

FORATON

"Renewables together with nuclear energy will be <u>the backbone of a carbon-free European power system</u>" A Clean Planet for All, EC Communicatio<u>n, Nov. 2018</u>

Role of Nuclear in Energy Transition

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ABOUT FORATOM



FORATOM: Who we are?

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- FORATOM acts as the voice of the European nuclear industry in energy policy discussions with EU Institutions & other key stakeholders
- The membership of FORATOM is made up of 15 national nuclear associations and two corporate members, representing more than 3,000 companies





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EU Energy Policy:

- Economics of nuclear
- EU energy mix
- Environment
- Euratom Treaty
- Security of energy supply
- Special projects Brexit

Nuclear technology:

- Nuclear safety
- Nuclear transport
- IRD
- Supply Chain
- Waste disposal

Communication:

- Nuclear advocacy
- Perception of nuclear energy
- Promotion of nuclear energy
- Young generations in nuclear





NUCLEAR ENERGY & CLIMATE CHANGE. GLOBAL VIEWS 2050



Global Carbon Atlas



Nuclear Energy in the World (2018)



https://www-pub.iaea.org/MTCD/Publications/PDF/RDS-2-39_web.pdf 33

https://www-pub.iaea.org/MTCD/Publications/PDF/RDS2-32_web.pdf



The role of nuclear energy in reaching climate targets





•The latest IPCC report recognises that by "*mid*century, the majority of primary energy comes from non-fossil fuels (*i.e.*, renewables and nuclear energy) in most 1.5°C pathways"

•"... health risks are low (for nuclear) per unit of electricity production, and land requirement is lower than that of other power sources ..."

http://ipcc.ch/sr15



Climate Change And Nuclear Power, 2018,

If the existing nuclear fleet starts to decrease "CO2 emissions might be more difficult and expensive to abat"
Subsidies for renewables "will likely be greater than those to properly maintain and increase the nuclear fleet"
Non-electrical application of the nuclear energy "can potentially result in a dramatic reduction in the associated GHG emissions"

https://www-pub.iaea.org/MTCD/Publications/PDF/CCNAP-2018 web.pdf

Nuclear Power in a Clean Energy System, 2019



- "With nuclear power facing an uncertain future in many countries, the world risks a steep decline in its use in advanced economies that could result in billions of tonnes of additional carbon emissions"
- "The lack of further lifetime extensions of existing nuclear plants and new projects could result in an additional 4 billion tonnes of CO2 emissions."
- <u>https://www.iea.org/newsroom/news/2019/may/steep-decline-in-nuclear-power-would-threaten-energy-security-and-climate-goals.html</u>

World Energy Scenarios 2019. The Future Of Nuclear: Diverse Harmonies in the, Sep. 2019

Energy Transition



"There is increasing and widespread recognition that nuclear energy will feature in the future global energy mix and make its contribution to sustainable development"
Nuclear energy will grow in all three scenarios: Modern Jazz, Unfinished Symphony and Hard Rock <u>https://www.worldenergy.org/assets/downloads/Nuclear_Scenari</u> os Exec Summary FINAL for website.pdf



IAEA's International Conference on Climate Change and the Role of Nuclear Power, 7–11 October 2019, Vienna, Austria



550 participants representing 79 countries and 18 international organisations

energy technologies are important', Fatih Birol, executive director, IEA/OECD

"Renewable energy - solar and wind - are definitely important parts of this picture,

but we also think that nuclear power, CCS, utilisation and storage, and other clean

"It is difficult to see how the goal of reducing greenhouse gas emissions can be achieved without a significant increase in the use of nuclear power in the coming





decarbonization over the next 30 years "The global nuclear industry is committed to delivering what it needs to do to save our planet from climate change", said Agneta Rising, Director General of WNA

Hoesung Lee, Chair of the IPCC, reiterated the contribution of nuclear power to

http://www.world-nuclear-news.org/Articles/The-disconnect-between-climate-action-and-reality /https://www.iaea.org/newscenter/news/energy-mix-needs-nuclear-to-combat-climate-change-pa

decades", Cornel Feruta, IAEA acting director general



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NUCLEAR ENERGY AND THE EU ENERGY POLICIES

Nuclear energy in the EC strategy (Nov 2018)

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EC Communication*:

"Renewables together with nuclear energy will be the backbone of a carbon-free European power system"

EC in-depth analysis**:

- 8 scenarios analyze different technology pathways: nuclear energy is part of each of them
- Nuclear energy is a well-established large-scale zero-carbon technology in power generation
- Nuclear will remain an important component in the EU 2050 energy mix
- Capacity of nuclear in 2050 between 99-121 GW
- Share of nuclear in the electricity mix in 2050 ~ 15%
- LTO are expected to represent the majority of nuclear investments in the short to medium term

Authors of the strategy referred directly to the study commissioned by FORATOM

* https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_en.pdf ** https://ec.europa.eu/clima/sites/clima/files/docs/pages/com_2018_733_analysis_in_support_en_0.pdf

New build in the EU – construction & plans



Countries preparing or
considering new build

- ✓ Bulgaria
- ✓ Czech Republic
- ✓ Finland
- ✓ France
- ✓ Hungary
- ✓ Poland
- ✓ Romania
- ✓ UK

There is a clear understanding that the use of nuclear energy is a national choice to be made by each Member State and this will continue to be the case

Nuclear capacity "under construction" - ca. 7,500 MW

Nuclear capacity "planned" – between 10,000 - 20,000 MW



- nuclear power plants under construction

- nuclear projects being developed or planned



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*Source: European Commission's PINC, May 2017

Nuclear Illustrative Programme, PINC 2017



Currently the 120 GW of installed nuclear capacity in the EU accounts for around 1/4 of the electricity generated and almost 50% of the lowcarbon electricity. Nuclear power will clearly play an important role in the 2050 carbon-free power sector.

Nuclear LTO

"Meeting the EU's ambition to decarbonize its economy will require using all low-carbon sources and the LTO of the existing nuclear fleet will have a significant impact on this transition"

Source: FORATOM - The Importance of Long-Term Operation of Existing EU Nuclear Fleet, May, 2019, https://www.foratom.org/press-release/foratom-highlights-importance-of-long-term-operation-of-existing-nuclear-fleet/

LTO main benefit:

- **Decarbonisation**: To achieve the intermediate decarbonisation targets in the transition ٠ towards 2050, LTO of existing nuclear power plants will be crucial
- **Economy**: Nuclear LTO is economically advantageous compared to other power sources ٠
- **Energy security**: LTO reduces the EU's energy import dependency mainly fossil fuels.
- **Regulations**: Nuclear LTO provides a great advantage thanks to the "...timely ٠ implementation of reasonably practicable safety improvements"
- **System reliability**: Low-carbon nuclear generation provides firm capacity to the electricity system



THE BATTLE FOR FINANCING SUSTAINABLE DEVELOPMENT



European initiative "Financing sustainable development"

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The European initiative on "*Financing sustainable development*", March 2018 – an Action Plan to limit global warming to well below 2°C

https://ec.europa.eu/transparency/regdoc/rep/1/2018/EN/COM-2018-97-F1-EN-MAIN-PART-1.PDF

- EC Regulation: "The establishment of a framework to facilitate sustainable investment" ("Taxonomy Regulation")
- ECON and ENVI /EP interventions:

https://ec.europa.eu/transparency/regdoc/rep/1/2018/EN/COM-2018-353-F1-EN-MAIN-PART-1.PDF

- Removing" ... climate-neutral energy ...", replacing with "renewable energy", adding "in line with the Renewable Energy Directive" (art. 6.1 a);
- Removing " switching to use of renewable materials", replacing with " switching to or increasing the use of environmentally sustainable renewable materials based on a full life cycle assessment" (art. 6.1 d).
- Effects on the future NNB and advanced nuclear technologies.

AND T	n Plan: Financing S	OF THE REGIO	ons vth	

Council mandate for negotiations with the EP on 'taxonomy'

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- Sep. 24, after COREPER meeting, the mandate of the ٠ Finnish Presidency of the EU Council for the *trialog* gives the technology neutrality FORATOM were asking for, which is goods news for the nuclear industry.
- Written remarks from DE, AT, LU and an oral remark ٠ from Greece are included.

"We are however convinced that any taxonomy that would allow for nuclear energy to be qualified as sustainable would be inherently flawed and could give rise to severe criticism, as it would send the wrong signals and incentives to financial market participants and investors"

And this is not the end!

\circ	Council of the European Union	Brussels, 24 September 2019 (OR. en)
Interinsti 2018/0	itutional File: 1178(COD)	12360/2/19 REV 2
		EF 274 ECOFIN 809
		CODEC 1406 ENV 791 SUSTDEV 127
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Agreement and the 2030 UN Sustainable Development Agenda, this proposal is part of a broader Commission initiative to facilitate investment in sustainable projects and assets across the European Union.

2. In this context, on 24 May 2018, the Commission submitted to the Council a package of legislative proposals:

ECOMP.1.B

12360/2/19 REV 2

EN

https://mail.nuclearelectrica.ro/owa/redir.aspx?C=bfPnLtHvQXMUmKPxL47rLKhBKgJyL9a PsIB4UnYDQ____UT2BkLXCA..&URL=https%3a%2

f%2fdata.consilium.europa.eu%2fdoc%2fdocument%2fST-12360-2019-REV-2%2fen%2fpdf

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Technical expert group on sustainable finance (TEG)

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- TEG, July 2018 35 members from civil society, academia, business and the finance sector,
- The mandate of TEG was to focus on the following topics:
 - an EU classification system environmental sustainable economic activity;
 - an EU Green Bond Standard;
 - methodologies for EU climate benchmarks and disclosures for benchmarks; and
 - guidance to improve corporate disclosure of climate-related information.
- TEG Report subject to public consultation, deadline Sep. 13, 2019:
 - "nuclear energy generation has near to zero greenhouse gas emissions in the energy generation phase and can be a contributor to climate mitigation objectives"...
 - ... but "*TEG* **has not therefore recommended** the inclusion of nuclear energy in the Taxonomy at this stage", recognizing their lack of competence on this topic,
 - TEG report recommended a more extensive technical evaluation "by a group with indepth technical expertise on nuclear life cycle technologies and the existing and potential environmental impacts across all objectives"



Taxonomy Technical Report June 2019

An ad-hoc Nuclear Experts Group is proposed to complement the EU TEG on sustainable financing

Technical Report 2019 by the Technical Expert Group on Sustainable Finance, July 2019, <u>https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-taxonomy_en.pdf</u>



The European Investment Bank (EIB)

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- "EIB energy lending policy. Supporting the transformation into energy", July 2019, <u>https://www.eib.org/attachments/draft-energy-lending-policy-26-07-19-en.pdf</u>
 - neutral approach from a technological point of view: "EIB criteria should respect technological neutrality, respecting different mixtures of energy in the MSs"
 - nuclear energy is included in the category of technologies that lead to zero emission targets, together with energy efficiency, clean mobility, decarbonisation of heating systems, CCS
- The EIB technologically neutral approach represents a positive signal for the nuclear industry and a recognition of its role to a clean planet
- The EIB document resulted from extensive public consultation
 https://www.eib.org/attachments/draft-consultation-report-en.pdf
- At the EIB Council meeting on September 10, 2019, the approval of this document was postponed, waiting for the new EC to come into operation.





EIB energy lending policy





WHAT THE INDUSTRY DOES?

FTI CL Study, Nov. 2018 (commissioned by FORATOM)

Pathways to 2050: role of nuclear in a low-carbon Europe

Final report



3 nuclear scenarios:

- 1. <u>High</u> 150 GW, <u>share ~25%</u> (maintaining the current one)
- 2. <u>Medium</u> 103 GW, share ~15% (in line with the EC strategy)
- **3.** <u>**Low**</u> 36 GW, share ~4%

The study assesses the impact of each scenario on the key dimensions of Europe's energy policy:

- 1. security of supply
- 2. sustainability
- 3. economics



FTI CL Study Benefits of having a 25% nuclear share in 2050

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Sustainability

- Allowing the EU to meet its climate goals
- 700 million t. of CO₂ avoided per year (it emits 30x less CO₂ than gas, 65x less than coal, 3x less than solar)
- Compliance with air quality standards
- No need for vast volumes of land / raw materials

Energy security

- 85-90% capacity factor = a reliable source of electricity
- Decreased dependence on fossil fuels imports
- System flexibility much needed to support the RES developments
- Limited reliance on yetto-be-proven technologies

Economy

- ✓ High residual investment value (avoiding reducing the value by €1 trillion)
- ✓ Mitigation of the cost impact of the low-carbon transition on customer cost by €350bn
- ✓ Reducing network & balancing costs by 160bn€
- Positive & significant impact on jobs, GDP, revenues, etc.



Deloitte Study, May 2019 (commissioned by FORATOM)



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Deloitte Study: Nuclear energy's economic impact



*Deloitte study "Nuclear energy: powering the economy – carbon-free growth, jobs and leadership in innovation ** Other = Ireland, Denmark, Greece, Slovenia, Luxembourg, Croatia, Lithuania, Latvia, Estonia, Cyprus, Malta combined

#NuclearEuropeLeaders Manifesto

In June 2019, senior representatives from the nuclear industry signed a **joined manifesto*** highlighting what needs to be done to achieve a decarbonised Europe by 2050, whilst at the same time maintaining growth & jobs.

The leaders call upon EU policymakers to work with them to overcome the current challenges. https://www.foratom.org/downloads/nucleareuropelea <u>ders-</u> manifesto/?wpdmdl=42821&refresh=5d1325036107c <u>1561535747</u>



FORATOM Position Papers (2019)





KEY TAKEAWAYS

Key Takeaway: what industry says

Nuclear energy is, and must be, a major component of the EU policies and strategies, built on the objectives of decarbonisation, security in supply and sustainable development. For this, it is necessary at EU level:

- A coherent, consistent and stable EU policy framework is needed.
- Agree an ambitious net-zero CO2 emissions target for the EU in 2050, in line with the EC's long-term vision for a **climate neutral economy**.
- Sustainable finance needs to be defined by evidence not ideology
- Develop & implement **a strong industrial strategy** to ensure that Europe maintains its technological leadership
- Support human competences development
- Ensuring the **financing of research activities** a crucial decision in the move to a new generation of reactors, more safe, more flexible



Key Takeaway: what people say

"Nuclear is ideal for dealing with climate change, because it is the only carbon-free, scalable energy source that's available 24 hours a day"

Bill Gates

Bill Gates, Founder, TerraPower (source: nucnet.org, 2 January 2019)

https://www.foratom.org/

"At climate conferences Emmanuel Macron always has a little advantage over me because he has so many nuclear plants emitting so little CO2"

Angela Merkel

Angela Merkel, German Chancellor (source: lacroix.com, 22 January 2019)







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Q & A