



# SOLVAY

## **Industrial decarbonisation & SMRs**

**Engaging Stakeholders on the Role of SMRs in Decarbonization Strategies**

**April 2025 | Sofia, Bulgaria**

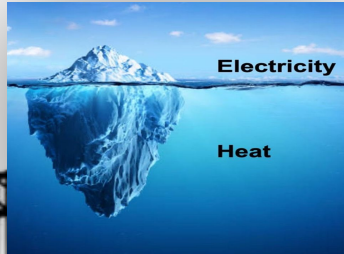
# Energy Intensive Industry in EU | Under pressure > obliged to implement a short-term solutions and looking for the sustainable and competitive long-term solutions

## INDUSTRY DECARBONISATION TARGETS

- **CO2 reduction** < 2026 / 2030
- Anticipated shorter period for 90% net emissions reduction - until 2040
- **CO2 neutrality** > 2040 / 2050
- Keeping the **products competitiveness**
- Improving the productivity and energy efficiency
- Environmental sustainability and responsibility
- Social responsibility and care
- Finding and maintaining a qualified staff

## PROCESS STEAM DECARBONISATION OPTIONS

- **ETS CO2 pressure** > 2027 **CBAM**
- **Phase out fossil fuels** - replacement coal by:
  - **CCUS** > **regulations + incentives**
  - **H2** > **price level** & energy production by small installations only & **incentives**
  - **geothermal energy** > limited potential
  - **alternative fuels** > prices + CO2 + **incentives**
  - **sustainable biomass** > **limited quantities** + prices + **incentives**
  - **SMR** > all development **challenges + incentives**



**Existing SMRs** | Beyond the new four operating SMRs, five are being built in the USA, Canada, Argentina, China, and Russia (mostly state-owned or guaranteed), while 65 more are in the design phase, involving both private and state initiatives.



- Existing SMRs in operation
- SMR country friendly : roadmap / funding/regulation
- Industrial interest for deployment (USA, Poland, France, Bulgaria, Italy)

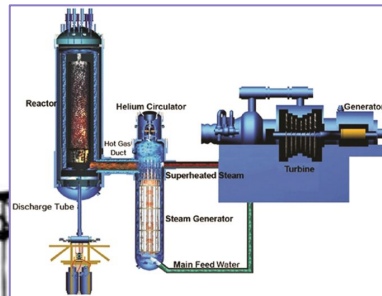
# SMR Project Challenges | How to meet both sides of a SMR project bridge ?

## INDUSTRIAL USER EXPECTATIONS

- Capital Expenditures Optimisation
- Incentives support
- Timeschedule (ASAP)
- Operational Performance
- Competitiveness

## KEY SUCCESSFUL FACTOR

STATE INVOLVEMENT



## SMR DESIGNER / VENDOR CHALLENGES

- Incomplete Design and Technology Licensing
- Inexperienced Workforce
- Unsecured Supply Chain
- Inequitable Contract Structure
- Regional preferences for investments

# IAEA SMRs Conference in Vienna (21-25 Oct'24) | The conclusions & key messages to all players

- 1) SMRs are called upon to play a key role in the near future of energy markets, in particular for their potential use for non-electric applications (Industrial CHP and DHNs ) and their flexibility allowing integration with renewable energies;
- 2) A key point of their success will be the ability to harmonize regulatory processes and standardize technical solutions across the entire supply chain to enable mass production;
- 3) Innovation was a key works. Technological innovation of course with advanced reactor concepts and the use of artificial intelligence and advanced modeling techniques, but also innovation in financing and contracting models, in regulatory approaches and authorization processes, and in human resources development strategies;
- 4) These new technologies will require new approaches for guarantees and increased vigilance on cybersecurity, including in security studies from the design stage;
- 5) Transportable nuclear reactors, particularly floating or for naval propulsion, have been identified as potential solutions to meet the energy demands and decarbonization needs of Member States and the private sector. Their development cannot be achieved without an adequate legal framework;
- 6) The emergence of private players was evident, both among designers and end users, and for financing, as illustrated by the announcements made in 2024 by digital giants Amazon, Google, Microsoft. It represents both an opportunity and a challenge, for example from a legal point of view;
- 7) The main issues identified for the deployment of SMRs were
  - a) the lack of financing solutions and the mismatch between the position of international financial institutions and the current momentum on nuclear energy,
  - b) the lack of qualified human resources,
  - c) the difficulty in finalizing nuclear projects on time and on budget;
- 8) The importance of international, regional and national cooperation, between regulators, operators and stakeholders, engaged at the earliest stage of projects, and between the IAEA and other international organisations, was underlined in all sessions;
- 9) The support provided by the IAEA to Member States was unanimously welcomed, in particular through the Step-by-Step Approach, assistance in taking into account safeguards and security by design, and the legal assistance programme.

# Business Model | A 'win-win' solution that supports national energy transition targets and industrial goals for phasing out coal in energy-intensive industrial field

★ Essential part of Project Development

--- Cash inflow / outflow during construction

... Cash inflow / outflow during operation

Turnover %

**Steam/ Power  
Off-taker**

Steam & Power PPA

20 %

**Grid / TSO**

Balancing / Capacity Market  
Primary, Secondary and  
Tertiary regulation

20 - 50 %

**Power Off Takers**

PPA (s)

50 - 30 %

REVENUES to  
SPV in a function  
of total SMR  
capacity

**Sponsors**

Incentives  
EU funds  
BG funds  
State  
guarantees

Private  
Investor(s)  
Financial  
Investor(s) and  
Hedge fund(s)

Stake c. 30 - 70%

Stake c. 30 - 70%

Lenders

**SPV  
(Nuclear Assets)**

**EPC partners**

EPC agreement with  
Technology Provider and EU / BG  
constructors

**Future Operator**  
(synergy with SPV is possible)

Licensing and/or O&M agreement

Nuclear Fuel

Insurance

Chemicals

Residuals

Water

Other variables

Fixed costs

Admin

Nuclear waste

Ancillary contracts

# Thank you for your attention !

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