World Status of Fast Reactor Technology Development

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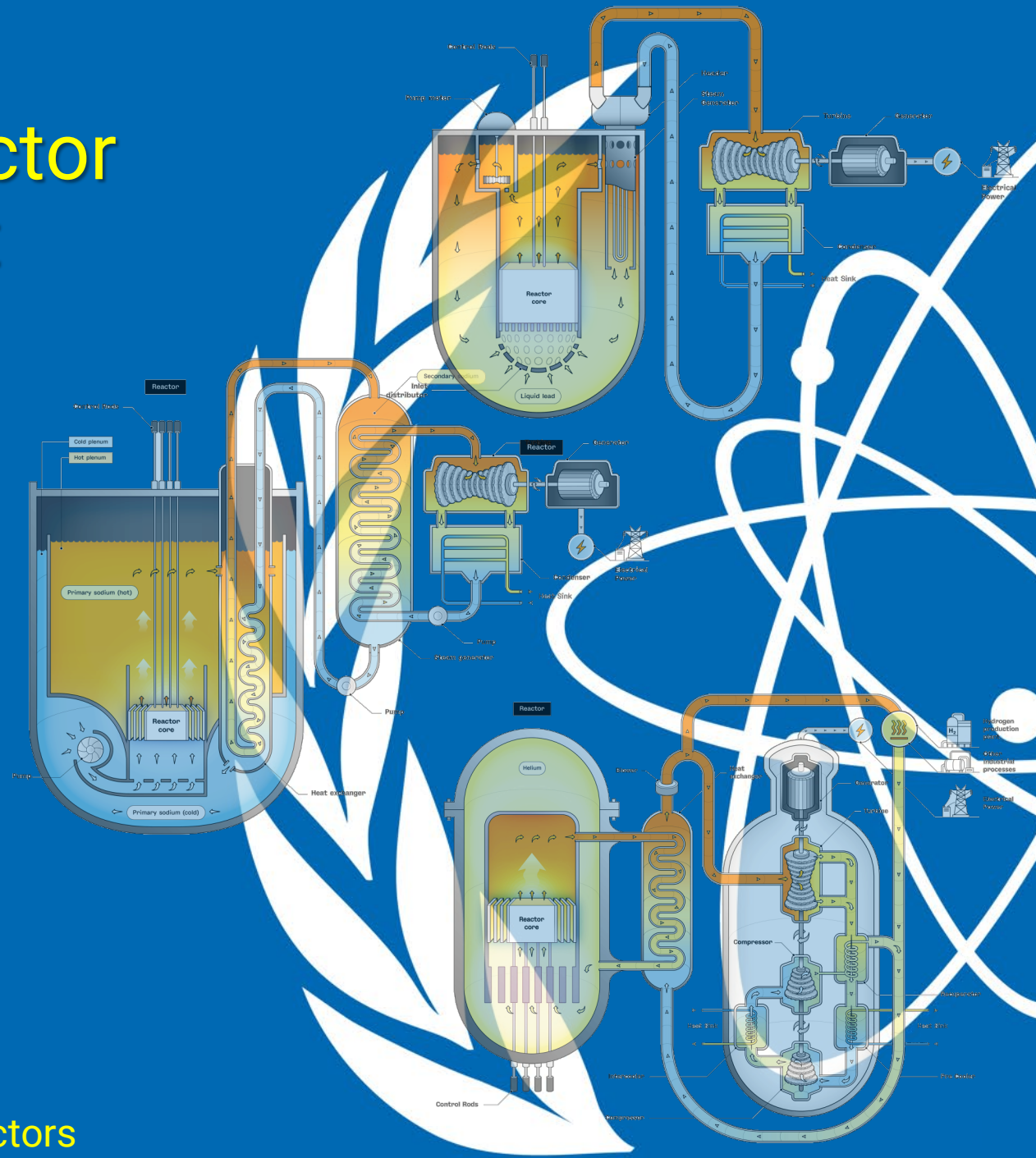
International Atomic Energy Agency

IAEA Technical Meeting on
Advances and Innovations in
Fast Reactor Design and Technology
29 September – 3 October 2025, IAEA, Vienna



https://www.iaea.org/topics/fast-reactors

Outline

- Fast Reactors: World Status
  - in Operation
  - under Construction
  - in Development
  - IAEA Advanced Reactors Information System (**ARIS**)

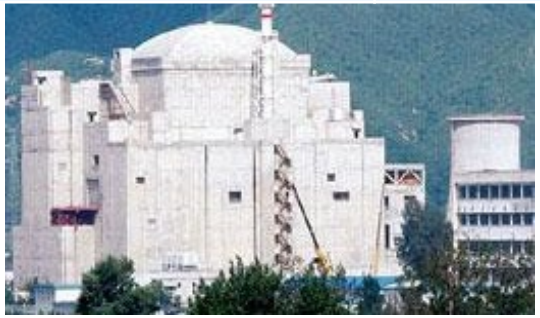
- ***FR26*** *International Conference on Fast Reactors and Related Fuel Cycles*

Fast Reactors in Operation & under Commissioning

Country	Name	Coolant	Fuel	Purpose	Power (th/e) MW	Year (Op.)	Status
Russia	BOR-60	sodium	UO_2	experimental	60/10	1969	operating
	BN-600	sodium	UO_2	prototype	1470/600	1980	operating
	BN-800	sodium	UO_2/MOX	commercial	2100/880	2015	operating
China	CEFR	sodium	UO_2	experimental	65/20	2011	operating
	CFR600-1	sodium	UO_2/MOX	prototype	1500/650	2023	operating
India	FBTR	sodium	UO_2	experimental	40/13	1985	operating
	PFBR	sodium	UO_2	prototype	1250/500	2026	commissioning
Japan	JOYO	sodium	UO_2/MOX	experimental	100/--	1978	lic renew (2026)

BN-600, Russia, 1980

BN-800
Russia, 2015

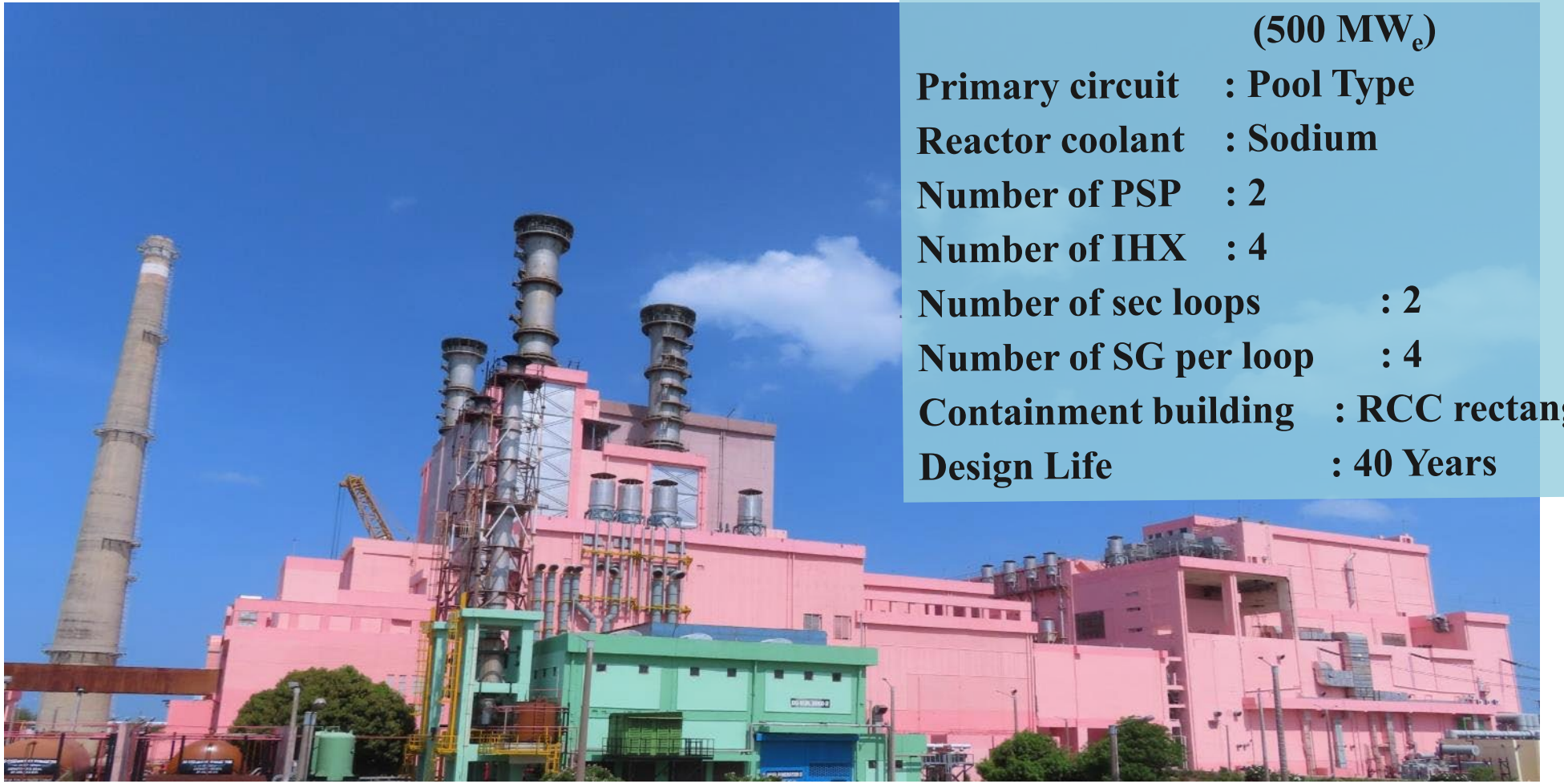


CEFR, 20 MW(e)
China, 2011

FBTR, 13 MW(e)
India, 1985

PFBR, 500 MW(e)
India, 2024

PFBR: Prototype Fast Breeder Reactor (India)



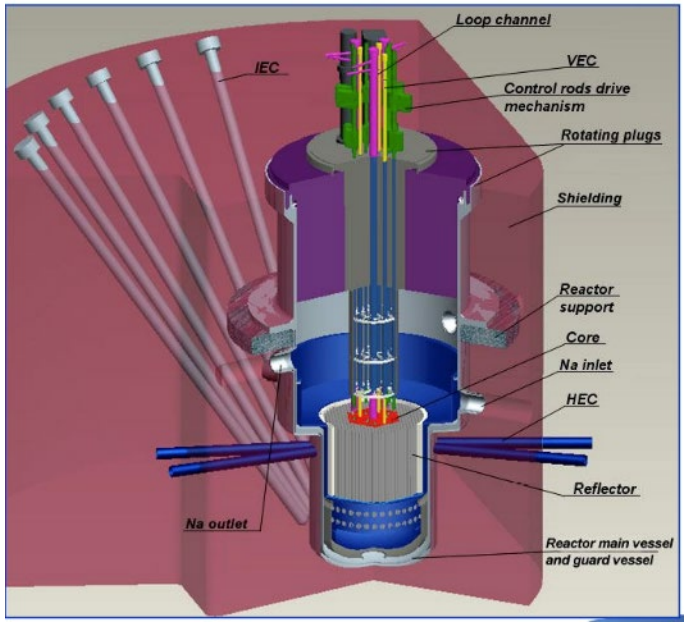
Power	: 1250 MW_t (500 MW_e)
Primary circuit	: Pool Type
Reactor coolant	: Sodium
Number of PSP	: 2
Number of IHX	: 4
Number of sec loops	: 2
Number of SG per loop	: 4
Containment building	: RCC rectangular shape
Design Life	: 40 Years

As presented by Mr Uppala at TWG-FR Meeting in June 2025

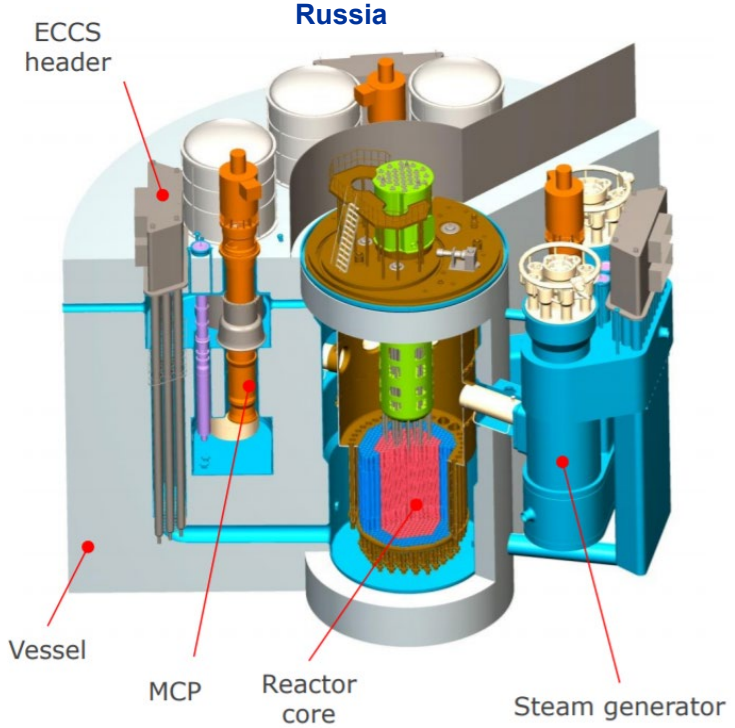
Fast Reactors under Construction

Country	Name	Coolant	Fuel	Purpose	Power, MW(th/e)	Year (Op.)	Status
Russia	MBIR	sodium	MOX	experimental	**150/50**	~2028	construction
	BREST-OD-300	lead	PuN/UN	demonstrator	**700/300**	~2026	construction
China	CFR600-2	sodium	UO_2/MOX	prototype	**1500/650**	~2028	construction

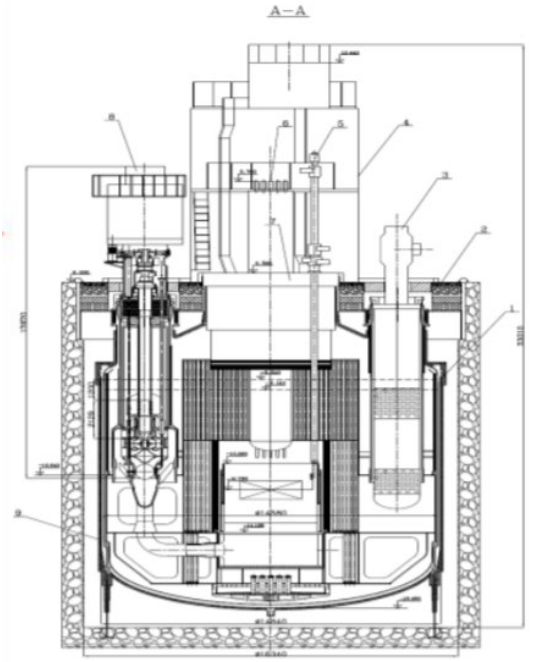
MBIR, Russia



BREST-OD-300
Russia



CFR600, China

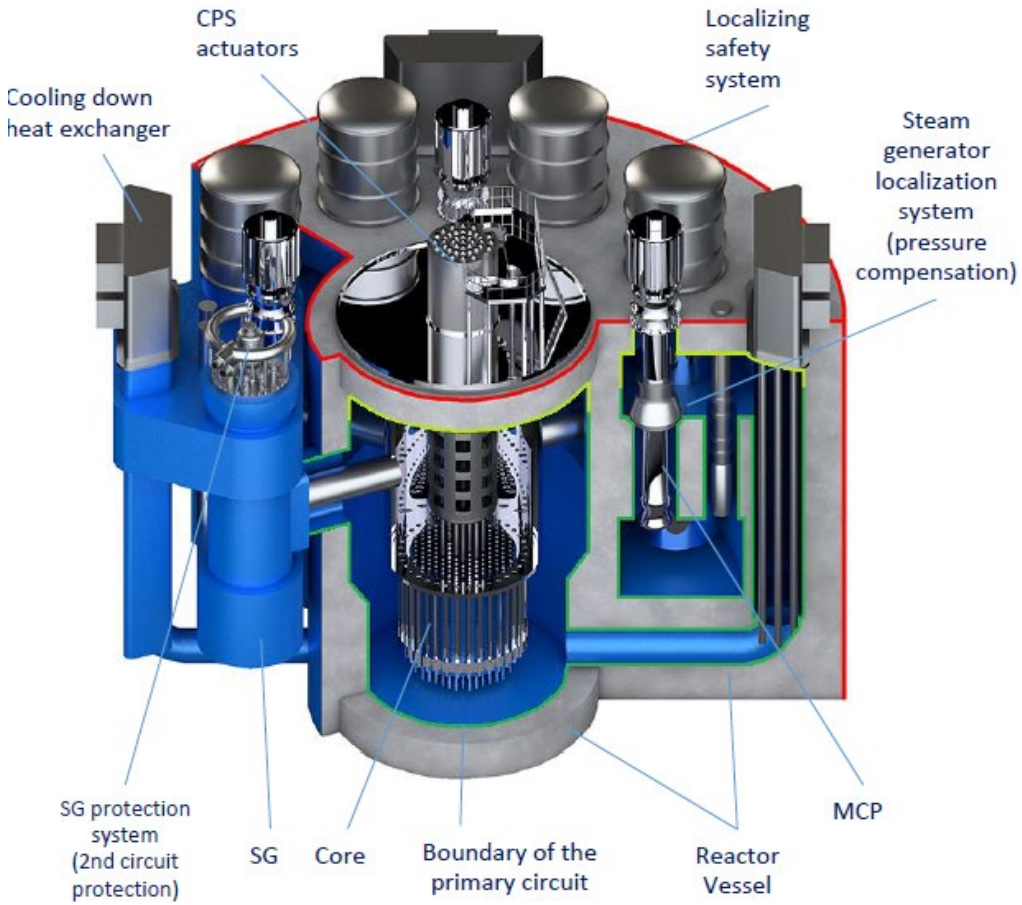


As presented by Ms Y. Kyzina at TWG-FR Meeting in June 2025

Status of BREST-OD-300

Construction status at PDEC site (December 2023)
Mounting of the BREST-OD-300 reactor began

The lower tier of the enclosing structure was immersed in the reactor shaft (December 2023)



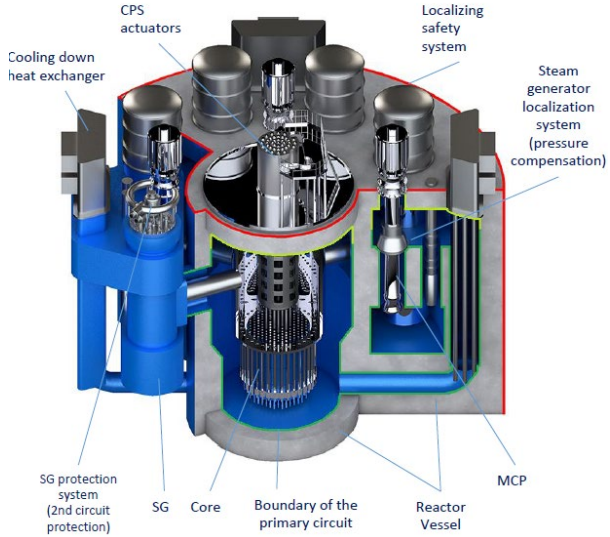
2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030

Construction and commissioning of the ***Fuel (re-) fabrication module***

Equipment manufacturing, construction of the nuclear power plant with the ***BREST-OD-300 lead-cooled fast reactor***

Construction and commissioning of the ***Reprocessing module***

BREST-OD-300 (April 2024)



2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030

Construction and commissioning of the ***Fuel (re-) fabrication module***

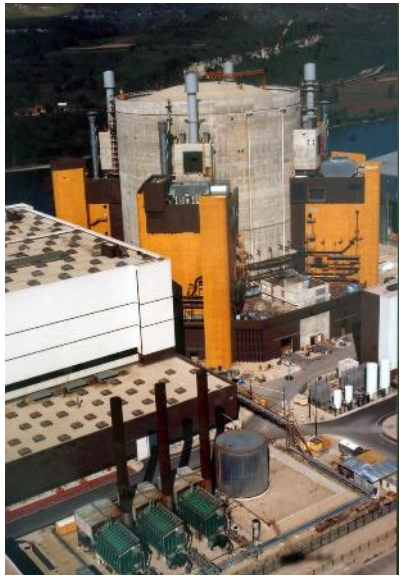
Equipment manufacturing, construction of the nuclear power plant with the ***BREST-OD-300 lead-cooled fast reactor***

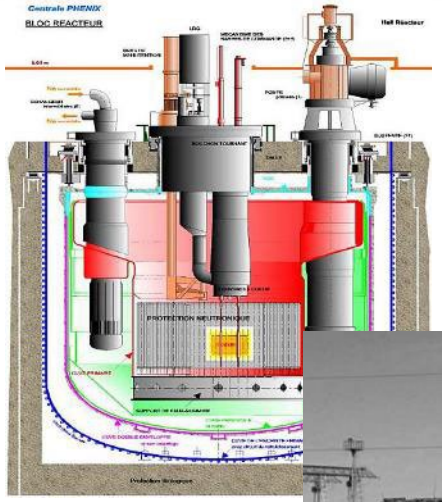
Construction and commissioning of the ***Reprocessing module***

Fast Reactors under Decommissioning

Country	Name	Coolant	Fuel	Purpose	Power, MW(th/e)	Year (Op.)	Status
France	Phenix	sodium	UO_2	prototype	590/250	1973	decommissioning
	Superphenix	sodium	UO_2	FOAK	3000/1242	1986	decommissioning
Japan	MONJU	sodium	MOX	prototype	714/280	1994	decommissioning
USA	FFTF	sodium	UO_2	experimental	400/--	1980	decommissioning
Kazakhstan	BN-350	sodium	UO_2	prototype	1000/350	1973	decommissioning

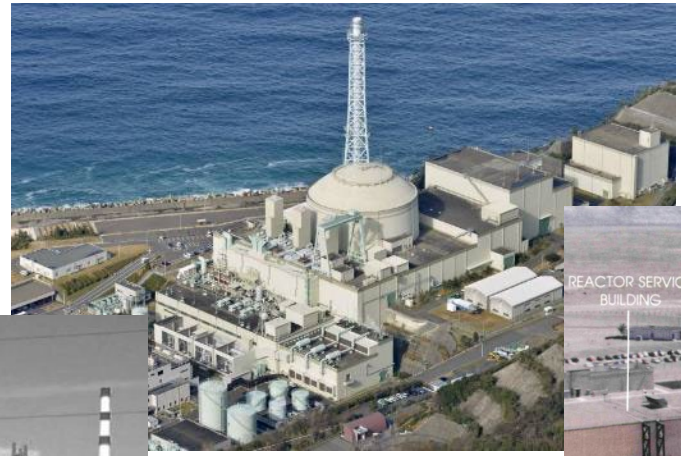
Superphenix, France





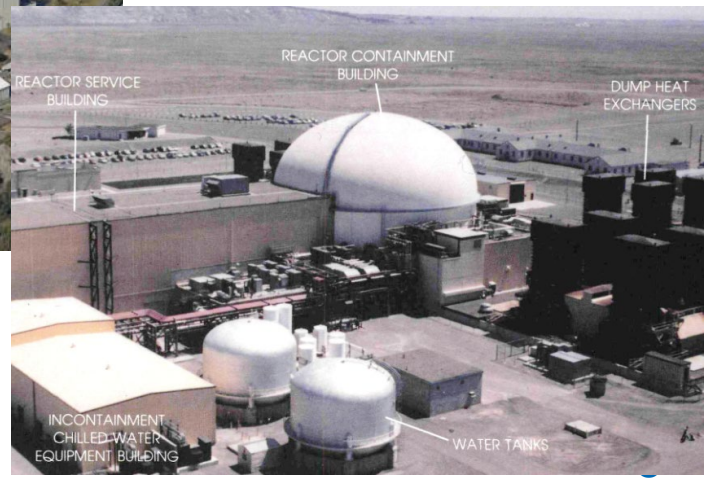
Phenix, France

BN-350, Kazakhstan



MONJU, Japan

FFTF, USA



Innovative SFRs under Development and Design

Country	Name	fuel	Purpose	Power (th/e), MW	Status
Russia	BN-1200	PuN/UN/MOX	Gen-IV, industrial	2900/1220	design
China	CFR1200	MOX	Gen-IV, industrial	2800/1200	design
	CiFR1000	U-Pu-Zr	Gen-IV, industrial	2800/1000-1200	design
France	ASTRID	MOX	demonstrator	1500/600	suspended
	HEXANA	MOX	SMR prototype	2x400/Flexible	concept
	OTRERA		AMR prototype	295/110	concept
EU	ESFR	MOX, (U,Pu)Zr	Gen-IV prototype or AMR	3600/1500 360/150	concept
India	FBTR-2	U-Zr	experimental/SMR	320/100	concept
	FBR 1&2	MOX	prototype	1250/500	design
R. of Korea	KALIMER-600		GEN-IV, prototype	1523/600	design
	PGSFR	U-Zr/U-TRU-Zr	GEN-IV, prototype	400/150	suspended
	SALUS-100		AMR prototype	267/100	design
USA	NATRIUM	U-Zr	demonstrator	1000/345-500	design
	VTR	U-Pu-Zr?	experimental	300/-	design
	ARC-100	U-Zr	demonstrator	260/100	Concept
	Oklo	U-Pu-Zr	demonstrator	/15-50	concept

Innovative LFRs under Development and Design

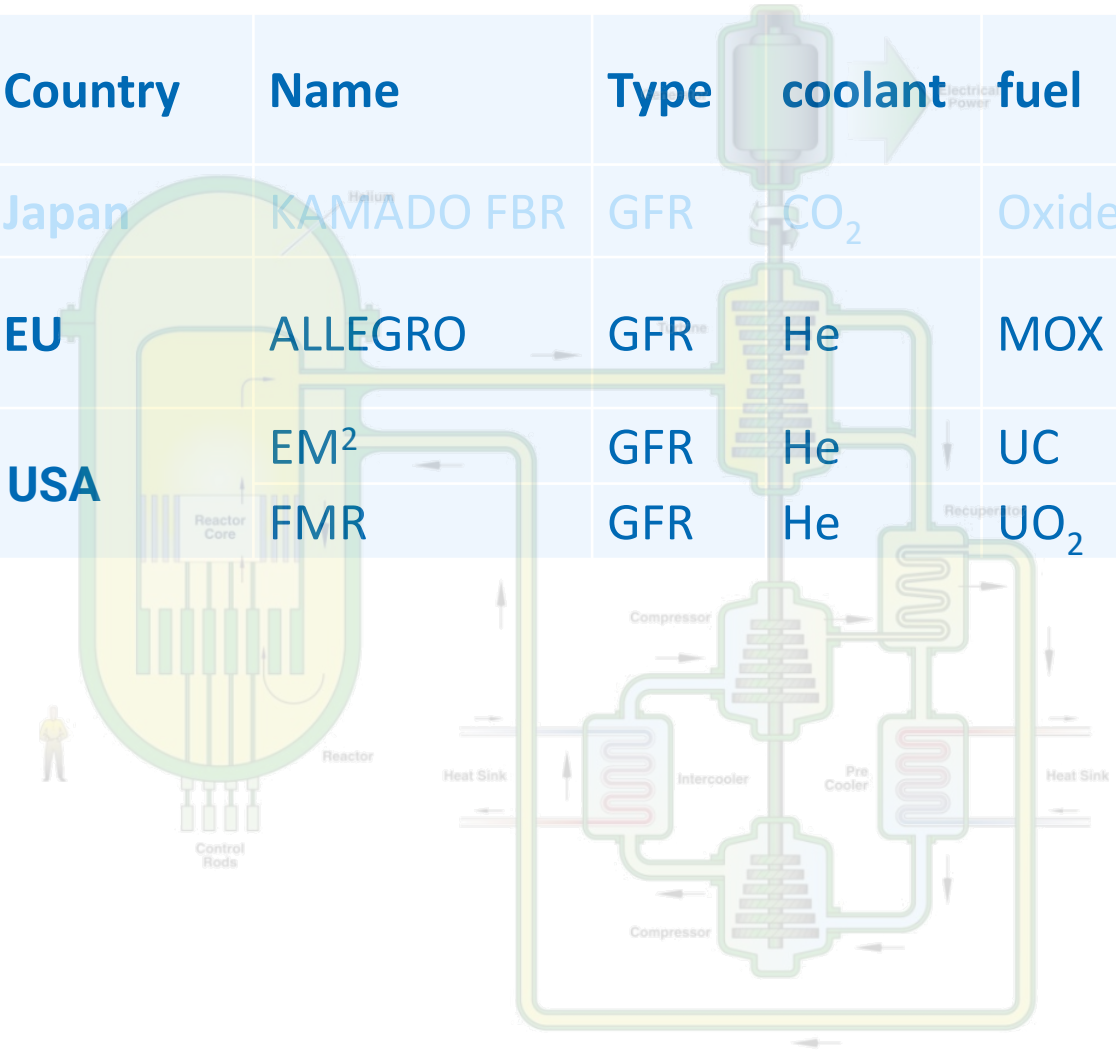
Country	Name	Type	coolant	fuel	Purpose	Power (th/e), MW	Status
Russia	SVBR-100	LFR	LBE	UO_2	prototype	280/100	design
China	CLFR-300	LFR	LBE/Pb		demonstrator	740/300	concept
	CLEAR-I	LFR	LBE	UO_2	experimental	10/-	design
	CLEAR-M10d	LFR	Pb	UO_2	demonstrator	25/10	concept
Belgium	MYRRHA	LFR ADS	LBE	MOX	experimental	100/-	design
Italy + EU	LFR-AS-30/200 (newcleo)	LFR	Pb	MOX	Experimental /prototype	/30 or /200	concept
Romania /Italy + EU	ALFRED	LFR	Pb	MOX	Gen-IV, industrial	300/120	design
EU	EAGLES-300	LFR	Pb	MOX	Gen-IV, demonstrator	900?/350	concept
Sweden	SEALER-55	LFR	Pb	UN(?)	demonstrator	140/55	design
USA	Westinghouse LFR	LFR	Pb	MOX	demonstrator	950/450	design
USA	SSTAR	LFR	Pb		experimental	45/20	suspended

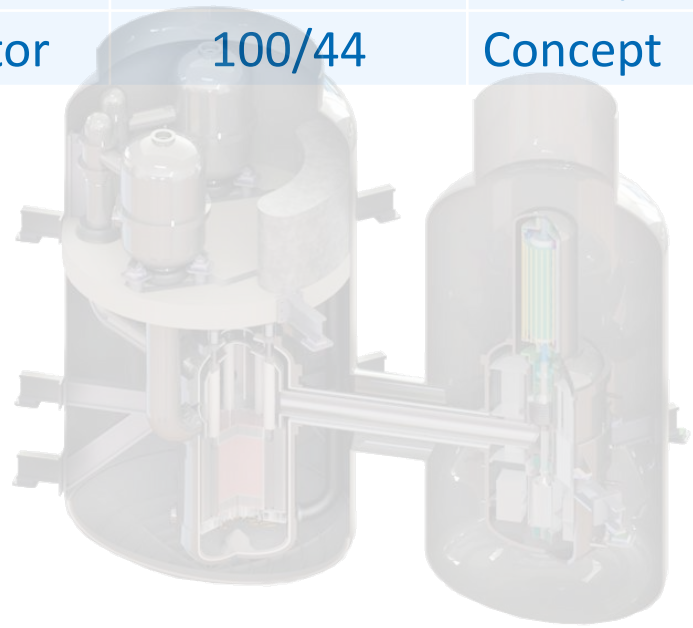
Gen-IV MSRs under Development and Design

Country	Name	Type	coolant	fuel	Purpose	Power (th/e), MW	Status
Canada	SSR-W	MSR	molten salt		demonstration	750/300	demo
France	MSFR	MSR	molten salt (LiF-AFn)		Gen-IV, prototype	3000/	concept
	STELLARIUM	MSR	NaCl		Prototype SMR	250/110	concept
	XS(A)MR (Naarea)	MSR	molten salt		Prototype SMR	80/40	concept
Netherlands /EU	Thorison	MSR	molten salt		Prototype SMR	250/100	concept
Russia	MOSART	MSR	molten salt		prototype	2400/	concept
USA	MCFR	MSR	NaCl		experimental	1800/800	design

Innovative GFRs under Development and Design

Country	Name	Type	coolant	fuel	Purpose	Power (th/e), MW	Status
Japan	KAMADO FBR	GFR	CO_2	Oxide	demonstrator	3000/1000	Concept
EU	ALLEGRO	GFR	He	MOX	Gen-IV, demonstrator	75/-	design
USA	EM^2	GFR	He	UC	demonstrator	500/265	Concept
	FMR	GFR	He	UO_2	demonstrator	100/44	Concept





Advanced Reactors Information System (ARIS)

Designs in ARIS	Design Organizations	Countries
127	> 75	~25

Web accessible database and a tool for Member States at various stages of nuclear power development, offering standardized, impartial data on reactor designs, including evolutionary and innovative concepts, to support informed reactor technology assessments

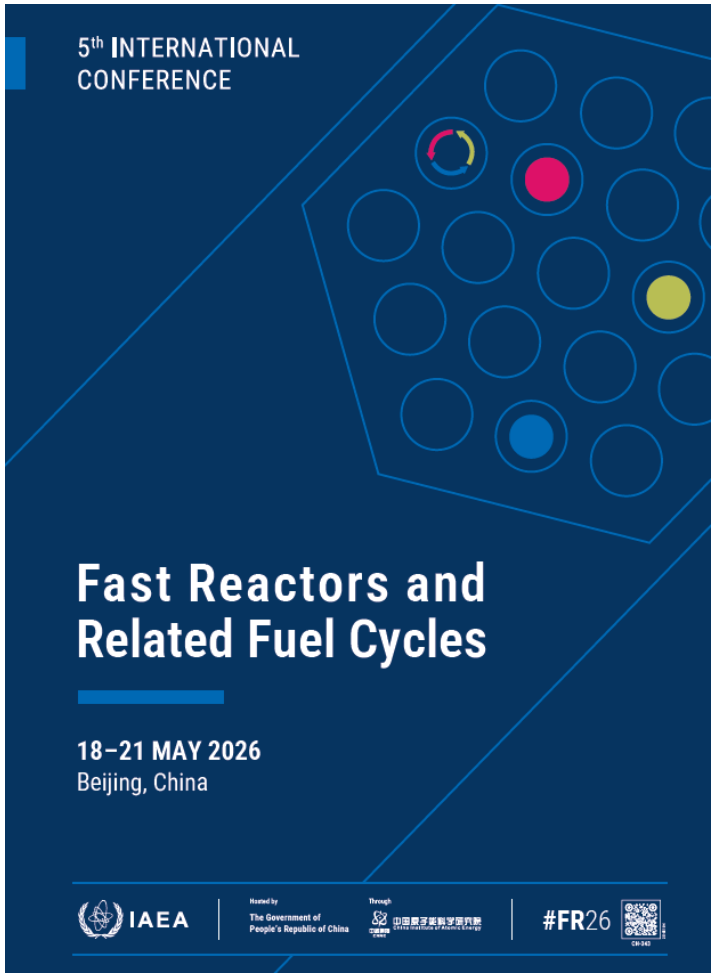
Access online: Advanced Reactor Information System | ARIS

IAEA Conferences on Fast Reactors and Related Fuel Cycles

FR22

DG Grossi opens FR22

Mr Bhaduri,
FR22 General Chair



FR26 in Beijing

- Hosted by CIAE
- 18 - 21 May 2026

IAEA

Atoms for peace and Development…

Thank You!

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