

# INNOVATION GATEWAY

Collated Challenges  
Round 1, 2019



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# Innovation Categories

## Theme: Low Carbon Refrigeration and Cooling

### Challenges:

- Low carbon refrigeration and cooling

## Theme: Improved Building Performance and Construction

### Challenges:

- Building fabric of heritage buildings
- Durable internal wall construction and/or finishing

## Theme: Improved Occupant Experience

### Challenges:

- Indoor air quality
- Access control system to manage lock-outs in tenanted accommodation
- Tamper-proof fire alarm detector heads

## Theme: Renewables

### Challenges:

- Domestic PV
- Urban wind

## Theme: Water and Waste Management

### Challenges:

- Water saving devices
- Use of sink grey water for toilet flushing
- Prevention of drainage issues and reduced risk of non-compliance

## Theme: Kingfisher

### Challenges:

- Products that enable rainwater harvesting/grey water for domestic use
- Gadgets for reducing domestic water consumption
- Outdoor treated wood
- Indoor composting

# Low carbon refrigeration and cooling

## The challenge

The Partners are looking for innovative new technologies across all their portfolio types.

A number of emerging technologies are sought that will enhance energy efficiency, maintenance and control across sales floors, including HVAC chillers, high temperature and low temperature systems and F Gas assets such as comfort cooling. These are areas of specific interest for their business.

The challenge here is to identify new impactful technologies that could be developed and advanced to enable further energy reduction and control.

## The solutions we are seeking

The Partners are looking for solutions that would suit a range of refrigeration and cooling uses from large supermarkets to small food outlets and possibly residential scale.

The intention is to promote and support development of new technology to reduce energy and carbon emissions related to refrigeration and cooling.

## Further information

New solutions should have a detailed environmental footprint analysis and should provide step change improvements on existing solutions.

Retrofit solutions/additions to existing installations would be considered.

Maintenance of new systems should be comparable to or better than existing solutions.

There is the opportunity for a development partnership with the Partners, if the technology is still at an early stage.

## Selection criteria

- Refrigeration and cooling using alternative generation technologies offering significant energy and carbon emission reduction.

# Improved Building Performance and Construction

## Building fabric of heritage buildings

### The challenge

The Partners would like to improve the thermal performance of the building fabric of their heritage buildings, which have numerous associated problems including difficulty of access and strict planning laws.

The Partners have old, listed, heritage and feature buildings within their portfolios generally have poor thermal performance. Increasing insulation in these buildings is difficult - external insulation is often not an option due to conservation status and internal insulation can be difficult because of building features, cost, space and work required.

The challenge is to find innovative products which could improve thermal performance of these buildings without having a significant visual impact.

### The solutions we are seeking

The solutions will reduce heat loss, cutting energy consumption and improving thermal comfort.

There are issues with draughts around windows and doors, and damp and condensation from difficult to insulate solid walls.

Envisioned solutions include, for example, thin insulating panels, paints or coatings, but the applicability of these will depend on the type of building.

### Further information

Limited options have been considered to date, usually taking the form of simple draft-proofing or improving efficiency of heat sources where possible.

### Selection criteria

- Improved thermal performance and reduced energy consumption.
- Limited visual impact.
- Would consider trailing an early stage technology.
- A payback of under 10 years is preferred.
- Innovators that have an understanding/ experience of working with heritage buildings are desirable.

# Durable internal wall construction and/or finishing

## The challenge

The Partners are investigating how they can change the construction or surface finish of internal walls in high traffic areas such as corridors, stairs and common areas to make them more durable, easier to maintain, longer lasting and less prone to damage.

Internal walls in high traffic areas receive high levels of damage (both wear and tear, and malicious damage) which results in tired looking buildings and high costs for maintenance and repainting.

The challenge is to find a solution that will improve/maintain the current aesthetics of their properties and reduce the frequency of repair and repainting.

## The solutions we are seeking

Solutions could be:

- durable construction methods/materials for new builds,
- retrofittable cladding or other finish e.g. paint,
- other protective elements to guard against impact, abrasion, scuffs, dirt, splashes etc...

These solutions should be aesthetically acceptable, and not make buildings look institutional. The appearance should not have colours, designs or finishes that will date quickly before end of product life. Solutions should be easy to clean, have longer lifecycle than current painting regime (around 8 years), and potentially display a reduction in time, cost and skill needed for installation/application compared to traditional finishes.

## Further information

Currently, internal walls are traditionally finished (plaster board, skim, paint) and with high durable paint, and some edge/corner protection.

The Partners will require solutions to fit within their specific brand guidelines. Further information, including Pantone colours, can be provided.

## Selection criteria

- Easy and quick to install/apply, durable, long life, well established supply chain, easily available, safe and compliant.
- Mature solution; ideally market ready or already available.
- Potentially 10,000s required so as low unit cost as possible.
- Solutions could be used for both new construction and retrofit.
- Compliant with all necessary regulations and standards and CE marked. Fire performance would be of particular importance given these spaces are often fire escape routes.

# Improved Occupant Experience

## Indoor air quality

### The challenge

Our Partners, who own and maintain buildings that are used for multiple occupancies, have been receiving increasing numbers of queries about indoor air quality. Currently, there is some measurement of humidity and CO2 and the Partners are aware of the need to measure other aspects such as NOX and VOC's.

This is particularly relevant to older buildings within the Partners' estates that may always have had poor ventilation, or sites with MVHR that is performing poorly/reaching end of life. Many older buildings have issues in shower rooms/en-suites with mould caused by poor ventilation.

The challenge is to identify a solution that will help partners measure a range of indoor air quality factors to enable them to act where necessary to improve indoor air quality.

### The solutions we are seeking

The solution would ideally be mobile, so that it may be moved from property to property. A successful solution could be deployed in a property with a suspected air quality issue and provide the business case to install equipment/make interventions in that property.

As the equipment may be deployed within tenant bedrooms, any equipment would need to be robust, secure and tamper-proof. This means It would need to be able to be fixed to a wall for a fixed period of time.

### Further information

A better understanding of air quality will allow the Partners to understand when MVHR/extraction units are not performing as they should and prompt action. It will also allow them to build a view of air quality throughout their estate.

This knowledge can then be fed into specifications and be used in building business cases for the upgrade of ventilation/MVHR. Primarily, the main driver is to increase wellbeing in buildings.

Partners would be interested in a small level of support to help with understanding the data initially.

### Selection criteria

- The solution needs to be mobile so that it can be moved easily and not tied to a single building.
- Being able to see the data from an online platform is useful but not required. Attending site after a week of measurements to download the data would be acceptable.
- A mature and proven solution is sought for this challenge.
- The solution must be easy to use by members of staff.
- The solution will need to be battery powered.
- Cost will be a consideration, but the Partners will be open-minded given the reusability required.

# Access control system to manage lock-outs in tenanted accommodation

## The challenge

The Partners would like to simplify the process of dealing with tenants who lock themselves out of their accommodation at bedroom, flat, or main entrance level.

Lockouts cause customer dissatisfaction and are a health and safety risk for tenants. They create a significant workload, management burden and cost for the Partners.

The challenge is to identify an access control system that can operate at all levels (i.e. main entrance, flat entrance, bedroom entrance) and allow for centralised control that will enable locked out tenants to be identified and then let in.

## The solutions we are seeking

The solution should be future proof, scalable, and secure while being easy for tenants and staff to use.

The solution would ideally be a digital solution that overcomes the problem of tenants being locked out, without keys or phone.

The solution should have an independent central control system that the security team can use to enable access remotely.

Any installation work is likely to occur over short periods where the property is unattended, so the solution needs to be rapid to install and ideally retrocompatible without significant carpentry work/ replacing whole doors or frames, and without running mains power to all doors.

## Further information

Generally, RFID card or fob systems are used at the moment. The Partners have undertaken reviews of access systems and are aware of Bluetooth, RFID and Biometric systems. Systems have been discounted where they still rely on a physical key device or mobile device.

Whilst not ideal, solutions may be considered where they enable locked-out tenants to obtain access to a property safe zone to await security.

The Partners are interested in seeing solutions that are capable of printing new access key cards upon signal from a central security centre.

## Selection criteria

- Compliant with all necessary regulation (e.g. GDPR) and standards, be CE marked and Secure By Design rated.
- A secure system that is not vulnerable to hacking.
- No significant cost uplift compared to incumbent system.
- Simple and relatively quick to install, easy to use, easy to manage. Minimal ongoing maintenance requirements.
- Solution will be battery operated and not require a mobile phone.
- Mature proven system with a well-established supply chain, that is easily available.
- Potentially 10,000s required so as low unit cost as possible.

# Tamper-proof fire alarm detector heads

## The challenge

The Partners properties have fire detection and alarm systems to protect building residents from fire and to ensure legal compliance. This includes fire detection heads in tenant bedrooms and kitchen areas.

A known issue is tampering with fire detector heads. Tampering can take the form of attempted removal or covering (with a plastic bag, cling-film, a sock, etc.).

The challenge is to identify a solution that prevents tampering/covering of fire alarm detector heads, or automatically alerts management/warns tenants (e.g. via localised alarm) if fire detection heads are covered/tampered with.

## The solutions we are seeking

The solution should ideally be compatible with existing and new build solutions where a variety of different proprietary fire alarms are used. The solution could be a replacement but retro-compatible fire alarm head for use with existing and new development properties.

A successful outcome would be a solution that improves overall safety by preventing people from tampering with fire detector heads. This could be something to physically prevent or make it harder to cover detector heads, or to send automated alert or sound local alarm if it is found to be covered.

The solution should also be aesthetically acceptable (e.g. an institutional/industrial looking protective cover is unlikely to be acceptable).

Some systems will be fixed on solid ceilings so could not be recessed or flush-fitted.

## Further information

Currently, the Partners rely on management processes for logging and reporting covered detector heads during routine inspections, and labels/signage warning "do not cover".

Optical/IR camera/beam type detectors may not be acceptable due to concerns over surveillance and small size of rooms.

An aspirator type system similarly may be deemed unacceptable due to high cost, maintenance and aesthetic impact.

The solution must not use Wi-Fi as this can provide an unstable service. 4G service, etc. is a possibility.

## Selection criteria

- Easily installed, retro-compatible, inexpensive, aesthetically acceptable, unobtrusive.
- Compliant with all necessary regulation and standards, and be CE marked.
- A well-established supply chain.
- Ideally, a ready-to-deploy solution, with a proven track record, but will consider others depending on risk/complexity.
- Low unit cost.

# Renewables

## Domestic PV

### The challenge

The Partners would like to investigate ways to improve the business case for installing new domestic PV on their properties in the face of Feed-in Tariff cuts.

They have a large number of existing installations, on both domestic and commercial properties. There are commitments to install a set number of systems within the next two years, and at the moment the business case is prohibitive.

The challenge is to find innovative PV technologies which support the Partners' bids for funding or make a viable business case for self-funded projects.

### The solutions we are seeking

The Partners are seeking low cost, low carbon energy, particularly for tenants in council-owned housing stock. In addition, innovative funding and trading models could be of interest.

There is also interest in packaged solutions, including battery storage (whether at an individual or communal level) into any funding bid.

The system would need to demonstrate ease of integration with existing systems, including online energy use platforms (e.g. EMIG) and safety systems e.g. lightning protection and fire alarms.

### Further information

One solution already known to the Partners involves a hybrid inverter and lithium battery system, which would help reduce the cost of adding on battery storage, and they would be interested in exploring this further.

The Partners have also briefly looked at peer to peer trading of energy which could be an interesting solution.

Installation could either be performed by the Partners or by the innovators themselves.

The solar-produced energy is used in a variety of ways for different Partners:

- In case of seasonal tenancies, 95% of the power is used during periods the property is occupied, but exported during quiet times e.g. the summer.
- In case of permanently-inhabited properties, the majority of solar-produced energy is exported as tenants are not at home during the day to use it.

### Selection criteria

- A proven 5% ROI is desirable.
- Improve business case for installing domestic PV.
- Can be implemented at scale, potentially in the 1,000s of 10-200kWp installations.
- Preferably the solution will be available in the short term, i.e. market ready. However, there is the potential to fund the installation of a solution that is not quite at this stage.

## Urban wind

### The challenge

The Partners would like to identify innovative wind turbine technologies which could be deployed in an urban environment.

These solutions may be used in combination with mapping exercises which look at wind patterns and speeds at different strata to identify optimal locations to site wind technologies.

The challenge is to find innovative small-scale urban wind turbines that combat the traditionally bad reputation of such solutions when it comes to efficiency, planning permissions and maintenance requirements.

### The solutions we are seeking

A successful outcome would be the trial of one or more new concepts which can be easily installed in the urban environment. Trialled solutions should deliver efficient energy generation to be used in the Partners' buildings, or to power street lighting or similar.

We have interest from Partners who have very strict planning requirements, and who have not been able to install wind solutions previously due to risk of radio interference. A successful solution must be able to demonstrate the ways in which it can combat these problems.

There are no output requirements to make a solution appealing, but all electricity generated will be used to cut costs and deliver carbon savings.

Ideally, technologies will achieve a 5%-10% ROI over their lifetime.

### Further information

The Partners are flexible on whether a solution is market ready – the stage of innovation would correlate with the size of the installation.

### Selection criteria

The technology should be:

- Deployable in the urban environment.
- Compliant with planning laws.
- Low maintenance, where possible.
- Able to generate electricity efficiently to deliver a 5%-10% ROI over its lifetime (inclusive of maintenance costs).
- The Partners would consider trialling early stage technology as long as it has been thoroughly tested.

# Water and Waste Management

## Water saving devices

### The challenge

Water is an increasing utility cost and a resource that requires effective management, especially in areas predisposed to drought. The Innovation Gateway Partners have diverse portfolios of commercial buildings that consume large amounts of water, including:

- Community centres, libraries, crematoriums and other public buildings.
- Leisure centres and pools.
- Commercial offices.
- Transport terminals.

The challenge is to identify innovative solutions that reduce water consumption across the range of commercial properties and across a range of applications.

### The solutions we are seeking

The Partners are seeking innovative water-saving technologies to improve the efficiency of their buildings, focusing on consumption associated with taps, toilets and showers.

Potential solutions of interest range from simple add-on products all the way to full system replacement solutions. Solutions that are technologically simple or advanced are of equal interest.

Retrofittable solutions should demonstrate the ability to integrate with existing pipework and flows, while ensuring minimal disruption.

Solutions must demonstrate a level of robustness and functionality necessary for continuous operation.

### Further information

Any solution that will be public facing must meet with the Partners' aesthetic requirements, looking smart and continuous with existing systems and brand guidelines.

Due to the range of buildings involved, a solution may be suitable for installation across only a section of the estate, but this will not rule out any innovation from consideration.

### Selection criteria

- Water and cost savings are key requirements.
- Solutions must be WRAS certified for consideration.
- 3-5 year payback.
- Any degree of market readiness will be considered, with pilot sites used to test solutions before rolling out.
- Low maintenance solutions are desirable.

## Use of sink grey water for toilet flushing

### The challenge

Toilets are responsible for a significant proportion of water consumption across the Innovation Gateway Partners' estates.

The challenge is to locate innovative ways of using grey water from sinks associated with the toilets to provide the flushing water.

### The solutions we are seeking

The aim is the reduction in water consumption across their sites, with no impact on the performance of the toilets and no impact on the user's perception of the toilets.

Solutions that work with toilets and sinks that are spaced significantly apart from one another, as in public bathrooms, are necessary for the commercial buildings across the Partners' estates.

Retrofittable solutions that integrate into existing systems with minimal disruption and low maintenance requirements are desirable. However, there is the possibility of combining installation with upgrades across some of the properties.

### Further information

An innovation that displays a solution to the associated discolouration/staining that comes from using grey water would be preferred. While some Partners are able to roll out educational programmes to increase public understanding, others would struggle with aesthetic requirements.

### Selection criteria

- Solutions must be WRAS certified.
- A solution from a UK based provider is preferable.
- For the right trial, the Partners would consider a cost of £10-20k.

# Prevention of drainage issues and reduced risk of non-compliance

## The challenge

Current solutions to large drainage blockages (small fatberg type blockages) involve grease traps and enzyme dosing followed by high pressure jetting to unblock drains.

This can be costly, time-consuming and uses a lot of water. There are also risks of noncompliance with the wastewater regulations.

The challenge is to find innovative solutions that save time, money, water and effort when maintaining drainage systems.

## The solutions we are seeking

Solutions will ideally lower the water costs associated with treating blockages, increase safety and ensure the system is kept compliant.

The following types of solutions are of particular interest:

- Sensing technology that monitors the condition of drains and provides early warning indicators so that major blockages can be avoided.
- Biological treatments that target any organic material that enters the drains.
- More effective solutions for preventing inappropriate waste entering the drains.
- Solutions that increase the efficiency of cleaning drains when blockages do occur.

A retrofittable solution that can integrate with existing drainage systems is preferred.

A solution that can maintain effectiveness throughout changes of staff would be ideal.

## Further information

The drains systems range from those associated with office kitchens to larger commercial operations.

Ways of using recovered fat for feedstock or the biofuel industry are of interest.

The solution would ideally be mobile, although there is demand for permanent solutions at problematic sites.

## Selection criteria

- Staff safety must not be compromised.
- Effective through high staff turnover.
- Mobile or fixed installation.

# Kingfisher

## Products that enable rainwater harvesting/grey water for domestic use

### The challenge

Domestic rainwater harvesting is a well-known solution for conserving water, but the predominant implementation is for outdoor use, such as watering the garden.

The challenge is to find products that will allow customers to simply and effectively use harvested rainwater inside the home.

### The solutions we are seeking

Applications of interest include using the harvested water for toilet flushing or laundry water.

Solutions should not require a large amount of effort to install, function and maintain.

Solutions should clearly demonstrate that they are able to comply with all associated safety and regulatory requirements related to storing rainwater internally.

### Further information

There have been previous attempts to sell products that use grey water for functions such as toilet flushing, but due to strict regulations these products are not suitable for all of Kingfisher's markets.

Solutions that employ grey water or rainwater must clearly display how they satisfy all necessary regulations to be considered.

### Selection criteria

- Installation via DIY as opposed to a specialist trader is preferable.
- The solution must comply with Kingfisher's sustainable home product guidelines.
- Kingfisher would prefer that spare parts, where appropriate, are available to enable the customer to maintain their product.
- The cost of the solution will make it accessible to the average household.
- A product that could be sold across all markets would be optimal. Kingfisher's primary markets are the UK, France and Poland.
- Ideally the solution will be market-ready. However, less developed innovations are still of interest if the innovator would be happy to collaborate with Kingfisher's existing third-party manufacturers/supply chain.

# Gadgets for reducing domestic water consumption

## The challenge

Domestic water conservation has beneficial implications for both the environment and customers' finances.

The challenge is to find simple gadgets which allow customers to effectively and easily decrease their water consumption and increase their household sustainability.

## The solutions we are seeking

The solution should be usable anywhere water use is liable to be excessive – for example in the bathroom or kitchen.

There are a number of products on the market already, so the ideal solution would clearly display its innovation and effectiveness.

The solution will be simple to install, whilst fun, imaginative and inspiring to a consumer.

## Further information

Kingfisher sell a wide range of simple water saving devices, from plugs and washing up bowls, to regulators for taps. An easy to use and easy to install solution, regardless of its technological complexity, will be of interest.

## Selection criteria

- Simple installation and ease of use.
- The solution must be able to demonstrate an effective reduction of water consumption.
- The solution must comply with Kingfisher's sustainable home product guidelines.
- The cost of the solution will make it accessible to the average household.
- A product that could be sold across all markets would be optimal. Kingfisher's primary markets are the UK, France and Poland.
- Ideally the solution will be market-ready. However, less developed innovations are still of interest if the innovator would be happy to collaborate with Kingfisher's existing third-party manufacturers/supply chain.

## Outdoor treated wood

### The challenge

Kingfisher sell a vast array of wooden products with outdoor applications, including garden furniture, storage and plant pots.

The commercial wood they use must be treated with chemical preservatives for protection from moisture, decay and fungal/insect attack. Many of the preservatives used are concerns to human health and the environment and Kingfisher wish to remove them from their supply chain.

The challenge is to locate a source of treated wood that avoids the use of harmful chemicals.

### The solutions we are seeking

Potential solutions could include:

- Formaldehyde / isocyanate free MDF/HDF that can resist outdoor environments
- Outdoor wood resistant to fungus, insect, and rot without harmful chemical treatment such as heavy metals and biocides.

### Further information

Previous composite solutions have been a successful offering for Kingfisher, but there are end of life concerns associated with these products.

### Selection criteria

- The product must have demonstrable water-resistant qualities.
- The recyclability of the wood at end of life is an important factor.
- The wood must comply with Kingfisher's responsibly sourced wood and paper policy.
- Low cost is preferred but there may be certain applications for higher priced solutions.
- A product that could be sold across all markets would be optimal. Kingfisher's primary markets are the UK, France and Poland.
- Ideally the solution will be market-ready. However, less developed innovations are still of interest if the innovator would be happy to collaborate with Kingfisher's existing third-party manufacturers/supply chain.

## Indoor composting

### The challenge

Food waste is a growing problem for customers and the environment, with over 7 million tonnes discarded annually. The decomposition of this food waste in landfills contributes to greenhouse gas emissions.

Homeowners and tenants of urban areas generally struggle to recycle/compost food, due to lack of space or no support from their local authorities. For customers who do have facilities to recycle/compost food, concerns regarding smell or pests often discourage them.

The challenge is to find solutions for indoor food waste recycling/composting, which are compact, simple to install and easy to use.

### The solutions we are seeking

A product could be stored under sinks or in utility rooms. Also of interest are solutions that can be stored outdoors on a balcony or in a garage.

Solutions that address the issues of odour or risks of pests are of particular interest.

### Further information

Kingfisher are looking for a level of innovation that is accessible to the average household, while demonstrating improvements over existing solutions such as wormeries.

### Selection criteria

- Simple installation and ease of use.
- The solution must be effective in terms of smell and pest prevention.
- The solution must comply with Kingfisher's sustainable home product guidelines.
- The cost of the solution will make it accessible to the average household.
- A product that could be sold across all markets would be optimal. Kingfisher's primary markets are the UK, France and Poland.
- Ideally the solution will be market-ready. However, less developed innovations are still of interest if the innovator would be happy to collaborate with Kingfisher's existing third-party manufacturers/supply chain.