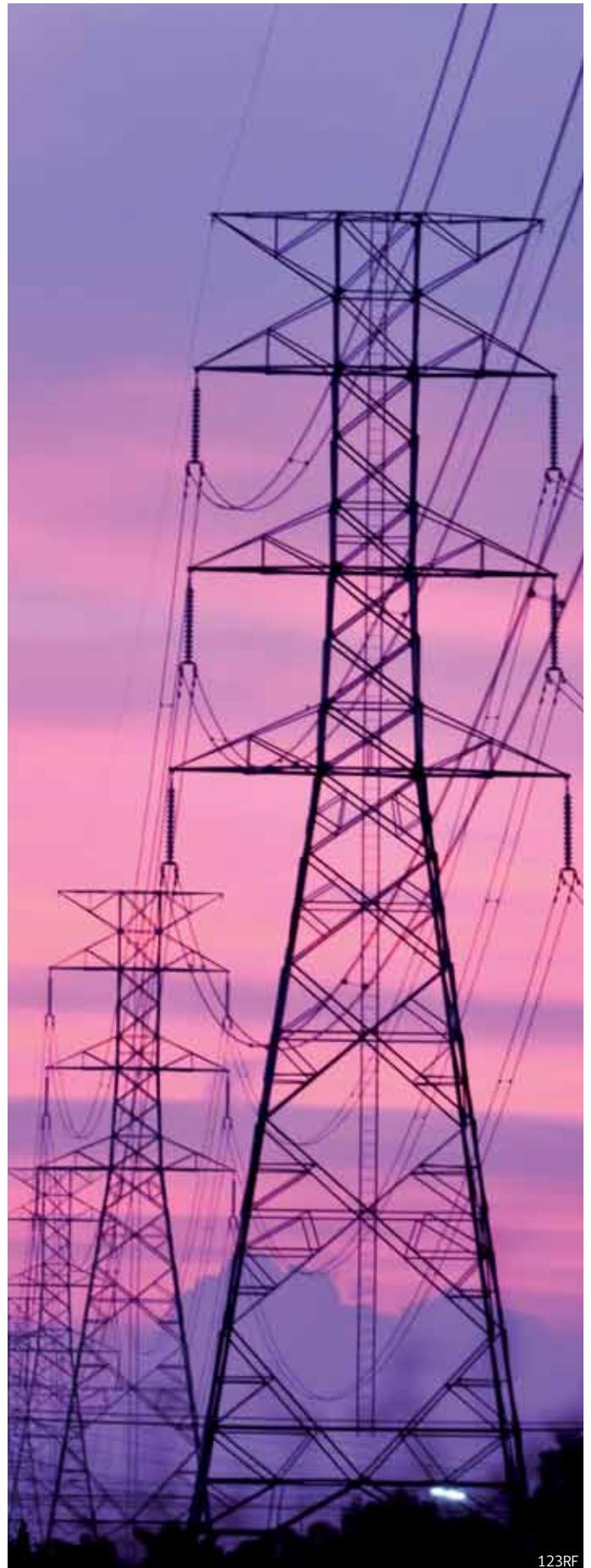
## Improving Procedures for Granting Electricity Concessions

In order to make the electricity concession process more fluid and suited to the challenges of generation and system demand, we will present to National Congress observations on the bill on this subject which is presently before Congress, with the object of making the procedure for obtaining electricity concessions quicker and more precise, while safeguarding the legitimate rights of third parties. Likewise, modifications will be made in parallel to the current regulations in all areas which do not fall into the legal domain.

## Creation of Utility Corridors

The State would be able to declare Utility Corridors, which may be expropriated or the object of easements in the public or national interest, based on information provided by studies and interministerial coordination.

To implement this concept, the current electricity regulations will be modified, creating a specific regulation for facilities listed as being of public or national interest, which would make use of these corridors. Some of the aspects to be dealt with by the new regulations would be: the remuneration regime for these facilities, their dimensions, and territorial planning for expansion of the transmission system through their development.



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## Regulatory Changes in Additional and Trunk Transmission and in Sub-transmission

These regulatory changes are important for imparting consistency to the regulatory framework governing transmission systems, under the new focus of a public electricity highway. Furthermore they are necessary for the connection of generation projects to the electricity system, and therefore for our target of ensuring competitive generation prices by eliminating barriers. They are also necessary to provide a regulatory framework for the new focus on a public electricity highway for transmission installations.

In trunk transmission, regulatory change goes hand-in-hand with the new concept of a public electricity highway, which will require a review of the systems for assigning payment to installations, and of the objectives and structure of trunk transmission studies.

In the area of additional transmission, definitions will be made for aspects such as the conditions for open access by third parties to transmission lines under this classification, the minimum asset valuation conditions for such open access, and the corresponding payment scheme.

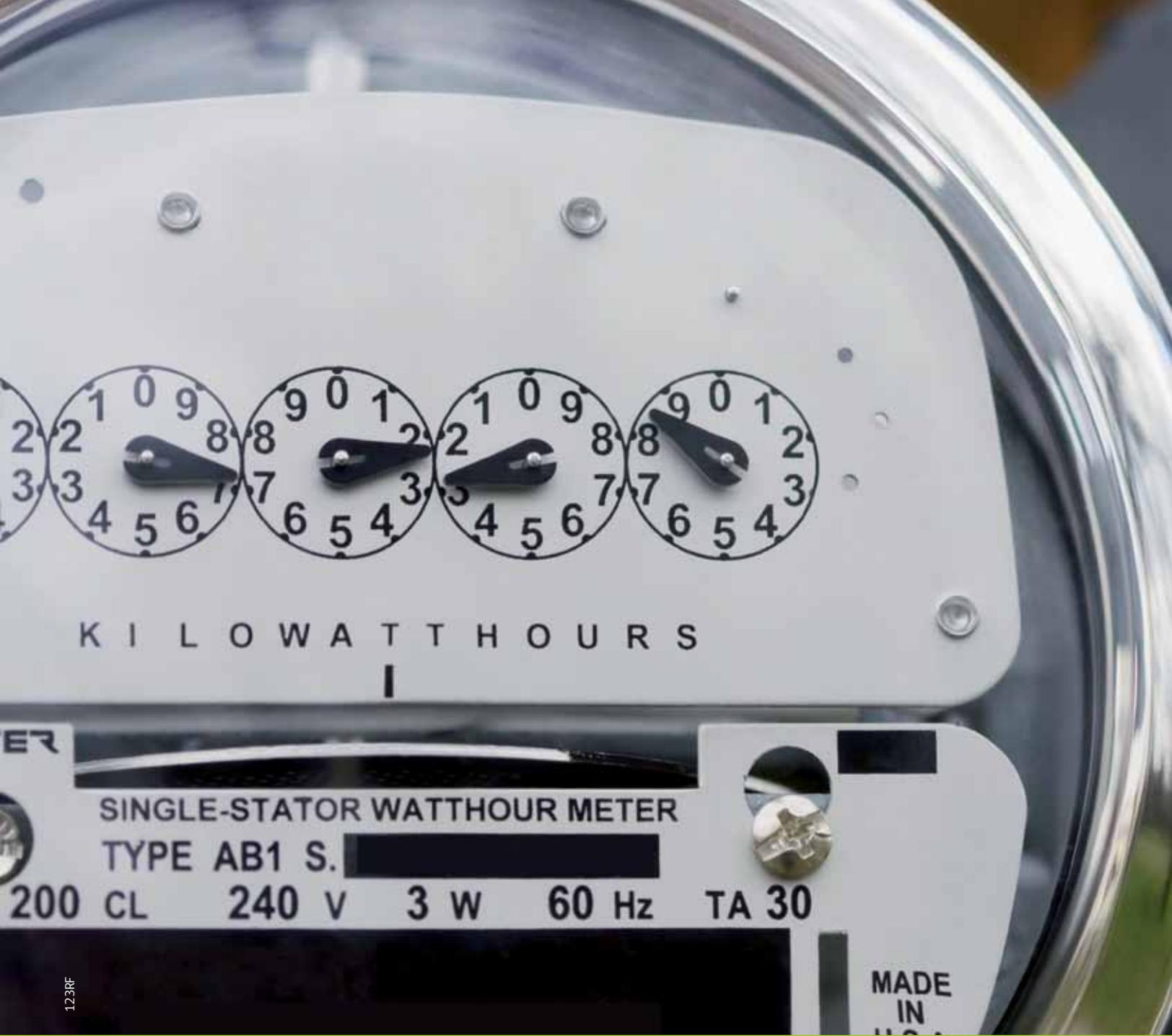
Finally, in sub-transmission, work will be done on improving the mechanisms for connection to these networks, and their long term security and development.

## Facilitating Connection for Small Generators and Intelligent Networks

We will improve the existing regulation governing the connection of small generators, in order to facilitate the connection of these projects. The transparency mechanisms governing the information provided by distribution companies, and the costs associated with such information, will be improved, incorporating processes which will give greater participation and oversight to the Superintendency of Electricity and Fuels (Superintendencia de Electricidad y Combustibles, SEC). Information guidelines will be created for investors interested in becoming involved at the distribution level. The procedures for determining the costs and benefits for the distribution network resulting from the connection of a small generator will be modified.

Progress will be made in implementing the concept of intelligent networks as broadly as possible, in order to help the introduction of distributed generation, among other things. To this end the technical and economic viability of the concept will be analyzed, taking into account developments, implementations and local and international experience of pilot projects, and trying above all to evaluate the advantages of implementing this new technology (offering both a social and a private benefit) in the Chilean market.





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# V.

## Towards a More Competitive Electricity Market



Chile was a world pioneer in liberalizing its electricity market, being the first country in the world to privatize the electricity sector. This has enabled the country to increase the installed capacity of the SIC by four times, and that of the SING by six times, in the last twenty years. This has created a market which has been able to meet the maximum demands on the electricity system, although it is not free of difficulties, as already indicated in this document.

However, as we have mentioned, a series of weaknesses may be observed which need to be addressed now in order to ensure an electricity market with greater levels of competition, security and reliability. Throughout this document, a series of measures is described whose overarching object, apart from meeting the specific proposals of their general framework, is the desire to introduce more competition into the sector in the medium- and long-term. It is our conviction that the regulatory framework should encourage and facilitate the entry of new actors into the system, with the resulting diversification of the participants, thereby progressing towards a more competitive and efficient electricity market, in which the market operator can take independent decisions in matters affecting both supply security and the levels of competition and transparency prevailing in the electricity market.

At the same time it is essential to improve the tender mechanisms for regulated clients, since on the one hand the existing mechanism does not efficiently provide long-term signals to the end client, and on the other, contrary to expectations, this mechanism has not led to large numbers of new actors entering the market. The existence of contracts with electricity distributors affected by generator breakdown, and the impact of this on the market, ratifies the need for a change of course in this respect.

It is therefore natural to adapt the electricity tariff terms for end consumers, in a scenario in which technology has evolved sufficiently to allow clients the flexibility of choosing between several economic and technical alternatives for meeting their electricity needs.



## Creation of Independent Operation Centers

The Chilean electricity market requires an organization with the quality, independence and strength necessary for the physical and economic operation of the electricity system. Likewise the need for transparent information and effective market supervision will provide the necessary foundations for institutional reform of the organization responsible for the security and economic operation of the electricity system, and access to it.

Independent Operation Centers will be created for each electricity system, replacing the Economic Load Dispatch Centers (CDEC). They will be legal entities with their own assets, an autonomous management structure and clearly defined responsibilities. The objective will be to guarantee the independence and proper functioning of electricity market operators, such that operational decisions on electricity installations, and decisions leading to economic transfers between market operators, are timely and transparent for all parties operating in the market.

These new institutions will also have a clear role in the planning of transmission systems, contributing to the development of electricity transmission infrastructure, and to the security and sufficiency of the system in the long term.

## Secure, Economical Electricity for the Distribution Network

The regulation of supply tenders will be improved, with the objective of generating the most effective mechanisms for awarding energy blocks at prices which reflect long-term conditions, damping uncertainty in supply and demand and reducing the negative effects of speculative actions.

In addition, the minimum notice periods for calls to tender will be modified and tender schemes will be designed with shorter contract periods. The standardization of the resulting contracts will also be studied.

Furthermore, specific measures will be established to introduce greater competition at the level of tariffs to final customers, through the design of effective mechanisms for tariff flexibility to regulated clients, allowing these to manage and optimize their electricity consumption. In the same context, one of the measures proposed is to lower the limit defining the classification of free clients from 500 kW to 100 kW.

Likewise the feasibility will be assessed of implementing free choice of electricity supplier through the introduction of the "sales agent", establishing the necessary guarantee and verification schemes to ensure that the contracts signed are duly backed by production. All these changes will be implemented gradually in the retail market. In this respect, existing regulations will be reviewed to evaluate the separation of network activity from commercial activity in the distribution segment.

At the same time, distribution tariff calculation processes will be reviewed in order to implement any modifications needed to reflect business risks properly and improve tariff calculation procedures.

## Net Metering for Residential Generators

In order to consolidate the distribution of energy generated as an effective solution tending towards a more efficient electricity system with increased supply, a regulatory design incorporating Net Metering will be implemented after approval by Congress. The object of this initiative is to allow end users (e.g. families or small businesses) to install technologies for generating electricity from non conventional renewable energy sources in their homes or businesses. The energy generated by each of these small producers may be used for own consumption or for injection into the network, to the point where they may even receive a net payment from the distributor for the electricity they deliver.



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# VI.

## **Sustained Progress with the Options for Regional Electricity Interconnection**

Chile's experience of international energy integration is limited. There are numerous reasons for this and the flawed experience of gas integration with Argentina clearly has not helped. It is important to understand the great benefits that electricity integration would bring, as has been shown by many cases regionally and around the world.

In the medium- and long-term, regional electricity integration, as well as contributing towards greater security of supply, will enable the diversification of the energy matrix, increasing competition in the electricity market, as well as reducing costs. It will also mean full utilization of infrastructure and fewer local pollution and greenhouse gas emissions.

There are many possibilities and points for interconnection that are being analyzed internationally. The alternatives we must study include the Deep Integration Agreement which our country most definitely supports; the efforts of Colombia to build lines towards both Central America and the southern

cone; to consolidate greater connection between Chile and Argentina at different points along our borders and to continue deepening our links with Peru, Bolivia and Ecuador.

In the medium-term, Chile aspires to work together with other countries in the region to develop an interconnection infrastructure which brings benefits to all the parties involved. To this end, joint operation rules and electricity interchange mechanisms must be designed and a framework of rights and responsibilities must be established to promote investment in international transmission links.

We believe that regional electricity interconnection will occur in a framework of respect and observance of a joint legal institutionality and the existence of benefits for all participants. Thus we will be able to aspire in the long-term to develop systemic integration, in which the stakeholders can freely draw up energy contracts, promoting reliable joint operations and improving the conditions for electricity consumers across the region.





## Implementing the Strategy

The objective of this document is to explain the Government's vision with regard to electricity and to describe the challenges which will be addressed immediately by this Administration. It also summarizes what we consider to be the priorities for the sector and the guidelines and concrete solutions which must be adopted to deal with the sustained growth in energy demand and to provide the security and solidity our system requires.

We will work with a range of stakeholders in Chile and at regional level in order to implement the measures necessary to fulfil this strategy. All the actions, projects, regulations and public policies which are adopted as a result of this document will be shared in a transparent and timely manner with the public, through different participation mechanisms both locally and nationally in such a way that the different social stakeholders can get to know the assumptions, foundations and technical facts behind them. We place great value on the contributions which the public and different technical entities (such as academic organizations, research centers, consumers' associations, business associations and public entities, among others) can make towards the topics outlined in this document, as we are aware of the extraordinary value that society has placed on different aspects of public energy policy. We also know that to achieve this we must be

sufficiently transparent, providing the information needed to enable dialogues to be open and well-informed.

This document constitutes an energy roadmap for the coming years and has been drawn up based on valuable contributions our Government has received from intermediary groups, consultants, commissions and other sectors of society and the public. However, we know that this cannot be an isolated effort. Chile needs institutions for the long-term that will periodically review, study and establish the objectives for the energy matrix of our country, incorporating technical, economic and social criteria. This should involve experts, related organizations, the public and guidance from the authorities. We have demonstrated the need to outline the pillars for Chile's long-term energy policy and vision, but we also know that this process will require revisions and assessments on an ongoing basis to incorporate changes and address new challenges or needs that may arise in the future.

We are firmly convinced that only in this way will we build a matrix which takes account of the main concerns of the public and the technical, economic and political foundations that must accompany it. This will give the energy matrix legitimacy and validate the policy vision of the respective Government.



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