ENERGY STATEMENT

Newcastle Apartment Block, Main Street, Newcastle, Dublin

Project Reference: P22-153

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1 Introduction

The intention of this report is to identify the energy efficiency measures associated with the design, construction, ongoing management, and maintenance of the proposed developments.

As part of the developments efforts to reduce energy consumption, several sustainable design features were included to demonstrate and quantify these energy efficiency and sustainable design measures.

Figure 1 - Proposed Development Perimeter

1.1 BER

As of 2006 all domestic buildings that were newly built and existing buildings that are for sale or rent require a BER (Building Energy Rating) certificate.

The actual building energy rating is based on the primary energy used for one year and is classified on a scale of A1 to G with A1 being the most energy efficient. It also gives the anticipated carbon emissions for a year's occupation based on the type of fuel that the systems use.

To identify primary energy consumption of the building, the BER assesses energy consumed under the following headings:

- Building type
- Building orientation
- Thermal envelope
- Air Permeability
- Heating systems
- Ventilation
- Fan and pump efficiency
- Domestic hot water generation

- Lighting systems.

Sustainability Target – Design & Construction			
Building Type	**Assessment Method**	**Standard**	**Level**
Apartments	DEAP	BER	A2/A3
Duplex	DEAP	BER	A2/A3

Table 1 - BER Target

1.2 Development Details

The proposed development consists of a total of 18 residential units, comprising of 15 apartments and 3 duplex units over 2 apartment blocks. This report identifies the energy standards with which the proposed development will have to comply and also sets out the overall strategy that will be adopted to achieve these energy efficiency targets. The dwellings will be required to minimise overall energy use and to incorporate an adequate proportion of renewable energy in accordance with Building Regulations Part L 2021, Conservation of Energy & Fuel (hereinafter referred to as Part L) and anticipated future revisions.

This Energy Statement Report has been prepared in support of a planning application on behalf of:

Customer: Rathgearan Ltd. Riverview House, Dublin Road, Celbridge, Kildare, Ireland.

Architect: Demesne Architects, Main Street, Maynooth, Co. Kildare.

The proposed building is located in Main Street, Newcastle Co Dublin.

2 Sustainability Statement

To emphasise the importance of sustainable design for the proposed development, the following approach would be adapted and include the following:

- Building designed to reduce and optimise overall energy consumption
- Building construction using environmentally friendly materials with a low-embodied energy, minimising water waste and adapting water conservation measures
- The proposed development will be attentive to occupant comfort conditions whilst allowing flexibility in layout for future changes

Figure 2 - The Sustainability Hierarchy

Throughout the design and construction phase for the proposed development, the design team will strive to ensure the highest standards of sustainability.

3 Energy Performance in New Buildings

Ireland has recently legislated its commitment to its EU requirements with respect to energy usage within buildings. The European Energy Performance of Buildings Directive requires all new buildings to be Nearly Zero Energy Buildings (NZEB) by 31st December 2020 and all buildings acquired by public bodies by 31st December 2018. Certificates of compliance must be available for buildings to ensure compliance with the new building regulations and the NZEB standard. Ireland has altered Part L of the building regulations (Conservation of fuel and energy buildings - dwellings) to ensure compliance with the EU directive.

These targets will be achieved by implementing the following measures within the proposed development:

- Building orientation and exposure
- Construction materials
- Thermal insulation properties of building elements
- Mechanical plant efficiencies and design strategies
- Use of renewable technologies.

The current edition of the Building Regulations Technical Guidance Document Part L – Conservation of Fuel and Energy – Dwellings sets out the requirements for the minimum fabric and air permeability requirements, maximum primary energy use and carbon dioxide (CO2) emissions as well as the minimum amount of energy derived from renewable sources, as calculated using the Domestic Energy Assessment Procedure (DEAP) methodology.

3.1 Achieving Part L Compliance

The Dwelling Energy Assessment Procedure (DEAP) is the official Irish method for calculating the energy performance and associated carbon dioxide emissions of domestic buildings in support of the Energy Performance of Buildings Directive (EPBD). DEAP consists of a software tool and is a key component of the Irish Building Energy Rating (BER) scheme. DEAP is also the compliance tool specified in Part L of the Irish Building Regulations for Domestic dwellings. For standardized occupancy, it calculates annual values of delivered energy consumption, primary energy consumption, carbon dioxide emissions and costs, both totals and per square meter of total floor area of the dwelling.

Compliance is demonstrated by the following:

- Comparing the energy performance coefficient (EPC) and carbon performance coefficient (CPC) to the max permitted energy performance coefficient (MPEPC) and max permitted carbon performance coefficient (MPCPC) as defined in Part L 2021 Building Regs.
- Confirming heat loss has been limited as defined in Part L 2021 Building Regs.
- Confirming air permeability is limited as defined in Part L 2021 Building Regs

To demonstrate acceptable primary energy consumption, the result will aim to show the EPC (Energy Performance Coefficient) will be no greater than the max energy performance coefficient (MPEPC), MEPC is 0.3.

To demonstrate that an acceptable level of CO2 emission rate is achieved, the carbon performance coefficient (CPC) of the building of the proposed development will be no greater than the max carbon performance coefficient (MPCPC). MPCPC is 0.35.

The table below outline the minimum energy values for the dwelling as outlined in the Building Regulations TGD-L:

Element	TGD-L / NZEB
Maximum Permitted Energy Performance Coefficient (MPEPC)	0.30
Maximum Permitted Carbon Performance Coefficient (MPCPC)	0.35

Renewables	TGD-L / NZEB
Minimum Amount of Energy from Renewable Sources	20%

Table 2 – Energy / Carbon Performance Targets

4 Energy Efficient Design

The specification of an energy efficient façade and Mechanical & Electrical systems will allow the energy consumption of the building to be reduced compared to a set baseline. This ensures the environmental and economic impact of the operation of the building is reduced. The philosophy behind energy efficient design will encompass the following plan:

4.1 Be-Lean - Strategy

The *Be-Lean* strategy aims to firstly reduce the buildings lifetime energy consumption by limiting the amount of energy required by improving on the building's insulation.

The following measures will be implemented to reduce the energy consumption of the development:

- High performance U-values
- Air tightness
- Thermal transmittance
- Passive design measures

4.1.1 Passive Design

Lighting accounts for typically 12% of the overall primary energy. Maximising day lighting in the main areas will reduce the demand on artificial lighting during daylight hours.

By employing Energy Efficient Design (EED) methods, the energy consumption (and CO^2 emissions) can be reduced for this development.

4.1.2 High Performance Elemental U-Values

Heat loss through the building fabric and façade will be limited by ensuring the specification and continuity of insulation is done to a high standard. High performance U-Values for the walls, floor, roof, windows and façade will slow the rate of heat loss from the building.

Target U-Values for the proposed development will exceed the minimum standards as set out in Part L of the Irish building regulations.

Thermal Element	Part L 2021 Max. Elemental U-Values (W/m².K)
External Walls	0.18
Pitch Roof	0.16
Flat Roof	0.20
Ground Floor/Exposed Floor	0.18
External doors, Windows/Glazing	1.40
Air Permeability (Air Tightness)	3.0 (m³/h/m²) @ 50 Pa.

Table 3 - Irish Building Regulations Maximum Permissible Elemental U-Value

4.1.3 Air Tightness

One major contributing factor to unnecessary heat loss is infiltration. Infiltration is the air leakage of external air into a building due to the pressure difference associated with internal and external temperatures.

Current building regulations state that a minimum standard needed to be achieved by an air permeability test is 3.0 (m³/h/m²) @ 50 Pa.

4.1.4 Thermal transmittance & cold bridging

Thermal bridges occur where the insulation layer is penetrated by a material with a relatively high thermal conductivity and at interfaces between building elements where there is a discontinuity in the insulation. The design will aim to have low thermal transmittance values where possible.

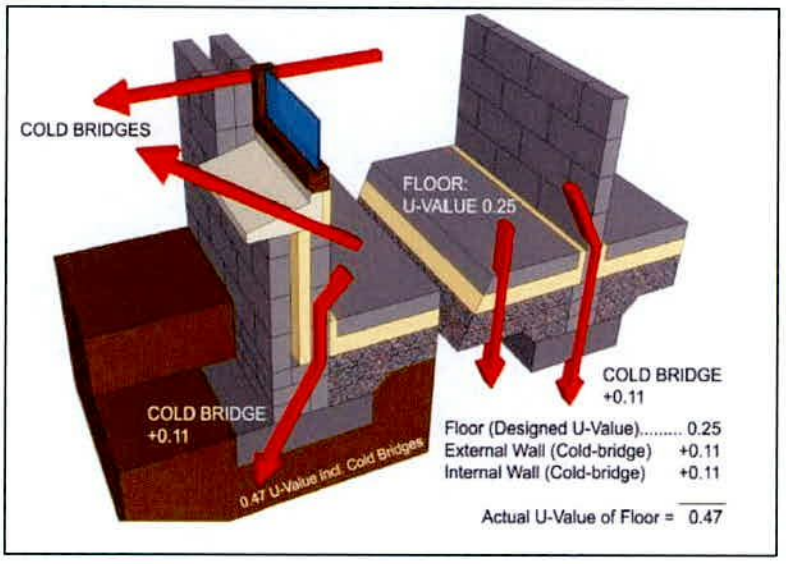

Figure 1- Thermal Transmittance Example

4.2 Be-Clean - Strategy

To ensure the high quality of construction and materials are maximised, energy consuming plant and equipment for the building will be as efficient where possible.

4.3 Building Services Systems Design

The below selection of technologies will be finalised at the detailed design stage depending on compliance to Part L, cost effectiveness, lifecycle of equipment and operation of building.

4.3.1 Heating system

Individual Air Source Heat Pump, Exhaust Air heat pumps or Solar PV panels subject to detailed design.

4.3.2 Domestic hot water

Domestic hot water shall be generated in combination with the associated Heat Pump per dwelling.

4.3.3 Ventilation

There are three options currently being analysed for use within this development. The solution will be confirmed during the detailed design.

- Traditional Natural Ventilation Approach
- Whole House Mechanical Heat Recovery Ventilation (MHRV)
- Mechanical Whole House Extract (MEV).

4.3.4 Water Conservation Measures

Flow restrictors will be installed on all showers in each dwelling. This will reduce water use and energy used to heat hot water. It is a requirement to supply shower with flow restrictor to 6litre/min in each dwelling.

4.3.5 Lighting

The design intent for internal lighting design is to introduce artificial lighting in all areas applicable. To create a better internal environment for occupants, natural daylight should be encouraged where possible. To reduce energy usage, all light fittings will be based on LED type (A+ rated Bulb). External Lighting will be energy efficient LED technology with photocell technology.

4.4 Be-Green - Strategy

As part of NZEB commitments for new dwellings and to further reduce the dwellings overall energy consumption, all new dwellings shall employ a proportion of their annual energy demand by renewable energy sources. The minimum renewable energy contributions for dwellings as required by Part L 2021 is defined as the Renewable Energy Ratio (RER) which is the ratio of the primary energy from renewable energy sources to total primary energy. In order to meet the requirements of Part L 2021, the RER is required to be a minimum 20%. In order to determine the most efficient and effective means of complying with the requirements of Part L 2021, a detailed assessment of the various renewable energy systems available will be conducted during the detailed design stage.

Renewable technologies across the spectrum have been assessed for suitability and application for the proposed development, these are detailed in the following table:

Technology	Sustainability Rating*	Notes/Comments:
Low	**Medium**	**High**
Combined Heat & Power (CHP)	Low	➢ Space onsite is not readily available ➢ Heat sink throughout the year will not meet minimum running times for CHP over the year
Wind Turbines	Low	➢ Space for a wind turbine onsite is not freely available
Wind Power	Low	➢ Not deemed suitable for a suburban location due to aesthetical and noise implications.
Biomass Fired Heating	Low	➢ Availability and space for storage onsite is limited ➢ Drive to lower heating consumption onsite will extend the payback period for this system ➢ Aim to negate use of solid fuels onsite ➢ Additional maintenance required
Ground Source Heat Pumps (GSHP)	Low	➢ Extensive space required for horizontal/vertical loops required ➢ Good potential from a renewable/green strategy
Solar Thermal	Low	➢ Not deemed suitable due to complexity of the system and the required maintenance implications.
Solar Photovoltaic (PV)	High	➢ Space available at roof level to accommodate substantial array ➢ Optimum installation can be achieved to maximise yield of irradiation levels for the location
Air Source Heat Pump	High	➢ Suitable. It is proposed to use EAHP unit in individual heating systems subject to further assessment at the

		detailed design stage.
Exhaust Air Heat Pump Exhaust Air	High	➢ Suitable. It is proposed to use EAHP unit in individual heating systems subject to further assessment at the detailed design stage.

Table 4 - Technology Applicability for the Proposed Project

*Based on applicability for the proposed development