IMPLEMENTATION OF THE FRENCH POLICY FOR THE ROLE OF NUCLEAR ENERGY TOWARDS NET ZERO 2050

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February 11th, 2025

The French Strategy for Energy and Climate

After consultations of the public and member of Parliament, orientations for the French Strategy for Energy and Climate have been published in November 2023, with 5 main objectives:

- Lower French total energy consumption
- Increase low carbon energy production
- Adapt energy networks
- Ensure security of supply
- Protect purchasing power and competitiveness

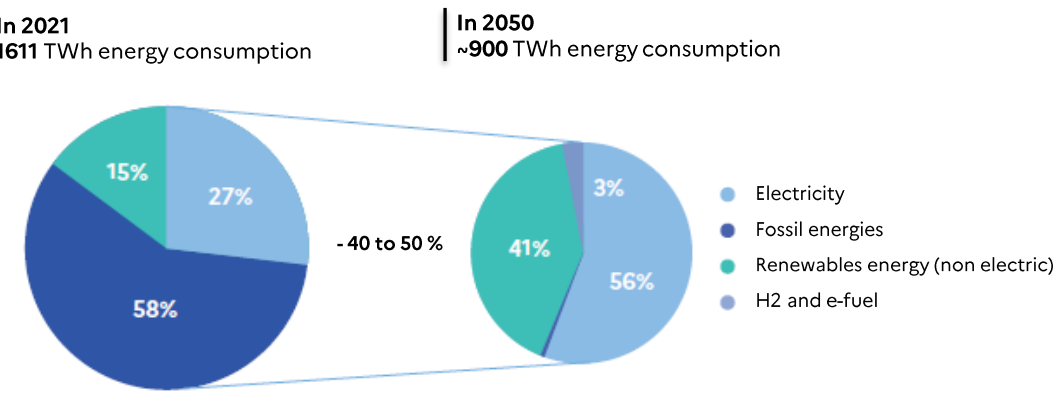
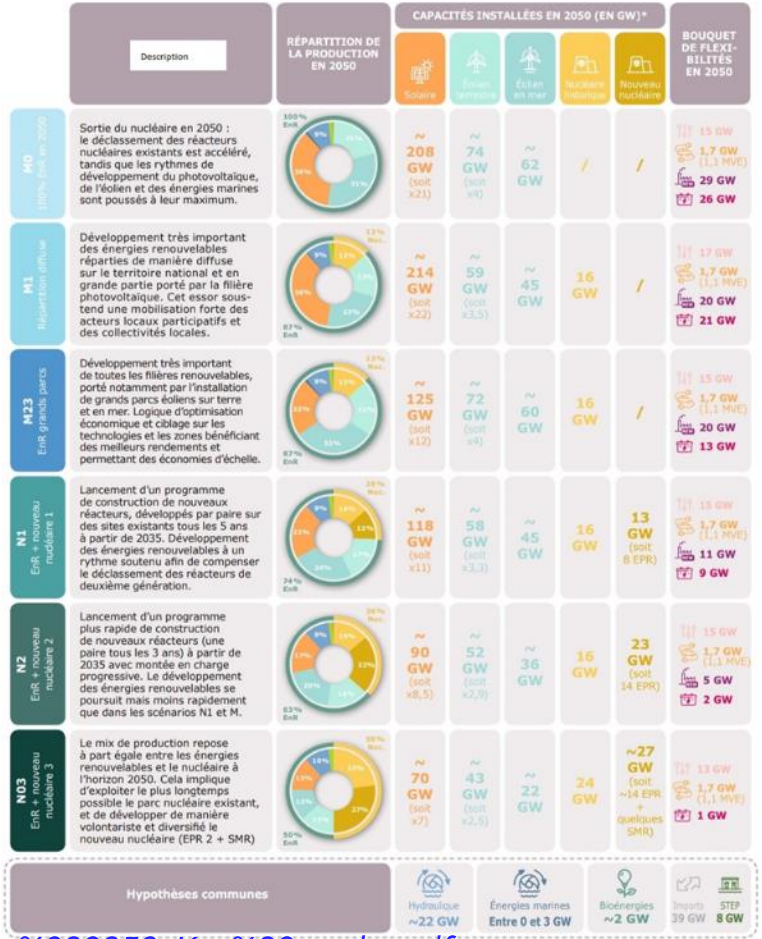


FIGURE 1. Consommation finale d'énergie 2021 et projections à horizon 2050[4]

Energy pathways to 2050 (RTE study)

Main Takeaways

- Programmatic orientations for a very significant decrease in energy consumption is a prerequisite to reach climate goals.
- Going out of fossil sources of energy further requires electrification of a vast range of activities (transport, industry, etc.). The electrical system can cope with such evolutions and put France on track for carbon neutrality at a reasonable cost.
- Renewable sources of energy are needed for energy transition. Whatever the scenario, their development must reach a very high pace, for all renewable technologies.
- Hydrogen is an asset for decarbonation and will be needed in scenarios with a high ratio of renewable sources of energy. More generally, flexibilities and electrical networks must be developed.
- Building new nuclear reactors and big solar and onshore wind farms is economically relevant.
- Scenarios with very high ratios of renewable sources of energy (i.e. more that 85 % in 2050) or which rely on nuclear reactors' lifetime extension over 60 years would imply risky technological bets to reach carbon neutrality by 2050.



https://assets.rte-france.com/prod/public/2022-01/Energy%20pathways%202050_Key%20results.pdf

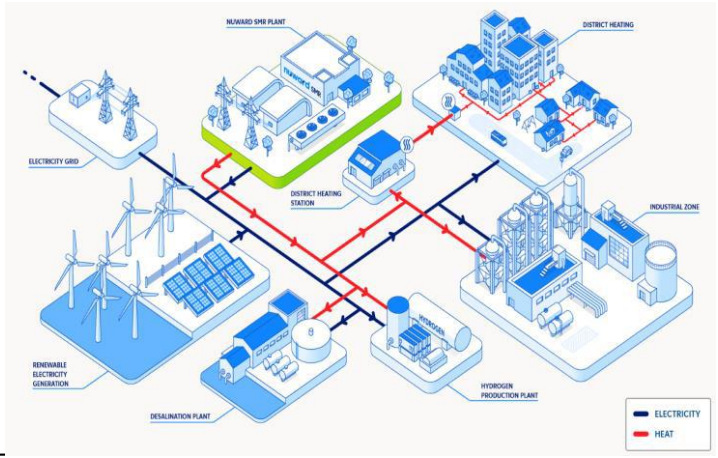
Advantages of nuclear energy

1. Energy with very low CO2 emissions and a small footprint on the ground
2. Controllable electricity generation to support the deployment of renewable energies
3. Contribution to sovereignty

French nuclear energy policy (1/2)

1. **Long term operation of existing nuclear power plant** > 50 years (*subject to safety requirements*)
2. **Launch of a new nuclear program targeting 25 GWe new capacity by 2050**
   → New build program with 6 EPR2 (3 pairs)
   → Study for 8 more EPR2
3. Support for the Nuward **Small Modular Reactor** project

EPR2 at Penly (© EDF)



French nuclear energy policy (2/2)

4. Innovation program for Advanced Modular Reactor through a call for projects

https://www.entreprises.gouv.fr/fr/actualites/appel-projets-reacteurs-nucleaires-innovants-annonce-des-nouveaux-laureats

11 awarded projects

naarea

newcleo
Futurable Energy

CALOGENA

HEXANA

Jimmy

RENAISSANCE FUSION

otrera

BLUE CAPSULE

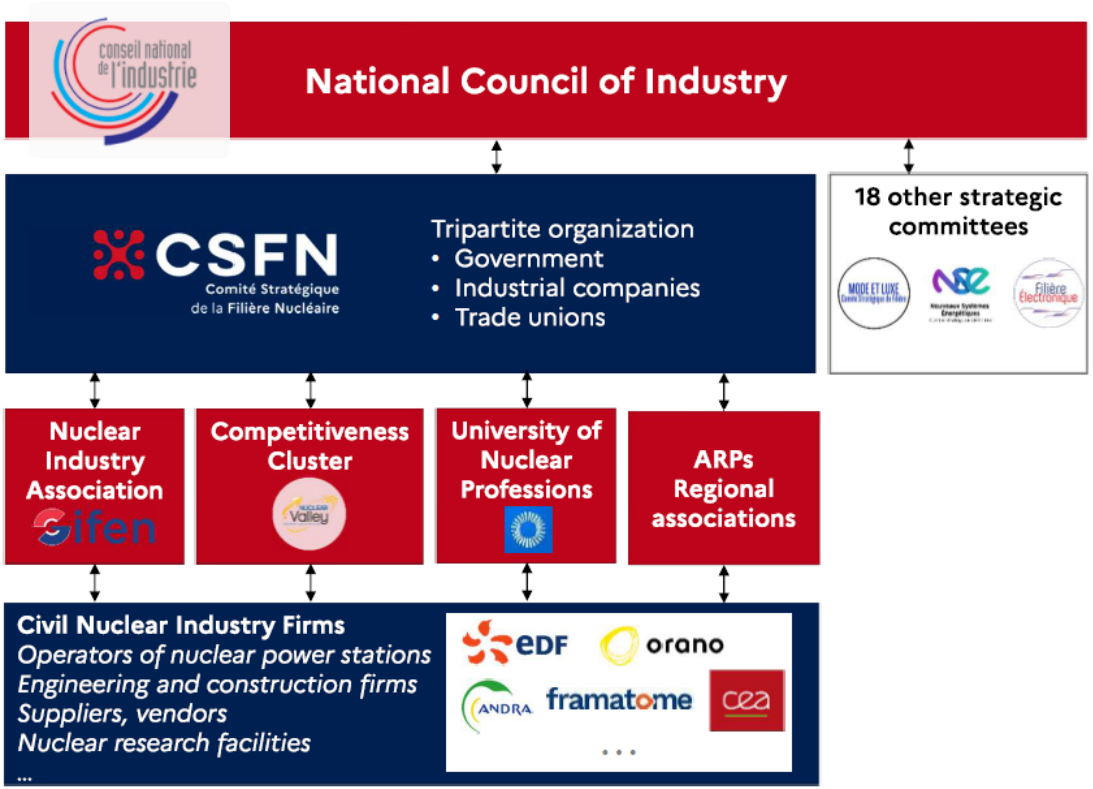
STELLARIA

THORIZON

GenF

as a complement to Large scale reactors and SMR solutions, to develop solutions that contribute to the decarbonization of industrial sites and systems (direct use of heat, cogeneration, hydrogen, e-fuels, …)

An organization to improve our delivery capacity



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A Nuclear Alliance at European level

- Financing
- Supply chain
- Skills & competencies

Scope covered by the French nuclear industry

R&D

Engineering, manufacturing & construction

Operation and maintenance

Dismantlement

Waste management

Fuel cycle

Extraction

outside of France

Conversion

Enrichment

Manufacturing

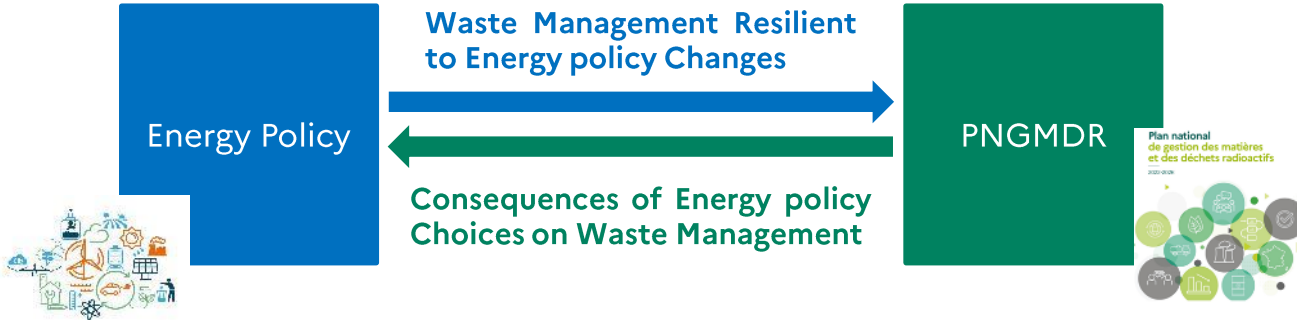
Use of fuel

Conditioning

Reprocessing / Recycling

Waste management policy (1/2)

French National Plan for Radioactive Materials and Waste Management (PNGMDR)

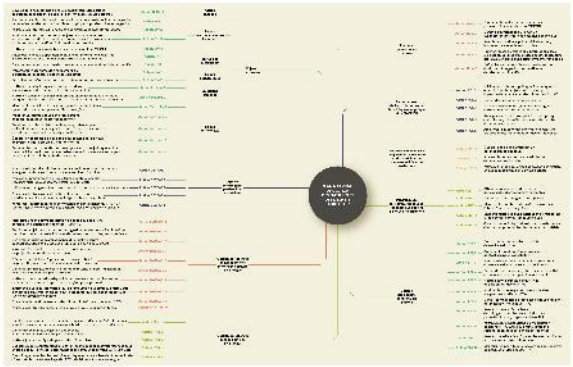


Transversal Issues

Particular Categories of Waste

High-Level and Intermediate-Level Long-Lived Waste (HLW and ILW)

Long-Lived Low-Level Waste (LLW-LL)



Governance

Energy Policy and Waste management

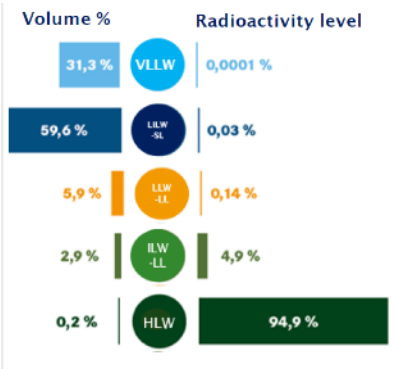
Materials Valorization and Anticipation of classification as waste

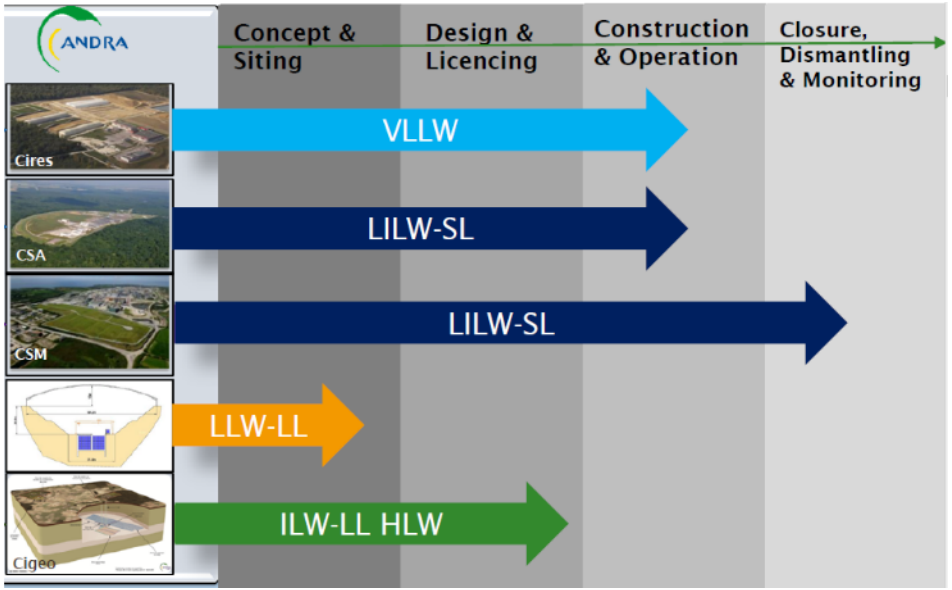
Spent Fuel Storage

Very Low-Level Waste

Waste management policy (2/2)

	Very short-lived waste containing radionuclides with a half-life <100 days	Short-lived waste, whose radioactivity comes mainly from radionuclides with a half-life ≤31 years	Long-lived waste, whose radioactivity comes mainly from radionuclides with a half-life >31 years
Very low-level waste (VLLW) <100 Bq/g	Managed according to radioactive half-life	Surface disposal (CIRES waste collection, storage and disposal facility) VLLW	
Low-level waste (LLW) < 1 million Bq/g		Surface disposal (CSA waste disposal facility, Aube) LILW-SL	Near-surface disposal (currently being studied) LLW-LL
Inter-mediate-level waste (ILW) < 1Bn Bq/g	VLSLW		ILW-LL
High-level waste (HLW) >8n Bq/g	Not applicable (0,2%)	HLW	Deep geological disposal (Cigéo project currently being studied)





THANK YOU