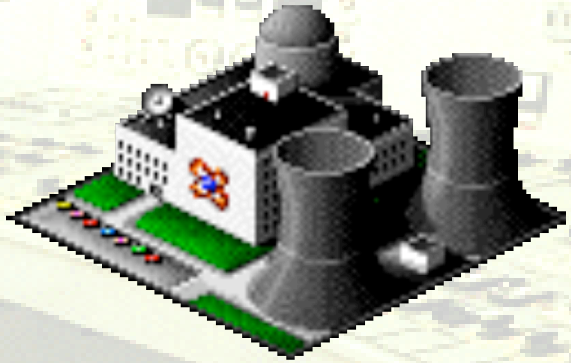
First Deputy Minister of the Russian Federation for Atomic Energy
M.I. Solonin

Basic Trends of Nuclear Power and Fuel Cycle Development in Russia



Energy supply of Russia in the 1-st half of XXI century

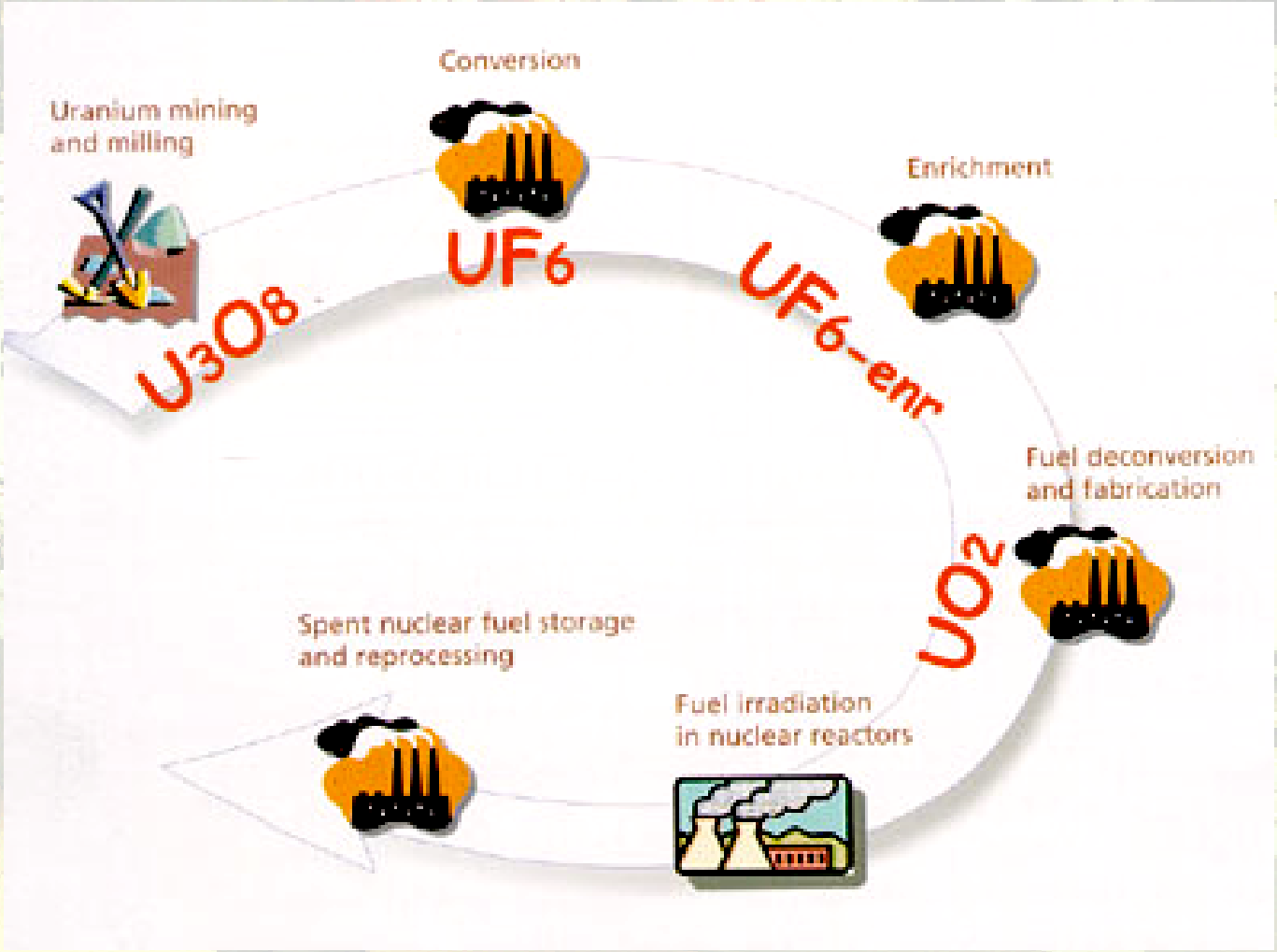
Vast and variety of resources enable Russia to carry out flexible policy in the power sector.

At the same time expected demand for electric power along with growing share of Russian fossil fuel export inevitably makes Russian nuclear power a key factor of sustainability of the national power system.

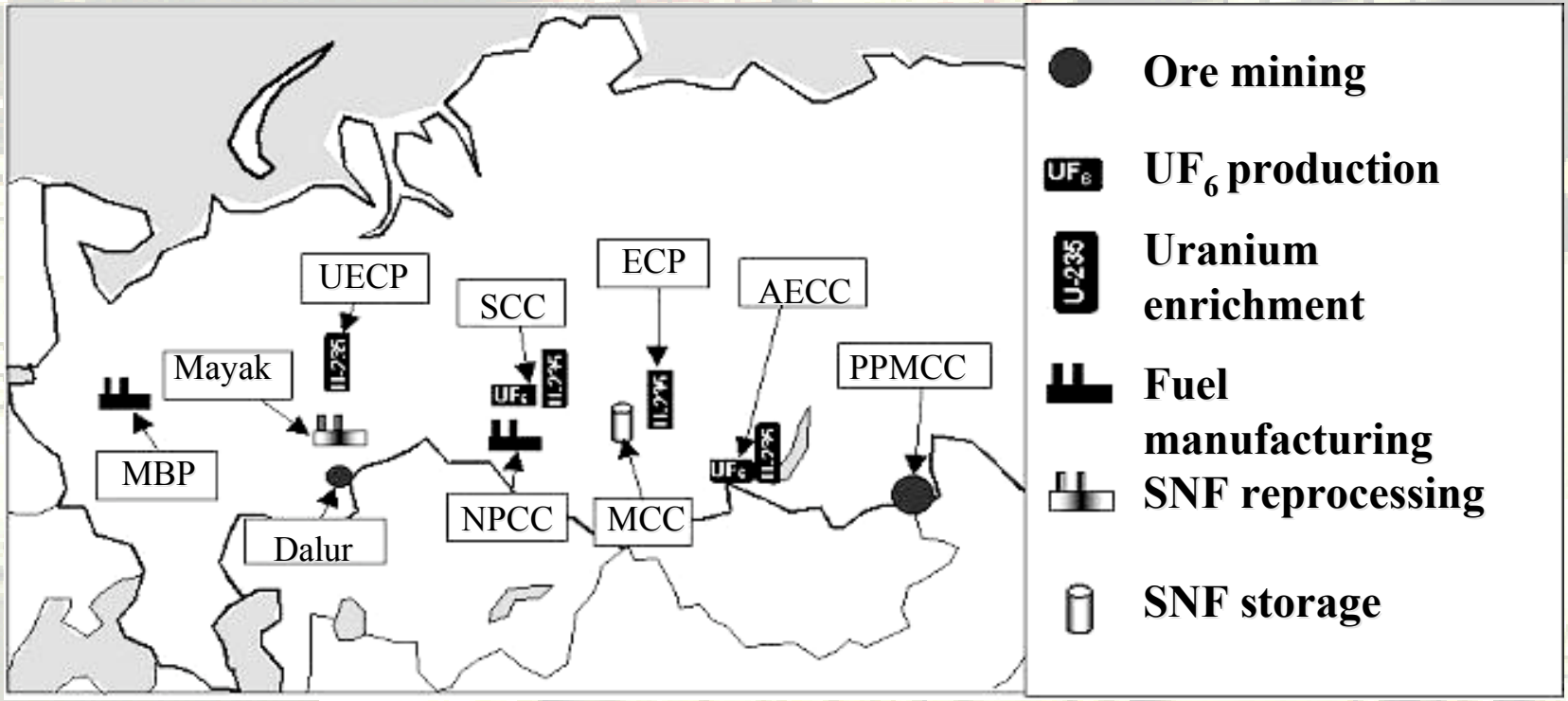
Conditions for Russian nuclear power development

- continuous increase of electric power demand in the forthcoming decades;
- competitiveness of nuclear electric and thermal power against fossil fuel power including sources to be possibly developed in the medium-term perspective;
- raw material availability;
- investment potential and production capacities;
- environmentally sound and politically acceptable technologies for spent nuclear fuel and radioactive waste management

Nuclear Fuel Cycle

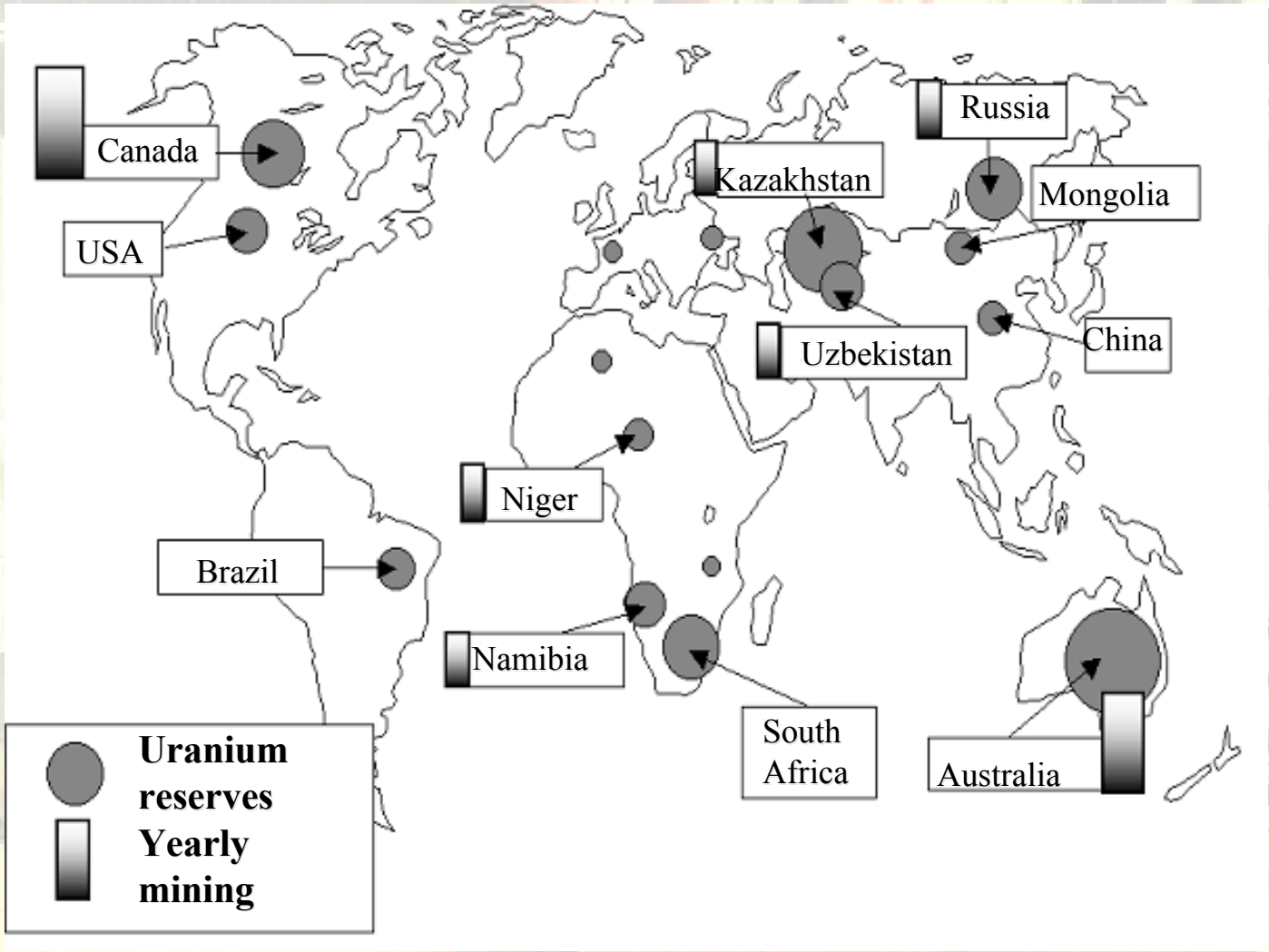


Russian Nuclear Fuel Cycle Facilities



- NFC facility availability
- backup production facilities
- process geography
- production capacities provide for the development of nuclear power for 10 year period

World reserves and leading uranium manufacturers



Explored reserves, thous. t

Australia	863
Kazakhstan	629
Canada	437
Russia (7-th place in the world)	165

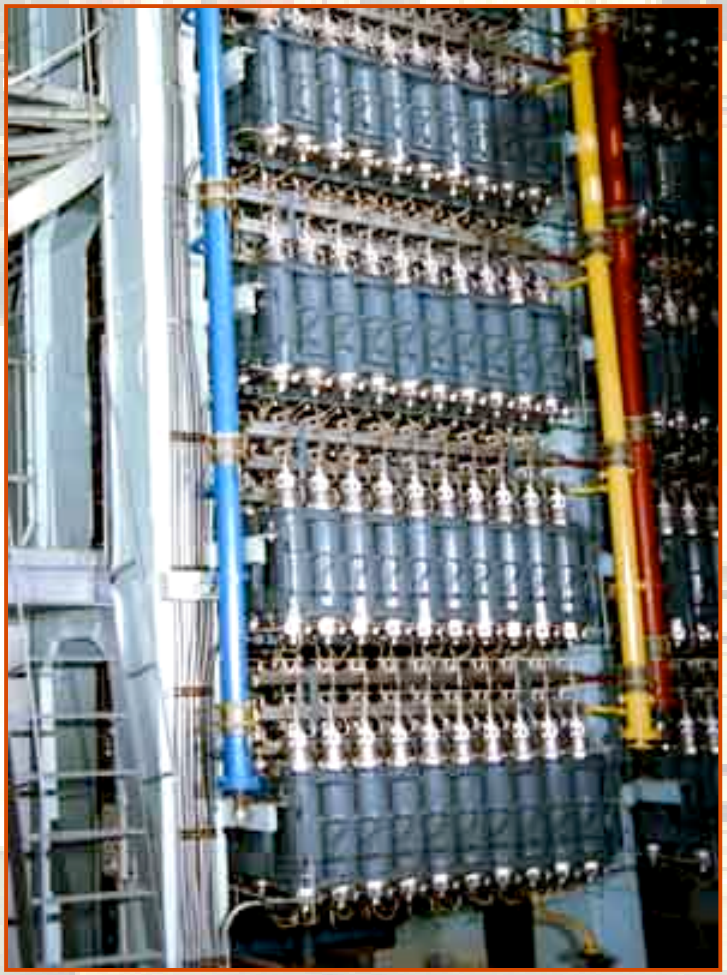
Production, thous. t/yr

Canada	11,6
Australia	6,9
Niger	3,1
Russia	3,1
Namibia	2,3
Kazakhstan	2,8
Uzbekistan	1,8

Separation facilities of Russia

«Urals Electrochemical Combine»

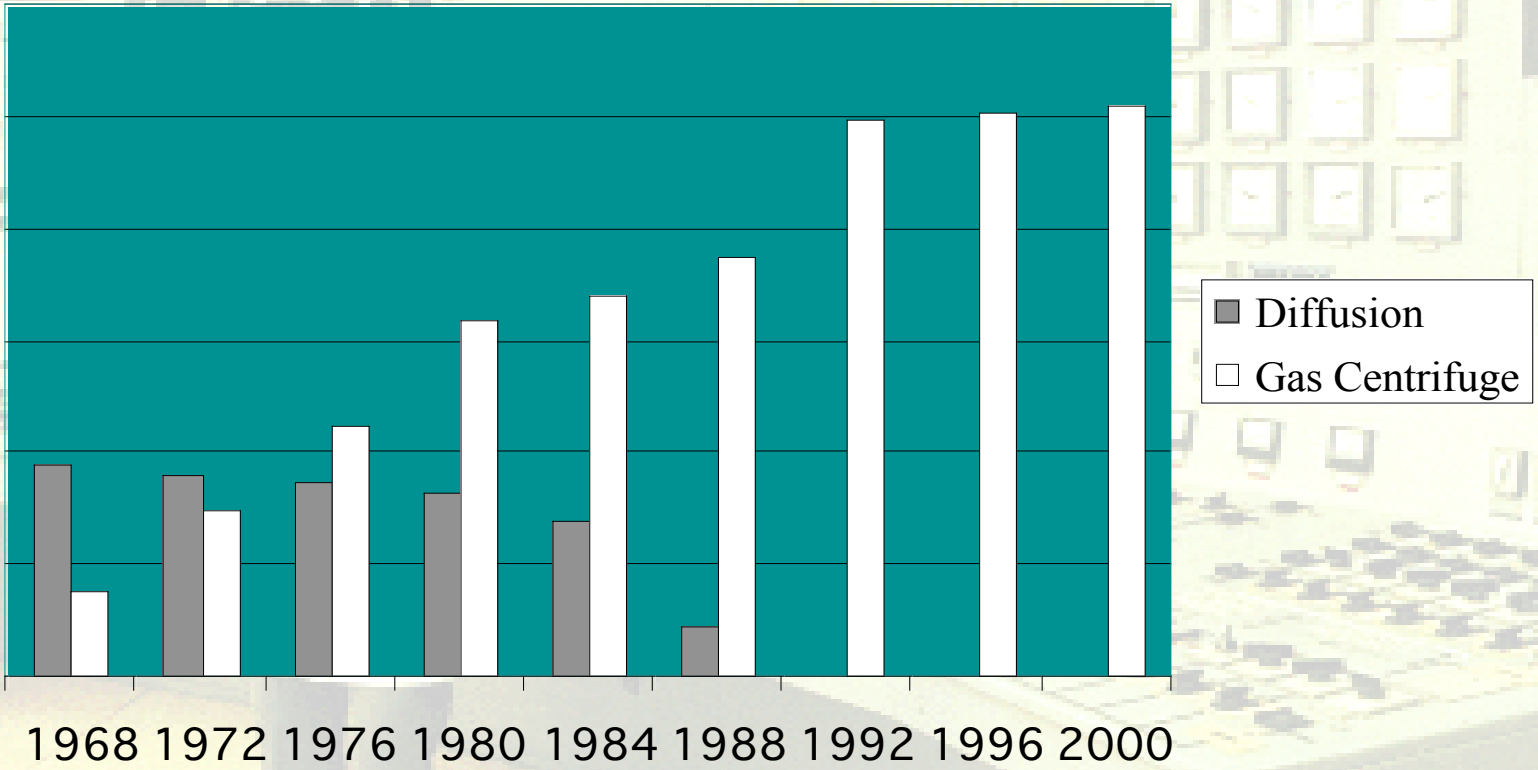
«Siberian Chemical Combine»



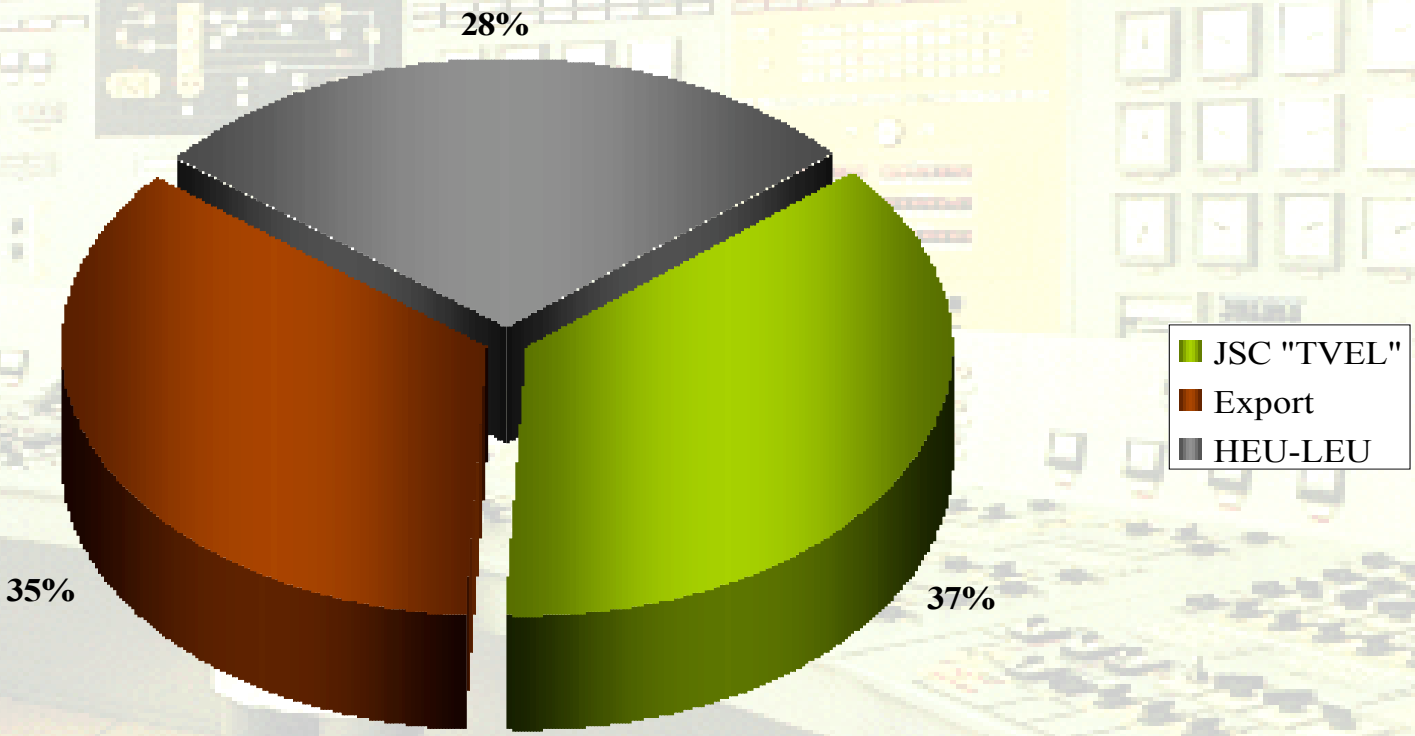
«Electrochemical Plant»

«Angarsk Electrolysis Chemical Combine»

Dynamics of enrichment capacity development in Russia



Services provided by Russian enrichment capacities



Fuel assembly manufacturing facilities

«Machine Building Plant»

«Novosibirsk Chemical Concentrates Plant»

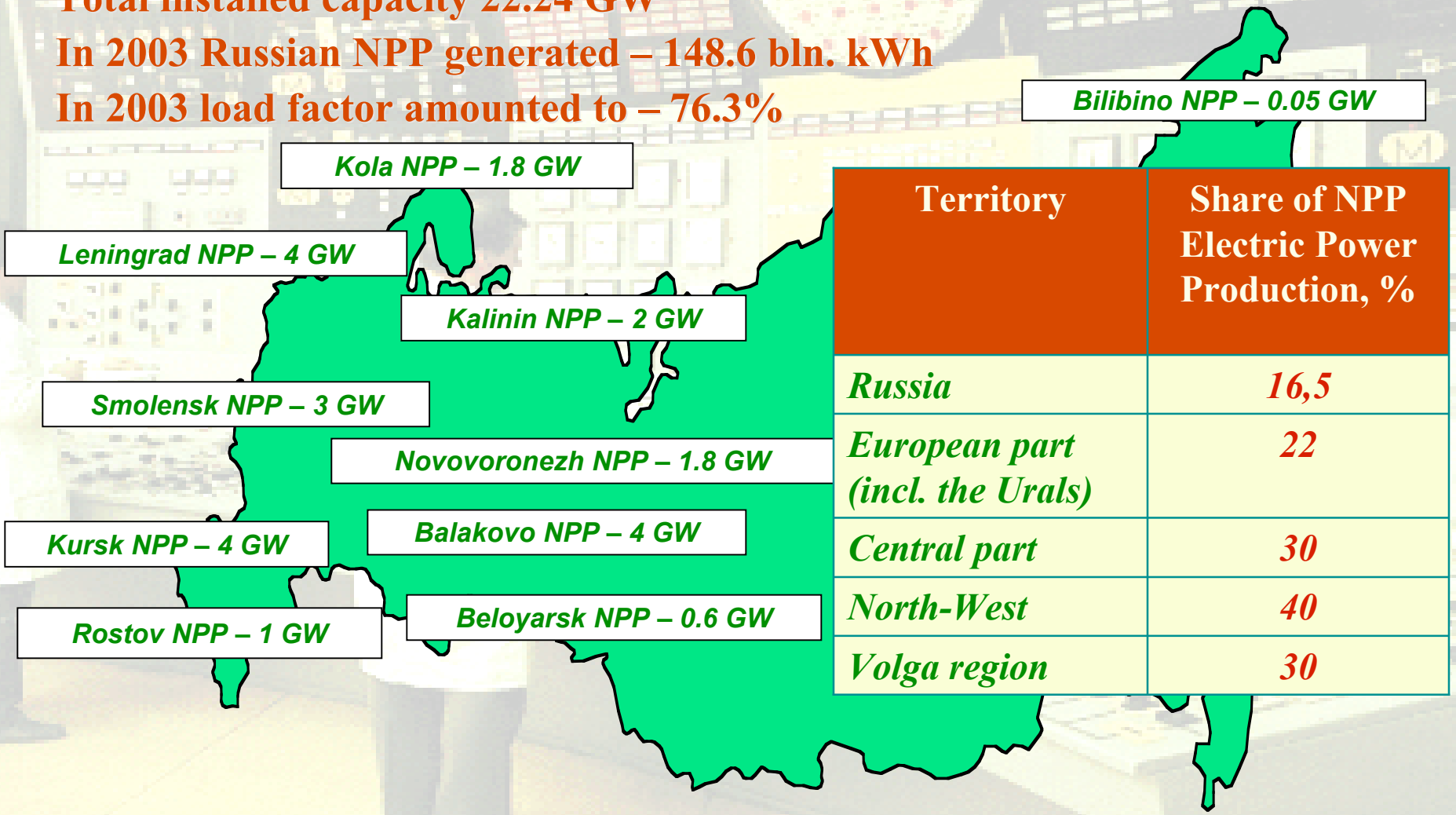
Fuel best indicators in Russia and in the world

Parameter	Foreign NPPs		Russian NPPs with VVER 1000	
	NDU (Canada)	PWR-4 (France)	FAA, FA-2 (4 years)*	FAA, FA-2 (5 years)**
Natural uranium consumption kg/MW-d	0,179	0,195	0,198	0,193
Average burn-up MW-d/ U kg	8,33	52,3	48,6	56,4

* - industrial scale, ** - design stage

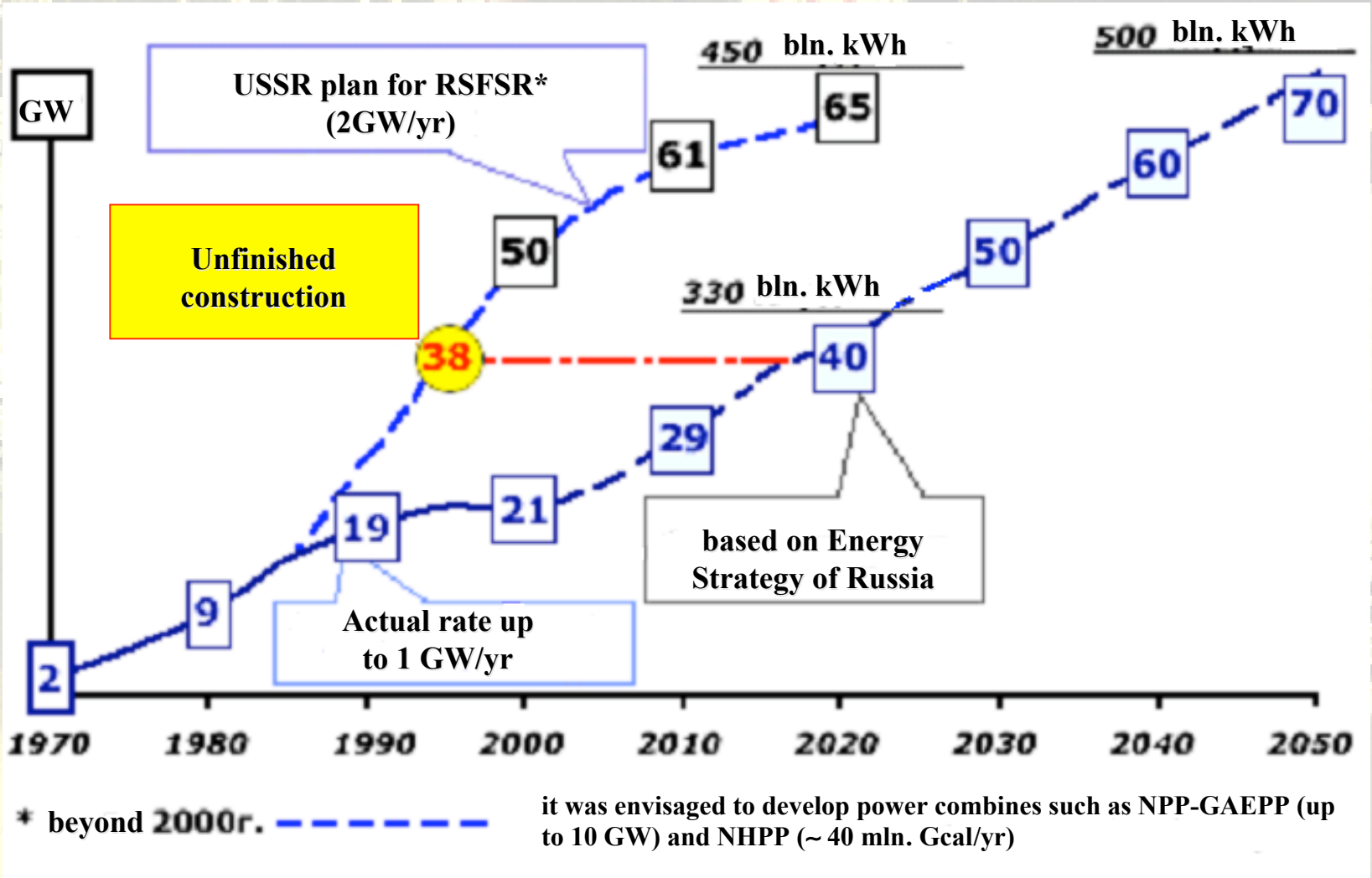
Basic indicators of operating NPPs in Russia

Total installed capacity 22.24 GW
In 2003 Russian NPP generated – 148.6 bln. kWh
In 2003 load factor amounted to – 76.3%

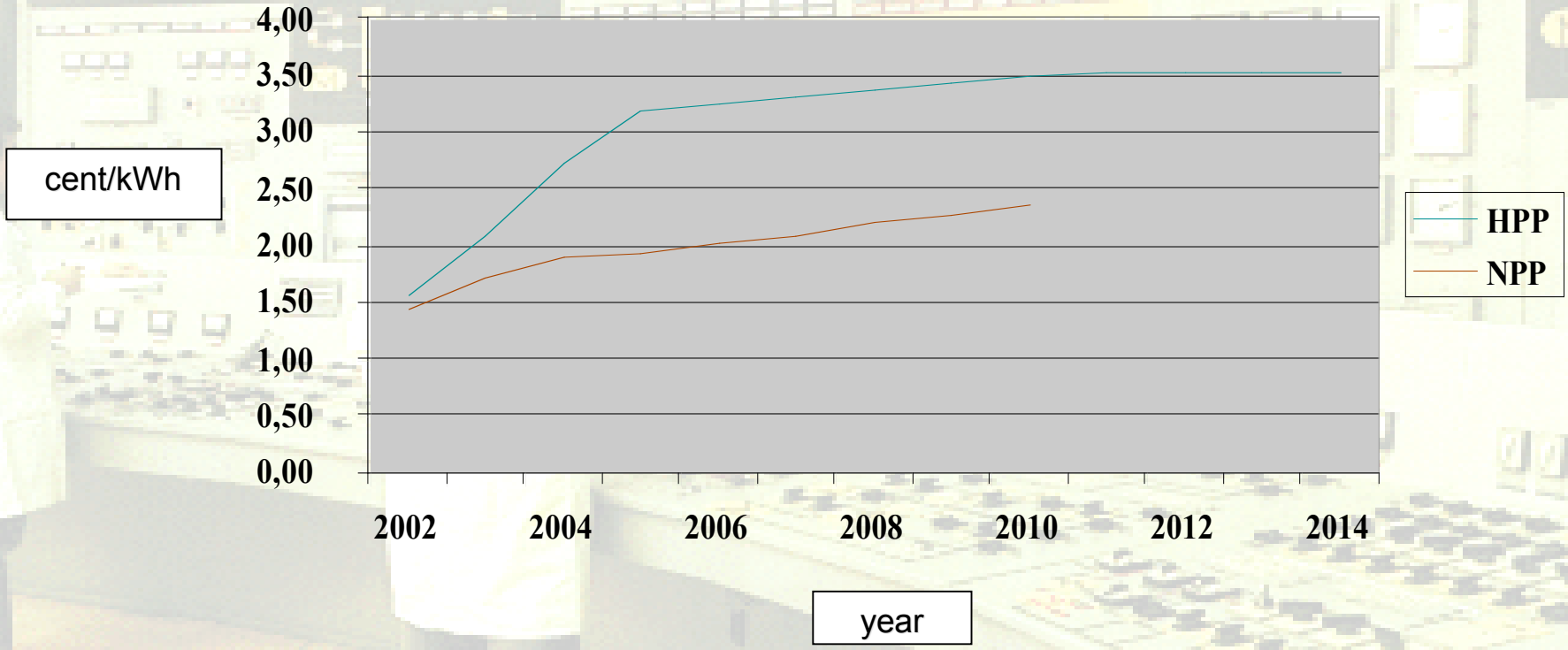


Territory	Share of NPP Electric Power Production, %
Russia	*16,5*
European part (incl. the Urals)	*22*
Central part	*30*
North-West	*40*
Volga region	*30*

History and perspectives of nuclear electric power capacities in Russia

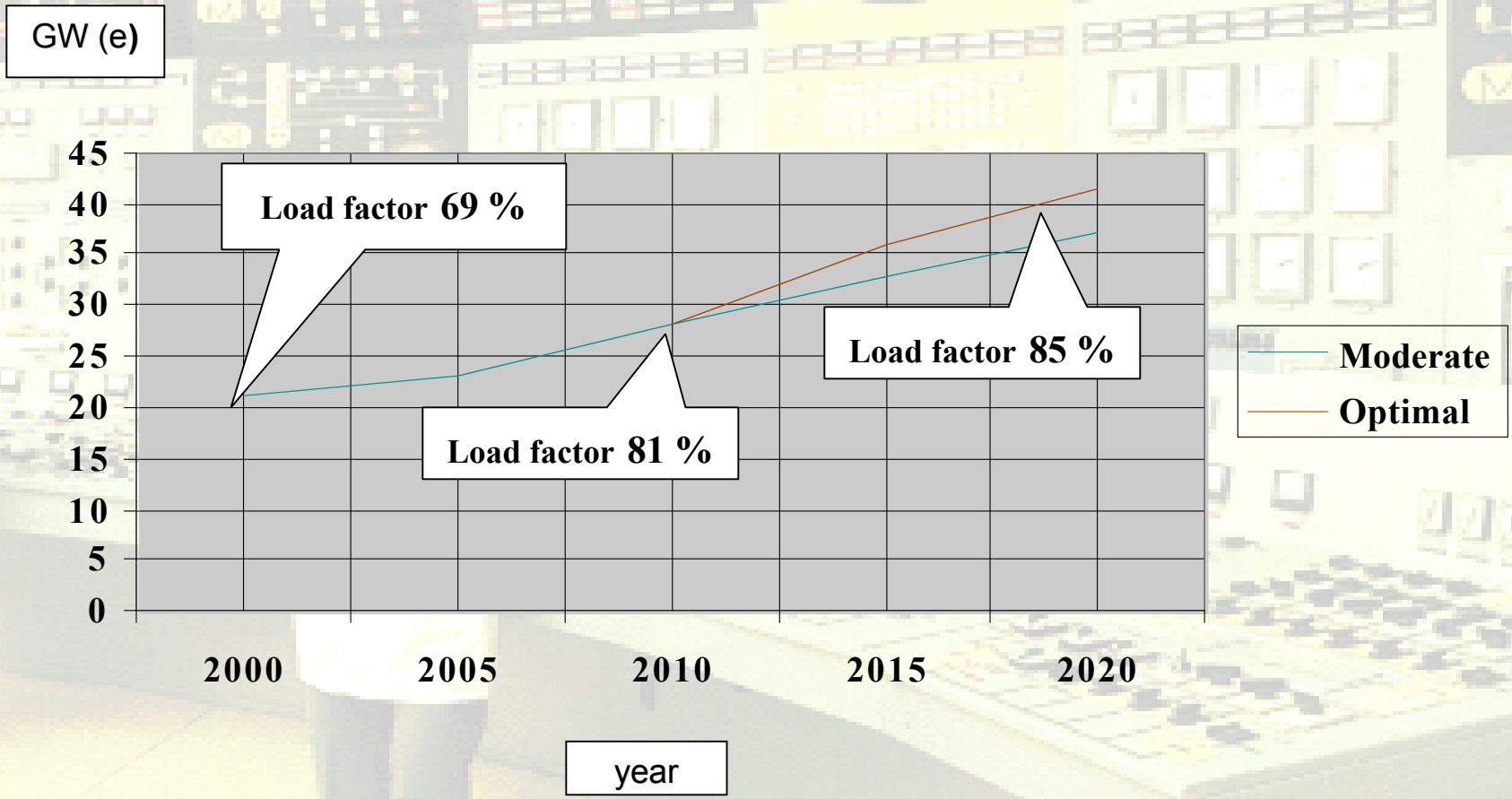


Expected electric power tariff



according to Russian Nuclear Society magazine No. 1-2, 2003

Load factor and installed capacity improvement (up to 2020)



Russian and foreign NPPs with VVER reactors

Balakovo NPP

Novovoronezh NPP

Kola NPP

Loviisa NPP

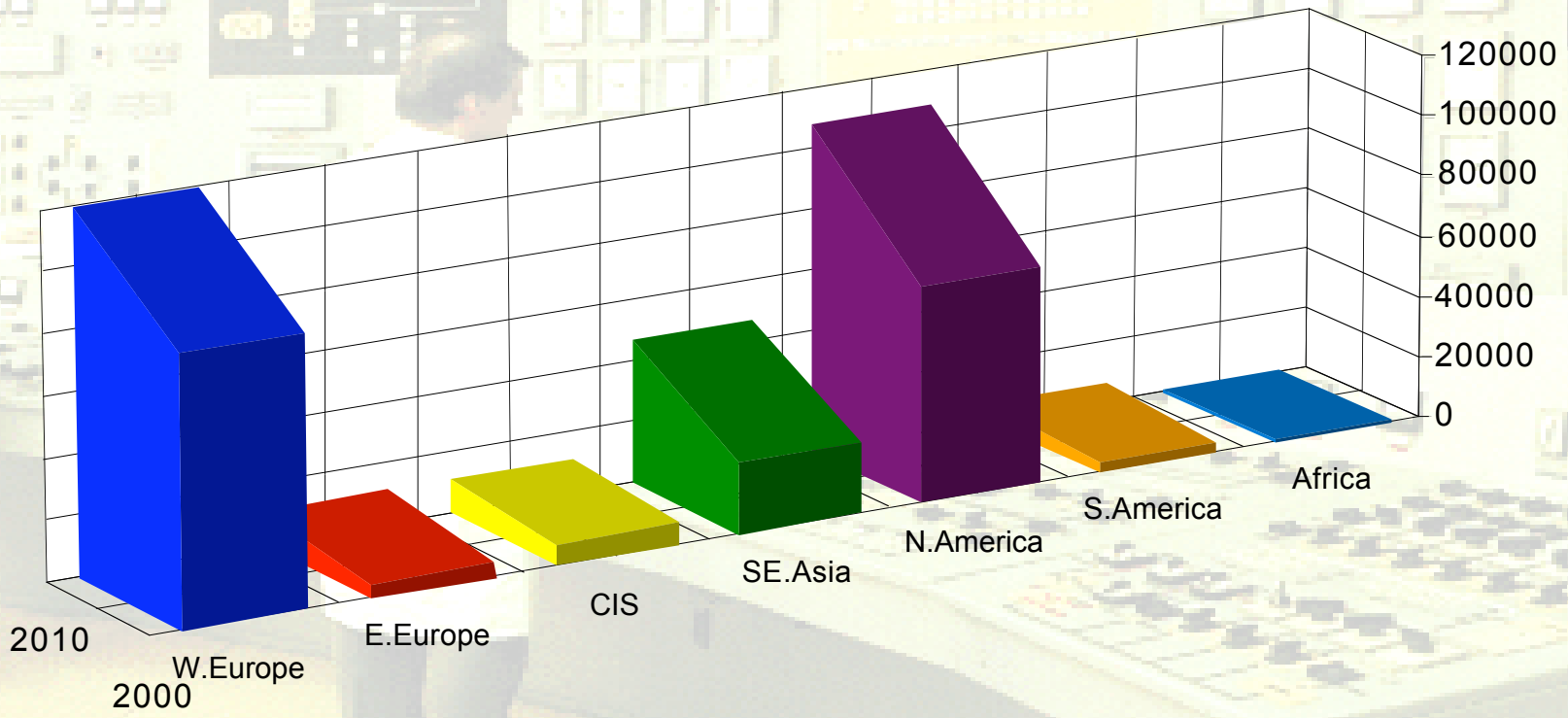
Kozloduy NPP

Dukovany NPP

Bohunice NPP

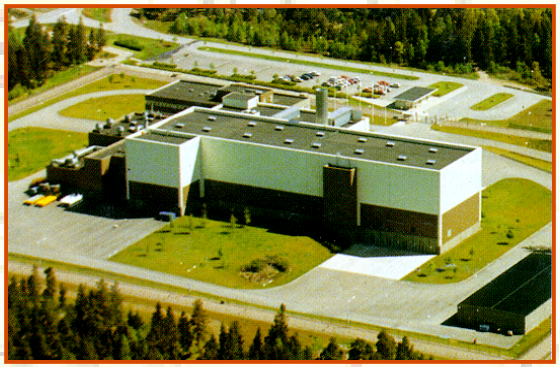
Paks NPP

Amount of accumulated SNF (thous.t, “h.m.”)



SNF management concept in the world nuclear energy production

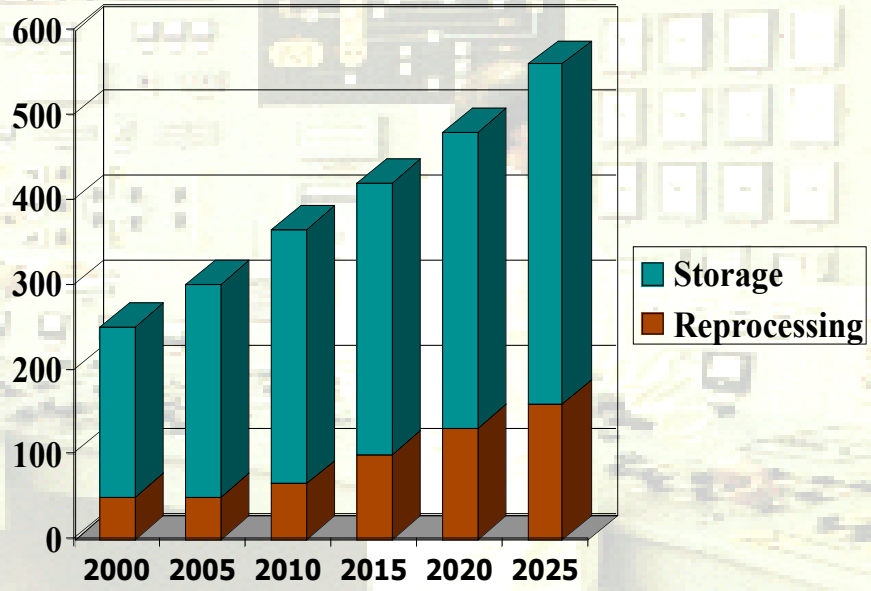
Reprocessing



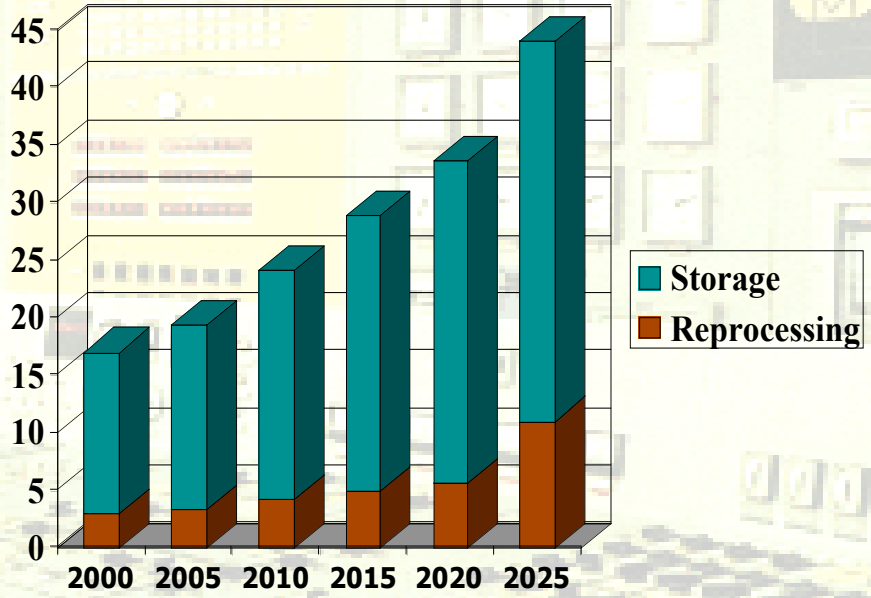
Direct disposal

Long-term storage
(with put-off decision)

Storage-to-Reprocessing Ratio (thous. t, “h.m.”)

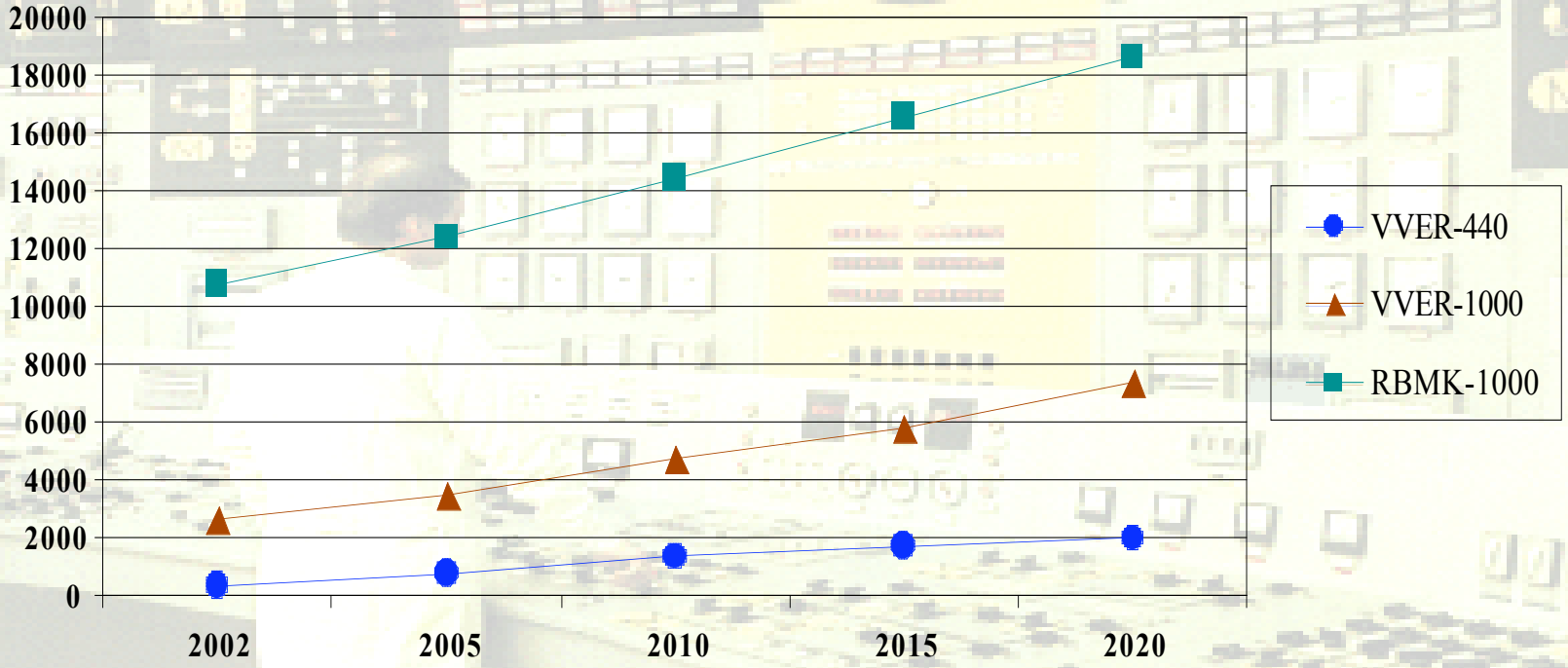


World nuclear power



Russian nuclear power

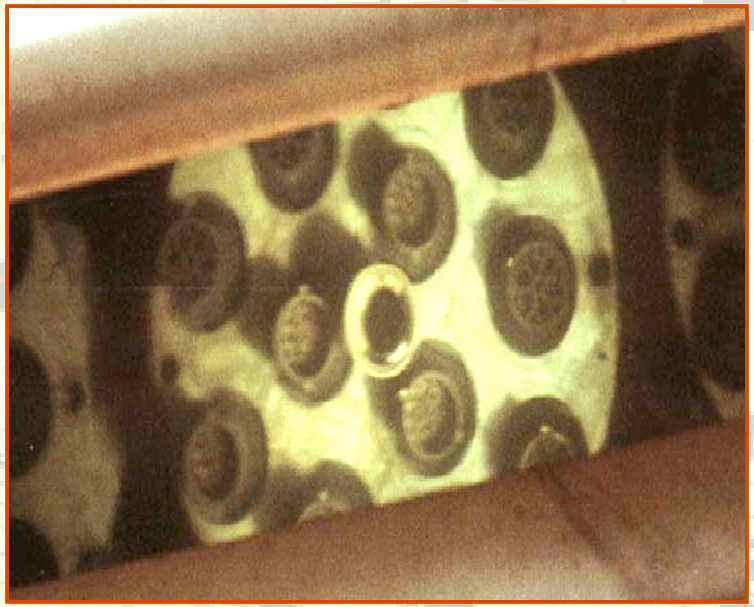
Dynamics of SNF accumulation by fuel types in the Russian Federation (tons, “h.m.”)



Today total amount of accumulated SNF generated by NPP in Russia is **14,000 t «h.m.»**, by 2020 – **about 28,000 t «h.m.»**

Development of SNF long-term storage system

- Increase the capacity of existing SNF storage facility for VVER-1000 reactors at MCC up to 9,000 t
- Construct "dry" SNF storage facility for VVER-1000 and RBMK-1000 reactors at MCC with capacity of 34,000 t.



Russia's goals at SNF management services global market

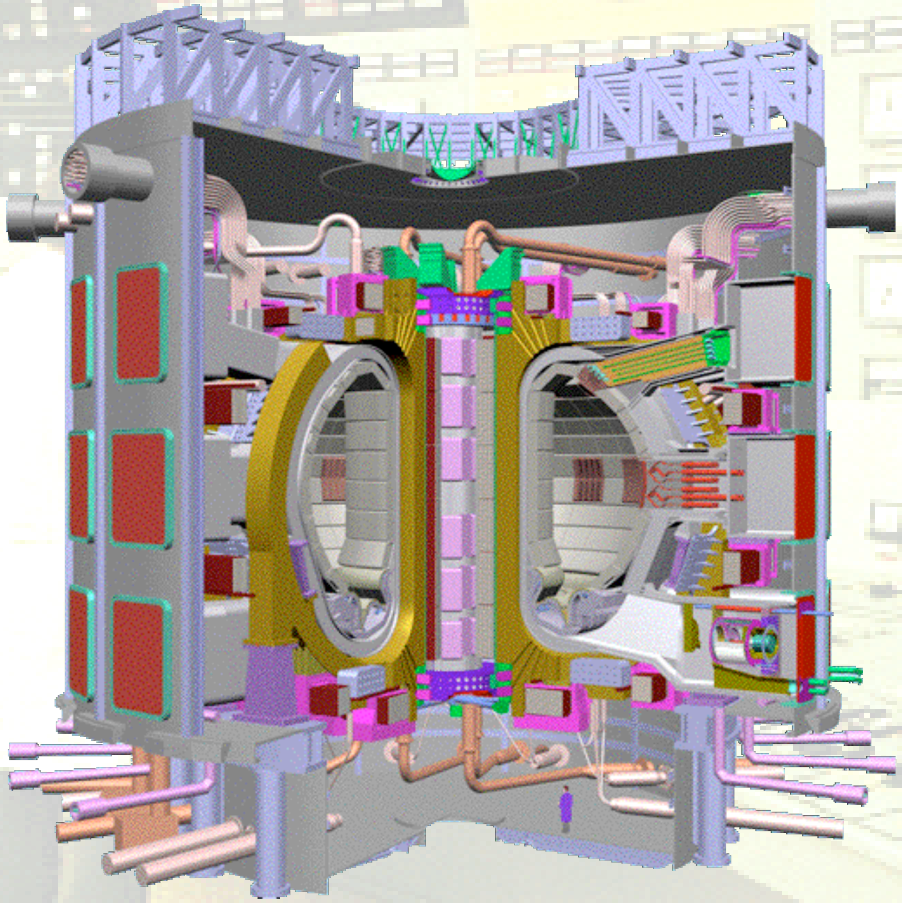
- carry out combined supplies in the field of nuclear fuel cycle
- secure nuclear weapons non-proliferation regime
- secure raw materials for future nuclear power involving recovered uranium and plutonium
- secure financial resources to solve Russian environmental problems resulting from nuclear weapons manufacturing
- develop national infrastructure for SNF management in accordance with international standards
- develop international cooperation in the field of science, technology and industry for SNF management

International cooperation in the field of peaceful use of atomic energy

Initiative of the Russian Federation President V.V.Putin at UN Millennium Summit

to secure energy supply for sustainable development of the mankind, to finally address non-proliferation problems and to enhance the environment of the Earth.

International Thermonuclear Experimental Reactor (ITER)



Environmental Policy Basis of Minatom of Russia

The major objective of Minatom's environmental policy is to create the conditions when the facilities achieve the strategic goal of the environmental policy of the Russian Federation in the most efficient way:

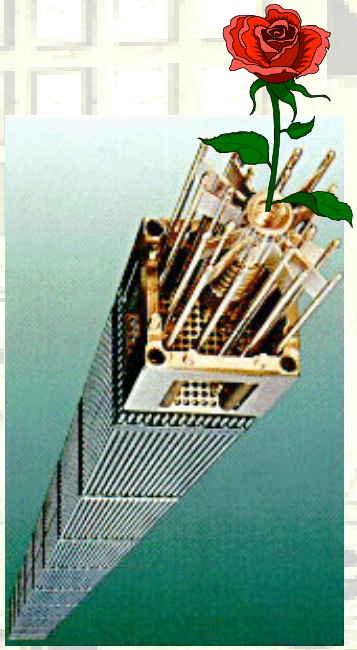
- preserve the nature;

- maintain integrity and life support functions of the ecosystems for sustainable development of the community;

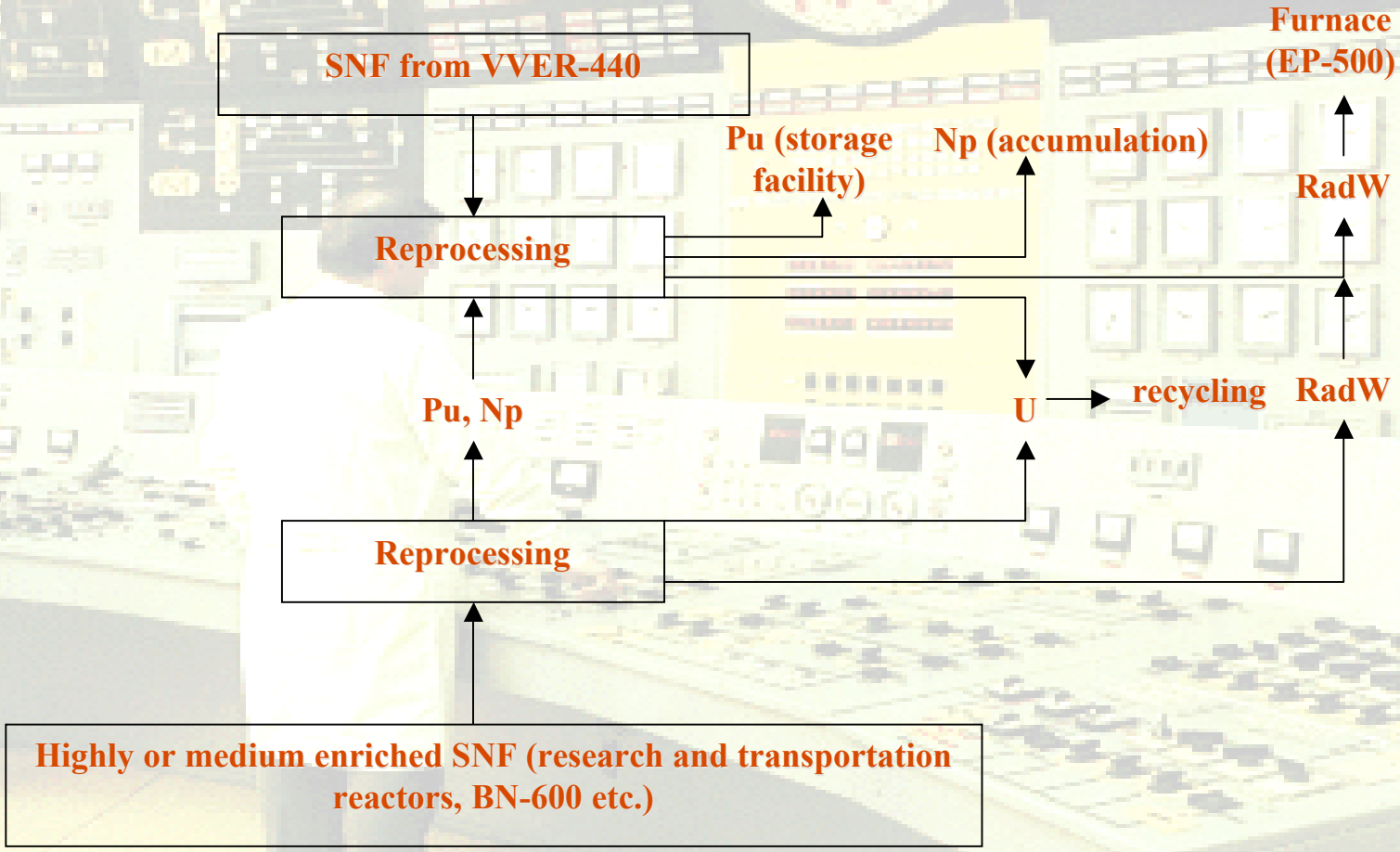
- improve the living standards and health condition of the population as well as demography;

- secure environmental safety of the nation.

RT-1 plant modernization as well as implementation of the environmental measures at PA Mayak is a good example of the above mentioned.



SNF reprocessing flow chart at RT-1



High level waste fractionating at PA Mayak

Year of operation	Reprocessed HLW, m^3	HLW specific activity, Ci/dm^3	Cs-Sr extracted concentrate, $x10^6$ Ci	Extracted transplutonium and rare earth elements	
				_-activity, $x10^3$ Ci	_-activity, $x10^3$ Ci
1996	210	32,4	7,5	-	-
1998	95	20	4,8	-	-
1999	62	20,3	1,5	1,9	37,0
2000	276	27,3	6,8	125,8	313,8
2001	586	27,0	16,112	290,2	970
Total	1229	-	36,712	417,9	1320,8

Summary