# Korea's Nuclear Technology Development and Regional Cooperation

**10. June. 2026**

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KHNP
KOREA HYDRO & NUCLEAR POWER CO., LTD

# CONTENTS



i-SMR



KHNP

CHAPTER 1

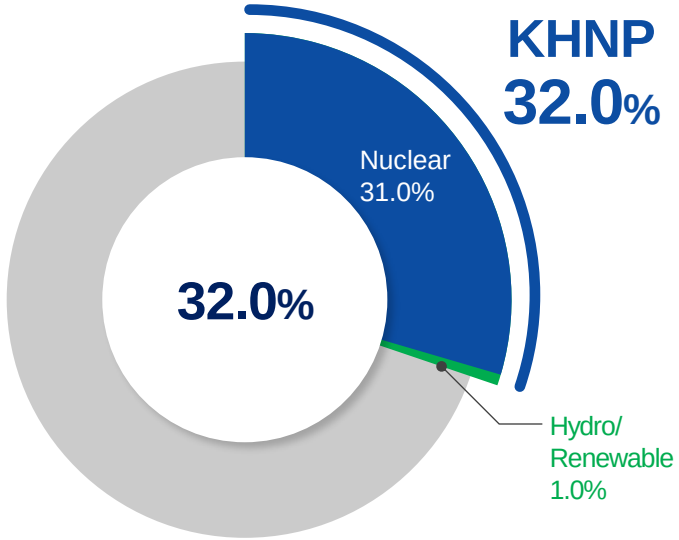
# Korea Nuclear Industry

# Produces One-Third of the Nation's Electricity



## 2025 Power Generation

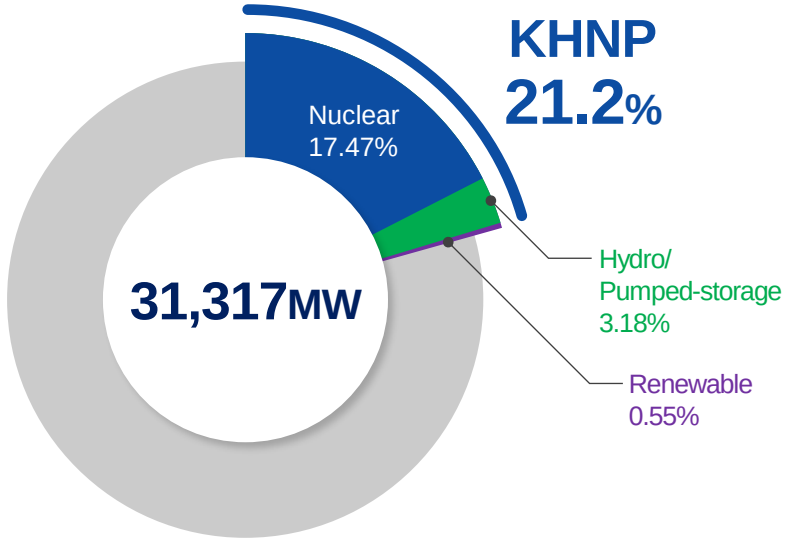
(Based on the Total Domestic Power Generation of 595,523GWh)




**Proportion of the total domestic power generation**

## 2025 Installed Capacity Distribution

(Based on the Total Domestic Installed Capacity of 147,736MW)

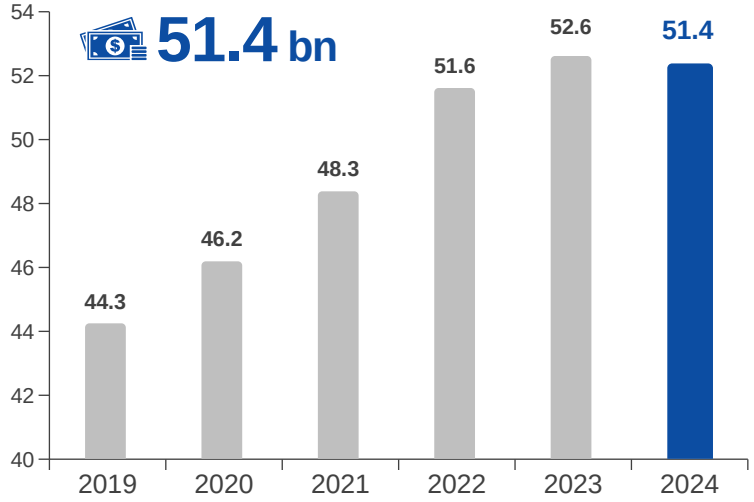



**Installed Capacity**

## Robust Financial Stability

### Assets

(Unit:USD bn)




### Credit Ratings

(As of Dec 31, 2025)

| S&P Global | Moody's Investors Service | FitchRatings |
|---|---|---|
| AA (Stable) | Aa2 (Stable) | AA- (Stable) |

## Our Team

**More than 12,100 Employees Including 7,500 Engineers**

# Nuclear Power Plants in S. Korea



| Operation | |
|---|---|
| 26 Units | 26,050 MW |

| Under Construction | |
|---|---|
| 4 Units | 5,600 MW |

| Permanent Shutdown | |
|---|---|
| 2 Units | Kori #1<br>Wolsong #1 |


- In operation: 8 units
- Under Cons.: 2 units

- In operation: 5 units
- P. Shutdown: 1 unit

- In operation: 2 units
- Under Cons.: 2 units

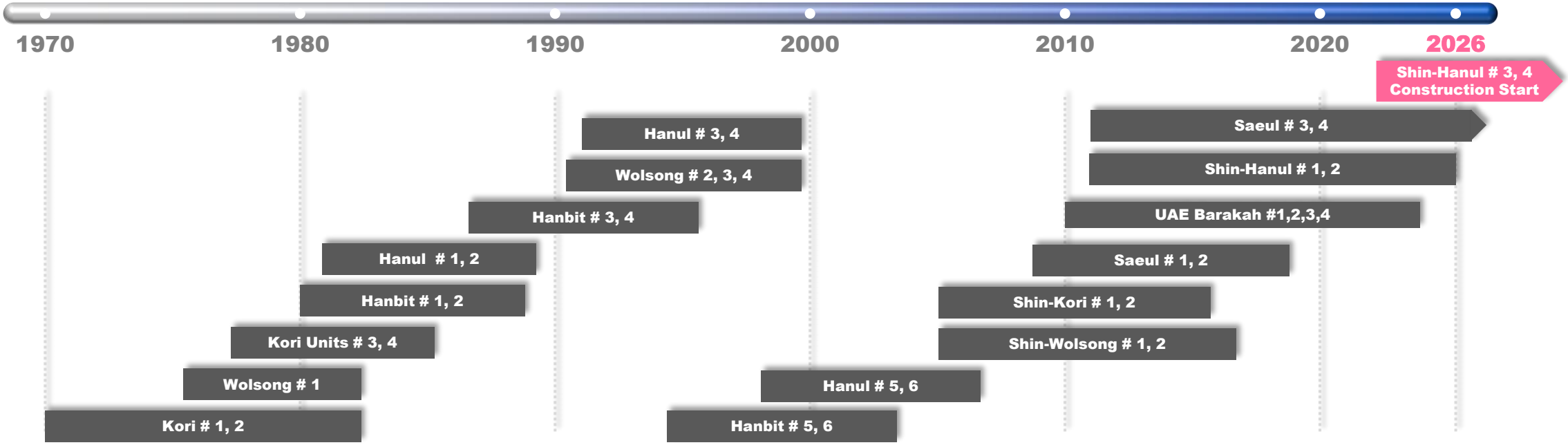
In operation: 6 units

- In operation: 5 units
- P. Shutdown: 1 unit

# Over 50 Years of Continuous Construction



## KHNP's Power Plant Construction History




# Global Projects

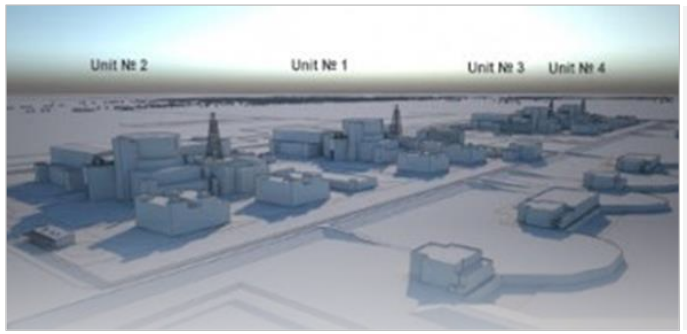


## UAE Barakah NPP

- The first-ever nuclear power in the Middle East
- 4 units of APR1400 (Total 5,600MW) Unit #1 (2021), #2 (2022), #3 (2023), #4 (2024)

**The only case among OECD countries since 2009 where a nuclear power plant export project has been successfully completed construction on time.**

## Egypt




- Supply of equipment, construction of turbine buildings, etc. (2022-2029)

**Second Part of El-Dabaa Project in Egypt**

## Romania

- Detailed design, equipment supply, construction, and commissioning(2023-2027)

**Tritium Removal Facility Project in Romania**

## Dukovany NPP in Czech Republic

- Czech New Build: Selected as the Preferred Bidder
- 2 units APR1000 (1000MW, up to 4 units)

**Reaffirming Korea's nuclear edge: 15 years post-UAE win**

# CHAPTER 2

# Korea Nuclear Technology Development

# KHNP Update (2026)



- **26 NPPs currently in operation with a total capacity of 26GW**
- **4 NPPs under construction; 3 additional NPPs planned**

## APR1400

- 8 units in operation
  (4 units in Korea, 4 units UAE)
- 4 units under construction
- 2 units planned by 2038
- US NRC DC (2019)

## APR1000

- Upgraded version of APR1400
- EUR certification (2023)
- Signed Czech Dukovany EPC contract (Jun. 4, 2025)

## i-SMR

- Currently in development
- SDA submitted (2026. Feb)
- Site Selection (2026. June)
- 1 unit planned by 2035

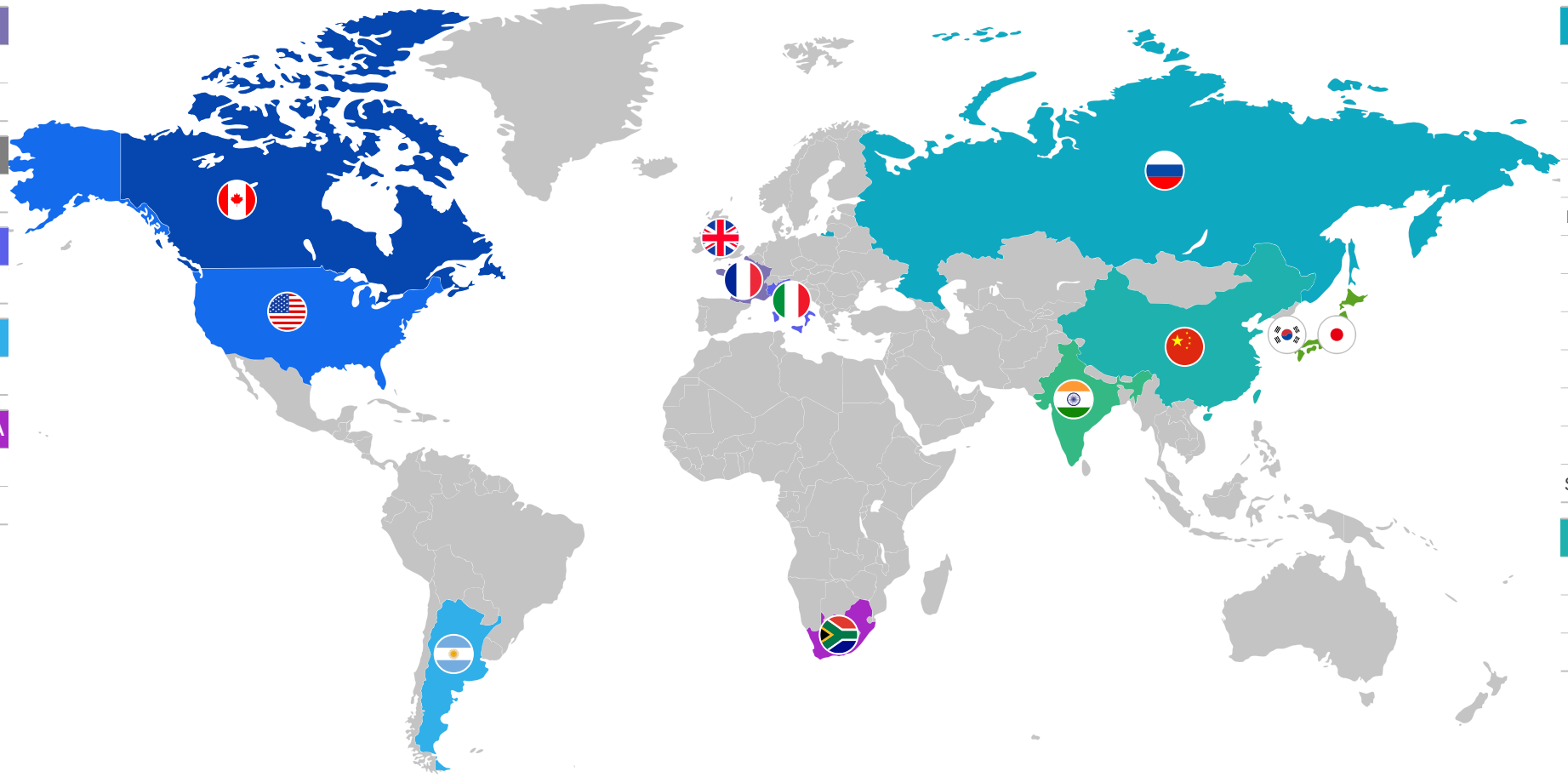
# Global SMR Development Status



## Fierce competition for SMR development to achieve commercialization by 2030s

**"Over 80 types of SMRs under development worldwide"**

| USA | FRANCE |
|---|---|
| NuScale | NuWard |
| BWRX-300 | Flexbule |
| SMR-160 | **UK** |
| mPower | UK SMR |
| W-SMR | **ITALY** |
| EM² | IRIS |
| GT-MHR | **ARGENTINA** |
| PRISM | CAREM-25 |
| G4M | **SOUTH AFRICA** |
| Xe-100 | PBMR |
| SC-HTGR | HTMR-100 |
| **CANADA** | |
| StarCore Nuclear | |



| RUSSIA | KOREA |
|---|---|
| ELENA | i-SMR |
| VK-300 | SMART |
| KLT-40S | BANDI-60S |
| SVBR-100 | **JAPAN** |
| BREST300-OD | DMS |
| VBER-300 | IMR |
| VVER-300 | 4S |
| RITM-200 | **INDIA** |
| ABV6-M | PFBR-500 |
| MHRs | AHWR-300 |
| UNITERM | PHWRs |
| SHELF RUTA-70 | |
| **CHINA** | |
| HTR-PM | |
| ACP-100 | |
| CEFR | |

# Design Characteristics of i-SMR: Safety

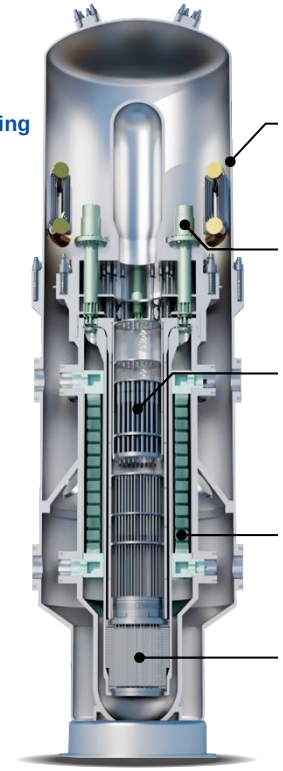


## Improved Safety by applying a fully passive safety system → No power, No operator intervention

### Integral RCS Configuration

- Exclude the LOCA

- **Modular manufacturing and installation**
- **Land transportation available**



**Integrated Reactor**
Eliminates the possibility of a large break loss-of-coolant accident

**Canned motor pump**
Eliminates the possibility of a large break loss-of-coolant accident

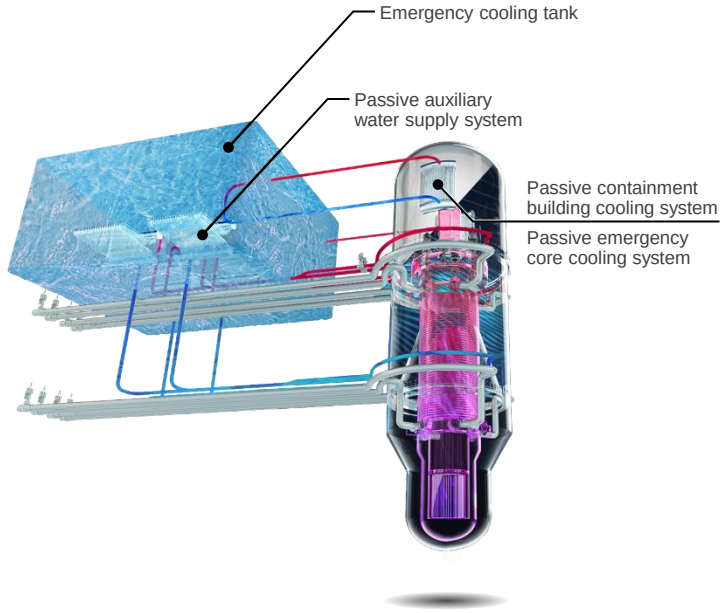
**In-vessel CEDM**
Removes the possibility of a control rod ejection accident

**Helical type Steam Generator**
Compact design of reactor vessel

**Boron-free reactor core**
System simplification and reducing burdens on maintenance

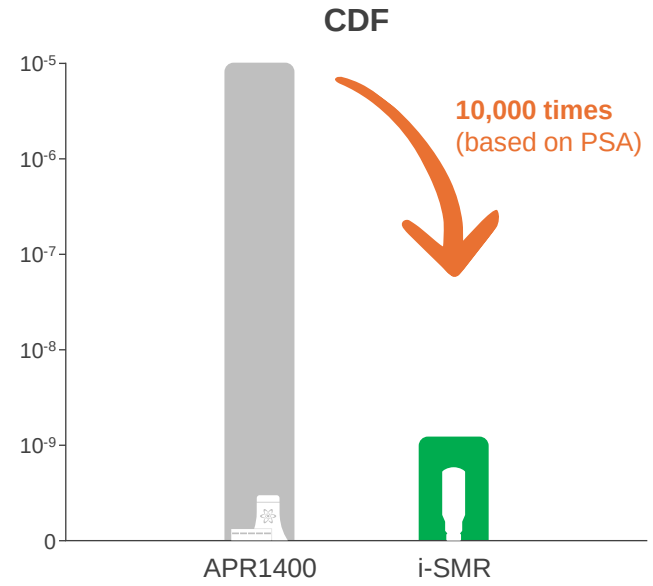
### Fully Passive Safety System

- Cooling water circulation by using natural force such as gravity (No power required)
- No power and operator action in the emergency




### Core Damage Frequency

- APR1400 vs i-SMR CDF (Core Damage Frequency)




**'Zero' possibility of serious accidents such as Chernobyl and Fukushima**

# Design Characteristics of i-SMR: Economics



## Enhanced Economics by Simplification, Modularization, Standardization and application of Innovative technologies

### Reduction in construction volume

- Design simplification of system
- Multiple modules in a single reactor building

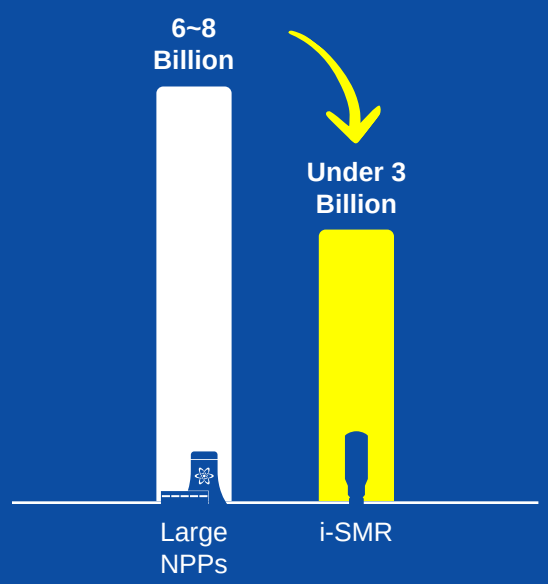
### Modularization and factory manufacturing

- Design optimization for inland transportation
- Reduced construction time and cost with innovative technologies

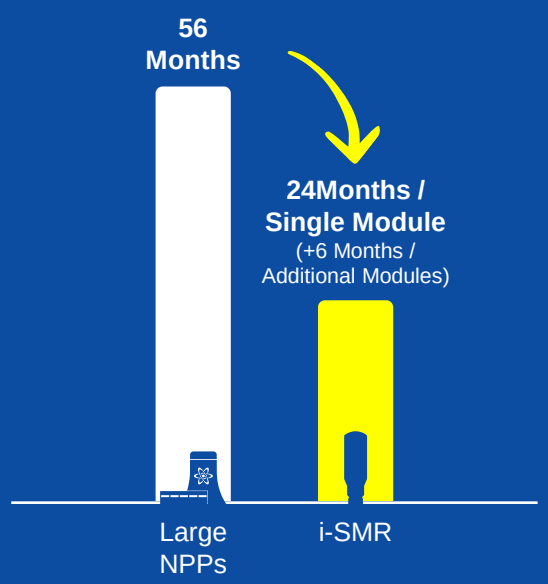
### Significant reduction in operators

- 3 operators in one integrated MCR for multiple modules
- Autonomous/Automatic operation and operate support system
- Predictive preventive maintenance

### Low investment cost




### Construction Period



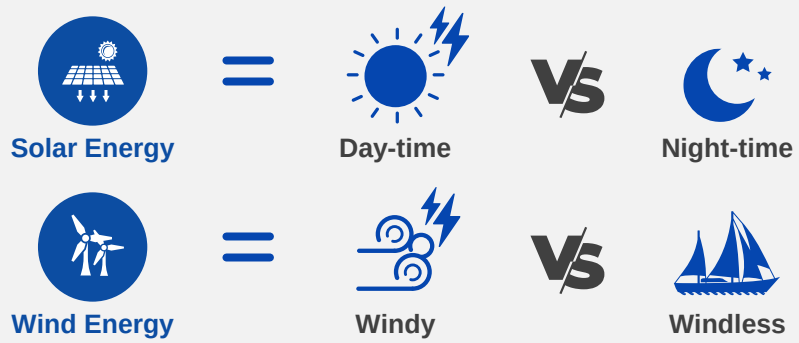

- Reduction risk by reducing construction period with low investment cost

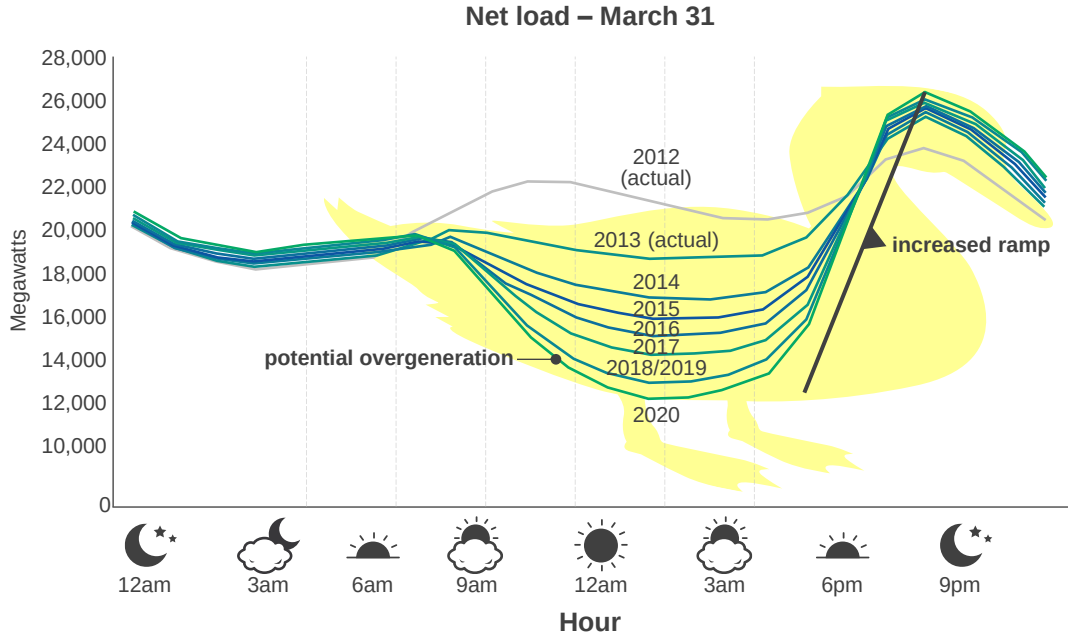
**In overseas nuclear power plant project, over budget and delays are frequent**

# Design Characteristics of i-SMR: Flexibility



## Volatile renewable energy

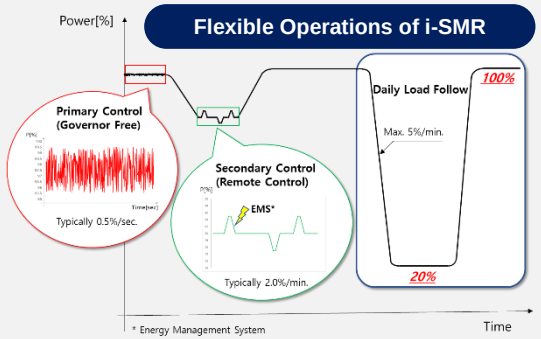


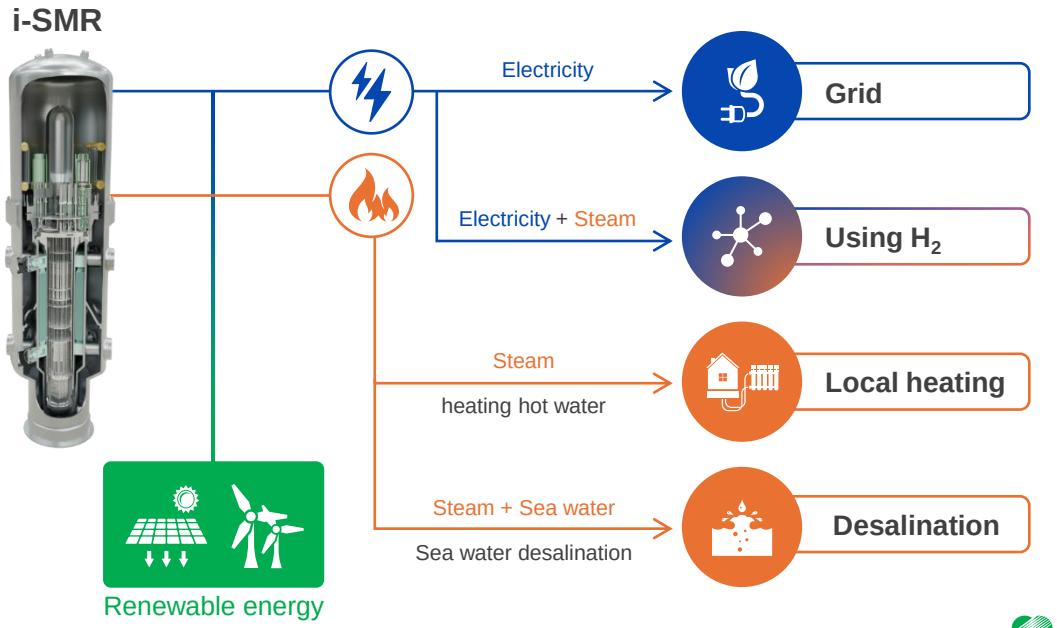




## Flexible power control

| Power Control | |
|---|---|
| Power range | 100%-20%-100% |
| Change rate | 5%/min |

**$H_2$ production, desalination, thermal load control**



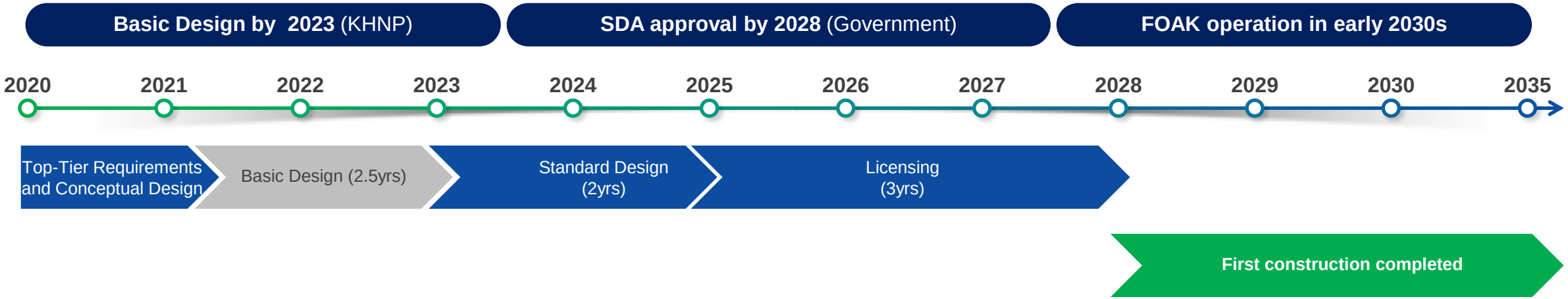
# Development Status and Future Plans of i-SMR



## Target Goal: SDA approval by 2028, FOAK operation in early 2030s

| Preliminary Design led by KHNP | National R&D Projects Supported by the Government |
|---|---|
| • **KHNP project** (KAERI, KEPCO E&C, KNF, Doosan, Academic)<br>**Period:** '21 ~'23 **3years**<br>**Budget:** $40 Million | • **MSIT* / MOCEE* project**<br>**Period:** '23 ~'28 **6years**<br>**Budget:** $300 Million |

*MSIT: Ministry of Science and ICT / MOCEE(Ministry Of Climate, Energy and Environment)

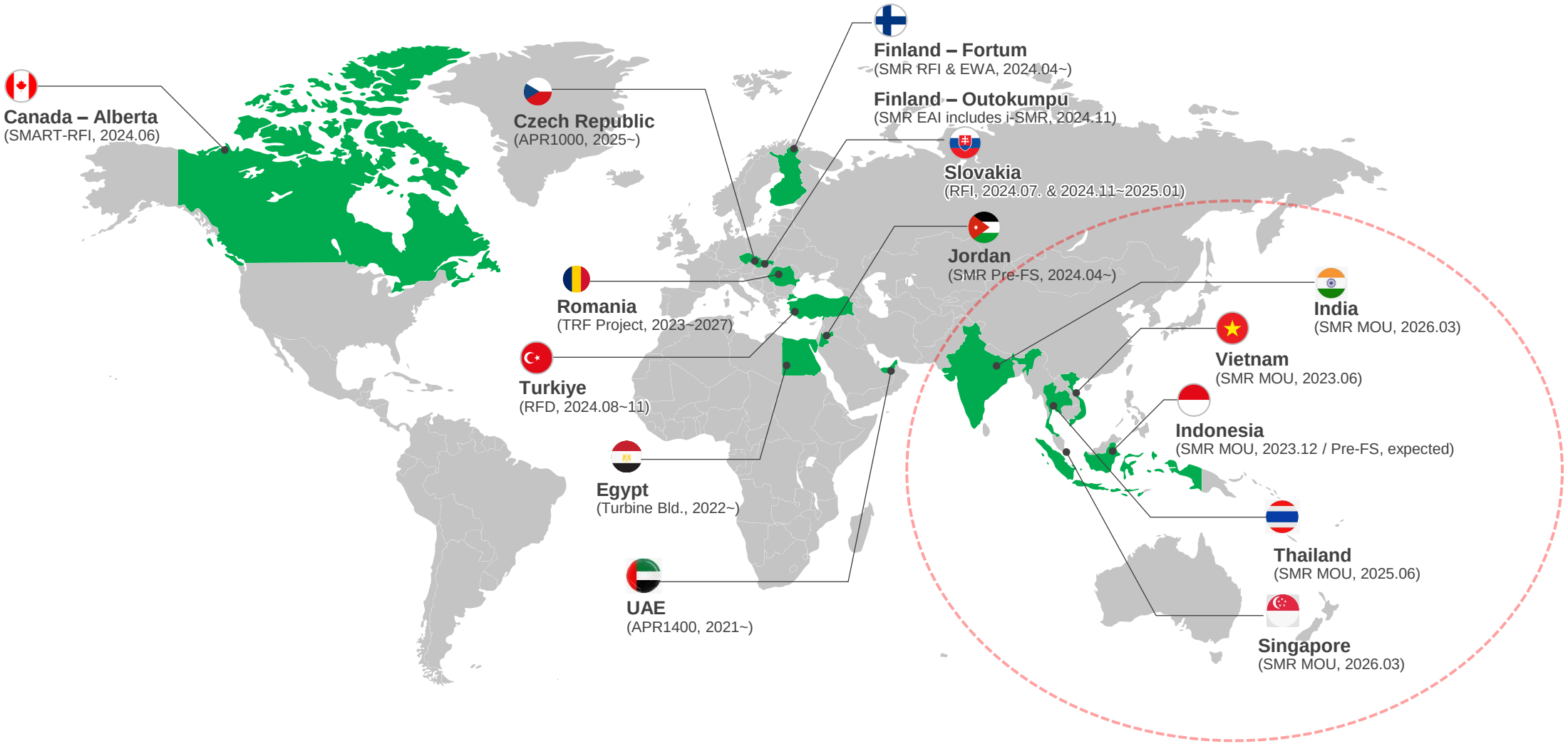


CHAPTER 3

# Regional Cooperation

# KHNP's Overseas Business Status of Nuclear





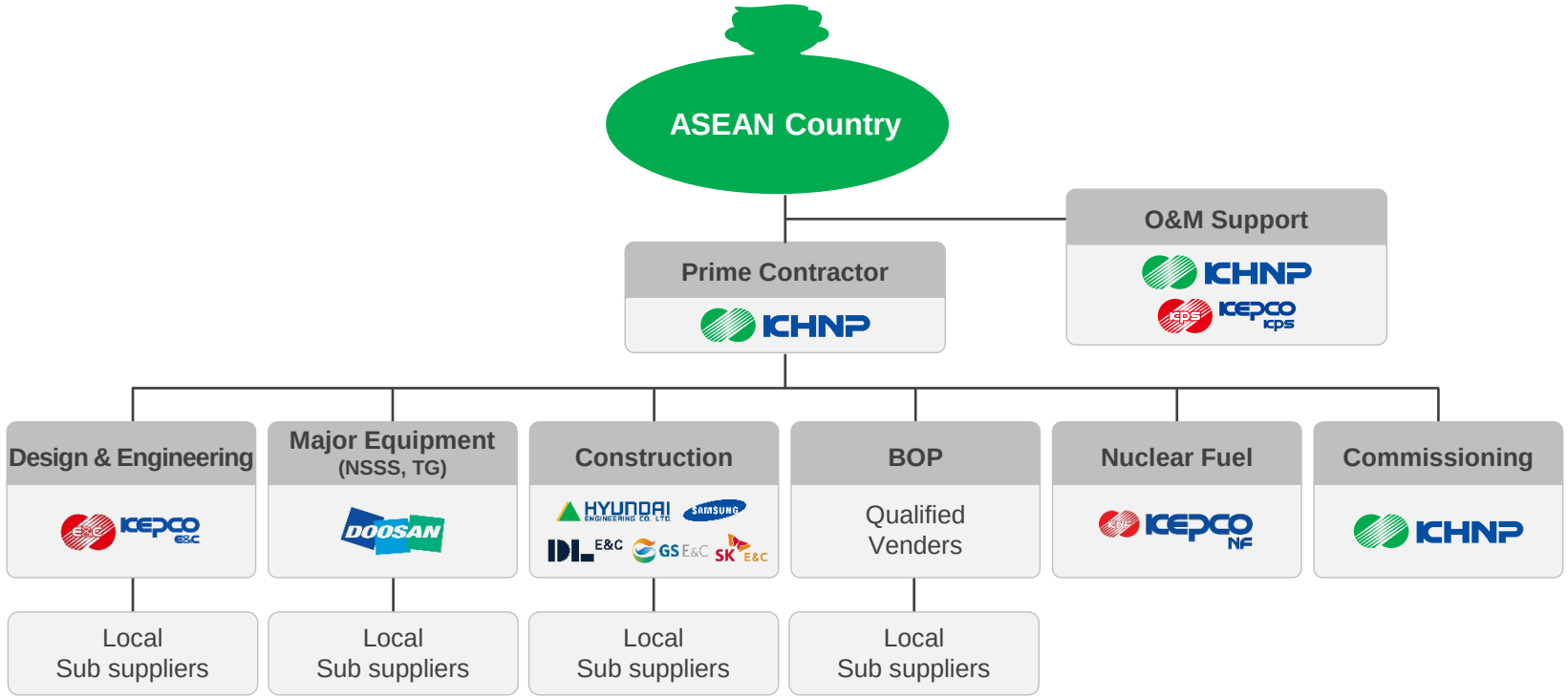
# Project Structure and Localization Plan



## Proven Project Management Capability and Robust Supply Chain

## Localization based on Existing Strong Supply Chain

### Project Structure of Team KHNP (Example)




### Basic Localization Plan

- KHNP will execute the Nuclear Project as a single EPC Turnkey contractor.

| Stages | Activities |
|---|---|
| Pre-Project Preparation | • Preliminary survey of the local industry<br>• Preliminary localization plan |
| Project Preparation | • Enhance the localization plan<br>• Establish local supply chain (pre-qualification) |
| Project Execution (1st unit) | • Utilize local resources<br>• Prepare for further development |
| Project Execution (2nd unit) | • Increase localization level<br>• Expand to 3rd country markets |

# Financing

**KHNP can offer financial support to the project through participating in investment and attracting lenders and investors.**

| Equity Financing | Debt Financing |
|---|---|
| KHNP<br>KIND 한국해외인프라도시개발지원공사 | Korea Eximbank THE EXPORT-IMPORT BANK OF KOREA<br>K-sure KOREA TRADE INSURANCE CORPORATION<br>+<br>KDB Korea Development Bank, Shinhan Bank, Hana Bank, WOORI BANK, KB Kookmin Bank |

1) KIND : Korea Overseas Infrastructure and Urban Development Corporation

# Embarking Country

## Technology

- Issues with reference plants and vendor country of origin (ITSO solutions).
- Transportable SMR/MR implementation and manufacturing base setup.
- Safeguards by Design and strong vendor government support.

## Human Resource Development

- Defining HR requirements and driving local community engagement.
- Aligning with INSAG report focusing on embarking countries.
- Early licensing for specific technologies and requiring stronger skills.

## Regulatory Framework

- Efficient regulatory regimes and regulator-to-regulator safety collaboration.
- Predictable licensing via Combined Licenses and strong technical knowledge.
- Evaluating country-of-origin approaches and securing EPR (Social License).

## Collaboration

- Government-to-government (G2G) and vendor-to-utility (V2U) collaboration.
- Utility-to-utility (U2U) partnership on safety and training.
- Regulator-to-regulator (R2R) collaboration and vendor government support.

## Knowledgeable Customers

- Readiness strategies and knowledgeable operators/regulators for new models.
- Utility-to-utility collaboration and early establishment of SSAC.
- Incentivizing ownership, risk mitigation, and reference plant utilization.

## Funding And Financing

- Vendor government support and long-term financial/in-kind relationships.
- End users driving SMRs and paths to incentivize ownership/risk mitigation.
- 10–15 year roadmap to secure mainstream finance (VC/grants).

※ Reference: Considerations to Facilitate the Accelerated Deployment of Small Modular Reactors (IAEA, 2025)

First Step to Net-zero, i-SMR

# Thank you



KHNP