Environmental Design Partnership
mechanical & electrical consulting engineers

Block B1, Centrepoint Business Park,
Oak Road, Dublin 12, Ireland.

Tel: (01) 409 2800
Fax: (01) 409 2858

email: admin@edp-engineers.com

Climate Action Energy Statement

to accompany a planning application at

43-50 Dolphin's Barn Street, Dublin 8

Prepared by:

Environmental Design Partnership Consulting Engineers.

For:

The Iveagh Trust

Revision	*Date*	*Prepared By*	*Checked By / Approved By*
Issue 2	26.02.2025	MP/RG	Martin Pordes - Director
Issue 1	20.02.2025	MP/RG	Martin Pordes - Director
Issue 0	11.02.2025	MP/RG	Martin Pordes - Director

Table of Contents

Executive Summary

1.0 Introduction.

1.1 Design Aspirations.

1.2 National Level Plans/Strategies.

1.2.1 Climate Action Plan

1.2.2 Dublin City Council - Development Plan, 2022 – 2028.

2.0 Energy Efficient Design & Strategy.

2.1 Design Standards.

2.2 Part L - Conservation of Fuel and Energy.

2.3 Summary of Design Strategy Intent for Consideration and Application on the Dolphin's Barn Street Development.

2.4 Water Consumption.

2.5 Building Fabric.

2.6 Building Envelope Air Permeability.

2.7 Building Services Compliance.

3.0 Sustainability and Renewable Energies.

3.1 Combined Heat and Power.

3.2 Air Source Heat Pumps (ASHPs).

3.3 Solar Photovoltaic.

3.4 Exhaust Air source heat pumps.

4.0 Domestic Energy Assessment Procedure (DEAP) & NZEB Achievability Calculations.

4.1 Building Energy Rating Certificate.

4.2 Nearly Zero Energy Building.

5.0 Conclusions.

Executive Summary.

This Climate Action Energy Statement, compiled by Environmental Design Partnership Consulting Engineers, on behalf of The Iveagh Trust, demonstrates the proposed scheme addresses the requirements of the Dublin City Council Development Plans and complies fully with the Technical Guidance Document L 2022 – Dwellings as all units will exceed the minimum required A2 and nZEB ratings.

1.0 Introduction.

The following Climate Action Energy Statement has been prepared to accompany a planning application, for a development, as detailed below:

The Iveagh Trust intend to apply to Dublin City Council for permission for a Large- Scale Residential Development on a site of c.0.358 ha at 43- 50 Dolphins Barn Street, Dublin 8.

The site is bound by Dolphin's Barn Street to the east, No. 51 Dolphin's Barn Street to the northeast, No. 7 Poole Terrace to the south and boundaries of rear gardens of the residential properties located on Reuben Street and Emerald Square to the west and north of the application site respectively. The proposed development consists of the following:

- The demolition of all existing buildings on site (comprising the former factory building to the rear of the site and buildings which front onto Dolphin's Barn Street (No's 43-50)), which have a total gross floor area of c.3,243.5 sqm.

- The construction of a 1-9 storey Large Scale Residential Development (LRD) comprising 119 no. apartments (70 no. 1 bed units and 49 no. 2 bed units) and a community hub space at ground floor level totalling c.523.5 sqm.

- All apartments are provided with balconies/terraces, which are located on the eastern, western, southern and northern elevations of the building.

- The proposal includes external communal open space areas (c.707 sqm) at ground floor level, and provision of PV panels at roof level.

- The proposal provides a total of 15 no. car parking spaces (12 no. for residents, 2 no. for the community hub, including 1 no. accessible parking space, and 1 no. car sharing space). 172 no. cycle parking spaces are provided for residents, and 60 no. cycle parking spaces are provided for visitors to the residential element of the development. 2 no. long stay cycle parking spaces, and 6 no. short stay cycle parking spaces are provided associated with the community hub element of the development.

- The proposal includes for alterations and upgrade of the site boundary walls / treatment.

- The proposal includes 1 no. shared pedestrian/ vehicular entrance point from Dolphin's Barn Street, alterations to the public footpath/street along Dolphins Barn Street, the provision of 2 no. ESB sub-station's, plant and storage rooms, a comms room, a LV switch room, a life safety room, bin stores and all associated and ancillary works.

- The associated site and infrastructural works include provision for water services; foul and surface water drainage and connections; attenuation proposals; permeable paving;

all landscaping works including hard and soft landscaping; blue/green roofs; boundary treatment; internal roads and footpaths; electrical services; and all associated site development works above and below ground.

- The application may be inspected online on the following website set up by the applicant: www.dolphinsbarnstreetlrd.ie

1.1 Design Aspirations

Apartments:

The proposed development will exceed the requirements of Technical Guidance Document L 2022, Conservation of Fuel and Energy – Dwellings, requiring the following:

Minimum fabric and air permeability requirements: 3 m^3/ ($h.m^2$) @ 50Pa.

Maximum permitted energy performance coefficients (MPEPC): 0.3

Maximum permitted carbon performance coefficients (MPCPC): 0.35

Renewable Energy Ratio (RER): 0.2

A minimum BER of A2 will be achieved using good construction practice and energy efficient system design.

1.2 National Level Plans/Strategies

The following documents and publications are in place on a national level and local level, all of which feed into the design and decision-making process when determining the most appropriate energy systems.

1.2.1 Climate Action Plan

The government is creating and implementing policies and strategies to achieve its long-term goal of transitioning to a low-carbon, climate-resilient and environmentally sustainable economy by 2050.

By 2030, the government aims to achieve the following:

- Cutting greenhouse gas emissions by at least 30%
- Reaching a target of at least 32.5% energy efficiency
- Delivering 70% renewable electricity

Climate Action Plan 2024, the second update under the Climate Action and Low Carbon Development (Amendment) Act 2021 builds on the targets set for Ireland to be on the path to a 51% reduction in emissions by the end of this decade and to net-zero emissions no later than 2050.

In order to deliver the most efficient pathway to reach our overall national emissions reduction targets for 2030, we must reduce our built environment sector emissions to 4-5 Mt CO_2eq. by 2030.

This will require the introduction of a range of further measures, in addition to those already committed to in the 2019 Climate Action Plan, including:

- Improving the fabric and energy efficiency of our existing buildings
- Rolling out zero-carbon heating solutions, predominantly heat pumps and district heating networks
- Planning for the full phase out of fossil fuels in buildings by 2050
- Progressive strengthening of building standards for all types of buildings
- Promoting the use of lower carbon alternatives in construction
- Promoting behavioural change in how households use energy

1.2.2 Dublin City Council - Development Plan, 2022 - 2028

Environmental Design Partnership will evaluate and consider the Dublin City County Council policies and objectives in the Development Plan 2022-2028, in-line with current national level plans and strategies, to include:

POLICIES AND OBJECTIVES

It is the Policy of Dublin City Council:

CA1 National Climate Action Policy

To support the implementation of national objectives on climate change including the 'Climate Action Plan 2019 to Tackle Climate Breakdown', the 'National Adaptation Framework' 2018 and the 'National Energy and Climate Plan for Ireland 2021-2030' and other relevant policy and legislation.

CA2 Mitigation and Adaptation

To prioritise measures to address climate change by way of both effective mitigation and adaptation responses in accordance with available guidance and best practice.

It's an Objective of Dublin City Council:

CA01: Dublin City Council Climate Change Action Plan

To implement Dublin City Council's 2019 Climate Change Action Plan in consultation and partnership with stakeholders including the Dublin Metropolitan Climate Action Regional Office (CARO), Codema, residents and elected representatives.

CA02: Variation of Development Plan to Reflect New Guidance / Legislation

To consider a future variation(s) of the development plan, where required, to ensure consistency with the approach to climate action recommended in forthcoming ministerial guidelines, any other relevant guidelines and/or relevant legislation and government climate action policy.

CA03: Quantification of Greenhouse Gases

To support the Eastern and Midland Regional Assembly (EMRA) in identifying a robust method for quantifying the relative GHG impacts of alternative spatial planning policies as part of the European Union ESPON 'QGasSP' research programme.

SUSTAINABLE SETTLEMENT PATTERNS

It is the Policy of Dublin City Council:

CA3 Climate Resilient Settlement Patterns, Urban Forms and Mobility

To support the transition to a low carbon, climate resilient city by seeking sustainable settlement patterns, urban forms, and mobility in accordance with the National Planning Framework 2018 and the Regional Spatial and Economic Strategy 2019.

CA4 Climate Mitigation and Adaptation in Strategic Growth Areas

To ensure that new development in strategic growth areas (including Strategic Development and Regeneration Areas) integrates appropriate climate mitigation and adaptation measures.

THE BUILT ENVIRONMENT

It is the Policy of Dublin City Council:

CA5 Retrofitting and Reuse of Existing Buildings

To promote and support the retrofitting and reuse of existing buildings rather than their demolition and reconstruction where possible.

CA6 Energy Efficiency in Existing Buildings

To support high levels of energy conservation, energy efficiency and the use of renewable energy sources in existing buildings, including retrofitting of appropriate energy efficiency measures in the existing building stock, and to actively retrofit Dublin Council housing stock to a B2 Building Energy Rating (BER) in line with the Government's Housing for All Plan retrofit targets for 2030.

CA7 Climate Mitigation Actions in the Built Environment

To promote low carbon development in the city which will seek to reduce carbon dioxide emissions, and which will meet the highest feasible environmental standards during construction and occupation. New development should generally demonstrate / provide for:

a. building layout and design which maximises daylight, natural ventilation, active transport and public transport use.
b. sustainable building/services/site design to maximise energy efficiency.
c. sensitive energy efficiency improvements to existing buildings.
d. energy efficiency, energy conservation, and the increased use of renewable energy in existing and new developments.
e. on-site renewable energy infrastructure and renewable energy.
f. minimising the generation of site and construction waste and maximising reuse or recycling.
g. the use of construction materials that have low to zero embodied energy and CO2 emissions.
h. connection to (existing and planned) decentralised energy networks including the Dublin District Heating System where feasible.

CA8 Climate Adaptation Actions in the Built Environment

Development proposals should demonstrate sustainable design principles for new buildings/services/site. The Council will promote and support development which is resilient to climate change. This would include:

a. measures such as green roofs and green walls to reduce internal overheating and the urban heat island effect.
b. ensuring the efficient use of natural resources (including water) and making the most of natural systems both within and around buildings.
c. minimising pollution by reducing surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems (SuDS).
d. reducing flood risk, damage to property from extreme events– residential, public and commercial.
e. reducing risks from temperature extremes and extreme weather events to critical infrastructure such as roads, communication networks, the water/drainage network, and energy supply.
f. promoting and protecting biodiversity and green infrastructure.

CA9 Climate Action Energy Statements

All new developments involving 30 residential units and/or more than 1,000 sq. m. of commercial floor space, or as otherwise required by the Planning Authority, will be required to submit a Climate Action Energy Statement as part of the overall Design Statement to demonstrate how low carbon energy and heating solutions, have been considered as part of the overall design and planning of the proposed development.

ENERGY

It is the Policy of Dublin City Council:

CA10 Energy from Renewable Sources

To support the production of energy from renewable sources, such as from solar energy, hydro energy, wave/tidal energy, geothermal, wind energy, combined heat and power (CHP), heat energy distribution such as district heating/cooling systems, and any other renewable energy sources, subject to normal planning and environmental considerations.

CA11 Micro-Renewable Energy Production

To support and encourage the development of small-scale wind renewable facilities / micro-renewable energy production.

CA12 Offshore Wind-Energy Production

To support the implementation of the 2014 'Offshore Renewable Energy Development Plan' (OREDP) and to facilitate infrastructure such as grid facilities on the land side of any renewable energy proposals of the offshore wind resource, where appropriate and having regard to the principles set out in the National Marine Planning Framework.

CA13 Geothermal Energy

To support the exploration for, and development of, geothermal energy resources having regard to emerging government policy on geothermal energy.

CA14 Waste Heat, District Heating and Decentralised Energy

To actively encourage the development of low carbon and highly efficient district heating and decentralised energy systems across the city utilising low carbon heat sources such as renewable energy and waste heat recovery and to promote the connection of new developments to district heating networks where such systems exist/can be developed in a given area.

CA15 The Dublin District Heating System (DDHS)

To support the development and expansion of any necessary energy infrastructure which will deliver the low carbon Docklands and Poolbeg catchment of the Dublin District Heating System (DDHS) project including, its pipeline infrastructure and its energy centre with energy storage and back-up heat production.

CA16 Supporting the Potential of District Heating in Dublin City

To support the potential of district heating in Dublin City, all Climate Action Energy Statements submitted to the Council (see Policy CA9) shall include an assessment of the technical, environmental, and economic feasibility of district or block heating or

cooling, particularly where it is based entirely, or partially on energy from renewable and waste heat sources.

In addition:

Climate Action Energy Statements for significant new residential and commercial developments in Strategic Development and Regeneration Areas (SDRAs), will assess the feasibility of making the development 'district heating enabled' to facilitate a connection to an available or developing district heating network in the area.

Climate Action Energy Statements for significant new residential and commercial developments in the Docklands SDRA will assess the feasibility of making the development 'district heating enabled' to facilitate a connection to the Dublin District Heating System.

CA17 Capture and Utilisation of Waste Heat

To encourage proposed and existing developments and facilities (such as data centres) to capture and utilise otherwise wasted heat, and use waste heat either on-site, or in an adjoining, and nearby sites, in compliance with all relevant Energy Efficiency Regulations.

CA18 Decarbonising Zones

To support the specific polices and projects identified in the Decarbonisation Zone of Ringsend/Irishtown in order to address local low carbon energy, greenhouse gas emissions and climate needs and commit to establishing Decarbonising Zones in each LEA within the lifetime of this plan, with a view to designating all of Dublin City as a decarbonised zone by the end of this Development Plan.

CA19 Strategic Energy Zones

To support the designation of potential Strategic Energy Zones in the Dublin City Area in conjunction with the Eastern and Midland Regional Authority.

CA20 Sustainable Energy Communities

To support the ongoing efforts and future development of Sustainable Energy Communities in Dublin City through the SEAI 'Sustainable Energy Communities' Initiative.

CA21 Dublin Regional Energy Masterplan

To support the preparation of the Dublin Regional Energy Masterplan by Codema and to support its implementation in conjunction with neighbouring Dublin Local Authorities, Dublin Metropolitan CARO and other relevant stakeholders.

2.0 Energy Efficient Design & Strategy

2.1 Design Standards

Environmental Design Partnership will ensure full compliance with all relevant Building Regulations and Irish Standards during detailed design stage for the development and with specific reference to the following:

- Technical Guidance Documents
- Technical Guidance Document L 2022, Conservation of Fuel and Energy – Dwellings
- Technical Guidance Document F 2019, Ventilation
- Nearly Zero Energy Buildings (nZEB)

2.2 Part L - Conservation of Fuel and Energy

The requirements regarding conservation of fuel and energy for dwellings and the energy performance of dwellings are laid out in Part L of the Second Schedule to the Building Regulations 1997 (S.I. No. 497 of 1997) as amended, the European Union (Energy Performance of Buildings) (No. 2) Regulations 2019 (S.I. No. 292 of 2019), the European Union (Energy Performance of Buildings) Regulations 2019 (S.I. No. 183 of 2019) and the European Union (Energy Performance of Buildings) Regulations 2021 (S.I. No. 393 of 2021). The Second Schedule to the Building Regulations, insofar as it relates to works relating to dwellings, provides as follows:

L1 A building shall be designed and constructed so as to ensure that the energy performance of the building is such as to limit the amount of energy required for the operation of the building and the amount of carbon dioxide (CO_2) emissions associated with this energy use insofar as is reasonably practicable.

The European Union (Energy Performance of Buildings) Regulations 2019 (S.I. No. 183 of 2019), insofar as it relates to works relating to dwellings, provides as follows:

Regulation 8:

For new dwellings, the nearly zero energy performance requirements of this regulation shall be met by:

(a) providing that the energy performance of the building is such as to limit the calculated primary energy consumption and related carbon dioxide (CO_2) to that of a nearly zero energy building within the meaning of the Directive insofar as is reasonably practicable, when both energy consumption and carbon dioxide (CO_2) emissions are calculated using the Dwelling Energy Assessment Procedure (DEAP) published by Sustainable Energy Authority of Ireland.

(b) providing that, the nearly zero or very low amount of energy required is covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.

(c) limiting the heat loss and, where appropriate, availing of heat gain through the fabric of the building.

(d) providing and commissioning energy efficient space and water heating systems with efficient heat sources and effective controls.

(e) providing that all oil and gas fired boilers shall meet a minimum seasonal efficiency of 90 %.

(f) providing to the dwelling owner sufficient information about the building, the fixed building services, controls and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and energy than is reasonable.

- **General Guidance**

The aim of Part L of the Second Schedule to the Building Regulations, and of the European Union (Energy Performance of Buildings) Regulations 2019 is to limit the use of energy and related carbon dioxide (CO_2) emissions arising from the operation of buildings, while ensuring that occupants can achieve adequate levels of lighting and thermal comfort. Buildings should be designed and constructed to achieve this aim as far as is practicable.

For new dwellings, the key issues to be addressed to ensure compliance are: -

- **Whole dwelling performance.**

Primary energy consumption and related CO_2 emissions: providing that the calculated primary energy consumption associated with the operation of the dwelling and the related CO_2 emissions when calculated using the Dwelling Energy Assessment Procedure (DEAP) published by the Sustainable Energy Authority of Ireland.

- **Individual minimum performance levels**

The performance levels specified for items (b) to (i) below are in the nature of backstop minimum performance levels so as to ensure reasonable levels of performance for all factors affecting energy use, irrespective of the measures incorporated to achieve compliance with Regulation 8(a).

Meeting the performance levels specified for items (b) to (j) will not necessarily mean that the level specified for primary energy consumption and related CO2 emissions [item (a)] will be met. One or more of the performance levels specified, for items (b) to (j), will need to be exceeded to achieve this.

(b) Use of Renewable Energy Sources: providing that the contribution of renewable energy sources to the calculated primary energy requirement meets the target for such contribution as set out in Section 1.2.

(c) Fabric Insulation: providing for fabric insulation, including the limitation of thermal bridging, which satisfies the guidance in this regard as set out in Section 1.3 (sub-sections 1.3.2 to 1.3.3).

(d) Air Tightness: limiting air infiltration as set out in sub-section 1.3.4.
(e) Heat Generator: providing an efficient heat generator as set out in sub-section 1.4.2.

(f) Building Services Controls: controlling, as appropriate, the demand for, and output of, space heating and hot water services provided, as set out in sub-section 1.4.3.

(g) Insulation of Pipes, Ducts and Vessels: limiting the heat loss from pipes, ducts and vessels used for the transport or storage of heated water or air, as set out in sub-section 1.4.4.

(h) Mechanical Ventilation Systems: providing that, where a mechanical ventilation system is installed, the system meets reasonable performance levels, as set out in sub-section 1.4.5.

(i) Limiting Heat Gains: ensuring that the building is appropriately designed to limit heat gains through the fabric, as set out in sub-section 1.3.5.

(j) Performance of Completed Dwelling: ensuring that the design and construction processes are such that the completed building satisfies compliance targets and design intent.

- **Nearly Zero Energy Buildings (NZEBs)**

  Environmental Design Partnership Consulting Engineers are developing their design to achieve, at a minimum, the compliance requirements of the NZEB building regulations described below and calculated using the DEAP method.

  The definition for Nearly Zero Energy Buildings in the Energy Performance in Buildings Directive (EPBD) is 'a very high energy performance, as determined in accordance with Annex 1. The nearly zero or very low amount of energy required should be covered to a very significant extent be energy from renewable sources, including energy from renewable sources produced on-site or nearby'.

  To achieve the acceptable primary energy consumption rate for a nearly zero energy dwelling, the calculated energy performance coefficient (EPC) of the dwelling being assessed should be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC). The MPEPC for a nearly zero energy dwelling is 0.3

  To demonstrate that an acceptable CO_2 emission rate has been achieved for a nearly zero energy dwelling, the calculated carbon performance coefficient (CPC) of the dwelling being assessed should be no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC). The MPCPC for a nearly zero energy dwelling is 0.35.

  Renewable Energy Ratio (RER) is the ratio of the primary energy from renewable energy technologies to total primary energy as defined and calculated in DEAP. For the purposes of this Section, "renewable energy technologies" means technology, products or equipment that supply energy derived from renewable energy sources, e.g., solar thermal systems, solar photovoltaic systems, biomass systems, systems using biofuels, heat pumps, aerogenerators and other small scale renewable systems.

  Where the MPEPC of 0.3 and MPCPC of 0.35 are achieved, a RER of 0.20 represents a very significant level of energy provision from renewable energy technologies. A RER of 0.2 represents 20 % of the primary energy from renewable energy technologies to total primary energy as defined and calculated in DEAP.

- **Limitation of Primary Energy Use and CO_2 Emissions.**

  Environmental Design Partnership Consulting Engineers are applying a holistic design strategy to reduce primary energy consumption and reduce CO_2 emissions, the strategy will include an energy modelling of the entire project.

  A holistic review of the model results will be undertaken to determine optimum insulation parameters for all elements of the proposed buildings.

  The review will include the extreme operating conditions to address all heating challenges.

- **Confirmation of achievements and results for limitation of Primary energy consumption and CO_2 emissions.**

  Compliance with the requirements in relation to primary energy consumption and CO_2 emissions specified in Regulation 8(a). The methodology for calculation to be used is specified in the Regulation as the DEAP methodology.

  This methodology is published by the Sustainable Energy Authority of Ireland (SEAI) and calculates the energy consumption and CO_2 emissions associated with a standardised use of a dwelling and standardised external environmental condition. The energy consumption is expressed in terms of kilowatt hours per square metre floor area per year ($kWh/m^2/yr$) and the CO_2 emissions expressed in terms of kilograms of CO_2 per square metre floor area per year ($kg\ CO_2/m^2/yr$).

The calculation is based on the energy balance considering a range of factors that contribute to annual energy usage and associated CO_2 emissions for the provision of space heating, cooling, water heating, ventilation, and lighting of a dwelling.

These factors include:

- size, geometry, and exposure of the dwelling.
- materials used for construction of the dwelling.
- thermal insulation of the different elements of the building fabric.
- ventilation characteristics of the dwelling and ventilation equipment.
- efficiency, responsiveness, and control characteristics of the heating system(s).
- solar gains through glazed openings of the dwelling.
- thermal storage (mass) capacity of the dwelling.
- the fuel used to provide space and water heating, ventilation, and lighting.
- renewable and alternative energy generation technologies incorporated in the dwelling.
- air permeability of the dwelling.

The performance criteria are based on the relative values of the calculated primary energy consumption and CO_2 emissions of a dwelling being assessed, and similar calculated values for a reference dwelling. The criteria are determined as follows:

- primary energy consumption and CO_2 emissions for both the proposed dwelling and the reference dwelling are calculated using DEAP.

- the calculated primary energy consumption of the proposed dwelling is divided by that of the reference dwelling, the result being the energy performance coefficient (EPC) of the proposed dwelling. To demonstrate that an acceptable primary energy consumption rate has been achieved, the calculated EPC of the dwelling being assessed should be no greater than the Maximum Permitted Energy Performance Coefficient (MPEPC). The MPEPC is 0.3. This coefficient represents the numerical indicator for the energy performance of Nearly Zero Energy Dwellings.

- the calculated CO_2 emission rate of the proposed dwelling is divided by that of the reference dwelling, the result being the carbon performance coefficient (CPC) of the proposed dwelling. To demonstrate that an acceptable CO_2 emission rate has been achieved, the calculated CPC of the dwelling being assessed should be no greater than the Maximum Permitted Carbon Performance Coefficient (MPCPC).

The MPCPC is 0.35. This coefficient represents the numerical indicator for the CO_2 emission rate for Nearly Zero Energy Dwellings.

The DEAP software will calculate the EPC and CPC of the dwelling being assessed and clearly indicate whether compliance with the requirements of Regulation 8(a) has been achieved.

Where a building contains more than one dwelling (such as in a terrace of houses or a block of apartments), reasonable provision would be to show that: - every individual dwelling has an EPC and CPC no greater than the MPEPC and MPCPC respectively; or - the average EPC and CPC for all dwellings in the building is no greater than the MPEPC and MPCPC respectively.

Where the latter approach is used, the average EPC and CPC are calculated by multiplying the EPC and CPC for each individual dwelling by the floor area of that dwelling, adding together and dividing the results by the sum of the floor areas of all dwellings. Common areas in the building are not included in this calculation.

The requirements that the calculated EPC and CPC do not exceed the calculated MPEPC and MPCPC respectively, applies to the constructed dwelling.

The use of renewable and low carbon technologies, such as solar hot water, biomass (e.g., wood and wood pellets) and heat pumps, whether provided to meet the requirements of this Part of the Building Regulations or provided as additional to meeting that requirement, can facilitate compliance with the requirements in relation to primary energy use and CO_2 emissions. As defined, primary energy does not include energy derived from on-site renewable energy technologies. In addition, as renewable energy technologies are generally characterised by zero, or greatly reduced CO_2 emissions, the calculated EPC and CPC are reduced by the extent that they replace traditional fossil fuels.

For certain dwelling types, use of renewables may prove the most practical approach to achieving compliance. The use of centralised renewable energy sources contributing to a heat distribution system serving all dwelling units in a development or apartment block may prove to be more practicable than providing separate renewable energy for each dwelling individually.

2.3 Summary of Design Strategy Intent for Consideration and Application on the Dolphin's Barn Street Residential Development.

Environmental Design Partnership Consulting Engineers are undertaking their design assessments accounting for DCC requirements and aspirations and to the recommendations and requirement standards and practices of the Chartered Institute of Building Services Engineers.

- **Minimum design aspirations and ratings.**

  - A2 Building Energy Rating.
  - Near Zero Energy Building.

- **Design approach analysis and evaluation.**

  - Energy modelling of the project.
  - Dwelling Energy Assessment Procedure modelling.

- **Analysis Review.**

  - A holistic review of the model results will be undertaken to determine optimum insulation parameters for all elements of the proposed building.
  - The review will include the extreme operating conditions to address all heating challenges.

- **Solar Influences.**

  - A solar influence performance to reduce or address overheating resulting from solar penetration.

- **Outcome**

The evaluation and selection of the optimum characteristics will allow the reduction of the primary energy consumption and reducing CO_2 discharge to atmosphere and at a minimum compliance with the: -

- Maximum Energy Performance Coefficient.
- Maximum Carbon Performance Coefficient.
- Design aspirations actual Energy and Carbon Performance below allowable Max standards.

Initial review and assessments determined that to achieve optimum results, 3 no. individual systems needed to be considered to achieve full compliance and their specific merits to the project were reviewed and assessed in detail.

Option 1:

Centralised Plant Boiler & CHP or Centralised Multi-function Heat Pump units.

Option 2:

Local external air to water heat pump unit per apartment.

Option 3.

Local indoor exhaust air to water heat pump unit per apartment.

It is our design intent to select and utilise the highest efficiency plant available that will be compatible with our overall design and building layout and limitations while achieving all energy compliance requirements.

2.4 Water Consumption

During the detailed design stage of the proposed development Environmental Design Partnership will evaluate the storage and consumption of potable water and general application particularly in sanitary applications which will be reviewed to ensure compliance with DCC and Irish water recommendations and compliance requirements.

2.5 Building Fabric

Environmental Design Partnership will work closely with the full design team to determine the optimum building element U-values, in order to limit the heat loss through the building fabric of the project the thermal insulation for each of the plane elements of the development will be equal or better than the area weighted average elemental U-Values (Um) as specified in Table 1 of section 1.3.2.5 of TGD Part L 2022 – Dwellings.

2.6 Building Envelope Air Permeability

To avoid excessive heat loss, reasonable care will be taken, during the design and construction to limit the air permeability. High levels of infiltration can contribute to uncontrolled ventilation. Infiltration is unlikely to provide ventilation as required in the correct location. It will be important to assess tat as air permeability is reduced that purpose provided ventilation is maintained. The design intent will be to achieve an air permeability of $3m^3/(hr.m^{2)}$ which represents a reasonable upper limit of air tightness and an improvement on the requirement set out in Part L of $5m^3/(hr.m^2)$.

Should a lower level of air tightness be achieved then care will be taken to ensure that purpose provided ventilation is maintained. The specific requirements of Technical Guidance Document F 2019, Ventilation will be adhered to in the design and selection of suitable ventilation systems.

2.7 Building Services Compliance

- Mechanical Ventilation Systems

Mechanical ventilation systems will be full in compliance with Technical Guidance Document L 2022 – Dwellings and Technical Guidance Document F 2019, Ventilation. Specific Fan Powers will all exceed the minimum requirements.

- Variable Speed Pumps and Ventilation Fans

All pumps and fans will be specified with variable speed drives and constant pressure/flow control. This means that these items of mechanical plant will run at partial load most of the year rather than at the peak design load. This has obvious energy savings.

- **Insulation of Hot Water Storage Vessels, Pipes and Ducts**

All hot water storage vessels, pipes and ducts (where applicable) will be insulated to prevent heat loss. Adequate insulation of hot water storage vessels will be achieved by the use of a storage vessel with factory applied insulation tested to BS 1566, part 1:2002 Appendix B.

Water pipes and storage vessels in unheated areas will be insulated for the purpose of protecting against freezing. Technical Guidance Document G and Risk report BR 262, Thermal insulation avoiding risks, published by the BRE will be followed.

- **Heat Recovery**

Any HRV specified will have optimum heat recovery systems applied. This will reduce the overall heat energy consumption, as we are recuperating in excess of 75 % of the heat within the occupied space.

2.7 Low Energy Lighting Solutions

Energy efficient lighting design and luminaires will be applied and will control and maximize the use of natural daylight, occupancy requirements and avoid unnecessary high illuminance.

LED fittings only will be considered as the most energy efficient and practical solutions for the development.

PIR occupancy control will be used for lighting in areas that will have intermittent occupancy.

Perimeter lighting control / daylight linking will be considered for large open plan areas where the internal zoning permits.

Good lighting design has a double benefit as it can help reduce internal heat gains, thus reducing the need for air conditioning.

3.0 Sustainability and Renewable Energies

The following low & zero carbon technologies and opportunities will be reviewed and considered by Environmental Design Partnership during the detailed design stage in terms of their applicability for this development.

3.1 Combined Heat and Power

Technology Description

Combined heat and power (CHP), also known as co-generation, is the simultaneous generation of both useable heat and electrical power from the same source. CHP systems can be used in applications where there is a significant year-round demand for heating in addition to the electricity generated.

A CHP unit comprises of an engine (referred to as the prime mover) in which fuel is combusted. The mechanical power produced by the engine is used to generate electricity using an integral electrical generator. The heat emitted from the engine (waste heat) is used to provide space

heating and domestic hot water. For CHP engines to be economic they must run for between 4,500 and 5,000 hours per annum therefore are usually sized on or below the base loads.

3.2 Air Source Heat Pumps (ASHPs)

Technology Description

ASHPs upgrade naturally occurring low temperature heat into useful high temperature heat and vice versa. The operational characteristics differ from a gas boiler, where 1 kilowatt of thermal energy gives less than 1 kilowatt of heat to the building due to efficiency losses. With a typical electrically driven heat pump, 1 kilowatt of electrical energy will give 3 or 4 kilowatts or more of heat I cooling to the building.

3.3 Solar Photovoltaic

Technology Description

A photovoltaic system employs solar modules, each comprising a number of solar cells, which generate electrical power from sun light. PV installations may be ground-mounted, rooftop mounted, wall mounted or floating. The mount may be fixed or use a solar tracker to follow the sun across the sky.

3.4 Exhaust air source heat pumps

Technology Description

An exhaust air heat pump will re-cycle the heat from the apartment ventilation system. Air is drawn through ducts to the heat pump from the bathrooms, utility and kitchen areas. The heat pump works on the same principal as the Air source heat pump without the requirement for an outdoor condenser unit. The cold waste air is discharged to outside through another duct, and condensation to a drain. As a result, additional heat generated internally from lighting, people and domestic appliances is also utilised through heat recovery.

4.0 Domestic Energy Assessment Procedure (DEAP) & NZEB Achievability Calculations

During full detail design development Environmental Design Partnership will carry out complete thermal modelling of the building integrating and using the DEAP system of calculations. This will be used to select optimum design strategy and equipment to demonstrate compliance and achievability of a minimum A2 Building Energy Certificate rating and compliance with TGD Part L 2022 – Dwellings and to guide the design of the fabric and Mechanical and Electrical systems and application and achieve an NZEB building rating.

4.1 Building Energy Rating Certificate

A Building Energy Rating (BER) Certificate is an indication of the energy performance of a building. A BER certificate is accompanied by an Advisory Report which identifies how you might improve the energy performance of a building.

BER is the calculated energy use for space and hot water heating, ventilation and lighting based on standard occupancy. A BER is like the energy label for an electrical appliance. The label has a scale of A-G. A-rated buildings are the most energy efficient and will tend to have the lowest energy bills.

A BER is compulsory for all building offered for sale or rent. A BER is also required before a new building is occupied for the first time.

4.2 Nearly Zero Energy Building

NZEB is a very high energy performance where 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 NZEB regulations will be equivalent to a 60% improvement in energy performance from previous regulations.

The European Energy Performance of Buildings Directive Recast 2010 (EPBD) 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. Any building completed after these dates must be NZEB irrespective of construction start date.

5.0 Conclusions.

The design strategy and proposals as outlined in the preceding paragraphs take full regard of the Dublin City Council – Development Plan 2022 - 2028, and when applied to the proposed development will fully comply with, Technical Guidance Document L 2022, Conservation of Fuel and Energy – Dwellings, Technical Guidance Document F 2019, Ventilation and NZEB requirements for energy performance and renewable energy contributions.