

# **Internationalization of nuclear fuel supply and SNF management as a factor of strengthening nonproliferation regime**

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According to IAEA assessment:

**best case scenario –**

**total nuclear capacity will be raised from 372,2 GW (electricity) in 2007 to 747,5 GW (electricity) in 2030,**

**worst case scenario –**

**total nuclear capacity will be raised from 372,2 GW (electricity) in 2007 to 473,2 GW (electricity) in 2030**



**Although assessment of nuclear energy development by international organizations significantly differ, despite the crisis it is still possible to expect that trend for the increase in global nuclear capacities will continue.**

**It is possible to assert that during the entire XXI century the major reactor fleet will be light water reactors that constitute about 80% of entire reactor fleet.**

**Anticipated growth in nuclear energy will require from world community to find adequate solutions to the existing key challenges of energy development.**



**NPP operation doesn't pose proliferation risks.**

**Facilities for uranium enrichment and SNF reprocessing, related to NPP operation do pose such risks.**

**Also, we should not overlook the risks of so called 'dirty bomb' manufacturing.**

**It is necessary to provide for a sustainable balance between the development of nuclear energy and international nonproliferation regime.**



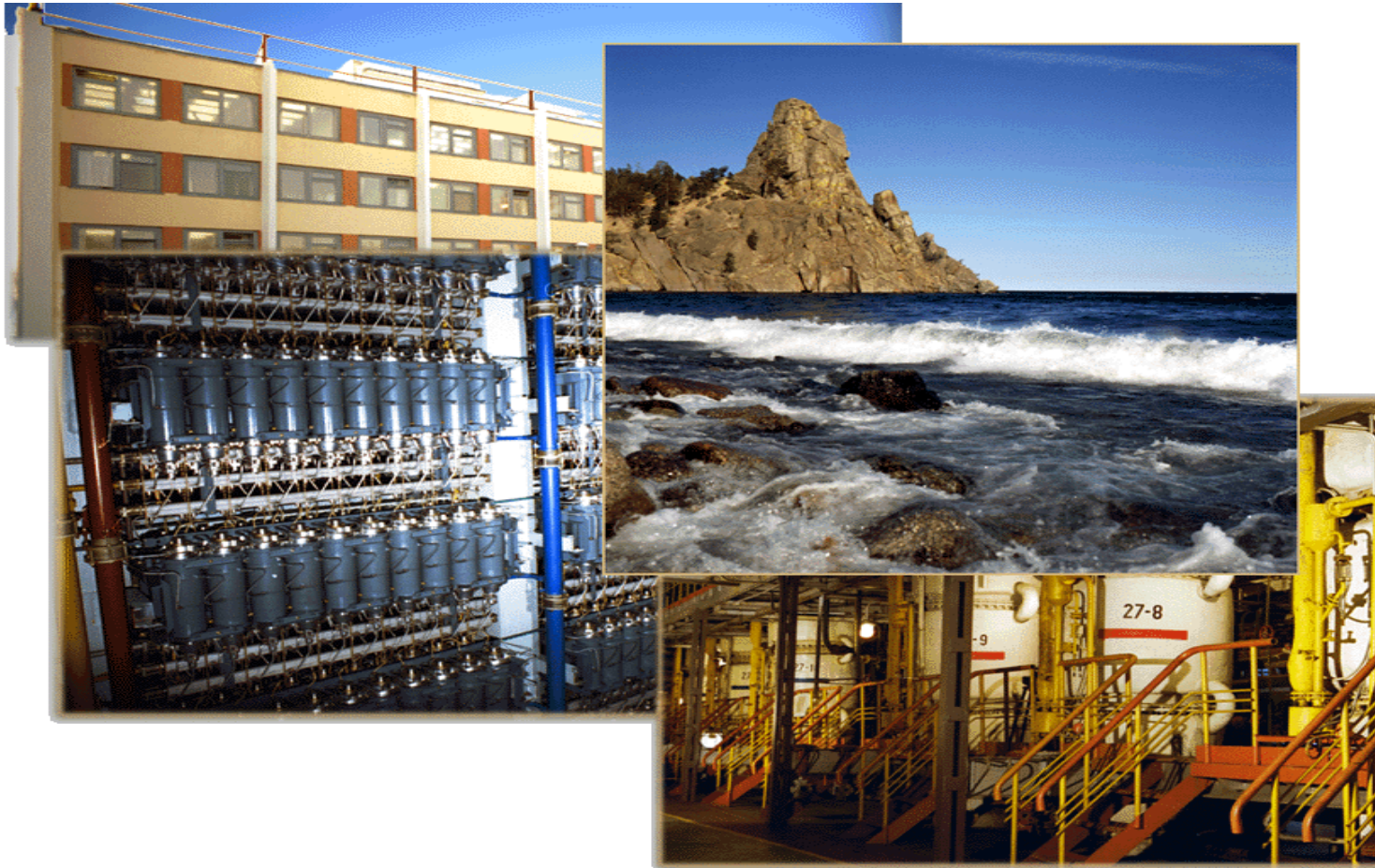
**At present, existing enrichment capacities and those under construction are able to meet current demand as well as its expected growth in the next decade.**

**There is an opinion that even in these conditions NPPs will lack fuel due politically motivated refusal of supply.**



**The Initiative of the President of the Russian Federation to establish global nuclear energy infrastructure provides for an equal access of all parties concerned to nuclear energy as well as strict compliance with requirements of non-proliferation regime.**

**This Initiative is in harmony with the IAEA multinational approaches to NFC, including to the position of the Director General of the IAEA on internationalization of its sensitive elements.**



## The International Uranium Enrichment Centre (IUEC) established in the City of Angarsk (Russian Federation)

**The Government of the Russian Federation proposed to establish a guaranteed reserve of enriched uranium at the IUEC as a response to the initiative of the Director General of the IAEA M. El Baradei to establish a fuel bank under IAEA auspices.**

**The reserve will comprise up to 120 tons of UF<sub>6</sub> enriched to 2.0-4.95 %.**



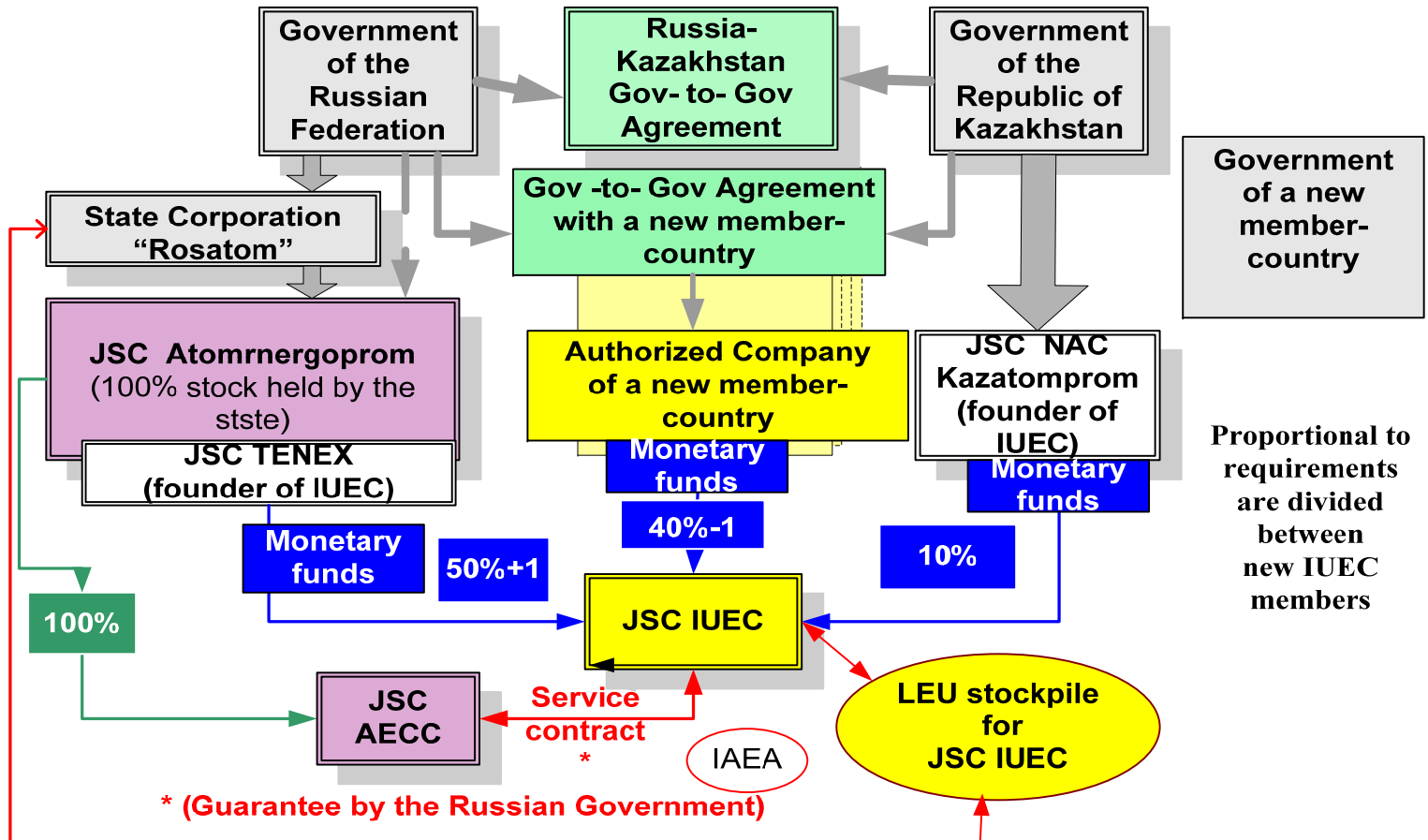
**Nuclear material will be under IAEA safeguards and will be supplied upon the request of the Agency in a situation when an enriching organization and the market refuse to supply uranium under political motives to any other state that develops civil nuclear energy and complies with its proliferation obligations.**

**Legal framework for the activities of the reserve and if necessary removal of uranium from the reserve is provided by two different agreements. The first agreement will be concluded between the Government of Russian Federation and the IAEA, the second one – between the recipient country and the Agency.**

**It is expected that establishment of guaranteed reserve of enriched uranium and IUEC activities will provide base to develop on practice the mechanism of implementation the guaranteed fuel supply concept and will mark a new step in developing global infrastructure for future nuclear energy.**



# IUEC and guaranteed reserve chart



**Non-governmental organization Nuclear Threat Initiative also worked on similar project to establish nuclear fuel bank under IAEA auspices. By now all necessary funds are allocated.**

**In both cases it is up to IAEA Board of Governors to decide.**



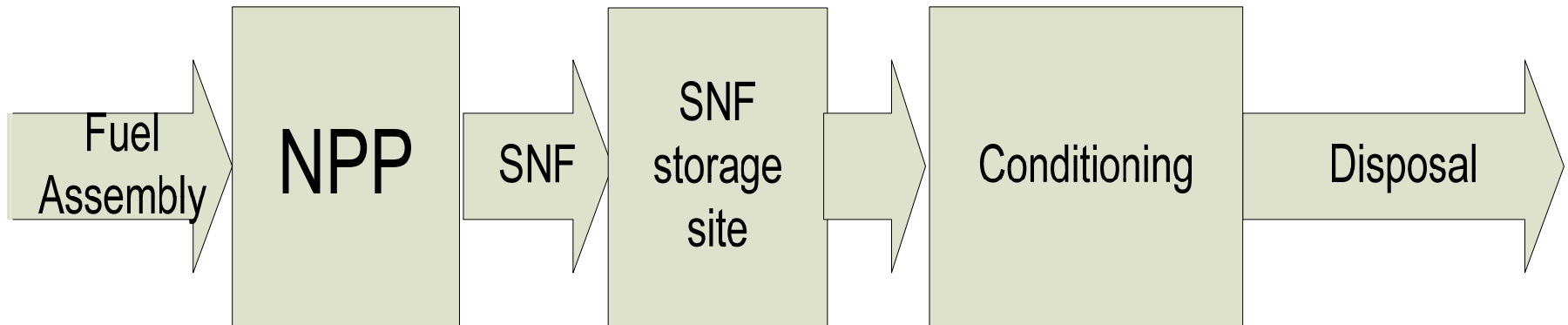
**Total amount of discharged SNF in early 2007 was estimated at 290 000 tons m, from this amount more than 190 000 tons of SNF are stored. Under IAEA assessment, more than 445 000 tons of SNF will be discharged from nuclear reactors.**

**At present, the situation with spent nuclear fuel may be defined as ‘postponed decision’.**

**Many countries consider SNF to be high active waste and implement programs of its disposal in deep geological formations.**



# Open Nuclear Fuel Cycle



**Open fuel cycle depends on natural uranium resources, explored reserves of which according to some estimates will last till the end of this century under the pessimistic scenario of nuclear capacity growth.**

**Many experts agree that SNF reprocessing may help provide nuclear energy sector with fuel resources for centuries as well as to solve problem of reducing volumes and radiotoxicity of high level waste.**

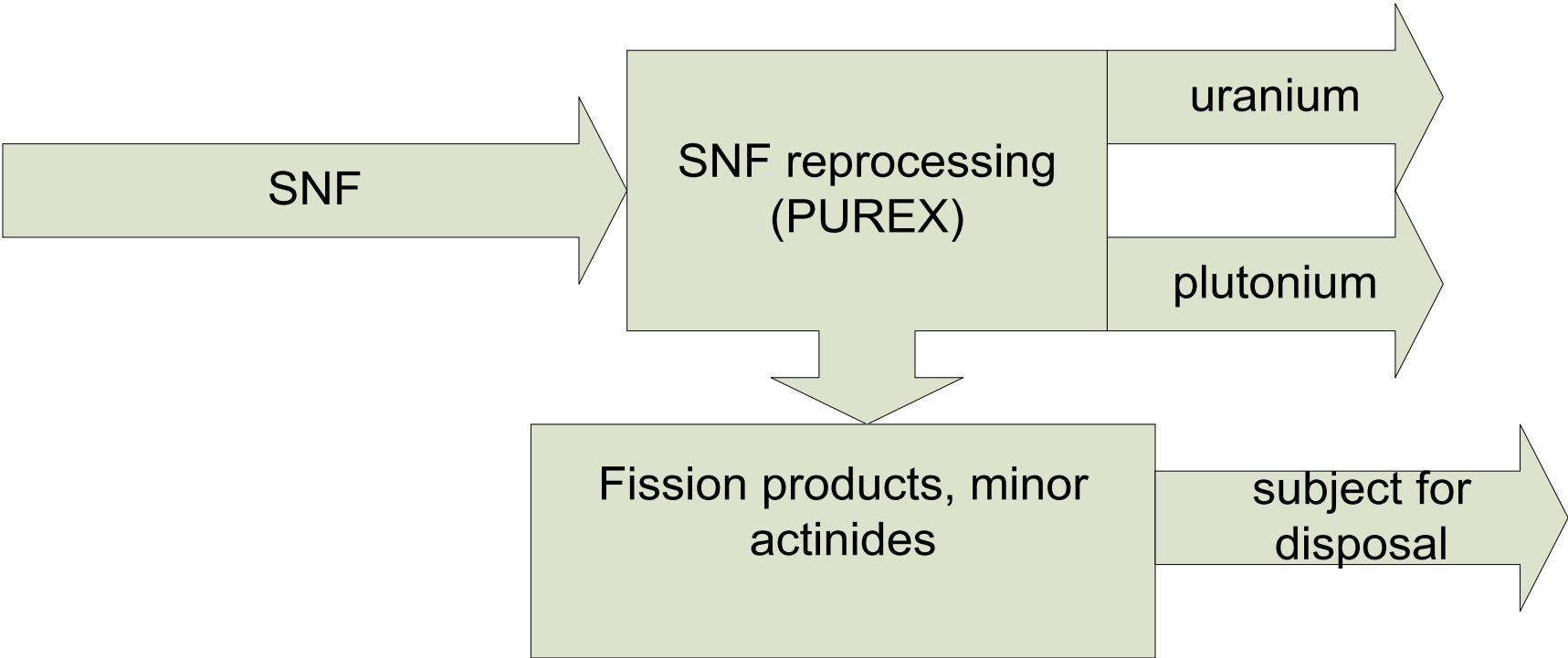


**Nowadays, chemical technology PUREX is employed for these purposes, it is well known and widely described in public literature.**

**This technology is used to extract pure plutonium form SNF.**

**Its emergence in countries that do not possess such technology may pose serious risks to nonproliferation regime.**

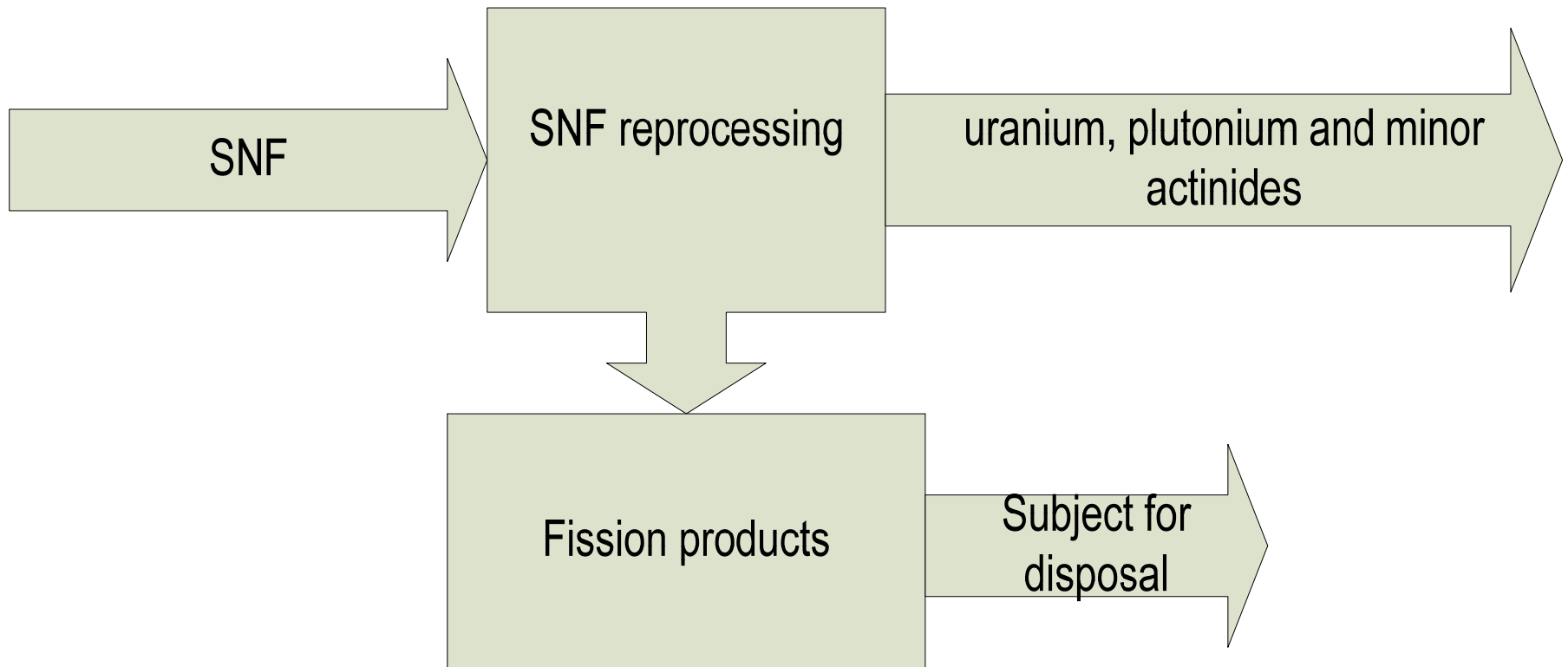
# Reprocessing of SNF under PUREX procedure



**No aqueous methods are a possible new technology for closed fuel cycle.**

**Potentially, they can be shorter and easier, ensure safety of the dangerous components within the system and provide for combination of fuel reprocessing and manufacturing procedures.**

# Innovative Nuclear Fuel Cycle

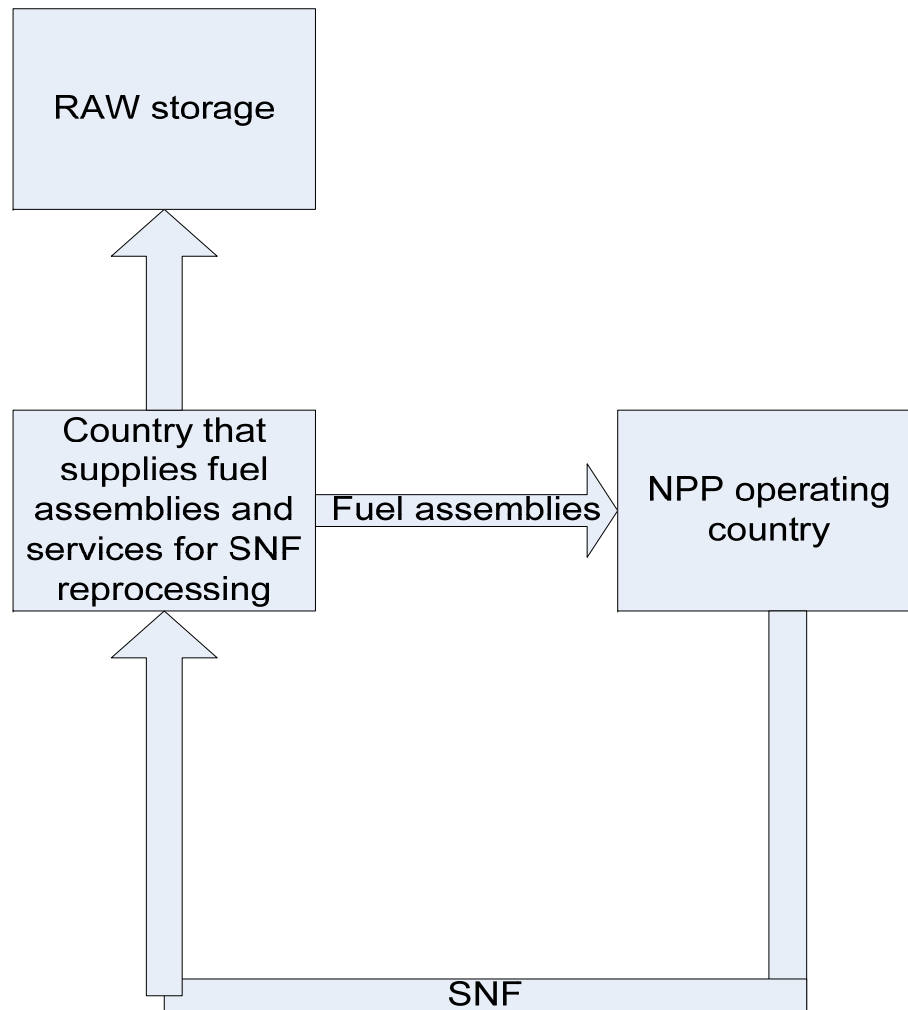


**It would be appropriate to further consider on the multinational basis the mechanisms of establishment and functions of the regional SNF and RAW management centers as well as issues of nuclear fuel leasing.**

**Practical examples of such approaches are supply to the NPPs of the Russian design of Russia's fresh nuclear fuel and take this spent nuclear fuel back to the Russia. It is also possible to consider French SNF reprocessing plant in the La Hague as a reprocessing center for European countries and Japan.**



# NPP Fuel Leasing



**The Initiative of the President of the Russian Federation put forward by him at the UNN Millennium Summit in 2000 to provide energy for sustainable development of mankind, solve key problems of nuclear nonproliferation and environmental sanitation of the planet Earth.**

**The initiative supported by the IAEA as well as existing international INPRO project embracing 29 countries and EC and aimed at considering and selecting more acceptable nuclear technology of the XXI century has successfully reached the second phase.**

**International cooperation actually facilitates solving issues of nuclear energy development and strengthening nonproliferation regime.**



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