

## Saint Raphaela's – District Heating Residential

Located in Stillorgan Co. Dublin, St. Raphaela's is a purpose built residential complex specifically designed for low energy operation. The completion of the project in January 2014 is a substantial move towards coordinated low energy low impact urban living.

The development has one hundred individually accessed apartments over two separate blocks comprising an occupied floor area of approx. 94,195 sq. feet. Each residential unit has an individually controlled heating system that are 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 & billing.



The boiler house comprises a 1MW Hamworthy Wessex boiler which can modulate to 50kW during low load periods. The two Origen Energy supplied micro combined heat and power units combine with 5,000 litres of buffer storage to 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 on a 60°C flow temperature, this ensures the boilers operate in condensing mode 100% of the time, keeping running costs to a minimum and efficiency to a maximum.

The apartments are further enhanced by use of a heat recovery ventilation system. Radiators are sized to operate correctly at this reduced temperature. The use of return temperature limiters on each apartment ensure that the lowest temperature always returns to the mains gas boilers and therefore further increases efficiency reducing fuel usage on site.



**Client**  
Shannon Homes

**Contractor**  
M&P Mechanical

**Micro CHP & District Heating Supplier**  
origen<sup>+</sup> Origen Energy Ltd

**Insulated Pipe Supplier**  
Polytherm Heating Ltd.

**Boiler Supplier**  
Hevac Ltd.

**Fire Services & Mains**  
Tube Company of Ireland

## District Heating & Renewable Energy Part L

The system has 1,000kW of installed boiler power 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.

Therefore by employing a district heating system in the development the heating plant was reduced in size by 44% with the additional cost & aesthetic savings of having only a single gas pipe and a single exhaust flue for the boiler.

The Part L renewable energy contribution for the development was provided by the Origen Energy supplied micro CHP, which generates electricity and uses the exhaust gases to assist in heating the building.

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 per square metre floor area can be generate – or a mix of the two.

By using two Origen Energy supplied mCHP 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 DISTRICT HEATING:**

As there is no boiler in the house or apartment:

- No flue required, no core for flue, no boxing for flue, no flue gas and more aesthetic finish.
- No space required in dwelling for boiler.
- No noise from boiler or flue.
- No danger of carbon monoxide therefore safer for occupants.
- Increased lettable floor area in building.
- No gas piping required for individual boiler feed. (That's a lot of money)
- No fire rating or venting of gas riser required.
- No gas meter rigs required in basement or on site, therefore increased car park spaces & free area.
- No hot water cylinder in dwelling therefore increased storage space & 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 rates & properly annually maintained plant.
- Simultaneous supply to commercial units.
- Instant hot water production eliminates the danger from storage cylinders and legionella.
- Reduced plant requirements on site - on this project the heating system was 44% smaller than a standard heating system with individual boilers.



### **CHP 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