

November 2022

CASE STUDY

ON THE VALIDATION OF
ENVIRONMENTAL SENSORS



TOGETHER WITH

POPLAR **HARCA**

POPLAR HARCA KNEW THEY
NEEDED TO MAKE THEIR
RESIDENTS' HOMES SAFER,
GREENER AND HEALTHIER,
AND WERE LOOKING FOR
BETTER WAYS TO MANAGE
THEIR PORTFOLIO.

SO, WHEN AN
OPPORTUNITY AROSE, THEY
ACTED.

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THE BEGINNING: TECH, MEET HUMAN INGENUITY

Peter Marcus, the Assistant Director of Research, Development & Transformation of Poplar HARCA, wanted to prove that the air-conditioning in their office was too cold. In 2016, this mission led him to build a Raspberry Pi gateway (think of it as a DIY-device) that could connect to sensors, and measure temperature and humidity.

Very quickly after Peter's creation came together, Poplar HARCA realised that this technology could be used in residents' homes, to better their living conditions and in turn their health and safety. They started exploring Internet of Things (IoT) solutions and saw how it could be integrated to unravel the many issues faced by social housing as an industry.

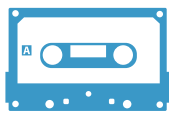
Poplar HARCA operates in an area of longstanding deprivation and, although in the shadow of Canary Wharf, has one of the highest child poverty rates in the UK. Fuel poverty is a real concern for their residents, especially as energy prices are increasing dramatically. Early on, they identified that tackling fuel poverty would make a real difference to people's lives and this was something a monitoring solution could do besides tackling some of the wider strategic issues that they face as a landlord, especially carbon reduction and asset management costs around condensation and the condition of their stock.

THE CHALLENGE: EVOLVING TO SCALE

But there were a number of **barriers** to rolling out what they already had to every home in their portfolio;

- The Raspberry Pi gateway, while impressive, took time and required an effort similar to that of any DIY project. It was also held together with tape and “looked quite suspicious!”, Peter himself had remarked. Overall, this meant scaling, among other things, would be an issue
- There were also questions surrounding CE marking and ensuring whatever device went into each home complied with the applicable laws

In the following years, Elizabeth (Lizzie) Williams, the Assistant Director of Asset Management at Poplar HARCA, together with Peter and their team would go on to trial other comparable technologies available in the market only to find that these were:



Impractical & out
of date



Delayed/
unrealistic time
frames



Intrusive
& temporary

One great example is the data logging fan being marketed as a solution to resident driven condensation which requires data to be downloaded to a USB stick. This means having to collect it, download and upload the data, analyse it for any trends – and then repeating this cycle - or removing it after a certain period - denying relevant parties the chance to gain an understanding in the long term.

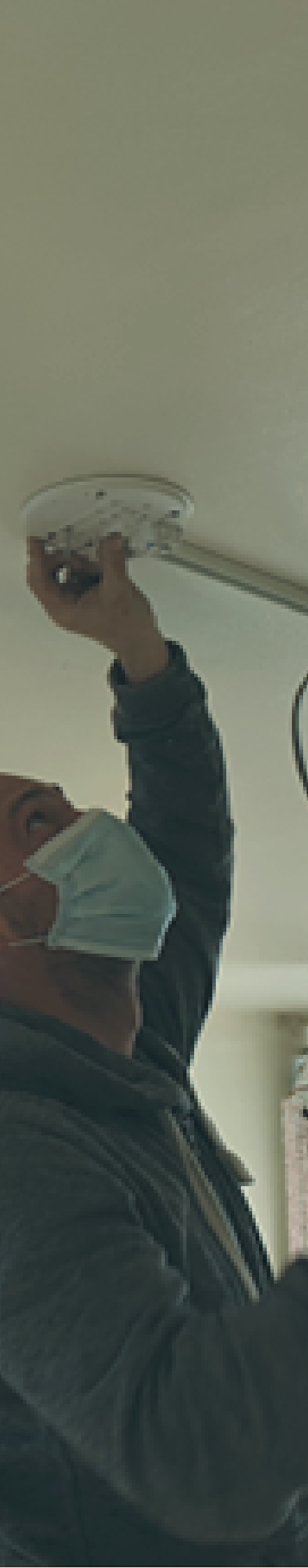
Just as Poplar HARCA had found a serendipitous solution to a larger problem with Peter’s Raspberry Pi in 2016, three years later, Peter had a chance encounter with Chris Jones, fresh from starting up HomeLINK.



There was a queue of people lining up after the NHMF presentation to ask questions. One was Peter, he told me about a project that he had undertaken - his solution was very similar to what we had at the time. He set up a follow up call for a wider discussion and included Lizzie . We agreed on a pilot... It's a romance, we were fated to meet!

– Chris Jones, CEO of HomeLINK





THE MIDDLE: TESTING & USE CASES

The partnership between Poplar HARCA and HomeLINK can be broken down into three phases: two of which are explored in this section.

Phase 1, in mid 2019, involved the deployment of sensors with the purpose to “test and learn”, validate the stability of connectivity and ensure that previous worries (see barriers mentioned above) were not a blocker. Four properties were selected where eight environmental sensors and four gateways were deployed, and at least four smoke and Carbon Monoxide (CO) alarms were connected as well. **At the completion** of this trial deployment, a report summarised the performance of the devices as well as a basic analysis of the data captured by the sensors – which **validated and met all initial requirements**.

Phase 2 followed in February 2021. While the pandemic had slowed many industries and general day-to-day living, the Coronavirus emphasised just how important indoor air quality and the monitoring of it was.

Poplar HARCA was ready for a larger roll out, this time to look at specific use cases (see next page).

Use Case 1: Ventilation, fuel poverty, indoor air quality monitoring & void detection

60 environmental sensors (40 humidity and temperature sensors, and 20 temperature, humidity and Carbon Dioxide sensors) along with 20 gateways were deployed into 20 homes. To test this use case, "problem properties" and other "listed" properties were chosen to explore inefficiencies and test various interventions.

Use Case 2: Mould monitoring & intervention

36 sensors and 12 gateways were deployed across 12 homes for the mould use case. Properties/residents were chosen according to who called in with a mould complaint and instead of sending the usual Condensation and Mould Data Logger, the HomeLINK kit - which consisted of three environmental sensors (two humidity and temperature sensors, and one temperature, humidity and Carbon Dioxide sensor) along with one gateway - was installed.

*see Outcomes (next page) for further details

Phase 2 also included a big update in terms of the overall solution that HomeLINK provided. Poplar HARCA's residents had access to the then newly-released HomeLINK App which gave their residents the opportunity to take control of the health of their homes. Besides that, the Portal had gone through quite a few updates and provided Landlords with even more functionality.



THE OUTCOME: AN ALL-IN-ONE CONNECTED HOME SOLUTION

Poplar HARCA's Phase 2 Outcomes:

1 Custom Notifications

With the Portal configured to send notifications via email to specific departments within Poplar HARCA, the right people were notified when a relevant Medium or High Risk was identified or if an event required further investigation.

2 Fuel Poverty Detection

Poplar HARCA discovered a resident struggling with fuel poverty after noticing the Insight being raised on the Portal. They inspected and found that the resident was only heating one room in their property to save on their electricity bill. Poplar HARCA were able to promptly intervene and provide advice and support.



While still at a relatively early stage, Peter's project is already having tangible benefits to asset management at Poplar HARCA. In properties where devices are fitted, we're able to support residents before mould proliferates which benefits their health and reduces our operating costs. This is a great achievement in itself..

– Elizabeth Williams, Assistant Director of Asset Management at Poplar HARCA



3 Void Detection


They successfully identified two empty properties because of the void detection Insight. Poplar HARCA confirmed that the residents had indeed left and re-let the void properties in a shorter period, addressing the need from long waiting lists.

4 Time & Cost Savings

- Replacing the Condensation and Mould Data Loggers with the Environmental sensors meant reduced cost, effort and time for their Repairs Team as no repeat visits were necessary just to collect and analyse the mould situation. Poplar HARCA were able to act remotely, intervening physically only after residents had attempted all other methods of reducing the risk of mould. Furthermore, unlike data loggers which can only ever provide a temporary view, historical data will not be lost as the sensors can be used indefinitely (with a 10 year battery life).
- Poplar HARCA also reduced visits and callouts to intervene or give advice on the first instance of an issue as the HomeLINK App provided residents with real-time information to help them prevent mould from even occurring.

5 Happier & Healthier Residents

The app gave recommendations to improve conditions such as reducing indoor air pollution, optimising the temperature within one's home, reminders to test their smoke and CO alarms regularly, and other tips related to improving their health and safety.



'I used to fall asleep in the front room, (I) suffer with sleep apnoea but now I know if I'm going to fall asleep, I'll open the window or garden door. I know what to do now and am not worried about falling asleep now'

'I like looking at the CO2 sensor for the living room... So I know to open the window and can see it go down. Temperature and humidity is useful too'

'It shows Poplar HARCA are a responsible landlord because they are looking after their residents'

– Three Residents from Poplar HARCA (Anonymous)





With my asthma, I have to make sure there's plenty of airflow - if things get too stuffy - if I'm having trouble breathing and I look (and see) the humidity's higher (on the App), I know the reason.

– Fren Jefcoate, a Resident from Poplar HARCA.



Watch her interview on our BBC Morning Live segment here:
<https://vimeo.com/646833516/28fda63bda>

BBC



THE END... IS REALLY JUST THE BEGINNING

With the Use Cases validated, Phase 3 - the full-scale rollout - has begun, bringing us to today.

A total of

137

properties with
IoT devices installed

872

rooms are being
monitored

972

devices are now
connected

(As of November, 2022)

Poplar HARCA intends on rolling out 80 properties worth of environmental sensors per month with the goal for 10% of their tenanted homes connected by the end of 2022/23. Future use cases include retrofit validation and energy monitoring to reach Net Zero goals besides ensuring their smoke and CO alarms are connected to the HomeLINK Platform to ensure a holistic view, eliminating visibility gaps and unifying Insights that will increase the health and safety of their portfolio.



"We're looking at retrofitting projects, we want to use IoT and data to figure out the best investment – what's going to make the biggest impact?"

– Peter Marcus

"Yes, the goal is to have safer, greener, healthier homes."

– Elizabeth Williams

