



Trend of SFM and Storage in Eastern Europe

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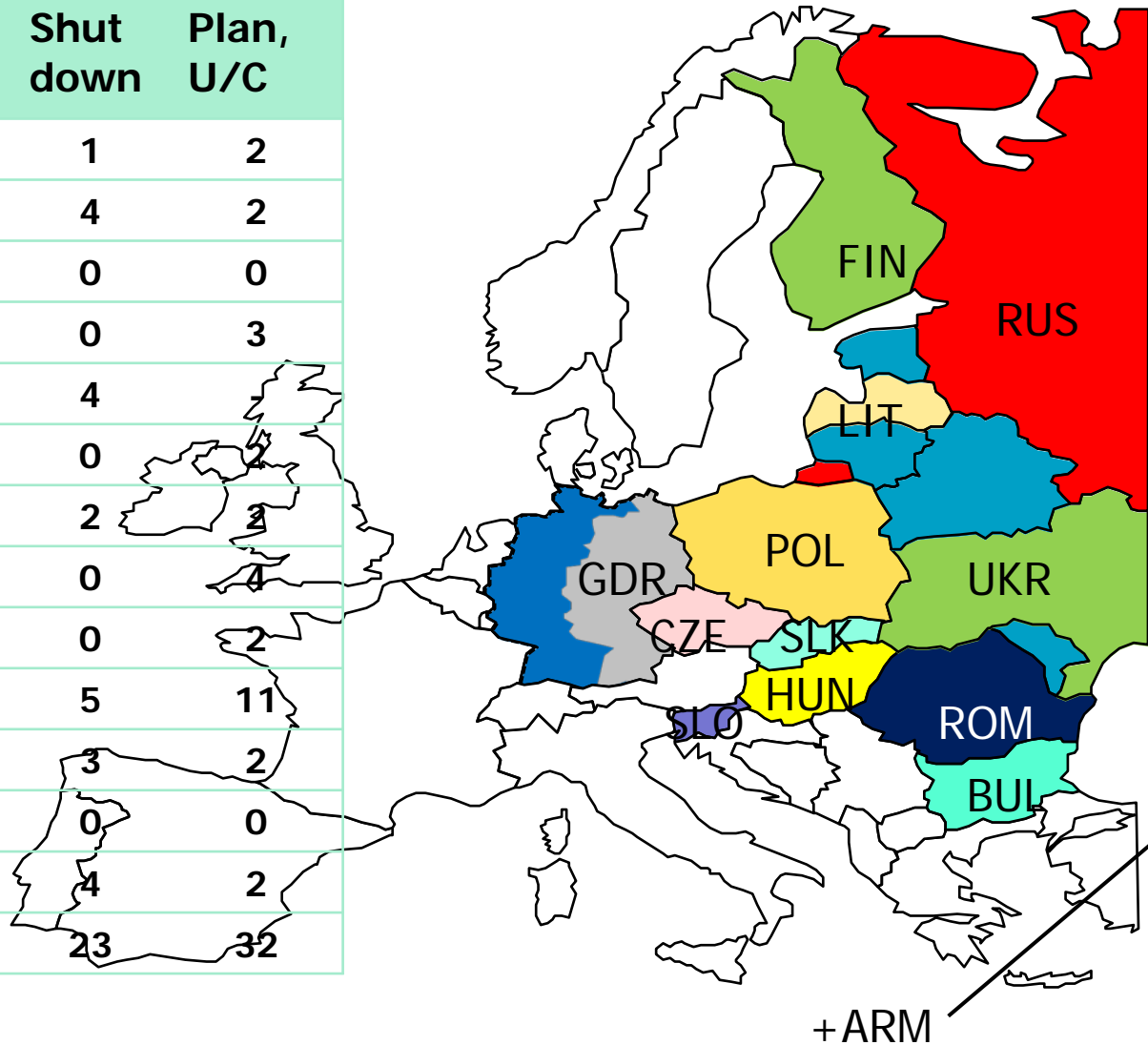


Structure

- Introduction
 - Number of NPPs
 - SF facilities
 - SF amounts
- Individual country updates

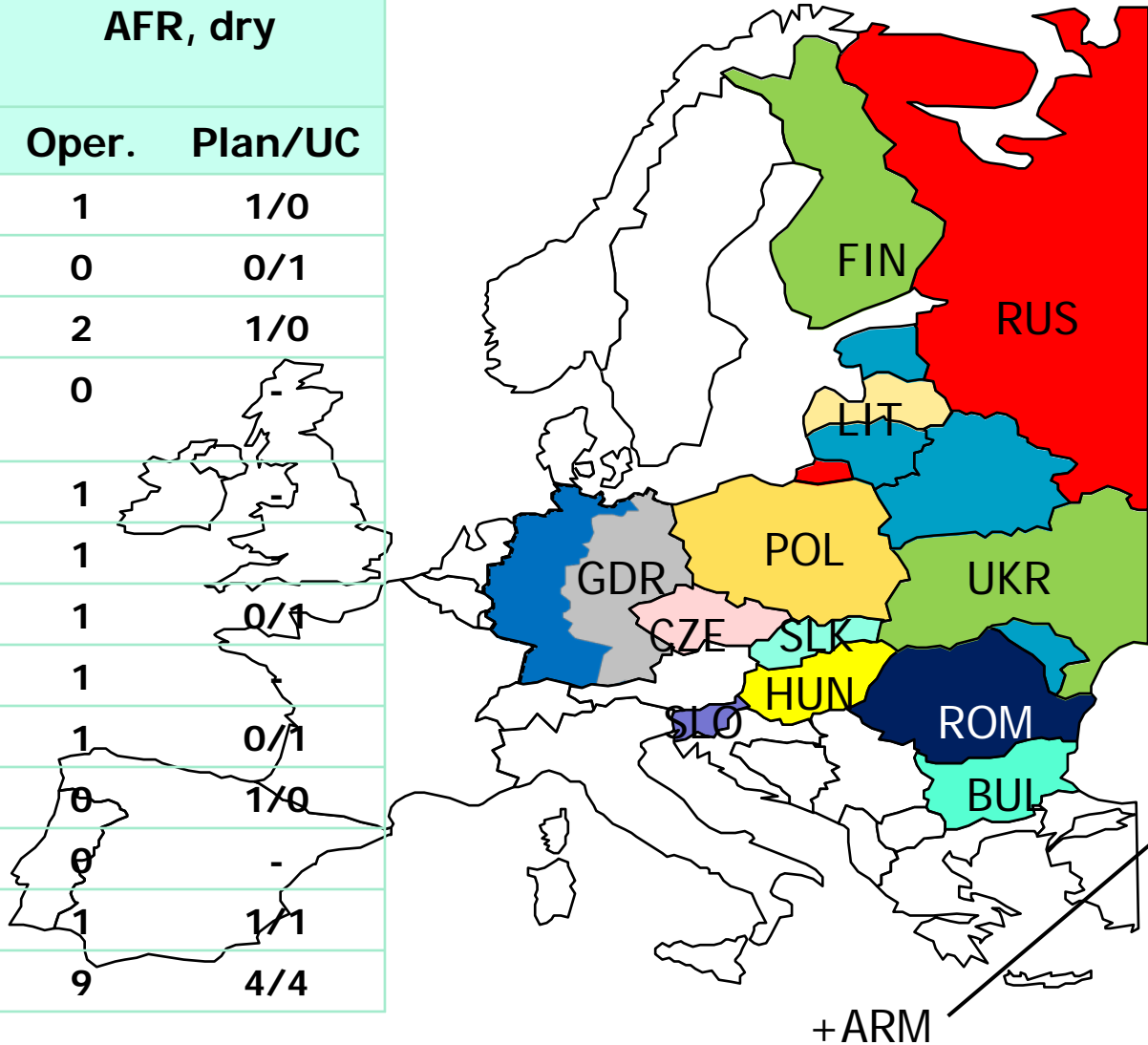
Introduction, NPPs of the Region

No	Country	Operating	Shut down	Plan, U/C
1	ARM	1	1	2
2	BUL	2	4	2
3	CZE	6	0	0
4	FIN	4 (2 RUS)	0	3
5	GDR	0	4	
6	HUN	4	0	
7	LIT	0	2	
8	POL	0	0	
9	ROM	2	0	2
10	RUS	32	5	11
11	SLK	4	3	2
12	SLO/CRO	1	0	0
13	UKR	15	4	2
Total:		69 (71)	23	32



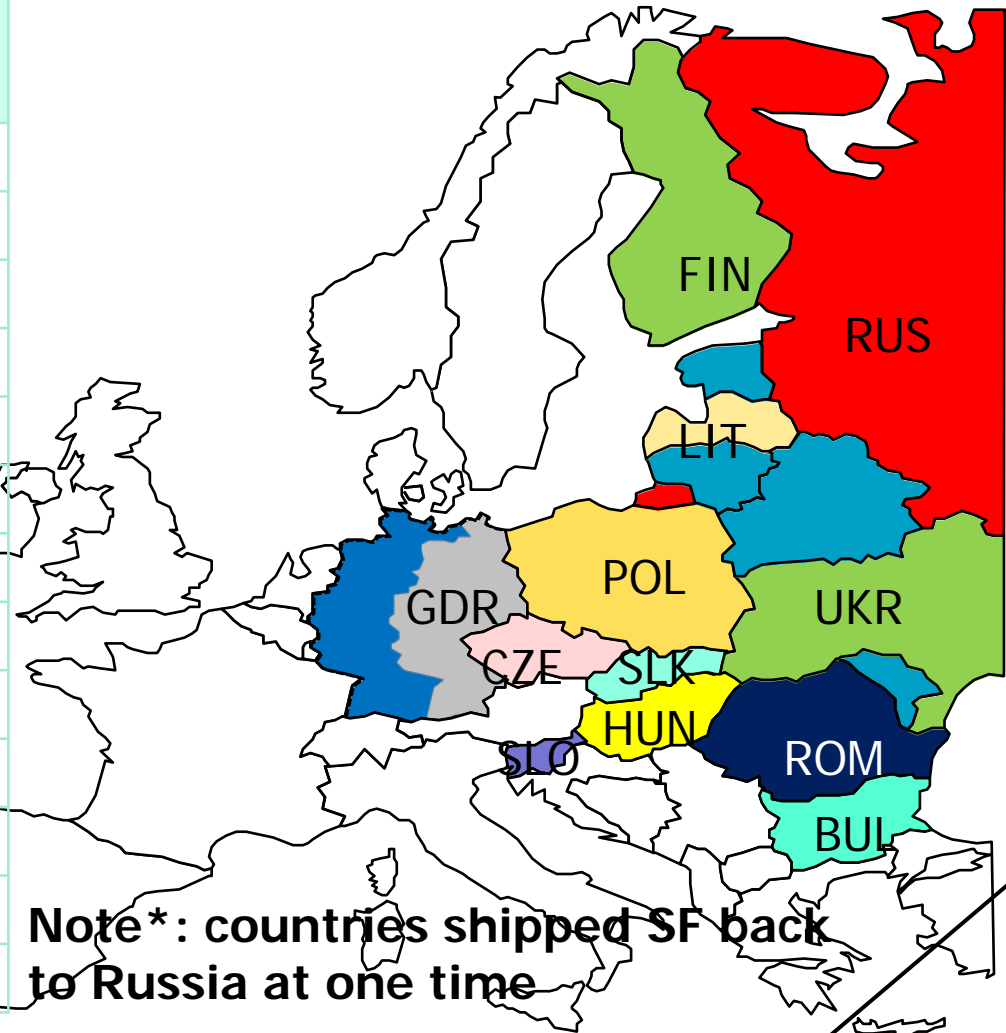
Introduction, SF facilities

Country	AR Pools	AFR, wet	AFR, dry	
			Oper.	Plan/UC
ARM	✓	0	1	1/0
BUL	✓	1	0	0/1
CZE	✓	0	2	1/0
FIN (WWER)	✓	1	0	-
GDR	✓	1	1	-
HUN	✓	0	1	-
LIT	✓	1	1	0/1
ROM	✓	0	1	-
RUS	✓	7	1	0/1
SLK	✓	1	0	1/0
SLO/CRO	✓	0	0	-
UKR	✓	1	1	1/1
Total:	-	13	9	4/4



Introduction, SF amounts, tHM

Country	AR Pools	AFR, wet	AFR, dry
ARM*	60	-	75
BUL*	380	500	-
CZE	630	-	750
FIN*	55	375	-
GDR*	0	0	583
HUN*	230	-	750
LIT	200	1000	700
ROM	750	-	433
RUS	8.000	28.500	10
SLK*	400	900	0
SLO/CRO	360	-	-
UKR*	5.000	1980	750
Total:	16.065	33.255	4.051



Armenia

- 1 reactor operating, pool of second unit is also used
- 11 NUHOMS-56V modules constructed (616 FA in store)
- Approximate quantity of additional SNF (if operation of Unit 2 will be continued up to 2016) is 1988 FA
- Extension with further 36 modules is required
- Shipment to Russia = ?



Bulgaria

- 2 reactors and an AFR pool operate at Kozloduy
- 4 units shut down, 2 operate in Kozloduy, 2 under construction at Belene
- AFR with baskets of 30 W-440 or 12 W-1000 assemblies
- EBRD order for 34 CONSTOR W-440 casks, later extended with 38 more casks, this facility for 700tHM is expected to be finished in 2011
- Further expansion to accommodate 8000 W-440 and 2500 W-1000 assemblies is envisaged



Czech Republic

Dukovany

- 4 compacted AR pools
- ISFSF: 60 CASTOR casks (600 tHM)
- SFSF: 133 CASTOR casks (1340 tHM)

■ Temelin

- AR capacity until 2014 (12 yrs)
- Dry store: capacity 1370 t expected in 2010 – contract for 35 CASTOR casks



Finland (WWERs)

- Loviisa
 - An AR pool at each reactor unit
 - An AFR wet storage facility at the NPP - multiple extensions
 - Basket type pool storage at the NPP 57.6 tHM – full
 - Rack type storage, capacity: 433 tHM, 95% full



Germany (former GDR)

- All units shut down, decommissioning is ongoing
- All fuel moved to AFR wet storage in Greifswald
- ZAB: 560 tHM, emptied in 2006
- ZLN: 583 tHM



Hungary

- AR pools at 4 WWER-440 units
- AFR MVDS with 16 modules
- At present 6487 assemblies are stored there. This corresponds to 752.5 tHM
- Further extension with 4 increased capacity modules



Lithuania

- 2 RBMK units are now being decommissioned
 - Pools: Unit 2 – 225 tHM
AFR – 1065 tHM
 - Unloading into dry casks until 2016
- Dry store:
 - 20 CASTOR RBMK casks and 78 CONSTOR RBMK casks,
 - Further 22 CONSTOR casks in future
 - New ISFSF to operate from 2011



Romania

- AR pools for up to 7 years
- Transfer to a Macstor dry storage facility
- The first module was commissioned in 2003
- The facility capacity is designed as 12.000 fuel bundle per module
- Three modules in operation. Final capacity: 27 modules



Russia

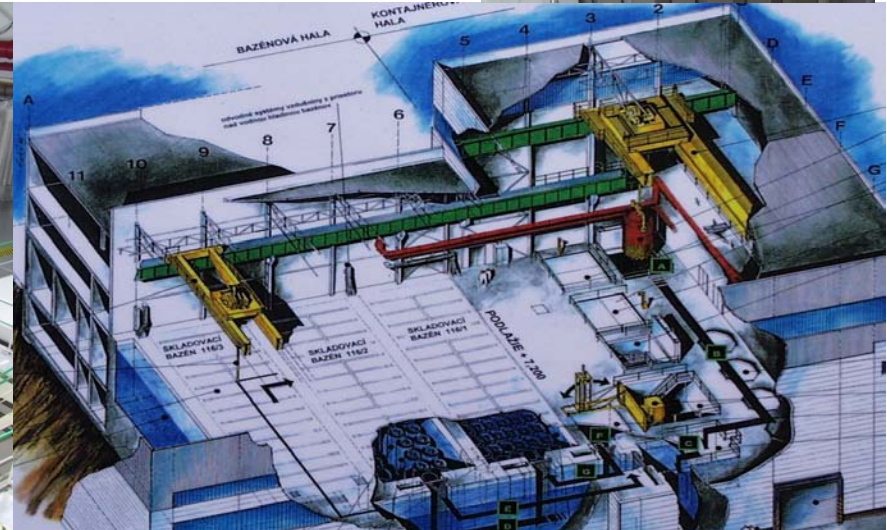
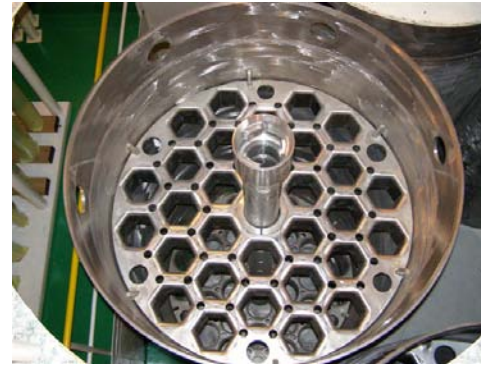
- AR pools at all units
- 6 AFR pools:
 - 4 pools at NPPs (12.500 tHM)
 - 2 pools at reproc. plants (16.000 tHM)
- New dry store at MCC (8600 t)
- Further pool capacity increases and extension of dry store
- Reprocessing of W-440 fuel continues



ISSF2010

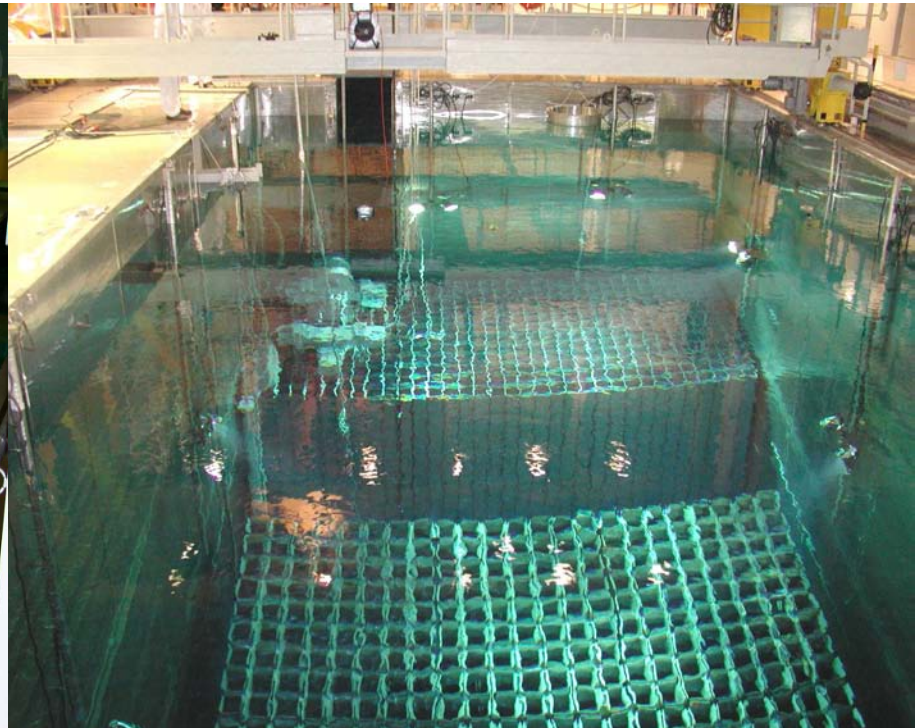
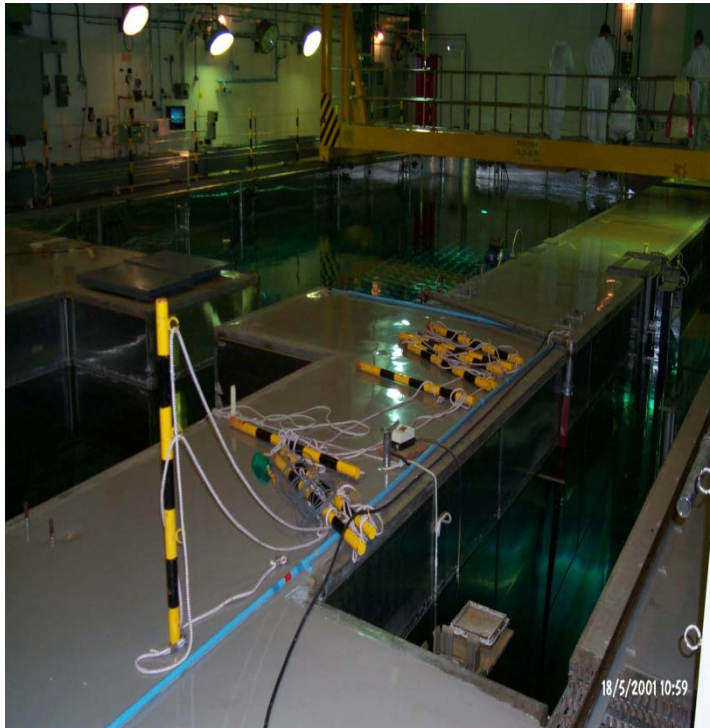
Slovakia

- 2 W-440 Units and A-1 shut down
- 4 units operational, 2 under constr.
- AFR pool at EBO:
 - capacity expansion: modification of storage baskets
 - Total capacity: 1680 t



Slovenia

- Single unit NPP
- Three region storage pool (fresh, 13 GWd, 41GWd)
- High density rack – capacity sufficient until 2023, 55% full



Ukraine

- AR pools at all units (15)
- AFR pool at Chernobyl (420t)
- AFR dry stores
 - VSC at Zaporozhye (700 t)
 - Holtec/NUHOMS at Chernobyl (2000 tHM)





Conclusions

- Russian supplied reactors are dominating in Central and Eastern Europe
- National strategies are deferring the back end of fuel cycle decision („wait and see“)
- Storage times are increasing
- Fuel is stored predominantly under water
 - Wet storage mostly at the reprocessing plants
 - Some AFRs are being emptied into dry stores
- Dry storage is becoming a common solution



**THANK YOU FOR YOUR
ATTENTION**

QUESTIONS?