



What's next for net-zero?

Current position, outlook, and success factors of the European energy transition

Executive summary

The world is facing significant environmental challenges—and to overcome them, how society produces, distributes, converts, and uses energy will need to transform. Led by Europe, the world is making progress towards its decarbonization goals, but could need to invest 10 times more in clean energy than fossil fuels globally to reach net zero by 2030.¹ The outlook for the European energy transition is challenging but also encouraging:

- CO₂ emissions are decreasing in Europe, giving European Union (EU) nations an opportunity to build upon this momentum.²
- The biggest investments will be required in wind and solar, along with flexible generation capacity, such as natural gas and biomass.
- These investments will likely need to be made against a backdrop of rising power demand.
- As electrification picks up pace, natural gas demand is expected to drop, while demand for hydrogen is expected to rise, driven by industrial and power plant usage.³
- Building a robust hydrogen supply chain by 2050 will likely come with a €1.1 trillion price tag.⁴

What's next for net-zero? A successful European energy transition will likely hinge upon accelerating clean tech while maintaining reliability and affordability. This will demand a greater focus on:

- 1. Execution.** It's time to move beyond planning.
- 2. Patience.** Stakeholders should accept longer time horizons.
- 3. Funding.** Big change takes big investment.

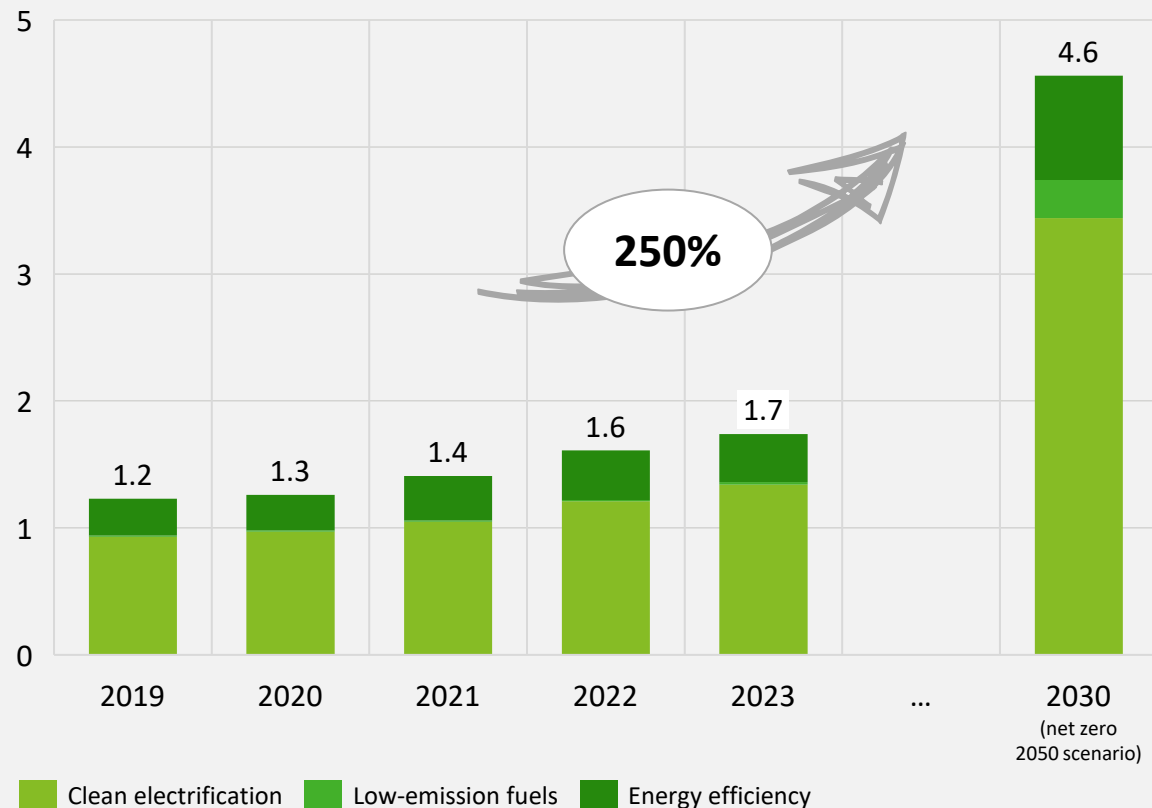
Transitioning to a clean energy future is a significant undertaking

The current infrastructure used to produce, distribute, and convert energy would need to be redesigned and rebuilt. While this is a significant task, it is already underway. Global clean energy investments are outpacing global investments in fossil fuels. Although the balance is tipping in the right direction, clean tech adoption should be accelerated even further.

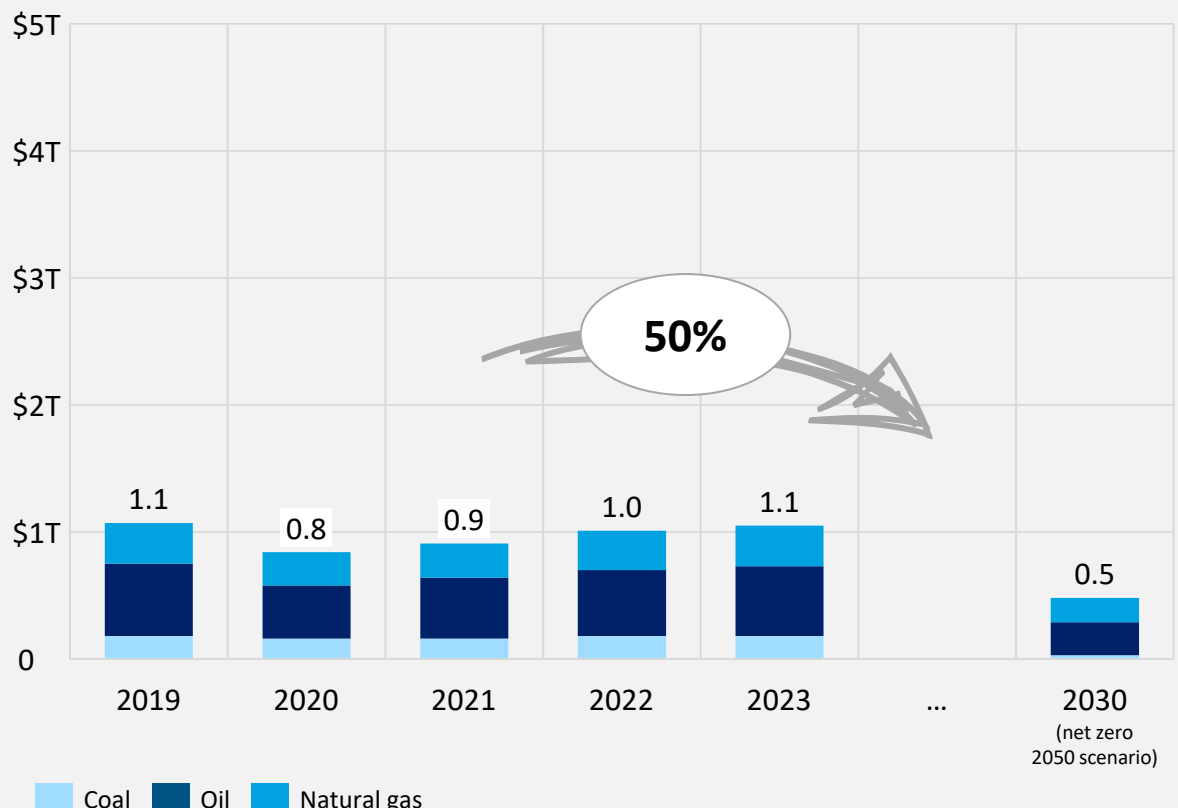


To reach net-zero by 2030, the world should invest 10 times more in clean energy than in fossil fuels

Global investments in clean energy, US\$T



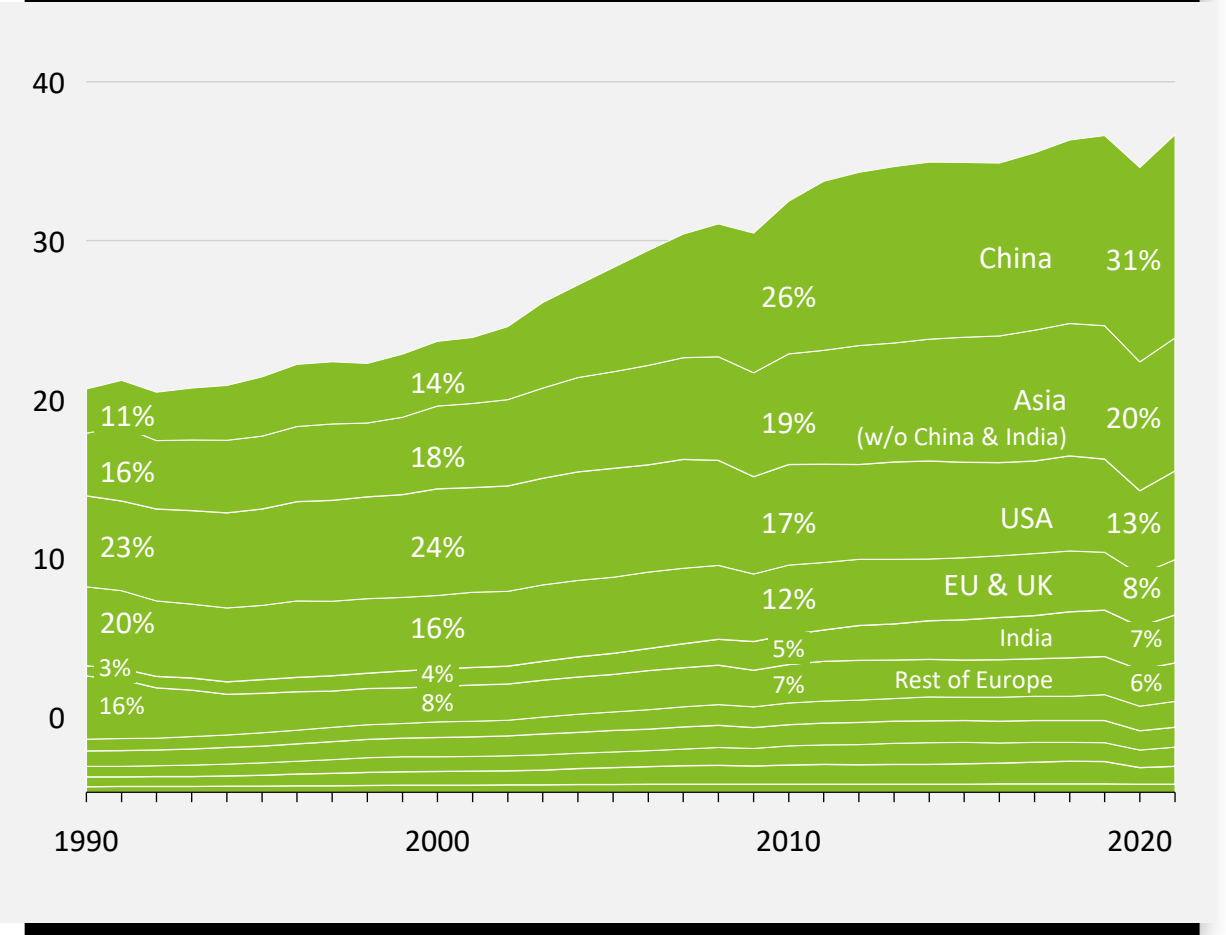
Global investment in fossil fuel extraction and infrastructure, US\$T



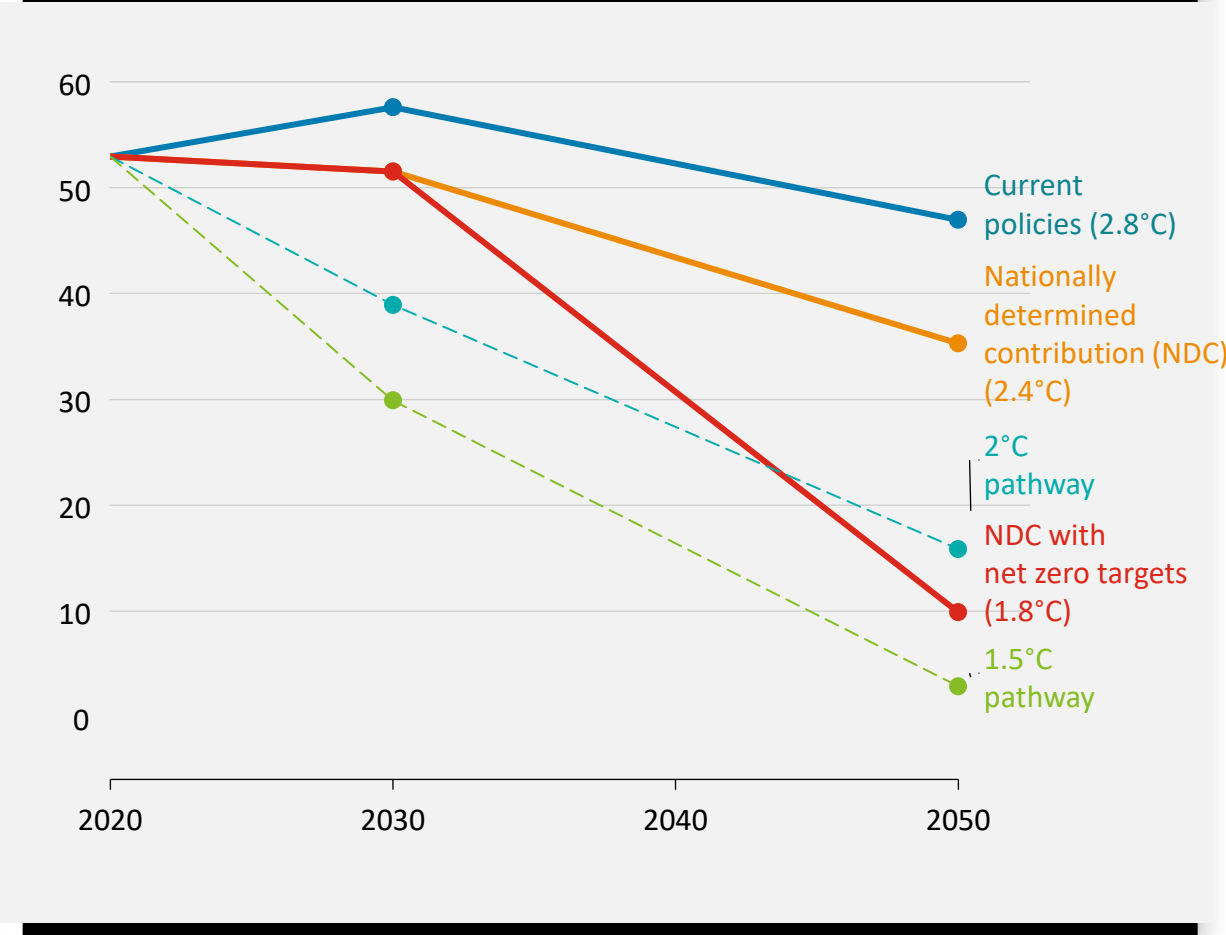
Source: International Energy Agency⁵

CO₂ emissions are nearly flat overall and decreasing in Europe. Significant reductions are still needed after 2030 to meet net zero targets

Global emissions from fossil fuels and industry by region [Gt CO₂e]



Projection of global GHG emissions by scenario [Gt CO₂e]

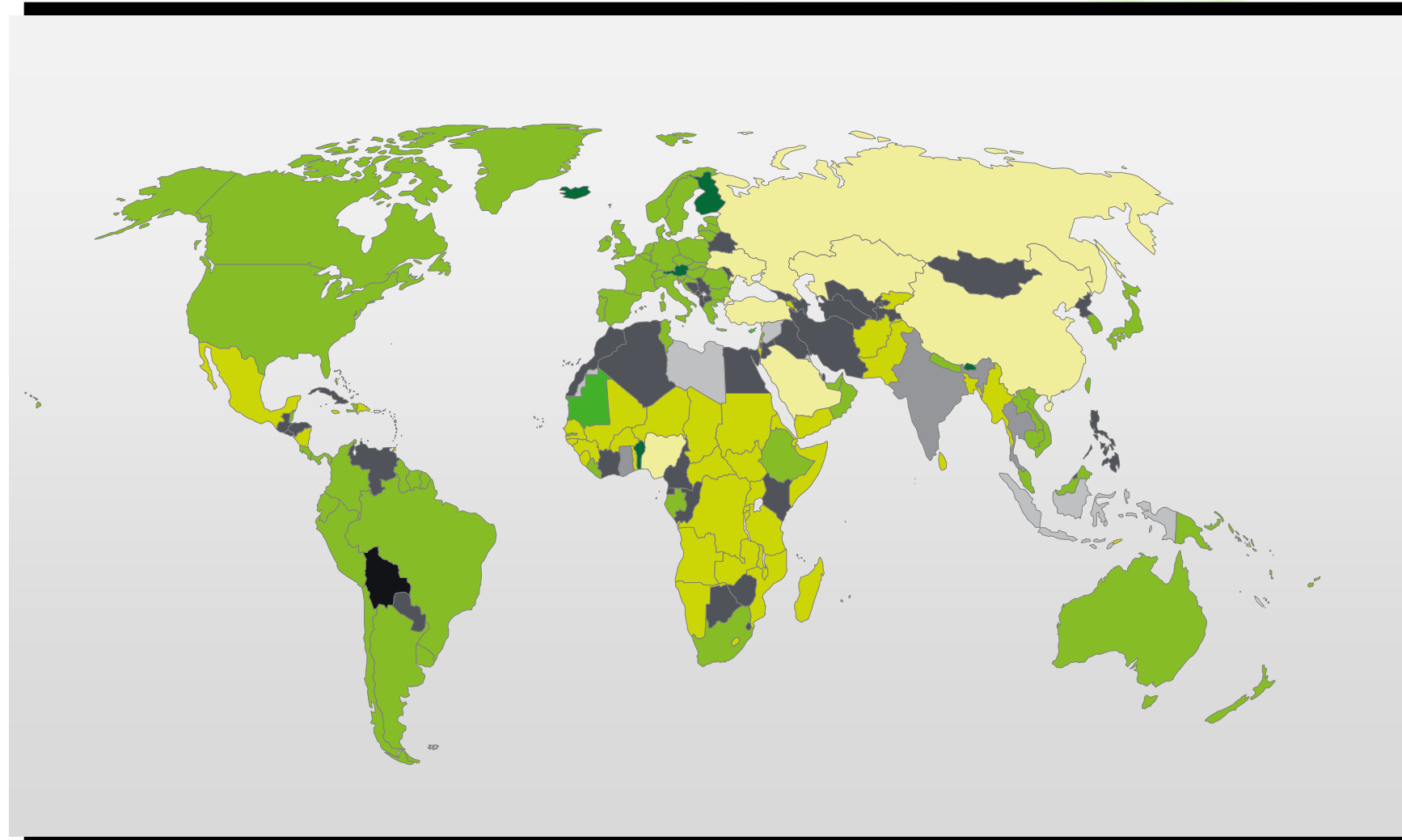
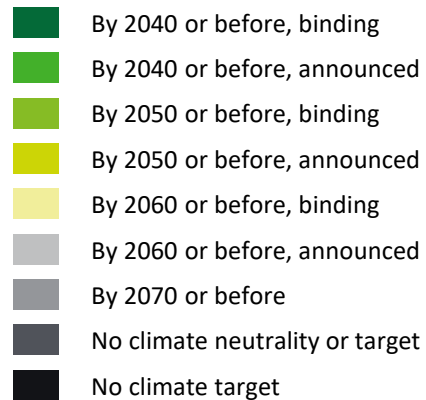


Sources: Intergovernmental Panel on Climate Change (IPCC)⁶ and United Nations Environment Programme (UNEP)⁷

Europe leads the world in progress toward carbon neutrality—but, it is not alone

Climate neutrality targets by country

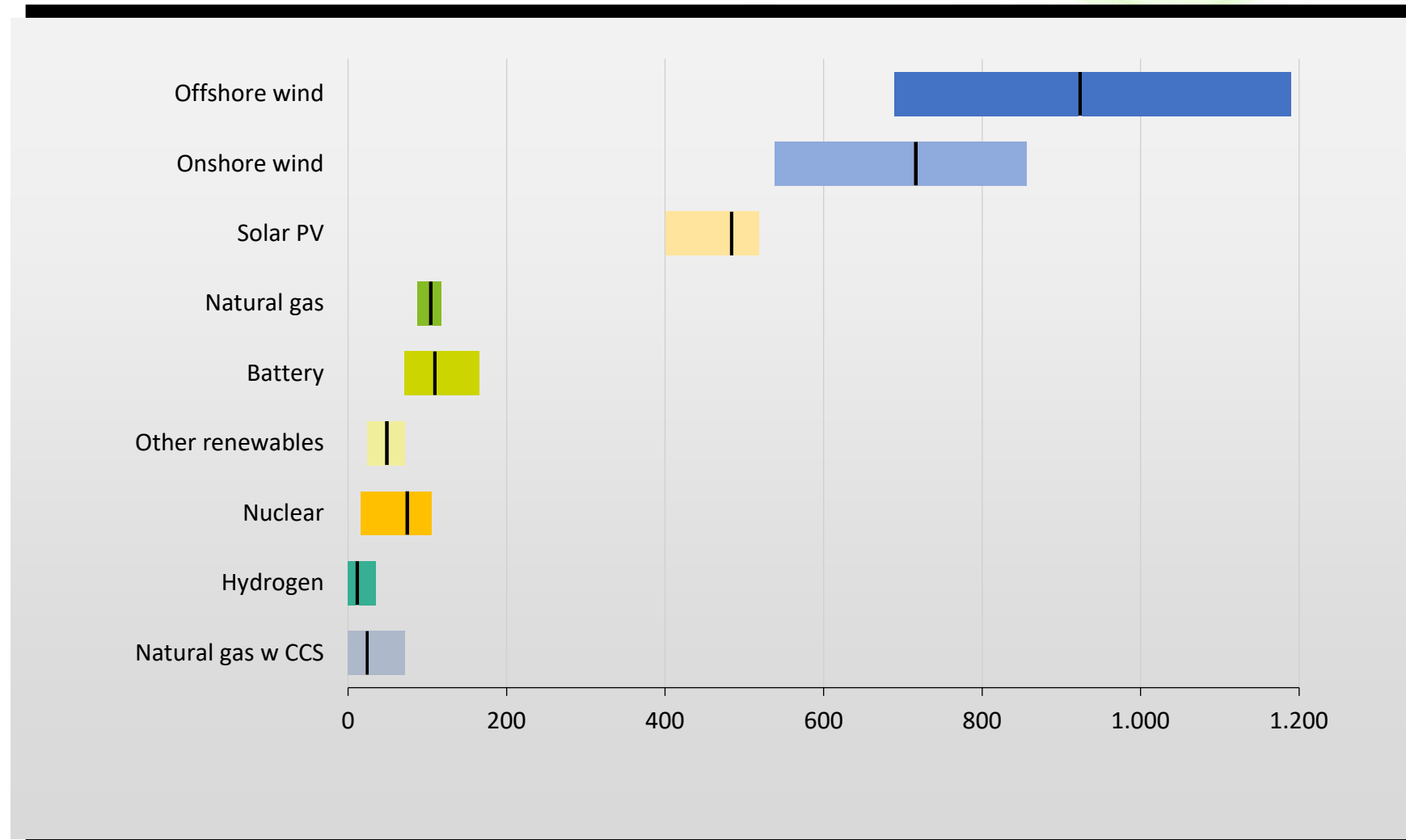
The US follows close behind with the shift from coal- to gas-fired generation, due to an abundance of shale gas. Some countries are further along the journey than others, but many countries and regions have not only communicated climate neutrality targets by 2050 or before, but have also created legislation to support this.



The goal in Europe: Net-zero by 2050. The cost: €3.1 trillion

Cumulative investment in European power generation by 2050, €B

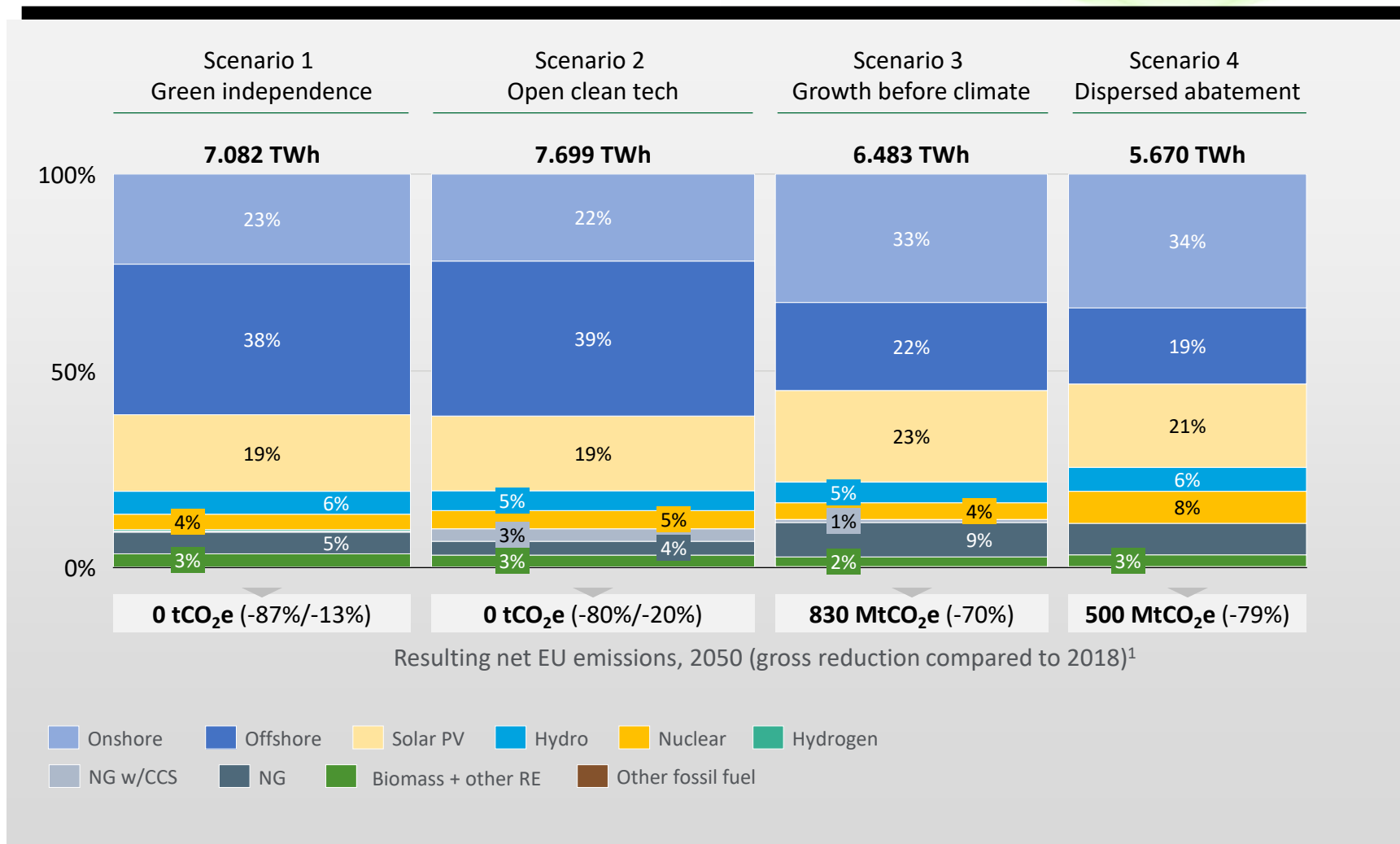
The biggest investments will likely be required in wind and solar, and flexible generation capacity.



Across various scenarios, demand for power will keep growing within the EU

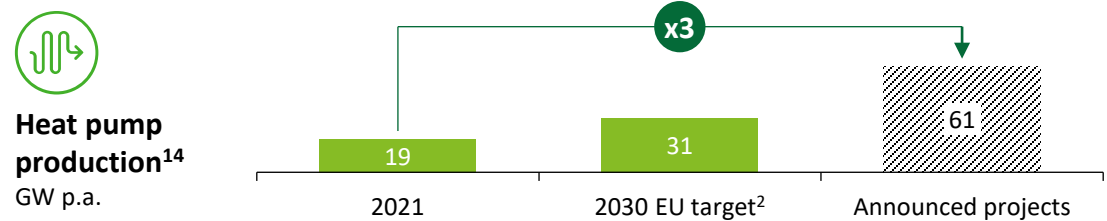
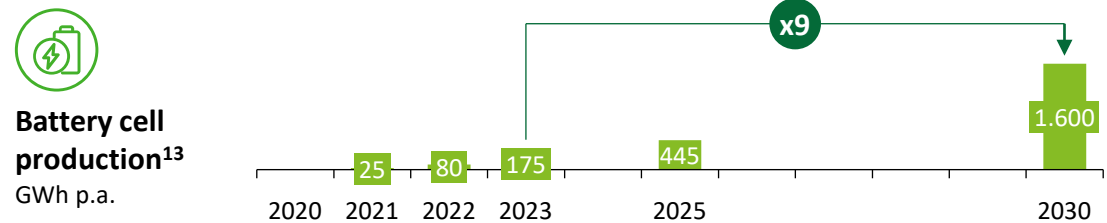
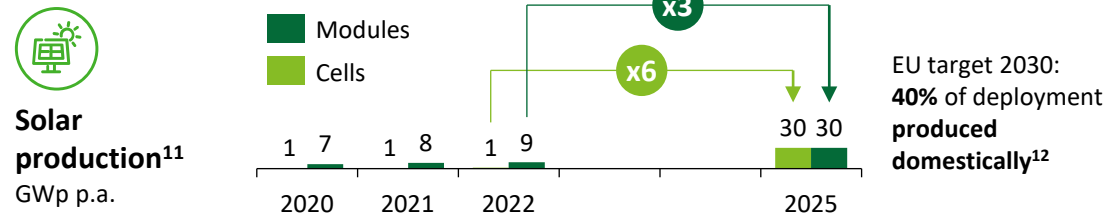
European power generation by 2050 (TWh), per Deloitte scenario

All scenarios see renewables as the central solution, but they also recognize the need for flexible capacity (from gas-based generation and other sources) to balance the system.

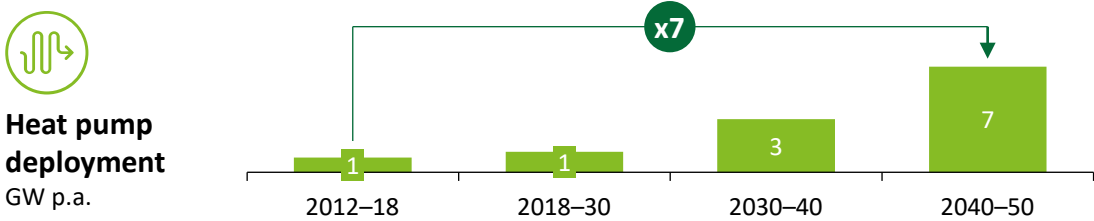
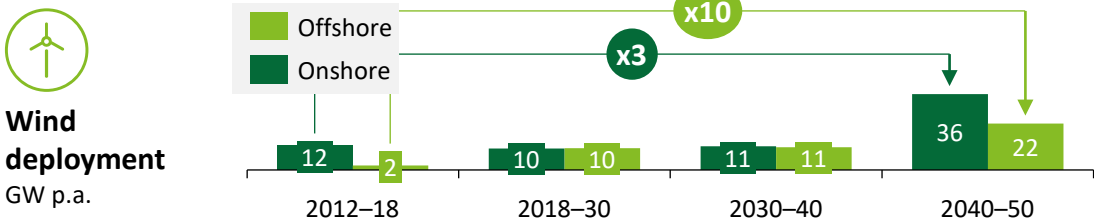
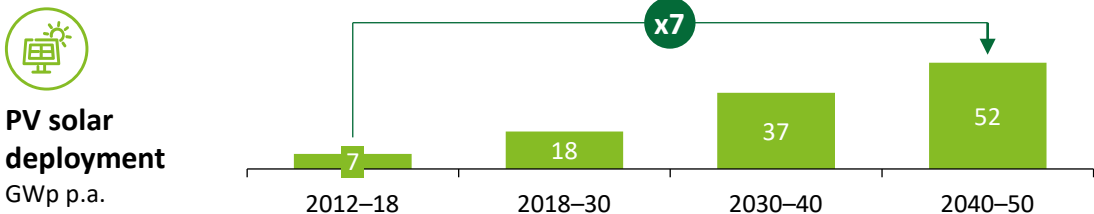


To meet rising power demand while progressing toward its climate goals, Europe will likely need to increase investments in solar and wind—along with manufacturing capacity for battery cells and heat pumps

EU production capacity needed for clean tech and targets



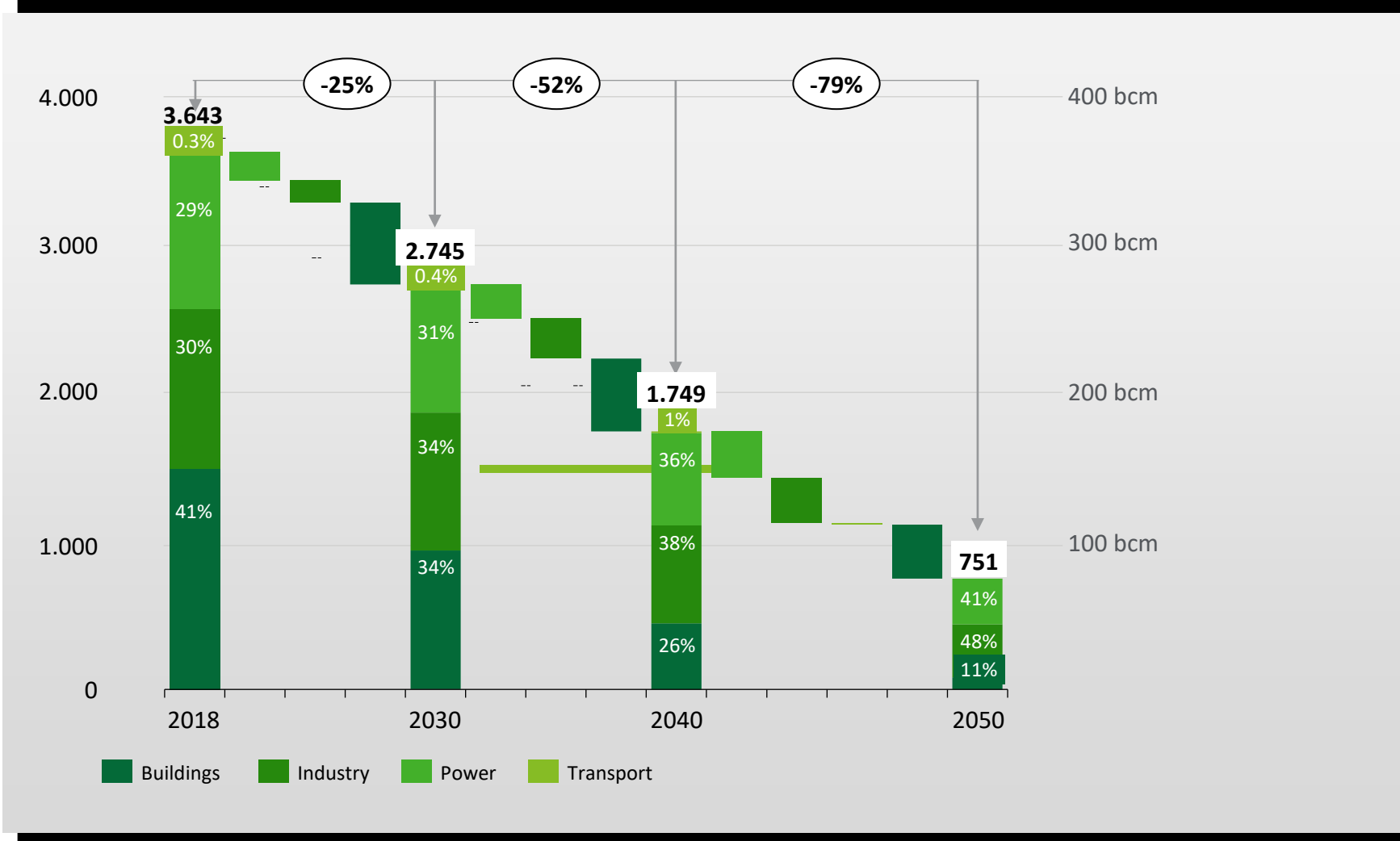
Deployment rates for EU power infrastructure¹⁵



Sources: SolarPower Europe¹¹, European Union¹², Important Project of Common European Interest (IPCEI) Batteries¹³, International Energy Agency; European Heat Pump Association¹⁴ and Deloitte¹⁵

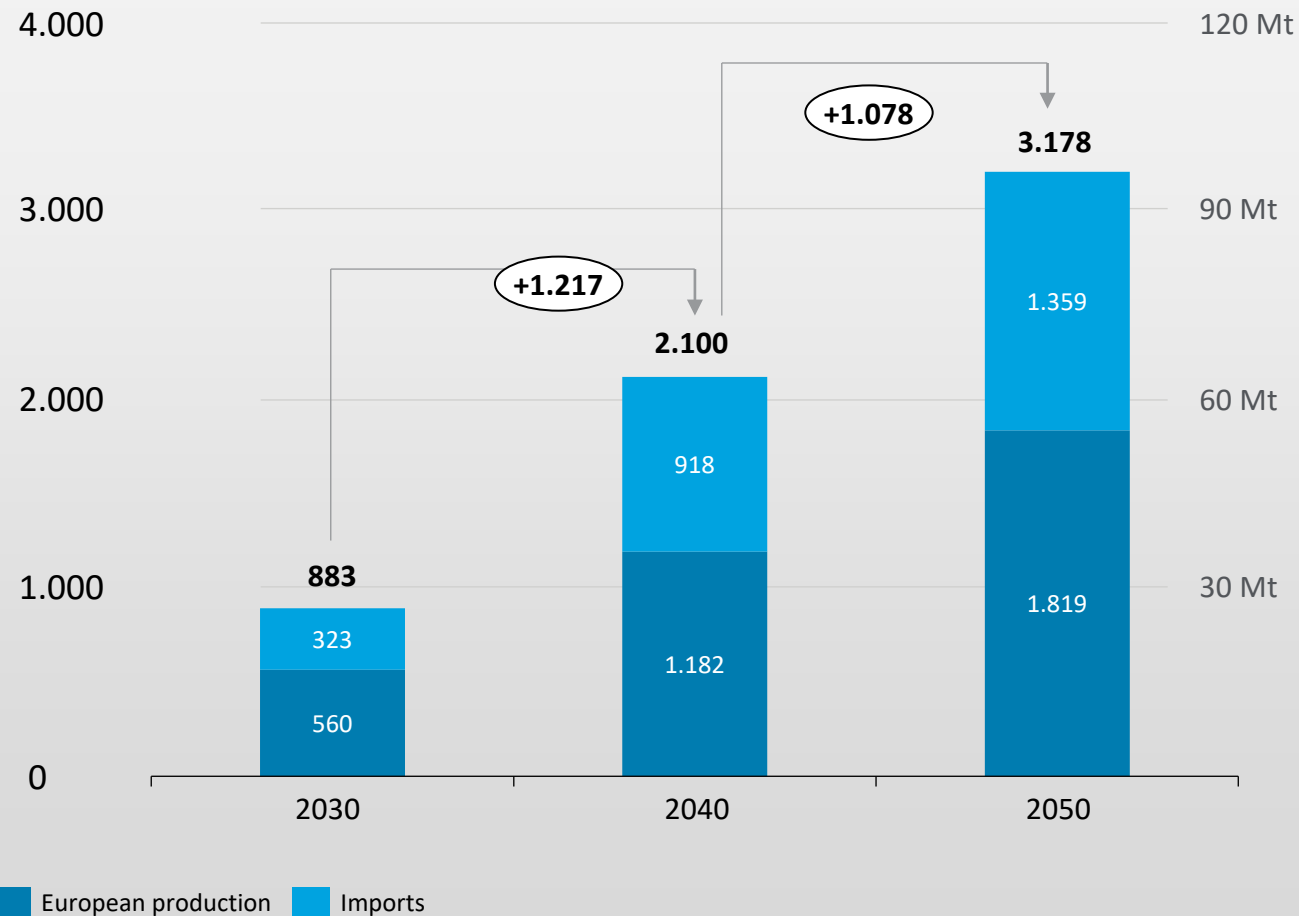
As Europe moves toward net-zero, natural gas demand will likely drop, due to heating electrification and industrial substitution of low carbon gases

Projection: EU natural gas consumption, TWh¹



While demand for natural gas is expected to reduce, demand for hydrogen will likely more than triple by 2050, driven by industrial and power plant usage

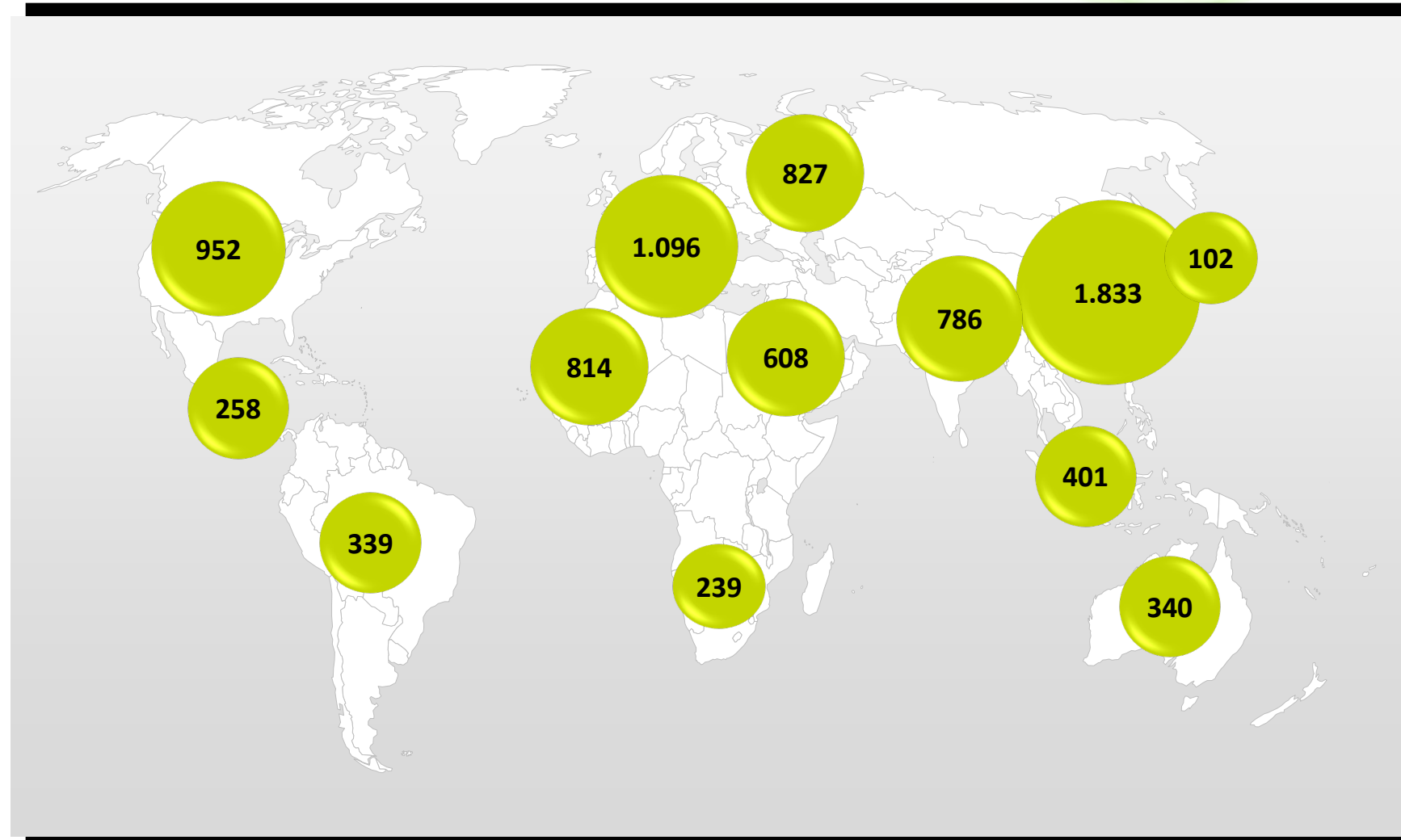
European hydrogen and derivatives production and imports, TWh²



€1 trillion will likely be required for the European hydrogen supply chain by 2050

Cumulative investment in the hydrogen supply chain by 2050, €BM

One part of Europe's hydrogen supply will likely be produced within the EU, but an even larger part may need to be imported, specifically from the Global South.



The €3.1 trillion question: How do we accelerate clean tech while delivering energy reliably and affordably?



Three likely requirements for a successful European energy transition

1

Execution

It's time to move beyond planning

- Policymakers should place greater focus on defining step-by-step implementation planning.
- Regulation, including licensing and permitting, should be accelerated and automated.
- To engage demand, a consistent, comprehensive, and creative energy policies will be needed.

2

Patience

Stakeholders may need to accept longer time horizons

- Other energy transitions have taken 30 years or more.
- Both politicians and public and private stakeholders should embrace long-term planning.
- Unrealistic targets have the potential to backfire.

3

Funding

Big change takes big investment

- Infrastructure will likely require significant capital.
- Rising interest rates aren't helping.
- Collaborative, hybrid financing—public and private—could attract more investment.

Endnotes

1. International Energy Agency (IEA), [World Energy Investment 2024](#), 2024.
2. Reuters, [EU carbon market emissions fall record 15.5% as renewable power soars](#), accessed 2 July 2024.
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4. Deloitte, [Green hydrogen: Energizing the path to net-zero](#), 2023.
5. International Energy Agency (IEA), [World Energy Investment 2024](#), 2024.
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7. United Nations Environment Programme (UNEP), [Emissions Gap Report 2022](#), 2022.
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14. International Energy Agency, [Heat pump manufacturing capacity by country or region according to announced projects and in the net-zero scenario](#), accessed 24 June, 2024; European Heat Pump Association, [EU plan will boost heat pumps but aims too low](#), accessed 24 June, 2024.
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16. Deloitte and Öko-Institute, [Natural Gas Demand Outlook to 2050](#), 2023.
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