

1st Chilean International Seminar on  
**Biogenic Gases As Fuel**  
**FOR THE FUTURE**



*Non Conventional Renewable Energies in Chile:*  
***Biogas development Challenges***

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**Concepción, Junio de 2010**

# Scope of Presentation



- 1. Context elements for development of NCRE in Chile**
- 2. Diagnosis and Advances - Biogas Fuel**
- 3. Current challenges - Biogas Fuel**

# Economy growth



- By 2050 it is expected to grow 4 times
- And up to 10 times in developing countries (China, India)
- Chile has proposed a growth rate of 6%
- ⇒Better living standards
- ⇒**Increased energy consumption**
  - ⇒**Stress on natural resources**
  - ⇒**Stress on the Environment**

# Energy Dependence

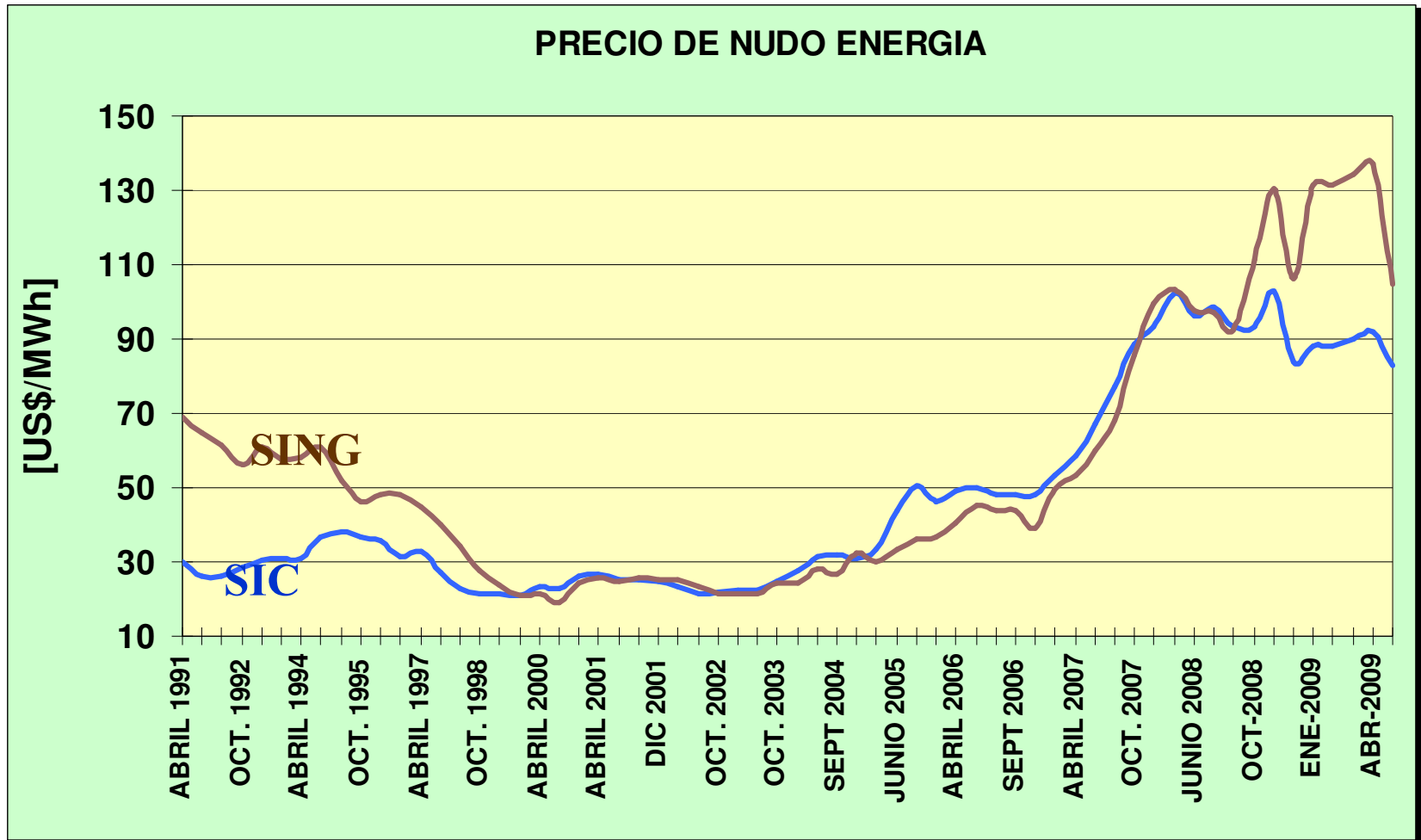
Chile depends on the international market for their energy supplies :

- ⇒ Chile is a net importer of energy. About 70% of its energy comes from imported inputs.
- ⇒ The dependence exposes us to the volatility of international prices, particularly of fossil fuels. 73.3% of fossil fuels are imported (2007). This dependence exposes us to risks in all uses.



# Price Trend

In recent years there has been a national and international increase in energy prices.



Fuente: CNE

# National Energy Policy

## Main Components

- I. Contingency Management
- II. **Energy Matrix Optimization**
  - Increased Investment
  - **Diversification (Renewable Energy Development )**
- III. Energy Efficiency
- IV. Rural Electrification
- V. Institutional Strengthening



# Ministry of Energy

## Division of Non-Conventional Renewable Energy

- **Mission :**

Create the conditions for the development of non-conventional renewable energy in the country by removing barriers that limit their development, so as to contribute to the objectives of security of supply, efficiency and environmental sustainability of the national energy policy.

- **Objective :**

Have policies that accelerate the development and involvement of nonconventional renewable energy in power generation, thermal energy and transport sectors.

- **Thematic lines :**

NCRE in competitive electricity markets

Liquid biofuels and biogas fuels

Geothermal

Solar Thermal Systems (STS)



# Economic, technical and political conditions for NCRE development in Chile are given

Energy prices increase

+

High undeveloped potential

+

Institutional Strengthening (Ministry and Policy)



In Chile there are conditions for the development of a comprehensive portfolio of NCRE projects without direct support for investment.

The strategy adopted by Chile to accelerate the development of NCRE seeks to reconcile the four goals of energy policy:

Security, Efficiency, Sustainability and Equity of supply.



# Unconventional Renewable Energy



- What do we mean in Chile by NCRE?: They are a subset of renewable energies. A combination of renewable energy and technology that are not significantly present in the national market.
- Varies depending on the energy market: for example biomass (wood) is considered "conventional" in the heat market, but not in the electric market.
- There are similarities in policies to boost different NCRE associated with the difficulties they face: risks of innovation, very capital intensive, some technologies still maturing, new actors, etc... → barriers to be removed.

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# Diagnosis

## Substrates for production of biogas fuel:

Biomass to produce biogas that consists of organic matter likely to degrade anaerobically, such as:

- Organic Fraction of Municipal Solid Waste,
- Sludge from Wastewater Treatment Plants
- Agricultural wastes
- Agro-industry wastes
- Energy plantations, etc.

Biomass for production of Syngas is made up of material from forests and waste from forest industries, as well as agricultural waste with high lignin content not suitable for anaerobic digestion

=> Waste generators can not visualize the energy use of these wastes



# Diagnosis- Biogas Production Potential

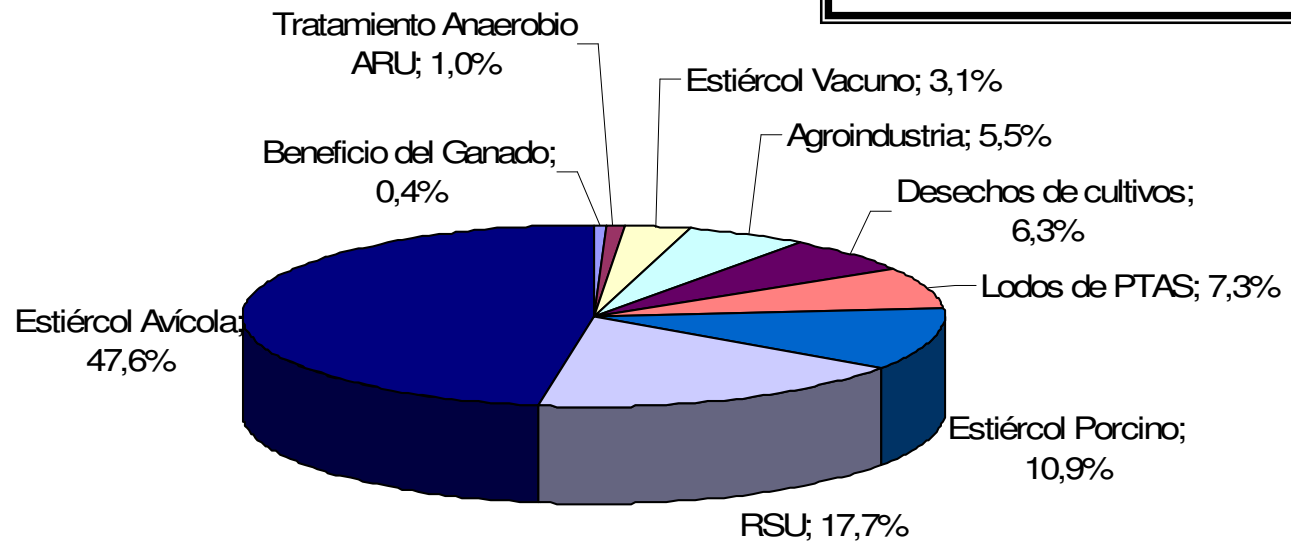


## Estimated potential of Biogas:

Year 2009; 1.226 MMm<sup>3</sup>/year

Projection by 2019; 1.807 MMm<sup>3</sup>/year

% de Biogás por Sector



# Diagnosis- Synthesis Gas Potential

- Obtained by gasification or pyrolysis
- From wood residues, considering only 10% the available biomass as it has alternative uses

**390 MMm<sup>3</sup>/year**



# Diagnosis

## Procurement Process:

- 1.- Biogas from anaerobic digestion processes
- 2.- Synthesis Gas (Syngas) from gasification or pyrolysis processes

## Several possibilities for energy:

- Electricity
- Heat / Cold
- Replacement of Gas
- Vehicle Fuel
- Production of biofuels

=> Lack of Business Model knowledge

The biomass is in the environment in different degrees of dispersion (dispersed, clustered, concentrated), this determines the kind of project to develop

=> Poor information on both resource availability (geographic) and its quality



# Diagnosis

As a result of the above stakeholders are varied:

## – Public Institutions

- Centro de Energías Renovables
- CORFO
- CONICYT
- CONAMA
- SEC
- Ministerio de Salud
- SiSS
- ODEPA, FIA, INDAP, INIA, INFOR, CONAF, CIREN
- Municipios
- Gobiernos Regionales
- MINVU

## – Private Sector

## – Universities

## – Consultants



# Diagnosis- Regulatory and Policy Framework



**The identified biomass is under regulatory frameworks beyond the powers of the Ministry of Energy, which require to generate intelligent networks of interministerial working.**

# Diagnosis



- In Chile there are more than 20 facilities that capture biogas producing more than 200 million m<sup>3</sup> of biogas per year
- The vast majority of larger facilities and much of the volume collected (165 million m<sup>3</sup> / year) is burned in torches, not being used as fuel.
- In some cases, part of biogas is used to generate heat for the same process (Agrosuper, La Farfana and Rexin).
- Existing installations use a wide range of substrates, the most important being household organic waste, pig slurry and sewage treatment plants.

# Diagnosis



- There are funding tools for the different stages in the development of biogas projects:
  - Research (Fondecyt)
  - Development (Innova)
  - Studies, projects (CORFO)
  - Investments (Créditos CORFO)

# Conclusions

- It is feasible the production of biogas as non-conventional renewable energy at different scales
- There is a growing interest in the development of biogas
- Limited technical capacity exists for the development of projects that should be encouraged through the formation of specialized courses at universities and centers for technical training
- It is necessary to evaluate the support mechanisms to increase biogas production projects and its use as energy
- The cost of the technology remains high because it is not mass produced yet.
- The quality of information about the quality of biomass and geographic distribution should be improved
- Actions must be evaluated to overcome the barriers of biogas projects according to the source of biomass
- Regulatory and legal framework related to the residual biomass should be improved

**SPECIFIC ACTIONS ARE NEEDED TO DEVELOP BIOGAS THAT  
CONSIDERS THE DIFFERENT SOURCES OF BIOMASS**



# Support for Development of Projects Using Biogas



**General Purpose:** Generate the conditions for the development of biogas fuel industry in Chile.

## **Action lines:**

1. Strengthen the legal and regulatory framework
2. Improve information, facilitate access and support technology transfer.
3. Strengthen inter-agency coordination
4. Support the development of skilled human capital

# Work Done

## – Studies

- Identification and classification of different types of biomass available in Chile for the generation of biogas , UCV, march 2007
- Study of the regulatory framework and procedures that must be met in the chain of production-consumption of biofuels, for the initiation and development of their activities within the Republic of Chile , Barros y Errazuriz, 2007
- Practical workshop on the use and design of a family digester, CNE. Project for removal of barriers for rural electrification with NCRE, 2008
- Potential of Biomass for generation of Alternative Fuels , FCH
- Strategic analysis of elements of policy for Biogas Fuels in Chile , GAMMA (proposals to overcome legal barriers, regulatory, technical , etc)
- Pre-evaluation of energy use of sludge Methanization in sewage plants, GAMMA
- Pre-evaluation of MSW Energy Use, IASA

## – Guides

- **Planning Guide for Biogas Projects in Chile , GTZ-CNE (under development)**



# Work Done

## Financing of Scholarships in Bioenergy

- The National Commission on Science and Technology Research CONICYT



- Energy Programme, Internship Program Abroad (6 internships abroad)
- Energy Programme, Skill Training Courses in the energy sector (8 courses)

### Call for tender “Thematic Programme of R & D in Bioenergy” Summons: Fondef

- Sustainable production of biomass
- Efficient logistics of biomass
- Pre-treatment or conditioning of biomass

There were 16 applicants, currently under evaluation

# Work Done



## **Seminars for Bioenergy diffusion and Motivation**

Organizers: ODEPA – CNE - FAO

4 They developed the año 2009

## **National Biofuels Board**

<http://biocombustible.cne.cl/>

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# Lines of Action



1. Strengthen the legal and regulatory framework
2. Improve information, facilitate access and support technology transfer.
3. Strengthen inter-agency coordination
4. Support the development of skilled human capital

# 1.- Strengthen the regulatory framework and regulatory



- Analysis of regulatory framework applicable to biogas.
- Adequate regulatory proposals affecting the development of biogas projects (sewage treatment, landfills).
- Proposal for specific technical standards for biogas plants.

## **2.- Improve information, facilitate access and support technology transfer**



- Study of models of use of biomass (associative models).
- Analysis of needs and design of specialized funding tools for biogas projects.
- International Seminar on Biogas, coordinated with Ministry of Agriculture and FAO

## **3.- Strengthen inter-agency coordination**

Development Division, does not directly implement most initiatives it drives: Study => Diagnosis => proposing lines of action => definition of policy instruments => transfer to implementing agencies

**Strengthening strategic alliances with relevant actors**



## **4.- Support the development of specialized human capital**

- New funding for Internships and courses, through CONICYT
- Two Biogas courses in coordination with Ministry of Agriculture and INDAP



# International Cooperation

International cooperation is structured so that it is an integral part of the Division, in objectives, activities and professional staff.



## **Projects applying**

NCRE in heat and transport markets: \_BMU-GTZ,  
2010-2013.

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