THE XI INTERNATIONAL FORUM «ATOMEXPO 2019»
Roundtable : “Responsible approach to the environment and natural resources”

ГОСУДАРСТВЕННАЯ КОРПОРАЦИЯ ПО АТОМНОЙ ЭНЕРГИИ «РОСАТОМ»

SNF recycling : responsible approach to the SNF management from the point of view of environmental safety and preserving natural resources for the nuclear energy sustainable development

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In every industry, recycling is the rule today

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Recycling in Nuclear:

One kilogram of 4%-enriched fuel grade uranium releases energy equivalent to the combustion of nearly 100 tons of high grade coal or 60 tons of oil

Residual energy potential of 1 SFAs can generate energy sufficient to supply 12,000 households per year

Preserving natural resources:
Moving from open to mono recycle to multi recycle saves from 25% to ≈100% of natural uranium resources

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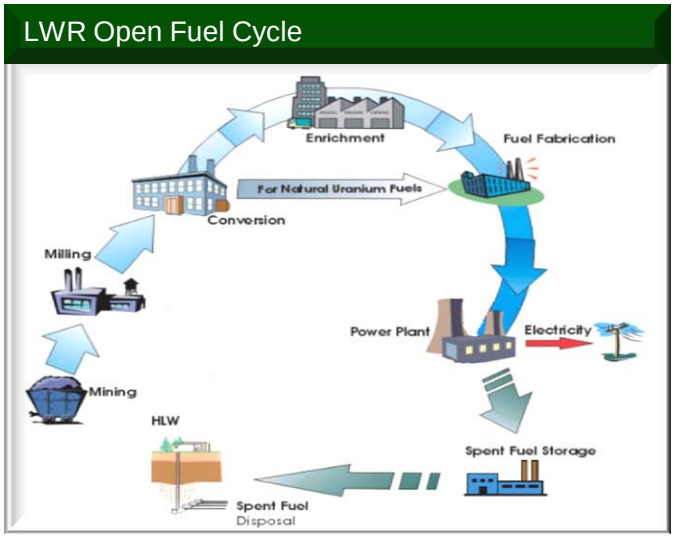
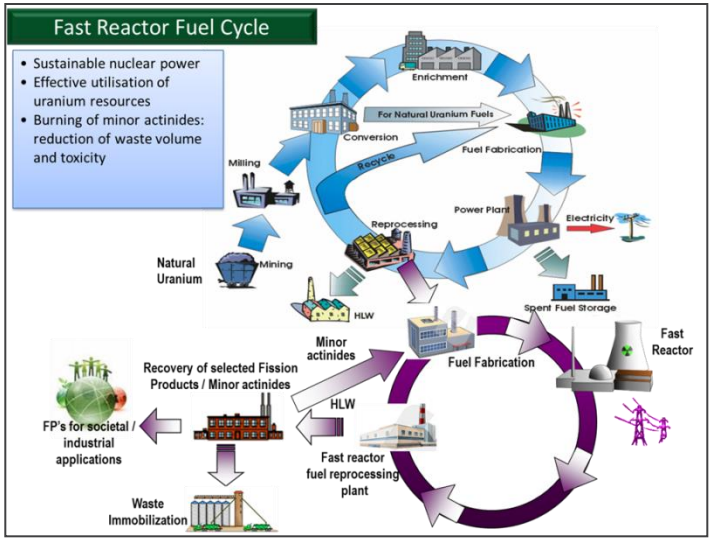
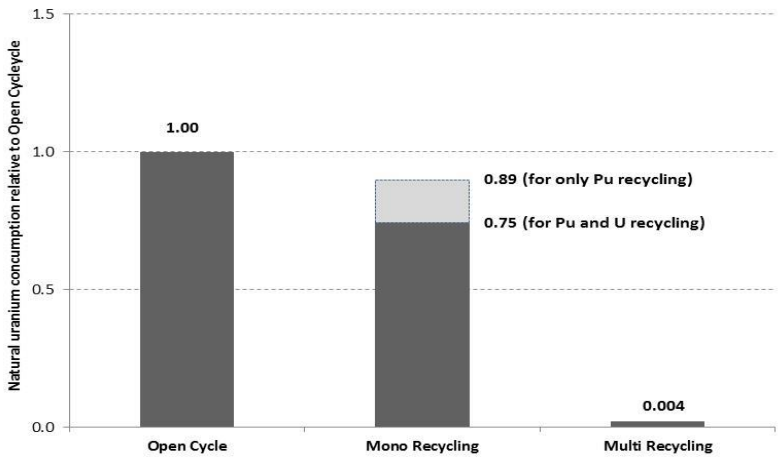
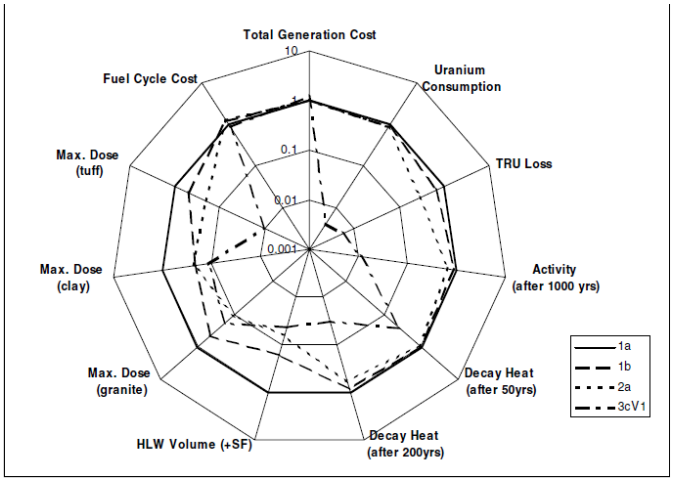






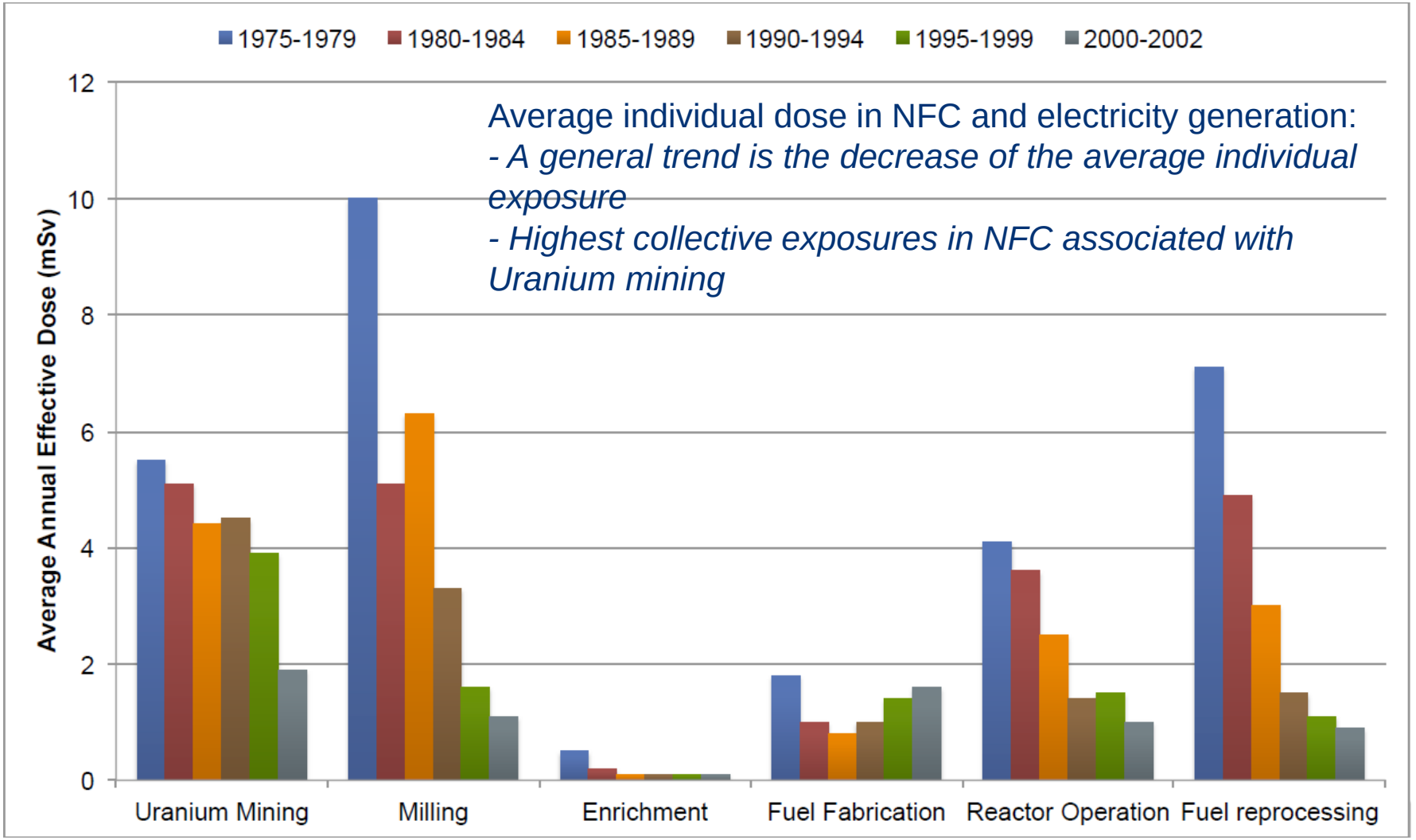


Note: 1a: once-through PWR scheme (reference); 1b: 100% PWRs, spent fuel reprocessed and Pu reused once; 2a: 100% PWR, spent fuel reprocessed and multiple reuse of Pu; 3cV1: 100% fast reactors and fully closed fuel cycle.

Advanced Nuclear Fuel Cycles and Radioactive Waste Management, OECD 2006

Public and environmental safety

Recycling SNF and closing nuclear fuel cycle : reduction the individual dose in nuclear fuel cycle through reduction uranium mining



UNSCEAR 2008 Vol. 1 , report provides estimates on workers' occupational exposures in various field of activities, including the use of atomic energy for electricity generation

The characteristics of the final waste :
Nuclear reprocessing and recycling reduce the volume of wastes, the long-term radiation hazard, and long-term heat capacity needed

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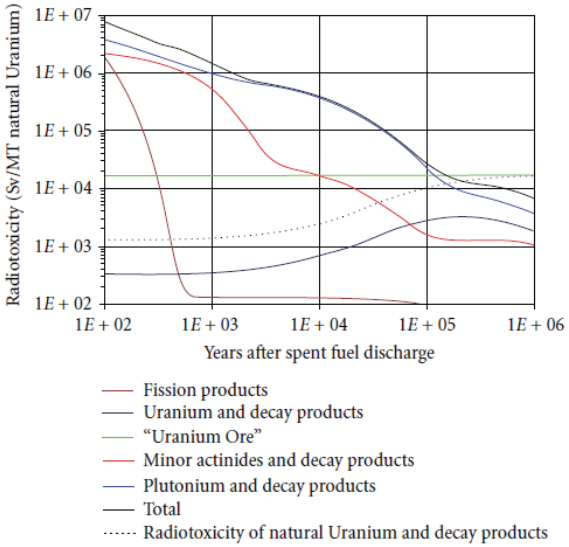
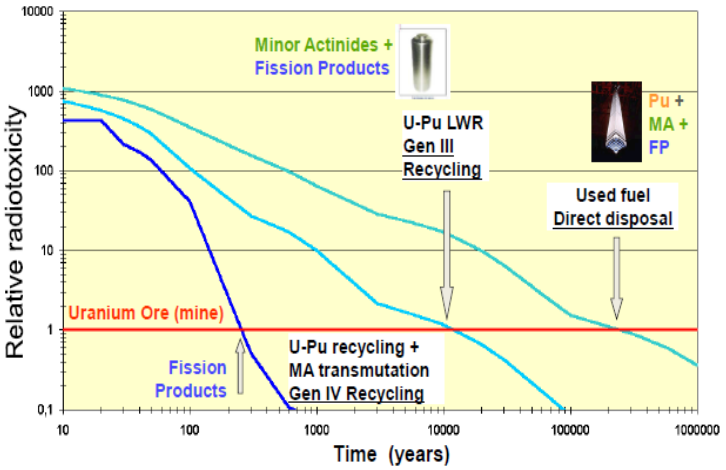
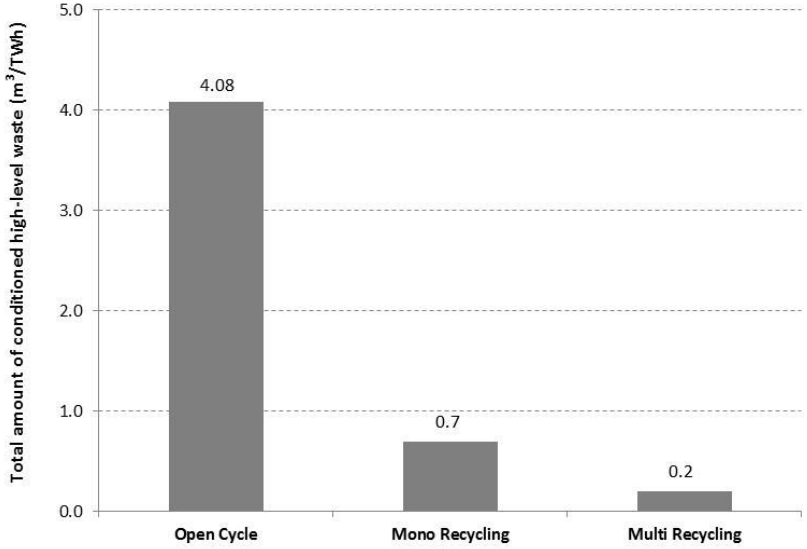
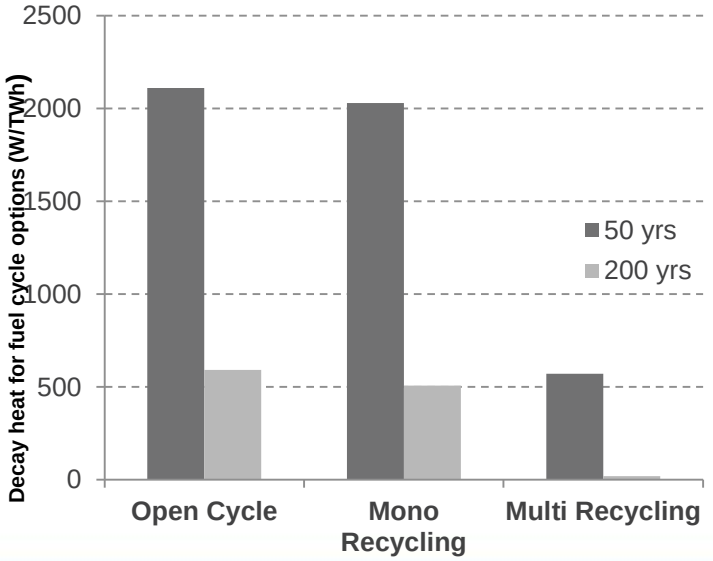


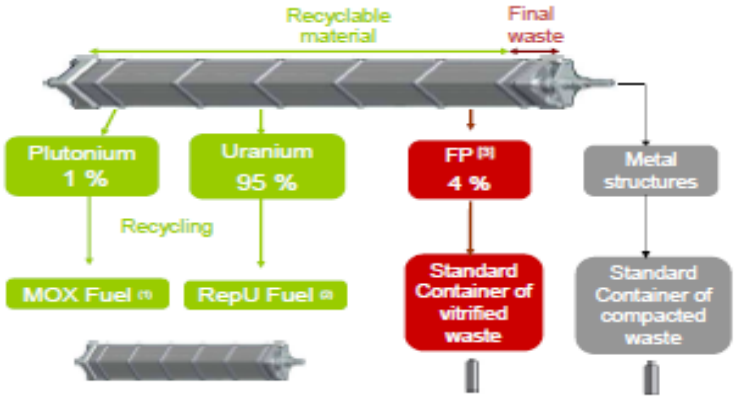




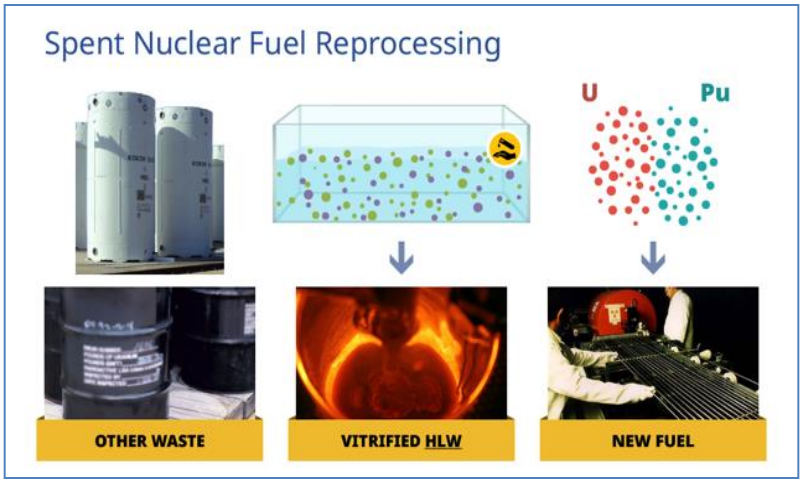


Advanced Nuclear Fuel Cycles and Radioactive Waste Management, OECD/NEA 2006

Reprocessing& Recycling today



World Map of MOX Fuel users



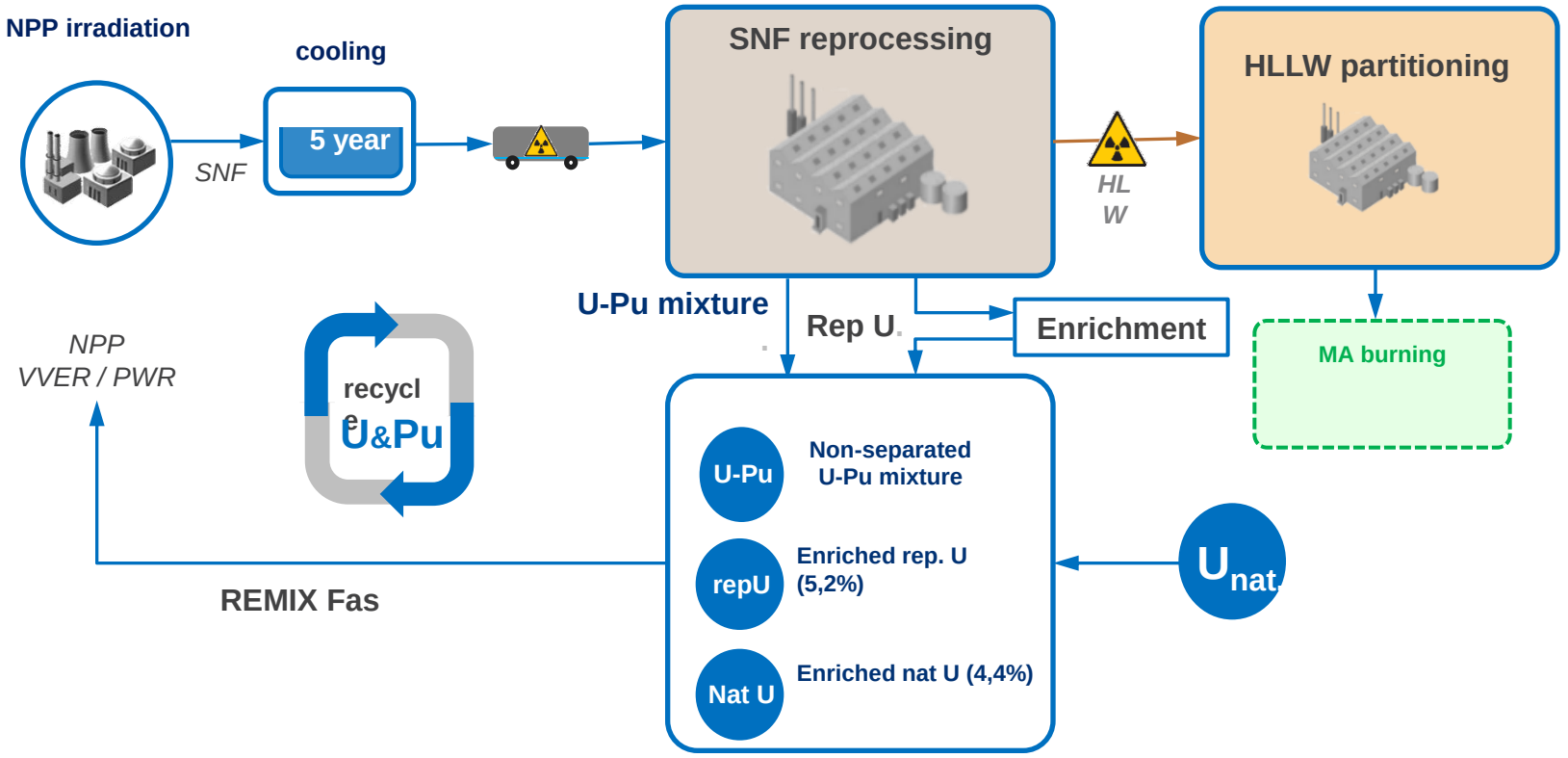
40 LWRs **14 AGRs** **11 LWGRs** **9 PHWRs**

World Map of repU Fuel users

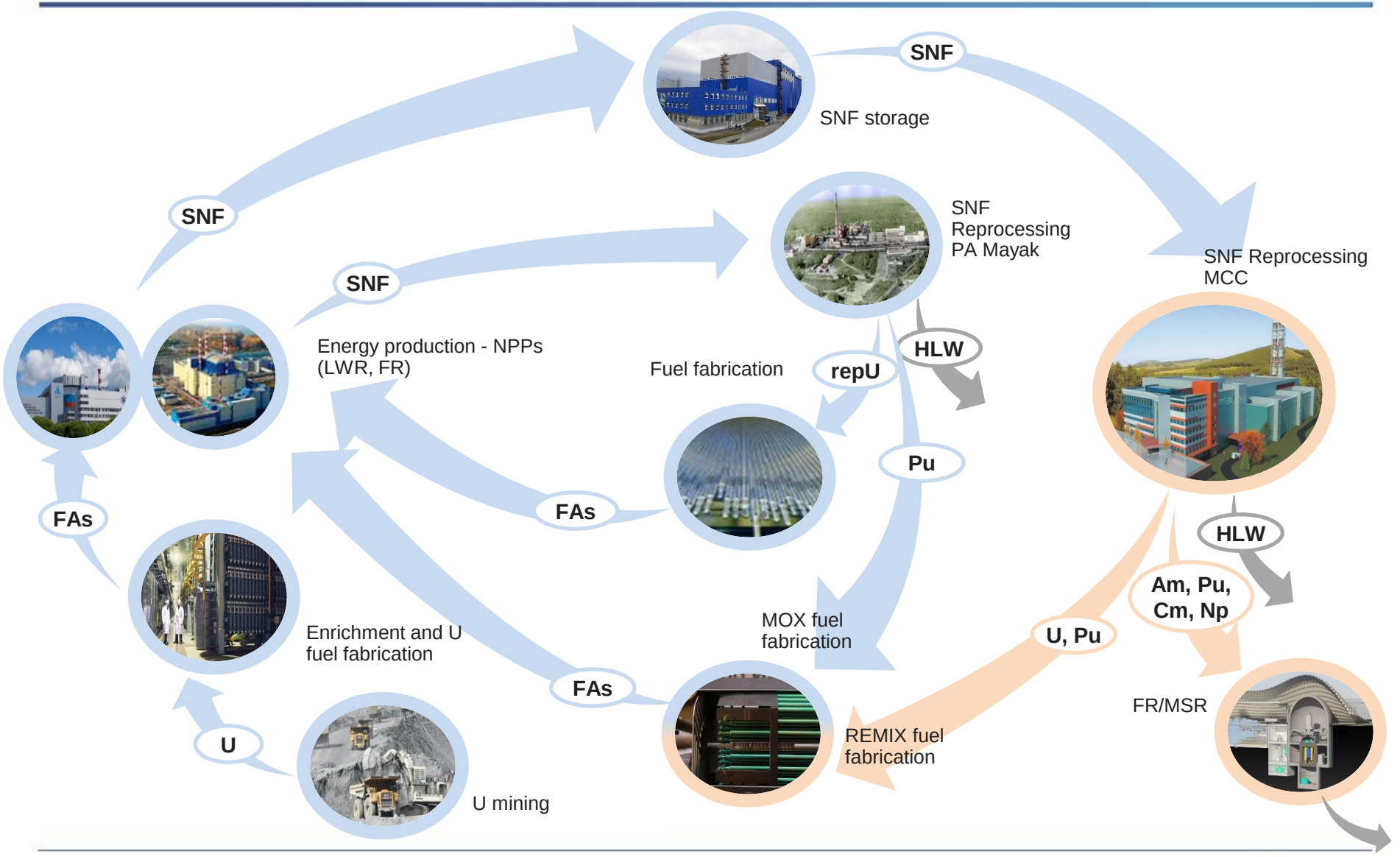
Slide have been inspired in the e-learning material on SFM in the IAEA (NE department)

REMIX fuel – U& Pu multi - recycling in LWR reactors

REMIX fuel is the mixture of U and Pu from LWR SNF reprocessing, with the addition of enriched uranium (natural or rep. U) .
REMIX fuel enables multiple recycling of the entire quantity of U and Pu from SNF, with the 100% core charge and 20%- saving of natural uranium in each cycle.



Infrastructure of Advanced Fuel Cycles in Russia



Summary

SNF recycling is a model of waste management policy and corresponds the global scheme of sustainable development

-By recovering and recycling reusable materials

-By minimizing waste volume and toxicity

-By conditioning ultimate waste into a safe form, specially designed for final disposal