

# Financing nuclear power projects in the UNECE region



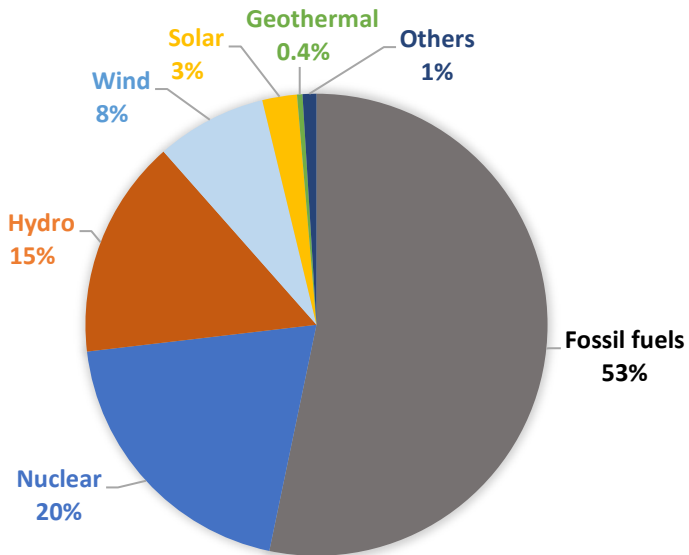
**Dr. Sama Bilbao y Leon**

Director General, World Nuclear Association

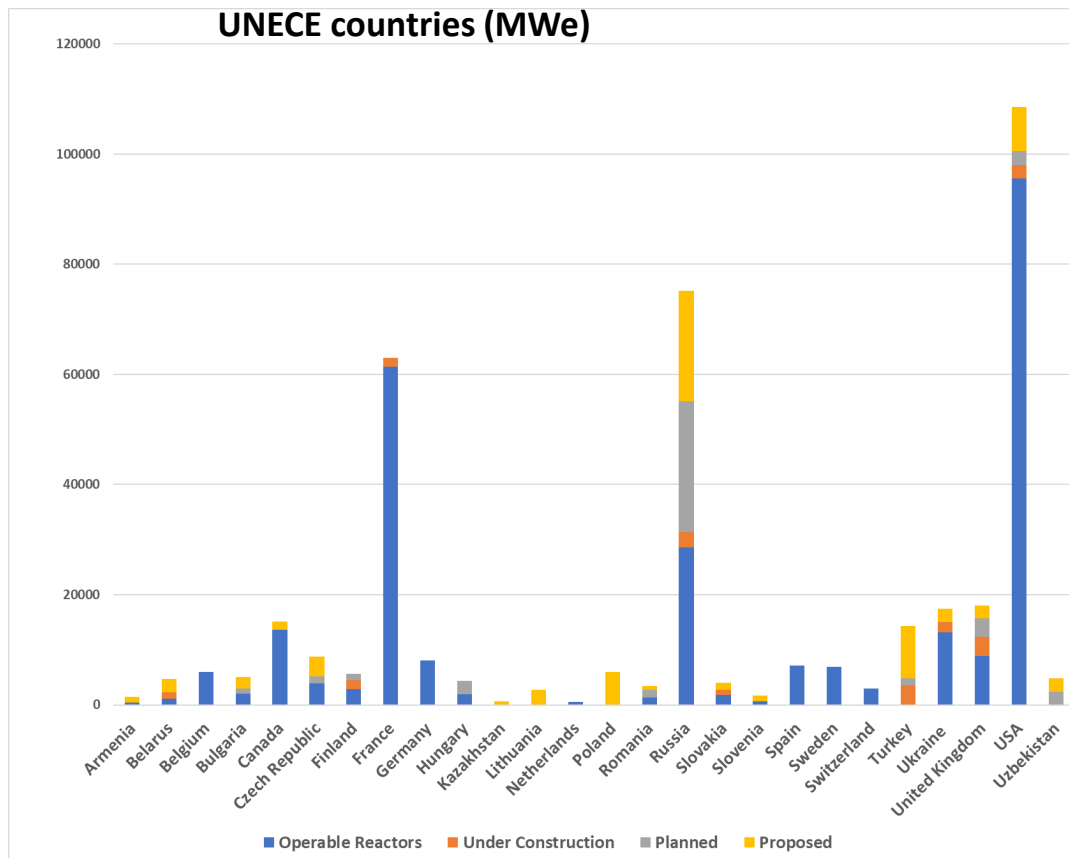
UNECE Sustainable Energy  
Expert Week  
6 October 2021

# Nuclear energy plays an essential role in the UNECE Region

Electricity generation by source in the UNECE region for 2019

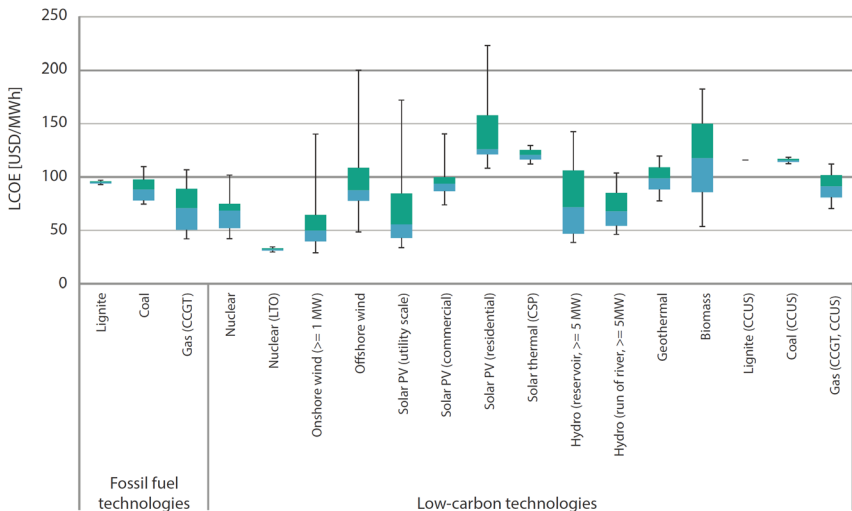


Current and proposed nuclear power plants in UNECE countries (MWe)

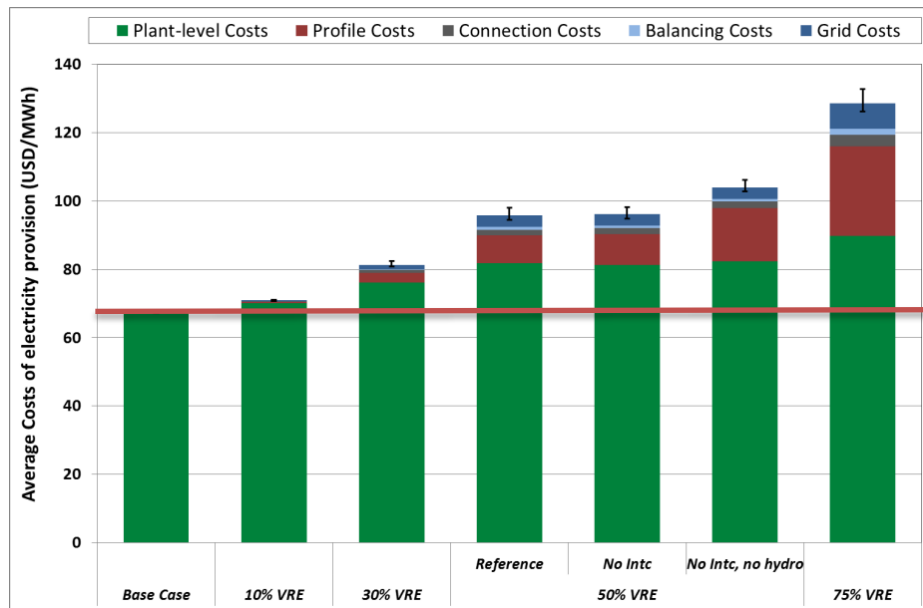


# Nuclear energy is cost competitive

## Levelized cost of electricity in different countries



## Total cost of electricity provision - system costs

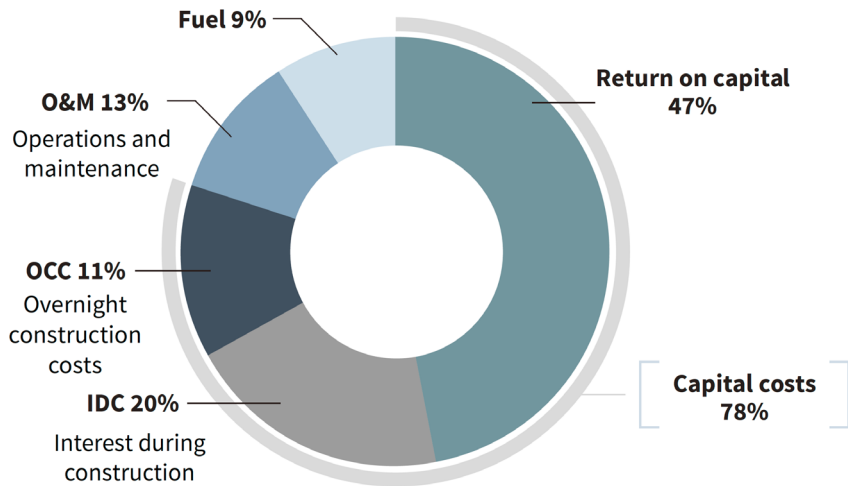


Data source: IEA and OECD-NEA, 2020, [Projected Costs of Generating Electricity 2020 edition](#)

Data source: OECD-NEA, 2019, The Costs of Decarbonisation: System Costs with High Shares of Nuclear and Renewables

# Financing cost is very large for nuclear

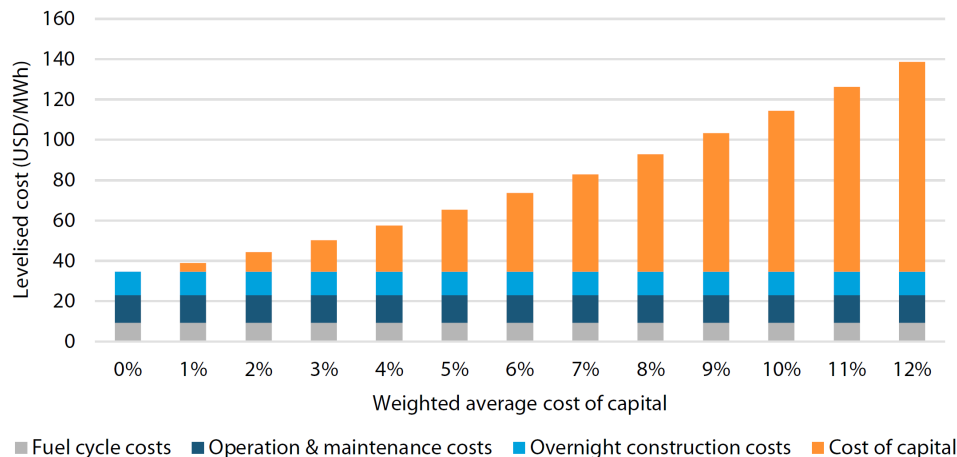
## Breakdown of the levelised cost of nuclear power



**Capex 11%, Opex 22%**

**Financing cost @9%: 67% = IDC 20% and Return on capital 47%**

## LCOE of a new nuclear power plant project according to the cost of capital

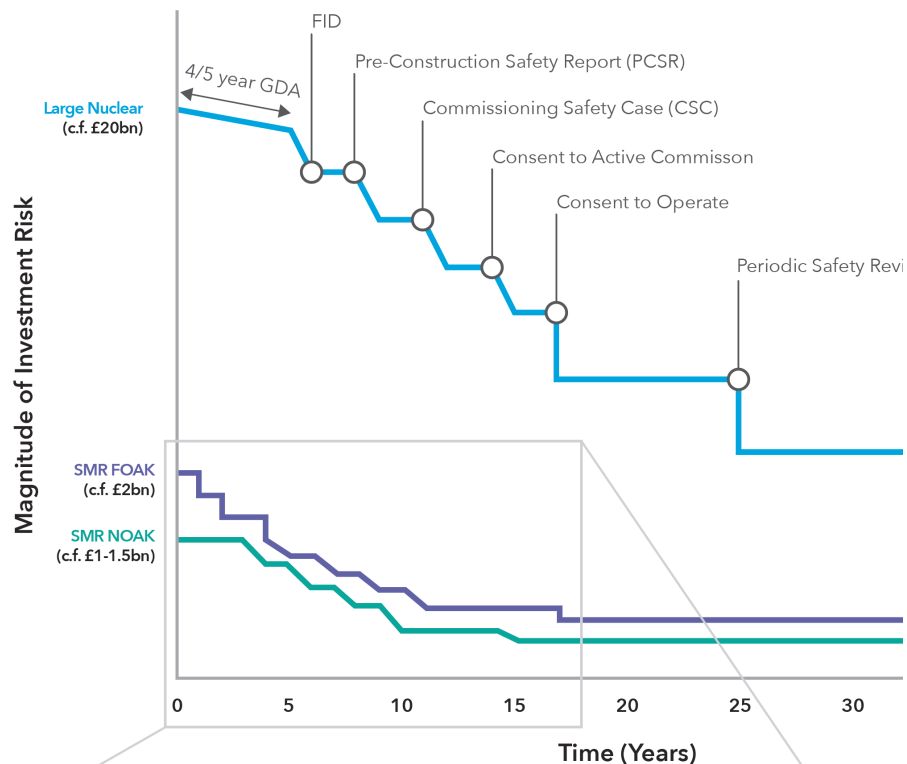


# Financial risk profiles for large and small nuclear projects are different

Risk profile of nuclear projects decreases significantly at start of operation.

The risk profile of a small nuclear project differs significantly from that of a large scale nuclear project.

Smaller nuclear reactor projects may offer an opportunity to attract wider investment and finance.



Data source: OECD-NEA, 2019 , Market framework for financing small nuclear

# Project structuring and financing

## HPC deal-type structure

### Sensitivity of strike price to investors' return

Private investors bear no risk (taxpayers or consumers bear all risks)

Some risk shared

Private investors bear all risk

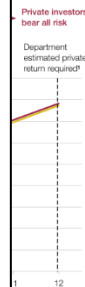
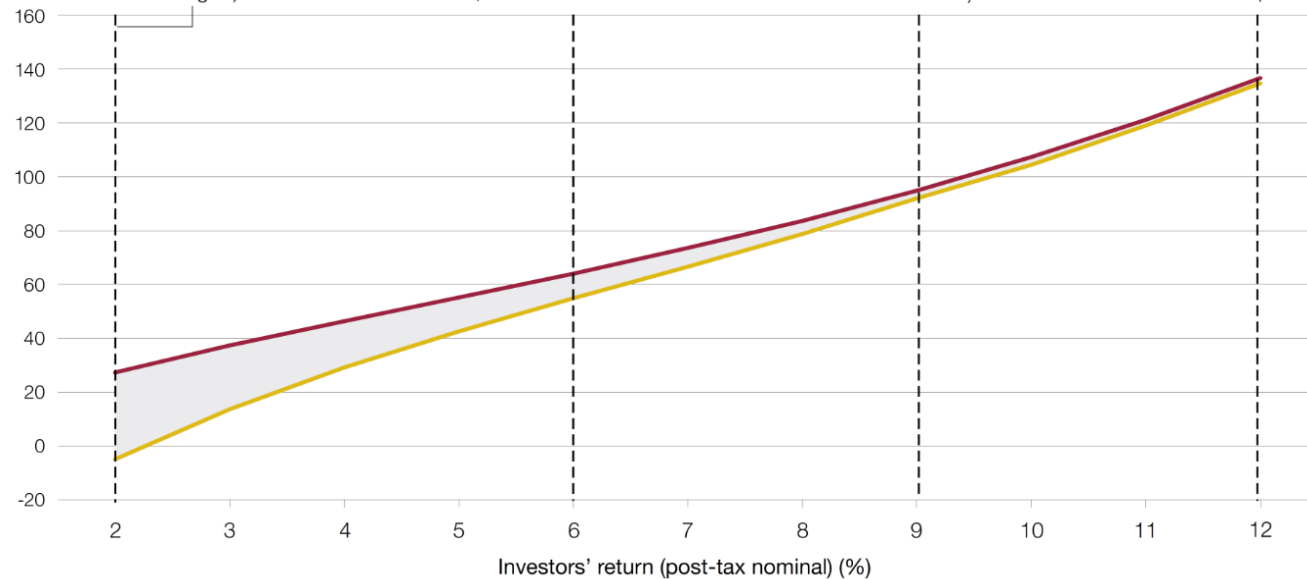
Strike price (£/MWh)

Risk-free investment (equivalent to return on gilts)

Social time preference rate used to appraise public investments

EDF return on HPC (revenue risk shared with consumers)

Department estimated private return required<sup>1</sup>



£/MWh

# Examples of recent nuclear finance



## United Kingdom - Hinkley Point C

Contract for Difference (CfD) structure to mitigate de-regulated electricity market risk.  
All equity financed (EDF Energy 66.5% and CGNC 33.5%)  
Project owner takes all project delivery risk.



## United Arab Emirates - Barakah

Government and vendor finance.  
Sovereign guarantees on debt.  
Power Purchase Agreement for the full electricity.



## USA - Vogtle

Regulated market with Government support measures,  
Production Tax Credit, Federal loan guarantees and Federal  
Risk Insurance to cover regulatory delays in construction.  
Recovery mechanisms for capital spending during  
construction

# Nuclear projects result in significant socio-economic benefits

**IMF study found that nuclear energy investment spending has a large output economic multiplier, significant in the short run**

Horizon	Nuclear Energy Investments Multiplier	Green Energy Investments Multiplier	Non-Eco-Friendly Energy Investments Multiplier
Impact	4.11*	1.19*	0.65*
1 Year	3.97*	1.20*	0.64*
2 Years	3.88	1.19*	0.62*
3 Years	3.83	1.17*	0.59*
4 Years	3.80	1.14*	0.55
5 Years	3.78	1.11	0.52

Data source: IMF Working Papers 2021 Building Back Better: How Big Are Green Spending Multipliers?

**For example the UK Hinkley Point C nuclear power plant project:**

**Jobs** - 22,000 people in Britain currently working on the project, with a total 71,000 projected jobs to be supported by the project.

**Skills** – 800 apprentices trained on the project to date

**Local and regional economic development** – £3.2 Billion spent with local companies in the South West region.

**Industrial development and supply chain** 64% of the value of Hinkley Point C contracts has been awarded to UK-based companies to date. The total projected economic value to the UK of £18 Billion.

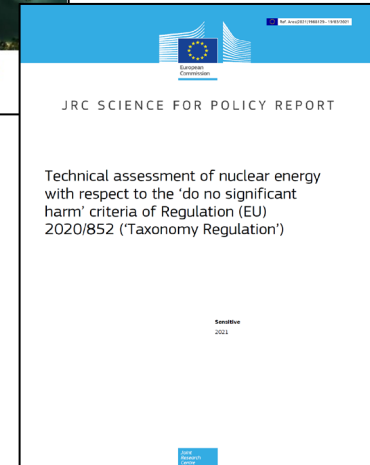


# Nuclear energy belongs in ESG finance

Sustainable Finance and ESG criteria are being used more frequently to guide investment decisions and direct capital flows to achieve sustainable and inclusive growth.

Taxonomy is a tool to help investors, companies, issuers and project promoters navigate the transition to a low-carbon, resilient and resource-efficient economy.

EU Joint Research Centre, report on nuclear energy found “The analyses did not reveal any science-based evidence that nuclear energy does more harm to human health or to the environment than other electricity production technologies already included in the Taxonomy”



# Key Takeaways

- Strong government support is essential in any large scale major infrastructure new built project.
- The scale of financing needed for large scale nuclear project is challenging in de- deregulated markets
- Appropriate funding mechanisms to support investment by managing the risks associated with price and revenue uncertainty in deregulated markets include power purchase agreements (PPAs) and/or contracts for difference (CFDs), government financing or guarantees, capacity remuneration, tax incentives, carbon pricing etc.
- Small modular reactors potential lower financial risk profile may offer an opportunity to attract wider investment and finance
- Leverage government support to attract cost-effective private financing to deliver nuclear energy infrastructure e.g. Regulated Asset Base (RAB).
- Sustainable & ESG financing frameworks should be technology-neutral and science-based to enable access to the investment needed to achieve decarbonization goals
- Nuclear projects should be included in the sustainable activities of multilateral banks and international finance institutions

# WORLD NUCLEAR ASSOCIATION

The Harmony programme is a global initiative of the nuclear industry coordinated by World Nuclear Association.



[sama.bilbaoleon@world-nuclear.org](mailto:sama.bilbaoleon@world-nuclear.org)