



# Grimsby Combined Court

Case study



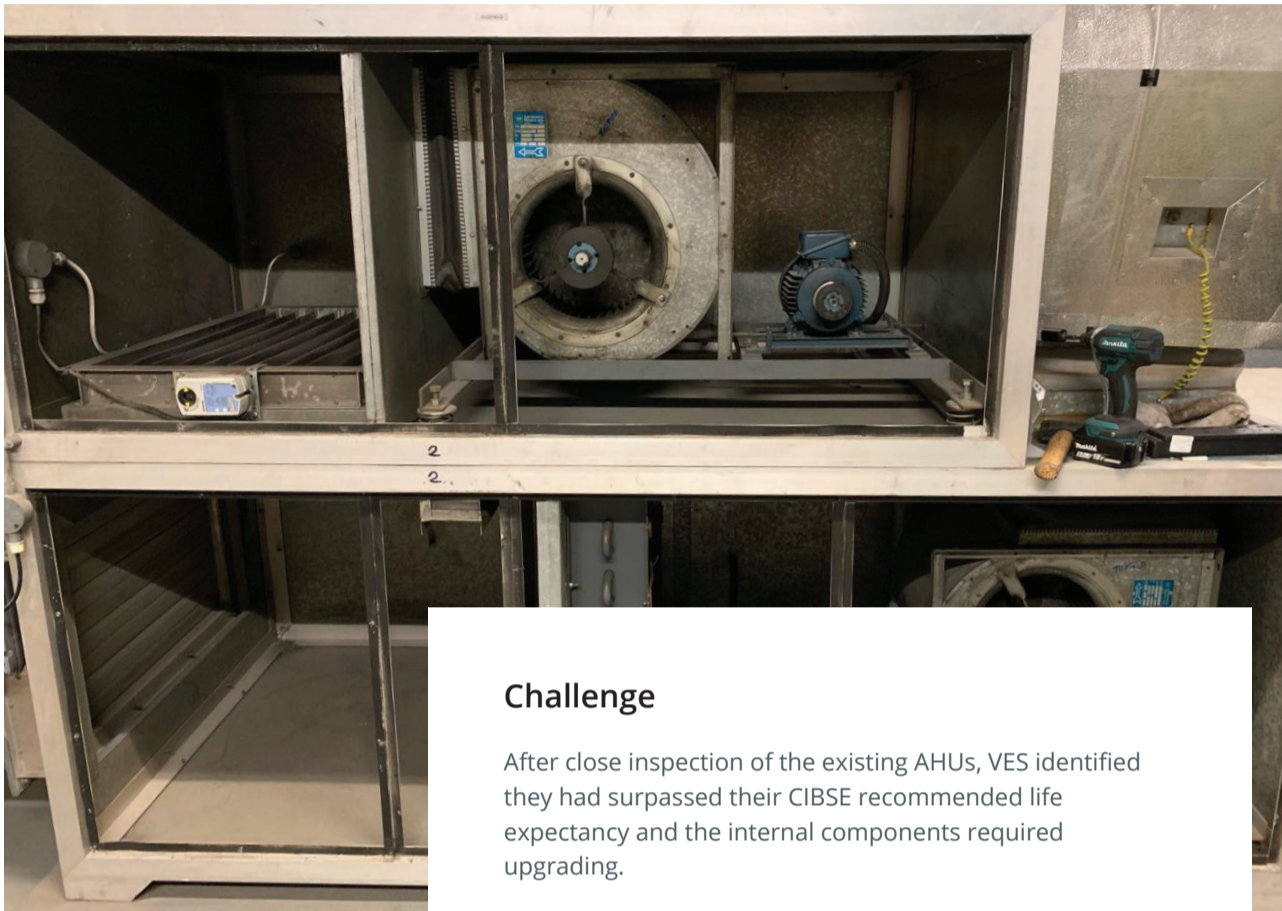
## Refurbishment of out-dated AHUs increases the AHU's life expectancy and improves indoor air quality

Working in conjunction with ENGIE and Pole to Pole Climate Control, VES were asked to undertake a full technical survey of the air handling units at Grimsby Combined Court. We established a scope of works that would offer improvement to the building's ventilation systems.

Indoor air quality and the effectiveness of the building's operation is fundamental to the public, judiciary and staff at the Court. To maintain optimum, comfortable conditions, improvements to the existing ventilation system were required.

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<b>Client</b>	ENGIE and Pole to Pole Climate Control
<b>Sector</b>	Government
<b>Challenge</b>	Improve air quality and extend the life of the existing AHUs by upgrading their components
<b>Success</b>	AHU life extension of up to 15 years, Improved indoor air quality, improved energy efficiency and reduced maintenance costs through EC fan technology, as well as the introduction of cooling through new in unit cooling coils



## Challenge

After close inspection of the existing AHUs, VES identified they had surpassed their CIBSE recommended life expectancy and the internal components required upgrading.

There were 10 supply and extract AHUs, each containing mixing boxes, G4 panel filters, LPHW heating coils and belt driven forward curved fans. 5 of the AHUs contained CHW coils, with the remaining 5 not containing any cooling functionality.

To improve energy efficiency and system reliability, VES recommended that all the fans were upgraded to energy efficient direct drive IE5 EC plug fans. There was also a requirement to retrofit cooling into the remaining 5 AHUs that had no cooling. Due to the existing chiller capacity, we recommended DX cooling coils were installed.

It was noted by our technical engineers that the recirculation damper on each unit was fully open and there were no filters within the extract air stream. Under current guidance, CIBSE and others recommend that recirculation dampers within air handling units are closed where it does not have a negative impact on the thermal comfort of the building occupants.

The existing units have no filtration on the return air and as the filtration within the supply air stream was only G4, which only filters out large particulates ( $\geq 10\mu\text{m}$ ), this would not be sufficient to remove viruses from the air stream which is vital now more than ever.



*Belt driven forward curved fans*



*Outdated components*



## Solution

VES successfully upgraded the belt driven fans to EC plug fans, improving energy efficiency and removing maintenance costs. Another advantage of installing EC plug fans are the significant noise reductions.

Due to the space saving design of EC plug fans, it created room within the existing AHU casework for VES to retrofit DX cooling coils for the 5 AHUs that did not have any cooling functionality. Due to the coastal environment, the replacement coils were manufactured with polyester coated aluminium fins. To improve indoor air quality, VES provided the option to install Bipolar Ionisation. It has air purification technology that produces unstable oxygen ions that deactivate harmful substances like viruses, bacteria, mould, odours and volatile organic compounds (VOC).

Small ion densities range from 900 to 1,100 negative ions and 1,000 to 1,200 positive ions per cubic centimeter (ions/cm<sup>3</sup>) in pristine natural environments. As the ion density decreases, so does the air quality. By increasing the quantity of both positively and negatively charged small oxygen ions, air quality is improved.

## Results

Refurbishment of the existing AHUs has successfully extended the existing AHU's life by another 10-15 years. By utilising EC fan technology energy efficiency has been improved as well as a reduction in maintenance costs. The introduction of additional cooling combined with Bipolar Ionisation has improved indoor air quality for the occupants and has resulted in an increase of negative ion levels from an average range of 250 ions/cm<sup>3</sup> to 1130 ions/cm<sup>3</sup>.



*During refurbishment*



*Post refurbishment*



*Bipolar Ionisation*