

# INNOVATION GATEWAY

Round 1 2018 Challenge Brief

**All Challenges**



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## Contact details

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# Summary themes and challenges

## Theme: Improving energy use and generation

### Challenges:

- Utilising assets capable of demand side management
- Heat recovery and ventilation in residential and domestic buildings
- Low carbon refrigeration and cooling systems
- Ultra-low and zero carbon generation technologies
- Improving district heating performance
- Recovering and using waste heat
- Assist in the transition to fossil free district heating

## Theme: Making better use of physical space

### Challenges:

- Measuring and monitoring meeting room usage

## Theme: Improving waste management

### Challenges:

- Separation of liquids out of a waste stream
- Improving the use of waste and recycling data to increase engagement

## Theme: Improving health and wellbeing

### Challenges:

- Improve indoor air quality in buildings
- Connecting people with nature

# Improving energy use and generation

## Utilising assets capable of demand side management

Demand side management has the capacity to significantly reduce energy spend and the Innovation Gateway Partners want to continue making improvements in this area. The utilization of existing assets (hot water controls, generators, refrigerators etc.) is an area that could yield substantial results. There is a particular priority for making the most of CHP assets.

However, there appears to be a lot of change in the energy markets in general, and in the demand response offerings in particular. Additionally, for our partners who use onsite generation, the ability to flex when those units are operational is a great way to benefit from Demand side management.

## The solutions we are seeking

Innovative technologies, approaches, and products that:

- Provide an end-to-end solution that identifies and implements opportunities for demand side management of current assets
- Has the capacity to meet future needs as batteries become part of the estate
- Provide third party financing to complete enabling works (whether directly or through a partnership)

Innovation Gateway partners are interested in solutions for use in commercial buildings.

## Selection criteria

- An ability to provide enabling works and financing where required to participate in schemes (e.g., installing metering on CHPs in order to participate in the Capacity Market)
- Network control would need to interface with existing solution providers
- Should have no negative impact on customer experience
- Ability to be retrofitted
- Scalable
- Payback under 5 years

## Heat recovery and ventilation in residential and domestic buildings

The Innovation Gateway Partners see heat recovery as a process that yields significant energy savings. A key component of the Partners' building services strategy in new builds is MVHR with heat being recovered from exhaust sources such as shower areas and cooker hoods. However, with the ceiling height of new builds continually decreasing, finding high-performance MVHR for these smaller spaces is increasingly difficult. Some of the Partners are also looking for retrofit MVHR for use within a domestic setting.

### The solutions we are seeking

An innovative technology or product that can provide high-performance heat recovery and ventilation in residential block new builds without increasing the size of ceiling voids.

Plug & play/retrofit solutions for existing buildings that will help ventilate at a small scale (e.g., a domestic setting).

### Selection criteria

- Uses minimal ceiling void space
- Meets all relevant regulatory requirements
- High efficiency of heat recovery
- Payback of 3 years or less

## Low carbon refrigeration and cooling systems

The Innovation Gateway Partners need to adopt new low carbon refrigeration and cooling systems technologies to reduce their energy spend and reduce their carbon footprint. Current systems in use are mainly refrigeration for display cases for food (which are a mixture of f-gas systems and CO<sub>2</sub> systems), air conditioning, and centralised chilled water systems.

### The solutions we are seeking

Innovative refrigeration technologies that might include refrigeration batteries, magnetic cooling and coolants, waste heat recovery, control strategies and CO<sub>2</sub> refrigeration.

Retrofit solutions that are suitable for retail environments.

### Selection criteria

- Capacity to be rolled out in a store or office environment
- Preference for commercially proven solutions
- Payback under 5 years
- Meets all relevant regulatory requirements
- Solutions for buildings with a variety of different space constraints

## Ultra-low and zero carbon generation technologies

In a move to operate zero carbon infrastructures, the Innovation Gateway Partners are looking for innovative ultra-low and zero carbon generation technologies for electricity, cooling, and heating. These technologies could be innovations that improve already existing ultra-low and zero carbon technologies such as ground-source heat pumps, wind, or solar generation or they could be totally new technologies.

### The solutions we are seeking.

Small-scale (building based) and large-scale (can be rolled out across an estate) solutions are welcomed. Limited space needs to be a consideration for building-based solutions.

The partners are interested in solutions for use in both commercial and residential buildings.

### Selection criteria

- Technologies that can be retrofitted into existing infrastructure and/or incorporated into new builds
- Solutions that offer optional 3<sup>rd</sup> party financing
- Solutions that offer maintenance
- Payback requirements will vary widely depending on the scale and cost and solutions

## Improving district heating performance

Innovation Gateway partners have already established CHP (mainly gas fired) heating across their estates. With expansive district heating it is hard to locate areas of heat loss in pipework underground in a non-disruptive manner. Therefore managing, monitoring and reducing heat loss on the network is challenging.

### The solutions we are seeking

Innovative technology that can improve the overall performance of existing district heating systems (e.g., by improving insulation).

Non-disruptive technology that can be deployed into pipework to locate breaks/areas where heat loss is occurring on the network and then solve issues while it's there (e.g., by using robotics).

### Selection criteria

- Non-disruptive technology for testing and fixing pipework that maybe underground
- Preferably an already tried and tested technology
- Has a payback of between 6 to 8 years

## Recovering and using waste heat

Sources of low grade heat in buildings generate significant amounts of energy that needs to be ventilated out and is difficult to reuse. The Innovation Gateway partners would like to find a way to make better use of waste heat, e.g. for energy generation, in a range of settings from data centres and freezer rooms in commercial buildings to bathrooms and utility rooms in homes.

### The solutions we are seeking

Cost effective technology for extracting and using low grade heat from one or all of a commercial, residential or domestic setting. We recognise that solutions may only be applicable to one of these areas.

### Selection criteria

- Can work with low-grade heat
- Works in space-constrained areas
- Meets all regulatory requirements
- Has a payback of between 3 to 8 years

## Assist in the transition to fossil free district heating

### The challenge

The Innovation Gateway Partners have diverse property portfolios that require both heat and power for their operation. Many of the partners already use CHP systems with a wide range of power outputs, and district heating systems. The majority of the existing CHP systems are gas fired. Progressing grid decarbonisation means that the energy these CHP systems produce is increasingly less competitive from an environmental perspective. In order to advance organisational objectives of becoming carbon neutral, more sustainable low-carbon solutions are required.

### The solutions we are seeking

Innovative technologies, approaches, and products that:

- Provide non-fossil, sustainable heat and power, and/or help manage the transition from gas towards fossil free district heating.
- Can be incorporated into CHP plants to cost effectively convert heat into electricity
- Can take waste streams such as farm waste, food waste, municipal waste for conversion into heat and power

### Selection criteria

- Truly innovative in some way
- Offer performance above and beyond that achievable with traditional technologies
- Cost competitive with gas CHPs overall for energy and heat costs (once savings on existing waste disposal costs have been taken into consideration)
- Use existing heating/cooling distribution infrastructure

# Making better use of physical space

## Measuring and monitoring meeting room usage

With the rise of remote and flexible working, there is an opportunity to improve the monitoring and management of meeting rooms. Space utilisation can be optimised in instances where there are no-shows for booked meeting rooms for example. A better managed system would promote staff engagement and positive behaviour change in terms of resource use, and could also improve security, as all personnel would be accounted for.

The ability to measure and monitor room use is also a challenge for educational establishments, where some areas maybe be open 24hrs but are not actually being used. Being able to accurately understand room use in this context can contribute to reducing energy use and spend.

## The solutions we are seeking

The Innovation Gateway partners are looking for intelligent monitoring systems which will ensure the efficient use of available space, possibly through the use of a scanning system. Ideally, the solution will provide an efficient room-booking service, intelligent room-unlocking, and have the capacity to integrate smart energy sensors.

## Selection criteria

- Tracking system to assess number of people using a room, as well as to see whether employees are using rooms that have been booked
- Ability to send reminders to people about room bookings
- Highlight inefficient room use (e.g. when 2 people have booked a 12-person room)
- A solution that provides automatic room access only to those who have booked, but where access becomes open for all if there is a no-show
- Ability to integrate with existing IT infrastructure

# Improving waste management

## Separation of liquids out of a waste stream

The Innovation Gateway Partners have already made significant reductions in the waste that goes to landfill from their operations. Waste recycling best works when the various waste streams are separated at source, kept free from contaminants and kept dry. In some instances though, it is hard to minimise contamination for example waste generated on airplanes has to be incinerated if it has been contaminated by food. Cleaners have limited time and space to segregate this waste at source and all waste is collected (and contaminated) in one bag. This can often include half-full plastic bottles. The presence of liquid increases the weight of waste streams, and associated costs of disposal / recycling.

## The solutions we are seeking

A cleaner-centric innovative technology or approach that improves waste separation at source (such as a belt or a pouch that can be worn to put food waste into).

Innovative products that can be retrofitted to compactors (pre incineration) that will squeeze water out of bottles and take liquid off as a side stream to be treated.

## Selection criteria

- Improves waste segregation at source
- Reduces contamination of recycling streams

## Improving the use of waste and recycling data to increase engagement

Some of the Innovation Gateway partners have a property portfolio which spans several councils. Recently a single waste provider has been appointed across several of these councils, giving the Partners unprecedented access to data (in csv format) on waste from residential student accommodation. However, this data needs to be used effectively in order to increase employee and customer engagement on improving recycling rates.

### The solutions we are seeking

Innovative approaches to show data in a coherent and engaging way and that can be used to incentivise customers and employees to recycle their waste appropriately. Incentives may include the ability to offer rewards.

Solutions that can present data via the existing partners' social media channels and/or integrated into existing apps.

### Selection criteria

- Does not use email as a way of disseminating information
- Able to integrate with existing comms channels
- Can demonstrate a viable financial model

# Improving health and wellbeing

## Improve indoor air quality in buildings

Ventilation, temperature and air quality are all proven to affect the productivity and wellbeing of people who use indoor spaces. Studies have shown that improvements in these areas can increase cognitive performance, reduce headaches and respiratory complaints and lead to higher levels of health and wellbeing. However, the notion of “comfort” isn’t always felt – we can’t always feel, see or smell poor indoor air quality.

With that in mind, the challenge that the Innovation Gateway Partners face in trying to improve air quality for building users is two-fold – one passive and the other active. The first is that they want to find non-polluting interior design products (e.g., paint) that do not have an impact on indoor air quality. The second is to find innovative solutions that will actively improve air quality, e.g. portable air filters.

## The solutions we are seeking

Innovative technology that can measure and monitor air quality, the data from which may inform future purchases of products that then can improve air quality (e.g. air filters, window filters).

Portable solutions that customers can buy and reuse when they move home.

Solutions appropriate for both commercial and residential buildings.

Products that improve the indoor environment through avoiding contamination of air, e.g. the use of formaldehyde-free paints.

## Selection criteria

- A consideration of the carbon impact of potential solutions
- Truly innovative products that do not copy what is already on the market

## Connecting people with nature

The rise of urbanism and population density in cities means that people are becoming increasingly disconnected with nature. Proximity to nature has shown to reduce stress and increase health and wellbeing. Many people do not have a garden attached to their property and live in small apartments where it is difficult to nurture green spaces in their homes. The Innovation Gateway Partners are looking for ways in which to positively impact wellbeing by reconnecting people with nature within their home environment.

## The solutions we are seeking

We are seeking ideas on how people can connect with nature in small spaces. This could include biophilic design, innovative ways to grow indoor plants and herbs and ways to attract birdlife to small porch/balcony areas.

This can be treated as a design challenge around how to connect consumers with nature in a home environment.

The partners are interested in both indoor and outdoor solutions for use in residential buildings.

## Selection criteria

- Solutions must not have a negative impact on air quality
- Must not increase the likelihood of attracting vermin

## Contact details

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