

Research Reactor Fuel Cycle Issues (small additions)

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Conversion of the reactors from HEU to LEU

- Now all countries announced about their intentions to reduce enrichment not only in foreign reactors but in **domestic (!)** reactors too.
- But for more important high-flux reactors the process is only at the feasibility study.

HIGH FLUX REACTORS USING HEU OR PLUTONIUM FUEL

1	Belgium	BR-2
2	France	HFR
3	France	ORPHEE
4	Germany	FRM II
5	U.S.A.	ATR
6	U.S.A.	HFIR
7	U.S.A.	NBSR
8	U.S.A.	MITR-II MASS. INST. TECH.
9	U.S.A.	MURR UNIV. OF MISSOURI
10	China	HFETR
11	Russia	BOR-60 (+Pu)
12	Russia	IR-8
13	Russia	IVV-2M
14	Russia	MIR.M1
15	Russia	SM
16	Russia	WWR-M
17	Japan	JOYO (Pu)

REACTORS UNDER CONSTRUCTION OR PLANNING TO USE HEU OR PLUTONIUM FUEL

1	China	CEFR
2	Russia	PIK
3	France	RJH
4	Russia	MBIR

MBIR reactor (main ideas)

- Fast reactor
- Sodium cooling
- Power - 150 MW
- Fast neutron flux $5 \cdot 10^{15}$
- Several loops for different coolant
- Start of the operation - 2017



Repatriation of the HEU Russian-origin fuel (Russian Research Reactor Fuel Return (RRRFR) Programme)

Country	Year	Fuel		Reactor status
		Fresh	Irradiated	
Serbia	2002	+		Shutdown
Romania	2003	+		Shutdown
Bulgaria	2003	+		Under reconstruction
Libya	2004,2006	+		Operation
Uzbekistan	2004	+		Operation
Czech Republic	2004,2005	+		Operation
Latvia	2005	+		Shutdown
Uzbekistan	2006		+	Operation
Poland	2006	+		Operation
Germany	2006	+		Shutdown
Poland	2007	+		Operation
Vietnam	2007	+		Operation
Czech Republic	2007		+	Operation
Latvia	2008		+	Shutdown
Bulgaria	2008		+	Under reconstruction
Hungary	2008		+	Operation

Plans of the repatriation of the HEU Russian-origin fuel

Country	Year	Fuel		Reactor status
		Fresh	Irradiated	
Ukraine	2009		+	Operation
Poland	2009		+	Operation
Belarus	2009		+	Shutdown
Romania	2009		+	Shutdown
Libya	2009		+	Operation
Kazakhstan			+	Operation
Serbia			+	Shutdown
Vietnam			+	Operation
DPRK		+	+	Operation (?)