SPAIN COGENERATION SITUATION

2026 SMART INVESTMENTS FOR 1.200 MW (AT LEAST)

PART I

SEVILLE FORUM ON MACHINERY FOR DECARBONIZATION

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January 20, 2026
Seville, Spain

Agenda

Time	Tuesday – January 20th, 2026 (Day 1)
5:05 PM	Panel Session – Lightning Talk (Lead: Karl Wygant, Ebara Elliott Energy) • Tim Allison, SwRI • Wayne Bliesner, ADI Solar Corporation • Renaud Le Pierres, Parker FES • Jose de la Cal, University of Jaen • Julio Artiñano, COGEN Spain and Iberdrola • Javier Rodríguez Morales, ACOGEN • Ulrich Schmitz, Atlas Copco

Cogeneration (CHP) is deployed worldwide under a wide variety of regulatory frameworks

15% World Electricicy is CHP generated

UE

12% UE Electricity

15% UE Heat

ASIA

17% Asia Electricity

EE.UU.

8% USA Electicity

81.000 MW

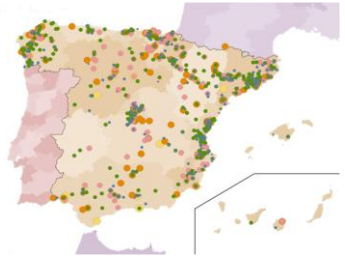
@4.500 facilities

Germany | Italy

20% **35%**

CHP Electriity

In SPAIN, cogeneration has fallen from 12% to only 6% of national electricity (2019–2025). Cogeneration is deployed in around 600 industrial sites that account for 20% of the country's industrial gross value added (food, chemicals, paper, ceramics, refining, etc.).



6% Spain Electricity

15% *Natural GAS*

National consumption

20% Industrial GDP by CHP

@ 600 **industries**

Fuentes (enlaces):

- *EUROSTAT*
- *GLOBAL CHP MARKET OVERVIEW – CWC - Cogen Word Coallition 2024*

In Spain, cogeneration is INDUSTRY

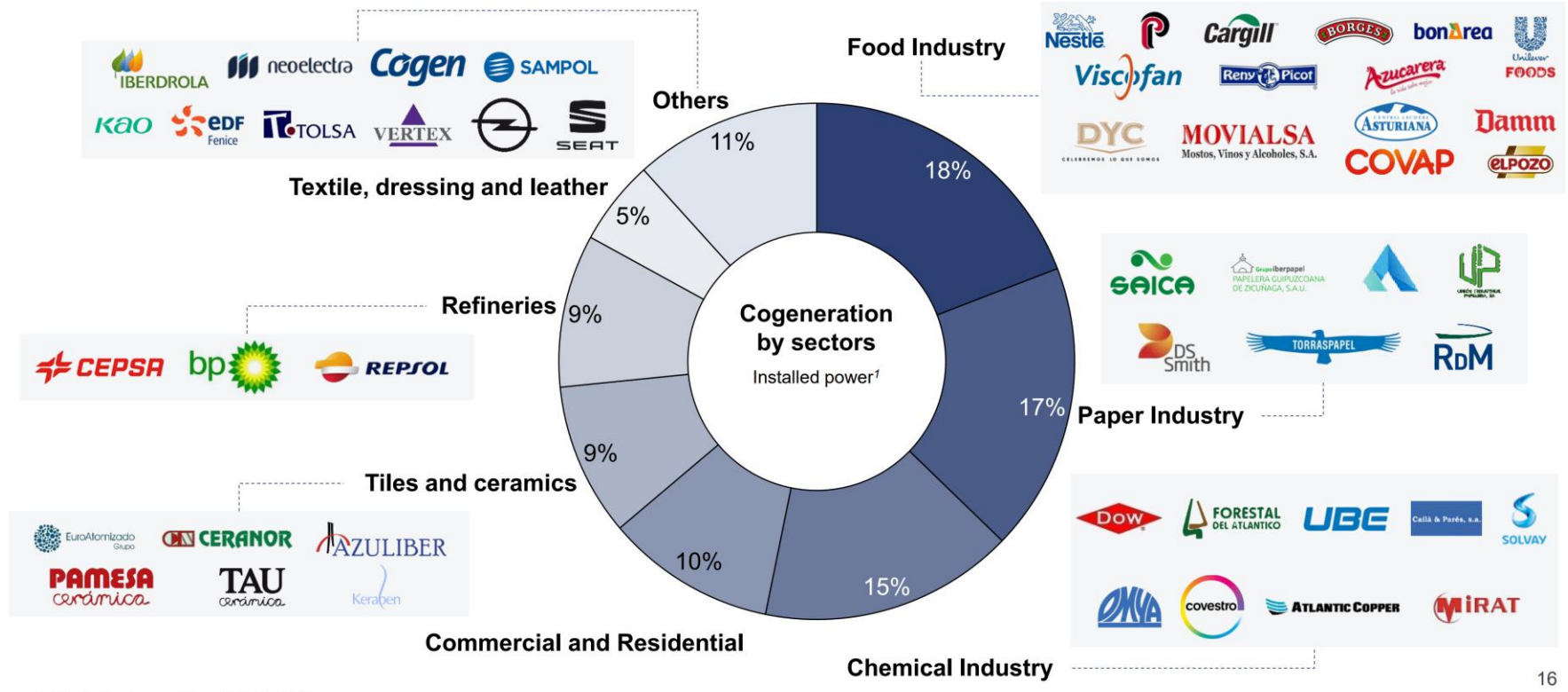
600 industrial sites, 20% of Spanish industrial GDP produced by CHP means

- **over 60% industrial SMEs**
- **Large enterprises and Multinational Groups**

More than 60% of production is exported

Cogeneration is a versatile and integrative technology, capable of generating synergies with other energy solutions and promoting effective, competitive, and sustainable decarbonization of heat-intensive industries.

The cogeneration park in Spain is spread across different industrial sectors. However, the food industry, paper and chemical industry have a great weight in this mix, as they account for approximately 50% of the total installed power.



ources: [1] Institutional presentation ACOGEN 2020.

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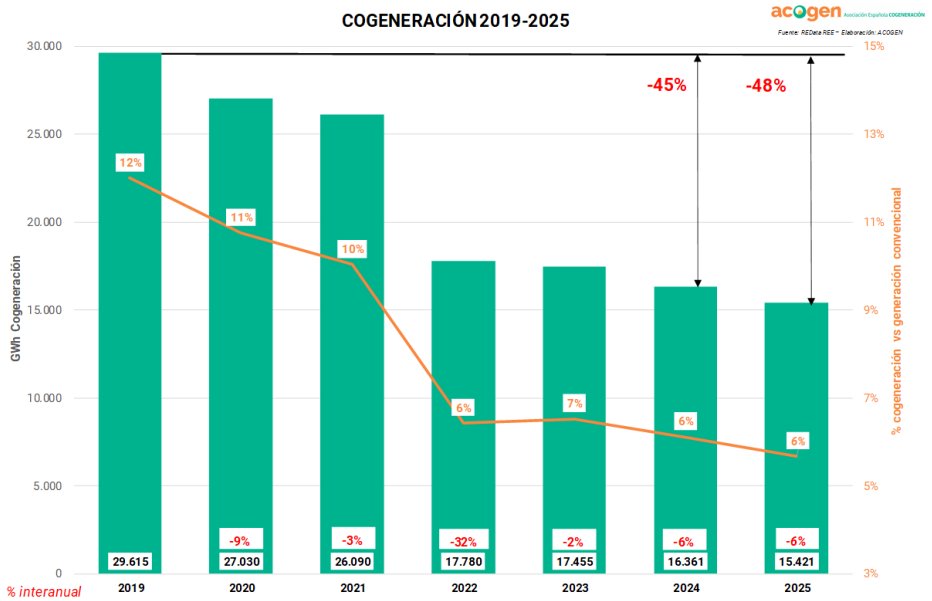
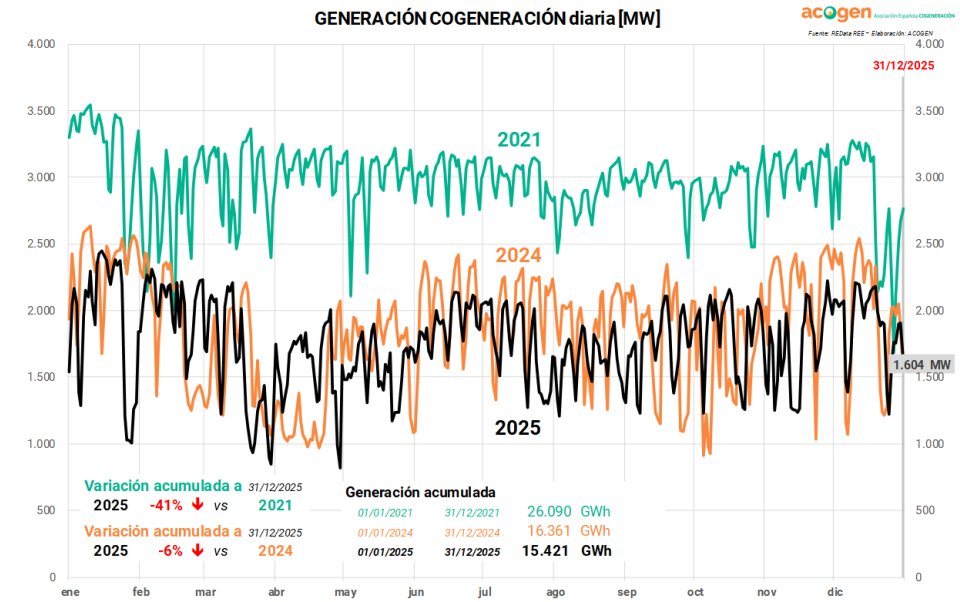
Source: Everis, IDAE (link)

Since 2019 reduction of 50% industrial CHP production:
WRONG ENERGY&CLIMA National POLICIES related to Energy Intensive Industries





- Cogeneration electricity production has **fallen by 48%** in **Spain** since 2019, going **from 12% of Spain's electricity mix to 6%** *(29 to 15 TWh/year), whilst CCGT increased, actually 17% Spanish Mix.*
- Between 2020 and 2025, **150 CHP plants in operation were shut down** — 1,500 MW— upon reaching the **end of their regulatory useful life, awaiting the investment framework** in curse since 2022.

Consequences od CHP Setback

- ***Loss of energy efficiency:*** 14 TWh/year PES** equivalent to ***+4% national gas consumption (500 m€/YR)***
- ***More emissions:*** ***+3 million more tons of CO2/year*****
- ***Industrial competitiveness:*** ***€1.5 billion/year in lost industrial energy revenue.***
- **SECURITY OF SUPPLY: SHUT DOWN FIRM AND SYNCRONOUS ELECTRICITY DISTRIBUTED GENERATION @ DISTRIBUTION LEVEL EQUIVALENT TO 2 NUCLEAR PLANTS (30% Spanish Nuclear production)**

- **Between 2026-2028**, **another 60 facilities in operation** —900 MW—will reach the end of their remuneration period and will shut down if a framework for energy transition is not put in place.

The "good news" is that a new investment cycle for 1,200 MW of cogeneration will begin in 2026.

*** CCGT replacement, actually 17% Spanish Mix*

Regulatory VIEW for SPANISH CHP: REGULATION TO OPERATE (in place) + INVESTING (pending)

In place: ACCURATE REGULATION TO OPERATE

- ✓ Quaterly Regulated Remuneration + markets.
- ✓ Every quarter: Short term Electricity, Gas and CO2 price recognition (futures portfolio OMIP, MIBGAS, ICEE) Promotes Flexible operation | Daily flexibility
- ✓ Enables energy risk management and position hedging
- ✓ Security in cost coverage for a certain Pool Price Level

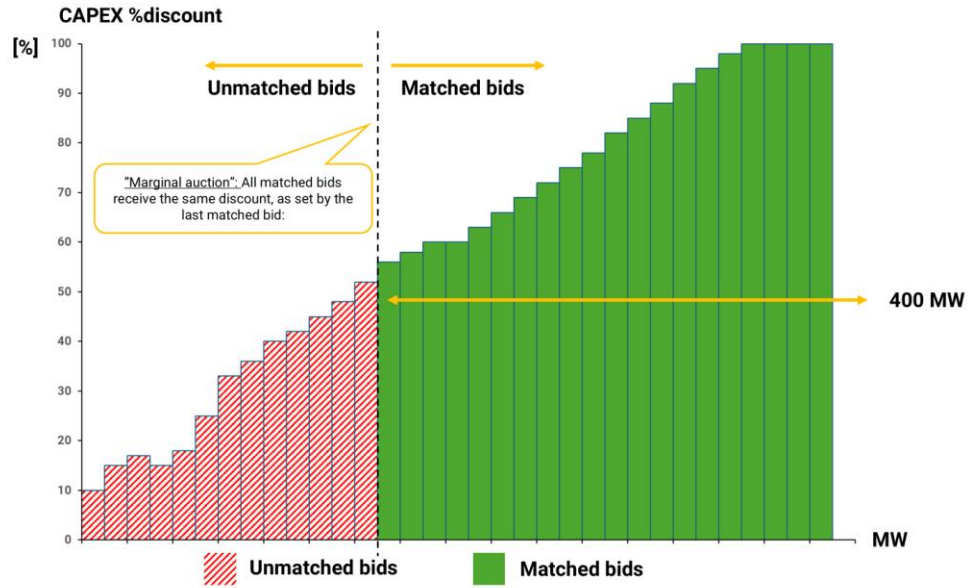
NEW METHODOLOGY ORDER TED/526/2024

- Quarterly update of the Ro
- NG Cost MIBGAS futures + other tariff costs.
- Quarterly review of income with electricity market price estimated with OMIP futures
- Estimated cost of fuel oil & diesel/LPG with CIF NWE and CIF MED spot markets + log. costs
- Exempt from adjustment for deviations in market price in article 22 of RD 413/2014
- Estimated cost of biomass with quarterly variations of several indices:
  - IPRI of capital goods
  - price of road freight transport
  - SMI
- Estimated CO2 cost with ICE Endex EUA futures

CHP PERFECT PARTNER FOR RENEWABLE GASES PROMOTION SCHEMES (H2, BIOGAS, RFNBO...)

2026 Incoming: REGULATION FOR INVESTMENT

- ✓ **Incoming 1.200 MW CHP Auction 2026-2028 (NECP). Regulation to be published 1S2026**
  - ➢ Renewal of existing or new sites.
  - ➢ NG CHP (15% H2 Ready) and Biomass CHP
  - ➢ Marginal Auction. CAPEX competitive bidding process
  - ➢ 12 to 25 years remuneration scheme
  - ➢ Wide range of eligible investments: main equipment and other flexibility and decarbonization assets.



The 1,200 MW cogeneration auctions and other key regulatory factors for the future

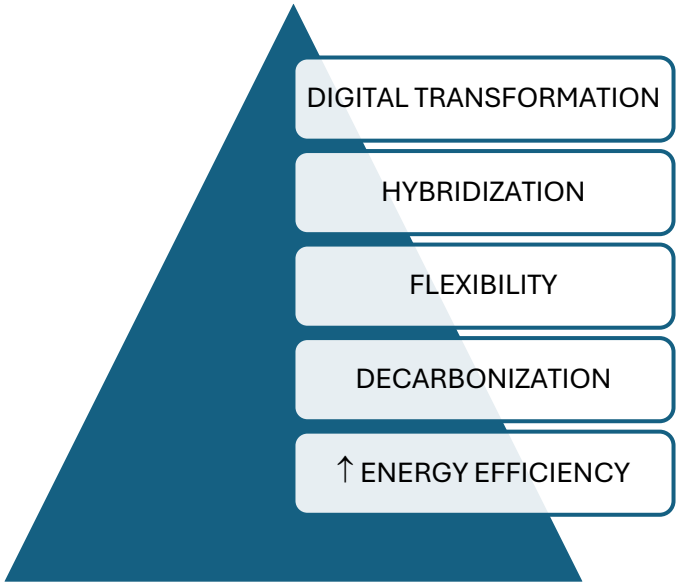
82 industries confirm their interest in investing 1.3 billion euros in cogeneration auctions announced for the first half of 2026

Link ACOGEN + COGEN Survey

Confirmed interest 1.224 MW CHP . Higher expected competition.
H2 ready **Natural Gas =** 1.002 MW | **Biomass** = 186 MW ↑).

The business survey conducted by ACOGEN and COGEN Spain among cogeneration companies in the country reflects the sector's high level of interest and commitment to participating in the upcoming auctions for 1,200 MW of cogeneration, which have already been delayed for four years. However, companies warn that their participation will depend on the definition of fair and balanced conditions that are in line with European regulations and do not introduce additional rigidities to the current framework.

"SMART CHP" = COMPETITIVE INDUSTRY IN THE ENERGY TRANSITION



1. Higher **ENERGY EFFICIENCY**
2. Increasing **DECARBONIZATION** (***gradually incorporating H2, BioMethane,RFNBO …)***
3. **FLEXIBLE OPERATION**
4. **HYBRIDIZATION @ INDUSTRIES WITH OTHER ENERGY TECHNOLOGIES** ***(PV, Biomass, E-Boilers/Heat P., Thermal Storage, BESS, CCUS …)***
5. **DIGITAL TRANSFORMATION: INTEGRATED OPERATION+MARKET MANAGEMENT for multi energy-assest facilities**

CHP PERFECT PARTNER FOR RENEWABLE GASES PROMOTION & SUPPORT SCHEMES (H2, BIOGAS, RFNBO…)

✅ Cogeneration Auctions: Eligible Investments

MAIN COGENERATION EQUIPMENT

- Natural gas turbines
- Gas reciprocating engines
- Steam turbine generators

HEAT, COOLING AND HEAT RECOVERY EQUIPMENT

- Heat recovery units
- Post-combustion equipment
- Biomass and gas boilers for cogeneration cycles
- Absorption chillers

ORC (Organic Rankine Cycle) systems.

ELECTRICAL GRID AND GAS GRID CONNECTION AND METERING SYSTEMS

- Electrical connection and metering system with the consumer or the grid
- Gas grid connection facilities
- Regulating and metering stations (RMS)
- Gas compressor
- LNG plants

CONTROL AND GAS TREATMENT SYSTEMS

- Control systems
- Fuel gas and flue gas cleaning system

Equipment adaptations to meet voltage/reactive setpoints, enable voluntary/zonal voltage control, and provide black-start capability

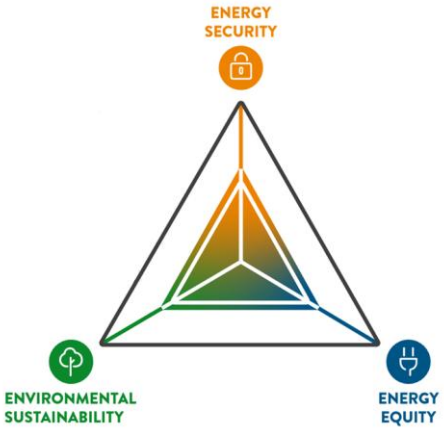
HYBRIDISATION, STORAGE AND ADVANCED CONVERSION SYSTEMS

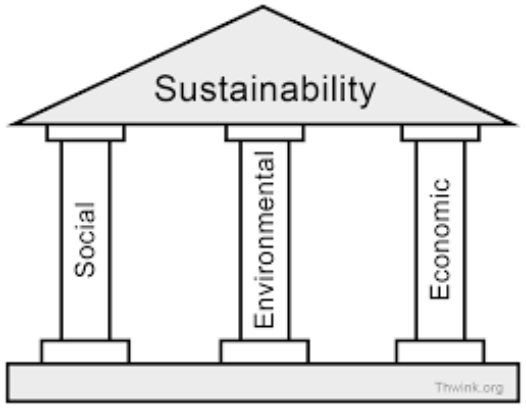
- **Thermal energy storage system**
- **Electrical energy storage system**
- **Electricity-to-heat conversion equipment**
- **CO_2 capture systems**
- **Hydrogen readiness systems**

- xxx = Gov. proposal
  xxx = to be included



Europe's deindustrialisation has already begun





Some Keys to RE-BALANCING ENERGY & CLIMA & INDUSTRIAL UE + SPAIN POLICIES

A COMPETITIVE DESCARBONIZATION + NEW SCENARIES (demand, grids, sourcing …)

Enhance COMPETITIVENESS & SECURITY OF SUPPLY

1. Balancing Energy Trilemma: decarbonization, security of supply and competitiveness actually too CO2 commanded and driven by Ideology.
2. Technological Neutrality (No ideologically driven (*i.e. absolutization in electrification*))
3. Security of Supply. RES intermittent integration limits. (*Spain´s blackout*)
4. Demand risk: deindustrialization reduction & Data centers increasing hyperdemand.
5. Competitiveness: Ell ongoing relocation outside UE. is UE ETS giving right results after 20 years? UE Energy doubles and trebles abroad industrial prices.
6. Electricity Grids networks out of capacity. Long construction periods (4-7 yr.)
7. Planification - Update and re-oriented (NECP, Grids, etc..)
8. Natural Gas remains essential for industry (2.5 times electricity consumption).
9. Electrification vs. industrial gas consumption on case to case basis.
10. Renewable gases (biogas-CH4, H_2), require time, limited scaling & higher energy prices
11. Legal insecurity and regulatory uncertainty. Bureaucracy.

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