

INNOVATION GATEWAY

Challenge Selection
Round 2, 2018

Innovator Briefs



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Innovation Categories

Theme: Energy use and metering

Challenges:

- Sub metering at a site level
- Energy batteries and storage funding options
- Reduce energy usage of hot food stands
- Innovative BMS solutions

Theme: Building heating systems

Challenges:

- Ageing heating systems
- Efficient domestic electric heating
- Heat pumps for domestic heating

Theme: Reduction and reuse of waste

Challenges:

- Sustainable materials for building and furniture
- Reducing plastic waste

Theme: Health and wellbeing

Challenges:

- Create a more inclusive environment

Theme: Heating, Ventilation And Cooling

Challenges:

- Heating and cooling of automatic doors
- Optimisation of building ventilation

Energy use and metering

Energy monitoring and measurement

The challenge

The Innovation Gateway Partners want to increase the use of more granular energy monitoring across their estates. They already have a range of AMR solutions in place, but have only adopted sub-metering of energy use to a limited extent due to the high costs of traditional solutions.

The Partners wish to increase their energy monitoring capability in order to gain more granular data on utility usage for the purposes of:

- Understanding and optimising building energy consumption.
- Project performance analysis.
- Anomaly detection.

The solutions we are seeking

The Innovation Gateway Partners are looking for energy monitoring solutions that by virtue of their innovative nature are lower cost and easier to install than standard solutions.

The Partners are particularly interested in solutions that:

- Don't require a qualified electrician to install.
- Have a range of wireless and mobile connectivity options.
- Provide non-intrusive load monitoring for disaggregated energy consumption measurement.

Selection criteria

- Low cost per monitoring channel.
- Minimal disruption for installation.
- Able to provide data to existing systems (Analytics / AM&T).
- Accurate measurement of usage.
- Security certification for internet accessible systems.

Energy batteries and storage funding options

The challenge

The Innovation Gateway Partners have been investigating the use of behind the meter batteries or flow machines, predominantly in order to avoid periods of peak charging and to participate in Demand Side Management schemes.

However, due to the risk of changes to legislation and demand response revenue streams, it has proved difficult to build a business case to support the high capital costs of battery solutions.

The solutions we are seeking

The Innovation Gateway Partners are looking for behind the meter battery solutions that present a better balance between risk and reward, in order to unlock the commercial opportunity.

These solutions will offer one or both of:

- An innovative commercial model that offers greatly reduced commercial risk to the building owner / electricity consumer. Important to achieving this will be the assumption of commercial risk by the solution provider.
- Innovative battery technology that provides a better balance between cost and performance in order to make the solution commercially attractive.

The energy storage solutions should be able to work in conjunction with existing and planned renewable energy schemes across our Partners' estates.

Further information

The known revenue streams for these solutions are non-commodity costs (NCC). NCCs account for ~65% of the Partners' electricity bills.

Our Partners have tens of commercial building sites where they would consider the installation of battery technology if a suitable balance between commercial risk and reward could be achieved.

Previous business cases have specified batteries of 250 kWh or less at individual sites. The average kVA for a typical site during the peak power consumption period (November – December) is around 240 kVA.

PV has been rolled out across many sites, with further roll-outs planned. The majority of this solar power is currently used on site.

Selection criteria

- Truly Innovative technology or commercial model.
- Better risk reward balance than previously available solutions.
- Flexible in regard to existing and future legislation changes.
- Small form factor or scalable.

Reduce energy usage of hot food stands

The challenge

The Innovation Gateway Partners have thousands of hot food stands in their shops. At present it is not possible to ensure that these are turned off when there are no products in them. The operation of these stands when not required impacts energy costs and reduces the lifetime of the equipment.

Time clocks have been trialled in the past however these proved hard to maintain and keep up-to-date with the correct timings. Difficulty in accessing and operating the timers has in some cases led to them being removed or bypassed in order to operate the units.

The solutions we are seeking

The Innovation Gateway Partners are looking for a retrofittable solution that can be used to control existing stands and counters, ensuring that these switch off when they are empty.

We are interested in two types of solution:

- Solutions that can turn off the power to the hot food stands when all of the food is removed from them.
- A solution that switches the power to hot foods stands based on the time of day, but doesn't suffer from the maintenance problems of local timers.

Additional information

In some cases, the hot food stands are plugged into a standard 13amp socket, but this is often difficult to access. In other cases, the stands are hard wired into a circuit fed by the distribution board.

The power consumption of a single hot food stand is generally around 2kW.

Selection criteria

- Payback within 3 years.
- Non-intrusive.
- Retrofittable.
- Easy to install and maintain.

Innovative BMS solutions

The challenge

The Innovation Gateway Partners have a number of challenges and opportunities relating to the use of BMS systems across their estates. These can be summarised as follows:

- Buildings that have no BMS control in place.
- Buildings with old, unmaintained BMS systems.
- BMS systems in individual buildings, but no central visibility or control.
- High cost of proprietary BMS hardware and individual device controller solutions.
- Lack of in-house expertise necessary to maintain and operate complex systems.

The solutions we are seeking

The Innovation Gateway Partners are looking for innovative BMS solutions of the following types:

- Lower cost alternatives to traditional proprietary BMS hardware solutions, that are radically easier to configure, maintain and operate.
- Monitoring and control solutions that can interface to the existing BMS system portfolio to provide centralised visibility and control of building operations across the estate.
- Next Generation IoT based BMS solutions and programmable edge controllers for the full range of building automation requirements.

Selection criteria

- Easier to commission, maintain and operate than proprietary BMS hardware / controllers.
- Lower cost than proprietary BMS hardware and associated controllers.
- Strong security model and relevant certifications.
- <5 year payback.

Building heating systems

Ageing Heating Systems

The challenge

The Innovation Gateway Partners operate a large number of ageing heating systems in a diverse range of buildings across their estates. As these systems age, they suffer from reduced reliability and energy efficiency.

Some of these systems have only simple time clock control, and it is not currently possible to centrally monitor or control their operation.

Detecting issues that lead to reduced efficiency or system failure is therefore limited to expensive programmes of inspection and preventative maintenance.

The solutions we are seeking

The Innovation Gateway Partners are looking for innovative solutions that can be retrofitted to existing heating systems to extend their life, improve energy efficiency, reduce maintenance costs and prevent system failures.

Innovative solutions may come in the form of low cost monitoring / controls, or as physical additions / alterations to existing systems.

Further information

Many of the smaller systems are 30kW – 100kW in size, although there are also a number of larger systems that range between 100kW and 20mW in size. Smaller systems are single pipe with standard radiators.

There may be access issues for the sites, but all should have some form of connectivity even if it is basic.

Selection criteria

- Cost effective.
- Demonstrable ability to reduce energy use, maintenance costs.
- Demonstrable ability to extend life of existing systems.
- <5 year payback period.

Efficient domestic electric heating

The challenge

The Innovation Gateway Partners have found that IR heaters used in conjunction with better, more sophisticated controls offer a measurable energy saving in comparison to traditional electric convector heaters.

Whilst Infra-Red panels also present benefits to occupants over traditional convection panel heaters, including a cleaner feeling heat and a faster heat-up time, many of the available solutions are difficult to justify on a cost basis.

The solutions we are seeking

The Innovation Gateway Partners are looking for innovative Infra-Red heating solutions that offer a price-performance advantage when compared with the majority of available IR heating panels.

The Partners will consider wall mounted or ceiling mounted panels, ceiling tiles, or other solutions such as films and fleeces that can be incorporated into walls, ceilings or floors.

Any solution will have to demonstrate how it will comply with the new EU Lot 20 regulations.

Solutions may have their own control solutions, be bundled with IR controls, or be capable of easy integration with existing control systems such as Prefect controls.

Further information

Ideally, solutions will come in a variety of power outputs. The most common application will be heating a room of around 12m² with 2m high ceilings. For this purpose, it is assumed that around 600w of IR heating is required.

The solution may also be applied to smaller outbuildings, such as home offices, sheds and cabins.

Selection criteria

- 3-4 year payback when compared to convector heaters.
- Lot 20 compliant.
- A mature solution from an organisation with established manufacturing operations.

Heat pumps for domestic heating

The challenge

The Innovation Gateway Partners are looking for innovative, high performance domestic sized heat pumps that can be easily retrofitted to provide domestic heating and/or hot water.

Solutions they have previously considered have suffered from the following issues:

- Real world performance too low to be financially attractive.
- Need for a great deal of expert advice to specify a retrofit solution.
- Insufficiently user-friendly controls.
- Too noisy in close proximity to other buildings.

The solutions we are seeking

The Innovation Gateway Partners are looking for innovative domestic-sized heat pump solutions that can overcome some of the drawbacks with many of the solutions that are available.

The ideal solution will have the following characteristics:

- Easy for a non-specialist to specify as a replacement for traditional domestic heating, hot water or cooling equipment.
- Able to be installed by a competent and qualified person.
- Intuitive, smart controls that make it easy for occupants to use.
- Low noise operation.
- Comes in a range of sizes.

Air to air, air to water or ground source heat pumps will be considered. Air source solutions should be low noise, and ground source systems should overcome issues associated with complexity of installation.

Further information

Our Partners are looking to apply this solution across the UK and Europe (including Ireland, France, Spain, Germany, Poland, Portugal), with varying building regulations and differing housing market trends. The biggest requirement will be in the UK and France.

The solution may also be applied to smaller outbuildings, such as home offices, sheds and cabins.

Selection criteria

- Easy to specify, install and use.
- Ability to supply in different European countries.
- <10 years payback, ideally when replacing an existing system which is not end of life.

Reduction and reuse of waste

Sustainable materials for building and furniture

The challenge

The Innovation Gateway Partners wish to improve the sustainability of the materials they use in traditional build, modular build and furniture construction projects.

They want to avoid the use of virgin and unsustainable materials, and the use of materials that are difficult to recycle, or whose manufacture and use is unfriendly to the environment.

The solutions we are seeking

The Innovation Gateway partners are looking for innovative and more sustainable materials for use in traditional build, modular build, and furniture projects. All materials that can be used in retail, commercial office and domestic environments are of interest.

Examples of materials where more sustainable alternatives are sought include:

- Chipboard, MDF.
- Plasterboard.
- Laminates.
- Cement, plaster, sand and aggregate.
- Ceiling tiles, rafts, acoustic rafts and baffles.
- Vinyl flooring and vinyl graphics.
- Materials for office furniture construction counters, desks and pedestals.

Further information

Successful solutions will succeed in reducing waste to landfill, reducing environmental pollution, or reducing the unsustainable use of natural resources

The Partners are willing to consider early stage as well as more mature solutions.

Selection criteria

- Improved environmental performance / more sustainable.
- Comparable lifecycle costs.
- Meets relevant building regulations.

Reducing plastic waste

The Challenge

The Innovation Gateway Partners are targeting increasingly sustainable and responsible modes of operation. As a part of this journey, they want to reduce the use of single-use plastics across their operations.

Plastics are currently employed across a multitude of products that are used in day-to-day commercial operations, and finding cost effective and high-performance alternatives to existing products is challenging.

The solutions we are seeking

The Innovation Gateway Partners are interested in innovative solutions and approaches to reducing the use of single-use plastics in commercial offices and retail environments.

Many of the solutions are likely to be application specific, and some examples of these are:

- Plastic windows in envelopes.
- Coin bags for use in bank branches.
- Banks cards.
- Visitor cards, holders and lanyards.
- Pens.

An ideal solution would:

- Eliminate the need for single use plastics.

OR

- Increase engagement of key stakeholders in reducing plastic use.

Solutions should be able to fit into the building and waste infrastructure of our Partners' sites and be flexible to fit different layouts and locations.

Further information

The Partners are interested in both early-stage innovations and more mature ideas for quicker roll out.

Selection criteria

- Deliver a reduction in plastic use.
- Improved sustainability.
- Less waste to landfill.
- Comparable cost to existing plastic solutions.
- Futureproof against cost, legislation and reputational risk.
- Low upkeep and payback time.

Health and wellbeing

Create a more inclusive environment

The challenge

The Innovation Gateway Partners have been actively addressing ways to improve the experience of people with disabilities across their estates.

They have solutions in place currently to support people with physical access needs, visual impairments and hearing loss, but would also like to support other groups, including those who have less visible disabilities.

The solutions we are seeking

The Innovation Gateway Partners are looking for innovative solutions that support the creation of more inclusive and supportive environments for both customers and staff.

The Partners are open to any innovations that can improve the experience of their customers and staff. Examples include navigational aids, alternatives to induction loop hearing systems and systems to help those with visual impairment.

Further information

Cost and ability to retrofit into existing retail or office environments will be factors in selecting viable innovations, as well as the perceived impact and value in the opinion of disability groups.

Our Partners will judge a solution on the basis of improvements in customer and staff enablement / satisfaction.

Selection criteria

- Improve enablement impact.
- Reduction of stress.
- Retrofittable to office and retail premises.
- Cost justifiable on the basis of benefits.

Heating, Ventilation and Cooling

Heating and cooling of automatic doors

The challenge

The Innovation Gateway Partners have a large number of doors and entrances to buildings that are used by both passengers and, in some cases, vehicles. A significant amount of heat is lost through these doors in winter, and gained in summer, leading to increased energy bills, and occupant discomfort.

Most of the doors in question are fitted with over-door heaters that are primarily water- and electricity-heated. They have filters that require regular maintenance in order that they continue to operate effectively.

The solutions we are seeking

A solution that keeps heat in the building in the winter and out of the building in the summer. The system should not impact on the use of the door and should not impact user comfort.

The solution could achieve this by improving the control of existing equipment, or by replacing with higher performance or lower maintenance equipment.

The ideal solution would demonstrate a measurable reduction in power necessary to run the units.

Further information

In some cases, the doors directly separate the interior and exterior of the building, and in others, there are two sets of doors separated by an airlock.

The door types include shop-front automatic doors, roller-type industrial doors and cold store doors.

Some of the Innovation Gateway Partners have tried unheated high-velocity overhead door fans, but this was uncomfortable for the person walking under and did not seem to reduce heat loss.

In cases where the units are to be installed in customer facing areas, they need to be aesthetically pleasing.

Selection criteria

- Units need to be robust and low-maintenance.
- Easy installation.
- UK based solution preferable, or one with a UK based distribution capability.
- Ability to supply a number of different sized products for different sized doors.
- 3-4 year payback based on operational savings.

Optimisation of building ventilation

The challenge

The Innovation Gateway Partners have a diverse portfolio of buildings containing many different ventilation systems. They wish to reduce the energy consumption of these systems.

The systems in question range from small air handling units supplying one zone to larger units with multiple zones. These units are specified, and many are operated, to cope with peak building usage, in spite of large fluctuations in occupancy.

Whilst larger air handling units have been retrofitted with plug fans, hundreds of smaller units have older belt drive induction motors, owing to difficulties in making the business case for replacement with more efficient EC fans.

In some cases, the capacity of ventilation systems is being stretched by building occupancy that has exceeded design limits. In others, there are significant challenges in heating, cooling and ventilating retail spaces that are continually opened to the outside environment.

The solutions we are seeking

The Innovation Gateway Partners are looking for following types of innovative solutions:

- Retrofit solutions to allow control of existing ventilation equipment in response to fluctuating building occupancy.
- Solutions that increase the capacity of systems where building occupancy has gone beyond the original design.
- Solutions designed to overcome the challenges of ventilating modular design retail spaces (e.g. bank branches) that are continually opened to the outside environment.
- Cost effective retrofit solutions for upgrading the efficiency of smaller air handling units.
- High efficiency extraction units.

Further information

Existing fans in smaller air handling unit fans generally have a power consumption of 1.5kW - 5kW

Some of the Partners are measuring CO₂ levels using sensors, but are not yet using this data to control the operation of ventilation systems.

Existing extraction units currently use 10kW-30kW fans and are often located >2m above ground

Selection criteria

- Retrofittable with minimal disruption.
- Improved energy efficiency without compromising safety.
- Payback period under 5 years.
- Systems with internet accessible components will need ISO security certification.