Nuclear Energy: Key Facts and Issues



May 12-14, 2025

Clean Air Task Force (CATF), Massachusetts Institute of Technology (MIT), and Warsaw University of Technology

A three-day seminar hosted at the Warsaw University of Technology

Questions? Contact Mary Louks, Director of Events and Engagement, Clean Air Task Force at mlouks@catf.us

CLEAN AIR TASK FORCE

Massachusetts Institute of Technology

Warsaw University of Technology
Faculty of Physics

Agenda

Meeting space: Warsaw University of Technology, Faculty of Physics, Auditorium Hall, Koszykowa 75 street, 00-662 Warszawa, Poland

Attendees are expected to arrange their own lodging and travel accommodations as needed.

Subject to change.

Day 1 | Monday, May 12

8:30 – 9:15	**Welcome and Introductions**
9:15 – 10:45	**Nuclear Energy and Climate Change** *Malwina Qvist, Director, Nuclear Energy Program, Clean Air Task Force* will explore a systems analysis of clean energy sources, including nuclear and renewables, with a focus on land use, energy density, and siting challenges.
10:45 – 11:00	**BREAK**
11:00 – 12:30	**Nuclear Power Plant Basics** *Jacopo Buongiorno, Professor, Nuclear Science and Engineering, Massachusetts Institute of Technology* will cover the basic principles of nuclear power plants, including current technologies such as PWRs and BWRs, the differences between fast and thermal reactors, and an overview of power cycles.
12:30 – 1:30	**Lunch**
1:30 – 2:45	**Nuclear Fuel Cycle, Nuclear Waste, and Spent Fuel** *Wacław Gudowski, Professor, Royal Institute of Technology, Stockholm and National Center for Nuclear Research, Swierk,* will examine the nuclear fuel cycle, including mining, conversion, enrichment, fuel fabrication, reprocessing, and recycling, as well as technical options for managing nuclear waste and spent fuel, with insights into global and U.S. developments.
2:45 – 3:00	**BREAK**
3:00 – 4:15	**Nuclear Safety** *Jacopo Buongiorno* will cover the fundamentals of nuclear safety, with an analysis of key events at Three Mile Island, Chernobyl, and Fukushima.

4:15 – 5:15	**Nuclear Energy – The Finnish Example** *Atte Harjanne, Parliament of Finland* will explore the role of nuclear energy in Finland, focusing on energy security, waste management, public acceptance, and the political atmosphere.
5:45 – 7:45	**Dinner Reception**

Day 2 | Tuesday, May 13

8:30 –9:30	**Applications of Nuclear Energy Beyond Electricity** *Malwina Qvist* will discuss the value of nuclear energy in decarbonizing hard-to-abate sectors beyond electricity generation.
9:30 – 10:30	**Advanced Reactors and Advanced Fuels** *Staffan Qvist, Founder and CEO, Quantified Carbon* will explore advanced reactors and advanced fuels, discussing what they are, how they differ, and why they are important.
10:30 – 10:45	**BREAK**
10:45 – 12:00	**Nuclear Regulation** *Ian Grant, Principal, Ian Grant Consulting* will examine how nuclear plants are licensed and regulated, with a focus on the roles of the IAEA and national regulatory bodies.
12:00 – 1:00	**Lunch**
1:00 –2:15	**The Cost Challenge** *Jacopo Buongiorno* will address the cost challenges of nuclear energy, examining recent cost trends, the factors contributing to high costs, and strategies for cost reduction.
2:15 – 3:30	**Financing the Future: Strategies for Advancing New Nuclear Projects** *Stephen Comello, Executive Director, Nuclear Scaling Initiative* will examine the financial frameworks and development models shaping new nuclear deployment and how key stakeholders—governments, investors, and utilities—navigate risk, capital allocation, and policy incentives to structure viable projects in an evolving energy landscape.

3:30 – 4:30	**Polish Nuclear Projects** *Adam Rajewski, Chief Operation Officer, Nuclear PL* *Attendees may arrange their own dinner plans at their leisure.*

Day 3 | Wednesday, May 14

8:30 –9:30	**Non-Proliferation Issues** *Elina Teplinsky, Partner, Pillsbury Law* will explore non-proliferation issues, including its definition, the history of nuclear weapons, the Non-Proliferation Treaty, the current vision for non-proliferation, the role of the IAEA, and ongoing challenges.
9:30 – 10:30	**Radiation Health Science** *Krzysztof Fornalski, Faculty of Physics, Warsaw University of Technology* will cover the fundamentals of radiation, including its sources, health effects, detection methods, and related regulations.
10:30 – 10:45	**BREAK**
10:45 – 11:45	**Current Global State of Nuclear Energy** *Elina Teplinsky* will examine the current global state of nuclear energy, focusing on the divide between Western and other regions, as well as evolving policies in the U.S., EU, Middle East, and Asia.
11:45 – 12:45	**Lunch**
12:45 – 1:45	**Public Opinion and Nuclear: European and Global Trends** *Mark McInnes, European Research Director, Project Tempo* will explore public opinion on nuclear energy, examining its historical trends, current global and European perspectives, factors influencing support or opposition, risk perceptions, and the role of community-led decision-making.
1:45 – 3:00	**Key Takeaways and Group Discussion**

Speakers



HOST: JACOPO BUONGIORNO
Professor of Nuclear Science and Engineering, Massachusetts Institute of Technology

Jacopo Buongiorno is the Battelle Energy Alliance Professor of Nuclear Science and Engineering at the Massachusetts Institute of Technology (MIT), and a member of the U.S. National Academy of Engineering. He is also the Director of Science and Technology of the MIT Nuclear Reactor Laboratory and the Director of the Center for Advanced Nuclear Energy Systems (CANES). Jacopo teaches a variety of courses in thermo-fluids and nuclear reactor engineering. He has published >110 journal articles in the areas of reactor safety and design, two-phase flow and heat transfer, and nanofluid technology. For his research work and his teaching he won several awards, among which an ANS Presidential Citation (2022), the MIT MacVicar Faculty Fellowship (2014), the ANS Landis Young Member Engineering Achievement Award (2011), the ASME Heat Transfer Best Paper Award (2008), and the ANS Mark Mills Award (2001). In 2016-2018 he led the MIT study on the Future of Nuclear Energy in a Carbon-Constrained World. Jacopo is a consultant for the nuclear industry in the area of reactor thermal-hydraulics, a member of the Accrediting Board of the National Academy of Nuclear Training, a Fellow of the American Nuclear Society (including service on its Special Committee on Fukushima in 2011-2012), a member of the American Society of Mechanical Engineers, past member of the Naval Studies Board (2017-2019), past member of the Secretary of Energy Advisory Board Space Working Group, and a participant in the Defense Science Study Group (2014-2015).



HOST: MALWINA QVIST
Director, Nuclear Energy Program, Clean Air Task Force

Malwina is based in London and her portfolio has an emphasis on supporting CATF's European programs and EU advocacy agenda. Malwina has both deep technical expertise as a nuclear engineer as well as a breadth of strong analytical capabilities through her experiences in advising senior policymakers, ministers, and private sector developers on a variety of low-carbon energy sources. Most recently, Malwina worked at Cornwall Insight where she worked directly with renewable developers to advise on energy markets and regulatory landscape within Great Britain. Prior to that, Malwina supported the UK government as a civil servant (Department for Business, Energy and Industrial Strategy) where she used her analytical skills to build evidence for future energy policies to achieve the UK's zero-carbon energy goals. Malwina has a PhD in Nuclear Engineering from Oregon State University, an MSc in Nuclear Engineering and BSc in Power Engineering from Warsaw University of Technology and completed a postdoctoral in the nuclear engineering department at UC Berkeley.



STEVE COMELLO
Executive Director, Nuclear Scaling Initiative

Stephen D. Comello is Senior Vice President, Strategic Initiatives at the EFI Foundation, Executive Director at the Nuclear Scaling Initiative, Co-Managing Director of the Energy Futures Finance Forum. Comello previously served as a faculty member at the Stanford Graduate School of Business for over a decade, co-leading the Rapid Decarbonization Initiative. With a 23-year career dedicated to scaling emerging energy and environmental technologies, Comello specializes in policy and business model innovations. His expertise spans techno-economic analysis, policy and project finance, corporate strategy in the energy transition, and open innovation. At Stanford, he held leadership roles in various research initiatives and industrial affiliate programs. He has authored numerous publications in energy policy, industrial organization, development economics, innovation management, and carbon accounting. Stephen holds bachelor's and master's degrees in mechanical and industrial engineering from the University of Toronto and a doctorate in civil and environmental engineering from Stanford University. Originally from Canada, he now resides in Washington, D.C.



KRZYSZTOF FORNALSKI
Faculty of Physics, Warsaw University of Technology

Dr. Krzysztof Wojciech Fornalski, PhD, DSc, Eng., is Adjunct Professor at the Faculty of Physics, Warsaw University of Technology, Poland. His main field of interests are radiation biophysics, radiation and nuclear physics, radiation protection, nuclear technology and cancer physics. In 2007 Dr. Fornalski graduated in physics from the Faculty of Physics, Warsaw University of Technology. He specialized in nuclear and particle physics. In 2012 he obtained a PhD degree (with honors) in the field of nuclear physics and radiation biophysics from the National Centre for Nuclear Research (NCBJ), Poland. He then started to work parallelly in science and industry where he was working in the project of the Polish nuclear power program. In 2023 he obtained his DSc (habilitation) degree at the Faculty of Physics, Warsaw University of Technology. In 2013-2014 Dr. Fornalski participated in research projects at the Central Laboratory for Radiological Protection, Poland, in the field of biodosimetry. In 2014 he participated in the IAEA Fellowship in the SCK-CEN institute, Belgium, followed by the ENETRAP III project (European Network on Education and Training in Radiological Protection). He was a member of radiation protection working group in the World Nuclear Association. He is involved in nuclear safety and radiation protection of the Polish nuclear power program and SMR technology implementation. Dr. Fornalski is the Alternate representative of Poland to UNSCEAR (United Nations Scientific Committee on the Effects of Atomic Radiation). He is an author of over 70 scientific papers.



WACLAW GUDOWSKI
Professor, Royal Institute of Technology – Stockholm

Waclaw Gudowski is a professor in Neutron and Reactor Physics at Kungliga Tekniska Högskolan (KTH) - The Royal Institute of Technology in Stockholm, Sweden. He was Director of the Nuclear Energy Technology Centre (CEKERT) at the Royal Institute of Technology in Stockholm till 2006. Member of the Swedish Royal Academy of Engineering Sciences – IVA. Author of over 75 scientific papers in nuclear technology and solid state physics. Lecturer and Mentor of the First World Nuclear University (WNU) in Idaho, USA, in 2005. Since 1992 involved in the ISTC activities. First as an advisor to the Swedish Minsitry of Foreign Affairs, then as a colaborator of more than 30 ISTC projects, an animator and the first chairman of the Contact Expert Group on Partitioning and Transmutation related ISTC projects. In 1997 he became a fellow of the Los Alamos National Laboratory and a foreign expert for the Department of Energy. In 2003 and 2005 he worked as an international expert of the French Parliament for public hearing on nuclear power and nuclear waste. Since November 2006 on leave from the Royal Institute of Technology for an assignment as a Deputy Executive Director of the International Science and Technology Center (ISTC) in Moscow representing the European Union.



IAN GRANT
Principal, Ian Grant Consulting

Ian Grant is a speaker and consultant in nuclear safety and regulation. He was the Deputy Director General for Operations at the Federal Authority for Nuclear Regulation in Abu Dhabi from 2016 to 2018 and the Director of Nuclear Safety at FANR from 2009 to 2015. He played a leading role in establishing FANR as the new national nuclear regulatory body in the United Arab Emirates in particular directing the development of regulations and guides, licensing, and inspection of the construction and commissioning of the 4-unit nuclear power plant at Barakah in the UAE. Before joining FANR, Ian held senior management roles with the Canadian Nuclear Safety Commission with responsibilities for licensing and safety assessment of the fleet of operating nuclear power plants in Canada. He joined Atomic Energy of Canada Limited in 1980 after beginning his career with Babcock and Wilcox in the United Kingdom in 1975. Ian is an invited contributor to several International Atomic Energy Agency (IAEA) peer review missions, has led and participated in national delegations to four review meetings of the Convention on Nuclear Safety, and has served on the IAEA Nuclear Safety Standards Committee and on the OECD Nuclear Energy Agency committees for nuclear safety and regulation.



ATTE HARJANNE
Member, Parliament of Finland

Atte Harjanne is a member of parliament and the chair of Green Parliamentary group in Finland. Before being elected to the parliament in 2019, he has worked at the Finnish Meteorological Institute studying socio-economic impacts of climate change, energy policy and use of climate information. Harjanne has also been member of the city council of Helsinki since 2017 and acts as the chair of the executive board of Helen, the city-owned energy utility that provides district heating and cooling for Helsinki and electricity to over 600,000 households in Finland.



STAFFAN QVIST
Founder and CEO, Quantified Carbon

Staffan Qvist was trained as a nuclear engineer at University of California, Berkeley. Qvist currently leads Qvist Consulting Limited, where he consults on clean energy projects around the world. He contributed his expertise in renewables and nuclear energy development to the book A Bright Future: How Some Countries Have Solved Climate Change and the Rest Can Follow, which examines international responses to climate change with a focus on Sweden's successful decarbonization using nuclear power.



MARK MCINNES
European Research Director, Project Tempo

Mark McInnes (Lord McInnes of Kilwinning CBE) currently works as European Research Director for Project Tempo a political and economic consultancy. Mark has a background in voter insights and developing political and policy solutions tailored to voter types and voter values. He has served three UK Prime Ministers as a senior adviser. Mark has been focussed on attitudes to climate specifically in relation to energy since 2022. He is also a member of the UK House of Lords (the UK second chamber).



ADAM RAJEWSKI
Chief Operating Officer, Nuclear PL

Adam Rajewski is an engineer specialised in power systems. Over last nearly two decades he has pursued parallel career paths: in the industry and in academia. On the industrial track, Adam has dealt with issues of district heating and cogeneration, data centre power supply, EPC delivery of power generation projects, contract negotiations, and strategic advisory for nuclear projects. Currently he holds the position of Chief Operating Officer at Nuclear PL, Poland's first consultancy firm focused exclusively on nuclear power. On the academic track, Adam is mostly focused on teaching new generations of engineers, and popularisation of knowledge about clean energy systems. Adam is also a Vice-President of the Polish Nuclear Society.



ELINA TEPLINSKY
Partner, Pillsbury Law

Elina Teplinsky, Pillsbury's Global Energy Industry Leader, co-leader of the Hydrogen Practice and a leading member of the firm's International Nuclear Projects team, focuses on international nuclear energy matters, including advice to U.S. and global clients on transactional and regulatory issues. Elina is a trusted advisor to nuclear owner-operators, reactor and equipment suppliers, investors, architect-engineering companies and technical consulting firms on complex nuclear and hydrogen transactional and regulatory matters. She frequently serves as lead outside counsel on new build projects, equipment and fuel procurements, M&A transactions and joint ventures in the nuclear sector. She has worked on transactions for more than 30 countries in North and South America, Europe, Turkey and the Middle East, Russia and the former CIS, Asia and Africa. She is the co-leader and spokesperson for the Nuclear Hydrogen Initiative. Elina is also a member of the International Bank for Nuclear Infrastructure (IBNI) Implementation Organization Strategy Advisory Group.