

TMSR Project in China

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Outline

1. Project Overview

2. Research Progress

1. Project Overview

- **January, 2011, Chinese Academy of Sciences (CAS) initiated the “Thorium Molten Salt Reactor Nuclear Energy System”(TMSR) project.**
- **August, 2013, TMSR has been chosen as one of the National-Energy Major R&D projects of Chinese National Energy Administration (CNEA)**
- **2014, Shanghai Local Government plans to start a major new-Energy project to support the TMSR project, including the manufacture of the special materials, devices, building&utilities.**

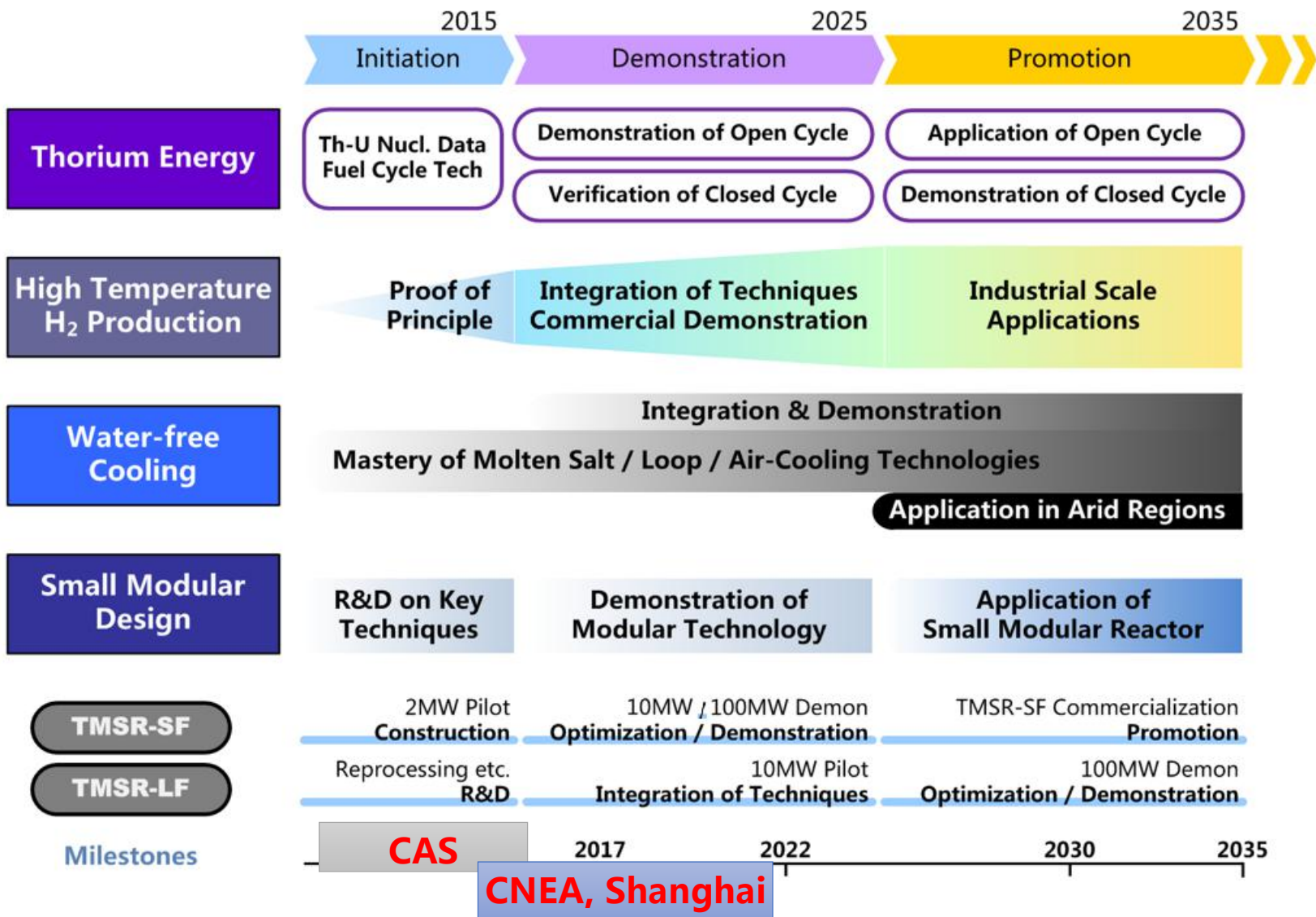
The Aims of TMSR Project

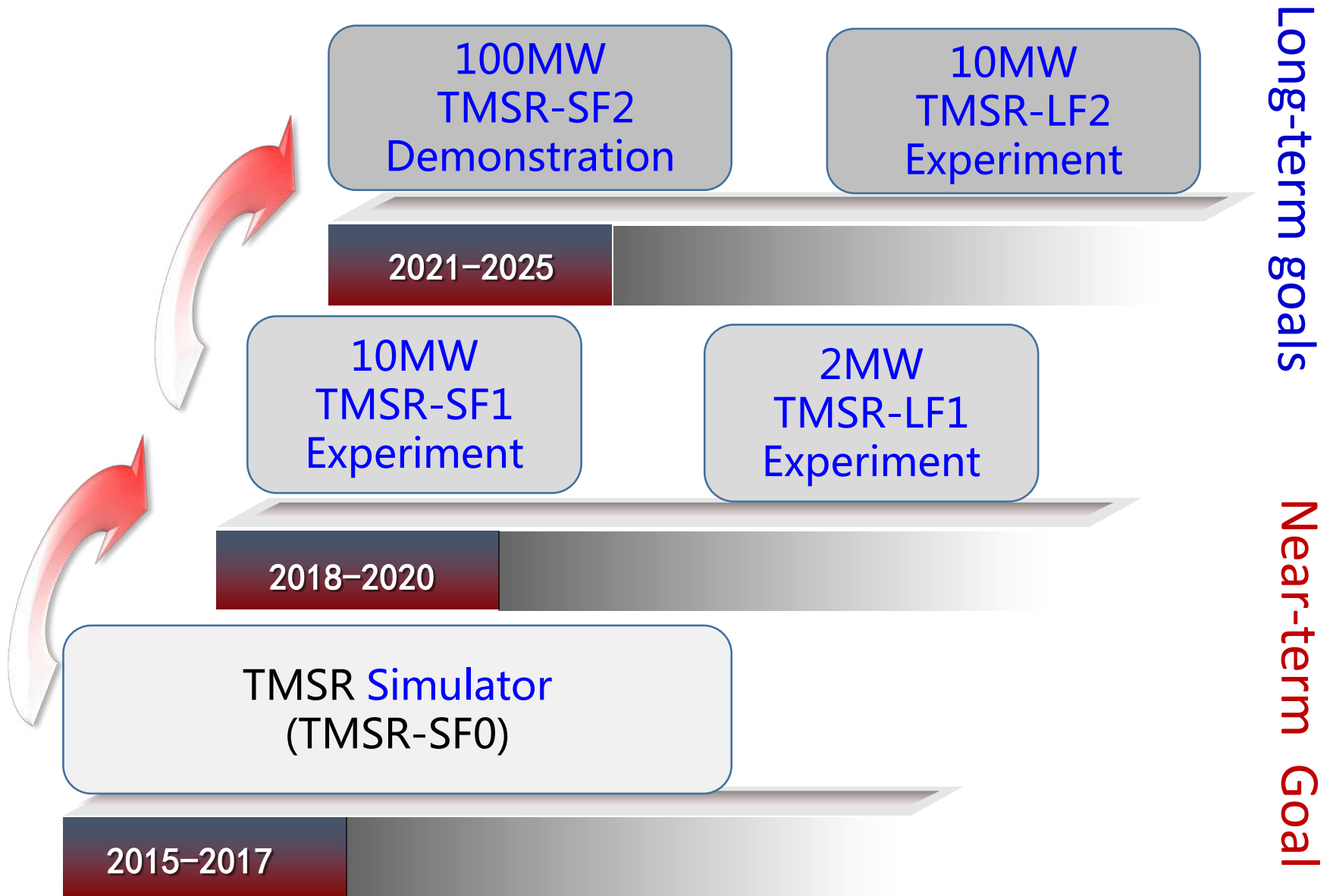
- The Aims of TMSR Project is to develop Th-Energy, Non-electric application of Nuclear Energy based on Liquid-Fuel TMSR and Solid-Fuel TMSR during coming 20-30 years.
 - Liquid-Fuel TMSR (TMSR-LF)--- MSR_s
 - Solid-Fuel TMSR (TMSR-SF1)--- FHR_s

TMSR-SF: Optimized for high-temperature based hybrid nuclear energy application (Non-electric application).

TMSR-LF: Optimized for utilization of Thorium.

TMSR Road Map





TMSR Near-term Goal

■ Phase-I (~2017)

- **Completion of TMSR-SF simulator.**
- **Start to construct 10MW TMSR-SF test Reactor (TMSR-SF1), 2MW TMSR-LF test Reactor (TMSR-LF1) & Pyro-Process Facility (PDF).**
- **Build up full capability of non-radioactive laboratories in Jiading.**

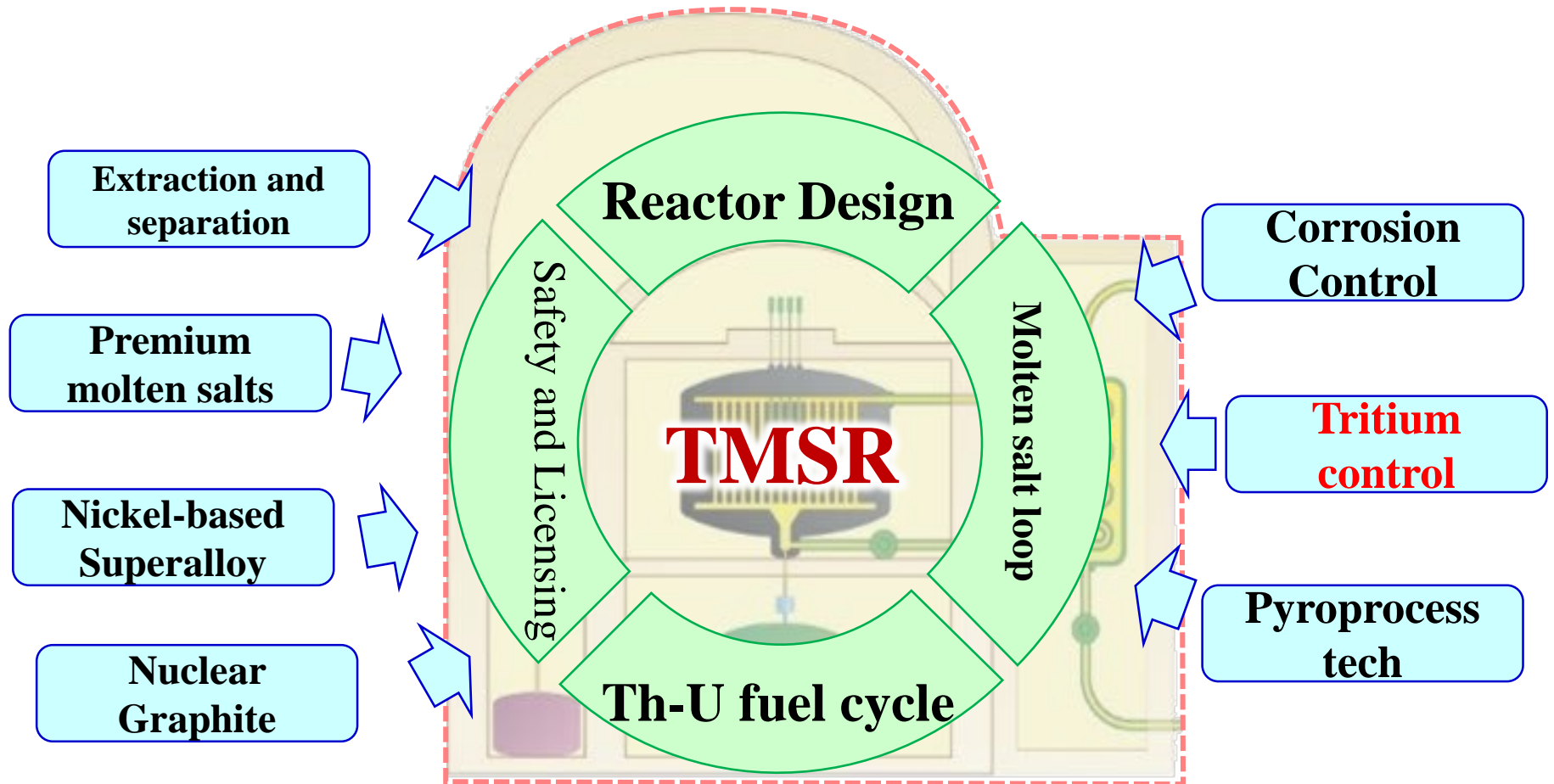
■ Phase II-(~2020)

- **Completion of the TMSR-SF1, TMSR-LF1 and PDF,**
- **Completion of the engineering design of 100MW TMSR-SF demonstration reactor (TMSR-SF2).**
- **Build up R&D abilities for future TMSR development , including the TMSR Nuclear Park in DaFeng**

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4 Prototype Systems and 7 key technologies



Master the key technologies of tritium control in the molten salt reactor such as tritium extraction with bubbling, tritium separation, tritium monitoring and son on .

(6) Tritium Monitoring

(1)
Tritium
Behavior

**Chemical forms of
Tritium in TMSR**
**Interaction between
tritium with either
of coolant or metal.**



(2)
Tritium
Extraction

**Extraction of
tritium from the
molten salt**



(3)
Tritium
Separation

**Separation of
tritium from
other gaseous
mixture**



(4)
Tritium
Storage

**tritium storage
with alloys after
the recovery of
tritium in TMSR**



(5)
Tritium
Sampling

**Sampling
tritium with
different
chemical forms**



TMSR International Cooperation

- Th Utilization, Reactor Tech.
- Material, Molten Salt Tech,
- Pyro-process
- Nuclear Safety Standards



Organizational Overview



The Chinese Academy of Sciences (CAS) and U.S. Department of Energy (DOE)
Nuclear Energy Cooperation Memorandum of Understanding (MOU)

MOU Executive Committee Co-Chairs

China – Mianheng Jiang (CAS)
U.S. – Pete Lyons (DOE)



Australia

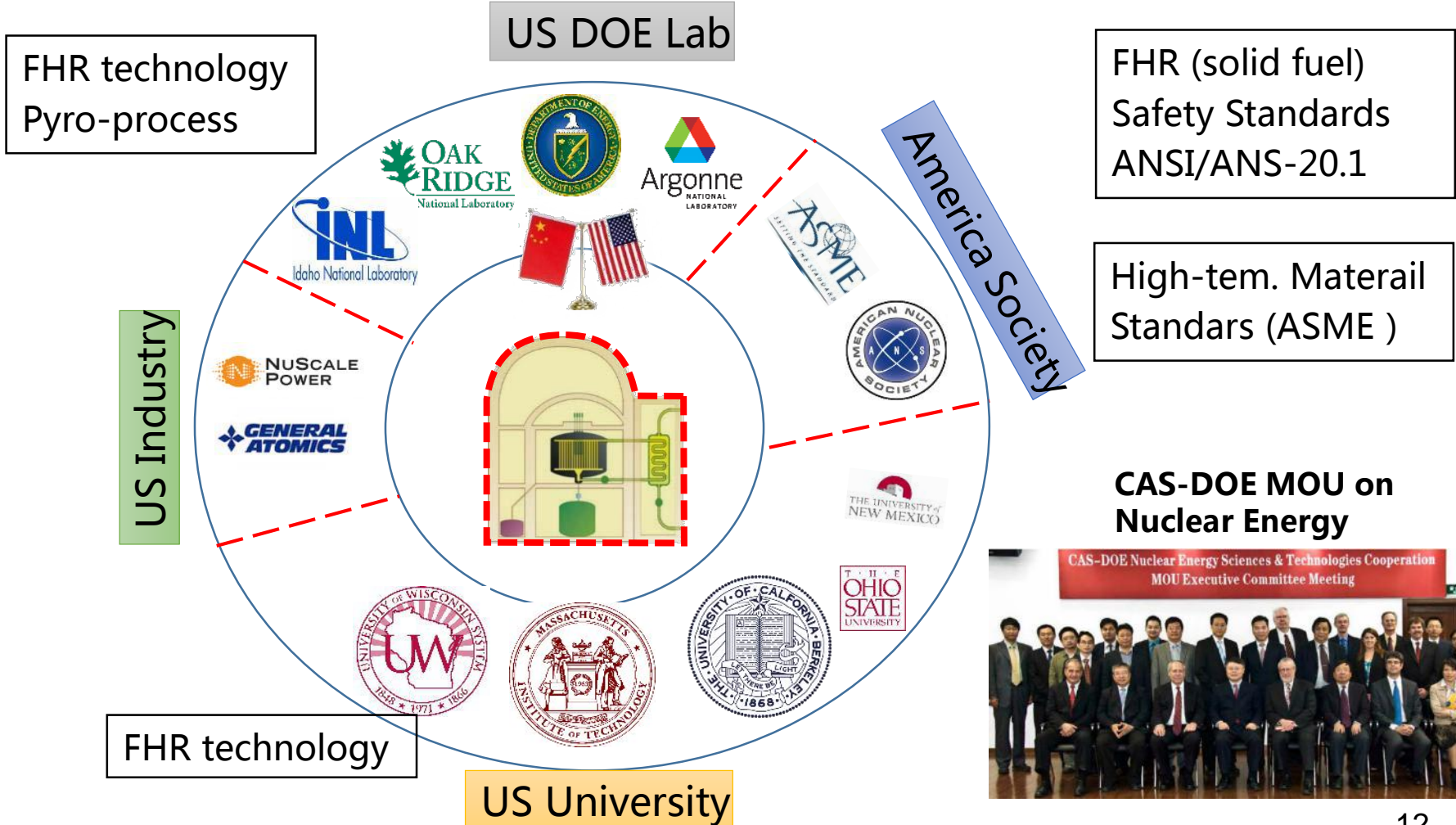


Nuclear-based science benefiting all Australians

Future

- Russian
- EU
- Korea
- Japan

Collaboration with USA



Collaboration with USA-II



**TMSR—ORNL FHR CRADA,
Signed in July 2014**



**TMSR—MIT FHR MRA,
signed in April 2015**

Started to discuss the CRADA on Pyro-process between TMSR and INL & ANL.

Cooperation Workshop for R&D of Pyro-process Technology will be held in SINAP, 14-15, May, 2015. Stephen Kung, DOE; K. Michael Goff, INL & Mark A. Williamson, ANL will attend the workshop.



Thanks for Your Attention

