

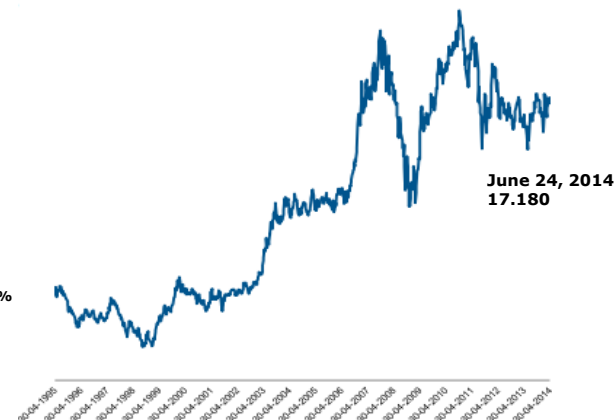
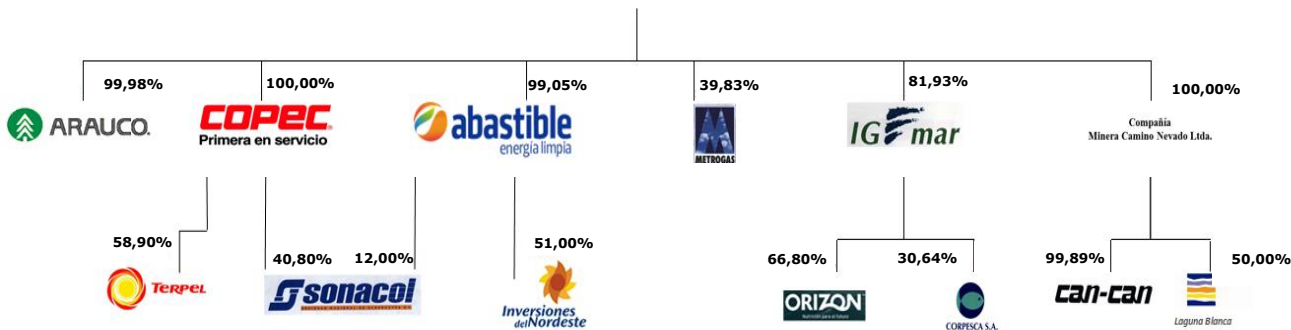
Energy Policies in Chile

Jorge Ferrando
Empresas Copec

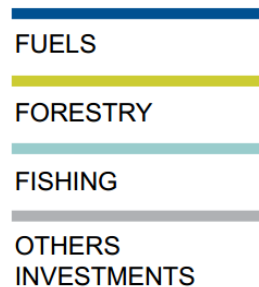
Empresas Copec



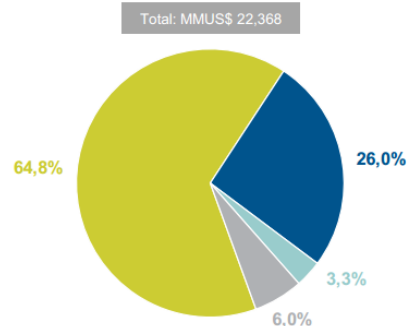
EVOLUTION OF MARKET CAPITALIZATION
(MMUS\$)



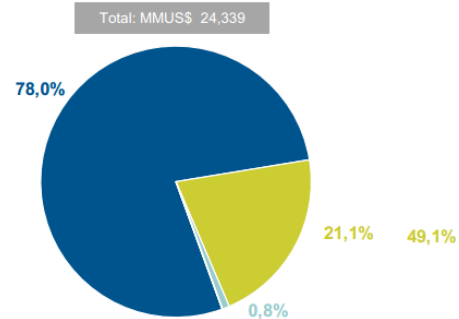
Business Sectors



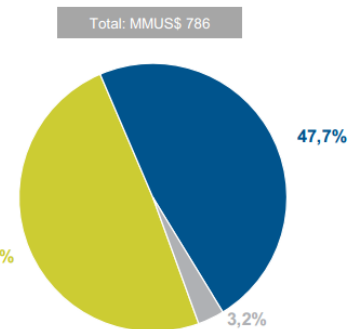
CONSOLIDATED ASSETS



CONSOLIDATED SALES



CONSOLIDATED NET INCOME



Energy in Empresas Copec



Biomass Power Plants

Chile: 10 plants. 606 MW
Argentina: 2 plants. 78 MW
Uruguay: 1 plant. 164 MW



Fuels: 9.4 million m³ sold in 2013

58.3% market share



Fuels: 1,902 million gls sold in 2013

NGV: 381 million m³ sold in 2013



LPG: 418 thousand tons sold in 2013

36.3% market share



LPG: 189 thousand tons sold in 2013

34,0% market share



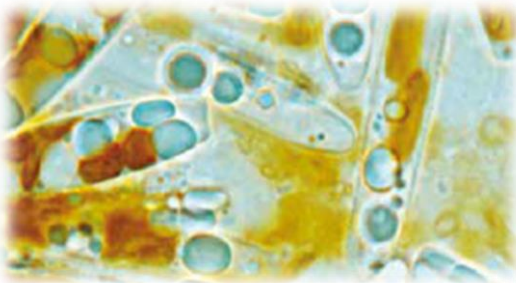
LNG: 1.004 million m³ sold in 2013

LNG terminal operating since 2009



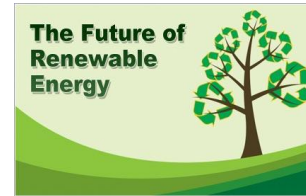
New 4 - 6 million tons/year coal mine started operations in 1H 2013

Energy in Empresas Copec



Introduction

Introduction



People are committed to their development



Clean



Inexhaustible

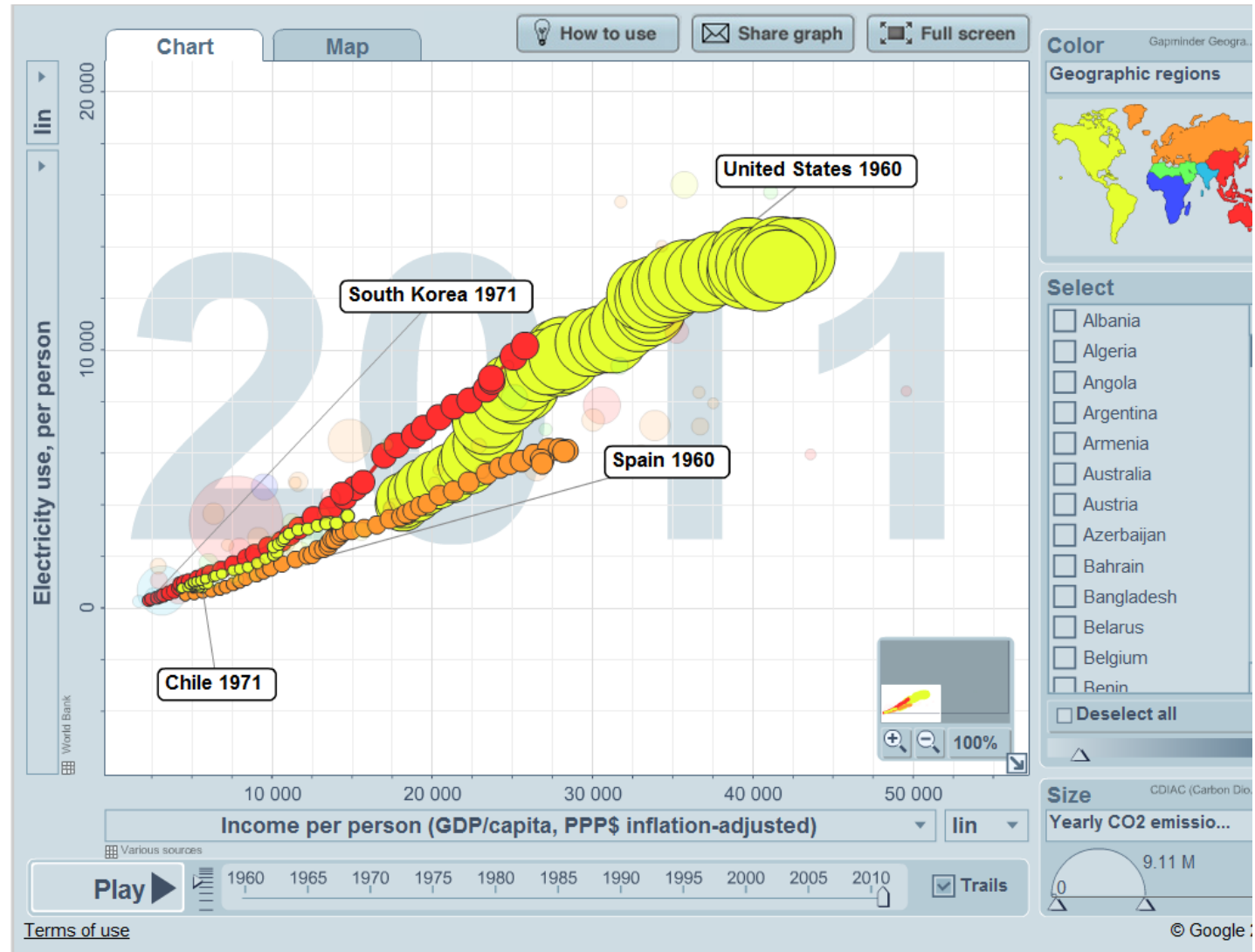
Introduction



Non-conventional renewable energies are insufficient to support the development of societies

Energy Consumption and Development

Energy Consumption and Development



Energy Consumption and Development

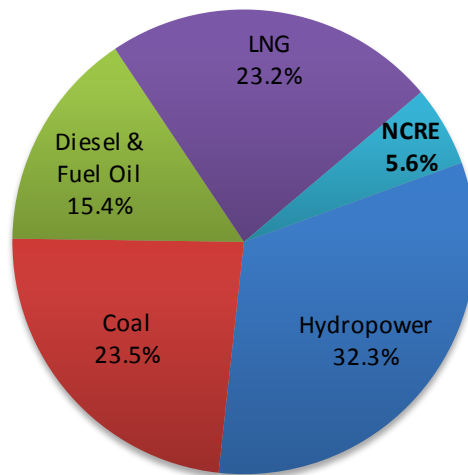


Are NCRE enough?

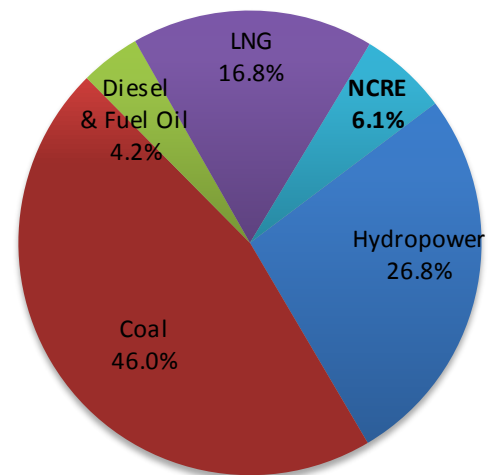
Are NCRE enough?

Energy in Chile: Capacity and Generation 2013

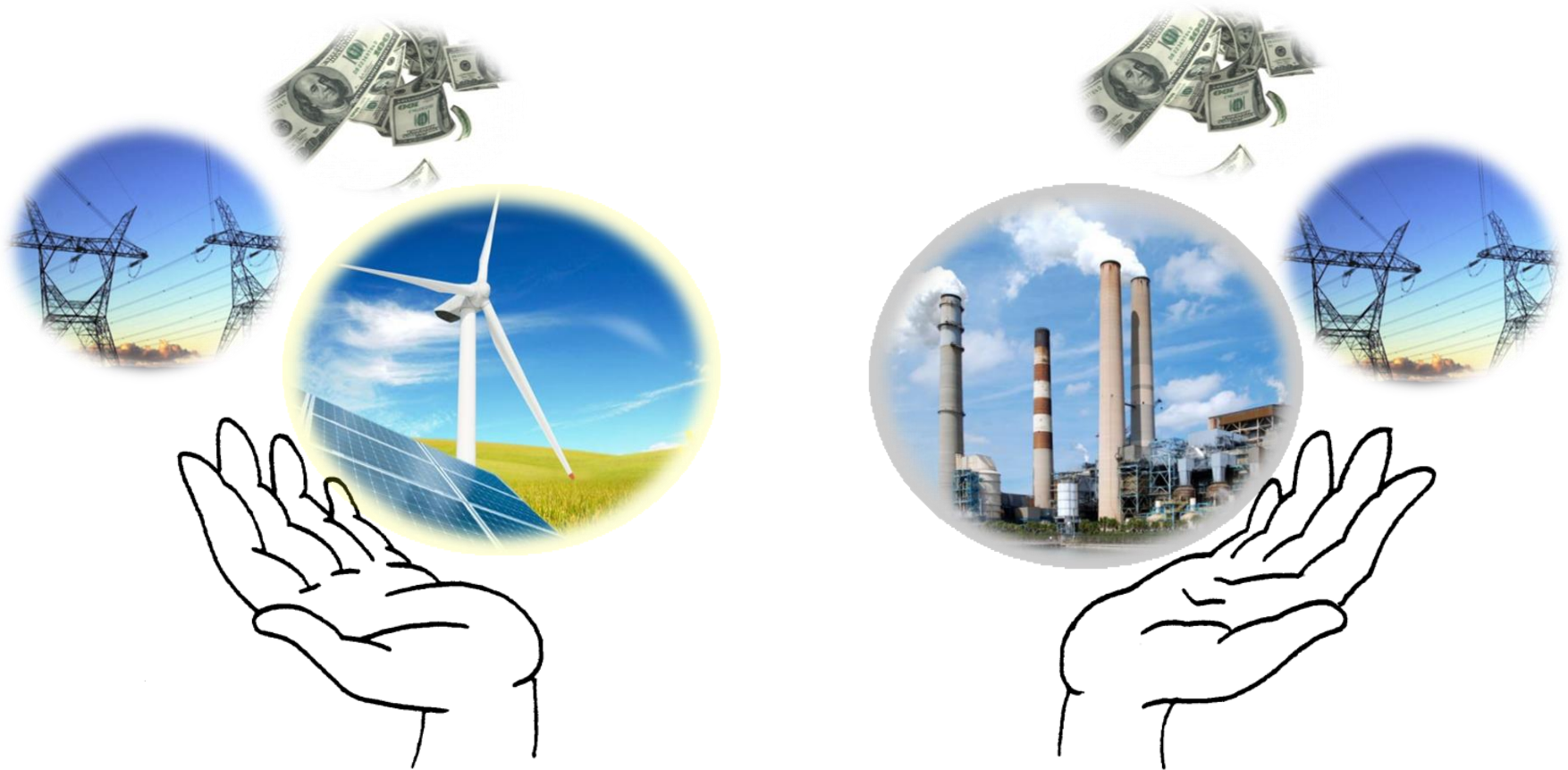
Installed Capacity
17,744.8 MW



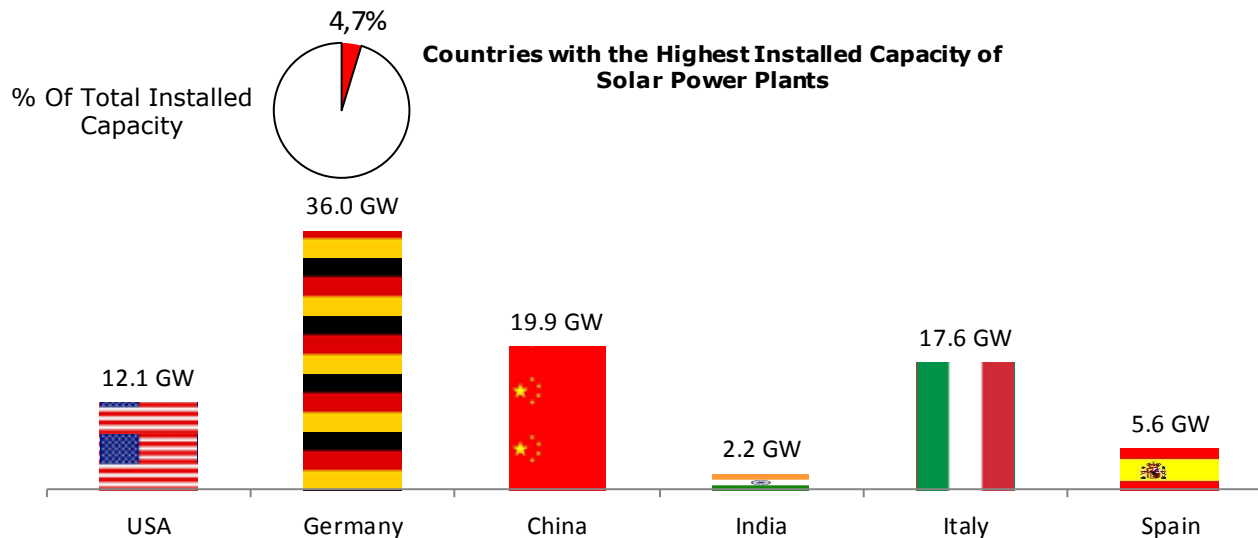
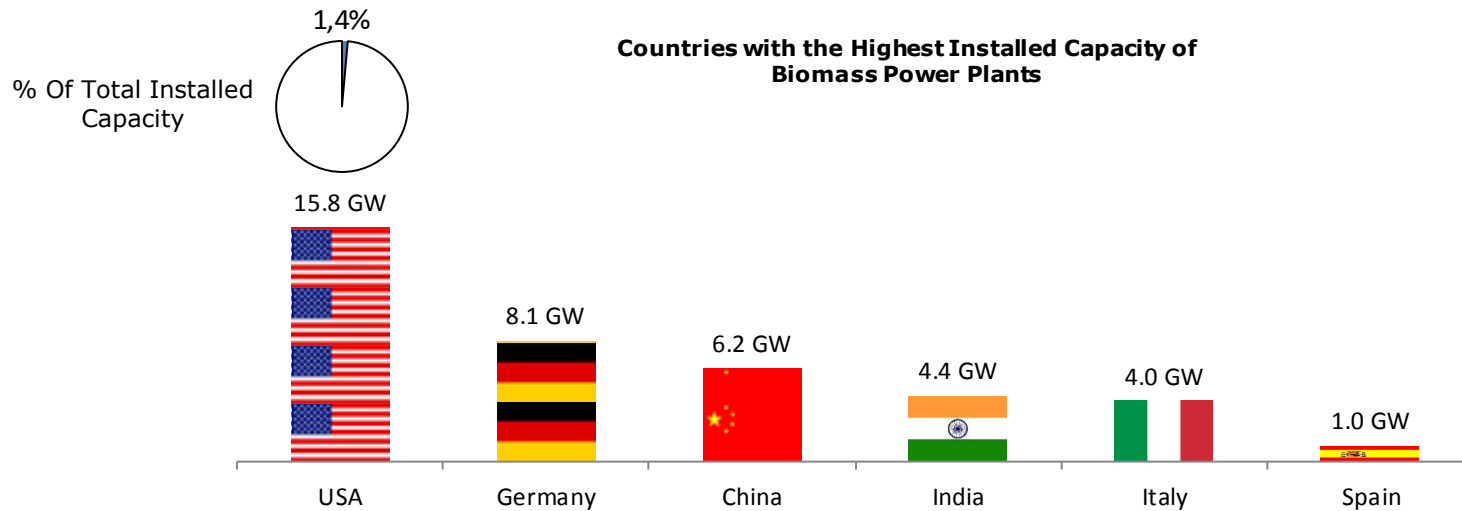
Generation
68,513.7 GWh



Are NCRE enough?



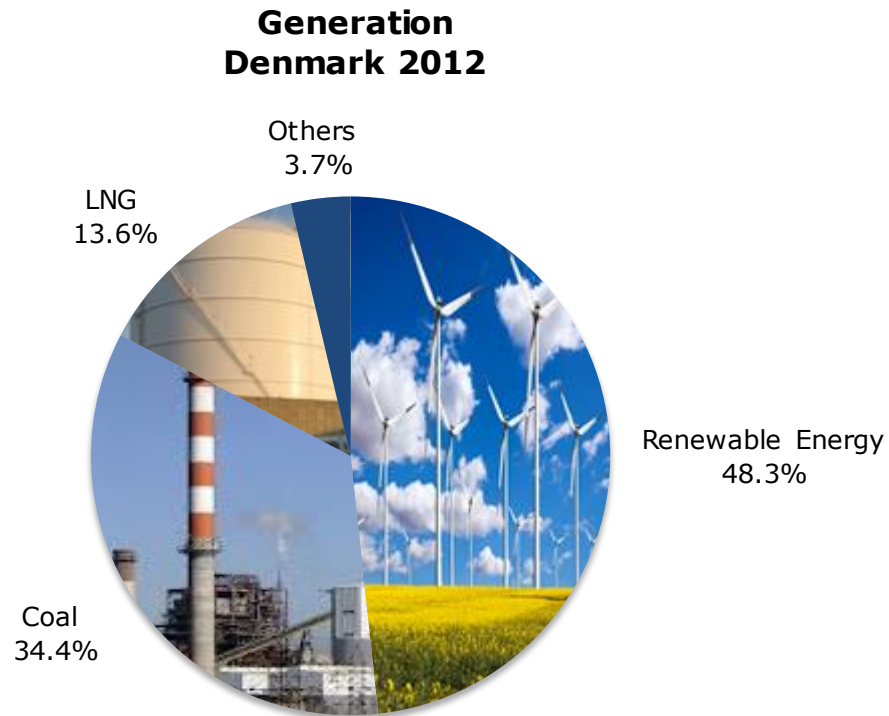
Are NCRE enough?



Sources:

- www.renewableenergyworld.com. "Renewable Energy provides 37% of all new US electrical generating capacity in 2013"
- REN 21
- Energieverbrauch in Deutschland im Jahr 2013. www.ag-energiebilanzen.de

Are NCRE enough?



Are NCRE enough?

Solar Power Plant El Águila I. 2,0 MW
Capacity factor Q1 2014: **26,6%**



Wind farm Canela. 78,2 MW
Capacity factor 2013: **21,5%**



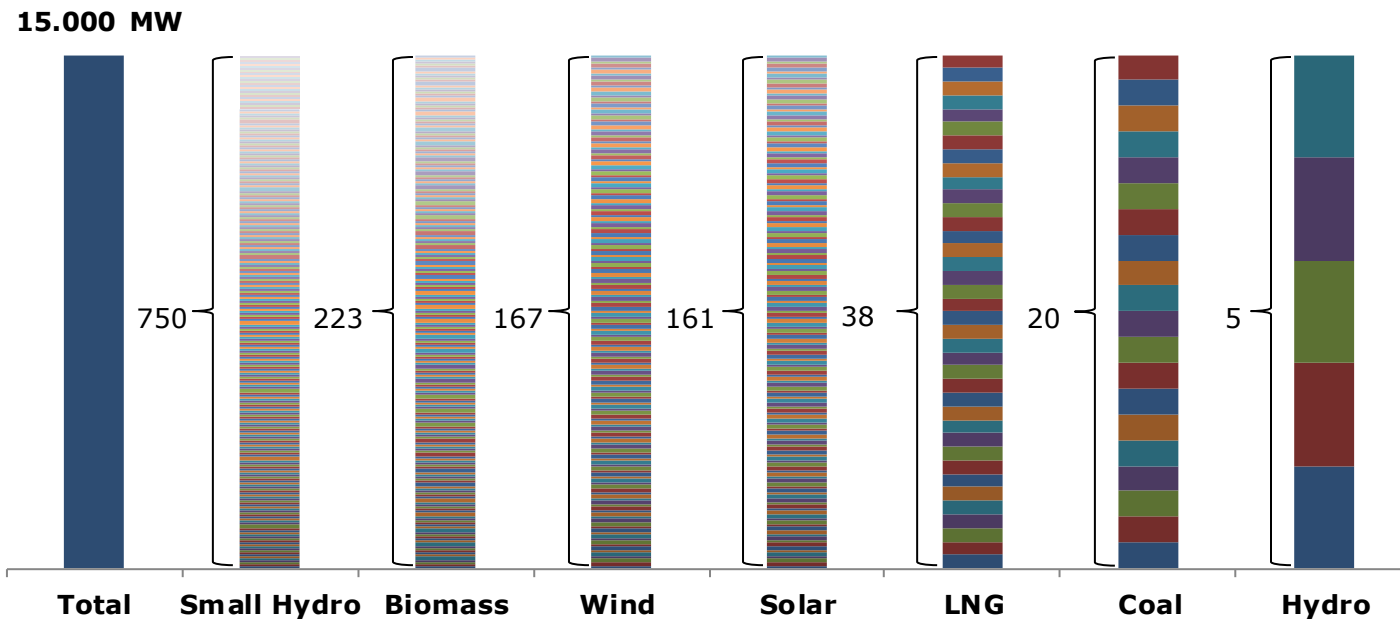
Small Hydro Chiburgo. 19,4 MW
Capacity factor 2013: **40,7%**



Are NCRE enough?

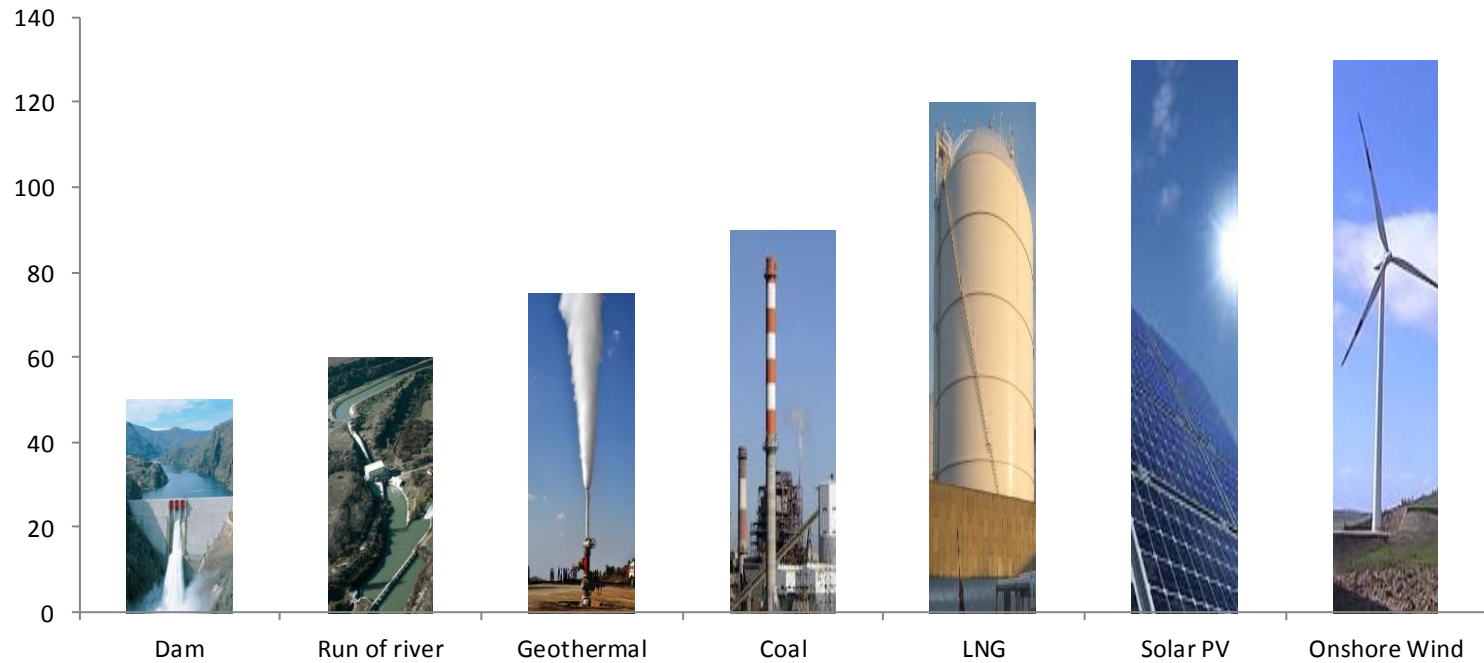
NCRE	Capacity (MW)	Power Plant
Small Hydro	20	*Maximum Capacity NCRE
Biomass	67	Santa Fé
Wind	90	Talinay Project
Solar	93	Llano de Llampos Project

Conventional	Capacity (MW)	Power Plant
LNG	400	U16 (E-CL)
Coal	740	Punta Alcalde Project
Hydro	2.750	Hydroaysen Project



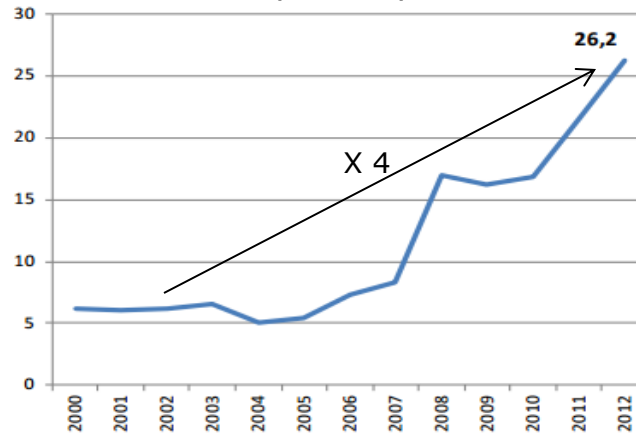
Are NCRE enough?

Development cost by technology
US\$/MWh

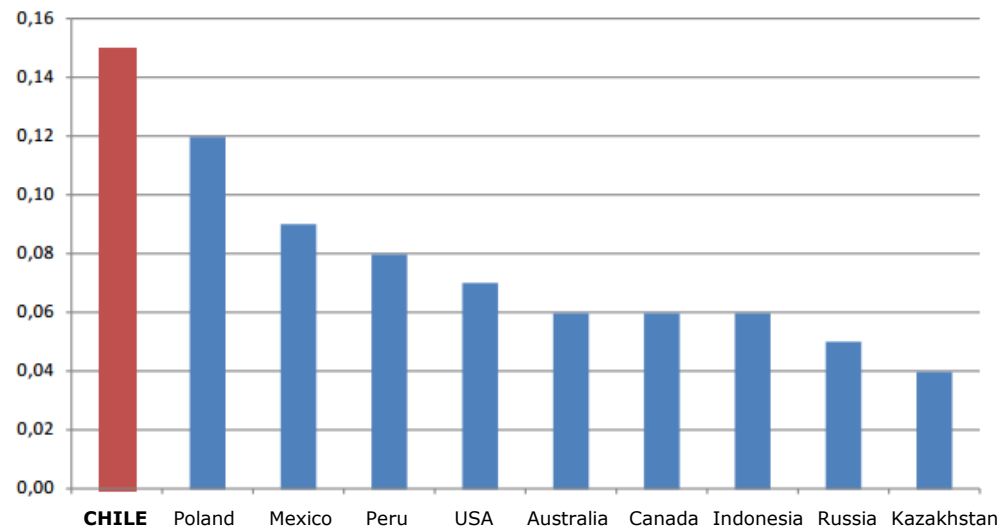


Are NCRE enough?

Energy Costs in Copper Mining
(US\$ c/lb)



Electricity Prices for Industry in Copper Producing Countries
(US\$/KWh)



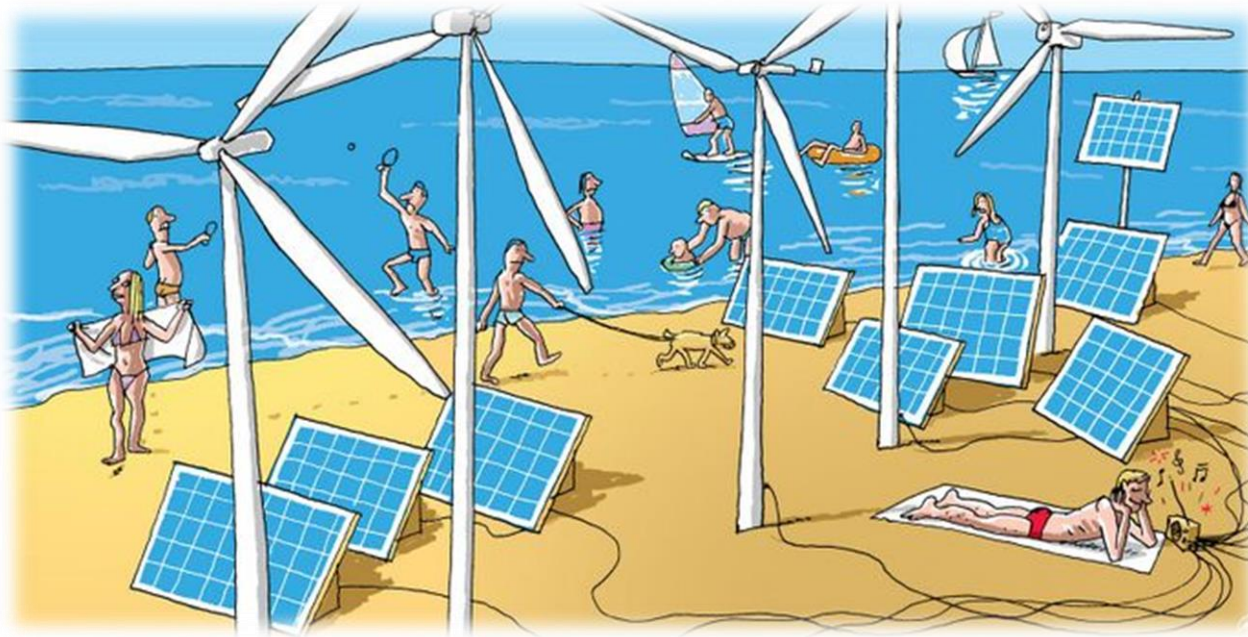
Are NCRE enough?



Are NCRE enough?

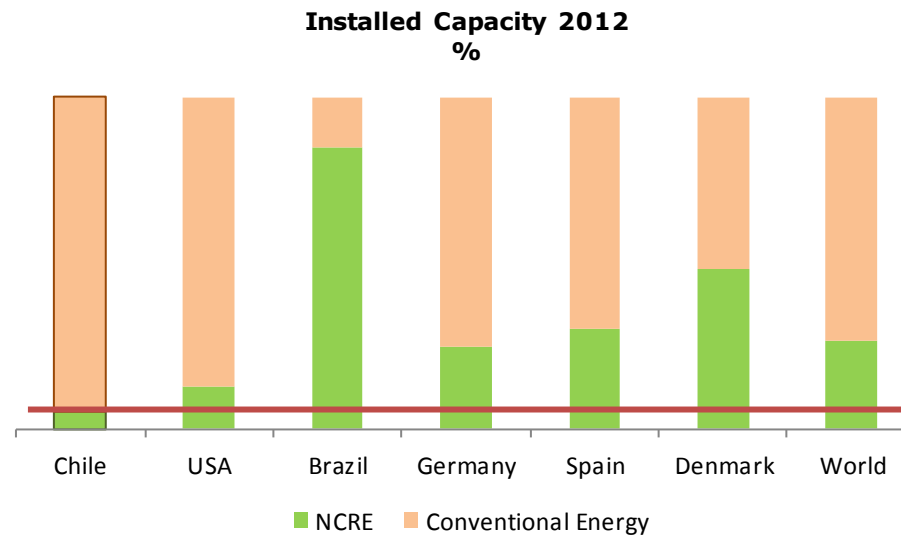


Are NCRE enough?

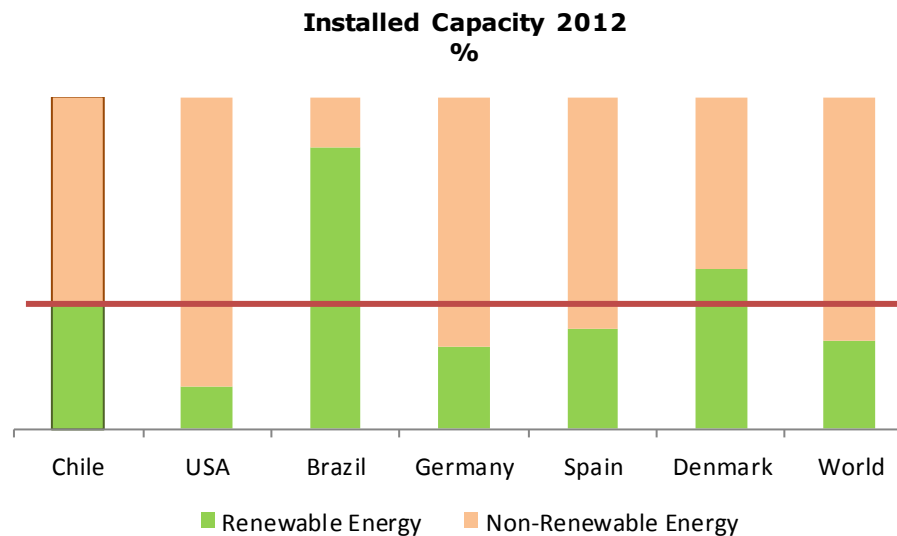


Renewable Energy in Chile

Renewable Energy in Chile

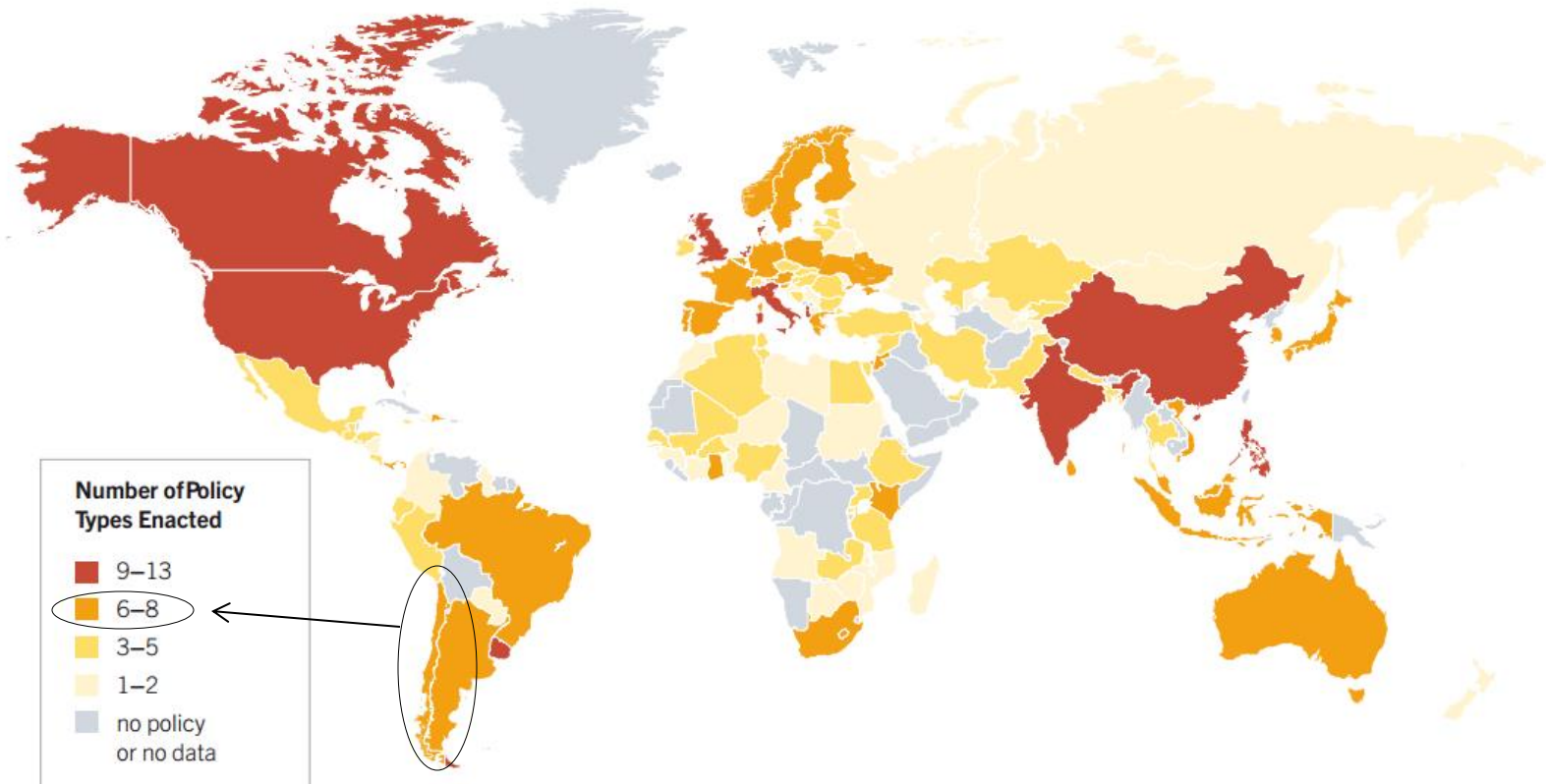


But if we remove the «Non-Conventional» part...

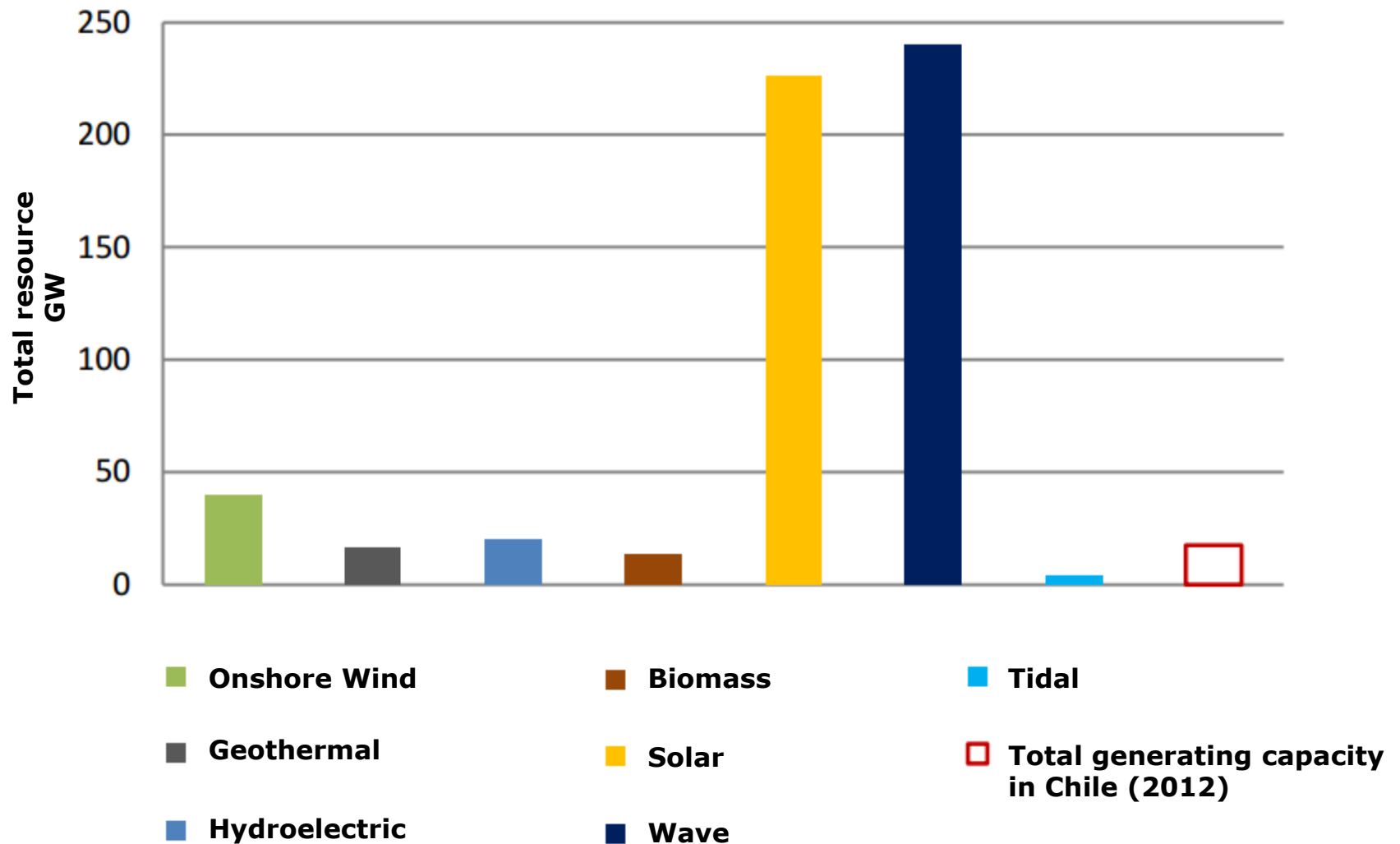


POLICY MAPS

Figure 26. Countries with Renewable Energy Policies, Early 2014



Renewable Energy in Chile



Renewable Energy in Chile

Total costs increase



Capacity factors are affected



Reserve requirements grow



Extra maintenance costs triggered by cycling



Policy Recommendations

Recommendations

- To remove/reduce barriers for NCRE development:
 - Renewable portfolio standards
 - Short lived feed-in tariffs
 - Auctions
 - Smart metering
- To reduce NCRE related problems:
 - Portfolios/mixes or incentives that build a supply curve similar to the load curve
 - Boost NCRE energy trading initiatives
 - Allow for power source selection at the retail level (*multicarrier*)
- Clear policy of energy efficiency: *Decoupling plus*

Energy Policies in Chile

Jorge Ferrando
Empresas Copec