



# APR1000 for Dukovany New Nuclear Build Project

**BE GREAT TOGETHER**

**TEAM KHNP**

**October 19, 2023**



# CONTENTS

- 1 Korean Nuclear Industry – Continuous building for 50 years**
- 2 Success Story in Korea & UAE – On time, Within Budget**
- 3 Preparation for Dukovany 5**
- 4 Development of SMR**
- 5 Closing Remark**



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**1**

# **Korean Nuclear Industry**

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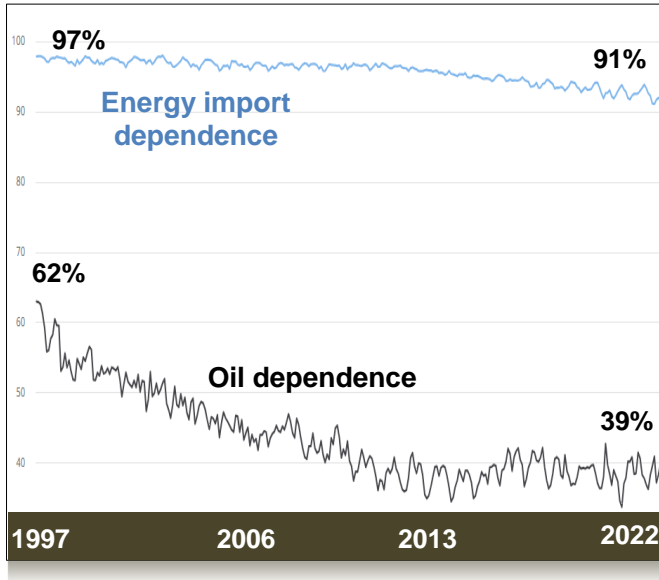
# History of Nuclear in Korea (Kori Unit 1 in 1970s)



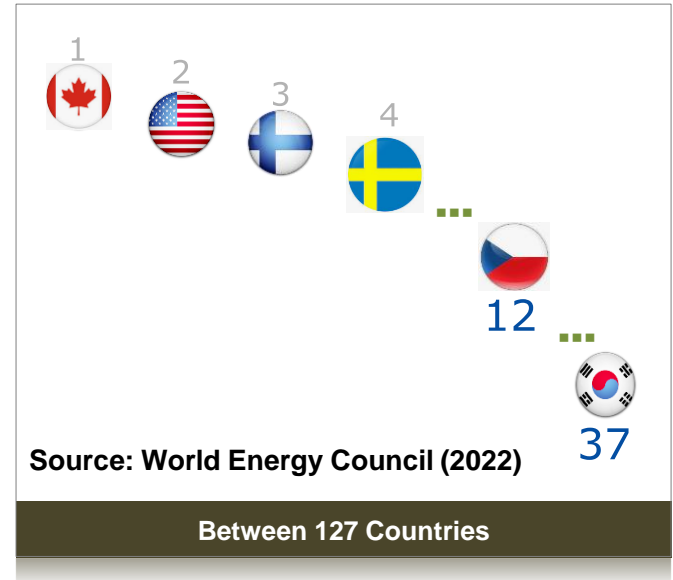
- **In 1978, Korea's first NPP was constructed and began operation, playing an important role to support the industry and overcome the global oil crisis in the 1970s**
  - ✓ The project cost was approx. 5 billion CZK, which was 25% of Korea's total state budget
  - ✓ The unit has replaced 42 million tons of coal from 30 years of operation

# Why Nuclear is important in Korea

## Status of Energy Imports



## Energy Security Index



- Overseas dependence is still high in Korea
- Korea is an “Energy Island” due to its geopolitical position
- Korea has an energy-guzzling industrial structure

Nuclear Power

Obtain energy independence

Uranium accounts for only 1% of the imported energy price

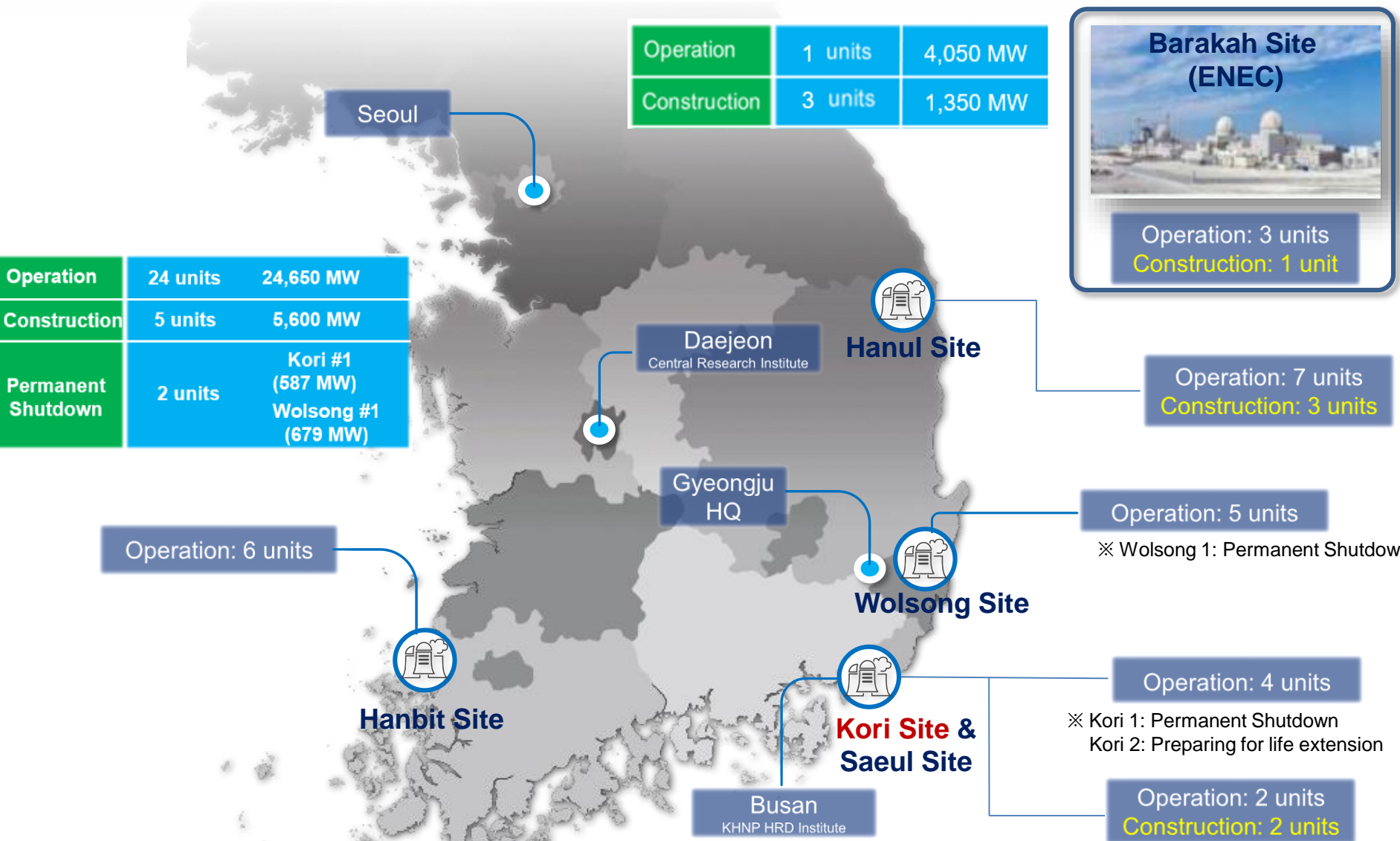


# History of Nuclear in Korea (Kori Unit 1 in 2023)



- As of today, nuclear power capacity has increased by **5 times** since the 1970s
  - \* 24 units in operation & 5 units under construction in South Korea (about 30 GW)
- KHNP supplies **30% of the electricity demand** through nuclear power in Korea
- Successfully **contributing to energy security** by providing “safe and reliable electricity”

# Nuclear Power Plants in Korea & the UAE



# Nuclear Power Plants under Construction

Reference Plant for Dukovany 5

Shin-Hanul 1

Shin-Hanul 2



Shin-Hanul 2 (target of 2024)



Shin-Kori 5, 6 (target of 2024, 2025)



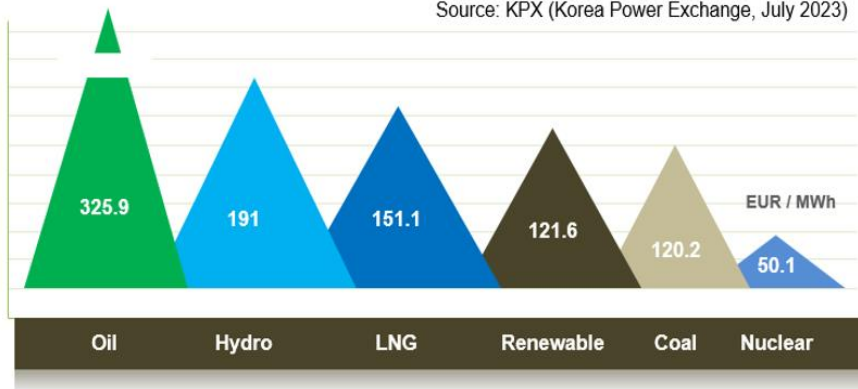
Shin-Hanul 3, 4 (target of 2033, 2034)



# Why Nuclear is important in Korea

Electricity Sales Price to Grid

Source: KPX (Korea Power Exchange, July 2023)

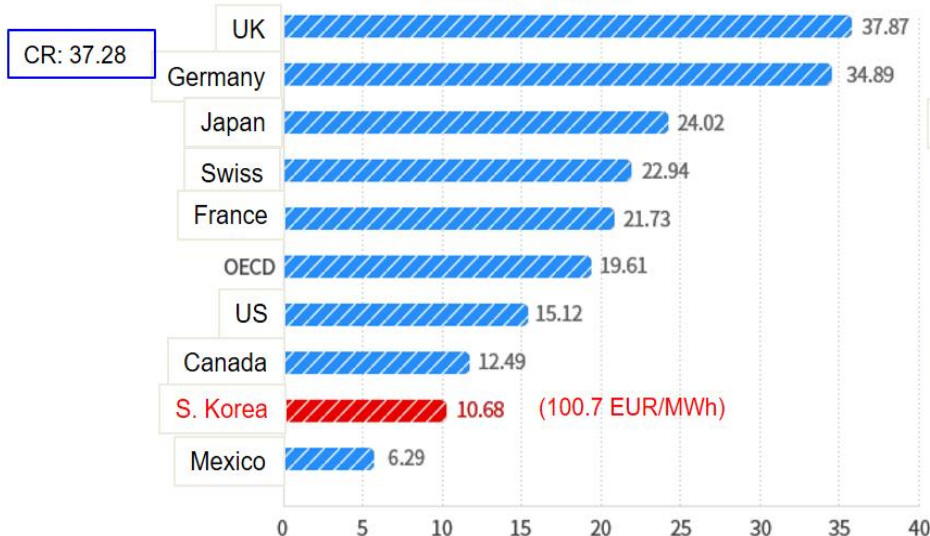


Contribution to National Economy

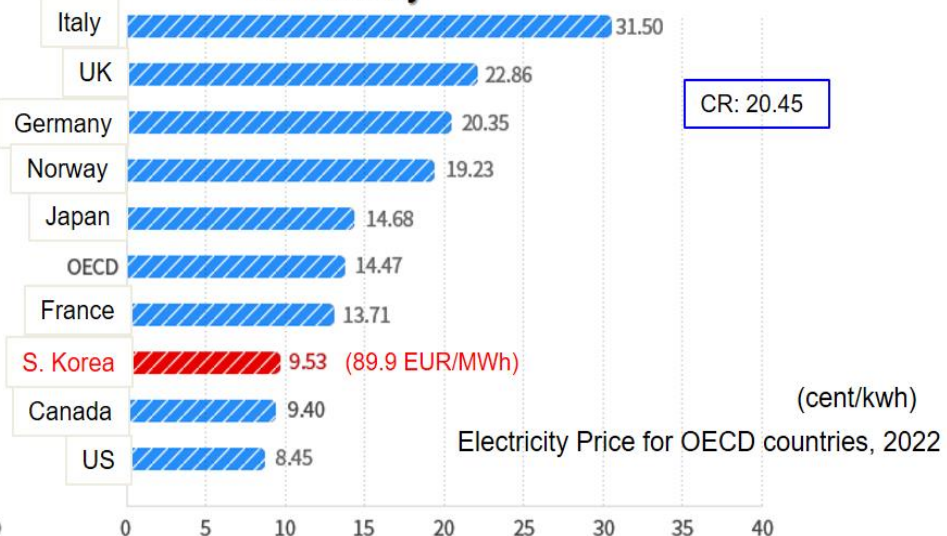
Source: KEPCO(2015)



For households



For industry



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**2**

**Success Story  
in Korea & UAE**

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# KHNP Overview

‘ **100% Carbon Free** ’

## Energy Producer

<b>Nuclear</b>	<b>24,650 MW</b>
Pump-Storage	4,700 MW
Hydro	608 MW
Solar/Wind	72 MW

(2022)

# KHNP

The World’s Leading Player  
in the Nuclear Power

‘ **30%** ’

Produces 1/3 of  
Domestic Demand

‘ **38GW** ’

Total for Nuclear Capacity (Since 1971)  
(including 4 units in the UAE)

**36 Units Construction Experience**  
**27 Units in Operation**  
**6 Units under Construction**

**€49BN.**

Total Assets



# Nuclear Industry Structure in Korea





# New Nuclear Policy in Korea

- **Korean President Yoon approved the new “Energy Policy”** (Jul. 2022)

- Increased the share of nuclear power in the national energy mix to **more than 30%**

- **Korean government established the “State Basic Plan for Electricity Supply”** (Aug. 2022)

- Share of nuclear power to be increased from **24% (2022) to 33%**
- 6 units of new nuclear build (including Shin-Hanul 3&4) + life extension for 10 units

- **Korean government established a committee for nuclear export strategy promotion** (Aug. 2022, led by the Ministry of Industry and Trade)

- Control tower for nuclear exports among the ministries, industry, academic and finance sectors

- **MIT established a Prompt Support Center for nuclear companies** (Sep. 2022)

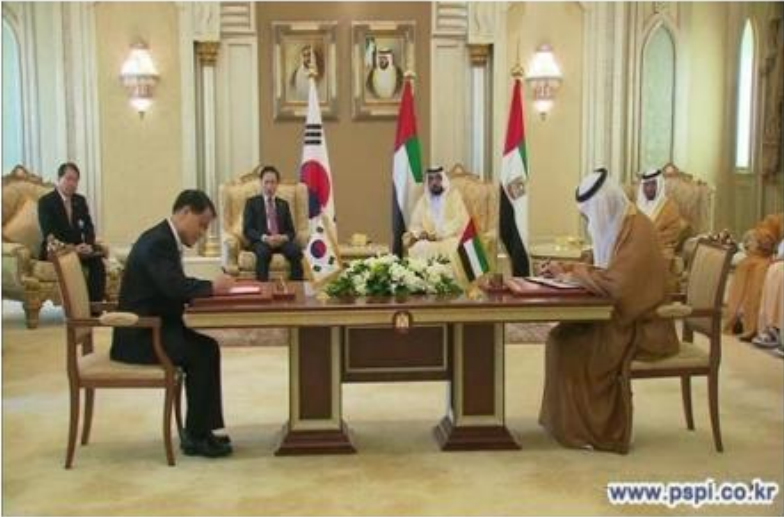
- **MOU between KHNP and K-EXIM, K-SURE and commercial banks to provide financial support for nuclear exports** (Dec. 2022)

- **KHNP has been pursuing procurement for the Shin-Hanul 3&4 Project** (since Jan. 2023)

- **Korean government approved the implementation plan for construction of Shin-Hanul 3&4** (June 2023)



# UAE Project – On time, Within Budget



<b>Contract Date</b>	Dec. 27, 2009
<b>Owner</b>	ENEC
<b>Scope</b>	APR1400 x 4 Units (5,600MW) Nuclear Fuel (3 Cycles) Operating Support Service
<b>Ref. Plant</b>	Shin-Kori 3 & 4 in Korea



**Unit 4**  
(Target to operate in 2024)

**Unit 3**  
(Operation in 2023)

**Unit 2**  
(Operation in 2022)

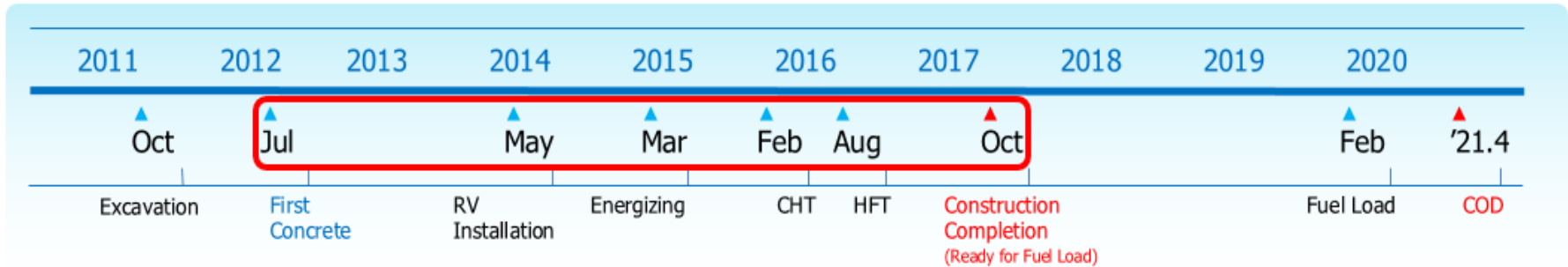
**Unit 1**  
(Operation in 2021)

Total capacity is almost 25% of the power generation capacity in CZR (30TWh/yr)



# UAE Project – On time, Within Budget

## ● BNPP unit 1 construction: completed within 6 years as planned



## ● Expected BNPP project costs: 20 → 24 bill. USD as contracted

- Expected increase of 20% of the contract amount, mainly due to cost escalation by yearly inflation over 15 years

(Source: Wikipedia, 2022)

## ● How did we overcome the BNPP challenges?

- Timely action to address risk factors, using our **One Team** approach and depth of knowledge
- Provided qualified and **experienced manpower** in advance (1,100 KHNP manpower at peak time)
- **Systematically managed** multinational workforce from third-countries (18,000 laborers from 15 countries)

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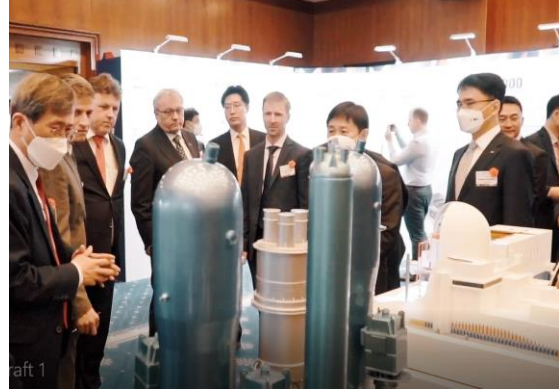
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## **Preparation for Dukovany 5**

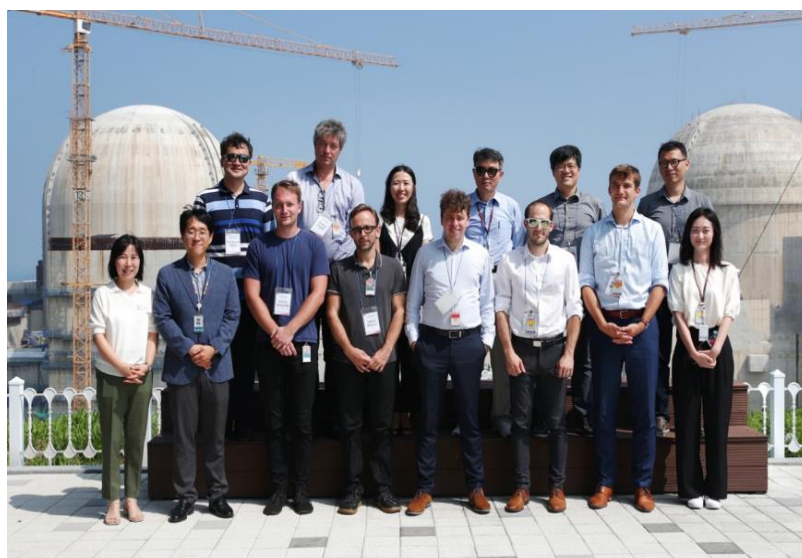
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# Cooperation with Local Companies (MOU, B2B, round table...)



# Cooperation in R&D (Cross visits & Tech. Exchange)

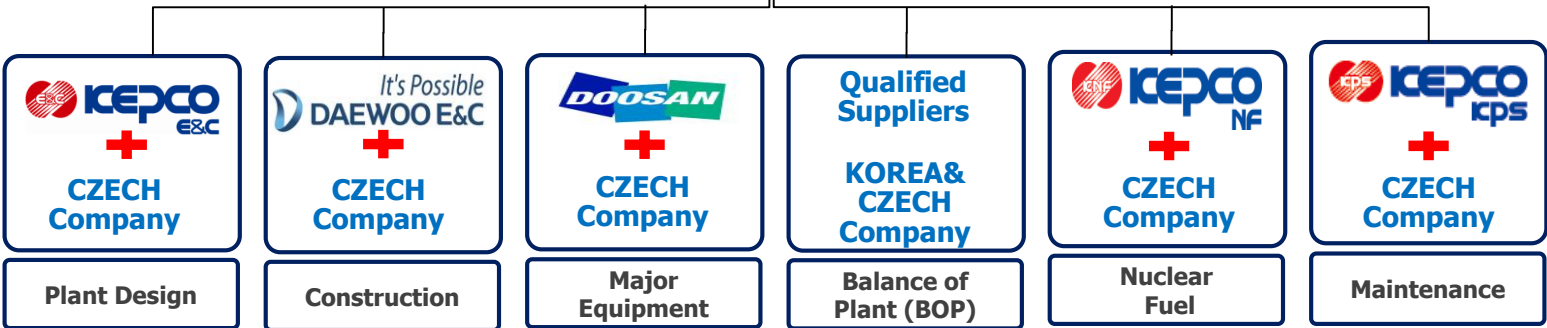




# Team KHNP for Dukovany 5 (2020~)



Director	G.M	S.M	Staff	Total
1	6	17	6	30



KHNP	KEPCO E&C	DAEWOO	DOOSAN	KEPCO NF	KEPCO KPS	TOTAL
50	30	30	30	10	10	160+

# Dukovany Site Visit (2021 & 2022)



October  
2021



June  
2022





# Technical meeting (2023)



# EUR Certification for APR1000 (March 2023)



- 1. Assessment Duration : 2019 – 2022 (3 years)
- 2. Assessment Team



The EUR Association hereby certifies that the:

## APR1000 standard design

has successfully passed all the steps of the analysis of compliance against the EUR Document Revision E with the contribution of: *KHNP, KEPCO E&C, KEPCO NF and Doosan.*

Following this analysis, a specific subset of the EUR Document Volume 3, dedicated to the APR1000 design, has been published by the EUR Association

March 2<sup>nd</sup> 2023

*(Signature)*  
**Manuel Carrasco**  
 President of the EUR Association



# Global Volunteer Activities (2017~ present)



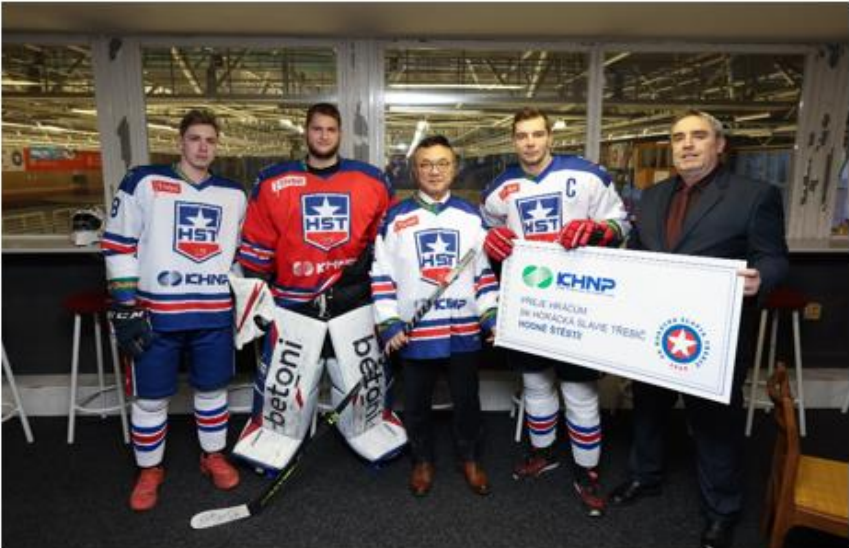


# Pyeongchang Winter Olympics (2018)





# Sponsorship of SK Horácká Slavia Třebíč (2018~)



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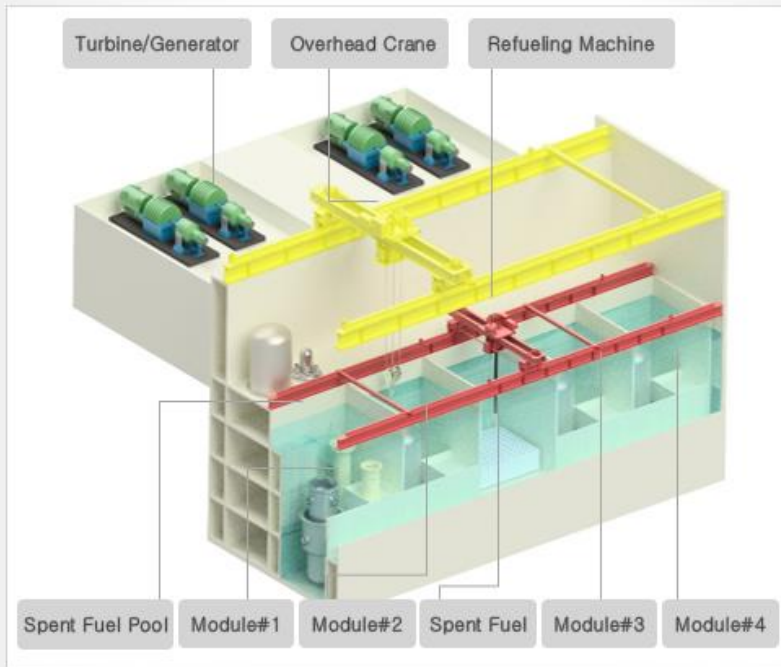
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**SMR  
Development**

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# i-SMR, Design Concept

## i-SMR Module Layout



1 Module 170 MWe

Basic Unit

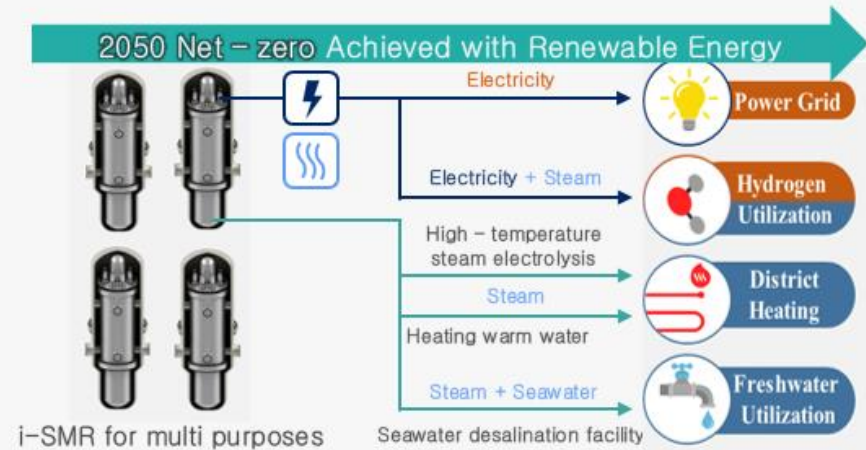
Module : 680 Mwe

Capacity adjustable depending on number of the modules

## Multi Modules (optional)

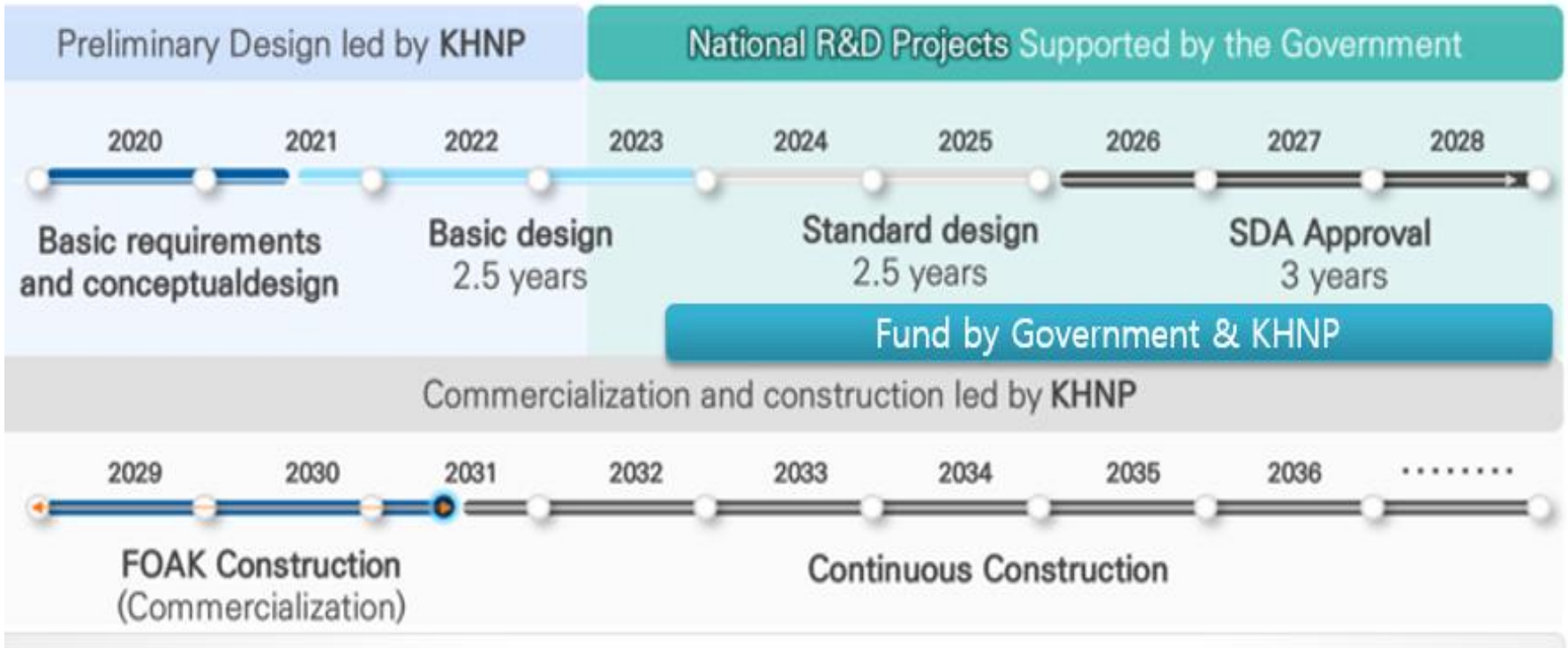
- 1 Module 170MWe : Low economic, but beneficial in remote areas
- 4 Module 680MWe : Replacement of Coal-fired Power Plant
- 8 Module 1,360MWe ~ : High economical & can be option for replacement of old NPP and new NPP

## Eco-friendliness and diversity



# i-SMR, Project Implementation Plan

Started from 2020, National R&D Project form 2023, SDA approval by 2028, FOAK operation in 2031





# King “Munmu” Science Institute

- Purpose: R&D center for SMR and Nuclear Decommissioning development (under KAERI)
- Construction : 2021 - 2025



# National Industrial Complex for SMR

- Purpose: Centralize the SMR development for engineering, equipment and components
- Construction : 2026 - 2030



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**Closing Remark**

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# Best Partner for Each Other



**Korea and Czechia**  
**Century-long partnership for the nuclear industry**



**KOREA HYDRO &  
NUCLEAR POWER CO., LTD**



# DĚKUJI

*The APR1000!*

