

About Ambisense

Founded in 2014, Ambisense solutions combine IoT sensors and smart software for a data driven approach to risk assessment and management.

After years in the geo-environmental sector, last year Ambisense expanded into the indoor air quality and smart buildings markets with the AmbiAir solution. AmbiAir combines discrete, connected hardware with intelligent software that not only automates the collection and analysis of data, but also uses complex algorithms to predict indoor air quality and identify the likelihood of mould growth in a building.

AmbiAir monitors parameters including CO₂, temperature, and humidity, with predictive alerts notifying users to potential problems, allowing them to take a proactive, low-cost approach to building maintenance.

The solution also assesses building efficiency, helping users to optimise the heating to both increase the comfort of building occupants while decreasing heating costs.

Benefits:

- Low cost, real-time overview of the housing stock (24/7)
- Better living/working conditions with reduced potential for litigation and long term health issues
- Potential fuel poverty identified
- Forecasting data lets councils make proactive plans for retrofits and maintenance, decreasing spend
- Improved building efficiencies mean reduced greenhouse gas emissions

Pricing:

From €6/device/week.

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Case Study

How a Local Authority is Using Predictive Analytics to Forecast Mould Growth and create Healthier Living Conditions for its Residents

Client:

Dun Laoghaire Rathdown Council, Co. Dublin.

Our Solution:

Ambilytics™ - Environmental data analytics

AmbiAir™ – Indoor Air Quality Monitor

Challenge:

The mild, damp Irish climate makes properties in Ireland susceptible to mould, a factor that Dun Laoghaire Rathdown Council are looking to combat as part of their strategy to increase the comfort of the building residents in their large housing stock. With such a large portfolio, having a deep yet current understanding of the condition of each individual property is very difficult using a manual approach. Another facet is that mould growth itself needs continuous monitoring as seasons and environmental conditions change throughout the year. The Council wanted to proactively manage and mitigate mould growth in buildings, and so turned to Ambisense. Our approach on creating solutions that allow data driven decision-making meant that they could not only see current or future problems, but also assess whether the expensive remediation works that have been carried out, have resolved the issue. Not only does this process help in improving the living conditions of the residents in the property, but ultimately allows the Council to see how they could best allocate their maintenance workforce and budget.

Approach:

Eight properties considered at risk of developing mould were selected by the council for monitoring, all were of similar age and design. Ambisense assessed each building using thermal imaging to find thermal bridges (Figure 1) and to calculate the location where mould was most likely to grow.

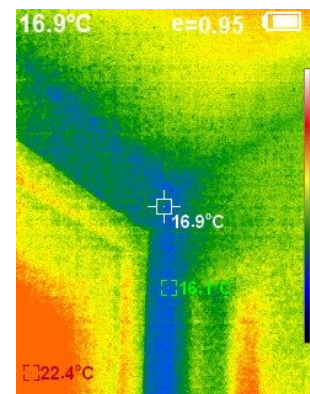


Figure 1 –
Thermal Image of Property

The AmbiAir solution, one that combines discrete hardware with intelligent software, was installed in bedrooms or entrance ways within the properties, a single device per property. These locations within the properties were selected to avoid potential induced environmental conditions by everyday actions (e.g. increased humidity and temperatures) in places like bathrooms and/or kitchens. All measurements were taken every 15 minutes and sent directly to the smart software, Ambilytics.

Research that measured air humidity and temperatures has shown that mould can grow from anywhere as low as 20% relative humidity up to 100%. By measuring the equilibrium relative humidity at the wall also however, it allows for a much tighter spread of conditions for potential mould growth (Figure 2). Measuring these two factors simultaneously allows us to assess whether there is likely to be mould, if the growth conditions are driven by behaviours within the property or driven by potential underlying structural issues.

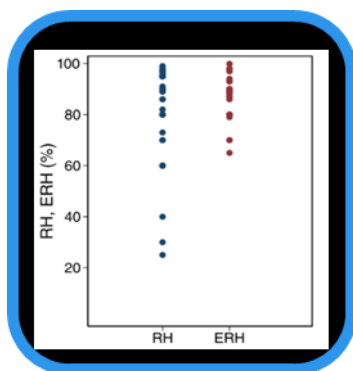


Figure 2 – Relative Humidity & Equilibrium Relative Humidity Research Document Counts

Ambilytics analysed the vast quantities of incoming data to correlate the room humidity, wall humidity, and temperature measurements and combined these in a complex algorithm to predict likely mould growth. This was assessed over a six month period to ensure seasonal changes were taken into account.

Results:

The units were first installed in July 2020 which allowed for summer, autumn and most importantly, winter monitoring. Two data reviews were held with the DLR council; in October and January.

Using 'Variable' and 'Time Series' data generated on the Ambilytics platform, we were clearly able to see properties with issues (Figure 3 & 4), such as Property A below.

Figure 3 shows a clear and consistent high humidity (+80%) both in the air and the wall itself, accordingly there is a high likelihood of mould growth here.

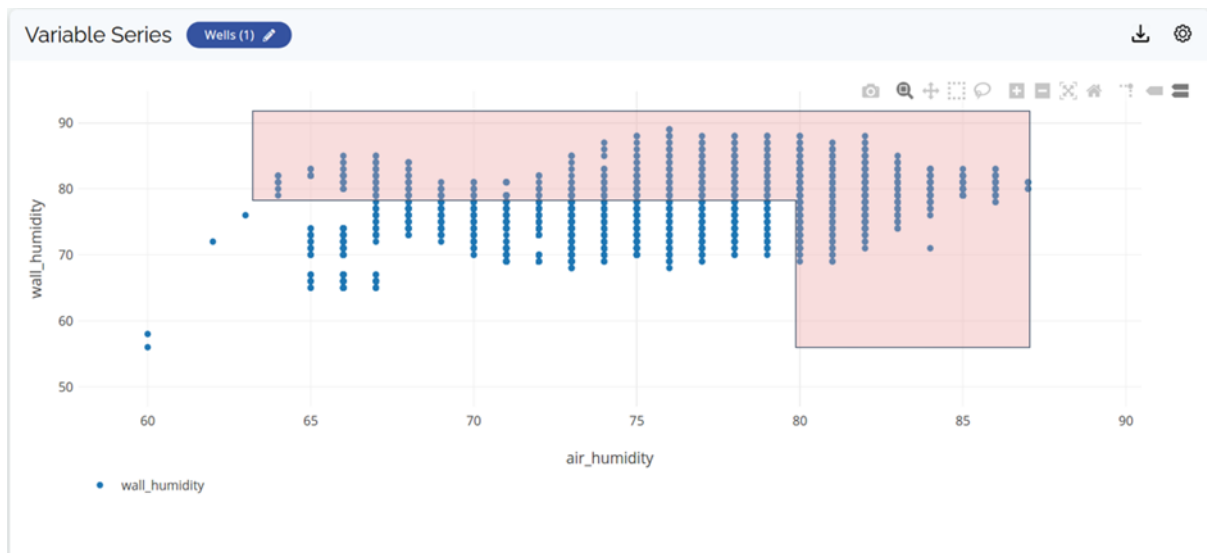


Figure 3 – Consistent High Air and Wall Humidities

Figure 4 is able to show that there is little correlation between the wall and air humidities in this property. This means that the room and walls are not wetting/drying in sympathy with each other, and it is highly likely that there are underlying conditions conducive to mould growth, and this property would require further investigation.



Figure 4 – Lack of Correlation between Air & Wall Humidities (High Likelihood of Mould Growth & Potential Structural Issues)

Tabulating the results over the properties, we also found that, in several cases, the likelihood of mould growth was, unexpectedly, more likely in summer months than winter (Figure 5).

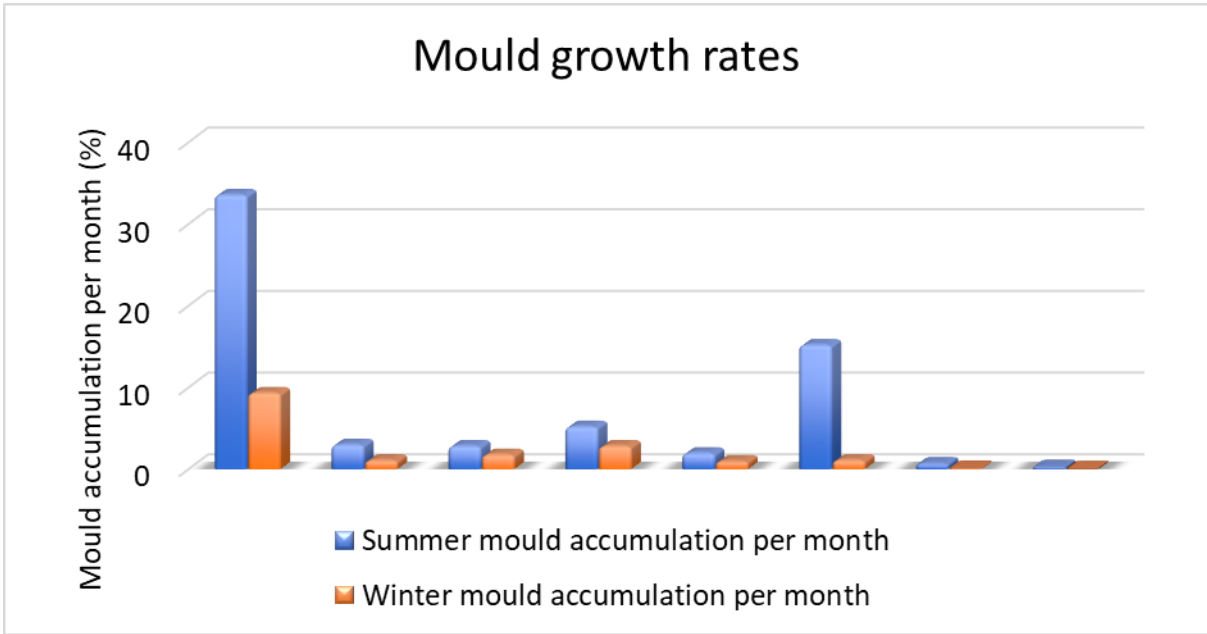


Figure 5 – Mould Accumulation per Month per Property Monitored

While monitoring and assessing for potential mould growth was the focus of this project, Dun Laoighaire Rathdown Council also used the AmbiAir solution to look into potential fuel poverty and thermal comfort issues. Both were potentially evident in all eight properties in the winter months (Figure 6).

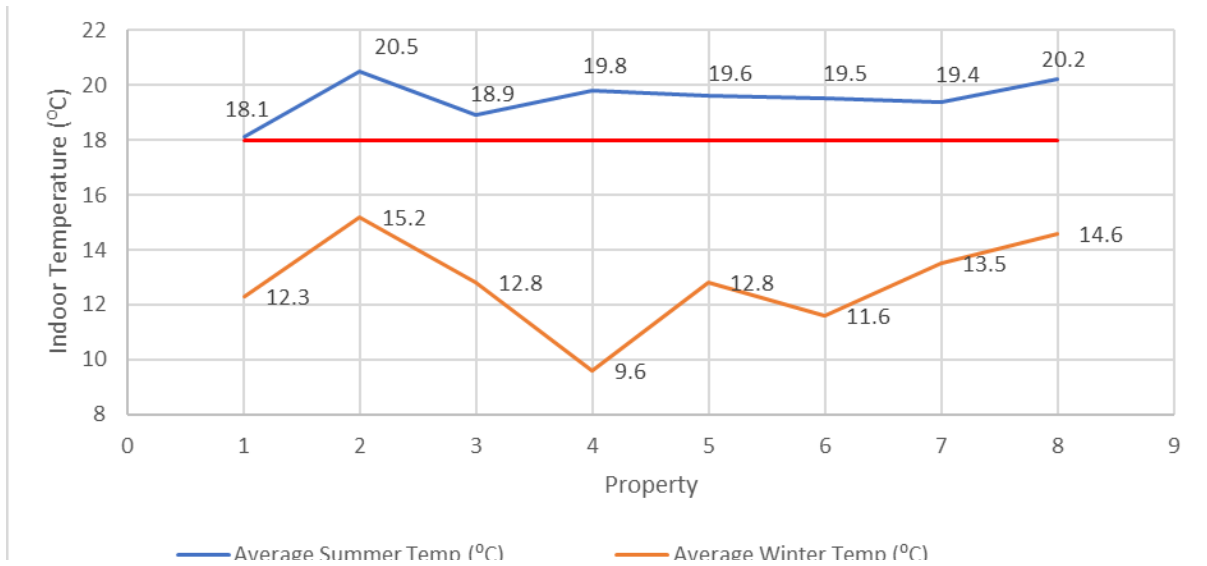


Figure 6 – Summer vs Winter Temperatures (referenced against WHO thermal comfort guideline)

Finally, we were able to provide the council with a full analysis table with recommended next steps (Figure 7).

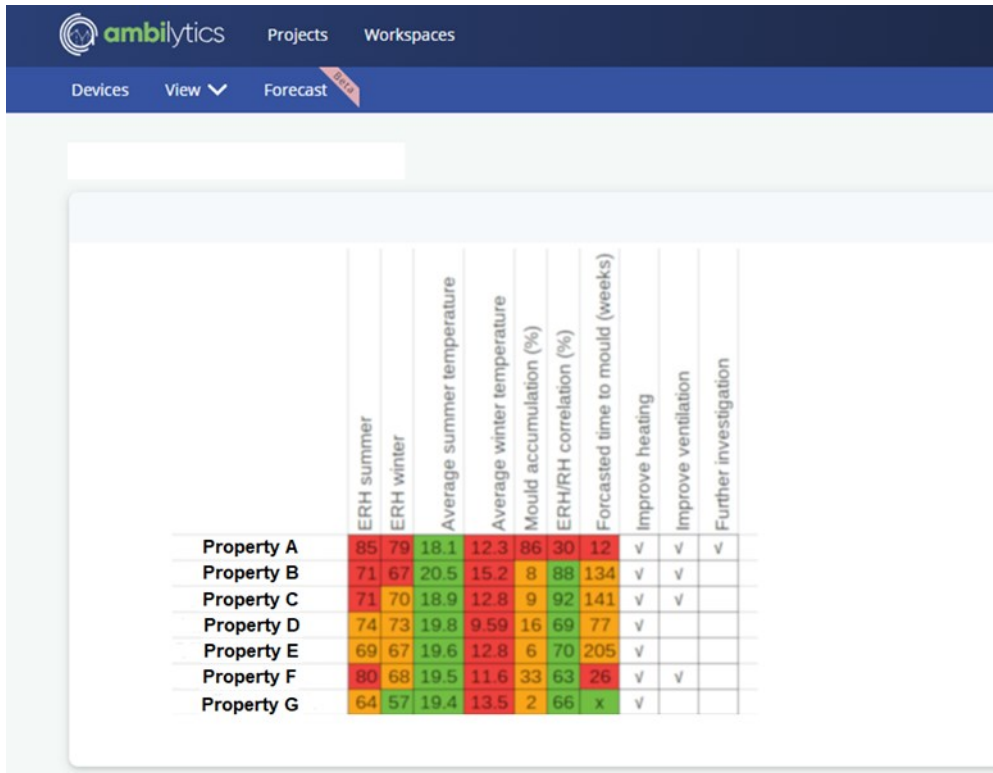


Figure 7 – Analysis Across all Properties & Actions Required

Conclusion:

Using the AmbiAir™ solution, Dun Laoghaire Rathdown Council was able to get a deep and real-time understanding of a number of their properties in relation to mould growth and general living conditions (e.g. thermal comfort). Not only that, but based on the data generated and the forecasts created from this data, an appropriate action and remediation plan could be put in place to try to improve the conditions for residents, especially for those most at risk of mould growth.

Testimonial

**Aidan Blighe (Senior Executive Officer (Housing Department) with
Dun Laoghaire Rathdown Council)**

“The main benefits were to get real live data on our stock which would help determine which stock was most in need of retrofitting and hard solutions, v’s the stock that might see improvements with softer measures such as education on ventilation, or installation of vents. This data is extremely useful when resources are limited and we have more properties with issues than we have the resources to fix them. A side benefit was to get better data on fuel poverty which is important for L.A.’s as we generally house the most vulnerable in society.

Some of the data in the trial was surprising. Some of the properties were high on my list for retrofitting, but it became clear that retrofitting might not be necessary, and DLR might see significant improvements with softer measures.

In the future I would like sensors in all of our housing stock covering a range of issues..... becoming integrated with our work so we are making evidenced based decisions on the best course of action for each property.

Training and useful information in a tenants handbook are very cheap interventions if we know about an issue early on. Likewise vents are not expensive. The key is to get the data early, intervene and continue monitoring. Unfortunately because we don’t monitor our properties we often only find out there is an issue when it is too late and much more expensive remediation is necessary.

The trial with Ambisense was made very easy by the professionalism of Ambisense staff. The devices were easy to install and they began to send useful data immediately. Over the course of the trial we were able to analyse extremely useful data which will help inform future retrofit plans for the dlr housing stock. I would recommend these devices as a really useful tool to help in day to day, and in strategic decision making on the dlr Housing Stock.”