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Policy & Regulatory Challenges for i-SMR Design

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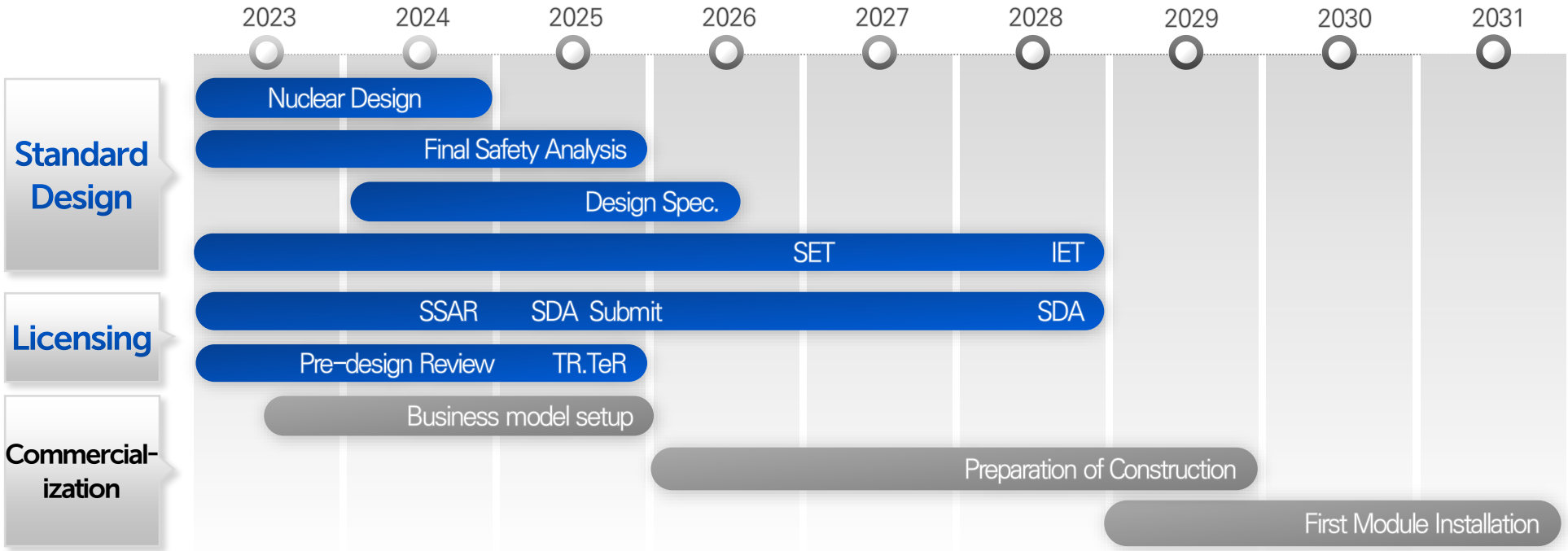
Policy & Regulatory
Challenges for i-SMR Design

CONTENTS

01 Introduction

Milestone of i-SMR



i-SMR Agency

- The Government funded foundation to lead the development of i-SMR (Standard design & Licensing)
- Based on the leadership of the agency, Team-Korea will work together.

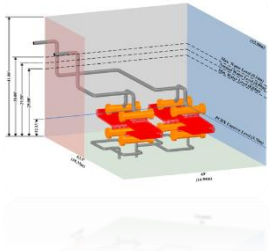
Duration : '23 ~ '28 6yrs

01 Introduction

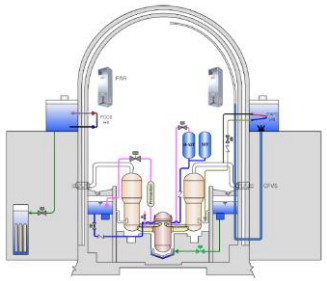
Proven Tech. of Large Commercial PWR

APR1400 & APR+(1500MWe)

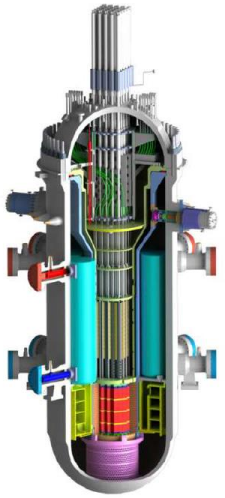
Passive systems



iPOWER(1250MW, Passive PWR)

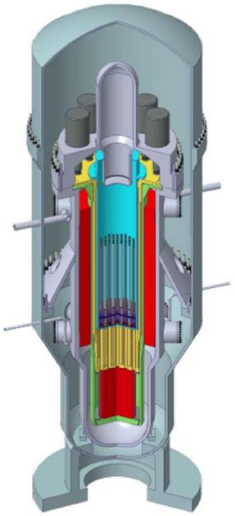


SMART(100MWe)



World's first standard design Approval SMR (2012)

i-SMR(170MWe)



More Safe
More Economical
More Flexible

02 i-SMR Design Features

Integrated module reactor

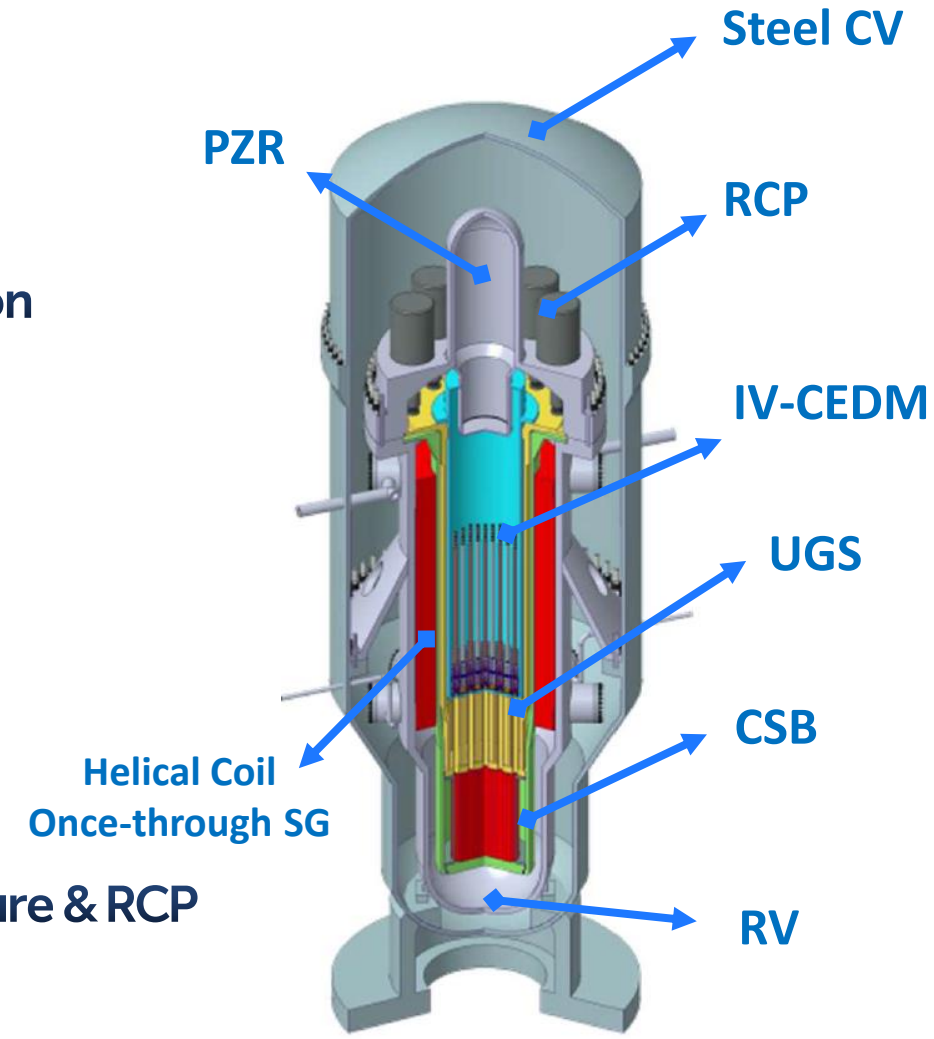
Minimization of rad-waste by boron free operation

Elimination of pipe break

Elimination of CEA ejection by In-vessel CEDM

Enhanced thermal margin

Optimization of economics by module manufacture & RCP



Schematic diagram of RV and CV

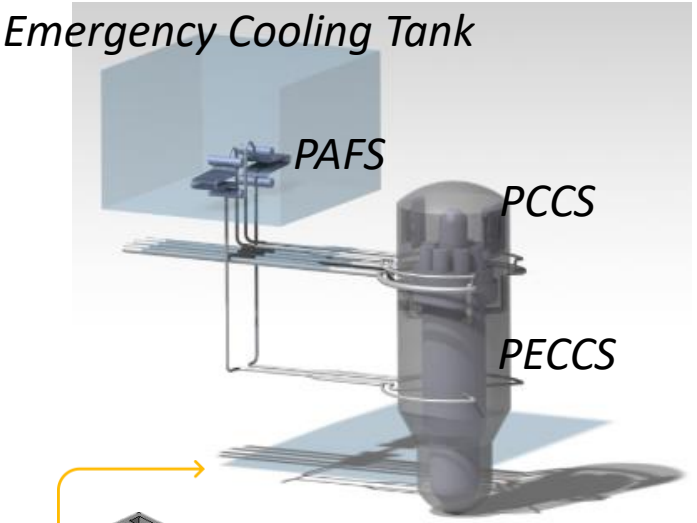
02 i-SMR Design Features

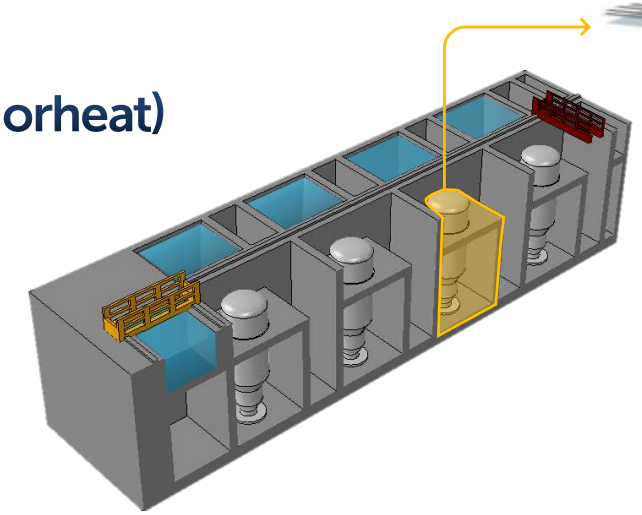
Full passive safety system with dry containment vessel

Practical elimination of severe accident

Independent module arrangement

Flexible utilization
(Load following operation or hydrogen orheat)





02 i-SMR Design Features

Major design parameters	
Reactor type	Integral PWR
Plant capacity(number of reactors) MWe	680 (4)
Thermal/electrical capacity per reactor, MWt/MWe	540/170
Reactor coolant pump	Vertical canned motor type
NSSS operating pressure, MPa	15
Core inlet/Outlet coolant temperature, °C	295.5/320.9
Fuel type/assembly array	UO_2/17x17 square pitch
Number of fuel assemblies in the core	69
Fuel enrichment, w/o	<5
Core discharge burnup ,MWD/MTU	<62,000
Refueling cycle, months	24
Reactivity control (Soluble boron-free)	Control rod, burnable absorber rods, moderator temperature
Steam generator	Helical once-through type
Safety systems	Fully passive
Design life, years	80
Seismic design (SSE), g	0.5

03 Challenges on i-SMR Development

1. Political Challenges for FOAKE construction
   - PA, Site(Coal-to-Gas → Coal-to-Nuclear), Business model, Governmental Support etc
2. Regulatory Challenges for Standard Design Approval of i-SMR
   - Regulation on Innovative design, Module & plant licensing, EPZ etc.
3. International Standardization of SMR Regulatory & Industrial Rules

03 Challenges on i-SMR Development

1

Business model to build NPPs in Korea

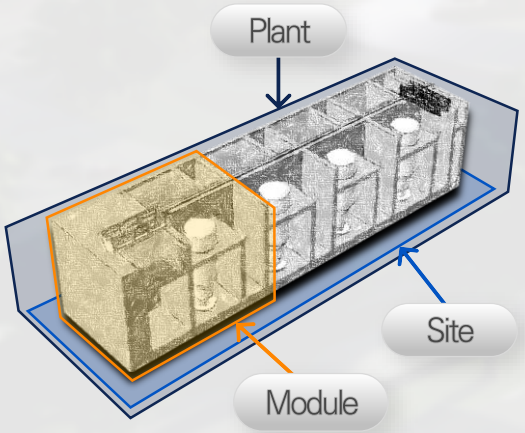
- As-is : Government driven, Public enterprise (KHNP, KAERI, KEPCO-ENC, KNF) business for domestic & overseas NPP construction project
- Question :
  - Is it still effective for SMR business ?
    (Flexible utilization, Relatively small capital costs etc)
  - How to involve private enterprise for SMR construction and Overseas business?

03 Challenges on i-SMR Development

2 Regulatory Challenges for Standard Design Approval of i-SMR

- Communication with Developer / Regulator
- Effectiveness of Pre-review

- Regulation by principles
- 3 Crews Operation
- EPZ Elimination



- Flexible Utilization
- Separate review for Reactor module / Plant / Site

THANK YOU

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i -SMR
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