RadoNorm
Managing risks from radon and NORM

Deliverable 8.4

Report on stakeholders' engagement

Work Package 8

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Disclaimer

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Executive Summary

This report presents the outcomes of stakeholder engagement activities carried out within the RadoNorm project, which aims to advance radiation protection strategies related to radon and Naturally Occurring Radioactive Materials (NORM). Stakeholder engagement was recognised as a fundamental component of the project, ensuring that research outcomes are relevant, impactful, and responsive to societal and technical needs. Through a structured and iterative approach, RadoNorm identified, categorised, and actively involved a diverse spectrum of stakeholders, including scientific communities, regulatory authorities, policymakers, industry professionals, residents, media, and the general public.

The engagement process was informed by early stakeholder mapping and the establishment of network groups, which allowed for tailored communication and more effective involvement. Stakeholders were grouped into eight categories based on their roles, interests, and potential influence, and these classifications guided the development of communication strategies and dissemination tools. A dual-database system—one for project participants and another for external stakeholders—enabled continuous updates, targeted outreach, and GDPR-compliant data management. As of July 2025, the stakeholder database includes 141 entries from 41 countries, reflecting the project's wide geographical and institutional reach.

Key engagement tools included the RadoNorm website, newsletters, social media platforms, citizen science initiatives, surveys, workshops, and five Annual Meetings. Notably, the European Radon Behavioural Atlas, the largest stakeholder engagement initiative of its kind, captured radon-related perceptions and behaviours across 15 countries and over 17,000 respondents. Additional activities such as the NORM e-survey and citizen science projects in six countries demonstrated the project's commitment to participatory research. Feedback mechanisms, including panel discussions and dedicated sessions for stakeholder input, were integrated throughout the project to refine actions and maximise societal relevance.

Overall, RadoNorm's stakeholder engagement activities supported the dissemination and exploitation of project results, strengthened links between science and society, and laid the groundwork for sustainable partnerships beyond the project's lifespan. The methods and lessons documented in this deliverable offer valuable guidance for future initiatives seeking inclusive and effective stakeholder engagement in environmental and public health research.

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Glossary

ALLIANCE	European Radioecology Alliance
AM	Annual Meeting
APA	Portuguese Environment Agency
BfS	Bundesamt für Strahlenschutz (Federal Office for Radiation Protection, Germany)
BSS	Basic Safety Standards
CNR	Consiglio Nazionale delle Ricerche (National Research Council, Italy)
CONCERT	European Joint Programme for the Integration of Radiation Protection Research
CONFIDENCE	Project under the CONCERT programme
DB	Database
DMS	Data Management System
EC	European Commission
ENA	European NORM Association
ENGAGE	H2020 project on stakeholder engagement in radiation protection
ERA	European Radon Association
EU	European Union
EURADOS	European Radiation Dosimetry Group
EURAMED	European Alliance for Medical Radiation Protection Research
EURATOM	European Atomic Energy Community
GDPR	General Data Protection Regulation
GIS	Geographic Information System
HERCA	Heads of the European Radiological Protection Competent Authorities
IAEA	International Atomic Energy Agency
IAF	Institute for Applied Ecology (Institut für Angewandte Forschung)
ICRP	International Commission on Radiological Protection
IGAG-CNR	Institute of Environmental Geology and Geoengineering – National Research Council of Italy
IRPA	International Radiation Protection Association

MELODI	Multidisciplinary European Low Dose Initiative
NEA	Nuclear Energy Agency
NERIS	European Platform on Preparedness for Nuclear and Radiological Emergency Response and Recovery
NORM	Naturally Occurring Radioactive Material
OECD	Organisation for Economic Co-operation and Development
OECD-NEA	OECD Nuclear Energy Agency
PR	Periodic Report
RASSC	Radiation Safety Standards Committee (IAEA)
SHARE	Social Sciences and Humanities Associated with Radiation Protection
SME	Small and Medium-sized Enterprise
STMUV	Bavarian State Ministry for the Environment and Consumer Protection
STOREDB	Shared platform for storing and accessing radon-related datasets
TENORM	Technologically Enhanced Naturally Occurring Radioactive Material
UK	United Kingdom
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation
WHO	World Health Organization
WP	Work Package
WPL	Work Package Leader

1. Introduction

Identification of stakeholders, their prioritisation and assigning of appropriate means for the engagement is one of the objectives in RadoNorm project. This document is final report on stakeholders' engagement and describes types of stakeholders in RadoNorm that were engaged, provides the overview of their mapping with the aim to encourage and promote engagement, and gives the overview of the stakeholders' engagements with the feedback.

Stakeholders' engagement was considered a cornerstone of the RadoNorm project to ensure the effectiveness, relevance, and impact of radiation protection measures, particularly for radon and NORM (Naturally Occurring Radioactive Materials). Key principles included:

- Two-way communication and knowledge exchange to multiple actors identified already from the RadoNorm start.
- Proactive tailoring of communication and dissemination based on stakeholders needs.
- Ensuring stakeholders' input is integrated into technical and societal aspects of radiation protection.

To actively involve stakeholders, RadoNorm employed a multi-channel approach as defined in communication, dissemination and exploitation of results strategy and plans ([1], [2],[3], [4]) including:

- Invitations to join stakeholder networks (via online registration on the project website),
- Workshops, seminars, pilot testing, open projects for citizens science especially within WP6 (Societal Aspects),
- Tailored materials like brochures, newsletters, and videos,
- Online platforms (RadoNorm website, LinkedIn, Twitter, YouTube),
- Direct consultation during project events and public feedback sessions.

Special care was taken to address language clarity and accessibility to enhance trust and facilitate uptake of research findings.

2. RadoNorm stakeholders

In the deliverables and milestones on communication, dissemination and exploitation of results also provide the approach to stakeholder identification and first relevant RadoNorm stakeholders. Further were stakeholders addressed in two milestone documents on stakeholder mapping and establishments of stakeholder' networks [5].

In terms of communication, dissemination and exploitation of results for radon and NORM exposures with stakeholders, the following steps are taken:

- Identification of related and relevant stakeholders for the project and for project's uptake,
- Mapping of stakeholders in view of their interest, attitude, needs and their interactions, and
- Engagement activities to address their particular needs and requirements.

To identify the related and relevant stakeholders, it has to be first recognised what were planned RadoNorm results. According to the description of the RadoNorm project [6] and further project outputs the results include deliverable reports, recommendations, new skills and knowledge, educational materials, scientific publications and PhD theses, new collected data and prototypes (like new pre-standards, measurements methods). Important outputs were also scientific papers published in scientific journals addressing important research new knowledge developed in RadoNorm. These results are being communicated and disseminated with the broader scientific community, and beyond, like business partners and industry, policy makers, municipalities in the radon-prone areas or related to NORM exposures, media and other interested parties. The results are enabled also for exploitation, either directly or indirectly, for use in further research activities (outside the project), for marketing of a product,

process or service and use in standardisation activities. The exploitation was enabled by using repository on the RadoNorm website (https://www.radonorm.eu/) in different folders, the methods and experimental data are published on the STORE^{DB} (https://www.storedb.org/store_v3/) which was in RadoNorm used as the central repository for any data or databases.

Based on the outputs from RadoNorm project, two stakeholders' groups were identified for RadoNorm: internal RadoNorm participants and external audiences.

2.1 RadoNorm participants

The RadoNorm participants include 57 partners from 19 EU countries plus Norway, Switzerland, the UK and the Ukraine. From each of the organisations, several participants are normally involved. According to the minutes of the kick-off meeting, there were around 170 people attending the first meeting in September 2020, and this number being stable through the years of annual meetings. RadoNorm partners have competences in the fields of dosimetry, physics, biology, epidemiology, molecular-epidemiology, medical, societal sciences and data management. All the project partners are fully committed to the project and have complementary roles needed to reach the project goals.

The RadoNorm participants are very much linked to the existing national radiation protection structures and are also involved in international associations, related platforms, projects and other radon- and NORM-related activities. Therefore, the RadoNorm participants are excellent disseminators of the RadoNorm activities and results. The RadoNorm members are involved in research groups from national radiation protection institutions and regulatory authorities, national research centres, universities as well as SMEs and a non-profit organisation. They have liaisons with many similar partners and have exchanges with partners and projects in and outside Europe. Radiation protection and regulatory authorities are involved in the implementation of new directives and regulations and / or have advisory functions to policy makers and radiation protection authorities on national, European and international levels. Therefore, the RadoNorm results will be directly available for further implementation in recommendations and legislation. Many of the partners involved in RadoNorm represent their country in international or government organisations or actively participate in relevant committees of those such as IAEA (i.e. RASSC), WHO, UNSCEAR, Euratom Art. 31 Group of experts, OECD-NEA and HERCA. In addition, many of the partners actively participate in the work of ICRP, the European ALARA Network, the related ERA and ENA associations and the European radiation protection research platforms (MELODI, ALLIANCE, EURADOS, NERIS, EURAMED, SHARE)

The composition of the RadoNorm consortium partners ensures impactful dissemination and guarantees the best possible communication, dissemination and use of the RadoNorm results for decision makers, regulatory authorities and various stakeholder groups on national, European and international levels.

All the RadoNorm participants were involved in communication and dissemination activities, as agreed in D8.1 and the upgrades. The communication and dissemination took place in cascades from work package leaders (WPLs) to participants in each of the WPs and were included in the RadoNorm contact database to more effectively direct the activities. In the list of RadoNorm participants on the internal RadoNorm website, there is 255 participants in RadoNorm project from partners organisations (July 2025). In addition, also all liaisons to the RadoNorm partners are collected and included in the separate RadoNorm database. The information on what data were collected is given in Contact Database section.

2.2 External stakeholders

The objective of the RadoNorm project was to support European Union Member States, Associated Countries and the European Commission in the implementation of the Council Directive 2013/59/EURATOM laying down Basic Safety Standards (BSS) for protection against the dangers arising from exposure to ionising radiation at the legal, executive and operational level. The project

aimed to significantly reduce scientific, societal as well as technical uncertainties in all steps of the radiation risk management cycle for radon and NORM (Naturally Occurring Radioactive Materials; the term NORM includes aspects of TENORM, i.e. Technologically Enhanced Naturally Occurring Radioactive Materials, in this project) exposure situations.

Based on this objective, the following stakeholders were identified:

- relevant scientific communities such as the European radiation protection research platforms MELODI, ALLIANCE, EURADOS and SHARE, and professional associations, such as ERA, ENA, IRPA and ICRP, also participants in similar projects from past,
- future scientific community, like students, PhD candidates, young researchers in the area,
- radiation protection regulatory authorities, also at the European level like HERCA, health institutions and other responsible ministries, municipalities and implementing authorities,
- decision makers and politicians,
- public building managers and house owners,
- building professionals, industry, construction engineers and architects,
- residents in radon prone areas and NORM exposure areas,
- workers and their organisations (unions),
- media,
- broader civil society (citizens science networks) and general public.

The identified stakeholders can contribute to communication, dissemination activities and exploitation of results as described in the reports on strategy for communication and dissemination and related other documents. The produced scientific and technical outputs from RadoNorm are being spread to the wider scientific community, responsible authorities, decision makers and responsible operational bodies at different levels. The target audiences, like residents and workers are involved in some activities also to obtain the feedback on the outputs or due to particular methodology developed for the activities. The media is used as a broadcast source for all involved, including general public. Based on the novel approaches, use of social media developed and employed in the RadoNorm project was the main channel for dissemination of information about the project and the results.

All these stakeholders were identified on a variety of levels: from national, even municipality level, to the European and pan European level, to the international level. All these levels are important to be identified as the impacts of RadoNorm outcomes are amplified.

The identified stakeholders were included in the RadoNorm contact database through dialogue, research and experience continuously, including promotion on the RadoNorm website https://www.radonorm.eu/stakeholders/ and in different RadoNorm material (like News and Newsletter). The engagement with stakeholders was regularly revisited during the Executive Board meetings where best approaches and opportunities were discussed and the decisions taken to assure evolution with time and prevailing circumstances. An active engagement was used to encourage and motivate stakeholders' participation, building and maintaining the interest, also by using the developed tools as proposed in D8.1 and related updates. The participation of RadoNorm stakeholders was also financially supported in case of lack of own resources and for active participation in RadoNorm events.

2.3 Stakeholders' networks

The identified stakeholders can be grouped into networks based on their interests and needs to be actively involved in the project's activities, such as pilot testing of communication tools and citizen science in WP6 or development of new regulatory standards in WP5, activities related to NORM e-survey, or to be just informed about the RadoNorm results. The following network groups were identified in RadoNorm project:

1. **Scientific community and researchers:** RadoNorm community, young researchers, related research platforms (like MELODI, ALLIANCE, EURADOS and SHARE), associations (ERA, ENA), ICRP, IRPA, IAEA, ….
2. **Authorities**: EC, responsible ministries (health, environment, …) at different levels, regulatory authorities (radiation protection, nuclear safety, HERCA, …), municipalities and implementing authorities,
3. **Policy makers**: decision makers at different levels and politicians,
4. **Implementers**: public building managers and house owners, building professionals, construction engineers and architects, industry,
5. **Related:** stakeholders with similar project, citizen science networks,
6. **Impacted:** workers, residents,
7. **Media** and
8. **General public**.

The eight groups were recognised based on their interest and potential impact, but also on their needs and attitudes in relation to the RadoNorm project and includes both internal and external audiences. The stakeholder groups were included in the RadoNorm Contact Database and can be further categorised with additional data which might include:

- Scope of interest / responsibility according to their role,
- Geographical scope (international / national / local group),
- Main interest (for example, science / regulation / standards / practice / impacted),
- Radiation protection sector (radon / NORM).

The stakeholders' networks approach is developed to ensure a more focused exchange of information which is more important for a particular group, and also to address their main needs and concerns. The dialogue can be more effective and productive if a more tailored approach is adopted, whereby meetings, dialogues and other exchanges are organised around specific themes / issues and / or countries relevant for particular group. All the developed RadoNorm material as discussed in D8.1 and related updates are custom made also in view of different groups. Also, the RadoNorm website as a main communication and dissemination tool of RadoNorm project, collects particular information for the groups in specific folders. The identified channels, tools and activities as given in D8.1 and related updates, chapter 4.4., was used for specific audiences (Table 1). This approach also provides a route for feedback with their opinions and helps to identify areas of concern where further information or research could be beneficial. On the RadoNorm website (https://www.radonorm.eu/stakeholders/) there is a simple information about the stakeholders, the network groups and the online application form. Following the invitation sent by the WPLs to their existing liaisons in 2021, constant popularisation of this opportunity with the benefits and available participation options, the list of RadoNorm stakeholders include 141 entries from 41 states (July 2025). The opportunity to become a RadoNorm stakeholder was promoted during different events and presentations by all WPLs.

RadoNorm project also established strong liaisons with ongoing PIANOFORTE partnership, radiation protection platform like MELODI, ALLIANCE, EURADOS and SHARE, related associations (ERA, ENA) and also concerned international organisation in the field. The feedback from the communication and dissemination activities, and specific attention to invite representatives from such organisation to exchange on the RadoNorm results or to particular events were even strengthen the radiation protection in radon and NORM exposure situations.

The management of the collected data was organised carefully for purpose of the RadoNorm project only. The collection of data was focused first on the already established networks (associations,

platforms, etc.) from project partners, from past activities / projects or ongoing related projects and partnerships. Further it has grown with the RadoNorm development.

Table 1 – Measures for communication and dissemination to targeted groups

Target group	Results to be communicated/disseminated	Measures
Scientific community and researchers	New knowledge in the fields of research: metrology measurements, dosimetry, radiobiology and toxicology, epidemiology, modelling, mitigation techniques and technologies, radioecology, behavioural and social science.	• Publications and reports, RadoNorm material • RadoNorm events and other face to face meetings • Social Media and Website, online events • Green and Gold Open Access • RadoNorm STORE^{db} • Citizen sciences
Authorities	New knowledge on standards, approaches, guidelines and recommendations to address the needs.	• Publications, reports and recommendations • RadoNorm material • Devoted events • Feedback from involvement • Social Media and Website, online events • Green Open Access
Policy makers	Advice to regulatory framework and inclusion of new standards in legal framework.	• Publications, reports and recommendations • Devoted events • RadoNorm material • Feedback from involvement • Social Media and Website • Green Open Access
Implementers	Guidelines and advice on the best approaches to fulfil standards and regulatory requirements, approaches to remediation.	• Publications, reports and recommendations • Devoted events • RadoNorm material • Feedback from involvement • Social Media and Website • Green Open Access
Related	New knowledge supporting the research activities and directions for future research.	• Publications and reports • RadoNorm events and other face to face meetings • Social Media and Website, online events • Green and Gold Open Access • RadoNorm STORE^{db}
Impacted	Approaches how to improve conditions in homes and guides for remediation Guidelines for radiation protection, better awareness of related health risk, new standards based on the research	• Publications, reports and recommendations • Devoted events • RadoNorm material • Feedback from involvement • Social Media and Website

General public	Information about activities and raising of awareness for radon and NORM	• Publications, reports and recommendations • RadoNorm material • Social Media and Website • Citizens science
Media	Findings and recommendations from RadoNorm, relevant for general public to promote and enable information for all	• Publications, reports and recommendations • Devoted events • Press releases and other RadoNorm material • Social Media and Website • Citizens science

3. Contact Database

The RadoNorm Contact Database was developed and regularly maintained as a basic tool for communication and dissemination activities, as well as for some actions within WPs (like pilot testing in WP6, discussion of results with particular network for activities developed in WP 2 to 6, online NORM e-survey). The database enabled active stakeholders' engagement and assured continuous collection of the stakeholders' data, both internal and external. The database was uploaded on the internal RadoNorm website but the registration was possible from the public RadoNorm website Two separate but coordinated databases have been developed within the RadoNorm project:

- RadoNorm Participants Contact Database: An internal tool for managing communication among consortium members.
- RadoNorm Stakeholders Contact Database: A dedicated registry for engaging with external stakeholders, including regulators, scientific organisations, affected communities, and media.

These databases were pivotal for targeting specific stakeholder groups with customised messages, coordinating invitations to events, surveys, and pilot tests, managing ongoing communication, feedback loops, and dissemination follow-up and supporting the monitoring, evaluation and traceability of engagement efforts. Of particular importance was the second database on RadoNorm Stakeholders. Its organisation followed the stakeholders network groups division: Scientific community and researchers, Authorities, Policy makers, Implementers, Related, Impacted, Media and General public.

The collection of data about stakeholders' network groups respected the Regulation (EU) 2016/679 of the EU Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (GDPR). The RadoNorm Privacy policy (published on the RadoNorm website) with regards to data protection management was applied. The database was structured to provide possibilities for effective interactions and engagement, so it included the following data: name, email, institution, stakeholder group and country. It was complemented also with some more precise information to be characterised like responsibility, geographic zone, sector, main interest and similar.

The RadoNorm stakeholders' groups have been involved in RadoNorm activities to engage, to obtain feedback, to be used in the pilot test or for any other activity. The collection of data focussed first on the radon- and NORM-related stakeholder, including the scientific community, representatives from regulatory authorities, health institutions and other responsible ministries, municipalities and implementing authorities, public building managers and house owners, building professionals, construction engineers and architects, residents and media representatives.

3.1 Statistics on RadoNorm stakeholders

In line with RadoNorm's communication and dissemination objectives, a stakeholder contact database was established to track participation across relevant countries. To this date (July 2025), the database comprises 141 stakeholders from 41 different European and associated countries.

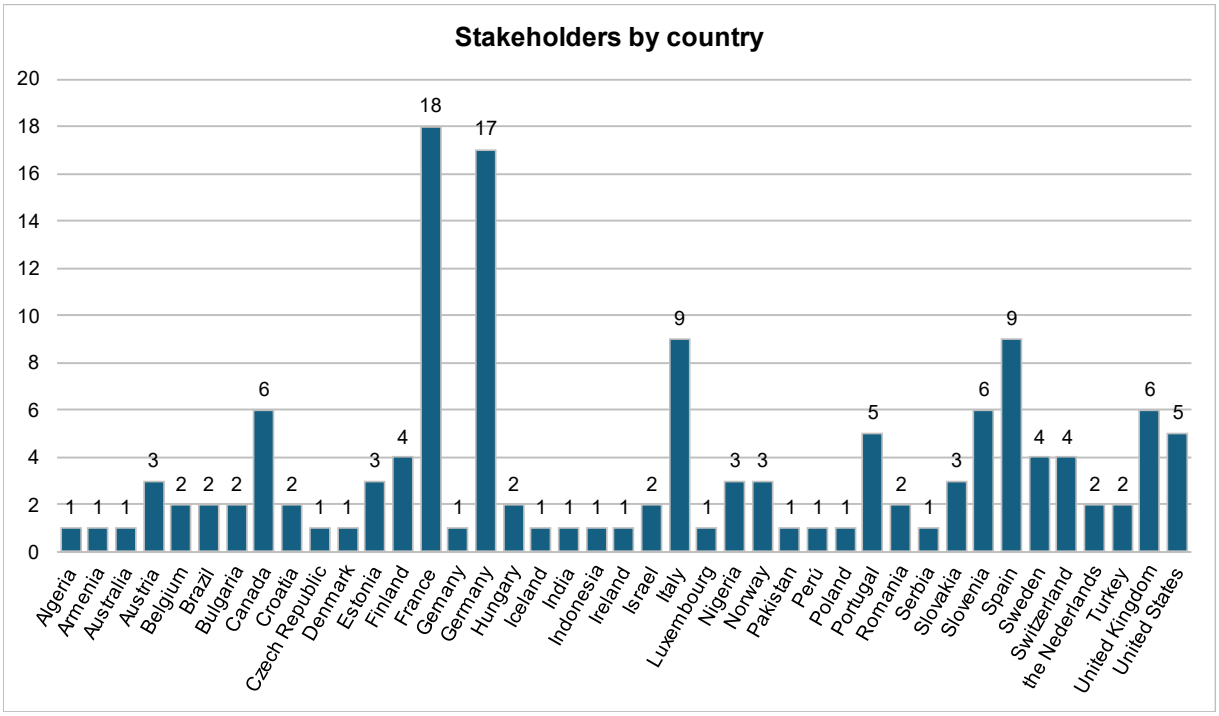

Figure 1 – RadoNorm stakeholders by country

The Figure 1 illustrates the number of stakeholders by country included in the RadoNorm stakeholder database. The highest representation comes from France (18) and Germany (17), followed by Italy and Spain (9 each), as well as Canada, Sweden, and the United Kingdom (6 each). The broad geographical distribution across 41 countries highlights the strong international engagement, with most countries contributing between 1 and 3 stakeholders.

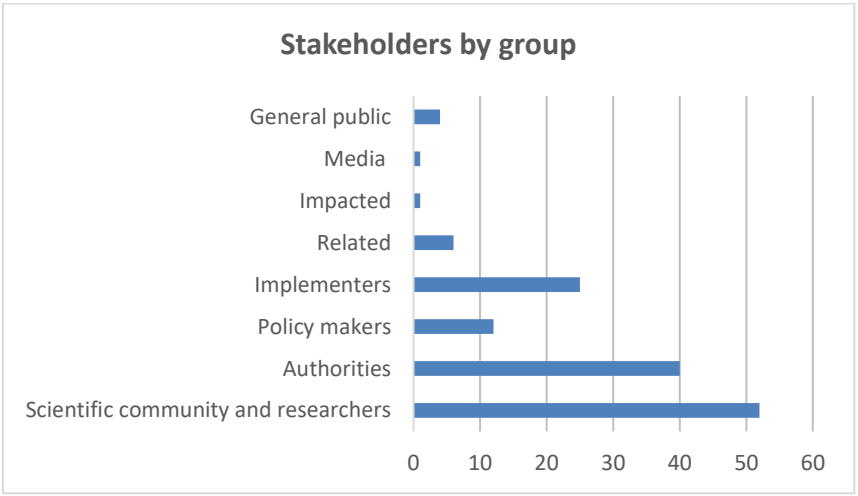

Figure 2 – RadoNorm stakeholders by group

Figure 2 shows the distribution of 141 stakeholders by group affiliation within the RadoNorm stakeholder database. The majority fall under the Scientific community and researchers category (52 stakeholders), followed by Authorities (40) and Implementers (25). Several stakeholders belong to multiple groups. Less frequently represented groups include the General Public, Related stakeholders, Policy makers, and Media, each with one to four entries.

4. Stakeholders' mapping

Stakeholders mapping is the visual representation of a stakeholder analysis and was, for the RadoNorm project, developed for the networks. The analysis of stakeholders' groups was performed to better understand their relevance and the perspective they offer in relationship to the RadoNorm project and each other, and to prioritise the contents based on their needs and concerns. Based on the analysis of stakeholders, the level of engagement can be different as presented on Figure 1 - Modes and levels of stakeholder engagement with various modes of interactions, from provision of information, two-ways exchanges and involvement in the solutions. In the RadoNorm project, a range of modes and approaches to stakeholder engagement was used which evolve over time with the aim to improve engagement. Until now all different modes were implemented, from simple distribution and dissemination of various information, two-way dialogue during the project events and engagement in the ongoing activities. Experience from stakeholders' engagement also showed that there is limited number of external stakeholders with sufficient time to be actively involved, even if there is financial support for engagement. This was taken into account, so the plans were design approximately 6 months in advance for particular event.

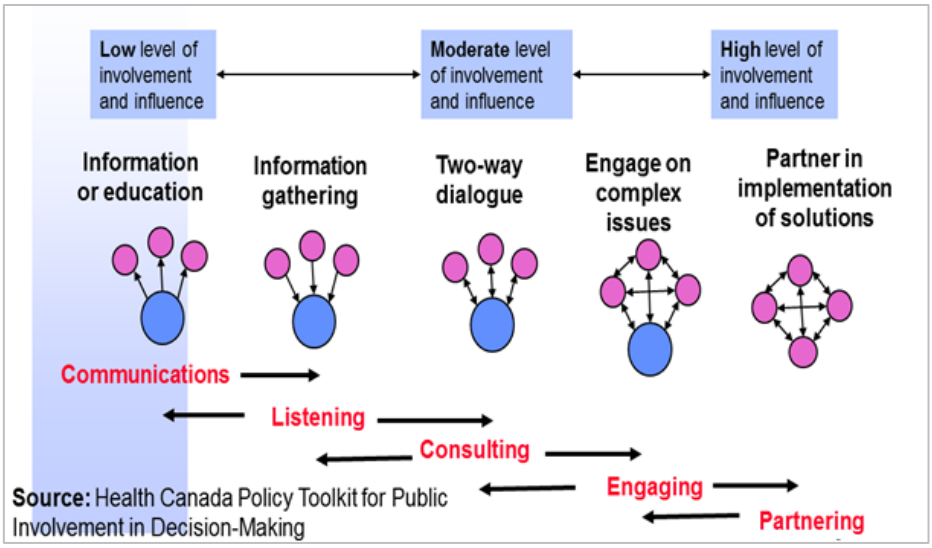

Figure 3 – Modes and levels of stakeholder engagement

The list of criteria to help the analysis of each identified stakeholder group was:

- *Expertise*: Does the stakeholder group have information, counsel, or expertise on the issue that could be helpful to RadoNorm undertaking?
- *Willingness* to engage: How willing is the stakeholder group to engage?
- *Influence*: How much influence does the stakeholder group have? Who they influence (e.g., other NGOs, companies, the public, investors, etc.)
- *Necessity* of involvement: Is this someone who could derail or delegitimise the process if they were not included in the engagement?

The results of the analysis for RadoNorm stakeholders' networks are the following:

1. **Scientific community and researchers**: The members are very well or well informed about the current problems and needs for further investigation and research in relation to the radon and NORM exposures, however not all with very high expertise or their expertise is specialised in a given field. They are very willing to engage, have high influence and can impact also other groups. It is important to engage with them.
2. **Authorities:** The members are informed about the current problems and needs in relation to the radon and NORM exposures. They are usually willing to engage, but have also limited time as they might cover a variety of topics. They have rather high influence and can impact also other groups. It is important to engage with them.
3. **Policy makers (Decision Makers-DM):** The members are informed in general but not in details about the current problems and needs in relation to the radon and NORM exposures. Their involvement is challenging with limited time and priorities. Their influence is medium but can still impact other groups. It is important to keep them informed and occasionally engaged.
4. **Implementers:** The members are not in particular informed about the current problems and needs in relation to the radon and NORM exposures, in particular to fields of research and investigations. However, they perform the planning for and implementation of remediation actions. They are very willing to engage, to obtain more related information (new standards, new approaches to mitigation, etc.). They have limited influence. It is important to keep them informed with proper information and also to obtain their needs and problems they have.
5. **Related:** The members are informed in general about the current problems and needs in relation to the radon and NORM exposures. Their involvement is not of high importance. However, more attention was given lately to the citizen science networks as a special call for projects was issued in RadoNorm. Several projects were implemented with 6 citizen science initiatives focused on radon testing and mitigation in Italy, Poland, Portugal, Slovakia, Slovenia and Spain involving more than 800 participants Their influence is medium to high as they are used as multipliers. They are informed about new developments and findings, especially as potential for exploration of results, and now also involved in the citizen science call.
6. **Impacted:** The members are not very informed about the current problems and needs in relation to the radon and NORM exposures. They are very willing to engage, to obtain more related information (new standards, new approaches to mitigation, health impacts, communication issues,…). They have limited influence. It is important to find novel ways on how to keep them informed with proper information, and occasional engagement should be organised.
7. **Media:** Not informed very well about radon and NORM exposure challenges, however reporters highly impact the current opinion. Interested in news (and connected problems). Lately the results from European Radon Behavioural Atlas also resonate in media and reports about radon and related challenges were published. Media have limited time to engage and require specially designed information. They have rather high impact on other groups. They should be informed regularly with targeted information.
8. **General public:** The members are not well informed about radon and NORM exposures, except in radon prone areas. In this respect, several actions were implemented in RadoNorm to obtain attitudes, perception and challenges these citizens face. Usually, general public is not willing to engage. They have low influence to other groups. However, they compose part of general public opinion about the topics and should be informed.

The analysis is performed as the continuation of the first assessment [5] in relation to the RadoNorm stakeholders' networks. Mapping of stakeholders' networks is presented in figure 4[1]. It determines which stakeholders are most useful to engage with and allows to see where stakeholders stand when evaluated by the same key criteria and compared to each other. The "Power" in the Y-axis corresponds to the expertise and influence, and "Interest" in the X-axis to the willingness to engage and necessity of involvement.

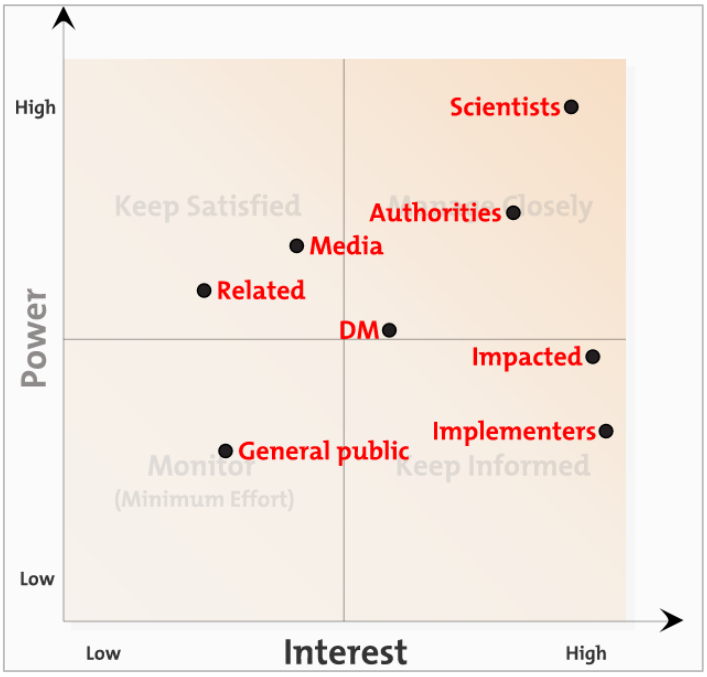

Figure 4 – RadoNorm stakeholders' networks mapping

5. Stakeholders' engagement

In the RadoNorm project, many stakeholder engagement opportunities have been developed and are based on a synergistic combination of several channels and tools:

- a project website linked with social media networks (LinkedIn[2],Twitter[3] and YouTube[4]),
- regular news[5] , newsletters[6] and other information materials, available online for all,
- two-way interaction tools and channels with different stakeholders[7],
- calendar of conferences and other events[8] that are of RadoNorm interest (RadoNorm events, RadoNorm-related events and internal project events for members only) with material[9],
- publications[10], including deliverables, peer-reviewed scientific journals papers, popular science publications and others.

[1] https://www.mindtools.com/pages/article/newPPM_07.htm
[2] https://www.linkedin.com/company/69622732/admin/
[3] https://twitter.com/RadoNorm
[4] https://www.youtube.com/channel/UC6yCORiPX5DXgmu5AaGLn9Q
[5] https://www.radonorm.eu/news/
[6] https://www.radonorm.eu/newsletter/
[7] https://www.radonorm.eu/stakeholders/
[8] https://www.radonorm.eu/event/
[9] https://www.radonorm.eu/event/event-material/
[10] https://www.radonorm.eu/publications/

The stakeholders were involved in information exchange, in the WPs activities, and were invited to the RadoNorm events. There were several RadoNorm activities which included the stakeholders' participation. One performed in first half on 2022 was the NORM e-survey[11]. It was formulated with the main objective to gather specific information and data on different NORM issues, which will contribute to improved understanding and handling of NORM exposure situations. The evaluation of obtained responses was published in the RadoNorm deliverables[12] and included 35 organisations from 19 countries. The second one was activity on citizen science[13], divided into two steps. Pilot citizen science projects were being developed and tested in France, Ireland, Norway and Hungary. The call to apply for funding to launch RadoNorm citizen science projects was opened until February 2023 and 6 proposals were selected in Italy, Poland, Portugal, Slovakia, Slovenia and Spain. These projects focused on indoor radon measurements, also exploring radon concentrations in tap water and water sold for drinking in spa resorts. Together 804 citizens were contributing to the RadoNorm citizen science research. For the investigation of public attitude and perception regarding radon, health risks, mitigation and remediation activities, different activities with various stakeholders have been performed.

In the second half of RadoNorm project the online seminars[14] took place every 2nd Wednesday of the month aiming to have approximately 10 presentations a year. The purpose of the seminar series was to present the latest publications and deliverables, PhD dissertations and trending topics in radiation protection. It also offered a platform where consortium members and stakeholders come together to discuss the relevance of the latest findings and their potential applications in society.

In spring 2025 a RadoNorm Showcase Meeting[15] was organised to bring together members of the European Commission, EURATOM, the EURATOM Scientific & Technical Committee, the Article 31 Group of Experts, together with other vital international organisations and bodies involved in radiation protection, focussing on radon and NORM. The event focus on presentation of RadoNorm's achievements and contributions to radiation risk management and building competence in the field, and areas that require further research to protect people and the environment from the effects of radon and NORM ionizing radiation.

The RadoNorm European Radon Behavioural Atlas[16] was the largest and most comprehensive cross-national study to date examining behaviours, attitudes, and awareness related to radon exposure across Europe. The dataset comprises 17,253 respondents and includes over 250 survey items, which was the biggest stakeholder engagement activity in Europe on radon and NORM[17]. Data collection occurred from 2021 to 2024, beginning with a pilot study in Belgium and concluding in Portugal. The study spans 15 European countries—Austria, Belgium, Bulgaria, Czech Republic, Finland, Germany, Greece, Ireland, Norway, Portugal, Romania, Slovenia, Spain, Sweden—as well as selected sub-national regions (e.g., Wallonia in Belgium and Galicia in Spain). The Atlas presents detailed insights into public attitudes, beliefs, and behaviours related to radon and Naturally Occurring Radioactive Materials (NORM). By visualising this data across European countries, the Atlas helps policymakers, researchers, and public health professionals understand how people perceive and respond to radon-related risks. These behavioural insights are essential for shaping evidence-based National Radon Action Plans and designing communication strategies that resonate with the public.

In addition, members of registered RadoNorm stakeholders were invited to participate in RadoNorm annual meetings. At the first RadoNorm annual meeting several stakeholders from authorities (Portugal), implementers (Sweden) and researchers (Italy) were invited to present stakeholders' perspectives,

[11] https://www.radonorm.eu/norm-e-survey/
[12] https://www.radonorm.eu/publications/deliverables/
[13] https://www.radonorm.eu/activities/radonorm-citizen-science/
[14] https://www.radonorm.eu/activities/research-seminar-series/
[15] https://www.radonorm.eu/activities/showcase-meeting/
[16] https://www.radonorm.eu/activities/radon-behavioural-atlas/
[17] https://radonbehaviouratlas.wixstudio.com/radonorm

priorities and challenges and to discuss opportunities for stakeholder collaboration in areas covered by RadoNorm. The brief overview is reported in the deliverable on the event [7] with event material available online[18]. At the second RadoNorm annual meeting four stakeholders were invited to attend the event in person, representing science (Germany), implementers (Slovenia and Spain) and authorities (Germany). The main goal of the discussion was to improve actions taken in RadoNorm and make project outcomes useful for a wider group of final users as well as keeping them as close to the everyday practice as possible. The discussion is reported in the annual meeting report [8], material also available online[19]. The presentations are also publicly available on RadoNorm website under event material[20]. The third RadoNorm annual meeting was modified and introduced panel discussions after each of the dedicated block. Presentations from consortium members were given in the three sessions titled "Health", "Environment" and "Society & Radiological Protection". Feedback from the previous AM indicated a need for more panel discussions, and therefore, each session featured a panel discussion at the end, which involved stakeholders and members of the consortium. The online feature of the meeting allowed stakeholders to also participate online as panellists. The discussion is reported in the annual meeting report [9], material also available online[21].

The fourth RadoNorm annual meeting in June 2024 built on the participants feedback and the positive opinion about the panel discussions. Presentations from consortium members were given in the three sessions titled "Fundamentals", "Recommendations" and "Applications & Implementation". Each session featured a panel discussion at the end, which involved stakeholders and members of the consortium. The online feature of the meeting allowed stakeholders to also participate online as panellists. Again, the discussions are reported in deliverable [10] and material available online[22]. At the final 5th Annual Meeting of the RadoNorm project the attendees' included members of the consortium, advisory board members, external stakeholders, and early career researchers (ECRs), all of whom contributed to the exchange of knowledge and reflections on the achievements of the project. The programme included open sessions organised under three thematic tracks: Health and Beating Cancer, Environmental Risks, and Measures to Protect People. These sessions featured scientific presentations from WPs 2 through 6 and were complemented by panel discussions involving external experts from international organisations such as the ICRP, IAEA, EURADOS, and MELODI, as well as national regulatory authorities and research institutions. The panels examined key outcomes of the project and explored how RadoNorm's results can inform radiation protection policy, public health strategies, and sustainable development.

6. Conclusions

The RadoNorm project has demonstrated a comprehensive and strategically structured approach to stakeholder engagement, underpinned by inclusive principles of transparency, responsiveness, and participation. This report has outlined the wide array of internal and external stakeholders involved, the formation and functioning of targeted stakeholder networks, and the tools and methods deployed to facilitate meaningful engagement throughout the project lifecycle.

Stakeholder mapping based on interest, influence, and willingness to engage allowed for tailored communication, targeted involvement, and prioritisation of resources. Through dedicated channels such as annual meetings, online seminars, the European Radon Behavioural Atlas, citizen science projects, NORM e-surveys, and a robust contact database, RadoNorm ensured that stakeholders were not only recipients of information but also contributors to research and dialogue. Particular emphasis was placed

[18] https://www.radonorm.eu/event/event-material/#245-287-wpfd-1st-annual-meeting-1646828526
[19] https://www.radonorm.eu/event/event-material/#245-380-wpfd-2nd-annual-meeting
[20] https://www.radonorm.eu/event/event-material/#245-245-wpfd-top
[21] https://www.radonorm.eu/event/event-material/#245-440-wpfd-3rd-annual-meeting
[22] https://www.radonorm.eu/event/event-material/#245-492-wpfd-4th-annual-meeting

on adapting communication tools to stakeholder-specific needs and promoting accessibility and mutual learning.

The success of the stakeholder engagement strategy is evidenced by the breadth of participation across 41 countries, the establishment of eight stakeholder network groups, and the active involvement of over 800 citizens in citizen science initiatives. Feedback loops were integral to the engagement process, informing iterative improvements and fostering ongoing collaboration with authorities, implementers, policymakers, scientists, and the public.

RadoNorm's stakeholder engagement has not only supported dissemination and exploitation of research outcomes but has also laid a foundation for continued collaboration beyond the project's lifespan. The strategies, structures, and insights developed will inform future initiatives in the field of radiation protection and public health. Continuous updating of this milestone document will ensure that stakeholder feedback and evolving needs remain central to the project's legacy and sustainability.

7. References

[1.] Zeleznik N., Kulka U., Birschwilks M., Fevrier L., Madas B., Salomaa S., Fronka A., Perko T., Wojcik A., (2020): Strategy and plan for communication, dissemination and exploitation of results. Final version as of 30.11.2020 of deliverable D8.1 of project RadoNorm https://www.radonorm.eu/publications/deliverables/.
[2.] Milestone 92: Updates of Strategy and plan for communication, dissemination and exploitation of results, August 2021.
[3.] Milestone 92: Updates of Strategy and plan for communication, dissemination and exploitation of results, November 2022.
[4.] Zeleznik N., Kulka U., John W., Fevrier L., Madas B., Roivainen P., Fronka A., Perko T., Wojcik A., Schofield P. (2023): Strategy and plan for communication, dissemination and exploitation of results – update, Final version as of 15.8.2023 of deliverable D8.2 of project RadoNorm https://www.radonorm.eu/publications/deliverables/.
[5.] Milestone 96: Stakeholder mapping and establishments of stakeholder‘ networks. December 2020 and update December 2022.
[6.] Grant Agreement Number 900009 — RadoNorm as from 13.05.2020.
[7.] Birschwilks M. et al. (2021): Minutes from the 1st Annual Meeting, D1.2, RadoNorm, September 2021.
[8.] John, W. et al. (2022): Minutes from the 2nd Annual Meeting, D1.3, RadoNorm, October 2022.
[9.] John, W. et al. (2023): Minutes from the 3rd Annual Meeting, D1.4, RadoNorm, October 2023.
[10.] John, W. et al. (2024): Minutes from the 4th Annual Meeting, D1.5, RadoNorm, October 2024.
[11.] John, W. et al. (2025): Minutes from the 5th Annual Meeting, D1.6, RadoNorm, July 2025, draft.