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2040 Communication & Accompanying Impact Assessment: Our Analysis

Presentation Outline




01

PROCESS

The what?
The why?
The when?

02

MAIN TAKEAWAYS

Our five key takeaways?

03

QUESTIONS ANSWERED

Answers to 20 “need to know” questions

04

DEEP DIVE

Targets & Scenarios
Power sector Investments

05

OTHER ISSUES

LULUCF, CC(U)S, Security of supply, Farmers’ protests etc

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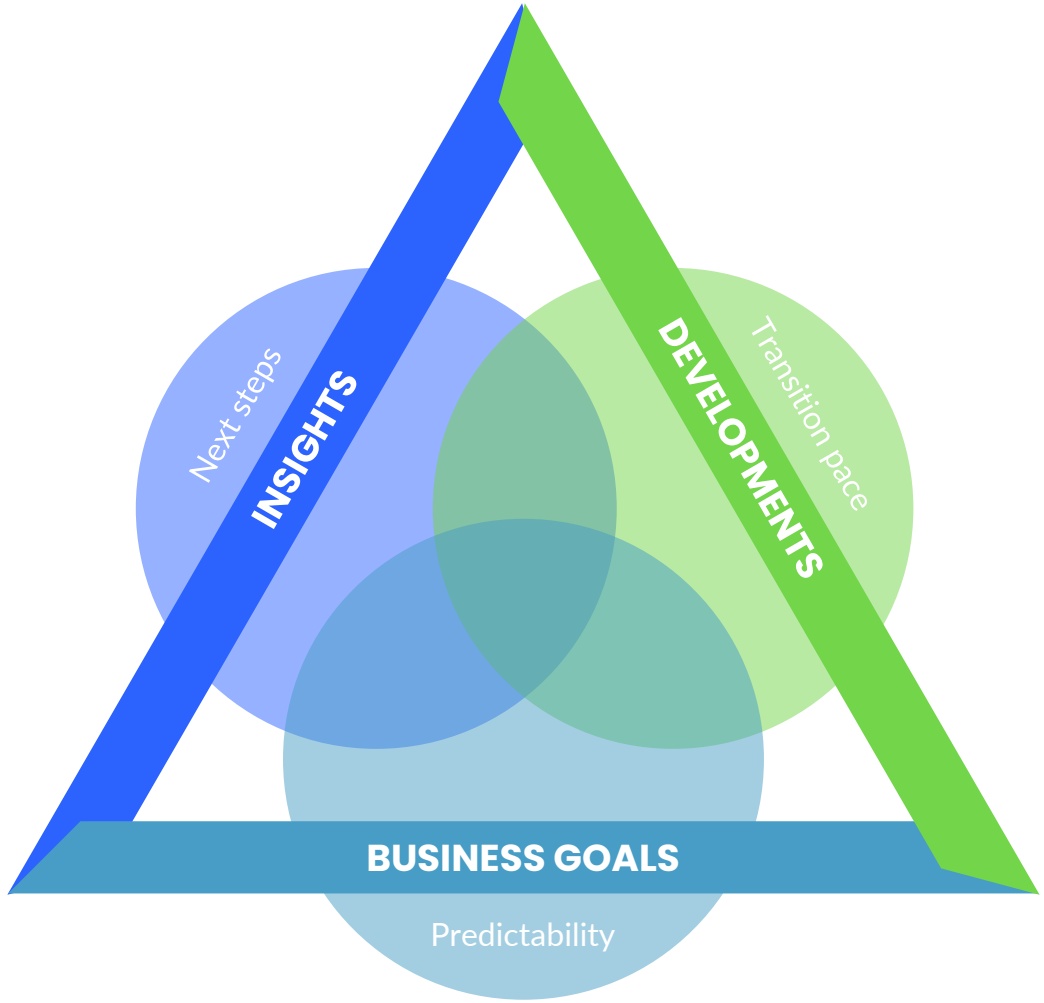
Disclaimer

- This slide deck represents Eurelectric's initial analysis of the Commission's Communication and Impact Assessment.
- It does not represent the Eurelectric position and does not reflect the views of our members.
- This analysis might contain oversights and inaccuracies, your input is most welcome.

Why it matters ?

The Communication and impact assessment are important in that they give a clear insight into the Commission's thinking.



Whatever your issue or interest, in the impact assessment you can see how the Commission sees things developing up to 2040 and 2050.

The Communication and impact assessment enable the wider economy to identify pressure points and prepare.

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1. Process

2040 Framework – state of play

We are Here!

06 February 2024 The European Commission published its Communication and accompanying impact assessment on the EU climate targets for 2040.

The full legislative package is expected to be tabled by the incoming Commission and trigger the revision of the Climate Law

When approved through the co-decision process, it will make a target for 2040 legally binding.

After the 2040 target has been agreed upon, the post-2030 policy framework will be developed (proposals possible by 2026).

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2. Our Main Takeaways

2040 Communication: Our main takeaways

1

Electrification is key

Reasonable level of ambition on electrification (48-51%) by 2040, but high on indirect electrification. H2 demand to go 5 times the current level (7.4mn tonne to 35mn tonne)

2

Power sector decarbonises

Power sector achieves CO2 negative in S3 & is almost net-zero in S2 scenario. CCS is used in the fossil power plants to achieve carbon neutrality.

3

High ambition

3 scenarios analysed: 80%, 85-90% and 90-95%. A target of 90% can be expected. The IA EC stresses that keeping up with today's pace would already bring the EU to a -88%

4

No U turn

Focus on further electrifying the economy, speeding up the roll-out of RES, with a 3.6-4 x increase by 2040. No power system adequacy demonstrated.

5

Strategic autonomy

Trade measures, resilience & expectations on an accelerated decarbonisation in 3rd countries.

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3. Key Questions Answered

Is this strategy different?

What stays the same?

Ambitious GHG reduction targets-powered by electrification: the focus remains to electrify the economy more, improve energy efficiency & promote greatly the speed up and roll-out out of renewables.

What is new?

A. Increased trajectory

Whereas a simple application of a linear trajectory between 2030 and 2050 would translate into a 75.5/78.5% emissions reduction in 2040, the Commission considers that implementing existing policies would already lead to 88% emissions reductions. 90% is above that.

B. Betting on Carbon Capture & Removals:

Carbon capture & removals are more prominent than in previous strategies. Across the scenarios, the Commission places a huge bet on technologies that are yet to prove their efficiency in cutting emissions.

C. Focus on strategic autonomy & resilience

The recent crises seem to have a high influence on the positioning, driving a more in-ward and self-sufficiency focus to reduce exposure to external volatility and supply chain bottlenecks

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Squaring the circle on carbon

Is the EU decarbonising fast enough?

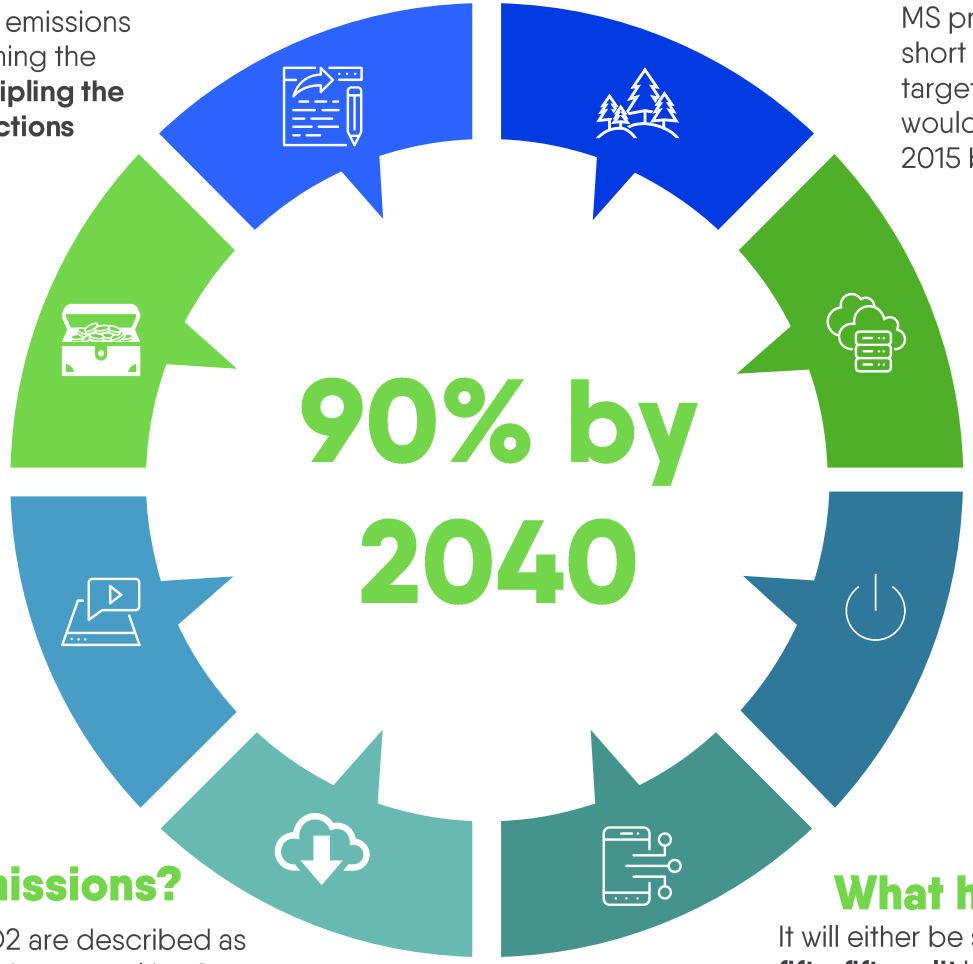
By 2022, the EU reduced its GHG emissions **by 32% compared to 1990**. Reaching the 2030 55% climate target means **tripling the pace of the average annual reductions** achieved over the past decade.

What role for LULUCF?

MS projections show that planned measures are falling short by 50MtCO2e to meet the 2030 net removal target of 310Mt CO2e. By 2040 LULUCF net removals would be limited to **-218/-317 MtCO2e** (below the 2015 baseline **– 322 MtCO2e**)

What is the carbon budget?

The GHG budget is the **total volume** of EU net greenhouse gas emissions that can be emitted up to 2050. In 2021, total net GHG emissions of the EU **was 3242 MtCO2eq**.



What role for CC(U)S?

The Commission wants **CCS to play a key role.** Industrial Carbon Management Communication sets out a roadmap to deploy the necessary CCS and CCU technologies for hard-to-abate sectors & create a single market for captured CO2.

What is the 2040 CO2 budget?

The level of remaining EU emissions in 2040 should **be less than 850 MtCO2,** and carbon removals should reach up to 391 MtCO2 by 2040, under the 90% target.

CCS in the power sector?

High demand for capturing is envisaged. CCS for fossil-fuelled plants & "the biomass + DACC" would lead to **similar needs as industrial processes. 62% in power sector.**

What are negative emissions?

Practices or technologies that remove CO2 are described as achieving 'negative emissions'. They are either natural '**carbon sinks' or chemical processes to capture CO2** directly from the atmosphere.

What happens to the captured carbon?

It will either be stored or reused. In S1 there is a **fifty-fifty split** between storage and reuse (i.e. e-fuels), while in S2 & S3 roughly **1/3 is reused & 2/3 injected** underground.

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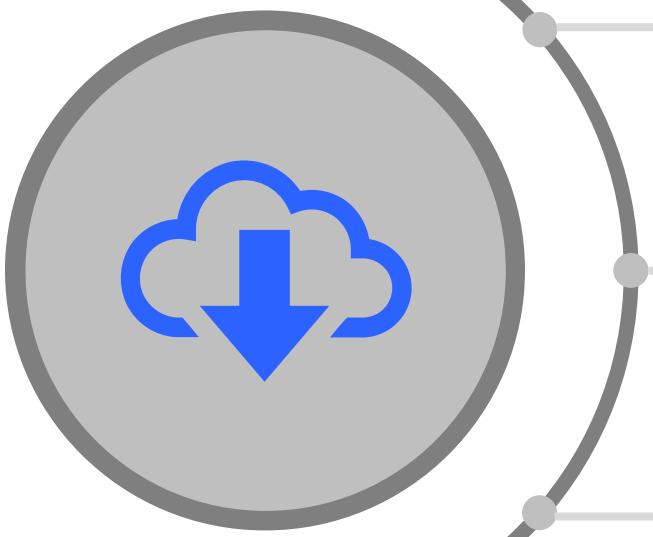
What sectors will decarbonise most & what are the specific sectoral GHG reduction targets?



Power

The power sector will be fully decarbonised by 2040 with **nuclear and renewables poised to represent 90% of generation.**

Transport

Transport **emissions could drop by 69-78%** compared to 2015. Current policies would lead to **quadrupling the electrification** of the sector over 2031-2040.

Buildings

The buildings sector **will see 75-85% drop in emissions**, thanks to a rapid phase out of fossil fuels. Oil & coal being almost entirely phased-out by 2040 and natural gas phased-out by mid-century.

Industry

Industry is likely to see a **56-84% cut in emissions** against 2015 levels, due to electrification and implementation of new manufacturing technologies.

Agriculture

Depending on the scenario, **between 9% and 30% of** emissions could be reduced by 2040. However roughly 65% of emissions will still be there in 2050.

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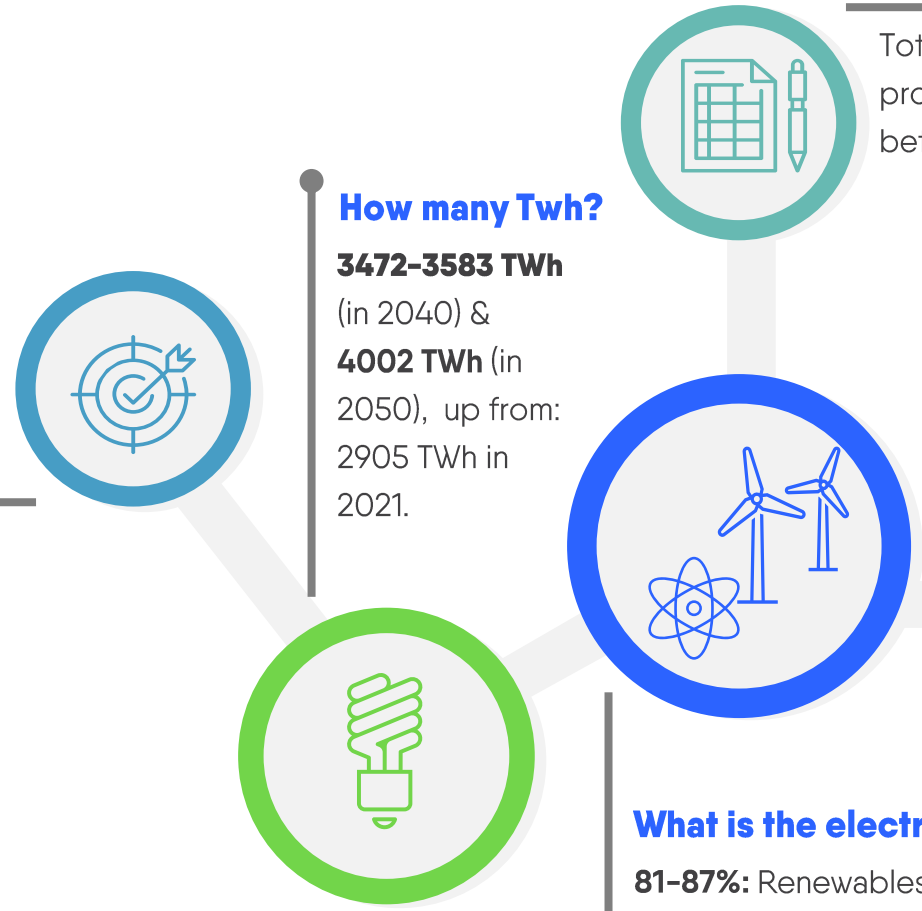
Power sector in a nutshell: EC views



How much growth?

Total installed capacity is projected **to grow > 2 times** between 2022 & 2040.

How many Twh?

3472-3583 TWh (in 2040) & **4002 TWh** (in 2050), up from: 2905 TWh in 2021.

How will the system be balanced?

Up **to 10 x increase** in total storage capacity (from 50 to 531-636 GW) by 2040.

What level of electrification?

48-51% of final energy consumption by 2040, & up to 62% in 2050.

What about electricity prices ?

In 2040: average electricity production cost of 94-97 euros/MWh

Industry : 130-131 EUR/MWh

Services : 249 EUR/MWh

Households: 288 EUR/MWh

What is the electricity mix?

81-87%: Renewables

11-10%: Nuclear

8%-3%: fossil-fired power generation, phased out coal.

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3% of GDP/year to transition away from fossil fuels

Do fossil fuels have a future?

The consumption of fossil fuels for energy by 2040 is expected to reduce by approximately 80% compared to 2021 and coal will be phased out.

What about hydrogen?

The hydrogen production in the EU is in the range of 60 to 100 MTOe (698 TWh to 1163 TWh) for 2040. This is between 21 to 35 million tonnes of hydrogen produced in the EU.

How much H2 currently produced?

In 2022, EU had a hydrogen production capacity of 10.4 million tons/year. 4 % of this capacity is from electrolysis & > 90 % is from steam methane reforming using natural gas.

What about the ETS ?

- Cap reaches 0: ETS1 (2039) & ETS2 (2044);
- Carbon pricing levels the playing field between electricity & fossil carriers
- Possible extension in upcoming revision

How much will it cost?

Annual average investment in the energy system, excluding transport, needs to reach about 660 billion (2031 to 2050). This represents an increase compared to 2011 – 2020, rising from 1.7% of GDP in 3.2% in 2031-2050

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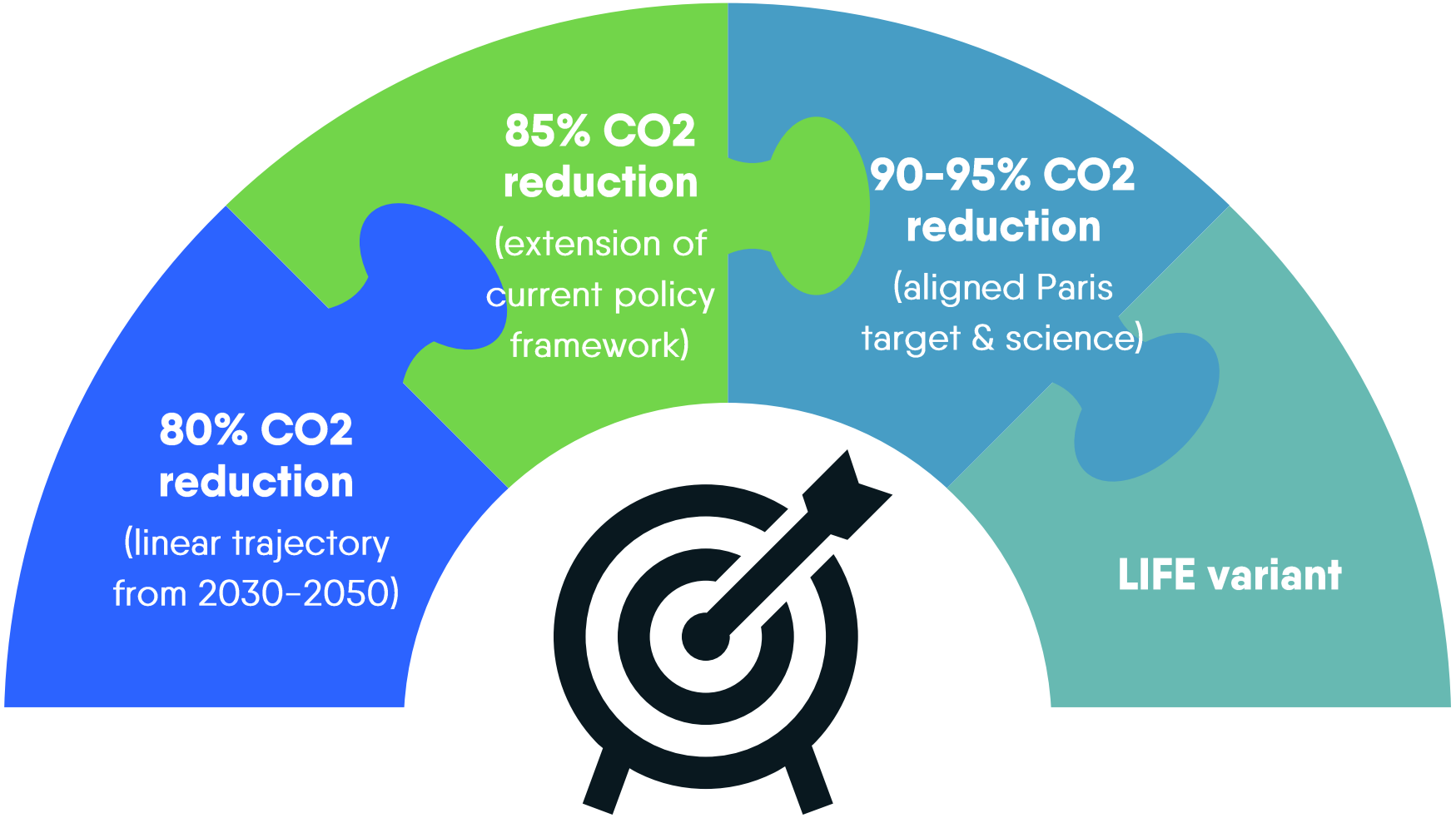
4. Deep Dive on Key Issues

a. Targets & Scenarios
b. Power Sector Analysis
c. Investments

A. Targets & Scenarios

Targets: 3 scenarios & a variant



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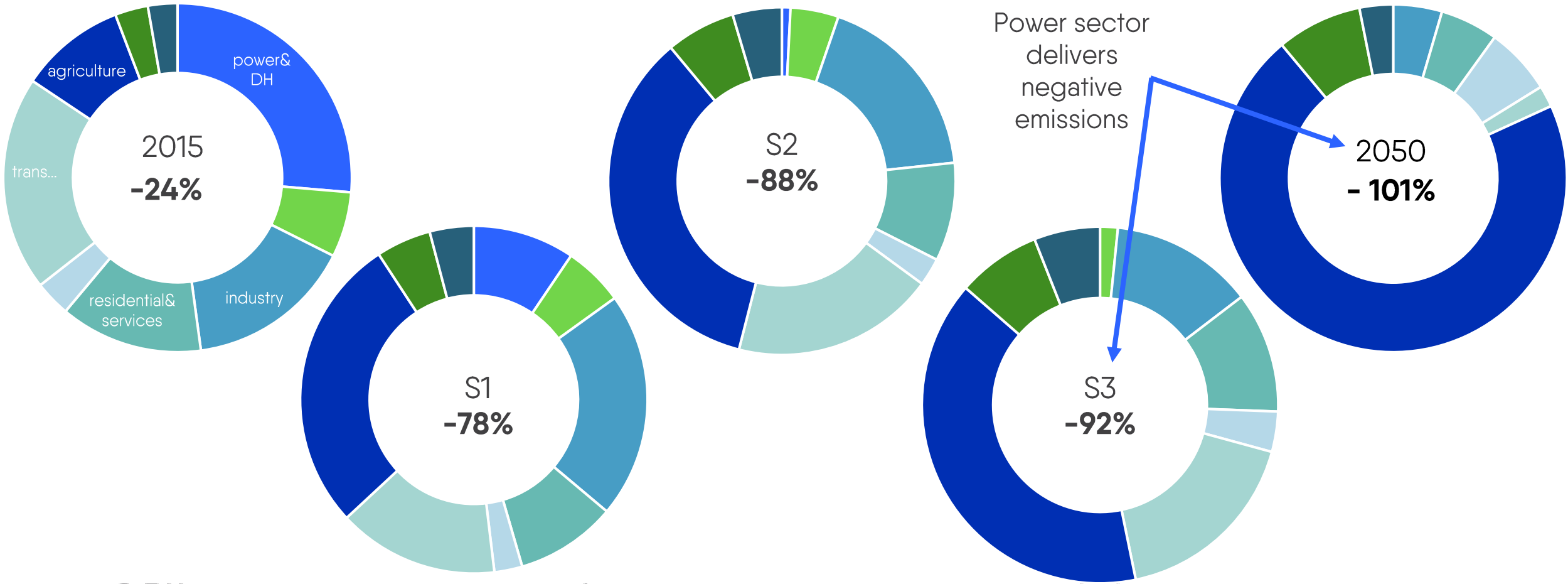
Power sector delivers negative emissions



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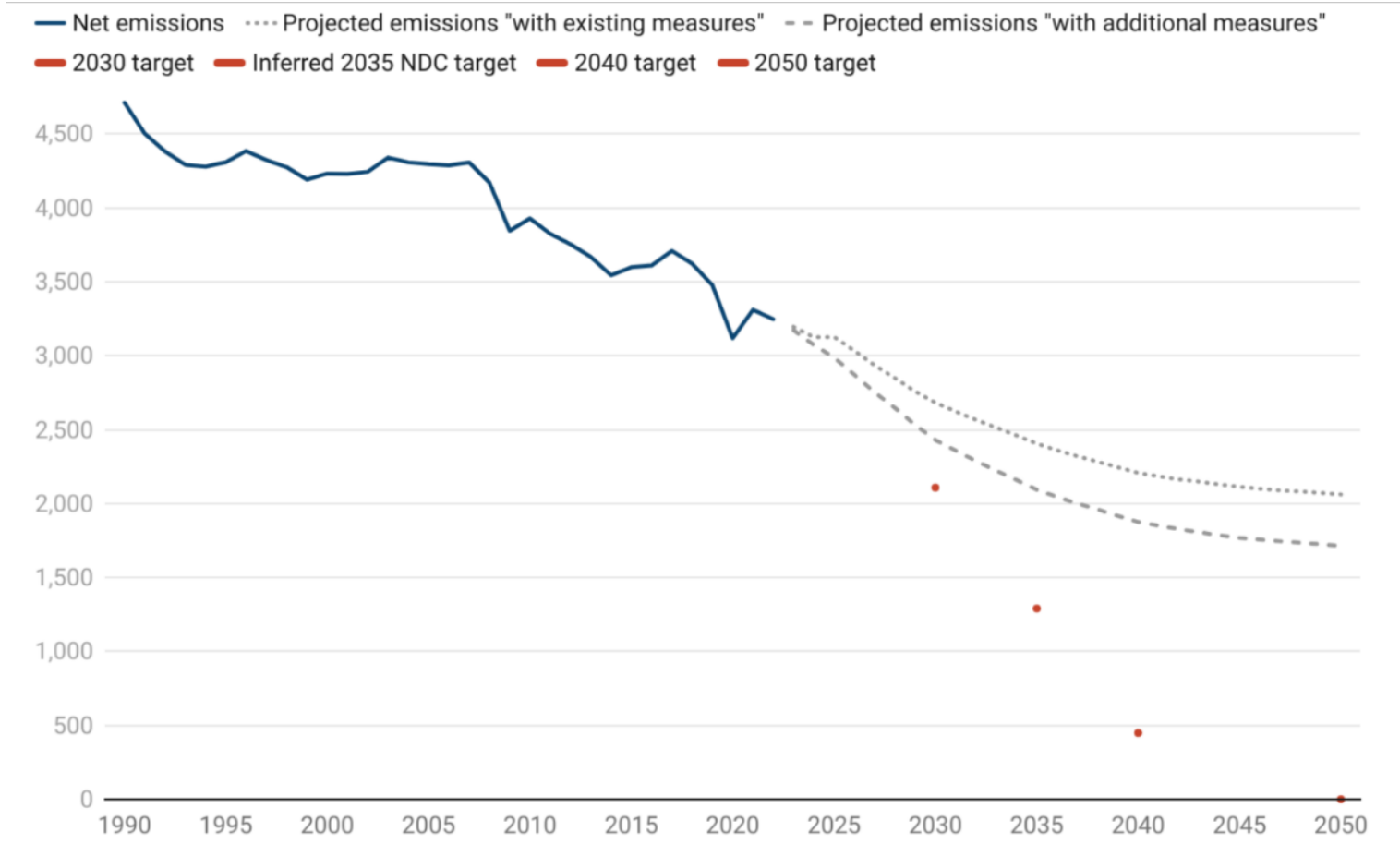
Past, projected and targeted emissions, MtCO2e



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90% net emissions reduction by 2040

No new policy measures or sector-specific targets were set in the Communication, **but a 90% target is recommended**

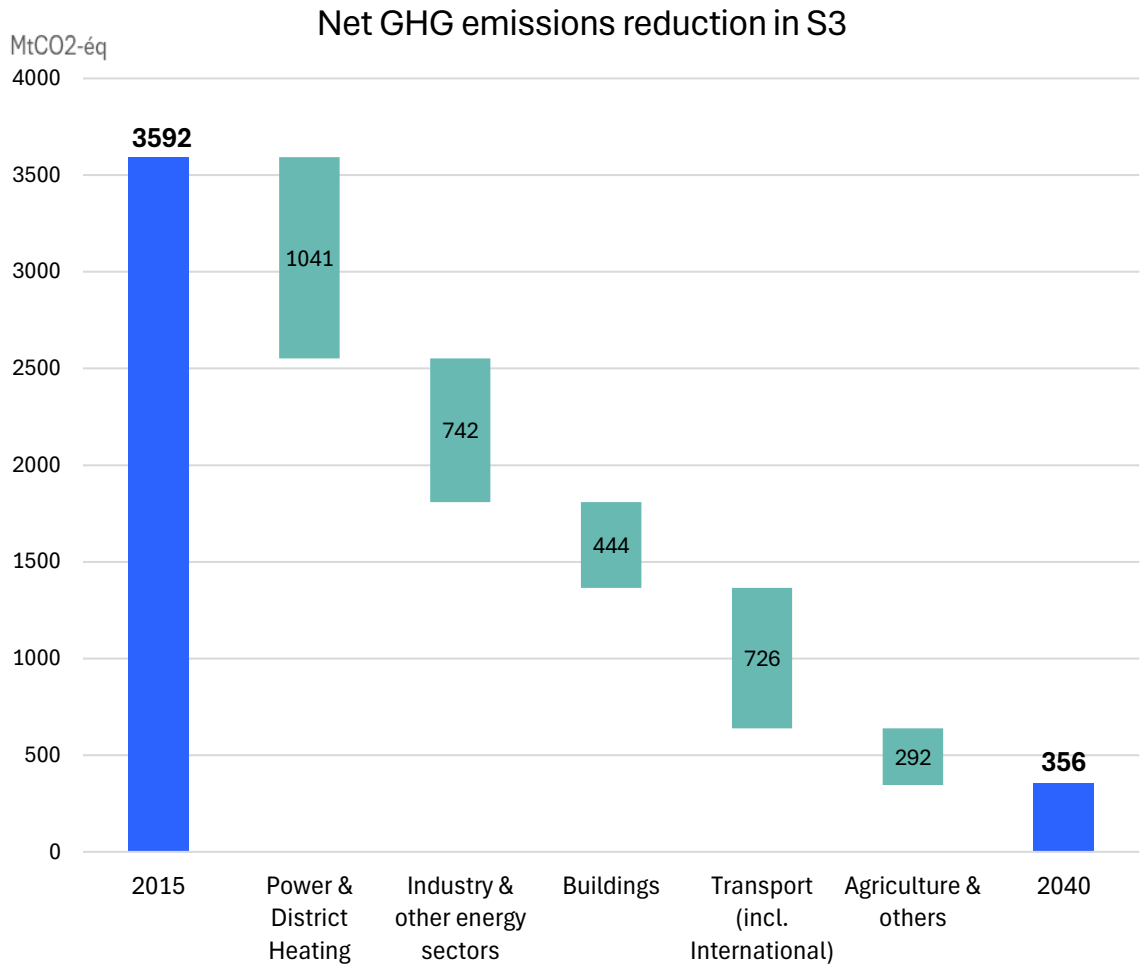
In line with the lower end of the ESABCC recommendation (**90–95% net emissions reduction by 2040**)

Breaking down -90% by 2040...

The **lowest GHG budget** for the EU, with net cumulative GHG emissions (the indicative GHG budget) of 16 GtCO2-eq for 2030-2050.

The level of remaining EU GHG **emissions** in 2040 should be **less than 850 MtCO2-eq** & **carbon removals** (from the atmosphere through land-based and industrial carbon removals) should reach up **to 400 MtCO2.**

Faster investments for deployment of novel low carbon technologies such as hydrogen production by electrolysis, carbon capture and use and industrial carbon removals between 2031 and 2040.



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Is -90% too ambitious?

Too much CCS	86 to 344 MtCO2/year	Significant reliance on technologies that have yet to prove scalability, profitability and most importantly, efficiency
No additional solution for financing	3.2% of GDP (2031-2050)	Fails to provide additional solutions for financing a scaled-up effort, marking a reliance on private funding, coupled with support from a fluctuating ETS budget (i.e. Innovation Fund)
Limited focus on mitigating distributional effects	Cap is 0 in 2044	Assumes that the revenues collected through the Social Climate Funds, after the implementation of ETS2, would suffice for mitigating its distributional impacts.
Increased cost pressure on industrials ?	130- 133* EUR/MWh	The Communication does not address the firming costs, expects PPAs to offer the main solution and does not come with complementary carbon leakage measures

* Electricity final price

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B. Power System Analysis

Electrification by 2040

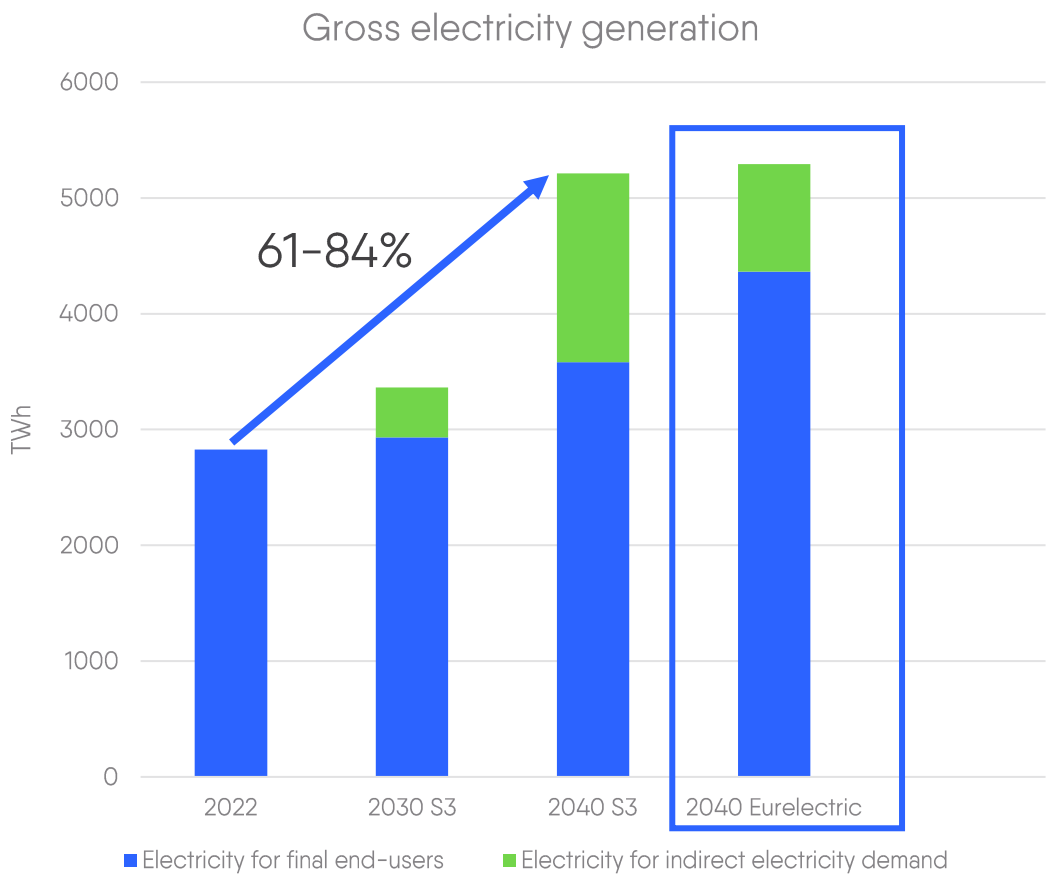
"Electrification, with a fully decarbonised power system by 2040, is the main driver of the energy transition..."

× No mandatory electrification target given, but...

✓ Electricity will cover 48-51% of Europe's consumed energy by 2040

➡ doubling the current levels

61-84% increase in gross electricity generation



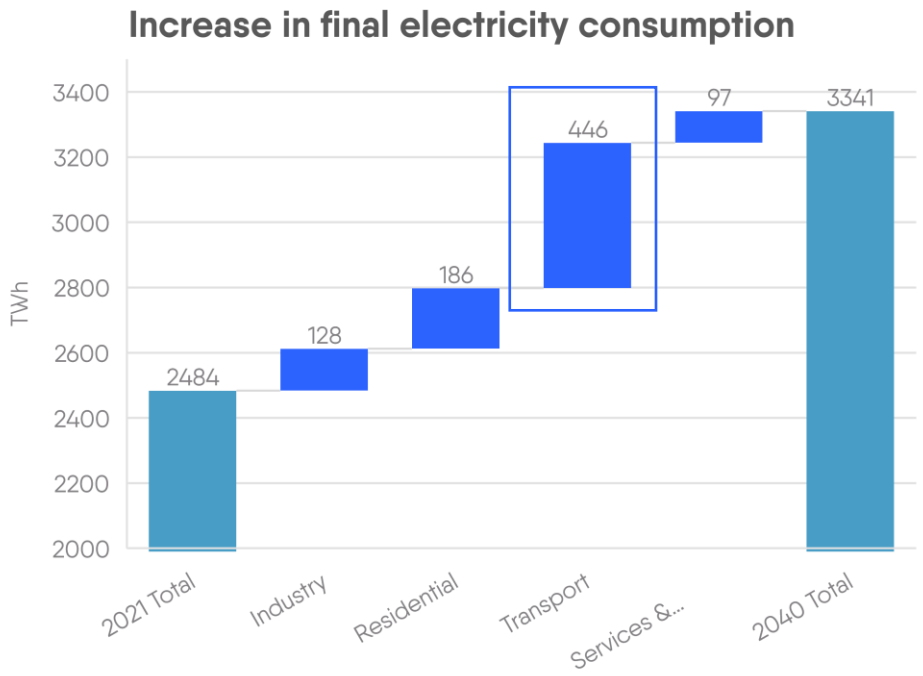
61-84 % increase in gross electricity generation

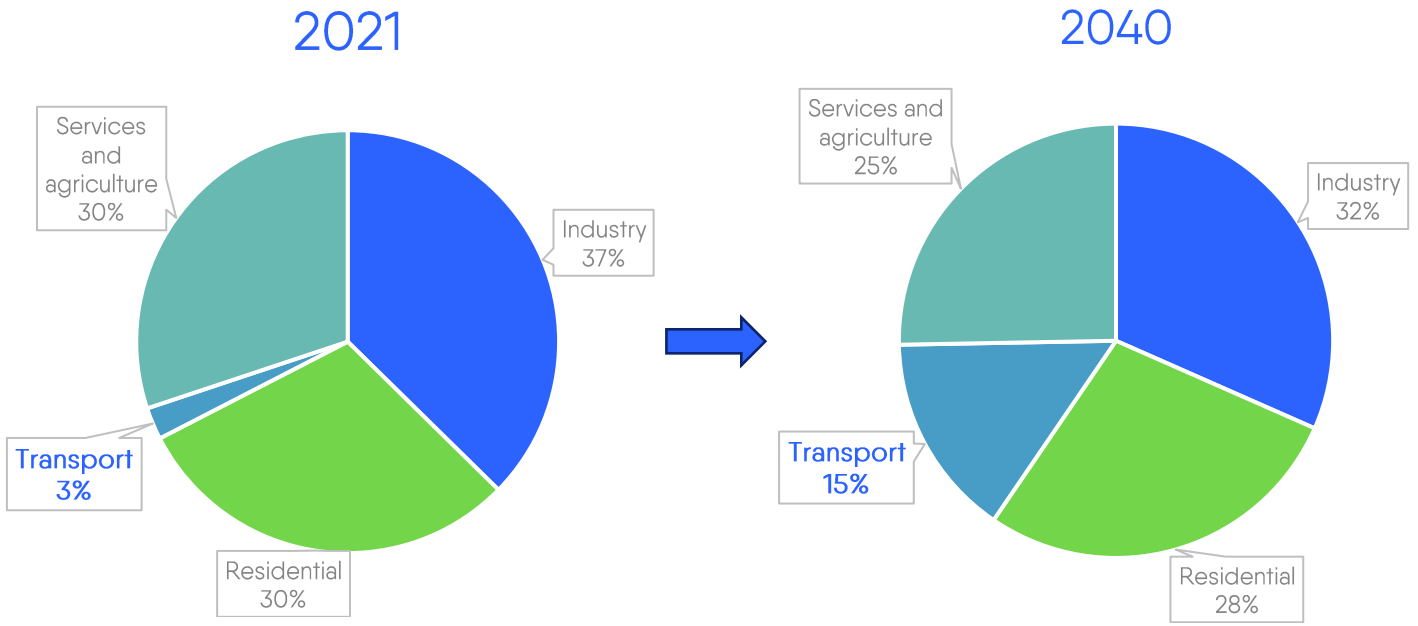
Comparable with Eurelectric's projection: **70 TWh difference**

500 TWh divergence when only direct electrification is considered

EC H2 production**, 698-1163 TWh**, is much higher than **Eurelectric's 242 TWh**, hence indirect electricity demand is higher.

Transport sector leads the electricity demand growth





Transport sector's additional electricity demand is close to the current electricity consumption in France.

Most of this demand is going to be at **distribution grid level**, as most transport demand is from passenger cars.

Transport sector, that is currently not a major power consumer, will constitute 15% of the power consumption in 2040.

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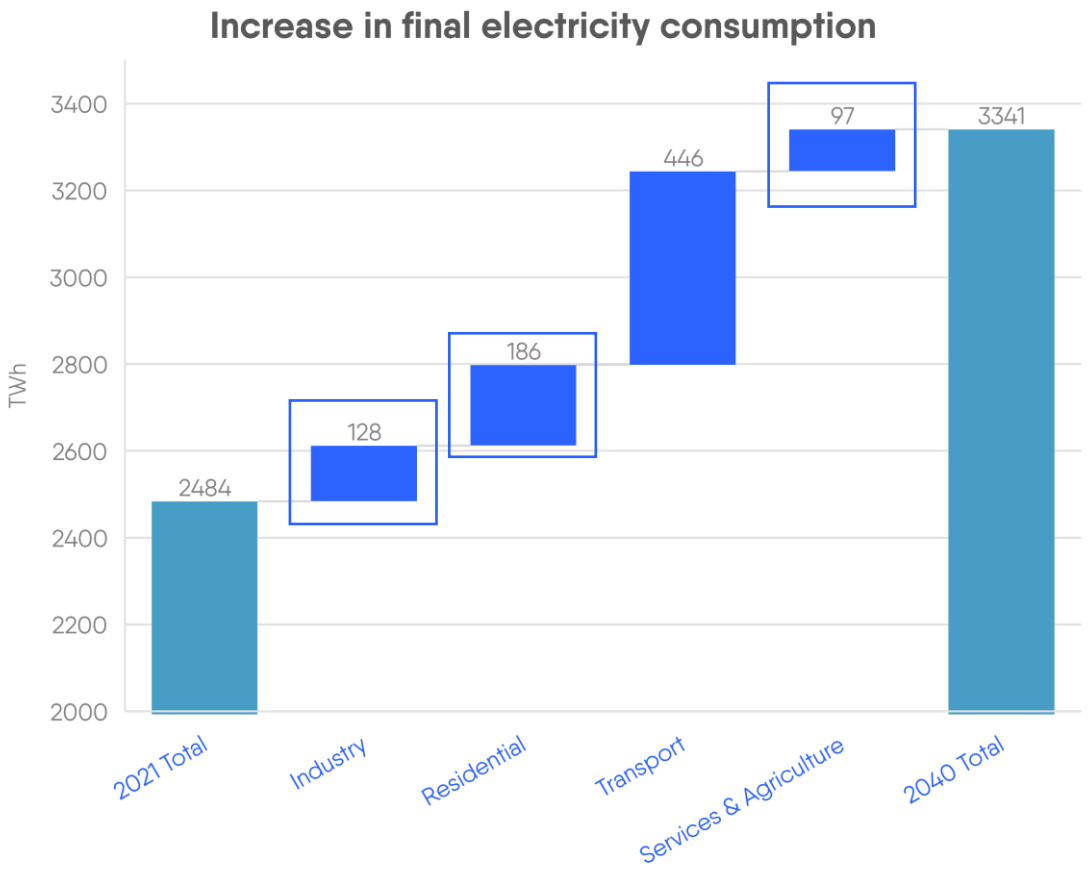
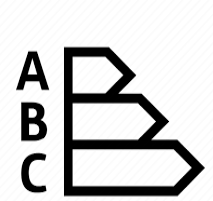
...and 'beyond transport'



Industry, Residential and Services & Agriculture



Demand growth mitigated by increases in energy efficiency

Despite growing electrification rates, power demand increases slightly in buildings & industry thanks to energy efficiency

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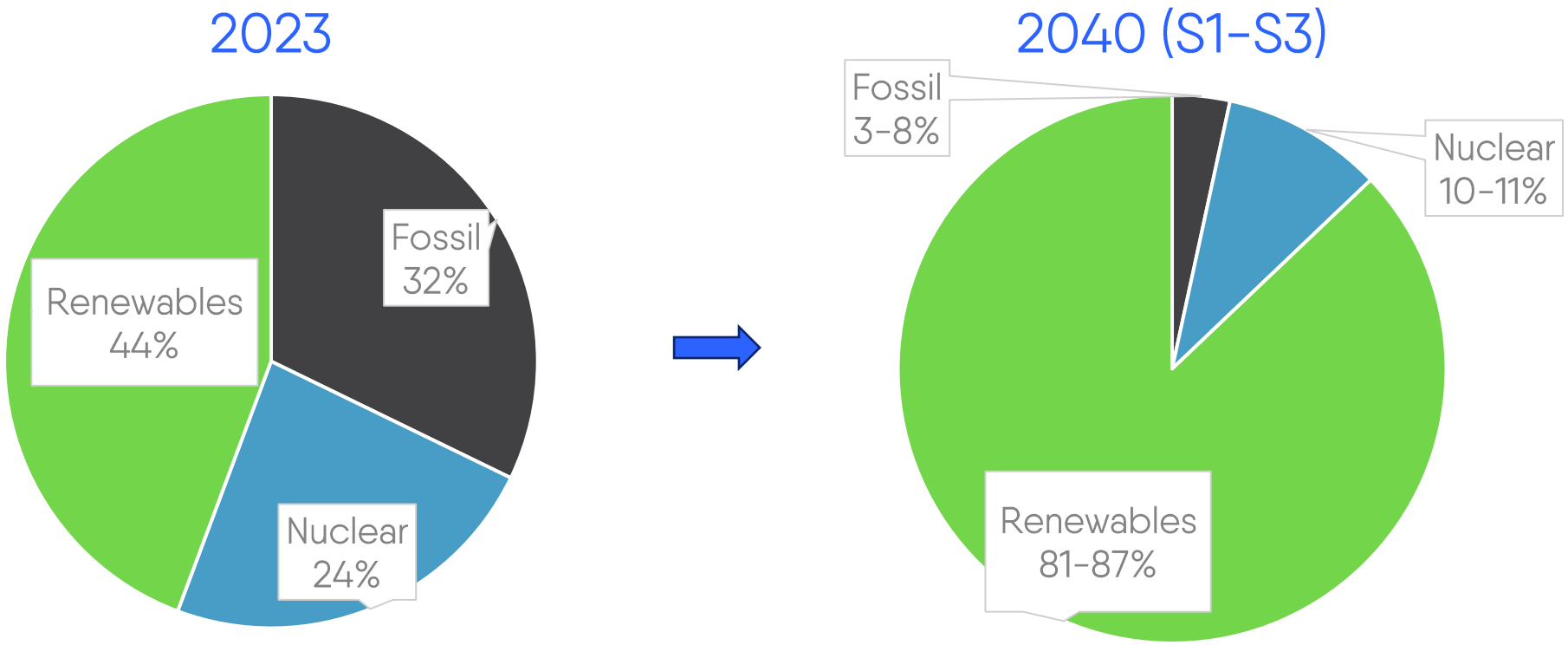
Big Picture: 92-97 % clean electricity by 2040

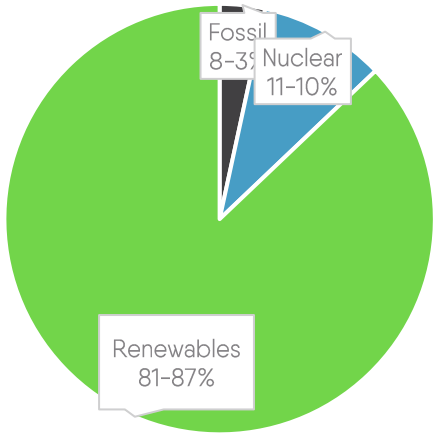


Generation mix is aligned with Eurelectric's projections. Eurelectric projects **90% clean electricity in 2040**

*Current analysis is based on 2019 NECPs. Nuclear numbers will go up when the latest NECPs are accounted in EC's modelling

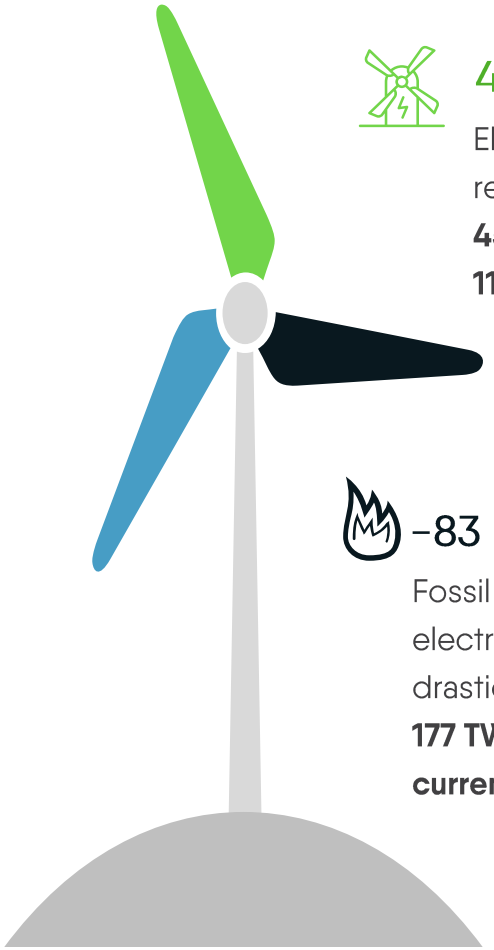
Analysis: 92-97 % clean electricity by 2040

2040



Nuclear power's share reduced

Nuclear power will provide **495 TWh in 2040 compared to the 732 TWh in 2021***. The numbers might change after the latest NECPs.



4X more RE power

Electricity from renewables will reach **4540 TWh up from 1100 TWh** currently.

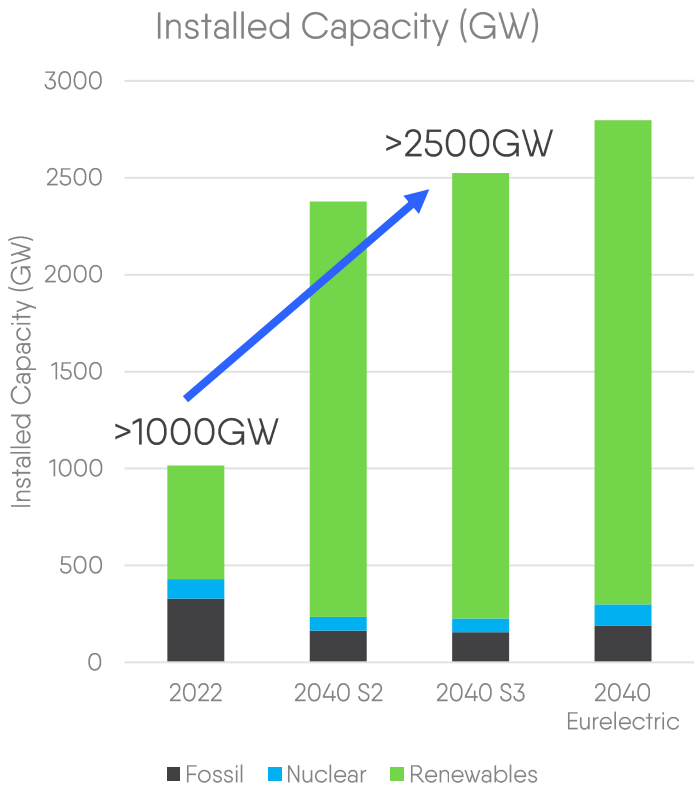
-83 % fossil power

Fossil fuel powered electricity will drastically **reduce up to 177 TWh from the current 1052 TWh**.

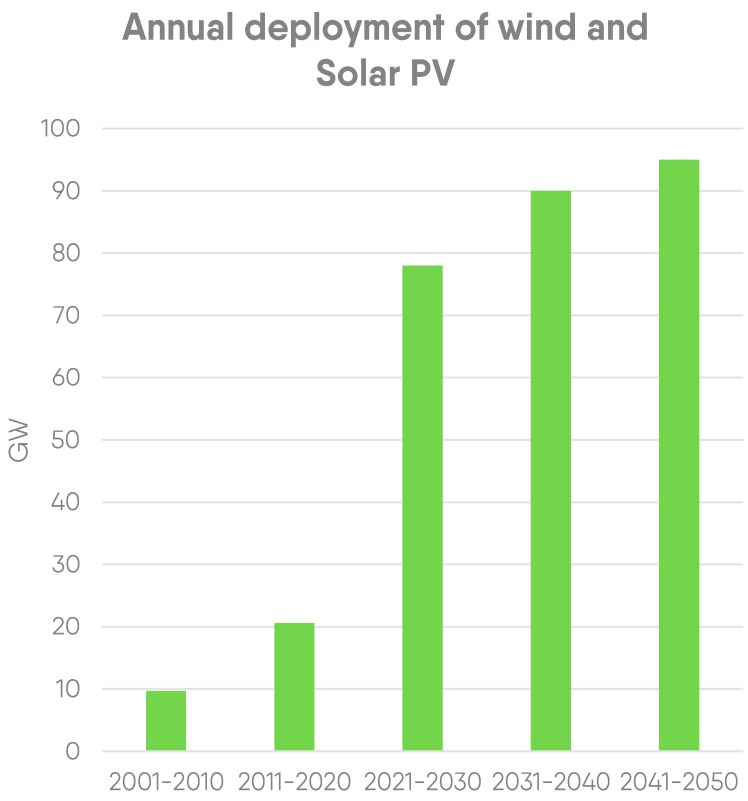
*Current analysis is based on 2019 NECPs. Nuclear numbers will go up when the latest NECPs are accounted in EC's modelling

Renewable *capacity* should quadruple by 2040

Installed capacity



Annual wind & solar installation



1. Wind & solar's low full load hours mean more capacity to replace fossil fuels.
2. Annual wind installation was 16.2 GW in 2023 and might have to double and triple.
3. Annual solar installation was 55,9 GW and this is on track.
4. Capacities comparable to Eurelectric's projection.

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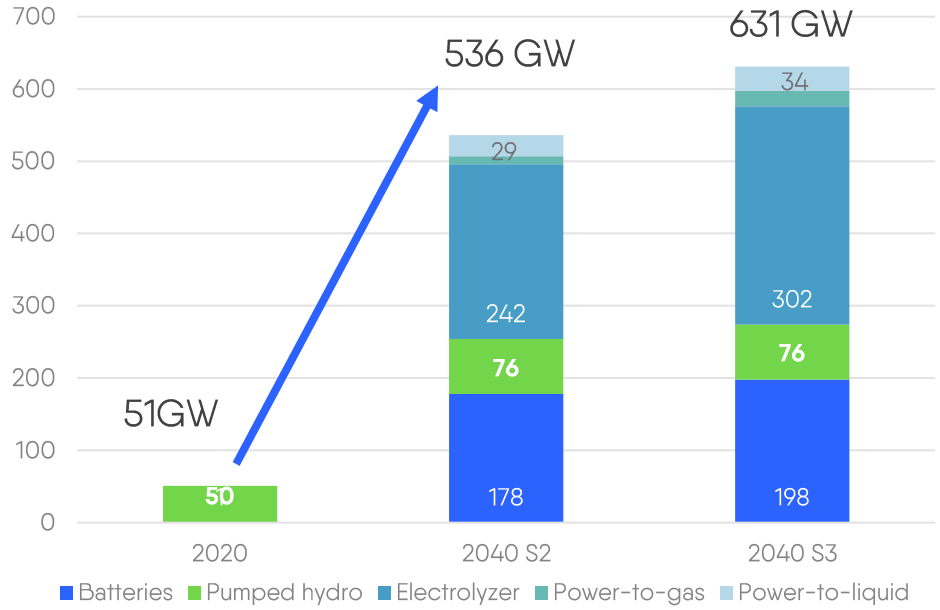
>10 times more storage & flexible capacity by 2040

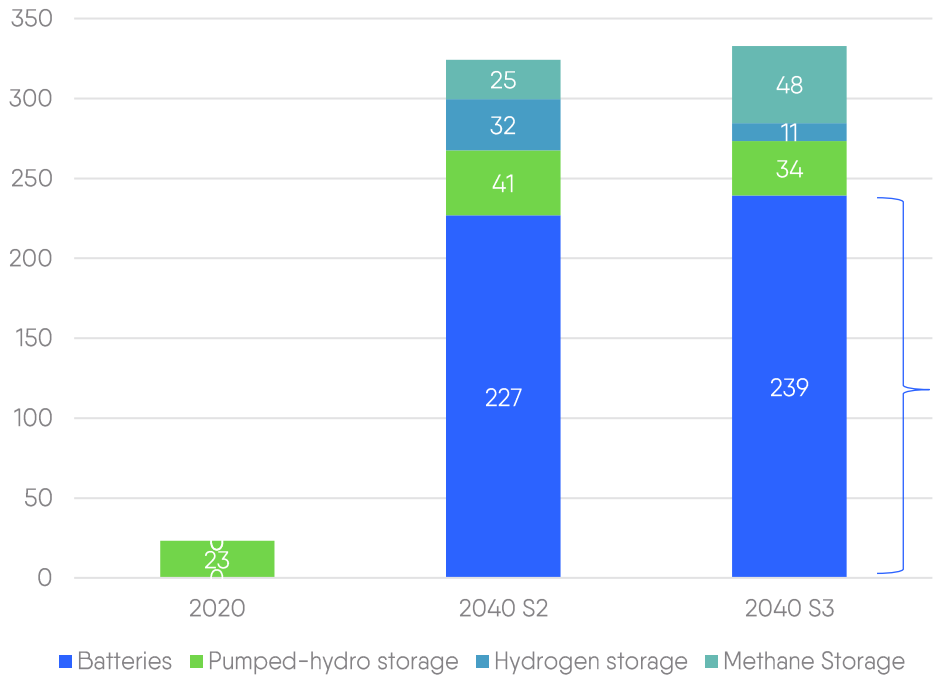
Net installed storage & new fuels capacity (GW)



Batteries will surpass pumped hydro in providing the storage needs after 2030

Pumped hydro, battery and electroyser capacities are similar to Eurelectric's figures.

Stored energy by technology (TWh)



Batteries make up a significant part

Pumped hydro & batteries will be major contributors to storage

High electrolyser capacity contributes less to storage but more to sectors beyond power, enhancing H2 utilisation

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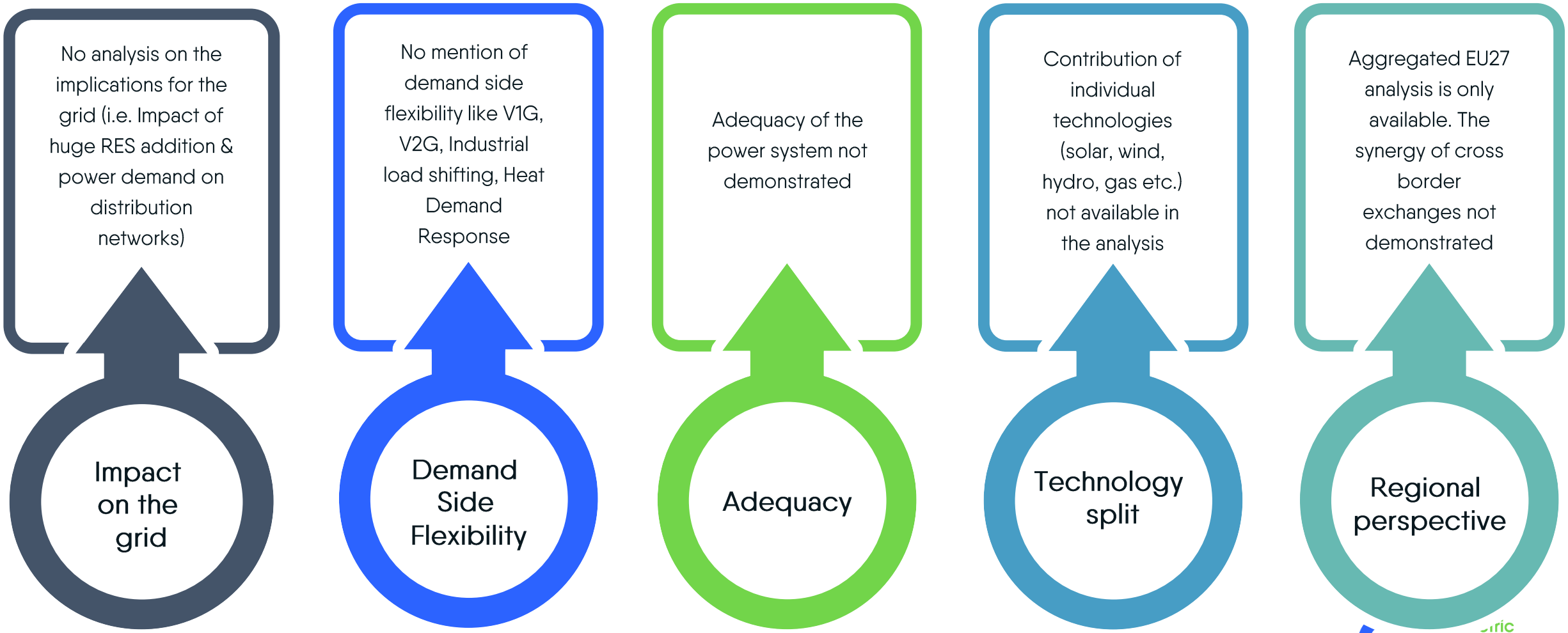
Gaps in EC Power Sector Impact Assessment



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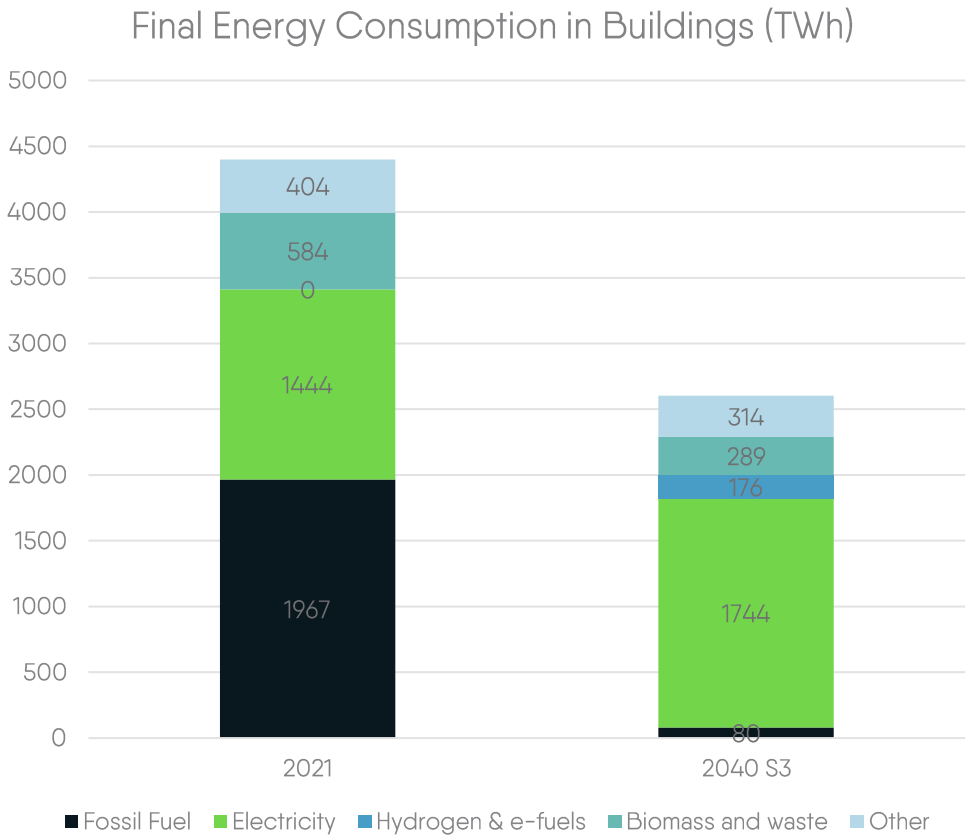
More efficient & electrified buildings



Similar electrification levels in 2040: 64% (EC) vs 68% (Eurelectric). But divergence for 2050.

Energy Consumption 39 % ↓

Fossil Fuel 96 % ↓

High uptake of electricity
33 % in 2021 → 64 % in 2040

Heat Pump stock grows
20 mn in 2022 → 89 mn in 2040

Moderate H_2 & e-fuels
0 % in 2021 → 7 % in 2040

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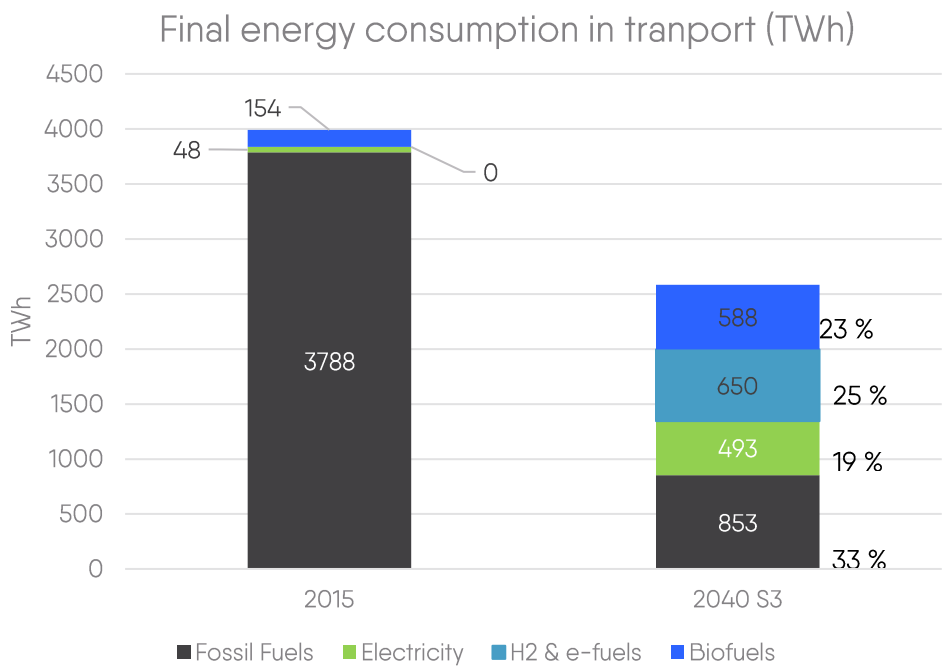
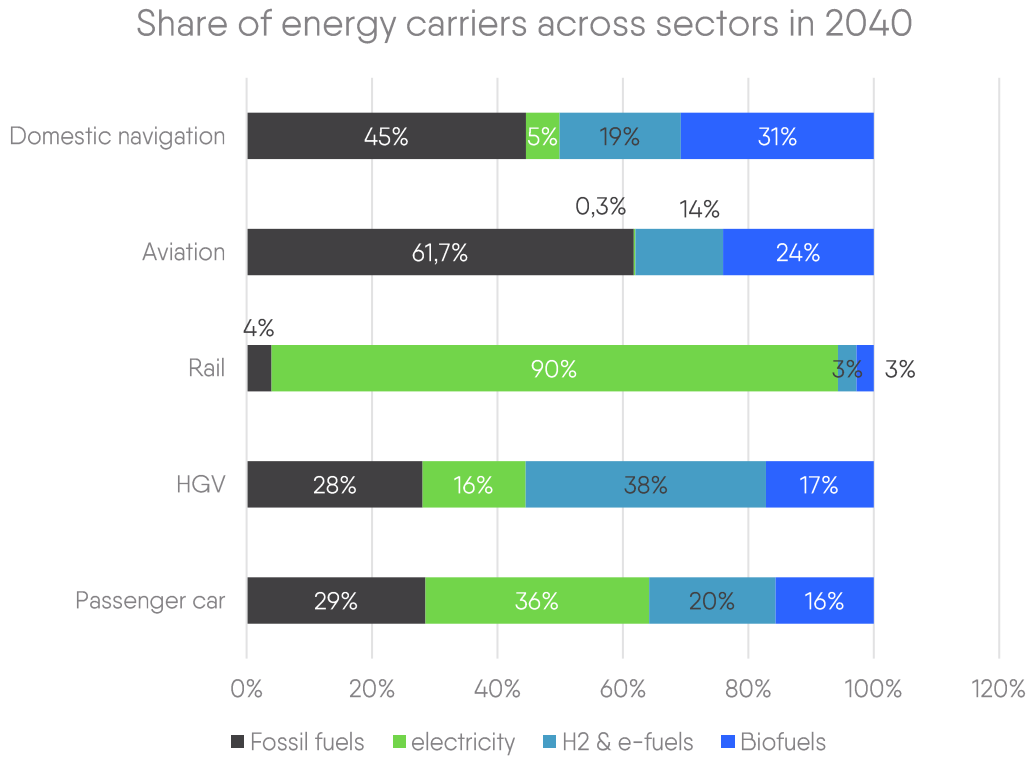
All zero emission fuels contributing to transport decarbonisation





Energy Consumption 35 %

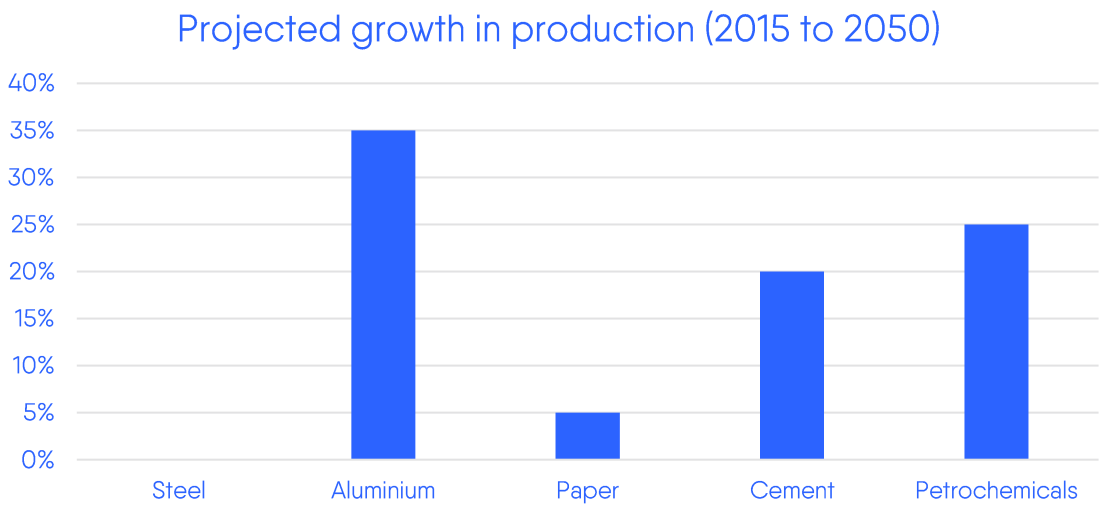
Fossil fuel consumption 77 %

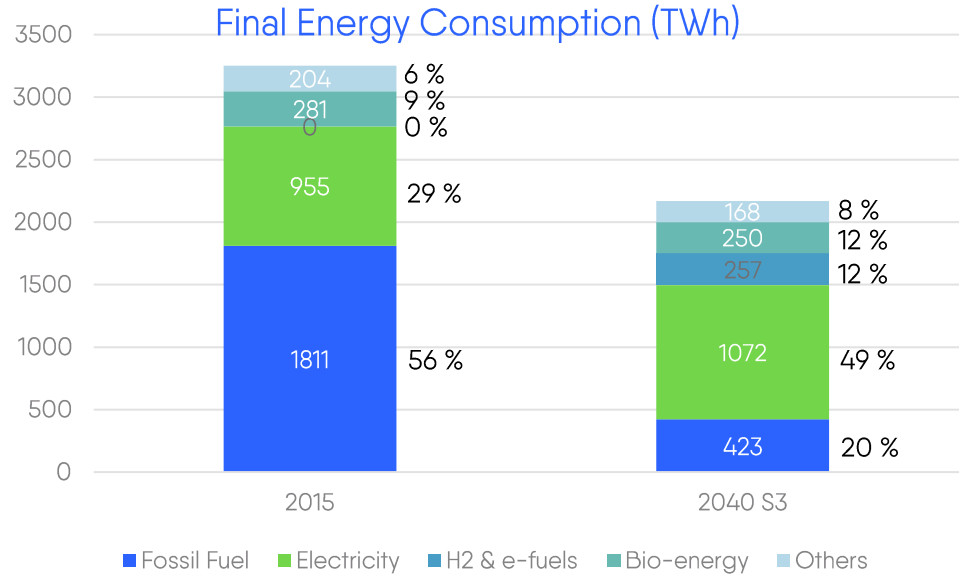
EC's electrification (19%) is less ambitious compared to Eurelectric's electrification (26%)

Fossil partially replaced by electricity, biofuels, e-fuels & hydrogen

Road transport cuts energy by 53%, while other sectors' consumption go up

Industry's path to decarbonisation: leveraging multiple tools





The drivers of decarbonisation in industry

Electrification: Industrial processes electrified.

Energy efficiency: tech upgrades & processes optimised

H2 & CCS: Fossils replaced by H2 & e-fuels for some process

Behavioral shifts: sustainable practices & resource optimisation

Socio-economic factors: Economic incentives, regulations, and market demand spur industries to decarbonise.

Energy Consumption 33 % ↓

Fossil fuel consumption 77 % ↓

Electrification of 49% aligned with Eurelectric's projection of 50% in 2040

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Summary: EC S3 vs Eurelectric's RePowerEU

Electricity generation comparable

EC S3 generates 70 TWh less than Eurelectric.

Direct electrification lower

EC S3 diverges by around 500 TWh when considering only direct electrification

2X more H2

Hydrogen demand in EC S3 scenario is 2 times higher than Eurelectric's.

Total installed capacity comparable

Eurelectric's RePowerEU is 138 GW higher.

EC is low on nuclear

EC has 71 GW nuclear capacity vs 111 GW in Eurelectric's scenario.

EC is comparable on storage & flexibility but DSM missing

Similar level of pumped hydro, battery & electrolyser capacity, but important DSM technologies like V2G missing.

Comparable DSO investment & 1,4 X power plant investment

Eurelectric's investment requirement is 1,42 times higher than EC, despite greater capacity needs.

Power sector net 0 by 2040 with CCS

EC's S3 reaches net-zero by capturing 32 Mt CO2 by CCS. Eurelectric has 121 Mt residual emissions .

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C. Investment Needs

Power sector dominates investment

SIGNIFICANT INVESTMENT	3% of GDP (2031–2050)	This is an increase of 1.5 to 2 percentage points of GDP compared to average investments in 2011 to 2020. It is comparable to the level of investment that needed this decade to reach the set 55% GHG reduction target
EU NET-ZERO MANUFACTURING	23 Bn for 2031–2040	2/3 of these are for battery manufacturing, while 1/5 to ¼ are for wind technologies. Wind, electrolysers, solar PV & heat pumps each represent between 2% – 6% of the total.
DISTRIBUTION GRIDS	67–68 billion euro/year	Compared to the 35 billion euro invested in 2022 this is a 2-fold increase.
GENERATION	142 bn/ year	On power plants, EC foresees an annual average investment of 142 billion which is a 1.5 times increase compared to the 95 billion annual investment in 2022.

The electricity sector (generation & grid) dominates investments on the supply side, due to increased electrification. On the demand side, the residential sector accounts for the largest share of investment needs, at about 2/3 of the total.

The Commission agrees that an increase in RES & electrification require investments in:

- Expansion & upgrades of power grids
- New interconnectors
- Energy storage facilities
- Dispatchable energy sources
- Sector coupling
- Flexibility market solutions

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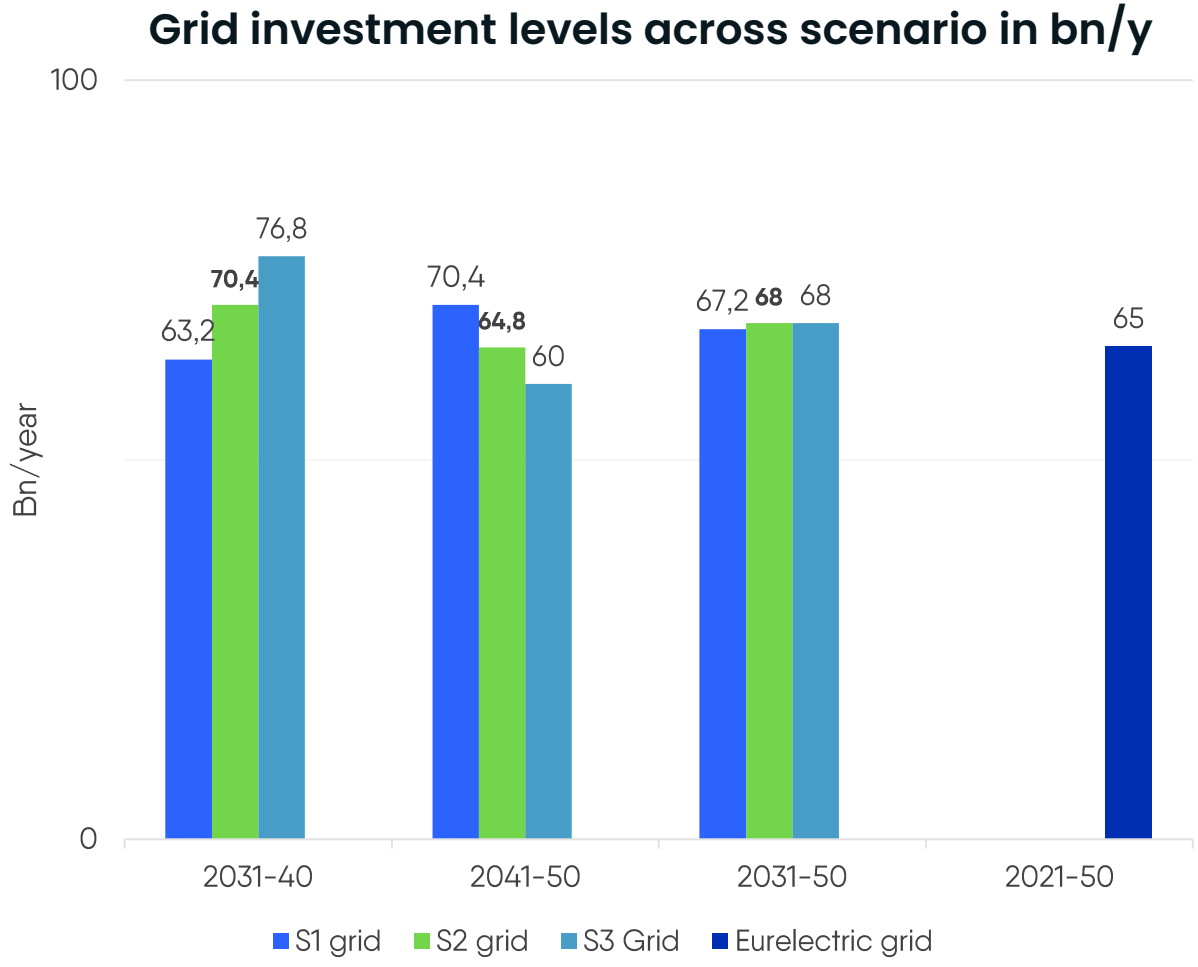
Grid investment comparable to Eurelectric's estimate



2X investments in DSO grid

Current distribution grid investments should double in the coming years

How much DSO grid investment?

Across scenarios, average grid investment of 67-68 bn/year*.

When will the investment happen?

S3 foresees accelerated investment during 2031-40 and hence need lower investment in 2041-50. S1 sees lower investment during 2031-40 which then requires the highest investment in 2041-50 to achieve net 0

Comparable to Eurelectric's projection

EC's projection comparable to Eurelectric's projections from decarb speedways and power barometer.

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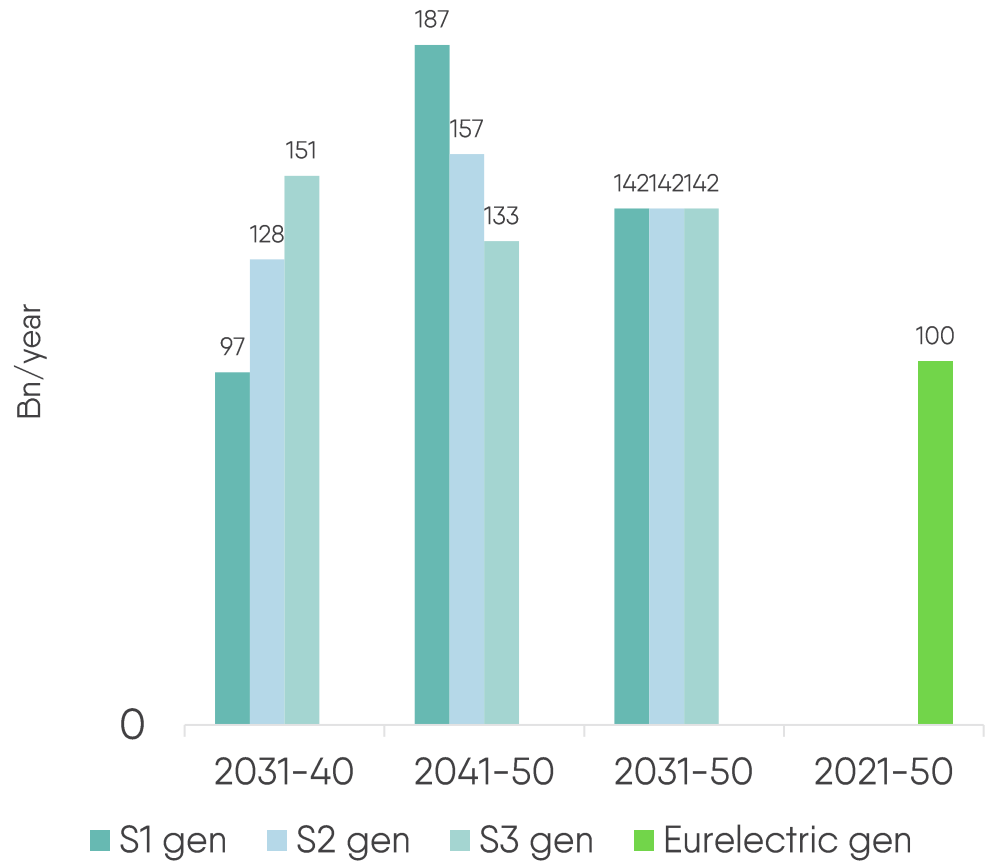
* To estimate distribution grid investment it was assumed that 80 % of grid investment goes to distribution grid

Generation investment figures significantly above Eurelectric's estimates

Generation investment across scenario in bn/year



140 bn Euros on average

EC requires an annual average of around 140 billion Euros across all scenarios. This is

40% higher than EurREPowerEU...

EC investment requirements are more than 40% above Eurelectric's Repower EU scenario.

... Even higher than Eurelectric Radical Action

Eurelectric's Radical Action scenario requires an annual investment of 117 bn Euro.

Why are they higher?

This is counter intuitive as the capacity requirements of Eurelectric and EC are at same level.

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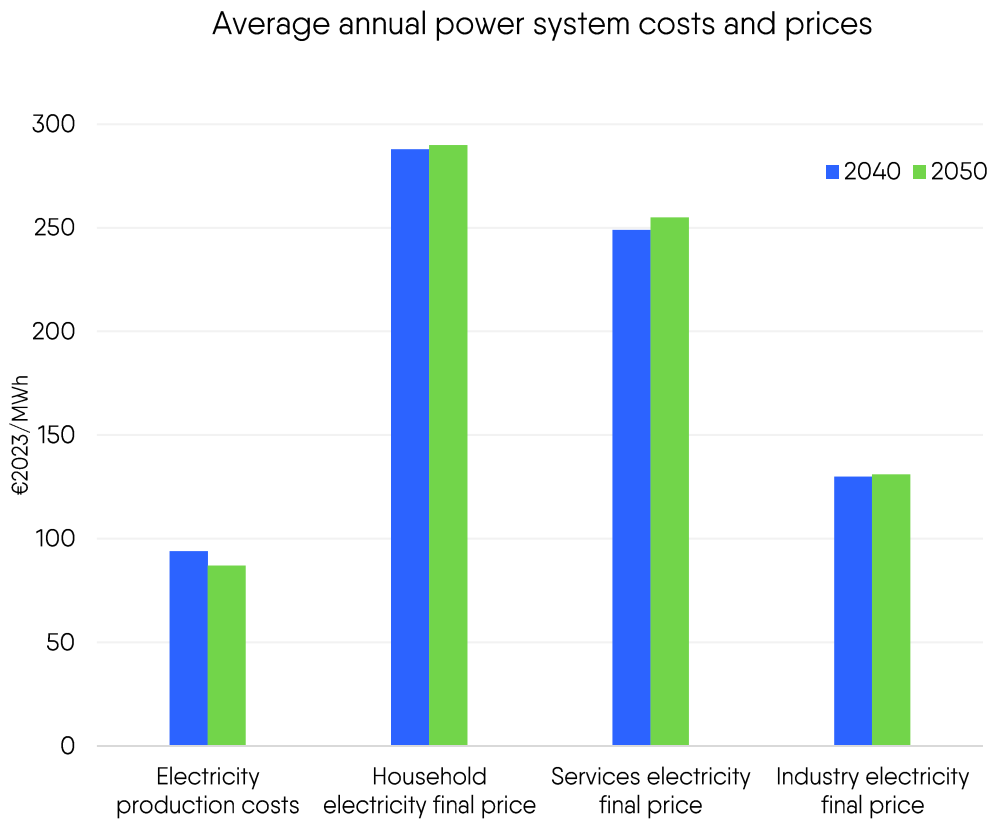
Power system costs transitioning to a capital-based model

- Electricity production costs is transitioning from an energy purchases system towards a capital-based system, less exposed to fossil fuel prices.
- Costs and final prices are comparable across scenarios, with limited information available on the underlying factors causing minimal contrast between them.



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5. Other Key Issues

Impact of farmer protests

ESABCC Impact Assessment

- Acknowledges the crucial role that agriculture plays given that it represents roughly 10% of Europe's GHG emissions, recommending 60% cut.
- Highlights the significant role of carbon removals in this sector.
- EC Scenario 3, however, outlines an emissions reduction target of 30%

2040 Communication

- Acknowledges the crucial role that the agriculture sector plays.
- Expresses the need for a more 'holistic approach' towards this sector.
- Expects an even greater role of carbon removals.
- Omits an emissions reduction target for the agriculture sector altogether.

Effort-sharing implications for the power sector, potentially requiring negative emissions by 2040

CCS/CCUS

The role of carbon capture and carbon removals is an important differentiating factor for the 2040 climate ambition. Overall, CCS/CCUS play a prominent role throughout the strategy.

01

Carbon capture has to reach 344-400 MtCO2/year for a -90% CO2 emissions reduction target

6 to 8-fold increase of 2030 target

02

62% in the power sector

In industry, CCS is expected to capture between 37 and 137 MtCO2/year in 2040. In the power sector, the fossil fuelled generation + the negative generation would use 62% of the modelled CCS capacity.

03

Roughly one third will receive a second life, whereas two-thirds will be injected underground. This ambition is likely to drive extensive infrastructure development projects – including the build-out of CO2 transport systems.

1 third, 2 thirds

LULUCF: how nature absorbs emissions

2030 target

The LULUCF Regulation sets an EU-level net removal target of 310Mt CO2e by 2030.

50 Mt CO2e short

NECP projections show current implemented & planned measures will not suffice to meet the target, falling short by 50 Mt CO2e.

.

Low to high transformation

Measures range from a small increase in forest coupled with a decrease in grassland to higher land-use change relying on more forest land & rewetting of peatlands & decrease of grassland.

2040 & 2050 expectation

LULUCF contributions could decrease. They range between -218 (S1) & -317 (S3) Mt CO2eq by 2040, with a -333Mt CO2eq by 2050.

More nature less tech

LULUCF contributions remain significantly higher than the technological removals: 50 times higher in S1, with a narrowing difference of six times in S2, and four times in S3.

2050 the new 2015

In the absence of stronger policies, the LULUCF contribution in 2050 would be the same of 2015.

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Raw materials

Trading one energy dependency for another?

More than 90% of the EU's supply of critical minerals like nickel, copper, lithium come from a third country, with China alone accounting for 100% of heavy rare earth elements.

ESABCC report highlights import dependences as a major hurdles for the EU 2040 target.

RES deployment drives demand

In S1 and S3, raw material needs would be lower and higher than in S2, respectively, as in 2040 net installed renewable power capacity is lower by 8% in S1 and higher by 6% in S3 compared to S2.

Regulation & financing

The EU must secure a conducive regulatory & financing environment to attract investment & production in Europe.

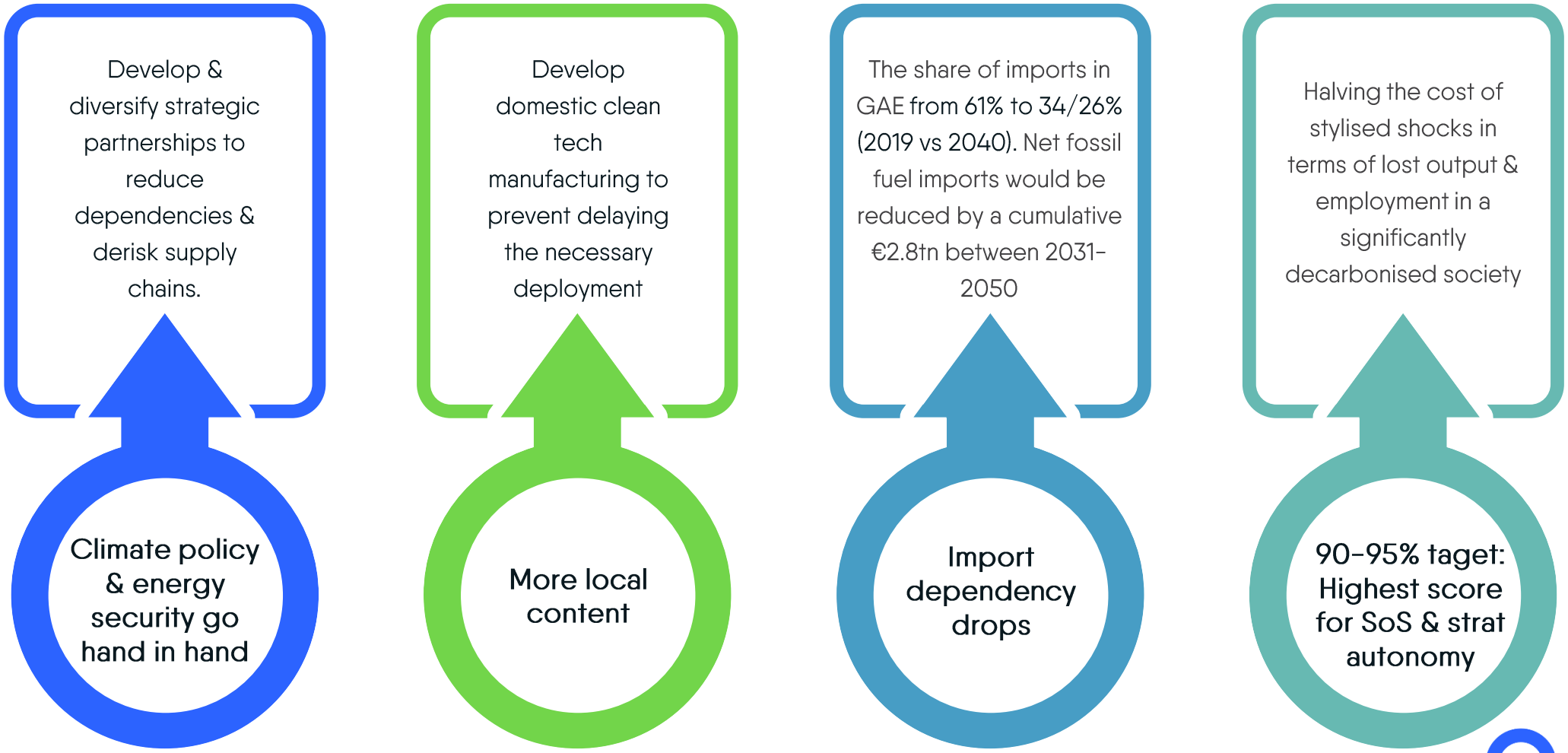
In this respect, both the Critical Raw Materials Act (CRMA) and the Net Zero Industry Act (NZIA) are outlined as crucial legislation to implement that geostrategic framework

Circularity will be key

Circular economy is expected to play a larger role moving forward to tackle the EU's import reliance for critical raw materials, reduce environmental pressure and create 580K jobs.

EC would like to accelerate the implementation of the Second Circular Economy Action Plan to achieve a doubling of the circular material rate by 2030.

Strengthening security of supply



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Eurelectric's reaction & Next steps

Eurelectric reaction: ambitious realism, enablers will be key

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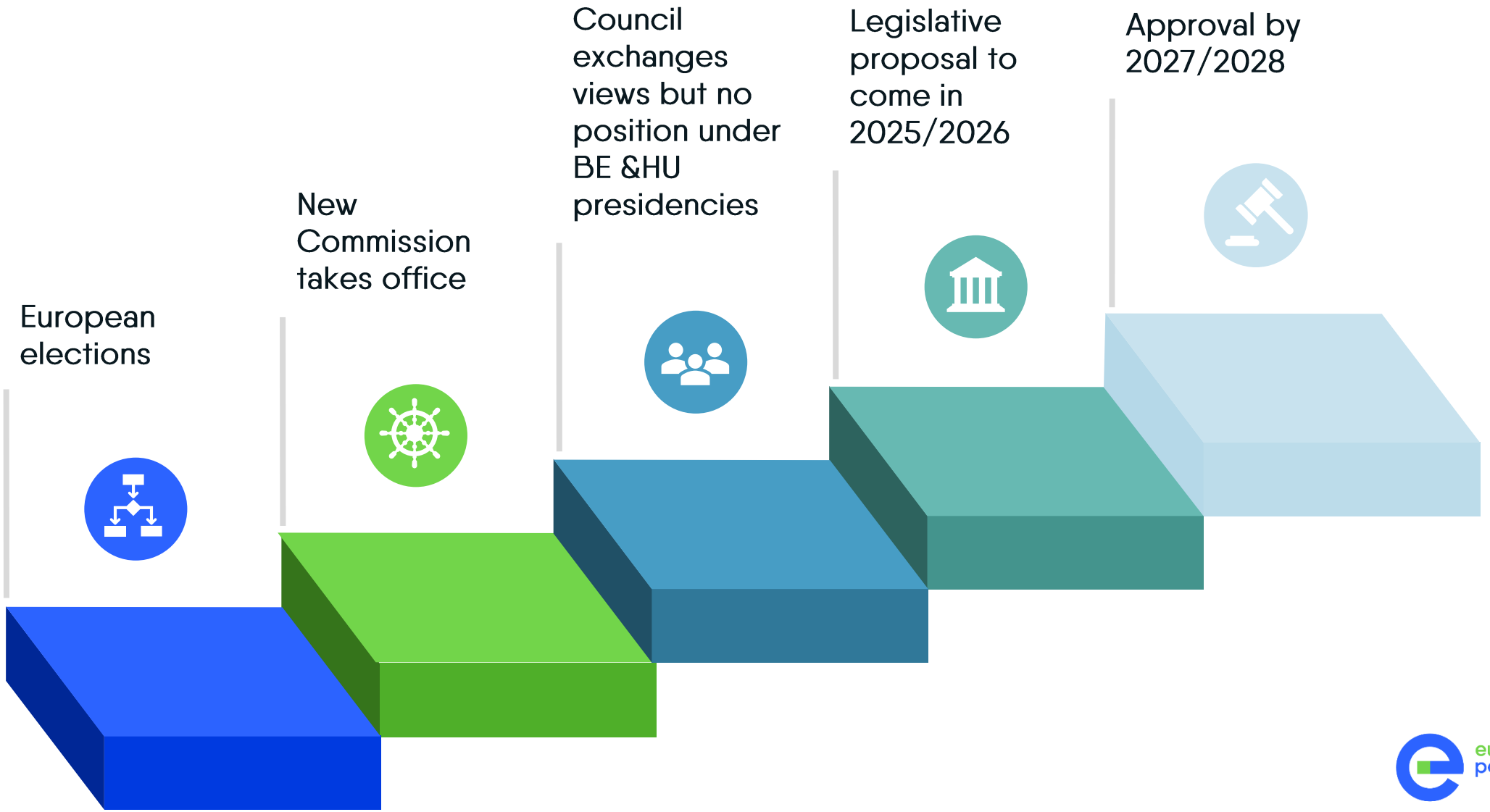
Next steps



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Thank you for your attention!

For questions & suggestions please reach out to:

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Exchange with members on national and European positioning

01 How was the Communication perceived in your companies/ national associations/ countries?

02 What pain points and opportunities did you observe ?

03 What measures would you deem necessary to mitigate the adverse effects & ensure a successful delivery?

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Annexes

Benefits of climate change mitigation

Reducing costs of damages

Climate damages could cost 1% of EU GDP annually already in the next few years. By 2050 these could cost **2.3%EU GDP/year, and even 7%** in the case of uncontrolled climate.

Cutting the risk on tipping points

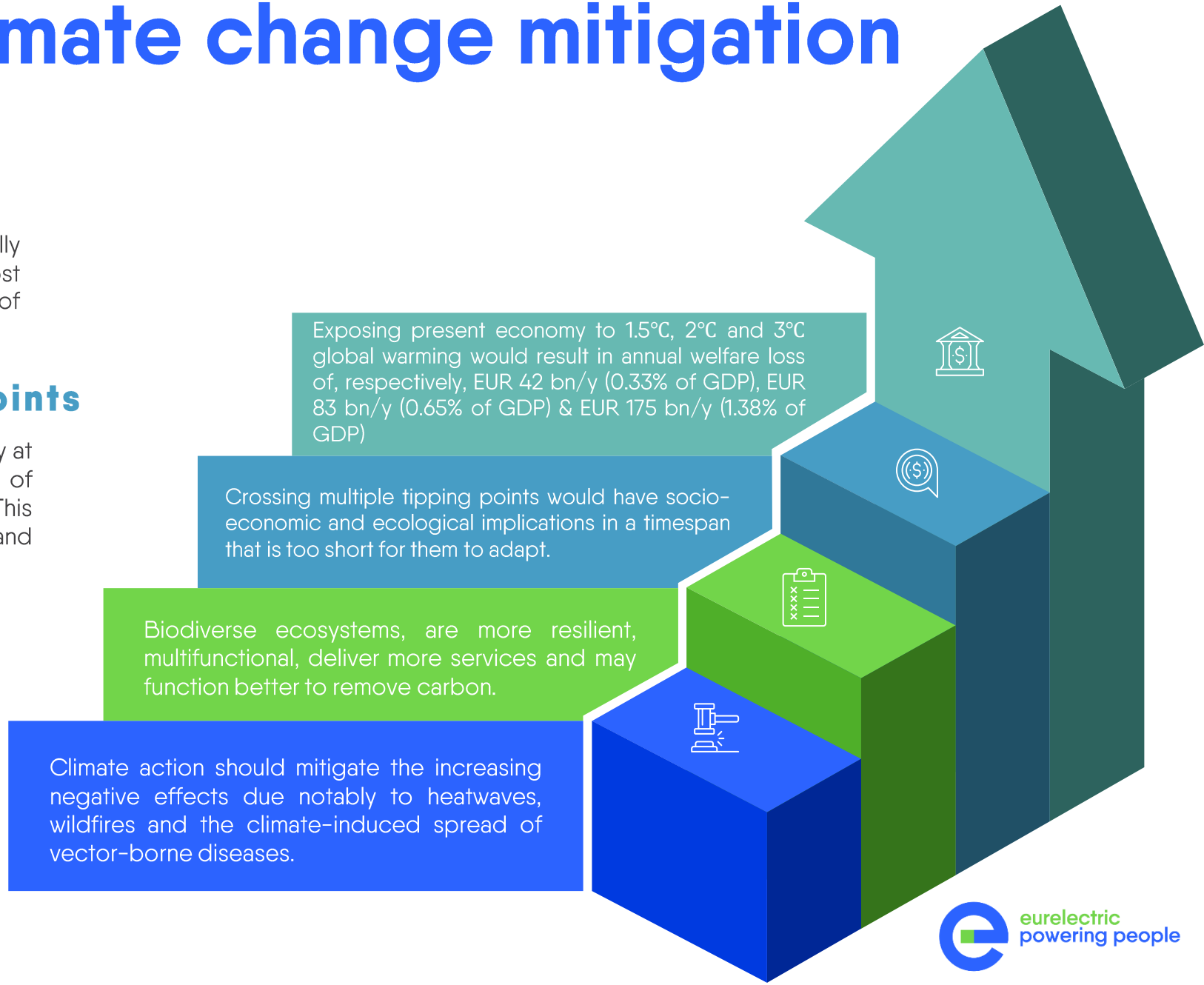
At current pace **5 planetary tipping points** are already at risk of being crossed & even when meeting the 1.5* of the Paris Agreement 10 of them might be passed. This may lead to abrupt, substantial, irreversible, and dangerous impacts for human and natural system.

Biodiversity protection

US **$44 trillion of economic value generation** – over half the world's total GDP – is moderately or highly dependent on nature and its services.

Better air quality

Across scenarios primary air pollutant emissions in the **EU decrease by 16%-77%** (depending on the pollutant) between 2015 and 2040. This is linked to declining use of fossil fuels & solid biomass, combined with clean air policies.



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Climate change impact on the energy system

GRIDS

Without adaptation **damages could triple by the 2040s,** multiply six-fold by mid-century, and amount to more than 10 times by the end of the century, considerably increasing the cost of the energy system.

RENEWABLES

Renewables are less affected. The variation of wind energy potential linked to changes in wind availability is less than 5% overall, while the projected range of variation for solar irradiance and temperature increase will only marginally impact the PV potential in EU.

HYDROPOWER

Hydropower reliability of dispatching might also be negatively affected. In a 2°C scenario, water resource and hydro production increases by 2050 in Northern Europe, while Southern Europe experiences the opposite trend.

THERMAL

Water availability is set to increase in northern Europe & decrease in southern Europe with marked seasonal differences. By 2050, a 15% decrease in usable water capacity for **thermoelectric power plants** is foreseen, leading to unplanned shutdowns, curtailments & performance reduction of turbines.

DEMAND

The overall energy demand will decrease, with a **minor 5% change in the short term** & becoming more prominent only in the second half of the century. In cold countries, a decrease of total energy demand occurs, while warm countries experience an increase of overall energy demand & an increase in peak electricity demand due to cooling.

Climate change impact on business

Impact on assets

By 2050 over 90% of the world's largest companies will see at least 1 asset financially exposed to climate risks, & for > 1/3 of these companies at least 1 asset will lose at the minimum 20% of its value.

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Better now than later

Without action, the impacts of climate change for those most exposed to climate risks would become very significant & negatively affect their creditworthiness.

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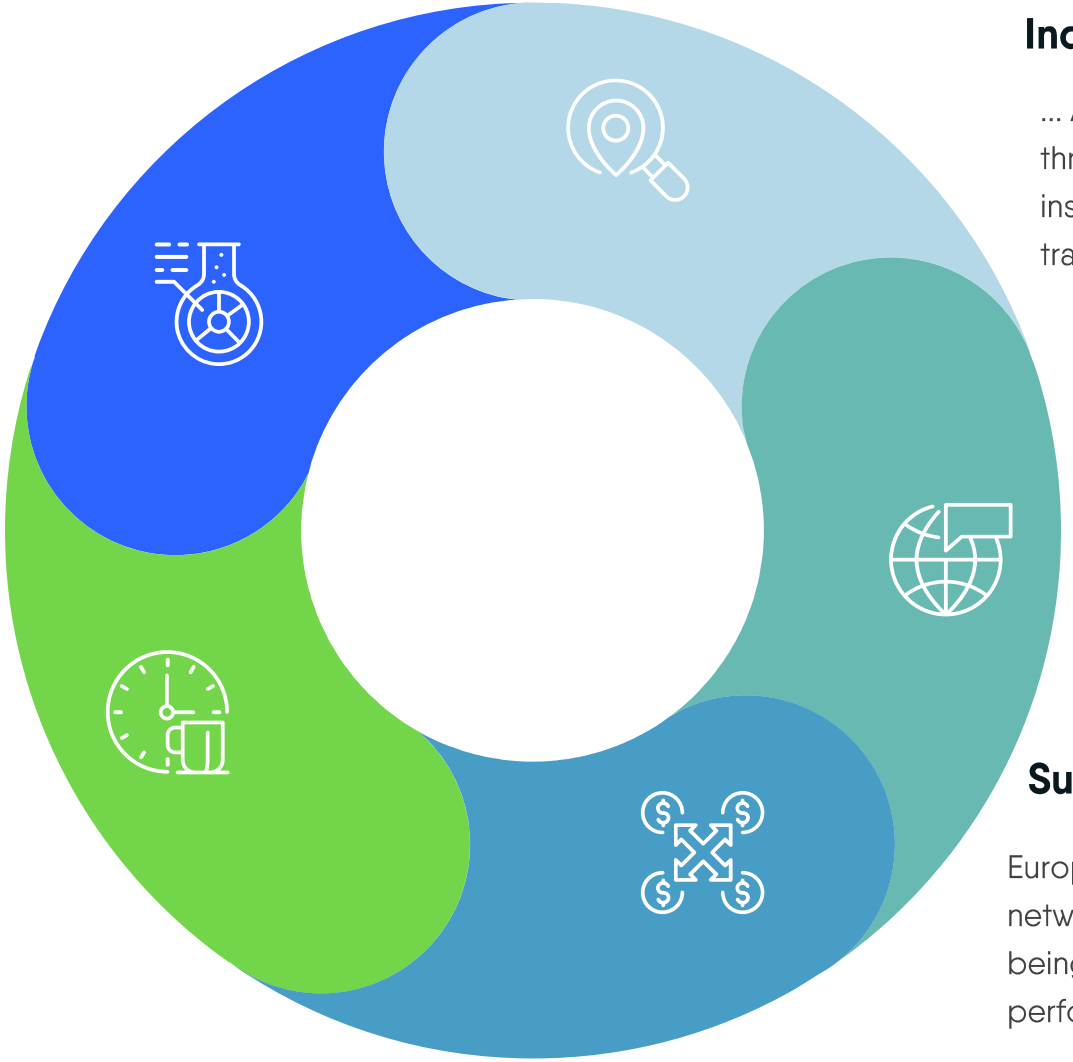

Industrial & service sectors...

... Are affected directly or indirectly, through damage to assets, increased insurance, O&M costs, disruptions in transport, and reduced revenues

The most affected businesses are...

Some sectors are more exposed than others. Notably agriculture, tourism, fisheries and forestry, as well as SME will be most impacted.

Supply chain & productivity shocks

Europe is strongly integrated in global production networks & has less concentrated supply chains, being vulnerable to shocks & reduced export performance.

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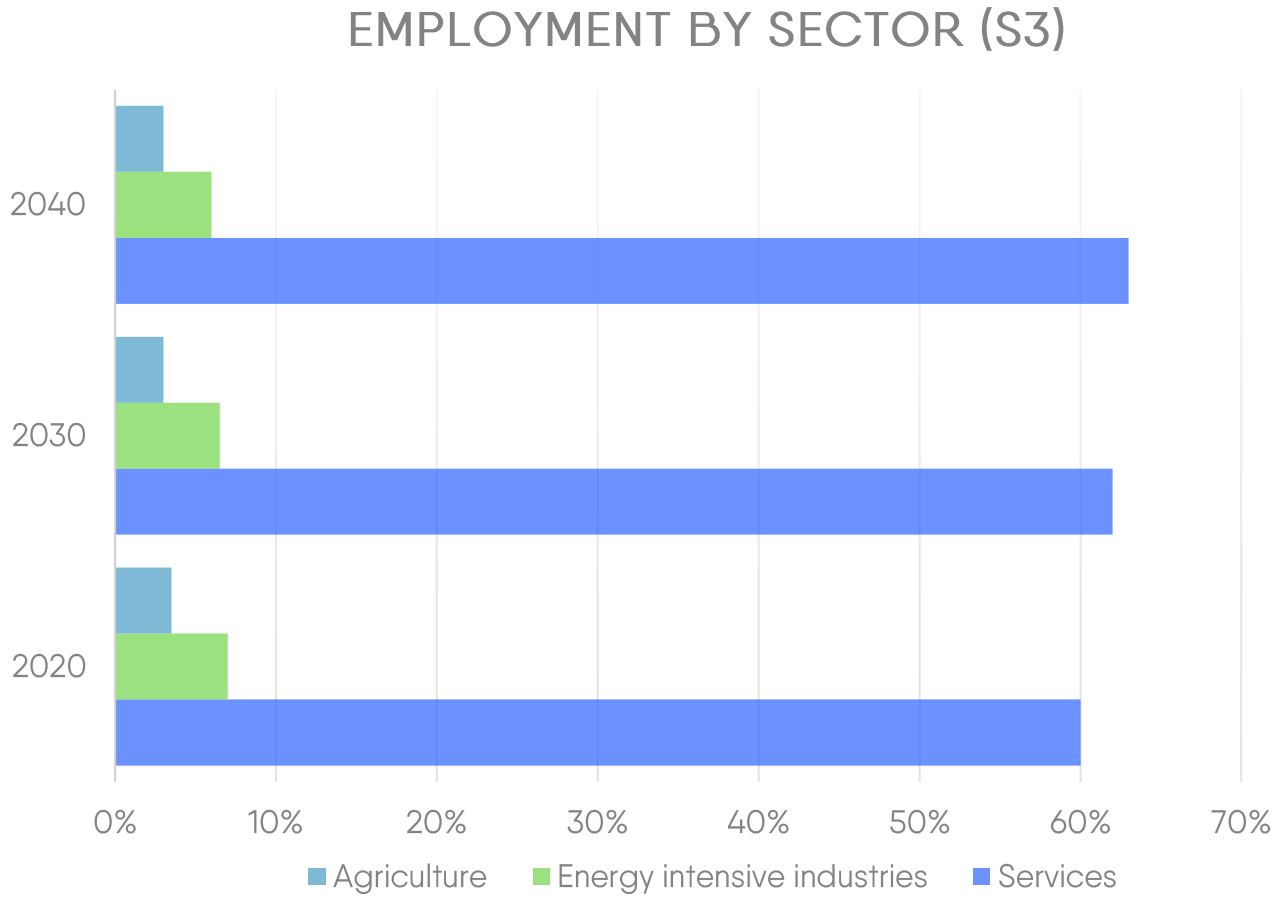
Employment: sectoral trends set to continue at accelerated pace

From 2020-2040

- **Services' employment will continue to increase** from around 60% to 62.2% of the share of EU total employment.
- **Energy intensive industries will decrease** to 6.2% by 2040 from almost 7% in 2020.
- **Agriculture jobs will decrease** from 3.5% in 2020 to 3.1% by 2040.
- **Fossil fuel industry jobs will severely decrease** from 0.13% in 2020 to just .05% by 2040.



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Which occupations should grow the most?

The Impact Assessment's projections show that the 3 main scenarios are extremely similar regarding impacts on occupation requirements.

1. Two key occupational groups are projected to experience a significant increase in their share of total employment: professionals and technicians.
   - By 2040: Professionals & Technicians each expect to increase by roughly 2% in 2040.

2. In the crafts and trade group, occupations related to buildings as well as plant and machine operators are also projected to experience an increase in employment share relative to 2022.

Just transition: Jobs in the Power Sector

Solar Power Generation

- On the installation side, solar power is more likely to **generate business opportunities and job creation among SMEs**.
- On the manufacturing side, **66, 000 jobs could be created i**n the sector if the EU were to become self-sufficient in the production of solar PVs.

Wind Power Generation

- On the installation side, wind turbines will mostly **generate business and jobs for larger companies**.
- It was estimated that **around 40,000 additional jobs would be needed** to make the EU self-sufficient in the production of wind turbines in a 2030 horizon.
- With the annual installation needs for wind power projected to increase by around 60% between 2021-2050, one could foresee **the creation of large additional employment opportunities in the technology.**

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Just transition: Jobs in the Power Sector

Transport Electrification

- Electrification alters supply chains and leads to structural shifts in employment from traditional vehicle manufacturing towards battery production, electricity supply and related investments.
- Transport sector expects a small net **increase in employment in the car manufacturing sector** overall.

Buildings Renovations

- The share of the total employment is projected to remain broadly stable across all scenarios.
- The construction sector should benefit from the building of new green infrastructure, including in power generation and transport.
- The renovation drive alone could generate **about 250,000 jobs over the period 2031–2050.**

Heat Pump Manufacturing

- The Commission estimated that producing the entirety of the heat pumps installed up to 2030 in the EU would lead to **an increase of about 60,000 jobs.**

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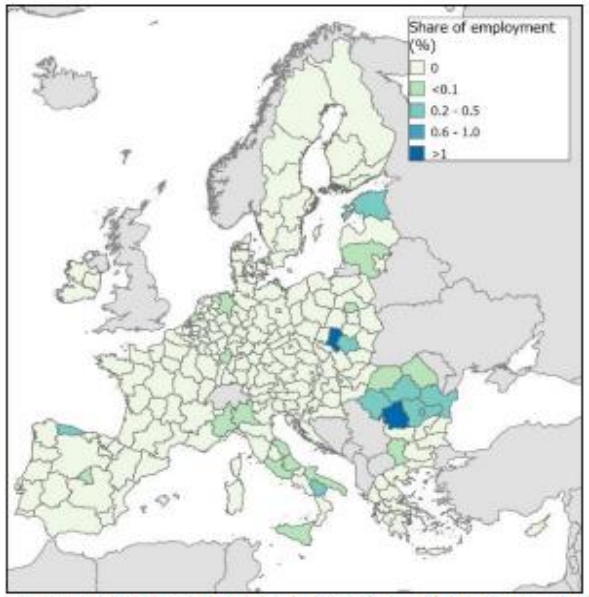
Regional Impacts

In 2020, only two EU regions (NUTS-2 level) had employment shares of more than 1% of direct employment in coal and lignite mining, as well as crude petroleum, and natural gas extraction.

- The local impact on regions reliant on these sectors is significant because they have a central role in their economies, driving indirect employment.
- The employment and social consequences of **the decline in extraction activities in these areas will need to be mitigated**

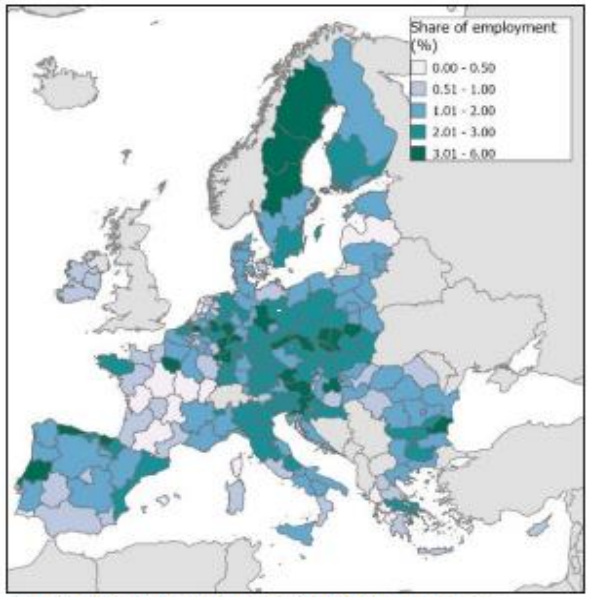
Figure 129: Share of employment in sectors most negatively impacted

(a) Regional exposure to sectors expected to decline



Share of total employment in mining of coal and lignite (B06) and extraction of crude petroleum and natural gas (B07) in 2020

(b) Regional exposure to energy intensive sectors



Share of total employment paper and paper products (C17), coke and refined petroleum products (C19), chemicals and chemical products (C20), other non-metallic mineral products (C23) and basic metals (C24) in 2020

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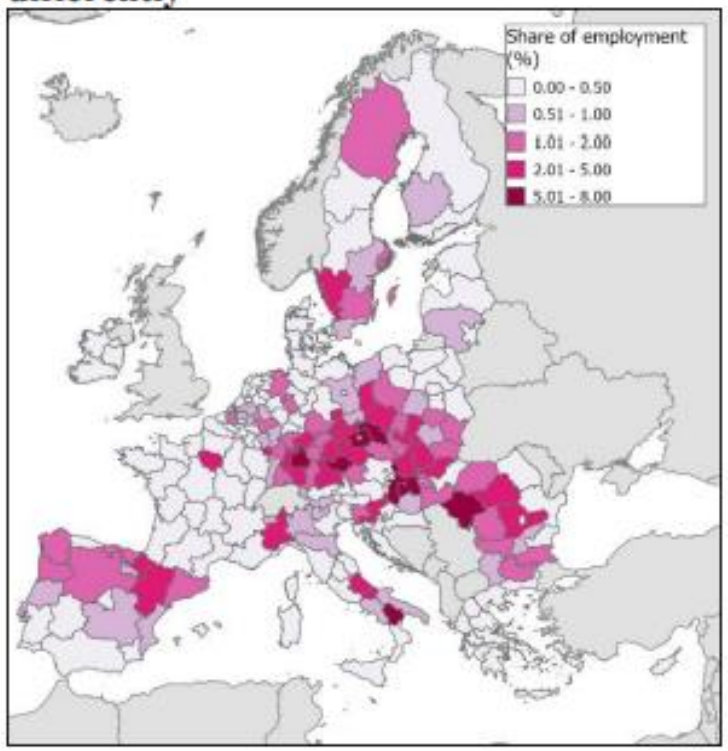
Regional Impacts

(c) Regional exposure to sectors that will have to produce the same goods differently

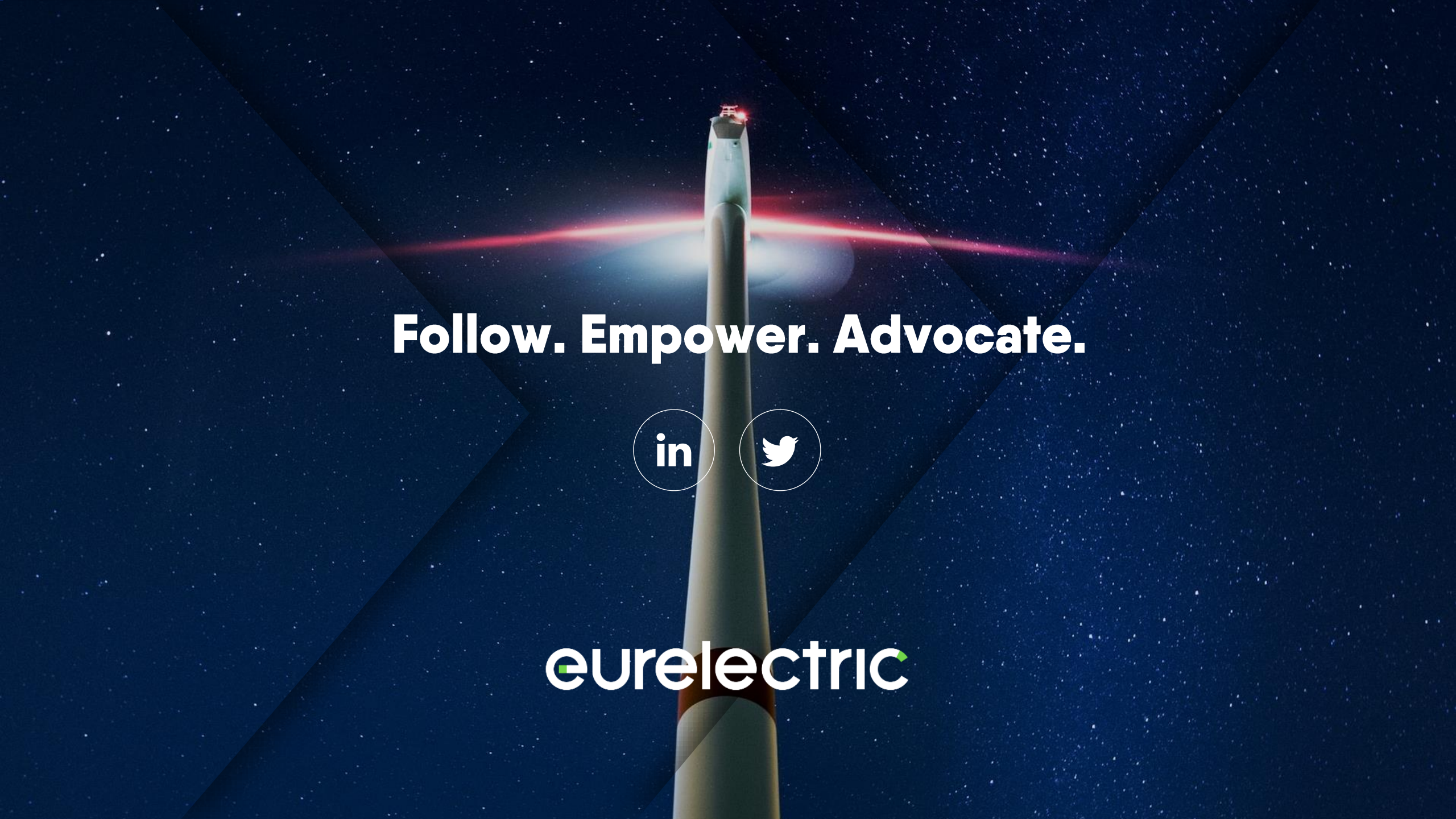


Share of total employment in motor vehicles, trailers and semi-trailers (C29) in 2020

Regions with a relatively high share of employment in sectors significantly impacted by the transition are prone to experience higher levels of negative impacts.

This is due to:

- Closures of mines/extraction facilities and related production/manufacturing facilities
- Transformation of industries (namely because they will have to produce different goods).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