

Ministry of Energy

How does Geothermal Energy fit
alongside other Renewables in Chile



Ministerio de
Energía

Gobierno de Chile



GEOLAC 2019 – July, 17th



Chilean energy context

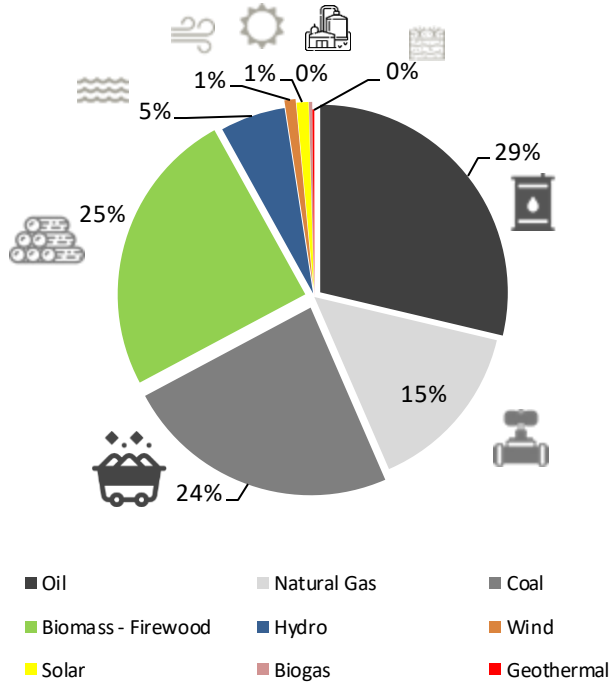
- 17.6 MM inhabitants.
- GDP/capita of USD 22.7 M.
- High dependency from imported fossil fuels.
- Low level of electricity and gas interconnection with the region.
- High renewable potential.



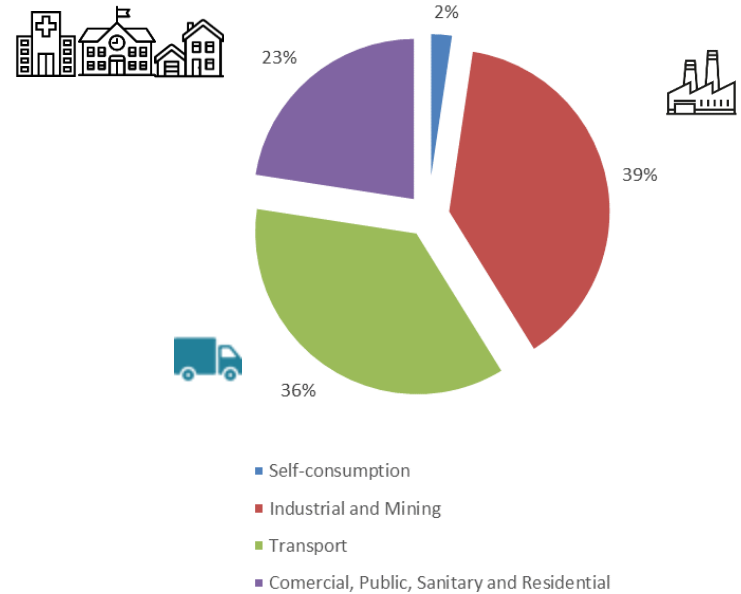


Primary Energy Offer and Final Consumption

Primary Energy Offer 2017



Final Energy Consumption 2017

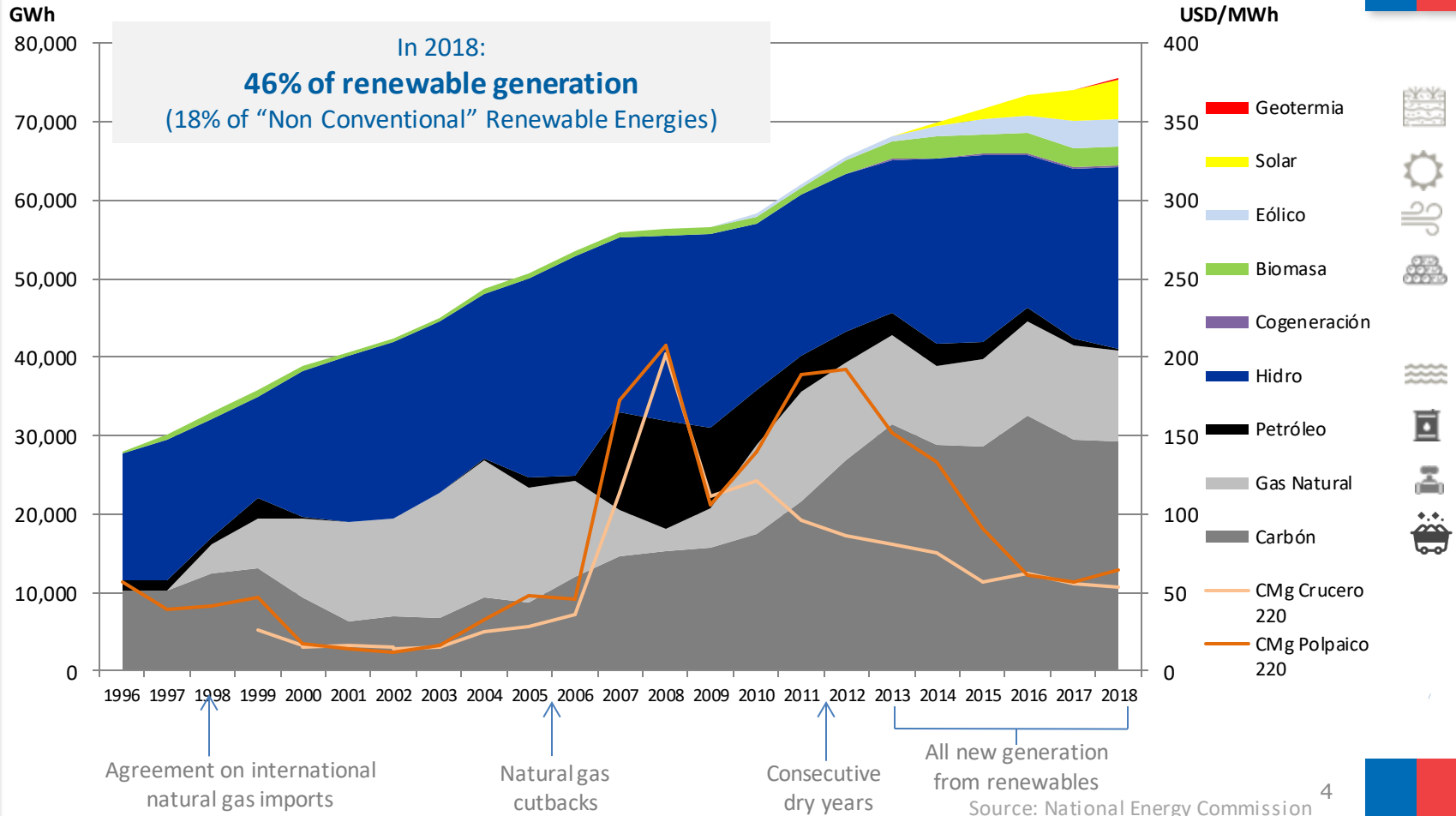


Source: National Energy Balance 2017





Evolution of Electric Generation in Chile





High renewable energy potential

Potential estimated by the Ministry of Energy for the last Long Term Energy Planning process.



Legenda

- Eólico
- Hidroeléctrico
- Subestación representativa
- Fotovoltaico
- Geotérmico
- Área de Reserva de Taltal
- Concentración Solar de Potencia (CSP)

Technology	Potential [GW]
Wind	37
Hydro	6
Solar-PV	1194
Solar –CSP	510
Geothermal	2
Total	1.749

Over **25 GW** undeveloped capacity with environmental approval.

72 times the current installed capacity in Chile

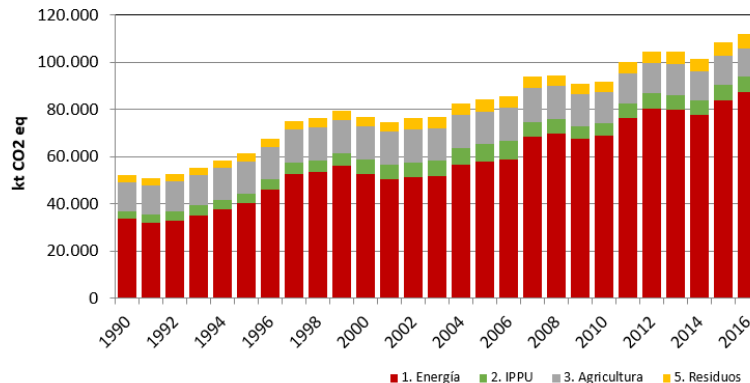


Energy Sector: highest emissions of GHG in Chile

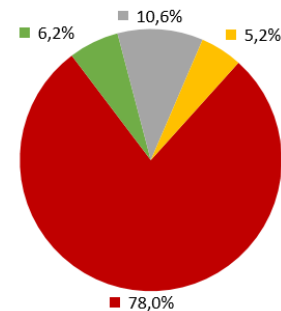


Per sector:

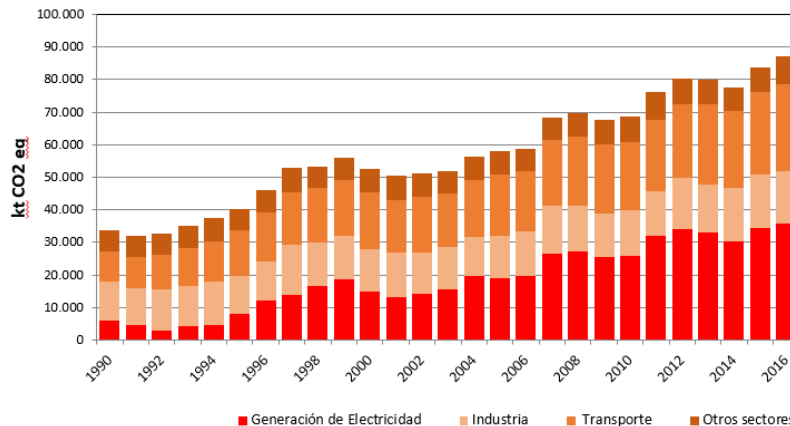
Emisiones nacionales por sector. Serie 1990-2016



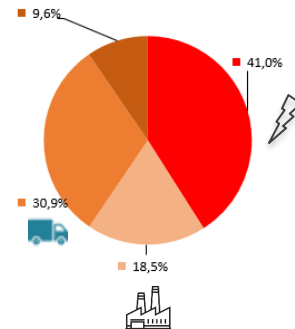
Emisiones nacionales por sector 2016



Per Energy sub-sector :



Emisiones del Sector Energía por sub sector 2016



TIME FOR ACTION

COP25

CHILE
2019

UN CLIMATE CHANGE
CONFERENCE

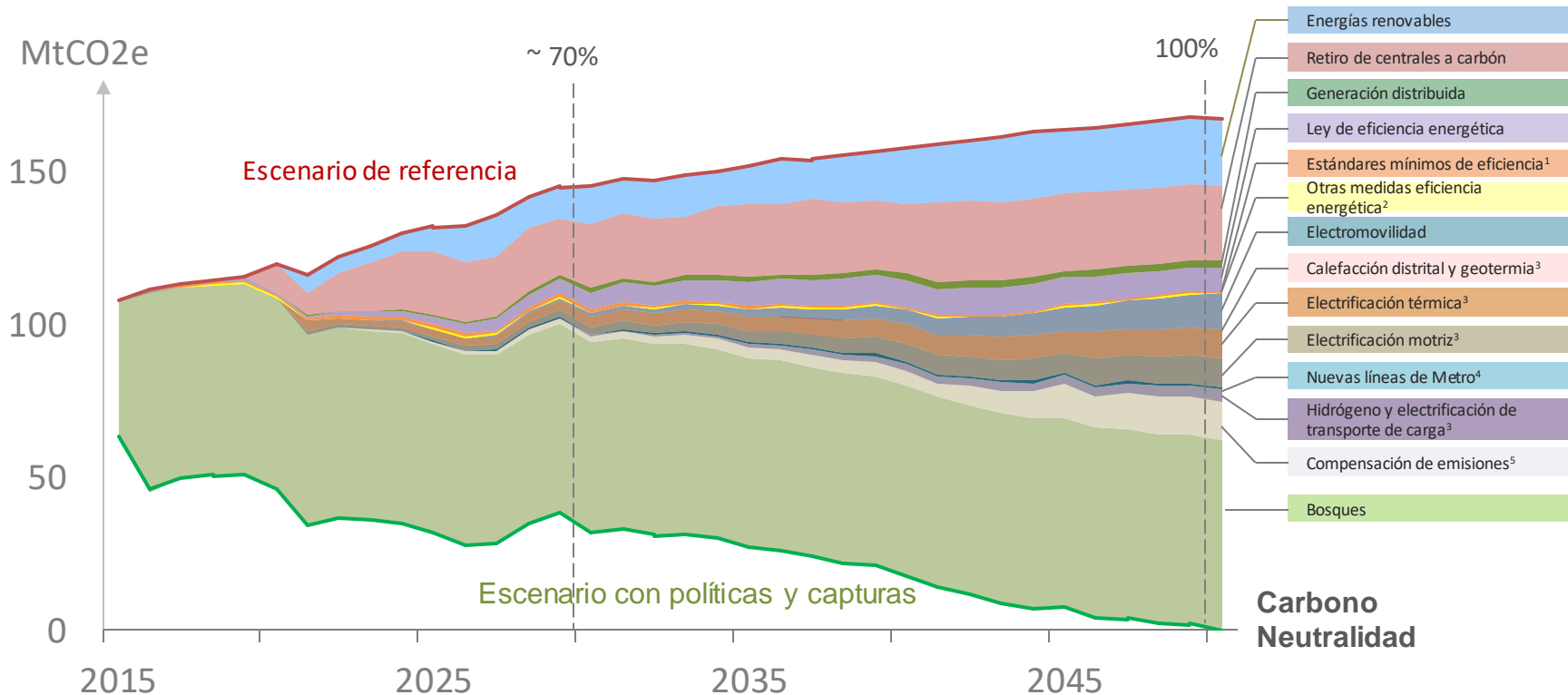


Energy: highest opportunities to lower emissions of GHG in Chile



- Phase out of coal power plants by 2040 (8 will be closed by 2023)
- Actions in transport, heat and cooling used, etc.
- Commitment of carbon neutrality by 2050

Carbon neutrality by 2050



Source: División Ambiental y Cambio Climático, Ministry of Energy

¹ Considera ahorros por estándares mínimos de eficiencia en bombillas, refrigeradores y motores industriales. ² Considera ahorros por recambio de alumbrado público, programa de eficiencia energética en hospitales y reacondicionamiento térmico de viviendas. ³ Medidas que deben ser estudiadas en mayor profundidad para su correcta cuantificación. ⁴ Considera entrada de líneas 6 y 3; extensiones de línea 2, 3 y 4; y nuevas líneas 7, 8, 9 y 10. ⁵ Medida aún en estudio, este sistema a nivel nacional aún está en proceso de diseño y análisis.



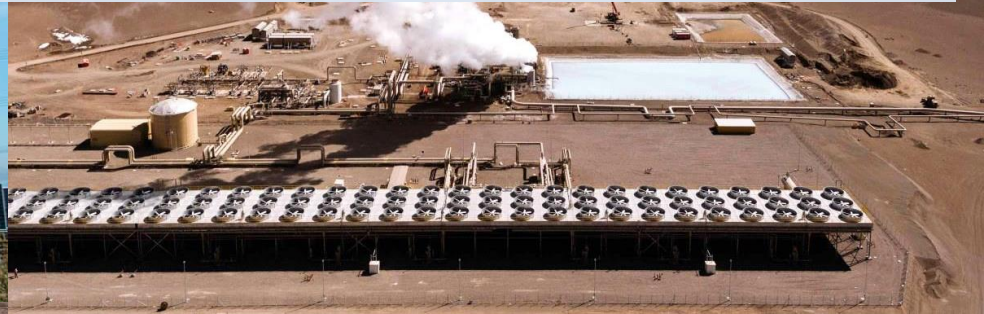
Renewable Future

- According to different studies, the future development of the energy matrix is forecasted to remain renewable.
- We are moving forward on decarbonization.
- Transport, H₂, heat, and cooling electrification are a new opportunities for renewables.



- Chile ranked #1 on the 2018 Climatescope ranking of attractive emerging markets for clean energy investments.

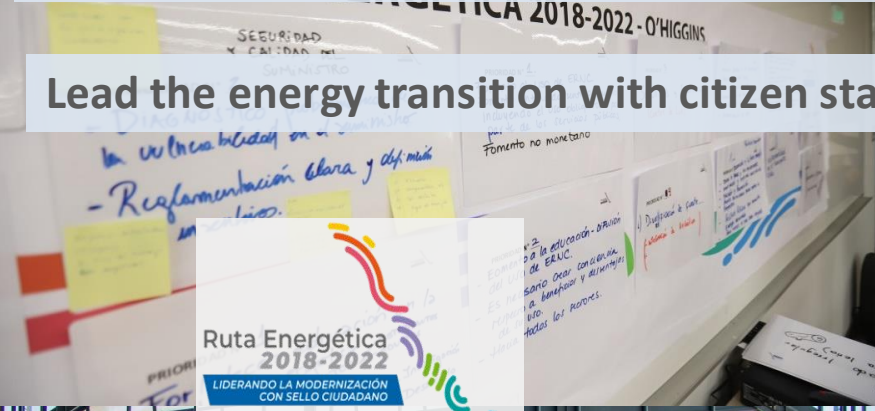
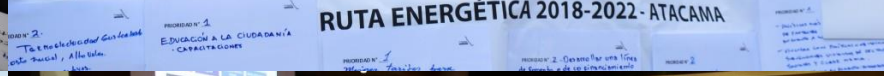
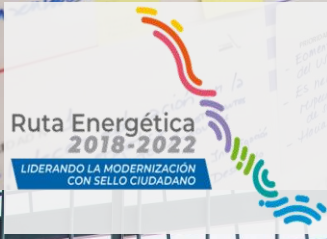
We must ensure integration of massive amounts of secure, efficient and sustainable energies in the long term.





Energy Roadmap 2018-2022

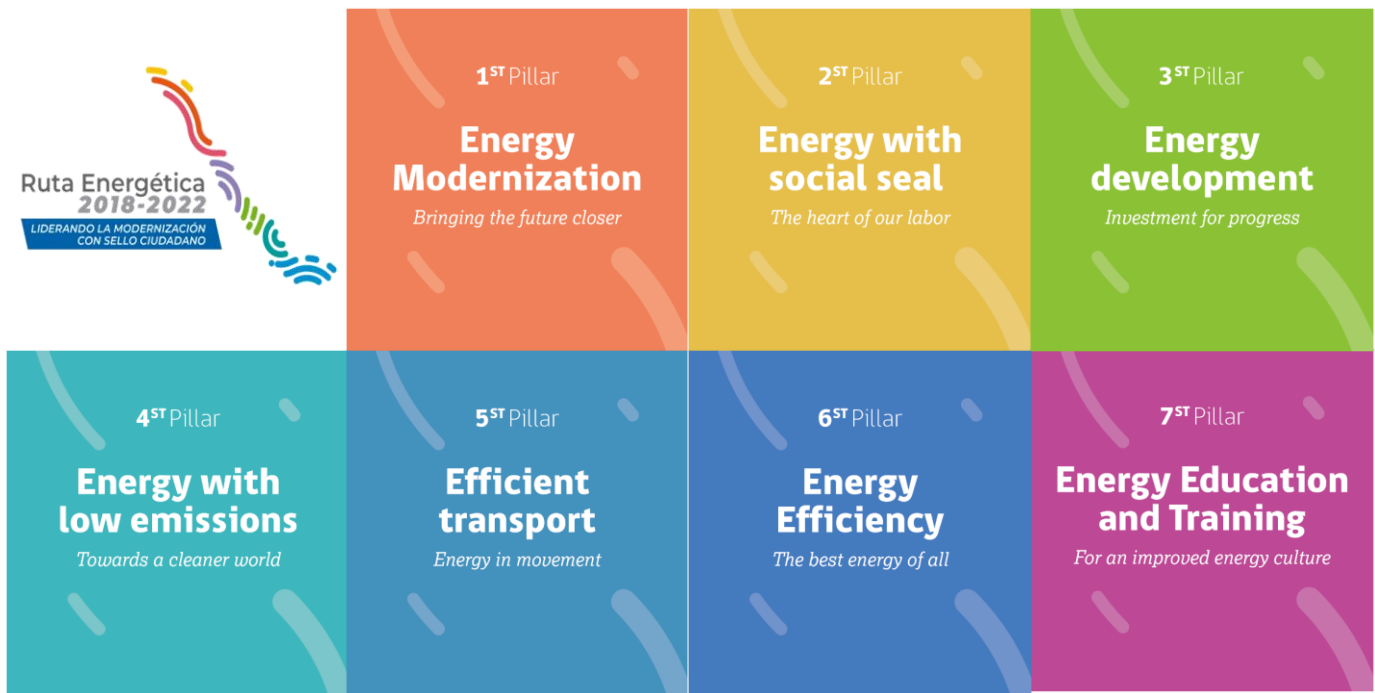
Lead the energy transition with citizen stamp.





Energy Roadmap 2018-2022

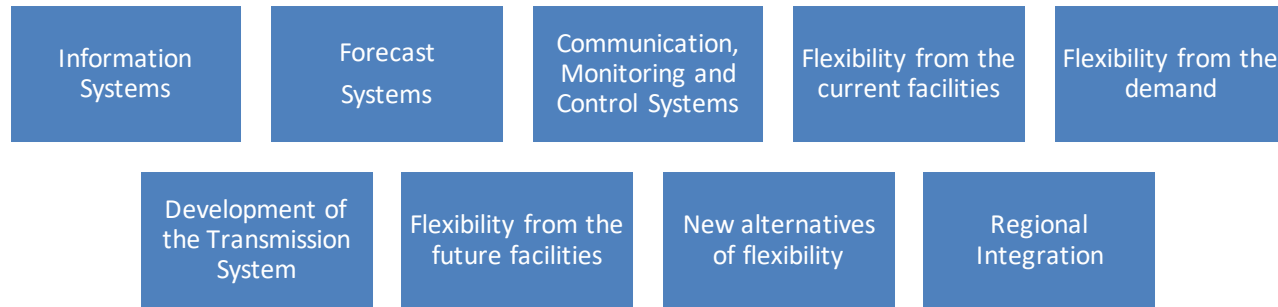
Lead the energy transition with citizen stamp.





Towards a sustainable energy transition

- Allow development of **flexibles systems** that allow integration massive amount of renewables.



- High quality projects not only from technical view, but also **solid involvements with communities**.
- **Allow development of new solutions** (Distributed Generation, Storage, Electromobility, Demand Side Management, Energy Efficiency, Internet of Things, Smart Grids, District Energy, etc.)

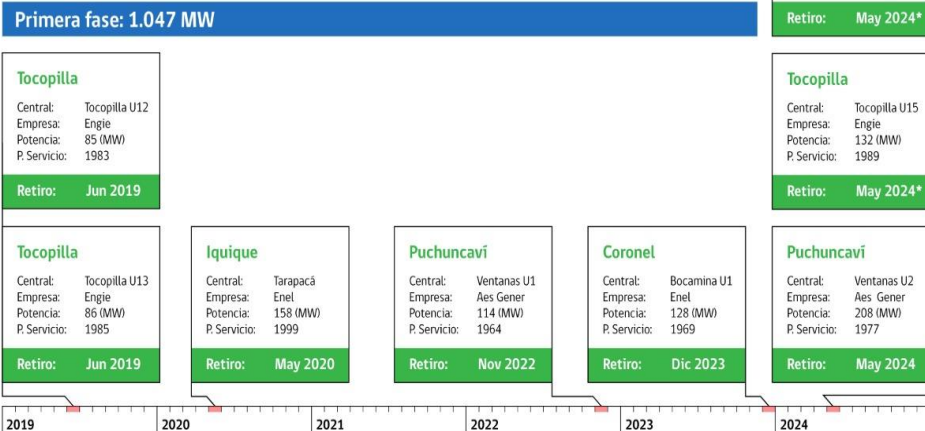


Phase out of coal plants

- Target to phase out or reconvert all 28 plants by 2040
- Without additional costs or subsidies
- 8 plants will be closed by 2023 (1.047 MW)



First phase coal power plants decommissioning schedule 2019 - 2024

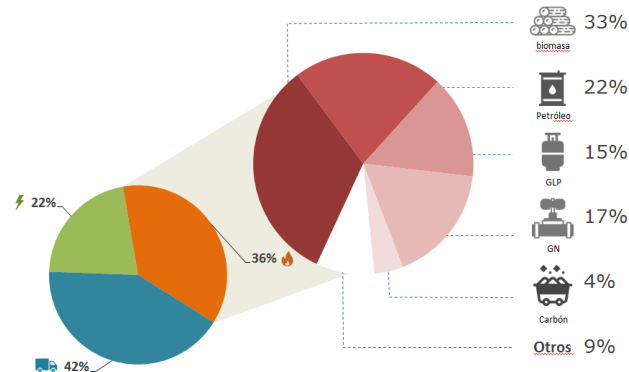




Modernizing the energy sector

Thermal uses (Heat and Cooling)

- Represents 36% of total energy consumption in 2017.
- Opportunities for industrial and residential sector.
- Renewable Thermal National Strategy under development during 2019.



TEMUCO



COYHAIQUE



District heating

An opportunity to modern heat and cooling. Lowering emissions is needed (!)

- Development of regulatory framework
- Development of information tools (e.g. heat maps)
- Support in implementation of projects



Modernizing the energy sector

Efficient Transport & Electromobility

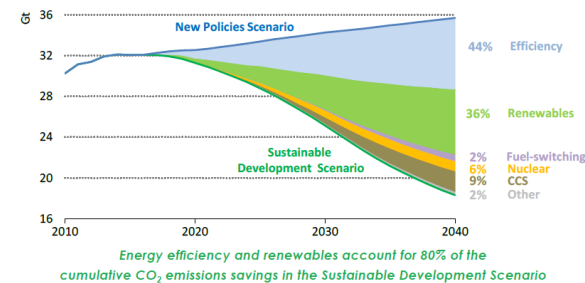
- Represents 36% of total energy consumption and 24% of greenhouse gas emissions.
- 99% of transport relies on fossil fuels
- Agenda: EE in Transport, Regulation for EV, Information, Pilot Projects and Public Transport, Charging Infrastructure



200 new electric buses for public transport in Santiago – Feb 2019

Energy Efficiency

- Project of Law under discussion in the Congress
- Includes energy efficiency policies on industry, households, transport, public sector, among others.





(part of) current work on Legislation

- Modification of **Distributed Generation Law**



APPROVED IN 2018



- Modification of **Geothermal Concessions Law**



UNDER DISCUSSION
IN THE CONGRESS



- **Energy Efficiency Bill.**

- Modification of **Transmission Law**



- Reform in **Distribution Sector.**

SOON TO BE DISCUSSED
IN CONGRESS



- **Biomass and Firewood Regulation Bill**





Energy Roadmap and Geothermal Energy

- **Amendments to the Law 19.657** about geothermal concessions.
- **Digitalization** of concessional system.
- **Flexibility Strategy** for the power sector.
- Review and update of the **Capacity Payment** mechanism.
- To boost **Direct Uses of Geothermal Energy**.
- Enhance **information systems** about renewable resources.
- **Carbon plants phase out** and Carbon Neutrality.



Our vision for the future

Lead the **energy transition**, not only to adapt to the technological changes, but to **accelerate its development and become a leader** of this process in the region.

Social and citizen stamp has to be part throughout the process



Thank you



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Outline

- Chilean energy context
- Energy Roadmap 2018-2022: towards a sustainable energy transition
- Decarbonization

Next Energy Auction in November 2019

- Open to all technologies.
- Delivery from 2025.
- 3500 GWh per year.
- 16-year contract.
- 3 time-blocks.
- Estimated sales over USD 100 million per year.

Transmission Auctions

- Started in March 2019.
- Expected investment above USD 409 million.
 - 14 projects of new infrastructure for USD 289 million.
 - 42 projects of infrastructure expansion for USD 119 million.
 - 20-year fixed tolls.



(Some) relevant topics in our agenda

- Modernization of Energy Markets
- Development of Renewable Energies and massive integration into the power system
- Efficient Transport
- Energy Efficiency
- Education y Capacity Building

