TURKEY

Updated 2012

1. GENERAL INFORMATION

1.1. Country overview

1.1.1. Governmental system

The Republic of Turkey is a democratic, secular and social state. It is governed by the rule of law, bearing in mind the concepts of public peace, national solidarity and justice, respecting human rights, loyal to the nationalism of Atatürk, and based on the fundamental tenets set forth in the Preamble. Legislative power belongs to the Turkish Grand National Assembly (TGNA) on behalf of the Turkish Nation.

1.1.2. Geography and climate

Turkey lies between Asia and Europe, serving as a bridge geographically, culturally and economically. Its land border has an overall length of 2,875 km. In the south, Turkey shares a 378 km border with Iraq and an 877 km border with Syria. In the west, it shares a 203 km border with Greece and a 269 km border with Bulgaria. In the east, Turkey borders on Iran for 529 km, Georgia for 276 km, Armenia for 312 km and Nakhichivan (Azerbaijan) for 18km.

Turkey is surrounded by sea on three sides, with the Mediterranean in the south, the Aegean in the west and the Black Sea in the north. The coastline exceeds 8,300 km. The two continents, Europe and Asia, are separated by the Dardanelles in the west and the Bosphorus Straits in the east.

Although Turkey is situated geographically where climatic conditions are quite temperate, the diversity of the landscape, and the fact that mountain ranges run parallel to the coasts, result in significant differences in climatic conditions from one region to the other. While the coastal areas enjoy milder climates, the inland Anatolian plateau experiences hot summers and cold winters with limited rainfall.

1.1.3. Population

The population in Turkey is about 74 million, and the population density is about 96 inhabitants per km^2 (Table 1).

TABLE 1. POPULATION INFORMATION

Year	1970 [1]	1980 [1]	1990 [2]	2000 [2]	2005 [2]	2011 [2]	Average annual growth rate (%) year to 2011
Population (millions)	35.321	44.439	55.120	64.252	68.566	73.950	
Population density (inhabitants/km^2)	46	58	72	83	89	96	
Urban population as % of total	38.5 [3]	43.9 [3]	59.0 [3]	64.9 [3]	_	76.8 [4]	
Area (1000 km^2)	767						

(1) Mid-year population estimations are based on Population Censuses.
(2) Mid-year populations are estimated and projected based on 2008 Address Based Population Registration System and Population and Health Surveys.
Population projections have been revised according to the final result of 2008 Turkey Demographic and Health Survey.
(3) Proportion of population of province and district centers in the census day.
(4) Proportion of population of province and district centers based on Address Based Population Registration System referring to December 31, 2011.

Source: Turkish Statistical Institute

1.1.4. Economic data

Table 2 shows the historical trend of Gross Domestic Product (GDP). GDP was 734.93 billions of current US$ and GDP/capita was 10,067 current US$/capita in 2010.

TABLE 2. GROSS DOMESTIC PRODUCT (GDP)

	1970	1980	1990	2000	2005	2010	Average annual growth rate (%) year to 2010
GDP (millions of current US$)	18825*	67457*	149195*	265384	481497	734929	
GDP (millions of constant 1998 Turkish Liras)				72436	90500	105739	
GDP per capita (PPP US$/capita)	1241	2884	5849	9172	11391	15666**	
GDP per capita (current US$/capita)	533*	1518*	2655*	4130	7022	10067	

* old base year (1987)
** 2010 data
Source: Turkish Statistical Institute

1.2. Energy Information

1.2.1. Estimated available energy

TABLE 3. ESTIMATED AVAILABLE ENERGY SOURCES

	Fossil Fuels			Nuclear		Renewables		
	Solid	**Liquid**	**Gas**	**Uranium**	**Thorium**	**Hydro**	**Wind+ Geothermal**	**Solar**
Units	**Mt**	**Mt**	**bcm**	**metric tons**	**metric tons**	**TWh/y**	**TWe**	**TWh/y**
Total	12,615	41.7	6.8	9,129	380,000	140	0.049	380

Hydro and Other Renewable (geothermal, solar and wind) values given as their maximum available potentials
Source: Ministry of Energy and Natural Resources

1.2.2. Energy Statistics

TABLE 4. ENERGY STATISTICS (EJ)

	1970	1980	1990	2000	2005	2008	2010	Average annual growth rate (%) 2000 to 2010
Energy consumption								
- Total	0.79	1.34	2.22	3.37	3.81	4.45	4.57	3.09
- Solids	0.45	0.62	0.99	1.28	1.23	1.52	1.59	2.19
- Liquids	0.33	0.68	1.00	1.36	1.35	1.33	1.22	-1.08
- Gases			0.13	0.58	1.03	1.41	1.46	9.67
- Nuclear								
-Hydro	0.01	0.04	0.08	0.11	0.14	0.12	0.19	5.61
- Other Renewables			0.02	0.04	0.06	0.07	0.11	10.64
Energy production								
- Total	0.61	0.73	1.06	1.09	1.03	1.22	1.37	2.31
- Solids	0.44	0.58	0.79	0.80	0.70	0.90	0.92	1.40
- Liquids	0.16	0.11	0.16	0.12	0.10	0.09	0.12	0
- Gases			0.01	0.02	0.03	0.04	0.03	4.13
- Nuclear								
- Hydro	0.01	0.04	0.08	0.11	0.14	0.12	0.19	5.61
- Other Renewables			0.02	0.04	0.06	0.07	0.11	10.64
Net import (import - export)								
- Total	0.18	0.62	1.21	2.29	2.84	3.27	3.32	3.78

Source: Ministry of Energy and Natural Resources

1.2.3. Energy Policy

The Turkish energy policy is concentrated on the assurance of energy supply in a reliable, sufficient, timely manner. This is to be obtained in economic and clean terms, and in such a way as to support and orientate the targeted growth and social developments. In parallel to this ultimate target, the energy policy of Turkey has the following major pillars:

- Prioritizing the energy security-related activities in order to cope with increasing demand and import dependency
- Taking into account the environmental concerns in all stages of the energy chain, within the framework of sustainable development
- Facilitating reform and liberalization activities in the energy sector, so as to increase the overall productivity and efficiency and to enhance the transparency through creating competitive framework
- Intensifying energy technologies-related R&D studies and activities
- Realization of projects regarding the transportation of hydrocarbons through the recognition of “East–West” and “North-South” Energy Corridors and Terminals concepts

Policy issues related to energy are within the responsibility of the Ministry of Energy and Natural Resources (MENR). Energy planning studies, taking into account short-, medium- and long-term policies and measures, are carried out by the MENR within the framework of the above-listed objectives.

Achieving 3Es (energy-economy-environment) has become a crucial challenge for the Turkish energy sector, in parallel to the growing demand and investment needs. Market liberalization has tended to improve overall economic efficiency, orientating the targeted growth. On the other hand, enhancing energy security and reliability within the competitive market structure is one of the main challenges, requiring determination and implementation of policy tools on a well-defined basis. Although environmental quality has been given high priority for the past few years, the financial burden constituted by the implementation of necessary measures urges for more cost-effective approaches to be followed. Integrated approaches considering the achievement of 3Es in a sustainable manner have been taken into account in determining the policies.

Although almost all conventional resources exist in Turkey, these resources are not sufficient to meet the substantial growth in energy demand, except for lignite and hydro. Around 73% of energy demand is met through imports. Energy planning studies indicate that Turkey's energy demand will continue to increase in parallel with economic development, industrialization and urbanization. In this context, Turkey has been intensifying efforts for further diversification in primary energy sources, imports (diversifying in both type and origin), technologies and infrastructures, while accelerating the production and utilization of the remaining domestic resources potential and efficiency gains along the energy supply-demand chain.

Turkey became a party to the United Nations Framework Convention on Climate Change in 2004, based on the principles of "common but differentiated responsibilities". The Law regarding the accession of Turkey to the United Nations Framework Convention on Climate Change (UNFCCC) was acceded by the Turkish Grand National Assembly in October 2003, and entered into force on 24 May, 2004. Studies are underway for the first National Communication to be submitted to the UNFCCC Secretariat. Kyoto Protocol was ratified by the Turkish Parliament on February 5th, 2009. Improvement of energy efficiency, larger utilization of renewable sources, deployment of clean coal technologies and the introduction of nuclear power are among the main strategies involved in addressing the challenges within the energy-environment linkage.

With regard to its geographical location, Turkey has been considered a natural land-bridge, connecting Europe to Asia. Turkey therefore has an important role to play, as an "Energy Corridor and Terminal" between the major oil- and natural gas-producing countries in the Middle East and Caspian Sea and the demanding markets.

1.3 The Electricity System

1.3.1. Electricity and Decision Making Process

In parallel to the economic growth and social development, electricity demand has shown a significant increase over the past decades, and reached 229 TWh by the end of 2011.

Turkey has coal (mostly lignite) and hydro resources for electricity generation. Roughly 35% of the total indigenous potential had been utilized by 2008. Turkey attaches utmost importance to the utilization of the remaining potential, with due regard, to cope with the risks stemming from import dependency. Integration of nuclear power plants into the Turkish electricity grid is also being considered as an essential tool to enhance supply security, while strengthening the GHG emission mitigation efforts.

The Electricity Market Law (Law No: 4628) was enacted in 2001, so as to establish a competitive market structure in the electricity sector, under the autonomous supervision and regulation of the Energy Market Regulatory Authority (EMRA). The market model is based on bilateral contracts, supplemented by a Balancing and Settlement Mechanism. The secondary legislation governing the electricity market has been issued by EMRA. As of January 2009, 50% of market opening had been achieved.

Electricity Market and Security of Supply Strategy Paper has been approved by High Decision Council on 18th May, 2009, as a road map towards a fully competitive electricity market structure. The Strategy Paper draws together the essential elements for ensuring security of supply and enhancing competitiveness in the rapidly growing electricity market of Turkey. According to the Strategy Paper, the share of electricity produced from renewable sources in the total electricity generation mix is projected to be at least 30% by 2023.

The Strategy Paper also states that new interconnection lines will be set up and the capacity of existing interconnection lines upgraded, so as to advance electricity import and export potential with neighboring countries. In this context, synchronous parallel operation with ENTSO-E (former UCTE) has been realized, and Turkey physically integrated to the EU internal electricity network.

1.3.2. Structure of Electric Power Section

The Ministry of Energy and Natural Resources is the main body of the Turkish energy sector and is responsible for the preparation and implementation of energy policies, plans and programs, in co-ordination with its dependent and related institutions and other public and private entities. The Ministry is responsible for monitoring and taking measures regarding the security of electricity supply.

The state owned companies acting in the electricity sector are as follows:

The Electricity Generation Company (EÜAŞ) is the state-owned generation company responsible for the operation of existing power plants owned by the public and for new capacity additions, as well as being the last resort, should the market fail to provide sufficient capacity to cover demand.

The Turkish Electricity Transmission Company (TEİAŞ) is the transmission system operator and is responsible for planning, installing and operating the transmission grid, for providing system security such that transmission constraints will be minimized, and for preparing generation capacity projection and the 20-Year Long-Term Electricity Generation Development Plan.

The Turkish Electricity Trading and Contracting Company (TETAŞ) is the wholesale company established to offset the stranded cost element of the electricity market reform, and is responsible for electricity wholesales and purchases.

The Turkish Electricity Distribution Corporation (TEDAŞ) is responsible for carrying out electricity distribution activities. The Strategy Paper, endorsed by the High Planning Council in March 2004, envisages privatization in the distribution segment of the electricity market. Accordingly, in 2011, privatization of TEDAŞ was completed by dividing into 21 regions.

The State Water Works (DSİ) is in charge of the planning, design and building of hydro plants as well as flood protection, irrigation, water supply to big cities and land drainage works.

1.3.3. Main Indicators

TABLE 5. ELECTRICITY PRODUCTION, CONSUMPTION AND CAPACITY

	1970	1980	1990	2000	2005	2010	2011*	Average annual growth rate (%) 2000 to 2011
Capacity of electrical plants (GWe)								
Thermal	1.51	2.99	9.54	16.05	25.90	32.28	34.23	7.13
Hydro	0.73	2.13	6.76	11.18	12.91	15.83	17.14	3.96
Nuclear								
Wind+Geothermal			0.02	0.04	0.04	1.41	1.84	41.63
Total	**2.24**	**5.12**	**16.32**	**27.27**	**38.85**	**49.52**	**53.21**	**6.27**
Electricity production (TWh)								
Thermal	5.59	11.93	34.31	93.93	122.24	155.83	170.91	5.59
Hydro	3.03	11.35	23.15	30.88	39.56	51.79	52.07	4.86
Nuclear								
Wind+Geothermal			0.08	0.11	0.15	3.58	5.42	42.52
Total	**8.62**	**23.28**	**57.54**	**124.92**	**161.95**	**211.20**	**228.40**	**5.64**
Total electricity consumption (TWh)	8.62	24.62	56.81	128.28	160.79	210.43	229.31	5.42

**Preliminary data*
Source: TEIAS (Turkish Electricity Transmission Company)

TABLE 6. ENERGY RELATED RATIOS

	1970	**1980**	**1990**	**2000**	**2005**	**2008**	**2010**
Energy consumption per capita (GJ/capita)	22.37	30.12	39.51	49.99	52.91	62.25	62.04
Electricity consumption per capita (kW.h/capita) (Gross)	244	550	1006	1891	2231	2770	2854
Electricity production/Energy production (%)	5.1	11.5	19.4	41.2	56.7	58.3	55.9
Nuclear/Total electricity (%)	-	-	-	-	-	-	-
Ratio of external dependency (%) (1)	23.1	46.1	54.4	68	74.5	73.5	72.41

(1) Electricity transmission losses are not deducted.
Source: Ministry of Energy and Natural Resources

2. NUCLEAR POWER SITUATION

2.1. Historical development and current organizational structure

2.1.1. Overview

Studies to build a nuclear power plant in Turkey were started in 1965. Later, between 1967 and 1970, a feasibility study was undertaken by a foreign consultant company to build a 300-400 MW nuclear power plant. This nuclear power plant would have been in operation in 1977. However, the project could not come to fruition because of problems related to site selection and other issues.

In 1973, the Turkish Electricity Authority (TEK) decided to build an 80 MWe prototype plant. However, in 1974, the project was cancelled for the reason that this project could delay the

construction of a greater capacity nuclear power plant. Instead of this prototype plant, TEK had decided to build a 600 MWe NPP in southern Turkey.

Site selection studies were made in 1974 and 1975, and the Gülnar-Akkuyu location was found suitable for the construction of the first nuclear power plant. In 1976, the Atomic Energy Commission granted a site license for Akkuyu. In 1977, a bid was prepared, and ASEA-ATOM and STAL-LAVAL companies were awarded the contract as the best bidders. Contract negotiations continued until 1980. However, in September 1980, due to the Swedish government's decision to withdraw a loan guarantee, the project was cancelled.

A third attempt was made in 1980. Three companies were awarded the contract to build four nuclear power plants (1 CANDU unit by AECL, 1 PWR unit by KWU in Akkuyu, and 2 BWR units by GE in Sinop). Due to Turkey's request to apply the Build Operate Transfer (BOT) model, KWU resigned from the bid. Although AECL accepted the BOT model, it insisted upon a governmental guarantee of the BOT credit. The Turkish government refused to give such a guarantee, and as a consequence the project was cancelled.

In 1993, the Supreme Council for Science and Technology (BTYK) identified nuclear electricity generation as the project of third highest priority for the country. In view of this decision, the Turkish Electricity Generation and Transmission Company (TEAŞ) included a nuclear power plant project in its 1993 investment program. In 1995, TEAŞ selected the Korean KAERI as the consultant for the preparation of the bid specifications. The bid process started in 1996. Three consortiums (AECL, NPI and Westinghouse) offered proposals in 1997.

In July 2000, after a series of delays, the government decided to postpone the project.

Later on, the Law on Construction and Operation of Nuclear Power Plants and Energy Sale (Law No: 5710) was ratified, and entered into force in November 21, 2007.

By-Law regarding the Principles, Procedures, and Incentives for the Contracts and the Contest which will be made within the context of Law on the Construction and Operation of Nuclear Power Plants and the Sale of the Energy Generated was published in the Official Gazette dated March 19, 2008. The purpose of the By-Law is to regulate the procedures and principles regarding the construction and operation of nuclear power plants for electrical energy production, and to regulate energy sale.

In accordance with this, Turkish Atomic Energy Authority (TAEK) issued a set of criteria which establish general principles that should be met by investors.

A competition for construction and operation of nuclear power plants and energy sale was held on 24 September, 2008, by the Turkish Electricity Trading and Contracting Company (TETAŞ), for the construction of NPP units at the Akkuyu Site.

Only one consortium bid for the competition. After evaluation of the technical documents provided by the consortium, TAEK announced, on 19 December, 2008, that the offered nuclear power plant met the TAEK criteria.

The last envelope given by the consortium on September 24, 2008, and including energy sale unit price, was opened by TETAŞ on January 19, 2009. After assessment, the competition performed on September 24, 2008, was canceled by TETAS on November 20, 2009.

Direct negotiations with the Russian Federation to build a nuclear power plant near on the Akkuyu site in Turkey started in February 2010, and concluded with an Intergovernmental Agreement based on BOO (Build Own Operate) model. The agreement was signed on May 12, 2010. It has been aimed at building nuclear capacity in Turkey through mutual co-operation, ranging from nuclear

power plant construction and operation in Akkuyu-Mersin, to technology transfer and decommissioning.

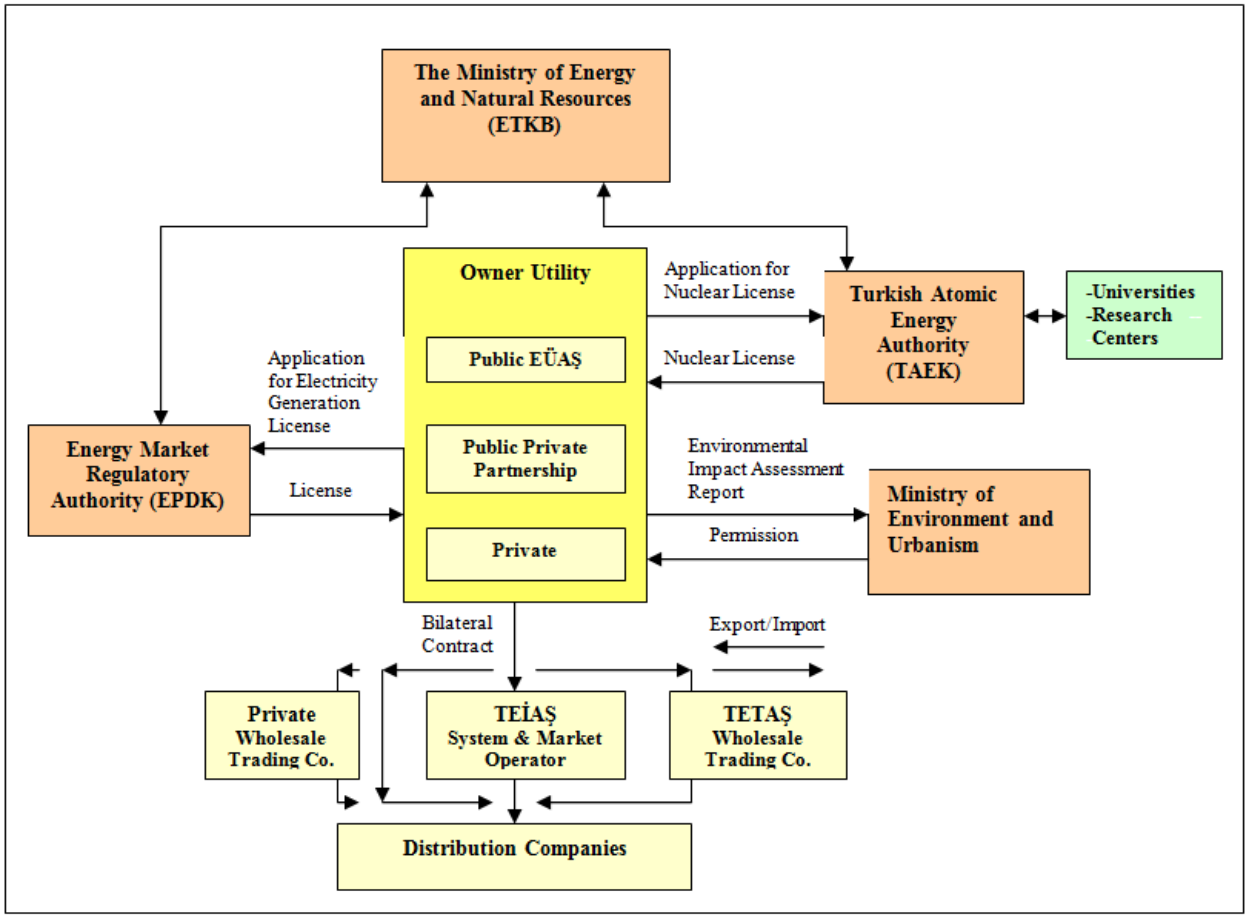
For the implementation phase of the project, the Project Company Akkuyu NGS Elektrik Üretim A.Ş. was established. On February 7, TAEK recognized Akkuyu NGS Elektrik Üretim A.Ş. (APC) as the owner, according to the Decree on Licensing of Nuclear Installations. APC started site investigations in Akkuyu for the updating of the site characteristics and parameters, according to the national procedures laid out in the Decree on Licensing of Nuclear Installations.

Akkuyu site, with the existing site license, was given to Project Company APC. Project Company APC submitted an Environmental Impact Assessment (EIA) to Ministry of Environment and Urbanism. Project Company APC also submitted a document of Electric Generation License (EGL) to Energy Market Regulatory Authority (EMRA). Site survey for EIA is still continuing.

At the same time, another study has started for the installation of nuclear power plants in the Sinop province. A Joint Declaration was signed between state owned utility EÜAŞ and South Korea Electrical utility KEPCO in Istanbul, on March 10, 2010, for the construction, commissioning, operation and decommissioning of Sinop nuclear power plant. However, during the negotiations, an agreement has not been reached with South Korea.

Negotiations with the Government of Japan and Japanese companies started on 26 November, 2010, for the Sinop NPP Project. The negotiations for constructing NPPs are based on Public Private Partnership (PPP), where EÜAŞ will be a public shareholder of the project company. After the Fukushima event, negotiations with Japan have been suspended.

2.1.2. Current organizational chart



The Ministry of Energy and Natural Resources (ETKB) is the main body of the Turkish energy sector. It is responsible for the preparation and implementation of energy policies, plans and programs, in co-ordination with its dependent and related institutions and with other public and private entities.

The Energy Market Regulatory Authority (EPDK) has been established by Laws 4628 and 4646. "Electricity Market Law", published in the Official Gazette dated March 3, 2001, is enacted to unbundle electricity market activities, enable progress into a liberalized electricity market and provide fair and transparent market regulation.

The Turkish Atomic Energy Authority (TAEK) is responsible for determining the basis of the national policy and the related plans and programs regarding the peaceful utilization of atomic energy, for executing and supporting research, analysis and studies that might lead to nation's scientific, technological and economical development related with the utilization of atomic energy, for establishing research and training centers, laboratories, test facilities and pilot plants without electricity-producing purposes wherever there is need in the country, for educating the personnel in the nuclear field and arranging co-operation with universities and related organizations, for giving approval, permission and license, related to the site selection, construction, operation of nuclear facilities, for enlightening the public in nuclear matters, and for preparing and implementing decrees and regulations to determine the basis for the nuclear and radiological safety. TAEK undertakes the research duty by performing experimental and theoretical studies at TAEK's research centers, and by collaborating in projects with universities and other related organizations. The research infrastructure at the Çekmece Nuclear Research and Training Center of TAEK is especially devoted to research and development activities addressing issues for nuclear reactor and fuel technology.

The Ministry of Environment and Urbanism has jurisdiction for making environmental assessment reports for power plants, including nuclear power plants.

The Turkish Electricity Trading and Contracting Company (TETAŞ) is responsible for electricity wholesale sales and purchases.

2.2. Nuclear power plants: Overview

There are no nuclear power plants in operation, under construction or decommissioned.

2.3. Future development of nuclear power

The Science and Technology Supreme Board (BTYK) is the main body that sets national policy and priorities for science and technology. BTYK has given decision on National Nuclear Technology Development Program (2007-2015) in 2007, which is being undertaken by TAEK. According to this Program, the establishment of a new nuclear technology center is planned.

The Strategy Paper Concerning the Electricity Market and Security of Supply was approved by High Planning Council on May 18, 2009. According to the Strategy Paper, the share of nuclear in electricity generation is planned to reach a minimum of 5% by 2020, while a further increase in this share is planned in the long term. With regards to the Law on Construction and Operation of Nuclear Power Plants and Energy Sale (Law No: 5710), nuclear power plant investment may be based on public, private or public-private partnership (PPP). The utilization of the Sinop site along with Akkuyu (licensed in 1976) may lead to further expansion of this capacity.

The nuclear power program is intended to meet electricity supply needs. According to the Agreement with the Russian Federation, Project Company APC will be responsible for the construction and operation of 4 units VVER, each with 1,200 MW power.

Akkuyu NPP will be constructed between 2014 and 2022, and commissioning of the four units is planned for 2019, 2020, 2021 and 2022.

Policy for nuclear fuel cycle will be determined during the progress of nuclear power development.

2.4. Organizations involved in construction of NPPs

According to the Agreement with the Russian Federation, Russian companies will be involved in the architect engineering, reactor supply and main component supply. Provisions are included in the Agreement to maximize local participation and utilization of manpower.

2.5. Organizations involved in operation of NPPs

According to the Agreement with the Russian Federation, Project Company APC will be responsible for operation of the NPPs in Akkuyu Project.

2.6. Organizations involved in decommissioning of NPPs

According to the Agreement with the Russian Federation, Project Company APC will be responsible for decommissioning of the NPPs in Akkuyu Project.

2.7 Fuel cycle including waste management

A nuclear fuel pilot plant, for the refining of uranium concentrate for conversion to UO_2 and for the manufacturing of sintered pellets, is in operation at the Çekmece Nuclear Research and Training Center (ÇNAEM) of TAEK since 1986. This pilot plant is subjected to IAEA safeguards. At present, research and development activities are focused on pellet manufacturing and characterization.

Waste management is currently limited mainly to radioactive waste arising from the industrial and medical applications of nuclear technologies, and there is a facility for interim storage of these wastes. This storage facility was built and has been operating since 1989, in the ÇNAEM. Compaction, cementation and precipitation processes have been carried out at this facility.

According to the Agreement with the Russian Federation, Project Company APC will be responsible for NPP fuel supply and waste management.

2.8. Research and development

2.8.1. R&D organizations

The nuclear policy of the country includes research and development activities concerning the application of nuclear technology in various sectors, such as energy, environment, human health, industry, agriculture etc.

TAEK is the national authority responsible for research and development activities in nuclear energy and technology. TAEK has five departments and three research and training centers.

The bodies of TAEK are:

- The Atomic Energy Commission
- The Advisory Council
- Advisory Committee on Nuclear Safety
- The Specialized Departments:
    - Department of Nuclear Safety

- Department of Radiation Health and Safety
- Department of Technology
- Department of Research, Development and Coordination
- Department of Administrative and Financial Affairs

- The Affiliated Centers:
  - Çekmece Nuclear Research and Training Center
  - Sarayköy Nuclear Research and Training Center
  - Ankara Nuclear Research and Training Center

The General Directorate of Mineral Research and Exploration (MTA) is responsible for the systematic investigation and research into all kinds of resources, including thorium and uranium.

Research and development activities in nuclear technology are performed by the related departments of some universities in Turkey.

2.8.2. Development of advanced nuclear technologies

Not applicable

2.8.3. International co-operation and initiatives

The Turkish Atomic Energy Authority (TAEK) is closely following worldwide trends and progress in the field of nuclear reactor technologies and fuel cycle. Turkey is participating in the "International Project on Innovative Nuclear Reactor Technologies and Fuel Cycles", coordinated by IAEA. TAEK also participates and contributes to the studies and projects of the OECD/NEA working groups.

Turkey has an observer status for CERN, the European Organization for Nuclear Research, which is the world's leading laboratory for particle physics. All activities in Turkey are coordinated and sponsored by TAEK. Turkey is a member of the Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME), another important international initiative, and TAEK is the representing Authority. The main objectives of Turkey are to establish qualified manpower by actively participating in the experimental programs in CERN and SESAME, and to follow world-wide scientific progress.

2.9. Human resources development

Some universities in Turkey have undergraduate and graduate programs in the field of nuclear engineering. TAEK trains personnel in the nuclear field at the affiliated research and training centers, also arranging for co-operation with universities and related organizations on this matter. IAEA is one of the main supporting organizations for developing national manpower through training and fellowship programs.

Turkish students will be awarded scholarships to receive a nuclear engineering education in Russia, with the goal of employing them at the planned nuclear power plant in Akkuyu, Mersin, when it begins operation.

2.10. Stakeholder communication

Co-operation between the Government of the Republic of Turkey and the Russian Federation on development of nuclear energy envisages the establishment of a "Public Information Center" for Akkuyu NPP, in the town of Büyükeceli and in the city of Mersin.

3. NATIONAL LAWS AND REGULATIONS

3.1. Regulatory Framework

3.1.1. Regulatory Authority(s)

The Authority responsible for enforcing nuclear safety is the Turkish Atomic Energy Authority (TAEK). TAEK is the main driving-force for the enhancing and broadening of all nuclear-related activities in Turkey. Alongside its other duties, TAEK undertakes all regulatory activities, including licensing, drafting regulations, and performing inspections for nuclear facilities, nuclear materials and radioactive materials.

3.1.2. Licensing Process

Department of Nuclear Safety (NGD) is the responsible unit for licensing applications of nuclear installations. It functions under the co-ordination and supervision of the Vice President of TAEK, who is responsible for Nuclear Power and Safety. "Decree on Licensing of Nuclear Installations" regulates the application requirements and procedures of licensing activities for all stages of nuclear installations. The licensing of nuclear facilities is composed of three main stages. The first stage is the Site License. The second stage is the limited work permit and the Construction License. The final stage is composed of the commissioning permit, permit for fuel loading and start up tests, and the Operating License.

Department of Nuclear Safety reviews, assesses and evaluates each application, preparing a report which includes the opinion of Advisory Committee on Nuclear Safety. This is submitted to the Vice President, who conveys this report to the President of TAEK with an additional report of his/her own. The President of TAEK brings these reports to the Atomic Energy Commission (AEK) meeting for adoption. An affirmative decision by AEK is the granting of the license.

3.2. Main national laws and regulations in nuclear power

The 1982 Law (No. 2690, published in Official Gazette No. 17753 on 13 July, 1982) established TAEK and superseded the former organization, the Atomic Energy Commission. The Law defines the structure of TAEK and the duties, responsibilities and jurisdiction of each unit. According to the Law, TAEK is the judicial organization for preparing the regulatory framework concerning radiation protection and nuclear safety.

In addition to the Law mentioned above, TAEK issued two decrees concerning the licensing procedures of nuclear installations and radiation safety. "Decree on Licensing of Nuclear Installations" (Official Gazette, No.18256, 19 December, 1983) regulates the licensing procedures and necessary documents for license application.

There are 14 regulations issued by TAEK regarding the safety of activities related to nuclear installations, which cover issues like quality management in nuclear installations, inspection of nuclear installations, nuclear power plant site requirements, safety principles for nuclear power plants, physical protection, safeguarding of nuclear materials, transport safety of radioactive materials and emergency preparedness and response. Guides and recommendations of the Atomic Energy Commission serve only for advisory purposes.

Several other regulations are in various stages of preparation, mainly on safety objectives and principles for nuclear installations, radiation protection in nuclear power plants, requirements on NPP personnel, safety principles of fuel cycle facilities, etc., and are drafted based on IAEA safety requirements.

Turkey recently changed the high-enriched uranium fuel of TR-2 research reactor to low-enriched uranium, and shipped its spent nuclear fuel to US, in accordance with the agreement between the USA and the Turkish Republic.

Regarding radioactive waste disposal, Turkey has enacted Law No. 5710, which requires all NPP operators to contribute to the National Decommissioning Fund and National Radioactive Waste Fund. Furthermore, a Nuclear Law in draft stage extends this responsibility to all nuclear installations and to all radioactive waste producers.

The list of issued regulations is as follows:

- Decree on Licensing of Nuclear Installations, RG[1] No. 18256 of 19.12.1983
- Decree on Radiation Safety, RG No: 18861 of 07.09.1985
- Regulation on Physical Protection of Special Nuclear Materials, RG No.16702 of 20.07.1979
- Regulation on Radiation Safety, RG No. 23999 of 24.03.2000
- Regulation on Nuclear Materials Accounting and Control, RG No. 23106 of 10.09.1997
- Regulation on Safe Transport of Radioactive Materials, RG No. 25869 of 08.07.2005
- Regulation on the Establishment and Working Procedures of Advisory Committee on Nuclear Safety, RG No. 23106 of 10.09.1997
- Regulation on Working Procedures of Atomic Energy Commission, RG No.17927 of 13.01.1983
- Regulation on Basic Requirements of Quality Management for Safety in Nuclear Installations, RG No. 26642 of 13.09.2007
- Regulation on Nuclear Safety Inspections and Enforcements, RG No. 26642 of 13.09.2007
- Regulation on Export Controls of Nuclear and Nuclear Related Dual Use Equipment, RG No. 26642 of 13.09.2007
- Regulation on Specific Principles for Safety of Nuclear Power Plants, RG No. 27027 of 17.10.2008
- Regulation on Design Principles for Safety of Nuclear Power Plants, RG No. 27027 of 17.10.2008
- Regulation on Nuclear Power Plant Sites, RG No. 27176 of 21.03.2009
- Regulation on Nuclear and Radiological National Emergency Preparedness, RG No. 23934 of 15.01.2000
- Regulation on Protection of Outside Workers in Controlled Areas from the Risks of Ionizing Radiation, RG No.27968 of 18.06.2011

Regulatory documents and guides approved by AEK:

- Guide on Fire Protection in Nuclear Power Plants
- Guide on Documentation Examples, Work Instructions and Procedures for the QA Program for Survey, Assessment and Approval of Nuclear Power Plant Sites

[1] RG : Official Gazette

- Guide on External Man-Induced Events in Relation to Nuclear Power Plant Design
- Guide on Seismic Design and Qualification of Nuclear Installations
- Guide on the Earthquake Related Subject Requested in the Issuance of Limited Work Permit and Site License
- Guide on Establishing and Implementing a Quality Assurance Programme for Safety in Nuclear Installations
- Guide on Management of Non-Conformance Control and Corrective Actions for Safety in Nuclear Installations
- Guide on Management of Document Control and Records for Safety in Nuclear Installations
- Guide on Inspection and Testing for Acceptance for Safety in Nuclear Installations
- Guide on Assessment of the Implementation of the Quality Assurance Programme for Safety in Nuclear Installations
- Guide on Quality Assurance in Procurement of Items and Services for Safety in Nuclear Installations*)*
- Guide on Establishing and Implementing a Quality Assurance Programme in Siting for Safety in Nuclear Installations
- Guide on Quality Assurance in Design for Safety in Nuclear Installations
- Guide on Quality Assurance in Construction for Safety in Nuclear Installations
- Guide on Quality Assurance in Commissioning for Safety in Nuclear Installations
- Guide on Quality Assurance in Operation for Safety in Nuclear Installations
- Guide on Quality Assurance in Decommissioning for Safety in Nuclear Installations
- Guide on Format and Content of Site Report for Nuclear Power Plants
- Directive on Principles of Licensing of Nuclear Power Plants

REFERENCES

[1] Electricity Market and Security of Supply Strategy Paper

APPENDIX 1: International, Multilateral and Bilateral Agreements

International treaties, conventions and agreements signed/ratified by the country

	NAME	SIGNED ON	RATIFICATION
1	Convention on Cooperation in the Atomic Energy Field Between the NATO Members and Its Amendment	22 June 1955	10 September 1956
2	Paris Convention (1960 Paris Convention on Third Party Liability in the Field of Nuclear Energy)	29 July 1960	13 May 1961

3	Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water	05 August 1963	13 May 1965
4	Protocol to Amend the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960	28 January 1964	13 June 1967
5	International Labor Conference Convention Number 115 Concerning the Protection of Workers Against Ionizing Radiations	17 June 1962	25 July 1968
6	Treaty on the Non-proliferation of Nuclear Weapons	28 January 1969	28 November 1979
7	Convention for the Protection of the Mediterranean Sea Against Pollution	16 February 1976	12 June 1981
8	The International Convention on Railway Transportation	21 March 1985	01 June 1985
9	Protocol to Amend the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as Amended by the Additional Protocol of 28 January 1964	16 November 1982	23 May 1986
10	Convention on Physical Protection of Nuclear Material	23 August 1983	07 August 1986
11	Protocol for the Protection of the Mediterranean Sea Against Pollution From Land-based Sources	17 May 1980	18 March 1987
12	Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	28 September 1986	03 September 1990
13	Convention on Early Notification of a Nuclear Accident	28 September 1986	03 September 1990
14	Convention on the Protection of the Black Sea Against Pollution	21 April 1992	06 March 1994
15	Convention on Nuclear Safety	24 September 1994	14 January 1995
16	Comprehensive Nuclear Test Ban Treaty	03 November 1999	26 December 1999
17	Joint Protocol Relating to the Application of the Vienna and the Paris Conventions	21 September 1988	19 November 2006
18	Protocol to Amend the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960, as Amended by the Additional Protocol of 28 January 1964 and by the Protocol of 16 November 1982	12 February 2004	-
19	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	-	Ratification process is ongoing

Cooperation agreements with IAEA in the area of nuclear power

	NAME	SIGNED ON	RATIFICATION
1	Agreement Between the Government of the Republic of Turkey and the IAEA for the Application of Safeguards in Connection with NPT	30 June 1981	20 October 1981
2	Protocol Additional to the Agreement Between the Government of the Republic of Turkey and the IAEA for the Application of Safeguards in Connection with NPT	06 July 2000	12 July 2001

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

	NAME	SIGNED ON	RATIFICATION
1	Agreement Between the Government of Canada and the Government of the Republic of Turkey for Cooperation in the Peaceful Uses of Nuclear Energy	18 June 1985	29 June 1986
2	Agreement Between the Government of the Republic of Turkey and the Government of the Argentine Republic for Cooperation in the Peaceful Uses of Nuclear Energy	03 May 1988	08 February 1992
3	Agreement Between the Government of Turkey and the Republic of Bulgaria on Early Notification of a Nuclear Accident and Exchange of Information on Nuclear Facilities	28 July 1997	11 September 1997
4	Agreement Between the Government of the Federal Republic of Germany and the Government of the Republic of Turkey for Cooperation in the Peaceful Uses of Nuclear Energy	14 January 1998	-
5	Agreement Between the Government of Korea and the Government of the Republic of Turkey for Cooperation in the Peaceful Uses of Nuclear Energy	26 October 1998	12 April 1999
6	Agreement Between the Government French Republic and the Government of the Republic of Turkey for Cooperation in the Peaceful Uses of Nuclear Energy	21 September 1999	18 May 2011
7	Agreement Between the Government of the Republic of Turkey and the Cabinet of Ministers of Ukraine on Early Notification of a Nuclear Accident and Exchange of Information on Nuclear Facilities	23 November 2000	02 May 2001
8	Agreement Between the United States of America and the Government of the Republic of Turkey for Co-operation in the Peaceful Uses of Nuclear Energy	26 July 2000	09 July 2006
9	Agreement Between The Government Of The Republic Of Turkey And The Government Of Romania On Early Notification of a Nuclear Accident	03 March 2008	16 May 2008
10	Memorandum of Understanding for Technical Cooperation and Exchange of Information in Nuclear Regulatory Matters Between the Turkish Atomic Energy Authority and The State Nuclear Regulatory Committee of Ukraine	07 June 2005	22 October 2008
11	Agreement Between the Government of the Republic of Turkey and the Government of the Russian Federation for Cooperation in the Use of Nuclear Energy for Peaceful Purposes	06 August 2009	12 February 2011
12	Agreement Between the Government of the Republic of Turkey and the Government of the Russian Federation on Early Notification of a Nuclear Accident and Exchange of Information on Nuclear Facilities	06 August 2009	12 February 2011
13	Agreement Between the Government of the Republic of Turkey and the Russian Federation on Cooperation in Relation to the Construction and Operation of a Nuclear Power Plant at the Akkuyu Site in the Republic of Turkey	12 May 2010	06 October 2010
14	Agreement Between Turkish Atomic Energy Authority (The Republic of Turkey) and The Federal Environmental, Industrial and Nuclear Supervision Service (The Russian Federation) for Cooperation in the Field of Nuclear Licensing and Supervision	08 June 2010	08 June 2010

15	Agreement Between the Government of the Republic of Turkey and the Government of the Hashemite Kingdom of Jordan for the Cooperation in the Use of Nuclear Energy for Peaceful Purposes.	17 February 2011	-

Other relevant international agreements

	NAME		RATIFICATION
1	ZANGGER Committee	Member	21 October 1999
2	Nuclear Suppliers Group	Member	20 April 2000

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

NATIONAL ENERGY AUTHORITY

Ministry of
Energy and Natural Resources of Turkey
İnönü Bulvarı, No: 27 Bahçelievler
Ankara
http://www.enerji.gov.tr/

Turkish Atomic Energy Authority
Eskisehir Yolu
Lodumlu, TR-06530
Ankara
http://www.taek.gov.tr/

OTHER ORGANIZATIONS

Nuclear Engineering Department
Hacettepe University
06532 Beytepe, Ankara
http://www.nuke.hun.edu.tr/

Nuclear Engineers Society
www.nmd.org.tr/

Institute for Energy
Technical University of Istanbul
Ayazaga Kampusu
TR- 80626 Istanbul
http://www.energy.itu.edu.tr/

Institute of Nuclear Sciences
Ege University
İzmir
http://nbe.ege.edu.tr/

Institute of Nuclear Sciences
Hacettepe University
Ankara
http://www.nukleerbilimler.hacettepe.edu.tr/

Institute of Nuclear Sciences
Ankara University
Ankara
http://nukbilimler.ankara.edu.tr/

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