POLAND

(UPDATED 2011)

1. GENERAL INFORMATION

1.1. COUNTRY OVERVIEW

1.1.1. GOVERNMENTAL SYSTEM

Poland is a democratic country based on legislative, executive and judicial authorities.

The legislative authority is held by a two-bodied Parliament. The upper chamber (Senat) with 100 senators and the lower chamber (Sejm) with 460 deputies who are elected for a four-year term in general election.

The executive authority is due to the President, elected for a five-year term in general election, and to the Government. The Head of the Government and on his/her recommendation, the Ministers, are nominated by the President. Thus constituted Council of Ministers is responsible for domestic and foreign affairs, whose activities are supervised by the Head of the Council of Ministers, i.e. the Prime Minister.

State administration and the government in a province (voivodship) are represented by a voivoda. On the basis of the act of the 24th July 1998, which came into effect on the 1st January 1999, a three-level territorial division of the country was introduced.. The units of this division are : communes, counties and voivodships. Since January 1999, the country has been divided into 16 voivodships.

The capital city of Poland is Warsaw (area of 494 square km) with 1,702 thousand inhabitants.

The official language is Polish

The monetary unit is 1 zloty (PLN) = 100 groszy

1.1.2. GEOGRAPHY AND CLIMATE

Provide a brief description of geography, climate, etc. (relevant in connection with energy/nuclear power).

Poland is located in Central Europe on the coast of the Baltic Sea. Poland boarders with: the Czech Republic (796 km), Slovakia (541 km), Ukraine (535), Germany (467 km) , Belarus (418 km), Russia (210 km) and Lithuania (104 km). The length of the sea border equals 440 km (length of coast line is 770 km). **The total length of the borders is 3511 km**.

The area of Poland is equal to 322,575 sq km, comprising land area (together with inland waters)-311,888 sq km, sea inland waters – 2,005 sq km, territorial waters – 8,682 sq km. According to calculations of the total area of all administrative units, **the total administrative area of Poland is equal to 312,679 sq km** (311,888 sq km of land area and 791 sq km of sea inland waters).

In Poland lowlands (elevations below 200m) take up 75% of the country's surface. The average elevation is thus only 173 meters. Lowlands appear in the north and in the centre, whereas mountains and highland areas in the south. The highest elevation is Rysy – 2,499m.

Poland lies in the transitory climate zone. The western part of the country has a temperate oceanic climate, whereas in the eastern part continental temperate climate prevails. Different masses of air collide over the territory of Poland which is the result of its central location in Europe and latitude layout of topographic zones.

The average annual air temperature in Poland is 7 to 10 ºC (excluding mountainous areas). Significant differences occur between summer and winter periods. The average summer temperature oscillates between 16.5ºC to 20 ºC, and from – 6ºC to 0ºC in winter.

1.1.3. POPULATION

Complete Table 1 and provide a brief summary of the projected population growth.

Poland, after the change of political system, is suffering from a decline in population. This situation is due to a number of phenomena among which the decrease in birth rate plays a significant part. The Central Statistical Office predicts further decline in the next

25 years. It is expected that in the year 2035, the population of Poland will be about 36 million. It will create some problems for the national economy due to the increasing number of elderly people.

TABLE 1. POPULATION INFORMATION

							Average annual growth rate (%)
Year	1970	1980	1990	2000	2005	2009*	2000 to 2009
Population (millions)	*32.5*	*35.6*	*38.1*	*38.5*	*38.2*	*38.1*	*-0.1*
Population density (inhabitants/km²)	*106.8*	*116.8*	*125.2*	*126.3*	*124.6*	*125.3**	
Urban Population as % of total	*52.1*	*58.1*	*61.3*	*61.7*	*61.5*	*61,2*	
Area (1000 km²)						*312.7*	

* data for 2008

Source: World Bank World Development Indicators

1.1.4. ECONOMIC DATA

Complete Table 2 and provide a brief summary of the projected GDP Growth.

In the years 1990-91 Gross Domestic Product (GDP) decreased by about 7% per year, mainly due to a dramatic fall in industrial output caused by plummeting demand. It was a consequence of the administrative control of wage increase, high exchange rates, lowering of subsidies and increase in interest rates. There were also some restrictions in investments and employment. A significant improvement in national economy took place in the years 1994-1997. The average GDP equaled 6.4%. It was the effect of good results achieved in industry, the construction sector and also in trade. The inflow of foreign capital influenced an increase in employment and investments significantly. Consumer demand was stimulated by the increase in buying power and consumption as well as by loans.

In the consecutive years **economic slowdown** was observed. Economic crisis in Russia caused an abrupt break in export to the East, which in years 1998-1999 lead to the biggest negative foreign exchange rate Better results in agriculture and a one-digit inflation were the positive phenomena of this period. The reverse in negative tendencies took place in 2003, and in 2004 GDP increased by 5.3% .The boom had a wide range of influence and its sources were ascribed to Poland's accession to The European Union resulting in export acceleration.

The period of pronounced economic growth comprising all main sectors (i.e. services, industry, construction) which started in 2004 lasted until the middle of 2008. In the next years the tendency to grow slowed down, also owing to the financial crisis. **In the year 2009 the GDP increase was equal to 1.7%.**

TABLE 2. GROSS DOMESTIC PRODUCT (GDP)

							Average annual growth rate (%)
	1970	1980	1990	2000	2005	2009	2000 to 2009
GDP (millions of current US$)			*58 975.9*	*171 276.1*	*303 912.3*	*430 076.2*	*10.6*
GDP (millions of constant 2000 US$)			*118 040.7*	*171 276.1*	*199 363.6*	*241 510.3*	*3.9*
GDP per capita (PPP* US$/capita)			*5 460.7*	*10 513.9*	*13 784.2*	*19 058.7*	*6.8*
GDP per capita (current US$/capita)			*1 547.2*	*4 454.1*	*7 963.0*	*11 273.3*	*10.7*

SOURCE: WORLD BANK WORLD DEVELOPMENT INDICATORS

1.2. ENERGY INFORMATION

FOR ENERGY UNITS, PLEASE REFER TO ATTACHMENT-1.

1.2.1. ESTIMATED AVAILABLE ENERGY

Complete Table 3 showing reserves of fossil fuels and uranium, and potential renewable energy. Countries with significant resources of Thorium should add a column. Calculation of EJ equivalent is optional and for renewables should be expressed for a period of 10 years. Additional information on the economic viability of recoverable energy sources may be added.

TABLE 3. ESTIMATED AVAILABLE ENERGY SOURCES

Estimated available energy sources					
Fossil Fuels			Nuclear	Renewables	
Solid	Liquid	Gas	Uranium	Hydro	Other Renewable

Total amount in specific units*	55		139	7270		
Total amount in Exajoule (EJ)						

* Solid, Liquid: Million tons; Gas: Billion m^3; Uranium: Metric tons; Hydro, Renewable: TW

Source:

1.2.2. ENERGY STATISTICS

Complete Table 4 in Exa-Joule (EJ)

TABLE 4. ENERGY STATISTICS

	1970	1980	1990	2000	2005	year* 2009	Average annual growth rate (%) 2000 to year* 2009
Energy consumption**							
- Total	3.53	5.21	4.23	3.72	3.90	3.93	5.65
- Solids***	2.90	4.02	3.16	2.35	2.32	2.16	-8.09
- Liquids	0.37	0.77	0.66	0.82	0.93	1.05	28.05
- Gases	0.22	0.37	0.37	0.42	0.51	0.51	21.43
- Nuclear							
- Hydro	0.01	0.02	0.00	0.01	0.01	0.01	0.00
- Other Renewables	0.03	0.03	0.04	0.12	0.13	0.20	66.67
Energy production							
- Total	4.00	5.10	4.10	3.29	3.23	2.74	-16.72
- Solids***	3.76	4.85	3.95	2.99	2.88	2.36	-21.07
- Liquids	0.02	0.01	0.01	0.03	0.04	0.03	0.00
- Gases	0.18	0.19	0.10	0.14	0.16	0.15	7.14
- Nuclear							
- Hydro	0.01	0.02	0.00	0.01	0.01	0.01	0.00

- Other Renewables	0.03	0.03	0.04	0.12	0.14	0.19	58.33
Net import (Import – Export)							
- Total	-0.46	0.11	0.14	0.34	0.69	1.26	270.59

* Latest available data

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

*** Solid fuels include coal, lignite

Source: ARE S.A.

1.2.3. ENERGY POLICY

Briefly describe the current energy policy in terms of, for example, independence of the sector, use of domestic resources, importance of market forces, influence of climate change and impact of the Kyoto protocol. Include a short discussion on the energy resources of the country and their impact on energy policy.

POLICY OBJECTIVES

ENERGY POLICY TO 2030

The main objective of the energy policy document adopted by the government in November 2009 is to enhance the country's energy security by observing the principle of sustainable development. The key directions of Polish energy policy are:

- to improve energy efficiency;
- to enhance security of fuel and energy supplies;
- to diversify the electricity generation structure by introducing nuclear energy;
- to develop the use of renewable energy sources, including biofuels;
- to develop competitive fuel and energy markets; and
- to reduce the environmental impact of the power industry.

Polish energy policy is driven to a very large extent by EU directives and requirements. In particular, Poland has to liberalize its electricity market in line with the EU directives. The Polish electricity market has been gradually opened to competition since 1998 and was fully opened on 1 July 2007, in accordance with EU directives. All customers are now eligible to choose their supplier. Poland has adopted all EU regulations regarding market liberalisation and security of supply relatively quickly, compared to some other countries that started market transformation earlier.

Poland therefore places focus on maximizing the use of existing domestic energy resources. Also, as part of the EU "20-20-20" goals, the following targets have been set for Poland for 2020:

- limit greenhouse gas emissions in the sectors not covered by the EU Emissions Trading Scheme (EU-ETS) to 14% above the 2005 level (binding target);
- reduce energy consumption by 20% of the projected 2020 levels (non-binding); and
- increase the share of renewable energy to 15% of gross final energy consumption, including an increase of the renewables in transport to 10% (binding target).

1.3. THE ELECTRICITY SYSTEM

1.3.1. ELECTRICITY POLICY AND DECISION MAKING PROCESS

Provide a brief description of electricity policy including planning the electricity system. Briefly describe the future plans.

The government aims to enhance security of electricity supply through the following measures:

- ♦ continuing to use coal as the main fuel for power generation;
- ♦ building new generating capacity (including nuclear units and new highly efficient co-generation plants);
- ♦ developing and modernizing the national transmission system;
- ♦ developing cross-border connections to exchange the equivalent of 25% of the electricity used in Poland by 2030;
- ♦ modernization and extension of the distribution grids.

The development of renewable energy sources and an increase in energy efficiency will also be beneficial for the security of electricity supply.

Today, the Polish electricity sector is characterized by ageing infrastructure. Nearly half of generating capacity is older than 30 years, emphasizing the requirement for substantial new investment in the short and medium term to satisfy electricity and heat demand. Electricity networks see similar investment challenges: nearly 80% of 400 kilovolt (kV) lines and 99% of 220 kV lines are over 20 years old.

NUCLEAR ENERGY PROGRAMME

THE INTRODUCTION OF NUCLEAR POWER IS A PRIMARY AIM OF THE POLISH ENERGY POLICY STIPULATED IN THE* ENERGY POLICY OF POLAND (EPP 2030). *THE FIRST

NUCLEAR UNIT IS PLANNED TO START OPERATION BY 2020. BEYOND THIS, THE GOVERNMENT'S PLAN IS TO HAVE 4 500 MWE BY 2030. TO IMPLEMENT ITS NUCLEAR ENERGY, THE GOVERNMENT HAS PREPARED A SCHEDULE OF ACTIVITIES COVERING THE PERIOD UP TO THE FIRST PLANT ENTERING OPERATION. THIS SCHEDULE HAS BEEN INCLUDED IN* EPP 2030 *AS PART OF THE ACTION PLAN FOR THE YEARS 2009-2012. THE MINISTRY OF ECONOMY HAS ALSO PREPARED A MORE DETAILED DRAFT POLICY STATEMENT, THE POLISH NUCLEAR POWER PROGRAMME (PNPP), EXPECTED TO BE APPROVED BY THE GOVERNMENT BY THE END OF JUNE 2011. THE GOVERNMENT HAS DESIGNATED PGE SA, THE COUNTRY'S LARGEST ENERGY UTILITY, AS THE LEAD INVESTOR IN THE PROPOSED NUCLEAR POWER PLANTS.

1.3.2. STRUCTURE OF ELECTRIC POWER SECTOR

Briefly describe generation, transmission and distribution network including main organizations.

Currently, the Polish electric energy sector is divided into four subsectors – generation, distribution, transmission and sales.

In the Polish energy system, there are 17 large power plants (or groups of power plants) and 19 combined heat and power stations (CHPs). The total capacity installed in the electric energy generation sector is over 35.000 MW. A significant (currently 20 - 30 per cent) surplus of production capacity has been recorded, however, the "quality" of these capacities is often low. Most power units date back to the 1970s, although there are also some much older plants.

The Transmission System Operator (PSE Operator S.A.) is only one in Poland – a company fully independent from other electricity activities.

Distribution System Operators are functioning as independent companies within four strong groups vertically-structured (PGE, TAURON, ENEA, ENERGA) and two smaller DSO's (Vattenfall, RWE).

Electricity sales are carried out by approx. 100 companies. The position of the Polish Power Exchange, whose turnover at the beginning of 2011 reached the level of over 30% of the total Polish electricity consumption, is getting stronger every day.

1.3.3. MAIN INDICATORS

Complete Tables 5 and 6 and provide additional text specifying how the different sources are used (eg. base load, peak load) and specify if the capacity and production are reported as gross or net values.

TABLE 5. ELECTRICITY PRODUCTION, CONSUMPTION AND CAPACITY

							Average annual growth rate (%)
	1970	1980	1990	2000	2005	year* 2009	2000 to year* 2009

Capacity of electrical plants (GWe)							
- Thermal	11.38	20.66	25.99	28.38	29.82	29.98	5.64
- Hydro	0.74	1.30	1.98	2.18	2.32	2.34	7.34
- Nuclear							
- Wind				0.004	0.12	0.71	17 650.00
- Geothermal							
- other renewable							
- Total	12.12	21.96	27.97	30.56	32.26	33.03	8.08
Electricity production (TW.h)							
- Thermal	62.64	118.59	133.00	141.05	153.02	147.67	4.69
- Hydro	1.89	3.28	3.31	4.12	3.78	2.97	-27.91
- Nuclear							
- Wind			0.005	0.14	1.08		21 500,00
- Geothermal							
- other renewable							
- Total (1)	64.53	121.87	136.31	145.18	156.94	151.72	4.50
Total Electricity consumption (TWh)	59.02	109.44	124.71	124.58	131.19	137.00	9.97

(1) Electricity transmission losses are not deducted.

* Latest available data

Source:

TABLE 6. ENERGY RELATED RATIOS

	1970	1980	1990	2000	2005	year* 2009
Energy consumption per capita (GJ/capita)	108.09	145.80	111.10	97.24	102.21	102.97
Electricity consumption per capita (kWh/capita)	1 807	3 063	3 276	3 257	3 438	3 589
Electricity production/Energy production (%)	5.8	8.6	11.96	15.89	17.49	19.93
Nuclear/Total electricity (%)	0.0	0.0	0.0	0.0	0.0	0.0
Ratio of external dependency (%) (1)	-13.03	2.11	3.31	9.4	17.69	32.06

(1) Net import / Total energy consumption.

* Latest available data

Source: ARE S.A.

2. NUCLEAR POWER SITUATION

Note: Most of this chapter is applicable to all countries either implementing or considering nuclear power programme. Some sections (2.2, 2.5 and 2.6) are specifically applicable to countries with operating or shutdown nuclear power plants.

2.1. HISTORICAL DEVELOPMENT AND CURRENT ORGANIZATIONAL STRUCTURE

2.1.1. OVERVIEW

Provide a brief overview of the main decisions, rationale, and events related to the implementation and development of the nuclear programme.

First plans to launch nuclear power in Poland were drawn in 1956. Nuclear energy was perceived as a tool enabling reductions in internal coal consumption (on which the whole Polish energy sector was based) thanks to which it would have been possible to save precious natural resources or to export them. Such a justification was found in reports of scientific councils commissioned by the government

At first an experimental power plant of 200 –300 MWe was planned to be built by the Narew and Bug rivers.

In 1956 the post of Government Commissioner for Nuclear Energy was set up and operated until 1973, when it was replaced by the Office of Atomic Energy (UEA) which functioned until 1980. A counselling board, National Counsel for The Nuclear Energy Application operated by the side of the Representative and later with the President of the UEA

A full nuclear fuel cycle was considered for Poland.

In the 60`s there were plans to construct the first merchant ships with nuclear propulsion in the Gdańsk Shipyard. For this purpose designs of nuclear units with PWR and SCHWR reactors were drafted. Due to the low price of oil on the global markets, these works were stopped in late 60`s.

Between 1945 and 1977 uranium was mined in several places in Poland, especially in the Sudety mountains. The uranium ore with 0.2% of uranium content was sold to the Soviet Union. The

mining was carried out by a company called Zakłady R- 1 (the "R-1 Facilities"). The uranium mining and sales were top secret. Over 800 t of raw material (calculated in respect to pure uranium) was obtained. In 1965 all the resources of uranium ore of 0.2% U content were used up and at the same time Soviet Union refused to buy the ore with lower U content and thus the management of Zakłady R-1 made a decision to build a yellowcake production plant which would deliver uranium concentrate for export purposes out of the ore with U content lower than 0.2%. The plant started its production in 1967 and continued to operate until the end of 1972 when the Government Commissioner for Nuclear Energy decided to close down Zakłady R-1 due to uranium mining becoming non-profitable because of high mining costs, the low price of uranium ore on the global markets and running out resources of uranium rich ore.

Until 1971 the government had not made any binding decisions on the construction of nuclear power plants. In the year 1971 it resolved to build the first nuclear plant and a year later it designated Żarnowiec near Gdynia (by the Baltic Sea) as its site.

Table 1 Nuclear power plants under construction in Poland in the eighties

REACTOR	**TYPE**	**net CAPACITY**	**construction start**	**construction cancel**
Żarnowiec-1	*VVER-440/213*	*440*	*03/1982*	*09/1990*
Żarnowiec-2	VVER-440/213	440	03/1982	09/1990
Żarnowiec-3	VVER-440/213	440	preliminatory works and reactor manufacturing were started	09/1990
Żarnowiec-4	VVER-440/213	440	preliminatory works and reactor manufacturing were started	09/1990
Warta-1 (Klempicz)	VVER-1000/320	950	1988 (preliminatory works)	04/1989
Warta-2 (Klempicz)	VVER-1000/320	950	1988 (preliminatory works)	04/1989
Warta-3 (Klempicz)	VVER-1000/320	950	not started	

Warta-4 (Klempicz)	VVER-1000/320	950	not started
Total net power **(8 units)**	5560 MWe		

According to plans made in 1973, a total 10 (7860MWe) or 12 (9860MWe) nuclear units in several locations were to have been commissioned by the end of 2000.

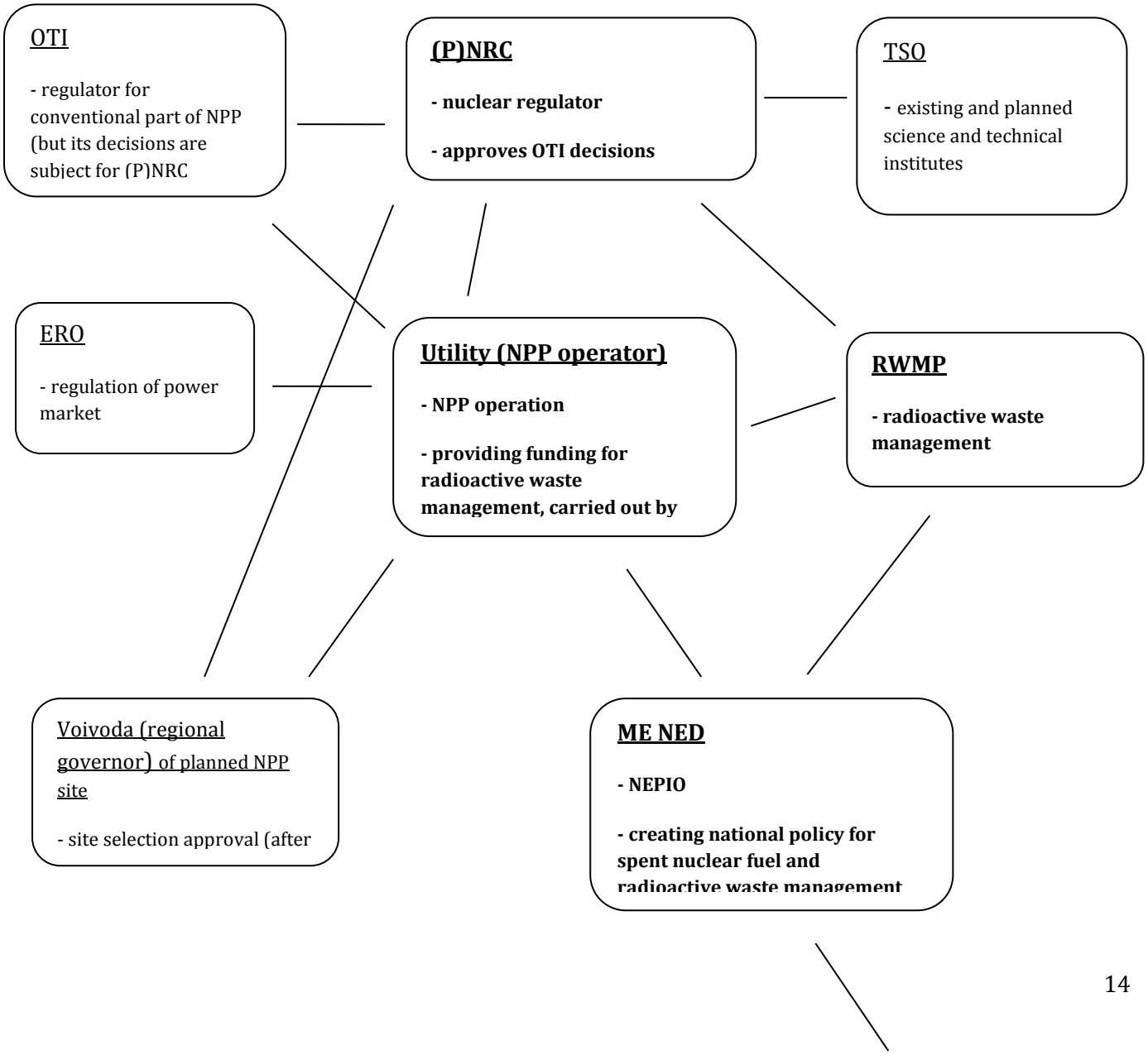
The construction of Żarnowiec NPP was delayed until 1982. It was to consist of 4 units with Soviet VVER-440/213 reactors which were to be upgraded in compliance with the recommendations of the International Atomic Energy Agency and the requirements of Polish nuclear regulator. Power units of Żarnowiec NPP were to be equipped in turbines of Polish production (manufactured on ABB license) in a single-unit system (one turbine per one reactor) with higher efficiency and power than typical Soviet turbines in a double-unit system (two turbines per one reactor). Gross electrical power 465MWe instead of 440MWe). Moreover, the whole conventional power plant was designed in Poland and it was to be supplied with equipment provided by Polish manufacturers. Units 3 and 4 were to be a CHP units and supply heat for the needs of the central heating system of the Tricity (Gdańsk-Sopot-Gdynia). The power plant was to be cooled by the water from Żarnowieckie Lake (open cooling system). Economic difficulties (characteristic for centrally controlled economy) made the progress of construction slow, but the quality was high due to the implementation of the first in Poland system of quality assurance.

The high quality of civil works was confirmed by the pre-OSART mission carried out between 15.09 and 02.09.1989. Next, from the 26 to 30.03.1990 a successive MAEA mission – *Site Safety Review Mission*, which confirmed the suitability of Żarnowiec site selection. In the periods 26 – 27. 04 1990 and 29.04 – 4.05 1990 IAEA held a mission to evaluate the containment structure and confirmed the good quality of its design and realization. On 04.09.1990 the government resolved to stop the construction. At that time the extent of construction completion was 40% and its infrastructure at 90%. The equipment that had been ordered was sold or scrapped. It is estimated that the decision to cease the construction caused direct losses of 1,500,000 $ (at the value from 1990).

A second power plant was also planned. In 1987 the government assigned its location in Klempicz to the north of Poznań. The construction (preparatory works, ground excavation and infrastructure building-up) was started in 1988 and stopped in 1989. That power plant was to have a closed cooling system with cooling towers and it was to be based on 4 VVER –1000/320 units of Soviet design.

2.1.2. CURRENT ORGANIZATIONAL CHART(S)

The chart(s) should show main players involved in the nuclear power programme, their responsibilities and their relationships. For example, the Government, utility, regulator, R&D support and technical support organisations etc.



Ministries and Offices

- cooperate with NEPIO

The key players are **bolded**.

In the model of the Polish nuclear power, the four following main subjects can be distinguished:

1) The central independent body of state administration playing the part of nuclear control – at present this role is performed by the President of the National Atomic Energy Agency, who with the assistance of the Agency supervises (from the point of view of nuclear safety and radiological protection (NSRP) the application of ionizing radiation in industry, medicine and research (With the exception of X-ray machines in medical diagnostics, radiological treatment, surface radiotherapy and cancer radiotherapy, as control in this field is yielded by Regional State Sanitary Inspectorates or respective services subordinate to Ministry of National Defense and Ministry of Interior and Administration „.).

   It is expected that in 2014 the President of the NAEA will be replaced by a collective body – The Polish Nuclear Regulatory Commission (PNRC).

2) The Nuclear Energy Department of Ministry of Economy (NED ME) which is subordinate to the Minister of Economy. Its primary duty is to support the appropriate minister for economy in outlining and coordination of the strategy of nuclear power development implementation. As the nuclear power policy is in tune with the national energy strategy, it will be periodically updated and confirmed by the Council of Ministers. Outlines of nuclear energy development will be prepared by NED. NED ME holds the position of NEPIO (Nuclear Energy Programme Implementing Organization)

3) Radioactive Waste Management Plant (RWMP) which will deal with radioactive waste. A substantial part of the costs connected with radioactive waste handling including spent fuel from nuclear power plants, will be covered by the operator (investor) of the facility

4) Investors of nuclear power facilities, and after their start-up - the operators, with experience and knowledge necessary for construction and maintenance of such facilities also possessing sufficient funds.

Research and development (R&D) support is treated as TSO (Technical Support Organization). At present in Poland there are four institutes performing research in the field of nuclear energy (physics, chemistry, engineering etc.). Two of them (The Institute of Atomic Energy IEA POLATOM and The Institute of Nuclear Studies) are located in Świerk near Warsaw. IEA POLATOM operates a research nuclear reactor (the only one in Poland) and has had experience in research reactor operation and critical assemblies since 1958.

Remaining two institutes are:

1) the Institute of Nuclear Chemistry and Technology in Warsaw

2) Institute of Nuclear Physics in Kraków

A very important element of TSOs is the Central Laboratory for Radiological Protection in Warsaw which monitors environmental radioactivity, carries out personal dosimetry; controls the use of radioactive sources; conducts research on mechanisms of influence of radiation on organisms, behaviour of radionuclides in the environment; develops dosimetric methods, and calibrates, controls and standardizes dosimetric equipment and provides training for radiological protection officers.

Prace B+R prowadzą również uczelnie wyższe (uniwersytety i politechniki), które były

Research and development work is also carried out by higher education institutions (universities and technical universities) which were engaged in the nuclear energy programme of the 80-ies especially Gdańsk University of Technology, Warsaw University of Technology, Wrocław University of Technology, AGH University of Science and Technology and others.

2.2. NUCLEAR POWER PLANTS: OVERVIEW

2.2.1. STATUS AND PERFORMANCE OF NUCLEAR POWER PLANTS

Complete Table 7 for all nuclear power plants: those in operation, under construction, suspended, and cancelled after start of construction, permanently shut down and decommissioned.

For operating reactors add a brief description of the overall performance. For permanently shut down reactors provide a summary of the decommissioning strategy and the current situation.

Include a map of the country indicating the nuclear power plants and site links, if possible.

TABLE 7. STATUS AND PERFORMANCE OF NUCLEAR POWER PLANTS

Station	Type	Net Capacity	Operator	Status	Reactor Supplier	Construction Date+	Grid Date ++	Commercial Date	Shutdown Date	UCF for year **

* UCF (Unit Capability Factor) for the latest available year (only applicable to reactors in operation).

** Latest available data

+ Date, when first major placing of concrete, usually for the base mat of the reactor building is done.

++ Date of the first connection to the grid

Source: PRIS database (www.iaea.org/pris).

No nuclear power plant in Poland is currently in operation, under construction, suspended, or decommissioned. Two nuclear power units at Zarnowiec, construction of which started in 1982, have been cancelled in 1990 when 40% complete.

2.2.2. PLANT UPGRADING, PLANT LIFE MANAGEMENT AND LICENSE RENEWALS

Provide a short description.

Not applicable.

2.3. Future development of Nuclear Power

Note: This chapter is applicable to all countries planning future development of nuclear power, both those planning expansion of existing programs and those countries considering development of a nuclear power programme.

2.3.1. NUCLEAR POWER DEVELOPMENT STRATEGY

Provide a brief description of the strategic plan including:

- *Main decisions that have already been made.*
- *Project framework (time scales, number of units, etc).*
- *Type of contract (Turnkey, Split Package, Multi Packages).*
- *Application of nuclear power: electricity supply, heat supply, water desalination …*
- *Policy for nuclear fuel cycle,*
- *Strategy for funding long term spent fuel handling and final disposal, waste management and decommissioning*

The Government made a decision to implement nuclear energy announcing an act on 13th January 2009 which provides that by the end of 2020 the first nuclear power plant (one nuclear unit) will have started its operation. In May 2009, a Government Commissioner for Nuclear Power in the rank of undersecretary at the Ministry of Economy was appointed and the Nuclear Energy Department within the same Ministry was set up. This Department operates as NEPIO (Nuclear Energy Programme Implementing Organisation) and is subordinate to the Commissioner.

The Council of Ministers took into account the development of nuclear energy in a document of 10th November 2009 entitled “Energy Policy of Poland for 2030”, in point 4, – “Diversification of the structure of electricity generation throughout implementing nuclear power”

In August 2010 the Polish Nuclear Power Programme (PNPP) was put forward for public consultation by the Ministry of Economy and in December 2010 its Environmental Impact Assessment. After accounting for public and other governmental bodies' remarks, the Programme is expected to be endorsed by the Council of Ministers at the end of June 2011. The Programme states that the construction of the first nuclear unit will start in 2016 and it will be commissioned by the end of 2020 at the latest. The construction of the second unit (of the same plant) will start in 2018. It is planned that by 2030 two plants will have started operation, each with the total power of about 3200 MWe (net), i.e. 4-6 nuclear units.

PGE S.A. (Polish Energy Group, a joint-stock company) will be the first operator. The first 2-3 units will probably be built under the turnkey contract.

Nuclear Power Programme schedule in short:

Stage I (till July 2011) – drafting new nuclear legislation, entering new legislation in force, preliminary site selection (4 locations)

Stage II (August 2011 – December 2013) – final site selection, technology and vendors selection, establishing business partnership with experienced nuclear utility (or utilities)

Stage III (January 2014 – December 2015) – gaining all necessary approvals and licences, technical design, preliminary site works (ground excavation etc.)

Stage IV (January 2016 – December 2020) – construction of first NPP, first reactor start-up by December 2020)

Stage V (January 2021 – December 2030) – construction of next reactors, so as to achieve at least 4,500 MWe of nuclear in power grid by December 2030 with the last reactor under construction (overall ca. 6,000 MWe is planned by national utility PGE, however this may be raised if other investors/utilities emerged by that time)

After performing some technical and economic analyses, the investor will be able to make a decision about the possible use of the plant for heating purposes (CHP).

By ordinance of the Minister of Economy of 27th August 2009, a Committee for drafting the *National Plan of Nuclear Waste and Spent Fuel Handling* was set up. It consists of representatives of offices and companies involved in the radioactive waste and spent fuel handling. Its basic duty, apart from defining a method of dealing with radioactive waste

coming from different activities, is to suggest an approach to spent fuel handling as well as formulating assumptions and recommendations for further works in this field. (regarding which method should be used in Poland- the open cycle or the open cycle with spent fuel processing method). The Committee has already started work – at the moment it is analysing the costs of applying different methods of radioactive waste and spent fuel management. The result of this will be the basis for recommending an approach to spent fuel handling (whether it should be processed or stored as a whole in Poland), taking into account costs and advantages of both methods.

As far as the financial side of nuclear waste and spent fuel handling is concerned, the following solutions to be eventually implemented, are considered:

- creating a Radioactive Waste and Spent Fuel Storage Fund supplied by the operator/operators of Nuclear Power Facilities (NPF). Moreover, the Fund will be augmented by contributions from other users of storage sites coming from outside the field of nuclear power.
- creating a Fund for Decommissioning Nuclear Power Facilities (NPF) which will have to cover costs connected with the decommissioning of NPF. The NPF operator will be obliged to create and manage the Fund. Financial means accumulated at the Fund will come from annual payments made by NPF operators and from the income from legal investments of the Fund's means. Finances accumulated at the Fund, if the operator declares a state of bankruptcy, will be exempted from execution.

Other processes concerning radioactive waste and spent fuel management will be financed by the NPF operator.

Storage of radioactive waste and spent fuel will be carried out by the Radioactive Waste Management Plant (RWMP) The "National Plan of Radioactive Waste and Spent Fuel Management" is expected to be endorsed by the Council of Ministers in 2011, after the acceptance of the Programme. (PNPP)

The activities which the Committee undertakes do not directly refer to the matter of the deep geological repository for high level waste and spent fuel. At the moment, Poland does not experience any problems with spent fuel storage from the research reactor. In 2009 agreements with the USA and the Russian Federation were signed regarding transporting this fuel to Russia indefinitely. However, basing on the experience of other countries, the issue of establishing such a repository will arise after approximately **30 to 40 years** after the first nuclear power plant has been started, (that is at the earliest in about 2050). Up until then, the spent fuel will be stored in fuel buildings or at interim storage installations at the plant site. The

Plan, based on the results of analyses performed for its needs, will contain initial recommendations regarding the introduction of a closed or an open cycle after considering the estimated costs of both approaches. It will also include a schedule and financing modes of activities necessary for constructing a deep geological repository for high level wastes and spent fuel.

The most important task in radioactive waste management, regarding the filling up of the National Radioactive Waste Repository in Różan, is to build a new waste repository for low and intermediate level waste. As far as establishing a site for such a facility, National Fund for Environmental Protection and Water Management (NFEPWM) had been approached, to include such activities in the Fund's Plan starting from the year 2010 The company to implement them will be chosen in 2011. It will have to analyse the accumulated results of studies and interpret archival geophysical data regarding these sites. As a result the three most suitable locations for waste facilities will be chosen. For the selected sites more detailed studies will be carried out, and as a result one location for a low and intermediate level waste repository will be established (scheduled for the year 2014). After the completion of the selection process, designing and construction works will be carried out, so that a new waste facility will be ready in 2020 at the latest. It is vital, as implementing nuclear power will increase the scope of low and intermediate level waste storage needs.

Complete Table 8.

TABLE 8. PLANNED NUCLEAR POWER PLANTS

Station/Project Name	Type	Capacity	Expected Construction Start Year	Expected Commercial Year
NPP-1, unit 1	PWR or BWR	1000-1650	2016	2020
NPP-1, unit 2	PWR or BWR	1000-1650	2018	2022
(NPP-1, unit 3)	PWR or BWR	1000-1650	(2020)	(2024)
NPP-2, unit 1	PWR or BWR	1000-1650	2022(2020)	2026 (2024)
NPP-2, unit 2	PWR or BWR	1000-1650	2024(2022)	2028(2026)
(NPP-2, unit 3)	PWR or	1000-1650	(2030)	(2034)

	BWR		

2.3.2. PROJECT MANAGEMENT

Provide a description of the main organizations involved in the development of nuclear power. (eg. NEPIO, owner/operator, stakeholders, construction licence holder, staffing for NP project preparation and implementation) Describe their responsibilities and resources.*

Note: The information in this section will depend on how far the project has developed. For example, some countries may not have set up an operating organization or regulatory body, others may have a specific project organization to construct a new NPP.

**NEPIO (Nuclear energy programme implementing organization). The organization set up by the government to study and develop the initial programme.*

As in point 2.1.2

The Nuclear Energy Department of the Ministry of Economy, subordinate to the Government Commissioner for Nuclear Power, plays the part of NEPIO.

NUCLEAR REGULATORY

The President of the National Atomic Energy Agency (NAEA), operating with the assistance of the Agency, is the institution responsible for nuclear regulatory in Poland.

Activities of the President of the NAEA as a central body of government administration for nuclear safety and radiological protection are regulated by the act of 29th November, 2000 Atomic Law (Dz. U. [Journal of Laws] 2007 No 42 item 276 with subsequent amendments) In June 2011, the Parliament endorsed an amendment to the Atomic Law which will come into effect on 1st July 2011. Its aim is to adjust the Atomic Law to the regulations of nuclear regulatory and to transpose the 2009/71 Euroatom Directives of 25th June 2009, determining common nuclear safety framework for nuclear facilities, into the Polish law. Drafts of new implementation regulations to the Atomic Law have also been published. They contain the requirements from the point of view of nuclear safety and radiological protection in particular referring to the criteria of site location and its analyses, a design, safety analyses and a reporton safety, commissioning, operation and decommissioning of a nuclear power facility.

Additionally the duties of the President of the National Atomic Energy Agency (NAEA) are the result of a number of other acts.

Since the 1st January, 2002, the President of the NAEA is subordinate to an appropriate minister, the Minister of the Environment.

The significant elements of the nuclear safety and radiological protection system implemented by the President of the NAEA are the following:

- Regulating the activities where nuclear materials and ionizing radiation sources are used, realized throughout granting permissions for such activities or their registration. Regulation of the methods employed in these activities and regulation of occupational radiation doses. Supervision of training of nuclear regulatory inspectors and inspectors of radiological protection (experts in nuclear safety and radiological protection functioning in units operating on the basis of granted licences) and employees working with ionizing radiation. Control over radioactive material turnover. Keeping a record of radioactive sources and their users. Keeping a central record of individual doses, and in the case of activities employing nuclear materials – also administrating a detailed register and accounts regarding them, endorsing plans of physical protection and control of applied technologies.
- Monitoring radiation in the country throughout coordination (together with standardization) of operation of local facilities measuring radiation doses, radionuclide content in chosen elements of natural environment and also in drinking water, food products and fodder.
- Maintenance of services ready to recognize radiation conditions and to react in the case of radiation occurrences (in cooperation with other bodies and services operating within the National Emergency Response System)
- performing activities with the aim of fulfilling Poland's duties resulting from treaties, conventions, and international agreements within nuclear safety and radiological protection.

In reference to nuclear power facilities (including power plants), radioactive waste repositories as well as radioactive waste and spent fuel bunkers, the President of the NAEA grants permissions within nuclear safety and radiological protection for their:

- construction,
- commissioning
- operation
- decommissioning

By the year 2014 the number of employees in the Nuclear Regulatory Commission will have reached its intended number of 130.

It is expected that in the year 2014 the President of NAEA will be replaced by a collective body – **The (Polish) Nuclear Regulatory Commission (NRC)**

An additional regulatory institution, the Office of Technical Inspections, set up in the 1920's, will in the case of nuclear power deal with licensing pressure and lifting devices and the conventional parts of Nuclear Power Facilities. However, it will be only a support institution for (P)NRC, since (P)NRC will be the main and only nuclear regulator.

RWMP – RADIOACTIVE WASTE MANAGEMENT PLANT

RWMP will continue to operate radioactive waste repositories and also in the future it will build a spent fuel repository. It will be justified to shift proprietor's control over RWMP from the Minister of Treasury onto the Minister of Economy. Financial responsibility for waste handling will be the responsibility of the nuclear power facility operator, who will be obliged to accumulate financial means for this purpose and financing activities in this field.

INVESTORS / OPERATORS OF NUCLEAR POWER FACILITIES

Investors of nuclear power facilities, and after their commissioning – operators, will be the subjects with sufficient financial means, experience and knowledge for construction and operation of such facilities and will possess a reliable and thorough design of a nuclear power facility. Obtaining an essential decision reflecting the Government's acceptance for construction of a nuclear power facility at a particular site by a particular investor will be the confirmation of fulfillment of these requirements.

The investors (operators) of nuclear power facilities will be responsible for a number of duties, and in particular for the following:

- accumulating funds for preparation of storage and the storage of radioactive waste and spent fuel
- accumulating funds for decommissioning of nuclear power facilities

- decommissioning of facilities after their operation cycle has finished
- fulfilling legal requirements of legal liability for nuclear damage
- preparing plans for emergencies

The design of the first nuclear power plants will be unique due to the pioneering character of such an investment in Poland as well as the need to prepare the whole vicinity with infrastructure for the optimal site location choice, construction, operation and for later decommissioning of nuclear facilities. For this reason both the Government and the first investor of nuclear power plants will have to face a number of additional challenges, which will also refer to their mutual relations.

Development of infrastructure: regulations, organization, education, research and development and others, will require substantial funds. In the suggested model of Polish nuclear power it is assumed that these will be financed by both the national institutions and the investor of the first power plant. For this reason, and due to the strategic importance of nuclear power for the widely understood state safety, it is provided that the investor of the first nuclear power plants of up to 6,000 MW will be a company with a direct or indirect major share belonging to the State Treasury.

It means that the largest Polish energy utility PGE SA Polish Energy Group will become an organizational investor within the scope of the first nuclear power plants in Poland. Operational activities in the first nuclear power plants will be carried out throughout a company/companies dependent on PGE SA.

Owing to this, it is necessary to enable the selected investor to build its stronger market position based on activities aimed at developing this subject including the takeover of other energy utilities both in Poland and abroad. Leading position of the investor is indispensable for undisturbed realization of nuclear power plant construction. Thus, it is of utmost importance that PGE SA should achieve a position which will be at least comparable to that of its competitors in the region. Such a position will enable the implementation of the Polish plan of nuclear development in an effective way and in compliance with undertaken regulations without the threat that an integration of the electrical energy market on the regional level will negatively influence the essential aims of the Polish energy policy including the nuclear power programme.

The selection of suppliers and contractors for the nuclear power plants will be carried out with regard to the rules of competitiveness and transparency and in compliance with national and European regulations as well as with clearly formulated requirements on ensuring supplies meeting the requirements of nuclear safety and radiological protection (NSRP). A limiting requirement should be inviting to negotiation only such suppliers who posses modern nuclear technologies of the 2nd and 3rd generation and whose installations, apart from fulfilling Polish

requirements, are in accordance with the requirements defined in the **European Utilities Requirements (EUR**) and in the American **Utility Requirements Document (URD**). Continuous cooperation between the representatives of the Government and the investor will be indispensable in the process of supplier selection, from the very moment of presenting the key requirements for nuclear power technologies and their suppliers until the point when the final choice has been made.

The confirmation of the investor's fulfillment of all the above requirements will be its selection by the Government for the nuclear power facility construction at a particular site, by the particular investor employing technologies suggested by the investor.

The condition on which an investor is granted a permit to construct a nuclear power plant, on the basis of Construction Law regulations, is to previously obtain a permit regarding the nuclear safety and radiological protection – granted on the basis of Atomic Law regulations by nuclear regulatory authorities: the President of the NAEA and in the future by the PNRC. The investor is obliged to cooperate with the nuclear control authority supervising the construction regarding nuclear safety and radiological protection and later to obtain a permit for the commissioning and operation of nuclear power plants.

During the process of operation of the nuclear power plant, the operator will be obliged to continuously cooperate with nuclear regulatory (PNRC) and provide necessary information to ensure full safety of the installation. Despite the fact that PNRC will hold control over the operation of the nuclear power plant, in compliance with national and international regulations, it is the operator who will be responsible for its safety and any damage arising as a consequence of would-be faults.

After the nuclear power plant has completed its operation, the operator will be obliged to decommission the facility according to PNRC requirements resulting from the accepted schedule of decommissioning.

Within the whole period of construction preparation, construction , operation and decommissioning of the plant, the investor/operator will be obliged to carry out information and educational activities directed at the local communities and also nieghbouring communities where the nuclear facilities will be located. In particular, the Investor/Operator is obliged to set up an information centre (about each nuclear power facility) which would perform the role of information and education centre for nuclear power.

The investor should also plan activities that ensure appropriate personnel for the needs of nuclear power plant operation and will also be responsible for appropriate personnel training and their obtaining relevant authorizations.

Other national institutions

According to MAEA recommendations, responsibilities of the national administration in the field of managing the nuclear power development scheme should be delegated to a specially appointed organizational unit NEPIO (Nuclear Energy Programme Implementing Organization). At the present stage of preparations for implementation of nuclear power in Poland, this role is played by the Government Commissioner for Nuclear Power together with the Nuclear Energy Department at the Ministry of Economy. The activities of the Commissioner are supported by an inter-institutional Committee for Polish Nuclear Power and the members of The Voluntary Committee of Advisors at the Government Commissioner for Nuclear Power. The members of the Voluntary Committee of Advisors actively participate in giving opinions on initiatives undertaken by the Minister of Economy and the Commissioner, whereas in the case of the inter-institutional Committee, which came into being in 2010, its most important involvement is expected to take place from the moment when the Polish Nuclear Power Programme is endorsed until its implementation process begins. Details regarding the above mentioned Committees are included in Appendix no. 2.

Duties within the field of nuclear power development will be realized throughout the following:

- Ministry of Economy
- National Atomic Energy Agency (from 2014 Polish Nuclear Regulatory Commission (PNRC))
- the President of the Energy Regulatory Office (ERO)
- Office of Technical Inspections (OTI) and other Polish inspection institutions
- Institutions connected with environmental protection and industrial development
- Institutions responsible for safety, physical protection and emergency planning
- Voivoda from the province where the investment is planned to be located

Additionally, the realization of the Programme will require the participation of many other ministries and offices (Ministry of the Environment, Ministry of Finance, Ministry of Science and Higher Education, Ministry of National Education, Ministry of the Interior and Administration, Ministry of Health, Ministry of Treasury, Ministry of Foreign Affairs, Ministry of Infrastructure, Ministry of Labour and Social Policy, Ministry of Regional Development, The Internal Security Agency)

Duties of the two most important institutions for the implementation of the Programme, i.e. PNRC and ME are described previously in this paper. The duties of the other subjects are as follows:

Ministries and national administration offices are engaged directly or indirectly in the realization of the PNP Programme

The President of the Energy Regulatory Office

As in the case of other electrical energy and heat producers, nuclear power plant operators will be obliged to obtain a License for electrical energy production (and perhaps also heat) issued by the President of ERO

THE OFFICE OF TECHNICAL INSPECTIONS (OTI) AND OTHER INPECTION INSTITUTIONS IN POLAND

These will carry out all technical inspection activities not connected with nuclear safety and radiological protection (NSRP)

The Voivoda appropriate for the province where the investment is to be located

The Voivoda from the province where the investor will be interested in constructing a power plant will issue a decision “Site Indication” and a decision about the location of the nuclear power facility.

2.3.3. PROJECT FUNDING

Provide a summary of funding and financing options being considered (eg. National or regional Government funding, Export or private financing).

The Ministry of Economy within its preparations for drawing up the Programme of estimated public expenses on nuclear power development. In the calculations the following were considered:

1. **Functioning of a unit coordinating the development of nuclear power – The Nuclear Energy Department of the Ministry of Economy**– its objective is to create an institutional basis for drawing up and implementing the Polish Nuclear Power Programme (PNPP)

2. **Performing indispensable evaluations and analyses for creating and functioning legal regulations on nuclear power operation** – its aim is to prepare drafts of legal acts, which are necessary for the construction of nuclear power facilities and the infrastructure connected with it.

3. **Performing analyses connected with the PNPP implementation and upgrading** – its objective is to supply comparative information on the costs of energy generation in relation to other sources with a view to evaluating economic justification of nuclear power introduction and operation and the necessary extent of nuclear power in the energy-mix.

4. **Realization of the *Programme of Personnel Education for Institutions connected with Nuclear Power*** - its aim is to train the personnel for the Polish nuclear power industry; both for the needs of the preparation and realization of the first stage of the PNPP and for the subsequent operation of power plants.

5. **Running a campaign providing information and education on nuclear power -** its aim is to present the society with convincing and true information on nuclear power and throughout educational activities – causing an increase in awareness in this field which should lead to a higher level of social acceptance for the development and functioning of nuclear power.

6. **Nuclear regulatory functioning** – its aim is to ensure the functioning of an independent modern and professional nuclear control, which as an institution of public trust will be able to meet the demands carried by the development of nuclear power in Poland.

7. **Performing site analyses for nuclear power plants -** its objective is to do research and select potential locations for nuclear power plants.

8. **Performing site analyses for radioactive waste repository together with its design and construction -** its objective is to establish a site for a new waste repository for low and intermediate level waste with consideration to the almost complete filling up of the presently operated one, NRWR in Różan, and to prepare its design and construction.

9. **Providing research and development support -** its objective is to create a strong research and development support for the needs of nuclear power, which is necessary for full multi-issue advantages connected with the chances and opportunities that might arise for Poland with the introduction of nuclear power.

10. **Preparation of the participation of Polish industry in the Programme -** its objective is to ensure the highest participation of Polish industry in supplying equipment and services for nuclear power and employing Polish companies for the construction and decommissioning of nuclear power plants in Poland

11. **Search for uranium resources within the territory of Poland -** its objective is to obtain information regarding the resources of uranium within the Polish territory and the potential chances of their use.

12. **Covering the costs of participation in international organizations and research programmes -** its objective is to acquire experience and knowledge indispensable for implementing and functioning of nuclear power in Poland.

The calculations of **new costs** for Programme realization were carried out for the years:

2011-2020 - estimated costs equal to 790.377 mln Polish zlotys (PLN)

These costs do not include :

- those covered at present by the national budget to finance the operation of the NAEA – approximately11 mln PLN per annum
- those covered at present by the national budget (the appropriate minister, the Minister for Science) to finance research institutes connected with nuclear energy
- subventions to basic activities in 2010 reached 47.4 mln PLN
- subventions to construction and fixture investments –1.7 mln PLN in 2010

The expected expenses in the years 2011-2020, connected with the introduction of nuclear power in Poland.

No.	TASK	Expenses up to the year 2020 thousands PLN	Included expenses for the years 2011 – 2014			
			2011 thousands PLN	2012 thousands PLN	2013 thousands PLN	2014 thousands PLN
	1	2	3	4.	5	6
1	Functioning of a unit (office, division, department etc.) coordinating the development of nuclear power, planned employment of 45 people.	**75.760**		**5.160**	**6.900**	**7.476**
2	Performing indispensable evaluations and analyses for creating and functioning of legal regulations on nuclear power operation.	**2.900**	**600**	**250**	**200**	**200**
3	Performing analyses connected with the implementation and upgrading of the nuclear power programme.	**2.000**	**200**	**200**	**100**	**200**
4	Realization of the personnel education programme for institutions connected with nuclear power.	**40.000***	**9.000**	**9.000**	**9.000**	**8.000**
5	Running a campaign providing information and education on nuclear power.	**50.000***	**8.000**	**8.000**	**6.000**	**5.000**

6	Preparing the National Atomic Energy Agency for playing the role of the nuclear and radiological regulatory for the needs of nuclear power. The costs will comprise: -increase of employment until 2014. -39 jobs and other costs connected with them. -development of the necessary technical infrastructure	**175.717**	**2.581**	**6.408**	**10.011**	**13.206**
7	Site analyses for a radioactive waste repository together with its design, construction and implementation of the National Plan of Radioactive Waste and Spent Fuel Management	**260.000**	**5.000** **Incl. From: ME – 1.000 NFEPWM – 4.000**	**28.000** **Incl. From: ME –21.000 NFEPWM – 7.000**	**22.000** **From ME**	**25.000** **From ME**
8	Adjustment of research and development for the needs of nuclear power	**160.000***	**8.000** **Incl. From: ME (subwentionNCNR) - 8.000**	**20.000** **Incl. From: MSHE – 15.000 MG (subwentionNCNR) - 5.000**	**20.000** **Incl. From: MSHE – 15.000 MG (subwentionNCNR) - 5.000**	**20.000** **Incl. From: MSHE – 15.000 MG (subwentionNCNR) - 5.000**
9	Search for uranium resources within the territory of Poland (including the means from the NFEPWM)	**10.000**	**-**		**-**	**-**
10	Preparation for the participation of Polish industry in the PNPP	**4.000**	**200**	**200**	**400**	**300**
11	Costs of participation in international organizations and research programmes	**10.000**	**1.000**	**1.000**	**1.000**	**1.000**

	TOTAL	**790.377** including from the national budget ---------- **771.377**	**34.581** including from the national budget ---------- **30.581**	**78.218** including from the national budget ---------- **71.218**	**75.611** totally from the national budget	**80.382** totally from the national budget

*It is expected that from 2014 (a new financial perspective), funds from the European Union will be used to realize this task, which will allow the decrease of funds coming from the national budget. Due to the lack of records referring to nuclear energy in the National Strategic Reference Framework (NSRF) it is impossible to finance the costs connected with the realization of PNPP (Polish Nuclear Power Programme) from the means of European Union within the present financial perspective (2006-2013) and the change of NSRF at this moment, due to lengthy procedures and the level of means assignment, is not justified. As a result of co-ordinations with the Ministry of Regional Development from 2010, activities connected with nuclear power will be included in the National Strategic Reference Framework (NSRF) in the new financial perspective. A special operational group of representatives from the Ministry of Regional Development and the Ministry of Economy was formed to analyse the National Strategic Reference Framework (NSRF) to be able to use European Union means to finance the activities connected with PNPP realization to the highest possible degree.

A programme, to ensure financing and simplified procedures for using financial means for the development of the Polish nuclear power industry should have a status of a multi-year programme in the sense of Article 136 Act of 27th August 2009 on public finances for the realization of the *Energy Safety and Environment* strategy.

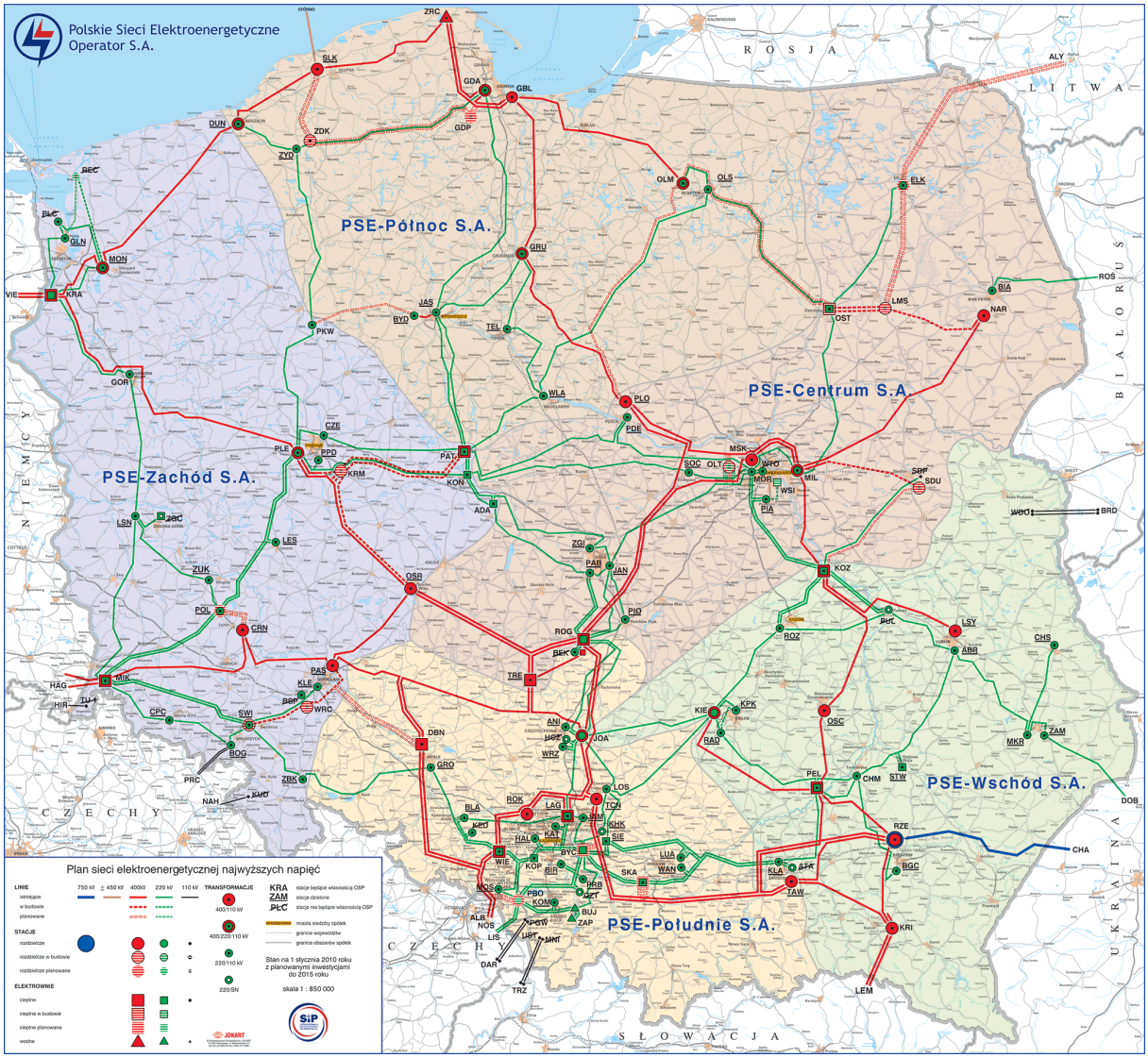
REALIZATION COSTS AND SOURCES OF FINANCING THE INVESTMENT

The results of financial analyses of nuclear power plant construction costs, including the possibilities of its financing by the investor after a study of the project feasibility has been completed.

Thus, by the year 2013, it will have been known whether the construction of nuclear power plants will require national budget guarantees and if so, to what extent.

2.3.4. *ELECTRIC GRID DEVELOPMENT*

Provide a summary of any required developments of the existing grid (eg. grid expansion and upgrade needed to implement NPP).



Scheme of the extra high voltage power grid (NTN)

National Transmission Network (NTN) comprises the voltages of 220 and 400kV. The 220kV network is well developed and interconnected, whereas the 400kV one is relatively well developed only in the south of the country, but in eastern and northern Poland there are still "radial" lines which are in particular danger of disturbances and lengthy blackouts.

One of the most important barriers for introducing new units of over 1000 MW, including nuclear ones, to the Polish Power System (PPS) is the lack of properly developed power system of 400kV. Moreover, a proper amount of active power (second and minute redundancy) regulation services should be provided. Together with the development of nuclear power,

decisive steps must be taken to accelerate the activities connected with the development of the network regarding both the stations and the network.

Suggested activities regarding the development of the PPS

Intensive development of the 400kV network in the northern and north-eastern part of PPS and gradual limiting of the role played by the 220 KV network as well as replacing it with the 400kV one in the remaining parts of the country to a much larger extent than it is stated in the presently valid *Development Plan concerning the provision for the present and future needs for electrical energy for the years 2010-2025* prepared by PSE -Operator SA (PSE) is of vital importance.

An element of the concept presented by the Transmission System Operator (TSO) introduced in the *Programme of Development and Modernization of Electrical Power Network* is the development of the 400kV network along the routs of the existing 200kV lines. Apart from this, it is also necessary to:

* increase transmission abilities of PPS throughout new, multi-circuit 400kV grids,

* carry out significant network investments connected with the expansion and modernization of the 400kV lines and the construction of appropriate stations near power plants

*increase transmission abilities of the existing 220kV lines,

*develop transmission and distribution networks around big agglomerations (Warsaw, Cracow, Poznań, Wrocław, Szczecin, the Tricity). This need is resulting from a significant increase in demand for electrical energy in these areas and aims at fulfilling the criterion of power reservation as a condition for ensuring the safety of electricity supplies,

*increase the certainty and reliability of PPS operation as well as decrease transmission losses,

*strengthen international connections enabling electric energy and power transmission,

*carry out studies with technical and economic analyses, site and feasibility studies for investment projects planned to be realized in consecutive years.

At the preparatory stage, basic criteria that the system connecting nuclear power plants to the PPS should fulfill, have to be determined Also the following matters have to be dealt with (taking

into account the requirements regarding cooperation of nuclear power plants with the network described in EUR/URD documents):

*the choice of the main diagram of an electric power station at the nuclear power plant,

*the acceptable, regarding the reliability, maximum length of lines leading the power from unit transformers to the station,

*number and capacity of lines leading the power form the nuclear power plant (depending on the power installed in the plant)

*criteria for reliability of transmission lines and distribution networks affecting the operation of a nuclear power plant unit.

These activities should be carried out with close cooperation of the PSE-Operator, the local distribution system operator and the investor with support from independent consultants and experts.

The increase in demand for electrical power, as well as the perspective of constructing nuclear power plants and the modernization of electrical power infrastructure bring about the necessity to manufacture appropriate equipment which requires the involvement of the Polish electrical engineering industry.

PROBLEMS TO SOLVE

In the processes of realization of electrical power investments, in particular in grid investments, legal regulations play a key role –starting from the Energy Law, throughout Construction Law, Public Procurement Law, acts on planning and spatial development to the environmental protection regulations. In the past there were no uniform, coherent regulations enabling effective realization of grid investments. At present the situation is changing.

Works are carried out on an act on transmission corridors, including electric power transmission lines – the act is expected to be passed in 2011. It is expected that the legal system will be simplified and more permeable.. Regulations will be introduced to enable effective solutions in disputable cases regarding property and access to investment areas.

ISSUES TO CONSIDER

Taking into account possible sites for nuclear power plants in Poland, it is advisable to prepare, in cooperation with the investor and the PSE Operator, a final scheme of the transmission network for the considered sites with various alternatives regarding, among others, the following:

* network investments (development of the existing ones or constructing new power lines), for which the decision regarding their realization would be undertaken with a 100% probability,
* possible investments which turned out to be useful at particular scenarios
* investments related to the particular design and location.

Such a Plan of Transmission Network Development could be used as a main reference point for making key decisions regarding the introduction of new production units into the PPS and further development of the transmission network, such as:

* introducing high, uniformed technical standards for the whole network infrastructure,
* systematic construction of double-circuit transmission lines at the 400kV level, even if in some cases the single-circuit ones would have been sufficient.

The operating model of the electric power system will not significantly change with the introduction of nuclear power. For instance, the requirements of the Instruction of Transmission System Operation and Maintenance (ITSOM) are stricter than those referring to frequency changes range, and the requirements for continuous operation of units connected to the PPS are met by most units with nuclear reactors. Fulfilling the requirements by nuclear power plants will directly influence the results of nuclear safety analyses.

Once the investor selects a particular technology, the solutions in respect to technical issues will have to determine among others: matters connected with adjusting the range of voltages to the synchronization of generating units, primary regulations of frequencies or standards connected with operation at load. The PSE-Operator will be obliged to adjust the ITSOM to the technical requirements of nuclear power plants connection.

Within the process of technology selection, cooperation of the investor with PSE will be necessary in order to determine the conditions at which the nuclear power plant will cooperate with the transmission network at normal operation and at emergencies. Determination of these requirements could create some problems in the case of new technologies, which is why cooperation is required.

2.3.5. SITE SELECTION

Provide the list of selected sites (if available), their characteristics (eg. Source of cooling water, existing/new site, transport infrastructure) and their approval status from nuclear and environment regulators (eg. Environmental Impact Assessment approved).

In 2009 the Ministry of Economy in cooperation with local authorities upgraded the list of nuclear power plant sites considered up to 1990. Also new offers presented by local authorities were collected. On this basis a new list of 28 potential locations of nuclear power plants was prepared.

In 2010 the Ministry of Economy commissioned a study entitled: *A Study of Criteria of Nuclear Power Plant Locations and Their Initial Evaluation..* Within this study, a ranking list of locations was made taking into account expert opinions on 17 evaluation criteria (the last place on the list was taken by the site for which geographical coordinates were not given, which due to formal reasons made it impossible to be evaluated)

The results were published on the Ministry of Economy website and passed on to the potential investor of the first Polish nuclear power plant, the PGE SA for further research and analyses.

The PGE SA started further analyses of the first four sites from the beginning of the list (Żarnowiec, Warta – Klempicz, Kopań, Nowe Miasto). Choczewo and Lubiatowo-Kopalino (positions 8 and 18 on the Ministry list) joined the other sites due to their coastal location which is characterized by more favourable cooling conditions, than is the case of locations inland, and potentially better economic conditions of electrical energy production.

At the same time, the PGE SA is carrying out its own further research regarding potential locations of the first nuclear plant. This may result in indicating a place different from those listed by the Ministry of Economy.

Activities indispensable for estimating the location of a nuclear power plant in Poland will be carried out on the basis of Polish regulations (a draft of the ordinance of the Council of Ministers on detailed evaluation of sites for nuclear power facilities and the requirements for the nuclear facility site report) with regard to international standards and in particular MAEA indications (see above) and European requirements (European Utility Requirements – EUR) or/and American ones (Utility Requirements Document – URD)

The role of the Investor is to carry out detailed site analyses and to select a location.

The most important factors taken into account in the process of site selection will be: the area available for the construction of the power plant and its facilities, access to sufficient amounts of cooling water and raw water (for technological and social needs), the possibility of power take-off from the plant, geological structure and seismic stability of the area, hydrogeological characteristics, population density and distribution in the vicinity of the plant, restrictions on the construction and operation of the power plant due to its vicinity conditions including environmental protection area development, accessibility to communication routs, lack of threats from nature or human activities and suitable meteorological conditions. These factors were characterized in Attachment no 8 to the Polish Nuclear Power Programme. Methodology of site studies and the criteria for site selection will be determined by the PGE SA in cooperation with the NAEA/PNRC (the site examination criteria were determined in §5 of the above mentioned ordinance of the Council of Ministers)

Until the end of 2011 a company will be chosen to perform detailed site studies for three potential sites indicated by the investor. In this task, the previously obtained results within this field will be used. These studies are expected to be finished by the first half of 2013.

2.4. ORGANIZATIONS INVOLVED IN CONSTRUCTION OF NPPS

Briefly describe the main organizations involved in nuclear power plant construction related activities. (eg. architect engineering companies, reactor suppliers and main component suppliers). Include also export activities. If relevant explain any recent changes in organizational structure or company name.

Describe the policy for national and local industrial involvement, including special facilities, like e.g. heavy water production, and the strategy for developing or enhancing industrial capabilities of the country.

About 80 Polish companies took part in the nuclear power programme in the 80`s. During the construction of Żarnowiec NPP, Polish companies realized 50% of equipment deliveries by investment value including the nuclear island, except for: reactors, main pipelines for the primary circuit, main feed water pumps, equipment for the systems of radioactive water treatment, some fixtures, the main overhead crane in the reactor building and steam generators for the first two power units. Polish companies carried out 100% of construction and assembly works and most of the design tasks (on the basis of Soviet documentation modified for Polish needs in compliance with IAEA recommendations). Many of the firms took part in the construction of nuclear power plants in the countries of the former COMECON (GDR, Czechoslovakia, Hungary, Bulgaria, Soviet Union). Some of them do not exist any more due to ownership changes after the economic transformations in 1989, while others were taken over by foreign investors and became their Polish subsidiary, however, some of them survived as Polish companies and operate in the nuclear power sector in Europe and all over the world, especially at the construction of unit no 3 of the Olkiluoto Nuclear Power Plant in Finland.

PARTICIPATION OF POLISH INDUSTRY IN NUCLEAR ENERGY PROGRAMME – PRESENT TIMES

A number of Polish companies are taking part in the construction of unit no 3 of the Olkiluoto Nuclear Power Plant in Finland, these include:

ELEKTROBUDOWA Katowice S.A. responsible for electrical installation works including cables and distribution boards, control and measurement systems and automatics. The company is also taking part in the commissioning of nuclear island . The Elektrobudowa group embarked on the contract in Olkiluoto in 2008. The value of the contract is 33.6 mln euros and the works are to last for 4 years. There are 250 employees at the construction of Olkiluoto-3. The company is negotiating subsequent contracts for electrical installations at the construction of nuclear power plants in a number of European countries.

ZT-B POLBAU ltd. – at first this company was contracted to do the building shells of the engine building and pump house and later after recognition its responsibility and high quality of works – in 2008 Polbau won the contract for construction works on the whole package: the so called accompanying facilities around the reactor. Due to the extension of contracts and a wide range of additional works, the final value of the contract was ten times higher that the initial one. Polbau has about 400 employees. In Olkiluoto it is a subcontractor of HEITKAMP.

ENERGOMONTAŻ – Północ (at present Polimex-Mostostal S.A.) production of steel elements for containment lining of the EPR reactor, as a subcontractor of Babcock Noel Nuclear GmbH.

KMW Engineering Ltd – supplier and a company responsible for installation of equipment for ventilation and air-conditioning, between 2007 and 2010.

About 4500 people are employed at the construction of the third unit of Olkiluoto – 40% of them are Polish. It is the biggest ethnic group, even outnumbering the Finnish group which is the second biggest.

Erbud International Ltd – subcontractor for the construction of the uranium enrichment plant in Pierrelatte in France, 2006-2007.

Rafamet SA manufactures high quality machine tools used for reactor pressure vessels - working for, among others: Areva, GE-Hitachi, Siemens, Kanemastu KGK (subcontractor of Japan Steel Works)

According to information from potential suppliers of parts for nuclear units (AREVA, Westinghouse, GE-Hitachi) about a hundred Polish companies are interested in taking part in the construction of nuclear power plants in Poland. Europolbudatom, a lobby group of Polish construction companies with an interest in nuclear power plant construction all over the world, is at its formation stage.

Some of the above mentioned companies gained experience in the construction of nuclear power plants in the eighties, also in the one constructed in Poland.

Polish companies have the potential to be contractors of services in the following fields:

*preparation of data connected with site location,

*site development plan of the power plant

* cooling water system and facilities,

* power take-off and emergency power system,

*hydraulic facilities, office buildings, storerooms, workshops etc.,

*water and sewage management facilities (including water treatment, technological and social needs) and other auxiliary facilities.

Polish companies are capable of manufacturing the following equipment for nuclear industry:

*heat exchangers, containers, pipelines and fittings for auxiliary systems and for emergency systems of reactors (including emergency cooling),

*some elements from the reactor cooling system like the pressurizer or elements of pipelines,

*equipment for nuclear waste management,

*heat exchangers, containers, pipelines and fittings for auxiliary rotor units,

*metallurgic products and construction materials,

*pumps of different type, size, and purpose (including those for supplying water, condensation and cooling water),

*fans, blowers and other equipment for ventilation, heating and air-conditioning systems,

*emergency diesel electricity generators,

*transformers of different power and destination,

*electrical equipment,

*some cranes,

*facilities for chemical water treatment and sewage treatment including the treatment of water for technological needs (demineralization, decarbonization),

*steel structures and prefabricated construction products,

*cables.

Capability of Polish companies to carry out construction and installation works:

*earthworks and concrete reinforcement works including those at main facilities such as containment and auxiliary facilities of the reactor, engine buildings and if necessary cooling towers and cooling water pump houses,

*mechanical installations including equipment, structures and systems of the nuclear island as well as start up tests,

*electrical equipment installations and I&C and alarm systems needed in the nuclear island and start up tests

*steel structure construction and general construction,

*construction geodesy services,

*geotechnological control,

*work quality control.

In compliance with the Polish Nuclear Power Programme , the appropriate minister, Minister of Economy, will prepare an effective system supporting the preparation of Polish companies for taking part in the construction of nuclear power facilities (NPF). The appropriate minister, Minister of Economy, will have a chance to evaluate the operation of the system on the basis of data supplied by the investor and Polish companies.

ACTIVITIES FOR SUPPORTING THE PARTICIPATION OF POLISH INDUSTRY

Evaluation of needs

The investor and/or its direct nuclear technology supplier is to determine a list of products and services which can be commissioned to Polish companies. This list is the result of knowing objective factors and elements dependent on local conditions (location, weather conditions, geology, level of development represented by suppliers of services etc.)

Commissioning Polish companies will not be restricted only to technical issues. It can also include legal, organizational, design, transport, logistic and other services.

Evaluation of Polish industrial and service potential

The investor or its direct technology supplier will publish the above mentioned list of products and services which can be commissioned to Polish companies to obtain their declaration of readiness to participate in the construction of nuclear plant facilities (NPF).

Following on, they will verify the obtained applications from the technological, expertise and organizational point of view. The next step will be to verify the companies interested in

participating to establish their production or service potential. Companies at a certain level will be able to start the accreditation procedure throughout introducing the necessary organizational changes, new technologies, increased production potential, lowering its self-costs etc. The analysis should also indicate the means to implement these changes.

Accreditation

The interested companies, after finishing the adjustment process will get the accreditation from the investor. The extent of accreditation will depend on the company's adjustment process and its suggested activity. Accreditation will be valid for a strictly specific period of time. There is a possibility of cascade accreditation: the contractor will accredit a subcontractor (already possessing an accreditation) to accredit other sub-suppliers. The investor can also choose one Polish partner giving it the right to select subcontractors. The aim of accreditation is to maintain the strictest safety rules. For this reason obtaining accreditation for parts to be directly used in the nuclear island will be a very difficult, lengthy and costly process.

Final analysis

A full set of data on requirements and on Polish companies is a basis for final analysis considering the participation of Polish industry in the Programme. As a result, the investor will possess the following information:

- a list of companies interested in the Programme and ready to supply the appropriate quality of products and services;
- a schedule of accreditation activities referring to particular suppliers of products and services;
- a set of directions regarding using selected Polish manufacturers and suppliers of services.

For a thorough evaluation of the scale of the participation of Polish industry in particular nuclear technologies, it would be helpful to establish an indicator of Polish industry utilization which would numerically determine the level of engagement of Polish sub-suppliers. This indicator could take into account the global amount of contracts, employment, increase of expertise of companies, qualifications of employees and the possibility of using the companies in subsequent nuclear investments. Thus, the potential of companies which are subject to public procedures, should also be analysed.

2.5. ORGANIZATIONS INVOLVED IN OPERATION OF NPPS

Provide information about the main organizations involved in nuclear power plant operation (eg. owners, operators, vendors, supporting organisation.

At present, there are no nuclear power plant operators in Poland. A company belonging to the PGE SA. and a chosen co-investor will be the first operator in Poland.

The Institute of Atomic Energy POLATOM in Świerk is the operator of the MARIA research reactor,.

2.6. ORGANIZATIONS INVOLVED IN DECOMMISSIONING OF NPPS

Provide information about the main organizations involved in nuclear power plant decommissioning.

In Poland, there are no companies with experience in decommissioning nuclear power plants. However, the Radioactive Waste Management Plant (RWMP) has experience in research reactor decommissioning.

2.7. FUEL CYCLE INCLUDING WASTE MANAGEMENT

Give a short description of strategies for fuel cycle and waste management.

Provide information on current activities and indicate the organizations responsible. Consider the following stages:

- *Mining and milling,*
- *Uranium conversion,*
- *Uranium enrichment,*
- *Fuel fabrication,*
- *Interim storage of spent fuel,*
- *Reprocessing,*
- *Waste management*
- *Policy for ultimate high level waste disposal*

At the moment there are only two plants of the nuclear fuel cycle: an interim bunker of spent fuel at the site of the nuclear research centre in Świerk (RWMP is its operator) and a repository for low and intermediate level radioactive waste in Różan (known as National Radioactive Waste Repository, operator-RWMP)

Between 1945 and 1972, uranium was mined, initially converted and enriched in Poland. The Institute of Chemistry and Nuclear Technology carried out research in the field of spent fuel reprocessing.

The uranium ore resources studied so far contain from 250 to 1100 ppm of uranium, and those mined in the fifties typically contained approximately 2000 ppm.

Resources of uranium ore in Poland (the forecasted resources are at the depth of more than 1000m) according to OECD NEA Red Book, 2008

Region of Poland	Identified resources of pure Uranium [ton]	Uranium content in the ore [ppm]	Forecasted resources [ton of pure U]
Rajsk (Podlasie)	5320	250	88850

Peribaltic syneclise			10000
Okrzeszyn (Wałbrzych basin, the Sudety mts)	940	500-1100	
Grzmiąca in Głuszyca Dolna (the Sudety mts)	790	500	
Wambierzyce (the Sudety mts)	220	236	2000

Resources of uranium ore in Poland (the forecasted resources are at the depth of more than 1000m) according to OECD NEA Red Book, 2008

Polish resources are rather poor, however, some of them (Wambierzyce, Grzmiąca, Okrzeszyn) have a special advantage. They are bedded deposits with a quite uniform character, which enables their fairly regular exploitation throughout the years. It is also possible to recover uranium from copper deposits occurring in the region of Lubin – Sieroszowice. The uranium content in this ore is of about 60ppm, at 2% of copper content. The total resources of this ore are approximately 2400mln tons, including 48 mln tons of copper and 144 thousand tons of uranium. At present the annual production in the Lubin – Sieroszowice area is of about 569 thousand tons of copper, and the amount of dumped uranium comes to about 1.7 ton/year.

Due to the lack of thorough overviews regarding uranium resources in Poland, one of the aims

of the activities described in the"Programme of Activities for The Years 2009-2013", Appendix nr 3 to the "Energy Policy of Poland until 2030" is "Studies of Uranium Resources in the Territory of Poland". The Ministry of Environment commissioned such an analysis following the suggestion of the Ministry of Economy.

The issue of radioactive waste management arose in Poland in the year 1958, when the first research nuclear reactor EWA started its operation in the Institute of Nuclear Research in Świerk. A significant development of radioactive isotope applications in different sectors of national economy, which took place at the beginning of the sixties, caused an immediate necessity to deal with the problem of radioactive waste handling. The solution to the problem was the decision of locating a repository in Różyn and its commissioning in1961.

In Poland, the manager of the facility where radioactive waste is produced, is responsible for its interim storage, administration and treatment. However, the only Polish company authorized to treat and store radioactive waste so far is the state company of public utility RWMP, which is responsible for proper handling of radioactive wastes from the moment of taking it over from the producer.

RWMP collects liquid and solid low and intermediate level radioactive waste, spent closed radioactive sources and out of service smoke detectors. The main source of low level liquid radioactive waste is the reactor MARIA, which produces about 90% of all the liquid waste. Liquid waste of intermediate level appears at production of radioactive sources and in some cases at decontamination of contaminated surfaces.

A significant amount of solid radioactive waste, i.e. 40% originates in the Centre in Świerk, its source being the research reactor MARIA and the plant producing radioactive isotopes i.e. the Institute of Atomic Energy POLATOM, Radioisotope Centre. Radioactive reactor-based waste comes from, among others: filters (from cooler purification and ventilation systems), post-decontamination waste, out of service parts of reactors. The remaining 60% comes from hospitals from all over the country and from other companies which use isotope techniques. The waste from utilization of radioactive substances for medical purposes is most of all, the following: ampoules after radioactive substances, also syringes, lignin, foil, protective clothing and out of use elements of equipment as well as decontamination waste.

The table below presents the balance of waste collected for treatment between the years 2000 and 2008. It shows, that the amount of solid and liquid waste systematically decreases, thanks to new technologies of isotope production and correct operation of equipment for nuclear technologies and also due to a decrease in radioactive isotope applications.

Balance of waste collected for treatment between the years 2000 and 2008 (source RWMP)

Specification	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**

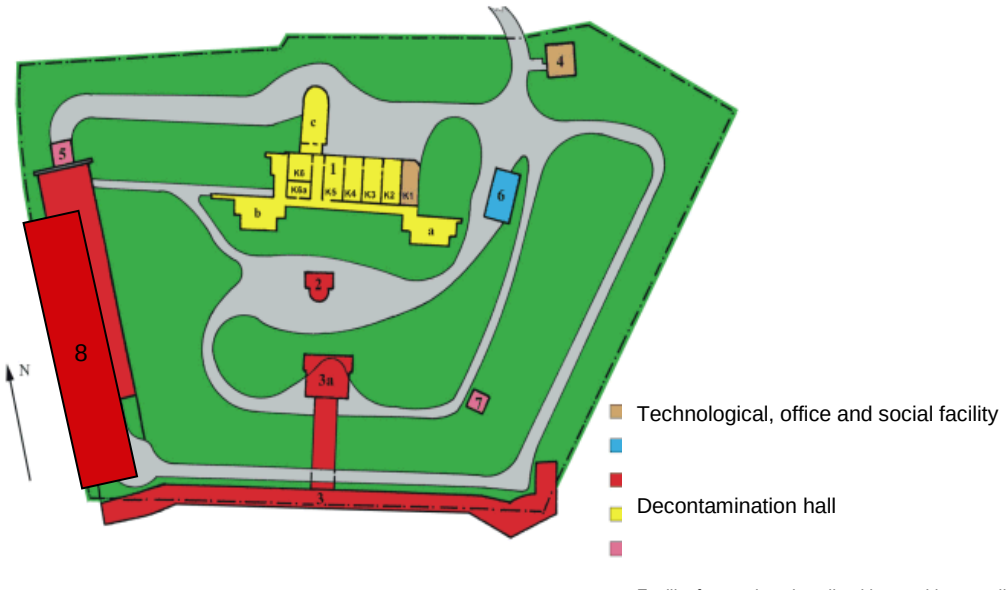
	solid	liquid	solid	liquid	solid	liquid	solid	Liquid	solid	liquid	solid	liquid	solid	liquid	solid	liquid	solid	liquid
Sources of radioactive waste																		
MARIA reactor (m^3)	16,55	265,00	14,60	110,00	8,00	95,00	6,00	30,00	6,00	98,21	5,030	21,00	12,92	152,09	5,50	84,00	6,76	29,00
EWA reactor (m^3)	4,65	-	1,20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OR POLATOM IEA (m^3)	11,85	0,41	10,75	0,34	7,200	0,26	7,80	0,23	8,03	0,13	8,60	0,02	7,75	0,03	6,20	0,02	-	0,05
RWMP (m^3)	5,89	8,50	76,95	8,00	3,10	4,00	18,95	8,00	7,06	-	2,56	4,00	0,33	0,00	1,51	0	3,35	6,00
Companies from outside the Świerk Centre (medicine, industry, science) (m^3)	45,83	1,30	41,98	1,39	29,73	1,59	26,79	1,45	31,39	2,88	26,13	1,66	21,17	0,96	17,27	0,48	12,68	2,59
In total	***84,76***	***275,20***	***145,48***	***119,73***	***48,03***	***100,85***	***59,54***	***39,68***	***52,48***	***101,22***	***42,32***	***26,68***	***42,17***	***153,08***	***30,48***	***84,50***	***22,79***	***37,64***
CATEGORIES OF RADIOACTIVE WASTE																		
low level (m3)	63,22	274,81	128,14	119,40	39,77	100,64	47,62	39,66	40,17	28,19	31,26	26,68	41,57	153,08	29,92	84,48	22,38	37,63

intermediate level (m3)	-	0,40	-	0,33	-	0,21	1,88	0,02	1,35	73,03	0,65	-	0,60	0,02	0,60	0,02	0,40	0,01
alpha radiation (m3)	3,74	-	1,66	-	5,07	-	2,16	-	0,79	-	1,90	-	2,46	-	0,45	-	0,08	-
smoke detectors (pcs)	24 367		20 490		10 148		9 995		12 211		14101		19 394		16 425		25 053	
closed sources (pcs)	898		875		1235		1195		619		825		1 397		1 508		2675	
WASTE SENT FOR STORAGE AT NRWR – RÓŻAN																		
by volume (m3)	44,87		137,16		40,72		40,99		33,03		36,30		67,95		48,88		73,41	
by activity (at 31.12 in a given year) (TBq)	1,40		1,57		2,41		1,24		0,52		1,87		1,74		1,37		1,26	

RWMP is both the operator and user of the National Radioactive Waste Repository (NRWR). The NRWR is situated in Różan by the Narew River, about 90km from Warsaw. It is located on the site of a former fort with an area of 3.045 ha. NRWR has been operating since 1961 and according to MAEA classification it is a repository of the surface type. It is located in one of the former military forts, built by the Russian authorities between the years 1905 and 1908.

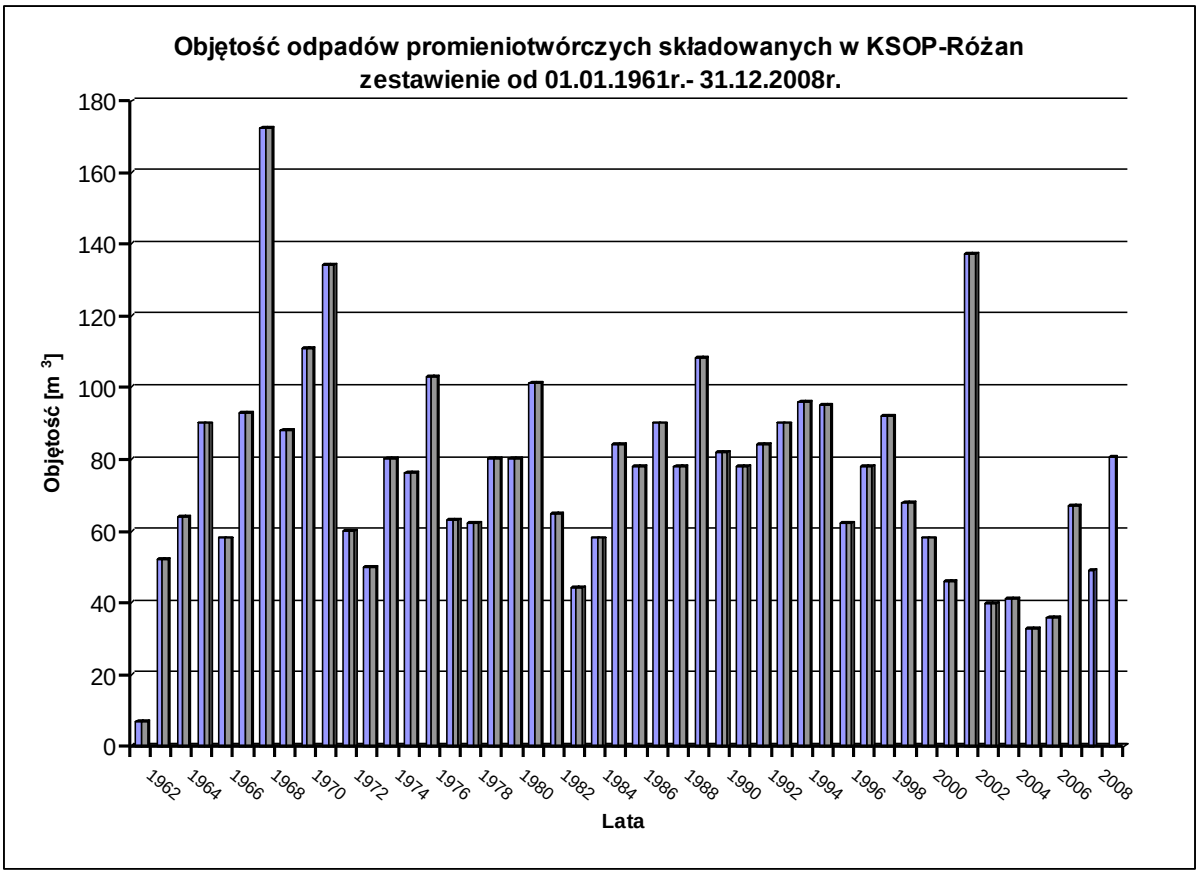
This repository is destined to store short-lived low and intermediate level radioactive waste and to provide interim storage of long-lived waste. The sites where the waste is stored are the concrete facilities of the fort, partly covered with earth (facilities 1,2,3 and 3a) and parts of the western moat (facility 8)

LOCATION OF FACILITIES AT THE SITE OF NATIONAL RADIOACTIVE WASTE REPOSITORY IN RÓŻAN **SOURCE RWMP,2010**



The amount of radioactive waste for interim or final storage reaches 45 m3 a year. This is the solid or solidified waste of 70 ton mass, which takes up the volume of 80m3 (35m3 out of it falls on binding materials – mainly concrete). The solidified waste is transported to the only one repository in Poland, NRWR in Różan.

According to estimations made by RWMP, NRWR will reach its capacity around 2020-2022.



The volume of radioactive waste sent for storage between the years 1961 and 2008. Source RWMP

Planned activities referring to radioactive waste management in Poland, connected with the nuclear energy development.

2.8. RESEARCH AND DEVELOPMENT

2.8.1. R&D ORGANIZATIONS

Provide information on institutes, research centres, etc., independent from the companies listed in the sections above, (e.g. atomic energy commissions and national laboratories). A description of the national policy programmes and funding could be included in this section.

In Poland exist several research institutes related to nuclear energy. The most important are the following:

The A. Soltan Institute for Nuclear Studies at Swierk-Otwock which comprises six research departments located in Swierk, three in Warsaw and one in Lodz plus the research establishment for nuclear instrumentation (ZdAJ, manufacturer of medical accelerators and other instruments). The Institute is a state owned institution and carries out pure and applied research on subatomic (i.e. the elementary particles) and nuclear physics, hot plasma physics and related fields. It also produces specialized equipment for various applications (notably for medicine and environmental protection).

The Institute of Nuclear Chemistry and Technology (INCT), Warsaw, is specialized in radiation chemistry and technology, application of nuclear methods in material and process engineering, design and production of instruments based on nuclear techniques, radiation analytical techniques and environmental research. Basic research is focused on radiochemistry, chemistry of isotopes, physical chemistry of separation processes, cellular radiobiology and radiation chemistry.

The Institute of Atomic Energy POLATOM, Otwock-Swierk, equipped with the 30 MWth MARIA research reactor is dealing with reactor physics and nuclear engineering, nuclear safety, radiation protection, radioactive waste management, application of nuclear techniques in industry, science, environmental protection, solid-state physics, and computing techniques. It is also a producer of unique specialized equipment. The Institute is in paritcular equipped with devices for the identification of nuclear materials.

The Central Laboratory for Radiological Protection (CLRP), Warsaw, carries out work in the field of monitoring of environmental radioactivity; personal dosimetry, controlling the use of radioactive sources, research on mechanisms of influence of radiation to biological organisms, behaviour of radionuclides in the environment; development of dosimetric methods, calibration, control and standardization of dosimetric equipment and training for radiological protection officers.

The H. Niewodniczanski Institute of Nuclear Physics, Kraków, is specialized in theoretical and experimental research in the following fields: high energy and elementary particle physics, physics of the structure of the nucleus and of nuclear

reaction mechanisms, studies of the structure, interactions and properties of condensed matter, applications of nuclear methods in geophysics, radiochemistry, medicine, biology, environmental physics and materials engineering. The Institute of Nuclear Physics in Krakow now belongs to the institutions working under the Polish Academy of Sciences.

The Faculty of Physics and Applied Computer Science of the University of Science and Technology AGH in Krakow, is involved in theoretical and experimental aspects of elementary particles physics, solid state physics, theoretical and computing physics, nuclear electronics, radiation detectors, X-ray fluorescence and microdosimetry, hydrology and gas chromatography, nuclear geophysics, effective energy conversion, medical physics and industrial radiometry. The research programs are carried out in close collaboration with many international laboratories and centers (e.g. DESY, CERN).

The Nofer Institute of Occupational Medicine (NIOM), Łódz, has as a primary task to conduct R&D activities and provide expertise on health hazards arising from occupational and environmental exposure to noxious agents. The multidisciplinary nature of the research performed at NIOM makes it possible to address complex environmental and health related problems.

The above listed research institutes together with universities will comprise TSOs (Technical Support Organizations) for nuclear regulatory or the operator of a nuclear facility. In 2011 the National Atomic Energy Agency signed respective agreements on cooperation with IEA POLATOM and the PAN Institute of Geophysics.

2.8.2. DEVELOPMENT OF ADVANCED NUCLEAR TECHNOLOGIES

Describe the country's engagement in the development of advanced nuclear technologies, including implementation plans.

Institutes mentioned in point 2.8.1 carry out research work within European Union projects and work on commission for foreign companies.

2.8.3. INTERNATIONAL CO-OPERATION AND INITIATIVES

Briefly describe research and development activities carried out jointly with other countries and/or within the framework of international projects (e.g.: INPRO, GIF, ITER, GNEP), technical and industrial co-operation, and transfer of know-how and technology.

Poland is a member of INPRO and IFNEC (formerly called GNEP). The government together with research institutes initiated the process of joining into one of the European projects of the 4th generation reactors MYRRHA.

The Institute for Nuclear Studies carries out different activities for the ITER project within the EURATOM framework

2.9. HUMAN RESOURCES DEVELOPMENT

Describe strategy and institutions for human resources development related to nuclear industry (eg. educational institutions, facilities for training operation, maintenance and technical support staff).

At the moment there is a shortage of specialists in the field of nuclear energy. Most of those actively engaged during the construction of Żarnowiec nuclear power plant in 1980's are now at or near retirement age.

At present Polish research centres are actively supporting the initiatives aiming at development of education and nuclear research. The following organizations will be involved in these activities:

1. Scientific and Technological Consortium "Atomics Centre"
2. Polish Platform of Nuclear Technologies
3. Consortium "Personnel for Nuclear Power and Nuclear Technologies in Industry and Medicine"

Here are the specializations of studies directly connected with nuclear power:

- AGH University of Science and Technology:

  *Faculty of Physics and Applied Computer Science, Field of Studies: Technical Physics, Specialty: Nuclear Physics

  *Faculty of Power Engineering, Field of Studies: Power Engineering, Specialty: Nuclear Power Engineering

- Consortium “Personnel for Nuclear Power and Nuclear Technology in Industry and Medicine” (MCS University, Wrocław University of Technology, University of Warsaw):

  Wrocław University of Technology:

  *Faculty of Mechanical and Power Engineering, Field of Studies :Power Engineering, Specialty: Construction and Operation of Power Systems

  Maria Curie-Skłodowska University in Lublin:

  *Faculty of Mathematics, Physics and Computer Science, Specialisation: Nuclear Safety and Radiological Protection,

  University of Warsaw:

  *Faculty of Chemistry and Physics, Interdisciplinary Studies: Power Engineering and Nuclear Chemistry first-cycle studies from academic year 2011/2012 and second-cycle studies from academic year 2012/2013,

- Gdańsk University of Technology:

  *Inter-faculty Studies, Field of Studies: Power Engineering (Faculties: Ocean Engineering and Ship Technology, Mechanical Engineering, Electrical and Control Engineering)

  *Faculty of Ocean Engineering and Ship Technology, Field of Studies: Power Engineering,

  *Faculty of Electrical and Control Engineering, Post-graduate Studies on Principles of Nuclear Power Engineering since academic year 2009/2010, and Nuclear Power Engineering second-cycle full time studies from 2011/2012,

- Cracow University of Technology:

  *Faculty of Electrical and Computer Engineering, Field of Studies: Power Engineering,

- Technical University of Łódż:

  *Faculty of Mechanical Engineering, Field of Studies: Power Engineering,

- Poznań University of Technology:

  *Faculty of : Electrical Engineering, Chemical Technology, Civil and Environmental Engineering, Technical Physics, Field of Studies: Power Engineering, Specialty: Nuclear Power Engineering,

- Silesian University of Technology:

  *Faculty of Energy and Environmental Engineering, Field of Studies: Machanics and Machine Construction, Specialty: Nuclear Engineering,

  *Faculty of Energy and Environmental Engineering, Field of Studies: Power Engineering, Specialty: Nuclear Power Engineering,

  *Faculty of Electrical Engineering, Field of Studies: Electrical Engineering, Specialty: Power Engineering

- Warsaw University of Technology:

  *Faculty of Power and Aeronautical Engineering, Field of Studies: Power Engineering, Specialty: Nuclear Power Engineering,

- Wrocław University of Technology:

*Faculty of Mechanical and Power Engineering, Field of Studies: Power Engineering, Specialty: Heat and Nuclear Power Engineering,

As a part of getting ready for the Polish Nuclear Power Programme PNPP, most technological universities and universities are planning to start studies with specializations (both at undergraduate and graduate level) directly connected with nuclear power. These activities are supported by training, which is organized and financed by the Ministry of Economy, for educators active at Polish universities. In 2009 the first group of 20 people received a training in France. The second stage of this training took place in France from the 4th October to the 18th of December 2010 catering for a group of twenty-five. Such activities will continue in subsequent years.

After estimating personnel needs of the Polish nuclear power sector, a *Plan of Human Resources Development* will be prepared by the appropriate minister, Minister of Economy, which is expected to be accepted by the end of 2011. The Plan will also include personnel development of the National Atomic Energy Agency. The infrastructure of personnel training will be developed to implement the Plan. One of the solutions will be the modification and modernization of existing infrastructure in vocational and secondary schools and at the level of higher education. The Plan will deal in detail with activities and means, also financial, that will have to be provided. It will cater for the needs of administration and all national services (including the National Atomic Energy Agency in the field of nuclear regulatory, professional and administrative staff), schools, universities and research and development support and contractors. The Plan will identify indispensable qualifications and the number of specialists at each stage of the PNP Programme realization. It will contain potential dangers of reaching some indicators defined there and it will be consulted with science and contractor representatives.

2.10. STAKEHOLDER COMMUNICATION

Describe strategy for interaction and communication within stakeholders (eg. general public, local government, industry, media, neighbouring countries).

PNPP accounts for activities in the following fields: public communication, information and educational activities and the participation of the society in decision making in the field of nuclear power. These activities will be realized basing on the Atomic Energy Act and on the Act on Access to Information on the Environment and Its Protection, The Community's Participation in Protection and Environmental Impact Assessment.

In the Act of Atomic Law duties of the Minister of Economy, the operator of a nuclear power plant and of the NPP investors have been determined. They refer to collection, publication and access to data and information on nuclear power , methods of dealing with information activities, as well as a range of duties in the field of education including social education. The Amendment to the Act on Atomic Law will determine the duties of the President of NAEA (later PNRC) within the field of supplying the society with information on nuclear safety and radiological protection.

The society will have the right to obtain information on the operation of nuclear power. All the information will be accessible, unless it is legally protected in compliance with existing regulations on information protection, protection of intellectual property rights, or considered dubious by the NPP investor/operator, or referring to physical protection and security of nuclear materials and such which when publicized would become a threat to public safety.

A Local Information Centre (LIC) will be an important element of social communication in the local aspect. Each investor will be obliged to set up an LIC situated in the commune respective to the nuclear facility location not later than on the day when the decision on the site is issued and the Centre will be obliged to execute its activity until the moment of decommissioning of the NPF.

The LIC will be an information centre where the NPP investor and operator will carry out the local information, educational and promotional strategy on nuclear power. NEPIO (Ministry of Economy) and nuclear regulatory will be able to fulfill their duties within information and data access and education throughout LICI

The investor/operator administrating the LIC will have a duty to: publish current information on the nuclear facility operation, publish current data on the state of nuclear safety and radiological protection (NSRP) around the nuclear facility, cooperate with NEPIO (ME) within supplying the society with thorough information on nuclear power in the country and all over the world as well as cooperate with nuclear regulatory in access to information and data referring to NSRP and social education within this field. LIC will have to publish the above at least in electronic form throughout websites and in the printed form as a local information bulletin.

The Commune Council, where the nuclear facility will be localized, on suggestion of the local community, will have the right to establish a Municipal Information Committee (MIC) which will act as a liaison between the local society and the investor/operator. The Committee will consist of representatives of local authorities and local community. The MIC will be obliged to: ensure voluntary monitoring of the nuclear facility operation, inform local community about the nuclear facility operation and represent local community in contacts with the facility representatives. The MIC will have the right to enter the premises of the nuclear facility and inspect its documentation (with the exclusion of documents legally protected in compliance with existing regulations as well as sensitive information including documents referring to physical protection and security of nuclear materials), the right to call for external experts and demand to obtain from the investor/operator explanations on issues interesting to the committee.

The Commune Council, where the nuclear facility will be planned to be constructed, where it will be constructed or where it will operate, will have the right to set up a Municipal Information Post (MIP), where the municipal information, educational and promotional strategy in the field of nuclear power will be carried out. Detailed duties of the MIP and means of their realization will be determined by the Community Council. NEPIO (ME) and LIC will be obliged to supply the MIP with information and data on the basis defined in the Act on Atomic Energy.

Public consultation will be carried out only in connection with decisions of obligatory character. Thus, in the case of a decision indicating the site for a nuclear facility construction, they will not be held. However, in reference to the decision on the nuclear facility site selection, within the scope of public consultation the investor will have the right to organize additional public consultation not only limited to those provided by the Act on Access to Information on the Environment and Its Protection, The community's Participation in Protection and Environmental Impact Assessment. However, they will have to meet the following requirements:

1. An equal access of all interested parties, both natural and legal persons, to the participation in consultation;
2. All interested natural and legal persons will have the right to express their views;
3. The investor and the Voivoda will have the right to respond to the opinions of consultation participants
4. As a result of the consultation, a report will be published, where the enquiries and conclusions of natural and legal persons as well as the responses of the representatives of the investor, the Voivoda and other bodies invited to the

consultation will be summarized. The report will be enclosed to the application for the decision on nuclear facility site location.

Public Education

Recent social studies have indicated that the level of awareness of nuclear physics and nuclear power as well as ionizing radiation and its influence on living organisms is very low in Poland. Thus, it is necessary to carry out a continuous educational campaign. Its aim is to increase the level of knowledge of the society in the field of nuclear power, the result of which will be to obtain opinions on nuclear power, either positive or negative, based on facts not myths or untrue theses. Also, the society will be more resistant to populist or ideological actions of nuclear power opponents and to irrational attitudes based on negative associations and emotions.

Educational activities directed at the whole society will be carried out by nuclear regulatory within NSRP in compliance with the act on Atomic Law and by NEPIO (ME) with the cooperation of the investor. An important element of the educational campaign will be the educational offer directed at the primary, lower secondary and secondary schools throughout the LIC. It will mainly comprise of activities directed at these schools, exhibitions and interactive presentations. Apart from LIC, also NEPIO (ME) and nuclear regulatory will carry out educational activities using all available forms of spreading information: Internet, TV, radio, newspapers, magazines and specialist publications.

Educational activities of NEPIO (at the moment – the Government Commissioner for Nuclear Power together with its subordinate Nuclear Energy Department of the Ministry of Economy) will be financed from its budget (i.e. from the budget of the Ministry of Economy), whereas educational activities of the nuclear regulatory will be financed from its own budget. NEPIO will cooperate with the Ministry of National Education on education of primary, lower secondary and secondary students in the field of nuclear power. NEPIO will also educate university students in this field, cooperating with the Ministry of Science and Higher Education.

Within educational activities at schools, it is planned to prepare lessons on nuclear power using the most attractive methods. The plan of educational activities provides an organization to associate teachers who at present are trying to carry out such activities independently, without any support.

The campaign project takes into account activities on the local level and active cooperation of the Ministry of Economy with the media.

Activities utilizing the Internet will also be developed. There will be websites dedicated to basic information on nuclear power and others for those more interested in the subject. Discussions on the net will be held throughout specially prepared forums.

The campaign will put the greatest emphasis on discussions. To make a final decision on launching the Polish Nuclear Power Programme, the society must be equipped with full and thorough knowledge of nuclear power. Public discussions will be carried out all over Poland, the most important of them should be transmitted on TV – so that everyone would have a chance to learn the arguments of the supporters and the opponents of civil utilization of nuclear energy.

3. NATIONAL LAWS AND REGULATIONS

3.1. REGULATORY FRAMEWORK

3.1.1. REGULATORY AUTHORITY(S)

Briefly describe the role and responsibilities of the regulatory authority(s).

Include a brief history of the nuclear regulatory body with key dates; the organizational structure and relation to governmental organizations and the organizations responsible for radiation and environmental protection.

The President of the National Atomic Energy Agency is an institution of nuclear regulatory. The Agency was set up at the beginning of the1980's and since its beginning has dealt with the licensing process of the Żarnowiec Nuclear Power Plant and other nuclear facilities in Poland.

The activities of the President of the National Atomic Energy Agency (NAEA) were described in point 2.3.2.

The Act – Atomic Law and other acts for implementing the Law, define regulations on the requirements for :

1. radiological protection (of employees, population and patients)
2. nuclear and radiation safety, including:
    - safety of nuclear facilities,
    - handling of nuclear materials and sources of ionizing radiation,
    - radioactive waste and spent nuclear fuel,
    - transport of radioactive materials and sources as well as spent nuclear fuel and radioactive waste,
    - evaluation of radiation conditions and emergency procedures,
3. physical protection (of nuclear facilities and nuclear materials)
4. non-proliferation of nuclear materials and technologies (protection)
5. legal liability for nuclear damage

3.1.2. LICENSING PROCESS

Briefly describe the overall licensing process for nuclear facilities.

The licensing process is regulated by the Amendment to the Atomic Law accepted by the Parliament and signed by the President in June 2011.

3.2. MAIN NATIONAL LAWS AND REGULATIONS IN NUCLEAR POWER

Provide a list (with date and reference) of national laws regulating nuclear power in the country considering for example:

Main National Laws:

- *Nuclear Law, establishing responsibilities for different areas;*
- *Civil nuclear liability ;*
- *Establishing a regulatory body;*
- *Implementing IAEA safeguards,*
- *Rules for environmental protection;*
- *Protection of intellectual property rights;*
- *Import and export controls of nuclear material and items;*

- *Security principles, including physical protection of nuclear material and facilities and protection of sensitive information.*
- *Roles of national government, local government, and stakeholders;*

Main Regulations in Nuclear Power:

- *Regulation for establishing an authorization system, responsibilities of the operator, inspection and enforcement;*
- *Site selection and approval;*
- *Radiation protection, including protection of workers public and environment;*
- *Safety of nuclear installations;*
- *Radioactive waste and spent fuel management, including storage and disposal;*
- *Decommissioning, including funding and institutional control*
- *Mining and milling;*
- *Emergency preparedness;*
- *Transport of radioactive material);*

All the issues connected with civil use of nuclear energy are regulated by the Act on Atomic Law of 29th November, 2000 (amended in June 2011) and the acts for its implementation.

In the middle of 2011, the Parliament accepted two acts regulating different fields of nuclear power operation, and in particular:

1. Act on the preparation and implementation of investments in nuclear power facilities and accompanying facilities. Its main objective is the implementation of regulations enabling an efficient process of preparation and execution of the construction of nuclear power facilities. The afore mentioned are vitally important for the national energy safety and due to high investment and financial risks.
2. An Amendment to the Act on Atomic Law – its aim being to determine the requirements for nuclear safety and radiological protection of nuclear facilities including the construction and operation of nuclear facilities at the highest level, which is reached in compliance with international requirements and recommendations. The present amendment is to implement into Polish

regulations the directives of The Council 2009/71 Euratom of 25th June 2009 establishing a Community framework for the safety of nuclear installations. Moreover, the amendment is to supplement the so far applicable regulations on legal liability for nuclear damage and to introduce any issues connected with the duty of the nuclear facility operator to supply the society with information on operation of such facilities. In a subsequent amendment of the Atomic Law a new structure of nuclear regulatory operation will be introduced, which will respond to the requirements of ensuring safety of a number of nuclear facilities in Poland.

The issues of environmental protection are regulated by the Act on Nature Conservation of 16th April 2004 together with implementing acts (Dz.U. [Journal of Laws} No62 item 627 with subsequent amendments) and also the Act of 18th July 2001, Water Act (Dz.U. [Journal of Laws} No115 item 1229)

Authors rights are regulated by the Act on Authors Rights and Neighbouring Rights of 4th February 1994 (Dz.U. [Journal of Laws}1994 No24 item 83 with subsequent amendments) and any implementing acts

The issues of export are regulated by the Act of 29th November 2000 on the International Trade of Goods, Technologies and Services of Strategic Importance for the State Security and Maintenance of International Peace and Security. (Dz.U. [Journal of Laws}2004 No229 item 2315 with subsequent amendments) and any implementing acts

REFERENCES

Provide the bibliography (suggested reading for more detailed information).

Polish Nuclear Power Program – www.mg.gov.pl (Ministry of Economy)

Polish Energy Policy 2030 – www.mg.gov.pl (Ministry of Economy)

National Atomic Energy Agency – www.paa.gov.pl (nuclear regulator)

PGE Polska Grupa Energetyczna S.A. – www.pgesa.pl (utility)

Institute of Atomic Energy POLATOM – www.iea.cyf.gov.pl

Institute of Nuclear Studies – www.ipj.gov.pl

Institute of Nuclear Chemistry and Technology – www.ichtj.waw.pl

APPENDIX 1: INTERNATIONAL, MULTILATERAL AND BILATERAL AGREEMENTS

Provide a list (with date and reference) of international agreements in the following categories:

- *International treaties, conventions, and agreements signed/ratified by the country (See the following website for a list of the major ones http://ola.iaea.org/lars/ReportOutput/GlobalReport.pdf)*
- *Cooperation agreements with IAEA in area of NP*
- *Bilateral agreements with other countries or organizations signed/ratified by the country in the field of nuclear power*

International treaties, conventions, and agreements signed/ratified by the country and Cooperation agreements with IAEA in area of NP

Title	Date of entry into force	Date of signature	date of Poland's ratification
Treaty on the Non-Proliferation of Nuclear Weapons, done at Moscow and London on 1 July 1968	5.03.1970	1.07.1968	3.05.1969
Convention on the Physical Protection of Nuclear Materials together with Appendixes I and II, opened for signature at Vienna and New York on 3 March 980	8.02.1987	3.03.1980	08.09.1983
Convention of Assistance in the case of a Nuclear Accident or	24.04.1988	26.09.1986	24.04.1988

Radiological Emergency, done at Vienna on 26 September 1986			
Convention on Early Notification of a Nuclear Accident, done at Vienna on 26 September 1986	24.04.1988	26.09.1986	24.04.1988
Convention on the Third Party Liability in the Field of Nuclear Energy, done at Vienna on 21 May 1963	23.04.1990	-	8.12.1989
Joint Protocol relating to the application of the Vienna Convention and the Paris Convention (on liability for nuclear damage), done at Vienna on 21 September 1988	27.04.1992	21.09/1988	27.04.1992
Convention on Nuclear Safety, done at Vienna on 20 September 1994	24.10.1996	20.09.1994	14.06.1995
Comprehensive Nuclear-Test-Ban Treaty adopted by General Assembly of the United Nations on 10 September 1996	Treaty did not come into effect	24.09.1996	25.05.1999

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, done at Vienna on 5 September 1997	18.06.2001	03.10.1997	09.03.2000
Treaty establishing the European Atomic Energy Community, signed at Brussels on 17 April 1957	1.05.2004	16.04.2003	23.07.2003
An agreement between the Kingdom of Belgium, the Kingdom of Denmark, the Federal Republic of Germany, Ireland, the Italian Republic, the Grand Duchy of Luxembourg, the Kingdom of the Netherlands, the European Atomic Energy Community and the International Atomic Agency in implementation of Article III (1) and (4) of the Treaty on Non-Proliferation of Nuclear Weapons, signed at Brussels on 5 April 1973	01.03.2007	-	02.08.2006
Additional Protocol to the	01.03.2007	-	02.08.2006

Agreement between the Republic of Austria, the Kingdom of Belgium, the Kingdom of Denmark, the Republic of Finland, the Federal Republic of Germany, the Hellenic Republic, Ireland, the Italian Republic, the Grand Duchy of Luxembourg, the Kingdom of Netherlands, the Portuguese Republic, the Kingdom of Spain, the Kingdom of Sweden, the European Atomic Energy Community and the International Atomic Agency in implementation of Article III (1) and (4) of the Treaty on the Non-Proliferation of Nuclear Weapons, signed at Vienna on 22 September 1998			
An Amendment to the Convention on the Physical Protection of Nuclear Materials, adopted at Vienna on 8 July 2005	amendment did not come into effect	08.07.2005	20.04.2007

Bilateral agreements with other countries or organizations signed/ratified by the country in the field of nuclear power

Country – -signatory to the agreement	Name	Date
Austria	Agreement between the Government of the Polish People's Republic and the Government of the Republic of Austria on Exchange of Information and Cooperation in the Field of Nuclear Safety and Radiation Protection, done at Vienna on 15 December 1989.	1989-12-15
Belarus	Agreement between the Government of the Polish Republic and the Government of the Belarus Republic on Early Notification of a Nuclear Accident and Cooperation in the Field of Radiological Safety, done at Minsk on 26 October 1994.	1994-10-26
Denmark	Agreement between the Government of the Polish People's Republic and the Government of the Kingdom of Denmark on Exchange of Information and Cooperation in the Field of Nuclear Safety and Radiation Protection, done at Warsaw on 22 December 1987.	1987-12-22
Lithuania	Agreement between the Government of the Republic of Poland and the Government of the Republic of Lithuania on Early Notification of a Nuclear Accident and on Cooperation in the Field of Nuclear Safety and Radiation	1995-06-02

	Protection, done at Warsaw on 2 June 1995.	
Norway	Agreement between the Government of the Polish People's Republic and the Government of the Kingdom of Norway on Early Notification of a Nuclear Accident and on Cooperation in the Field of Nuclear Safety and Radiation Protection, done at Oslo on 15 November 1989.	1989-11-15
Russia	Agreement between the Government of the Republic of Poland and the Government of the Russian Federation on Early Notification of a Nuclear Accident, Exchange of Information on Nuclear Facilities and on Cooperation in the Field of Nuclear Safety and Radiation Protection, done at Warsaw on 18 February 1995.	1995-02-18
Slovakia	Agreement between the Government of the Republic of Poland and the Government of the Slovak Republic on Early Notification of a Nuclear Accident, Exchange of Information and on Cooperation in the Field of Nuclear Safety and Radiation Protection, done at Bratislava on 17 September 1996.	1996-09-17
Ukraine	Agreement between the Government of the Republic of Poland and the Government of Ukraine on Early Notification of a Nuclear	1993-05-24

	Accident, Exchange of Information and on Cooperation in the Field of Nuclear Safety and Radiation Protection, done at Kiev on 24 May 1993.	
Czech Republic	Agreement between the Government of the Republic of Poland and the Government of the Czech Republic on Early Notification of a Nuclear Accident and on Exchange of Information on Peaceful Uses of Nuclear Energy, Nuclear Safety and Radiation Protection, done at Vienna on 27 September 2005.	2005-09-27
Germany	Agreement between the Government of the Republic of Poland and the Government of the Federal Republic of Germany on Early Notification of a Nuclear Accident, Exchange of Information and Experience and on Cooperation in the Field of Nuclear Safety and Radiation Protection, done at Warsaw on 30 July 2009.	2009-07-30

APPENDIX 2: MAIN ORGANIZATIONS, INSTITUTIONS AND COMPANIES INVOLVED IN NUCLEAR POWER RELATED ACTIVITIES

Provide contact details for organisations as mentioned in Section 2 (name, address, telephone number, facsimile number, e-mail address, web site address, main activities and production capabilities).

Name	Activity	Contact data
Ministry of Economy, Department of Nuclear Energy	acting as NEPIO (Nuclear Energy Programme Implementing Organisation)	Pl. Trzech Krzyzy 3/5 00-507 Warsaw tel. (+48 22) 693 49 79 fax. (+48 22) 693 40 51 www.mg.gov.pl
National Atomic Energy Agency – NAEA (from 2012: Polish Nuclear Regulatory Commission)	nuclear regulator	Państwowa Agencja Atomistyki ul. Krucza 36 00-522 Warszawa tel/fax: (+48 22) 628-27-22, (+48 22) 695-98-00/629-01-64 www.paa.gov.pl
PGE Polska Grupa Energetyczna S.A.	main national nuclear utility	ul. Mysia 2, 00-496 Warszawa tel: (+48 22) 340 1053 faks: (+48 22) 340 1041 www.pgesa.pl
Radioactive Waste Management Plant	radioactive waste management	05-400 Otwock-Świerk tel.: (+48 22) 718 00 92 fax: (+48 22) 718 02 57

		zuop@zuop.pl www.zuop.pl
Office of Technical Inspection	regulator of pressure vessels, cranes, and conventional parts of nuclear facilities	02-353 Warszawa, ul. Szczęśliwicka 34 tel. (+48 22) 57-22-100, fax: (+48 22) 822-72-09, udt@udt.gov.pl www.udt.gov.pl
Central Laboratory for Radiological Protection	TSO to NAEA in the area of radiological protection	ul. Konwaliowa 7 03-194 Warszawa tel./fax. (+48 22) 811 16 16 dyrektor@clor.waw.pl www.clor.waw.pl
Institute of Atomic Energy POLATOM	TSO to NAEA, scientific research, development and applied studies in physics and technology of nuclear reactors, condensed matter physics and material engineering, application of nuclear techniques in environment and health protection, ecology, nuclear safety, health physics, and radioactive waste and nuclear spent fuel management. Institute operates the only Polish research nuclear reactor MARIA that is employed in production of radioactive, isotopes, modification of materials with nuclear radiation and studies with neutron beams.	05-400 Otwock-Świerk, tel. (+48 22) 718-00-01 fax (+48 22) 779-38-88
The Andrzej Sołtan Institute for Nuclear Studies	R&D in nuclear physics, physics of elementary particles, plasma physics and technology, physics of the cosmic radiation, astroparticle physics, electronics and detectors,	05-400 Otwock-Swierk tel.: (+48 22) 7180583, fax: (+48 22) 7793481 sins@ipj.gov.pl

	accelerator physics, radiation medical physics, materials research, education/popularization,	www.ipj.gov.pl
Institute of Nuclear Chemistry and Technology	radiation chemistry and technology, application of nuclear methods in material and process engineering, design and production of instruments based on nuclear techniques, radiation analytical techniques and environmental research	ul.Dorodna 16 03-195 Warszawa, tel.:(+48 22) 5041220, 5041000 fax: (+48 22) 8111917, 8111532
ELEKTROBUDOWA Katowice S.A.	(nuclear) electrical equipment manufacturing, installation and commissioning	40-246 Katowice, ul. Porcelanowa 12 tel. (+48 32) 259 01 00 fax (+48 32) 205 27 60 elbudowa@elbudowa.com.pl www.elbudowa.com.pl
ZT-B POLBAU sp. z o.o.	(nuclear) civil works	45-054 Opole ul. Grunwaldzka 25 tel. (+48 77) 4543288 fax (+48 77) 4530019 marketing@polbau.pl www.polbau.pl
ENERGOMONTAŻ-Północ (Polimex-Mostostal S.A.)	(nuclear) shop manufacture and prefabrication of piping and steel components	ul. Przemysłowa 30, 00-450 Warszawa tel. (+48 22) 583 60 00 fax (+48 22) 583 60 06 info@energomontaz.com.pl www.energomontaz.com.pl
Erbud International sp. z o.o.	(nuclear) civil works, reinforced steel constructions	ul. Wapienna 10 87-100 Toruń tel. +48 56 658 00 10 fax +48 56 658 00 20 torun@erbud.pl
KMW Engineering Sp. z o.o.	ventilation and AC systems	ul. Powstańców 8a 86-050 Solec Kujawski tel. +48 52 569 80 00

		fax +48 52 569 80 01 kmw@kmw.pl
Machine Tool Factory RAFAMET S.A.	Production of high quality machine tools for manufacturing reactor pressure vessels	ul. Staszica 1 47-420 Kuźnia Raciborska **Tel.** +48 327 213 300 **Fax** +48 324 191 251 **Fax** +48 324 191 366 www.rafamet.com ***rafamet@rafamet.com.pl***

Name of report coordinator

Institution

Contacts

Provide the name and contact of the focal person and institution contributing to the CNPP report.

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Attachment 1: PREFIXES AND CONVERSION FACTORS

TABLE 1. PREFIXES

Symbol	Name	Factor
E	exa	10^{18}
P	peta	10^{15}
T	tera	10^{12}
G	giga	10^{9}
M	mega	10^{6}
K	kilo	10^{3}
H	hecto	10^{2}
da	deca	10^{1}
D	deci	10^{-1}
C	centi	10^{-2}
M	mili	10^{-3}
μ	micro	$^{10-6}$
η	nano	10^{-9}
P	pico	10^{-12}
F	femto	10^{-15}
A	atto	10^{-18}

TABLE 2. CONVERSION FACTORS FOR ENERGY

To:	TJ	Gcal	Mtoe	MBtu	GWh
From:	Multiply by:				
TJ	1	238.8	2.388×10^{-5}	947.8	0.2778
Gcal	4.1868×10^{-3}	1	10^{-7}	3.968	1.163×10^{-3}
Mtoe	4.1868×10^{4}	107	1	3.968×10^{7}	11630
Mbtu	1.0551×10^{-3}	0.252	2.52×10^{-8}	1	2.931×10^{-4}
GWh	3.6	860	8.6×10^{-5}	3412	1

TABLE 3. CONVERSION FACTORS FOR MASS

To:	kg	T	lt	st	lb
From:	Multiply by:				
kg (kilogram)	1	0.001	9.84×10^{-4}	1.102×10^{-3}	2.2046
T (tonne)	1000	1	0.984	1.1023	2204.6
Lt (long tonne)	1016	1.016	1	1.12	2240.0
st (short tonne)	907.2	0.9072	0.893	1	2000.0
lb (pound)	0.454	4.54×10^{-4}	4.46×10^{-4}	5.0×10^{-4}	1

TABLE 4. CONVERSION FACTORS FOR VOLUME

To:	US gal	UK gal	bbl	ft^3	L	m^3
From:	Multiply by:					
US gal (US gallon)	1	0.8327	0.02381	0.1337	3.785	0.0038
UK gal (UK gallon)	1.201	1	0.02859	0.1605	4.546	0.0045
bbl (barrel)	42.0	34.97	1	5.615	159.0	0.159
ft^3 (cubic foot)	7.48	6.229	0.1781	1	28.3	0.0283
l (litre)	0.2642	0.22	0.0063	0.0353	1	0.001
m^3 (cubic metre)	264.2	220.0	6.289	35.3147	1000	1

Attachment 2: LIST OF ACRONYMS

EPP2030 (PEP 2030) – Energy Policy of Poland until 2030

PNPP (PPEJ) - Polish Nuclear Power Programme

PGE SA – Polish Energy Group

NAEA (PAA) – National Atomic Energy Agency

PNRC (KDJ) – (Polish) Nuclear Regulatory Commission

ME (MG) – Ministry of Economy

NED ME (MG DEJ) – Nuclear Energy Department of Ministry of Economy

NEPIO - Nuclear Energy Programme Implementing Organisation

RWMP (ZUOP) – Radioactive Waste Management Plant

TSO – Technical Support Organization

NPF (OEJ) – Nuclear Power Facilities

ERO (URE) – Energy Regulatory Office

OTI (UDT) – Office of Technical Inspections

NRWR (KSOP) – National Radioactive Waste Repository

NFEPWM (NFOŚiGW) - National Fund for Environmental Protection and Water Management

MRD (MRR) – Ministry of Regional Development

NPP (EJ) – Nuclear Power Plant

PPS (KSE) – Polish Power System

PWR – Pressurized Water Reactor

BWR – Boiling Water Reactor

ITSOM (IRiESP) – Instruction of Transmission System Operation and Maintenance

LIC (LCI) – Local Information Center

MIC (LCI) – Municipal Information Committee

MIP (GPI) – Municipal Information Post

NSRP (BJiOR) – Nuclear Safety and Radiological Protection

NTN (KSP) – National Transmission Network

MSHE (MNiSW) – Ministry of Science and Higher Education

NCNR (NCBJ) – National Centre for Nuclear Research