European Commission

Nuclear in the energy mix - an overview of EC activities

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Energy

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- ✓ European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (role of nuclear)
- ✓ EC activities on SMRs
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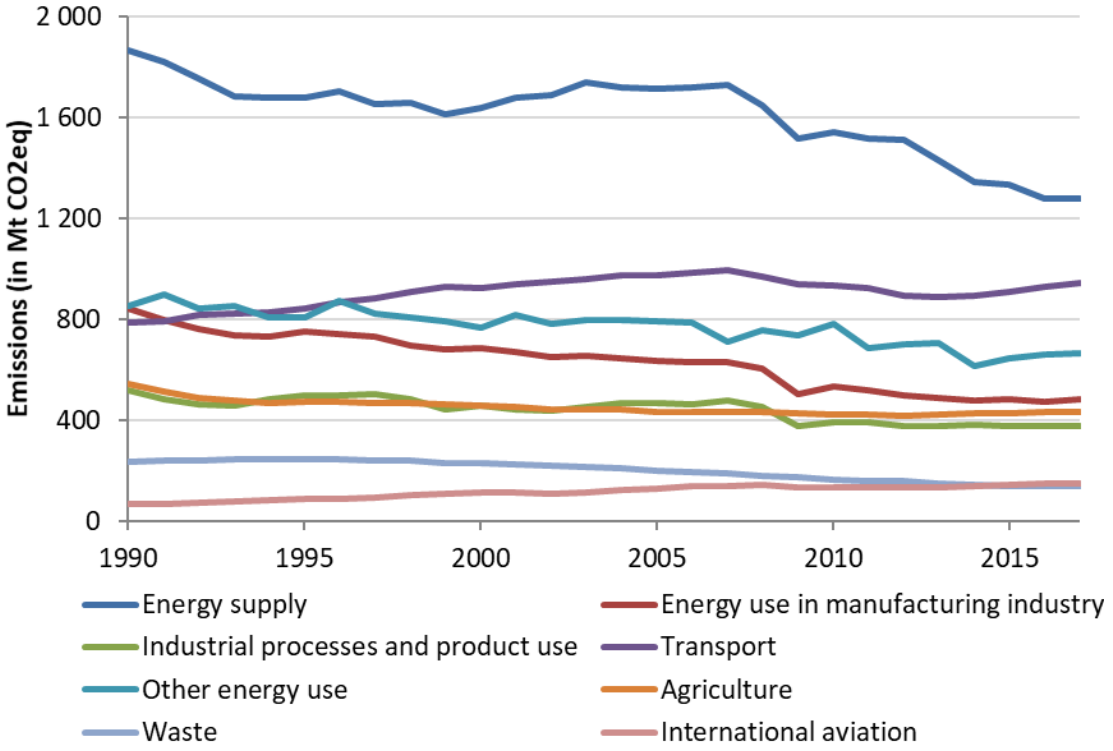
Europe today

- The EU is about to achieve its 2020 targets and targets for 2030 are agreed in EU law
- Business as usual means 45% reduction of GHG emissions in 2030 (vs. 1990)
- Without increasing ambition: -60% emissions in 2050
- **Paris Agreement to be enforced**

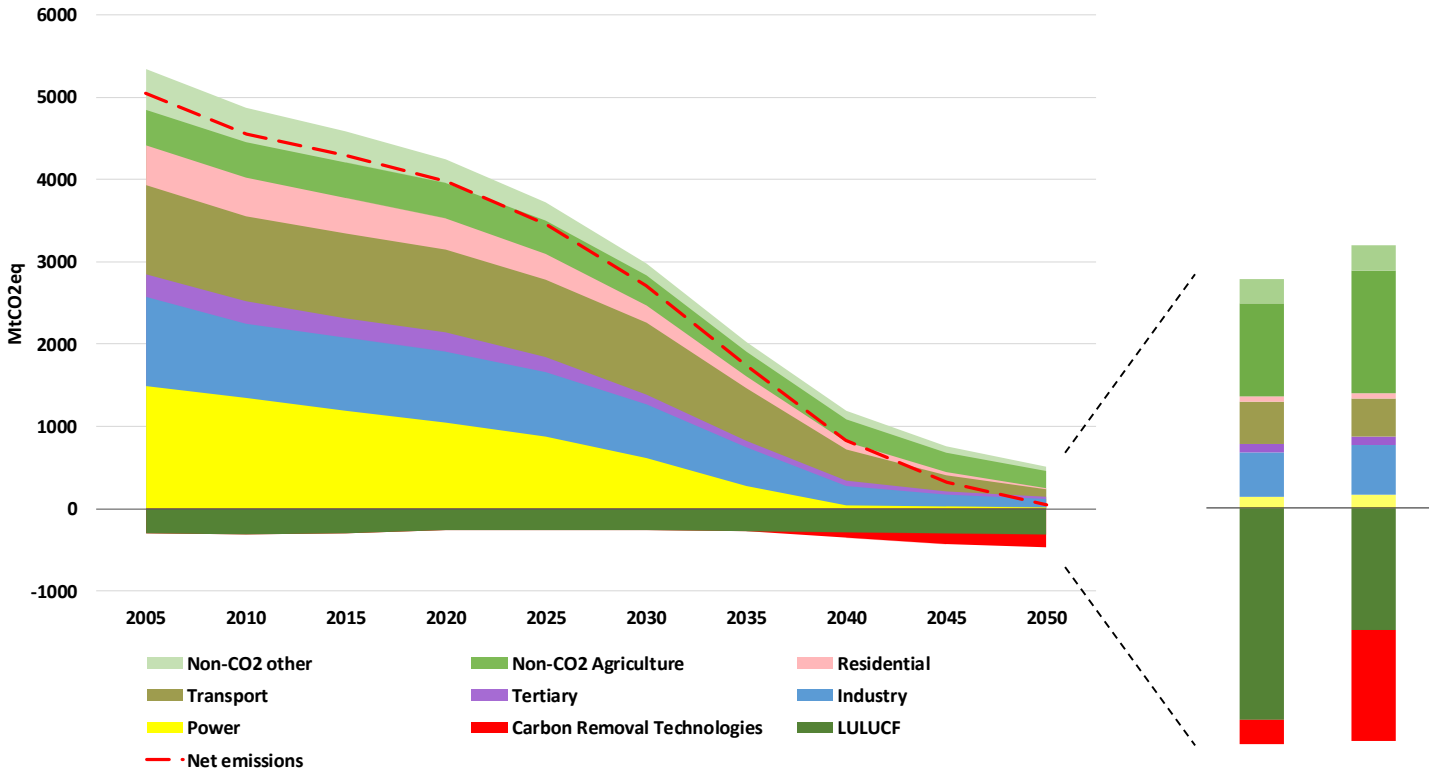


Europe in 2050

- The Paris Agreement requires to reduce GHG emissions, with global temperature increase well below 2°C and pursue efforts to limit it to 1.5°C
- For Europe, this means **80% emissions reduction** by 2050 compared to 1990. To lead the world in climate action, it means achieving **net-zero emissions**
- Building blocks: Energy efficiency, Deployments of renewables, Clean safe & connected mobility, Competitive industry and circular economy, Infrastructures and inter-connections, Bio-economy and natural carbon sinks, Tackling remaining emissions with carbon capture and storage
- The EU long term strategy shows that transforming our economy is possible and beneficial. It also highlights the challenges of the transformation, but the status quo is not an option

All sectors have to contribute

GHG emissions trajectory in a 1.5°C scenario

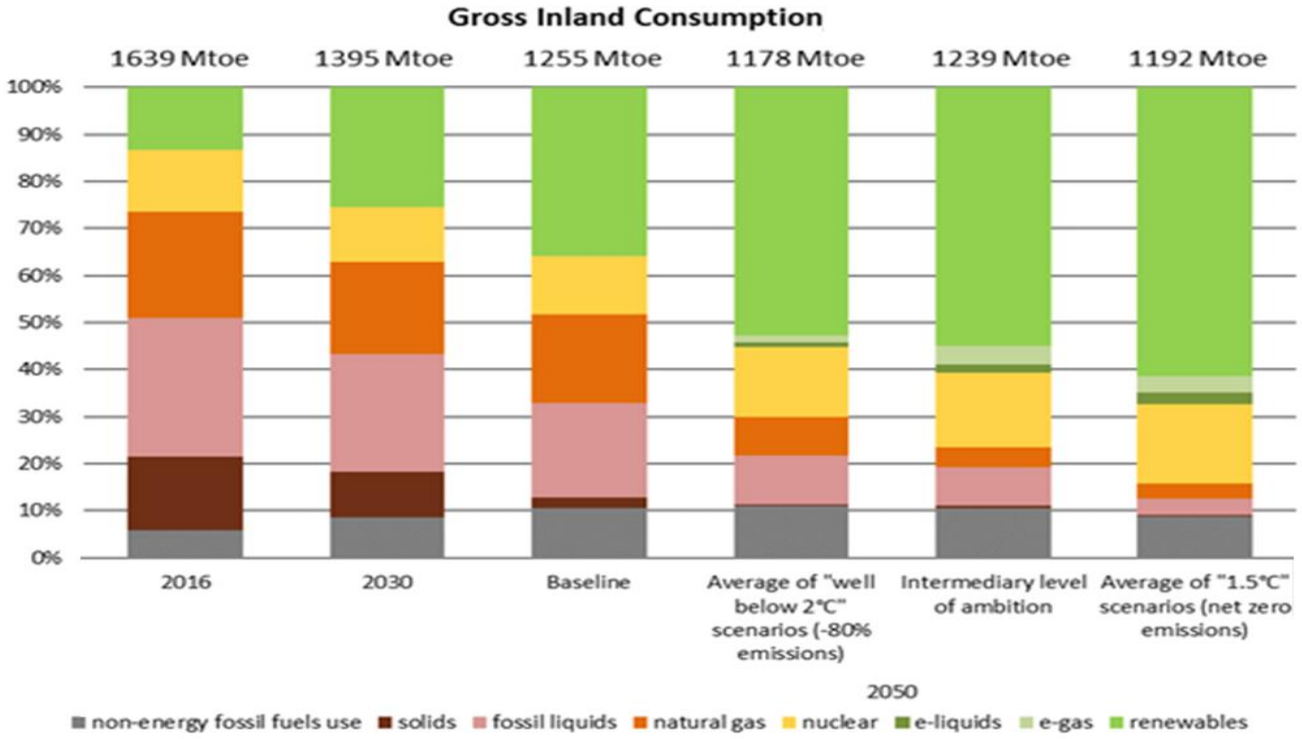


Analysed scenarios in line with Paris Agreement

Long Term Strategy Options

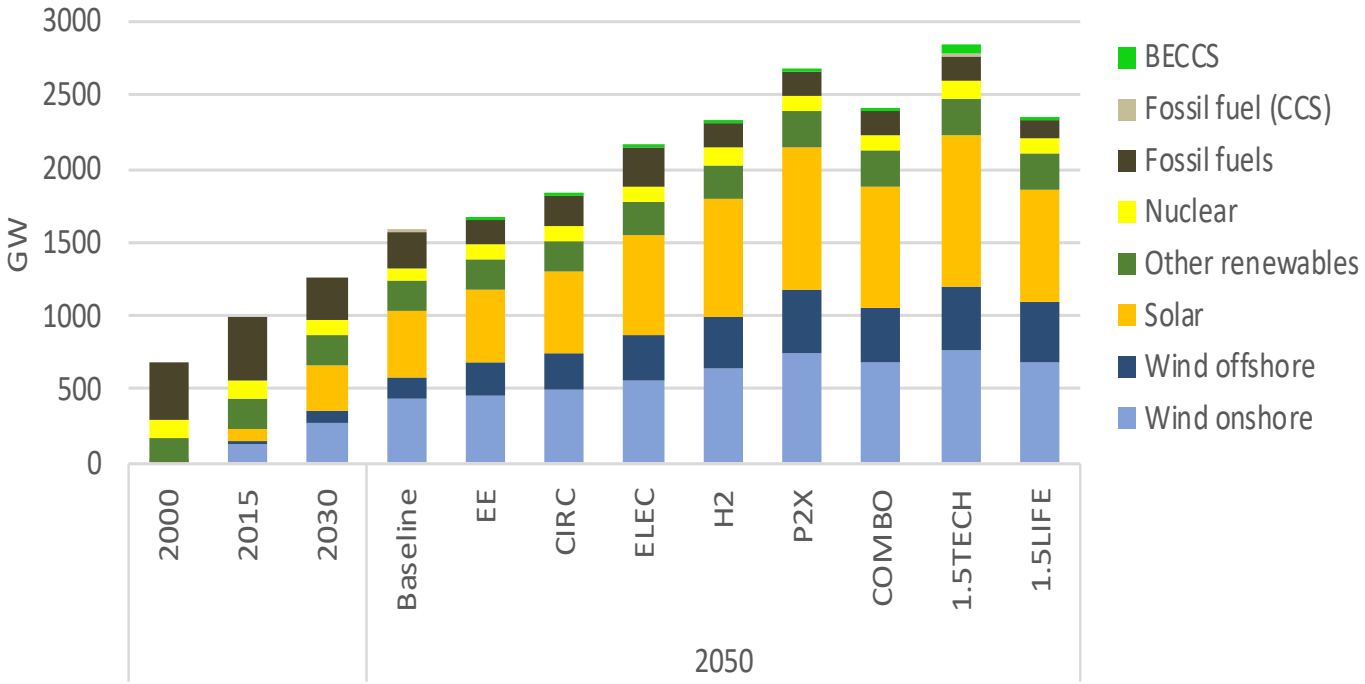
	Electrification (ELEC)	Hydrogen (H2)	Power-to-X (P2X)	Energy Efficiency (EE)	Circular Economy (CIRC)	Combination (COMBO)	1.5°C Technical (1.5TECH)	1.5°C Sustainable Lifestyles (1.5LIFE)
Main Drivers	Electrification in all sectors	Hydrogen in industry, transport and buildings	E-fuels in industry, transport and buildings	Pursuing deep energy efficiency in all sectors	Increased resource and material efficiency	Cost-efficient combination of options from 2°C scenarios	Based on COMBO with more BECCS, CCS	Based on COMBO and CIRC with lifestyle changes
GHG target in 2050	-80% GHG (excluding sinks) ["well below 2°C" ambition]					-90% GHG (incl. sinks)	-100% GHG (incl. sinks) ["1.5°C" ambition]	
Major Common Assumptions	• Higher energy efficiency post 2030 • Deployment of sustainable, advanced biofuels • Moderate circular economy measures • Digitilisation				• Market coordination for infrastructure deployment • BECCS present only post-2050 in 2°C scenarios • Significant learning by doing for low carbon technologies • Significant improvements in the efficiency of the transport system.			
Power sector	Power is nearly decarbonised by 2050. Strong penetration of RES facilitated by system optimization (demand-side response, storage, interconnections, role of prosumers). Nuclear still plays a role in the power sector and CCS deployment faces limitations.							
Industry	Electrification of processes	Use of H2 in targeted applications	Use of e-gas in targeted applications	Reducing energy demand via Energy Efficiency	Higher recycling rates, material substitution, circular measures	Combination of most Cost-efficient options from "well below 2°C" scenarios with targeted application (excluding CIRC)	COMBO but stronger	CIRC+COMBO but stronger
Buildings	Increased deployment of heat pumps	Deployment of H2 for heating	Deployment of e-gas for heating	Increased renovation rates and depth	Sustainable buildings			CIRC+COMBO but stronger
Transport sector	Faster electrification for all transport modes	H2 deployment for HDVs and some for LDVs	E-fuels deployment for all modes	• Increased modal shift • Electrification as in ELEC	Mobility as a service			• CIRC+COMBO but stronger • Alternatives to air travel
Other Drivers		H2 in gas distribution grid	E-gas in gas distribution grid				Limited enhancement natural sink	• Dietary changes • Enhancement natural sink

Energy supply in 2050



By 2050, more than 80% of electricity will be coming from renewable energy sources. Together with a **nuclear power share of about 15%**, this will be the backbone of a carbon-free European power system

Power generation capacity in 2050

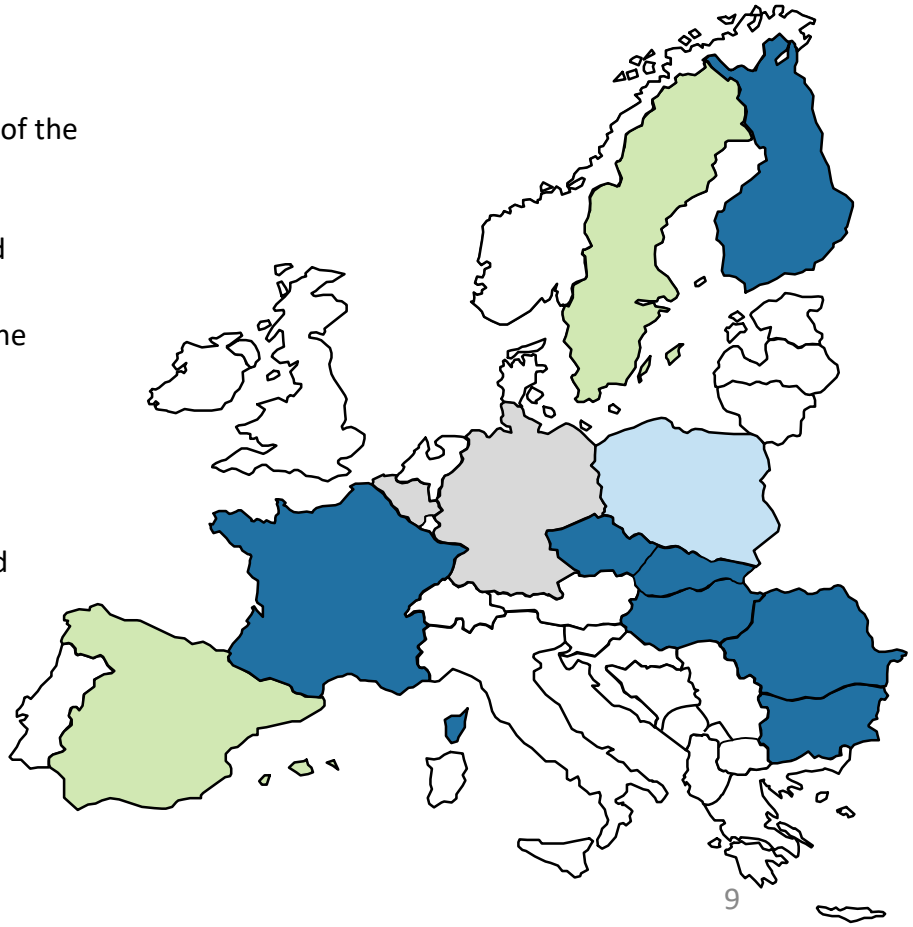


Nuclear installed capacity in 2050 is only slightly lower than current level (**99-121 GW, depending of the scenario**, versus 122 GW in 2015) and, in all cases, higher than both the 2030 projection (97 GW) and the Baseline in 2050 (87 GW)

National Energy and Climate Plans (NECPs)

Some MS have included information on the role of nuclear energy in their energy mix (2050 horizon).

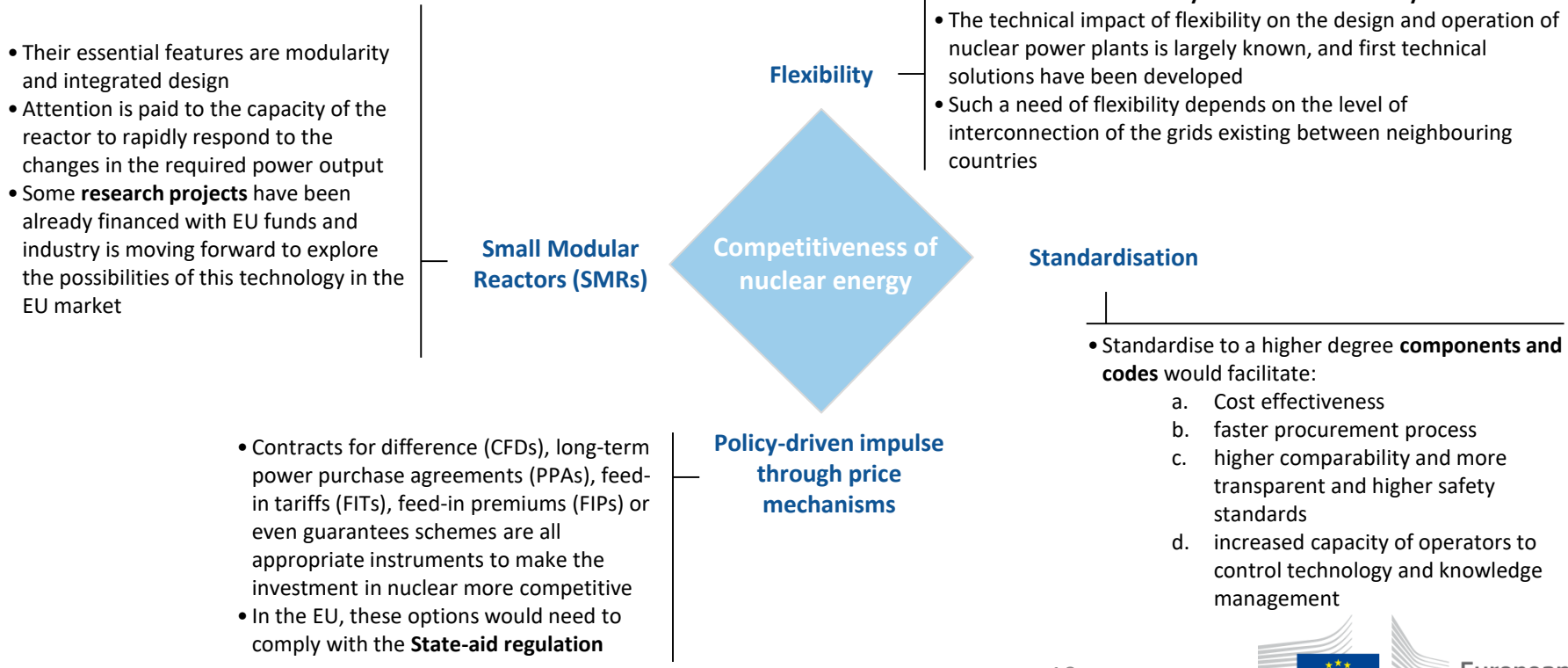
- Nuclear expected to be part of the energy mix in the long term
- Phase-in of nuclear expected
- 100% renewables target in the long term
- Phase-out from nuclear
- Non-EU country / EU non-nuclear country / no detailed information available



COM recommendation: "For those Member States which have nuclear energy as part of their energy mix, the NECPs could introduce policies to maintain adequate capacities in all the parts of the nuclear supply chain and to ensure security of fuel supply"

Possible drivers of evolution for the nuclear sector

Nuclear energy will also need to progressively adapt to the evolving electricity scenario in the EU.



Small Modular Reactors

Potential benefits	Commission activities
• Lower investment costs, lower risk • More flexibility in electricity generation • Easier integration in the grid • Possibly, lower levels of RAW • Suitable for brown field / existing sites • Easier public acceptance?	• **PINC** recalled SMRs as promising new technology • SMRs discussed during **ENEF 2018** • Some **EU research funds** invested in technologies linked to SMRs

Nuclear energy and sustainable finance 1/2

- In March 2018, the European Commission issued its "*Action Plan: financing sustainable growth*". Action 1 of the Plan calls for the establishment of an EU classification system for sustainable activities (EU taxonomy)
- To support with the plan, the European Commission established a Technical Expert Group (TEG) on sustainable finance in July 2018. On 18 June 2019, the TEG issued their **Report on Taxonomy**
- Nuclear is recognized to contribute to climate change mitigation. But, "*it was not possible for TEG to conclude that the nuclear energy value chain does not cause significant harm to other environmental objectives*" → The TEG has not recommended the inclusion of nuclear energy in the Taxonomy at this stage

Nuclear energy and sustainable finance 2/2

- The TEG has launched on 04 July 2019 a call for feedback, asking for technical input on its Report
- Stakeholders are invited to comment on the proposed activities identified that contribute substantially to climate change mitigation and adaptation and the proposed technical screening criteria. They are also called to answer questions on the usability and future development of the taxonomy
- The call for feedback will close on 13 September 2019
- During the autumn, the expert group will advise the Commission how to take this feedback forward in developing the future EU Taxonomy

DGENER studies

- Study on Market of decommissioning
- Study on Risk profile of funds used in the nuclear back-end
- Study on methodologies of cost assessments for radioactive waste and spent fuel management
- Study on methodologies of inventorying for radioactive waste
- Study on benchmarking of nuclear technical requirements against WENRA safety reference levels, EU regulatory framework and IAEA standards
- Study on nuclear liabilities
- Modelling exercise on energy market structure given LTOs scenarios

European Commission

Thanks

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