

## Content

After the second ECOSSENS year ..... 1

Short news from WPs ..... 2

ECOSSENS future engagement opportunities ..... 5

Deliverables and publications ..... 5

### After the second ECOSSENS year

*Dr. Daniela Diaconu, RATEN, ECOSSENS co-ordinator*



Dear Readers,

The launch of the European Industrial Alliance on Small Modular Reactors (SMRs) in May 2024 brought them to the forefront of European industry, developers, implementers, scientists, regulators, and general public, with the aim of accelerating their commercial deployment and regaining leadership in nuclear energy.

In this new European landscape, the ECOSSENS project, its objectives and results become even more relevant, offering interested players:

- an up-to-date picture of the public perception of SMRs and new nuclear technologies, captured and interpreted by experts in social sciences and humanities, which identifies critical issues related to the implementation and the role of SMRs in future energy policies;
- a comprehensive assessment of the sustainability of nuclear energy throughout its life cycle, integrating both technical and social perspectives on the major challenges facing our society (climate change, energy security, crises) and the future of the energy market at European level;
- a new economic model based on the successful approach of the System of Provision, a model that offers politicians and decision-makers a unique tool to assess the country's suitability and readiness for new nuclear investments and to identify weak points.

We are confident that the ECOSSENS results will reach the European SMR Alliance through our "ambassador", Merixell Martell, project partner and at the same time, leader of the Technical Working Group 5 - Public Engagement.

ECOSSENS achievements over the past year are the result of close interdisciplinary collaboration among partners and co-construction with a wide range of stakeholders in the framework of ECOSSENS seminars and Scientific Events. The documents reporting its activities and results are available on the [ECOSSENS website](#).



## Short news from WPs

### WP1 - “A collaborative assessment of (imagined) energy worlds”

*Dr. Catrinel Turcanu, SCK CEN & Gaston Meskens, SCK CEN*



### *Cross-country qualitative research into public attitudes towards Small Modular Reactors*

Case studies have been conducted in six European countries to examine qualitatively public perceptions and views on small modular reactors (SMRs) technology and its potential role in future energy policies. The research design combined desk research (gathering country-specific information on the inclusion of SMRs in energy strategies and the concomitant public debate) and qualitative data collection, which mostly relied on focus group (FG) discussions – in Spain (two FGs), the Czech Republic (two FGs), Belgium (four FGs), and Slovenia (one FG), with the general public, residents near nuclear power plants, and regional stakeholders – but also involved – in Slovakia, Slovenia, and the UK – interviews, consultations and secondary data analysis.

This research revealed that the policy strategies of the Czech Republic, Slovenia, Belgium, and the UK foresee deploying SMRs in the future and act accordingly, while some Spanish companies take the technology rather as an opportunity to engage in R&D&I, and Slovakia’s stance is less obvious based on open-source data. Among the countries considering SMR deployment, there is evidence that the number of web news articles related to SMRs has increased substantially since 2021, suggesting an intensification of the public debate. However, the public lacks information about SMR technology and perceives the visions of its future deployment as potentially promising but vague and uncertain.

Mixed views prevail regarding the comparisons with traditional large power plants or renewable energy sources, with participants mentioning opposing pros and contra arguments. The benefits of SMRs for tackling climate change are often unrecognised or deemed too hypothetical to cope with the pressing climate crisis issues. The energy security benefits of SMRs are better understood in some countries but acknowledged less than the energy security benefits of large traditional reactors. Possible barriers to SMR technology implementation include local opposition to SMR projects, nuclear waste management and disposal concerns, safety concerns (more reactor sites imply more risks and require more oversight), qualified workforce deficiencies, or legislation and licensing challenges. There is a preference for experts, not politicians, to decide about SMR development, and the room for possible public involvement in decision-making remains unclear. Lastly, concerns about the transparency of an SMR technology introduction have been raised, especially in Slovakia and Slovenia.

### *European Association for the Study of Science and Technology (EASST) and the Society for Social Studies of Science (4S) conference*



From July 16–20, 2024, the EASST/4S conference took place in Amsterdam, attracting over 3,000 scholars in the field of Science and Technology Studies (STS). Centred on the theme ‘*Making and Doing Transformations*,’ the conference aligned closely with the ECOSENS project’s focus on exploring nuclear technologies in the context of societal challenges. To engage with a broad range of academic stakeholders, the ECOSENS team organized a panel at the event.

Titled ‘*Transdisciplinary Sensibilities in Investigating Nuclear Research and Innovation*,’ the panel was co-chaired by Susan Molyneux-Hodgson (University of Exeter) and Robbe Geysmans (SCK CEN). It invited contributions on the challenges and opportunities of interdisciplinary collaboration in nuclear research, development, innovation, and decision-making. Furthermore, it allowed for discussions that explored participants’ experiences and approaches to transdisciplinary research in the nuclear domain. A total of 5 contributions were presented at the panel: 4 in the form of classical conference presentations, and 1 in the form of a group discussion moderated by Gaston Meskens (SCK CEN). The session was well-attended and well-received by the conference participants.”

### **SRA-Benelux conference**

Results from the focus groups on SMRs in Belgium have been presented (poster) at the SRA-Benelux conference (<https://sraeurope.eu/8th-sra-e-benelux-meeting-the-hague-netherlands>) on “Balancing risks: the role of science, society and policy in climate and energy transition”, 22 October 2024, Den Hague. Results points towards the need for i) better public communication about the specific design pursued in Belgium, with factual information about risks and benefits and opportunities to weigh in on decisions, particularly regarding siting; ii) political clarity and consistency regarding energy policy.

## **WP2 - “Assessment of the sustainability of the whole cycle of nuclear power”**

### **Dr. Marin Constantin, RATEN**



The ECOSENS project is breaking new ground with its comprehensive sustainability assessment of nuclear power across its entire life cycle, integrating the latest advancements in nuclear technology. Nuclear energy, as a consistent player in the global energy landscape, is essential for achieving long-term sustainability and climate goals. To offer a well-rounded analysis, ECOSENS also compares nuclear energy to other pivotal technologies driving the EU’s energy transition, including wind and solar, hydropower, and natural gas.

Through a balanced, comparative approach, ECOSENS aims to clarify each technology’s role in achieving the EU’s carbon reduction, energy security, and sustainability targets. Given that EU member states vary widely in their energy resources and policies, the project recognizes that no single solution fits all. By analysing these differences, ECOSENS helps chart how each technology can contribute within both EU-wide and national frameworks.

A distinctive feature of ECOSENS is its emphasis on stakeholder involvement in the sustainability assessment process. The report “Investigation on the sustainability of the entire life cycle of nuclear power” (a link to be introduced) highlights ways that informed public participation can enhance decision-making, particularly as energy choices grow more complex.



Key highlights include:

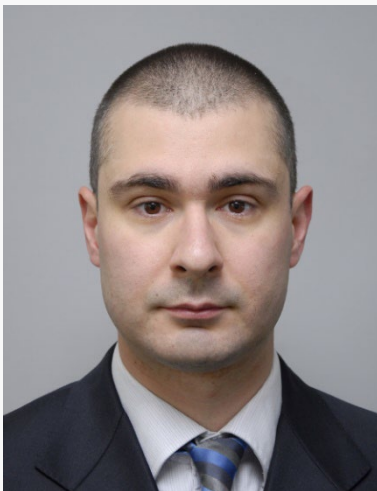
Page | 4

- **Decision-Making and Public Participation:** The report underscores the value of public input in determining sustainable energy strategies. Effective participation relies on access to accurate, accessible information, which ECOSSENS strives to provide.
- **Comprehensive Methodology:** ECOSSENS developed a robust framework of 62 indicators to assess technologies across environmental, social, and economic dimensions. This framework ensures that all aspects of sustainability are considered neutrally.
- **Assessment Results:** The findings are organized by sustainability pillars, with a final "figure of merit" that aggregates scores to reflect each technology's strengths and weaknesses. By adjusting indicator weightings, the project also explores how different priorities may influence overall results.
- **Conclusions and Recommendations:** The report concludes with insights on the relative sustainability of each technology, offering policy recommendations to guide EU energy choices. Nuclear power's role, including emerging technologies, is also discussed.

The ECOSSENS project provides EU policymakers with valuable data to refine energy strategies and enhance public understanding and involvement in shaping a sustainable future.

### WP3 - "A System of Provision approach for nuclear power"

**Dr. Giorgio Locatelli, POLIMI**



During this second year of the ECOSSENS project, WP3 has been actively engaged in both investigating the role of the social discount rate (SDR) in the evaluation of nuclear infrastructure and in the development and finalization of a socio-economic model based on the System of Provision (SoP) approach, integrating principles of circular economy.

The first study systematically analyses the strengths and weaknesses of the Social Rate of Time Preference (SRTP) and Social Opportunity Cost (SOC) methodologies, as these are pivotal in shaping long-term policy and investment decisions. In the research, we emphasize the advantages of the SRTP, particularly its suitability for projects with extended time horizons, such as nuclear infrastructure. The Ramsey formula is a focal point, with efforts to address the challenges of selecting consistent input variables to ensure more reliable applications.

The second study in WP3 develops an enhanced SoP model to analyze nuclear Large Technological Systems (LTSs) through a multiple case study across four European nations: France, the UK, Germany, and Italy. It explores how socio-economic, political, technological, socio-cultural, and environmental factors shape nuclear deployment, highlighting key enablers and barriers. The model examines five core components—agents, structures, relations, processes, and material culture—drawing insights from government reports, scientific literature and industry publications. Incorporating circular economy principles, it adapts the 10R framework to nuclear LTSs, analyzing life extension factors and sustainability initiatives, offering a comparative and forward-looking approach to nuclear infrastructure analysis.



## ECOSENS future engagement opportunities

### WP4 - Communication, dissemination and exploitation of results

*Dr. Nadja Železnik, EIMV*



In ECOSENS project we established different engagement opportunities for the related and interested stakeholders to take part. For [workshops](#) in the project we usually publish open invitation on our website and other social media for all interested. The results for the first three workshops are presented in the [document folder](#). At least once a year [Scientific Events](#) are organized and are focusing on the presentation of the project ongoing results in order to discuss the findings and obtain the feedback, comments and suggestions from participants. Also, ECOSENS partners attend and co-organise the events and related conferences to present the work, but also to discuss the open issues and identified challenges. The activities are published in the [News](#) section and disseminated on the social media.

All interested are also invited to subscribe for more information, like Newsletter issues.

New opportunities for engagement are already known:

- ECOSENS will still organize in **July 2025** dedicated international workshop on **co-development of recommendations on stakeholder engagement in (nuclear) energy governance**. Details about workshop will be announced soon.
- A **final meeting (held jointly with [WP2 Assessment of the sustainability of the whole cycle of nuclear power](#) and [WP3 A System of Provision approach for nuclear power](#))**, planned for **July 2025**, will discuss the economic analysis offered in terms of a proposal for new indicators, tools and methods to be more adapted to the assessment of future societal development and mutual impacts on the energy context.
- **Final ECOSENS conference and project meeting** will be held from **8<sup>th</sup> to 10<sup>th</sup> of September in Milano, Italy ([POLIMI location](#))**. This will be opportunity for the wider engagement of stakeholders in the project to discuss the outcomes from the project. The further programme and details will be presented in the spring.

ECOSENS project will also contribute to the various related conferences organised by other institutions and organisations. More information will be presented in the [News](#).

## Deliverables and publications

Deliverables are available on [ECOSENS website](#):

[Social Discount Rate model](#), Giacomo Dei, Giorgio Locatelli (POLIMI), Benito Mignacca (UNICAS), Paolo Trucco, Marco Enrico Ricotti (POLIMI), D3.3, 2024, <http://dx.doi.org/DOI:10.20348/STOREDB/1191>:

This research systematically identifies, examines and compares two primary methodologies for the social discount rate (SDR) calculation: the social rate of time preference (SRTF) and the



social opportunity cost (SOC). The SRTP, grounded in the Ramsey formula, emerges as an advantageous approach for assessing infrastructure with a long useful life. Indeed, its effective integration of economic and societal indicators contributes to more reliable long-term estimations by governmental bodies. However, challenges in SRTP implementation exist, primarily due to a lack of consensus on input values, leading to potential inconsistencies in practical applications. In contrast, the SOC methodology faces drawbacks; it lacks a well-defined estimation protocol and fails to account for consumption displacement, which hampers its recommendation within guidelines. Particular concerns about the applicability of SOC arise from the several differences between public and private sectors, undermining its reliability. This research enriches the understanding of the SDR, enhancing clarity about its estimations and providing valuable insights for practitioners and policymakers. By presenting the advantages and disadvantages of each method, it can facilitate the improvement of current methods or the development of new frameworks. Ultimately, this research fosters more informed decision-making and strategic practice within the realm of SDR computation

[Investigation on the sustainability of the entire life cycle of nuclear power](#), M.Constantin, D.Diaconu, M.Apostol, C.Margeanu (RATEN), D2.4, 2024, <http://dx.doi.org/DOI:10.20348/STOREDB/1202>:

The ECOSENS project conducts a comprehensive lifecycle sustainability assessment of nuclear power and its role in the global energy mix, comparing it with other key energy technologies such as wind, solar, hydropower, and natural gas. The study addresses the pressing need for sustainable energy transitions aligned with climate goals and emphasizes the importance of stakeholder participation in energy decision-making. This assessment aims to bridge gaps in public understanding by providing accurate and accessible information, thus fostering informed decision-making. The methodology includes 62 indicators covering environmental, economic, and social dimensions, ensuring technological neutrality. Results from these assessments are analysed across several sustainability pillars, leading to aggregated scores that highlight the strengths and weaknesses of each technology. Particular attention is given to nuclear power, with discussions on the role of emerging nuclear technologies and their performance in the energy transition. Key findings emphasize nuclear power's strengths in energy security and low-carbon emissions, while acknowledging challenges like waste management and public perception. The conclusions offer policy recommendations to optimize the integration of energy technologies and enhance public engagement, supporting informed and sustainable energy transitions within the EU and beyond.

Several other publications from ECOSENS events are also available on [ECOSENS website](#):

- [Powering the Future Responsibly: Assessing the Sustainability of Nuclear Energy](#), First ECOSENS Scientific Event, 29 August 2023, Dessel, Belgium, at RICOMET conference 2023, focused on assessing the sustainability of nuclear energy within broader energy systems and societal perspectives.
- [Public participation in decisions related to Small Modular Reactors \(SMRs\)](#), Second ECOSENS Scientific Event, 10 June 2024, Ljubljana, RICOMET conference 2024, highlighted both the promise and challenges of advancing SMR technology, especially in light of public participation and stakeholder engagement.
- Martin Durdovic, Catrinel Turcanu, Roser Sala, Robbe Geysmans, Sergi López-Asensio, Lila Gonçalves, [The outlooks of nuclear energy in society: Unravelling public attitudes in the context of climate and energy security challenges](#), Progress in Nuclear Energy, Volume 174, 2024, 105286, ISSN 0149-1970, <https://doi.org/10.1016/j.pnucene.2024.105286>.



**The ECOSSENS team wishes you a successful and prosperous 2025!**

