General Assembly

Topic B: The new role of the nuclear energy on the medical and energetic camp.
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INTRODUCTION

Energy banked in atomic nuclei is million times greater than from chemical reactions. Energy emanated by the Sun is the result of nuclear reactions that materialize in its core. One of the major beliefs for clean, sufficient energy in the future is in the nuclear fusion reactor, which employs similar reactions to generate electrical energy.

The first hydrogen bomb was detonated in the Soviet Union on 12 August 1953. Kurcsatov and Stalin desired to set up an electricity generating reactor, that is a nuclear power plant. The fulfillment of this desire was done by July 27th of 1954, in the hottest era of the cold war the first nuclear power plant merged the Soviet electricity structure.

President Eisenhower's famous speech on December 8th of 1953 encouraged to foundate an International Atomic Energy Agency, which main purpose was to develop methods whereby this thermonuclear matter helped for peaceful meanings; to implement atomic energy to the demands of agriculture, medicine and other peaceful endeavors. A specialized intention would be to supply sufficient electrical energy in the power-starved areas of the world. The Atomic Energy Act had three main goals: to continue the development of weapons, increase the uses of nuclear energy in a peaceful way and promise public health and safety against dangers of commercial nuclear technologies.

In September 1954 the first profitable nuclear power plant was built in Shippingport, USA.The Shippingport reactor was a coerced water kind, which was initially created for the navy, particularly to drive aircraft transfers. Nowadays this is deliberated as one of the most acknowledged and safest reactor approaches.

HISTORICAL BACKGROUND

The EBR (Experimental Breeder Reactor) was the first reactor used to produce electric energy in the United States and was put into operation in 1951. This reactor was a fast reactor, with 94% of the fuel composed by enriched uranium, while the coolant was a combination of liquid sodium and potassium.

On August 12th 1953 the first hydrogen bomb was exploded in the Soviet Union. Kurcsatov said that it was time to think of a peaceful use of nuclear energy and he turned to Stalin for permission to build an electricity generating reactor, and that was how in July 27th of 1954 the first nuclear power plant joined the Soviet electricity network.

It was on December 8th of 1953 when nuclear energetics started a peaceful and commercial purpose, given that President Eisenhower gave his famous speech "Atoms for Peace" and proposed the foundation of the International Atomic Energy Agency.

The first commercial nuclear plant was built in Shippingport, USA in September 1954, and it supplied electricity to Pittsburgh on December 23rd 1957.

Nuclear medicine and radiology are composed of medical techniques that involve radiation or radioactivity to diagnose, treat and prevent disease. Nuclear medicine began about 50 years ago, while radiology has been used for almost a century. Today, about one third of procedures used in hospitals involve radiation or radioactivity.

CURRENT RELEVANCE

Nuclear technology not only generates nuclear power, it can also be used for peaceful in fields as varied as agriculture, industry and medicine, which has allowed assistance to various sectors of the economy and also contribute to the development of infrastructure and employment.

The main purpose for occupying nuclear energy in medicine is, to inhibite sprouting, eliminate microorganisms that cause diseases – this is done by radiating products, food, etc – , prolonging the useful life, disinfect, eliminate pollution and radio sterilize, among other uses.

In the Western industrialized world, diagnostic and treatment techniques have become so common, reliable and precise that approximately one in three patients undergo some form of radiological therapeutic or diagnostic procedure.

• Radiopharmaceuticals: Chemical compound, mostly organic, radioactive that is administered to the patient to investigate in the human body a biological process or the functioning of an organ.

• Gammagraphy: Once administered to the patient, the radiopharmaceutical, due to its special affinity, is fixed in the organ to be studied, emitting gamma radiation that is detected by a device called a gamma camera whose detector is placed on the organ to be scanned. These signals are transformed by means of a computer attached to the equipment, which allows the spatial representation of the organ.

• Radiotherapy: It is the medical specialty that uses the application of ionizing radiation with healing purposes for the destruction of malignant tissues and tumors. This therapy can be used alone or in association with other therapeutic means such as surgery or chemotherapy. Example: Cobalt Therapy, is the form of therapy that uses Cobalt-60 sources.

• Diagnosis by radioisotopes: Radioisotopes are used to obtain images of lung function, bone cancer therapy and for therapy against thyroid cancer.

• Sterilization of medical equipment: By irradiating them. It is a highly efficient and low cost process.

• Knowledge of biological processes using tracers: The information provided by the molecules marked in the different stages of the cell cycle and the help provided by the analytical separation techniques have made it possible to determine very small concentrations of enzymes, hormones, drugs, poisons, etc, using the radioimmunoassay technique (RIA), which makes use of the specificity of antigen-antibody reactions.

• Study of the characteristics of the tumor cells, their location and tumor

extension: It allows to plan the type of irradiation, the calculation of the total dose, the form of administration and its possible fractionation with rest intervals to facilitate the progressive reduction of the tumor, thus favoring the elimination of dead cells and allowing the best repair of the surrounding tissues.

Some advantages of nuclear energy are:
High energy density: by using Uranium
Emits less Greenhouse Gases (GHG) than fossil fuels
Needs less space

Disadvantages:
Uranium is a non-renewable resource
Cannot Replace Fossil Fuels: Nuclear power alone does not represent an alternative to oil, gas and coal fuels.
It takes a lot of investment of money and time to build a nuclear plant
Nuclear disasters

INTERNATIONAL ACTIONS

The World Association of Nuclear Operators (WANO) was established by the nuclear industry to ensure a global safety culture. WANO has built a transnational network of technical exchange that includes all countries with nuclear power. The goal of WANO´s system standards are set by the UN´s International Atomic Energy Agency (IAEA).

National and international insurance laws assign responsibility to nuclear plant operators and that is why safety related events are now near zero. Today, nuclear power plants have a superb safety record both for plant workers and the public. More than 20,000 containers of spent fuel (used nuclear fuel) and high-level waste have been shipped safely over a total distance exceeding 30 million kilometers
Eighteen countries depend on nuclear power for at least one-third of their electricity:

· Hungary, Slovakia, Switzerland and Ukraine get more than half
· Belgium, Czech Republic, Finland, Sweden, Switzerland and Slovenia get one-third or more
· South Korea and Bulgaria get more that 30%
· Spain, Romania, Russia, USA and UK get about one-fifth
· Japan relies on nuclear power for more than a quarter

· Canada has 19 nuclear reactors that generated 16% of the country´s electricity
· Mexico has two nuclear reactors, which produced 6% of the country´s electricity

The USA has 99 operable nuclear reactors, and in 2016 they generated 20% of the country´s electricity. In the last 15 years, the maintenance strategies and operational performance have improved thus increasing utilization of nuclear power plants.

Belgium has seven operable nuclear reactors, and in 2016 they generated 52% of the country's electricity.

Finland has for operable nuclear reactors, which generated 34% of the electricity in the country in 2016. A fifth reactor is under construction, and there are plans to build another one.

France has 58 operable nuclear reactor and they have produced 72% of the country's electricity. In 2015 an energy policy aimed to reduce the country's share of nuclear generation to 50% by 2025, but in 2017 the French government postponed this target because the country´s Energy Minister said that the target was not realistic and that it would increase the country's carbon dioxide emissions and endanger security of supply. Another reactor is currently under construction in the country. In Germany seven nuclear power reactors are operating and generating 13% of the country's electricity. By 2022 Germany is phasing out nuclear generation as part of its Energiewende policy, which is an ambitious national climate change mitigation policy, and aims to reduce carbon dioxide emissions. However, in 2015 the country emitted 730 Mt CO2 and remained the world's sixth biggest emitter of CO2.

The Netherlands has only one nuclear reactor, and it generates 3% of the country's electricity.

Spain has seven nuclear reactors which account for 3% of the country's electricity.

Sweden has eight nuclear reactors, and in 2016 they generated 40% of the country's electricity. They are closing old reactors, however they have invested heavily in operating lifetime extensions.

In 2006 a UK government paper endorsed the replacement of the country's fleet of nuclear reactors with a new nuclear build, and they aim to have a 16 GWe of nuclear capacity by 2030.

Bulgaria has two nuclear reactors, and in 2016 they produced 35% of the country's electricity.

Hungary has four operable nuclear reactors, which account for 50% of the country's electricity.

Romania has two nuclear reactors, and in 2016 they generated 17% of the country's electricity.

Russia has 35 nuclear reactors and they produce 17% of the country's electricity. In 2016 a government decree specified the construction of 11 nuclear power reactors by 2030. Russia strength in the nuclear industry can be seen in its dominance of exports markets for new reactors. They are involved in new reactors projects in Belarus, China, Hungary, India, Iran and Turkey.

Slovakia has four operable nuclear reactors and two more are under construction, which generate 54% of the country's electricity.

Ukraine has 15 operable nuclear reactors and they generate 52% of the country's electricity.

China has 38 nuclear reactors which produce 4% of the country's electricity. They dominate the market for new nuclear build; at the start of 2018, 20 of 58 reactors under construction in the world were in China, these include the world´s first Westinghouse AP1000 units and a demonstration high-temperature gas-cooled reactor plant.

India has 22 operable nuclear reactors, which generated 3% of the country's electricity in 2016. The Indian government aims to grow their nuclear power capacity by 2024. At the start of 2018 six reactors were under construction.

Japan has 42 nuclear reactors, in the past they generated 30% of the country's electricity, however in 2016 the figure was just 2%. At the start of 2018, only five reactors had been brought back online, with a further 21 in process of approval following the Fukushima accident in 2011.

South Korea has 24 nuclear reactors, and in 2016 they generated 30% of the country's electricity. They have four new reactors under construction, as well as four in the United Arab Emirates.

Pakistan has five operable nuclear reactors, which in 2016 produced 4% of the country's electricity. They have two Chinese Hualong One units under construction.

South Africa if the only African country currently producing electricity with two operable nuclear reactors, which in 2016 generated 7% of the country's electricity.

Iran has a single operable nuclear reactor, and in 2016 it produced 2% of the country's electricity.

The United Arab Emirates is building four South Korean reactors at a cost of over $20 billion and is collaborating closely with the International Atomic Energy Agency and international firms.

UN ACTIONS

The importance of nuclear medicine to people all over the world cannot be overestimated. It is a factor for saving and extending human life. It is also a factor in economic development because it is a technology available to nearly every country regardless of income levels. The IAEA points out: "In developing countries, malnutrition, communicable and non-communicable diseases, particularly cancer, threaten health and cut short productive lives. Health problems and diseases can be detected and treated using nuclear techniques." Radiation medicine technology allows a country to develop cancer control capacity through the introduction, expansion and improvement of infrastructure, services and workforce.

Using the world top experts, the UN has conducted exhaustive studies of the health effects of Chernobyl- beyond the original death toll of 31. Of around 4,000 thyroid cancer cases attributed to the accident, nearly all were successfully treated. Beyond this- after 20 years- there is no scientific evidence of any increase in cancer incidence at locations near or far.

The UN's authoritative findings do not minimize the gravity of what happened at Chernobyl. But they do refute many sensationalized reports

and help to place that singular event in perspective. The greatest health impact from over-use of fossil fuel comes from air pollution. The World Health Organization (WHO) estimates that such pollution causes nearly three million deaths each year. Medical scientists predict that the fossil fuel mortality rate will triple by the year 2025. These health effects-, which equal 600 "pollution Chernobyl's'" daily in the near future-, crush even the most distorted myths about nuclear power.

POINTS TO DISCUSS

Use accepted of the nuclear energy-

· What is proposed?
· Advantages and disadvantages
· Regulations

Energy sector-
· What improvements can brin?
· In what benefits society?
· What can you give as a technological advance?

Health Sector-
Organizations that control supplies- They are working properly?
Organization that manages the care of nuclear energy
Protections and restrictions of nuclear energy

Consequences to the countries that do not comply with the provisions of the regulations and uses

Potential uses against the right-

Countries willing to contribute-

Climate Change-

Clean Energy-

Contamination-

Unbalance of the terrestrial atmosphere.

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