INNOVATION GATEWAY

Challenge Selection
Round 2, 2018

Innovator Briefs – Heating, Ventilation And Cooling

Contents

Innovation Category

Theme: Heating, Ventilation And Cooling

Challenges:

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

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 $C0_2$ 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.