INNOVATION GATEWAY

Round 1 2018 Challenge brief

Improving energy use and generation

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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

Utilising assets capable of Demand Side Management

The challenge

Demand Side Management has the capacity to significantly reduce energy spend; the Innovation Gateway Partners want to continue making improvements in this area. The utilization of existing assets (hot water controls, generators, frequency response, refrigerators etc.) is an area that could yield substantial results. However, there appears to be a lot of fluidity in this sector and as such it is difficult to find a company that is stable enough to deliver results. 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).

The partners are interested in solutions for use in commercial buildings.

Further information

Partners generally have high-quality asset registers that identify all the plant and equipment that would be suitable for utilising demand response technologies. There is a particular priority for making the most of- of CHP assets. The ability to incorporate batteries into solutions would be also be beneficial.

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 current providers in use by Innovation Gateway Partners
- Cannot impact on customer experience or ability to trade
- Ability to be retrofitted
- Scalable
- Payback under 5 years.

Heat recovery and ventilation in domestic buildings

The challenge

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 shower areas and cooker hoods (in student accommodation spaces). 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 the home.

The solutions we are seeking

An innovative technology or product that can provide high-performance domestic heat recovery and ventilation in 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).

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

Selection criteria

- Uses minimal ceiling void space
- Meets relevant regulatory requirements on flow rates

Low carbon refrigeration and cooling systems

The challenge

The Innovation Gateway Partners are 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_2 systems), air conditioning, and centralized 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_2 refrigeration.

Retrofit solutions that are suitable for retail environments with a lot of customers and staff.

Selection criteria

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

Ultra-low and zero carbon generation technologies (electricity, cooling and heating)

The challenge

In a move to operate zero carbon infrastructures the Innovation Gateway Partners are looking for ultra-low and zero carbon generation technologies for electricity, cooling and heating for use across their estate. This could be off-site in the form of ground-source heat pumps, wind, or onsite solar generation.

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 3rd party financing
- Solutions that offer maintenance

Improving district heating performance

The challenge

Some Innovation Gateway partners have already established CHP heating across their estates. However, grid decarbonisation means that the energy produced is increasingly less competitive. 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 improving heat loss on the network is challenging.

Additionally, some of the Partners that provide district heating to customers on their network are looking to improve how they monitor heat use so they can provide information to the end user more effectively.

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).

Smart management solutions or technology that will help to monitor properties and provide information to the end user/Partner about the heat being used.

Selection criteria

- Non-disruptive technology
- Solutions that will not impact supply to customers
- 3 year payback

Recovering and using waste heat

The challenge

Data centres and freezer facilities generate significant amounts of heat 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 in a range of settings from data centres and freezer rooms 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.

Selection criteria

- Can work with low-grade heat
- Works in space-constrained areas

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