Ofgem Strategic Innovation Fund

Round two Innovation Challenges: final decision

Background and context

The purpose of the Strategic Innovation Fund (SIF) is to support network innovation that contributes to the achievement of net zero, while delivering net benefits to energy consumers.

Ofgem is the decision-maker in relation to the SIF. However, to support the SIF's operation, Ofgem is partnering with Innovate UK as part of UK Research and Innovation (UKRI). Innovate UK's role is to deliver the SIF in line with the SIF Governance Document - administering the funding programme, monitoring the delivery of Projects, making recommendations to Ofgem on operational matters, supporting third-party innovators and, where possible, supporting successful Projects to become business as usual activities.

The Strategic Innovation Fund (SIF) is funded through the RIIO-2 network price control. It is currently open to the Electricity System Operator, and the electricity transmission, gas transmission and gas distribution sectors. From April 2023 electricity distribution operators will enter the RIIO-ED2 network price control, so they will also be eligible to lead Projects under round 2 of the Strategic Innovation Fund.

Innovation Challenges summary

Ofgem sets Innovation Challenges, with support from UKRI, which will help meet the strategic objectives of the sector. The approach to challenge setting is described in our decision on the SIF Governance Document.[1] Challenge setting is part of a four-stage innovation process delivered by Innovate UK (UKRI). See 'the innovation operating model' below for more details on this process.

[1] https://www.ofgem.gov.uk/publications/sif-governance-document

The Innovation Challenges for round one of the SIF, which opened August 2021, were identified as whole system integration, data and digitalisation, heat, and zero emission transport.[2]

These broad areas remain the focus of the SIF. For round two, due to open in early September 2022, a refined set of Innovation Challenges has been developed working with the energy sector and targeting further progress in these areas.

These Innovation Challenges are as follows:

1. Supporting a just energy transition
2. Preparing for a net zero power system
3. Improving energy system resilience and robustness
4. Accelerating decarbonisation of major energy demands.

The full scope and detail of these Innovation Challenges is covered further in this document.

Collaboration and consultation

These Innovation Challenges have been developed through extensive collaboration and consultation with a wide range of stakeholders and interested bodies, including energy network companies, other innovators and entrepreneurs, government and academia.

From December 2021 to March 2022, around 140 representatives from across the energy and other sectors gave their input to Innovate UK on potential challenge areas that could be considered. A direct engagement approach was taken. This ensured that a range of organisations who may not usually have the resources to respond to a written consultation could contribute and also enabled more qualitative discussions on the nature of strategic priorities, as well as the target outcomes of Innovation Challenges. Through this process over 100 different areas of potential focus were offered.

[2] https://www.ofgem.gov.uk/publications/strategic-innovation-fund-innovation-challenges

The key underlying principles established to secure consensus and to prioritise these challenges have been:

- **Strategic:** innovations are required to meet national and devolved net zero targets effectively.
- **Network relevant:** innovation needs and solutions that can be taken forward or materially supported by energy networks.
- **Timely:** the challenge should focus on problem areas where solutions can be scaled up to meet the requisite net zero targets and commitments.
- **Scope:** the scope of Innovation Challenge is not covered by other UK innovation programmes (including other network innovation funding mechanisms).

These options were then refined and prioritised through concentrated focus groups and workshops held with a range of organisations from areas including:

- Energy networks
- Energy technology providers
- Consumer representative groups
- Non-energy sector technology companies
- Devolved and local governments
- Small businesses
- Academics
- Trade associations.

As part of the consultation, Innovate UK invited stakeholders to consider how to best achieve impact. Feedback indicated that challenges should be framed in an outcome-orientated, way also which supports the achievement of key national and sub-national policy commitments and targets. This gives space for creative ideas and innovation, while also working towards common objectives.

In summary, the feedback provided was:

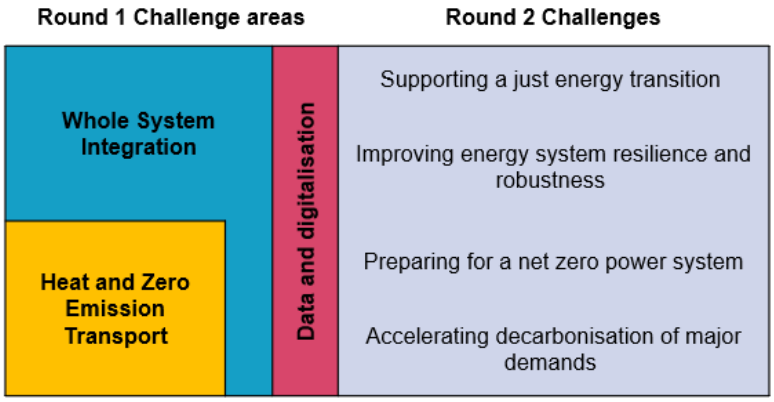
- Challenges should be ambitious in taking full whole system and integrated approaches, and not siloed. This feedback was taken on-board with the consolidation of heat, transport and energy efficiency challenges, and also helped to inform the Project Partner requirements.
- Data and digitalisation should be embedded across all challenges. As a result, specific data and digitalisation requirements have been outlined in each of the relevant challenge areas.

- Preparing for a net zero power system was prioritised by all stakeholder groups and, as a result, has been included in the final four Innovation Challenges.
- Reducing the number of themes under each challenge will help to make innovation more focused. This was addressed by bringing the number of themes that must be addressed to two, from four previously, across all challenges
- The challenges should go beyond just addressing technical challenges. The challenges have been reframed in a way which offers access to a range of approaches including societal and commercial innovation. Specific non-technical needs have been highlighted in the relevant challenges.
- The SIF Innovation Challenges should be framed to allow development of long term and strategic solutions to current issues such as market volatility, consumer vulnerability and extreme weather events. Inclusion of challenges around just transition and resilience directly respond this feedback.

Further details of the feedback and evidence provided by stakeholders through the challenge setting process will be shared at the Innovation Challenge briefing events.

Strategic alignment with round one Innovation Challenges

This iteration of challenges and associated themes for round two is more detailed on specific innovation needs. These challenges still closely link to the first challenges announced for round one (see diagram below) and will deliver outcomes that meet the strategic objectives of the SIF and to achieve the objectives and priorities of Ofgem's strategic change programmes[3] and Innovation Vision[4].



[3] Details of Ofgem's strategic change programmes can be found in Ofgem's forward workplan 2021/22: https://www.ofgem.gov.uk/publications/forward-work-programme-202122
[4] https://www.ofgem.gov.uk/publications/ofgem-innovation-vision-2021-2025

The challenges have also been defined to provide aims for energy networks and third-party stakeholders to work towards, with action-oriented target outcomes aligned to net zero.

We will continue to work with government and industry to identify and refine future priorities for innovation, to maximise the opportunity to deliver value for consumers. We welcome any input into priority areas for future consideration.

The SIF innovation operating model

The identification of Innovation Challenges is the first stage of a cycle of activity of activities planned to recur and be refined each year – Innovate UK describe this activity with the heading 'Giant Leap Together'. 'Giant Leap Together' describes the process of setting strategic Challenges, generating the best ideas to address those challenges, and then forming delivery partnerships to achieve impact. This operating model has four stages:

Phase	Timeline	Objectives
Challenges: Identifying the most important energy network innovation challenges, based on problems that users and consumers are facing.	Jan-Apr	• Engage with a wide range of stakeholders to gather innovation challenges relating to SIF • Achieve broad consensus on the priority innovation challenges for the round • Develop and publish the Innovation Challenge document along with partnership requirements for the sector to develop ideas against.
Ideation: generating new ideas for projects/products and services that will target these challenges.	Apr-Jun	• Engage with wide range of energy and non-energy sector innovators on the SIF Challenges, help understand network needs, gaps in knowledge and support their idea development • Provide a streamlined process for the innovators to submit ideas and receive feedback.
Incubation: helping energy networks and innovators form effective partnerships which can develop the ideas into powerful innovation	Jun-Sep	• Direct the best and most relevant ideas from innovators to the appropriate networks for consideration • Support development of impactful consortiums via match making in line with the outlined partner requirements in this document

projects/products and services.		• Reduce time and effort required for energy networks to find the best ideas and develop partnerships.
Acceleration: selecting and funding the most promising ideas, sharing insights, solving problems, helping businesses secure investment and developing the very best ideas into 'business as usual.'	Oct-Dec	• Disseminate and learn from other UK energy sector innovation projects and activities • Support energy networks and partners to develop and submit high quality applications on time to SIF.

Next steps

With the round two Innovation Challenges identified, the ideation period runs between May and June 2022. This will include Innovate UK communicating the aims and objectives of each challenge, outlining the process for submitting project proposals, and brokering partnerships between organisations with complementary capabilities and aims.

The incubation period then follows, when innovators and other potential project partners will work directly with the energy network companies to develop their ideas together.

Finally, as the acceleration stage begins in September, we will invite applications for funding - led by the energy network companies but supported by their project partners – for round two 'Discovery' projects, which will address these Innovation Challenges.

More information

Details on how to engage and participate in the Ideation and Incubation stages will be shared during our Innovation Challenges briefing event on 25 May 2022. You can sign up here.

To be kept informed on future SIF activities, sign up to the SIF newsletter.

Ofgem recognises the valuable input given by many organisations on the development of these Innovation Challenges. Alongside Innovate UK, we look forward to working

with the sector to realise the benefits of innovation for consumers and to support continued progress towards net zero.

Graeme Barton

Head of Price Control Operations: Small & Medium Sized Projects

Onshore Networks

Innovation Challenge 1:
Supporting a just energy transition

Delivering net zero technologies and services that works for all consumers whilst protecting the vulnerable

Context: the background to the problem we are trying to address

Achieving a net zero energy system and economy will see different communities and sectors impacted in different ways. A key part of UK government's net zero strategy[5] is to ensure that the transition is just and fair for all parts of society, both in terms of sharing costs based on ability to pay and sharing the benefits widely.

Specifically, from an energy transition perspective, the key challenge is to acknowledge that energy consumers[6] are people with differing preferences, and who have varying levels of capability or resources to engage with reducing their energy related emissions. The combination of Covid-19 pandemic and a 'cost of living crisis' has exacerbated consumer vulnerability recently, with potential long-term implications for driving a fair net zero transition. This requires decarbonisation approaches that embed a range of consumer needs at the core of new product and service development.

Whilst significant work has been undertaken to understand vulnerability[7] in the context of the energy sector, the net zero transition could alter these characterisations in future.

Deepening this understanding across energy and other sectors is critical to be able to develop and execute long term and well considered strategies to meet net zero in a fair way. Furthermore, approaches which cater for the needs of all groups in society will be needed to drive adoption of low carbon technologies and achieve the deep decarbonisation required to meet national targets. Existing approaches to heat and transport decarbonisation do not work effectively and fairly for certain socio-economic and demographic groups.

The Rural Net Zero Report[8] published by UK100's Countryside Climate Network captures some of the just transition aspects from a rural community perspective. This

[5] https://www.gov.uk/government/publications/net-zero-strategy
[6] Users of network services (for example generators, shippers) as well as domestic and business end consumers, and their representatives.
[7] Refers to someone who, due to their personal circumstances, is especially susceptible to harm.
[8] https://www.uk100.org/sites/default/files/publications/Rural%20Net%20Zero_May%202021.pdf

research found that rural communities face greater barriers to achieving net zero, including lower average incomes affecting affordability of new technologies, poor digital connectivity limiting access to digital services, buildings needing bespoke energy efficiency solutions and grid capacity constraints limiting electrified heat and transport solutions.

Another example is from the recent Department for Transport research[9] which focused on people without off-street parking. It found that 56% of those surveyed were likely to purchase or lease a petrol or diesel engine when replacing their current vehicle in the future. The main concerns raised on transitioning to electric vehicles included high up-front cost and perceived issues around time for charging and lack of access to public charging infrastructure.

A key theme that is pervasive in the context of rising digitalisation in energy and other sectors is digital exclusion. 10% of the UK adult population are not internet users[10] and this puts some groups at risk of vulnerability and exclusion from information and future changes in the energy sector. More broadly digital inclusion should also consider effective consent models for consumers that is both simple and builds trust on the usage of their data.

These examples outline the types of issues that need to be considered to develop decarbonisation and energy transition approaches that work across society.

Addressing these issues is important for energy networks given their central role in enabling effective and reliable access to net zero solutions for all consumers.

The 'supporting a just energy transition' Innovation Challenge aims to:

- Improve coordination between networks and other stakeholders with remit and responsibility for consumer service provision for more targeted and joined-up support
- Significantly progress the understanding of consumer vulnerability in the context of energy networks and net zero transition, and develop robust strategies to support these consumers

[9] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1061865/public-ev-charging-infrastructure-research-report.pdf

[10] https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/articles/exploringtheuksdigitaldivide/2019-03-04

- Significantly narrow the gap between consumer segments in terms of ease, accessibility, and cost effectiveness of decarbonisation solutions relevant to energy networks
- Adapt and improve existing decarbonisation solutions and approaches to work better, considering different vulnerability factors.

Innovation Challenge-specific requirements

In addition to meeting the requirements within the SIF Governance document and licence condition, projects applying to the 'supporting a just energy transition' Innovation Challenge must meet the below requirements.

Scope of projects

Networks are encouraged to consider all the below points within their project development, but as a minimum your proposal must directly address at least one as a primary focus of the proposed project.

1. Novel and replicable approaches for better identification, support, and inclusion of vulnerable and disadvantaged consumers
2. Supporting the decarbonisation of heat and mobility for rural, off gas grid, fuel poor and those consumer groups with reduced access to opportunities for decarbonisation.

Partner requirements

The table below outlines Project Partner requirements for each of the specific focal areas (scope of projects) and the stage of the project.

Project scope	Discovery (at least one of each)	Alpha (at least one of each)
1. Novel approaches for better identification, support, and inclusion of vulnerable and disadvantaged consumers.	1. Consumer representative group or relevant charities 2. Relevant local government entity.	1. Energy network licensee in addition to the project lead. The partner network must hold a gas transporter, electricity transmission or electricity distribution licence 2. Energy supplier 3. Alternative utility or organisation with experience in managing

		consumer data in other sectors – e.g., water, telecommunications, finance.
2. Supporting the decarbonisation of heat and mobility for rural, off gas grid, and those consumer groups with reduced access to opportunities for decarbonisation.	1. Consumer representative group or relevant charities 2. Relevant local government entity.	1. Energy network licensee in addition to the project lead. The partner network must hold a gas transporter, electricity transmission or electricity distribution licence 2. Energy supplier 3. A heat technology, service, or infrastructure provider or transport refuelling or charging provider. For example, this could include, but is not limited to; • heat network providers • heat pump designers and installers • EV charging point developers • Hydrogen hubs developers.

Innovation Challenge 2:
Preparing for a net zero power system

Supporting the safe and reliable operation of a net zero power system by 2035

Context: the background to the problem we are trying to address

A key policy commitment within the UK government's net zero strategy is to fully decarbonise the power system by 2035, subject to security of supply considerations[11]. This has made Great Britain the fastest decarbonising power system in the world. As of 2020, around 40% of installed capacity and 30% of generation output came from fossil fuels, these may need to be replaced by renewables, nuclear and other low carbon sources prior to 2030. Particularly, significant increases in deployment of offshore wind (supported by a policy commitment of 50 GW by 2030[12]), onshore wind, and solar PV (five-fold increase by 2035) are expected.

Operating a power system safely and securely with high levels of renewables will bring novel challenges and require new approaches. As noted in the Operability of High Renewable Electricity Systems Report by the National Infrastructure Commission (NIC) and the System Operability Framework by the Electricity System Operator (ESO)[13], aspects including inertia, short circuit level, voltage control, system restoration, loss of mains protection and fault ride through will need to be met to operate a safe and secure system.

Traditional synchronous generators[14] provide a lot of the system needs outlined above and this creates a challenge as the nature of the energy generation mix moves primarily towards renewables by 2035. In addition, the deployment of large nuclear plants and increases in interconnector capacity could also further impact system operability due to increase in largest in-feed loss[15] and current non-provision of system services respectively.

While such challenges exist, developments in digitalisation and decentralisation creates a significant opportunity to reimagine and deliver future system operation for

[11] https://www.gov.uk/government/publications/net-zero-strategy
[12] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1067835/british-energy-security-strategy-web.pdf
[13] https://nic.org.uk/studies-reports/operability-highly-renewable-electricity-systems/
[14] Fossil fuel generators producing electricity for the grid have spinning parts – they rotate at the right frequency to help balance supply and have stored energy allowing them to carry on spinning/slow down even when the system frequency changes.
[15] Largest infeed loss is set typically based on largest single generator exporting power to the grid at the time to help hold sufficient reserves to cover this loss.

net zero. Research from the Energy Systems Catapult[16] highlights some of these opportunities including – using demand side flexibility to support system operation, more real time, and dynamic approaches to manage risks and constraints, distributed intelligence and control systems and regional system operation with national coordination.

Unlocking these opportunities will require innovation across technology (including control systems), markets and standards and must take place in the wider context of local energy systems, cyber security, Distribution System Operator (DSO) transition[17], and new challenges to energy security.

The 'preparing for a net zero power system' Innovation Challenge aims to:

- Develop innovations in technology, markets and standards that help the power system be ready for net zero by 2035
- Develop evidence on the technical and commercial capability of new assets to provide power stability services
- Support the system integration of novel assets including the necessary digital interfaces and their market accessibility to help increase the pool of resources providing system stability services ahead of 2035.

Innovation Challenge-specific requirements

In addition to meeting the requirements within the SIF Governance Document and licence condition, projects applying to the 'preparing for a net zero power system' Innovation Challenge must meet the below requirements.

Scope of projects

Networks are encouraged to consider all the below points within their project development, but as a minimum your proposal must directly address at least one as a primary focus of the proposed project.

1. Novel ways to reliably support low stability systems
2. Accessing grid/system support from novel supply and demand side sources.

[16] https://es.catapult.org.uk/report/zero-carbon-energy-system-the-operability-challenge/
[17] https://www.energynetworks.org/creating-tomorrows-networks/open-networks/distribution-system-operation-transition

Partner requirements

The table below outlines Project Partner requirements for each of the specific focal areas (scope of projects) and the stage of the project.

Project scope	Discovery (at least one of each)	Alpha (at least one of each[18])
1. Novel ways to reliably support low stability systems.	1. Organisation with expertise focused on data and digitalisation approaches 2. An electricity transmission, electricity distribution or electricity system operator network licensee in addition to the project lead.	1. Operator of assets connected to the energy networks. Such as, but not limited to; a. renewable generators b. nuclear plants, c. hydrogen electrolysers d. energy storage or e. aggregators with a portfolio of demand side resources including electric vehicles (including charging points), or demand side response.
2. Accessing grid/system support from novel supply and demand side sources.	Same partner requirements as above.	Same partner requirements as above.

[18] At least one from each numbered group relevant to the project

Innovation Challenge 3:
Improving energy system resilience and robustness

Strengthening whole system resilience and robustness to achieve net zero securely

Context: the background to the problem we are trying to address:

Energy system resilience is broadly defined as the ability to recover from shocks whilst being able to deliver the required energy service needs via alternative means. Whereas robustness is the system's ability to withstand shocks without significant loss of the ability to deliver those services. These two characteristics are critical aspects to consider for a net zero energy system. As the energy system becomes more complex, distributed, and interdependent between vectors, it creates new challenges and opportunities to deal with increasing risks from natural and other hazards[19].

There is considerable evidence on the value of multi-energy systems[20] where services are coordinated rather than treated separately for cost effective decarbonisation. Such system configurations also offer novel approaches to maintain or even increase resilience of a dynamic energy system in the future. Examples include power-to-gas (including hydrogen) coupling (for applications including long term storage during periods of low renewable generation output), and multi-energy microgrids operating independently to deliver critical services during disruptions to the national system.

Whilst such multi-energy systems are currently being developed in different contexts including smart local energy systems, specific aspects around how they can impact and provide wider system resilience is not being considered. Additionally, there is a need for better understanding of consumer behaviours and acceptance (cost, quality of service etc) of novel approaches to increasing system resilience.

Innovations in policies, codes, organisational responsibilities, operational strategies, and measurement approaches, relating to resilience and security of supply are important considerations alongside technology developments.

In addition to operational resilience, securing and strengthening aspects of the energy system including the supply chains for energy networks (hardware and digital) is also critical to ensure a robust energy transition towards net zero. This challenge is further

[19] This could include intentional cyber or physical attacks and technical failures.
[20] Systems in which electricity, heat, cooling, fuels, transport, and so on optimally interact with each other at various levels - for instance, within a district, city, or region (taken from Mancarella, 2014).

compounded by the pace of change and associated integration rates required in the energy networks for meeting the net zero commitments.

The 'improving energy system resilience and robustness' Innovation Challenge aims to:

1. Incorporate resilience and robustness as key and measurable considerations into future multi-energy system design
2. Develop technical, organisational and commercial innovation including using novel multi-energy system configurations for increasing system resilience
3. Improve understanding of trade-offs between increasing resilience, robustness and the cost implications and consumer trust & acceptability in the context of a net zero transition
4. Improve understanding of robustness in future energy system configurations and develop solutions to improve and strengthen it.

Innovation Challenge-specific requirements

In addition to meeting the requirements within the SIF Governance Document and licence condition, projects applying to the 'improving energy system resilience and robustness' Innovation Challenge must meet the below requirements.

Scope of projects

Networks are encouraged to consider all the below points within their project development, but as a minimum your proposal must directly address at least one as a primary focus of the proposed project.

1. Novel approaches to improving resilience using multi-energy systems
2. Strengthening the UK's energy system robustness to support efficient roll out of new infrastructure.

Partner requirements

The table below outlines Project Partner requirements for each of the specific focal areas (scope of projects) and the stage of the project.

Project scope	Discovery (at least one of each)	Alpha (at least one of each)
1. Novel approaches to improving resilience using multi-energy systems.	1. Academic partner or Research and Technology Organisation (RTO) with experience in system resilience and risk analysis.	1. Consumer representative group 2. Energy network licensee in addition to the project lead. The partner network must hold a different category of network licence than the licensee leading the project (i.e., gas transporter licence, electricity transmission licence, electricity distribution licence etc.).
2. Strengthening UK's energy system robustness to support efficient roll out of new infrastructure.	1. Academic or Research and Technology Organisation (RTO) organisation or industrial partner with capability in supply chains.	1. Energy network licensee in addition to the project lead. The partner network must hold a gas transporter licence, electricity transmission licence or electricity distribution licence.

Innovation Challenge 4:
Accelerating decarbonisation of major energy demands

Enable cost-effective integration of heat and transport decarbonisation solutions aligned to net zero timescales

Context: the background to the problem we are trying to address

Decarbonisation of heat and transport, at the pace required by the net zero commitment and the sixth carbon budget, is a significant challenge. For example, fewer than 30,000 heat pumps were installed in 2020, rapid scale up of deployment is needed to get to the government target of 600,000 installations by 2028[21]. While this is a national target, there are more aggressive targets at the devolved level, such as in Scotland where by 2030 at least 1 million homes must convert to zero emissions heating[22]. Similarly, in terms of heat networks which deliver c. 2% of total heat demand currently, this needs to scale rapidly to be low-carbon and distributing a fifth of the heat demand by 2050[23].

On the transport decarbonisation front, the current Electric Vehicle (EV) cars as a proportion of total sales was c. 12% at the end of 2021[24]. Rapid increase in this figure is required to meet the policy commitment of ending new petrol and diesel cars and vans by 2030[25]. There are similar accelerated efforts required for heavy good vehicles (HGVs) and for decarbonising the maritime and aviation sectors.

Whilst there are several dimensions to help reach these policy commitments, including reducing relative cost of technology, improving supply chain readiness and more consumer focused business models, this challenge is particularly focused on the effective connection, integration, and energy system operational aspects of these major energy demands.

Research by the Scottish Government on network constraints[26] highlights the scale of the connection and integration challenge. It shows that peak load increases for new developments from switching to a heat pump and having EV charging can be 4-5 times the current peak estimates. This could lead to increased costs for network

[21] https://www.gov.uk/government/publications/heat-and-buildings-strategy
[22] https://www.gov.scot/publications/heat-buildings-strategy-achieving-net-zero-emissions-scotlands-buildings/pages/3/
[23] https://www.gov.uk/government/news/uk-government-announces-major-expansion-of-heat-networks-in-latest-step-to-power-homes-with-green-energy
[24] https://www.zap-map.com/ev-market-statistics/
[25] https://www.gov.uk/government/publications/transport-decarbonisation-plan
[26] https://www.gov.scot/publications/research-electricity-network-constraints-2024-new-build-heat-standard/documents/

reinforcement and delays to connection times, depending on the level of network constraint in each area.

A smarter and more flexible approach to integrating decarbonised heat and transport technologies has been analysed extensively. Whole systems modelling by the Carbon Trust and Imperial College[27] estimate that integrating flexibility across heat (including in heat networks), power and transport can reduce the cost of meeting net zero by up to £16bn a year by 2050. In addition to flexibility, the value of energy efficiency is also documented- Imperial College for the Committee on Climate Change[28] estimate that this can save up to an additional £6bn a year across the system.

There has been increased activity in smart, efficient, and flexible systems, including via local area energy planning, data driven and digitalised demand planning, demand side flexibility development (both technology and market approaches), building retrofits, behavioural change, and planning for heat network zoning. Whilst these activities are important individually, it is critical for these to work together in a coordinated, sequenced and consumer focused manner for the deployment targets outlined above to be met cost effectively. This is the key focus of this challenge.

Energy networks are well placed to innovate collaboratively on these aspects given their key role in enabling the effective connection and integration of these demands.

The 'accelerating decarbonisation of major energy demands' Innovation Challenge aims to:

- Develop technical, social, economic and/or political approaches to integrated planning and connecting decarbonised heat and transport demand that reduces overall costs and reduces timescales
- Integrate energy efficiency together with flexibility to reduce costs of connecting and operating decarbonised heat and transport demands
- Demonstrate coordination between flexibility, energy efficiency and regional/local energy planning activities that reduce costs and improves consumer experience for decarbonisation.

[27] https://publications.carbontrust.com/flex-gb/report/
[28] https://www.theccc.org.uk/wp-content/uploads/2018/06/Imperial-College-2018-Analysis-of-Alternative-UK-Heat-Decarbonisation-Pathways.pdf

Innovation Challenge-specific requirements

In addition to meeting the requirements within the SIF Governance Document and licence condition, projects applying to the 'accelerating decarbonisation of major energy demands' Innovation Challenge must meet the below requirements.

Scope of projects

Networks are encouraged to consider all the below points within their project development, but as a minimum your proposal must directly address at least one as a primary focus of the proposed project.

1. Approaches to effectively facilitate, manage, and integrate multiple demands and demand-side solutions – e.g., heat and transport; flexibility and/or energy demand reduction
2. Integrating heat networks for wider energy network management
3. Improving efficiency at different levels in the energy system – e.g. loss reduction across networks; assessing and realising value of demand reduction to the energy network

Partner requirements

The table below outlines Project Partner requirements for each of the specific focal areas (scope of projects) and the stage of the project.

Project scope	Discovery (at least one of each[29])	Alpha (at least one of each)
1. Approaches to effectively facilitate, manage, and integrate multiple demands and demand-side solutions – e.g., heat and transport; flexibility and/or energy	1. A heat technology, service, or infrastructure provider or transport refuelling or charging provider. For example, this could include, but is not limited to: a) heat network providers b) heat pump designers and installers c) EV charging point developers d) Hydrogen hubs developers	1. Organisations with responsibility for constructing and maintaining buildings. For example, this could include, but not limited to: a) Property developer (for projects focussing on new builds) b) Housing associations or public sector property managers or private landlords or property

[29] At least one from each numbered group relevant to the Project.

demand reduction.	2. At least one relevant local government entity.	management companies (for projects focussing on existing buildings) c) Energy network licensee in addition to the project lead. The partner network must hold a gas transporter, electricity transmission or electricity distribution licence d) Flexibility and, or energy efficiency aggregator.
2. Integrating heat networks for wider energy network management.	1. Heat network developer 2. Relevant local government entity.	1. Electricity distribution network (must be a partner if not leading the project) 2. Flexibility aggregator 3. Thermal storage developer.
3. Improving energy efficiency at all levels in the system – e.g. loss reduction across networks; realising value of demand reduction to the energy network.	1. Relevant local government entity.	1. Organisations who constructing or maintain buildings 2. Energy efficiency (networks or demand side) installation or supply chain company.