

# Role of nuclear power: Maintaining future electricity supply reliability in the period of transition of five to ten years

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# At COP28 25 countries committed to tripling nuclear

الإمارات العربية المتحدة، ديسمبر 2023

## TRIPLING NUCLEAR ENERGY BY 2050

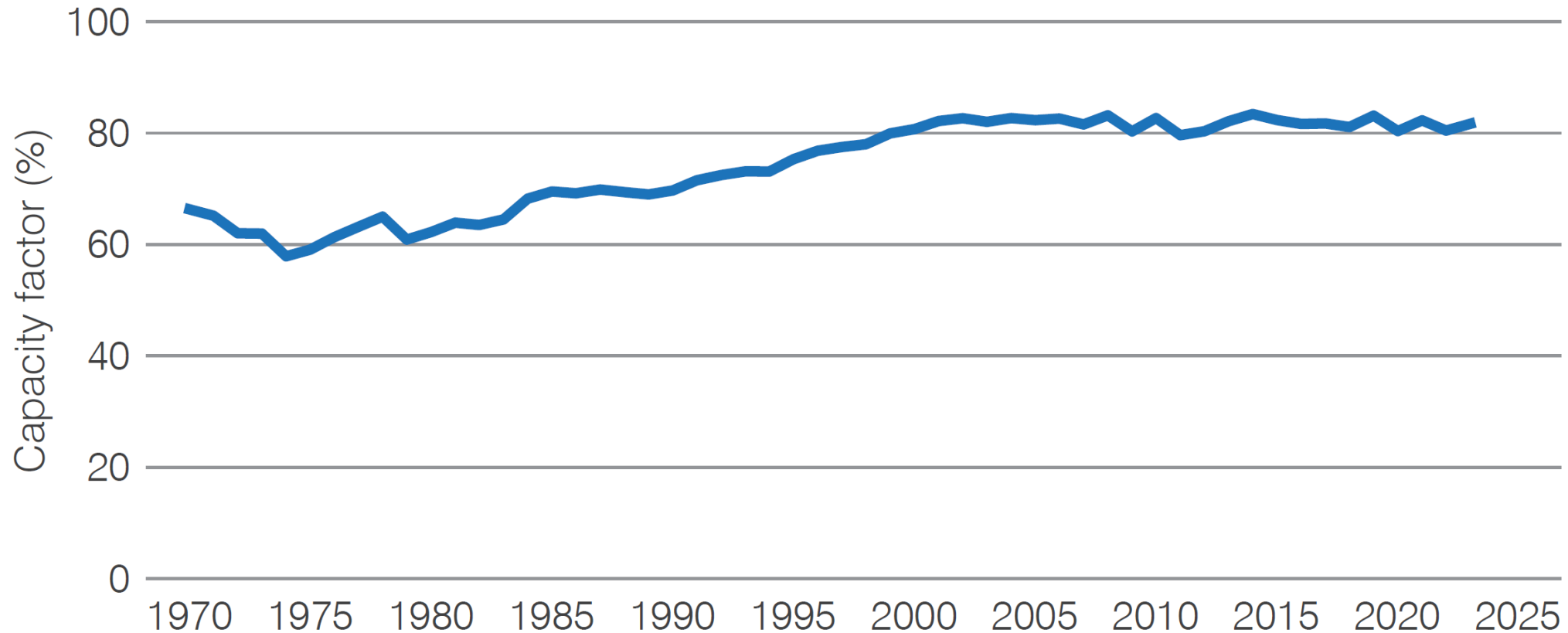
United Arab Emirates, December 2023





# Nuclear power high reliability

In 2023 the global average nuclear power capacity factor was 81.5%, up from 80.4% in 2022



Source: World Nuclear Association, IAEA PRIS

Source: World Nuclear Association 2024 World Nuclear Performance Report 2024 edition

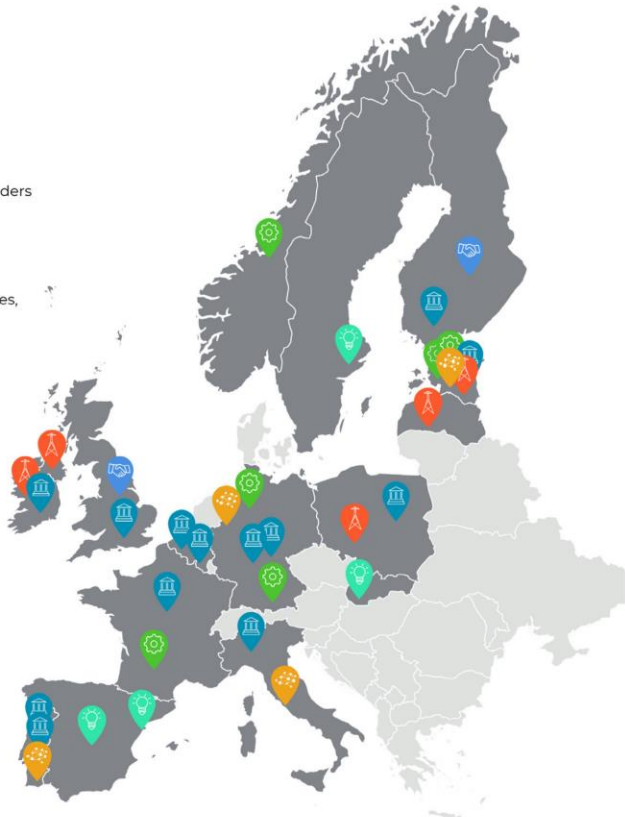


# Low-carbon resilient power system

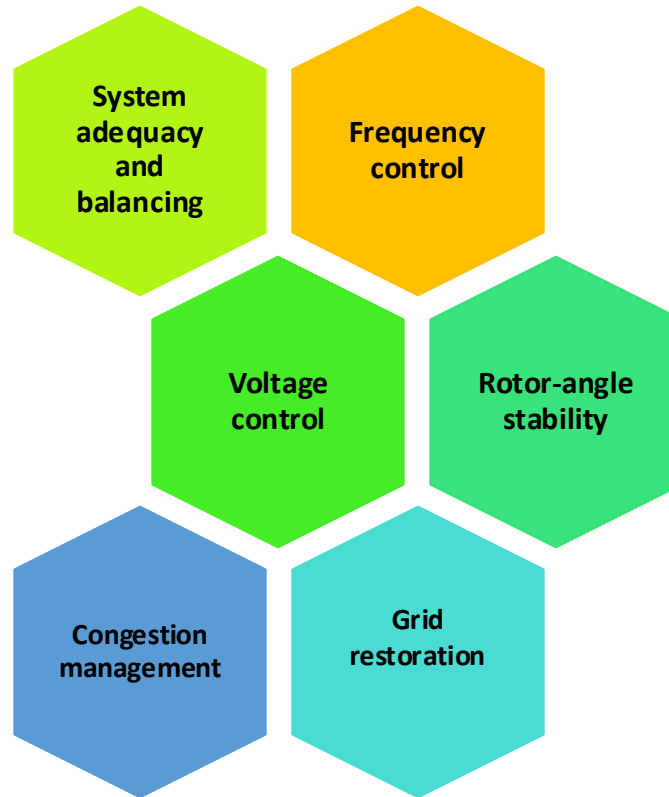


## EU-SysFlex

- TSO
- DSO
- Aggregators
- Technology providers
- Consultants
- Research institutes, universities



## Grid scarcities



### Findings:

As we transition to a European power system with a high share of variable renewables significant technical scarcities in flexibility appear.

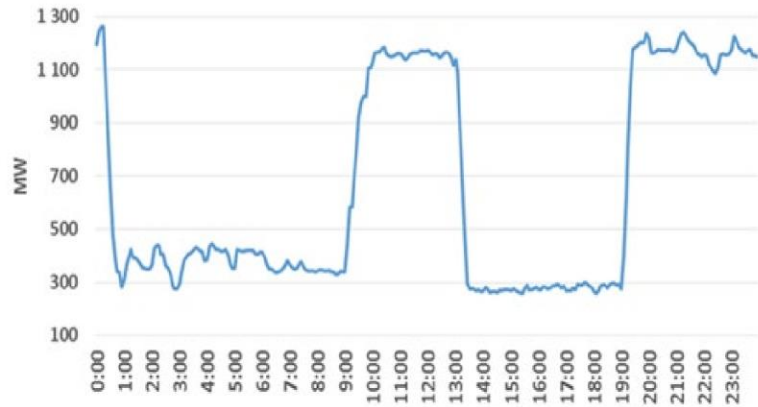
Enhanced services will be required from a wide range of technologies in order to mitigate the identified technical scarcities and ensure the required system flexibility.

<https://eu-sysflex.com/documents/>

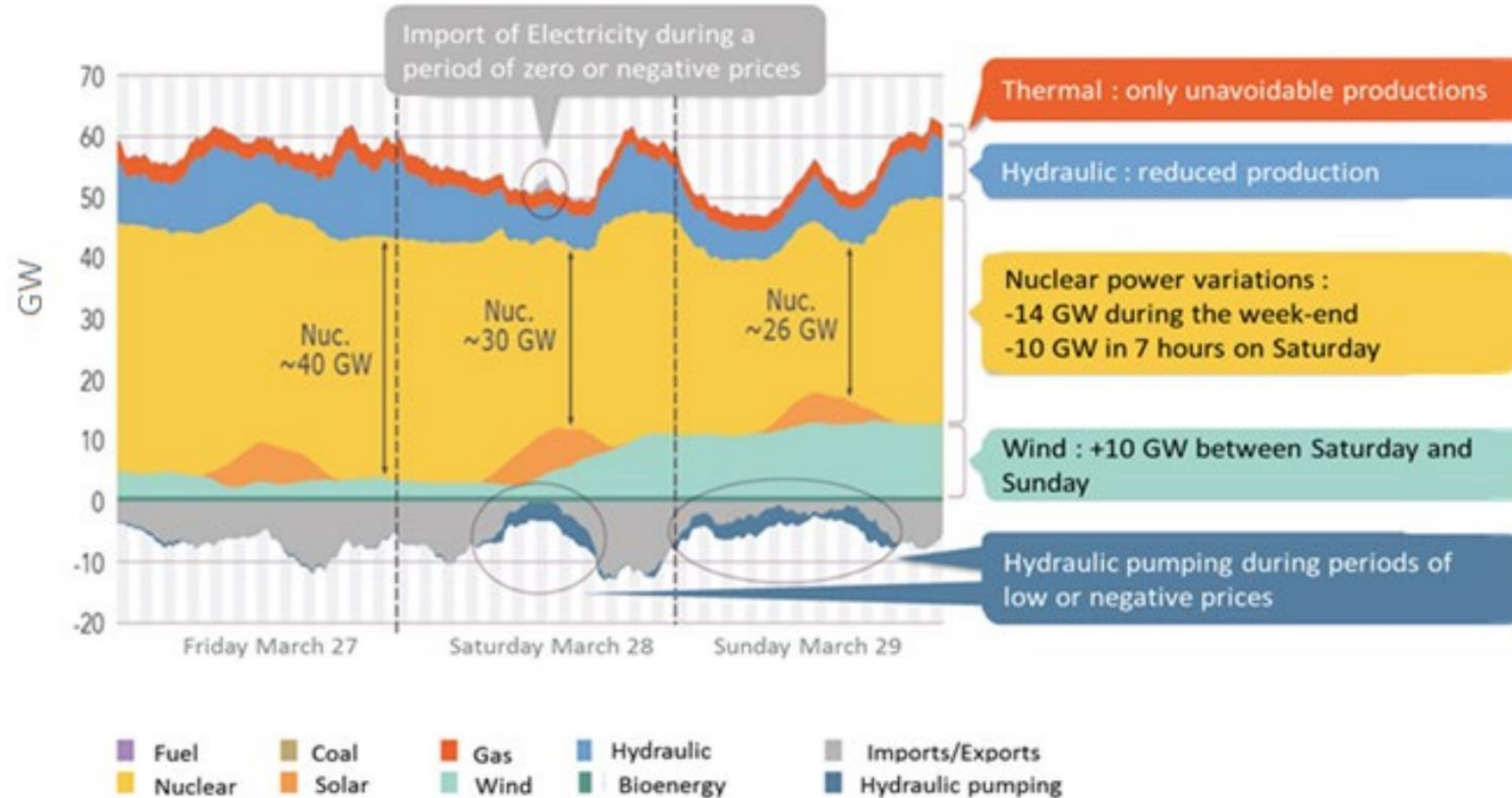


# Complementarity of flexible nuclear and variable renewables

**Nuclear Flexibility - Example of power variations over 1 day, Golfech 2 nuclear power plant, 1,300 MW**



**France power mix between March 27 and March 29, 2020**



Source: National Renewable Energy Laboratory 2020 Flexible Nuclear Energy for Clean Energy Systems

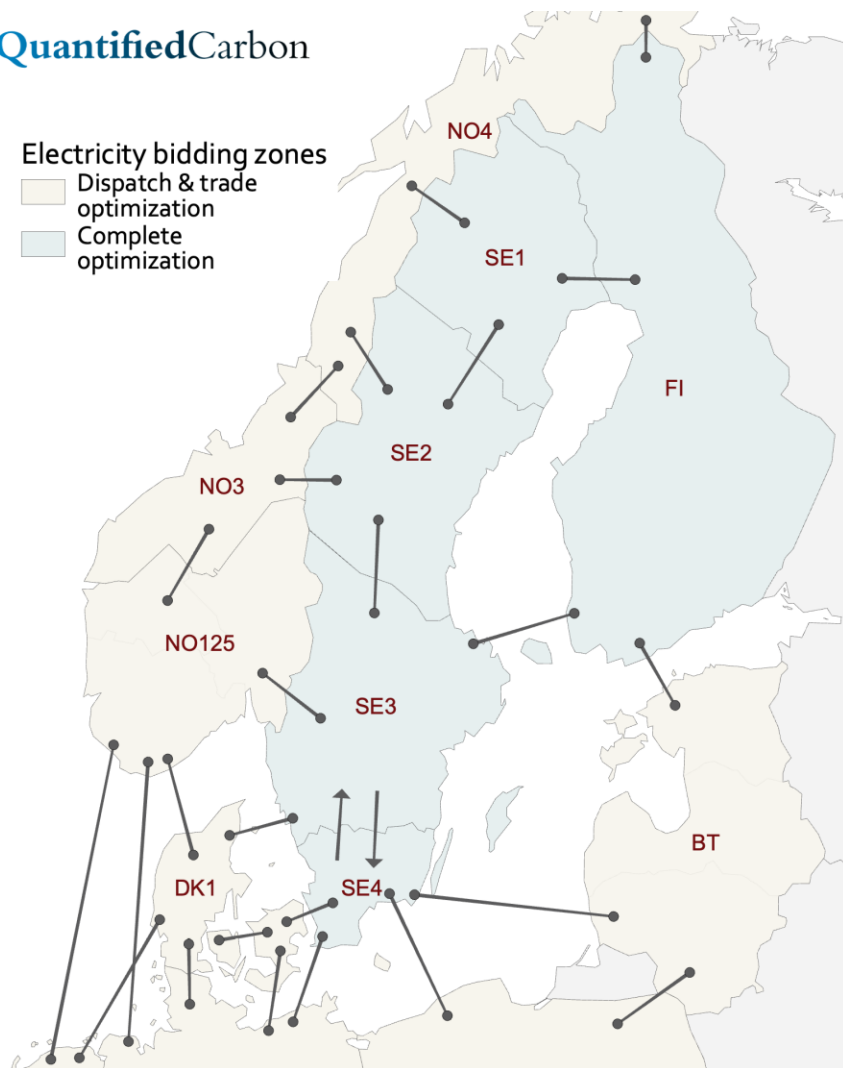
# More secure and lower cost with nuclear power

Summarised results comparing main parameters of the power systems

Parameter	Nuclear share	
	Low (existing nuclear)	High (+new nuclear)
Electricity price level (median)	67 €/MWh	55 €/MWh
Electricity price volatility compared to historic average <sup>1</sup>	Higher	Similar
Security of supply	Increased sensitivity	More robust
Annual system cost (B€)	Similar	
Relative greenhouse gas emissions, land use and use of critical minerals	Higher	Lower

**Source: Nordic Power Systems for A Competitive And Sustainable Economy, A Quantified Carbon study in collaboration with Fortum 2023**

## QuantifiedCarbon



# Small Modular Reactor (SMR)

## OPG applies for construction licence for Darlington SMR

02 November 2022



Ontario Power Generation (OPG) has submitted an application for a Licence to Construct a small modular reactor (SMR) at the Darlington site, where it plans to build Canada's first commercial, grid-scale SMR.



A rendering of a BWRX-300 plant (Image: OPG)

## Saskatchewan government announces microreactor funding

Monday, 27 November 2023

The province is providing CAD80 million (USD59 million) for the Saskatchewan Research Council to pursue the demonstration of a microreactor in Saskatchewan, with plans for a Westinghouse-designed eVinci microreactor to be operational in the province from 2029.



## Floating nuclear power plant starts journey north

30 April 2018



Russia's floating nuclear power plant *Akademik Lomonosov* has left Baltiysky Zavod shipyard in Saint Petersburg, where its construction began in 2009. Housing two 35 MW KLT-40S nuclear reactors, similar to those used in Russia's nuclear-powered ice breakers, *Akademik Lomonosov* left the shipyard on 28 April and is now heading to its permanent base in Russia's northernmost city of Pevek.



*Akademik Lomonosov* leaves Baltiysky Zavod shipyard (Image: Rosatom)

## HTR-PM heating project commissioned

02 April 2024



The nuclear heating project of the demonstration High Temperature Gas-Cooled Reactor-Pebble-bed Module (HTR-PM) at the Shidaowan site in China's Shandong province has been connected to the heating grid and put into operation, China Huaneng announced.



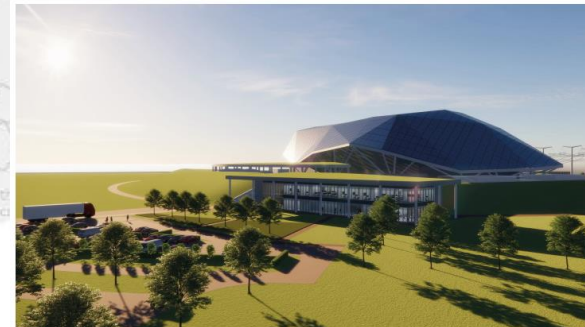
The HTR-PM demonstration project at Shidaowan (Image: China Huaneng)

## Rolls-Royce SMR progresses to final step of UK assessment

30 July 2024



Rolls-Royce SMR Limited's 470 MWe small modular reactor design has successfully completed Step 2 of the UK's Generic Design Assessment (GDA) process and progressed to the third and final phase.



How a Rolls-Royce SMR power plant might look (Image: Rolls-Royce SMR)

## TerraPower breaks ground for Natrium plant

Tuesday, 11 June 2024

TerraPower's chairman and founder Bill Gates joined company colleagues, government officials, project partners, industry champions and community supporters for the ceremony at the site of the first-of-a-kind advanced reactor plant at Kemmerer in Wyoming.



The groundbreaking ceremony marks the start of non-nuclear construction work at the site (Image: TerraPower)



# Helping the global nuclear industry deliver 24/7 clean energy for all

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The views expressed are those of author and do not necessarily reflect the views of the  
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