Ready for Carbon Pricing Policies?
Challenges and Opportunities for the Energy Sector

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GDF SUEZ supports World Bank & Global Compact in advocating for a global carbon price

- Carbon Pricing is inevitable for effective & cost-efficient global mitigation at scale.
- Smart combination of policies allows addressing country specific development needs.
- Developing countries must focus on social inclusion, efficiency and clean expansion.
- Global cooperation is key to ensure preventive mitigation and avoid high costs today and in future.
- Smart policy design must attract investment, ensure recognition of early action and efficient risk management.
- Building on existing mechanisms must ensure smooth evolution towards a global market.
GDF SUEZ in Chile: Solutions to face Climate Change

**Transmissional Infrastructure Investments**
Transmission lines, large HPP & Gas Infrastructure are key for clean & climate resilient growth.

**Universal use of NCRE**
Maximizing use of NCREs today minimizes structural lock-in with GHG intensive infrastructure.

**Energy Efficiency**
Improving efficiency ensures economic competitiveness & resource conservation.

**R&D and Innovation**
Ideas of today need to be developed as solutions for tomorrow.

**SING**
3.9 GW
25% demand

**SIC**
14.4 GW
74% demand

- El Aguilá 1 (Solar)
- El Aguilá 2 (Solar)
- Pampa Camarones (Solar)
- Biomass Micro-algae and co-combustion plant
- GNL Mejillones (LNG)
- Chapiquiña (HPP)
- Queñoas (forest recovery)
- Calama (wind) *
- Cofely Termika Antofagasta
- Cement manufacture with ash
- Eco bricks
- Cofely Termika Copiapó
- Monte Redondo (wind)
- Santiago
- Cofely Termika Concopiñón
- Laja (HPP)

* Under development
The uneven challenge to limit Climate Change to 2°C

WHAT DO WE NEED TO BRIDGE THE GAP?

- Non-OECD countries account for 90% of population and energy demand growth and require huge investments in infrastructure and mitigation.
- Energy causes 66% of global GHGs & non-OECD account for 100% of growth;
- The 450 (ppm) scenario requires additional investments of $11.6 trillion;
- GHG intensive thermal expansion is still the baseline and leads to a technological lock-in which is capable to close the door to 450 ppm.

Chile as an OECD country with development needs

Capita specific Power Consumption, GDP & HDI

Power consumption (kWh per capita)

Human Development Index (HDI)
Size of bubbles ~ GDP/capita

Source: UNDP and World Bank Data Bank
Power Sector: Fundaments & GHG Mitigation

Key to Socio-economic progress

Electricity is a key factor for social empowerment and key to health, education, income and social equity

Resource vs Capital intensity

Thermal power plants are resource intensive
Renewable power plants are capital intensive

System Complexity

Environmental, social & economic optimum is a result of the efficient combination & operation at system level.

Regulatory Driven

Regulatory framework is decisive for investor preferences, capital cost, efficient expansion & operation

Conceptual aspects and costs of GHG mitigation in the power sector

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Cost</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset substitution</td>
<td>Substituting existing GHG intensive plants</td>
<td>Very High</td>
<td>Lowering as assets depreciate over 30 years</td>
</tr>
<tr>
<td>Operational</td>
<td>Substitute coal by gas dispatch</td>
<td>HIGH</td>
<td>Cost depending on Gas availability</td>
</tr>
<tr>
<td>Structural</td>
<td>Anticipate NCRE and system efficiency</td>
<td>Moderate</td>
<td>Capital Cost to be kept low by efficient regulation</td>
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</table>
Build on and combine existing & emerging policies

**Value GHG Reduction**
- Carbon Market Instruments identify “least cost options” and assure profitability

**Provide Funding in Least and Less DC’s**
- Multilateral Development Banks & Green Climate Fund finance clean growth & attract Private Sector
- CDM adds credibility & assures profitability

**MRV**
- CDM offers well established principles for MRV & bottom up baseline setting
- Unparalleled DOE and PD capability is (still) available

**Domestic Efforts:**
- Advanced DC’s & private sector finance NAMA investments
- NAMAs facilitate sectoral activities
- National demand for offsets to Tax or C&T
Successful Non Conventional Renewable Energy in Chile:

- Projects implemented based on the strategic combination of different support mechanisms.
- Development Bank Financing is result of a governmental arrangement with the European Investment Bank (signed in March 2010).
- As 66 CDM registered NCRE projects with a total of 4.3 GW are stranded with CERs.
- NCRE certificates still have limited value.

CDM Projects Eolica Monte Redondo & Laja Hydropower plant:

- **EMR - 48 MW in IV Region**
- **Laja - 34 MW in VIII Region**
Impacts of CDM and Carbon Tax on Investments

1) Crash in the CDM Market

2) Carbon tax without flexibility

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<thead>
<tr>
<th></th>
<th>Existing</th>
<th>Future</th>
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<tbody>
<tr>
<td><strong>Renewables</strong></td>
<td><img src="image1.png" alt="Wind turbines" /> <img src="image2.png" alt="Frowny face" /></td>
<td><img src="image3.png" alt="Solar panels" /> <img src="image4.png" alt="Sad face" /></td>
</tr>
<tr>
<td><strong>Fossil fuel TPP</strong></td>
<td><img src="image5.png" alt="Smokestacks" /> <img src="image6.png" alt="Crying face" /></td>
<td><img src="image7.png" alt="Coal power plants" /> <img src="image8.png" alt="Surprised face" /></td>
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Investment Incentive

Energy Prices
## Opportunities to improve the design of Chile’s carbon tax

<table>
<thead>
<tr>
<th>Ideas for discussion</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>➢ Broaden the Scope and Coverage to sectors other than Power Generation</td>
<td>➢ Transversal Carbon price maximizes environmental benefit &amp; avoid distortion.</td>
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<tr>
<td>➢ Ensure pass through of price signal</td>
<td>➢ Ensure adequate economic signals to consumers and clean energy investors</td>
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<td>➢ Eliminate Provision that Spot Price will not be affected by Carbon tax</td>
<td></td>
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<tr>
<td>➢ Include the provision that Carbon tax can be compensated with CDM Certified Emission Reductions</td>
<td>➢ Mitigate impact on energy cost and inflation and protect consumers.</td>
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<td>➢ Ensure (Inter)-national recognition of early action and MRV of results</td>
<td>➢ Promote early action as investors will anticipate and balance their portfolio</td>
</tr>
<tr>
<td>➢ Promote indirect linking to attract international carbon finance</td>
<td>➢ Ensure (Inter)-national recognition of early action and MRV of results</td>
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<tr>
<td>➢ Impulse negotiations &amp; similar evolutions in other countries &amp; pave way to global carbon market</td>
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