



Generadoras de Chile



Affordable and clean energy for LAC

Lessons from Chile's energy transition

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India - Latin America & Caribbean Conclave
Santiago, October 1st 2018



Confederation of Indian Industry



We envision a more electric future, based on renewable, efficient, trustable and sustainable energy



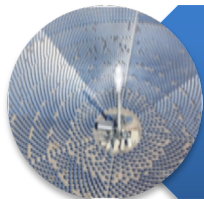
- Our mission is to lead and inspire the energy transition by promoting sound public policy and best industry practices for better use and production of electricity.
- We are the business association of the main power generation companies operating in Chile.
- Our members develop, build and operate projects in both renewable (hydro, wind, solar PV and CSP, geothermal, bioenergy) and non renewable sources.



Pillars of affordable and clean energy



Electrification of energy



Renewable electricity

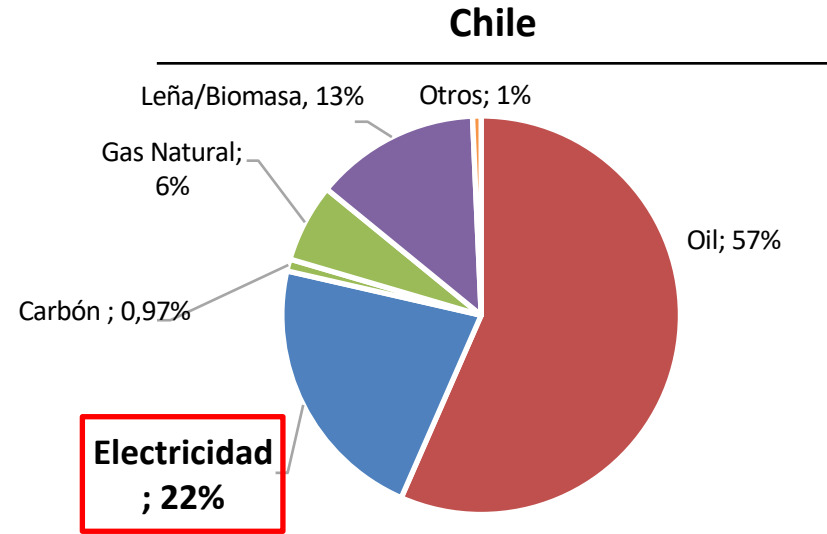
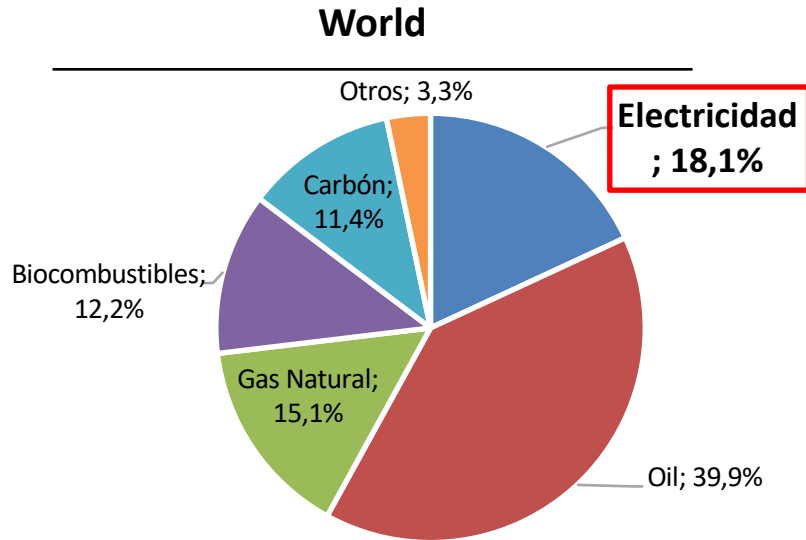
Air pollution of our cities is Chile's biggest environmental concern



(1) Fuente: Encuesta Nacional del Medio Ambiente, Ministerio de Medio Ambiente, febrero 2018

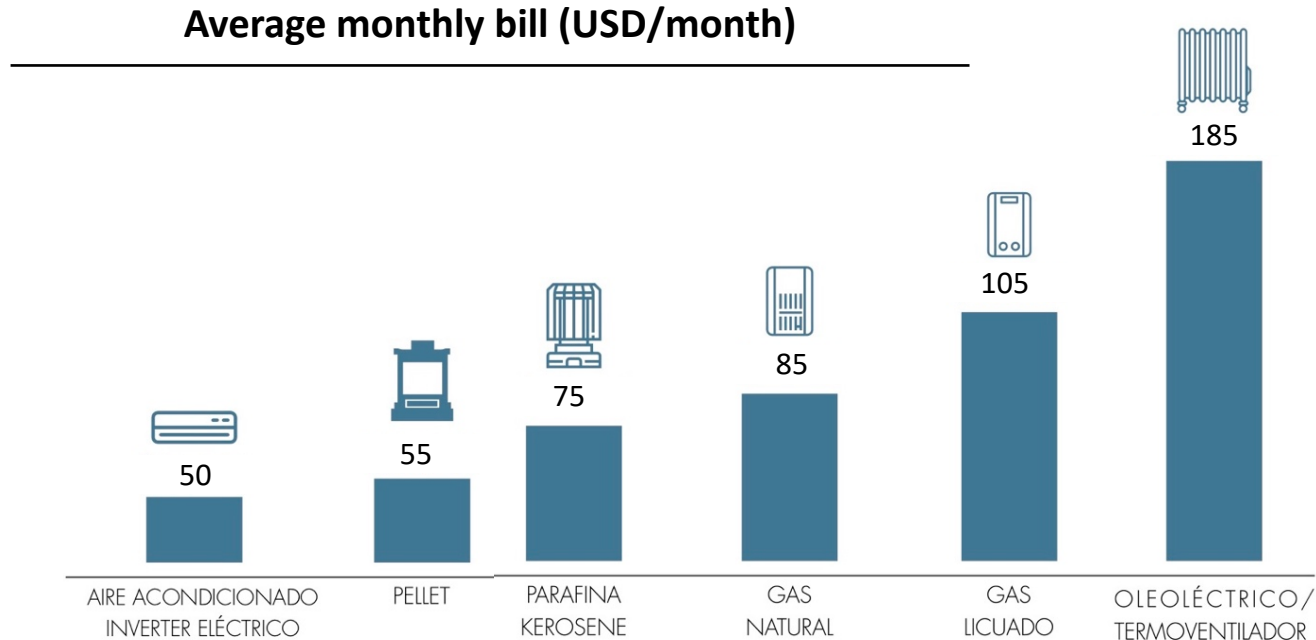
Only ~20% of final energy consumption is electricity today

Largest energy consumption are oil products, like gasoline, diesel or kerosene



Fuente: Mundo: IEA, 2016; Chile: BNE, 2015

Electric heat pumps deliver an increasingly competitive and zero local emission source of heating and hot water for homes and industry



Source: Calefacción sustentable. Ministerio de Medio Ambiente, 2016

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The future of transport will be electric (and hydrogen) driven

Currently only 2% of transport is electric

Benefits



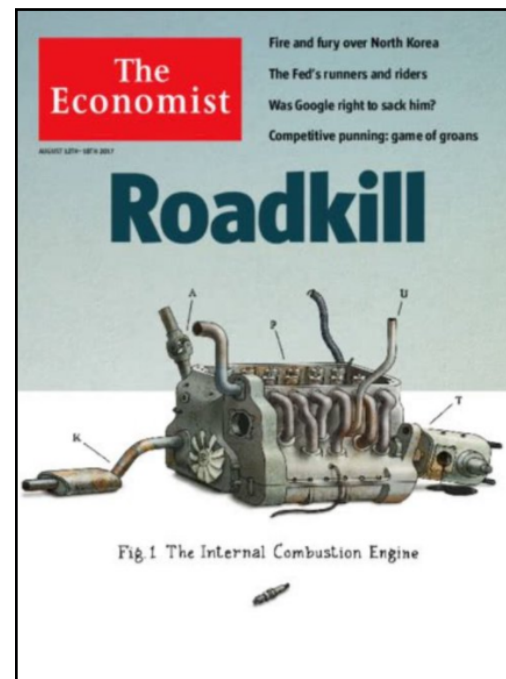
Energy efficiency



Improved health and pollution



Reduced global emissions

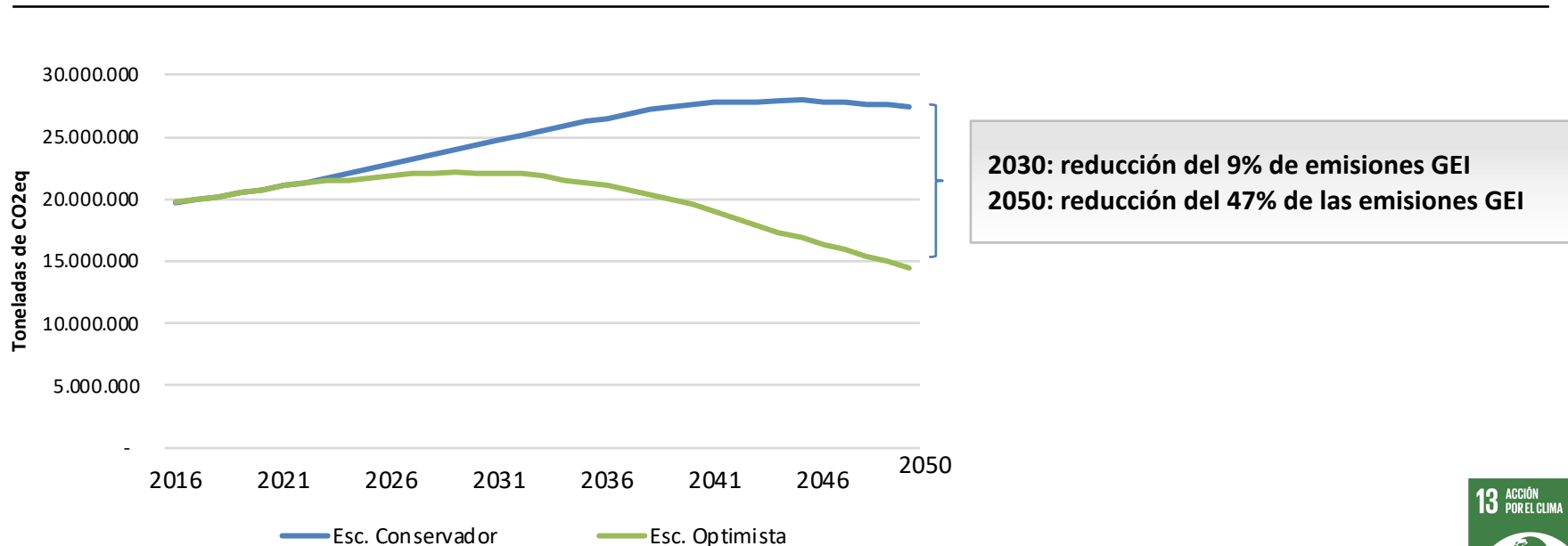


Fuente: The Economist

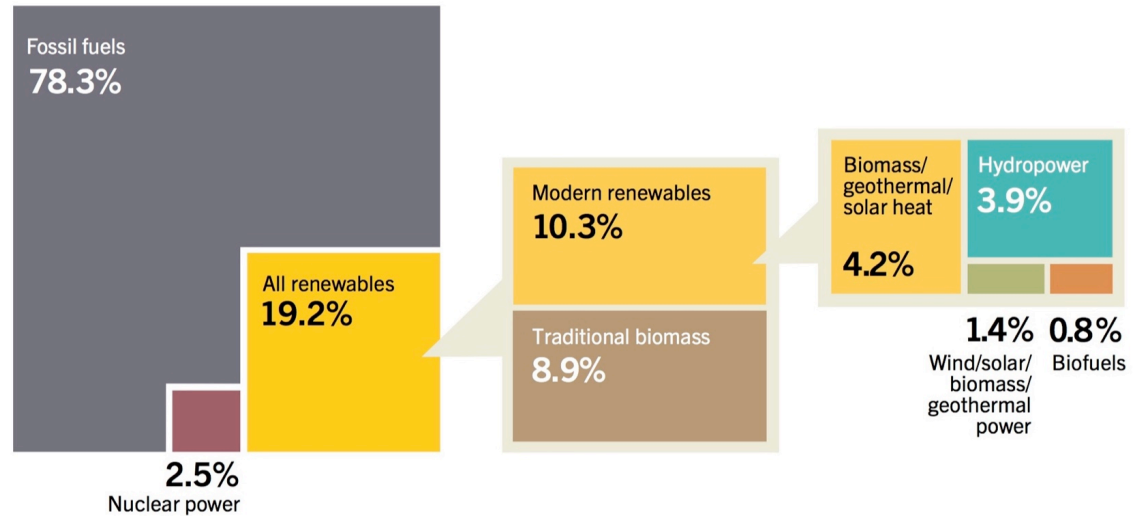
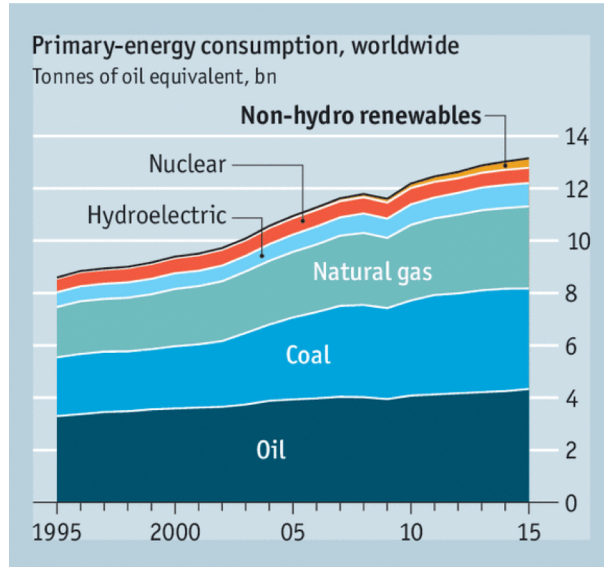
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Electric mobility will help stop and eventually reverse the increase of global emissions of transport

Tons of CO2 eq



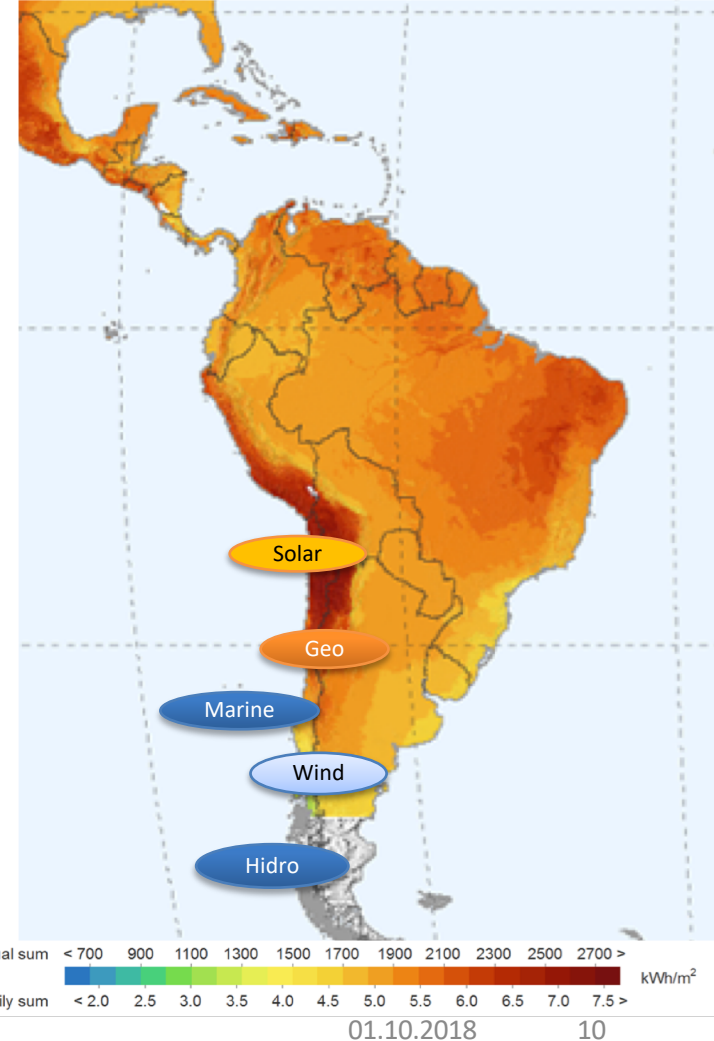
Less than 20% of global energy today comes from renewables



Fuente: Consumo final de energía, 2014. Renewables 2016 Global Status Report. REN21

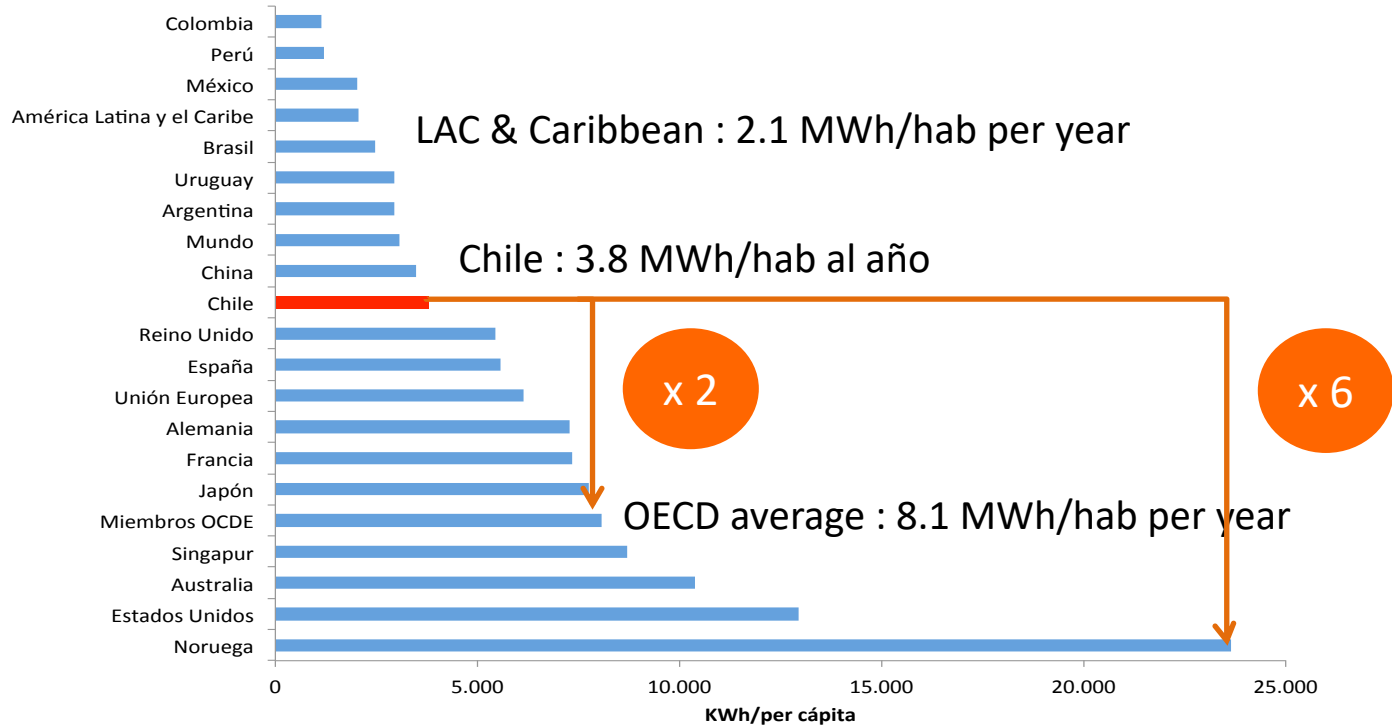
LAC and Chile are endowed with a vast and diverse sources of renewable energy

- **Solar:** Chile: estimated penetration of 20 GW by 2050.
Total potential of more than 2000 GW
- **Wind:** Chile estimated penetration of 20 GW by 2050
- **Geo:** Chile estimated penetration of 2 GW of 2050
- **Hydro:** additional potential of 16 GW



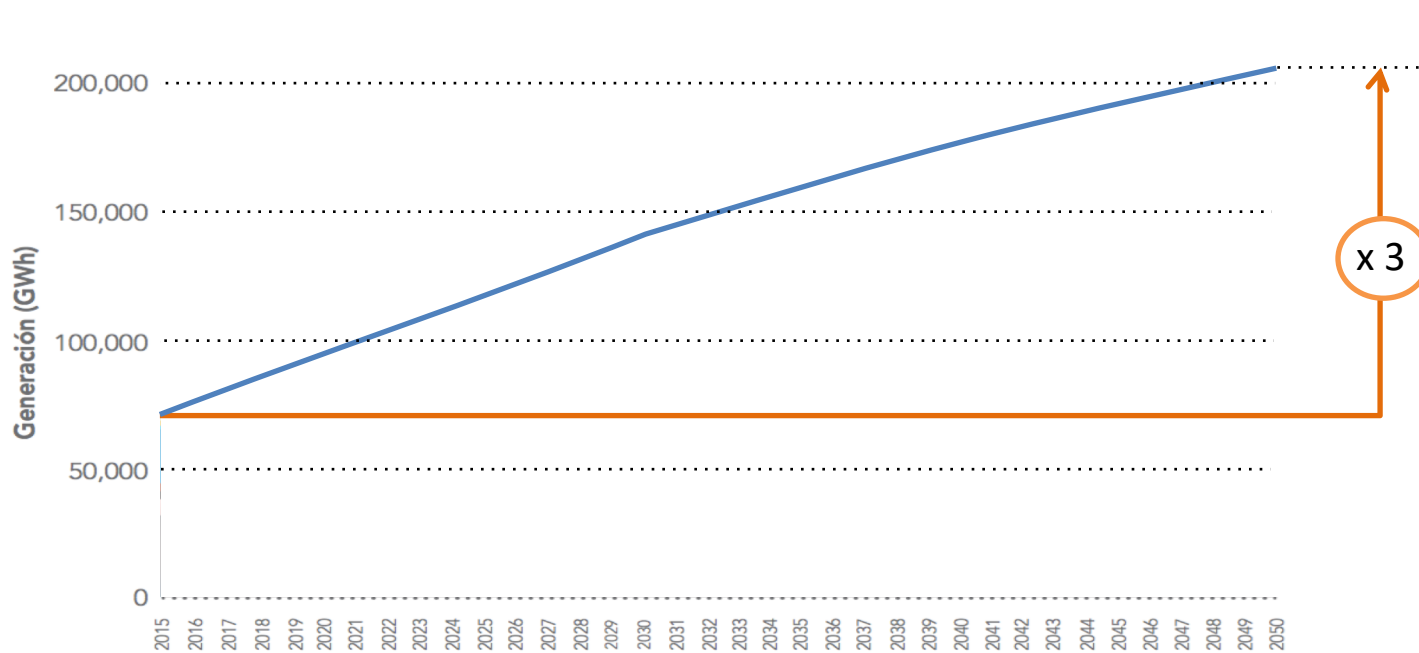
Source: El potencial de eólico, solar e hidroeléctrico de Arica a Chiloé, Ministerio de Energía, 2014

Latin America has still a large gap in per capita electricity consumption compared with OECD countries



Source: World Bank, 2015

Chile's Long Term Energy Policy projects a 2 to 3 fold increase in electricity consumption by 2050...

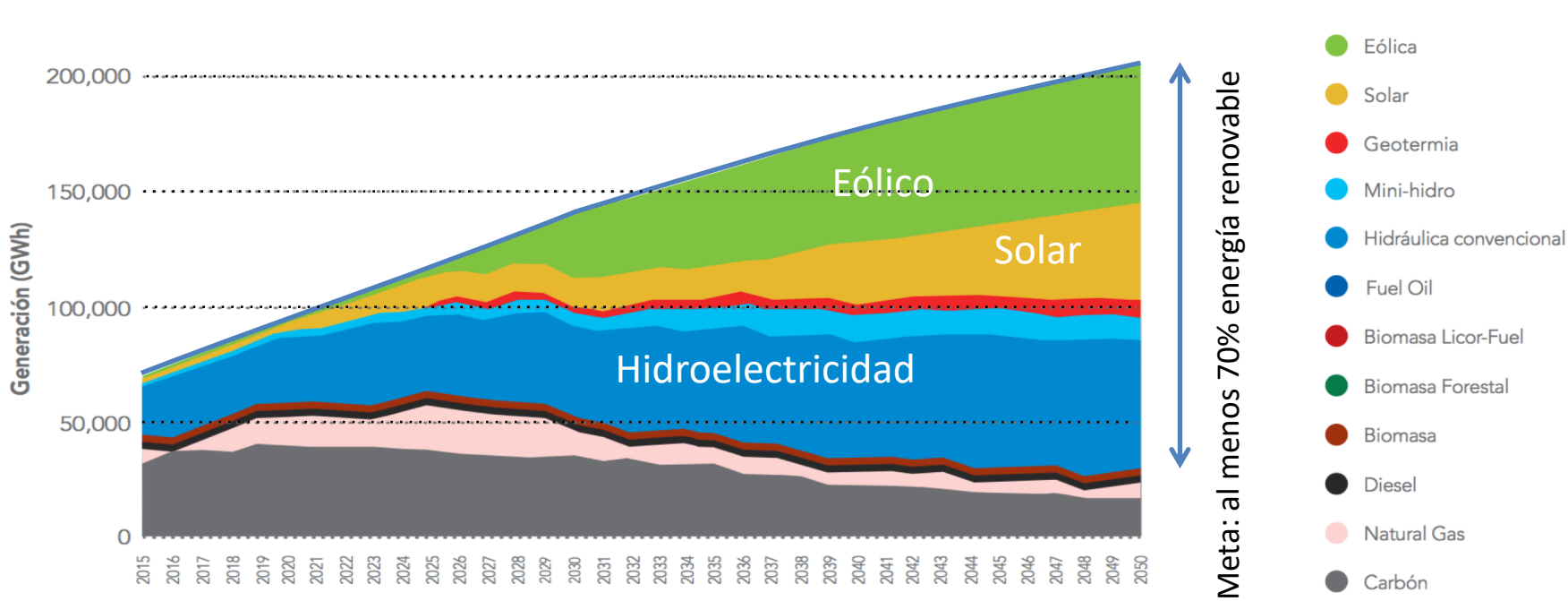


Fuente: Escenarios de demanda, Hoja de Ruta Energía 2050

1 TWh (terawatthora) = 1.000 GWh (Gigawatthora)

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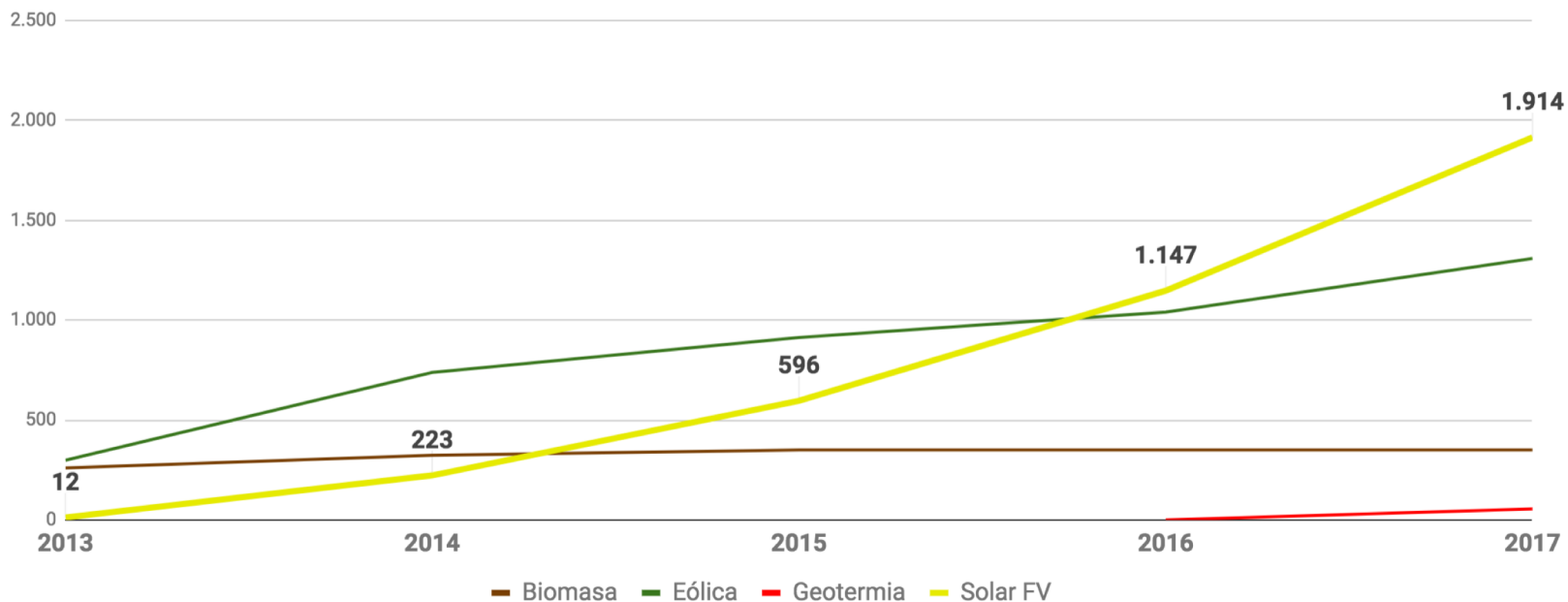
...and in 2015 set a target of 70% renewable (from current 43%) electricity by 2050, but in the mean time...



Fuente: Escenarios de generación, Hoja de Ruta Energía 2050
 1 TWh (terawatthora) = 1.000 GWh (Gigawatthora)
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... solar PV capacity passed from 12 MW in 2013 to almost 2.000 MW at the end of 2017, an annual growth of 255%, and...

Evolución solar, eólica, biomasa y geotermia



Fuente: Elaboración propia en base a información de Coordinador y CNE

...in 2018 through a voluntary agreement between Government and the generators operating coal plants, Chile started a decarbonization process of our electric grid, and...



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GOBIERNO Y GENERADORAS ANUNCIAN FIN DE NUEVOS DESARROLLOS DE PLANTAS A CARBÓN

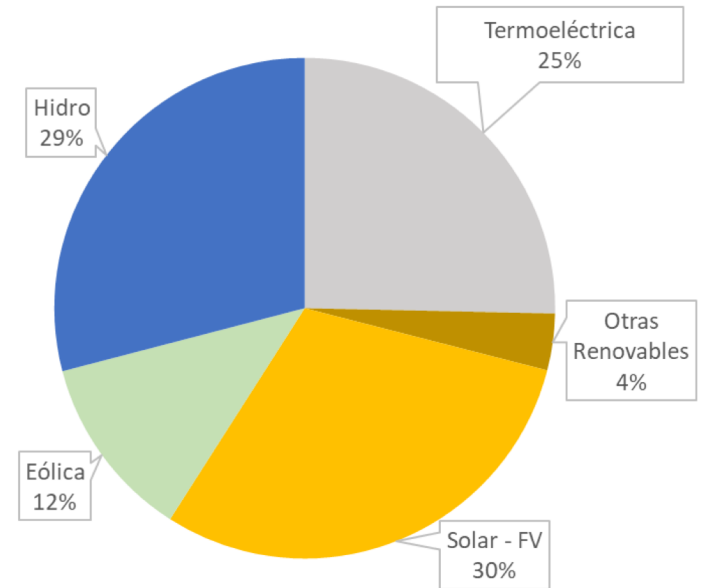
Se constituye además un grupo de trabajo para analizar y definir condiciones y un cronograma para el cese programado y gradual de generación eléctrica a carbón en el marco de la Política Energética 2050.



...our most recent studies estimate that already by 2030, 75% of power generation will be renewable.

- New capacity will be mainly VRE (Variable Renewable Energy): solar PV and wind.
- Installed capacity would increase between 30% (+8.8 GW) and 65% (+16 GW)
- By 2030 solar would become the number one source of renewable electricity, surpassing hydro, and thermal generation would be only 25% (from current ~57%)

Matriz de generación proyectada al 2030⁽²⁾



Source: Estudio Análisis de largo plazo del SEN considerando ERV, PSR Moray, 2018.
Resultados para escenario DMCM: demanda media, costos medios.

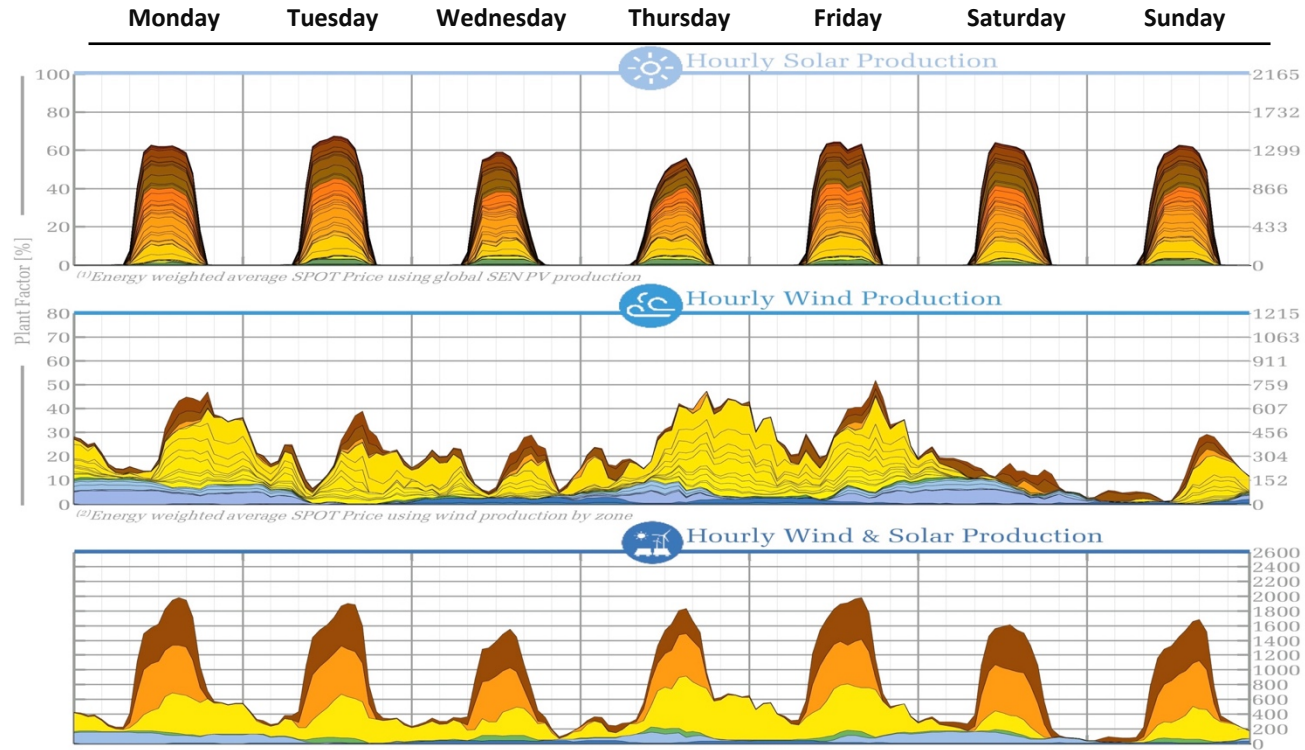
A tall, narrow solar tower stands in the center of a vast, flat desert landscape. The tower is illuminated by the low sun, casting a long shadow. The horizon is low, and the sky is a clear, pale blue with a few wispy clouds. The ground is a mix of brown and tan, with some small pools of water or wet patches. In the foreground, there are several thin, vertical poles or markers.

‘A SOLAR SAUDI ARABIA’

While Trump promotes coal, Chile and others are turning to cheap sun power

The great challenge will be to manage massive amounts of VRE

Investment and operation of a more flexible grid will be needed



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