

Energy Well

Marek Ruščák

History of forecasts

In 1975 IAEA predicted global installation capacity to be:

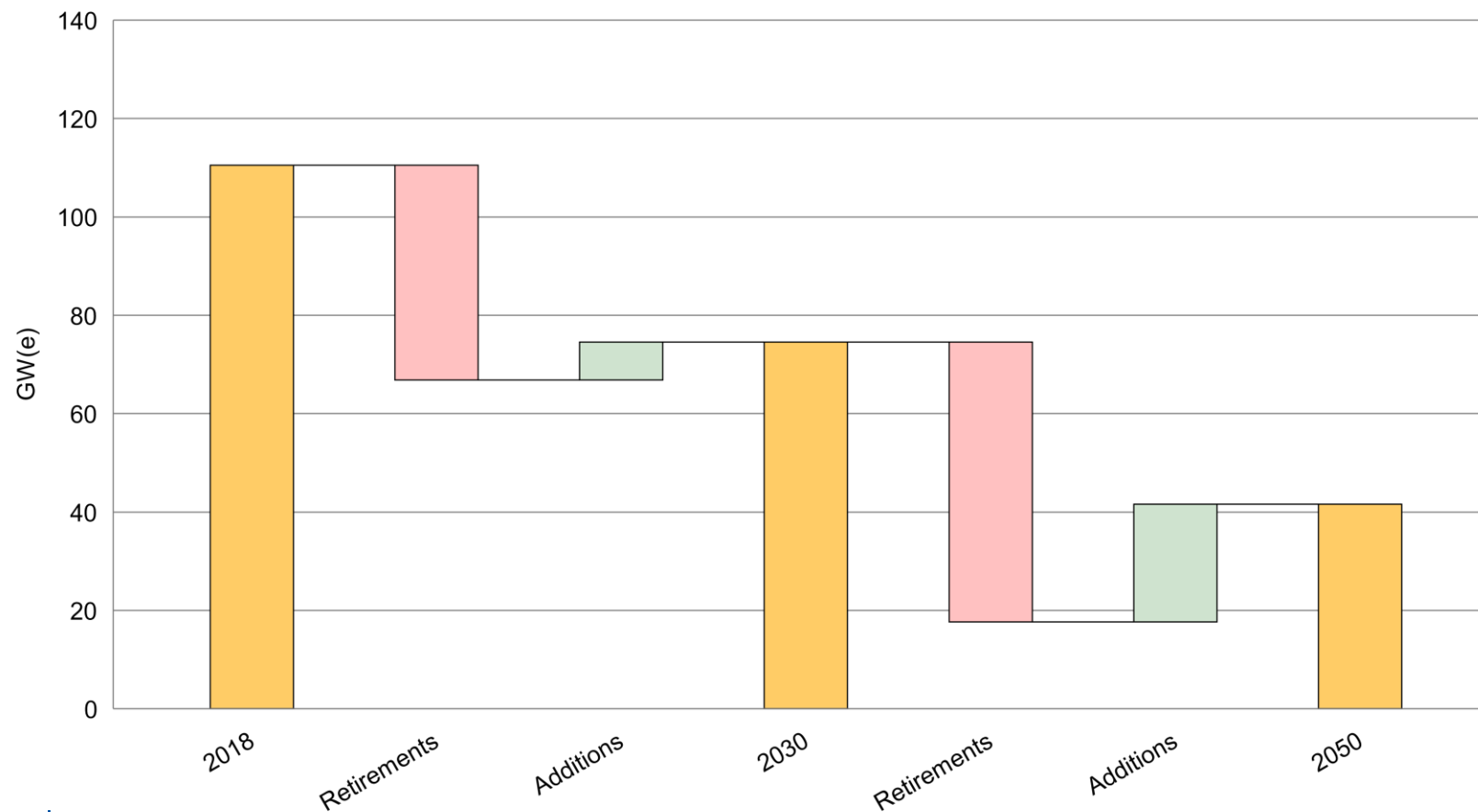
1990: 1000 – 1300 GWe

2000: 3600 – 5300 GWe

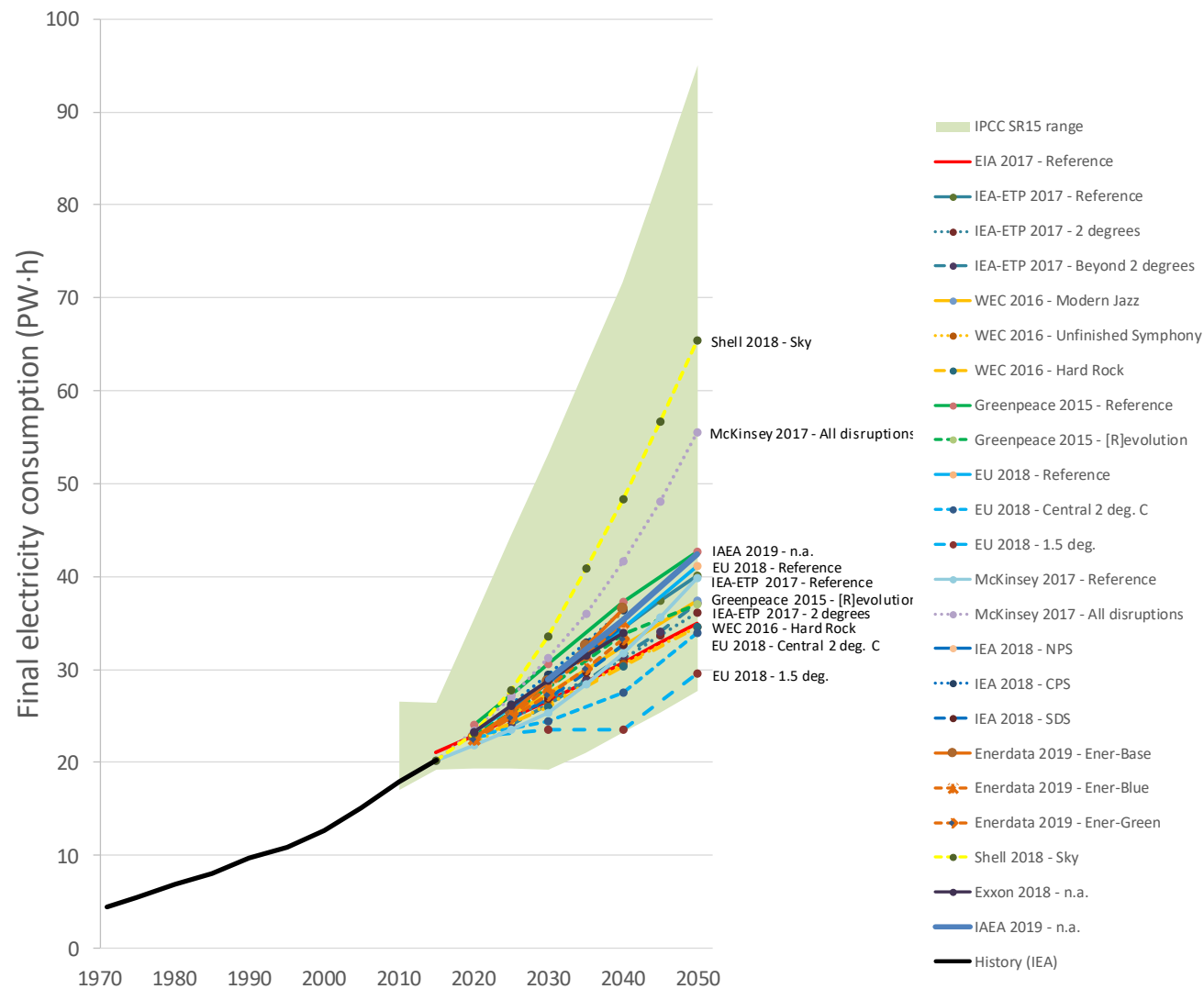
As of May 2021 total capacity is about **400** GWe.

(Total wind capacity grew from **24** GWe in 2001 to **744** GWe in 2021)

Nuclear outlook 2050 (Europe)



Electricity demand projection



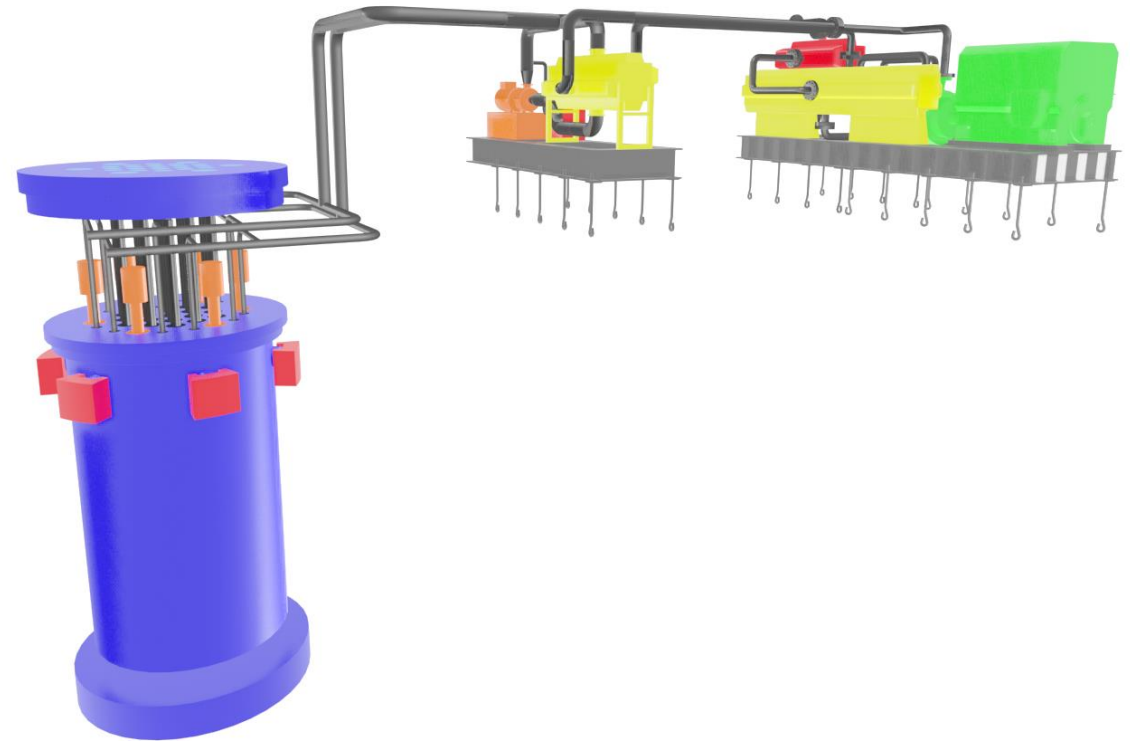
Source: IAEA Power Reactor Information System (PRIS)

Small modular reactors

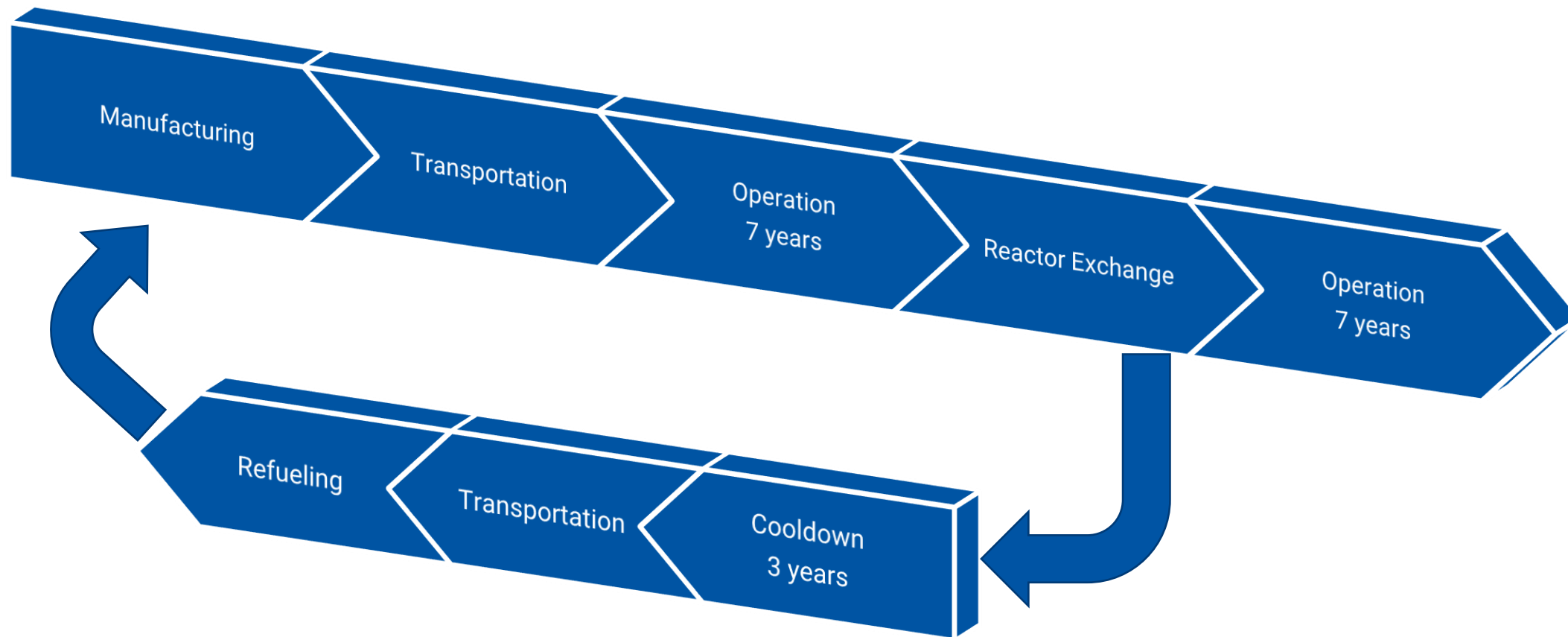
- **SMALL** – electric power output from few kilowatts to 300 MW
- **MODULAR** – integrated components, faster builds, lower costs
- LWR SMR – reactors using light water as coolant and moderator (2030+)
- Non-LWR SMR – reactor using advanced media as coolant (2040+)

Energy Well introduction

- μ SMR with power of 20 MW(t)
- FHR type: solid TRISO fuel cooled by FLiBe salt -> sCO₂
- Build for regional energy supply
 - 8 MW(e)
 - Heat supply
 - Hydrogen production

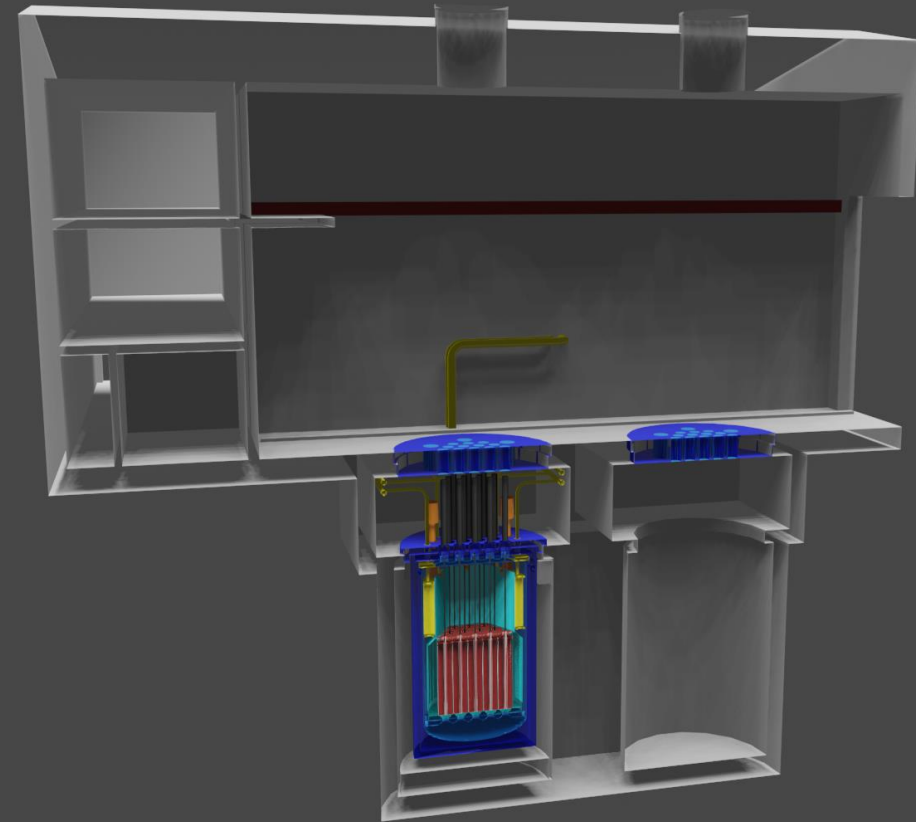


Life cycle of Energy Well

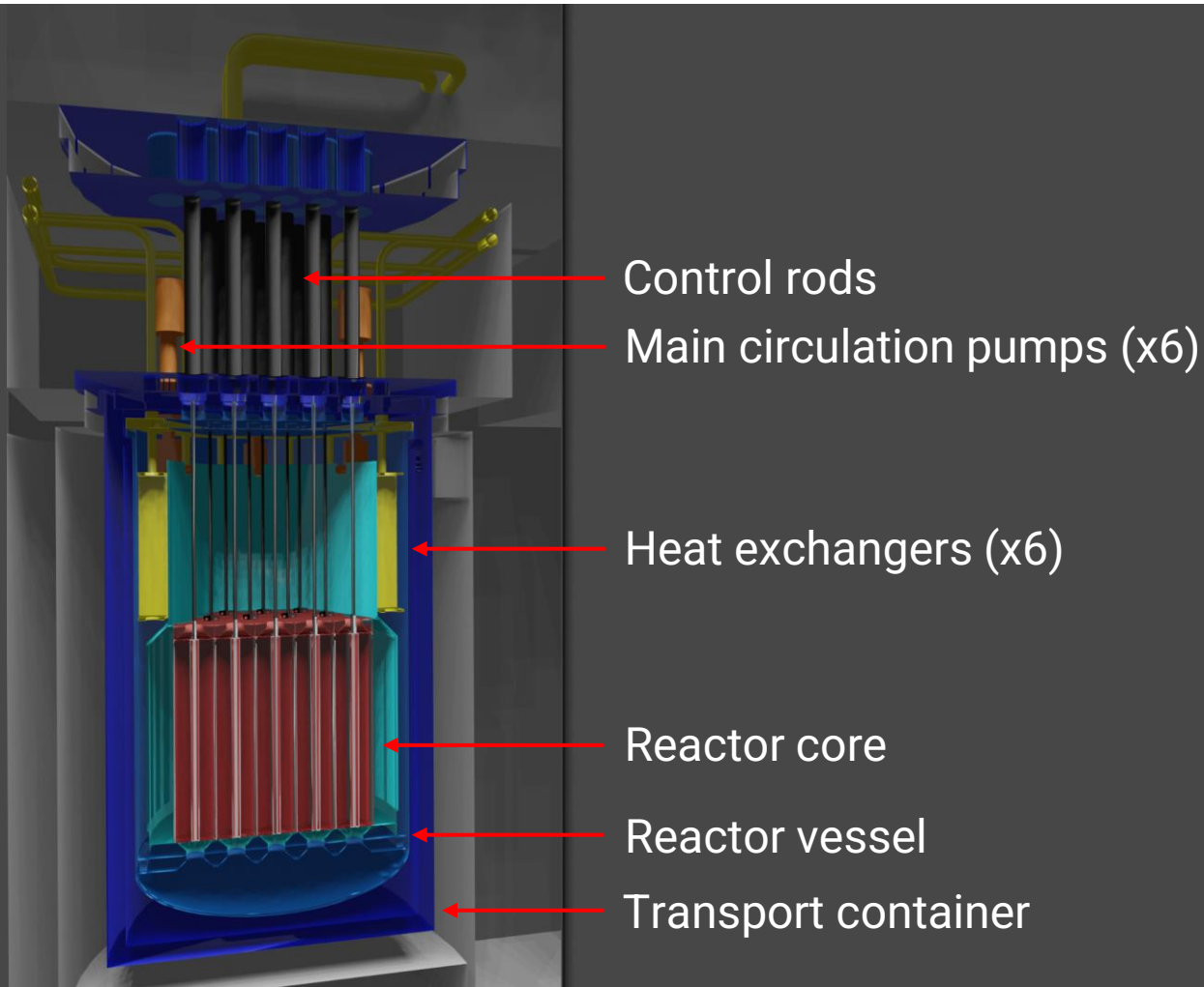


Energy Well layout

- Multiple unit arrangement
 - <math><200\text{ m}^2</math> per unit layout
- Reactor is placed underground
- Build for both cities and out-of-reach regions

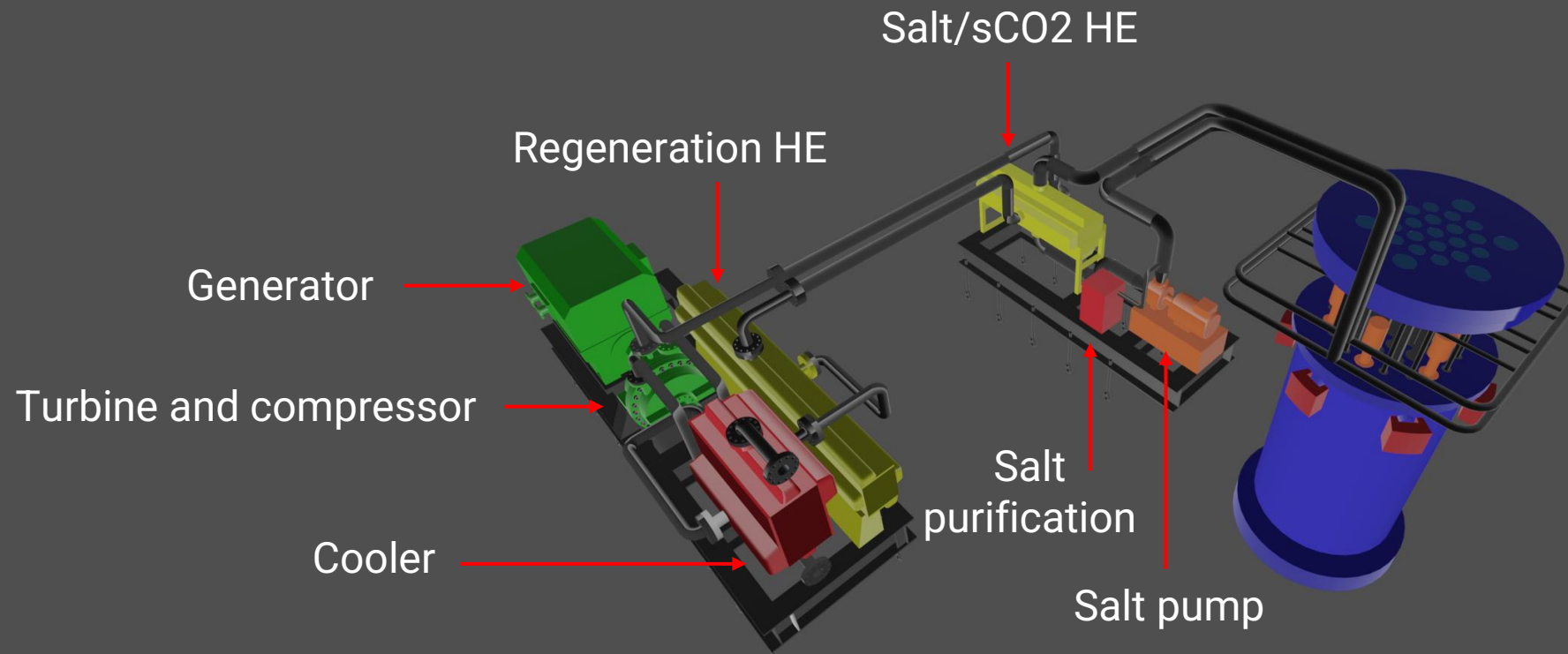


What is nuclear reactor Energy Well?



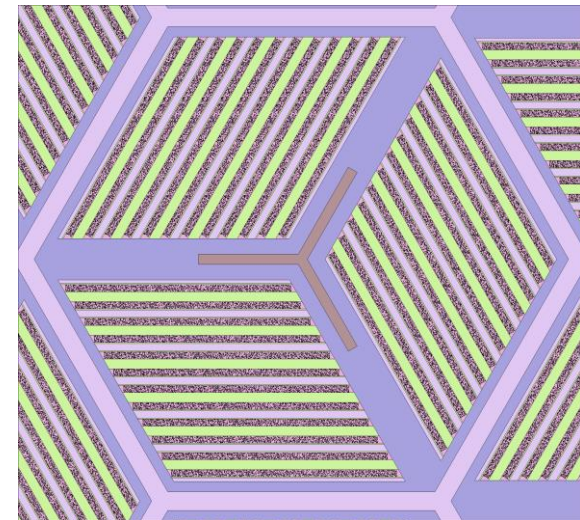
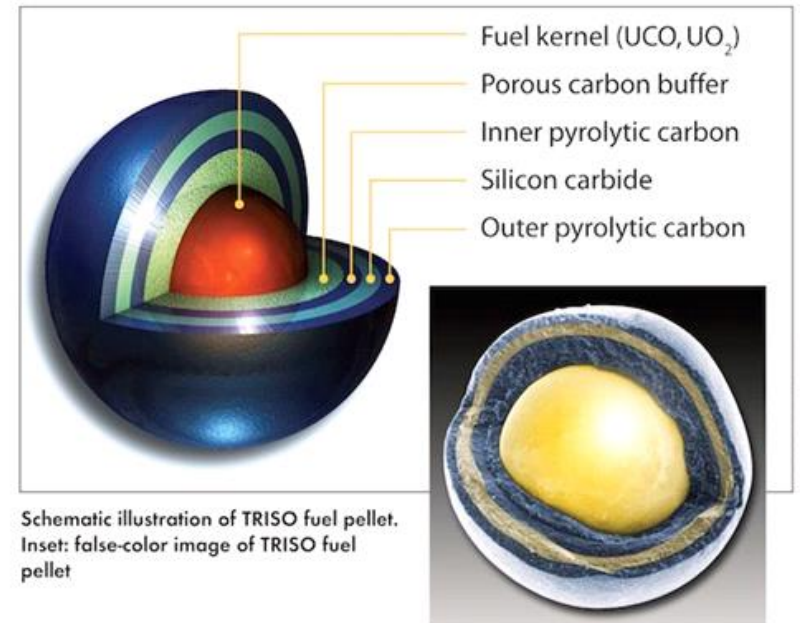
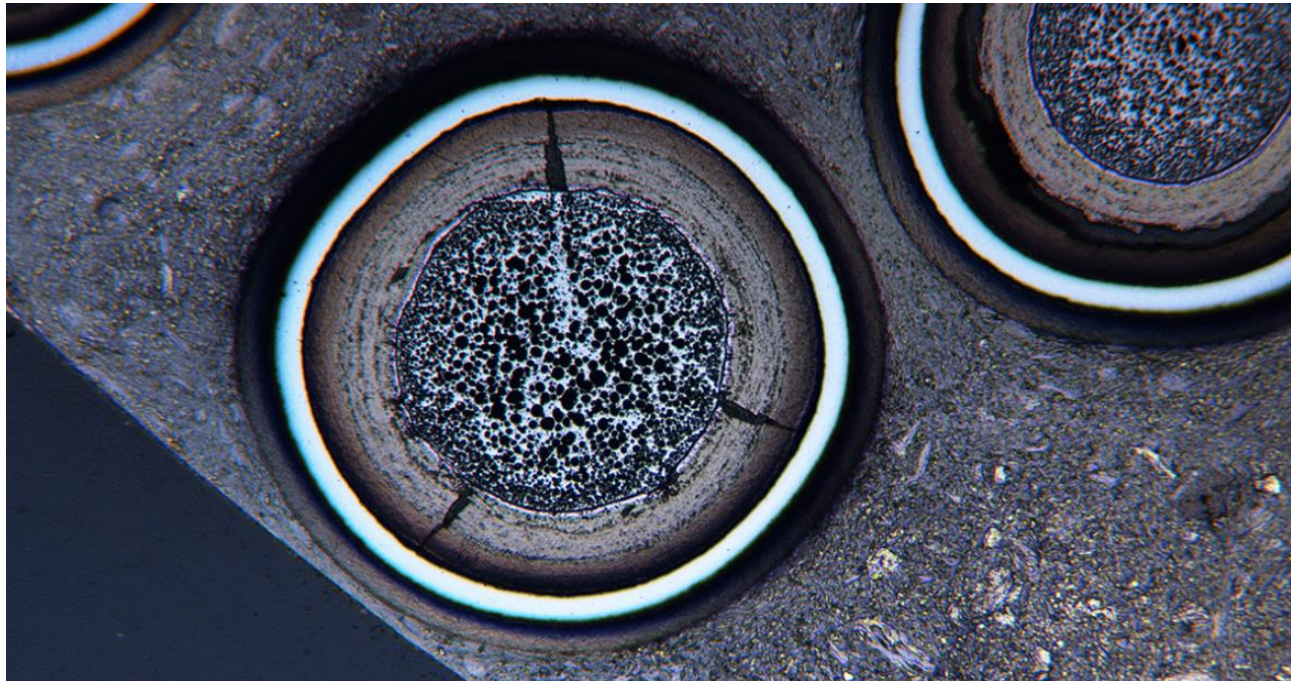
- Pool type
- 6 pumps
- 6 heat exchangers
- TRISO fuel
- FLiBe/sCO₂
- 650/700C

Secondary and tertiary circuits



Nuclear fuel

- Fission products remain inside irradiated TRISO up to 1800°C
- TRISO particles are in the graphite matrix
- This fuel is the same as the HTGR fuel developed under DOE-NE sponsorship
- TRISO particle radius: 0.46 mm
- Can be arranged into both plates and pins/pellets.



Current activities

- R&D projects are running for design finalization.
- Performing safety calculations, verifying available system codes.
- Preparing deployment studies for selected regions.
- Preparing design of Integral Test Facility.
- Participating in discussion on state of current legislation in CR.

Final word

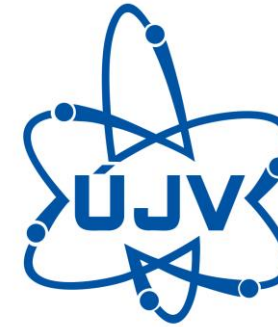
**The energy sector is changing.
Nuclear has to change too.**

Involvement and opportunities Czech Industry



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Marek.Ruscak@cvrez.cz