Futures for nuclear energy? Social, economic and environmental considerations

ECOSENS Project Conference

8–9 September 2025 POLIMI Milano Bovisa Campus, Milano, Italy

Introduction

Our society faces significant challenges shaping desired energy futures: the urgent need for decarbonisation, and ensuring the economic, environmental and social sustainability of energy systems in the face of growing energy demand. Nuclear energy presents a potentially important, yet contested, low-emission option for tackling these challenges. Currently attention is directed worldwide towards advanced nuclear technologies and Small Modular Reactors, as a way to meet decarbonisation and broader sustainability goals. Their development seeks to improve the characteristics of existing reactors on multiple levels, e.g. safety, lower proliferation risks, potentially reduced volumes of radioactive waste, or more efficient use of fuel. However, such technologies are still under development in Europe, and not a proven and ready to use solution.

From this perspective it appears essential to open up the techno-scientific issues of new and emerging nuclear technologies to the social, political, cultural and ethical context and to create interdisciplinary space for research, dialogue and collaboration between researchers, civil society and other stakeholders.

Topics

The ECOSENS 2-day conference in Milan will feature a dynamic format, combining short topical presentations with both structured and informal opportunities for dialogue and debate. Contributions received which include research findings, critical reflections, practical insights, and project-based work directly address with the core themes explored throughout the ECOSENS project. The key topics focused in the final conference are as follows:

1. Societal Perspectives:
   - Stakeholders' and wider publics' perceptions of risks, benefits and potentials of nuclear technology (including new and emerging technologies) in the context of major societal challenges such as the climate crisis, sustainable development, and energy security
   - Stakeholder engagement and communication needs
   - Inter- and transdisciplinary research initiatives
2. Sustainability Assessment:
   - Long-term sustainability of energy systems (including life-cycle analysis, resilience, and system integration analysis)
   - Environmental, economic and social impacts of various energy technologies involved in the energy transition (case studies)
   - Nuclear energy as a low-carbon solution: role of SMRs and advanced nuclear technologies in sustainable energy futures
   - Synergies and trade-offs between energy security, climate change mitigation, and social equity in the context of nuclear energy
3. Socio-Economic Models:
   - New and improved quantitative and qualitative socioeconomic models for assessing the potential role of nuclear energy in today's society
   - Experiences of socioeconomic assessment engaging stakeholders, including suppliers, investors, consumers, governments, and others

- Models of a broad scope, addressing the nuclear supply chain, policies, or nuclear governance

4. Historical and ethical reflections:
   - Understanding current trajectories of nuclear energy development through the lens of historical cases and experiences
   - Ethical frameworks to assess potential challenges and values informing the use of nuclear energy in society

Conference Format and Structure

The detailed programme of the conference is outlined below. Presentations will be grouped into thematic sessions aligned with the core topics of the ECOSENS project. Each speaker will be allocated 15 minutes, including time for Q&A. Sessions will conclude with a moderated discussion to stimulate exchange across perspectives.

To conclude the conference, a panel discussion will address the implementation of stakeholder engagement recommendations developed by the ECOSENS project. Panellists from academia, industry, civil society, and policymaking spheres will reflect on the practicalities, challenges, and opportunities for fostering inclusive engagement in nuclear energy governance.

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Session	*Chair, moderators*	Presenting Author	Title
9.00 - 9.30	*Opening*	*Daniela Diaconu*	ECOSENS project - objectives and achievements
9.30 -9.45	*Giorgio Locatelli*	*Gaston Meskens*	The art and science of imagining energy futures
9.45 -10.00		*Marin Constantin*	The Role of Nuclear Energy in Securing a Resilient, Renewable-Dominated Power System
10.00 - 10.15		*Marin Constantin*	Looking for a new way to gather stakeholder input to technoscientific assessment
10.15 - 10.30		*Claire Mays*	Engaging stakeholders in energy life cycle sustainability assessment: Critiques and recommendations for the ECOSENS methodology
10.30-10.45	*Moderated discussion*	*All presenters*	
10.45 - 11.15		***Coffee Break***	
11.15 - 11.30	*Catrinel Turcanu*	*Anouk Luypaert*	A comparative analysis of anti-nuclear protesters in Western Europe
11.30 - 11.45		*Meritxell Martell*	Integration of nuclear projects in local communities
11.45 -12.00		*Peter Thijssen*	Framing Nuclear: an analysis of online political discourse on nuclear energy in Belgium
12.00 -12.15		*Giorgio Locatelli*	Generational Shifts in the Perception of Nuclear Power Plants in Communities Surrounding old Sites
12.15 - 12.30		*Peter Mihok*	Some remarks concerning NGO engagement in the ECOSENS project
12.30 - 12.45	*Moderated discussion*	*All presenters*	
12.45 - 14.00		***Lunch***	
14.00 - 14.15	*Nadja Železnik*	*Rui Gaspar*	Community Engagement and Evidence-Based Risk Communication in Environmental Impact Assessment for Small Modular Reactors
14.15 -14.30		*Susan Molyneux-Hodgson*	The greening of nuclear power: addressing the challenge of doing STS on small modular reactors
14.30 - 14.45		*Meritxell Martell*	Public and Stakeholder Engagement in the Small Modular Reactor (SMR) Ecosystem of the European Industrial Alliance
14.45 - 15.00		*Willem Brabants*	SMR development in Belgium: Making experience count
15.00 - 15.15		*Martin Durdovic*	Public attitudes towards small modular reactors as an emerging field of social research
15.15 - 15.30		*Åsa Thelander*	Media reporting on Small Modular Reactors in Sweden – benefits, risks and actors involved
15.30 - 15.45	*Moderated discussion*	*All presenters*	
15.45 - 16.15		***Coffee Break***	
16.15 - 16.30	*Gaston Meskens*	*Mariusz Ilnicki*	How do we build stakeholder engagement during the deployment of a fleet of SMRs in an embarking country?
16.30 - 16.45		*Jonathan Reese*	Stakeholder and Public Engagement in Environmental Impact Assessments: Considerations and Lessons for the Implementation of Small Modular Reactors
16.45 - 17.00		*Catrinel Turcanu*	Understanding public attitudes towards SMRs in Belgium, Czech Republic and Spain
17.00 - 17.15		*Nadja Železnik*	Public Attitudes toward Small Modular Reactors (SMRs) in Slovenia
17.15 - 17.30		*Robbe Geysmans*	Perceptions and Prospects for Lead-Cooled Nuclear Technologies: Insights from R&D and Public stakeholders in Belgium
17.30 - 17.45	*Moderated discussion*	*All presenters*	

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Session	*Chair, moderators*	Presenting Author	Title
9.00 - 9.15	*Daniela Diaconu*	*Giacomo Dei*	Discounting the Future? Reviewing Social Discount Rate Calculation Methods for Nuclear Infrastructure Investments
9.15 - 9.30		*Benito Mignacca*	Retirement or Renewal? Investigating Life-Extension Projects in the USA Nuclear Large Technological Systems
9.30 - 9.45		*Alessandra D'Alessandro*	Building Nuclear Plants: a Study on Drivers and Barriers
9.45 - 10.00		*Rohunsingh Sam*	Financing Small Modular Reactors: Implications on Bankability
10.00 - 10.15		*Luc Van Wortswinkel*	The impact of nuclear energy integration in the 2050 fully decarbonized Belgian energy system
10.15 - 10.30	*Moderated discussion*	*All presenters*	
10.30 - 11.00			***Coffee Break***
11.00 - 11.15	*Claire Mays*	*Roser Sala*	Stakeholder engagement and transdisciplinary collaborations in nuclear decision-making in different EU countries: results from an online survey
11.15 - 11.30		*Tanja Perko*	When public and stakeholder engagement fails: The Slovenian nuclear referendum case
11.30 - 11.45		*Lila Gonçalves*	Stakeholder engagement in Spanish nuclear phase-out and decommissioning decision-making
11.45 - 12.00		*Barbara Horvat*	Slovenia's Nuclear Energy Debate and Stakeholder Engagement in the NEPN Process
12.00 - 12.15		*Ana Rita Melo*	Adolescents Radiation Risk Perception Survey towards a Transdisciplinary Approach
12.15 - 12.30	*Moderated discussion*	*All presenters*	
12.30 - 13.45			***Lunch***
13.45 - 14.00	*Michaël Tichauer*	*Yevgeniya Tomkiv*	Nuclear Norway: Should thorium be part of the deal?
14.00 - 14.15		*Giacomo Dei*	System Momentum and Exogenous Events: Understanding the Resilience of Nuclear Large Technological Systems
14.15 - 14.30		*Markku Lehtonen*	How nuclear promises are made credible and legitimate: Historical examples of SMRs, fast breeders, and megaprojects in Canada, France, and the UK
14.30 - 14.45		*Joseph Kóbor*	How a Green, Sustainable City Faces the Two Dirty Ends of the Nuclear Chain? Uranium Mining and High-Level Radioactive Waste Disposal in Pécs
14.45 - 15.00		*Petar Kardzhilov*	The never-ending struggle for transparency, participation and justice regarding nuclear projects in Bulgaria – civil society, courts, professional obfuscators and media dependence
15.00 - 15.15	*Moderated discussion*	*All presenters*	
15.15 - 15.45			***Coffee Break***
15.45 - 16.45	*Susan Molyneux-Hodgson*	*Pannelists: TBD*	Actions for implementation of recommendations for stakeholders' engagements
16.45 - 17.00	*Daniela Diaconu*		**Closing the Event**

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