Natural Gas **Applications & Solutions**

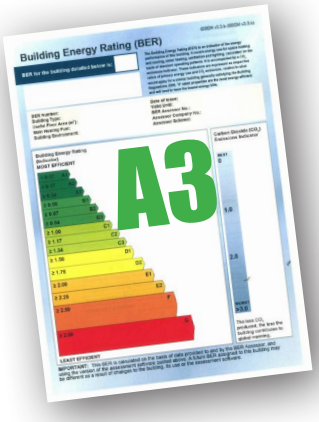
District Heating Residential

April 2014

St. Raphaela's Apartment Complex
Stillorgan, Co. Dublin.

Shannon Homes Dublin Ltd. developed a purpose built apartment complex, specifically designed for low energy operation. The completion of the project in March 2014 is a substantial move towards coordinated low energy low impact urban living.

The development has one hundred apartments over two separate blocks comprising an occupied floor area of approx. 94,195 sq. feet. Each apartment has an individually controlled heating system, connected to the central boiler house via individual heat interface units which separate the apartments from the primary system. Energy meters are provided in each unit to allow for ongoing system monitoring and billing which will be managed by Frontline Energy. Frontline will work closely with Shannon Homes to maximise the efficiency of the heating system, maintaining lower energy costs for the residents.



The apartments are further enhanced by use of a Vent-Axia heat recovery ventilation system.

The plant room utilizes a 1MW Hamworthy Wessex boiler which can modulate to 50kW during low load periods. Two Kinviro, combined heat and power Dachs units, work in parallel with the boilers and together with 5,000 litres of buffer storage allow for compliance with the renewable energy requirements of Part L 2011 of the Irish Building Regulations.

The primary heating system is designed to operate in condensing mode 100% of the time, keeping running costs to a minimum and efficiency to a maximum.

Construction Professionals

Developer
Shannon Homes Ltd

Architect
MCORM Architects

Consulting Engineers
Coakley McElligott

Mechanical Contractor
M&P Mechanical Services Ltd

Suppliers

Boiler and Heating Supplier
Origen Energy Ltd

CHP Supplier
Kinviro Ltd

Ventilation System Supplier
Lindab Ireland Ltd

Energy Management
Frontline Energy

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Central Plant and Renewable Energy Part L

The system has 1,000kW of installed boiler capacity to serve the 100 apartments heating and hot water usage. A standard development would have resulted in the installation of an 18kW boiler in each apartment, with 100 individual associated exhaust flues and 100 individual gas pipes to each dwelling.

In this case by employing a central plant system in the plant room of the development, the space required was reduced in size by 44%. Also the additional cost & aesthetic savings of having only a single gas pipe and two exhaust flues for the boiler plant room.

The CHP unit (below) provides the Part L renewable energy contribution for the development. The unit generates electricity from natural gas and utilizes the exhaust gases to provide hot water to the buffer tanks. Part L requires 10kWh of thermal energy (per square metre floor area) be generated renewably for use in the buildings heating or hot water system. Alternatively 4kWh of electrical energy can be generate – or a mix of the two. By using two CHP units each with an output of up to 14.8 kW of heat and 5.5kW of electricity the entire 94,000 square foot development was able to comply with the renewable energy requirement by using natural gas only.

Benefits of central plant:

- No individual flues required per apartment giving the building facade a more aesthetic finish.
- No space required in dwelling for boiler.
- No noise from boiler or flue in apartment.
- No gas piping required for individual boiler feed, reducing cost.
- No gas meter rigs required in basement or on site, thus increased car park spaces & free area.
- No hot water cylinder in dwelling, increased storage space and decreased installation time as plumbing to cylinder eliminated.
- Increased BER rating resulting from group heating scheme (A BER of A3 is in the Top 0.4% of all BER ratings issued in Ireland).
- Reduced running costs from commercial utility energy rates.
- Instant hot water production eliminates the requirement for storage cylinders.

DACHS Technical Data:

Electrical Output (kWe)	5.5
Thermal Output (kWth)	12.5–14.8
Electrical Efficiency %	27%
Thermal Efficiency %	61%
Max Water Flow Temperature	83°C
Weight	530kg

District Heating Station:

Hot Water Output (L/Min)	18
Thermal Input (kW)	59
Hot Water Type	Instant DHW
Max Heating Return	50°C
Heating Temperature	60°C / 40°C
Weight	20kg

Wessex Technical Data:

Max Thermal Output (kW)	750
Min Thermal Output (kW)	50
Turn Down Ratio	15 : 1
Seasonal Efficiency %	91.7%
Max Water Flow Temperature	90°C
Weight	678kg

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