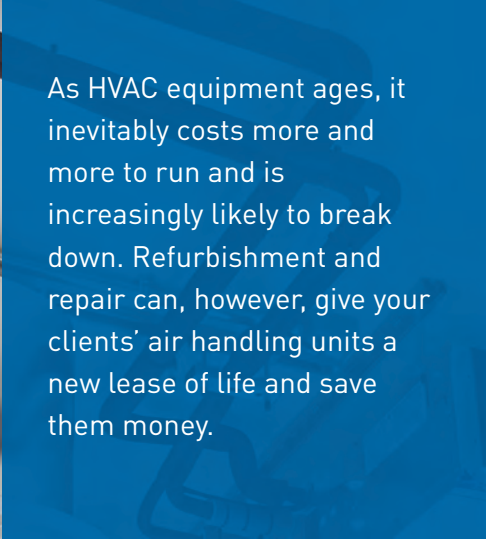




AHU REFURBISHMENT GUIDE

Avoiding expensive replacements
and improving the efficiency of AHUs



As HVAC equipment ages, it inevitably costs more and more to run and is increasingly likely to break down. Refurbishment and repair can, however, give your clients' air handling units a new lease of life and save them money.



As time passes, technological improvements lead to greater efficiency, lower costs and better overall performance – all of which you will miss out on if you fail to upgrade your HVAC equipment.

Conventional wisdom dictates that air handling units (AHUs) should be replaced every 10 to 15 years, depending on use and maintenance over that time. There is, however, a potentially far more cost-effective way to proceed than replacement – refurbishment and/or upgrade.

The cost of disposing of the old unit could easily run into thousands of pounds. And then there are the costs associated with commissioning a new unit to consider.

One of the best routes to sustainable development in the HVAC sector is through retrofitting and refurbishment of heavy-use equipment like air handling units and condensers. Retrofitting is,

essentially, the addition of new technology or features to older systems and refurbishment refers to the process of returning something to a good state of repair (which can include retrofitting as part of the mix).

The Carbon Trust says: “Nearly all refurbishments offer opportunities to reduce carbon emissions beyond the standards set by building regulations. However, conventional refurbishment projects often miss the opportunities available, leading to unintentional and unnecessary increases in energy use and associated emissions.”

Relatively simple measures can make a big difference. For example, HVAC systems have made considerable progress in the last two decades and new control technology (including variable speed drives) can be retrofitted to boost energy efficiency and reduce operating costs.

Retrofitting HVAC equipment can save energy, but its benefits don't end there. It can also allow you to:

- Accelerate your return on investment because you can retrofit equipment at a fraction of the cost of replacing it.
- Extend the life of an older system.
- Reduce the disruption caused by replacing large pieces of HVAC equipment, especially in city centre locations.
- Improve comfort conditions by ensuring more consistent temperatures and better-controlled humidity.

See also the box for more advantages of refurbishment. Refurbishment can be anything from simply re-sealing condensate pans, chamber floors and other surfaces to replacement of controls, or a complete overhaul. Even in the latter case, refurbishment is typically faster than replacement.



And, in the process of refurbishment, the existing specification of the AHU can be improved with, for example, the installation of the latest electronically commutated energy saving fans or boosting filter performance.

Refurbishment refers to the process of returning something to a good state of repair (which can include retrofitting). Retrofitting is, essentially, the addition of new technology or features to older systems.

A well-executed refurbishment can add 15 to 20 years working life to equipment. Many AHU components can be removed and replaced including fans, filters, heaters and cooling coils, dampers and burners.

- **Fans** – These can often be replaced with the latest energy efficient direct drive EC (electrically commutated) fans which are inverter controlled. Replacing old forward curved fans with new plug fans can use 15-20% less energy.

- **Filters** – Many older units have poorly fitting filters allowing bypass of unfiltered air. Specialist Site Services can replace filter frames to prevent this and often fit higher-grade filters.

- **Coils** – For units with restricted access, replacement coils can be provided in sections which are then joined on site, replacing valves and actuators as required. Coils can also be flat-packed to suit restricted access situations.

- **Dampers** – These can jam and this one of the biggest causes of poor AHU operation.

An AHU is essentially a metal box with fans, heaters and/or cooling elements inside to distribute and condition air in conjunction with heating, ventilating and air conditioning systems. Typically fitted to existing ductwork in the building, some AHUs – referred to as packaged units or rooftop units – are positioned outside on roofs.

Whatever your AHU needs, it pays to consider them in association with a reliable, knowledgeable partner with an established track record.

Indeed, the key to a successful retrofitting, refurbishment or maintenance project is to get the right people on board before you start ruling out options, and even before you set a final budget. And, of course, the right people include experts in retrofitting, repair and refurbishment of HVAC systems.

For more information, call **01635 244100** or email **sales@ecex.co.uk**. Visit **www.ecex.co.uk** for our full range of products and services.

WHAT ECEX OFFERS

ECEX offers a comprehensive AHU refurbishment and repair service, helping businesses keep essential equipment operational, improving energy efficiency and preventing breakdown with minimal impact to day-to-day operations.

The AHU refurbishment and repair service offers many benefits, including a big improvement in energy efficiency; the prevention of breakdowns; less disruption to the operation, and – as a result – a stronger bottom line.

Our extensive services also include on and off-site repairs of all tube and fin heat exchangers, and the manufacture of coils to existing patterns or bespoke new designs.

These services complement the company's comprehensive design service for coils as well as on and offsite maintenance and cleaning.

The company also offers coil filtering in the form of ECEX Air Intake

Screens, which extends the life and increases the reliability of coils.

Condenser and evaporator coils are normally left unfiltered, leading to a build-up of seasonal debris such as leaves and pollen.



BENEFITS OF REFURBISHMENT OVER REPLACEMENT

- Rapid and demonstrable return on investment due to greatly improved energy efficiency
- Minimal disruption, reduced downtime
- Refurbishment typically costs less than new replacement
- Problems of installing different sized plant are eliminated
- Logistics (e.g. crane lift) associated with transporting new plant to roof or plantroom are eliminated
- Reduces ongoing maintenance time and cost
- Helps AHUs adhere to energy efficiency standards defined in the ErP (Energy-related Products) directive. Equipment that does not meet defined minimum requirements can no longer be marketed in the European Union.
- Ensures more compact AHUs because the ErP Directive applies only to ventilation systems installed after January 1, 2016. This means heat recovery (in the form of a thermal wheel, crossflow heat exchanger or run-around coils) – which increase AHU size by around 20% – is not required.
- Cuts downtime from around 10 weeks for replacement with a new unit to between two and four weeks.
- Can result in energy savings of 26 to 38% because of new fan designs and savings on drive belts, motor and fan pulleys replacement.
- Extends lifespan of existing unit
- Typically costs less than a replacement AHU
- Overcomes transport and access difficulties of replacing units
- Removes need for cranes and road closure
- Latest energy efficient EC plug fans and components

THE IMPACT OF ECODESIGN

All new residential and non-residential ventilation units are now subject to the requirements of the Ecodesign Directive. This establishes a framework for the setting of eco-design requirements for energy-related products and their implementation.

As of January 2016, all ventilation and fan products have had to comply with Ecodesign and must be labelled with the relevant CE marking. The directive is designed to drive carbon-emission reductions and help the EU achieve its energy and climate change objectives. Equipment that does not meet the defined minimum requirements can no longer be marketed in the EU.

In most industrialised countries, HVAC

equipment is responsible for around a third of total energy consumption. The main purpose of heat recovery systems is to mitigate the energy consumption of buildings for heating, cooling and ventilation by recovering the waste heat.

Under the directive, AHUs must adhere to certain energy efficiency standards. To achieve these, they often require some form of heat recovery, whether with a thermal wheel, crossflow heat exchanger or run-around coils.

Since these need to be attached to the AHU, this makes the units bulkier and increases their footprint; new units are typically 20% larger than existing plant. This is to cope with the

increased heat recovery surface required to achieve compliance.

However, the legislation applies only to AHUs installed after January 1, 2016. Refurbishment comes under separate guidance which means that you don't have to comply with Ecodesign so the AHUs can remain smaller.

POTENTIAL SAVINGS OF REFURBISHMENT

The savings associated with air handling unit refurbishment can be dramatic. For example, on a recent AHU upgrade project, we calculated that we could provide an estimated 22% – 33% energy saving simply by upgrading the fans.

There were also additional savings as belts and pulleys would no longer

need replacement, as well as much reduced maintenance time.

On another job, we quoted to replace the fans with new direct drive EC energy efficient fans complete with new auto changeover function and potentiometer. New electrical isolators, air pressure switches and air flow tubing were also to be

installed to match the new fan design.

On top of this, general refurbishment included full deep clean, replacement backdraft shutters, replacement internal insulation lining and new roof plate fixings as the existing are damaged. We calculated that all this would result in an energy saving of 28% – 38%.



IDENTIFYING SUITABLE CANDIDATES FOR REFURBISHMENT

There are several signs that will help determine whether refurbishment is the right option for a particular HVAC system.

For example:

- The system is in a decent condition and has a clear history of being regularly maintained.
- Energy consumption is starting to climb.
- Comfort levels in the building are declining.
- The HVAC installation is in a densely populated area where replacement would cause expensive disruption to the building's neighbours.

- The application has strict requirements for precise temperature and humidity control – for example, food processing, storage of perishables, chemical processing and storage, and computer rooms.
- Management plans to keep the existing system for at least a further 18 months.

The larger the system, the greater the opportunities are for energy savings through refurbishment. The same argument applies to usage; the more hours the system runs, the greater the prospects for energy saving.



THE IMPORTANCE OF MAINTENANCE

Before even thinking about refurbishment or replacement, enlightened and progressive building owners and operators put in place an effective maintenance strategy. Run to failure has long been a discredited approach so the service options are limited to predictive and/or preventive maintenance.

As its name suggests, predictive maintenance is designed to predict when equipment failure might occur and to prevent its occurrence via appropriate servicing. If the predictive maintenance plan is working well,

machines are only serviced when required. Predictive maintenance tools such as vibration analysis, infrared thermography, ultrasonic testing and motor current analysis can be used to diagnose problems in advance.

Predictive maintenance helps preclude problems before they occur. However, preventive maintenance should be at the heart of any plan to ensure optimum HVAC equipment performance. Essentially, preventive maintenance is servicing that is regularly performed on a piece of equipment to lessen the likelihood of it

failing. It is in two parts – making certain that the system is operating at its highest possible efficiency and maintaining this performance.

There will, however, inevitably come a time when maintenance is no longer working. The choice is then to replace the asset or repair and overhaul it. But beware – it is a myth to assume that older assets exhibit higher failure rates; a well-treated HVAC system will have a lower failure rate than an ill-treated one, regardless of age.

Treatment, in this context, means how well they are maintained.



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