Agenda Item	5
Report No	CCWG/8/21

The Highland Council

Committee: **Climate Change Working Group**

Date: 18th August 2021

Report Title: **Smart Highlands; Smart Buildings Project Update**

Report By: Executive Chief Officer – Performance & Governance

1. Purpose/Executive Summary

1.1 This report provides a summary of the Council's Smart Highlands; Smart Buildings project and an update on the progress being made.

2. Recommendations

2.1 Members are invited to:

i. Discuss and note the contents of the report.

3. Implications

3.1 Resource – The ERDF funding allocation as part of the 8th City programme allows the reclaiming of resource costs for those working on the project. The existing team within Climate Change & Energy Team (CCET) will continue to manage the project and as such there will be no cost to the Council.

One of the CCET's Energy Engineers is acting as Project Manager, in conjunction with the CCET Senior Energy Inspector assisting in administering the project. The project will also involve wider members of the CCET team for assistance in deploying equipment, developing KPIs and establishing key objectives. This project is vital to the Council, in order to gain some insight of the performance of buildings within the estate that currently have no mechanism to monitor building operation, and also in order to collate various data streams onto one single user-friendly platform usable by various stakeholders within the Highland Council.

3.2 Legal – The Climate Change (Scotland) Act 2009 places a legal duty on the Council to both reduce emissions from operations and to adapt to the impacts of climate change. By gaining a much more detailed view of building usage, consumption and energy wastage across the estate, this project enables the Council to identify opportunities for improvement and savings (both financial and carbon) and as such ensure that a more pragmatic, evidence based approach is taken towards management of buildings and associated emissions.

3.3 Community (Equality, Poverty and Rural) – Whilst there is no requirement within the project to provide community benefits, the following potential benefits have been identified:

1. There is the potential for vacant spaces within buildings to be identified through utilisation of the sensors, which in turn could be used as community spaces, or rental spaces.
2. The deployment of IoT (Internet of Things) gateways has been required within key areas of the Highland region, this has come at zero cost to the Council but will provide benefit within the community in the form of open access to the network for small communities and/or businesses to tap into without investment at their expense.

3.4 Climate Change/Carbon CLEVER – It is vital in the current financial climate that the Council maximises external funding such as that provided by ERDF for this project, to enable and deliver carbon savings and reduce wastage throughout the estate to help contribute to our climate change targets. By delivering this project, a significant impact can be demonstrated in respect of

reducing our corporate carbon emissions, whilst also identifying areas where further rollout of the project / sensors can be beneficial in further reducing the organisation's emissions.

3.5 Risk – Failure to proactively address identified issues as a result of more detailed monitoring of our buildings and estate will result in a failure to proactively reduce carbon emissions and carbon wastage. This in turn will negatively impact the organisation's reputation and make it more challenging to meet our net zero objectives.

3.6 Gaelic – There are no Gaelic implications arising from this report.

4. Background

4.1 The Scottish Government has pledged to end Scotland's contribution to climate change no later than 2045. All public bodies have a duty to support and work towards this target under the Climate Change (Scotland) Act 2009, as amended by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019.

4.2 The £400k ERDF-funded Smart Highlands, Smart Buildings (SHSB) project is intended to move the Council towards a smarter, more efficient and less carbon-intensive use of buildings, by developing a process that can use new and existing datasets, collected from a range of building systems, to provide useful information on operation, performance, compliance and strategic reporting.

4.3 Naturally, there are many data streams involved with owning, operating and maintaining a modern non-domestic estate. This data is managed by various different teams and officers across Council services. Whilst access to this data is readily available, there is currently no internal resource allocated to analysing it. As a result, the aim of the SHSB project is to automate many aspects of this data challenge, whilst bringing all this data on to one single platform, with open access to all relevant parties. By allowing easy to access and more intuitive data streams, it is anticipated that this will create a more robust evidence-base in respect of building performance, enabling the development of additional projects to reduce energy consumption and wastage, and the associated costs, whilst working towards the net zero agenda.

4.4 It has been identified that a significant proportion of the Council's non-domestic estate is without any kind of building monitoring equipment, other than the utility bills that are processed. With nothing to compare this billing information to, no clear pathway can be identified to improve the efficiency of these buildings. Part of this project will bring Internet Of Things (IoT) sensors to the estate; these are easily deployable sensors that can monitor a number of parameters such as temperature, carbon dioxide levels, occupancy, lighting levels and many other parameters commonly found on a traditional BMS system. Combining these IOT sensors with the billing information will assist in understanding how a building is being used and identify improvements that could be made to operating conditions to improve efficiency and reduce energy consumption and wastage.

4.5 SHSB will add value to existing control systems by enabling more dynamic and interactive functionality. SHSB will utilise an innovative "e-services" reporting platform to gather, filter, process and analyse data being produced by other essential systems (e.g. outputs from heating, ventilation and air conditioning (HVAC), building management or recording programs) and provide a mechanism where the building 'communicates' (e.g. via alarms, alerts and regular reporting) directly to building managers, or other relevant personnel, to advise on the status of selected criteria or provide other useful performance feedback. This enables various aspects of building performance to be understood, or anticipated in advance, with the system automatically informing those responsible for taking appropriate actions: for example, sensors will inform the Council of usage patterns of each building and the rooms within it, enabling a more tailored and accurate remote control over maintenance, such as heating and lighting, to ensure systems are turned off when not in use.

4.6 Current practice is to have building management systems installed in premises which enable the control of overall operation of the services in that location. These systems collect a range of

information that can be analysed to ensure that the heating, ventilation, lighting and other services are operating. In addition, organisations collect billing and specific energy data that provides cost and consumption records for each site. SHSB will seek to utilise and combine this data to provide greater functionality and behavioural control.

4.7 More and more 'data' is being sensed and collected in the built environment industry than ever before, but to date the extraction of this data has been ad hoc and not particularly strategic. We now need to take steps to ensure that we extract, from a plethora of sources, only the data that is most important and relevant and which will enable officers to not only control buildings more effectively, but to build business cases for investment to move the estate towards a net zero future. SHSB will assist in this respect by enabling bespoke performance related notifications, alarms, KPIs and reports to be developed via the platform, to meet specific needs.

5. Progress to date

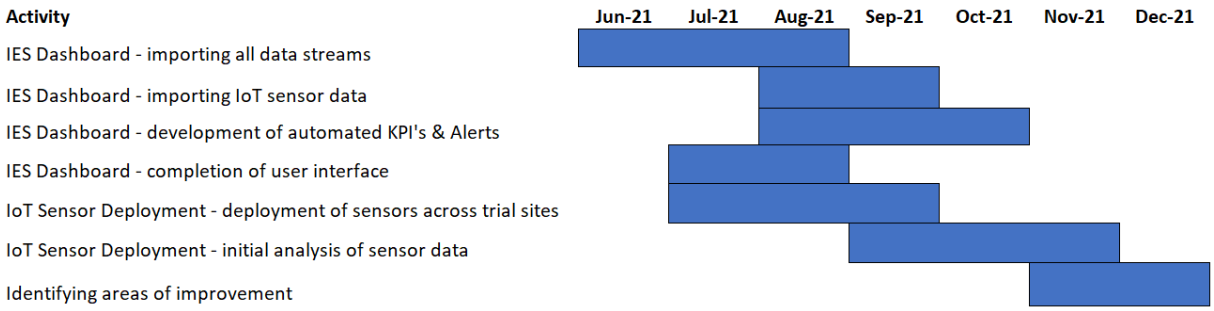
5.1 COVID-19 has had a significant impact on the delivery of the 2020/2021 deployment of equipment, which resulted in ERDF granting an extension for the programming by an additional 6 months to the end of 2022. The installation of IoT sensors was initially scheduled for 2019/2020; however due to the impacts of COVID-19 and inability to access the majority of Council sites, this has been rescheduled for 2021. With the revised ERDF deadlines, the installation of sensors is now on target for full installation of sensors by the end of September 2021.

The primary focus has been to install the sensors in the following buildings, which do not have traditional building management systems (BMS). Through collaboration with the Transformation Programme's Asset Rationalisation and New Ways of Working Project, it has also been recognised that the installation of sensors within the main hub offices, likely to be used in the return to work later in the year, would be of benefit and will be undertaken:

THC Headquarters	Raigmore Primary School
4 Castle Wynd, Inverness	Smithton Primary School
Charles Kennedy Building	St Joseph's Primary School
Inverness Town House	Charleston Academy
Dingwall County Buildings	Inverness Royal Academy
Acharacle Primary School	Lochaber High School
Mallaig Primary School	Kinlochbervie Primary & High Schools
Ardersier Primary School	Aviemore Primary School
Crown Primary School	Drummuie
Caithness House	Tigh na Sgire
Kingussie Courthouse	Nairn Courthouse
Osprey House	

5.2 The creation of a Smart Energy Data Dashboard, bringing together various different data sets as highlighted in section 4 of this report, has been in development since 2020, with a consistently improving user interface. This user interface is nearing completion, at which stage access and training will be provided to all relevant officers and stakeholders to enable them to start using the platform. A challenge associated with the development of the Smart Dashboard has been integrating data from all of our energy suppliers, our billing platform, alongside raw consumption data, but this has now been successfully achieved. The final hurdle is to now integrate the Council's BMS data into the dashboard, but it is expected that this will be completed by September 2021.

5.3 Below is a draft outline for completion of 2021 programme; it is expected that planning for the 2022 programme of works will be complete by the end of August 2021:



5.4 The main challenges associated with delivery of the project can be summarised as follows:

- Ensuring all sensors are deployed, given on-going COVID-19 restrictions and uncertainty in respect of the future Council estate;
- Ensuring access to all Council data streams through the Smart Energy Data Dashboard (BMS and gas remaining outstanding);
- Ensuring that the interests and requirements of various Council teams, including Property Maintenance and the Asset Management, are well integrated into the project; and
- Development of the second phase of IoT equipment deployment (this includes both electrical sub-metering as well as window sensors, which will allow us to monitor whether windows are open or closed).

6. Key Next Steps

6.1 The following provides a summary of the work which remains to be undertaken prior to conclusion of the project later in 2022:

- Finalise the importing of outstanding datasets on to the Smart Dashboard;
- Develop the second phase of IoT installations – involving the deployment of window sensors and electrical sub-metering;
- Ensure that all relevant teams, including the Asset Management, Facilities and Climate Change & Energy teams, have access to and are trained in the use the data platform. This will enable the development of targets and KPIs which will ensure that building perform more efficiently, that carbon emissions are reduced and to enable savings to be realised;
- Development of business cases for further projects, based on the data and evidence collected through the SHSB project. This will involve drawing in new funding streams to improve the estate based on our findings as a direct result of this project.

	Designation: Executive Chief Officer – Performance and Governance Date: 28th July 2021 Author: Douglas Burns, Energy Engineer