ENGINEERING
TOMORROW

Case study | Virtus® & iSET®

Superior **range** and **accuracy** brings increased efficiency in new residential apartments

>20%
peak energy reduction

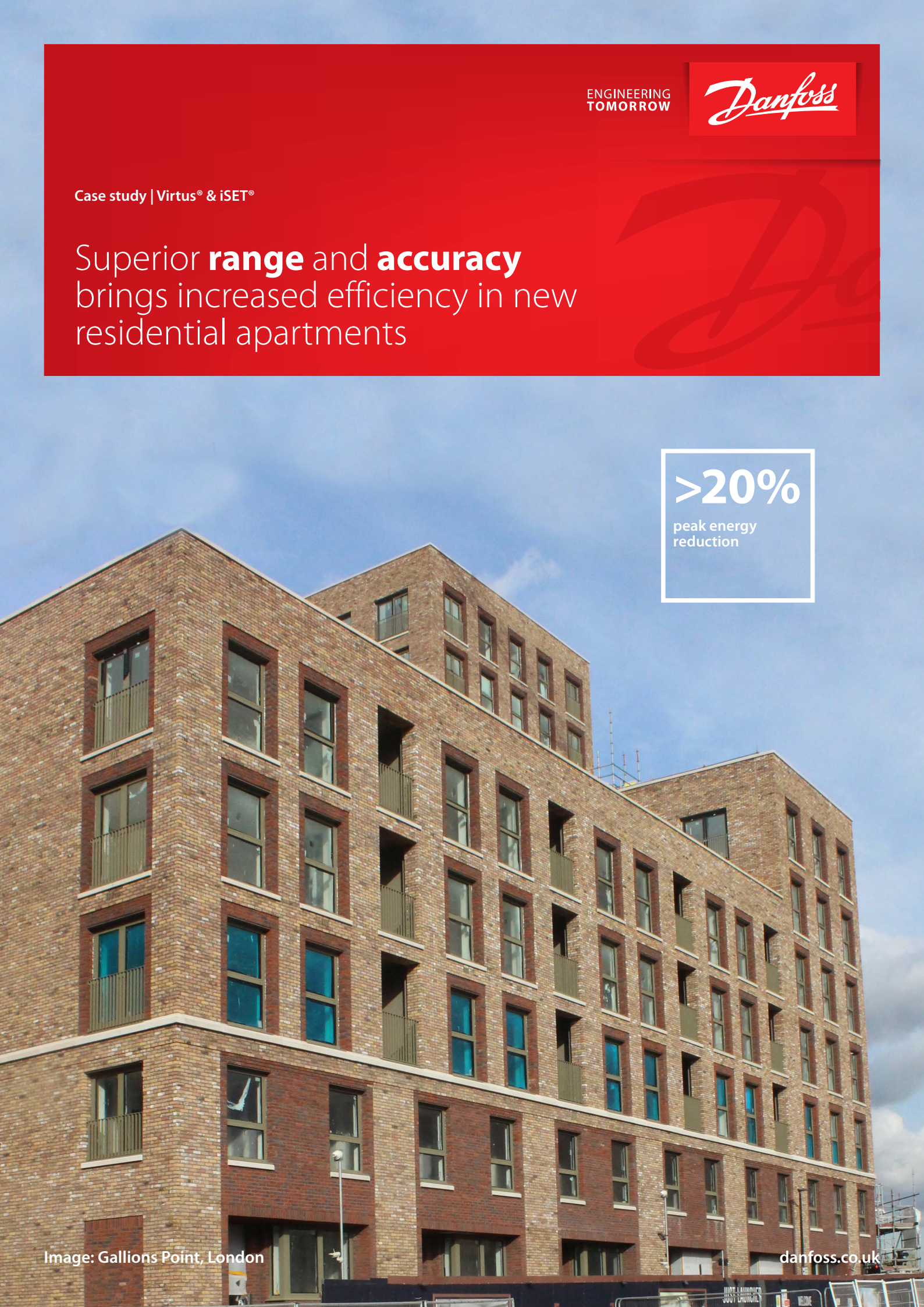

Image: Gallions Point, London

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Virtus® flow controllers and iSET optimisation

Intelligent optimisation of district energy in new residential apartments

The way district energy networks are balanced and optimised is changing. A new generation of Virtus intelligent ready pressure and flow controllers are here to ensure high durability, improved functionality and performance. With unique intelligent optimisation solution iSET, this will save even more energy whilst providing excellent range and accuracy.

This case study describes how new residential apartment developments have been equipped with intelligent solutions that give great control and stability of the district energy network.

Danfoss Virtus controls the pressures and flows even in the largest and most demanding district energy systems where big variations are required.

The Projects

Gallions Point, London

The Docklands area in London, England has a long history and an exciting future. The area, once heavily industrial and home to the world's largest port, is now a mixture of residential, commercial and light industrial space with huge levels of re-development continuing. Docklands, which includes the financial centre Canary Wharf, is now home to many medium to large sized residential apartments as the regeneration of the area continues.

Gallions Point is a large development of 1, 2 and 3 bedroom apartments situated in Royal Albert Wharf in London's newest district, the Royal Docks.

Newbury Racecourse, Berkshire

Newbury Racecourse is situated in Berkshire, to the west of London. The racecourse is over 100 years old and has a notable history with many champion jockeys having raced there. Now, a large new development is bringing new homes to the area, some with a premium view over the racecourse.

The second phase of the project at Newbury Racecourse comprises 10 separate blocks, featuring a total of 366 apartments. This phase forms part of a wider £100m+ development between David Wilson Homes and the racecourse.

Gallions Point developers Telford Homes, and Newbury Racecourse developers David Wilson Homes have partnered with E.ON as the energy supplier for the developments. As with any large development, district energy solutions are vital to the comfort, energy use and performance of the development. It is important that the district energy solution therefore delivers the best performance to the specifiers, developers and end users. It is for this reason that Danfoss Virtus and iSET solutions were specified.

"The Virtus combined with iSET provides a demand responsive range of flow in order to meet peak and off-peak demand. This product is superior to standard AFQM's in terms of the range and accuracy of the valve, greatly reducing heat transfer losses. This was the key reason for specifying this solution."

Jarrod Giroud,
E.ON UK Asset Engineer
Gallions Point & Newbury
Racecourse Developments

The challenge

E.ON City Energy Solutions is responsible for the district heat networks at Gallions Point and Newbury Racecourse, which includes the operation and maintenance of the heating network; and providing customer service and billing to all valued customers. The challenge is to provide the block with a constant temperature through the heating circuit to ensure residents comfort and also to provide the client with the maximum optimised information from the plant equipment. The parameters for efficiency, flexibility and sustainability were very high in the specifications for the planners. The key objectives were to optimise the plant equipment and ensure a low return temperature to the energy centre.

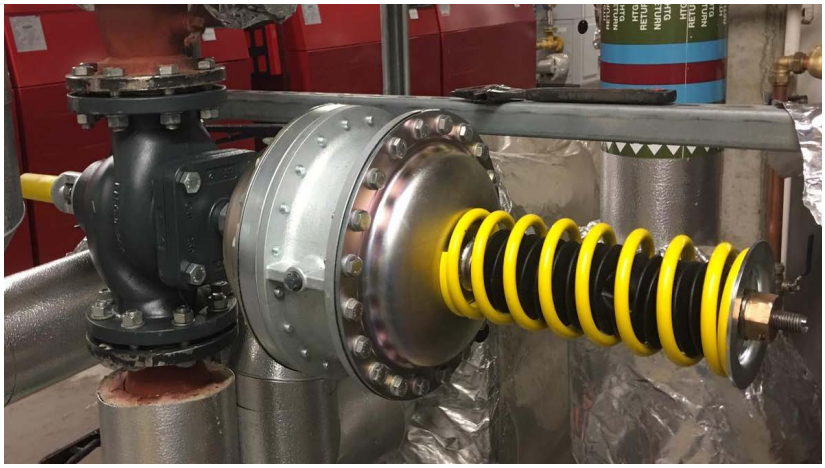
In district energy systems, it can be difficult transferring the return temperature from the plate heat exchangers. Essentially, there can be deviations from the set point on the secondary temperature side, with low differential temperature on the primary side and occasional return temperature fluctuations. The aim is to reduce temperature fluctuations and heat transfer losses as much as possible.

The iSET is able to eliminate temperature fluctuations (oscillations) by monitoring control and automatically adjusting the differential pressure (ΔP) over the motorised control valve (MCV).

The Solution

The Danfoss Virtus pressure controller with integrated anti-oscillation system iSET was the specified solution for the district energy challenges that E.ON had both in the Newbury Racecourse, and Gallions Point developments.

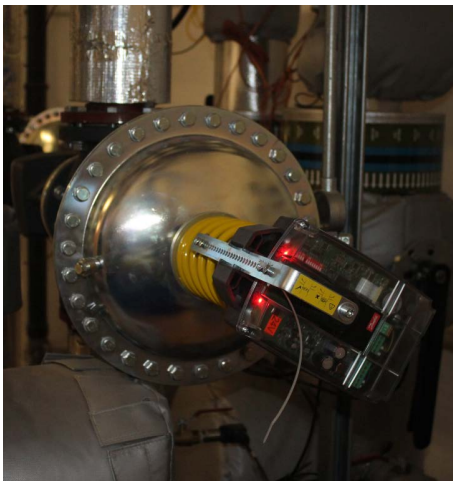
Differential pressure controllers are used for stabilising the pressure in various branches of a hydraulic system. The controllers serve mainly as the link between the district heating pipelines and the local heat exchanger and are usually used in heat networks and HVAC systems.



The Virtus controller automatically sets the optimal differential pressure in the system, thus providing stable functioning of the hydraulic system. Conventional differential controllers help in stabilising the hydraulic systems, but due to large differences in consumption between winter and summer seasons, they cannot prevent occasional oscillations in the system. Those oscillations usually occur in the periods of smaller heat demand due to larger system gain at lower control valve openings.

The Benefits

The challenges and importance of providing the appropriate range of flow, minimal fluctuations and valve accuracy meant that E.ON selected the Virtus intelligent pressure and flow controllers and iSET solution as the product is the best in its class.



Virtus enables large flows, and additionally offers stable control of the pressure and flow even in large, demanding district energy systems. This in turn gives a superior level of comfort, providing district energy heat to many different buildings just when they need it.

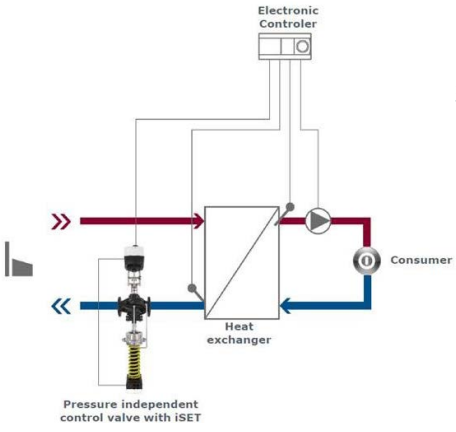
The iSET function constantly monitors the control signal level and adjusts the differential pressure over the motorised control valve (MCV). This intelligence is then fed to the control valve so that it can operate in an optimal way. Due to the fact that it is being constantly monitored, it only ever needs small adjustments which mean that there is a far greater amount of stability.

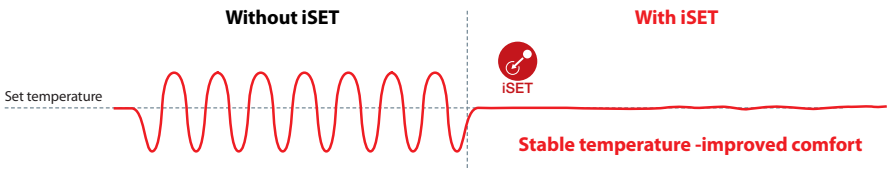
The overall benefits of the Danfoss Virtus and iSET are that they are extremely accurate, have a great range of flow, are the most stable solution and also have the best-in-class flow/investment ratio. Essentially, this provides stable district energy demand, provides energy savings, and increased levels of comfort.

Intelligent substation efficiency optimisation with iSET

ΔT optimisation without oscillations

iSET





Benefits of iSET:

- Perfect balance of temperature and flow in a real-time mode
- Stable temperature-improved comfort for consumers
- Reduced operational cost for consumer, especially in dynamic DHC systems
- Longer lifetime of installed equipment

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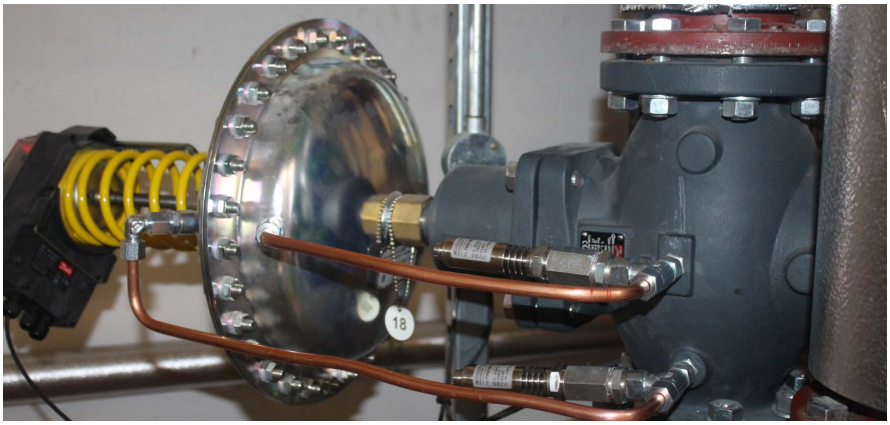
Careful inspection of the installed Danfoss Virtus and iSET: Gulam Seedat (left) Business Development Manager at Danfoss discusses the operation of the controllers at Gallions Point with Mithila Poshakwale (right) from E.ON UK.



The Virtus controls and iSET gives a superior range and flow to district energy specifiers. Here, the Virtus pressure flow controller at Gallions Point is in the process of being connected to testing equipment that will accurately measure the rate and flow, to ensure that the optimum results are gained.

The Danfoss and E.ON team in the plant room at Newbury Racecourse.

From L-R: Jarrod Giroud; Joshua Collings (E.ON); Iztok Kunšek; Zoran Saponia; Saso Strajnar (Danfoss)

About E.ON

E.ON UK is one of Britain's leading energy suppliers. It offers residential and business electricity and gas supplies, combined heat and power solutions, solar panels, battery storage and electric vehicle charging. In 2019, E.ON became the first of the "big six" UK power companies to switch all of its British electricity customers entirely to renewable electricity. E.ON is an international, privately owned energy supplier based in Essen, Germany, and has over 70,000 employees.

Installed Equipment

- AFQM PN 16 DN 80 + AME 655
- AFP 2 PN 16 640 cm 2 range
- AMEi-6 actuator (iSET)

Learn more about Virtus and iSET at
danfoss.co.uk

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