



Climate Action Energy Statement

Cherry Orchard Point – Phase 3 of Proposed Development at
Sites 4 and 5, Park West Avenue, Dublin 10

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Content

1. Introduction	1
2. Building Regulations Part L 2022 Dwellings	2
2.1 Regulation 8 Part (a)	2
2.2 Regulation 8 Part (b)	2
2.3 Regulation 8 Part (c)	2
2.4 Regulation 8 Parts (d & e)	3
2.5 Regulation 8 Parts (f)	3
2.6 Requirements for Common Areas	3
2.7 L2A & S.I No 393 of 2021 Regulation 5 Part (f) – Electric Vehicle Charging	3
3. DCC Development Plan Objectives & Policies	5
3.1 CA10 Climate Action Energy Statements	5
3.2 CA15 Waste Heat, District Heating and Decentralised Energy	5
3.3 CA17 Supporting the Potential of District Heating in Dublin City	5
3.4 Development Plan - Chapter 15	5
3.5 LDA Requirements	6
4. Building Fabric & Ventilation	7
4.1 Elemental U-Values	7
4.2 Air Permeability	7
4.3 Thermal Bridging	8
5. Heat Sources & Renewable Energy Options	9
5.1 Option 1 - On-Site Centralised Heating System	9
5.2 Option 2 - Connection to a Third-Party Off-Site District Heating Network	9
5.3 Option 3 –Electric Heating & Hot Water Heat Pumps	10
5.4 Option 4 –Exhaust Air Heat Pumps	10
5.5 Additional Allowance for District Heating Enabled	10
5.6 Apartment Corridors/Landlord Areas	10
5.7 Photovoltaic Solar Arrays	11
5.8 Electric Vehicle Charging Facilities	11
5.9 Embodied Carbon Assessment	11
6. Analysis of Systems	13
6.1 Summary Results of IES Energy Modelling Exercise	13
6.2 Summary Results of DEAP / Part L Compliance Checks	13
6.3 Assessment of Options	14
7. Conclusions	15

1. Introduction

Waterman Moylan Engineering Consultants have been appointed by The Land Development Agency (LDA) to provide Mechanical and Electrical Engineering Services consultancy services for Phase 3 of their residential development at Cherry Orchard.

The proposed development will consist of the construction of a residential led mixed-use scheme containing 312no. residential apartments comprising 244no. cost rental and 68no. social units, 8no. local retail and commercial units, landscaped public and communal open space. The proposed development includes a new principal access via Barnville Park to the south, providing entry to an internal undercroft parking court, upgraded pedestrian and cycle footpaths, Barnville link connecting the Park West Avenue and Cherry Orchard railway station and all associated site and development works.

The proposed development represents Phase 3 of the overall planned development at Cherry Orchard Point scheme for Development Sites 4 and 5 of the LAP lands. Phase 1 of the overall planned development was granted permission in July 2024 (ACP Case Ref: 318607-23) and Phase 2 was granted in September 2025 (ACP Case Ref: 321931-25). The proposed development comprises the works to be undertaken on Site 5: Barnville, which forms the subject of this planning application.

The proposed development (Total GFA of c. 28413 sq.m) involves construction of 312no. residential apartments (c. 24556 sq.m), across 7 core blocks consisting of 4 to 10 floors, comprising 16no. studio units, 146no. one-bed units, 139no. two-bed units (15no. two-bed three-person and 124no. two-bed four person), 9 no. 3-bed units (9no. three-bed five-person) and 2no. 4-bed units (2no. four-bed seven-person) together with 8no. Local Retail and Commercial units (c. 1441 sq.m GFA), and all ancillary and sundry accommodation (c. 2,416sq.m total GFA). The proposed development also includes the provision of landscaped public open spaces of c.1691 sq.m. and Communal open space of c. 2390 sq.m. The communal open space has been designed to provide a high-quality amenity area, incorporating a community garden with seating, play and fitness facilities, and associated landscaping. The scheme also provides private open space for all residential units.

The proposed development will involve the provision of car parking (including accessible and EV car parking spaces), car sharing spaces, bicycle parking spaces, motorbike spaces and loading bays. The scheme includes a Barnville link to the south of the site connecting Barnville Park with Park West Avenue and providing direct pedestrian access to the railway station, along with overall 4no. pedestrian crossing points connecting Park West Avenue, Barnville Park and New Cherry Orchard Park.

The development will also provide for all associated ancillary site development infrastructure including site clearance, boundary treatment, associated public lighting, internal roads and pathways, substations, switch room, water tank rooms, storage room, meter room, sprinkler tank room, bin storage, bicycle stores, hard and soft landscaping, play equipment, boundary walls, attenuation area, green and blue roof systems, photovoltaic panels and all associated works and infrastructure to facilitate the development including connection to foul and surface water drainage and water supply.

This report identifies the energy standards with which the proposed development will have to comply and provides an initial assessment of the options that are being considered for meeting the requirements. The standards with which the scheme must comply are as follows:

- 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 2022, Conservation of Energy & Fuel (hereinafter referred to as “*Part L 2022 Dwellings*”).
- The requirements of the Dublin City Council Development Plan 2022-2028.
- This report has been prepared at Stage 1a of the design process and represents an initial response to the LDA’s Sustainable Design Guidance Note #1; Energy Strategies.
- EU Taxonomy Requirements

2. Building Regulations Part L 2022 Dwellings

Compliance with Building Regulations *Part L 2022 Dwellings* is broken down into six distinct categories, known as Regulation 8; parts (a) to (f).

A summary of each of these parts as listed in Technical Guidance Document L 2022 is provided below together with a description of what is required to demonstrate compliance and suggested routes to meeting the required standards.

2.1 Regulation 8 Part (a)

The regulation requires that:

Providing that the energy performance of the building is such as to limit the calculated primary energy consumption and related carbon dioxide (CO₂) to that of a nearly zero energy building within the meaning of the Directive insofar as is reasonably practicable.

Part (a) is the overarching compliance target which stipulates the required overall reduction in energy consumption and carbon emissions for new dwellings.

This requires that the energy consumption and carbon emissions of every dwelling is assessed using the DEAP software and that reductions of 70% in energy consumption and 65% in carbon emissions are achieved. The baseline against which this reduction is to be measured is considered to be a dwelling which is constructed to perfectly comply with the 2005 version of Building Regulations Part L.

The ratio of the energy consumed by the proposed dwelling to a similar dwelling constructed to 2005 energy efficiency standards is referred to as the “Energy Performance Co-efficient”.

2.2 Regulation 8 Part (b)

The regulation requires that:

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;

This requires that all new dwellings are provided with a renewable energy source. The regulations state that 20% of the total energy consumed within the dwelling must be provided from renewable thermal sources (solar thermal, biomass, heat pumps) or renewable electrical sources (Photovoltaic, Micro-wind).

In practical terms, for a multiple unit development, this requirement is usually met by incorporating PV panels at roof level, incorporating air source heat pump technology or by adding an element of biomass or micro-Combined Heat & Power (CHP) to a district heating scheme.

Where CHP is included, the renewable energy is considered to be the waste heat which is generated as a by-product of the electricity produced. Specific calculation methods are set out within TGD *Part L 2022 Dwellings* which detail how compliance should be demonstrated.

2.3 Regulation 8 Part (c)

The regulation requires that:

Limiting heat loss and, where appropriate, availing of heat gain through the fabric of the building;

This requires that the fabric of the building is designed to minimise heat loss from the building and that the air permeability of the structure limits the unwanted passage of air into the building.

Typical compliant U-Values are as follows.

Pitched roof	0.16 W/m ² K
Flat roof	0.20 W/m ² K

Walls	0.18 W/m ² K
Floor	0.18 W/m ² K
Windows	1.4 W/m ² K

The u-values of individual elements can be relaxed if required provided that compensatory measures are taken on other elements and that the overall area weighted u-value for the entire dwelling is the same as it would have been if all individual elements had complied.

The thermal bridging details of junctions in the envelope of the building (floor-wall; wall-window; wall-roof, etc) must also be designed and constructed in accordance with the guidance set out in Limiting Thermal Bridging and Air Infiltration – Acceptable Construction Details

Every dwelling must also be subjected to an air pressure test to determine the air tightness. All dwellings must achieve an air tightness of less than 5m³/m²/hour when tested at 50 Pascals. In multiple dwelling developments with repeating apartment types, testing can be conducted on a representative sample of units in accordance with Table 1.5.4.3 of TGD *Part L 2022 Dwellings*.

2.4 Regulation 8 Parts (d & e)

The regulation requires that:

Providing and commissioning energy efficient space and water heating systems with efficient heat sources and effective controls;

Providing that all oil and gas fired boilers shall meet a minimum seasonal efficiency of 90%;

These require that gas or oil-fired boilers are at least 90% efficient and that heating controls allow independent time control of the heating (2 zones for dwellings larger than 100m²) and hot water. Heating in each zone should also be controlled by room thermostats (in the case of heating) and cylinder stats (in the case of hot water).

2.5 Regulation 8 Parts (f)

The regulation requires that:

Providing to the dwelling owner sufficient information about the building, the fixed building services 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.

This requires that information is provided to the dwelling owner which relates to the effective and efficient operation of the systems installed in that dwelling. Instructions on how to control the heating & hot water systems based on time and temperature requirements.

2.6 Requirements for Common Areas

Section 0.1.2.3 requires that:

Where a new dwelling forms part of a larger building, the guidance in this document applies to the individual dwelling, and the relevant guidance in Technical Guidance Document L - Conservation of Fuel and Energy – Buildings other than dwellings applies to the non-dwelling parts of the building

2.7 L2A & S.I No 393 of 2021 Regulation 5 Part (f) – Electric Vehicle Charging

The regulation requires that:

(a) A multi-unit building containing one, or more than one, dwelling that is new shall have installed ducting infrastructure (consisting of conduits for electrical cables) for each car parking space, to enable the subsequent installation of recharging points for electric vehicles where the parking space is:

(i) located inside the building concerned, or

(ii) is within the curtilage of the building concerned.

(c) A new building that is a dwelling, other than where the dwelling forms part of a multi-unit building, where a parking space is located within the curtilage of the dwelling, shall have installed appropriate electric vehicle recharging infrastructure to enable the subsequent installation of recharging points for electric vehicles.

This requires that ducting provision for the future installation of car charging point be made in all car parks with more than 10 parking spaces associated with multi-unit residential buildings. It also requires that individual / own-door dwellings which have on curtilage parking are provided with ducting infrastructure to allow the future installation of e-car charging.

3. DCC Development Plan Objectives & Policies

Chapter 3 of The Dublin City Development Plan 2022-2028 sets out a number of policies in relation to energy in use in proposed developments and the potential use of district heating / waste heat networks. The policies relevant to the proposed development at Cherry Orchard are set out below and are addressed in following chapters of this report.

3.1 CA10 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.

3.2 CA15 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.

3.3 CA17 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 CA10) 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' in order 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' in order to facilitate a connection to the Dublin District Heating System.

3.4 Development Plan - Chapter 15

In addition to the specific policies set out above from Chapter 3 of the development plan, Chapter 15 provide further guidance regarding the use of district heating networks.

Development Plan 15.7.3 - Climate Action and Energy Statement

In order to comply with the policies set out in Section 3.5.2 'The Built Environment' and Section 3.5.3 'Energy' of Chapter 3, proposals for all new developments in excess of 30 or more residential units or 1,000 sq. m. or more of commercial floor space, or as or as otherwise required by the Planning Authority, will be required to include a Climate Action Energy Statement.

The purpose of this statement is to demonstrate how low carbon energy and heating solutions have been considered as part of the overall design and planning of the proposed development. Having regard to the above, the statement, which shall be prepared by a certified engineer, shall address:

- the technical, environmental and economic feasibility of on-site renewable energy generation including solar PV and small scale wind power

- the technical, environmental and economic feasibility of at a minimum, the following high-efficiency alternative energy supply and heating systems
- decentralised energy supply systems based on energy from renewable and waste heat sources
- co-generation (combined heat and power)
- district or block heating or cooling, particularly where it is based entirely or partially on energy from renewable and waste heat sources
- heat pumps

Development Plan 15.7.3.1 - District Heating Enabled' Development

In addition to the requirements set out above, Climate Action Energy Statements for significant new residential and commercial developments in SDRAs, will be required to investigate local heat sources and networks, and, where feasible, to demonstrate that the proposed development will be 'District Heating Enabled' in order to facilitate a connection to an available or developing district heating network.

Any such investigation should have regard to the heat demand density of the area in which the proposed development is located.

Where it is not feasible for a development to be district heat enabled, the statement must provide a clear explanation as to why this is would not be the case, and must also demonstrate that the proposed development offers a similarly efficient and low carbon energy and heating solution.

For the avoidance of doubt, for a development to be 'District Heating Enabled', it should incorporate an efficient, low carbon building heat network, and/or a block communal heating network, in order to facilitate a future connection to a district heating network, without the need for significant additional retrofitting.

To this end, 'DH Enabled' development should provide for:

- an efficient, centralised, wet-based heat network within the building or within the area of the development as a whole (as appropriate);
- the allocation of sufficient space in plant rooms to accommodate suitable district heating equipment, such as heat exchangers etc.;
- the provision and safeguarding of suitable pipe routes throughout the building and complex;
- the provision and safeguarding of suitable district heating network connection routes at and beyond the site boundary

3.5 LDA Requirements

Guidance Note #1, Energy Strategies, published as part of the LDA's overall suite of sustainable design guides, sets out the overall targets for residential developments being designed on behalf of the LDA and also sets out the assessments and reporting structures that must be adhered to by the design teams involved in such projects.

The philosophy identified by the LDA is as follows:

Be Lean: Use less energy and manage demand during operation through building design efficiency, fabric and servicing improvements and the incorporation of flexibility measures

Be Clean: Exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly by connecting to district heating networks

Be Green: Maximise opportunities for renewable energy by producing, storing and using renewable energy on site

Be Seen: Monitor, verify and report on energy performance

4. Building Fabric & Ventilation

Before considering efficient building services or renewable energy systems, the form and fabric of a building must be assessed and optimised so as to reduce the energy demand for heating, lighting and ventilation. Target performance levels have been identified by the design team and are presented below.

4.1 Elemental U-Values

The U-Value of a building element is a measure of the amount of heat energy that will pass through the constituent element of the building envelope. Increasing the insulation levels in each element will reduce the heat lost during the heating season and this in turn will reduce the consumption of fuel and the associated carbon emissions and operating costs.

It is the intention of the design team to exceed the requirements of the building regulations. Target U-Values are identified below.

U-Values	Range of Target Values Proposed	Part L 2022 (Residential) Compliant Values	Part L 2021 (BOTD) Compliant Values
Floor	0.10 to 0.18 W/m ² K	0.18W/m ² K	0.21W/m ² K
Roof (Flat)	0.12 to 0.20 W/m ² K	0.20 W/m ² K	0.20 W/m ² K
Roof (Pitched)	0.10 to 0.16 W/m ² K	0.16 W/m ² K	0.16 W/m ² K
Walls	0.10 to 0.18 W/m ² K	0.18 W/m ² K	0.21 W/m ² K
Windows	0.9 to 1.4 W/m ² K	1.4W/m ² K	1.6W/m ² K

4.2 Air Permeability

A major consideration in reducing the heat losses in a building is the air infiltration. This essentially relates to the ingress of cold outdoor air into the building and the corresponding displacement of the heated internal air. This incoming cold air must be heated if comfort conditions are to be maintained. In a traditionally constructed building, infiltration can account for 30 to 40 percent of the total heat loss, however construction standards continue to improve in this area.

With good design and strict on-site control of building techniques, infiltration losses can be significantly reduced, resulting in equivalent savings in energy consumption, emissions and running costs.

In order to ensure that a sufficient level of air tightness is achieved, air permeability testing will be specified in tender documents, with the responsibility being placed on the main contractor to carry out testing and achieve the targets identified in the tender documents.

A design air permeability target of **3 m³/m²/hr** has been identified for the apartments and houses on the site. As set in Part L 2021 Buildings Other Than Dwellings target air tightness for the Commercial spaces will be **5 m³/m²/hr**.

The air permeability testing will be carried out in accordance with IS EN 9972:2015 'Determination of air permeability of buildings, fan pressurisation method' and CIBSE TM23: 2000 'Testing buildings for air leakage'

4.3 Thermal Bridging

Thermal bridges occur at junctions between planar elements of the building fabric and are typically defined as areas where heat can escape the building fabric due to a lack of continuity of the insulation in the adjoin elements.

Careful design and detailing of the manner in which insulation is installed at these junctions can reduce the rate at which the heat escapes. Standard good practice details are available and are known as Acceptable Construction Details (ACDs). Adherence to these details is known to reduce the rate at which heat is lost.

The rate at which heat is lost is quantified by the Thermal Bridging Factor of the dwelling and measured in W/m^2K . The Thermal Bridging Factor is used in the overall dwelling Part L calculation, this value can be entered in three different ways:

0.15W/m ² K	Default figure used for all thermal bridges
0.08W/m ² K	Used where the ACDs are fully adhered to
< 0.08 W/m ² K	Used where the thermal details are thermally modelled and considered to perform better than the ACDs

Detailed design stage will determine the thermal bridging factor to be utilised within proposed development and that the resultant Thermal Bridging Factor will be $\leq 0.15W/m^2K$.

5. Heat Sources & Renewable Energy Options

Part L of the building regulations requires that all new residential buildings must meet overall energy performance levels (as defined by the Energy Performance Coefficient - EPC) and must have a portion of their annual energy demand provided by renewable energy sources.

The renewable energy source can be thermal energy such as solar thermal collection, biomass boilers or heat pumps or it can be electrical energy as generated by photovoltaic solar panels or wind turbines. The minimum renewable energy contributions defined in Part L 2022 Part (b) is 20% of the total energy consumption for the dwelling.

The development must also comply with the requirements of the Dublin City Council Development Plan 2022- 2028, regarding the choice of energy systems and the methods used to assess each system.

5.1 Option 1 - On-Site Centralised Heating System

This approach would involve the generation of heat in a central location on the site and the distribution of this heat to each apartment via a network district heating pipework. In order to ensure that the centralised system can deliver a highly efficient and low carbon heat energy, the central plant will typically consist of large commercial grade air source heat pumps.

The large Air Source Heat Pumps (ASHPs) operate in the same manner as the smaller units incorporated in houses or apartments but at a larger scale. They utilise grid supplied electricity to extract thermal energy from a heat source, in this case, the ambient air. While the electricity consumed is not renewable energy, the efficiency at which a heat pump operates allows a significant portion of the heat delivered be considered as renewable. Typically, approximately 40% to 50% of the heat supplied is considered to be renewable energy

Air source heat pumps operate by transferring heat from a “source” rather than creating it directly. In the case of an “air source” heat pump, a fan draws ambient air across an evaporator coil containing refrigerant, which absorbs low-grade heat even in cold weather. This heated refrigerant is then compressed using electricity, raising its temperature to a useful level for space heating or hot water. Typically, around 70–75% of the delivered heat comes from the air, while about 25–30% comes from electrical energy powering the compressor and fans. The combined result is a total heat output roughly three to four times greater than the electrical input, (i.e. a coefficient of performance of 3 to 4 or efficiency of 300% to 400%) making the system highly energy-efficient.

Heating pipework will be installed throughout the scheme to distribute the heat generated in the plant room throughout the apartment development, serving each apartment via a heat interface unit (HIU). The HIU will both control and meter the consumption of heat and hot water within each individual dwelling allowing occupants to set the times they need space heating and ensuring they are charged accordingly.

5.2 Option 2 - Connection to a Third-Party Off-Site District Heating Network

This approach would involve the installation district heating pipework throughout the scheme to distribute the heat generated by a third-party off-site district heating network. Each apartment would be served via a heat interface unit (HIU). The HIU will both control and meter the consumption of heat and hot water within each individual dwelling allowing occupants to set the times they need space heating and ensuring they are charged accordingly.

The source of heat for the third-party district heating network could be waste heat from nearby commercial or industrial systems such as data centres, or from municipal geothermal heat sources.

From studies completed on the earlier phases of this development, it has been established that there are no existing or planned district heating networks in the vicinity of the Cherry Orchard site. As such, this option can be discounted without any further consideration or assessment.

5.3 Option 3 –Electric Heating & Hot Water Heat Pumps

This approach includes the provision of electric storage and/or convector heaters in the living & sleeping areas to meet all of the space heating requirements with electric towel rads provided in main bathrooms and en-suites.

The hot water demand is met by a hot water heat pump which utilise grid supplied electricity to extract thermal energy from a heat source in a similar manner to an Exhaust Air Heat Pump. The heat pump is ducted directly to the external façade through insulated supply & exhaust ductwork and uses external air as the heat source for generating hot waters. It can use up to 3 times less electricity than direct acting water heaters and produces renewable energy to aid Part L compliance.

PV panels are also then needed to improve the overall renewable energy contribution and improve the overall energy performance of the dwellings

5.4 Option 4 – Exhaust Air Heat Pumps

Exhaust Air heat pumps (EAHPs) operate in a very similar manner to the more conventional air source heat pumps and utilise grid supplied electricity to extract thermal energy from a heat source, in this case, the internal air within the apartment. The internal air is extracted from kitchens and wet rooms and is drawn into the heat pump via ductwork in the ceiling void. The heat pump extracts heat from this air before expelling it from the apartment.

As with the electricity consumed is not renewable energy but the efficiency at which a heat pump operates allows a significant portion of the heat delivered to the dwelling be considered as renewable.

There are a number of manufacturers offering products of this type and the certified seasonal efficiencies of some models can exceed 450% in heating mode and 170% to 190% in hot water mode. These efficiencies can deliver Part L 2022 compliance in most circumstances but in some instances may need supplementary PV panels in order to meet the required energy targets.

There is no requirement for a separate Mechanical Extract Ventilation (MEV) systems when an exhaust air heat pump is used as the heat pump draws the air from all wet rooms in the same manner as an MEV system would. The fan will run continuously to ensure that the minimum ventilation rates are maintained and the supply air to the dwelling is provided through trickle vents in each habitable room.

This approach is typically paired with Heat Recovery Ventilation to improve the overall energy performance of the dwellings, thereby maximising the benefits of air tight construction and reducing the load on the electric space heaters.

5.5 Additional Allowance for District Heating Enabled

As set out in the Development Plan, the feasibility of delivering a scheme which is “district heating enabled” must also be assessed in terms of technical and economic feasibility of including measures to enable future connection to a third-party off site district heating network.

From studies completed on the earlier phases of this development, it has been established that as there are no existing or planned district heating networks in the vicinity of the Cherry Orchard site the provision of extensive and costly infrastructure to allow for future the future connection to a heat network would not be economically feasible.

5.6 Apartment Corridors/Landlord Areas

In accordance with the requirements of Part L 2022, the common areas within the apartment blocks are required to meet the requirements of Part L 2022 for “Buildings Other Than Dwellings”. Under Part L 2022, a portion (10% to 20%) of the energy demand of the common areas must be met by a renewable energy source. The energy demand within these spaces will be exclusively provided by electrical energy (lighting, space heating & lifts etc) so a photovoltaic array would be best suited to meet this renewable energy demand.

5.7 Photovoltaic Solar Arrays

In addition to the systems described in Sections 5.1 to 5.4, roof mounted photovoltaic (PV) panels will be used to supplement the proposed systems and enhance overall energy performance. The overall size of the arrays required will depend on the choice of heating system adopted and will be determined by overall Part L compliance and EU Taxonomy requirements.

The PV panels will be mounted in a manner that minimises panel to panel shading and shading from nearby roof structures and parapets. Mounting angles will typically be in the range of 10 to 15 degrees from horizontal which will ensure that the highest edges of the panels will remain below the parapet height and will therefore not be visible and will not create any greater shading than the building itself.

PV arrays will be installed on non-combustible substrates and will not overlap with green roofed areas. The electrical energy generated from the PV arrays will be connected to landlord electrical distribution boards only, with no connections to individual apartments proposed. The entire electrical installation will be fully compliant with IS10101 2020+a1:2024.

5.8 Electric Vehicle Charging Facilities

The measures that will be included to facilitate the charging of electric vehicles will be in accordance with the DCC Development Plan 2022-2028 and shall exceed the minimum requirements identified in TGD Part L 2022.

A total of 156 car parking spaces will be provided in Phase 3 based on 0.5 spaces per unit and comprising:

- 130 spaces for residents will be located at Level 0 (including 4 accessible).
- 26 spaces will be located at street Level 1 (including 4 accessible).

Of the total 156 parking space provided in the proposed development, a total of 78 spaces shall be provided with functioning charging facilities for electric vehicles (50%)

The proposed EV strategy will support a strategy of demand-led “go live” for spaces across the site. In this regard, LDA note that EV take-up is on average c. 6% across their sites. In order to ensure appropriate capital and maintenance expenditure as part of the proposed development it is proposed to:

- Provide 20% EV charging as part of the proposed development day 1
- Monitor the EV uptake as part of the proposed development
- Increase the EV charging proposal to 30% once the demand reaches 15% on site (and to 40% when the demand reaches 25% and so on)

The remaining 78 spaces shall be provided with ducting/containment to facilitate the installation of the relevant infrastructure to accommodate future EV charging (50%).

5.9 Embodied Carbon Assessment

The DCC Development Plan 2022-2028 notes that the Climate Action Energy Plan should also include an assessment of the embodied carbon impacts of a proposed low energy heating solutions proposed.

The calculation and assessment of the embodied carbon of various aspects of the building's fabric and structure have become more common in recent years, there are less well established methods for assessing the embodied carbon of mechanical and electrical systems within buildings. This is primarily due to the difficulty in determining the embodied carbon in items of plant or equipment, which themselves are often constructed from numerous other sub-components.

CIBSE TM65 has been published by the Chartered Institute of Building Services Engineers in an attempt to address this, however even within this document it is noted that the assessment of embodied carbon for mechanical and electrical building services is very difficult.

The approach proposed within CIBSE TM65 is based on 3 possible metrics, in order of preference (and accuracy) these are:

1. Environmental Product Declarations (EPDs)
2. Manufacturer Form Section A & B (allowing “mid-level” calculation)
3. Manufacturer Form Section A only (allowing “basic” calculation)

However, as this approach is relatively new (TM65 was first published in 2021) few manufacturers of equipment have yet implemented the use of EPDs and use of Manufacturer Forms is also in it's infancy, meaning that there is little information available.

At planning stage of a project, no decisions have yet been made on the specific equipment suppliers or manufacturers so there is no means of having “Manufacturer Forms” completed. Therefore, as illustrated in Figure 4.2 in TM65 (reproduced below) it is not possible to carry out any calculations on embodied carbon for the systems being considered.

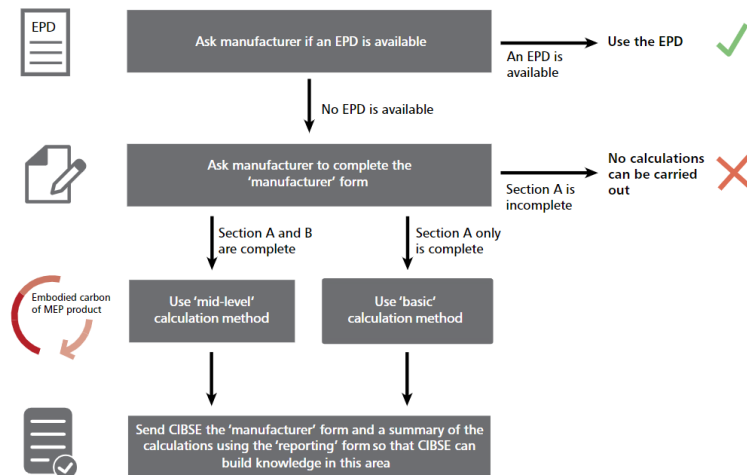


Figure 4.2 Steps taken to understand the embodied carbon impact of a MEP product

6. Analysis of Systems

In line with the requirements of the LDA's own procedures for the analysis of heating and renewable energy options, as set out in their Sustainability Guidance Note #1, Energy Strategies, energy modelling has been carried out on the proposed development, using both IES Virtual Environment dynamic thermal modelling and using SEAI's DEAP methodology.

6.1 Summary Results of IES Energy Modelling Exercise

Based on the IES modelling of the 4 systems as prescribed by the LDA, the energy performance of each system have presented in the table below.

Note that the Energy Model has been developed at a preliminary design stage so the energy data below is based on a series of assumptions on likely energy performance of each system. Assumptions for systems based on individual plant (Options 3 & 4) are expected to be more accurate than those based on centralised plant (Options 1 & 2) as there are a greater number of unknowns in the design of a district system that have had to be estimated for the analysis.

Energy Use & Carbon Emissions - For Development				
	Option 1 - On-Site Centralised Heating System	Option 2 - Connection to a Third-Party Off-Site District Heating Network	Option 3 - Electric Heating & Hot Water Heat Pumps	Option 4 - Exhaust Air Heat Pumps
Annual Delivered Energy	282,529.00	N/A	374,489.00	342,818.00
Annual Delivered Energy Intensity / m ² per Year	15.05	N/A	19.95	18.26

6.2 Summary Results of DEAP / Part L Compliance Checks

Based on the DEAP modelling of the 4 systems as prescribed by the LDA, the Part L Compliance & EU Taxonomy performance of each system have been presented in the table below.

EPC figures below provide a comparative analysis of how each system operates based on standard building fabric assumptions, and other DEAP default data. When further details are available on each of these parameters, it is expected that all EPC will improve and that EU Taxonomy targets will be achieved. Where shortfalls remain, PV can be added to ensure target levels are met.

Assumptions & default values used for systems based on individual plant (Options 3 & 4) are expected to be more accurate than those based on centralised plant (Options 1 & 2) as there are a greater number of unknowns in the design of a district system that have had to be estimated for the analysis.

Part L & Taxonomy Compliance				
	Option 1 - On-Site Centralised Heating System	Option 2 - Connection to a Third-Party Off-Site District Heating Network	Option 3 - Electric Heating & Hot Water Heat Pumps	Option 4 - Exhaust Air Heat Pumps
Confirm Part L Compliance can be achieved	Yes	N/A	Yes	Yes
EPC (<0.27 indicates taxonomy compliance)	0.265	N/A	0.269	0.267

6.3 Assessment of Options

- The IES energy modelling shows only a minor improvement in energy performance with only an estimated 8% to 10% difference in energy consumption. Furthermore, due to the extent to which assumptions have had to be made within the energy modelling for the overall efficiency at which the centralised options will operate (including assumptions on distribution losses) there remains doubt as to whether the savings identified would actually be realised. An example of this would be the distribution losses, which are estimated within the modelling in line with SEAI guidance, however, actual losses could not be modelled without a more developed design of the district heating network that would be installed. Also, as the LDA will ultimately not be paying for the operational energy, any savings that are delivered will not be realised by the LDA.
- Preliminary Part L calculations completed for the 4 options demonstrate that both the de-centralised options deliver superior performance in terms of EPC and CPC than the centralised options. There is, however, greater certainty regarding the Part L compliance of the de-centralised options at this early design stage than there are regarding compliance of the centralised system.
- While an assessment of capital costs is outside the scope of this report, separate studies have been undertaken and indicate that the installation costs are substantially higher for both the district systems than for either of the de-centralised options. Furthermore, this would come with a risk of further cost increases at tender stage due to the non-standard nature of the installation and the fact that fewer contractors would be capable of completing the installation.
- Other considerations include greater certainty on cost, quicker installation times, simpler commissioning and fewer post occupancy call backs for the de-centralised options over the centralised approach, all of which favour the implementation of a de-centralised system.
- As noted earlier in the report, as there are no known existing or planned third-party off-site district heating networks available for connection to the site, Option 2 - Connection to a Third-Party Off-Site District Heating Network has not been assessed.
- The addition of measures to make the site “district heating enabled” will add significant costs to the project and they do not align with the overall cost plan for the project and are not considered to be feasible.

7. Conclusions

The preceding sections of this report set out the regulatory requirements with which the scheme will have to comply while identifying a number of technologies and design approaches that may be utilised to achieve compliance.

As detailed in this report, energy modelling and qualitative assessment of each of the options under consideration has been progressed as far as is possible during the pre-planning design stage and spatial allowances have been made for all options, including provision of central plant space for the district heating options.

The building fabric standards and the technology solutions discussed within this report will all be assessed in greater detail during the detailed design stage of the project and a more detailed assessment of the capital cost and operational implications of each system will be undertaken.

Ultimately, the approach that will be adopted to achieving Part L Compliance will be based on a combination of the solutions assessed. A final decision will be made once capital costs, renewable targets and regulation compliance have all been compared to find the most appropriate solution.

Further studies & analysis will be completed early in the design stage to finalise the choice of heating system and renewable energy system, however the all systems assessed here have been shown to be suitable in terms of energy performance and compliance with Part L of the Building Regulations and with the more stringent requirements of achieving EU Taxonomy compliant energy performance.

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