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Intelligent Street Lighting Demonstrator

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Organisation: Glasgow City Council

Country: United Kingdom

Level of government: Local government

Sector: General public services

Type: Data, Public Service

Launched in: 2014

Overall development time: 1 year(s)

Link to the innovation's website

Description

The intelligent street lighting Demonstrator was installed in 3 locations within the City of Glasgow. At the most fundamental level, the use of LED streetlights demonstrated the energy efficiency associated with the use of LED lamps. However, the demonstrator also showed how the 'intelligent' street light could also contribute to reduction in carbon emissions and increase safety. In addition to the use of the LED lamp, sensors were installed on lighting columns. These sensors collected data such as footfall, air and noise pollution levels and the street lighting 'network' provided the foundation to capture and collate that data. This data was then published on the Open Data Platform which can be accessed on the internet by the public. The 'intelligence' in the street lighting network includes the ability to change the level using software. In addition, the sensors can be 'integrated' with the streetlights to allow automatic adjustment of lighting levels in response to sensor feedback e.g. increasing noise level (say, due to a disturbance), or motion on an street with low background lighting levels. This enhances the safety within the City of Glasgow. Furthermore, when this functionality is combined with the capability of the Glasgow Operations Centre (the public space CCTV hub for Glasgow) the Intelligent Street lights can notify the Operations Centre of movement, increase the lighting level and the Operations Centre can direct the cameras providing enhanced safety for, say, a pedestrian walking through a less busy area. The management software for the lighting will also detect and report faults, speeding up repair times and increasing efficiency.

Why the innovation was developed

- Through our Future Cities demonstrator, Glasgow led the way with the trial of intelligent street lighting, looking at ways to add more control and efficiency to our lighting network while harnessing the power of data to improve both lighting and safety throughout the city.
- The data captured by the sensors installed on the network allow themonitoring of air pollution, footfall and noise data which provides a greater understanding of the city and can inform change. Installing a LED lighting central management system provides more control over our lighting system by allowing the central control of the system and the achievement of additional energy savings and maintenance savings.

Objectives

Improve effectiveness, Improve efficiency, Improve service quality

- The objectives of the Intelligent Street Lighting project are to:Improve lighting quality in the city – the ability to optimize street lighting according to ambient lighting, and the use of intelligent lighting to expand lighting to areas of the city that are not currently lit to encourage more Active Travel.
- Improve public safety in the city – the ability to adjust lighting in response to predefined events such as public safety incidents. • Improve efficiency of lighting maintenance – the use of alerts from lighting equipment to improve the efficiency and effectiveness of lighting maintenance resources.
- Improve energy efficiency the use of energy efficientlighting to reduce costs and carbon emissions and to leverage this through variable lighting to deliver further energy reductions. • Improve data collection – the ability to gather data about the city (e.g. footfall, noise and air quality) and to integrate this data within a wider systemic city model.

Main beneficiaries

General population, Government staff

Results

Efficiency

- Fault nodes enable the automatic notification of faults. This means that if a part needs to be ordered then the system can do this automatically and alert an engineer to its arrival, negating the need for fault notification, reducing the number of public reports and reducing maintenance costs.
- The control management system provides the opportunity to centrally control the system and achieve additional energy savings. There is an approximate light saving of 60% on sodium lamps. Early indicators show substantial energy savings (70%) and carbonemission reduction.

Effectiveness

- Automated reporting to the control centre of faults provides a more streamlined process with less room for human error.
- Proactive maintenance reduces outage times and pre visit remote diagnostics enable single visit fixes reducing multiple attendances.
- Self diagnostics enable accurate lamp lifetime calculation. Lighting quality has improved in the 3 test locations contributing to a safer city environment.

Service quality

Responsiveness:

- Automated reporting to the control centre of faults, allowing automated ordering of parts and real time notification of an engineer at the point of delivery provides a quicker and more responsive service.

Reliability:

- Maintenance is proactive reducing outage times. Faults are reporting automatically to the control centre, ordering of parts automated and engineers advised of parts arriving for repair contributing to a more reliable service provision.

User satisfaction

- Proactive maintenance means a more reliable service and therefore an enhanced feeling of public safety and wellbeing in the city.

Development

Design

The idea for the innovation was generated in a bid to Innovate UK for the £24m Future City Demonstrator programme. The City won this bid and since 2013, has been investigating the role that technology, data, and connected assets play in making life in the city smarter, safer and more sustainable. The FCG programme has a focus on the key challenges affecting Glasgow and its citizens, including: Health, Public Safety, Transport, and Energy. The programme is funded by Innovate UK. The FDG programme includes a ‘City Systems Integration’ focus, with Demonstrator projects covering: Active Travel; Energy Efficiency; Integrated Social Transport; and Intelligent Street Lighting.

Testing

- The intelligent street lighting project is a demonstrator project, therefore it tackled 3 key and different areas in thecity (a busy city centre locations and a more remote cycle path) essentially to assess the technical and functionalviability of a city wide rolloutand understand the key activities, challenges and implications of rolling this out on alarger scale. In addition, the test areas also provided evidence of the benefits (qualitative and quantitative) likely tobe achieved from a larger roll out as well as the costs.

Implementation

Tools used:

- The intelligent street lighting infrastructure that was deployed has created a technical foundation that can be exploited for further use. GCC has recognized the value of providing a wireless communication infrastructure in the City that will support delivery of GCC’s services. In particular, implementing wireless access to Council resources from public space to support:
- Streamlining the delivery of front line Council services using mobile technology Gathering and communicating sensor information from the street to central city management systems for publication to Glasgow citizens and visitors via existing applications (e.g. my Glasgow app) – thereby enabling new services to improve quality of life for citizens, such as: smart parking systems to reduce parking time, emissions and congestion; and smart bins that will send alerts when almost full.

Diffusion

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Lessons Learned

Conditions for success

- Strong leadership from the top of the organisation and a senior sponsor.
- Adequate budget and resource allocation, with a dedicated team Policy and guidelines to support the rollout is essential