

# The Necessity of Nuclear Power in Iran

**Ghasem Ghorbani Rostam**

*Department of physics, Islamshar branch, Islamic azad university, Islamshahr, Iran*

*Gh\_Gh\_R@Yahoo.com*

**Ali Safari**

*Sama Technical And Vocational Training College  
Islamic Azad University, Islamshahr Branch, Islamshahr, Iran*

*Safari\_ee@Hotmail.com*

---

## Abstract

In the past two years, Iran's electricity consumption has been increased with an average of 7% over the years. So, as for the Iran's development programs, it is predicted that this trend continues to rise. On the other hand, despite the widespread development of resources, climatic conditions and restrictions in hydro-electric has caused to decrease the share of electricity generation from dams and water resources within the past 40 years more than 25% to less than 4% and the increasing of country's electricity production dependency to power plant steam and gas or compound cycle. also coal resources is limited in our country and cannot be used to electric power generation, thus production of electricity in power plants nationwide compared to global average depends on the hydrocarbon fuel.

Primary hydrocarbon energy conversion process to electricity is relatively low and negative environmental impacts, so It seems, turning to nuclear power generation, an inevitable and mentioned plans for country's future power supply, and stop this process will damage the country's economic development.

**Keywords:** Nuclear Power, Energy, Iran.

---

## 1. INTRODUCTION

According to important roles, wide ranges, broader applications of nuclear energy, nuclear power plant commissioning and its development in Iran, use of energy carriers, new energy (a core - the wind - the sun) usages located in the agenda of large countries, large manpower and financial investment has done on it so investment on the increasing of strategic expansion coefficient of each country leads to researches about nuclear energy. For sustainable development at the strategic necessity of nuclear and solar energy, especially new dimensions of economic, political and even security are important for countries.

Use of nuclear power from less than one Gw in 1960 to 100 Gw in 1970 and nearly reached to 300 Gw in the late 1980s. off course in the late 1980s the use of nuclear power intensity was decreased to about 366 Gw in 2005 and thus reached the highest expansion after 1980 the People's Republic of China. More than two-thirds of nuclear plants were canceled which start of their implementation was after 1970.

During the 1970s, 1980s fossil fuel prices reduction and increasing of cost to build a nuclear power plant reduce the demands of the Government for the construction of nuclear power plants. In 1973 the fuel crisis caused to increase a further demand of countries like France and Japan which do not have a lot of oil resources to nuclear power plant manufacturing so they can provide respectively 80% and 30% of their electrical energy from these sources now.

in the late Thirty years in twentieth century, fearing of nuclear disasters, serious accidents such as Chernobyl disaster in 1986, problems related to nuclear waste, diseases caused by nuclear radiation and so on, they are the reasons for its reduction of nuclear power plants development in many countries.

## **2. The necessity of utilizing nuclear energy**

The amount of uranium in the Earth's crust is relatively high so that is equal to the metal such as tin and Ge and to almost 35 times the silver resources under the Earth's Crust. Uranium is the structural mater of many environmental bodies such as soil and rocks. The average price of uranium is currently 130 USD per kg. The supplying stability of nuclear fuel is higher than many other minerals. Proportion to other minerals with increasing cost of fuel doubled, may be ten times the current uranium resources achieved. Should be noted that the price of fuel in a nuclear power plant is relatively small compared to other existing facilities, and uranium price has a so few effect on the price of electrical energy will be produced. As an example two times consumptive fuel cost increasing of light- water nuclear power plant, causes to increase the cost of reactor to 26%, for electric power production to 7% while the two times increasing of fuel price in a gas power plant, increases the price of electric power production up to 70%.

Light water nuclear power plants in the use of low productivity are the only potential cause fission in the isotope U-235 - (about 0.7% of the mineral uranium I). In contrast to conventional light water reactors of nuclear reactors can use uranium 238 with 99/3% of mineral uranium. Before using of uranium 238, in a special process it use for plutonium 238 productions, then for nuclear reactors.

According to worldwide power plant consumption estimations, uranium238 can produces power plant energy 5 million years for the feature.

## **3. Review the use of nuclear energy for electricity production in other countries**

The first reactor designed specifically for power generation, by the Soviet Union in June 1954 in "aabninsk" near Moscow, which had a higher spectacle aspect. Electricity production from nuclear reactors on an industrial scale began in England in 1956 and this trend continued until 1965. This jumping during years 1972 to 1976 with average 30power plant production per year would start very high and was remarkable. One of the reasons for this growth was the oil shocks of the early 1970s had prompted several countries to provide the energy needed, turned to nuclear energy yet waste. After the jump course of 1986 the construction of process plants has been reduced, so the annual average building started was only 4 atomic reactors.

Now, France is having a total electricity production with 75 per cent share of nuclear electricity is at the top of the world. Respectively then be Lithuania (73 percent), Belgium (57 percent), Bulgaria and Slovakia (47 percent) and Sweden (48.6 percent). America in spite of generates Nuclear power about 20% of within the world, from late 1960 until mid-1980 does not have explosive growth. But many countries still seek to meet their energy needs through nuclear power. Obtained to predict the trend of nuclear power an ascending trend will continue until the coming decades. In this context, Asia and Eastern Europe will be the main areas in the nuclear power plant construction. In this regard, Japan with more than 25,000 megawatts of capacity to build nuclear power plants among these countries is located at the top. Then also China, South Korea, Kazakhstan, Romania, India and Russia are in place. The use of nuclear energy in Canada, Argentina, France, Germany, South Africa, Switzerland and the United States over the next two decades will almost constant trend.

## **4. An economic view of the nuclear power usage**

Today, many countries, especially Europeans, can provide a significant share of its electricity needs through nuclear power. . So that statistics show the total power plant core installed to

power the world, appertain respectively, 35% to Western Europe, 33 % to North America, 16.5 % for the Far East, 13 % to Eastern Europe, and finally only 0.74 % to Central Asia. No doubt the necessity of explaining the diversity of the countries in the field of energy, nuclear power is economic as a safe option, the economic aspects of nuclear power plant replacing, with respect to price analysis production of electric power supply system are attainable. Thus, in most countries, nuclear power plant with its economic performance in any terms will be competitive with fossil fuel power plant. However, the manufacturing cost of nuclear power plant due to increased regulations, safety, built time consuming, low fossil fuel prices cause to financial cost increasing per electricity unit in these power plants.

To provide initial capital requirements and to ensure the construction site for a multi-unit cost savings of scale associated with shared facilities and facilities required at each plant, the economic advantage from the viewpoint of nuclear power plant with fossil fuels in most countries has been maintained.

## **5. Environmental perspective of nuclear power usage**

Over the past two decades a growing trend of increased fossil fuel consumption and the types of hazardous and toxic pollutants and emissions on the human environment, serious concern and an important human needs for present and future. Obviously, this process due to the destructive and deadly effects will not persist in the future. these risks is to increase gradually the destructive effects of greenhouse gas emissions resulting from the application of fossil energies process, it is clear that nuclear energy is mentioned as an environmental approach to deal with increasing global temperature and environment pollution. So statistics show now global nuclear power plants with the current installed capacity can prevent the spread 8% of CO<sub>2</sub> in space that in this way act as a hydro power plants.

If the current capacity utilization of nuclear power plants electric generation through the plants were fed with coal, the year totaled 1,800 million tons of carbon dioxide, several million tons of hazardous gases, sulfur dioxide and nitrogen, about 70 million ton of ashes, equal to 90 thousand tons of heavy metals being released into the atmosphere and environment that harms is non deniable. So if the obstacles and political issues related to the expansion of the world nuclear energy can be solved, especially in developing countries and third world, this energy in the coming decades, will play a significant role in reducing pollution and greenhouse gas emissions. While the pollution caused by fossil power plant causes accidents and many problems on the human environment, nuclear fuel does not produce a harmful toxic gases, and the problem of nuclear waste is reasonable and ignorable, because the nuclear waste low volume, nuclear science progressing, in the final burial of waste in deep underground rocks and safety, technical problems solve in large extent and so in our country technological and social problems completely will be solved.

On the other hand, it seems that the protests and opposition in the field of nuclear energy is due to accidents and explosions in some nuclear power plant for example as Chernobyl, fokoshima. According to studies, the occurrence of events that led to the death of a large number of such as air crashes, broken dams, explosion, earthquake, storm, heavenly rock falls, etc... much more than events that nuclear power is can be made. However, the benefits of power compared to a nuclear power plant fossil regardless of economic issues, in addition to being a little nuclear waste and more cleaning of power plants because have not environmental pollution and the dangerous of SO<sub>2</sub>, NO<sub>2</sub>, CO<sub>2</sub> and CO, can refer to advancement of technology, use as much of modern science, to increase efficiency and use of core technology in other areas peaceful.

## **6. Comparison of electricity social cost in fossil and nuclear power plants**

Economic assessment and studies performed to compare the production cost of electricity in common fossil and nuclear power plants show the prices of these two energy sources in social cost terms almost close and are competitive with each other. If the fossil energy consumption

price for the national plant based on the price of international order, the production price per kilowatt hour in the fossil, nuclear plant can be compared.

A new study to determine the power plants social costs have been made in five European countries Belgium, Germany, France, Holland and England, the social costs resulting from the power plant in comparison is very lower than fossil power plants. In this study, the external costs per kilowatt hour of power have been met about 39/0 cents (equal to 6/122 USD). So if we take into account the social costs of electricity production in fossil and nuclear power plant economic evaluation, certainly cost per kWh of electricity in nuclear power plants, will be reduced considerably compared to the fossil. Any way fossil, nuclear power plants each of them have advantages, disadvantages. Thus any creature has temporal and spatial requirements, final selection and decision depend on technological factors, values, political, economic and environmental. Certainly the diversity in energy supply and sustainable development in the field of strategy is very important. According to studies conducted in this regard, the council determined to develop nuclear energy, nuclear power plants, with 6000 MW total capacity until 1400 AH.

## **7. Nuclear energy superiority over other energies**

In addition to the economical, use of nuclear energy as high energy is necessary. Because fossil resources are limited and are reserved for future generations the use of crude oil in the petrochemical industry has the most value. Electricity production from nuclear power plants present no contamination seven thousand megawatts production with 190 million crude oil barrels consumption, thousands tons of carbon dioxide, 150 tons of suspended particles in the air, 130 tons of sulfur, 50 tons of nitrous oxide in the environment are kinds of pollutants, While nuclear power is no such pollution.

## **8. CONCLUSION**

Different views about the nuclear power future, suggests according to analysis of energy demand and, supply resources in the world, technological development, facts such as the depletion of fossil resources in the coming decades, nuclear energy environmental advantages, also for citing economic function, high nuclear power plant safety coefficient, a nuclear fuel cycle is less harmful than the others and the resulting progress in fusion energy field and Inhibition of nuclear fusion energy over the next half century, Undoubtedly one of the carriers available and secure nuclear energy for electricity production in the third millennium AD, is considered.

It is, therefore imperative for Iran to fill the expected capacity short-fall through the use of nuclear power to the maximum extent consistent with its technological capability and environmental and security considerations.

## **9. ACKNOWLEDGEMENT**

The authors gratefully acknowledge the financial and other support of this research, provided by Islamic Azad University, Islamshahr Branch, Tehran, Iran.

## **10. REFERENCES**

- [1] Walter C Patterson(1986), NUCLEAR POWER, PENGUIN BOOKS
- [2] Amir Hossien Ghorashi (2006), Prospects of nuclear power plants for sustainable energy development in Islamic Republic of Iran, Energy Policy Volume 35, Issue 3, March 2007, Pages 1643–1647
- [3] International Status and Prospects of Nuclear Power (2010), IAEA
- [4] Decommissioning the North Korean Nuclear Facilities: Approaches and Costs (2009), Hui Zhang.