M&E Utilities and Energy Analysis Report

White Heather,
South Circular Road,
Dublin 8

IN2 Project No. D2502
26/11/2025
Rev01

Revision History

Date	Revision	Description
31/10/2025	00	Issued for Comment
26/11/2025	01	Planning Stage Issue

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Company Registration No.: 466565

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1.0 Executive Summary

The proposed mixed-use Large-Scale Residential Development (LRD) will comprise the demolition of all existing commercial and warehouse buildings and structures on the site, and the construction of 250 no. residential units within six blocks (Blocks 01, 02(A/B), 03(A/B), 04(A/B), and two duplex blocks) ranging in height up to seven storeys.

The development will include 12 no. studio apartments, 148 no. one-bedroom apartments, 74 no. two-bedroom apartments, 8 no. one-bedroom duplex units, and 8 no. two-bedroom duplex units. All residential units will include private balconies or terraces, oriented north, south, east, or west.

The proposal also includes the conversion of the existing residential dwelling at 307/307A South Circular Road to a crèche with an associated external play area. A new kiosk/café and adjoining open space will be provided adjacent to 307/307A South Circular Road, along with car and bicycle parking. The development will provide public open spaces between Blocks 03 and 04, as well as to the north and south of the apartment blocks, the latter overlooking the Grand Canal, together with communal open spaces throughout the scheme. Vehicular, pedestrian, and cyclist access will be provided from the northeast of the site via South Circular Road, with additional pedestrian and cyclist access from the west via St James's Terrace.

The proposal also includes landscaping, public and communal open spaces, and all associated site development works required to facilitate the project. These works include boundary treatments, plant and waste management areas, and other service provisions, including ESB infrastructure.

This report summarises the existing Engineering Services infrastructure to the proposed residential development at White Heather Residential Development, South Circular Road in Dublin 8. The M&E Utilities strategy considered appropriate for the White Heather development are described in Section 2.0.

The existing infrastructure connections have been identified. These connections will each be isolated and removed prior to the commencement of site construction. New infrastructure connections have been considered in the design of the proposed residential development and there are no issues with Infrastructure to supply the new development. A Double ESB substation is proposed externally, near the northern boundary of the development. The substation will include two adjacent switch rooms. Each block core will have its own metering cabinet.

All ESB cabling infrastructure will run from the substation to the adjacent offloader switchrooms. Beyond that point, the cabling will be private. The cables feeding the apartment and landlord meters will run unmetered from the substation offloader switchboards to the ESB metering cabinets within each block.

A centralised comms frame room has been included in the undercroft for incoming telecoms connections including EIR and Virgin Media services. The heating strategy is via a centralised plant room consisting of a modular air source heat pump (ASHP) plant only. No natural gas connection is therefore required nor has been allowed for at this stage of the project.

The validation of the Nearly Zero Energy Building (NZEB) standard is demonstrated in Ireland using the SEAI approved Dwelling Energy Assessment Procedure (DEAP) software. The DEAP methodology is examined in Section 3.0 in terms of Primary Energy, Renewable Technologies and Decentralised plant solutions, illustrating how electrically based technologies (Air Source Heat Pumps, Photovoltaic panels etc.) are increasingly favoured within Part L and associated Building Energy Rating (BER) calculations. Input criteria, in terms of Building Construction, Mechanical and Electrical Systems and Renewable Technologies are also detailed in this section.

This report describes the outline information relating to the anticipated energy performance and CO2 emissions associated with the proposed development. Low carbon energy and heating solutions have been considered as part of the overall design and planning of the proposed development.

The proposed Energy Strategy solutions considered suitable for the White Heather Residential development were selected to:

- Reduce Energy Demand
- Improve Efficiency of Supply
- Integrate Renewable Solutions

The energy strategies considered appropriate for the White Heather development are described in Section 3.0. The energy strategy was assessed using the DEAP methodology. The analysis determined that the following energy and servicing strategies proposed for the White Heather development will deliver A rated BER results:

- Improvements to building thermal transmittance (U-Values), air permeability and thermal bridging with respect to Part L defaults.
- Renewable technologies comprising of Air Source Hot Water Heat Pumps in either a central plant or decentralised strategy.
- Mechanical Heat Recovery Ventilation system extracting stale air and suppling fresh air to space within each apartment.

2.0 M&E Utilities Services

2.1 ESB Infrastructure

The site is well located with regards to ESB infrastructure. The ESB Networks drawing below indicates the network distribution capacity to White Heather development.

Initial contact has been made with the ESB and there are currently no issues with the provision of the required power to the proposed development.

The existing ESB maps for the site indicated overhead and underground cables on the site including an ESB mini-pillar, these existing live connections will be isolated and disconnected prior to construction works commencing.

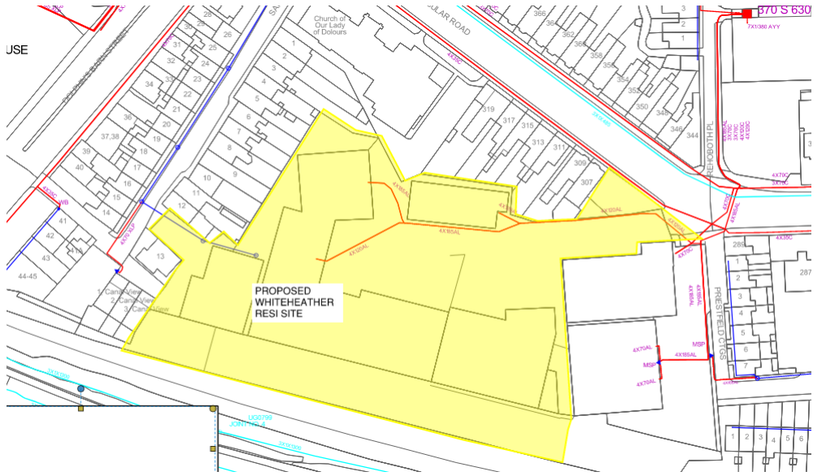

Fig 2.1 ESB Networks Map of Site Surrounds

A double ESB sub-station has been allowed for within the footprint of the development, which will cater for all electrical needs of the development. It is proposed to tie the new substations back into the ESB city network on the South Circular Road.

2.2 Gas Infrastructure

The Gas Networks map for the surrounding area below indicates both live and abandoned natural gas pipeline serving the site from South Circular Road. The existing buried gas connection which served the industrial buildings, will be isolated, capped and safety removed from site to allow development of the residential scheme. The proposed works will be discussed and agreed with Gas Networks Ireland during detailed design phase.

The utility strategy for the residential development at White Heather is to avail of a electrical heating and hot water solution utilising either centralised or decentralised air source heat pump plant. No natural gas connection is envisaged required fat this stage of the project.

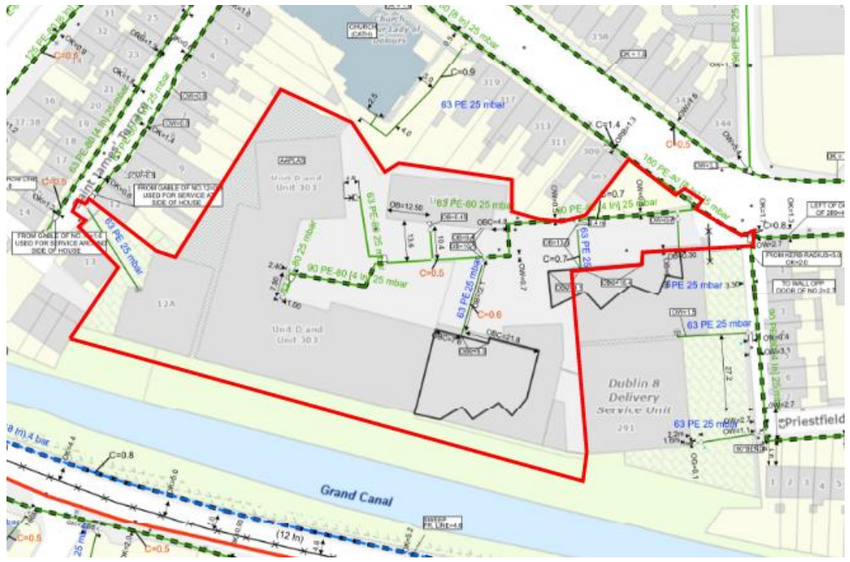

Fig 2.2 Gas Networks Map of Site Surrounds

2.3 Telecoms - EIR

EIR infrastructure to the surrounding area is sufficient to service the development from South Circular road subject to final agreement with EIR.

There are existing EIR in-ground ducts and overhead lines entering the development from the South Circular Road and St. Jame's Terrace. All existing EIR Cable connections shall be removed from the site and new fibre cable connections shall be provided to serve the residential development.

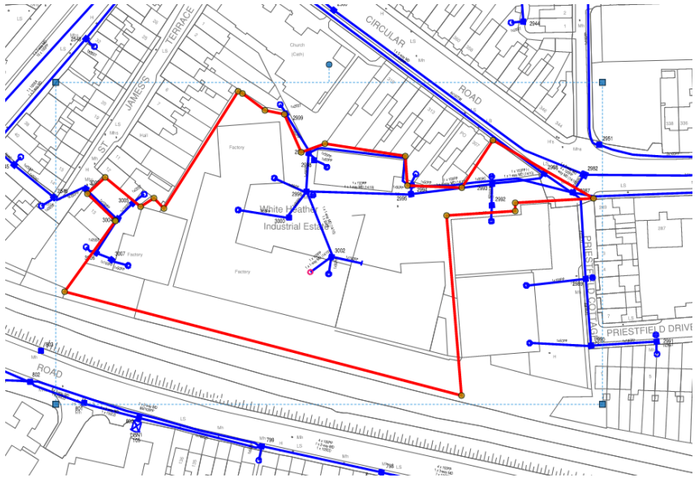

Fig 2.3 EIR Networks Map of Site Surrounds

A new EIR telecoms in-ground ducting network shall be provided in the development to services the apartments, housing and commercial units. It is proposed to provide a new Landlord comms room in the basement where all incoming Telecoms providers shall terminate their incoming cables.

2.4 Telecoms - Virgin Media

Virgin Media infrastructure to the surrounding area is sufficient to service the development from the South Circular road subject to final agreement with Virgin Media. The existing Virgin Media distribution enclosure, located at the proposed front entrance to the development, will need to be relocated upon agreement with Virgin Media.

Fig 2.4 VM Network Map of Site Surrounds and Existing Virgin Media Enclosures at front of Site

A new Virgin Media telecoms in-ground ducting network shall be provided in the development to service the apartments, housing and commercial units. It is proposed to provide a new landlord comms room in the undercroft where all incoming telecoms providers shall terminate their incoming cables.

Fig 2.4 Existing Virgin Media Enclosures at front of Site

2.5 Existing Public Lighting

There are existing Dublin City Council Public Lighting Columns located in front of the proposed new Residential site on South Circular Road. The Lighting Columns are fed from nearby Public Lighting micro-pillars.

The Lighting Columns shall need to be relocated as part of the new development; all shall be done with agreement of Dublin City Council Lighting department.

Fig 2.4 Existing DCC Public Lighting column in front of site on South Circular Road

2.6 Electric Vehicle Charging Infrastructure

The White Heather will include Electric Vehicle charging points to 20% of the car parking spaces. There will be EV charging infrastructure, comprising of cable ducting systems and cable trays provided to every parking space in the redevelopment in compliance with Technical Guidance Document L- Conservation of Fuel and Energy – Dwellings (2022).

The infrastructure will be routed back to the main landlord electrical supply. The EV infrastructure will be adequately designed to meet the full capacity of all recharging points when installed in the future and appropriately sized for EV charging point capacity. The ESB sub-stations have been sized to accommodate the electrical loads associated with the future provision of EV charging to all parking spaces.

The ducting infrastructure will be fit for purpose, capped as appropriate and clearly identified. Adequate space will be provided to accommodate all EV Charing point ducting connections and electrical supply equipment and will be adequately designed for maintenance access.

The complete EV infrastructure installations, including associated electrical equipment, etc. will be installed in accordance with the general wiring rules and safety requirements as outlined in the National Rules for Electrical Installations I.S. 10101:2020.

3.0 Building Regulations

Building energy has been long understood as contributing a major component of greenhouse gas emissions which was acknowledged within the 2030 Communication published by the European Commission (2014) which stated that "the majority of the energy-saving potential (for the EU) is in the building sector." Figure 2.1.1 above illustrates comparative Primary Energy (see Section 3.3) for Dwellings in Ireland from 1970's through to NZEB.

The EU Energy Performance of Buildings Directive set out the target that all *new* developments should be Nearly Zero-Energy Buildings (NZEB) by the end of 2020, with the intention having been that all Public buildings be in accordance with this by the end of 2018.

A Nearly-Zero Energy Building is defined as having "very high energy performance", with Article 2 of the EPBD outlining that "the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby"; the latter understood to refer to district heating systems and centralised plant arrangements.

Interpretation and implementation of these statements within the directive are at the discretion of each EU Member State in accordance with their "National, Regional or Local considerations" and thus the definition of NZEB itself varies greatly between different countries.

For new dwellings in Ireland, NZEB has been defined as being (primarily) associated with demonstrating the following characteristics are achieved:

- Primary Energy/ Carbon Emissions: 70% reduction against Part L 2005
- Renewable Energy: 20% of this Primary Energy required

Figure 2.1.2 above illustrates the NZEB targets for Primary Energy (and Carbon Emissions) and Renewable Energy. The Part L 2005 benchmark could be expected to be achieving a B3 BER, in comparison to A rated for NZEB compliance.

These NZEB targets have been now incorporated within the Technical Guidance Document (TGD) Part L 2022, as discussed below.

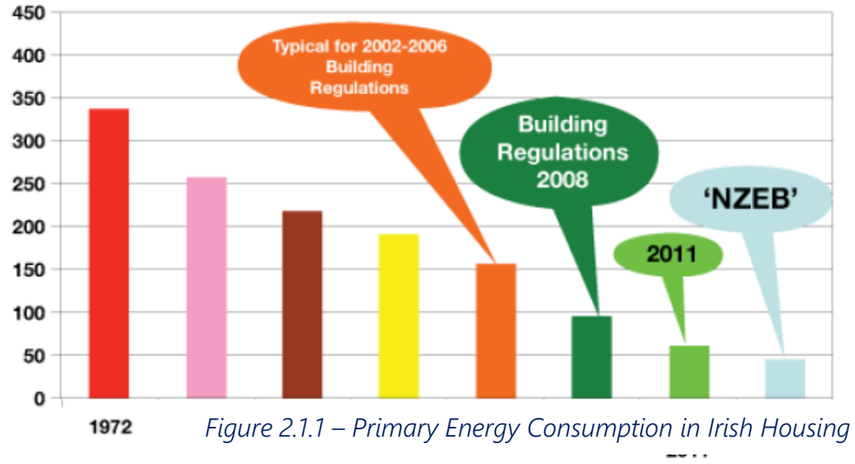

Figure 2.1.1 – Primary Energy Consumption in Irish Housing 1972-2020

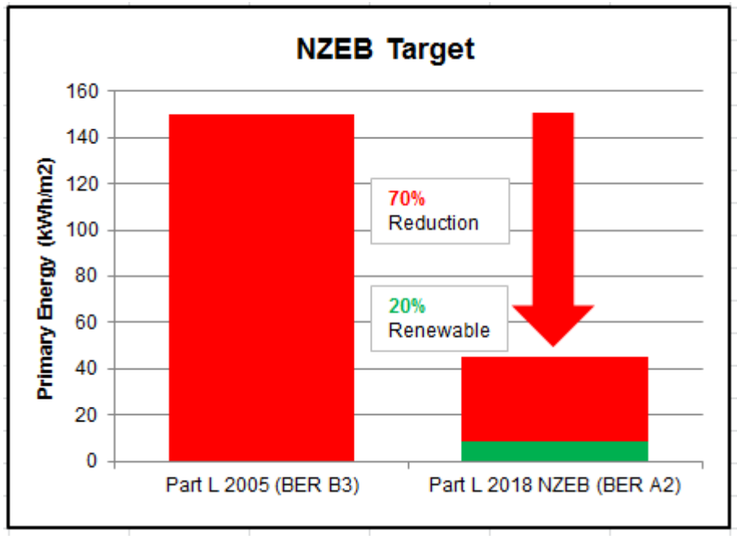

Figure 2.1.2 – NZEB Targets

Technical Guidance Document (TGD) Part L Conservation of Fuel and Energy – Dwellings outlines how compliance to this element of the Building Regulations can be demonstrated through the utilisation of the Dwelling Energy Assessment Procedure (DEAP) software, which analyses comparative energy usage for a particular residence.

The energy assessment is determined annually on a floor area basis (kWh/m^2.ann) for the following usages, known as “regulated loads”:

- Heating
- Hot Water
- Auxiliary (Fans, Pumps and Controls)
- Lighting

It may be noted therefore that considerable energy usages within dwellings; particularly equipment associated with cooking, washing etc. are excluded from DEAP analysis and associated Part L Compliance/ BER calculations. These energy usages, known as “unregulated loads”, are deemed to be associated with *operational* usage, as opposed to the building’s fabric and services performance.

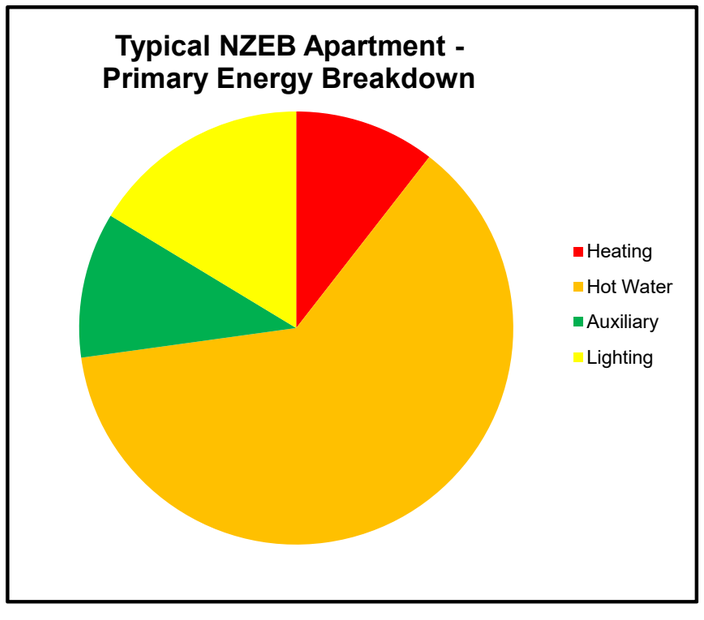

Figure 2.2.1 –Primary Energy Breakdown

Figure 2.2.1 above indicates an energy breakdown for a typical apartment (100m^2, local gas-fired boiler) compliant to NZEB/ Part L 2022. It can be seen that Hot Water Energy consumption pre-dominates, with Heating Energy considerably lower; reflective of the extensive improvement in insulation/ air permeability/ thermal bridging/ glazing/ heating system efficiency etc. through successive Building Regulations improvements.

However, as both Hot Water and Lighting Energy consumption are effectively fixed within the calculation methodology (as based on standardised databases of hot water usage etc.), further improvements to Heating related items (insulation etc.) are generally required to ensure overall compliance can be achieved.

In summary, DEAP analysis must demonstrate the following to ensure compliance to Part L 2022:

- Energy Performance Coefficient (EPC): 0.30 or lower (i.e., 70% reduction in Primary Energy against Part L 2005 benchmark)
- Carbon Performance Coefficient (CPC): 0.35 or lower
- Renewable Energy Ratio (RER): 0.20

In addition, minimum Fabric Performance is defined as follows in Part L 2022:

Apartment Construction and U-Values		
Element Type	Part-L 2022 Regulations	Targeted
Roof	0.16 W/m^{2}k	0.15 W/m^{2}k
External Wall	0.18 W/m^{2}k	0.18 W/m^{2}k
Ground/Exposed Floors	0.18 W/m^{2}k	0.15 W/m^{2}k
Windows/Rooflights	1.4 W/m^{2}k	1.3 W/m^{2}k
Heat Transmission Coefficient	0.15 W/m^{2}k	0.15 W/m^{2}k

Figure 2.2.2 – Apartment Construction

Apartment Glazing Parameters	
Total Solar Heat Transmittance	0.50
Framing Factor	0.70
Overshadowing	Average

Figure 2.2.3 – Apartment Glazing Parameters

Miscellaneous Building Parameters	
Element	Value Targeted
Air Leakage Rate	3m^3/hr.m^2 @ 50Pa
Shower Flow Rates	6 l/min
Water Usage	125 l/person/day
Lighting	100% LED

Figure 2.2.4 –Building Parameters

In terms of apartments or other terraced residential buildings, Part L allows that the compliance can be demonstrated based on the *average* of all dwellings for each of the parameters associated with Part L, namely Primary Energy (EPC), Carbon Emissions (CPC) and Renewable Energy (RER). Therefore, for the purposes of analysis, an apartment representative of the average attributes of the dwellings has been selected.

Primary Energy

In assessing energy performance for dwellings, Part L (and BER) utilises *Primary Energy* as a means of comparative analysis. This relates to the energy *at source* as required for the dwelling, as opposed to that consumed within the actual building. For example, electrical Primary Energy relates to that required for both generation (based on average 0of power plant fuels and efficiencies) and transmission for electricity through the ESB grid.

Primary Energy Factor (PEF) conversions for main fuel types are as follows

- Electricity: 1.75
- Natural Gas/ LPG/ Oil/ Biomass: 1.10

It can be seen from the above that the Primary Energy conversion for Electricity is approximately 60% greater than that of Natural Gas (as well as other fossil fuels and biomass); therefore a direct electric heater would consume 60% more Primary Energy of a LPHW radiator. However, as can be seen from Figure 2.3.1 below, the underlying trend over time has been that the Primary Energy of electricity with respect to Natural Gas (and other fuels) has been reducing (due to the increased “greening” of the ESB grid with Wind and Solar renewables and more efficient plant operation), with the following impacts in terms of technologies and associated Part L compliance, as PEF for electricity reduces

- Heat Pump, both Air Source and Geothermal, are becoming increasingly viable.
- Larger Photovoltaic (PV) arrays required to offset electricity usage (albeit offset by increases in PV efficiency for equivalent array sizes).

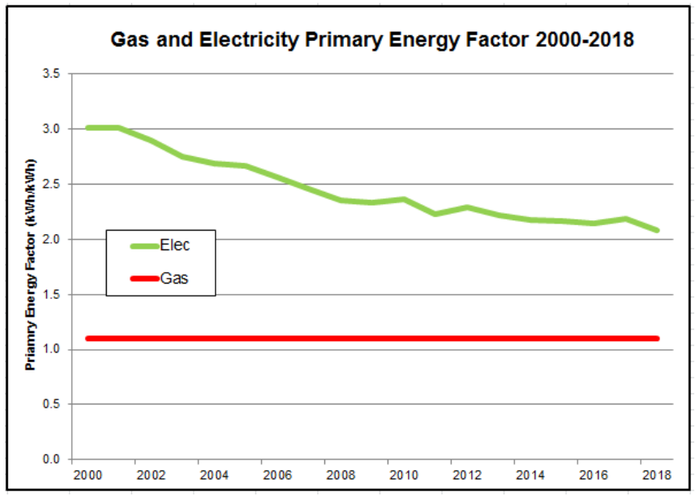

Figure 2.3.1 –Primary Energy Factors for Gas and Electricity 2000-2018

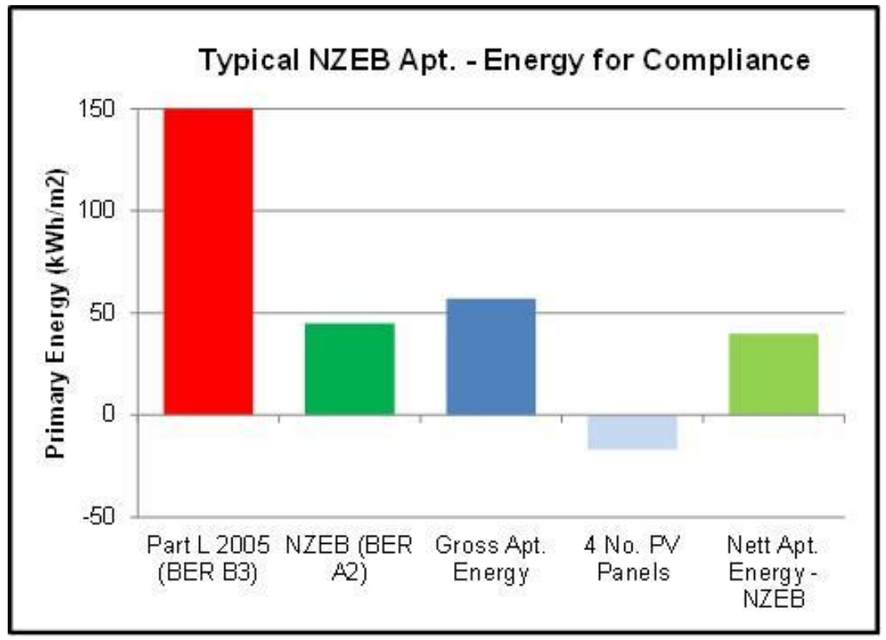

Figure 2.3.2 – EPC Compliance for Typical Apartment

In addition to improving heating energy related aspects, renewable technologies can be utilised to significantly reduce Primary Energy requirements (in addition to ensuring the renewable energy percentage is achieved). Figure 2.3.2 above indicates how, for a typical apartment (notional 100m^2) designed to ensure NZEB compliance, 4 no. (440W) PV panels would offset the excess energy within the gross consumption. This extent of renewable energy must be at least 20% of the overall Primary Energy (RER =0.20+).

4.0 Residential Energy Strategy

A number of strategies are under consideration for the White Heather development all of which are capable of meeting the NZEB targets, delivering BER A rated apartments and meeting the requirements of building regulations.

The options under consideration for White Heather are as follows:

Option 1 – Centralised Air Source Heat Pump and HIU within Apartments

Option 2 – Exhaust Air Heat Pumps within Apartments

Option 3 – Hot Water Heat Pumps within Apartments

Each of these systems are described below. While each system will have it's own particular requirements the White Heather development has been designed to provide the flexibility for either system to be implemented at detailed design stage.

Option 1 – Centralised Air Source Heat Pumps

This is a centralised heat pump strategy which utilises air source heat pump (ASHP) technology to provide heating and hot water for each apartment. ASHP plant would positioned externally at roof level. Heating would then be distributed to each apartment in the core risers. Within the apartments the Heat Interface Unit(HIU) plant is wall mounted and does not impact lettable area.

The system includes heat interface unit, and LPHW-DHW heat exchanger and heat energy meter. This system would be paired with a Mechanical Heat Recovery Ventilation (MVHR) unit to maximise efficiency of the apartment.

This strategy would perform relatively well under the SEAI DEAP methodology delivering majority of A-rated apartments.

The cold water to the apartments will remain centrally located at basement level. The mechanical risers will include space for individual water meters to be fitted in the future.

Option 2 – Exhaust Air Heat Pumps

This is a decentralised heat pump strategy which utilises Exhaust Air Heat Pump (EAHP) technology to provide heating and hot water locally within each apartment. The concept for this heating strategy is to utilise passive ducted air vents to provide the background ventilation to the living rooms and bedrooms. The warm exhaust air from the apartment is extracted via the heat pump from the bathrooms and kitchen area. This improves the efficiency of the heat pump which then heats both domestic hot water and provides LPHW to serve the radiators.

The system includes ventilation extract fan, hot water cylinder and LPHW heat exchanger and circulation pumps.

As the heat pump relies on warm air from the apartment to maintain capacity the system operates 24hours a day maintaining the apartment at a minimum of 18°C. While this ensures comfort conditions are constant it is inherently less efficient as the apartment must be heated when not in use. The heat pump is electric therefore the only bills to the tenant would be for electricity.

This strategy would perform relatively well under the SEAI DEAP methodology delivering majority of A-rated apartments. Additional PV panels would be provided to the development if EU taxonomy compliance is required.

The cold water to the apartments will remain centrally located at basement level. The mechanical risers will include space for individual water meters to be fitted in the future.

Option 3 – Hot Water Heat Pumps

This is a decentralised heat pump strategy which utilises Air Source Heat Pump (ASHP) technology to provide hot water locally within each apartment. Air is ducted from the façade to the heat pump where heat is extracted to heat hot water for the apartment. The cooled air then exhausted to the façade. This system would use electric radiators to provide heating to the apartment.

The system includes a single air circulation fan, heat pump and hot water cylinder. As with option 1 the heat pump is electric therefore the only bills to the tenant would be for electricity.

This system would be paired with a Mechanical Heat Recovery Ventilation (MVHR) unit to maximise efficiency of the apartment.

This strategy would perform relatively well under the SEAI DEAP methodology delivering majority of A-rated apartments. Additional PV panels would be provided to the development if EU taxonomy compliance is required.

Heating within the apartments would be provided by electric radiators.

As this strategy is powered by the apartment electrical supply the tenant does not receive a separate heating bill. Their single electricity bill provides all power, heating and hot water to the apartment.

As with the EAHP option the cold water to the apartments will remain centrally located at basement level. The mechanical risers will include space for individual water meters to be fitted in the future.

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