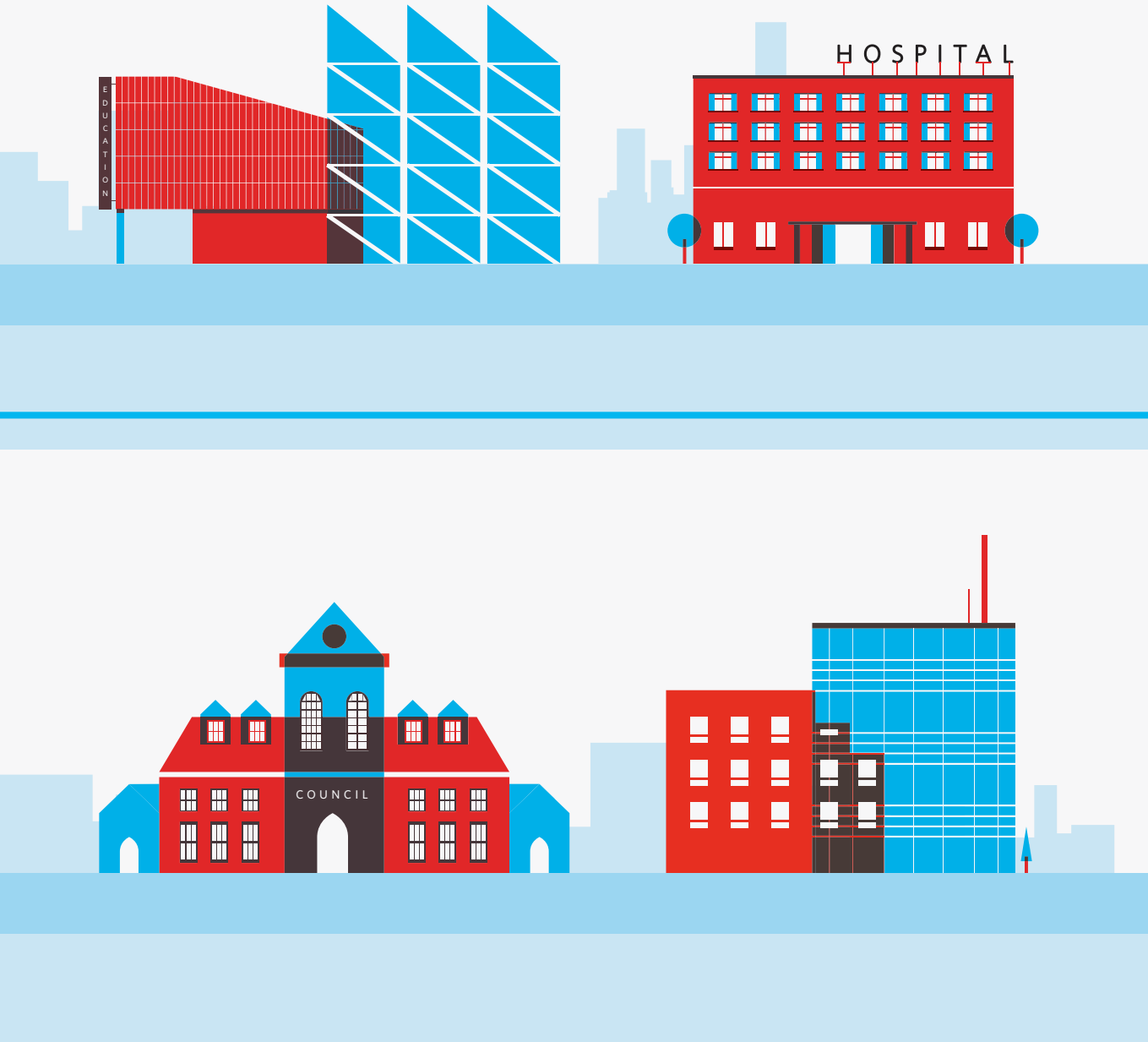
ARMSTRONG



ARMSTRONGINTEGRATED.CO.UK

Influencing the building cycle at every stage.

AT ARMSTRONG, WE'RE MAKING ENERGY MAKE SENSE.

We design, engineer and implement totally integrated intelligent energy solutions.

From pump and chiller upgrades to complete energy centre installations, we work in productive partnerships with private and public sector clients throughout the UK to deliver innovative and robust solutions - with ongoing support and single source responsibility.

Contents

Products

19

Since our founding in 1934, Armstrong has pioneered an uncompromising range of products for residential, commercial and industrial markets.

QUALITY FOUNDATION

Armstrong delivers solutions for Heating Ventilation and Air Conditioning (HVAC) systems. Integrated energy solutions which increase efficiency and minimise energy costs for all non-domestic buildings, including schools and universities, hospitals, shopping centres, commercial and industrial properties, data centres - in fact, for buildings of every description and application.

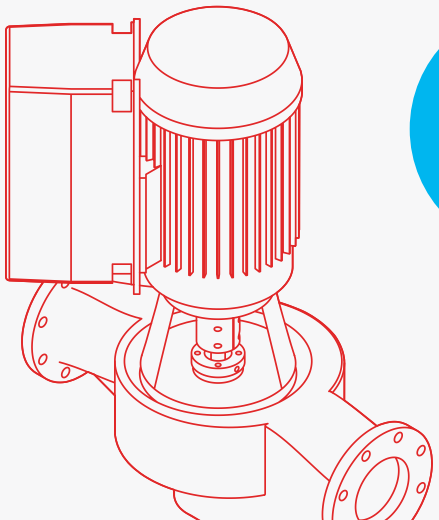
From the very beginning, the Armstrong name has been a benchmark for quality in design, engineering and manufacturing. The Armstrong range now covers the following categories:

1. Commercial Pumps
2. Pump Accessories
3. Hydronics
4. Expansion
5. Domestic Water Boosters
6. Legacy

INTEGRATION IS THE KEY TO OUR SUCCESS

We supply low carbon heating and cooling and pumping solutions, integrating multiple systems to deliver optimum performance and efficiency for our clients.

This expertise delivers real cost savings, reducing both capital and operational expense whilst making the most of renewable technologies.



Systems

Armstrong Systems are not formed through a collection of products brought together. They're formed through years of listening to the customer.

Our expertise lies in integrating multiple systems such as gas-fired condenser boilers, heat pumps, biomass boilers and solar thermals. It isn't enough to simply choose high performing products, or to add low or zero carbon technologies to an existing system and expect to minimise energy costs. In integrating these systems, we consider a wide range of factors including the different optimum temperatures, part load operation efficiencies, variable versus fixed speeds and demand based control.

Only with a full understanding of the challenges these different technologies present can we provide a totally effective solution.

Here are a selection of current Armstrong systems that have been designed to meet the customer's needs.

1. Packaged Plant Rooms Energy Centres
2. 8000 Series
3. MBS Integrated Heating Solution
4. IPP-CHW – Integrated Packaged Plant – Chiller Water
5. IPC – Integrated Plant Control
6. IPS – Integrated Pumping System
7. Tenantherm
8. Quantum Chiller

INDUSTRY-LEADER

As an industry-leader in the practices of off-site manufacture, Armstrong gained a firm reputation for supplying fully packaged plant rooms delivered to site fully assembled and ready for immediate installation.

PERFORMANCE & EFFICIENCY

Our experience has been built on the foundations of learning and providing solutions to a demanding and changing market.

- We now not only supply pre-fabricated packaged systems, each system is supplied to serve the individual needs of a building, with each and every component selected to work at maximum performance and efficiency.

Support services

In addition to the design, manufacture and installation of integrated energy solutions –

Armstrong provides a range of additional services to meet the life cycle requirements of our products and systems once the hand-over is complete.

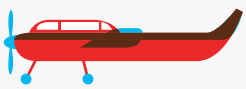
Contact Armstrong to discuss which support services package is right for you:

Armstrong building performance service
Optivisor, ECO Pulse, IPC, IPP, IVS

Enhanced service +
Condition based maintenance from remote analysis
Dedicated site spares | Vibration monitoring
(Auto collection)

Enhanced service
Condition based maintenance from analysis
Dedicated site spares | Vibration monitoring
(Manual collection)

Basic service
Planned maintenance
in line with O&M

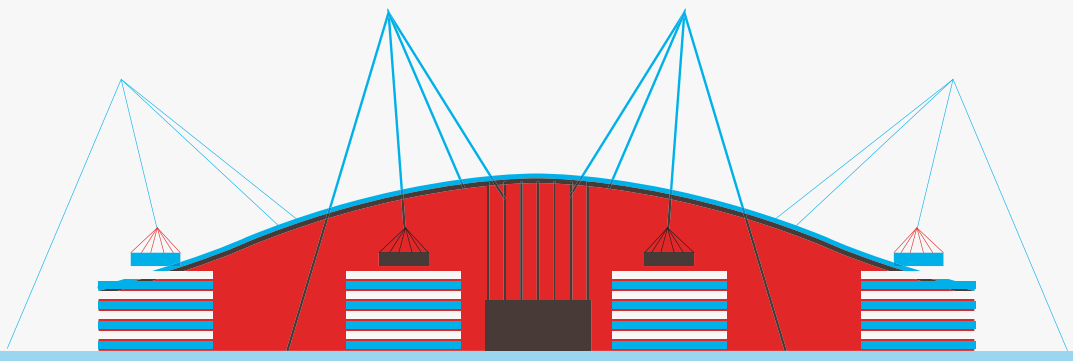


DISCUSS YOUR REQUIREMENTS

From regular servicing of systems to the provision and installation of spare parts, it's good to know that

ARMSTRONG ARE ON HAND

to ensure your HVAC systems perform close to maximum efficiency and continue to reduce whole life costs.



Verticals

57%*

Of a non-domestic building's carbon emissions generated from heating, cooling and ventilation.

CALL 08444 145 145

Our in-depth knowledge and experience enables us to deliver energy savings through unique integrated energy solutions which:

1. Lower first cost
2. Improve energy efficiency
3. Reduce whole life costs
4. Provide return on investment

From a new build project to the retrofit and upgrade of your existing HVAC system,

Armstrong can make the most of your building - today and in the future - by making your energy make sense.

With energy prices rising, facility budgets stretched to the limit and carbon emission targets still to be met, your need to partner an industry expert in HVAC systems has never been greater.

Fortunately with years of experience as an industry leader in the design, manufacture, installation and maintenance of innovative HVAC Systems, Armstrong is able to provide a comprehensive service to companies and organisations requiring optimum energy performance.

PARTNERSHIP

Our extensive experience working within the public and private sectors includes a diverse range of building applications; from education to health care and from retail to data centres.

We work in partnership with our clients including building owners, consulting engineers, ESCOs and M&E contractors to help ensure we meet and exceed these challenges.

*Source: BRE – Carbon Trust Analysis

Design Envelope

The Design Envelope for Armstrong variable speed equipment is made possible through new control methods. These control sequences enable the great part load efficiencies expected, regardless of the selected Design Day.

The Design Envelope is a new way of approaching the HVAC and plumbing equipment selection process for pre-engineered, integrated, factory- built solutions.

ENGINEERS

1. Range of operating conditions
2. Reduces HVAC redesign
3. Sustainable solution
4. Lessens environmental impact
5. Contributes towards BREEAM Certification

BUILDING OWNERS

1. Lowest life cycle
2. Reduced energy consumption for greater financial savings
3. Green-building incentives/rebates
4. Flexibility & improved occupant comfort
5. Future-proofs buildings
6. Ensures correct-sized equipment choice

BENEFITS FOR ENGINEERS

BENEFITS FOR BUILDING OWNERS

A designer can specify a range of possible design days (The Envelope). Right-sizing within the Design Envelope provides greater design flexibility, eliminates equipment "re-selection" thereby reducing design risk and can facilitate integration of future complementary systems (such as renewables) without requiring a redesign of the base plant.

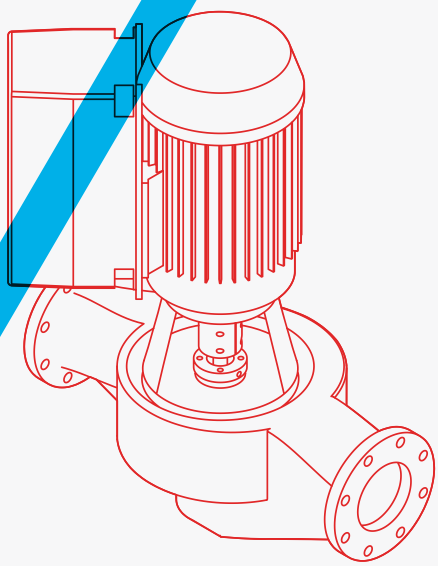
SAVINGS EVERYWHERE

CONTRACTORS

1. Successful project completion
2. Flexible solution
3. Eliminates equipment reworks

RESULT

As a result, original equipment can serve the building requirements for its maximum life span, making this a sustainable solution throughout the building's life, and a more sustainable selection through the design phase.



Intelligent pumping and boosters

Traditionally, pumping systems ran at fixed speed and constant volume, wasting needless highly expensive energy, but with the addition of an inverter, the pump can run at variable speed. This intelligent pumping allows the pump to be tuned to suit system demand, not peak demand, but current demand, which varies throughout the day, leading to cost savings through reduced energy usage (additional system changes may be required to achieve a greater reduction).

EXPERTS

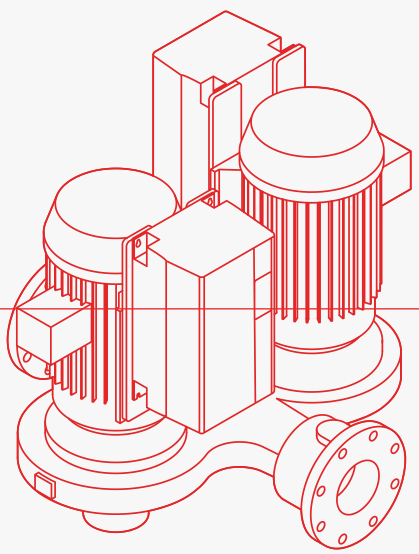
We are experts in pump technology and the innovative Armstrong product range reflects our investment in research and development to ensure we lead the industry with high-performing pumps which sit at the heart of the HVAC system.

Variable speed pumps are controlled through BMS or transducers mounted out in the system.

Armstrong's Sensorless eliminates the need for the sensors, which saves on installation costs, and makes it an ideal technology for retrofit applications. Our pumps are the core of our product offering and are the main important component in Armstrong systems and packages.

Armstrong cooling solutions include:

① Intelligent Variable series and Booster Sets

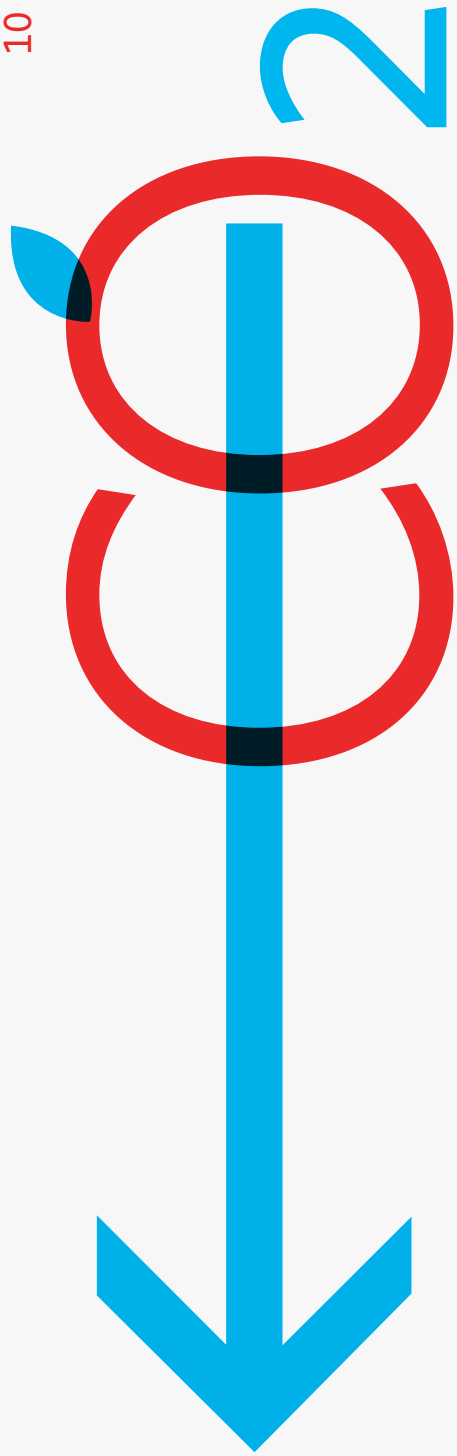


Armstrong intelligent pumping and boosters with the advantage of:

① High performance equipment
② Expert design, engineering, installation and maintenance
③ Reduced first and whole life costs
④ A lower carbon footprint
⑤ Off-site manufacture
⑥ Single source responsibility
⑥ A partnership approach

Armstrong also designs and manufactures booster sets which are designed for tall buildings where accurate pressure control is required.

Our range includes an all variable speed booster set with innovative soft fill function to reduce the risk of hydraulic shock.



Low carbon cooling solutions

The Armstrong objective of total energy efficiency is delivered in the cooling solutions we have designed, engineered, installed and maintained for clients in both the public and private sector, from health care and education to retail and data centres.

Our expertise in cooling solutions ensures comfort cooling needs are met and space, energy and environmental requirements achieved. We offer factory built solutions, with the construction and installation process optimised with future service needs in mind.

RESULT

The result is a highly efficient cooling system delivering flexible solutions - with multi-zone control - and real value with optimum performance and low first and whole life costs.

Armstrong cooling solutions with the advantage of

1. High performance equipment
2. Expert design, engineering, installation and maintenance
3. Reduced first and whole life costs
4. A lower carbon footprint
5. Off-site manufacture
6. Single source responsibility
7. A partnership approach
8. Providing a return on investment

Solutions include

1. Quantum Chiller, IPC, IPP-CHW

Low carbon heating solutions

OPTIMUM ENERGY PERFORMANCE

You will find a wealth of knowledge and experience at Armstrong when it comes to designing and manufacturing efficient heating solutions.

The Armstrong approach is further enhanced by off-site manufacture, which reduces both site installation time and the need for on-site manpower.

Utilising high performance equipment, we ensure the system design, installation and maintenance deliver maximum efficiency to lower a building's carbon footprint and reduce first and whole life costs.

We achieve this by integrating low carbon gas fired condenser boilers, for example, with zero carbon solutions - renewables like heat pumps, biomass boilers and solar thermals - and by taking advantage of part load efficiencies and demand-based control.

RESULT

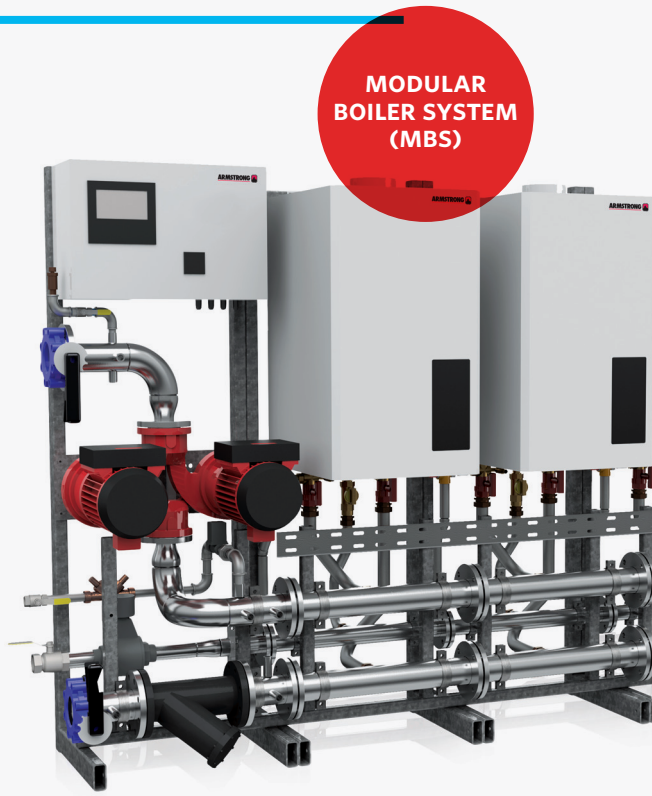
The result is a flexible heating system which ensures year-round occupancy comfort and optimum energy performance.

Armstrong heating solutions with the advantage of

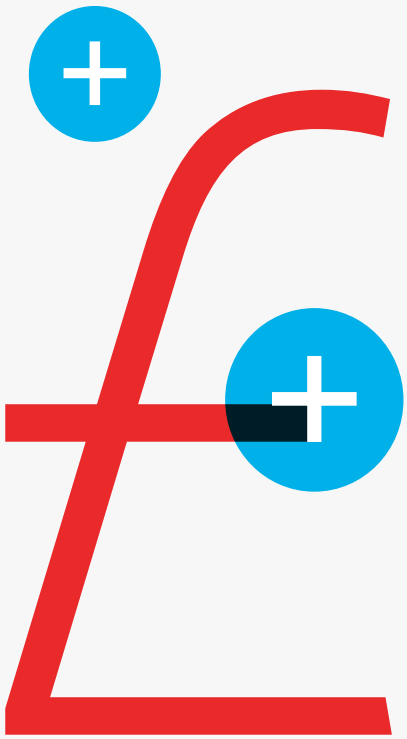
1. High performance equipment
2. Expert design, engineering, installation and maintenance
3. Reduced first and whole life costs
4. A lower carbon footprint
5. Off-site manufacture
6. Single source responsibility
7. A partnership approach
8. Providing a return on investment

Solutions include

1. MBS (modular boiler system), Tenantherm, Expansion Equipment



Capital assist



A mechanical plant needs to be kept updated, but frequently is not given the consideration it deserves, even though an upgrade can have a significant impact in reducing annual operating costs through energy savings.

CAPITAL ASSIST ENABLES YOU TO SPREAD THE COST OF ARMSTRONG SOLUTIONS

Allowing you to benefit from immediate savings without capital outlay. In many cases your energy savings will be more than the monthly payment, resulting in an investment in Armstrong equipment by giving you a positive cash benefit.

At Armstrong, we provide a complete solution to assist with your project. Capital Assist is an integral part of this solution – and it will enhance your cash flow and asset management options.

CUSTOMER BENEFITS

Updating your equipment with Armstrong solutions has a positive impact on the environment, and your organisation will also benefit from reduced energy & maintenance costs.

The additional benefits of using Capital Assist are:

1. Immediate savings with no capital outlay
2. Shifts Capital expenditure to Revenue
3. Aims to be self funding via energy/maintenance savings
4. Avoids equipment becoming obsolete
5. Fixed costs for ease of budgeting
6. Reduces backlog maintenance
7. Increases the value of your building stock

ELIGIBLE EQUIPMENT

Capital Assist can be utilised for a variety of project types. The scope of the project may include an update of mechanical plant components, or replacement of the full mechanical room –

Including but not limited to:

1. HVAC pumps
2. Water booster sets
3. Variable speed drives
4. Integrated heating solutions
5. Renewable energy centres

Armstrong plays star role in MediaCityUK

CASE STUDY

OPTIMISED PLANT LAYOUT

The packaged sets for MediaCityUK were constructed on-site at Armstrong's specialist facility in Halesowen and were delivered to site ready-assembled and mounted on pump skids requiring only final connection and commissioning.

PACKAGED PUMP SETS FROM ARMSTRONG SPEED UP CONSTRUCTION OF A MAJOR NEW COMPLEX

MediaCityUK developed by Peel Media at Salford Quays, will be the new headquarters for BBC North from 2011. Spread over 36 acres of land alongside the Manchester Ship Canal, the project involves a total investment by Peel of £500 million.

The selection of Armstrong 8000 Series pump sets provided faster, more efficient delivery of equipment for the MediaCityUK project by shortening the HVAC system design, construction and installation phases.

FIRST PHASE

Armstrong selected by NG Bailey to provide 40 8000 Series packaged pump sets incorporating highly-efficient variable speed IVS 'Sensorless' pumps with built-in inverters. It has also supplied pressurisation units and booster sets from its range.

SECOND PHASE

Armstrong provided 8000 Series packaged pump sets incorporating IVS pumps to contractor Rotary North West. These featured Armstrong IPS pump control panels and single point power distribution boards.

FINAL PHASE

Armstrong selected by Vital Energi to provide the large pumps which will be the power house of a trigeneration scheme utilising cooling water from the nearby canal.

Lancashire Constabulary

CASE STUDY

Lancashire Constabulary has responsibility for 220 buildings, including police stations and operational centres with an annual energy bill approaching £500,000 per year.

Reduced energy bills for the Hutton Hall site by £245,633 per annum.

It has also reduced CO2 emissions by 744 tonnes a year.

Offsite manufacture enabled the new system to be installed within an extremely tight timescale (which would have otherwise meant site occupants being without heating and hot water in the winter months).

The system for supply of heating and hot water at one of its largest sites, the Hutton Hall Police Training Centre, in Preston, Lancashire, was in urgent need of replacement. The existing system was inefficient, with extensive distribution losses, and engineers advised the Constabulary that the boiler could not meet the needs of the site over the coming winter.

PROJECT PRIORITIES

It was important to reduce the energy costs as much as possible. The energy manager wanted to capitalise on the opportunity to improve the energy efficiency and carbon footprint for the estate, and to position the site to meet increasingly stringent environmental legislation. The site houses several buildings with 24/7 demand, such as call centres on 24-hour duty, and the National Police Computer Database HQ. A key part of this strategy involved a move away from oil towards a gas-fired system with reduced carbon impact.

ENVIRONMENTAL IMPROVEMENT

ARMSTRONG SOLUTION

Armstrong installed four offsite constructed packaged plant rooms, incorporating highly-efficient variable speed systems based around the Armstrong MBS integrated heating solution, controlling Armstrong IVS pumps and pressurisation equipment.

The MBS incorporates fully modulating boilers, variable primary pumps, automatic fill/pressurisation unit and integrated controls, all pre-specified for optimum efficiency, and pre-assembled for rapid installation on site. It enables excellent boiler efficiencies to be achieved and exceeded without time-consuming mixing and matching of system components.

As the system is fully integrated and pre-assembled, additional system design input is not necessary, and installation and commissioning can be achieved much more easily and quickly.

STREAMLINING THE PROJECT

The packaged plant rooms were assembled concurrently with the excavations for the gas pipes rather than commencing once this work was completed. In addition, the installation time was reduced from several weeks to just a few days. The plant rooms were delivered to site, fully assembled, requiring only final connections.

Traditional on site methods of plant room construction could not have met the target date and would have continued into the winter months.

ENVIRONMENTAL IMPROVEMENT

525.27 tonnes CO_2 /year ..... Emissions reduced

+

217 tonnes CO_2 /year ..... Reduction resulting fro move from oil to gas

=

TOTAL REDUCTION OF

744 tonnes CO_2 /year

ENERGY REQUIRED / YEAR

4,503,600 kwh

REDUCED TO

2,550,730 kwh

=

SAVINGS OF

1,935,870 kwh

OR £126,936

PER YEAR

+

£118,696

PER YEAR

TOTAL SAVINGS

£245,633

PER YEAR

ARMSTRONGINTEGRATED.CO.UK

MANCHESTER

WENLOCK WAY
MANCHESTER
UNITED KINGDOM
M12 5JL
+44 (0) 8444 145 145

BIRMINGHAM

HEYWOOD WHARF, MUCKLOW HILL
HALESOWEN, WEST MIDLANDS
UNITED KINGDOM
B62 8DJ
+44 (0) 8444 145 145

TORONTO

23 BERTRAND AVENUE
TORONTO, ONTARIO
CANADA
M1L 2P3
+416 755 2291

BUFFALO

93 EAST AVENUE
NORTH TONAWANDA, NEW YORK
U.S.A.
14120-6594
+716 693 8813

BANGALORE

#59, FIRST FLOOR, 3RD MAIN
MARGOSA ROAD, MALLESWARAM
BANGALORE, INDIA
560 003
+91 (0) 80 4906 3555

SHANGHAI

NO. 1619 HU HANG ROAD, XI DU TOWNSHIP
FENG XIAN DISTRICT, SHANGHAI
P.R.C.
201401
+86 21 3756 6696

MAKING ENERGY MAKE SENSE™

ARMSTRONG INTEGRATED
ESTABLISHED 1934

ARMSTRONGINTEGRATED.CO.UK