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CASE STUDY

SHIRE HOUSING ASSOCIATION: THE USE OF ENVIRONMENTAL SENSORS FOR POST-RETROFIT MONITORING

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In a drive to increase the energy efficiency, sustainability, and health of their housing stock, Shire Housing Association has commenced a retrofit project across its 964 properties.

Based in Cumnock, East Ayrshire, Shire Housing Association has been providing affordable homes for the community since 1997. Today, the organisation provides homes and services to over 900 residents.

IMPROVING ENERGY EFFICIENCY IN COMPLIANCE WITH THE ENERGY EFFICIENCY STANDARD FOR SOCIAL HOUSING POST 2020 (EESSH2)

Throughout Scotland, and the UK, many properties have been constructed with non-traditional building methods, and as such, are poor at retaining heat; potentially leading to colder homes and higher fuel bills for residents.

To help combat this issue, social landlords, such as Shire Housing Association, are on a trajectory to decarbonise their homes and improve energy efficiencies in compliance with EESSH2. The standard requires social landlords to ensure:

“All social housing meets, or can be treated as meeting, EPC Band B (Energy Efficiency rating), or is as energy efficient as practically possible, by the end of December 2032 and within the limits of cost, technology and necessary consent.”

EESSH2 will also contribute to reducing carbon emissions; 75% by 2030 and 90% by 2040.

THE RETROFIT PROJECT

Shire Housing Association is installing external wall insulation (EWI) across their housing portfolio to:

- Increase thermal efficiency by enhancing U-values;
- Lower carbon emissions from heating homes;
- Reduce resident energy bills.

The retrofit project seeks to not only improve the energy efficiency of each property, but also contribute to lowering fuel bills amidst the energy crisis.

However, improving insulation without the consideration of sufficient ventilation can exacerbate negative consequences, for example, poor indoor air quality caused by increased airtightness. In turn, this could contribute to future health problems for residents, such as asthma and other respiratory illnesses, as well as increasing the risk of disrepair within the property.

To ensure residents have access to sufficient ventilation, homes will also have a Mechanical Ventilation with Heat Recovery (MVHR) system installed, designed to extract moisture-rich, stale air from a property and resupply fresh air back into the home.

"As social housing landlords look towards fabric first approaches, such as installing EWI, to increase energy efficiency and add additional protection to building structures, there is a risk that these insulation measures can unintentionally reduce domestic air quality, leading to potential future health problems for people and buildings. This is why the incorporation of the environmental sensors has been essential for providing key insights into the health of the home for the landlord as well as providing data for the tenant through the resident app. Working alongside Shire Housing Association has demonstrated how much the organisation cares about their people and community.

Gregor Morrison, Regional Specification Manager.

AVOIDING NEGATIVE CONSEQUENCES WITH POST-RETROFIT MONITORING

Shire Housing Association will utilise Aico's HomeLINK connected home solution to measure air quality across their housing portfolio for data-led validation of the retrofit projects. Each property will have the following devices installed:

- Ei1020 HomeLINK Environmental Sensor - measures temperature and humidity.
- Ei1025 HomeLINK Environmental Sensor - measures temperature, humidity, and carbon dioxide (CO2).
- Ei1000G Gateway - extracts and collates data from environmental sensors, presenting actionable insights into indoor environmental conditions on the HomeLINK Portal.

Environmental sensors have been installed in high-risk rooms, such as living rooms and bathrooms which are subject to frequent use and higher humidity levels. Analysing temperature and humidity data will provide Shire Housing Association with a better understanding on how its retrofit measures are performing with the ability to identify trends in specific rooms and properties.

The data will enable the housing provider to respond to any potential problems proactively, such as:

1. Indoor air quality

Through measuring CO2 levels, Shire Housing Association can determine the effectiveness of the MVHR system, and understand how the resident may be using it on a daily basis. Rooms with a consistently high level of CO2 may indicate a resident is not using the ventilation system often. Shire can then engage with the resident about the importance of sufficient ventilation.

2. Damp and mould risk

The damp and mould risk insight will highlight any rooms that are at risk of developing these conditions, even pinpointing whether the cause is due to structural or environmental factors. For example, a structural diagnosis could indicate that the retrofit solution (e.g. EWI) is causing adverse effects, whereas an environmental indicator could relate to insufficient use of the ventilation system.

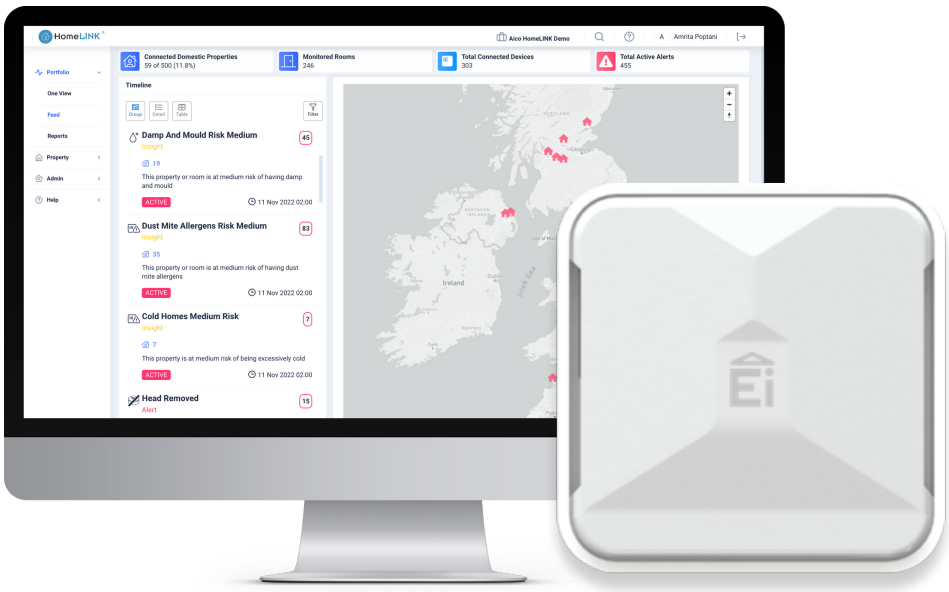
3. Void property detection

Monitoring indoor air quality will assist in detecting void properties. If temperature and CO2 levels remain unchanged with no surges relating to everyday use of heating or ventilation systems, this could indicate that the property is now empty. Quick identification will enable Shire Housing Association to re-let the property in a shorter time period.

4. Fuel poverty indication

Similar to the above, consistent low temperatures could indicate that a resident is choosing not to use their central heating to limit energy usage and save money. In this case, Shire Housing Association can intervene and offer support.

By collecting data with environmental sensors and analysing these insights, Shire can make data-led decisions for any properties that would benefit from further retrofit measures or improvements. The information can also be utilised to offer support to vulnerable residents.



"The sensors will give us a better understanding of the structural and environmental risks and factors within our properties, allowing us to proactively identify any issues within our properties and intervene with our tenants to find a resolution or provide guidance to improve the concerns from the data findings. The sensors will also allow us to truly reflect on the effectiveness of applying EWI to our properties as opposed to relying on EPC scoring. The data will also assist us to identify tenants potentially living in fuel poverty and allow us to signpost them to our Financial Inclusion Team to assist with assessing if the tenant is entitled to fuel vouchers and/or reductions on their utility bills.

Ross McCrindle, Shire Housing Association.

EMPOWERING RESIDENTS WITH THEIR OWN DATA

Residents will be encouraged to use the HomeLINK app, which provides access to the data about their home. Through notifications and alerts, the app will warn residents if conditions are not optimal and how to remedy issues to prevent them from occurring or deteriorating.

The app will help residents gain a better understanding of how their home is performing, and what changes they can make to run their property more efficiently - creating healthier, safer, and more sustainable homes.

To find out more about Aico's HomeLINK Connected Home Solution, please visit: www.aico.co.uk/homelink