FORATOM
THE VOICE OF THE EUROPEAN NUCLEAR INDUSTRY

FORATOM TAKEAWAYS FROM THE UPDATED

PATHWAYS TO 2050: "ROLE OF NUCLEAR IN A LOW-CARBON EUROPE" REPORT

NUCLEAR

Is a low-carbon energy source

Ensures security of supply

Is environmentally, economically and socially sustainable

NUCLEAR INDUSTRY IN NUMBERS

Accounts for
25%
of electricity in the EU

Almost
50%
of low-carbon electricity

Supports around
1.1Mn
jobs

Turnover of
102bn
per year

January 2022
Update

INTRODUCTION

Context

To achieve carbon neutrality by 2050, the European Union (EU) has committed to a 55% net reduction in greenhouse gas emissions by 2030 compared to 1990. This ambitious goal will entail an unprecedented transformation of the power sector. Europe will need to switch from carbon-emitting fuels to low-carbon energy technologies. Supported by the current set of EU policies, a massive deployment of renewable sources is foreseen. This will be backed up with storage technologies and low-carbon hydrogen.

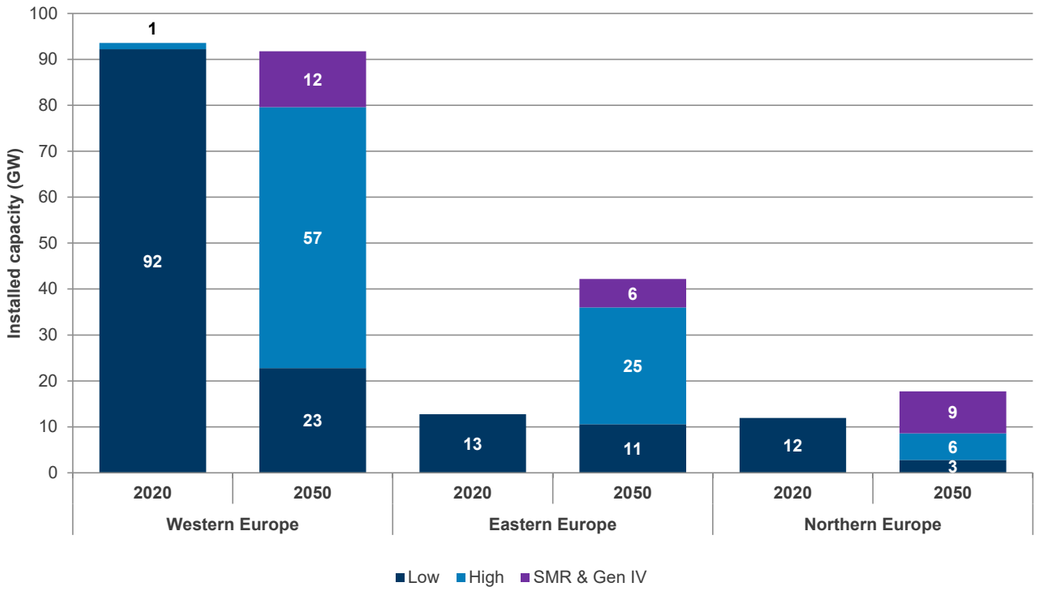
While FORATOM supports this ambitious undertaking, it urges policymakers to take a pragmatic approach. An updated report from Compass Lexecon (CL) highlights the need for additional dispatchable capacities. These technologies will need to support a reduction in the carbon intensity of the EU's power systems. In addition, a dispatchable, low-carbon and non-weather dependent technology must be used to ensure security of supply. **The only technology that fulfils these conditions is nuclear**.

The Compass Lexecon report

In 2018, FORATOM commissioned a report from consulting firm Compass Lexecon in order to assess the role that nuclear could play in the EU's long-term and deep-decarbonisation scenarios. FORATOM considered it necessary for the report to be revisited to account for: the updated EU decarbonisation targets for 2030 and 2050, the latest European Commission initiatives (i.e. the European Green Deal) and Brexit.

Two scenarios have been defined in the CL study when it comes to the level of installed nuclear capacities in the EU-27: a low nuclear scenario and a high nuclear scenario. Under the low nuclear scenario, estimations include the end of licensing lifetime or earlier-than-planned closure. Under the high nuclear scenario, the long-term operation (LTO) of most of the existing nuclear fleet is foreseen and additional new capacities are commissioned in order to avoid thermal baseload generation.

Graph 1: Installed nuclear capacity by scenario and region (GW)



Source: CL 2021 report

POLICY RECOMMENDDATIONS

Policies for affordable decarbonisation

The EU has greatly strengthened its climate objectives under the European Green Deal and the Fit for 55 package. Taking into account these objectives, FORATOM recommends that policymakers consider the potential of nuclear energy. There are three key takeaways from the CL report identified by FORATOM in relation to the EU's decarbonisation policy which form the basis of this report.

Firstly, **nuclear energy is an affordable and effective complementary partner to renewable energy sources**. Policymakers who are pragmatic about the energy transition know that finding a technology which complements renewables is crucial. By 2050, variable RES will form the backbone of the EU's electricity system but these are weather dependant. As a result, security of supply and system reliability are at risk. Nuclear can help to offset these difficulties by providing both dispatchable and flexible capacity. Furthermore, the CL report demonstrates that nuclear energy is the most cost-effective route to decarbonisation as it ensures access to affordable energy for final consumers. Keeping energy prices low ensures a just transition where both European industries and citizens alike are supported during the EU's energy transformation.

Secondly, **the early closure of nuclear power plants risks derailing long term decarbonisation goals**. The early closure of nuclear power plants will entail a range of different effects including: increased greenhouse gas emissions (caused by the need to replace nuclear with thermal power plants), higher final electricity costs (depending on the CO2 price under the EU Emissions Trading System), greater environmental impacts due to increased land use (nuclear has a very high energy density compared to renewables, which means that nuclear takes up drastically less land than renewables to produce the same quantity of energy) and a negative impact on the electricity adequacy level (due to the premature decommissioning of one of Europe's largest sources of dispatchable low-carbon energy).

Graph 2: Land use assessment - Equivalent 1800 MW low-carbon technologies (km2)

Source: FORATOM

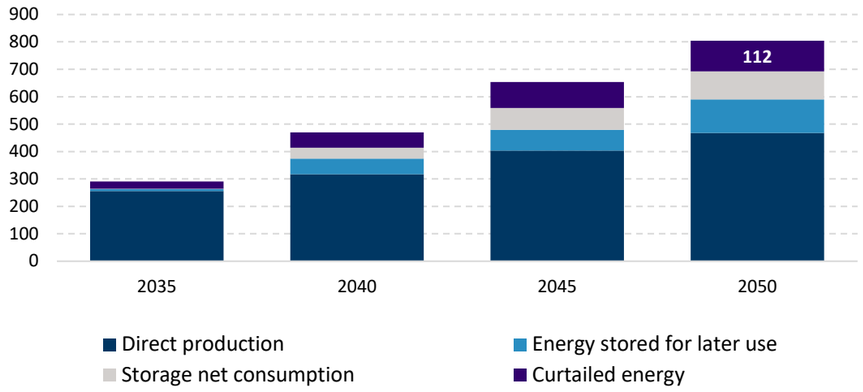
Thirdly, to ensure a sustainable transition, **all low-carbon technologies must be subject to the same robust and scientific assessment**. If we are serious about the transition, we must not act ideologically. This principle is reflected in the European Green Deal, which requires scientific evidence to demonstrate how different energy sources and technologies can help the EU to achieve its net-zero objectives in 2050. Evidence should meet the principle of technology neutrality and include references to internationally recognized sustainability metrics. The CL report provides insights into the Life Cycle Assessment methodology, an internationally recognized metric for environmental impact assessments. This methodology can also be found in a recent report from the Joint Research Centre, which shows that nuclear energy has a relatively low environmental impact when compared to alternative low-carbon sources of energy.

Policies for a secure supply of energy

With an asset life of 60 years or more, combined with reliable uranium supplies for nuclear fuel fabrication, **nuclear energy ensures long-term security of supply in the different regions where it operates**.

From an operational reliability and resilience point of view, recent events show that a higher share of variable renewable energy sources (above 40%) could put the electricity grid at risk of instability and interruptions. Therefore, in order to achieve an energy mix which is low-carbon and guarantees a security of supply, a mix of nuclear and renewables must be seriously considered by European policymakers.

Graph 3: RES (wind, solar) based power generation differences between Low and High scenarios (TWh)



Source: CL 2021 report

Policies for a competitive hydrogen economy

Nuclear supports a low-carbon hydrogen economy. In FORATOM's opinion, which is confirmed by the CL report, **a sustainable hydrogen economy cannot exist without including nuclear power as an important source**.

Policies for the EU's energy market design

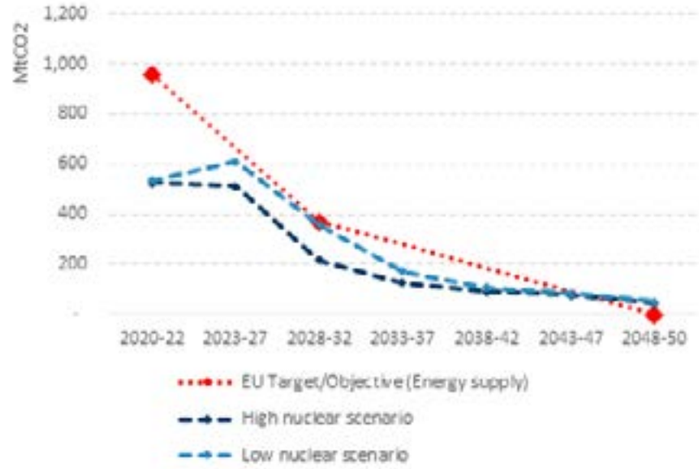
Financing is a crucial aspect of achieving the goals set out by the EU. Therefore, FORATOM urges a **market design which supports all low-carbon technologies**. The need for regulated asset frameworks and hybrid market designs can be further explored. Such frameworks may in the future incorporate capacity remuneration approaches while taking into consideration risk mitigation instruments.

CONCLUSION

In a nutshell

The EU has decided to proceed with an unprecedented transformation of the power sector to achieve its climate objectives. The CL report shows that flexible technologies can support a reduction in the carbon intensity of the EU's power systems to a certain extent, but only a dispatchable, low-carbon and non-weather dependent technology can support this energy system transition under secure conditions. Nuclear is the only technology that fits the bill: it will allow for an affordable decarbonisation policy while simultaneously ensuring European energy security.

Graph 4: Power sector CO2 emissions outlook 2020-2050 - High and Low scenario



About us

The European Atomic Forum (FORATOM) is the Brussels-based trade association for the nuclear energy industry in Europe. The membership of FORATOM is made up of 15 national nuclear associations and through these associations, FORATOM represents nearly 3,000 European companies working in the industry and supporting around 1.1 million jobs.

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