**IAEE WEBINAR**

# PEACEFUL USES OF NUCLEAR ENERGY IN LESS INDUSTRIALIZED COUNTRIES:

# CHALLENGES, OPPORTUNITIES, AND ACCEPTANCE

July 11, 2022, 8:30 to 9:30 EST

While the idea of nuclear energy in many people remember some adverse events in recent human history, its peaceful uses are extensive less known and have greatly benefited society. For example, in the U.S., where nuclear power accounts for 19% of electricity, a January 2022 Pew Research Center survey found that 35% of U.S. adults say the federal government should encourage the production of nuclear power, 26% say it should discourage it, and 37% say it should neither promote nor prevent it.

The peaceful uses of nuclear energy go far beyond power generation, which today accounts for 10% of the world's total electricity supply and is the second-largest electricity source with negligible $CO_2$ emissions during its operation. Also, for the past 70 years, atomic energy has had a significant impact on improving human life in health, agriculture, food preservation, industry, and the understanding of our world and universe.

Nuclear technology are used in the diagnosis and treatment of cancer and other diseases, radiography cameras, blood irradiators, and radio sterilization of biological tissues for the treatment of various conditions; it helps the development of scientific knowledge on the understanding and searches for a solution on environmental issues, like climate change and tracing of ecological impacts; in augmenting agricultural productivity and the elimination of food diseases, like reducing the threat of fruit flies in Latin America; in for various industrial applications like radiography, flow measurement and leak detection in industry and mining, in dredging operations in ports, and space exploration, among many others. Not to mention the impact of nuclear energy programs on a solid workforce and the technological development of the countries that scale their capabilities.

On the energy side, and to achieve the deep decarbonization required to keep the average rise in global temperatures below 1.5°C, combating climate change without an increased role of nuclear power generation would be much more complicated. The IEA state that achieving the pace of $CO_2$ emissions reductions in line with the Paris Agreement is already a considerable challenge, as shown in the Sustainable Development Scenario. It requires significant increases in efficiency and renewable investment and an increase in nuclear power. Also, the World Nuclear Association notices that nuclear power plants, throughout their life cycle, nuclear produce about the same amount of carbon dioxide-equivalent emissions per unit of electricity as wind and one-third of the emissions per unit of electricity when compared with solar

In this IAEE webinar, we will expect to unveil from renewed experts in the field the opportunities and challenges within less industrialized countries to developing a plan and capabilities for peaceful uses of nuclear energy and power generation.

Some of the critical issues/questions we look to be addressed by these renewed experts are:

- How should governments interact with civil society in analyzing and evaluating the peaceful uses of nuclear energy? How should the benefits and risks of peaceful uses of nuclear energy be communicated to civil society to understand the benefits and risks properly? What role has the scientific community here?
- What steps should countries take to build capacities to become ready to decide on building critical infrastructure for the peaceful uses of nuclear energy?
- How can IAEA and other industrialized countries support capacity building in less industrialized countries to be ready for a yes or no decision regarding peaceful uses of atomic energy?
- How important is the institutional framework, strong and independent regulatory and supervisory authorities in the nuclear industry, for the success and safe development of a nuclear program for peaceful uses
- In many countries, institutions are weak, which can seriously threaten the success and safety of any nuclear energy program. How can governments and the international community protect from this risk by exposing the world industry to higher downside risk?
- How should we address the lack of human capital, scientists, and experts in the field?
- Is nuclear power a realistic and cost-effective solution for less industrialized countries, given significant upfront investment costs and construction periods. Are SMRs turn-on key a solution for less industrialized countries?
- When it comes to building nuclear power infrastructure, upfront investments are significant compared to other power generation sources such as solar or wind, which can be developed by steps. How less developed countries can secure access to finance, and what are the key requirements for it?
- What are the critical characteristics of technology when deciding on the different alternatives of nuclear technologies available in the market and future SMRs?
- Should nuclear power generation be evaluated as a standalone project, only looking at a long-term reliable supply of cheap energy?
- Chornobyl, Three Mile Island, and Fukushima nuclear accidents marked a stopping point in many countries on their decision to implement a peaceful use of atomic energy program. How can we assure that safety standards in a broad sense have been enhanced to preclude future situations like the ones that happened there? Should the safety standards must depend on organization structure development in addition to modernized reactor design?

**Moderator/speaker:**

**Ricardo Raineri**, Past President International Association for Energy Economics, former Chilean Energy Minister and Chairman of the Board of de Chilean State Oil Company (ENAP), former Alternative Executive Director of the World Bank Group, Professor of the Engineering School at Pontificia Universidad Católica de Chile, and Economic Advisor of Associated Universities, Inc.

Economist with vast professional experience in the energy sector and institutional issues on the economics of regulation and antitrust policy, market structure, pricing, business strategy and competition, and corporate governance. Has published in various academic and professional journals and regularly consults for the public sector and private companies.

He has a bachelor's in economics, a business engineer professional degree, a master's in economics degree from the Pontificia Universidad Católica de Chile, and a Master of Arts (M.A.) and Doctor of Philosophy (Ph.D.) both in Economics from the University of Minnesota. Member of the Editorial Board of The Energy Journal.

**Speakers:**

**Dr. Jeffrey Binder** - Dr. Binder has had over a thirty-year career in applied energy technology as both an engineering & scientific contributor and high impact leader. His experiences include nuclear reactor technology, renewable energy, advanced/critical materials, and manufacturing technology. He has had multiple leadership roles including Associate Laboratory Director for applied energy at Oak Ridge and Argonne National Laboratories, and the Founding Director of the University of Illinois Applied Research Institute. Dr. Binder has significant international experience in promoting nuclear and renewable energy technology. He has proposed, built, and led multiple technology development initiatives in areas from the nuclear reactor safety, fuel cycle, radioisotope production, advanced/critical materials, advanced energy systems, and manufacturing technology. Dr. Binder was a significant leader for the United States in supporting and solving nuclear safety and security issues following the Three Mile Island accident, the dissolution of the Soviet Union and following the Chornobyl accident, and the Fukushima accident in Japan.

He has a Ph. D. in nuclear engineering from the University of Illinois at Urbana-Champaign and an MBA from the University of Chicago. He is the author or co-author of over 100 publications, articles, and conference submittals.

**Antonio Muller**, have over forty-five years career in the energy sector with executive positions in more than 20 years in the implementation of nuclear power plants in design, engineering, construction and commissioning in Brazil, and consulting abroad, in the total of 2500MWe.

Mr. Muller participation contemplates also conventional thermal power plants, hydro power plants and oil and gas sector in offshore, mid-stream and on shore installations.

Also, he was president of several nuclear associations, such as Latin America Section of American Nuclear Association, 10 years president of Brazilian Nuclear Association, with participation in the World Nuclear Association and World Nuclear University.

Mr. Muller has BS in Mechanical Engineering from State University of Rio de Janeiro with professional extension in USA in the Georgia Institute of Technology, Drexel University and Harvard Business School. Finalist of Lifetime achievement award at 2019 S&P Global Energy Award in New York.

And has more than 100 presentations in seminars and conferences in Brazil, Argentina, USA, China, Korea, England, Russia, Germany, Spain.

**Ted Jones** is senior director for national security and international programs at the Nuclear Energy Institute, the nuclear industry's policy organization in Washington, D.C.

An expert on international energy markets and nuclear trade policy, Mr. Jones leads initiatives related to nuclear energy exports, including nuclear cooperation agreements, nuclear export controls, export finance, export promotion and related issues. In addition to his work on nuclear trade policy and promotion, Mr. Jones serves as liaison to stakeholders in the nuclear policy and national security communities.

Mr. Jones previously served as policy director of the U.S.-India Business Council at the U.S. Chamber of Commerce. During his tenure at the India Council, Ted led a successful campaign to change U.S. law and international rules to admit India to global commercial nuclear trade.

Mr. Jones holds a Bachelor's degree from Birmingham-Southern College, studied graduate history at the University of Georgia and law at Georgetown University Law Center.