# APEC Workshop on Regulatory Approaches to Smart Grid Investment / Deployment

## Vision for the 21st Century Grid

Gobierno de Chile

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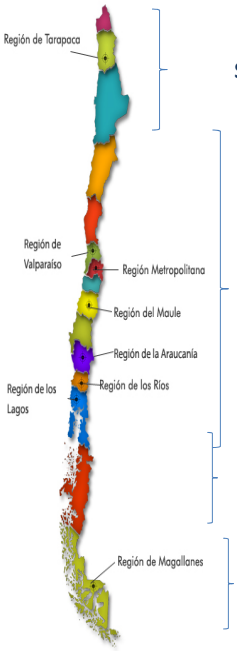
# Installed Capacity 2012 - MW




**SING – 3.964 MW**

| | MW | [%] |
|---|---|---|
| Termal | 3.949 | 99.6% |
| Hydro | 15 | 0.4% |

**SIC – 12.385 MW**

| | MW | [%] |
|---|---|---|
| Termal | 6 309 | 51.03% |
| Hydro | 5 859 | 47.38% |
| Wind | 198 | 1.59% |

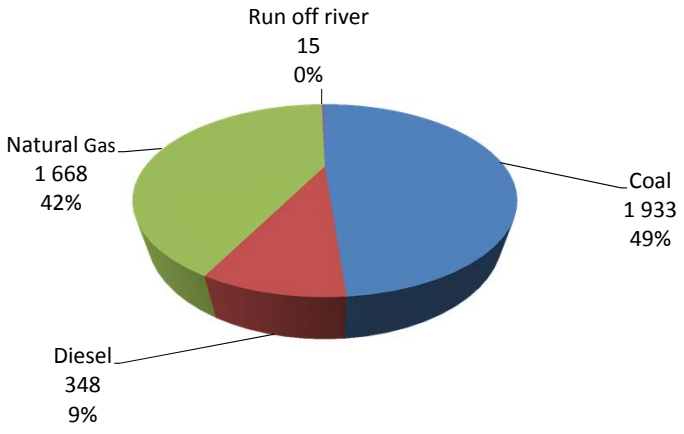
**SSMM Aysén – 52 MW**

| | MW | [%] |
|---|---|---|
| Termal | 29 | 56.7% |
| Hydro | 20 | 39.4% |
| Wind | 2 | 3.8% |

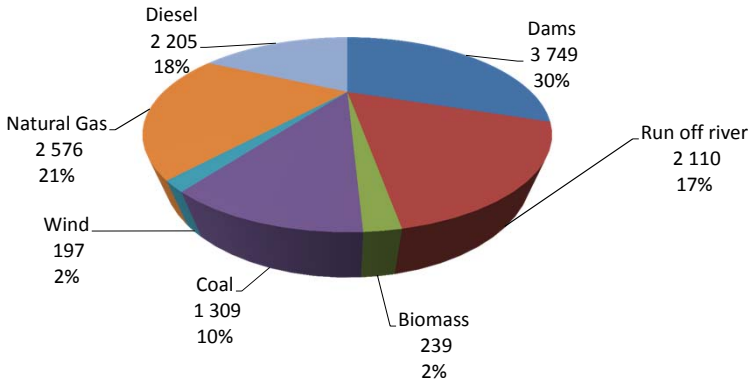
**SSMM Magallanes – 99,6 MW**

| | MW | [%] |
|---|---|---|
| Termal | 99,6 | 100% |

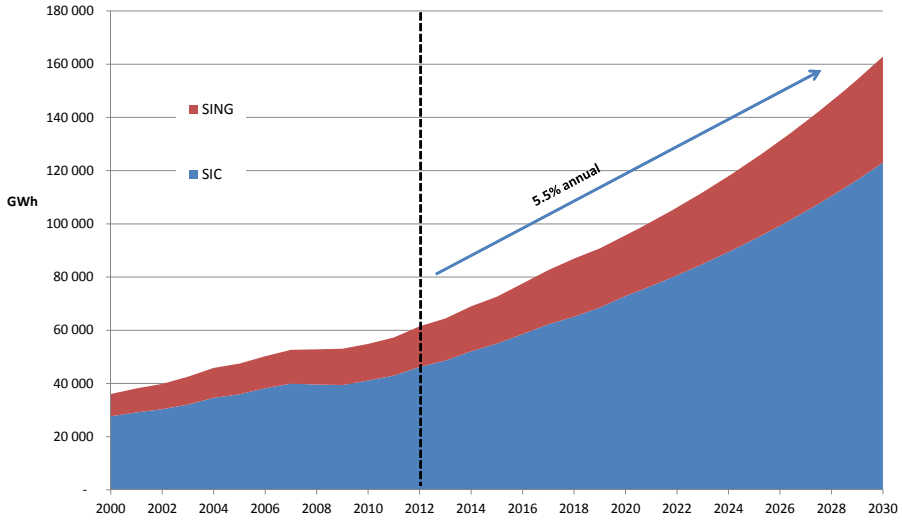
# Installed capacity SING 2012- MW



# Installed Capacity SIC 2012- MW




# Demand growth



## How to supply the growing demand?

- Is possible to reduce demand growth path?
  - Energy efficiency action plan
    - Target energy consumption reduction: 12% at 2020
  - Mean energy/electricity consumption in Chile is low

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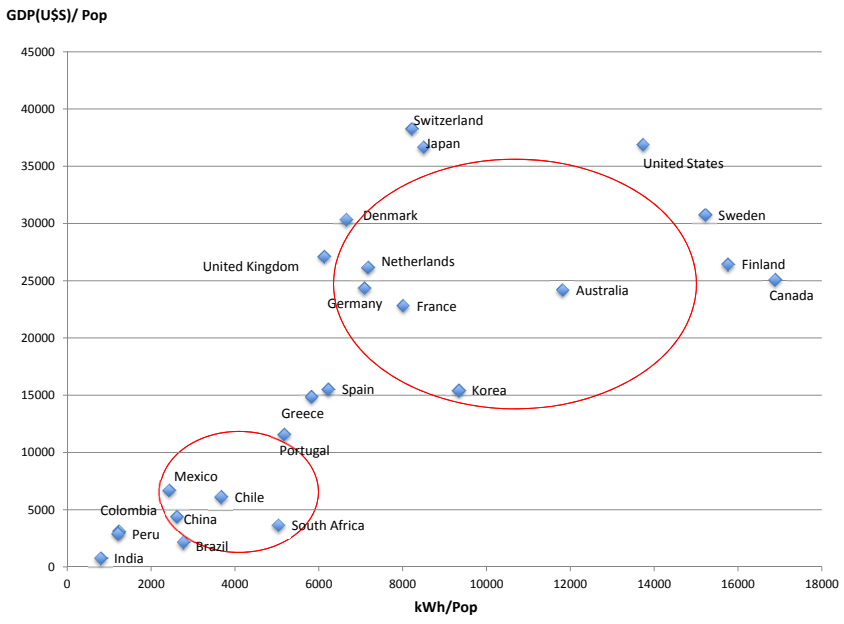


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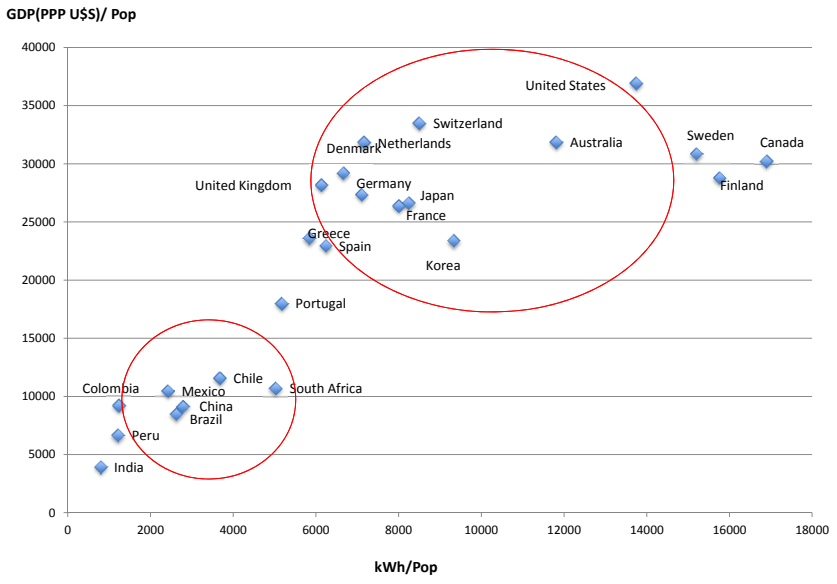


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## Regulatory Framework Overview

- Electric business is divided into 3 separately segments

**Generation**

- Competitive business
  - Free entry market
  - No central planning
  - System expansion is a result of markets forces
- System operation is coordinated by CDEC (SO)
  - Dispatch based in merit order
- There exists two markets:
  - Spot market
  - Contracts Market

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## Regulatory Framework Overview

**Transmission**

- Natural monopoly
- 3 categories of Transmission infraestructure:
  - Trunk system (Tariffs: regulated – Expansion: mandatory-tenders)
  - Subtransmission (Tariffs: regulated – Expansion: price incentives)
  - Additional systems (non regulated – Expansion: market forces)
- Tariffs setting and planning/expansion survey: every 4 years
- Operates under open access

**Distribution**

- Natural monopoly
- Distribution Added Value is calculated every 4 years, based on a model company (efficient and adapted Dx company)
- Grid appraisal and pricing do not consider the existence of DG
- Grid reinforcement (if needed) to connect DG, is afforded by DG owner.

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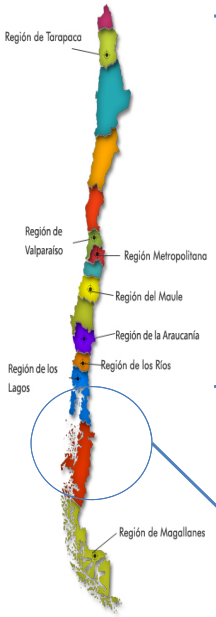
## Future challenges?

Potential Renewable energy sources




Non conventional renewable energy sources

| Tecnología | Theoretical Potential (MW) | |
|---|---|---|
| | (a) | (b) |
| Geothermy (2) | 3.300 | 16.000 |
| Biomass (3) | 470 | 13.700 |
| Biogas (4) | 400 | |
| Smallhydro (5) | 1.400 | |
| Wind (6) | 7.200 | 40.000 |
| Solar (7) | 228.000 | 40.000-100.000 |
| Waves- Undimotriz (8) | 240.000 | |

2) (a) ENAP 2005/ (b) Estudio A Lahsen 1986
(3) (a)Survey CNE-GTZ 2008 (Residuos de manejo forestal) / (b) Estudio UTFSM 2008: Estimación de potenciales brutos al 2025.
(4) (a) Estudio CNE-GTZ 2007
(5) (a) Estudio CNE, CNR y MEN 2007- 2010: Potencial teórico bruto en de obras de riego existentes entre Atacama y Araucanía. No considera derechos no consuntivos.
(6) (a) Elaboración Propia MINEN 2011 en base a explorador eólico solar aplicado sobre Región de Antofagasta (con 30 Ha/ MW)/ (b) Estudio UTFSM 2008: Estimación de potenciales brutos al 2025.
(7) (a) Estudio CNE 2009 Potencial en Regiones Arica y Parinacota, Tarapacá y Antofagasta, (con 2 Ha/ MW)/ (b) Estudio UTFSM 2008: Estimación de potenciales brutos al 2025.
(8) (a) Estudio Garrad Hassan 2009

Hidroelecticity: 6000 MW

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## Future challenges

- Therefore, will be necessary to:
  - Transmission level:
    - Holistic approach in planning and expanding decissions
    - Resources oriented rather than projects
    - Regional interconnection
  - Distribution Level:
    - Deploy Distributed Generation (DG)
      - Net metering
      - DG sources:
        - » Biogas
        - » Cogeneration
        - » Solar
    - Promote an active demand side participation
      - Load shedding
      - Peak load demand reduction
      - EV & energy storage

Smart Grids deployment is needed to achieve these goals

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# Thank you

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