SLOVAKIA

SLOVAKIA[1]

1. ENERGY, ECONOMIC AND ELECTRICITY INFORMATION

1.1. General Overview

The size of the Slovak Republic is 49 036 km^2 with 40% of the area situated up to the elevation of 300 m, 45% at the elevation between 300 and 800 m, and 15% at the elevation above 800 m. The lowest point is the mouth of Bodrog river at the elevation of 94 m and the highest situated point is Gerlachov peak at the elevation of 2655 m. Agricultural surface covers 49.9% from the entire Slovak territory, and forest surface 40.6%. The longest dimension in the east-west direction is 428 km and in the north-south direction 195 km. The Slovak Republic is a new country situated in the Central Europe. It was established on January 1, 1993. It is situated between 16º50'04" and 22º34'20" of east longitude, and between 47º35'55" and 49º36'54" of northern latitude (Fig. 1) in mild zone. The average annual temperature - a long-term average between 1901 and 1950 - is 10.1ºC in Bratislava and the average rainfall is 670 mm. Table 1 shows typical parameters from the Meteorological stations Jaslovské Bohunice and Mochovce.

In 2000, there were about 5.4 millions inhabitants and density of the population was 110 inhabitants per km^2 (Table 2). 2.4 millions people were economically active, out of which 0.92 millions in industry and transport, 0.18 millions in agriculture, 0.49 millions in trade and services, and 0.81 millions in non-productive spheres.

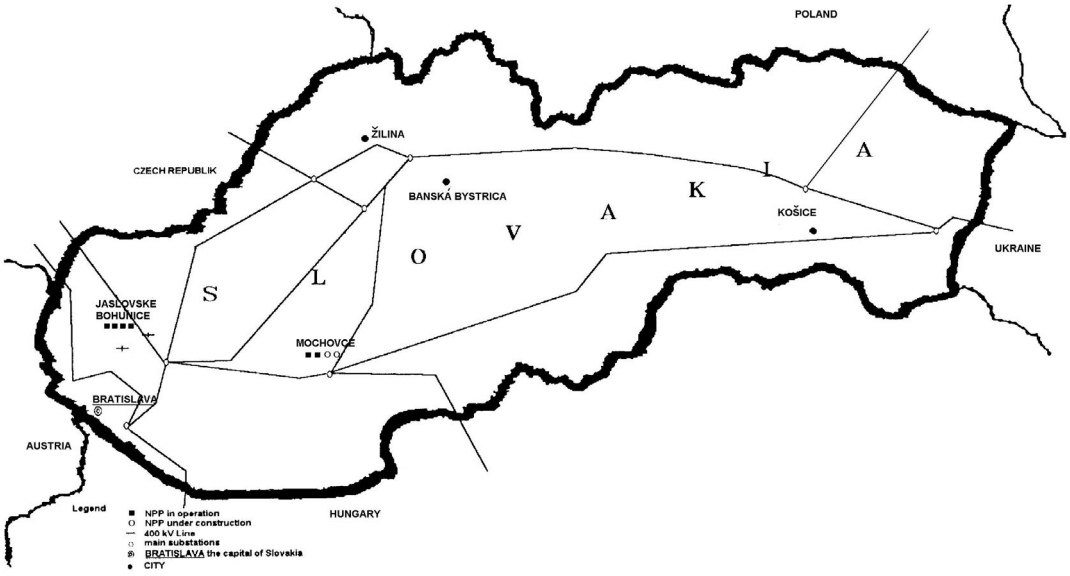

FIG. 1. Map of the Slovak Republic

[1] The profile has been updated by the Secretariat, mainly by replacing the statistical information in the Tables with EEDB and arranging contents according to the revised table of contents.

TABLE 1. SELECTED PARAMETERS FROM METEOROLOGICAL STATIONS IN BOHUNICE AND MOCHOVCE

Parameter	Unit	Jaslovské Bohunice	Mochovce
Elevation above sea	m	176	261
Average annual temperature	°C	9.3	9.1
Average annual humidity	%	76	75
Average annual rainfall	mm	548	560
Dominant wind direction		north-west	north-west
Wind velocity	m/s	3.4	1.7

Source: Country Information

TABLE 2. POPULATION INFORMATION

	1960	1970	1980	1990	1997	1998	1999	2000	2001	Growth rate (%/yr) 1980 To 2000
Population (millions)	4.1	4.5	5.0	5.3	5.4	5.4	5.4	5.4	5.4	0.4
Population density (inhabitants/km²)	85	92	105	107	109	109	110	110	110.2	
Urban population as percent of total					57	57	57			
Area (1000 km²)	49.0									

Source: IAEA Energy and Economic Database; Data & Statistics/The World Bank

1.1.1. Economic Indicators

The development of the gross domestic product (GDP) over the last ten years is shown in Table 3. The GDP and GDP per capita decreased compared with 1998. The 1996 energy consumption is shown in Fig. 2 whilst Fig. 3 shows the 1996 GDP and 1996 final energy consumption by sector. Projections of GDP in billion Slovak crowns, final energy consumption in PJ and energy requirements in PJ/billion Slovak crowns are shown in Table 4.

TABLE 3. GROSS DOMESTIC PRODUCT (GDP)

	1990	1991	1992	1993	1994	1995[a]	1996[a]	1997[a]	1998[a]	1999[a]	2000
GDP[(b)]	15,444	10,837	11,742	11,984	13,766	18,400	19,800	20,400	21,300	19,700	19.273
GDP[(c)] per capita	2,923	2,051	2,213	2,251	2,574	3,451	3,706	3,789	3,951	3,651	3.570
GDP by sector (%) :											
-Agriculture	7	6	5	6	7	5	5	5	4	4	
-Industry	59	60	38	41	33	36	37	34	32	32	
-Services	33	34	57	53	60	59	59	62	64	64	

[(a)] Data & Statistics/The World Bank [(b)] Millions of current US$ [(c)] Current US$ per capita

Source: IAEA Energy and Economic Data Base; Data&Statistics/The World Bank); Country Information.

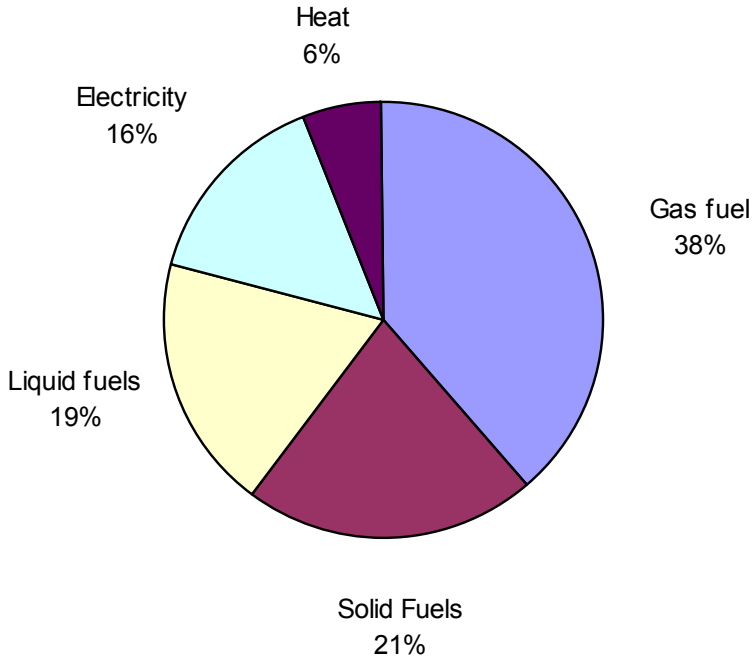

FIG. 2. 1996 Energy Consumption

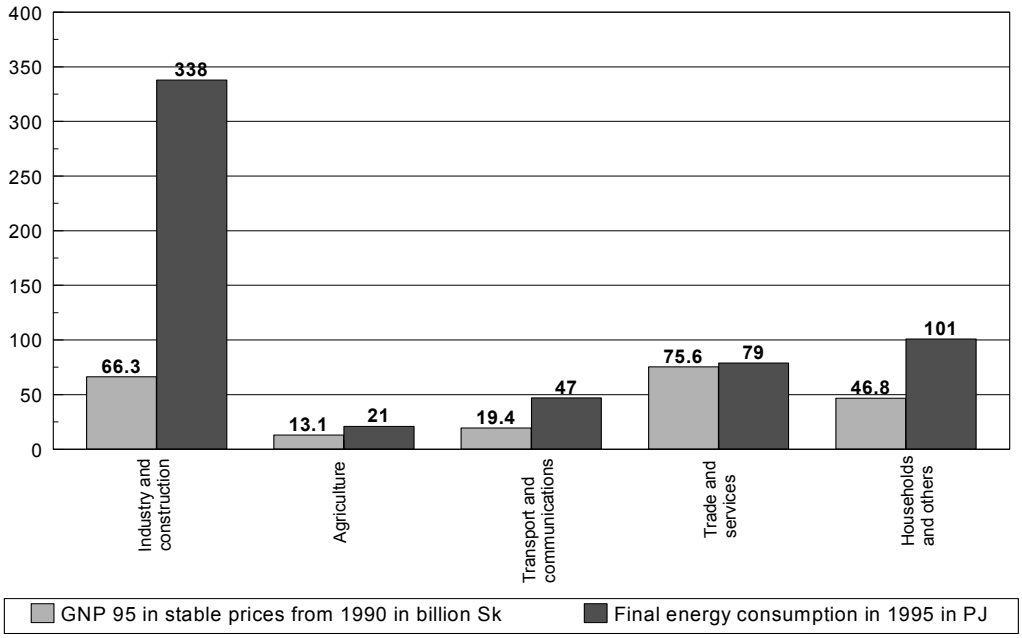

FIG. 3. 1996 GNP and final energy by Sectors

TABLE 4. CURRENT AND PROJECTED DEVELOPMENT OF GROSS DOMESTIC PRODUCT (GDP) IN CONSTANT 1990 PRICES

Year	Development of GNP		Final energy consumption	Energy requirements
	billion Sk	inter annual index	PJ	PJ/billion Sk
1990	243.6	100.0	729	3.0
1991	208.3	85.5		
1992	203.3	97.6		
1993	196.8	96.8	555	2.8
1994	206.0	104.7		
1995	221.2	107.4	586	2.6
1997	587.0*	-	780	-
2000	254.1	114.9	639	2.6
2005	294.6	115.9	666	2.3
2010	341.9	116.1	698	2.1

Source: Country Information 1 USD ≅ 50 Sk

1.1.2. Energy Situation

Slovakia has only a limited amount of available domestic energy resources, i.e. brown coal, oil, natural gas and renewable resources (Table 5.1). A breakdown of the fossil fuel resources is given in Table 5.2. The energy potential of renewable resources in Slovakia is approximately 5% from the total annual consumption of primary energy resources (Table 6). Table 7.1 shows the basic energy statistics and Table 7.2 the 1999 energy balance. The historical development of primary energy consumption is given in Table 8.

TABLE 5.1. ESTIMATED ENERGY RESERVES

	Estimated energy reserves in (Exajoule)					
	Solid	**Liquid**	**Gas**	**Uranium (1)**	**Hydro (2)**	**Total**
Total amount in place	1.94	0.04	0.57		0.96	3.52

(1) This total represents essentially recoverable reserves.

(2) For comparison purposes a rough attempt is made to convert hydro capacity to energy by multiplying the gross theoretical annual capability (World Energy Council - 2002) by a factor of 10.

Source: IAEA Energy and Economic Database.

TABLE 5.2. RESOURCES OF FOSSIL FUELS IN SLOVAKIA INCLUDING PROJECTED RESOURCES

Geological resources	Unit	Total amount	out of which balance reserves	
			totally	deposits mined
Coal	Mt	2,135	763	348
out of which: anthracite	Mt	8	2	0
brown coal	Mt	765	421	283
lignite	Mt	1,362	340	65
Oil	Mt	10	1	1
Natural gas	bil.m^3	29	11	8

As of January 1, 1996

Source: Country Information

TABLE 6. POTENTIAL OF RENEWABLE ENERGY RESOURCES IN SLOVAKIA

Resources	PJ/a
Geothermal energy	7.2
Forest biomass	11.6
Small hydro power plants	2.6
Solar energy	4.9
Wind energy	1.1
Biogas from waste	4.3
Communal and industrial waste	3.6
Total	35.3

Source: Country Information

TABLE 7.1. BASIC ENERGY SITUATION(*)

							Average annual growth rate (%)	
	1970	1980	1990	2000	2001	2002	1970 To 1990	1990 To 2002
Energy consumption								
- Total (1)				0.78	0.78	0.79		
- Solids (2)				0.19	0.18	0.18		
- Liquids				0.14	0.14	0.14		
- Gases				0.27	0.27	0.27		
- Primary electricity (3)				0.18	0.19	0.20		
Energy production								
- Total				0.26	0.27	0.27		
- Solids				0.04	0.04	0.04		
- Liquids								
- Gases				0.01	0.01			
- Primary electricity (3)				0.21	0.21	0.22		
Net import (Import - Export)								
- Total				0.55	0.55	0.55		
- Solids				0.15	0.15	0.15		
- Liquids				0.13	0.12	0.12		
- Gases				0.27	0.27	0.28		

(1) Energy consumption = Primary energy consumption + Net import (Import - Export) of secondary energy.

(2) Solid fuels include coal, lignite and commercial wood.

(3) Primary electricity = Hydro + Geothermal + Nuclear + Wind.

(*) Energy values are in Exajoule except where indicated.

Source: IAEA Energy and Economic Database.

TABLE 7.2. ENERGY BALANCE IN 1999

		Solid	Liquid	Gas	Total fossil	Heat	Electricity	Total
Natural resources	PJ	46	3	7	56	173	17	246
Fraction of consumption	%	21	2	5	10	N/A	N/A	N/A
Import	PJ	170	245	222	N/A	0	5	642
Export	PJ	-2	-117	0	N/A	0	-3	-122
Changes in storage	PJ	3	-2	-3	N/A	0	0	-2
Consumption	PJ	217	129	226	572	173	19	764

Source: Country Information

TABLE 8. CONSUMPTION OF PRIMARY ENERGY RESOURCES

Petajoule

	1990	1991	1992	1993	1994	1995	1996	1999
Solids	360	310	274	275	269	228	227	218
Liquid	197	171	150	130	137	156	144	132
Gases	224	212	214	205	202	221	232	243
Nuclear	132	129	121	120	132	125	148	143
Electricity	28	22	20	19	18	23	29	17
PER total	941	844	779	749	758	753	780	753
PER per capita	178	159	147	141	142	142	144	142

Source: Country Information

1.2. Energy Policy

The main goal is to achieve a necessary assurance in obtaining energy resources and to focus the Slovak energy economy on effective and environmentally friendly technologies of electricity generation, on higher use of renewables and secondary resources of energy, and on introduction of energy-saving production technologies and consumers, in which way a gradual reduction of the energy demands and of the absolute energy consumption will be provided.

The Energy Concepts for Slovakia till 2005 accepted by the Government decision No. 562/1993 define the principle objectives of and bases for the energy policy, analyze the current conditions of power economy and specify the strategy for assuring fuels and energy for the economy. These Energy Concepts were developed for the first time for the conditions of independent, national energy system. The philosophy of the concepts is based on a rational approach to both generation and consumption of electricity.

The Energy Concepts follow the concepts of industrial policy according to which the 1990 level of energy consumption will be reached between 2000 and 2003. A gradual restoration of the economic growth is expected with the increase of electricity consumption by approximately 2% annually. The approach to the assurance of resources that will meet the requirements of consumption has been changed drastically.

The fundamental strategic goal of the energy policy is to ensure fuel and energy for all consumers. The energy shall be:

i) produced with the lowest costs and impacts on the environment;
ii) transported to the consumer safely and reliably and in the quality required;
iii) used in the field of generation, transport and consumption as effective as possible.

One of energy policy priorities is to restore sound environment by reducing emissions of polluting materials in line with the accepted multilateral Convention on Remote Atmosphere Pollution from 1979 in Geneva, the protocols from Helsinki and Sofia on reduction of SO_2 and NO_x emissions, as well as the Declaration from The Hague. The following commitments resulted for Slovakia from the above documents:

i) to reduce SO_2 emissions by 30% in comparison with 1990 till 1993;
ii) not to exceed the level of annual NO_x emissions in 1987 by the end of 1994;
iii) to reduce CO_2 production by 20% against 1988 till 2005.

These specified tasks (only I) and ii)) in the power industry have been fulfilled up to now and there are expectations for their further successful fulfillment within the framework of the accepted "Energy Concepts of the Slovak Republic till 2005". Table 9 shows the emissions of steam power plants from SE a.s.

TABLE 9. EFFLUENTS INTO THE ENVIRONMENT FROM STEAM POWER PLANTS OF SE

Thousands tons

Pollutant	1990	1993	1995	2000	2001
SO_2	184.2	104.6	69.6	40.1	52,7
NO_x	31.5	24.7	25.3	21.4	18,7
CO_2	7 987	7 510	6 811	5 310	5 947
Solid pollutants (TZL)	56.7	13.9	10.6	8.5	8,0

Source: Country Information.

The fundamental document, defining main targets, directions and framework of power development, is the Power Policy of the Slovak Republic approved by the Slovak government decree No. 5 dated 12 January 2000.

The power policy defines the framework for new orientation of the power sector and has three pillars:
1. preparation for the integration into internal markets of the European Union,
2. security in power supplies,
3. sustainable development.

The main target of the preparation for integration into the EU internal markets is transformation of the power sector into a compatible one that is able and prepared to be incorporated into a united European market. The power sector transformation is conditioned by meeting the basic measures: restructuralization and privatization of power utilities, establishment of independent regulatory authority, making energy prices more realistic for all categories of consumers, completion and approval of legislation adapting power sector.

The intentions of the power policy are as follows:
- create competitive power sector able to access EU;
- establish conditions for stakeholders to enter electricity grid and to create competitive environment;
- minimize involvement of the state in the direct control of the sector;
- ensure non-discriminating and transparent conditions for all subjects participating in the generation, transmission, distribution and sale of power;
- make possible a gradual liberalization of power market for legitimate customers.

Another important measure related to nuclear power sector is the governmental decree on the closure of the two oldest units at the Bohunice V-1 nuclear power plant (EBO) in 2006 and 2008, respectively. By implementing a programme of modernization and safety upgrading of the V-2 Bohunice nuclear power plant, extension of the V-2 design lifetime will be enabled with the high level of safety maintained. The decision on the completion of Mochovce units 3 and 4 will depend on the interest of a strategic partner, as no guaranty of the state is possible.

In the field of electric power sector it is expected that a major part in the increase of electricity demand will be covered by developing the production of independent generators, mainly based on steam-gas cycle.

The development of heat supply systems, based mainly on centralized methods of heat supply for communal consumption and industrial technology processes, will depend on accelerated

elimination of deformations in the prices of electricity and natural gas. The process of making these prices more realistic has been already launched according to a time schedule accepted. A profitable geography position and significant location of Slovakia in regard to transit of natural gas through its territory into Western Europe create good preconditions for building a „Gas Centre“ with European-wide importance. Notwithstanding the high level of reliability of gas supply from the Russian Federation, it will be necessary to look for possibilities in diversification of gas imports from other territories. A similar suitable situation relates to the strategic assurance of oil imports. In line with EU legislation and with a bill under preparation on mandatory reserves of oil products, capacities for the storage of mandatory oil reserves (90-day reserve) will be gradually built. Based on a government decision to use preferentially for electricity production (up to the amount of 10% from total electricity consumption) domestic brown coal, that is the only significant fuel source, gradual extraction of coal and lignite resources in line with mining capabilities will be made possible. Protection of the environment is one of determining factors of the power policy. The legislation framework in effect and international obligations of Slovakia in the area of reduction of the production of emission materials provide the starting point for the acceptance of programs for emission reduction and increased utilization of renewable resources. For the implementation of these programs, coordinated progress of a number of industrial sectors and incorporation into practice of system measures in the field of tax and price policies, ecology and legislation is needed.

1.3. The Electricity System

1.3.1. Structure of the Electricity Sector

The dominant producer of electricity in Slovakia has been the utility Slovak Electric (SE) Inc. which is owned by the National Property Fund as a share-holding company (see Fig. 4 for its structure).

About 90% of the distribution and sale of electricity is done by regional energy enterprises shown in Table 10. The power grid operates within the framework of the Central Regional Net (Czech Republic, Hungary, Poland and Slovakia). In October 1995, a long-term trial test of the joint operation with the UCPTE started.

TABLE 10. DISTRIBUTION OF ELECTRICITY

(GW·h)

Region	1998	1999	2000	2001
East Slovakia	4889	4779	4605	4079
Central Slovakia	6824	6476	6531	6829
West Slovakia	6601	6659	6728	6889
Direct consumers of SE	3075	3087	3243	3074

Source: Country Information.

1.3.2. Decision Making Process

The development of the power sector has been implemented based on the Power Concepts of the Slovak Republic approved by the Slovak Government. The organization responsible for the development is the SE utility together with power distribution enterprises (Fig. 4).

1.3.3. Main Indicators

In 2000, the electricity production from SE was 26.3 TW·h (about 85%) and from other producers 4.6 TW·h (15%). The group of other producers consists mainly of energy generators in factories (auto producers). The development of electricity production and fuel consumption is given in Table 11 and also shown in Fig. 5. Table 12 shows the installed electrical capacity and Fig. 6 its share according to plant type. Fig. 7 shows the annual load follow curve of the Slovak electricity system.

BODIES OF SE

- General Assembly
- Supervisory Board
- Board of Directors

ORGANIZATIONAL CHART OF SE UTILITY AS OF JANUARY 1, 2001

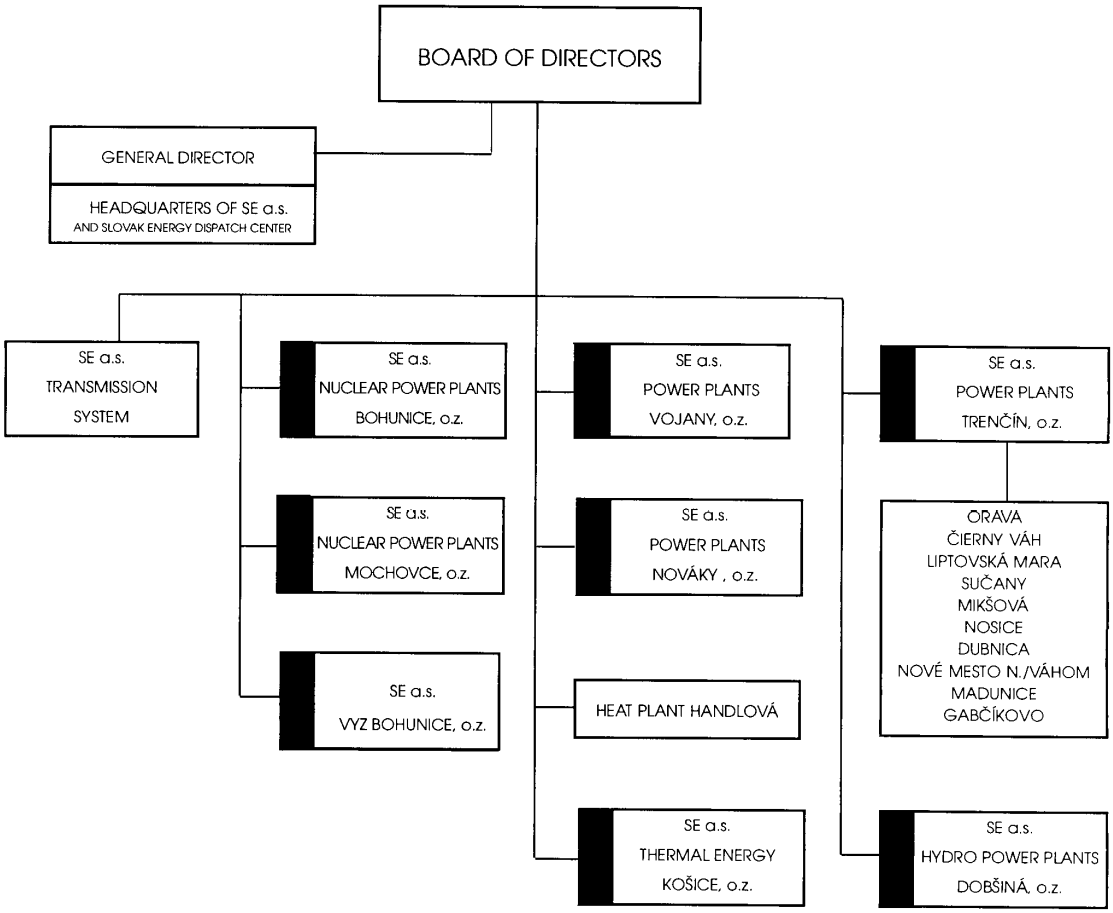

Fig. 4. Structure of the Slovak Electric utility (SE)

TABLE 11. DEVELOPMENT OF ENERGY PRODUCTION AND CONSUMPTION

TW·h

	Actual value						Prognosis
	1990	1994	1995	1998	2000	2001	2005
Nuclear power plants	12	12.1	11.4	11.4	16.5	17.1	17
Steam power plants	6.6	5.2	6.3	6.1	4.9	5.4	4.2
Hydro power plants	2.5	4.5	5.2	4.5	4.9	4.9	4.7
Other producers	3	2.9	3	4	4.6	4.6	8.1
Import - Export	5.2	0.4	1.4	2.3	-2.7	-3.7	-3.4
Consumption total	29.3	25.2	27.3	28.3	28.2	28.3	30.6
Production of electricity SE, Inc	21.1	21.8	22.9	22	26.3	27.2	23.6
Production of electricity Slovakia		24.7	25.9	26	30.9	32.0	34
Nuclear fuel consumption (PJ)	140.4	141.6	141.6	143.1	205.8		207.8

Source: Country Information

TABLE 12. INSTALLED ELECTRICAL CAPACITY

	Unit	Slovak Republic				SE, Inc			
		1995	1998	2000	2001	1995	1998	2000	2001
Installed capacity	MW	7117	7847	8292	8329	6119	6557	6999	6999
Nuclear power plants	MW	1760	2200	2640	2640	1760	2200	2640	2640
Thermal power plants	MW	2203	2385	2380	2388	1990	1963	1963	1963
Hydro power plants	MW	2375	2472	2450	2477	2369	2393	2395	2395
Auto producers	MW	778	791	822	824				
Peak loading Slovakia	MW	4218	4332	4275	4393				
Production of heat delivered	TJ						10720	9301	9851

Source: Country Information

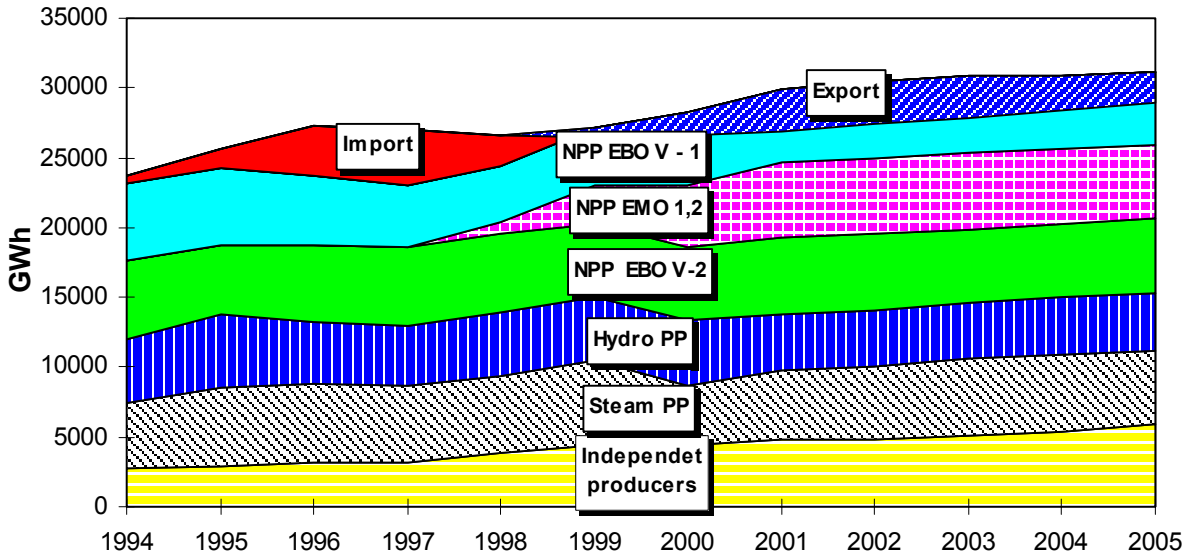

Fig. 5. Development of Electricity Generation

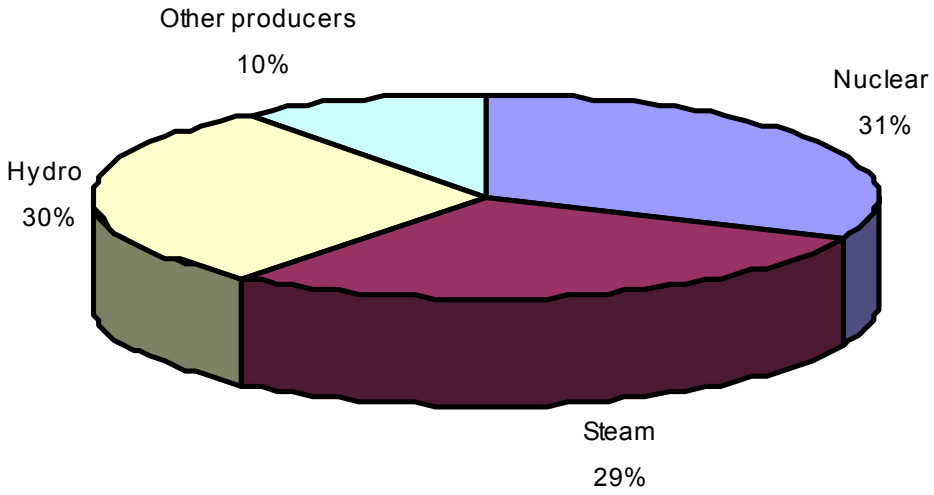

Fig. 6. Share of Power Plant Capacity in Slovakia 2001

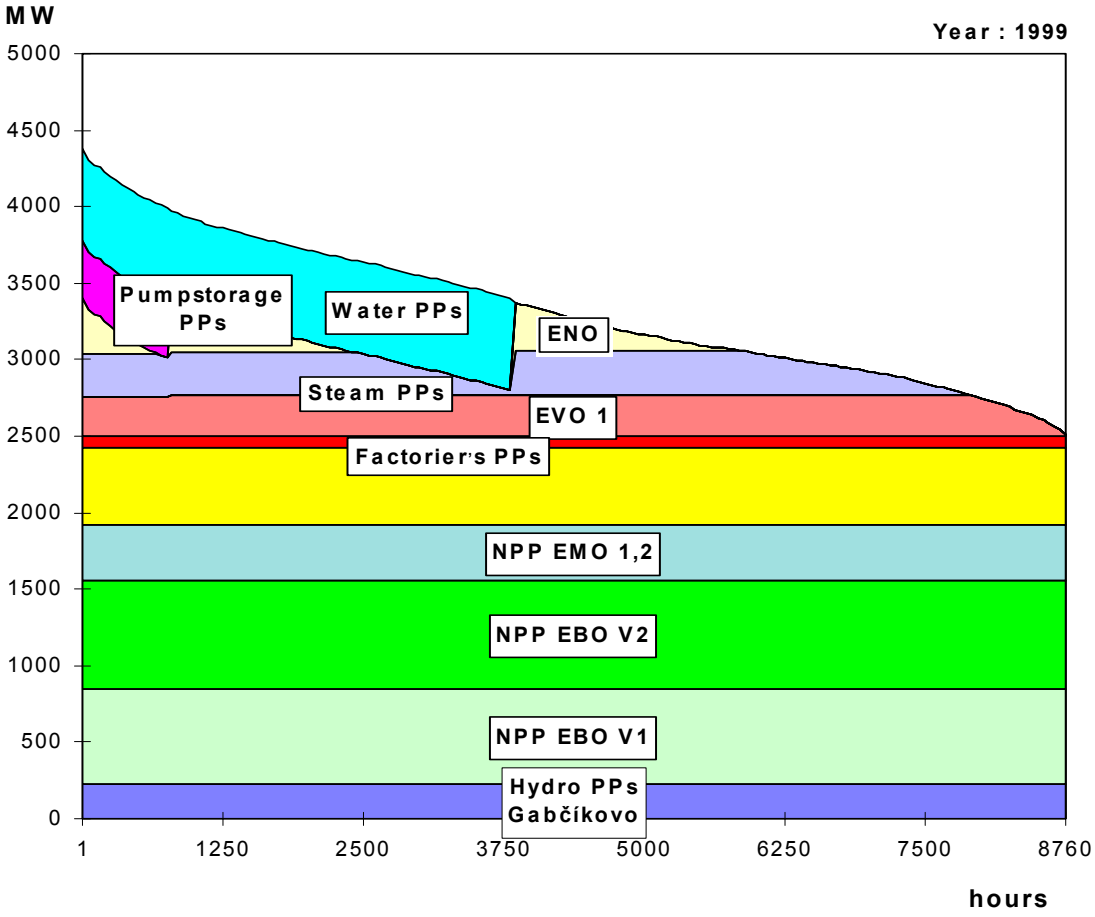

Fig. 7. Annual Load Follow Curve of the Slovak Electricity System

2. NUCLEAR POWER SITUATION

2.1. Historical Development and current nuclear power organizational structure

2.1.1. Overview

A-1 Bohunice:

1956	Intergovernmental agreement between the former USSR and CSSR on the construction of an industrial-research nuclear power plant on the territory of CSSR.
1957	Establishment of an investment enterprise Nuclear Power Plant A-1 by the decision of the Governmental Committee for Nuclear Energy and of the Authority for Nuclear Power Management.
1958	Beginning of A-1 construction.
1972	The research and development reactor KS 150 at A-1 reached criticality. Gradual increase of the electric output up to the maximum value of 127 MW. Connection of A-1 to the electric grid.
1976	First serious incident at the KS-150 reactor.
1977	The decisive severe accident during reactor refuelling.
1978	Decision of CSSR government to decommission A-1.
1992	Slovak government accepted the global concepts of A-1 decommissioning.
1998	Expected to bring A-1 into safe radiation conditions (The first phase ending in 2007).
2007	Completion of the first phase of A-1 decommissioning.

V-1 Bohunice:

1969	Decision of the State Planning Commission of CSSR based on an agreement with USSR to start the construction of nuclear power plants with pressurized water reactors of VVER 440 type.
1970	Decision of CSSR and USSR governments to supply two nuclear power plants each with two VVER reactors 440 MW.
1971	Establishment of affiliated organization in Jaslovské Bohunice.
1973	Laying of foundation stone for the construction of main production building.
1978	V-1 Unit 1 reactor made critical.
1979	Commissioning of V-1 Unit 1 into trial operation.
1980	Commissioning of V-1 Unit 1 into commercial operation. V-1 Unit 2 reactor made critical. Commissioning of V-1 Unit 2 into trial operation.
1981	Commissioning of V-1 Unit 2 into commercial operation.
1984	Re-evaluation of V-1 safety.
1986	Other safety measures to enhance nuclear safety.
1990	Execution of reviews to evaluate V-1 conditions.
1991	CSKAE Decision about V-1 operation based on implementation of additional safety measures.
1991-1995	Implementation of Phase 1 measures to upgrade safety by backfitting V-1 units.
1995-2000	Implementation of Phase 2 measures with the objective to achieve European standards and maintain V-1 in operation.

V-2 Bohunice:

1976	Agreement signed with USSR on the construction of V-2 in Jaslovské Bohunice. Beginning of V-2 construction.
1984	V-2 Unit 1 reactor made critical. Commissioning of V-2 Unit 1 into trial operation.
1985	Commissioning of V-2 Unit 1 into commercial operation. V-2 Unit 2 reactor made critical. Commissioning of V-2 Unit 2 into trial operation. Commissioning of V-2 Unit 2 into commercial operation.
2000	Concept of modernization with safety upgrading.

Mochovce:

1974	Preparatory studies, survey works, sociology survey.
1978	Federal Ministry of Fuel and Power approved an investment intention to construct two twin-reactor units with the capacity of 440 MW each.
1981	Physical start of Mochovce construction.
1983	Establishment of a concern enterprise Atomic Power Plants Mochovce with its headquarters in Mochovce.
1989	The original deadline for Mochovce Unit 1 commissioning failed to be met due to necessary replacement of inadequate instrumentation and control system.
1995	The way of funding the construction of Mochovce Units 1 and 2 was still open, construction and installation works continued in a minimum extent only. (The funding of Mochovce completion was resolved by the Government Decision No.339/96 dated May 14,1996).
1998	Unit 1 reactor reached criticality. Commissioning of Unit 1 into trial operation.
1999	Unit 2 reactor reached criticality.
2000	Commissioning of Unit 2 into trial operation. Completion of units 3 and 4 suspended since 1994.

2.1.2. Current Organizational Chart(s)

Fig. 9 shows the structure of institutions involved in nuclear power sector.

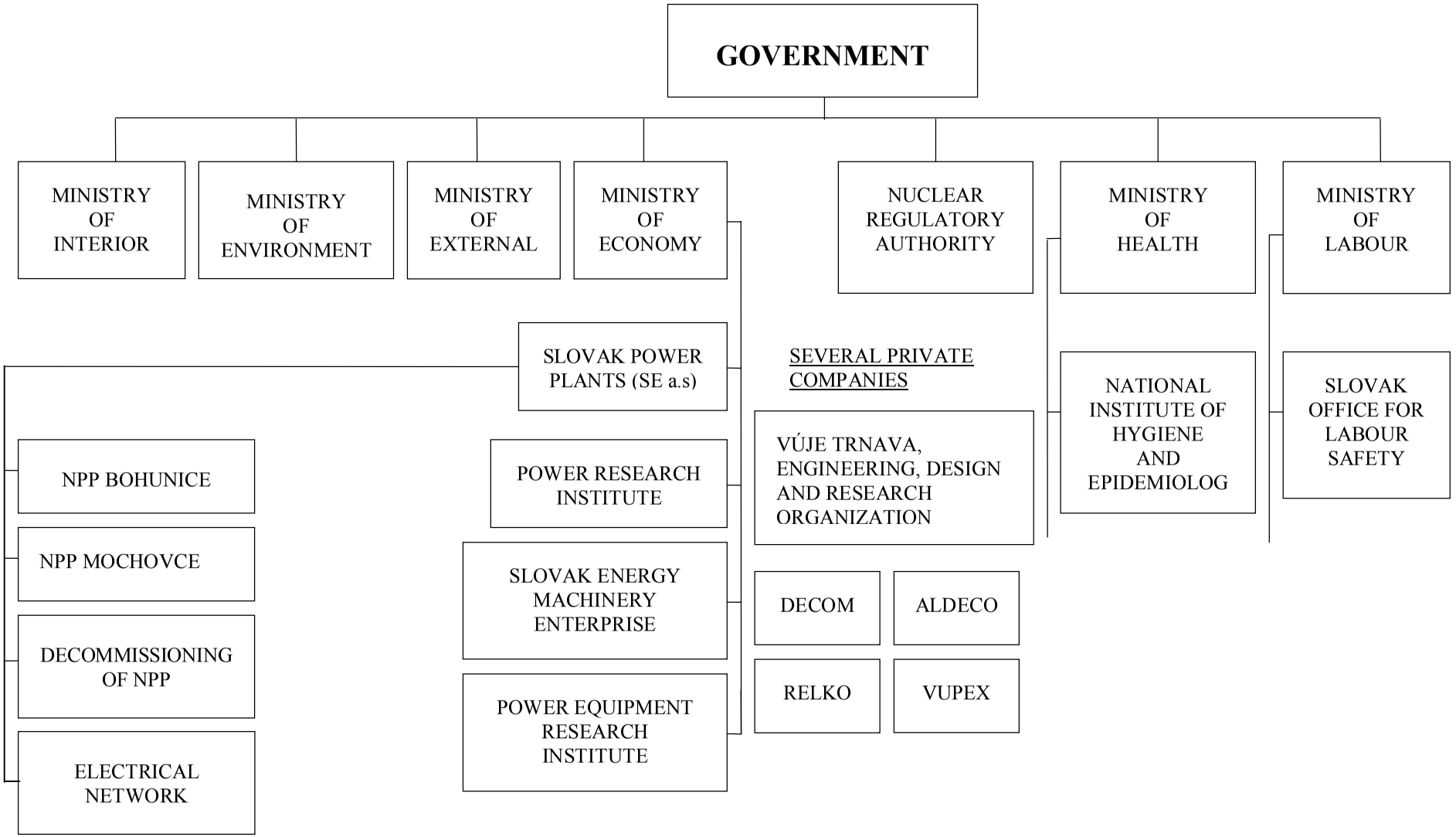

Fig. 9. Slovak Institutions involved in the nuclear sector

2.2. Nuclear Power Plants: Status and Operations

The decision on the orientation of the Slovak power industry in regard to the utilization of nuclear power made in seventies resulted from the status of useable reserves of primary energy resources that in no case could meet the demand on electricity. The construction of the V-1 Bohunice Plant (EBO Units 1, 2) with V-230 reactor types started in 1972 and the construction of the V-2 Bohunice Plant (EBO Units 3, 4) with V-213 reactors in 1976.

Four nuclear units are in operation in Bohunice, and two in Mochovce with a total capacity of 2.2 GWe. In 1998 the units produced 11.4 TW·h and the nuclear share was about 45% of the electricity production in our country. The Slovak Electric utility (Slovenske Elektrarne - SE), that operates the Bohunice nuclear power plant, was transformed in 1994. Two of the Bohunice units are of the older type of Soviet-designed VVER-440/230 pressurized water reactors. After an extensive program for upgrading these units carried out from 1991 to 2000, which brought them up to international safety standard levels, they were expected to be operated till 2015. Two other Bohunice units are of the more recent VVER-440/213 design which incorporate most of safety features of non-Soviet-type reactors. However, a program of further safety enhancement of these units has been undertaken in co-operation with Western European companies following the recommendations of the Slovak safety authority and the IAEA, see later in this Section.

Based on studies of further development of nuclear power in the former CSFR and following a lengthy decision making process, the construction of another nuclear power plant with four VVER 440 units with V-213 type reactors on the Mochovce site (EMO Units 1 to 4) started in April 1981. With regard to conceptually non-clarified questions of automatic control of production processes and nuclear safety, the completion of Unit 1, originally planned for 1985, has been gradually postponed and the process of its completion has not been completed on time.

Based on a decision of the Slovak government, in the first phase Mochovce-1 was completed in 1998 and Mochovce-2 in 2000. For the completion of Mochovce-1, 2, contracts have been signed with the following organizations: Atomenergoexport, Electricité de France, Energoprojekt Prague, EUCOM (Siemens AG, Framatome SA), Hydrostav Bratislava, ŠKODA Prague, VÚJE Trnava, and Zarubezhatomenergostroj. The Slovak government took over guarantees for bank loans for the Mochovce-1, 2 completion.

Table 13 presents some basic operating data and Table 14 shows the status of nuclear power plants in the Slovak Republic. The costs of one MW·h delivered from EBO 1, 2 and EBO 3, 4 and EMO 1 are calculated including 10 per cent contribution to the State Fund for Decommissioning of Nuclear Power Installations.

TABLE 13. BASIC DATA OF OPERATING NUCLEAR POWER PLANTS

	Production in TW·h		Load Factor in %		Net Efficiency in %	Own electr. cons. in %	Prod. Loss in TW·h	Heat delivered in TJ
Unit	2001	From commiss. till 31.12.01	Annual	Cumulative	Since commissioning		2001	2001
EBO 1	2,624	61,855	67,1	70,1	28,02	7,945	1,231	95
EBO 2	3,150	60,717	81,1	72,7	28,55	7,603	0,705	165
EBO 3	2,917	50,558	75,2	77,0	29,03	7,232	0,935	799
EBO 4	3,020	48,705	78,1	78,2	29,00	7,114	0,834	754
EMO 1	2,630	9,340	68,35	68,91	29,34	8,36	1,227	148
EMO 2	2,761	5,647	71,65	71,97	29,04	8,13	1,093	144
Total				-		-		

Prod. Loss EMO (gross) = P+U+O, TWh according to WANO PI	P - planned	U - unplanned	O - other	Cumulative Loss
EMO 1	0,890	0,074	0,263	1,227
EMO 2	0,651	0,208	0,234	1,093

Source: Country Information

These costs are approximately half in comparison with the costs of coal-burning steam power plants in SR. The costs of fossil plants represent more than 1000 Sk per one MW·h delivered in average. From the total electricity generated in SR in 2000, nuclear power plants generated 53%.

TABLE 14. STATUS OF NUCLEAR POWER PLANTS

Station	Type	Capacity	Operator	Status	Reactor Supplier
BOHUNICE-1	VVER	408	EBO	Operational	AEE
BOHUNICE-2	VVER	408	EBO	Operational	AEE
BOHUNICE-3	VVER	408	EBO	Operational	SKODA
BOHUNICE-4	VVER	408	EBO	Operational	SKODA
MOCHOVCE-1	VVER	388	EMO	Operational	SKODA
MOCHOVCE-2	VVER	388	EMO	Operational	SKODA
MOCHOVCE-3	VVER	388	EMO	Construction Postponed	SKODA
MOCHOVCE-4	VVER	388	EMO	Construction Postponed	SKODA
A-1 BOHUNICE	HWGCR	110	EBO	Under Decommissioning	SKODA

Station	Construction Date	Criticality Date	Grid Date	Commercial Date	Shutdown Date
BOHUNICE-1	01-Apr-74	27-Nov-78	17-Dec-78	01-Apr-80	
BOHUNICE-2	01-Apr-74	15-Mar-80	26-Mar-80	01-Jan-81	
BOHUNICE-3	01-Dec-76	08-Aug-84	20-Aug-84	14-Feb-85	
BOHUNICE-4	01-Dec-76	02-Aug-85	09-Aug-85	18-Dec-85	
MOCHOVCE-1	01-Oct-83	09-Jun-98	04-Jul-98	13-Oct-98	
MOCHOVCE-2	01-Oct-83	01-Dec-99	20-Dec-99	11-Apr-00	
MOCHOVCE-3	01-Jan-85				
MOCHOVCE-4	01-Jan-85				
A-1 BOHUNICE	01-Jan-58	01-Jan-72	01-Oct.-72	01-Dec-72	17-May-79

Source: IAEA Power Reactor Information System as of 31 December 2002.

Reactor Type V-1
2x440 MW VVER V-230

Based on recommendations from IAEA and EC experts, the so called "small backfitting" of V-1 was carried out between 1991 and 1992, with the costs of 2 million Sk, and focused mainly on:

- improving confinement integrity;
- upgrading seismic resistance;
- analyzing reactor pressure vessel life;
- backfitting fire protection systems;
- annealing reactor pressure vessels;
- installing another diesel generator and new distributions of essential power supply;
- verifying validity of the "leak before break" (LBB) principle at reactor coolant system.

The implementation of these actions was a prerequisite for the operation of the V-1 plant till 1995. According to the ÚJD SR Decision No.1/94, the prerequisite for further operation after 1995 was to implement the so called "gradual upgrading" between 1996 to 2000 with the costs of 8.000 million Sk. The content of the gradual upgrading was as follows:

- further improvement of confinement integrity;
- modifications of core cooling during both operation and loss of coolant accidents;
- modifications of emergency power supply for cooling systems, and of instrumentation and control systems;
- enhancement of the levels of quality assurance, safety, operating procedures, documents for personnel training, emergency planning etc.

The implementation of the gradual upgrading was completed in line with the schedule approved by the ÚJD SR. The V-1 nuclear safety thus achieved the level acceptable for early nuclear power plants according to both IAEA and WENRA reviews. During negotiations on Slovak accession to the EU, the Slovak government agreed to close the V-1 unit 1 in 2006 and the V-1 unit 2 in 2008.

Reactor Type V-2
EBO - 2 x 440 MW VVER 213

A similar programme will be implemented with the objective to upgrade V-2 seismic resistance and nuclear safety focused mainly on:

- modification of reactor coolant system, essential power supply, instrumentation and control system;
- strengthening of seismic resistance;
- improving of fire protection efficiency;
- enhancement of the levels of quality assurance, safety, operating procedures, documents for personnel training, emergency planning etc.

The ultimate goal for V-2 is to establish conditions for extending its design life up to 40 years, i.e. till 2025.

EMO - 2 x 440 MW VVER 213

The ÚJD SR issued operating licenses for the Mochovce Units 1 and 2.

2.3. Supply of NPPs

The main domestic producer and supplier of selected components of pressure systems (separators, piping) for nuclear power plants is the Slovak Power Engineering Works (SES) in Tlmace and the Piping Company in Kosice. The supplier of civil construction works is the Hydrostav Bratislava.

The main foreign suppliers are Atomenergoexport (Russia), ŠKODA and EGP (Czech Republic). Well-known Western firms (EdF, Framatome) cooperated with them during Mochovce completion and Bohunice upgrading.

2.4. Operation of NPPs

The owner of the Bohunice and Mochovce plants is the utility Slovak Electric (SE). The operators of these six units are SE affiliations Nuclear Power Plants Bohunice (EBO) and NPPs Mochovce (EMO). The Nuclear Power Plants Bohunice have built their own technical and professional capacities for the performance of maintenance activities. The execution of specialized activities is ordered by EBO and EMO from manufacturers of these components, or from specialized firms. The training of nuclear personnel, i.e. operators and maintenance and decommissioning personnel, is carried out by the Training Center in the VÚJE Trnava, Inc. – Engineering, Design and Research Organization. VÚJE performs professional, practical and theoretical training of nuclear power plant personnel in six categories based on the Certificate No. 1/94 from the ÚJD SR. The Category 1 is designed for selected personnel, e.g. operators, control physicists and reactor unit supervisors. Following successful graduation from theoretical and practical training, trainees obtain certificates. For the performance of a function, the Category 1 personnel have to obtain a ÚJD license that has to be renewed each two or three years depending on the function.

2.5. Fuel Cycle and Waste Management

Procurement of New Nuclear Fuel

All the fuel for the operation of six VVER-440 units in Slovakia has been fabricated in the Russian Federation and delivered by a monopoly Russian supplier. The supplier also takes care of the provision of natural uranium, its conversion and enrichment. No diversification is currently planned in the procurement of new fuel for the needs of the Slovak nuclear sector.

The VVER-440/213 units of the newer generation at Bohunice V-2 and Mochovce will be converted in order to use advanced fuel with higher enrichment (3.82%) and higher burnup (i.e. the fuel will stay about 5 years in the reactor) from 2001 onwards. This will result in a reduction of annual consumption of fuel to 84 assemblies (10 tU/year). Fuel storage on plant sites is maintained at the level corresponding to 6-month operation at the rated power level.

Management of Spent Fuel

By the end of 2000, the six Slovak VVER-440 units used 7 300 spent fuel assemblies. From this amount, approximately 700 assemblies were exported to the Russian Federation, 1 200 were cooled down in pools adjacent to the reactors, and 5 400 pieces were stored in a wet interim spent fuel storage facility at the Bohunice site. This facility was extensively refurbished during 1997-2000. The refurbishment resulted also in a capacity increase from 5 000 up to 14 000 fuel assemblies (or 1 680 tU). This capacity is sufficient for the fuel storage needs of both Bohunice till its expected closure and of Mochovce till 2015. By that time, it will be necessary to build a new storage facility at the Mochovce site. According to current intentions, the facility will probably be based on the dry storage technology.

The fundamental conception for the back end fuel cycle management remains unchanged. It is still expected that spent fuel will be ultimately disposed in a deep underground geological repository. Activities on the selection of an adequate site are thus continuing.

Treatment Disposal of Radwaste

The whole amount of radioactive waste from the past operation of the Bohunice units is stored temporarily on the site. The concepts of radwaste management from nuclear power installations and other organizations using sources of ionization radiation were prepared in 1993. The following production process fixing facilities have been constructed or are being built:

- A bitumenization facility for fixing concentrates was commissioned in 1995;
- A vitrification facility is in the stage of active comprehensive testing;
- A radwaste-processing center consists of a cementation facility with a possibility to densify concentrates, of a high-pressure pressing and of an incineration installation.

All low- and medium-level radwaste from Bohunice will be stored in fiber-concrete containers. To make the system of radwaste management complete, it was necessary to commission the operation of a disposal facility for low- and medium-level radwaste at the Mochovce site in 2000.

Material and Financial Provision of Radwaste Management

A new daughter plant of the SE utility with the name Decommissioning of Nuclear Power Installations and Management of Radioactive Waste and Spent Fuel (SE-VYZ) has commenced its activities on January 1, 1996. The new plant is located on the site of the Bohunice nuclear power plants. Its field of activities is spread over the whole Slovakia and it will be responsible for the ultimate disposal of all kinds of radwaste and spent fuel that have been and will be produced on the Slovak territory from the operation and decommissioning of nuclear power plants, as well as for early and complete preparation of designs and facilities and for executing of the above mentioned activities. Besides that, the new plant will provide the disposal of institutional radwaste from other organizations. The plant activities will be financed from the budget of the SE utility and from the State Fund for Decommissioning of Nuclear Power Installations and Management of Spent Fuel and Radwaste. This fund was established in 1995. The money has been accumulated from contributions amounting to 10 percent from the selling price of electricity supplied from nuclear power plants. The payment of this contribution is the responsibility of the nuclear power plant owner. From this fund, it is possible to take finances for the preparation and decommissioning of nuclear power installations, and for the management of spent fuel and radwaste related to nuclear power installation decommissioning, provided that approval of the Board of the State Fund for Decommissioning is given.

According to the projected electricity supply from nuclear power plants in Slovakia, the contributions to the State Fund for Decommissioning of Nuclear Power Installations and Management of Spent Fuel and Radwaste should provide approximately 30.8 billion Sk by 2010 including the interest rate of 6 per cent. This amount should be sufficient according to calculations performed for the construction of a long-term spent fuel storage installation with the costs of approximately 4.2 billion Sk and for the decommissioning of the V-1 plant following the completion of its economical life in the amount of about 10.0 billion Sk, and for other investment actions in this field. Establishment of the State Fund for Decommissioning of Nuclear Power Installations and Management of Spent Fuel and Radwaste should go in advance prior to its use, and the decommissioning of nuclear power installations and management of radwaste should be assured by finances without any other requests on the state budget of SR or other sources of SE.

2.6. Research and Development

The goal of nuclear research and development complex is to establish a research and development basis for state authorities, manufacturers and suppliers of process equipment for nuclear power installations and for nuclear power plant operators. As regards its structure, it includes basic research concentrated in the Slovak Academy of Sciences and at universities in a lesser extent, and applied research in a larger extent which provides the object of activities of independent research institutes (share-holding companies and companies with limited responsibilities) and sections of industrial organizations (Table 15).

With regard to financial aspects, the applied research is ensured by:

- projects of state orders;
- scientific and technical projects;
- orders from manufacture and supplier organizations, as well as from the operators of nuclear power installations.

2.7. International Co-operation and Initiatives

In the field of international co-operation, the most significant co-operation is with the International Atomic Energy Agency (IAEA) in Vienna, with the European Union within the PHARE programs and the 5th Framework Program (EURATOM), and last but not least also bilateral co-operation with international institutions and organizations. Slovakia co-operates by means of the IAEA with international subjects on:

- solution of research projects financed from a fund for technical co-operation;
- national projects within the framework of coordinated research with financial support from the IAEA;
- organization of international courses and seminars

The international co-operation with the EU goes within the framework of research and development programs of the European Community focused mainly on the 5th Framework Program and PHARE programs. The PHARE programs in the field of nuclear safety in relation to the EU are coordinated by the Slovak Ministry of Economy.

The Nuclear Regulatory Authority of the Slovak Republic (ÚJD SR) is a participant in discussions on regional and national programs in the field of nuclear safety. The national projects in this field are addressed since 1993 as regional ones in order to use the funds more effectively.

TABLE 15. SLOVAK TECHNICAL SUPPORT ORGANIZATIONS IN NUCLEAR SECTOR

Institution Name	Headquarters	Number of employees							Area of activity
		1992	1993	1994	1995	1998	2000	2001	
VÚJE Trnava	Trnava	543	462	434	420	612	633	612	Nuclear Safety, in-service inspection, plant commissioning and operation, personnel training, radiation safety
Research Institute of Welding (VUZ)	Bratislava	545	392	368	347	349	336	330	Technology of welding, welding equipment and materials, preparation of personnel, in-service inspections-only partly for NPPs
Research Institute of Cables and Insulating Materials (VUKI)	Bratislava	235	202	202	188	163	125	125	Cables with reduced flammability radiation resistant cables, testing of cables, residual life time of cables
Power Equipment Research Institute (VÚEZ)	Levice	118	109	106	106	150	146	146	Tests of containment's, sealing, condensation systems, safety system design, filtration and ventilation
Power Research Institute (EGU)	Bratislava	86	76	35	35	35	28	25	Integrity and lifetime of RPV, tubes, antiseismic upgrading, thermal loading, economical aspects
Institute of Clinical and Preventive Medicine-Dept. of Hygiene of Radiation	Bratislava	28	30	30	30	11	11	9	Personal dosimetry, radiation monitoring, protective barriers, radon, protection of patient and personal in medicine
CSA and EBO	Trnava	25	30	32	27	32	26	25	3-D model database of nuclear facilities, structural analysis digital archives
National Institute of Hygiene and Epidemiology (NUHE) Dept. for radiation protection	Bratislava	25	24	23	24	22	23	22	Expertise for radiation protection, state supervision in the field of radiation protection and nuclear safety
DECOM	Trnava	8	12	15	15	20	22	22	Preliminary projects for decommissioning, radwaste management decontamination
VUPEX	Bratislava	23	9	8	6	7	5	8	Technical-economical studies
RELKO	Bratislava		-	6	6	10	10	10	Reliability analysis, PSA studies, impact of external events
ALLDECO	Trnava	12	14	14	17	22	30	37	Decontamination technology and equipment
MERIT	Trnava	2	4	6	6	4	2	2	Radiation protection, dosimetry, monitoring, calculations of radiation fields
Institute of Radioecology	Kosice	not avail.	20	15	15	6	1	0	Radiological impact on environment, releases, decontamination
TOTAL		1650	1393	1297	1242	1443	1398	1373	

Source: Country Information

The bases for bilateral cooperation are intergovernmental agreements out of which some were transformed from the point of view of Slovakia as an independent state. Bilateral co-operation is widely developed which is evidenced by:

- establishment of the REKON consortium (VÚJE and SIEMENS) for the V-1 gradual safety upgrading;
- co-operation with BABCOCK in the design and implementation of control systems for coal-burning power plants;
- solution of research, development and technical problems together with:
  - KfK and NUKEM from Germany
  - EdF, Framatome, IPSE and CORYS from France
  - KEMA from the Netherlands
  - AEA Technology, Sheerbonnet and NNC from the United Kingdom
  - Westinghouse, SAIC, DS&S, ANL Argonne, Virginia Tech from the United States
  - ŠKODA, EGP, ÚJV Rez from the Czech Republic
  - Atomenergoexport and Zarubezhatomenergostroj from Russia.

3. NATIONAL LAWS AND REGULATIONS

3.1. Safety Authority and the Licensing Process

Licensing procedures have three main levels: selection of construction site, commencement of construction and permanent operation. Prior to issuing a license for permanent operation, the regulatory authority performs inspections in line with the approved programmes of active and non-active tests and issues approvals for fuel loading, physical start-up, power start-up and trial operation. The major regulatory authorities and the process of licensing procedures are shown in Figure 10.

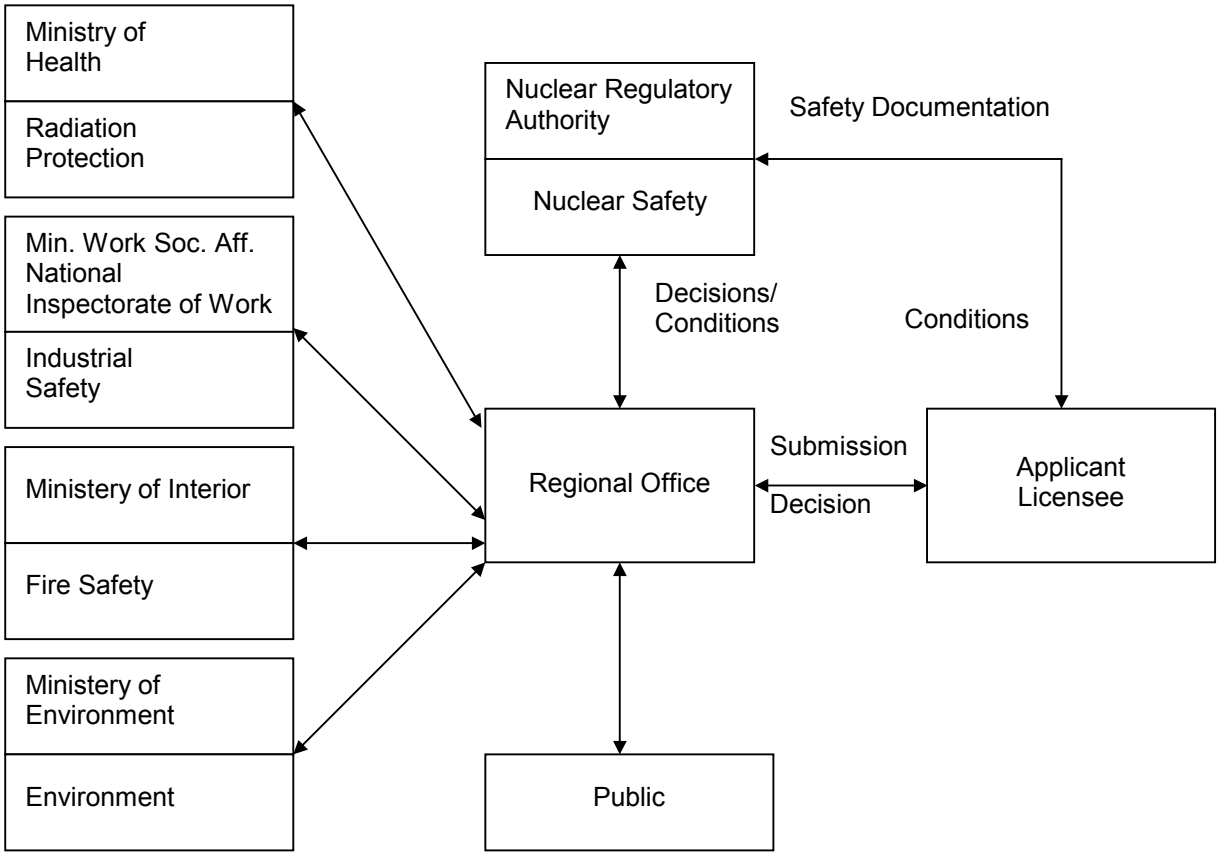

FIG. 10. Licensing procedures

The basic mandatory condition for issuing any approval related to nuclear safety is to develop and submit a Safety Analysis Report and other prescribed safety documentation and to comply with the conditions from previous approval proceedings and with the decisions of the regulatory authority. The environmental sections of regional offices issue decisions for the selection of construction site, construction, operation and decommissioning of nuclear installations based on the approval of the Nuclear Regulatory Authority, Ministry of Health and of other offices and organizations of state authorities. As regards approvals, responsibilities of these authorities are specified in the law No. 50/1976 (Construction Law), in Decrees of the former Czechoslovak Atomic Energy Commission Nos. 2/1978 and 4/1979 and in notices of the Ministry for Environment Nos. 453/2000 and 55/2001. The licensee is responsible for the safety of its nuclear installation.

The Nuclear Regulatory Authority (ÚJD) of the Slovak Republic is a follower of the former Czechoslovak Atomic Energy Commission. It was established on 1 January 1993 and its rights result from the Law No. 2/1993 of the Slovak National Council. The ÚJD is an independent state regulatory authority reporting directly to the government and its chairman is appointed by the cabinet. As of 1 January 2001, ÚJD staff amounted to 82 employees. The organizational structure is shown in the Figure 11.

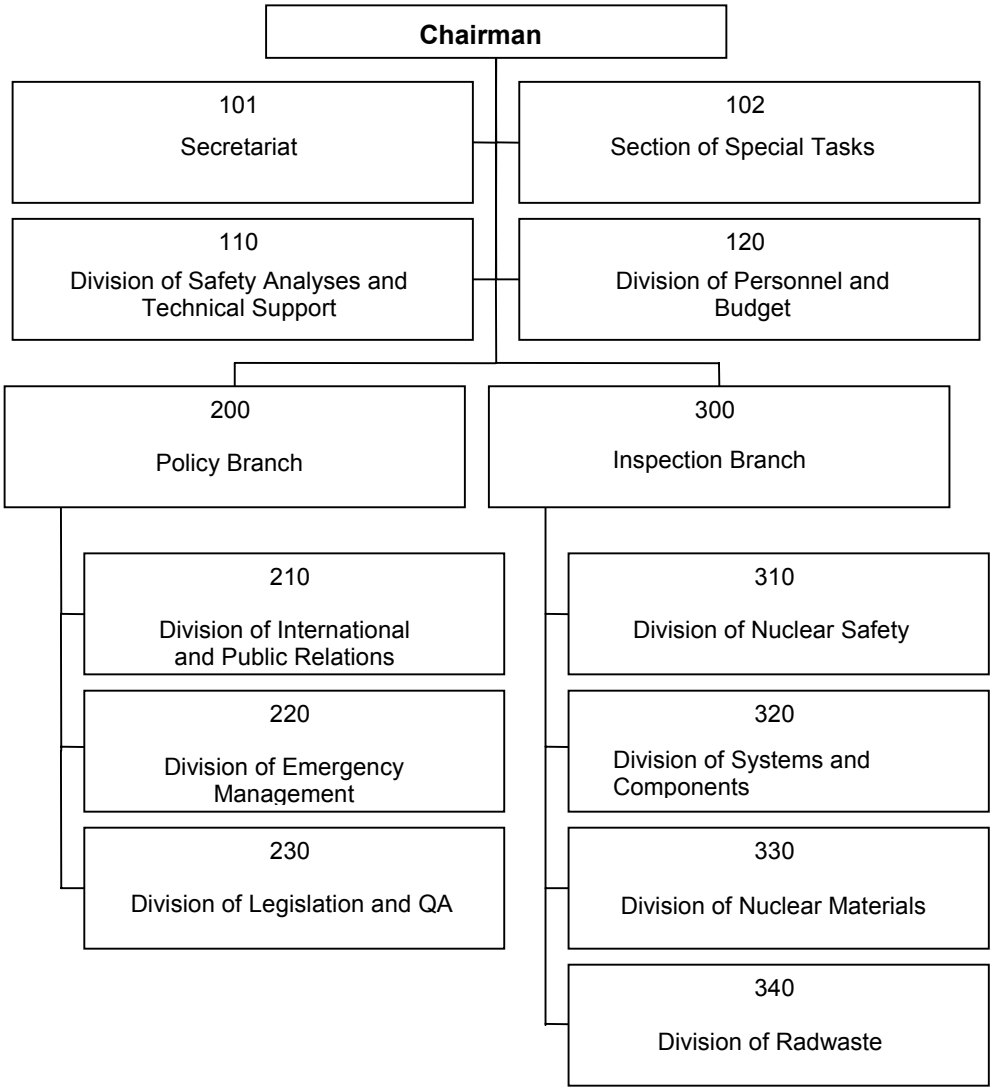

Fig. 11. Organizational Structure of the Nuclear Regulatory Authority ÚJD SR

The ÚJD SR Chairman is appointed by the government and co-operates with other central bodies of the state authorities in performing his activities, and he submits regularly to the Slovak government reports about the safety of nuclear installations in Slovakia and about his activities.

The ÚJD SR executes the state regulation over:

i) nuclear safety of nuclear installations including the regulation over the management of nuclear waste, spent nuclear fuel and other phases of nuclear fuel cycle;
ii) nuclear materials including their control and recording;
iii) quality of selected equipment and instrumentation.

The ÚJD SR ensures:

i) review of intentions how to use nuclear energy;
ii) evaluation and inspection of emergency plans;
iii) fulfilment of the commitments of the Slovak Republic resulting from international agreements in the field of nuclear safety and nuclear material safeguards.

The execution of nuclear regulation is supported by laws, especially in the law No. 130/1998 and in several regulations that give to the authority high powers including the acceptance of such measures as requirements on safety improvement, as well as orders for power reduction or reactor shut-down if required by safety reasons.

According to the law No. 130/1998, the ÚJD SR performs:

i) routine inspections by site inspectors;
ii) special inspections by nuclear safety inspectors;
iii) team inspections.

The routine inspections are executed according to standard procedures developed for the particular inspections. The special and team inspections are executed according to programs developed for the particular inspection. These programs are sent in advance to the organization in which the inspection is to take place. The inspectors write down protocols about the inspections performed. The inspections are performed in line with the Order of the ÚJD SR Chairman No.2/1995, with an inspection plan and programme of quality assurance and inspection activities as Appendix.

The authority has been established in line with international recommendations as was confirmed by a number of expert missions of the International Atomic Energy Agency and the European Commission. Work contacts with partner regulatory bodies in all European countries with nuclear power developed, but also in the U.S.A and Japan, contribute significantly to improving the work quality of the ÚJD SR.

On June 14, 2001, the bill No. 276/2001 on the regulation in network industries and on amendments in certain other laws was approved by the Slovak National Council. The bill specifies: A) establishment, authority and activities of the Office for Regulation of Network Industries; B) object and conditions of the state regulation in network industries; and C) conditions for the execution of regulated activities and rights and obligations of regulated subjects. The Office for Regulation of Network Industries was established as from 1 August 2001 and is currently under development.

3.2. Main National Laws and Regulations in Nuclear Power

- The law of the National Council of the Slovak Republic No. 2/1993 amends the law of the Slovak National Council No. 347/ 1990 on the organization of ministries and other bodies of state authorities in the Slovak Republic.
- The law No. 130/1998 on peaceful use of nuclear energy and amendments to the act No. 174/1968 on state supervision of work safety as amended by the act of the National Council of the Slovak Republic No. 256/1994.

- The CSKAE Decree No. 436/1990 on the quality assurance of selected equipment with regard to nuclear safety of nuclear installations.
- The CSKAE Regulation No. 2/1978 on the assurance of nuclear safety in designing, approving and performing constructions with nuclear power installation.
- The CSKAE Regulation No. 4/1979 on the general criteria for the assurance of nuclear safety in siting constructions with nuclear power installations.
- The CSKA Regulation No. 6/1980 on the assurance of nuclear safety in commissioning and operation of nuclear power installations.
- The CSKAE Regulation No. 9/1985 on the assurance of nuclear safety of research nuclear installations.
- ÚJD SR Regulation No. 29/1999 which includes list of special materials and equipment.
- ÚJD SR Regulation No. 30/1999 that specifies details about the maximum limiting amounts of nuclear materials for which occurrence of nuclear damage is not assumed.
- The law No. 276/2001 on the regulation in network industries and on amendments in certain other laws was approved by the Slovak National Council.

4. CURRENT ISSUES AND DEVELOPMENTS ON NUCLEAR POWER

4.1. Energy Policy

The results of a survey carried out in Slovakia concerning the public opinion on the use of nuclear energy are shown in Fig. 8. The data are based on the results of a standard survey by a Gallup's questionnaire method on a selected sample of 1.037 people from the population above 18 years in 1995. About 46% of the selected population indicated to be on favour of nuclear power and 44% was against.

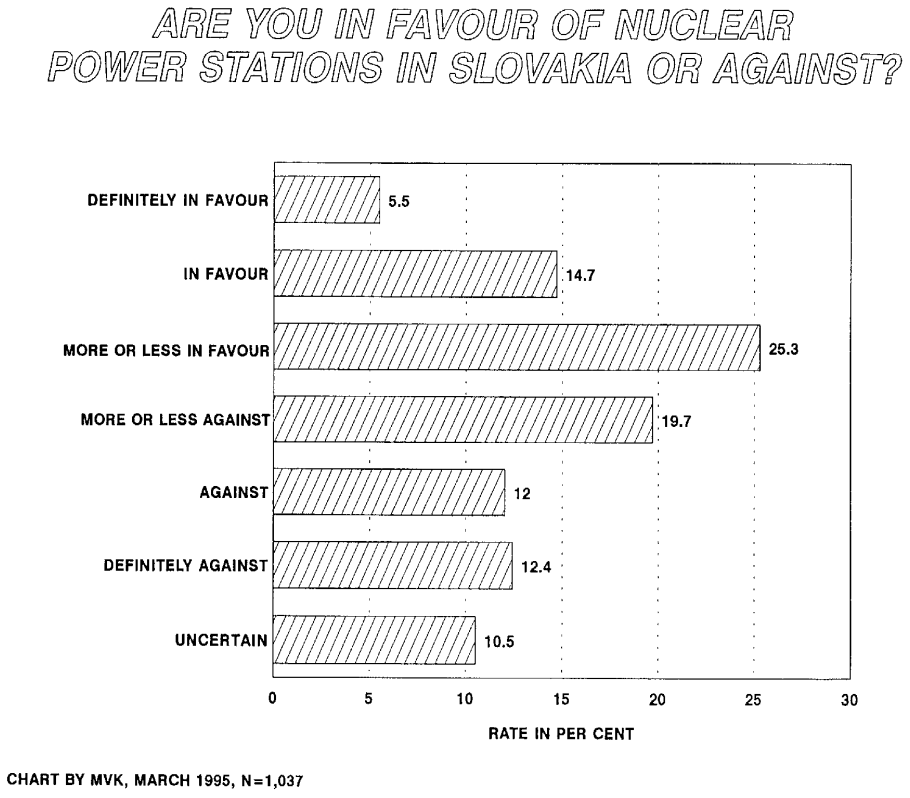

Fig. 8. Results of Survey on the Use of Nuclear Energy

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Appendix 1

INTERNATIONAL, MULTILATERAL AND BILATERAL AGREEMENTS

AGREEMENTS WITH THE IAEA

• NPT related safeguards agreement INFCIRC/173/Add 2	Entry into force by Czechoslovakia: Succession: New Agreement signed on	28 December 1972 1 January 1993 27 September 1999
• Additional Protocol	Signed	27 September 1999
• Improved procedures for designation of safeguards inspectors	Accepted	
• Revised supplementary agreement on provision of technical assistance by the IAEA	Entry into force:	4 October 1995
• Agreement on privileges and immunities	Succession:	27 September 1993

OTHER RELEVANT INTERNATIONAL TREATIES etc.

• NPT	Succession:	1 January 1993
• Treaty on the prohibition of the emplacement of nuclear weapons and other weapons of mass destruction on the sea bed and the ocean floor and in the subsoil their off		
• Convention on physical protection of nuclear material	Entry into force:	1 January 1993
• Convention on early notification of a nuclear accident	Entry into force:	1 January 1993
• Convention on assistance in the case of a nuclear accident or radiological emergency	Entry into force:	1 January 1993
• Vienna convention on civil liability for nuclear damage	Entry into force:	7 June 1995
• Joint protocol	Entry into force:	7 June 1995
• Protocol to amend the Vienna convention on civil liability for nuclear damage	Not signed	
• Convention on Supplementary compensation for nuclear damage	Not signed	

• Convention on nuclear safety	Entry into force:	24 October 1996
• Joint convention on the safety of spent fuel management and on the safety of radioactive waste management	Entry into force:	18 June 2001
• ZANGGER Committee	Member	
• Nuclear Export Guidelines	Adopted	
• Acceptance of NUSS Codes	Summary of reply received from Czechoslovakia: Codes are appropriate for formulating and implementing national requirements. They are used for that purpose. Letter of:	2 November 1988
• Nuclear Suppliers Group	Member	

BILATERAL AGREEMENTS

- Agreement between the Government of the Czech and Slovak Federal Republic and the Government of Hungary on Exchange of Information and Co-operation in the Field of Nuclear Safety and Radiation Protection.
- Agreement between the Government of the Czech and Slovak Federal Republic and the Federal Government of Germany on Questions of Common Interest in Connection with Nuclear Safety and Radiation Protection.
- Agreement between the Government of the Czech and Slovak Federal Republic and the Government of Austria on Questions of Common Interest in Connection with Nuclear Safety and Radiation Protection.
- Agreement between the Government of the Czech and Slovak Federal Republic and the Government of the United States of America on Co-operation in Peaceful Uses of Nuclear Energy.
- Agreement between the Government of the Czechoslovak Socialist Republic and the Government of India on Co-operation in the Field of Peaceful Uses of Nuclear Energy.
- Agreement between the Government of the Czechoslovak Socialist Republic and Government the Union of Soviet Republics on Extension of Co-operation in Peaceful Uses of Nuclear Energy.
- Agreement between the Government of the Czechoslovak Socialist Republic and the Government of Peoples Republic of Bulgaria on Co-operation in Peaceful Uses of Nuclear Energy.
- Agreement between the Government of the Slovak Republic and the Government of the Czech Republic on Co-operation in the Field of State Supervision of Nuclear Installations and of State Supervision of Nuclear Materials.
- Agreement between the Government of the Slovak Republic and the Government of the Republic of Poland on Early Notification of Nuclear Accidents, on Exchange of Information and Co-operation in the Field of Nuclear Safety and Radiation Protection.
- Agreement between the Government of the Slovak Republic and the Government of Canada for Co-operation in the Peaceful Uses of Nuclear Energy.
- Agreement between the Government of the Slovak Republic, the Government of Ukraine and the Government of the Russian Federation on Co-operation in the Field of Transportation of Nuclear Fuel between the Slovak Republic and the Russian Federation across the Territory of Ukraine.

- Agreement between the Government of the Slovak Republic, the Government of the Czech Republic, the Government of the Russian Federation and Cabinet of Ministers of Ukraine on Co-operation in the Field of Transportation of Nuclear Materials between the Czech Republic and the Russian Federation across the Territory of the Slovak Republic and the Territory of Ukraine.
- Agreement between the Government of the Slovak Republic and the Cabinet of Ministers of Ukraine on Early Notification of Nuclear Accidents, on Exchange of Information and Co-operation in the Field of Nuclear Safety and Radiation Protection.
- Agreement between the Government of the Slovak Republic and the Government of the Republic of Slovenia for the Exchange of Information in the Field of Nuclear Safety.
- Agreement between the Ministry of Economy of the SR and Federal Nuclear and Radiation Safety Authority of Russia on Co-operation in the Field of State Supervision of Nuclear Safety in the Peaceful Uses of Nuclear Energy.
- Agreement between the Ministry of Economy and the Committee on the Use of Atomic Energy for Peaceful Purposes of the Republic of Bulgaria on Co-operation in the Field of State Supervision of Nuclear Safety in the Peaceful Uses of Nuclear Energy.
- Arrangement between the Nuclear Regulatory Authority of the Slovak Republic (U.J.D.S.R.) and United States Nuclear Regulatory Commission (U.S.N.R.C) for the Exchange of Technical Information and Co-operation in Nuclear Safety Matters.
- Arrangement between the Nuclear Regulatory Authority of the Slovak Republic and the Nuclear Installations Safety Directorate of the French Republic for Exchange of Information and Co-operation in the Regulation of Nuclear Safety.
- Administrative Arrangement between the Nuclear Regulatory Authority of the SR and the Atomic Energy Control Board of Canada Pursuant to the Agreement between the Government of Canada and the Government of the Slovak Republic for Co-operation in the field of Peaceful Uses of Nuclear Energy.

Appendix 2

DIRECTORY OF MAIN ORGANIZATIONS, INSTITUTIONS AND COMPANIES INVOLVED IN NUCLEAR POWER RELATED ACTIVITIES

NATIONAL ATOMIC ENERGY AUTHORITY

Nuclear Regulatory Authority (UJD SR)
PO Box 24
Bajkalska 27
820 07 Bratislava

Tel: +421-2-53421 032
Fax: +421-2-53421 015
http://www.ujd.gov.sk/

OTHER MINISTRIES

Ministry of the Environment — http://www.lifeenv.gov.sk/minis/index.html

OTHER NUCLEAR ORGANIZATIONS

Slovak Electric (SE)
Hranicná 12
827 36 Bratislava

Tel.: +421-2-5069 3252
Fax: +421-2-5069 3552

Affiliations:
- NPP Bohunice
91931 Jaslovske Bohunice

Tel.: +421 33 555 2201
Fax: +421 33 559 1571

Decommissioning of Nuclear Power Installations and Management of Radwaste and Spent Fuel (VYZ)
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http://www.uniba.sk/www/index-e.html

P.J. Safarik University Kosice http://www.upjs.sk/

Technical University of Bratislava http://www.stuba.sk/index_en.html

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Slovak Metrological Institute http://www.smu.gov.sk/