



Sustainable Energy Authority of Ireland

National Energy Research Development and Demonstration (RD&D) Funding Programme 2022

Call for Submission of Applications

Key Dates	
Call Open Date	Wednesday April 6 th , 2022
Deadline for Application Submission	12pm (Irish Standard Time) Monday May 16th , 2022

It is the responsibility of each applicant to SEAI's National Energy Research Development and Demonstration (RD&D) Funding Programme Call to ensure that they have read and fully understand all Documentation associated with this Call before making a submission, including: this **Call Document** (pdf); **Application Form Template** (word doc); **SEAI RD&D Budget Policy** (pdf); and the **SEAI RD&D Budget Template** (xls).

SEAI is pleased to announce that the 2022 SEAI National Energy RD&D Call involves co-funding partnerships with the following organisations: the Department of Agriculture, Food and the Marine, the Department of Transport, ESB Networks, Geological Survey Ireland and the National Parks and Wildlife Service of the Department of Housing, Local Government and Heritage.



An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine



An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreachta
Department of Housing,
Local Government and Heritage



An Roinn Iompair
Department of Transport



NETWORKS



Geological Survey
Suirbhéireacht Gheolaíochta
Ireland | Éireann

TABLE OF CONTENTS

1. Programme Description and Objectives	2
2. Who Can Avail of the Programme	3
3. Definition of Project Roles	3
4. Levels of Funding Available – Project Scale/Type	4
5. Funding Rate	6
6. What Projects are Eligible	6
7. Submitting your Application	11
8. Evaluation Process and Criteria	11
ANNEX 1: Topic Strand	13
ANNEX 2: Application Form Template Instructions	45
ANNEX 3: Budget Template Instructions	55
ANNEX 4: General Terms & Conditions	55

The Sustainable Energy Authority of Ireland (SEAI) works with the public, businesses, government and communities to achieve a cleaner energy future. SEAI is funded by the Government of Ireland through the Department of the Environment, Climate and Communications.



Rialtas na hÉireann
Government of Ireland

1. Programme Description and Objectives

SEAI will be central to bringing about a low carbon economy through measures and activities focused on the transition to a smarter and more sustainable energy future. To achieve this mission, SEAI will continue to build an environment for positive change through our analysis, modelling and support for policy-making. SEAI will catalyse direct action through our design and delivery of grant and incentive programmes and through our capacity-building processes with citizens, communities and private and public sector organisations.

The overarching objectives of the SEAI National Energy Research Development and Demonstration (RD&D) Funding Programme are as follows:

- Accelerate the development and deployment in the Irish marketplace of competitive energy-related products, processes and systems;
- Support solutions that enable technical and other barriers to energy market uptake to be overcome;
- Grow Ireland's national capacity to access, develop and apply international class energy RD&D;
- Provide guidance and support to policy makers and public bodies through results, outcomes and learning from supported projects.

SEAI's National Energy RD&D Funding Programme supports innovative and targeted actions which assist in delivery of the [Climate Action Plan](#), the [Programme for Government](#), the [2030 Climate and Energy Framework](#), the 2015 Department of the Environment, Climate and Communications [Energy White Paper](#), Ireland's [National Energy & Climate Plan](#) (NECP), and the [Climate Action and Low Carbon Development Bill \(2021\)](#) such as it pertains to SEAI's remit.

Accelerating transformative research to deliver Ireland's clean energy and climate ambitions will require enhanced collaboration across a wide range of stakeholders and actors. Diverse approaches and engaged research¹ methods will be required, which may include multidisciplinary, transdisciplinary² and interdisciplinary research approaches. The SEAI National Energy RD&D Funding Programme welcomes research proposals from all research disciplines, as well as collaborative projects involving multiple organisations, and multidisciplinary, transdisciplinary or interdisciplinary approaches, subject to alignment with the overall programme objectives.

The programme provides the opportunity for applicants to submit proposals to either an Open Strand or a Topic Strand (see Section 6 of this Call Document for further details). The Open Strand provides an opportunity for applicants to pitch ideas for research proposals that are within SEAI's remit and that meet the above outlined programme objectives. The Topic Strand (Annex 1) includes 25 Topic areas which have been identified as priority areas for research. In the most recent 2021 Call, approximately 50% of successful applications were submitted to the Open Strand. The 2022 Call also includes five SEAI-based Fellowship Topics, please refer to Section 4 for further details.

¹ IUA Engaged Research Framework 2022 https://www.campusengage.ie/wp-content/uploads/2022/03/Updated-Final-PBS10553-IUA-Engaged-Research-Framework-2022_V7.pdf

² Where Transdisciplinary Research is defined as research efforts conducted by investigators from different disciplines working jointly to create new conceptual, theoretical, methodological, and translational innovations that integrate and move beyond discipline-specific approaches to address a common problem; and Interdisciplinary Research is defined as any study or group of studies undertaken by scholars from two or more distinct scientific disciplines ([Harvard](#), 2022).

2. Who Can Avail of the Programme

The SEAI National Energy RD&D Funding Programme is open to public and private sector organisations based in the Republic of Ireland (including Irish subsidiaries of overseas companies) who wish to carry out projects in Ireland. Applications will be accepted from companies, 3rd level Educational Bodies, public sector bodies and semi-state bodies who are based in the Republic of Ireland. The aforementioned organisations may apply to the Programme individually or as part of a consortium. Proposals from individuals applying in their own right will not be accepted.

In some circumstances, the programme may support Irish entities/researchers to carry out work undertaken in other jurisdictions, where this is necessary for the completion of the project. Researchers based in other jurisdictions will not be funded by the programme and should partake in proposals in the role of (non-funded) collaborators.

In exceptional cases, funding of work in other jurisdictions (e.g. where it is not possible for a component of work to be carried out in Ireland) may be supported where there is a demonstrable contribution to resolving issues directly relevant to Irish requirements.

3. Definition of Project Roles

Lead Applicant: The Lead Applicant is a budget holder and will hold responsibility and accountability for management of the proposed project. They will be responsible for the technical direction, progress monitoring, budgeting, reporting, dissemination and other management duties associated with the proposed project in-line with SEAI policies. The Lead Applicant is responsible for ensuring that all project partners and stakeholders are kept fully informed on all matters relating to the project. The Lead Applicant will act as the primary contact point for SEAI. Each application may list only one Lead Applicant. The Lead Applicant must hold a contract covering at least the duration of the proposed project or agreement from their employer that their employment will be extended to cover at least the period of the proposed project.

Please note, for 3rd level Educational Bodies, the named Lead Applicant must be a core funded member of academic staff or a member of academic staff with a fixed-term contract and is therefore ineligible to receive salary funding through the SEAI National Energy RD&D Funding Programme. Postdoctoral Researchers or Research Fellows may not be listed as the Lead Applicant (except for Fellowship applications).

Partner Applicant(s): Partner Applicants may form part of the proposed funded project team, along with the Lead Applicant and are responsible for supporting the Lead Applicant in order to achieve the goals of the proposed project. The role of the Partner Applicant(s) should be well-defined within the application.

Collaborators: Collaborators are organisations who are committed to providing a valuable intellectual, technical or financial contribution to the proposed project. Collaborators are not funded by SEAI in a proposed project.

End-Users: A research end-user is defined as an individual, community, or organisation, that will directly use or directly benefit from the output, outcome or results of the proposed research.

4. Levels of Funding Available – Project Scale/Type

The SEAI National Energy RD&D Funding Programme provides funding under the following five categories. Details of the typical duration and typical maximum SEAI funding associated with each scale/type are provided in the table below:

Scale/Type	Typical Duration	Maximum SEAI Funding Available*
Small scale projects	Up to 12 months	Up to €200,000
Medium scale projects	12 to 36 months	Up to €650,000
Large scale projects	36 to 48 months	Up to €1,000,000
Academic Fellowships	12 to 36 months	Up to €300,000
SEAI-based Fellowships	12 to 24 months	Up to €200,000

**Inclusive of Overheads, please see SEAI RD&D Budget Policy for further details.*

Classification of a small, medium or large-scale project is based on the duration of the proposed project. Please refer to Annex 1 for details of the Project Scale/Type defined for each thematic Topic. Note that for some particular Topics, the maximum funding amount may differ from the figures in the above table – please refer to each Topic description in Annex 1 for details of Topic-related maximum funding amounts available.

Fellowships

The Fellowship category aims to build capacity in the energy sector, providing opportunities for early-stage postdoctoral researchers to lead projects in support of Ireland's clean energy transition. There are two Fellowship categories in the 2022 Call: (a) Academic Fellowships; and (b) SEAI-based Fellowships.

All Fellowship applications must be submitted by the individual intending to take up the proposed Fellowship. Fellowship applications will be accepted from 3rd level educational bodies only, based in the Republic of Ireland. A mentor/supervisor should be identified as part of the project team and should be listed as a Partner Applicant. Please note that the mentor/supervisor is not eligible for funding, please see the SEAI RD&D Budget Policy for further details.

Both Academic and SEAI-based Fellowship applications should include an additional Letter of Motivation, uploaded as a supporting document along with the application. The Letter of Motivation should include a statement to demonstrate the Fellowship applicant's interest in and suitability for the proposed Fellowship. This may include an outline of their professional experience, how the Fellowship will enhance their career development and personal motivation for the submitted Fellowship proposal.

Both Academic and SEAI-based fellowship applications should include the following Letters of Support: (1) Lead Applicant (confirming that the information provided in the application is correct to the best of their knowledge and that the proposed projects has not been/is not the subject of grant aid from any other source); (2) Partner Applicant (mentor/supervisor); (3) An authorised staff member in the lead institution (e.g. the Vice President for Research or equivalent); (4) Letter of Motivation – Fellowship.

Successful Fellows will be recognised as an employee of their supportive host 3rd level educational body ('Research Body') for the duration of the Fellowship grant. The application must therefore be supported by the Research Body's Vice President for Research (or equivalent), and the host unit/Department of the Research Body (Partner Applicant – Mentor/Supervisor). Successful applicants will have a Specific Purpose Contract/Research Funded Contract with their Research Body and will be paid by their Research Body in accordance with their contract. All terms and conditions associated with the Fellow's Contract of Employment with their Research Body will apply.

(a) Academic Fellowships

Applications are welcome to the 'Academic Fellowship' category from postdoctoral researchers applying to the Open Strand, with support from a host 3rd level educational body (see section above). Academic fellows can request up to a maximum of €300k in support over a maximum of three years' duration.

It may be possible for PhD students to apply when in the latter PhD stages, however award of a Fellowship is contingent upon PhD completion. Where applicable, applicants should clearly detail expected PhD completion and graduation dates within their application.

(b) SEAI-based Fellowships

The 2022 Call is piloting a new 'SEAI-based Fellowship' category. This category provides the opportunity for postdoctoral researchers to apply for fellowship positions based within SEAI, where applications can be submitted to one of five Topics included within the 2022 Call (Topic 21-25).

The 'SEAI-based Fellowship' category aims to provide successful applicants with the opportunity to develop their careers by researching areas of Irish energy policy priority, while immersed in the diverse activities carried out by SEAI, Ireland's sustainable energy agency. SEAI wish to provide an enabling mechanism for researchers to secure diverse career opportunities in the energy sector, whilst also aiming to further develop and enhance national capabilities and capacities of relevance to the energy industry, public administration and government affairs. This category will provide an opportunity for Fellows to develop key skills that may support further career development opportunities at the energy research-policy interface.

SEAI-based Fellowships will be offered for a period of 12 to 24 months, on a full-time, continuous period basis, located in SEAI. SEAI-based Fellowships are open to postdoctoral researchers, who have the support of a host Irish Research Body at the time of application, and who can take a period of up to 24 months away from their current research activities. Successful applicants must be able to commence the placement by January 2023.

SEAI-based Fellows will be assigned a SEAI supervisor who will provide support and guidance for the duration of their Fellowship. Fellows shall comply with all relevant SEAI workplace policies, as notified by SEAI. Fellows will be provided with an appropriate workspace and the necessary IT equipment to fulfil their duties. The maximum SEAI contribution to a Fellowship award is €200,000 inclusive of overheads. Only staff costs for the Fellow will be deemed eligible direct costs.

Please note that for SEAI-based Fellowships, a CV (2p max) of the Fellow must also be provided.

Please note the actual work programme of a SEAI-based fellow may be subject to evolution following award, in alignment with relevant emerging national energy policy priorities related to that specific area of research.

5. Funding Rate

EU state aid rules stipulate what types of research activities are eligible for support, which costs relating to these activities may be covered in part or in full (ranging from 25% up to 100%), and the maximum aid intensity that may be granted for the various activities. Applicants should refer to the SEAI RD&D Budget Policy for additional information in relation to which category their project falls under.

The Categories below represent the maximum level of support that are available within the 2022 SEAI National Energy RD&D Call. Additional information is provided in the SEAI RD&D Budget Policy.

RD&D activities subject to EU State Aid Regulations					
Research Category	Base Level	Type of Company		Effective Collaboration	Maximum Support
		Small Enterprise	Medium Enterprise		
Industrial Research	50% of approved itemised eligible costs	+20%	+10%	+15%	80%
Experimental Development	25% of approved itemised eligible costs	+20%	+10%	+15%	60%
RD&D activities not subject to State Aid Regulations					
Non-economic Public Good Research					100%












6. What Projects are Eligible















The 2022 SEAI National Energy RD&D Funding Programme provides the opportunity for applicants to submit proposals to either a topic strand or an open strand.

Open Strand - The open strand of the call provides an opportunity for applicants to propose projects within SEAI's remit which directly address the aims and objectives of the SEAI National Energy RD&D Funding Programme Call.

Topic Strand - The topic strand of the call provides an opportunity for applicants to submit proposals that address the requirements of the topics outlined in Annex 1. These topics have been developed by SEAI and relevant stakeholder organisations. In some cases, successful proposals to the topic strand of the call will be partially funded by co-funding partners. The table below provides an overview of the topics which form part of this call. Please refer to Annex 1 of this document for full topic details.



Each topic description in Annex 1 outlines suggested project objectives & expected outputs. Please note that proposals submitted to these topics **are not necessarily expected to address every objective and output listed** in all cases. Applicants should clearly outline which of the suggested objectives & expected outputs they intend to address/deliver as part of their proposed project and may propose additional objectives/outputs. All proposals should build upon existing research and information available.

No.	Title	
Small Scale Projects		
1	Demonstration of grid forming inverters	
2	Identifying knowledge gaps in bird conservation in relation to offshore wind farm development, and setting out how to address them (Co-funded by NPWS)	
3	Economic evaluation of geothermal energy in Ireland (Co-funded by GSI)	
4	Investigation of geothermal energy for Industrial applications in Ireland (Co-funded by GSI)	
5	Utilising spatial analysis and AI to determine future EV charging requirements	
6	Assessing the role of equality, diversity and inclusion in the energy sector	
Small or Medium Scale Projects		
7	Airborne wind energy	
8	Demonstration of smart controllers in conjunction with ESB Networks' NNLC Programme (Co-funded by ESB Networks)	
9	Compact urban growth in Ireland	
10	Utilising CO2 from biomass combustion for greenhouse CO2 enhancement (Co-funded by DAFM)	
11	District heating deployment in Ireland	

Medium Scale Projects		
12	Floating offshore wind development	
13	Green hydrogen in the Irish energy sector	
14	Developing a pathway to a carbon-neutral shipping and maritime industry (Co-funded by the Department of Transport)	
15	Bioeconomy renewable energy (Co-funded by DAFM)	
16	Demonstration to address dispatch down of renewable electricity generation (Co-funded by ESB Networks)	
17	Investigation of residential electricity use and the opportunities to optimise solar PV renewable electricity for self-consumption	
Medium or Large Scale Projects		
18	Measuring the impact of behaviour change interventions on changing energy and transport related behaviours in Ireland	
Large Scale Projects		
19	Adaptive or risk-based management of wind farm interactions with hen harriers	
20	High temperature heat pumps for industrial use (Small, medium or large scale)	
SEAI-based Fellowships		
21	Investigating gender aspects of Ireland's clean energy transition	
22	Investigating ecological preservation while maximising Ireland's clean energy transition	
23	Investigating innovation to impact frameworks to achieve Ireland's clean energy transition	
24	Developing a research impact framework to support Irelands energy research sector	
25	Identifying optimal investments for citizens wishing to reduce energy-related emissions in an Irish context	

Co-funding Partner Profiles

SEAI is pleased to announce that the 2022 SEAI National Energy RD&D Funding Programme Call involves co-funding partnerships with the organisations outlined below:

<p>Department of Agriculture, Food and the Marine (DAFM)</p> <p>DAFM's mission is to serve the government and people of Ireland by leading, developing and regulating the agri-food sector, protecting public health and optimising social, economic and environmental benefits.</p> <p>Strategic Goals:</p> <ul style="list-style-type: none"> • to promote and safeguard public, animal and plant health and animal welfare for the benefit of consumers producers and wider society • provide income and market supports to underpin the rural economy and the environment • provide the optimum policy framework for the sustainable development of the agri-food sector • deliver a sustainable, growth driven sector focused on competitiveness and innovation driven by a skilled workforce delivering value added products in line with market demands • maintain and develop strategic, operational, regulatory and technical capacity to achieve operational excellence <p>DAFM operates 'public good' competitive research funding programmes for agriculture, food and forestry to support innovation and economic success across the bioeconomy. DAFM also provides support for Irish involvement in the EU Horizon 2020 research funding programme.</p>	 <p>An Roinn Talmhaíochta, Bia agus Mara Department of Agriculture, Food and the Marine</p>
<p>Department of Transport</p> <p>As a central Government Department, serving the Government and the people of Ireland, the mission of the Department of Transport is to shape the safe and sustainable development of transport, to support economic growth and social progress. In 2021, in recognising the challenge the Department faces in addressing climate change a Climate Pillar consisting of five divisions was established. The Department will play a significant role in the national objective to reduce emissions and in achieving a cost-effective reduction pathway to a low carbon and resilient transport system by 2050. In this role, the Department will encourage and support transport networks and services that are environmentally, economically and socially sustainable. The Department will also be responsible for supporting the necessary adaptation of our critical transport infrastructure and services in response to Ireland's changing climate.</p>	 <p>An Roinn Iompair Department of Transport</p>

<p>About ESB Networks and the National Network Local Connections Programme</p> <p>ESB Networks employs over 3,200 people, which includes our specialist network technicians working on the front line connecting, maintaining and repairing the electricity system for Ireland's homes, farms and businesses to create one of the world's most resilient energy networks.</p> <p>The ESB Networks' National Network, Local Connections Programme aims to support both government climate action targets and meet the needs and expectations expressed by stakeholders to deliver a network for net zero and support customers in getting more from their local connections so they can support a clean electric future.</p>	
<p>Geological Survey Ireland (GSI)</p> <p>Founded in 1845, Geological Survey Ireland is Ireland's public earth science knowledge centre and is a division of the Department of the Environment, Climate and Communications.</p> <p>GSI is committed to providing free, open and accurate data and maps on Ireland's subsurface to landowners, the public, industry, and all other stakeholders.</p> <p>GSI also acts as a project partner in leading international projects providing expertise, data and developing models and viewers in a diverse array of topics including geological mapping, geothermal energy, groundwater, seabed mapping, natural hazards, and public health risks.</p>	
<p>The National Parks and Wildlife Service (NPWS) of the Department of Housing, Local Government and Heritage.</p> <p>The role of NPWS is:</p> <ul style="list-style-type: none"> • To secure the conservation of a representative range of ecosystems to maintain and enhance populations of flora and fauna in Ireland. • To designate and advise on the protection of habitats and species identified for nature conservation, Natural Heritage Areas (NHA), Special Areas of Conservation (SAC) and Special Protection Areas (SPA) having particular regard to the need to consult with interested parties. • To make the necessary arrangements for the implementation of National and EU legislation and policies for nature conservation and biodiversity including the EU Habitats and Birds Directives, and for the ratification and implementation of the range of international Conventions and Agreements relating to the natural heritage. • To manage, maintain and develop State-owned National Parks and Nature Reserves. • To promote awareness of natural heritage and biodiversity issues through education, outreach to schools and engaging with stakeholders. 	 <p>An Roinn Tithíochta, Rialtais Áitiúil agus Oidhreacht Department of Housing, Local Government and Heritage</p>

SEAI may enter further co-funding arrangements with other funders, who may have an interest in certain Call topics. If deemed appropriate, SEAI may approach other potential funders, at any stage during the Call process, up to and including during the contract negotiation stage.

7. Submitting your Application

Applications to the 2022 SEAI National Energy RD&D Funding Programme should be made through SEAI's online application platform, PEP (Project Evaluation Platform).

The PEP Application Portal is available at the following link: <https://pepportal.seai.ie/>

Further detailed PEP application guidance can be found within the PEP Application Guidelines Document available to download at:

<https://www.seai.ie/grants/research-funding/research-development-and-demonstration-fund/>

8. Evaluation Process and Criteria

Only fully complete applications received prior to the application deadline will be considered for evaluation. The evaluation consists of a two-stage process:

Stage 1 – Eligibility Assessment: Applications will be assessed to ensure administrative compliance with programme requirements and objectives.

Stage 2 – Technical Evaluation: Applications passing the eligibility assessment will be technically evaluated under the evaluation criteria outlined below.

Following the above evaluation process, highly evaluated proposals will be recommended for funding, subject to budget availability. A Reserve List of highly evaluated proposals may also be formed. Reserve List projects may be funded at a later stage, should sufficient additional budget become available.

Projects selected for funding will be issued with a Grant Agreement which will detail the approved itemised eligible costs. SEAI may require applicants to clarify aspects of their proposal prior to issuing a Grant Agreement.

The evaluation criteria under which applications will be assessed, and the proportion of marks awarded to each criterion are provided below:

Excellence and Innovation (35%)

- The validity and reliability of the prospective technology/concept and approach – including transdisciplinary considerations, where relevant.
- Quality of the innovation and ambition related to state of the art in Ireland and beyond.
- Familiarity with relevant RD&D activities/knowledge of the area.
- Track record of participation or potential to perform in previous/future RD&D activities.
- Qualifications of the key personnel/organisations.

Relevance and Impact (35%)

- Relevance to the needs of the Irish energy sector with particular reference to national policy including: Ireland's Climate Action Plan 2021, the Programme for Government, Ireland's National Energy & Climate Plan (NECP), and the Climate Action and Low Carbon Development Bill (2021) such as it pertains to SEAI's remit.
- Stimulates & accelerates the development & deployment of energy related products, processes & systems in the Irish marketplace and/or facilitates guidance to policy makers on practical, regulatory, technological and/or market opportunities.
- Builds and/or maintains national capacity, capability and critical mass to carry out internationally leading RD&D activities underpinning the energy sector.
- Capacity of the project to strengthen the competitiveness and development of their relevant industrial sectors.
- Relevance of enterprise, scientific, policy and social impacts of project outputs.
- Strength of communication/dissemination and exploitation plans (including management of data).
- Replicability of the project outputs/case study across Ireland and at an international level.
- Evidence of the added value of transdisciplinary collaboration and/or the active engagement and involvement of key relevant stakeholders, including, for example, end-users and industry.

Quality and Efficiency of Implementation (including value for money) (30%)

- Coherence and effectiveness of the project work plan.
- Quality of project framework, clarity of deliverables and milestones with a credible breakdown of activities and associated budget allocation.
- Credibility of timing-related project management factors, including project scheduling, dependency identification/monitoring and calculation of critical paths with a particular focus on realistic timelines, availability of data, concession, permits and regulatory approvals (where relevant).
- Strength of the management and oversight arrangements including risk management and gender equality.
- Suitability and justification of the project size, budget and value for money. Leveraging of other funds (e.g. contributions from the applicant organisations, benefit in kind, technical support, expertise, data etc.).

Note:

When differentiating between projects that are scored equally, the availability of sufficient budget will be the first criterion considered. The second criterion considered will be the close alignment of the proposed research with national policy ambitions and targets.

An intensifier may be applied to Fellowship applications, to further support leadership and career development opportunities, providing enhanced capacity to the energy sector.

ANNEX 1: TOPIC STRAND

Topic 1	Demonstration of grid forming inverters
Indicative Duration	Up to 1 year
Project Scale	Small scale
Indicative Funding	Up to €200k

Background:

Ireland, through the Climate Action Plan (2021), established an increased 80% renewable energy target for the electricity sector by 2030. Renewable electricity resources require inverters for integration (e.g., wind turbines, PV, and battery storage systems). Consequently, conventional synchronous generators, such as thermal units, are being displaced by inverter-based renewable generation (IBRG).

A grid forming inverter (GFMI) is a promising solution for the challenges introduced to the electrical grid by the high penetration of the IBRG, where they create and sustain the grid frequency and voltage.

While previous research has highlighted benefits of GFMI for the Irish network (e.g. the European R&D project MIGRATE, Massive InteGRATion of power Electronic devices), there are still various challenges regarding GFMI to be addressed before widespread commercial adoption. An Ireland-specific, holistic study and demonstration of GFMI controls retrofitted to existing doubly-fed induction generator (DFIG) wind turbine(s) would therefore be merited. For this purpose, trial project(s) investigating the practical challenges of operating a GFMI-based RES would provide useful inputs.

Topic Objectives & Expected Outputs:

Project(s) proposed under this topic could consider addressing the following objectives, using data/insights collected on operational wind power plant(s):

- the evaluation of the operational issues associated with the connection of GFMI to the medium voltage grid, such as voltage control and load flow modification;
- interference of internal turbine modifications (or software upgrades, etc.), with existing O&M contracts;
- the practical challenges of operating a GFMI-based RES;
- provide field demonstration of GFM controllers and associated practices to yield qualify RES interface for system services;
- assessment of the possibility and demonstration of an industrial site fed with GFM controlled wind turbine(s) to demonstrate operation in self-consumption or isolated mode enabled by GFM controls.

Proposed project outputs could include a comprehensive system response study on the GFMI retrofitted wind turbine(s). A proposed demonstration could aim to qualify the upgraded wind power plant to support the grid during unplanned events/faults particularly in respect of:

- a. limiting the rate of change of system frequency following the loss of a generating unit or load;
- b. injecting instantaneous active power into the system at the time of a fault as a result of the corresponding phase change;
- c. injecting instantaneous Fast Fault Current into the system at the time of a fault as a result of the corresponding voltage change;
- d. Contributing to damping power;
- e. Limiting vector shift;
- f. Contributing to synchronising torque;
- g. Contributing to the maintenance of an improved voltage profile during a fault.

Proposed demonstration(s) should be carried out at a currently grid connected wind power plant. The targeted wind power plant must have all necessary authorisations to operate as a grid connected power plant and must be in operation. Agreement and cooperation of the wind power plant owner, the operation and maintenance provider and, where applicable, the warranty provider must be evident.

Where possible, data collected during the project should be made available publicly in a GDPR-compliant format (unless where sensitive data cannot be made public).

The project team/power plant owner must obtain all the necessary authorisations to carry out the project.

A project advisory group will be formed, by the Project Team, comprising the successful research team, SEAI, ESB Networks and other relevant stakeholders.

Topic 2	Identifying knowledge gaps in bird conservation in relation to offshore wind farm development, and setting out how to address them (Co-funded by NPWS)
Indicative Duration	Up to 1 year
Project Scale	Small scale
Indicative Funding	Up to €150k

Background:

The development of renewable energy sources is crucial for achieving the EU's energy and climate targets. Ireland, through the Climate Action Plan (2021) established an increased 80% renewable energy target for the electricity sector by 2030. Accelerated deployment at scale of offshore wind development needs to be conducted adhering to the Birds Directive, maintaining bird populations.

Under the Birds Directive, Ireland has an obligation to maintain all of its wild bird populations. Such developments need to be assessed for their impact on Ireland's bird populations including but not restricted to the Special Protection Areas (SPA) Network, at both the strategic and project level. This topic calls for a desk review, consultation and setting out an R&D framework to address knowledge gaps in bird conservation in relation to offshore wind farm development.

The collection of appropriate levels of data to inform ecological assessments is necessary to ensure that Ireland's development ambitions of offshore wind farms are sustainable and sited in the right areas.

Standard bird survey work is often carried out at the project level and there is little evidence of combined or strategic level attempts. Such standard seabird-focused survey work does not gather robust data on bird (seabirds, waterbirds, passerines etc) movements through the development sites on migration, during periods of inclement weather or during the night.

Applicants are expected to familiarise themselves with previous/ongoing relevant research work, including for example work relating to, ObSERVE, CETUS and EirWind, and to sufficiently differentiate their research. Applicants should note that proposed project activities should be in a position to proceed independently of active engagement of key stakeholders including NPWS.

Project Objectives & Expected Outputs:

Proposals submitted to this topic could address the following potential objectives:

- Desk review, (including international best practice) to identify knowledge gaps in bird conservation in relation to offshore wind farm development;
- Quantifying the vulnerability of seabirds to offshore renewable energy development due to collision or displacement risk;
- An assessment of the observation, monitoring and research techniques that could be utilised. For example, remote sensing technologies e.g. radar, passive acoustic monitoring or similar technologies, and species tracking studies;
- To identify, prioritise and describe the type of projects needed to address the prioritised individual knowledge gaps;
- Set out a strategic prioritised approach, to specify a programme of projects that could deliver survey work to fill these knowledge gaps. Knowledge gaps may exist at various scales, for example; local, regional, national and all would be expected to be considered;
- Framework/Guidance related to data collection standards related for bird (seabirds, waterbirds, passerines etc) movements through potential ORE development sites.

A project advisory group will be formed, by the Project Team, comprising the successful research team, SEAI, NPWS and other relevant stakeholders.

Topic 3	Economic evaluation of geothermal energy in Ireland (Co-funded by GSI)
Indicative Duration	Up to 1 year
Project Scale	Small scale
Indicative Funding	Up to €150k

Background:

Geothermal energy is now established globally as a renewable energy source for direct use (heating and cooling) and indirect use (electricity generation). Given the need to find suitable, near-zero carbon emission energy sources, particularly for the heating/cooling sector, economic modelling research is required.

This research could provide knowledge and support to decision-makers developing policies and measures intended to encourage development of geothermal energy. It will provide robust economic modelling analysis and/or identify the potential for industries of the Irish geothermal system. A key outcome of this research would be to provide guidance and knowledge to facilitate the accelerated scaled deployment of geothermal energy both for direct uses (heating and cooling) and indirect (electricity generation) within Ireland. The research will directly contribute to national policy, as outlined in the Climate Action Plan, as it is complementary to Actions 25 & 193, the Programme for Government, and the National Energy & Climate Plan 2021-2030. GSI will offer support in terms of providing all available data regarding geological settings and estimated temperatures at depth for the models.

Topic Objectives & Expected Outputs:

Economic studies for geothermal systems exist for a number of European countries. However, Ireland does not yet have this information available to policy makers or potential developers and it is essential that economic models appropriate to Ireland are made available. This research should investigate the economic viability of geothermal resource development in Ireland for either/both of the following:

- i. high temperature (>100°C) applications (heat and/or power generation) and
- ii. low-medium temperature (20-100°C) industrial, municipal and district heating applications.

It is expected that this study will incorporate case studies from countries with (a) similar geological settings and (b) similar financial and regulatory systems.

Expected outputs include an economic model/report outlining the estimated capital and operational expenditure, and return on investment, for appropriate geothermal energy systems in Ireland.

This should include:

- Technology baseline
- Levelized cost of energy (electricity and heat for geothermal projects)
- Drilling costs
- Commissioning and decommission costs
- Lifecycle costs
- Resource supply curves
- Expected effects of potential subsidy schemes/incentives
- Potential value of emission savings
- Potential value of energy generated
- Potential of future research to impact levelized cost of electricity and heat

Topic 4	Investigation of geothermal energy for Industrial applications in Ireland (Co-funded by GSI)
Indicative Duration	Up to 1 year
Project Scale	Small scale
Indicative Funding	Up to €150k

Background:

Geothermal energy is a potential source of renewable, near-zero carbon emission energy in Ireland. In particular, this may be suitable for targeted industrial applications such as pharma, biotechnology, food and beverage production/processing and data services. Industries are increasingly seeking renewable, low emission options to support their operations in Ireland – ranging from a single user, single building scale to a multi-user, industrial campus scale.

Industry applications use a vast amount of energy each year for process heating and facility heating, ventilating, and air conditioning. With geothermal heat available throughout Ireland and new closed-loop geothermal systems becoming more common, geothermal can help Ireland meet its large heating demands reliably and cleanly. Integration with ground-source heat pumps or absorption chillers provides opportunity for cooling as well as heating.

This project should investigate the potential for geothermal energy to support industrial applications in Ireland (e.g. manufacturing, food and beverage industry, pharma and biomedical industries). Studies should include an assessment of energy requirements, willingness to invest in new energy technologies, incentives and supports required, relevant policy etc.

GSI will offer support in terms of providing all available data regarding geological settings and estimated temperatures at depth for the models.

Topic Objectives & Expected Outputs:

The overall objective of proposal(s) to this Topic could be to deliver a report outlining the potential for geothermal energy to support industrial applications in Ireland. The analysis should take into account the variety of geothermal settings found in Ireland and also areas where heat demand currently exists, along with areas for future industrial development. International case studies from regions with similar geothermal settings to Ireland are expected.

Expected outputs could include a report addressing, among others:

- Assessment of the potential for geothermal energy to support industrial applications in Ireland;
- Analysis of the variety of geothermal settings found in Ireland versus areas where heat demand currently exists, along with areas for future industrial development;
- Applications of elements of geothermal technology for industry;
- Optimisation of industrial application of geothermal energy;
- International case studies from regions with similar geothermal settings to Ireland are expected.

Topic 5	Utilising geospatial analysis and AI to determine future EV charging requirements.
Indicative Duration	Up to 1 year
Project Scale	Small scale
Indicative Funding	Up to €200k

Background:

To achieve the national target of one million electric vehicles (EV) by 2030, a significant increase in the availability of charging locations outside the private house will be required. EV charging is a relatively straight-forward proposition when the driver has access to their own driveway adjacent to and within the perimeter of their own private property. In this case the driver can use their own electricity supply from their own home to charge their EV at low-cost domestic rates. However, if the driver must park their EV on a public street, then the supply of electricity to that location can become more complex and expensive. Similarly, those living in apartments in Multi Unit Developments (MUD) where parking may be shared or unassigned would face similar charging challenges.

There are no clear statistics on how many dwellings and available parking spaces fall into either category. There is scope for use of innovative approaches, for example using Artificial Intelligence (AI), to harness available satellite, mapping, and other data sources to rapidly assess a town, region or country to produce this assessment. This information would help to inform and develop EV policy and ensure related Government supports are proportionate to support the rapid uptake of EVs Ireland.

Topic Objectives & Expected Outputs:

There is limited data available in Ireland in relation to parking provision in the residential sector.

AI could be used to correlate visual images with other information for a given location and to categorise the property and assess the number of spaces on the street. It could also assess if a particular block was a residential apartment and count the number of surface spaces to estimate whether underground parking is also available, either from online documentation about the address or a visual assessment of a satellite image.

Examples of relevant studies include: <https://www.field-dynamics.co.uk/research/public-charger-catchment-research/>

Proposals to this topic could involve a detailed statistical and geo-spatial desk-based analysis of domestic parking available to address the following questions:

- What % of Irish Households have off-street parking available?
- What % of Irish households have shared parking available?
- What % of residences are apartment or MUD?
- How many spaces and residences are available at a location?
- How many spaces are assigned or shared?
- What % of residences rely on-street parking?
- How many cars might be on the street associated with one residential address?

Data could also be broken down by Local Authority/Tenure Type/Socio-economic groups.

The proposed project could result in, among others:

A benchmark against a measured known region where a manual survey may have been performed to verify the results of the AI assessment. Following this verification, confidence could be gained to use the method as part of a later national assessment.

Possible data sources to be used:

- GIS analysis via satellite imagery
- Parking permit data from Local Authorities
- CSO and Department of Housing, Local Government and Heritage Data
- Additional surveys as required

Project outputs could be made available through open-source repositories for example, [Geohive Hub](#).

A project advisory group will be formed, by the Project Team, comprising the successful research team, SEAI and other relevant Public Bodies and industry stakeholders.

Topic 6	Assessing the role of equality, diversity and inclusion in the energy sector
Indicative Duration	Up to 1 year
Project Scale	Small scale
Indicative Funding	Up to €200k

Background:

Ireland has set ambitious climate targets for 2030 and 2050. A 51% reduction in emissions by 2030 and achieving carbon neutrality by 2050 are both very challenging tasks. Given the scale of the challenge facing Ireland it is essential that all members of society are given an opportunity to contribute to the achievement of our climate goals. Therefore, it is important to understand the role that equality, diversity and inclusion plays in the energy sector and whether consideration of its role can positively contribute to emission reductions in Ireland.

Topic Objectives and Expected Outputs:

The key objective of this topic is to examine the role of equality, diversity and inclusion in the energy sector in Ireland. Proposal(s) to this Topic should aim to investigate whether equality, diversity and inclusion can be an essential enabler for Ireland's transition to carbon neutrality by 2050 and a 51% reduction in emissions by 2030. Consideration should be given to senior leadership in the energy sector in Ireland, and how diverse leaders can contribute to driving positive change. The IEA have highlighted that in energy firms the number of women in senior management roles still remains low and that women in leadership roles enable the power of different perspectives to be maximised for better decision making³. Further consideration could be given to whether there are under-represented groups in the Irish energy sector and if so, whether this could have an impact on the achievement of Ireland's climate action targets.

The proposed project should result in, among others:

- A review of existing literature in Ireland, the EU and internationally on the role of equality, diversity and inclusion in the energy sector;
- An assessment of whether equality, diversity and inclusion can be an enabler for the clean energy transition in Ireland;
- An examination of the levels of equality and diversity in senior leadership in the energy sector in Ireland, with a particular focus on key decision-making roles. Delivery of a set of recommendations based on the outcome of this examination into leadership and decision-making;
- An assessment of whether there are under-represented groups in the energy sector in Ireland and if so, outline how visibility of under-represented groups could be increased.

³ <https://www.iea.org/commentaries/women-in-senior-management-roles-at-energy-firms-remains-stubbornly-low-but-efforts-to-improve-gender-diversity-are-moving-apace>

Topic 7	Airborne wind energy
Indicative Duration	Up to 1 year (small scale) / 1 to 3 years (medium scale)
Project Scale	Small or medium scale
Indicative Funding	Up to €200k (small scale) / Up to €650k (medium scale)

Background:

Airborne wind energy (AWE) has the potential to give access to stronger and more stable high-altitude wind resources, including in remote areas and floating offshore, and thus could play an important part in the future energy mix. AWE also reduces material consumption which leads – in combination with a higher capacity factor – to potentially very low LCOEs and lower carbon and environmental impacts. Furthermore, it may be modified to provide propulsion and power for the maritime shipping sector.

There are currently over 60 organisations working on AWE, thereof about half from industry developing AWE systems and half from academia and government research ([Airborne Wind Europe, 2021](#)). AWE is progressing towards commercial demonstration. However, there are various questions that need to be answered before it achieves widespread commercial adoption. Challenges concerning safety standards and technical guidelines, resource and deployment potentials, markets, engineering issues, environmental impacts and social acceptance, regulatory as well as financial and policy challenges.

Ireland has been identified as a suitable location for testing AWE technologies and a planning application was submitted in 2020 for an AWE demonstration site near Bangor Erris in NW Mayo. The demonstration site will give the opportunity for Irish researchers to collaborate on research that advances the state of the art of the technology and addresses the challenges to its deployment.

The IEA Wind Technology Collaboration Programme has recently initiated the formation of a new research Task on AWE. Further details of Ireland's involvement in the IEA TCPs are available on the following [webpage](#).

Topic Objectives & Expected Outputs:

The aim of this topic is to address current research gaps relating to AWE that could support barriers to commercialisation to be overcome.

Potential proposals to this topic could address one or several of the following topics:

Feasibility and technology assessment:

- State of AWE technology: Current status, key challenges, and barriers. Identification of market strategies, incentives, benefits;
- Compiling AWE Frequently Asked Questions: e.g. technology suitability and longevity of components under various environmental conditions;
- Safety: Options for standardisation in relation to design, operation, and maintenance;
- Design tools: Design tools for benchmarking and reference standards, addressing engineering and other challenges;

Assessment of potential:

- Scenarios for 2030 to 2050: Potential role of AWE in Ireland. Potentially considering e.g. spatial constraints, altitudes of wind speeds, atmospheric conditions, and temporal availability onshore and offshore wind. Furthermore, identify control measures to combat surges in power output. Furthermore, identifying potential development of software and simulation environments that enable design, analysis, and cost modelling;
- Viability and efficiency: Review and assess e.g. AWE power curves; energy yield per km²; capacity factor; overall efficiency; LCOE potential. Considering e.g. optimal distances between kites and wake effects; duration kites can remain airborne; maintenance intervals;

Policy and Regulation:

- Policies for AWE: Requirements and lessons learned from other renewable energy technologies;
- Airspace/Planning regulation; recommendations specific to AWE technology;
- Environmental and social impacts/acceptance (e.g. impact on fauna, bird and bat species from noise and visual impacts).

A project advisory group will be formed, by the Project Team, comprising the successful research team, SEAI and other relevant Public Bodies and industry stakeholders.

Topic 8	Demonstration of smart controllers in conjunction with ESB Networks' NNLC Programme (Co-funded by ESB Networks)
Indicative Duration	Up to 1 year (small scale) / 1 to 3 years (medium scale)
Project Scale	Small or medium scale
Indicative Funding	Up to €200k (small scale) / Up to €650k (medium scale)

Background:

In the high demand scenario outlined in the Programme for Government, electricity demand will almost double by 2030, while electricity emissions are to be reduced by 60-80% at the same time. Two underlying drivers of changes in electricity demand include: i) Transport electricity demand is forecast to grow as a result of accelerated uptake of electric vehicle (EV) charging ii) Electrical heating in industry and growth in electricity demand due to deployment of heat pumps in buildings.

ESB Networks has established a National Network, Local Connections Programme (NNLCP) to develop a roadmap for flexibility services and system management approaches. To deliver this programme, ESB Networks has set successive pilots over the lifetime of the programme to put in place relevant solutions, and a technology roadmap for operation system upgrades and deployments. Investigation and demonstration of incorporation of smart grid controls on distributed energy resource (DER) technologies (i.e., standard technology requirements for EV chargers, heat pumps and microgeneration inverters) would be an essential prerequisite for rolling out the smart grid as well as the flexibility market across the state.

The rollout of NNLCP to provide the flexibility market coordinated with the Single Electricity Market (SEM), necessitates the incorporation of smart control technologies for electricity demand including EVs. This incorporation requires various aspects for consideration, however, to investigate the practical challenges that are facing such an uptake of technology, pilot demonstrations are strongly needed.

Topic Objectives & Expected Outputs:

Pilot demonstration project(s) proposed under this topic should aim to:

- Address barriers to the development of the flexibility market as well as demand response programmes.
- Investigate in detail and demonstrate the uptake of smart grid controllers for Distributed Energy Resources (DERs), specifically heat pumps and EVs (i.e., smart chargers) but also batteries and microgeneration in pilot areas selected by ESB Networks for the National Network, Local Connections Programme.
- Review and research current available standards in smart grid technologies and investigate their compliance with the proposed ESB Networks' smart grid technology and standards. The incorporation of smart control technologies⁴ in pilot areas and communication standards used should comply with the standard adopted by [ESB Networks](#) for the abovementioned DERs.
- Demonstrate solutions for customers' DER interaction with the DSO and other key actors including OEM and energy supplier.

Expected outcomes could include the following:

- A potential output of this demonstration could be recommendations relating to the interaction between DSO, and the smart control technology, e.g. whether this interaction shall be direct or indirect through the aggregators and technology developers.

⁴ Note, the Topic focuses on interoperable and interfaced smart control technologies which can be managed or controlled by means of remote signalling, as opposed to completely autonomous smart technology.

- Proposal(s) to this topic should aim to identify opportunities for reducing demand through both improved occupant behaviour and maximisation of efficient operating conditions via smart control technologies.
- As a common target with ESB Networks, proposal(s) could aim to ascertain whether the proposed ESB Networks standards and architecture could contribute to meeting Ireland's policy objectives. Another potential output of a proposed project could be the possibility of using various smart control technologies in a pilot. This should be implemented in consultation with ESB Networks.

Demonstration(s) should preferably be proposed at premises with pre-existing distributed energy resources installations (e.g. heat pumps, EV chargers, microgeneration, batteries). The project proposer will be responsible for recruitment of premises within the defined pilot areas. The proposal should describe the strategy to recruit houses and demonstration of engagement with potential participants will be considered an advantage. A proposed demonstration project should include a minimum of 10 buildings. Proposals submitted to this topic should include an aggregator and/or a smart grid technology developer.

A project advisory group will be formed, by the Project Team, comprising the successful research team, SEAI, ESB Networks and other relevant stakeholders.

Topic 9	Compact urban growth in Ireland
Indicative Duration	Up to 1 year (small scale) / 1 to 3 years (medium scale)
Project Scale	Small or medium scale
Indicative Funding	Up to €200k (small scale) / Up to €650k (medium scale)

Background:

Under the [National Planning Framework](#), Ireland's five cities are targeted for 50% of overall growth by 2040, with the four cities of Cork, Limerick, Galway and Waterford each targeted to grow by at least 50% within that period. Addressing low density/suburban sprawl by promoting compact urban growth is a key mechanism to enable sustainable development as well as action on climate change and congestion. This will involve not just the design of new developments, but also the addressing of issues within existing developments.

Topic Objectives & Expected Outputs:

The objectives of this topic are to quantify the energy and carbon emissions reductions attributable to compact urban growth (in support of Actions 78, 190 and 255 of Climate Action Plan 2021). Proposal(s) to this topic should consider the following among others:

1. Location

- The prioritisation of infill and brownfield development lands
- The compact growth agenda as it applies to cities, towns and villages

2. Infrastructure and Servicing

- The development and integration of a range of sustainable transport and movement city bikes, cycling/pedestrian paths, public transport networks, etc.
- Parks / environmentally friendly recreational activities
- Water supply and any related technologies
- Energy supply and energy efficiency to include but not limited to the use of district heating
- Pre and post construction waste management

3. Built Form

- The reuse and repurposing of existing building stock
- The integration of the natural environment
- Site layout to incorporate passive design, density and optimal footprint of buildings
- Design to facilitate future adaptation (or design for adaptability)
- Mix of use between housing, offices, retail and green infrastructures
- Sustainable building materials

Proposed project(s) should also consider risks related to climate change, incl. flooding risk.

A proposed project should aim to quantify, in a comprehensive way (i.e. with a system-wide perspective), impacts that compact urban growth could have in Ireland and provide recommendations on how to facilitate/support such growth.

A project advisory group will be formed, by the Project Team, comprising the successful research team, SEAI, the Department of Housing, Local Government and Heritage and other relevant stakeholders.

Topic 10	Utilising CO ₂ from biomass combustion for greenhouse CO ₂ enhancement (Co-funded by DAFM)
Indicative Duration	Up to 1 year (small scale) / 1 to 3 years (medium scale)
Project Scale	Small or medium scale
Indicative Funding	Up to €200k (small scale) / Up to €650k (medium scale)

Background:

Greenhouse operators regularly add CO₂ to greenhouses to bring the CO₂ content up to 700ppm where the plants will grow at their optimum. In the confined spaces of a greenhouse in sunny conditions, the CO₂ level can drop so low that it inhibits plant growth. Operators regularly burn natural gas or butane as a cheap source of CO₂ when heat is also required.

Biomass heating does exist in some greenhouse facilities, but they tend not to use the by-product of combustion for CO₂ due to the potential for particulates to affect the plants.

Topic Objectives and Expected Outputs:

Investigation of filtration systems that can effectively filter the products of combustion (to a much higher standard than is currently used) could assist in displacing fossil fuel use as well as providing a form of CO₂ fixation.

This research would support the Climate Action Plan (e.g. Action 330 - Identify knowledge gaps in the horticulture sector around climate change mitigation actions and address areas for change) and other associated policies including Greening Agriculture.

The project could address the following research areas:

- Desktop research of technologies available;
- Design of bespoke filtration system;
- Concept demonstration on a working greenhouse facility in Ireland.

A project advisory group will be formed, by the Project Team, comprising the successful research team, SEAI, DAFM and other relevant stakeholders.

Topic 11	District heating deployment in Ireland
Indicative Duration	Up to 1 year (small scale) / 1 to 3 years (medium scale)
Project Scale	Small or medium scale
Indicative Funding	Up to €200k (small scale) / Up to €650k (medium scale)

Background:

In a district heating system, heat is delivered to buildings via a network of insulated pipes. While new projects are being planned/developed, the share of district heating in Ireland is small, accounting for less than 1% of Irish heating sector. The recently published [National Heat Study](#) highlighted that district heating could provide as much as around 50% of building heating demand in Ireland.

The proposed Topic builds upon recent work; it welcomes research proposals that aim to address remaining barriers to the wide deployment of district heating in Ireland

Topic Objectives & Expected Outputs:

Proposals submitted to this Topic should address one or more of the below research areas:

- The public's understanding and attitudes towards district heating schemes, preferences related to aspects of district heating network designs, and factors affecting intention to connect;
- Research and review of the technical specifications of existing schemes abroad including the performance of the heat source, distribution source and heat losses from the network and how these are accounted for in the national calculation methodology for Energy Performance Certificates;
- Other research areas such as: community-based initiatives and the role they could play ('thermal energy communities', e.g. for geothermal energy), technical/economic and/or potential assessment research studies complementing the National Heat Study (e.g. at local/regional scale or at national scale including aspects not addressed in the National Heat Study).

Proposal(s) could aim to result in the following outputs, among others: publicly shareable datasets (GDPR-compliant) and tools, summary papers, guidelines/lessons learnt for future projects, recommendations for policy-makers and stakeholders of the sector, innovative demonstration projects, etc.

The proposal must clearly specify how the project will build upon the National Heat Study, and other relevant published work and address gaps to DH deployment in Ireland.

The project team must also specify how they plan to adapt to the Irish rapidly evolving operating environment in this field. While medium scale (1 to 3 years in duration) is an option for the larger projects proposed under this topic, applicants are encouraged to deliver results within shorter timelines to support the near future deployment of district heating in Ireland.

Topic 12	Floating offshore wind development
Indicative Duration	Up to 1 year (small scale) / 1 to 3 years (medium scale)
Project Scale	Small or medium scale
Indicative Funding	Up to €200k (small scale) / Up to €650k (medium scale)

Background:

Floating offshore wind (FOW) is seen as a key development opportunity for Ireland given Ireland's extensive maritime area, deep-water conditions and exposed wind resource. The EU Commission has noted that by "2024, 150MW of floating offshore wind turbines are expected to be commissioned. A higher level of ambition and clarity is needed to reach a market size sufficient to yield cost reductions: there is potential to reach an LCOE of less than EUR 100/MWh in 2030 if large capacity is deployed". In 2020, the Programme for Government set ambitious targets for floating offshore wind development in Ireland.

Topic Objectives & Expected Outputs:

While the opportunity for Ireland is apparent, with a number of projects already in planning, the objective of this Topic is to consider the extent of these opportunities and potential challenges in deploying FOW at scale of 30GW post 2030. It is intended that proposal(s) submitted to this Topic would aim to help inform national policy development for ongoing support of this sector. The IEA Wind TCP has identified some priority areas and research gaps with respect to FOW array deployments, which may be relevant to consider for further research to unlock this potential for Ireland. These include:

- Definition of reference site conditions for floating wind arrays;
- Curating a set of site conditions representative of the global floating wind deployment pipeline;
- Development of reference floating wind array designs;
- Developing reference array designs for typical site conditions and technology types;
- Array-level failure risks and mitigation;
- Cataloguing array-level failure risks and mitigation strategies, considering Irish conditions;
- Stakeholder integration;
- Identifying critical innovation opportunities and marine spatial planning requirements that will affect floating wind array design and deployment;
- Route to market opportunities;
- Identifying practical options and critical path to unlock connection challenges, route to market and export potential;
- Examination of pathway to 2030 and parameters and timelines required for scaling;
- Identifying possible demonstration opportunities pre-2030, opportunities to build supply chain, appropriate support level pre 2030 and past 2030.

The IEA Wind TCP has formed a new research Task on floating offshore wind arrays – Task 49. Further details of Ireland's involvement in the IEA TCPs is available on the following [webpage](#).

Proposals to this Topic should aim to address all or a number of complementary items above, with a planned programme of data and intelligence gathering for each research challenge addressed.

Proposed project outputs could include:

- Reports on the results of data collected/work done;
- Access to background data or systems developed;
- Dissemination of project findings, e.g. in relevant peer-reviewed publications;
- Recommendations for further research, development or demonstration.

Proposals to this topic should build upon prior research and information, for example including outputs from earlier projects and prior research, including e.g. OPFLOW, EirWind, and applicants will be expected to demonstrate in their proposals how they plan to do this.

Topic 13	Green hydrogen in the Irish energy sector
Indicative Duration	Up to 1 year (small scale) / 1 to 3 years (medium scale)
Project Scale	Small or medium scale
Indicative Funding	Up to €200k (small scale) / Up to €650k (medium scale)

Background:

The Programme for Government highlights the potential of developing green hydrogen as a fuel to support decarbonisation across several sectors including power generation, manufacturing, energy storage and transport. The recent [National Heat Study](#) investigated pathways for a decarbonised heat sector in Ireland by 2050, including the role of green hydrogen. The potential future resource for green hydrogen was estimated at over 90TWh, due to Ireland's abundant potential wind energy resource. However, significant risks and challenges for deployment were highlighted, including a key consideration that green hydrogen is unlikely to be available at scale until the 2030s and likely to be more costly than other decarbonisation options. A further recommendation of this study was the need for research and innovation to accelerate the timelines and cost-effective potential delivery of green hydrogen⁵.

Topic Objectives & Expected Outputs:

Given the above context, this topic calls for research and innovation to support the development of cost-effective technologies, solutions and infrastructure for the production and use of green hydrogen from Irish renewable energy resources.

Small-scale or **medium-scale** proposals to this topic could address one or more of the following areas of research:

- Research, development or demonstration projects to support test deployment/pilot studies focusing on green hydrogen production, process improvements, or storage technologies;
- Investigation of the role green hydrogen could provide to the electricity grid in terms of system services;
- Investigation of hydrogen use and the potential for sector coupling.

Project outputs may include:

- Project report(s) outlining key findings and results;
- Dissemination of project findings in relevant peer-reviewed publications;
- Recommendations for further research, development or demonstration;

Applicants to this topic should consider forming a project consortium or involving project collaborators/an advisory group, which could include, but is not limited to, some of the following: academia, utilities and industry stakeholders.

Please note that applicants are expected to familiarise themselves with recent and ongoing research and document how they will sufficiently differentiate their proposed research.

⁵ SEAI, 2022 – National Heat Study - <https://www.seai.ie/publications/Net-Zero-by-2050.pdf>

Topic 14	Developing a pathway to a carbon-neutral shipping and maritime industry in Ireland by 2050 (Co-funded by the Department of Transport)
Indicative Duration	1 to 3 years
Project Scale	Medium scale
Indicative Funding	Up to €650k

Background:

The [Fuel EU Maritime](#) proposal under the [Fit for 55 package](#), as well as the [Alternative Fuels Infrastructure Regulation \(AFIR\)](#), sets out binding measures for the shipping sector in Ireland. While no CAP actions currently exist, that does not preclude them in the coming years. In-depth analysis is required to explore and assess Ireland's current and future readiness to meet the obligations of the EU Fuel Maritime proposal to have a carbon-neutral shipping and maritime industry by 2050.

Topic Objectives & Expected Outputs:

Many knowledge gaps currently exist, and the objective of proposals to this Topic would be to engage with ports and marine fuel suppliers in Ireland to ascertain their current roles and knowledge of shipping companies' plans to adapt to renewable and low carbon fuels.

Research proposals to this Topic could aim to address the following questions:

- What fuels are used by the maritime industry now and in what amounts by vessel type?
- What adaptation/retrofitting is required to a ship to use renewable and low carbon fuels in the future?
- What renewable and low carbon fuels are expected to be used to reach targets set out in Fit for 55?
- How available are alternative fuels and technologies at present? When are they expected to be available? Are there other possible sources?
- Will the type of shipping influence the variety of renewable and low carbon fuel selected, i.e. short sea shipping versus deep sea shipping?
- What would be the optimum renewable and low carbon fuel ships in terms of reaching targets?
- What would be the best renewable and low carbon fuel in terms of longer-term sustainability i.e. minimal impact on food production or other effects?
- Is there a current consensus on the fuel of the future?
- Is ship retrofitting or new engine technology required? What are the estimated costs of ship adaptation?
- What are the advantages and disadvantages of the potential alternative fuels?
- What are the cost implications?
- What impact would fuel taxation have?

Projects proposed could result in the following outputs, among others:

1. A comprehensive review/analysis of available maritime alternative fuels and their suitability in an Irish context;
2. An analysis of the potential GHG benefits of the various alternative fuels;
3. An analysis of expected future alternative technologies/ships;
4. An analysis of the cost of retrofitting existing ships to allow them to use alternative fuels;
5. A Cost-Benefit Analysis of procuring new vessels over retrofitting;
6. Identification of differences in inland/short-distance shipping (ferries) and long-distance shipping;
7. Recommendations for a pathway to carbon-neutrality in Ireland's shipping and maritime industry by 2050.

A project advisory group will be formed, by the Project Team, comprising the successful research team, SEAI, Department of Transport and other relevant Public Bodies and stakeholders.

Topic 15	Bioeconomy renewable energy (Co-funded by DAFM)
Indicative Duration	1 to 3 years
Project Scale	Medium scale
Indicative Funding	Up to €650k

Background:

Bioeconomy, nature and renewable energy developments need to be considered in tandem to allow Ireland to move beyond simply a target compliance and carbon mitigation focus to integrating sustainable economic development into our economic model as we transition to a low carbon and circular (bio)economy⁶⁷.

When compared to fossil resources, biological resources like agriculture or forest resources, are usually owned and managed by many more people, and distributed across wider parts of the territory. The circular bioeconomy including bioenergy, if co-developed with the participation of local communities (in particular territorial contexts as identified by the Regional Assemblies or the Regional Skills fora areas), has great potential to generate an equitable distribution of prosperity across a wider geography. Managing the land sector (nature, agriculture, forestry, wetlands, biobased materials and bioenergy) requires sustainable and holistic considerations.

The opportunity arises to consider bioresources that are part of a territorial context 'metabolism' to consider the material flow as a resource supporting goals on ensuring food and nutrition security, managing natural resources sustainably, reducing dependence on non-renewable, unsustainable resources, limiting and adapting to climate change and strengthening European competitiveness and creating jobs, welfare and prosperity.

Topic Objectives and Expected Outputs:

Proposal(s) submitted to this topic could address the following objective(s):

- Develop and test integrated approaches for developing sustainable and circular bioeconomy, nature, and renewable energy approaches in a specific territorial context;
- Integrate developments on bioeconomy technologies⁸ and business models⁹ as considered in National and EU research;
- Examine policy innovation opportunities to aid the economic system to sufficiently accommodate cascading and circulating approaches including alignment with bioenergy and biofuel developments.

Potential outputs to the project(s) could include the development of an innovation blueprint for sustainable and circular bioeconomy, nature¹⁰, and renewable energy developments in a territorial context for replication across territorial contexts in Ireland.

Note: Applicants are advised to review the following literature, among others:

- [Climate Action Plan Action 363](#): Support Regional Assemblies to identify areas of potential growth in the bioeconomy;
- [National Policy Statement on the Bioeconomy](#): Key Action - Progress the leading value chain propositions by establishing the conditions required for their commercial viability and how these might be fulfilled;

⁶ [Investing in Nature as the true engine of our economy: A 10-point Action Plan for a Circular Bioeconomy of Wellbeing | European Forest Institute \(efi.int\)](#)

⁷ Front. Bioeng. Biotechnol., 21 January 2021 | <https://doi.org/10.3389/fbioe.2020.619066>

⁸ [Circular Bio-based Europe Joint Undertaking \(CBE JU\) | A competitive bioeconomy for a sustainable future \(europa.eu\)](#)

⁹ <https://www.frontiersin.org/articles/10.3389/frsus.2022.789435/full>

¹⁰ [Living Labs - The Circular Bioeconomy Alliance - Living Labs \(circularbioeconomyalliance.org\) and Regenerative landscapes \(circularbioeconomyalliance.org\)](#)

- The [Regional Skills](#) Fora have recently published their Regional Enterprise Plans to 2024 [Publication - DBEI \(enterprise.gov.ie\)](#) with many highlighting opportunities for renewable energy and bioeconomy amongst other matters;
- The [EU Commission Communication on Sustainable Carbon Cycles \(2021\)](#) outlining the role biological resources can play in addressing climate action;
- Biogas, Biomethane and Digestate Potential of By-Products from Green Biorefinery Systems - <https://www.mdpi.com/2571-8797/4/1/3>;
- The role of lignin and lignin-based materials in sustainable construction – A comprehensive review - <https://doi.org/10.1016/j.ijbiomac.2021.07.125>;
- Nova institute paper #9 on bio-based economy 2018-01 The “[Circular Bioeconomy](#)” – [Concepts, Opportunities and Limitations](#).

A project advisory group will be formed, by the Project Team, comprising the successful research team, SEAI, DAFM and other relevant Public Bodies and stakeholders.

Topic 16	Demonstration to address dispatch down of renewable electricity generation (Co-funded by ESB Networks)
Indicative Duration	1 to 3 years
Project Scale	Medium scale
Indicative Funding	Up to €650k

Background:

Challenges may arise at times when the amount of renewable electricity generation exceeds local demand and the transport capacity of export lines/transformers or when it displaces other generators providing critical system services. One measure used by system operators to alleviate such challenges is to instruct renewable generators to reduce their output or “dispatch down”.

The annual average dispatch down of wind energy in Ireland rose to 11.4 % (i.e., 1448 GWh) in 2020, of which 6.1% arose from system constraints¹¹. Local network constraints may occur during the day and are typically imposed due to network limitations and/or localised demand/supply mismatches, with the northwest and southwest transmission networks being the most affected. Other networks also experience constraints, for example due to maintenance outages.

Demand side actions can be taken as a solution to reduce dispatch down levels. Dispatch down caused by localised system constraints may, in particular, be amenable to demand side mitigation. These measures would involve shifting electricity demand to periods of local dispatch down. Where such measures involve the electrification of fossil-fuelled heat and transport, dual decarbonisation benefits may be possible. Although there has been much effort to address issues initiating dispatch down in the curtailment level (e.g., increment of SNSP and the reinforcement of the transmission grid), less attention has been paid to the constraint-driven dispatch down in operation level. Whilst constraints do not arise exclusively at the distribution system level, the development of the distribution system flexibility market could make a significant contribution to reducing future constraint-driven dispatch down, but the latter remains unquantified.

Topic Objectives & Expected Outputs:

Project(s) proposed under this topic should contribute to demonstrating the potential impact of modulating operation of the following types of plants/systems upon dispatch down level:

- CHP plants with other flexible heat source solutions such as electrical boilers, heat pumps, as well as the utilisation of heat storage tanks (e.g., a milk processing CHP plant); or
- Any projects involving technologies aiming at improving the flexibility of the use of electric heating in industry.

Proposed demonstration must be carried out with the agreement and cooperation of the plant/system owner, the plant/system operation and maintenance provider, and, where applicable the associated electricity provider.

Proposed project(s) should also aim to evaluate and develop the most effective communication gateway and infrastructures for transmitting signals between the plant/system and Distribution System Operator/Transmission System Operator (DSO/TSO) Demand Side Management centre.

Outputs should include cost-benefit analyses of plant/system participation in Demand Side Management/Demand Response (DSM/DR) schemes and the flexibility market, and address barriers and enablers identified (in terms of scheme design, technical parameters, market design or others). These analyses could be in terms of the annual reduction in both RES dispatch down and the

¹¹ Eirgrid – Historical Wind Dispatch Down - <https://www.eirgridgroup.com/site-files/library/EirGrid/Wind-DD-Historical.png>

plant/system emissions. Moreover, it is worthwhile that the Maximum Import Capacity (MIC) of the plant/system is evaluated in case of any increment.

It is also expected that the project identifies the most effective heat source solution for the CHP plant (e.g. heat pump, electrical boiler, heat storage tank) in terms of i) reduction in RES dispatch down ii) reduction in overall primary energy consumption. Further potential outputs could include an optimal hybrid heat source approach for CHP plant satisfying both i) and ii), in order to heat more efficiently with less energy consumption and shorter financial payback time.

Another potential output of this project could include desktop studies on schemes for reducing high localised dispatch down in the policy and regulation sections (e.g., focusing on incentives for modulating CHP units with electrical boilers/HPs/heat storage tanks in areas of high localised dispatch down).

Outputs could also identify barriers to widespread national use of such systems for dispatch down reduction and provide recommendations on how to overcome these. Recommendations could be provided for different key stakeholders.

Where possible, data collected during the project should be made available publicly in a GDPR-compliant format (unless where sensitive data cannot be made public).

A project advisory group will be formed, by the Project Team, comprising the successful research team, SEAI, ESB Networks and other relevant stakeholders.

Topic 17	Investigation of residential electricity use and the opportunities to optimise solar PV renewable electricity for self-consumption
Indicative Duration	1 to 3 years
Project Scale	Medium scale
Indicative Funding	Up to €650k

Background:

Ireland, through the Climate Action Plan (2021) established an increased 80% renewable energy target for the electricity sector by 2030. Microgeneration and small-scale generation have an important role to play in empowering and driving engagement and participation. It creates opportunities for domestic, community, farming, and small commercial customers to take the first steps towards investment in renewable technologies, which can play a role in shaping electricity demand and decarbonising homes and businesses. There is a need to understand further how electricity is used in the home, how solar PV can contribute to this electricity usage and support innovation and technologies that can maximise the use of the microgeneration electricity.

Topic Objectives & Expected Outputs:

Proposal(s) to this topic should aim to:

- Quantify, analyse and understand in detail the use of electricity within efficient homes in Ireland that are rated B2 or higher; and
- Gather data and analyse the self-consumption of solar PV within the home, as well as options for new innovative technologies to maximise self-consumption.

Proposed work could include the monitoring of a sample of homes and extrapolation of results to the wider Irish residential stock, among others. Monitoring should be carried out over a year; with overall project duration recommended to be 18 months to 2 years, where possible.

The primary objectives of this topic include the following:

- Monitoring the electricity consumption of regulated and unregulated loads (including heating, cooling, ventilation, cooking, lighting, electric vehicle charging, hot water, appliances, etc.) in a sample of homes achieving a minimum BER B2 rating. The sample would be expected to be at least higher than 50, covering different building archetypes and user types. The sample size and representativity should be discussed in the Application Form. Moreover, these homes should have a published BER rating;
- Monitoring and assessing the solar PV performance and its use within these homes;
- Investigating options for technologies that maximise self-consumption such as hot water diverters, smart appliances, EV charging;
- Analysing the market and gaps in the field of smart home technologies allowing to manage generation, storage, smart appliances and dynamic demands for home with PV systems.

Outputs from the research could include:

- Data logged in a GDPR-compliant format suitable for publication; examples of potential uses of the data could be modelling real life demand and generation in homes,
- A report assessing the use of electricity in Irish residential homes and a comparison to the BER methodology;
- Analysis of the solar PV data gathered and benefits for the specific homes, as well as potential for use in Irish homes considering the variation in electricity consumption in different homes;
- Recommendation for technologies which could help optimise the use of microgeneration solar PV within dwellings.

The proposal should specify how the team plans to recruit the sample of houses for the study - details of any potential prior engagement with relevant stakeholders should be described in the Application Form.

Topic 18	Measuring the impact of behaviour change interventions on changing energy and transport related behaviours in Ireland
Indicative Duration	1 to 3 years (medium scale) / 3 to 4 years (large scale)
Project Scale	Medium or large scale
Indicative Funding	Up to €650k (medium scale) / Up to €1m (large scale)

Background:

There is a need to encourage more sustainable energy behaviours across society to meet Ireland's climate targets (e.g. home energy upgrades, modal shift, adoption of sustainable energy technologies etc.). While background research into barriers and motivators of these behaviours is an important first step, there is now an urgent need to translate these insights into scalable interventions in the field that deliver real energy/emissions savings, as measured by counterfactual impact evaluation.

There is a need to build research capacity, and appetite, in Ireland for conducting large scale counterfactual impact evaluations of energy and transport related behaviour change interventions. For that reason, we would consider behavioural change interventions that lead to reduced energy-related emissions through any number of mechanisms, including but not limited to installation of energy efficiency measures and low-carbon technologies, reducing/shifting energy consumption, modal shift and changing driver habits.

Topic Objectives & Expected Outputs:

Proposed research would aim to provide robust evidence of behaviour change interventions that work (or do not work) for changing energy-related behaviours that could be brought to scale to achieve significant reductions in energy emissions. This would lead to increased capacity for running large scale counterfactual impact evaluations of behaviour change interventions in Ireland. A transdisciplinary approach would be required to engage a wide number of stakeholders and encourage collaboration between interdependent actors. Interventions could seek to address issues in urban environments, rural communities or compare impacts for both.

Objectives could include:

- Design and execution of trial(s) aimed at changing energy or transport behaviour in the field;
- Quantitative measurement of trial outcomes using robust, objective data (i.e. not relying on self-reported data where possible);
- Impact assessed using robust methods, ideally taking an experimental (randomised) or quasi-experimental approach;
- Assessment made of generalisability and persistence of results and potential for scalability.

Proposed project(s) should aim to result in, among others:

- Robust evidence of behaviour change interventions that work (or don't work) for changing energy-related behaviours that can be brought to scale to achieve significant reductions in energy emissions;
- Increased capacity for running large-scale counterfactual impact evaluations of behaviour change interventions in Ireland.

A project advisory group will be formed, by the Project Team, comprising the successful research team, SEAI and other relevant Public Bodies.

Further Considerations:

The project team will be encouraged to liaise with the SEAI Behavioural Economics Unit during project implementation. Each applicant should also choose behaviours which are well balanced in terms of the likely impact of changing the behaviour, the current penetration of the behaviour, and the probability of changing the behaviour. Applicants to this call should consider forming a project consortium, which could include some of the following: academia, local authorities, communities, utilities, businesses and industry.

Topic 19	Adaptive or risk-based management of wind farm interactions with hen harriers
Indicative Duration	3 to 4 years
Project Scale	Large scale
Indicative Funding	Up to €1m

Background:

In the years approaching 2030, many wind farms in Ireland will reach the end of their planned life. There are many factors to consider in the decision to extend the life of, or to re-power, a legacy wind farm. A key consideration is the planning status of a wind farm. Wind farm planning permissions are usually for a fixed lifetime, commonly 20 years, continued operation beyond that lifetime with the original, or similar turbines at the same locations, will require an extension to planning permission. In order for a planning authority to grant permission for such an extension, they must carry out Environmental Impact Assessment (EIA)/Appropriate Assessment (AA) screening for and assessing any likely impacts of the project on the environment and in particular, on protected habitats or species.

Many wind farms have a requirement for ongoing monitoring of their effects upon protected habitats or species. When used in conjunction with proactive habitat and species management measures, such monitoring campaigns might provide robust evidence that might be used to better understand the effects of wind energy development on ecological interests, and to confirm those effects were as expected in the relevant ecological assessments. The Hen Harrier is an Annex 1 listed species afforded protection under the EU Birds and Habitats Directives that is found sparsely distributed across Ireland.

Topic Objectives and Expected Outputs:

Gaps in current research and knowledge might be addressed through research proposal(s) to this topic across the following areas:

- Compiling and assessing published literature and via the undertaking of field studies at an appropriate geographic scale, frequency and intensity in order to quantify the extent of hen harrier mortalities occurring as a result of wind farm collision events at various scales i.e. wind farm, regional and national scales;
- An assessment of novel, non-invasive observation, monitoring and research techniques that could be utilised. For example, remote sensing technologies e.g. radar, passive acoustic monitoring or similar technologies, and species tracking studies;
- Further analysis on data collated already on the pressures acting on hen harriers with a view to informing conservation management;
- Non-breeding/wintering hen harrier ecology, and how to optimise conservation management of wintering habitats;
- Breeding success/foraging success and proximity to windfarms - investigating whether the physical range of impacts may be defined with further precision than previous studies (e.g. Windharrier);
- Hen harrier Habitat Management – reviewing and assessing the efficacy of existing hen harrier habitat management plans. Analysing how effective previous monitoring and mitigation programmes have been with respect to what they intended to do. Assessing the potential value add of changes in management approaches including adaptive management;
- Development and application of new technologies that can improve current understanding of hen harrier behaviour and effects on productivity, breeding behaviour, foraging behaviour, mortality around turbines, spatial ecology, and habitat use.

Project(s) proposed under this Topic should aim to include:

- Field demonstration, on (an) operational wind farm(s) in Ireland, of an adaptive or risk-based management approach to managing the interaction of wind farm operations with the local hen harrier population. Ideally, the project should be carried out over an entire hen harrier SPA, with multiple wind farms, rather than solely on a single wind farm;
- Robust monitoring of hen harriers within and around the study wind farm(s) to gain a better understanding of their interactions with the wind farm(s). Monitoring programmes should propose state-of-the-art technologies, including, but not limited to, GPS tracking technologies, but ideally also including novel non-invasive technologies that can provide improved insights of hen harrier behaviour around turbines, spatial ecology, and habitat use;
- Assessments of tracking technologies both in terms of efficacy/accuracy and any potential adverse impacts upon monitored hen harriers and their breeding success. Non-contact technologies are preferred where these can be utilised effectively. Applicants will be asked to strongly consider the risks and timelines associated with annual authorisation from the National Parks and Wildlife Service (NPWS) of any proposed physical tagging and how best to mitigate them;
- A species management plan for the wind farms(s) operations should arise from the monitoring campaign and prior studies on the hen harrier such as the “Windharrier” project;
- Trials of best practice management measures to improve the status of the species within the hen harrier special protection area(s) affected by the wind farm site(s), while using the monitoring campaign to assess the effectiveness of the measures;
- Proposed project(s) should aim to provide data to inform an evidence-based guidance on the future management practices on wind farms in hen harrier areas with the high-level objective of improving the conservation status of the hen harrier where its range overlaps with existing wind farms.
- A ‘toolbox’ for wind farms to assist them in engaging effectively and efficiently with the planning process in relation to the efficacy of habitat management and monitoring.

Any proposed projects should include for an advisory group of government and other expert stakeholders. Where possible, data collected during the project should be made available publicly in a GDPR-compliant format (unless where sensitive data cannot be made public e.g. sensitive nest and roost sites).

Topic 20	High temperature heat pumps for industrial use
Indicative Duration	Up to 12 months (small scale) / 1 to 3 years (medium scale) / Up to 4 years (large scale)
Project Scale	Small, medium or large scale
Indicative Funding	Up to €200k (small scale) / Up to €650k (medium scale) / Up to €1m (large scale)

Background:

The [Climate Action Plan 2021](#) has set ambitious targets for the decarbonisation of all sectors of the Irish economy including the industrial and enterprise sectors. The recent [National Heat Study](#) reported that to reach net zero by 2050, while optimising heating technologies, the industrial sector would need to begin to replace all end-of-life fossil fuel fired heating systems and processes with low carbon alternatives as early as 2025. Heat pumps can play a prominent role in decarbonising buildings and could be an option for replacing fossil fuel boilers in the industrial sector that supply high, medium and low-grade heat. Heat pumps are also a prime energy source for district heating within the published scenarios.

High grade heat pumps, or industrial heat pumps, can be defined as heat pumps that can-deliver heat between 100°C and 200°C, which are better suited to industrial processes.

The development and deployment of heat pump technology to cater for higher manufacturing temperature requirements could play an important role in decarbonisation by providing an option for the use of electrification and in turn reduce the need for fossil fuels such as natural gas and oil.

Topic Objectives & Expected Outputs:

Proposal(s) to this topic could relate to either a small-scale proposed project, or a medium-large scale proposed project.

A **Small-Scale** research proposal could aim to include an assessment of:

- The Irish industrial heat pump market; potential market barriers/challenges; specific heat use and temperature data for a number of high energy consuming processes.
- Integrated use of high temperature heat pumps in combination with thermal storage tanks in industrial applications.
- Irish policy requirements using other European countries with similar industrial heat requirements for comparison;
- Operational performance of heat pumps and optimal heat pump configuration to supply temperatures in range of 100° to 300°C (for example multistage heat pumps and overall performance of same);
- An assessment of the financial risks and mitigation factors including:
 - Variable cost analysis of using this technology with electricity as the primary energy input;
 - Manufacturing costs and the unit price of the heat pump;
 - Quantification of the energy and CO₂ saving of the calculated industrial heat pump market as well as the investments needed to realise the market potential.

A **Medium-Large** scale proposal could aim to develop a heat pump technology capable of operating in the 100°C-300°C range and demonstrate in pilot projects:

- Prepare working prototype and proposed demonstration project;
- Demonstration of a fully integrated high temperature heat pump minimising external energy consumption and greenhouse gas emissions.
- Investigation of the potential for flexibility services for the electricity grid.

Topic 21	Investigating gender aspects of Ireland's clean energy transition
Indicative Duration	1 to 2 years
Project Scale	SEAI-based Fellowship / Research and Technology Department
Indicative Funding	Up to €200k

Background:

The Irish government has increased its climate ambitions over the past number of years and has set challenging emission reduction targets. The scale of the challenge is such that there is a need for the inclusion and contribution of all citizens to the actions required to reduce our emissions. The United Nations (UN) has compiled 17 Sustainable Development Goals (SDGs) as part of the 2030 Agenda for Sustainable Development adopted by all United Nations Member States in 2015. There is a global commitment to the SDGs including access to sustainable energy for all by 2030.

The gender dimension of the energy transition is integrated into both the fifth SDG, achieving gender equality and empowering all women and girls and the seventh SDG, ensuring access to affordable, reliable, sustainable and modern energy for all. The EU is also committed to ensuring gender equality in the transition to a sustainable energy model. SEAI is a leading authority driving Ireland's sustainable energy transformation and works with Government to allow the smooth implementation of policy thus helping to deliver the ambitious and necessary national climate targets. It is assumed that energy policy is gender neutral, and that all benefit from it equally. However, that is not necessarily the case and there is a growing interest in understanding gender aspects of the energy transition.

Climate action needs to ensure that all citizens and genders are engaged in decision-making processes, development and use of technologies, and benefit from their outcomes. Different genders may experience different impacts of climate change and therefore, it is important that the needs of all are addressed to ensure effective and equitable climate action. Different and varied perspectives can also bring new insights and innovations in identifying and implementing solutions.

Topic Objectives and Expected Outputs:

Proposals to this topic could address the following objectives, among others:

- Review available literature on gender considerations in the energy sector such as awareness, access, consumption, decision making and assess the level of sex disaggregated data available for the energy sector;
- Consider whether energy policies in Ireland are gender neutral or gender blind;
- Assemble detailed data and information and/or review available databases on the different policy implementing programmes in SEAI;
- Investigate whether gender plays a role in the implementing programmes by examining related available gender data;
- Where gender data is unavailable provide recommendations for whether gender data should be collected and the process that would need to be followed to implement the data collection;
- Make recommendations about how gender considerations could be included in the design phase of new programmes;
- Consider the impact of gender on the communication strategies for policy implementing programmes;
- Conduct additional research activities relating to gender in the energy sector which may be required to support SEAI in delivery of relevant activities.

NOTE: Following technical evaluation, highly ranked applicants to this Topic will be invited to participate in an online interview. Further contractual terms and conditions will be provided to shortlisted applicants prior to interview. Successful SEAI-based Fellowship applicants will be based in SEAI's Dublin office for the entire duration of the Fellowship.

Topic 22	Investigating ecological conservation management while maximising Ireland's clean energy transition
Indicative Duration	1 to 2 years
Project Scale	SEAI-based Fellowship / Research and Technology Department
Indicative Funding	Up to €200k

Background:

It is recognised that the development of renewable energy sources is crucial for achieving Ireland and the EU's energy and climate targets. However, exploitation of renewable energy resources may also lead to certain environmental problems or risks regarding human health. Ireland, through the Climate Action Plan (2021) established an increased 80% renewable energy target for the electricity sector by 2030. Accelerated deployment and delivery of Ireland's clean energy ambitions need to be conducted in adherence with EU biodiversity goals, in particular EU protected habitats and species.

Renewable energy developments, such as wind, solar, ocean, geothermal and bioenergy, all require a planning authority to grant permission for the activity. As part of this application process, environmental screening is required for any likely impacts of the project on the environment and in particular, on protected habitats or species. Environmental assessments, including Strategic Environmental Assessment, Appropriate Assessment and Environmental Impact Assessment, are tools which help to maximise environmental and social benefits resulting from renewable energy development, while avoiding or minimising potential adverse effects. Increased demand of renewable energy in turn is increasing demand for ecological participation.

Topic Objectives and Expected Outputs:

SEAI wishes to examine ecological conservation management and its role in Ireland's clean energy transition.

Proposal(s) to this topic should aim to enhance national ecological capacity and suggest approaches, in line with EU Directives and ambitions, that could mitigate potential risk and streamline project level development, while capturing implications for stakeholders, including landowners and citizens.

The following is a non-exhaustive list of potential outputs that could be expected from this fellowship:

- Review policies in place in European member states, identifying measures that may support the mitigation of negative impacts to the Irish context, and tracking any unintended consequences;
- Literature review of evidence-based research into effective mitigation and compensation measures that have contributed to planning confidence;
- Habitat Management - review the efficacy of existing management plans and analysis of how adaptive management could be put in place based on current best evidence;
- Consider how ecology legal requirements fit in to the planning regime, including suggesting a best practice review process for local authorities to follow.

NOTE: Following technical evaluation, highly ranked applicants to this Topic will be invited to participate in an online interview. Further contractual terms and conditions will be provided to shortlisted applicants prior to interview. Successful SEAI-based Fellowship applicants will be based in SEAI's Dublin office for the entire duration of the Fellowship.

Topic 23	Investigating innovation to impact frameworks to achieve Ireland's clean energy transition
Indicative Duration	1 to 2 years
Project Scale	SEAI-based Fellowship / Research and Policy Insights Directorate
Indicative Funding	Up to €200k

Background:

To meet Ireland's climate targets, strategic innovation in the energy sector must develop and expand in a rapid fashion. The role of innovation in the establishment, survival and growth of organisations is understood. However, management approaches are required to support agile decision making and resource allocation in the context of changing opportunities as well as time and resource constraints.

To achieve breakthrough outcomes that can be scaled for population-level clean energy transition impact in Ireland, a structured but flexible transformative approach, that can support innovators in the context of their own organisation and industry, is required. A flexible framework for the Irish energy sector would facilitate development, implementation, testing, evaluation, and fast-cycle iteration and can guide the development of strategic innovation capabilities in Irish organisations over time with a strong foundation.

Topic Objectives and Expected Outputs:

The key outcome of this fellowship would be a framework to be adapted by SEAI which can address innovation challenges effectively within different departments. It is intended to support SEAI in developing sustainable innovation programmes that identify and support high impact business opportunities and in turn transform them into purposeful innovations that create significant value for all stakeholders. A concise framework sharing the language of core concepts of innovation and value proposition would be beneficial to SEAI quantify its potential impacts as part of the Clean Energy Transition.

The following is a non-exhaustive list of the outputs that could be expected from this fellowship:

- An extensive literature review and assessment of:
 - Different innovation to impact frameworks
 - Innovation models and management approaches
- Identify issues and challenges to the Irish energy sector in innovation;
- Design an Irish Innovation to Impact Framework for SEAI including:
 - Adaptable process template
 - Core tool template and toolkits
 - Common language and definitions
- Trial of the framework with a number of different departments of SEAI, supports and guidelines on how to use the framework.

NOTE: Following technical evaluation, highly ranked applicants to this Topic will be invited to participate in an online interview. Further contractual terms and conditions will be provided to shortlisted applicants prior to interview. Successful SEAI-based Fellowship applicants will be based in SEAI's Dublin office for the entire duration of the Fellowship.

Topic 24	Developing a research impact framework to support Ireland's energy research sector
Indicative Duration	1 to 2 years
Project Scale	SEAI-based Fellowship / Research and Technology Department
Indicative Funding	Up to €200k

Background:

Researchers, evaluators and research funding bodies are increasingly required to both describe and assess the impact of energy research related work. While specialised impact assessment studies exist, they can be difficult to replicate and may require resources and a skillset not readily available. While recognising the subjective and qualitative nature of impacts as they are perceived by different stakeholders in different times, places and cultures, a research impact framework is required to enable assessment of the significance and reach of both positive and negative effects of energy research.

Topic Objectives and Expected Outputs:

An SEAI-based Fellow would be tasked with creating a Research Impact Framework for energy research, based in the Research and Technology Department of SEAI. This could be developed by identifying potential areas of energy research impact from the research impact assessment literature and based on research assessment criteria. By conducting an extensive literature review, this research could aim to define, from an Irish energy research point of view:

- A new definition of research impact and impact evaluation;
- A typology of research impact evaluation designs;
- A methodological framework to guide evaluations of the significance and reach of impact that can be attributed to research.

A prototype of the framework would be used to guide an analysis of the impact of selected research projects funded by the SEAI National Energy Research, Development & Demonstration (RD&D) Funding Programme. The successful applicant could identify additional areas of impact in the process and interviewing researchers for feedback on which descriptive categories they thought were useful and valid in relation to the nature and impact of their work. This could aim to identify broad areas of impact that would be applicable across the broad range of energy research funded. It could also encompass detailed descriptions of categories of impact e.g. on policy / technological readiness / risk reduction / public understanding.

The Research Impact Framework would provide prompts and descriptive categories that will assist researchers, evaluators and funding bodies to systematically identify a range of specific and verifiable impacts related to their work. The framework could also help researchers think through implementation strategies and identify unintended or harmful effects. The standardised structure of the framework would facilitate comparison of research impacts across projects and time, which is useful from analytical, management and assessment perspectives.

NOTE: Following technical evaluation, highly ranked applicants to this Topic will be invited to participate in an online interview. Further contractual terms and conditions will be provided to shortlisted applicants prior to interview. Successful SEAI-based Fellowship applicants will be based in SEAI's Dublin office for the entire duration of the Fellowship.

Topic 25	Identifying optimal investments for citizens wishing to reduce energy-related emissions in an Irish context
Indicative Duration	1 to 2 years
Project Scale	SEAI-based Fellowship / Data and Insights Department
Indicative Funding	Up to €200k

Background:

Ireland's climate policy and SEAI's public-facing programmes focus on encouraging uptake of EVs and Home Energy Upgrades, among others. These two demand generation streams are typically treated as separate issues, despite targeting the same cohort of people (homeowners above a certain income level). Switching to an EV and upgrading a home are both costly upfront investments, and most people will not be able to do both. It is unclear, however, which is the optimal investment for a given individual or household to make, as this will depend on multiple factors including current energy performance of their home, driving habits etc.

Research shows that people have a poor understanding of the relative impacts of different behaviour changes on carbon emissions. Several decision aids have appeared in response to this deficit, drawing on evidence surrounding the relative impacts of different behaviours. However, these tools are not designed specifically for the Irish context, and do not typically consider people's financial situation.

Topic Objectives & Expected Outputs:

Proposed research would employ a business-case approach to provide a decision support tool for consumers when assessing the level of personal investment required vs. expected environmental and economic returns, for a given set of personal circumstances.

- An assessment of available energy saving options for consumers, incentives, and constraints;
- Review of anticipated financial and non-financial impacts for the consumer both short-term and long-term;
- Analysis including total cost of ownership (TCO), cost/benefit analysis (CBA) and projected return on investment (ROI);
- Modelling scenarios based on a range of incomes, residential circumstances, geographic locations and other socio-economic indicators;
- Consideration of any other risks and available financial tools.

A proposed project should aim to result in, among others:

- An assessment methodology that can be used to identify optimal investments/lifestyle changes to make given an individual's budget, current circumstances, grant availability and any other key factors identified through the research, in an Irish context;
- An assessment of how these options may change for different segments of the population, in order to guide policy;
- A user-friendly decision support tool based on the developed methodology. Depending on the scale of the project this tool could be at prototype or more advanced stage of development.

NOTE: Following technical evaluation, highly ranked applicants to this Topic will be invited to participate in an online interview. Further contractual terms and conditions will be provided to shortlisted applicants prior to interview. Successful SEAI-based Fellowship applicants will be based in SEAI's Dublin office for the entire duration of the Fellowship.

ANNEX 2: APPLICATION FORM TEMPLATE INSTRUCTIONS

This section provides guidance on how to complete the Application Form. Please note:

- Only fully complete applications received prior to the application deadline will be considered for evaluation.
- Do not exceed the maximum page limits defined for the following Application Sections:
 - Section 2 – Max 8 Pages
 - Section 3 – Max 8 Pages
 - Section 4 – Max 10 Pages
- The above page limits are exclusive of references. Please include a list of references/bibliography as an appendix as required.
- Font size must be a minimum of 10 pts.
- Please submit the final Application Form in PDF Format.
- Please use the following naming structure for submitting documentation
Organisation name (Lead surname) document type, for example 'SEAI (Bloggs) Application Form' and 'SEAI (Bloggs) Letter of Support 1', etc.

SECTION 1: PROJECT DETAILS

1. Project Title (max. 30 words)

The project title should clearly convey the nature of the project to be undertaken. Please include a project acronym, if applicable.

2. Topic Number (if applicable)

If you are applying to the Topic Strand detailed in Annex 1, please enter the topic number you are applying to here. If you are applying to the Open Strand, please type 'open strand'.

3. Lead Applicant, Partner Applicant & Collaborators

Provide the requested details relating to the Lead Applicant, Partner Applicant(s) and Collaborator(s). See Section 3 of the Call Document for definitions of project roles.

4. Project Scale/Type

From the drop-down list please indicate the project scale/type (Small Scale, Medium Scale, Large Scale, Academic Fellowship or SEAI- Based Fellowship) of your application. See Section 4 of the Call Document for definitions of each. Please provide a justification for the requested project scale/type.

5. Requested Duration, SEAI-Requested Costs and Total Project Costs

Indicate the requested project duration (months), the costs requested from SEAI and the total cost of the project. Please ensure that these figures align with those provided within the Budget Template (excel spreadsheet).

In-kind contributions are valued by SEAI and should be detailed in the 'in-kind contributions' table (only) within Section 5.3 of the Application form. In-kind contributions should not be included within the Total Project Costs table or within the Budget Template spreadsheet.

6. Abstract (max 250 words)

This should be a succinct and accurate summary of the proposed work.

7. Keywords (max 5 words)

These should be descriptors that best characterise the proposed research.

8. Energy Research Classification

From the drop-down list, please select the energy research category that best aligns with the proposed research.

9. Specific Policies and Targets addressed

List the national and international energy and climate targets and/or policies addressed through your project. Where relevant, please specify the specific policy target, and e.g. the number of the action(s) from the Climate Action Plan which your project aims to contribute to.

10. End-users targeted

Provide details of the research end-users targeted. A research end-user is defined as an individual, community, or organisation, that will directly use or directly benefit from the output, outcome or results of the proposed research.

11. SEAI and RD&D Funding Programme Remit (max 250 words)

Describe how the proposed project aligns with SEAI's remit and the overarching objectives of SEAI's National Energy RD&D Funding Programme. The overarching programme objectives are to:

- Accelerate the development and deployment in the Irish marketplace of competitive energy-related products, processes and systems;*
- Support solutions that enable technical and other barriers to energy market uptake to be overcome;*
- Grow Ireland's national capacity to access, develop and apply international class energy RD&D;*
- Provide guidance and support to policy makers and public bodies through results, outcomes and learning from supported projects.*

This statement will be reviewed by SEAI when determining the eligibility of the application.

SECTION 2: EXCELLENCE AND INNOVATION (Max 8 Pages)**1. State-of-the-Art/Literature Review**

Describe the current state-of-the-art, current knowledge or current best practice in this area, and particularly in the Irish context. Please ensure to use references where appropriate.

2. Innovation/Novelty - Beyond State-of-the-Art

Describe the concept of the proposed project and provide details of how the proposed project will further the current state-of-the-art, current knowledge or current practice. The degree of novelty and innovation associated with the proposed project should be clearly demonstrated. Describe clearly how this project would advance the state of the art in the research area/field, and within Ireland.

3. Project Objectives

Provide details of the objectives of the project and the associated timelines for delivery of these objectives.

4. Project Team & Collaborator Profile

Provide details of the Project Team (Lead Applicant and Partner Applicants) and Collaborators involved in the proposed project, including details of relevant qualifications and key achievements. Please refer to project members by surname.

Provide an outline of previous relevant involvement in research, innovation and/or commercialisation activities performed by the project team. For the Lead and Partner Applicants only, outline their track record in obtaining research/innovation funding from exchequer, industry, European or other funding sources.

*For applications submitted under the **Fellowship** Category (Academic Fellowship or SEAI-Based Fellowship), a mentor/supervisor should be identified as part of the project team and should be listed as a Partner Applicant. For Fellowship applications, a Letter of Motivation should also be submitted as a separate document. The Letter of Motivation should include a statement to demonstrate the Fellowship applicant's interest in and suitability for the proposed Fellowship. This may include an outline of their professional experience, how the Fellowship will enhance their career development and personal motivation for the submitted Fellowship proposal.*

Please note: this section should refer only to the Lead and Partner Applicants and Collaborators and should not provide details of individuals or organisations who may be engaged as external consultants. Whilst requests for the funding of external consultants is permitted, please note that applications will not receive additional marks for such consultants at the evaluation stage.

5. Previous SEAI or other RD&D Funding (if applicable)

- a. If applicable, describe any previous SEAI funded research projects and clearly outline how this proposed project builds upon previously funded work.*
- b. If applicable, describe any previous funded research projects and clearly outline how this proposed project builds upon previously funded work.*

SECTION 3: RELEVANCE AND IMPACT (Max 8 Pages)

This section should be as specific as possible and provide information that reviewers will find helpful in assessing the relevance and potential impact of the proposed research activity.

1. Relevance to the needs of the Irish Energy Sector and to SEAI

Clearly demonstrate the relevance of the proposed project to the needs of the Irish energy sector with particular reference to Ireland's Climate Action Plan, the Programme for Government, the National Mitigation Plan, Energy White Paper and/or Ireland's National Energy & Climate Plan (NECP), Climate Action and Low Carbon Development Bill (2021). Refer to other relevant policy documents as appropriate.

2. Impact - Expected Impact

Describe the expected impacts of the proposed project in terms of both a) academic impacts and b) research impacts. Furthermore, describe indicators of both qualitative and quantitative evidence of expected impacts.

In terms of academic impact; please describe how this research would contribute to your field of study within academia (if applicable). As part of your description, where relevant, please refer to how the proposed project would enhance the applicant/organisation's potential for involvement in, for example, Horizon Europe collaborative projects and/or other non-exchequer funded RD&D activities in the future. Where relevant, also outline how the proposed project would enhance business opportunities.

In terms of research impact; consider the contribution that this research would make in categories such as: economic (e.g. jobs, exports, turnover growth); societal (e.g. benefit to consumers); policy-oriented (e.g. contribution to evidence-based policy formation and/or the legislative/regulatory framework); or scientific (enhancement of Irish scientific capacity and capability).

Provide detail of expected impacts of engaged research¹²; working with rather than for the potential research end users (e.g. businesses in the energy/low-carbon technology sector, energy consumers, local authorities regulators, policy makers, communities etc.) and indicate the timeframe over which the anticipated impacts will be realised.

3. Impact – Communication and Dissemination Plans

Communication and Dissemination Plans: Describe the strategy for communication, dissemination and implementation (if applicable), and what activities will be undertaken to promote the proposed project and engage the relevant audiences/end-users throughout the project. Please provide evidence of tailored, multifaceted communication strategies for varying end-users. SEAI expects that outputs/findings from SEAI supported projects will be widely disseminated and made publicly available.

Please note that project outcomes (i.e. generated knowledge/scientific output/research results/lessons learned) must be made available, among others, in the form of a short, publishable project report/case study (allowing for IP or commercial sensitivity restrictions on any sensitive data). These outcomes may be disseminated via the SEAI website and further publication as required.

4. Impact – Data Management and Open Access Strategy

Data Management Strategy: Project participants are asked to consider in advance how they will manage the data the project will generate, and to plan which data will be preserved, made publicly available and where. Where possible, use of existing available data is encouraged. A data management plan will demonstrate how the data will be managed effectively and securely. Please describe (500 words max):

- *What new data will be collected or produced;*
- *What existing data will be re-used;*
- *How the data will be safely stored and managed both during and after the project.*

¹² IUA Engaged Research Planning for Impact https://www.campusengage.ie/wp-content/uploads/2022/03/Updated-Final-PBS10581-IUA-Engaged-Research-Planning-for-Impact-Framework-2022-Update_V5.pdf

Open Access Strategy: Project teams are encouraged to work with open access tools and to make project outputs/models/assumptions available to interested stakeholders to facilitate follow-on studies and reduce duplication of research. Associated metadata and clear descriptions of data, acquisition, organisation, analysis and interpretation should be included. Planned open access locations for the data should also be included. Projects should aim to follow the FAIR principles, making research data findable, accessible, interoperable and re-usable. Please describe your open access strategy (500 words max).

*Please complete the **Data Management Plan** Form (Annex 1 of the Application Form) and submit along with your application. This should outline details of all data to be collected, processed and/or generated by the proposed project.*

5. Impact - Intellectual Property Management & Exploitation

Exploitation Plan: describe how results and outcomes from the proposed project will be exploited during and after the project, such that the project will result in tangible impacts.

Describe how background and foreground Intellectual Property (IP) will be managed.

Describe how any discoveries, inventions or processes resulting from the proposed project will be exploited. Where relevant/available, provide details of potential end users/markets.

Where there is a reasonable potential for commercial exploitation of research outputs, applicants should apply the principles of the National IP Protocol¹³ 2019 – Ireland's framework for research commercialisation.

Where relevant, applicants should discuss expected project outputs and intellectual property with their Technology Transfer Office and/or consult with Knowledge Transfer Ireland for information on how to fulfil Intellectual Property obligations, and for support in relation to developing consortium agreements where required.

Successful applicants are required to take necessary steps to preserve and protect such intellectual property rights including, where appropriate, applying for patent registration; and actively exploiting any discoveries, inventions or processes resulting from the research, by means of commercial licensing arrangements or otherwise.

Where appropriate and whenever possible, IP should be managed for the benefit of enterprise development in Ireland.

For collaborative projects, please confirm (by ticking the relevant box in the application form) that should the proposed application be successful, the project consortium (Lead Applicant, Partner Applicant(s) and Collaborator(s)) will put a formal agreement in place to agree on Intellectual Property Rights and other relevant issues associated with the responsibilities within the project and exploitation of results.

6. Engagement with research end-users and key stakeholders ¹⁴

Please describe any engagement with research end-users, or other stakeholders, in the formation of the research proposal and in setting priorities for the proposed research. Please describe planned engagements with research end-users both during and after the project, that could involve multiple disciplines, sectors and stakeholders.

¹³ <https://www.knowledgetransferireland.com/ManagingIP/National-IP-Protocol/>

¹⁴ https://www.campusengage.ie/wp-content/uploads/2019/01/FINAL-JAN-16_ER-Report-2016-Jan-v2.pdf

7. Gender Considerations*

Complete the 'gender considerations' table in the application form template with further details on gender balance and any potential gender dimension within the proposed research activities.

Description of how gender balance will be fostered within the project team:	
Please describe how gender balance will be fostered within the proposed team.	
Please list concrete actions demonstrating how gender balance will be fostered.	
<ul style="list-style-type: none"> For 3rd level educational bodies, please comment on the Athena Swan¹⁵ Institutional award status or award commitment for your organisation/department. 	
Action title (add as many lines as appropriate)	Description
Action 1:	
Action 2:	
Action 3:	
Description of any potential gender dimension of the proposed research activity:	
Please consider any potential gender dimension of the proposed research activity. Gender considerations in research mean that gender is part of the research design and systematically controlled for throughout the research process, without necessarily being the primary focus of analysis. Research that takes gender considerations into account is found in most scientific disciplines and in energy research, with empirical evidence researchers have studied the gender dimension in areas such as energy consumption in households, energy saving and decision-making in the production of energy. Energy research that takes the gender dimension into account has potential for further development e.g. does the underrepresentation of women in the energy sector, in terms of both production and decision-making, have any impact on the transition to more sustainable energy systems? ^{16 17}	
The following video may be helpful in outlining the gender dimension in research: Gender dimension in research video - YouTube	

*Note - there will be no discrimination due to gender in the evaluation of projects.

SECTION 4: WORKPLAN (Max 10 pages)

1. Work Plan

Complete the 'summary of work packages' table in the application form template which provides details of the number and title of each work package.

WP No.	Title
1	xxx
Etc.	xxx

¹⁵ <https://www.advance-he.ac.uk/equality-charters/international-charters/athena-swan-ireland>

¹⁶ [what is the gender dimension roggkorsvik kilden genderresearch.no .pdf \(kjonnsforskning.no\)](#)

¹⁷ [A Review of Energy and Gender Research in the Global North.pdf \(geecco-project.eu\)](#)

For each work package, replicate and complete the table below in the application form template.

WP No. & Title	Provide the number and title of the work package.		
Start Month No.	e.g. 1	Finish Month No.	e.g. 6
WP Lead	Indicate the role and organisation of the project team member who will lead the work package.		
WP Contributors	Indicate the role and organisation of other contributors to the work package and briefly describe their role.		
Objective(s)	Describe the primary objectives of the work package.		
Description	Provide an outline of the work to be undertaken as part of the work package, including the methodology to be followed, specialised equipment to be used and analysis to be performed.		
Milestones (Specify the month each milestone will be reached)	Define and number each milestone (add as many lines as milestones)	Specify the month number each will be achieved	
	e.g. WP1-M1: Literature review	e.g. Month 3	
Deliverables (Specify the month the deliverable will be provided)	Define and number each deliverable (add as many lines as deliverables)	Specify the month number each will be achieved.	
	e.g. WP1-D1: Literature review paper submitted to a peer-reviewed journal	e.g. Month 3	
Data Required (if applicable)	WP1- Dataset 1: WP1: Dataset 2: (Add as many lines as datasets) Please provide a brief description of data required for this work package ¹⁸ .		

2. Project Management & Risk (max 3 pages)

Clearly describe the proposed project management structure for the project and provide details of reporting lines and responsibilities. Please also provide a high-level Gantt chart (or similar) indicating timelines and dependencies for the work packages and tasks.

Please include details highlighting the capacity of the Lead Applicant to lead this project, e.g. consideration to number of current awards and other activities underway, and associated full time equivalency (FTE), along with FTE expectations on this project. Similarly, please include details highlighting the capacity of the wider project leadership team, across both Lead/Partner Applicants, to deliver the project.

Please ensure to include your high-level Gantt chart within the Application Form (Word Document template). Please do not submit a Gantt chart as a separate file.

Using the table provided in the application form template, describe the primary risks associated with the proposed project, their likelihood (low, medium or high) and outline the measures which will be undertaken to avoid or mitigate these risks.

¹⁸ As per the data management strategy, (Section 3.4) projects are encouraged to outline good consideration of existing datasets and encouraged to reuse and repurpose existing datasets. Risks to data access/acquisition should be detailed in Section 4.2; Project Management and Risk.

If your research requires the acquisition of a licence (e.g. foreshore licence), permits or planning permission, please consider this in your risk assessment and provide details of the estimation of acquisition timelines and mitigation measures/alternative options. Similarly, please identify risks associated with data acquisition/ access and mitigation measures to reduce impacts.

SECTION 5: BUDGET

Please complete the following:

1. *Budget Justification (see below)*
2. *Budget Template (MS Excel spreadsheet)*
3. *Provide the requested 'financial documentation/declarations' (as PDF documents)*

Applicants should refer to the SEAI RD&D Budget Policy Document when completing the budget sections of their application.

1. Research Category Justification (max 250 words)

Please select a Research Category from the list and provide a justifying narrative for your selection. Before selecting, please review and refer to the SEAI RD&D Budget Policy document for detailed definitions of each research category listed.

The onus is on the Applicant organisations to select a research category which appropriately reflects the proposed project activities. Please select the appropriate Research Category. Repeat the table as required for each partner applicant.

2. Effective Collaboration - Grant Intensifier Justification (max 250 words)

If applying for the Effective Collaboration grant intensifier, please tick the relevant box and provide a justification in the table provided. Please refer to the SEAI RD&D Budget Policy document for eligibility details and requirements of this grant intensifier.

Repeat the table as required for each partner applicant.

3. Budget Summary

*Provide an overview of costs by completing the budget summary table. Add additional columns for each additional project partner if applicable. **Please ensure that these figures align with those provided in the budget template** (Excel spreadsheet).*

Please also complete the Summary Table – In-kind Contributions.

In-kind contributions are valued by SEAI and should be detailed within the 'In-kind Contributions' table (only) within Section 5.3 of the Application form. In-kind contributions should not be included within the Total Project Costs table or within the Budget Template spreadsheet

4. Budget Justification

Provide a justification to support proposed total project costs included in the application under the headings of: staff, equipment, materials, travel and external consultants.

Staff: *Justify the role and need for each staff member who would be funded by the proposed project by completing the table below for each person. Repeat the table as required for each proposed staff member to be funded.*

Position Title	<i>Please detail the requested position title (e.g. Research Engineer or Postdoctoral Researcher to be Recruited).</i>
Organisation name	<i>Indicate the name of the organisation which this staff post will be associated with.</i>
Total cost of staff member	<i>Indicate the total cost (€) associated with this role.</i>
WP/task alignment	<i>Provide details of the work packages/tasks which this person will work on.</i>
Justification for the level of this position	<i>Describe how the costs associated with this position have been calculated.</i>
Justification for this position	<i>Describe why this position is required on the project.</i>

Equipment: Justify the need for each piece of equipment which will be funded by the proposed project by completing the table below for each piece of equipment. Repeat the table as required for each piece of equipment.

Equipment & quantity	<i>Indicate the equipment required and the quantity.</i>
Organisation name	<i>Indicate the name of the organisation who will own the equipment and where it will be based.</i>
WP/task alignment	<i>Provide details of the work packages/tasks which the equipment is required for.</i>
Total cost (€)	<i>Indicate the total cost (€) associated with the equipment</i>
Justification for cost	<i>Provide a justification/rationale for the quoted cost.</i>

Materials: Justify the need for each material which will be funded by the proposed project by completing the table below. Repeat the table as required.

Materials & quantities	<i>Indicate the materials required and the quantity.</i>
Organisation name	<i>Indicate the name of the organisation who will own the materials.</i>
WP/task alignment	<i>Provide details of the work packages/tasks which the materials are required for.</i>
Total cost (€)	<i>Indicate the total cost associated with the materials.</i>
Justification for cost	<i>Provide a justification/rationale for the quoted cost.</i>

Travel (max ½ page): Justify the need for travel costs requested as part of the proposal. Where possible, online meetings/events are encouraged.

External Consultants: (max ½ page): Justify the need for and value of external consultants costs requested as part of the proposal.

SECTION 6: LETTERS OF SUPPORT

Letters of Support (max 1 page each)

The following letters of support should be submitted as part of an application to the Call. Letters of support may be uploaded individually or may be merged into a single PDF file.

Please also complete the summary Letters of Support checklist Table within the Application Form.

- ✓ **The Lead Applicant**, confirming that the information provided in the application is correct to the best of their knowledge, and that the proposed project has not been/is not the subject of grant aid from any other source. By submitting a proposal, the Lead Applicant confirms that they hold a contract covering at least the duration of the proposed project or agreement from their employer that their employment will be extended to cover at least the period of the proposed project.
- ✓ **An authorised staff member in the lead institution/organisation** (e.g. company CEO/CFO/Director, University/Research Institution Vice President for Research/Director of Research or equivalent) confirming their endorsement of the proposal and confirming their commitment to hosting and facilitating the proposed project should it be successful.
- ✓ **Each Partner Applicant Organisation (if any)** confirming their role in the proposed project and indicating the level of any financial support (cash or in-kind) being provided by their organisation to the proposed project.
- ✓ **Each Collaborator Organisation (if any)** included in the application, providing details to confirm their role in the project, and details of any proposed support (e.g. data access, technology trial/demonstrator, in-kind support, or other).
- ✓ **Fellowship Applications (Fellow)**
 - 1) **Lead Applicant (Fellow)** – as per above Lead Applicant Letter of Support;
 - 2) **Partner Applicant (Academic Mentor/Supervisor)**;
 - 3) **An authorised staff member within the 3rd level educational body** and;
 - 4) **Letter of Motivation** - providing a statement to demonstrate interest in and suitability for the proposed Fellowship. This may include an outline of professional experience, how the Fellowship will enhance their career development and personal motivation for the submitted Fellowship proposal.

Please note that unsolicited letters of support are not permitted.

ANNEX 3: BUDGET TEMPLATE INSTRUCTIONS

Please find details in Appendix 1 of the SEAI RD&D Budget Policy document, available to download from the Programme Documents section of the SEAI RD&D Webpage:

<https://www.seai.ie/grants/research-funding/research-development-and-demonstration-fund/>

ANNEX 4: GENERAL TERMS & CONDITIONS

1. Failure to fully adhere to the provisions of the Call may result in application refusal, grant offer revocation or grant claim refusal, depending on the particular status and stage of the application.
2. Please note that SEAI may, if required by law or otherwise and without incurring any liability, vary, revise or supplement Programme Documentation and/or Terms and Conditions of the Programme before or after the applicant's submission of an application and such revised terms will apply to the application unless the applicant chooses to withdraw its application or withdraw from the Grant Agreement.
3. The applicant's agreement with SEAI in the event of a Grant Offer being accepted will comprise the Grant Agreement, Terms and Conditions of the Programme, the Call Document (including its annexes), and other programme documentation provided by SEAI. The applicant having accepted the Grant Offer and communicated his/her acceptance of it to SEAI shall comply with and agree to be bound by the provisions of these documents.
4. The project, in respect of which the grant application is made, must be located in the Republic of Ireland.
5. The Grant Offer only becomes valid upon receipt by SEAI from the applicant of the signed Grant Agreement.
6. The applicant must ensure Grant approval is received before proceeding with any orders, purchases or commencing works. No payments will be made retrospectively for costs incurred prior to approval being granted. Orders placed or invoices dated prior to grant approval will not be eligible for grant support.
7. The total grant amount will not be permitted to escalate above the amount indicated in the grant agreement under any circumstances.
8. The applicant must obtain all necessary insurances, consents and statutory approvals and have authority to implement the project.

9. The SEAI National Energy RD&D Funding Programme is subject to any state aid clearances required from the Commission of the European Union and any consents, clearances or licenses that might be required from any other competent body. The applicant must ensure that compliance is achieved with the relevant principles of Irish and EC law regarding the spending of this funding and, where applicable, the laws and guidelines concerning State Aid and public procurement.
10. The applicant must be prepared to participate in follow-up site visit(s) to verify impacts and achievements and to participate in follow-up research (telephone or questionnaire) as may be commissioned by SEAI to establish the Programme's impacts and achievements. This may also include the acquisition of information and data for the development of case studies for wider dissemination (protecting as appropriate all confidential or commercially sensitive information/ data). The applicant acknowledges that SEAI may have to provide certain contact details to third party contractors in relation to these matters and the applicant hereby consents to SEAI making these disclosures.
11. The timing of payment to approved applicants is subject to the funding allocated by government to the Programme in a particular calendar year, in accordance with public financial procedures. Where all other conditions are met, payment will be made on a "first come, first served" basis. Where funding is exhausted in a particular calendar year, payment to remaining applicants will be deferred until such time as further funds may become available. Deferred payments will receive priority, if and when those funds become available.
12. The applicant shall follow the SEAI complaints procedure in relation to any disputes between the applicant and SEAI concerning any matter in connection with the Programme.
13. Any false, fictitious or fraudulent statements or claims knowingly made on grant applications, or supporting documentation, submitted in respect of previous grant applications / requests for payment or otherwise made to SEAI, its authorised officers, or an SEAI Inspector, or any breach of these Terms and Conditions of the Programme may result in current and future applications being deemed ineligible by SEAI. In respect of applications where the applicant has already received payment pursuant to the Programme.
14. The Applicant acknowledges that SEAI is subject to the requirements of the Freedom of Information Act 2014, as amended ("FOIA"). SEAI undertakes to use its best endeavours to hold confidential any information provided by the applicant subject to its obligations under law, including the FOIA. Should the applicant wish that any of the information supplied by him/her should not be disclosed because of its sensitivity, he/she should, when providing the information, identify the same and specify the reasons for its sensitivity. SEAI will consult with

the applicant about such information before making a decision on any Freedom of Information request received.

15. Any personal information which an Applicant volunteers to SEAI will be treated with the highest standards of security and confidentiality, strictly in accordance with the Data Protection Acts, 1988 and 2003, as re-enacted, amended or replaced from time to time, and pursuant to the General Data Protection Regulation (meaning Regulation (EU) 2016/679 of the European 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, and repealing Directive 95/46/EC) and any related legislation. SEAI, as data controller, and its agents, will store such information on its database and fully respect the confidentiality of the data provided. The information provided by applicants will be used for evaluation purposes and to facilitate the administration of the grant process. This may require that data be supplied to and discussed, in confidence, with any person or organisation appointed by SEAI to assist in assessing or monitoring this application. These persons will be subject to the same requirements for protection of confidentiality.
16. An applicant must notify SEAI immediately if it decides not to undertake and/or complete its project. If a successful applicant decides not to undertake and/or complete its project, SEAI will not pay it the grant and instead may (but is not obliged to) allocate some or all of the funds provisionally allocated to that applicant to a different applicant.
17. The parties are of the view that there is no supply of goods or services between them and therefore there is no VAT chargeable to SEAI by the grantee in relation to the payment of the grant. In the event that the Revenue Commissioners determine that, in their view, VAT is chargeable then the grant payment shall be regarded as inclusive of any VAT charge.