INSTITUTO ATLÁNTICO DE GOBIERNO

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Transición Energética en la Península Ibérica

PONENTE: Álvaro Bau

TEMA: La transición energética global: retos, oportunidades y el caso de Iberia

Executive Summary

The energy transition is no longer only an environmental agenda. It has become a race for industrial competitiveness, technological leadership and geopolitical influence

Three major shifts are redefining the EU landscape:

1. The centre of gravity of industry is moving: China has emerged as the world's manufacturing powerhouse, while Europe faces growing competitive pressure from both China and the United States.

2. Energy security has become as important as decarbonization: Following the energy crisis and geopolitical tensions, governments increasingly prioritize affordable, reliable and secure energy alongside climate objectives.

3. Spain and Portugal hold a unique strategic opportunity: With some of Europe's most competitive renewable resources, strong infrastructure and growing investment, the Iberian Peninsula is becoming a key platform for Europe's reindustrialization.

Success is not guaranteed: Grid expansion, regulatory simplification, innovation, talent and capital mobilization will determine whether Iberia captures this opportunity or remains a consumer of technologies and industries developed elsewhere.

Public narrative shifts to industrial competitiveness

> **Reliable and affordable energy** is the lifeblood of our economies…
>
> It sustains our **industrial and economic competitiveness**

– Ursula Von der Leyen

From IRA[1] to OBBBA[2]

Reflects a pivot from decarbonization incentives **toward fossil/ nuclear-favored energy security** framing

Clean Industrial Deal

Aims to incentivize industry decarbonization, lower energy prices, and mobilize **+€100 Bn investment in clean manufacturing**

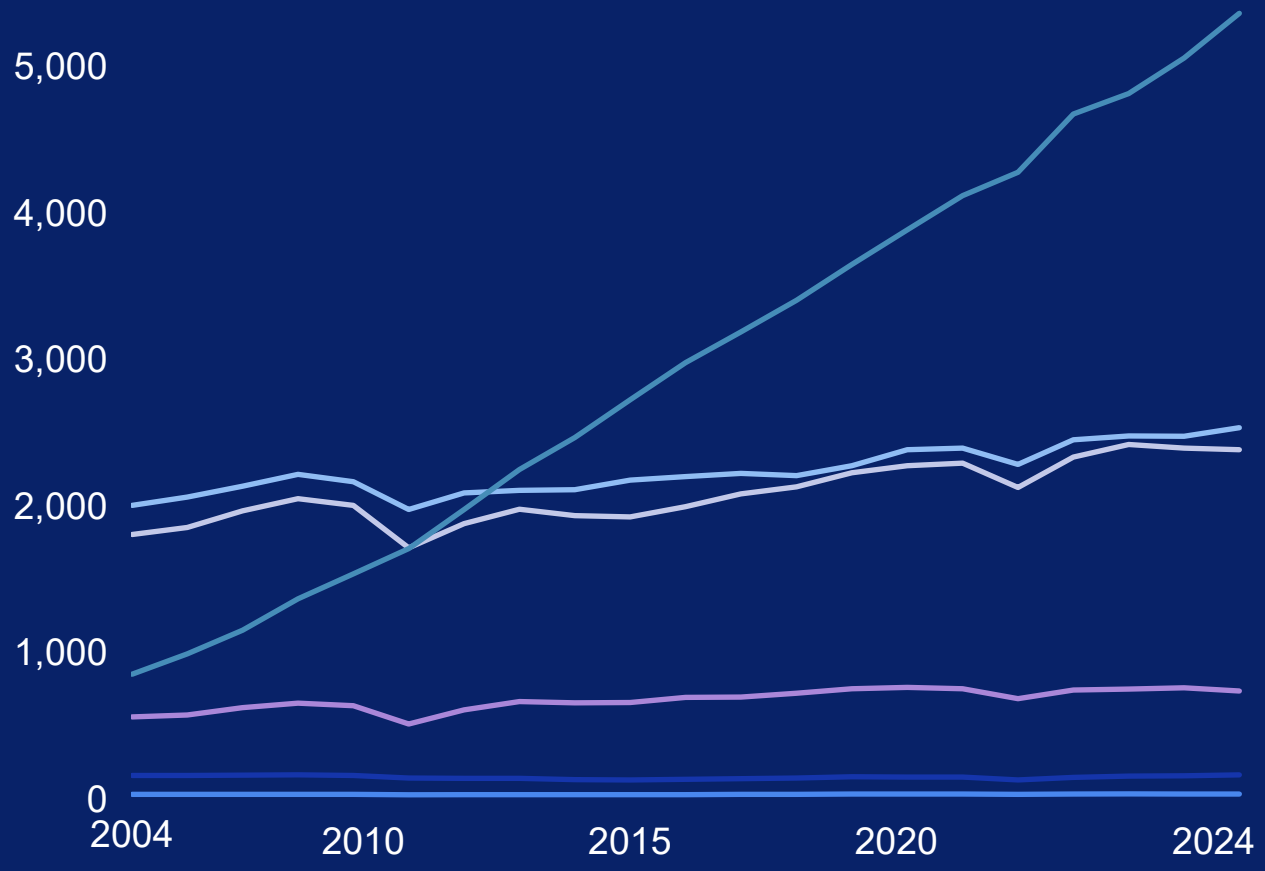
From MIC 2025[3] to Rare Earth export controls

Upgraded China's **manufacturing base from low-cost assembly** into higher-value, high-tech manufacturing; now tightens control of critical minerals for high-tech

1. Inflation Reduction Act
2. One Big Beautiful Bill Act
3. Made in China 2025

Growing industrial gap between China and Europe

Evolution of manufacturing GVA per country, volume ($Bn) and CAGR (%)



2004 - 2024

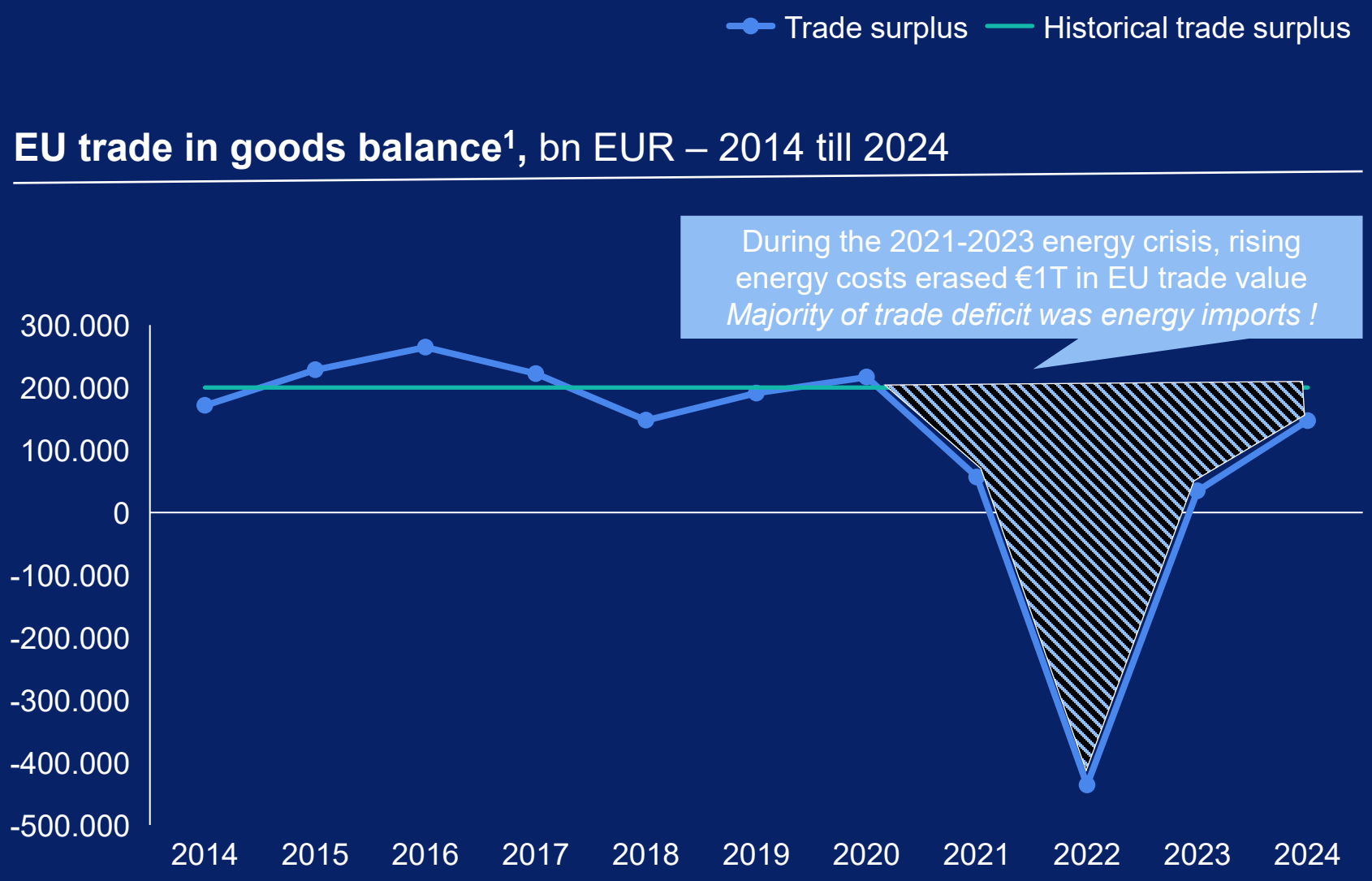
- **+9.7%**
- **+1.2%**
- **+1.4%**
- **+1.4%**
- **0.2%**
- **0.5%**

Despite overall growth, the **EU's industrial sector has expanded moderately**

China now leads, with its **share of global manufacturing GVA rising from 11% to 34%**

Source: Oxford Economics (value-added output, Real USD – 2015 base year price)

The energy crisis exposed Europe's structural dependence on imported energy

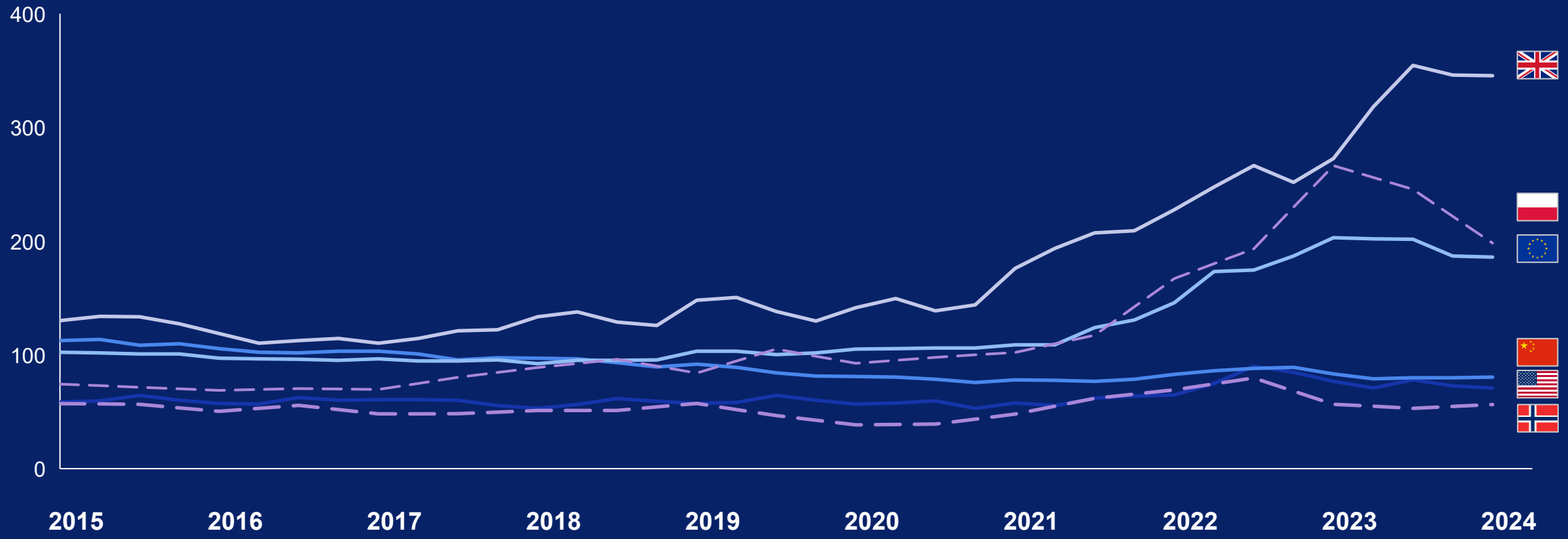


1. Product categories include: raw materials, chemicals and related products, Machinery and vehicles, Food & Drink, Energy, Other manufactured goods, and other products
2. Loss in value defined as the deteriation of the trade surplus in the EU due to high energy costs in 2021 till 2024, majority of trade deficit was energy

Source: Eurostat

On average, European industrials have paid up to ~2-3x more for electricity compared to US and Chinese peers

Electricity price for industrial users (>150 GWh annual consumption), EUR/MWh

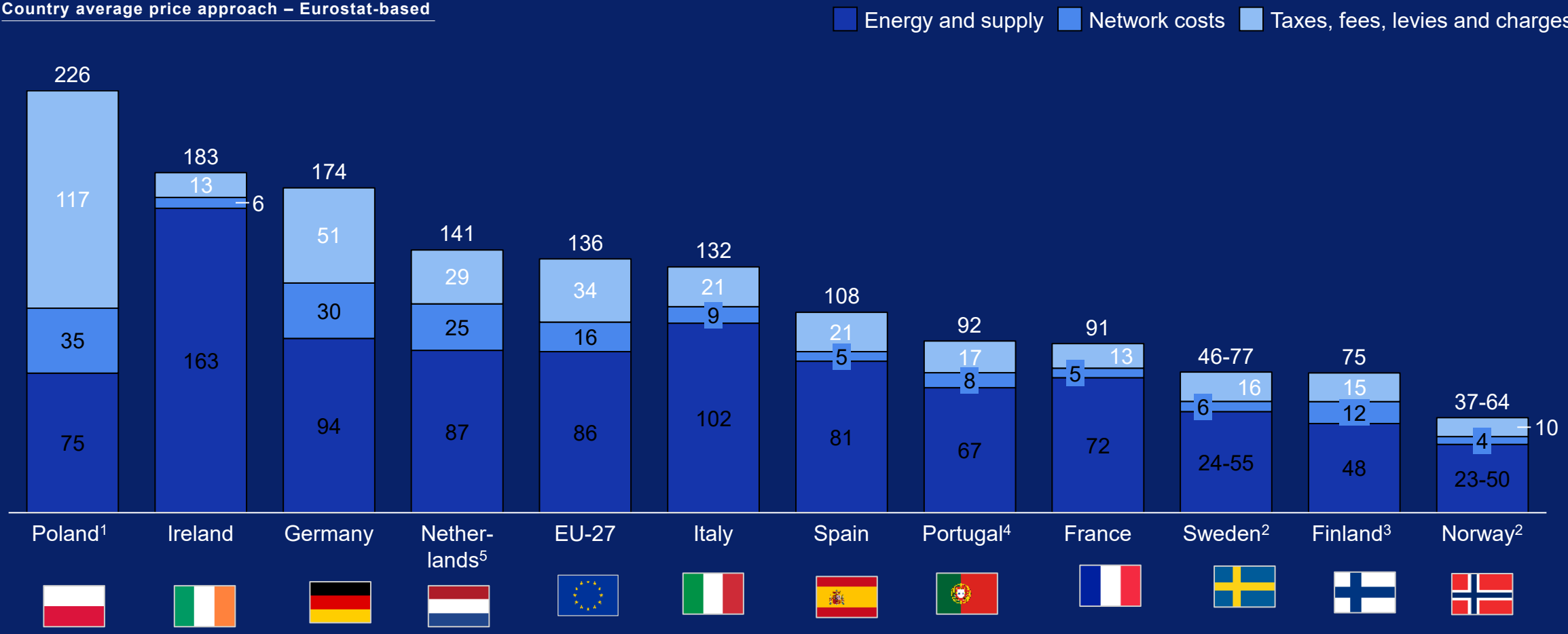


Source: Bruegel based on Chief Economist Team/DG ENER/European Commission, based on Eurostat (EU), Energy Information Administration (US), Department for Energy Security and Net Zero (UK), International Energy Agency(Japan and Korea), CEIC (China). Note: European Central Bank conversion rates.

Nordics, Iberia and France have lowest electricity prices for industrial players

Electricity prices in Europe for industrial consumers (150 000 MWh or over), EUR/MWh, 2024

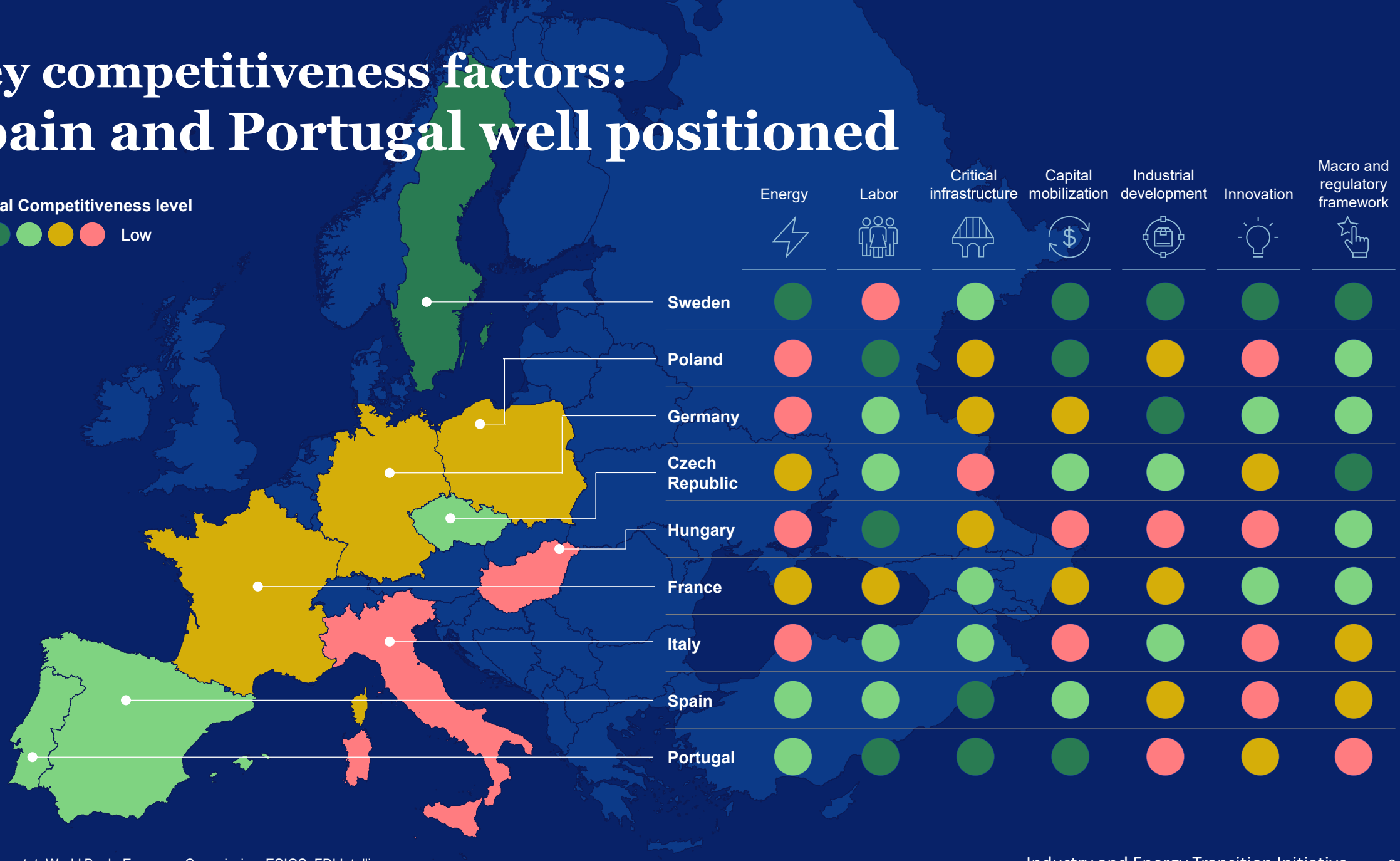
Country average price approach – Eurostat-based



1. Poland's high electricity taxes in 2024 can be attributed to the reversion of VAT to 23% (from a temporary 5% in 2022) and the inclusion of environmental levies, such as the EU ETS and other Polish-specific charges, which together account for ~80% of the total tax amount, reflecting both policy changes as well as possible reporting differences | 2. Denmark, Sweden, and Norway have multiple bidding zones. Sweden and Norway show significant price variance across zones, with ranges reflecting the minimum and maximum wholesale prices, verified against Eurostat national data | 3. Data for Finland's 150 000 MWh+ consumer profile was unavailable, so the 70 000–149 999 MWh profile was used instead | 4. Portugal's negative tax amount likely reflects a combination of tax reductions and government subsidies provided to companies to offset high electricity prices, which may have been accounted for within the tax component | 5. The Netherlands' 2024 value was corrected from Eurostat's initial data (36 EUR/MWh) after identifying a discrepancy with TenneT's announced 2024 tariffs

Source: Eurostat, Nord Pool

Key competitiveness factors: Spain and Portugal well positioned



Source: Eurostat, World Bank, European Commission, ESIOS, FDI Intelligence

Spain (and Portugal) have a lifetime opportunity of re-industrializing on the back of competitive clean energy

Energy: accelerate the energy transition

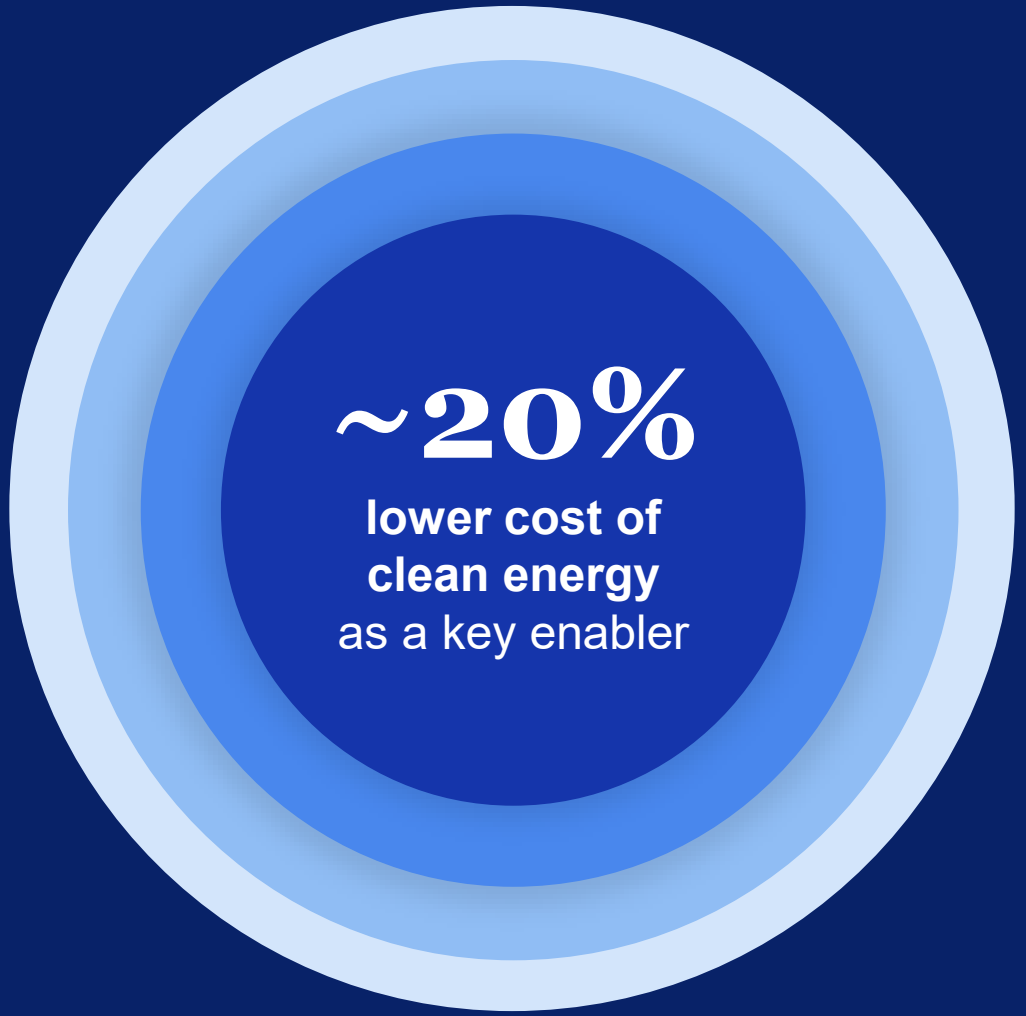
Electrification, renewable power, incl. green molecules and hydrogen

Carbon emissions – capture, use and storage (CCUS)

Industry: reinforce and attract industrial champions

Industrial cost competitiveness, e.g., energy efficiency, resilience

New supply chains, e.g., EVs, batteries, critical minerals



Resilience & defense: secure strategic autonomy

Energy security

Domestic value chains for resilience and defense

AI & tech enablement: surf new growth frontiers

Development of AI via data centers and other digital infrastructure

Spain and Portugal's competitive advantages point to 8 industries

NON-EXHAUSTIVE

Iberia's industry-relevant competitive edges:

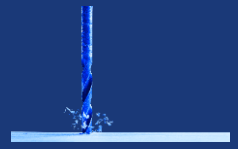
Energy · Labor · Critical infrastructure · Capital mobilization

Spain and Portugal can leverage Iberia's strengths in energy, talent, critical infrastructure, and its growing investment flows to both expand current leading industries and attract emerging, future-shaping sectors

Existing industries

Automotive and equipment

Basic Metals



Industrial and construction materials[1]

Refining and chemicals

Emerging industries

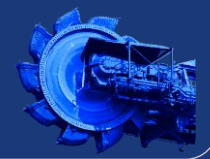
EVs and batteries

Hydrogen and renewable fuels

Data Centers and Cloud Infra

Critical mineral mining and refining

Existing mineral resources



1. Includes plastic, rubber, construction materials such as cement, marble, granite, limestone, clay, and industrial minerals such as phosphates, potash, quartz

The transition is not about energy alone – It is about building the industries that energy enables

NON-EXHAUSTIVE

POST-FID OR ADVANCED DEVELOPMENT (OCT 2025)

Lithium refinery
~30 kt capacity
+€0.5 Bn investment

Battery factory
~15 GWh capacity
+€2 Bn investment

Data Centers
~1.2 GW capacity
+€8 Bn investment

Biofuels plant
~240 kt year capacity
€0.4 Bn investment

Biofuels plant
~500 kt capacity
+€1 Bn investment

Data Centers
+€2.5 Bn investment
FID; +€15 Bn by 2035

Battery factory
~50 GWh capacity[2]
+€4.1 Bn investment

Data Centers
+1.5 GW capacity
€12 Bn investment

ICE to EV plant
+€3 Bn investment
for plant electrification[3]

Ecoplanta
240 kt capacity
+€0.8 Bn investment

Multi-metal refinery[4]
~€0.8 Bn investment

Note: Capacities and investments to reflect full capacity status (some cases still not announced); 1. Assuming similar capacity levels for data centers projects based on investment; ; 2. Maximum capacity expected (production of LFP batteries); 3. Additionally, €300 million announced to the construction of a new battery cell assembly plant; 4. Project among the initiatives selected by the European Commission out of 47 across Europe, under the CRMA framework

The opportunity at stake could entail substantial socio-economic impact to the region

Impact on GDP[1]
(% 2022 GDP)

Up to +15%

(up to 170 Bn€ in Spain & 35 Bn€ in Portugal)

Increased exports
(% 2022)

Up to +20%

Total Jobs,
#

~1M

…of which, qualified positions, #

~200k

(~700k in Spain, ~300k in Portugal)

Additional state income,
(% 2022)

+5-10%

1. GDP impact is measured using Input-Output tables for Spain & Portugal sourced from MGI, along with global tables from OECD, which help to estimate how additional revenues translates into domestic value creation. The outcome is a Gross Value Added (GVA, which measures sectorial contributions to GDP)

Source: McKinsey & Company – Industry and Energy Transition Initiative (2024), *The Iberian green industrial opportunity: Seizing the moment* [Link]

Looking at Spain and Portugal:
encouraging progress, structural gaps still to be addressed

Index dimensions	Spain		Portugal	
Forward-looking indicators E.g., VC+PE, pre-/post-FID invest.	 Leading	**Momentum is strong** Investment announcements increasing, post-FID investments up 2x, and power/ storage capacity growing at 16%; VC+PE remains a challenge	 Leading	**Investment increasing** Investment pipeline growing to €19 billion, post-FID commitments increasing 5x, and power/ storage capacity up 3%; VC+PE remains a challenge
Industrialization indicators E.g., GVA, employment, productivity	 Lagging	**Significant structural gaps** Vehicle production (2.4 million) and industrial jobs (2.9 million) are rebounding, but industrial GVA is stagnant at 12%, R&D at 1.5% of GDP and exports decreased vs. year before	 Lagging	**Industrial base remains weak** Vehicle production (330 thousand) slightly improving but industrial GVA fell from 14% to 13% and R&D investment, productivity and exports still far from targets or EU benchmark
Energy transition indicators E.g., GHG emissions, renewables	 On track	**Real progress but short of targets** Renewables remain at 25% of energy mix and electrified transportation reached 19% of sales, ahead of the target; but progress was limited across renewable molecules and GHG emissions are off-track to reach -32% target by 2030	 Leading	**Ahead on decarbonization** GHG emissions reduction on track to reach -55% by 2030 and energy dependency (64%) and electrified transportation (37% of sales) are ahead of the curve; however, progress biomethane production is limited

Source: IETI Index results

Why the transition is harder than expected: Challenges on bankability, regulation and system stability found across key areas

Energy examples

Highest relevance for: Electrification Biofuels Biomethane Hydrogen

Non-exhaustive

Lack of cost competitiveness

- **x2-5 times costlier green H2 solution** vs conventional **fossil alternatives for some applications**
- **Slower-than-expected H2 cost reduction** trajectories (exp. 4-5.5€/kg by 2030); limited **tech maturity**
- **+1-4k USD/t costlier biofuels** than **current fossil alternatives**

Regulatory burden

- **Tax burden** for **decarbonization levers** vis-à-vis other countries
- Long and **complex permitting processes** (up to 4 years) with **+17 frameworks**, one per **CCAA**
- **Unclear HVO demand**, uncertain regulatory outlook from new feedstock additions, and threats from non-EU markets
- Strict **EU Delegated Act requirements** for **green H2** production and uncertain **RFNBO non-compliance penalties**

System instability

- Insufficient **grid investments** to handle the increase of both **demand** and **RES**
- Limited **firm capacity availability** and **uncertainty** of future **RES profitability**
- **Power grid capacity constraints** for new connections
- Lack of **transparency** over existing **distribution grid** and **injection points**

Financing hurdles

- High **electrification upfront costs** for **industry** and long lifetime of **existing equipment**
- **20-80% higher upfront costs** of **EVs** vs **ICE**
- High uncertainty regarding **long-term demand**, **feedstock availability, and technology maturity**
- Limited **willingness** for long-term **offtake agreements**

5 actions to reinforce Europe's competitiveness
Contribution of Spain and Portugal to European reindustrialization

1 Boost ambition and coordination in key arenas

Create/ scale ecosystems and value chains around the growth arenas for the future – e.g., renewable fuels/ molecules, batteries, defense, tech enablement and AI – in line with EU strategy for competitiveness

2 Focus on competitiveness-driven regulation

Ensure simpler and stable regulatory frameworks focused on outcomes by improving ease of doing business: right incentives and environment for lower context costs

3 Accelerate infrastructure deployment

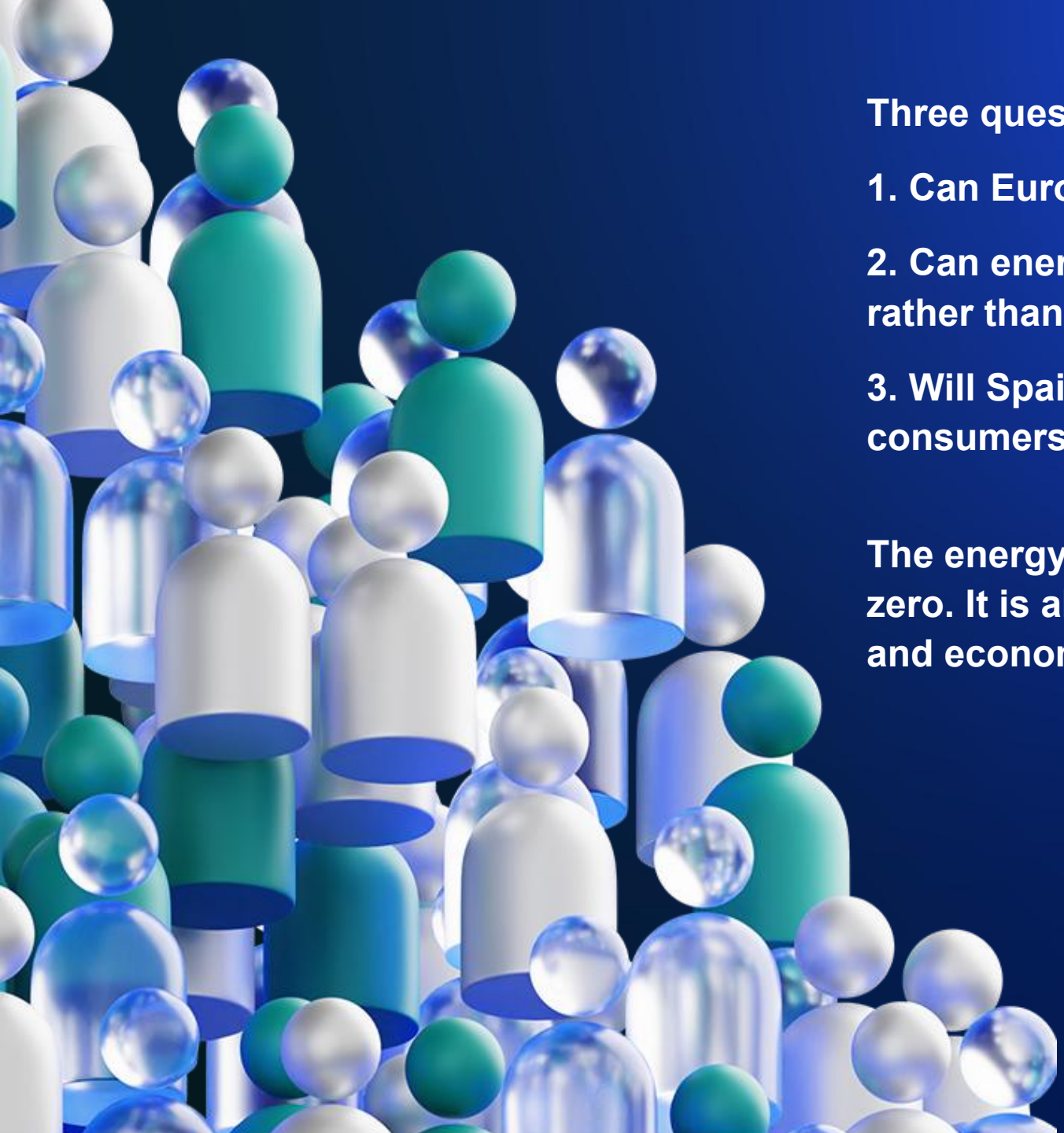
Reinforce critical infrastructure, such as electricity grids and storage, as well as transportation and logistics

4 Double down on innovation

Increase share of GDP invested in R&D and innovation (incl. via new financing instruments and cross-boarder collaboration) to secure relevance and future growth

5 Unlock talent productivity

Nurture the conditions for workforce's development, mobility and productivity as well as attract and retain top (foreign) talent – especially on key sectors/ skills



Three questions for the next decade

1. Can Europe decarbonize while remaining competitive?

2. Can energy transition strengthen European prosperity rather than weaken it?

3. Will Spain and Portugal become producers or merely consumers of clean technologies?

The energy transition is not only about reaching net zero. It is about deciding where future industry, jobs and economic power will be located.

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