Chile's Policy for Decarbonization and Expectations for JCM

Webinar on the Joint Crediting Mechanism (JCM) Implementation in Chile – Accelerating the Transition towards Decarbonization through JCM
Octubre 2022

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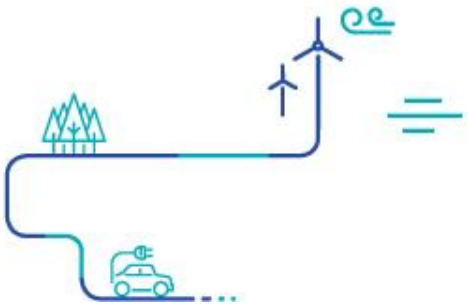
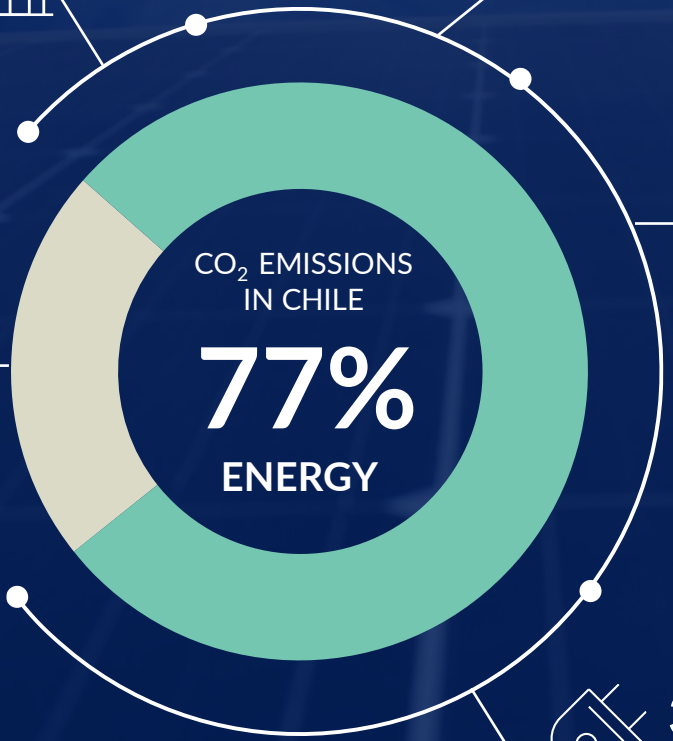
Ministerio de Energía

Gobierno de Chile

Energy sector context and scenarios



Current status of emissions in the energy sector, 2020



14%
INDUSTRY
Mining, Pulp&paper, others.

7%
BUILDINGS
Residential, others.

1%
FUGITIVE EMISSIONS

26%
TRANSPORT
Road, aviation, maritime, others.

6% WASTE
6% INDUSTRIAL PROCESSES
10% AGRICULTURE

30%
POWER SECTOR
Coal/GLNG and others.

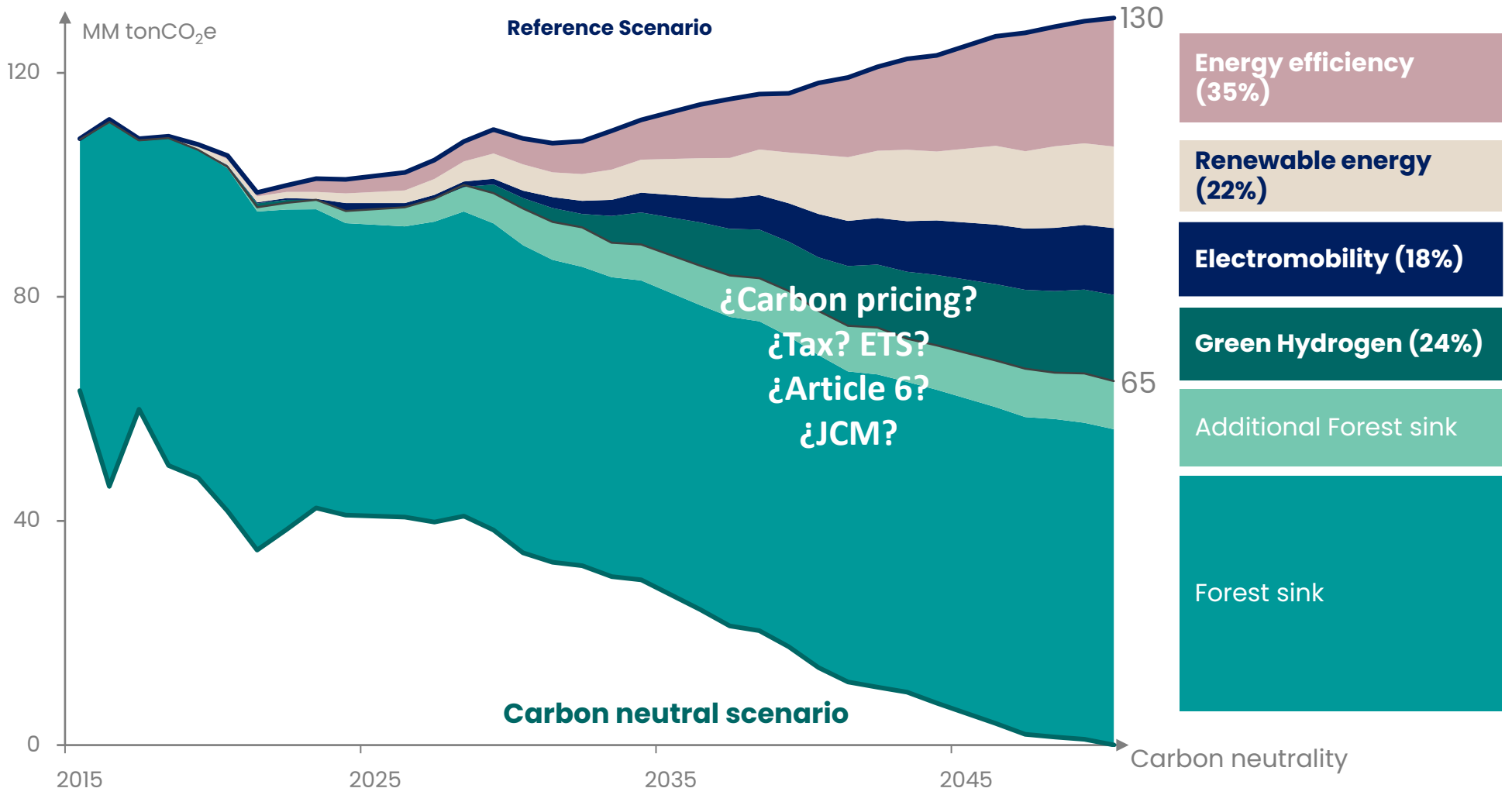
National GHG Emissions Inventory GEI-Chile 2020
Ministry of Environment

CO_2e

All references to CO_2e refer to greenhouse gas (GHG) emissions as:
- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF6)

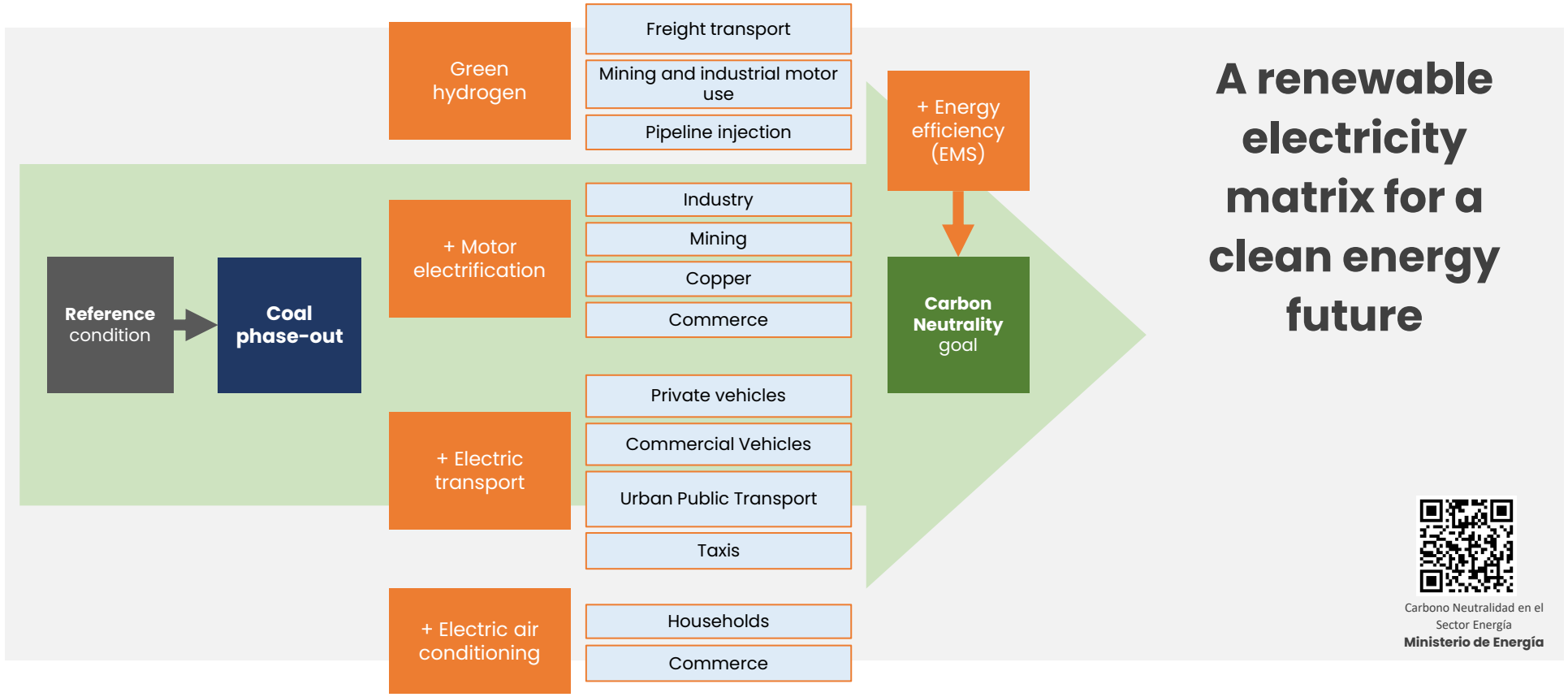
Measured in units of CO_2 equivalent

Chile towards carbon neutrality



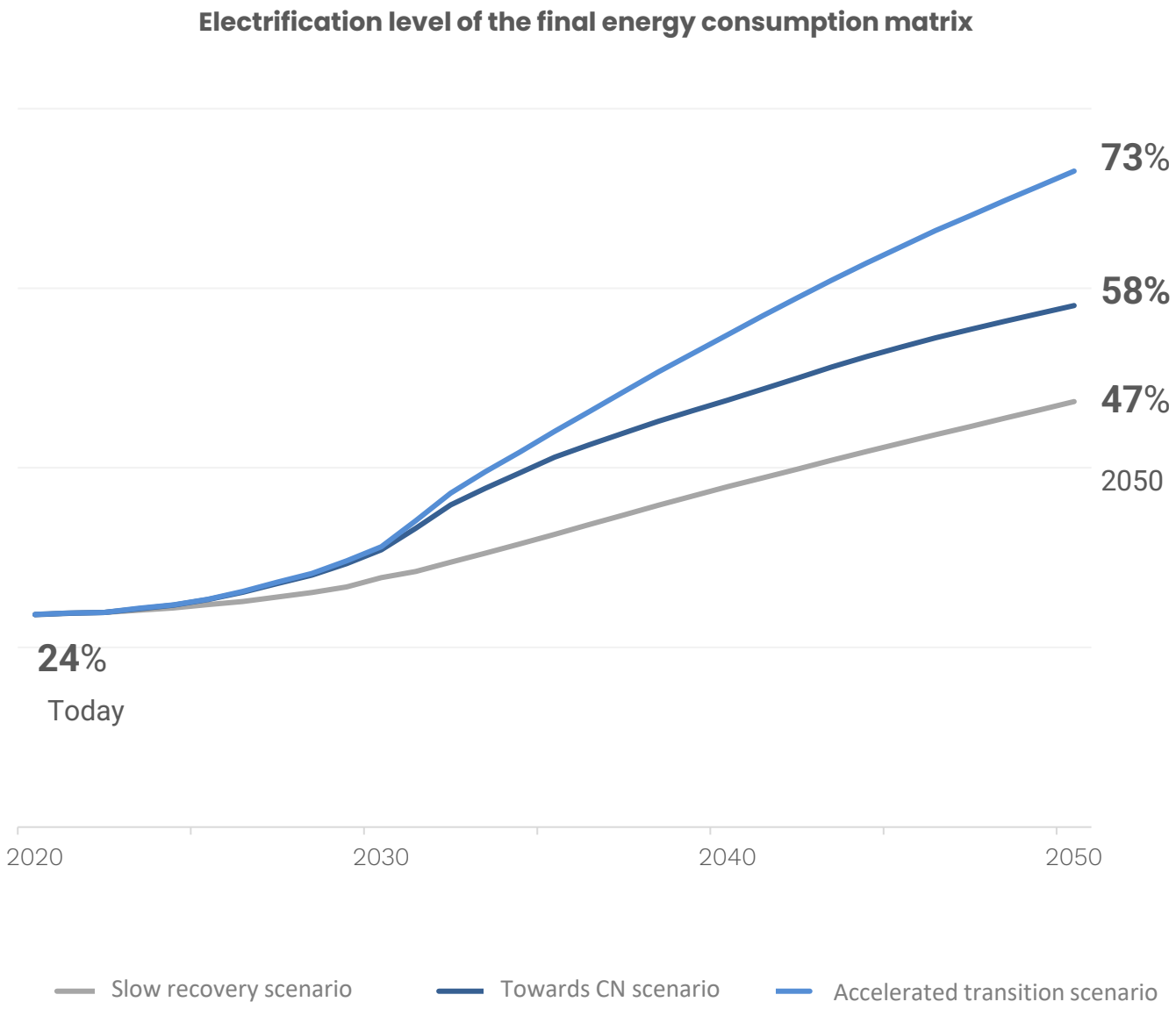
- Carbon neutrality before 2050
- NDC 2020: peak by 2025, carbon budget and absolute reduction goal (non-conditional) by 2030
- Long-term Climate Strategy
- Climate Change Law
- Coal phase-out

Coal-fired power plant retirements as an enabling measure



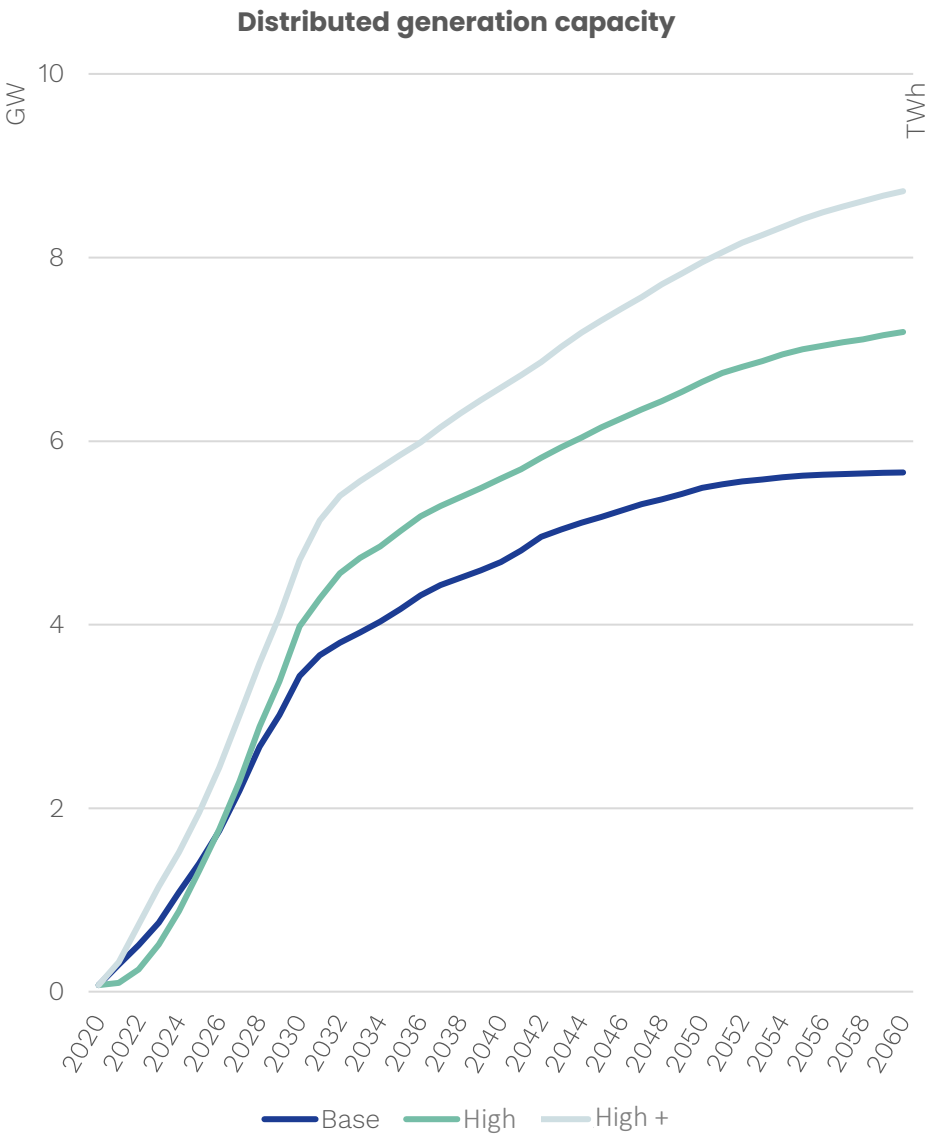
EMS: Energy Management Systems

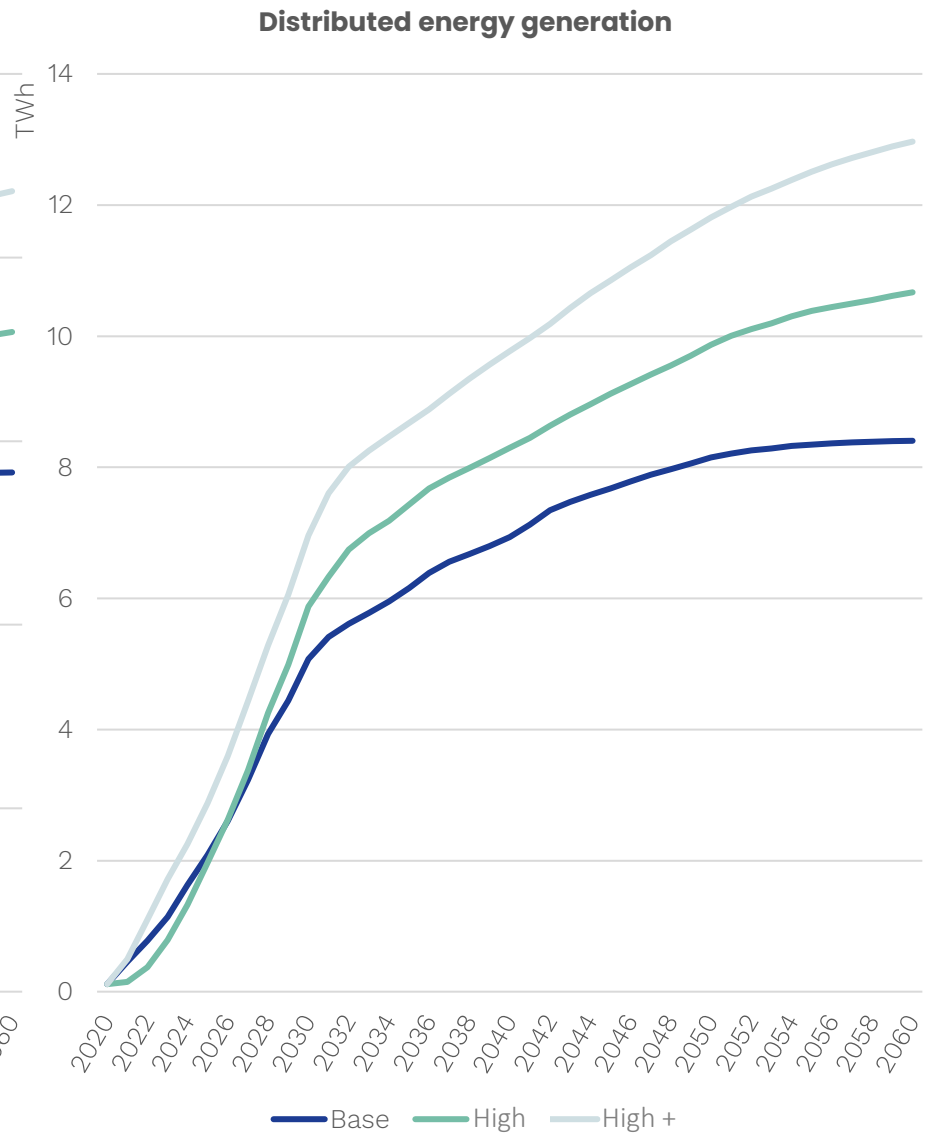
Electrification of energy consumption



Energy uses in Chile will be –directly and indirectly- electrified

Distributed generation forecasts

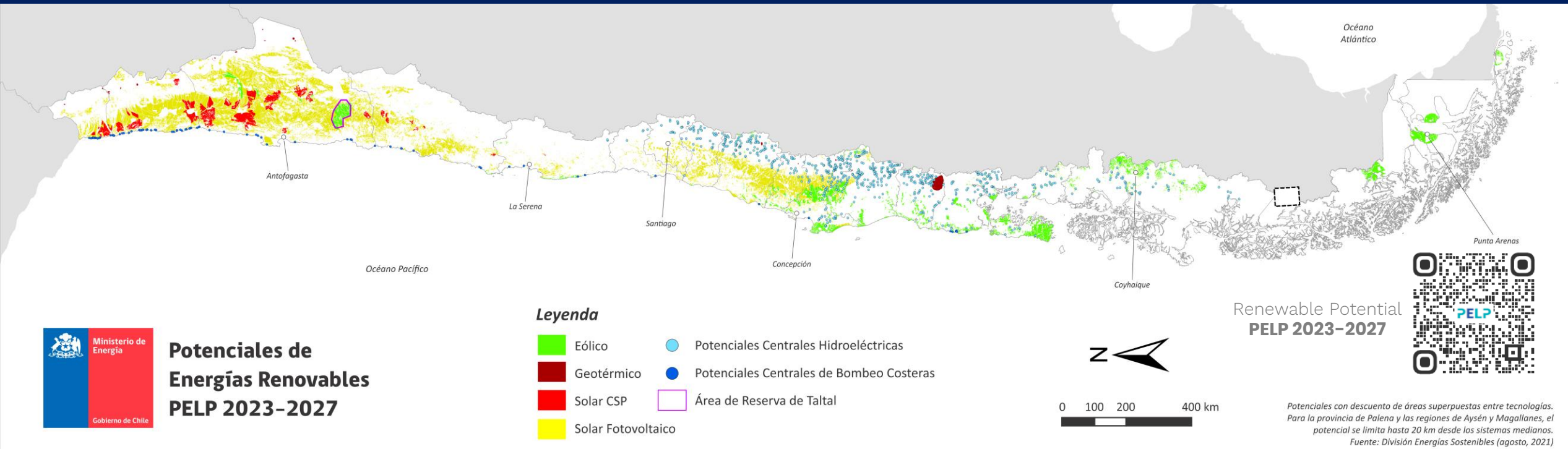




Energy close to consumption

Technology for energy supply in isolated areas

Renewable Energy potential in Chile



Technical potential

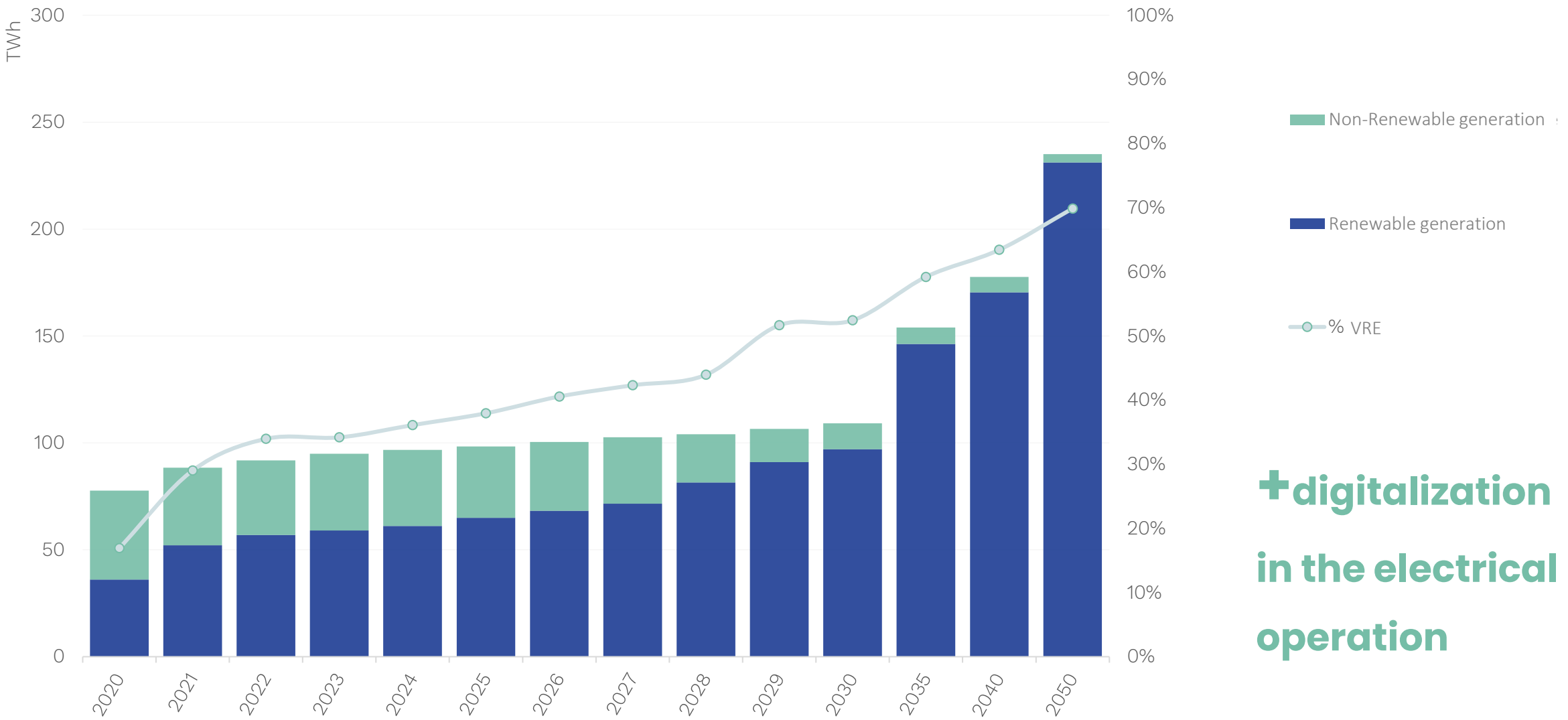
+80 times current installed capacity

Source: Ministry of Energy, August 2021

Tecnology	Potential (GW)
Solar FV	2,086
Wind	81
Solar CSP	152
Geothermal	4
Hydroelectricity	10
Hydraulic pumping	42
Total	**2,375**

Sustainable development requires territorial harmony

Variable Renewable Energy (VRE) Projection

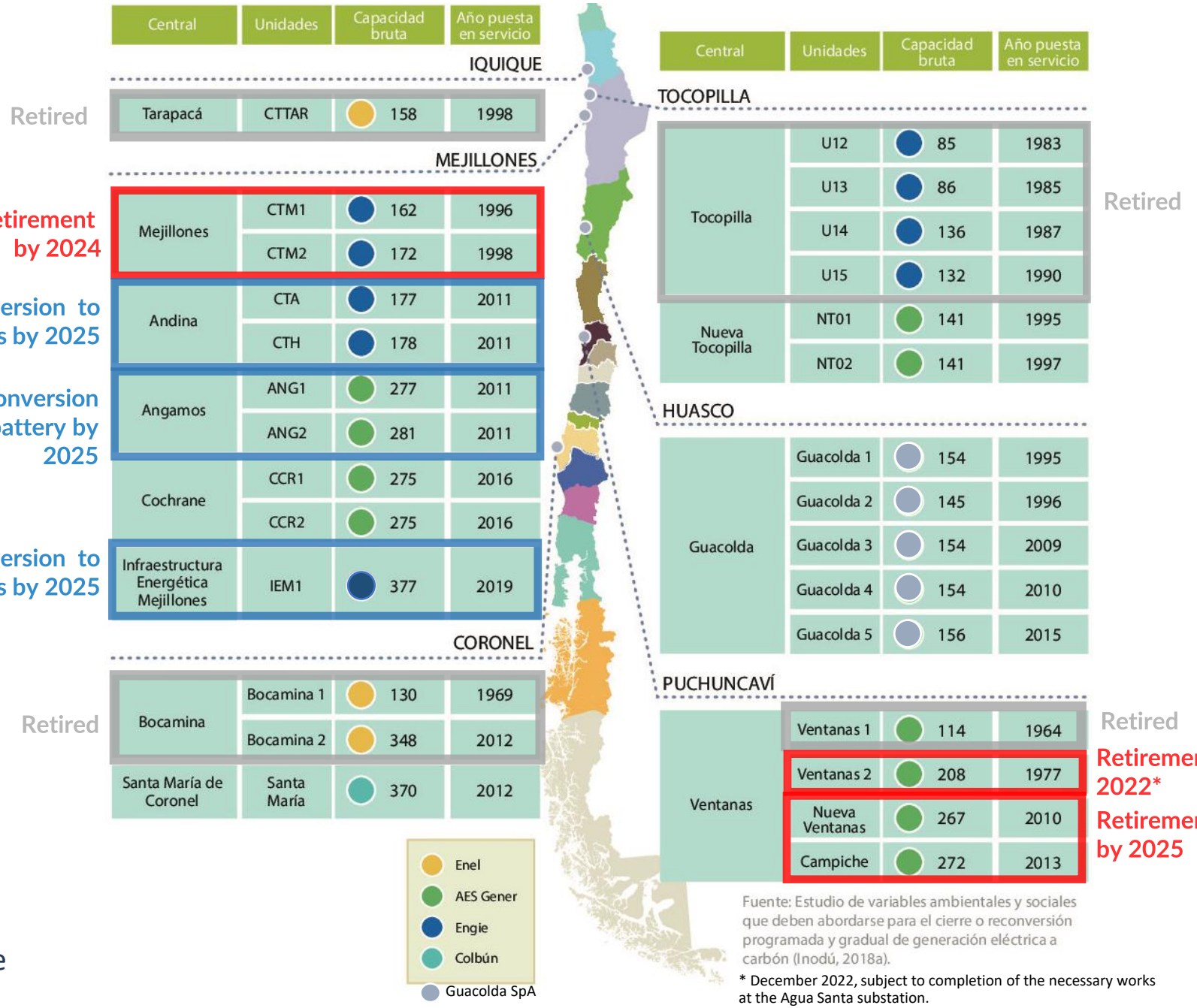


+digitalization in the electrical operation

Phase out to date

- From June 2019 to October 2022, **8 power plants** have been retired.
- By 2025 **13 power plants** will be available for retirement and 3 will be reconverted to other fuels, representing 65% of Chile's coal-fired power plants.

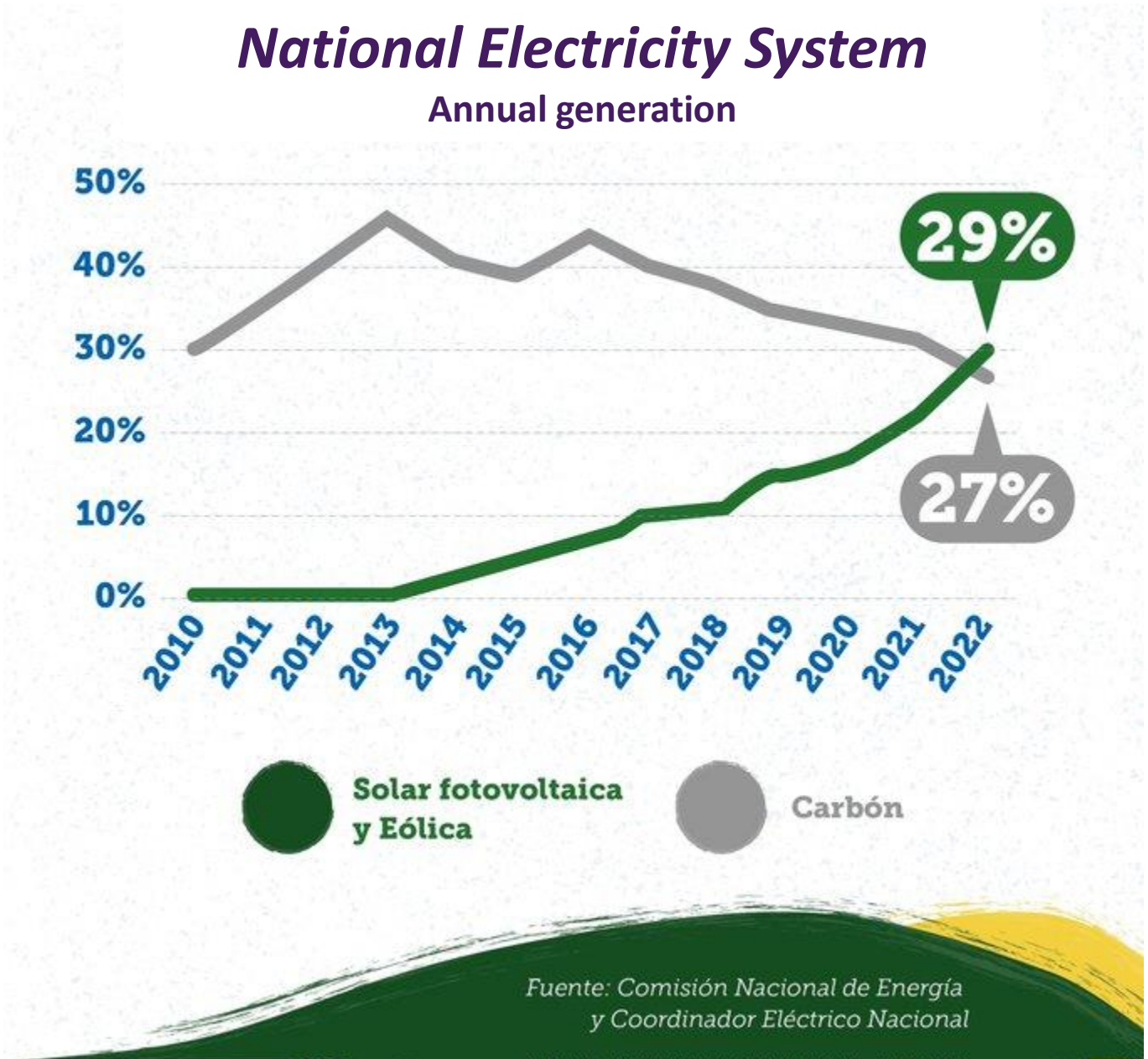
Plants with no retirement date are planned to be phased out no later than 2040.



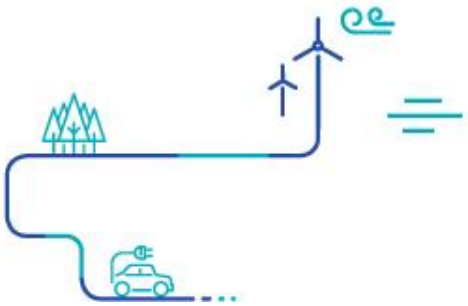
Fuente: Estudio de variables ambientales y sociales que deben abordarse para el cierre o reconversión programada y gradual de generación eléctrica a carbón (Inodú, 2018a).

* December 2022, subject to completion of the necessary works at the Agua Santa substation.

Wind and solar generation surpassed coal!

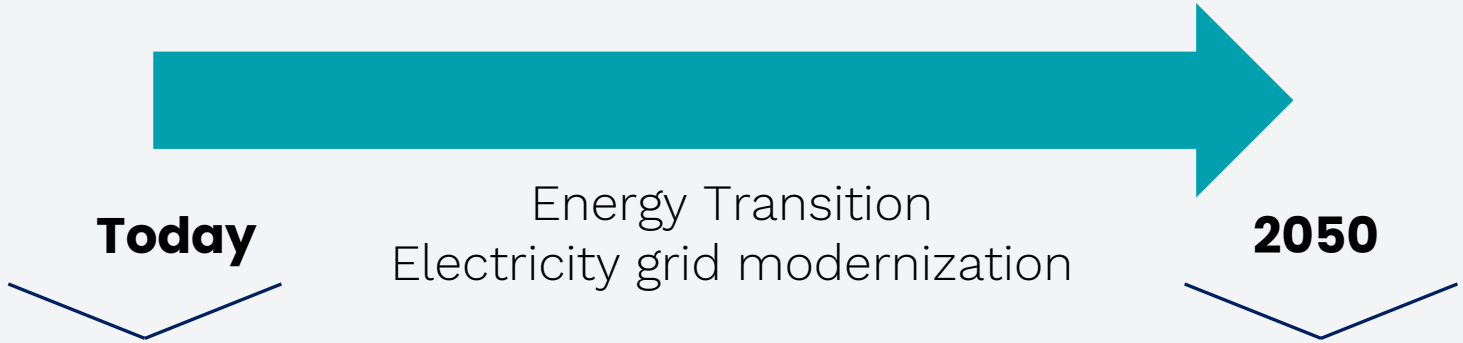


Challenges



Towards the power grid of the future

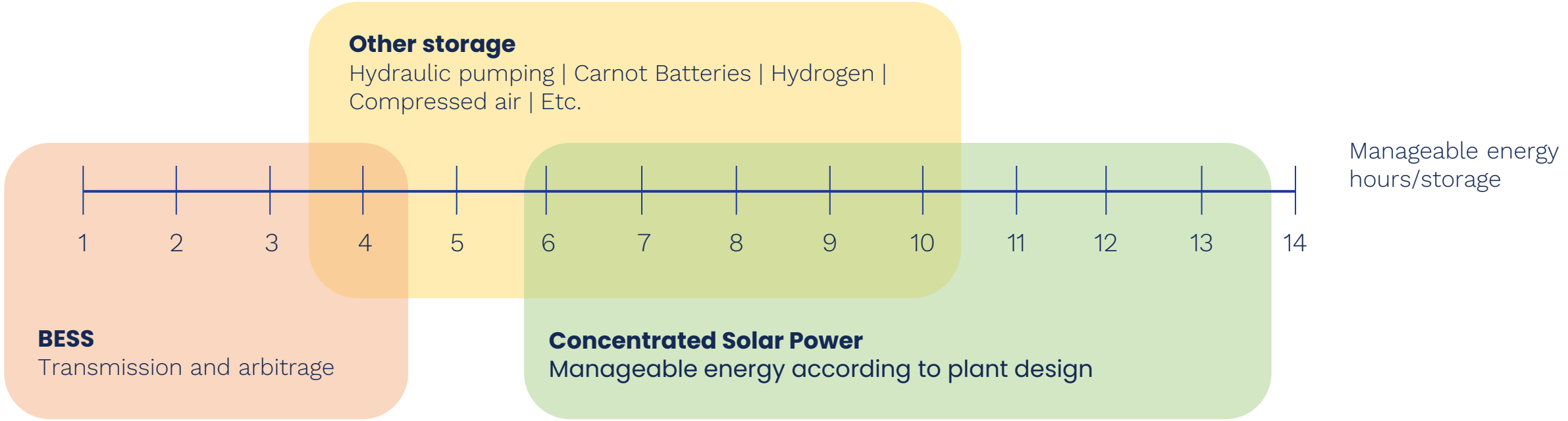
Grid-forming technology



- Frequency control.
  Inertia + CPF + CSF
  Resources in large power plants
- Predominance of electromechanical phenomena associated with rotating machines.
- Classic operation and manual allocation of safety resources.
- High short-circuit level.

- Frequency control.
  CRF and centralized control
  Distributed resources
- Predominance of electromagnetic phenomena and switching power electronics devices.
- Digitization requirements (bigdata, automated operation).
- Lower short-circuit levels.

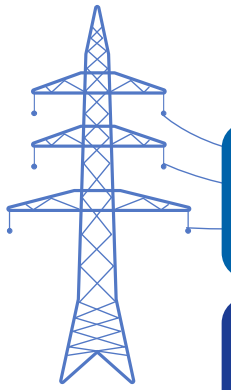
Incorporation of storage and manageable energy



Key to energy transition
24/7 Renewable portfolio

BESS: Battery Energy Storage System

Criteria for power transmission



Expansion of the Electric Transmission System

OPTIMIZATION Technologies	REINFORCEMENT	EXPANSION
Grid Booster Short Life Batteries	Voltage increase	New national transmission lines
FACTS devices	Conductor replacement	New zonal transmission lines
DLR devices	Repowering	

+clearances

Key elements in decarbonization

- **Regulation**
  - GHG and local emissions
  - Technology promotion (storage, biofuels, H_2V, RE)
  - Infrastructure and modernization of electricity system operation
  - International commitments (Paris Agreement)

- **Incentives for transition**
  - Economic instruments (Art6, JCM, others)

- **Investment**
  - Public-Private Partnerships
  - Accelerate project approval

- **Social acceptance**
  - Just Transition
  - Territories and communities

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