EDF's Pathway to a Competitive, Sovereign and Decarbonised Europe

Brussels, April 15th, 2026

Electrification supports competitiveness, sovereignty and decarbonisation

Since EDF's last publication, **geopolitical and economic changes have reshaped the global energy context**, urging Europe to reduce its exposure to fossil fuel imports and external shocks.

Europe's strategic choices remain strong: prioritising decarbonised energy produced in Europe lowers fossil-fuel dependence and geopolitical vulnerability. Without doubt, **decarbonised electricity strengthens** by 2050:

COMPETITIVENESS	SOVEREIGNTY	CLIMATE NEUTRALITY
5x	**-85%**	**0 tCO_2**
More resilient to fossil price shocks	*reduction on fossil fuel imports*	*net emissions by 2050*

Delivering Net Zero requires to:
"Consume less energy", "Electrify more", "Produce decarbonised power efficiently", "Decarbonise the remaining energy mix"

EDF offers a **robust system-level analysis** of the energy transition and derives **clear and actionable recommendations to enhance competitiveness, sovereignty and achieve decarbonisation.**

A Robust Methodology for a Pathway to a Competitive, Sovereign and Decarbonised Europe

Multi-energy modelling for 16 European countries *

Efficient multi-energy mix, considering:

- **Feasibility constraints** (physical, technological, societal)
- **Breakthrough technologies** (CCS, e-fuels) based on our **assessment** of innovation prospects

Efficient electricity mix:

- Based on an **hourly supply-demand balance analysis** with more than **90 climate years**
- Relying on an adequacy analysis that meets **security of supply** requirements of each country

Optimisation based on welfare maximisation, cost minimisation and system resilience.

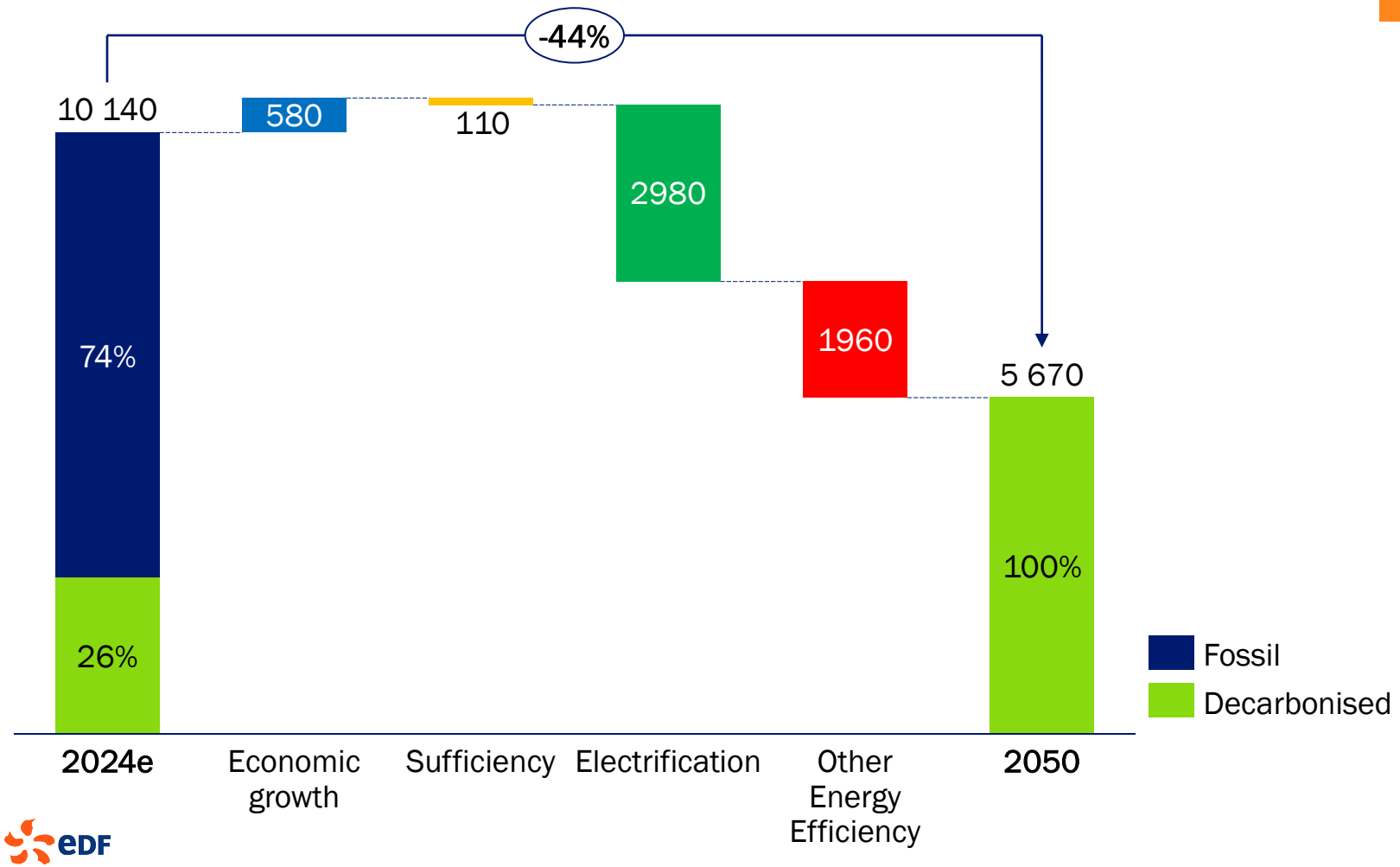
In the following slides, all figures are computed on EDF's NZ perimeter and stated in €24.

** Austria, Belgium, Czechia, France, Germany, Hungary, Ireland, Italy (multiple zones), Luxembourg, The Netherlands, Poland, Portugal, Slovakia, Switzerland, Spain, United Kingdom*

“Consume less energy” despite economic growth through Electrification and Energy Efficiency

Total Final Energy Demand In 2050 Compared to 2024 (TWh)

Excl international bunkers, feedstock and losses / energy sector

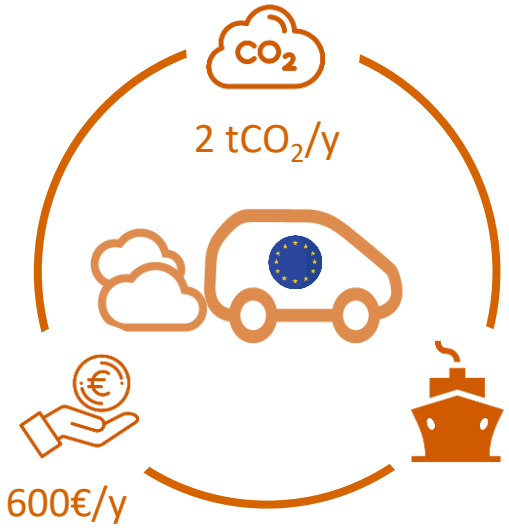


Reducing total final energy demand is essential to Europe’s energy transition, competitiveness and sovereignty.

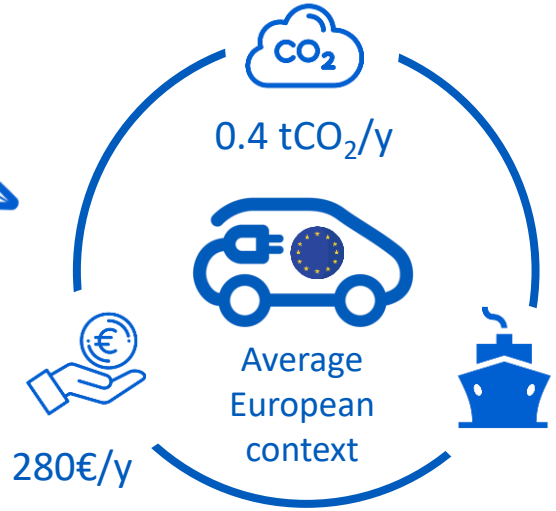
Although the economy is expected to grow, **total final energy demand declines by 2050 thanks to electrification**—the most powerful tool to **support the EU’s Energy Efficiency First principle**.

The technologies already exist, and many of them are locally produced: heat pumps for heating, electric cars for mobility, electric furnaces and boilers …

“Electrify more” to reduce energy consumption, imports of fossil fuels and CO_2 emissions starting today

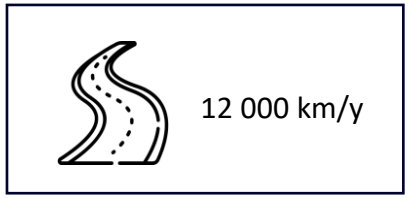


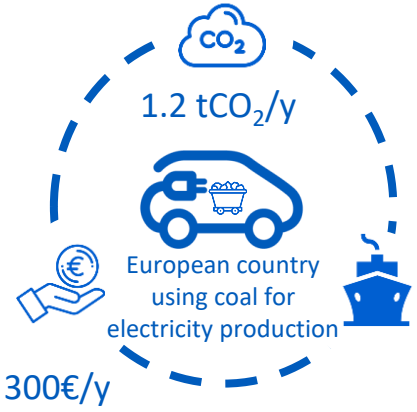
8 MWh of imported oil
(850 L of gasoline)



0.6 MWh of imported gas
(for 2 MWh of European power)

Electrification already reduces CO_2 emissions in Europe, even in European countries with a more carbon-intensive power mix.





0.4 MWh of imported gas and 0.8 MWh of mostly local coal (for 2 MWh of electricity)

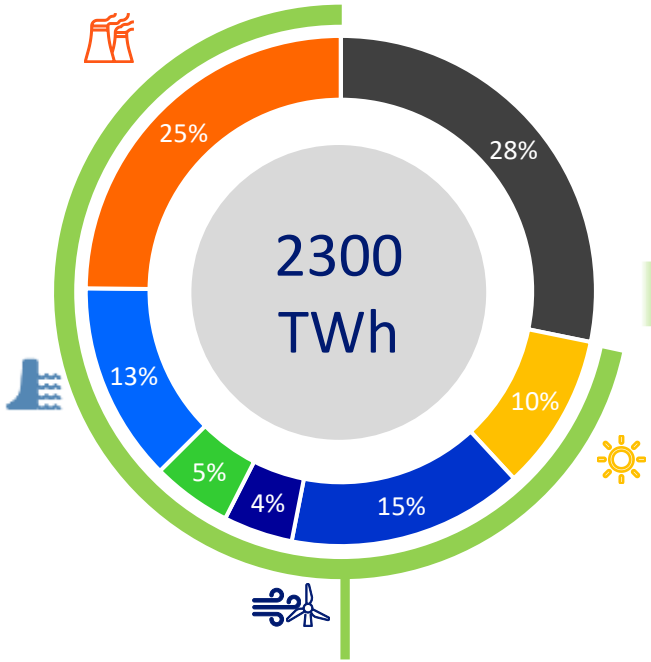
Similar conclusions for Heat Pumps and <150°C processes in Industry

“Produce decarbonised power efficiently” through a diversified mix combining nuclear, vRES and additional dispatchable assets

Total Electricity Generation

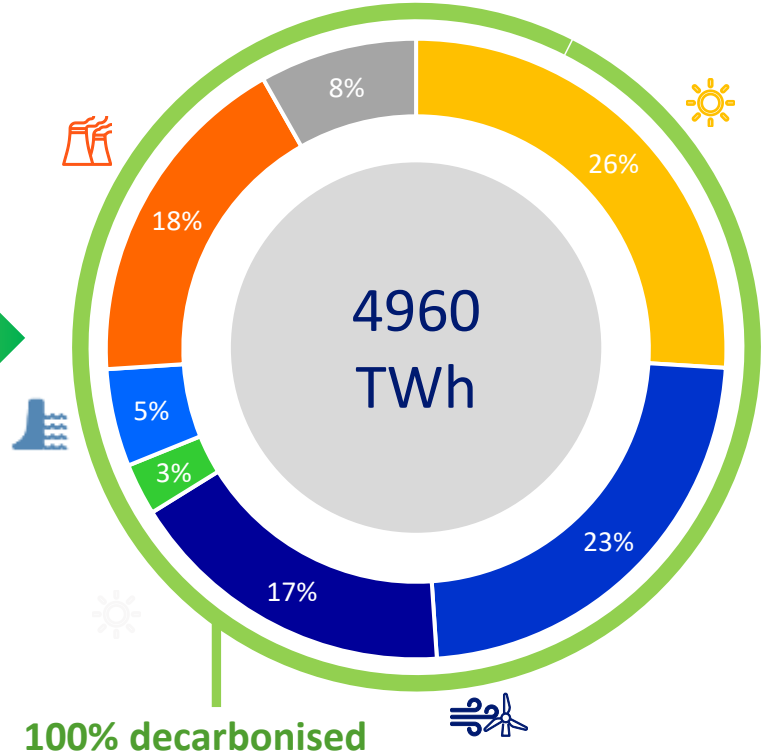
Incl. international bunkers (maritime and aviation)

2024*



72% decarbonised power production

2050



100% decarbonised

Fossil | Onshore | Offshore | Solar | Bio & other renewables | Hydro | Nuclear | Decarbonised Thermal

Achieving Net Zero requires mobilising all decarbonised technologies to meet **growing electricity demand**.

A resilient and cost-efficient power mix combines nuclear energy, variable RES, short term flexibility and dispatchable assets - such as hydropower and decarbonised thermal generation (e-fuels and/or CCUS) - to safeguard **security of supply**.

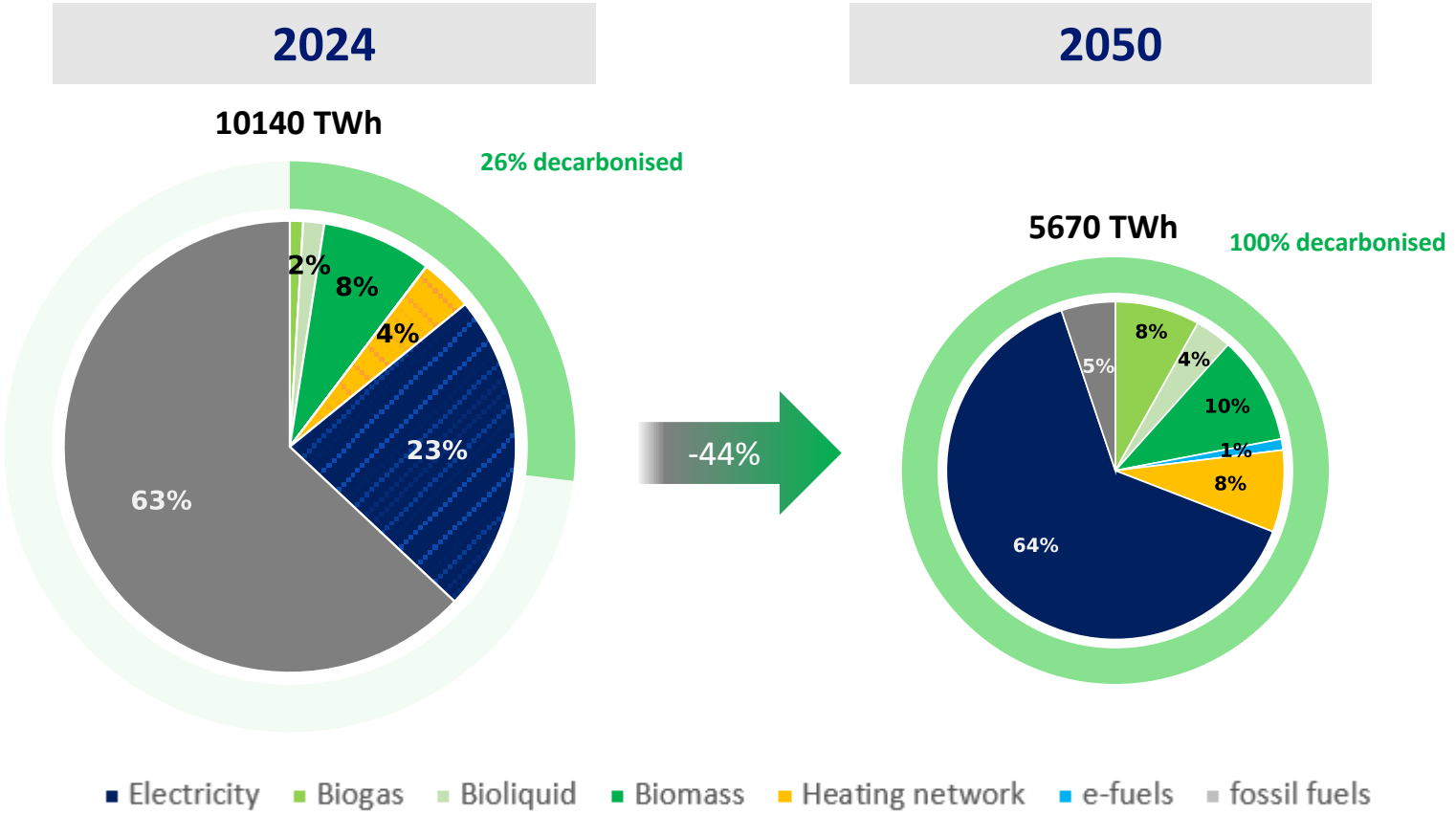
This can only be achieved with massive **investments in networks** upgrade.

*Source: ENTSOE, UK Department for Energy Security & Net Zero

“Decarbonise the remaining energy mix” and tackle challenges related to technology maturity and resource availability

Final Energy Consumption by Vector

Excl. international bunkers, feedstock and losses/ energy sector



ELECTRONS

72% decarbonised → 100% decarbonised

HEATING NETWORKS

33% decarbonised → 100% decarbonised

MOLECULES

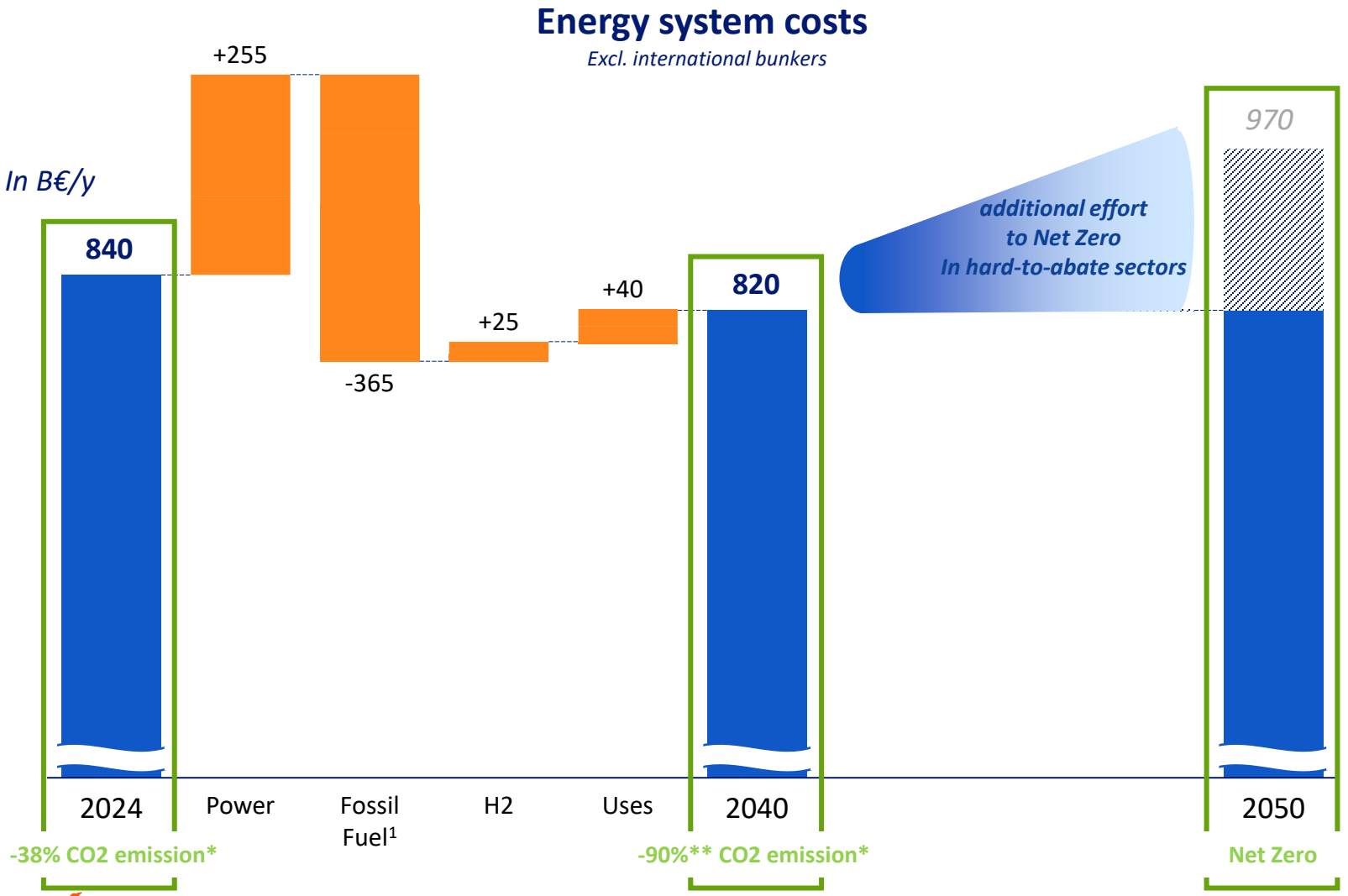
Fossil fuels → Bioenergy, e-fuels & H2, CCS & DACCS

FOSSIL FUEL IMPORTS

290 B€ → 60 B€

** 55% of H2 is produced via electrolysis, increasing total share of electricity production in the energy mix*

Achieving Net Zero requires deep transformation, EDF's system-level analyses propose clear recommendations to deliver this ambition



* compared to 1990

** including 5% of reduction outside EU

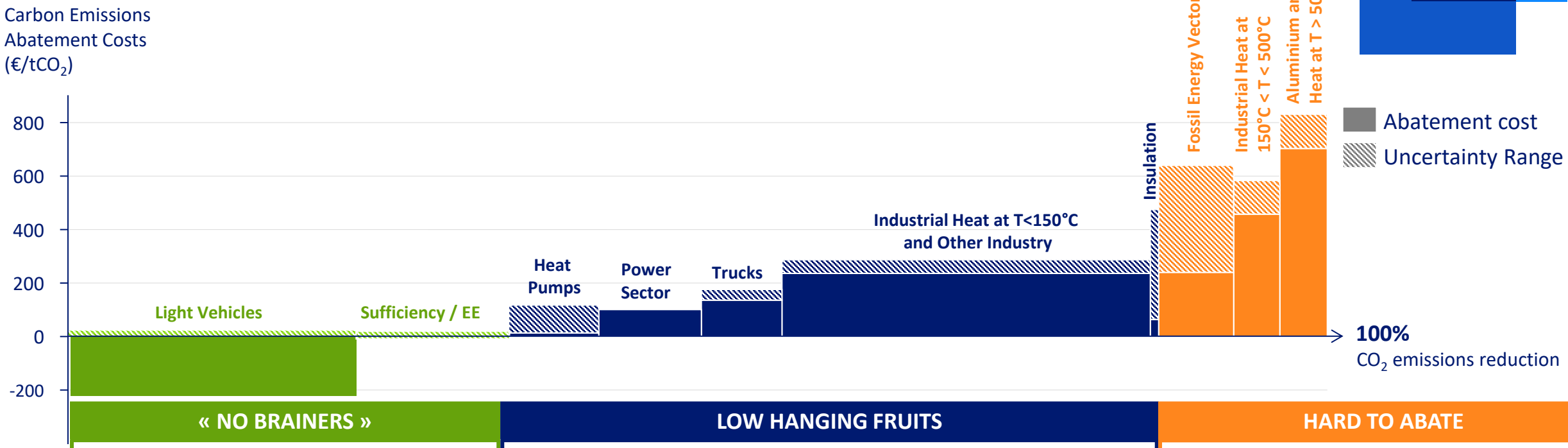
Most of the decarbonisation pathway will **redirect spendings from fossil imports towards local EU investments**, while **keeping overall energy costs in check**. This will support Europe's **economic development**.

The final steps may increase energy costs, but adopting a **system-wide perspective** and **boosting innovation** is essential to minimise these costs while strengthening Europe's resilience to gas and oil price volatility and enhancing industrial competitiveness.

EDF provides recommendations to help achieve the European goals.

[1] 2050 fossil fuel prices:
- Natural gas: 30€/MWh
- Oil: 39 USD/bbl

#1 Recommendation: prioritise the most cost-effective abatement actions without delay



« NO BRAINERS »	LOW HANGING FRUITS	HARD TO ABATE
Investments that already generate **economic gains today**, such as light electric vehicles, behavioural changes and the switch to energy-efficient appliances.	Investments in technologies that are **sufficiently mature** today but still **require some investment support** such as heat pumps, the decarbonisation of the electricity sector, electric trucks, enhanced buildings insulation, industrial heat at T < 150°C and other industrial sectors like steel, cement, glass, fertilisers, paper and chemicals.	Decarbonisation of sectors that rely on **immature technologies** and / or **major financial support**, like the final steps of decarbonisation of the aluminium sector, industrial heat at T > 150°C or the decarbonisation of remaining fossil fuel consumption.

Investments related to electrification are among the cheapest and the most efficient in terms of decarbonisation. **Electrification should therefore be largely promoted at EU and national level** through lower taxes on electricity, adequate public support, innovative financing and robust carbon pricing.

#2 Recommendation: accelerate Electrification to enhance Competitiveness, Sovereignty and reach Carbon Neutrality

Electrification boosts Europe's competitiveness by stimulating local industrial activity, supporting European value chains, boosting employment and keeping system costs in check.

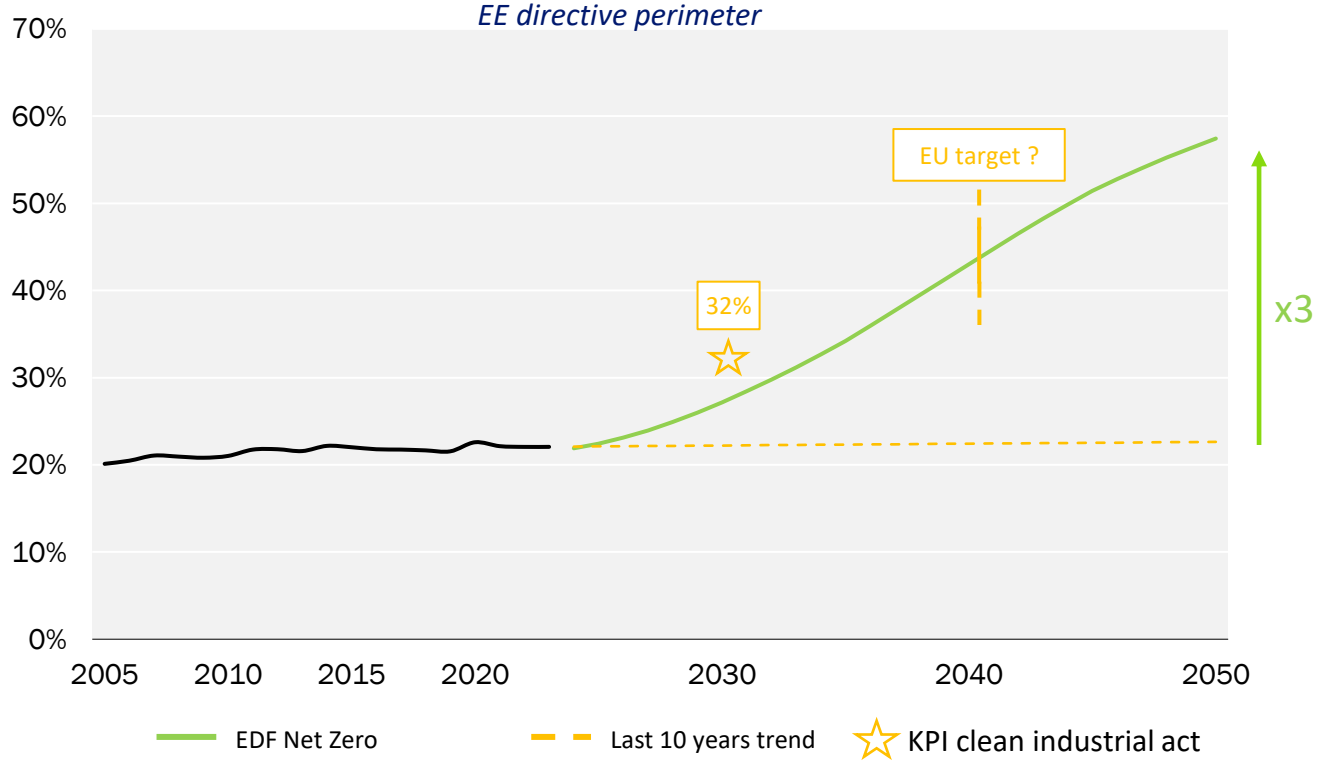
Electrification strengthens European sovereignty by improving energy efficiency, reducing fossil fuel imports and reinforcing local technological leadership.

Even before reaching a 100% decarbonised power mix, **Electrification lowers carbon emissions**.

% Electrification of Final Energy Demand

EDF's Net Zero geographical perimeter excl. UK and Switzerland

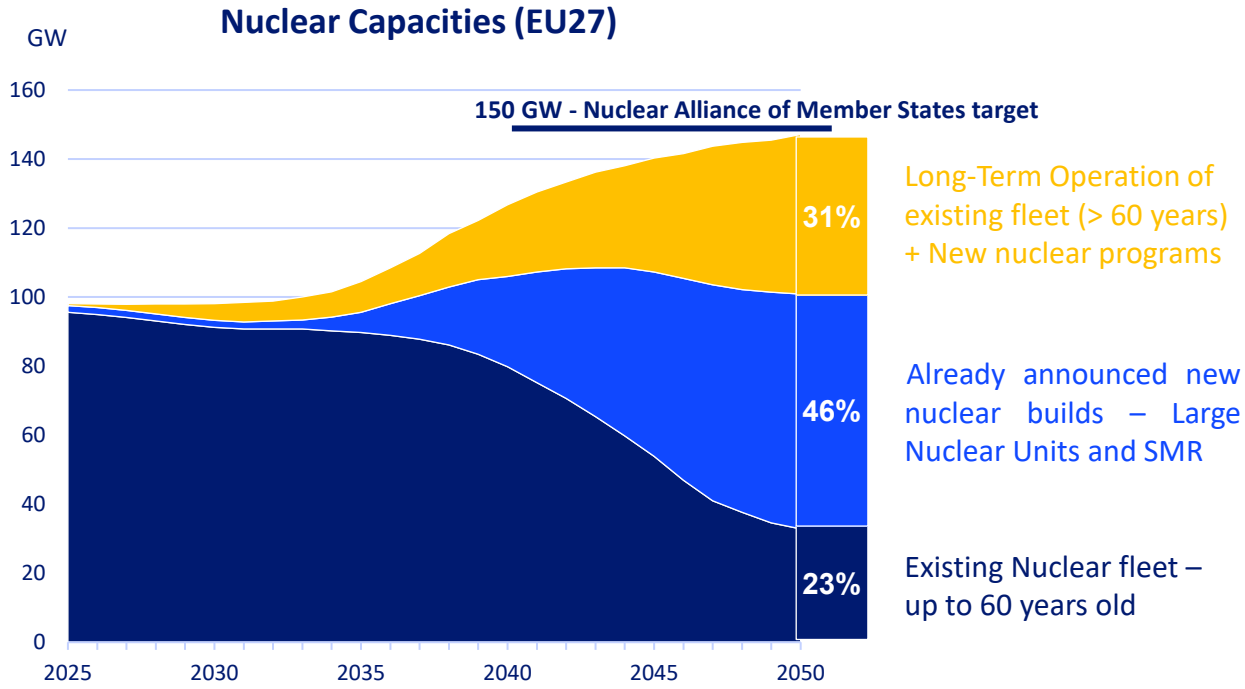
EE directive perimeter



After decades of stagnation, electrification rate must increase dramatically:

- unlock **transport electrification** by keeping an ambitious trajectory for 2035 objectives and on corporate fleets;
- introduce innovative financing tools to **support investments in heat pumps for buildings**;
- **allow CAPEX and OPEX support in industry, redirect ETS revenues and kick-start the Decarbonisation Bank.**

#3 Recommendation: promote nuclear power development to reinforce price stability, sovereignty and European industry



Long-Term Operation of existing fleet (> 60 years) + New nuclear programs

Already announced new nuclear builds – Large Nuclear Units and SMR

Existing Nuclear fleet – up to 60 years old

Nuclear power makes a major contribution to EU's net zero ambitions, as a **decarbonised, energy-dense and dispatchable technology.**

- It provides **flexibility** and **essential services** (inertia, frequency stability, voltage regulation), reducing electricity system costs, and thus consumer bills.

New builds and Long-Term Operation will represent 77% of nuclear capacity by 2050 and should be **supported as an industrial priority**.

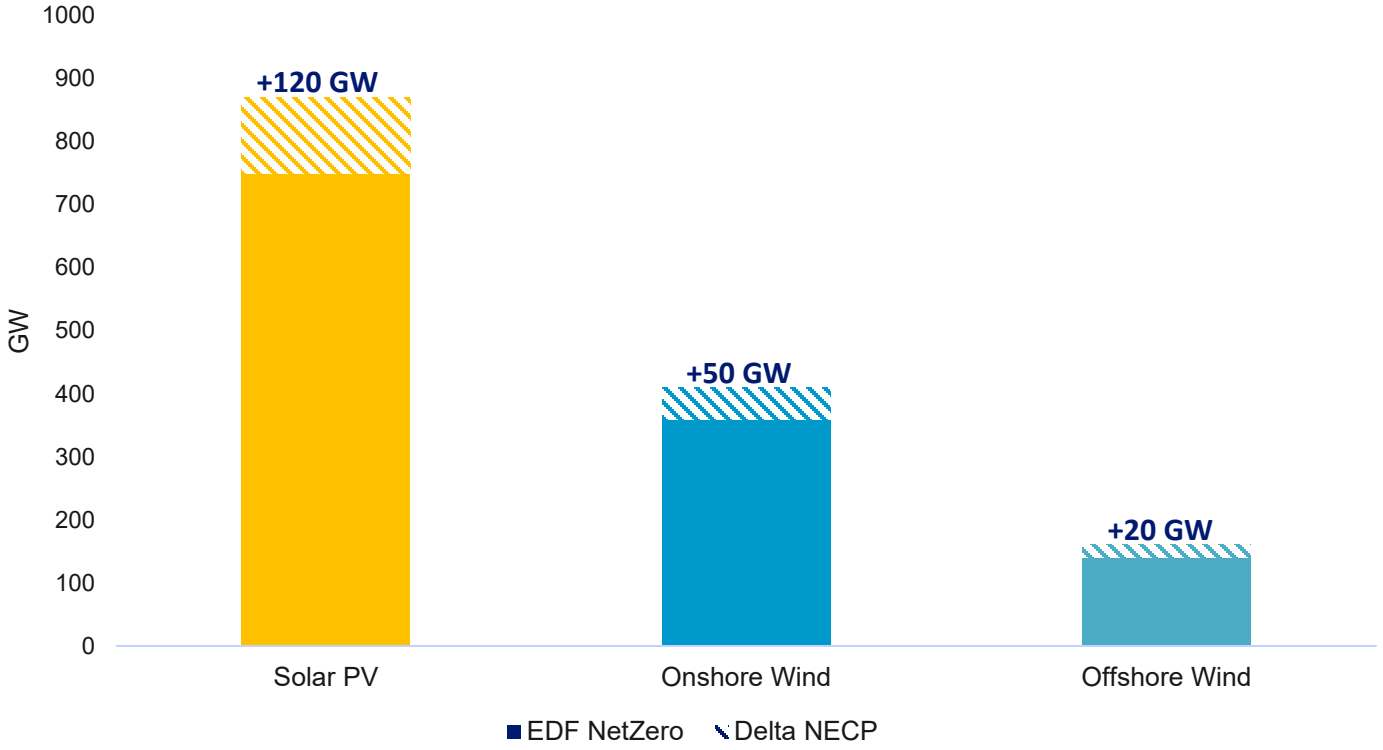
- Investing in Nuclear fosters European industry and local qualified jobs, thereby **strengthening Europe's energy independence**

Nuclear energy is **a key pillar for achieving climate, sovereignty and competitiveness objectives.** Therefore, we must provide it with an appropriate policy and financing framework **to allow the scale up of nuclear energy**

- Recognize the **decisive contribution** of nuclear within a system approach, strengthening the European supply chain;
- Facilitate access to funding by defending **technological neutrality;**
- Support workforce training and R&D in advanced nuclear technologies to design + build + operate + manage nuclear plants and fuel facilities

#4 Recommendation: pursue a European systemic approach by better coordinating national strategies

Renewables Capacities: EDF Net Zero and NECPs in 2035



Additional Curtailment with NECPs targets

+225 TWh vs EDF Net Zero in 2035

System Cost Divergence due to NECPs targets

+24 B€ vs EDF Net Zero in 2035

Political **coordination** between Member States on energy policy would allow mutual benefits of national choices and significantly **reduce total system costs**. It should be based on a system-wide electricity perspective integrating balanced mixes and network development.

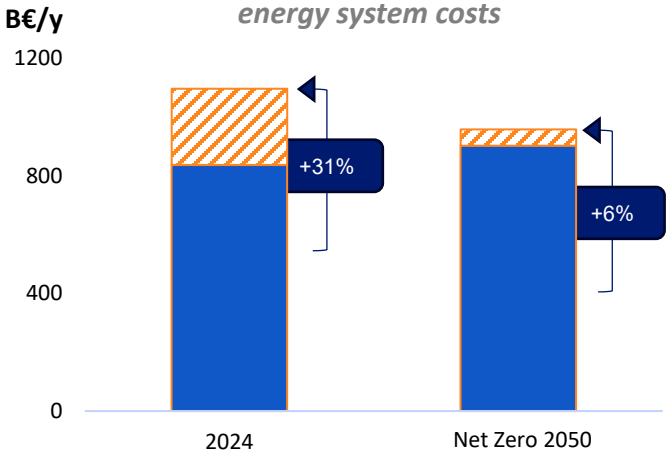
In depth coordination on NECPs at the regional level would be a strong 1st step.

Electrification leads to enhanced European competitiveness, sovereignty and carbon neutrality by 2050

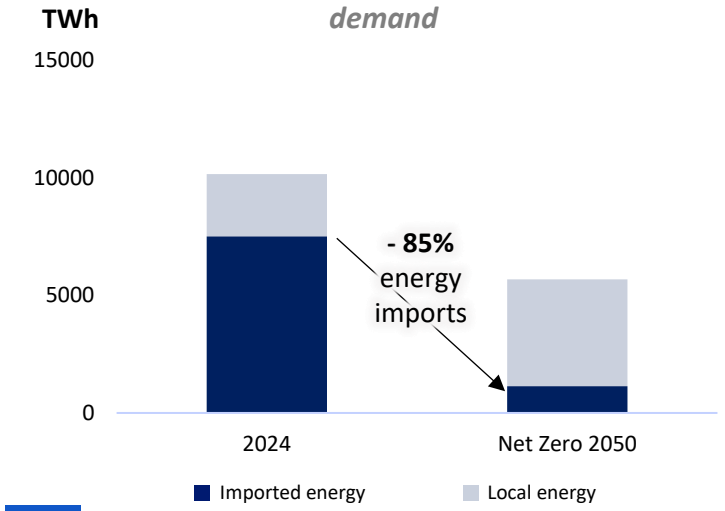
Electrification requires to keep a **stable regulatory framework**:

- An efficient market design based on marginal pricing combined with LT contracts
- A robust ETS with LT visibility and strategic revenue redistribution to encourage investments in decarbonisation

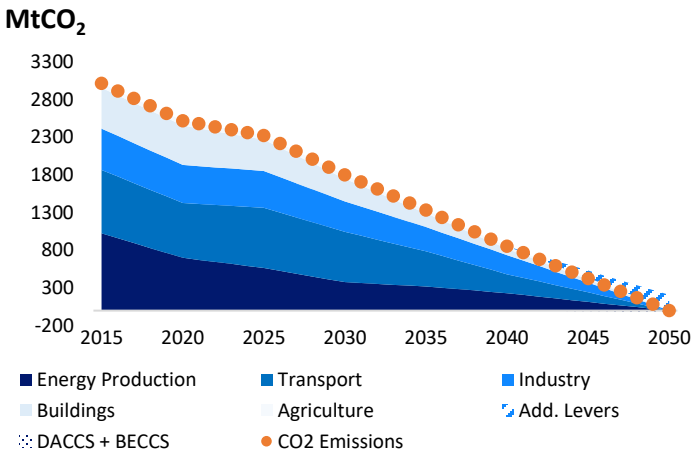
Impact of +100% on fossil fuel price on total energy system costs



Share of imports in total energy demand



Total CO_2 emissions



Improve resilience to fossil fuel price shocks

Boost European energy and industrial sovereignty

Reach carbon neutrality by 2050


Thank you