



EPA Research - 2015 Call

EPA Research – Sustainability Research Call 2015

Technical Description



Comhshaoil, Pobal agus Rialtas Áitiúil
Environment, Community and Local Government

The EPA Research Programme is funded by the Irish Government.

Environmental Protection Agency Research Call 2015:

This document provides the Technical Description for the Environmental Protection Agency Sustainability Research Call 2015. Applicants should read the following carefully and also consult the other documentation provided (i.e. Guide for Applicants, Terms and Conditions for support of grant awards,).

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1. Introduction

The EPA's Research Programme 2014-2020 is designed to identify pressures, inform policy and develop solutions to environmental challenges through the provision of strong evidence-based scientific knowledge:

- **Identifying Pressures:** Providing assessments of current environmental status and future trends to identify pressures on our environment.
- **Informing Policy:** Generating evidence, reviewing practices and building models to inform policy development and implementation.
- **Developing Solutions:** Using novel technologies and methods that address environmental challenges and provide green economy opportunities.

EPA Sustainability Research

The Sustainability Pillar of the EPA Research Programme has been allocated funding of approximately €2.75m for new commitments in the 2015 Research Call. The overall aim of the Sustainability pillar of the EPA's Research Programme 2014-2020 is designed to identify pressures, inform policy and develop solutions to environmental challenges through the provision of strong evidence-based scientific knowledge.

Sustainability is structured into four thematic areas of research as follows:

Theme 1: Resource Efficiency

The goal for this thematic area is to support research that will deliver solutions for more efficient use of resources, water and materials.

Theme 2: Health & Wellbeing

The goal for this thematic area is to develop national capacity in key areas, to collect data and make assessments of priority issues for Ireland and to mobilise this knowledge for use in environment and health protection.

Theme 3: Natural Capital and Ecosystem Services including soils and biodiversity

The goal for this thematic area is to protect, enhance and restore the ecosystem services we derive from our Natural Capital.

Theme 4: Socio-Economic Aspects of a Sustainable Environment

The aim of this research will be to identify opportunities for, and barriers to, leveraging and sustaining environmental gains through socio-economic approaches or mechanisms. This theme will examine the role of social and economic 'forcers' that trigger, motivate, create barriers or solutions to sustainable production/provision of goods and services, and sustainable consumption choices and behaviour change. This theme is also interested in the effectiveness of existing or possible future government policies and measures in promoting sustainability in consumption and/or production.

Application Process

Making an application online:

Applications must ONLY be made online at <https://epa.smartsimple.ie> .

Guide to the EPA online application system:

The guide to the EPA online application system, '2015 Quick guide to the EPA online portal (making an application), is available for download at <http://www.epa.ie/pubs/reports/research/call2015>

What to include in the application form:

To make the best application possible, it is recommended that you read the '2015 EPA Research guide for applicants' before drafting and submitting an application, available at <http://www.epa.ie/pubs/reports/research/call2015> .

To make an application under any of the topic areas:

Applicants must use the correct **Call Topic Reference**, as indicated in this document, from the drop down menu on the EPA online system e.g. *Sustainability 2015 Call Project 1*

It is the responsibility of the **Applicants** to ensure that proposals are submitted before the **call deadline**, and of the relevant **Grant Authoriser** (i.e. Research Offices / Managing Directors for companies) to ensure that the proposals are authorised before the **organisation approval deadline**.

FAILURE TO MEET EITHER OF THE ABOVE DEADLINES MEANS YOUR PROPOSAL WILL NOT BE CONSIDERED FOR FUNDING

2. Resource Efficiency Theme

Context

Natural resources underpin our economy and our quality of life. Continuing our current patterns of resource use is not an option. Increasing resource efficiency is key to securing growth and jobs for Ireland as well as reducing our carbon footprint and increasing our sustainability. It will bring major economic opportunities, improve productivity, drive down costs and boost competitiveness

The overall goal for this thematic area is to support research that will deliver solutions for more efficient use of resources, water and materials. In line with the Waste Framework Directive waste treatment hierarchy, prevention and minimisation should be prioritised. Where waste arises, research will be supported into approaches and technologies that recover the value in waste to yield raw materials for other processes and/or energy.

In terms of a policy context, a number of important policy documents have been released that will have significant impact both on the national resource efficiency agenda and on the focus of this EPA Research theme.

*A Resource Opportunity - Waste Management Policy in Ireland (July 2012)*¹ provides a roadmap for the future of waste management in Ireland. The policy covers the full spectrum of waste management, compliance and enforcement, taking into account the requirements of the Waste Framework Directive (2008/98/EC) and its waste treatment hierarchy.

The guiding principles behind the strategy are:

- Prevention and minimisation is at the heart of waste policy;
- Maximum value should be gleaned from waste by re-use, recycling and recovery; and,
- Disposal to landfill is a last resort, to be phased out within the next decade.

At a European level, the Resource-Efficient Europe framework² is a flagship initiative of the Europe 2020 Strategy³ and aims to shift Europe towards a resource-efficient, low-carbon economy to achieve sustainable growth.

In particular, the strategy identifies aims to:

- Boost economic performance while reducing resource use;
- Identify and create new opportunities for economic growth and greater innovation and boost the EU's competitiveness;
- Ensure security of supply of essential resources; and,
- Fight against climate change and limit the environmental impacts of resource use.

Furthermore at European level a strategy which aims to develop a competitive Circular Economy in Europe is being prepared. A 'circular economy' aims to maintain the value of the materials and

¹ <http://www.environ.ie/en/Environment/Waste/PublicationsDocuments/FileDownload,30729,en.pdf>

² <http://ec.europa.eu/resource-efficient-europe/>

³ http://ec.europa.eu/environment/consultations/closing_the_loop_en.htm

energy used in products in the value chain for the optimal duration, thus minimising waste and resource use. By preventing losses of value from materials flows, it creates economic opportunities and competitive advantages on a sustainable basis. A successful transition towards a circular economy requires action at all stages in the value chain: from the extraction of raw materials, through material and product design, production, distribution and consumption of goods, repair, remanufacturing and reuse schemes, to waste management and recycling.

Research will be considered under the following four sub-thematic areas:

1. Supporting Policy and Enforcement
2. Resource Efficient Production
3. Waste as a Resource
4. Sustainable Waste Treatment Options

Research priorities for this call are:

Supporting Policy and Enforcement

Possible research topics could include, but are not limited to:

- Project No. 1** Determining the value of reuse activities in Ireland to the economy. The research should look at the actual and potential value of these activities and assist in identifying the need for and value of policy intervention

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 1**

- Project No. 2** Research into the construction sector and its potential to contribute to the circular economy and in particular waste prevention, and material reuse and recycling flows.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 2**

- Project No. 3** Design of community based social marketing approach to achieve increased participation in WEEE reuse and recycling. The research should look at investigating public attitudes and behaviours to good WEEE management and identification of associated barriers.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 3**

- Project No. 4** A study of the trends in online sales of electrical and electronic equipment and the potential environmental impacts.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 4**

Resource Efficient Production

Possible research topics could include, but are not limited to:

- Project No. 5** Quantification of commercial food waste (and identification of reduction opportunities in the supply chain) (Medium Scale; refer to Appendix 1).

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 5**

Waste as a Resource

Possible research topics could include, but are not limited to:

- Project No. 6** Research into the area of material resource mining at closed landfills and at other industrial facilities in Ireland such as industrial minerals, mine tailings, residues, slags, flyash, industrial shredding residues and WEEE.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 6**

- Project No. 7** The role of incentivisation in the development of biomethane production, using anaerobic digestion (AD).

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 7**

Sustainable Waste Treatment Options

Possible research topics could include, but are not limited to:

- Project No. 8** Alternative uses for the organic fines fraction of residual waste : In Ireland the MBT output of stabilised biowaste has been consigned to non-hazardous landfill for use as cover material or intermediate capping. However, landfills are closing and landfill capacity is reducing. Alternative uses for the organic fines fraction of residual waste with/without alternative/additional treatments should be examined. Potential examples which could be evaluated are the conversion⁴ of organic fines to biochar, material mining or their treatment for brownfield land restoration for non-food uses.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 8**

Project Structure and Funding

The overall indicative budget for this area is in the order of €600,000-€750,000.

Proposals should be set up as either desk studies lasting between 6-12 months and/or medium-scale studies lasting between 24-36 months.

⁴ Co-conversion with other waste types that are of significance nationally (e.g. sewage sludge) are also welcomed

Indicative funding available for desk-studies is between €50,000 - €100,000 and for medium scale studies is up to €350,000 per proposal (which includes a 5% provision for communication costs⁵).

Please refer to the 2015 Guide for Applicants for further details.

⁵ For example, a €100,000 grant award is made up of €95,000 for project costs, and €5,000 for communication costs (€3,000 of which relates to communication activities and events which take place over the lifetime of the project and €2,000 which relates to post completion dissemination costs).

3. Socio-Economic Aspects of a Sustainable Environment Theme

Context

In the Socio-economic area of the environmental sustainability paradigm, we consider the role of social and economic ‘forcers’ that trigger, motivate, or create barriers or solutions to sustainable behaviours and choices.

The **behavioural change** agenda is a core element of the Sustainability Research Pillar. In addition, matters such as awareness, education, environmentally harmful subsidies, national environmental accounts, corporate social responsibility, environmental taxes, full environmental pricing of products and services, market-based mechanisms, environmental technologies, environmental socio-economic benchmarks, social and economic value of ecosystem services and biodiversity, valuing our natural resources, life cycle assessment for services and products, could all be considered within this socio-economic research area.

Environmental Socio-economic Research is the study of the sociological and economic factors, policies, behaviours, attitudes, values instruments, interactions, interventions, that exert an influence – for good or bad – on our environment, including measurement and assessment of this influence. It looks at the intimate relationship between economy, society and environment, and seeks to identify opportunities for, and barriers to, leveraging and sustaining environmental gains through socio-economic approaches or mechanisms.

A particular focus will be on the socio-economic aspects of consumption and production behaviours and choices. The effectiveness of existing or possible future government policies and measures to promote sustainability in consumption and/or production may also be of interest.

The EEA's report *The European environment — state and outlook 2010 (SOER 2010)* drew attention to the urgent need for Europe to shift towards a much more integrated approach to addressing persistent, systemic environmental challenges. It identified the transition towards a green economy as one of the changes needed to secure the long-term sustainability of Europe and its neighbourhood.

The SOER (2015) analysis suggests that neither environmental policies alone nor economic and technology-driven efficiency gains are likely to be sufficient to achieve the 2050 vision. Instead, living well within ecological limits will require fundamental transitions in the systems of production and consumption that are the root cause of environmental and climate pressures. Such transitions will, by their character, entail profound changes in dominant institutions, practices, technologies, policies, lifestyles and thinking.

Europe's success in moving towards a green economy will depend in part on striking the right balance between the four approaches- Mitigate, Adapt, Respond and Restore. Policy packages that include objectives and targets explicitly recognising the relationships between resource efficiency, ecosystem resilience and human well-being would accelerate the reconfiguration of Europe's systems of production and consumption. Governance approaches that engage citizens, non-governmental organisations, businesses and cities would offer additional levers in this context. This approach can enable social and environmental goals to be pursued simultaneously.

The foundation for short-and long-term improvements in Ireland's environment, people's health and economic prosperity rests on full implementation of policies, and better integration of the environment into the sectoral policies that contribute most to environmental pressures and

impacts.

The SOER (2015) report advocates supporting and upscaling niche innovations. The pace of innovation and diffusion of ideas plays a central role in driving systemic transitions. In addition to new technologies, innovation can take diverse forms, including financial tools such as green bonds and payments for ecosystem services; integrated resource management approaches; and social innovations such as 'prosumerism', which merge the role of consumers and producers in developing and providing, for example, energy, food and mobility services.

There is a gap between available, established monitoring, data and indicators and the knowledge required to support transitions. Addressing this gap requires investment in better understanding of systems science, forward-looking information, systemic risks and the relationships between environmental change and human well-being.

The Irish Government's *Our Sustainable Future* policy (2012) proposes measures to help meet the overall goal of achieving continuous improvement of quality of life for both current and future generations. The key challenges are categorised into a number of themes:

- Sustainability of public finances and economic resilience;
- Sustainable consumption and production;
- Conservation and management of natural resources;
- Climate change and clean energy;
- Sustainable agriculture;
- Sustainable transport;
- Social inclusion, sustainable communities and spatial planning;
- Public health;
- Education, communication and behaviour change;
- Innovation, R&D;
- Skills and training; and,
- Global poverty and sustainable development.

Research has a key role in identifying and analysing how these 'challenges' are inter-related and, indeed, how we should address them, particularly from the perspective of socio-economic interventions.

Research Priorities

It is proposed that over the period 2014-2020, the core areas of research carried out by the EPA Research Programme in the area of Socio-Economic Aspects of Sustainable Environment will be within the following three areas:

1. Production & Service Provision;
2. Consumption; and,
3. Governance.

Production & Service Provision

This research area covers the socio-economic aspects of production behaviours and choices.

Possible research topics could include, but are not limited to:

- Project No. 9** Identify and evaluate new business models for sustainable consumption e.g. product durability and buying a service rather than a product.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 9**

Project No. 10 Accessing full cost production

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 10**

Project No. 11 Research of upcycling supports to increase reuse, with a focus on waste electrical and electronic equipment (WEEE).

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 11**

Consumption

This research area covers the socio-economic aspects of consumption. Possible research topics could include, but are not limited to:

Project No. 12 Conduct a critical evaluation of the role of a sustainable third level campus in the transition towards a sustainable community.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 12**

Project No. 13 Critically evaluate the success of current responsible consumption practices/interventions adopted to raise awareness as a means to change behaviour in communities, setting up internal norms, narratives and reinterpretation that will drive behavioural antecedents beyond simple information provision and move towards a necessary ascription of consumption responsibility to the citizen/user in a sustained fashion.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 13**

Project No. 14 The production of national sectoral environmental benchmarks for significant economic and environmental sectors (e.g. water use in dairy sector).

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 14**

Project No. 15 Examine perceptions, effectiveness and promotion of current eco labels in place in Ireland and consideration of the development of others to reflect future needs in the context of socio-economic and environmental factors driving change. Does too much information on labels cause confusion and do eco labels influence purchasing choices?

To make an application under this topic area, you must use the following **Call Topic**

Reference: Sustainability 2015 Call – Project 15

Governance

The role of existing or possible future policies and measures to promote sustainability in consumption and/or production.

Possible research topics, viewed through the six sector approach of economy, environment, governance, demography, technology and culture, could include, but are not limited to:

Project No. 16 Examine Citizen Science as a vehicle to more effectively communicate current sustainability challenges and gain more insight and understanding of behaviour (associated with Cognitive Dissonance, as a means to enhance sustainability literacy and inform the development of relevant interventions). Allied to this is the opportunity to gain more understanding of the public's risk perception of environmental issues with a view to empower citizens to respond to current and future challenges.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 16**

Project No. 17 Explore ways to gain more understanding of the value/motivations that influence behaviour with a specific focus on intrinsic versus extrinsic values within the context of the current dominant neo-liberal philosophy that places more emphasis on extrinsic values, (i.e. growing bigger instead of better, growing quantitatively instead of qualitatively).

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 17**

Project No. 18 Critically examine community interventions designed to deliver behaviour change as a means to establish any key characteristics of success, the factors that deflect outcomes from intentions and identify potential for transferability where success has been achieved. Evaluate how local buy-in has been achieved and sustained and what practical guidance could be developed in relation to progressing sustainable development, renewable energy, resource efficiency.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 18**

Project No. 19 Valuation methods using revealed preference methods (e.g. travel cost methods) are lacking in an Irish context. Research on production function valuations undertaken in conjunction with other disciplines represents a more integrated and holistic approach. While stated preference techniques are very valuable they may not capture certain values that in turn influence behaviour patterns. Revealed preference methods may help to adapt EU systems to the Irish context.

To make an application under this topic area, you must use the following **Call Topic**

Reference: Sustainability 2015 Call – Project 19

Project No. 20 Conduct comparative analysis of the capacity of the Irish policy system to embrace an integrated approach to addressing environmental problems (i.e. seeing environmental policy concerns being addressed by policy in transport, in education, in health etc).

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 20**

Project No. 21 Develop tools to demonstrate that economic growth is dependent upon a sustainable environment and a sustainable environment is dependent upon economic development. This would potentially facilitate and examination of the impacts of the green economy on environmental quality and in so doing provide insight to highlight the value/merits of a more Circular Economy. Allied to this is the potential to leverage social competitiveness, e.g. engage with society re environmental challenges, address environmental challenges, enhance social competitiveness and in so doing advance economic competitiveness.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 21**

Project No. 22 Conduct a Scenario planning exercise within the context of current socio-economic and environmental factors driving change locally and globally to develop narratives characterised by a Business As Usual model alongside narratives with varying levels of public participation, varying levels of uptake in Citizen Science and growth in 'prosumerism'.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 22**

Project Structure and Funding

The overall indicative budget for this area is in the order of €600,000-€750,000.

Proposals should be set up as either desk studies lasting between 6-12 months and/or medium-scale studies lasting between 24-36 months.

Indicative funding available for desk-studies is between €50,000 - €100,000 and for medium scale studies is upto €350,000 per proposal (which includes a 5% provision for communication costs⁶).

Please refer to the *2015 Guide for Applicants* for further details.

⁶ For example, a €100,000 grant award is made up of €95,000 for project costs, and €5,000 for communication costs (€3,000 of which relates to communication activities and events which take place over the lifetime of the project and €2,000 which relates to post completion dissemination costs).

4. Natural Capital and Ecosystem Services including soils and biodiversity Theme

Context

“Natural capital refers to the elements of nature that produce value (directly and indirectly) to people, such as the stock of forests, rivers, land, minerals and oceans”. It includes the living aspects of nature (such as fish stocks) as well as the non-living aspects (such as minerals and energy resources). Natural capital underpins all other types of capital (man-made, human and social) and is the foundation on which our economy, society and prosperity is built. By combining different forms of capital, we are able to enjoy a huge variety of benefits; ranging from the food we eat and water we consume in our homes to outdoor experiences and improved health to name but a few.⁷

These benefits, frequently referred to as ecosystem services⁸, include the provision of food, materials, clean water, clean air, climate regulation, flood prevention, pollination, recreation and wellbeing. Since the flow of services from ecosystems requires that they function as whole systems, the structure and diversity of ecosystems are important components of natural capital.

Important considerations in this regard are:

- Biodiversity underpins many of our ecosystems and is vital to their resilience. Its loss can weaken an ecosystem, compromising the delivery of ecosystem services and making it more vulnerable to environmental shocks.
- Green Infrastructure can enhance ecosystem health and resilience, contribute to biodiversity conservation and benefit human populations through the maintenance and enhancement of ecosystem services.

We continue to seriously degrade our natural capital, jeopardising our sustainability and undermining our resilience to environmental shocks. The failure to protect our natural capital and to give a proper value to ecosystem services will need to be addressed as part of the drive towards smart, sustainable and inclusive growth⁹. The June 2012 United Nations Conference on Sustainable Development (Rio+20) produced an Outcome document¹⁰ which contains clear and practical measures for implementing sustainable development. This is supported by the 7th EU Environment Action Programme¹¹ (*Living Well, Within the Limits of Our Planet*).

The EU has called for a halt to biodiversity loss, the degradation of ecosystem services in the EU and their restoration in so far as feasible by 2020. Implementing the EU decision will be extremely challenging for Ireland and will require new approaches and solutions. These will require an integrated and cross-sectoral approach embedding ecosystem approaches such as Ecosystem Services and Green Infrastructure into policy and practice.

Ireland is currently implementing its second National Biodiversity Plan¹² for the period 2011-2016. The measures Ireland will take are presented as 102 actions under a series of 7 Strategic

⁷ <http://www.defra.gov.uk/naturalcapitalcommittee/natural-capital/what-is-natural-capital-2/>

⁸ <http://www.unep.org/maweb/documents/document.356.aspx.pdf>

⁹ Resource Efficiency Roadmap: http://ec.europa.eu/europe2020/index_en.htm

¹⁰ <http://sustainabledevelopment.un.org/index.php?menu=1298>

¹¹ <http://ec.europa.eu/environment/newprg/index.htm>

¹² <http://www.npws.ie/media/Biodiversity%20Plan%20text%20English.pdf>

Objectives. Some of the actions within the plan are continuing elements of existing work and many are requirements under existing EU Directives. The objectives cover the conservation of biodiversity in the wider countryside and in the marine environment, both within and outside protected areas; the mainstreaming of biodiversity across the decision making process in the State; the strengthening of the knowledge base on biodiversity; increasing public awareness and participation; and, Ireland's contribution to international biodiversity issues, including North South co-ordination on issues of common interest.

In 2012 a report from the National Platform for Biodiversity Research (NPBR¹³) identified knowledge gaps and priority research needs for various groupings: Freshwater; Marine; Invasive Alien Species; Agriculture, Grassland and Soils; Uplands, Peatlands and Wetlands. The European Platform for Biodiversity Research Strategy¹⁴ published a position paper on research priorities for Horizon 2020 which are required to support implementation of the EU biodiversity strategy.

In 2015 a National Peatlands Strategy was published. This Strategy aims to provide a long-term framework within which all of the peatlands within the State can be managed responsibly in order to optimise their social, environmental and economic contribution to the well-being of this and future generations.

Research will be structured into the following three sub-thematic areas:

1. Evaluation/Assessment of our Natural Capital;
2. Managing, Protecting & Restoring our Natural Capital; and,
3. Governance & Behavioural Changes.

Refer to the *Sustainability Research Discussion Document (June 2015)* for further background information.

Evaluation/Assessment of our Natural Capital.

This research area covers evaluation/assessment of pressures on natural capital. Possible research topics could include, but are not limited to:

- Project No. 23** The case for a National Raw Materials Strategy (co-funded with GSI Desk Scale; refer to Appendix 2)

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 23**

- Project No. 24** Evaluation of the ecosystem services derived from specified elements of our natural capital such as freshwater ecosystems, peatbogs, salmon, pollination services etc.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 24**

- Project No. 25** Classification, identification and high resolution mapping (with remote sensing and ground truth survey) of all of the State's peatlands, including wet heaths.

¹³ (<http://www.biodiversityresearch.ie>)

¹⁴ www.epbrs.org

Classification should include current status of peatland, e.g. on a degradation scale. Change detection, especially at margins, and indicator species for peat condition should be incorporated into the developed methodology which shall have due regard to national mapping systems including PRIME2.¹⁵

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 25**

Managing, Protecting & Restoring our Natural Capital

This research area aims at putting environment in the centre of decision making; working towards the importance of the environment being recognised; implementing environment legislation; and, supporting sustainable development. Possible research topics could include, but are not limited to:

Project No. 26 Research and develop practices for the eradication of Invasive Alien Species

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 26**

Project No. 27 Quantification of the socioeconomic value of good riparian zone management, including the establishment of riparian native woodland in permanent buffers to protect water quality.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 27**

Governance & Behavioural Changes:

This research area aims at mobilising society to behave in an environmentally responsible way. Possible research topics could include, but are not limited to:

Project No. 28 Education and awareness resource development pertaining to natural capital and ecosystem services.

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 28**

Project Structure and Funding

The overall indicative budget for this area is in the order of €600,000-€750,000.

Proposals should be set up as either desk studies lasting between 6-12 months and/or medium-scale studies lasting between 24-36 months.

Indicative funding available for desk-studies is between €50,000 - €100,000 and for medium scale studies is up to €350,000 per proposal (which includes a 5% provision for communication costs¹⁶).

¹⁵ For further details on this project please contact Eamonn Merriman in EPA Dublin Office

¹⁶ For example, a €100,000 grant award is made up of €95,000 for project costs, and €5,000 for communication costs (€3,000 of which relates to communication activities and events which take place over the lifetime of the project and €2,000 which relates to post completion dissemination costs).

Please refer to the 2015 Guide for Applicants for further details.

5. Health and Wellbeing Theme

Context

Human health protection is a fundamental aspect of environmental protection since our health is impacted by, *inter alia*, the air we breathe, the water we drink, the noise levels we experience, the food we eat and our sense of wellbeing. Research has an important role to play in enhancing human health through a healthy environment. By developing expertise and establishing a knowledge base, activities and policies with environmental impacts can be managed to guard against undue negative effects on human health and wellbeing.

The EPA has a key role in the protection of human health from environmental stressors. The licensing of large and complex industrial (IPPC) and waste facilities is conducted with regard to Section 52 of the EPA Acts 1992 & 2003 which requires the EPA to ensure a high standard of environmental protection as well as the prevention of significant environmental pollution. In these Acts, environmental pollution is defined as “..the direct or indirect introduction to an environmental medium, as a result of human activity, of substances, heat or noise, which might be harmful to human health or quality of the environment...”. Other EPA responsibilities with a direct effect on human health protection include the monitoring of water quality (drinking and recreational waters), of ambient air quality and of the levels of natural and artificial radionuclides in the environment and wastewater treatment licensing.

The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty to protect human health and the environment from chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of humans and wildlife, and have harmful impacts on human health or on the environment. Exposure to POPs can lead to serious health effects including certain cancers, birth defects, dysfunctional immune and reproductive systems, greater susceptibility to disease and damages to the central and peripheral nervous systems.

Radon is a naturally occurring radioactive gas formed in the ground by the radioactive decay of uranium which is present in all rocks and soils. It is the greatest source of exposure to ionising radiation for the general public and the second greatest cause of lung cancer in Ireland. It is estimated that exposure to radon accounts for approximately 13% of all lung cancer cases in Ireland, which equates to some 250 lung cancer cases each year. The aim of the National Radon Control Strategy (NRCS) is to minimise the exposure to radon gas for people in Ireland and to reduce to the greatest extent practicable the incidence of radon related lung cancers. The Strategy aims to reduce both the overall population risk and the individual risk for people living with high radon concentrations.

In order to comply with statutory and international obligations concerning monitoring and individual and population radiation dose assessment, the EPA carries out, on an ongoing basis, an environmental radioactivity monitoring programme. The main aims of the programme are to assess the levels of radionuclides in the environment, including in drinking water and foodstuffs, to which the Irish population is exposed; to identify temporal trends and spatial distributions; and to maintain the capability, in terms of the necessary systems, procedures and expertise, to ensure that any increases in radiation levels in the environment resulting from a nuclear or radiological incident anywhere can be detected and assessed rapidly.

Research Priorities

Research will be considered under the following sub-thematic areas:

1. Ecosystem Benefits for Health
2. Chemicals and Other Threats

Multi-disciplinary approaches involving experts from the environmental and health fields will be particularly encouraged.

Research priorities for this call are:

Ecosystem Benefits for Health

Funding is available for up to two studies at Medium Scale, to build knowledge and/or develop strategies to address aspects of health-supporting environments.

Project No. 29 Ecosystem Benefits for Health (**Co-funded with Health Services Executive see separate EPA / HSE Joint Research Call 2015 - Technical Description**).

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 29**

Chemicals and Other Threats (See Appendix 3)

Research is required to support national efforts in relation to the Stockholm Convention and to develop novel methods for the analysis of natural and artificial radionuclides in environmental samples.

Project No. 30 Study into potential sources and releases of newly listed Persistent Organic Pollutants (POPs) into the environment (Medium Scale).

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 30**

Project No. 31 Human exposure levels and pathways for certain newly listed Persistent Organic Pollutants (POPs) under the Stockholm Convention (Medium Scale)

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 31**

Project No. 32 Potential sources and environmental fate of certain phthalates (Medium Scale)

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 32**

Project No. 33 Development and application of Monte Carlo models of high purity HPGe gamma spectrometers for analysis of natural and artificial radionuclides in environmental samples (Medium scale)¹⁷

To make an application under this topic area, you must use the following **Call Topic**

¹⁷ For further details on this project please contact Paul McGinnity in the EPA Dublin Office

Reference: Sustainability 2015 Call – Project 33

Chemicals and Other Threats¹⁸ (See Appendix 4)

Research is required to support a number of the recommendations of the National Radon Control Strategy. Applications are requested under the following areas and high quality proposals will be funded subject to budget availability.

Project No. 34 To investigate if the choice of sealing across the base of a new building, influences the effectiveness of passive soil depressurisation systems also known as passive sumps (Medium Scale).

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 34**

Project No. 35 To investigate the effect of permeability and depth of aggregates (hard core) on the efficiency and area of influence of radon sumps (Desk Scale)

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 35**

Project No. 36 To investigate the relationship, if any, between radon levels and energy efficiency (Desk Scale)

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 36**

Project No. 37 To investigate the optimum positioning of the exhaust point of radon sump system on a building having undergone radon remediation. (Desk Scale)

To make an application under this topic area, you must use the following **Call Topic Reference: Sustainability 2015 Call – Project 37**

Project Structure and Funding

The overall indicative budget for this area is in the order of €600,000-€1,000,000.

Proposals should be set up as either desk studies lasting between 6-12 months and/or medium-scale studies lasting between 24-36 months.

Indicative funding available for desk-studies is between €50,000 - €100,000 and for medium scale studies is up to €350,000 per proposal (which includes a 5% provision for communication costs¹⁹).

Please refer to the 2015 Guide for Applicants for further details.

¹⁸ For further details on these projects please contact David Fenton in the EPA Dublin Office

¹⁹ For example, a €100,000 grant award is made up of €95,000 for project costs, and €5,000 for communication costs (€3,000 of which relates to communication activities and events which take place over the lifetime of the project and €2,000 which relates to post completion dissemination costs).

6. Expected Outputs

- **Final Report**, which should provide a clear and detailed account of all the steps and methodologies used during the project and ensure that the objectives, set out above, are met – including recommendations.
- **Synthesis Report** (20-30pp), which provide a clear non-technical summary of the research and of the recommendations.
- **Dissemination 2-pager**, which will be used to disseminate the findings of the research to the key stakeholders.
- **Workshop/Dissemination event(s)** to all stakeholders in the relevant arena (e.g. Policy, monitoring, regulatory, NGOs, media, public, etc.).

The list provided above is indicative and relevant alternatives will be considered. Please consult the **2015 Guide for Applicants**, **2015 Guide for Grantees** and the **EPA Terms and Conditions of award** for the **full list** of interim and final reporting requirements.

A **dedicated website/webpage/Twitter account** should be created and maintained, presenting the project and work carried to-date.

If you create a Twitter account, please let us know, so we can add you to our [list of EPA funded projects](#) and promote your content to our followers.

It is also expected that a number of **dissemination outputs**, such as policy briefs, peer-reviewed publications and presentations, will arise from the projects.

It is essential that applicants clearly demonstrate, in their proposal, the **policy-relevance** of the outputs of their proposed research; the **applicability** of their findings; and how these outputs address a knowledge-gap and can be **efficiently transferred/applied to the implementation** of environmental-related policies and the protection of our environment.

7. Indicative Timeframe

12th June 2015:	Call Opening
10th July 2015 (5pm):	Deadline for queries relating to the technical contents of this call
17th July 2015 (5pm)	Deadline for submission of applications by applicants
29th July 2015 (5pm)	Organisation Approval Deadline for authorisation by Research Offices
August/September 2015	Evaluation Process
September/October 2015	Negotiation ²⁰
November 2015	Grant Award of Successful Projects

²⁰ The EPA may consider calling the shortlisted applicants for interview at this stage.

8. Further Information

Information on current research projects being supported by the programme is available in the Research Section of the EPA web site (www.epa.ie/researchandeducation/research).

Alternatively, for further information on this call, please contact research@epa.ie

Follow us on Twitter [@eparesearchnews](https://twitter.com/eparesearchnews) to keep up-to-date with all of our activities

ALL QUERIES, OTHER THAN ON THE SUBMISSION PROCESS, SHOULD BE SUBMITTED BY THE 10TH JULY 2015, 5PM AT THE LATEST.

Research@epa.ie MUST BE COPIED IN ALL EMAILS. NO QUERIES WILL BE ENTERTAINED AFTERWARDS.

9. Additional Documentation

Additional Documents available at <http://www.epa.ie/pubs/reports/research/call2015>

- *2015 EPA Research Guide for Applicants*
- *2015 EPA Research Guide for Grantees*
- *2015 EPA Research Terms & Conditions for Support of Grant Awards*
- *2015 Quick guide to the EPA on-line portal (How to make an application)*

Appendix 1. Additional Information relating to Project No. 5:

Background

Food waste is a significant issue, both globally and nationally. At least 1 million tonnes of food waste is generated in Ireland each year and this has significant social, environmental and economic impacts. This is a significant waste stream and one that must be reduced, in accordance with EU and Irish waste policies (current proposed EU target to reduce food waste by 50% by 2020²¹).

Of the estimated 1 million tonnes of food waste generated in Ireland per annum, over 33% comes from the commercial sector. The commercial sector describes businesses that provide services directly to consumers and the public, including sub-sectors such as hospitality, retail, education, healthcare, etc. Thus the overall sector is a major contributor to food waste in Ireland and detailed data is required to put into place a comprehensive, focused and effective programme to reduce food waste. In addition to the amounts of food waste arising, more information is required on the types of food wasted.

Objectives and Expected Outputs

In order to determine the most effective way to reduce commercial food waste generation and identify priority actions and priority sectors, a thorough investigation is required of the food waste arising at different stages of the food supply chain. Work packages would likely include:

- Map the generation of commercial food waste along the food production/distribution/consumption cycle in Ireland and identify factors contributing to this waste.
- Identify the significant food waste producing commercial sub-sectors in Ireland and areas for priority interventions.
- Review best practice methodologies on food waste prevention worldwide within these commercial sub-sectors.
- Work within these sub-sectors to identify the key activities/areas where food waste is generated – using, for example, detailed qualitative and quantitative focused food audits.
- Trial a series of effective interventions to reduce the generation of food waste in these sub-sectors.
- Develop and disseminate benchmarks across the sub-sectors and a series of individual sub-sectoral best practice guidelines.
- Detailed programme of dissemination to include, at least, active engagement with user groups throughout project dissemination workshops for key stakeholders.

²¹ EU 2011: Roadmap to a Resource Efficient Europe (COM(2011) 571):
http://ec.europa.eu/environment/resource_efficiency/about/roadmap/index_en.htm

Appendix 2. Additional Information relating to Project No 23: The case for a National Raw Materials Strategy (Desk Study scale project). This project is being co-funded with the Geological Survey of Ireland (GSI)

Background

Societies' consumption of raw materials in recent decades has grown to unsustainable levels. The planet simply does not have sufficient supply of raw materials to sustain current and predicted future global needs. The EU has identified that over a third of raw materials consumed are wasted, much of it exported from the Union. The EU has also identified a number of raw materials critical to the EU economy, many of which we need to import. Raw materials are essential to the basic function of our economies and our domestic services: indeed raw materials are essential to life. Our natural environment has a finite supply of raw materials, and exploitation does present environmental challenges. Ireland must ensure that its own natural resources are made available in a manner that supports our economy and society whilst not compromising the environment, as well as preserving sufficient reserves to underpin required ecosystem services as well as for servicing future needs.

Raw materials planning, raw materials productivity and resource efficiency are key concepts in relation to the delivery of a sustainable raw material supply. The EU Circular Economy initiative²² stresses that we need to take a full value chain view of raw material supply and demand and to consider the opportunity in secondary raw material resources. Intimate to this circular approach are themes such as material substitution, life cycle analysis, eco-design, reprocessing and recycling. The proposed EU Raw Materials policy²³, and particularly the Raw Materials European Innovation Partnership (EIP), address the challenge of 'Making Raw Materials Available for Europe's Future Wellbeing'. This goal incorporates sustainability ambitions too. The Raw Materials EIP has the ambitious vision of turning the challenge of raw materials dependence into a strategic strength for Europe. Its mission is to boost the competitiveness, growth and attractiveness of the European raw materials sector via radical innovation and entrepreneurship across the entire value chain.

Research is needed to develop a roadmap for the articulation and implementation of a National Raw Material Strategy in support of major recent EU policy initiatives in this area and in support of national economic, societal and environmental interests. The research will have to consider national material flow accounts too as this will inform national needs.

Objectives and Expectations

The aim of this project is to prepare a report which reviews the need for/value of, a national raw materials strategy – reflecting, as well, the need for a national response to the EU Raw Materials initiative and the EU Resource-Efficient Europe initiative. The project will articulate a Roadmap that charts the current and predicted future state of raw materials consumption as well as

²² The circular economy: Connecting, creating and conserving value. EU, 2014

²³ http://ec.europa.eu/environment/circular-economy/index_en.htm

required actions, activities, participants and goals for such a strategy. The project should research international best practice in this area of national planning.

The expected outputs would include:

- Scope – primary and secondary Metallic and Industrial/Construction Minerals (including timber, but excluding food, hydrocarbon based fuels, rubber, water & soils);
- National economic & societal raw materials consumption – present and future trends/demand;
- Review of relevant issues, legislation, policy and literature (national & EU), including cross policy issues;
- Research of similar initiatives across Europe;
- Stakeholder mapping & stakeholder needs identification;
- Environmental, land-use & social issues;
- Raw materials (1^o and 2^o) related regulatory environment;
- Assessment of Public Value & Governance Value benefits (for a Raw Materials Plan);
- Engagement workshop involving key stakeholders

Appendix 3. Chemicals and Other Threats Additional Information relating to Projects No.30-33

Project No.30 - Study into potential sources and releases of newly listed Persistent Organic Pollutants (POPs) into the environment.

While there has been considerable research carried out into releases of the initial 12 Persistent Organic Pollutants (POPs) entered in the Annexes of the Stockholm Convention, less is understood regarding environmental contamination by the more recently listed POPs and in particular, the POP Brominated Flame Retardants and Perfluorooctane Sulfonic Acid (PFOS) and its derivatives.

The European Commission's "Study on waste related issues of newly listed POPs and candidate POPs" reported many of these substances had been widely used in plastics, textiles, furnishings and insulation foams. Much of the contaminated materials are likely to be landfilled. The extent of new POP-contamination by their potential sources and contamination pathways are largely unknown.

While it could be anticipated the release/contamination rates of these substances would be generally relatively slow due to the nature of some of the materials into which they have been incorporated, the quantities of contaminated materials landfilled could be substantial resulting in considerable overall contamination. In order to better quantify the potential environmental risks posed by newly listed POP-contaminated materials, it is proposed a study be conducted into the monitoring of landfill leachate for the relevant POPs.

Additionally, the stability of matrices, e.g. insulation foams, into which the new POPs have been incorporated should be checked to identify potential future environmental risks posed by POP-contaminated materials currently in use.

Please note that cross reference to the current EPA research project on the Identification and Treatment Options for Waste Streams of Certain Bromine Containing Flame Retardants (WAFER: 2014-RE-MS-2) will be required in order to avoid duplication.

References.

Stockholm Convention on Persistent Organic Pollutants (POPs) as amended 2009.

"Study on waste related issues of newly listed POPs and candidate POPs", Consortium Expert Team to Support Waste Implementation, March 25, 2011.

Background document for hexabromocyclododecane and all major diastereoisomers identified (HBCDD), European Chemicals Agency, June 01, 2009.

"Survey of Brominated Flame Retardants", Danish Ministry of the Environment, 2014.

"Perfluorooctane Sulphonate – Risk Reduction Strategy and Analysis of Advantages and Drawbacks – Final Report" Prepared for Department for Environment, Food and Rural Affairs and the Environment Agency for England and Wales by RPA in association with BRE Environment, August 2004.

Project No.31 - Human exposure levels and pathways for certain newly listed Persistent Organic Pollutants (POPs) under the Stockholm Convention.

The Dioxin Levels in the Irish Environment studies (expanded to cover certain brominated flame retardants) are currently some of the most comprehensive routine investigations not only into environmental dioxin contamination but also the potential level of human exposure to these POPs.

The listing of additional POPs under the Stockholm Convention has not only increased the number of substances requiring attention (contamination assessment and monitoring) but also the complexity in determining the potential sources of POP-contamination and their routes for human exposure.

To better understand the potential risks posed by these newly listed POPs, in particular the Brominated Flame Retardants and Perfluorooctane Sulfonic Acid (PFOS) and its derivatives, a project is proposed to examine the current human exposure levels to these POPs and their potential pathways.

As part of the project, previous studies into certain POP-contaminants in human breast milk could be repeated (this could provide additional indications of temporal trends for human exposure for POPs previously monitored).

References.

Stockholm Convention on Persistent Organic Pollutants (POPs) as amended 2009.

Dioxin Levels in the Irish Environment: Tenth Assessment (Summer 2012) – Colman Concannon, EPA, January 2014.

“Study on waste related issued of newly listed POPs and candidate POPs”, Consortium Expert Team to Support Waste Implementation, March 25, 2011.

Background document for hexabromocyclododecane and all major diastereoisomers identified (HBCDD), European Chemicals Agency, June 01, 2009.

“Survey of Brominated Flame Retardants”, Danish Ministry of the Environment, 2014.

“Perfluorinated substances and their uses in Sweden”, Swedish Chemicals Agency, September 2006.

“Perfluorooctane Sulphonate – Risk Reduction Strategy and Analysis of Advantages and Drawbacks – Final Report” Prepared for Department for Environment, Food and Rural Affairs and the Environment Agency for England and Wales by RPA in association with BRE Environment, August 2004.

Project No.32 - Potential sources and environmental fate of certain phthalates.

The threats posed by many phthalates to human health and the environment are well documented with the use of many of these substances severely restricted, e.g. inclusion in Annex XIV of the European REACH Regulation (No 1907/2006) concerning chemicals and their safe use where such chemicals are designated as Substances of Very High Concern.

Additionally resources are currently devoted to assess the impacts on human health and/or the environment posed by other phthalates e.g. candidates for inclusion in Annex XIV of the REACH Regulation. Phthalates have been incorporated into a wide varied of products such as textiles/fabrics, cable insulation and flooring with the highest usage as plasticisers, particularly in polyvinyl chloride-based polymers.

Because phthalates are not generally chemically bound to the plastics to which they are added, they can be released into the environment during product use or disposal. Human exposure routes to phthalates are likely to be many e.g. through dermal contact with phthalate-containing products, inhalation of phthalate-contaminated dust.

In order to better understand the level of risks posed by phthalates to human health and the environment, it is proposed to conduct a study to identify the potential sources of phthalate contamination, both historic and current, and to examine the environmental fate of these substances.

The phthalates proposed for investigation are Benzylbutylphthalate (BBP), Dibutylphthalate (DBP), Dipentylphthalate (DPP), Diisopentylphthalate (DIPP), Diethylhexylphthalate (DEHP), Dihexylphthalate (DHP), Diisobutylphthalate (DIBP), Di-n-octylphthalate (DNOP), Diisononylphthalate (DINP), Diisodecylphthalate (DIDP) and Dimethylphthalate (DMP)

It is envisaged such a study would include, but not be limited to, the monitoring of these substances in products, wastes, landfill leachate and their fate in waste water treatment plants.

References.

“Phthalates which are toxic for reproduction and endocrine-disrupting – proposals for phase-out in Sweden”, Swedish Chemical Agency, Report 4/15.

“Proposal for identification of DEHP as an SVHC”, REACH Annex XV Dossier.

“European Union Risk Assessment Report – Butyl Phthalate” European Chemicals Bureau, Volume 29.

“Bis (2-Ethylhexyl) Phthalate (DEHP) – Summary Risk Assessment Report.” European Chemicals Bureau. EUR 23384 EN/2, 2008.

“Benzyl Butyl Phthalate (BBP) – Summary Risk Assessment.” European Chemicals Bureau. EUR 22773 EN/2, 2008.

Project 33. Development and application of Monte Carlo models of high purity HPGe gamma spectrometers for analysis of natural and artificial radionuclides in environmental samples

Gamma spectrometry labs are increasingly using Monte Carlo codes to model and calibrate for efficiency HPGe (high purity germanium) detectors. These codes are used either in combination with or as a replacement to traditional efficiency calibration techniques which involve measurements of physical radioactive standards containing radionuclides of known activity concentrations. There are several advantages to Monte Carlo modelling including speed, (lower) cost, flexibility and their use for calculating various corrections which may be required including true coincidence summing (TCS), self-absorption and deviation from calibrated sample geometry. Previously, ORP, in collaboration with UCD, has developed manual methods for using a Monte Carlo code (GESPECOR) for calculation of efficiency calibration and TCS corrections.

The aim of this project is to build on the previous work by:

1. Automating and optimising detector characterisation and efficiency calibration. The current method involves iteratively running GESPECOR a number of times until best fits between calculated and measured efficiency curves for a number of different geometries are judged to have been obtained. Detector properties such as germanium crystal dimensions and sample-crystal distances are varied between iterations. These are known, nominally, from the manufacturers' documentation; some can also be measured directly (e.g. X-ray or CT scan). Significant and time-consuming manual intervention is required. Furthermore, the judgements of best fit are subjective. To develop this method it is proposed to automate the iteration process and to apply appropriate algorithms to determine the best fits between calculated and measured calibrations using GESPECOR or an alternative Monte Carlo code.
Expected output: Accurate models available for any ORP HPGe detector and efficiency curves for any sample geometry. Sensitivity analyses and thorough estimation of uncertainties associated with each model.
2. Extending the use of the Monte Carlo modelling to calculate self-absorption corrections for measurements of activity concentrations of a range of radionuclides in different sample matrices. Validation of the results using measurements of spiked samples or reference materials with consideration given to different common sample matrices.
Expected output: Comprehensive, robust, validated method for self-absorption correction of HPGe measurements of common natural and artificial radionuclides in common environmental sample matrices and thorough estimation of associated uncertainties.

The project would involve identifying, configuring and running the most appropriate Monte Carlo code, selection of the most appropriate optimisation/ minimisation algorithm, software development to package the process into user-friendly, operational software and application of this software to calculate self-absorption corrections for a range of common natural and artificial radionuclides in different environmental sample matrices

Appendix 4. Research Supporting National Radon Control Strategy

Research is required to support a number of the recommendations of the National Radon Control Strategy. Applications are requested under the following areas and high quality proposals will be funded subject to budget availability.

Project 34. To investigate if the choice of sealing across the base of a new building, for example using a radon membrane or damp proof membrane, influences effectiveness of passive soil depressurisation systems also known as passive sumps (Medium Scale).

The correct installation of passive radon prevention in new buildings that take account of Irish building practices has been identified as a research need to help deliver National Radon Control Strategy (NRCS) for Ireland. Exposure to indoor radon in Ireland is linked to some 250 lung cancer cases each year in Ireland therefore it is a significant public health issue.

The NRCS report to Government stated that international research into radon prevention together with anecdotal reports based on remediation in Ireland using passive soil depressurisation (PSD) systems indicated that the effectiveness of PSD is enhanced by appropriate sealing across the base of the building. The NRCS recognised however that technical work was needed to determine the optimum specifications for PSD systems taking into account Irish building practices and identified this a knowledge gap in the delivery of the strategy.

Current the Irish Building Regulations calls for a standby radon sump to be installed in all parts of the country. In those parts of the country designated High Radon Areas a radon membrane is required to be installed across the footprint of the building during construction. This is in addition to the standby radon sump. The radon membrane must meet minimum performance criteria set out in technical guidance C issued by the DECLG and where installed a radon membrane can act as a damp proof membrane (dpm). In other parts of the country not designated as a High Radon Area, although a radon membrane is not required, a dpm is nonetheless required

Objectives and Expected Outputs

Passive sub soil depressurisation systems can significantly reduce radon concentrations. The objective of the project is, taking into account of Irish building practices, to determine if the effectiveness of a radon sump is influenced by the installation of a radon membrane or a damp proof membrane.

The output of this project would

- Inform any decision to amend the building regulations to install PSD in new build in Ireland
- Feed into the training building professionals and so Improve how such systems are installed
- Improve the efficiency of PSD where installed
- Inform any decision to amend the Building Regulations to require radon membranes in all parts of the country.
- Feed into delivery of recommendation 6 of The National Radon Control Strategy

Project 35. To investigate the effect of permeability and depth of aggregates (hard core) on the efficiency and area of influence of radon sumps (Desk Study)

The correct installation of passive radon prevention in new buildings that take account of Irish building practices has been identified as a research need to help deliver National Radon Control Strategy (NRCS) for Ireland. Exposure to indoor radon in Ireland is linked to some 250 lung cancer cases each year in Ireland therefore it is a significant public health issue. The NRCS report to Government proposes replacing the existing recommendation to install standby radon sumps in new buildings with a recommendation to install passive radon sumps in new buildings. (A passive radon sump is also known as passive soil depressurisation). This proposed research investigates an important parameter for the operation of radon sumps, that is the permeability of the hard-core layer which is dependent on the grading or size of aggregate used.

The passive radon sump works by depressurising the hard core layer below the slab level. This can only be achieved if the radon laden air is free to move through the hard core and can then be discharged harmlessly to the outside. Therefore for the radon sump to work the hard core layer must be clean, dry, well-compacted and gas permeable following the compaction process. The hard core should have minimal fines so as not to impair the efficiency of the radon sump. Under these conditions, the radon sump may have an influence over an area of about 250 m² or a distance of 15 m from the sump. However, the evidence on which this advice is based is unclear. In addition, the specific grading of the hard core under which these conclusions were made is not specified. Moreover, the advice is not based on current Irish Building practices under the current Building Regulations.

One of the recommendations of the Pyrite Panel in 2012 was that a standalone specification for hard core was needed to cover the composition and grading of hard core used in new building. In 2014, NSAI published guidance on aggregates, which among other things, sets out explicit guidance to limit the risks from reactive pyrite. This guidance allows 22–50 % of aggregates to be < 4mm and allows for the inclusion of fines down to 0.065 mm. Such a grading therefore could impair the efficiency of radon sumps.

Objective

To determine the optimum grading of aggregates for the operation of a radon sump which also takes account of the measures needed to limit the risks of reactive pyrite

- Collate existing guidance on the grading of aggregates for radon sumps
- Examine the evidence behind this guidance
- Determine how the efficiency of radon sumps varies with commonly used hard-core material and hard-core material meeting the 2014 NSAI specification

Determine the area over which the radon sump is found to have an influence for these materials

Project 36 To investigate the relationship, if any, between radon levels and energy efficiency (Desk Study).

One element of making buildings more energy efficient is to reduce the heat loss from warm air escaping through unintentional draughts such as gaps and cracks around windows and doors. The installation of double glazed windows and doors are commonly fitted as a solution to draughts. However, as the air tightness is increased, less heat is lost but there is a possibility that radon concentrations may rise.

Any work that could disrupt ventilation patterns in a building has the potential to alter radon levels. For this reason it is advised, that when draught-proofing or making houses more airtight, to maintain recommended ventilation standards otherwise there is a possibility that radon concentrations may increase as a result of the greater airtightness. However, the relationship, if any, between improved energy efficiency and elevated indoor radon concentrations is not well understood. This was identified as a knowledge gap in the development of the National Radon Control Strategy (NRCS) and therefore warrants further study.

Between 1998 and 2002, the Department of Education and Skills carried out radon testing in all schools in the free education system. All schools with radon levels above 200 Bq/m³ were successfully remediated. Since then many of these schools have had energy efficiency measures retrofitted. The schools radon dataset continues to be a valuable source of research material. Therefore it would be worthwhile to consider re-testing a those schools where relevant energy efficient measures were retro fitted to determine if the radon levels have altered.

The objective of the project is to better understand the possible relationship between airtightness in homes and increased indoor radon concentrations.

Outputs

- Identify those energy efficiency measures that are likely to affect ventilation patterns
- Collate national and international data on the radon levels and energy efficiency.
- Assess their applicability for Irish buildings taking into account the radon potential and building codes in Ireland and abroad
- Deliver a research need identified in the National Radon Control Strategy
- Be in a position to inform guidance and allay concerns on the energy efficiency retro fit programmes
- Provide support the possible link energy efficiency and increased radon levels. This project will add weight to the advice we give in this regard.

Project 37. To investigate the optimum positioning of the exhaust point of radon sump system on a building having undergone radon remediation (Desk Study).

Successful remediation of high radon levels in existing buildings is important if the risk from radon is to be reduced. Radon remediation is commonly undertaken by experienced remediation contractors who generally also recommend the type of remediation technique to be installed. Active sumps are the most common radon remediation technique used in Ireland and can reduce radon levels by up to 92%. The effectiveness of radon remediation is shown by a post remediation measurement (PRM) made shortly after completion of the remediation work.

Traditionally, active sumps have exhausted above the eave level in line with guidance published by the Department of Environment, Community and Local Government. Recent reports suggest that low level exhaust systems terminating 1.5 metres from openings into the house and a metre or so above ground level are now increasing installed as they are easier and therefore less expensive to fit as well as being visually unobtrusive. High-level exhaust systems appear best for dissipating radon away from the building but low level exhaust systems are also effective in reducing radon concentrations as the PRM of such remediation work shows radon concentrations below the Reference Level.

The National Radon Control Strategy (NRCS) report to Government noted that currently there is no data comparing the effectiveness high and low level exhaust systems. This was identified as a Knowledge gap in the report warranting research.

The objective of the project is to determine the optimum positioning of the exhaust point of radon sump system on a building having undergone radon remediation.

The output of the project would

- Input into training on radon remediation, recommended by the NRCS and aimed at contractors who wish to be registered.
- Inform guidance on radon remediation aimed at those with high radon levels including those who wish to remediate on a DIY basis.
- Radon sumps are the most common radon remediation technique. As the NRCS is rolled out with the consequent increase in the rate of remediation it would be important that best practice is reflected in the official.

Feed into delivery of the National Radon Control Strategy

Suggested further reading

The National Radon Control Strategy for Ireland.
<http://www.environ.ie/en/Publications/Environment/EnvironmentalRadiation/FileDownload,35484,en.pdf>

The National Radon Control Strategy for Ireland. Knowledge Gaps.
<http://www.environ.ie/en/Publications/Environment/EnvironmentalRadiation/FileDownload,35484,en.pdf>

Building Regulations 1997. Technical Guidance Document-C. Site preparation and resistance to moisture. 2004, Department of Environment, Community and Local Government. www.environ.ie.

Building Research Establishment, BR211, 2007. Guidance on protective measures for new buildings.

US Environmental Protection Agency, EPA/402-K-01-002. Building radon out of new construction. A step by step guide on how to build radon resistant homes. April 2001. www.epa.gov/radon.

NSAI certificate No. 09/0328. Detail sheet 1 on Easi Sump.

R6 of the National Radon Control Strategy report to Government. www.environ.ie. R6 recommends consideration to be given to replacing the current guidance on standby sumps with guidance on passive sumps in all new dwellings.

NSAI SR: 21 2014. Guidance on the use of I.S. EN 13242:2002+A1:2007 – Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction

The EPA report on common radon remediation methods in Ireland. www.epa.ie.