

Clondalkin Decarbonising Zone Implementation Plan



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This Implementation Plan for the Clondalkin Decarbonising Zone has been prepared by the SDCC Climate Action Team in conjunction with Codema, the Dublin Energy Agency.

CONTENTS

CONTENTS.....	3
Table of Tables.....	5
Table of figures.....	6
Executive Summary	7
1. Introduction.....	10
1.1 What is a Decarbonising Zone?	10
1.2 The Clondalkin DZ today.....	11
1.2.1 Sizing, population, zoning and infrastructure	11
1.2.2 Transport Links.....	11
1.3 Clondalkin after the DZ.....	11
2. Community Engagement	14
2.1 The Engagement Process	14
2.2 Key insights from community engagement.....	15
2.3 Community vision, mission and objectives.....	16
2.3.1 Clondalkin DZ vision and mission statement	16
2.3.2 Community objectives and opportunities	16
2.4 Community Actions in the DZ	18
3. Delivering Evidence based Climate Action in the Clondalkin DZ	21
3.1 Key interventions.....	22
4. Opportunities for Climate Action in the DZ and Implementation.....	23
4.1 Energy in the DZ.....	23
4.1.1 Residential emissions and profile.....	23
4.1.2 Residential Climate Pathways to 2030.....	26
4.2 Commercial emissions and profile	28
4.2.1 Commercial and public sector climate pathway to 2030.....	30
4.2.2 Spatial energy planning and climate pathways	31
4.3 Transport in the DZ.....	37
4.3.1 Transport emissions and profile	37
4.3.2 Transport Climate Pathways in the DZ.....	38
4.4 Flood Resilience and Nature Based Solutions in the DZ	45
4.5 Circular Economy in the DZ.....	49
Appendix I: References	51

Appendix II: Evidence-base data sources and methodologies.....	52
Appendix III: Assumptions for action costs and carbon emissions reductions.....	55

Table of Tables

Table 1: Clondalkin DZ community vision and mission statements.....	16
Table 2: The five community objectives developed through workshops with local stakeholders.....	17
Table 3: Community Engagement Actions in the DZ.....	18
Table 4: Percentage of commercial property types in Clondalkin DZ.....	29
Table 5: DZ Plan Action list: Energy & Buildings.....	35
Table 6: DZ Plan Action list: Transport.....	41
Table 7: DZ Plan Actio list: Flood Resilience.....	45
Table 8: DZ Plan Action list: Nature Based Solutions'	46
Table 9: DZ Plan Action list: Circular Economy and Resource Management	48
Table 10: Evidence-base data sources.....	51

Table of figures

Figure 1: Clondalkin Decarbonising Zone.....	8
Figure 2: Location of the Clondalkin DZ and key buildings.....	10
Figure 3: Land use Zoning in Clondalkin DZ.....	12
Figure 4: Amenities and public places in Clondalkin DZ.....	13
Figure 5: Engagement process timeline for the Clondalkin DZ.....	14
Figure 6: Implementing Climate Action in the Clondalkin DZ.....	21
Figure 7: Baseline emissions inventory for the Clondalkin Decarbonising Zone.....	21
Figure 8: High impact residential interventions in the DZ.....	22
Figure 9: High impact commercial interventions in the DZ.....	23
Figure 10: High impact residential interventions in the DZ.....	23
Figure 11: High impact transport interventions in the DZ.....	24
Figure 12: Overall climate pathway to 2030 rounded to the nearest 10tCO ₂ e.....	26
Figure 13: Residential emissions in Clondalkin DZ.....	26
Figure 14: Clondalkin DZ median Building Energy Ratings.....	27
Figure 15: Clondalkin DZ boiler types.....	27
Figure 16: Residential climate pathway to 2030.....	28
Figure 17: Clondalkin DZ commercial emissions.....	30
Figure 18: Commercial and public sector climate pathway to 2030.....	31
Figure 19: Potential rooftop solar electricity opportunity in Clondalkin DZ.....	33
Figure 20: Heat pump suitability potential in Clondalkin DZ.....	34
Figure 21: Clondalkin DZ transport mode breakdown.....	38
Figure 22: Clondalkin's road transport emissions.....	39
Figure 23: Transport climate pathway to 2030.....	40

Executive Summary

As part of the Climate Action and Low Carbon Development (Amendment) Act 2021¹, local authorities across Ireland must identify and develop plans for a Decarbonising Zone (DZ) within their boundary. A DZ is considered a test bed for innovation and a demonstration site of what is possible concerning decarbonisation and climate action at a local level.

The DZ emissions reduction targets must align with the national climate targets of a 51% reduction in greenhouse gas (GHG) emissions by 2030 and net-zero emissions no later than 2050. South Dublin County Council (SDCC) identified Clondalkin as a DZ within its local authority boundary area. This Implementation Plan was prepared in accordance with Technical Annex D Guidance documents², which present five key stages for developing a Decarbonising Zone:

- 1) Identify the DZ and a clear, overarching mission, vision and objectives.
- 2) Establish the baseline emissions inventory.
- 3) Complete a Register of Opportunities (i.e. a portfolio of actions, projects, technologies and interventions).
- 4) Set out actions to be delivered over the lifetime of the plan.
- 5) Devise a strategy for implementation.

Additionally, these guidelines recommend a community-driven approach to the plan's development. With this in mind, an extensive stakeholder and community engagement plan was implemented in Clondalkin to ensure that the outputs of the five key stages listed above were reflective of those living, working and studying in the area and that they addressed some of the most prevalent needs of the community.

Through a series of facilitated workshops and local events from May 2024 to March 2025, core elements of this report were co-created with members of the Clondalkin community such as the vision, mission, community objectives, Specific, Measurable, Achievable, Realistic and Time-Bound (SMART) actions and recommendations for implementation.

This report satisfies the five key stages of the Clondalkin DZ, as listed above.

The Clondalkin DZ Implementation Plan is set out in the following sections:

- **The Clondalkin DZ today**

This section looks at the key characteristics of the Clondalkin DZ

- 1) the population;
- 2) travel patterns; and
- 3) building types within the Clondalkin DZ.

- **Community Engagement**

This section presents an overview of the engagement process and key insights into the Clondalkin community's perspective of their locality and the community's draft vision, mission and objectives.

The co-created community objectives identified through the engagement process are as follows:

- 1) Identify opportunities to upgrade existing housing. Ensure all future developments meet energy-efficient standards, use renewable energy and support those living in poverty through the transition.
- 2) Create a self-sustaining, socially connected community with local resources and services, ensuring future population growth is supported by the necessary amenities.

- 3) Improve use of and access to public transport and spaces, increase shared mobility schemes and enhance safe walking and cycling infrastructure
- 4) Support easy access to and enjoyment of nature and a healthy environment by prioritising, protecting and enhancing green and blue spaces.
- 5) Support the local community, especially the youth and elderly, to thrive in their local environment and engage in climate action by providing education, support and resources.

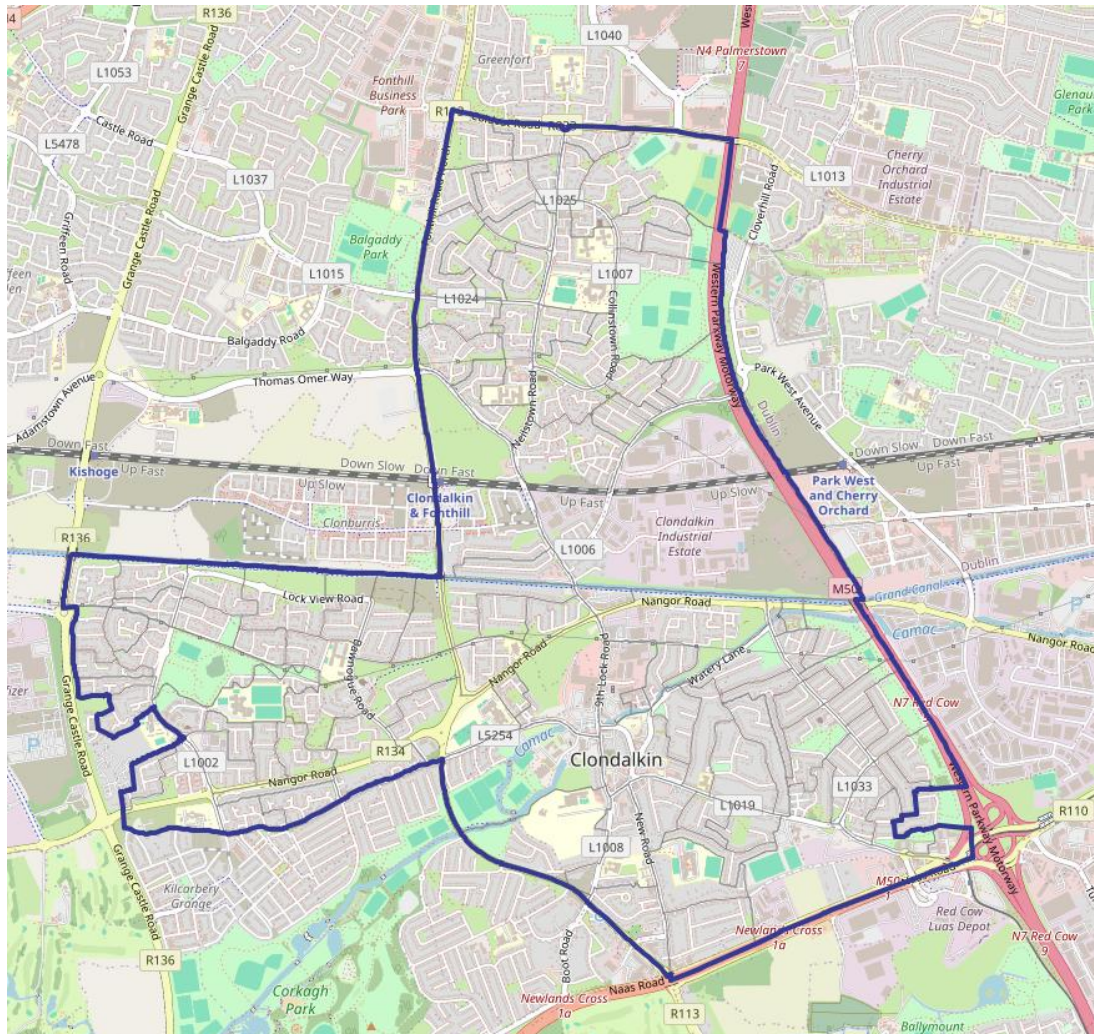


Figure 1: Clondalkin Decarbonising Zone

- **Delivering Evidence based climate action in the Clondalkin DZ**

Section 3 of this Plan looks at current emissions from residential, commercial, and transport sectors for the Clondalkin DZ (the sectoral emissions).

The sectoral emissions used in 2018 (the baseline year) are listed below:

- 1) The transport sector is responsible for 49% of emissions in the DZ. The bulk of the transport emissions are from private vehicles, predominantly in the Red Cow area where the N7 passes through Clondalkin. Additionally, a railway passes through Clondalkin and Fonthill, accounting for 3% of total transport emissions.
- 2) The residential sector contributes 31% to total emissions. There are 10,935 households within the boundary of the Decarbonising Zone. From this analysis, Codema's analysis found

that the Building Energy Ratings (BERs) of these households are primarily between the C3 - D2 range. This reflects the ageing building stock in this area, and highlights the considerable work required to meet the national aims of improving the BER of our building stock.

- 3) The commercial sector accounts for 15% of total emissions. This includes small, medium and large businesses, ranging from retail shops and supermarkets to office buildings and industrial activities.

Having identified where the emissions are coming from, the DZ Plan highlights 'Climate Pathways'. These pathways map out how emissions in the area can be reduced by considering solutions such as low-carbon technologies and renewable energy options.

Taking into account the expected increase in CO₂ emissions due to increasing population, a total of 56,036tCO₂e per annum needs to be reduced by 2030 for the Clondalkin DZ area to reduce emissions by 51% compared to the 2018 baseline.

The climate pathways look at quantifying what would be required to achieve the overall target in each of the emissions Sectors identified.

The main climate pathways identified in this analysis for each of the sectoral emissions are outlined below:

Greenhouse gas emissions are measured in '**Tonnes of carbon dioxide equivalent**' which is abbreviated to **tCO₂e**.

This is the amount of greenhouse gas that would have the same impact on climate change as carbon dioxide.

Transport

- 1) For the Clondalkin DZ to reduce transport emissions in line with national targets, a reduction of 39% in vehicle kilometres is needed, as well as a 20% shift from HGVs to electric vehicles. Furthermore, almost one out of every three private cars in the DZ would need to switch to electric vehicles (EVs).
- 2) A modal shift of 12% of the DZ population towards walking, cycling and public transport is needed to meet the 51% emissions reduction target.
- 3) For transport, electrification of five bus routes could potentially reduce emissions by 800tCO₂e. This accounts for a 0.73% reduction from the baseline.

Energy

- 1) Installation of solar photovoltaic (PV) panels on residential rooftops and energy upgrades of 10,935 homes to a B2 BER standard could potentially reduce annual emissions in the DZ by 14.96% or 16,429tCO₂e.
- 2) In the commercial sector, decarbonising the heat consumption for commercial users through measures such as heat pumps and building fabric upgrades could potentially reduce emissions in the commercial sector by 5,600tCO₂e. This is a 5% reduction from the baseline.
- 3) Installing solar PV panels on viable commercial rooftops could potentially reduce emissions in the commercial sector by a further 200tCO₂e (0.18% reduction).
- 4) Decarbonisation of Clondalkin's electricity supply (a national measure) will greatly impact the electricity grid and contribute significantly towards the 51% reduction in emissions. Decarbonisation of the electricity grid will contribute to a 13.9% reduction in the annual emissions of the DZ.
- 5) Upgrading street lighting to LEDs could reduce emissions by around 50tCO₂e (0.05% reduction).

Finally, Section 3 details key interventions that would significantly support the achievement of the DZ Plan targets. Section 4 outlines opportunities for action, alongside supportive CAP and community initiatives that could be implemented in the Clondalkin DZ.

1. Introduction

1.1 What is a Decarbonising Zone?

The national Climate Action Plan 2025³ defines a Decarbonising Zone (DZ) as a spatial area identified by the local authority in which a range of climate mitigation, adaptation and biodiversity measures will be identified to address local greenhouse gas emissions. The range of projects proposed are specific to each DZ and can address a variety of sectors. The economic and social benefits of decarbonising, including just transition, should be considered as well as the wider co-benefits including good air quality, improved health and more biodiversity.

The main objective of a Decarbonising Zone is to find innovative but achievable ways to reduce greenhouse gas emissions from the area by 51% by 2030, based on 2018 levels. According to the national Climate Action Plan 2019⁴ every local authority in the country is required to identify a Decarbonising Zone and develop a plan to reduce emissions in line with national targets. In 2023, as part of the guidelines for Local Authority Climate Action Plans² published by the Department of the Environment, Climate and Communications (DECC), Decarbonising Zones must now be included in all local authority Climate Action Plans. In 2024 a DZ advisory group was created as a joint initiative between the Department of the Environment, Climate and Communications (DECC) and the Sustainable Energy Authority of Ireland (SEAI) to further the development and implementation of the DZs and is supported in the 2025 Climate Action Plan.³

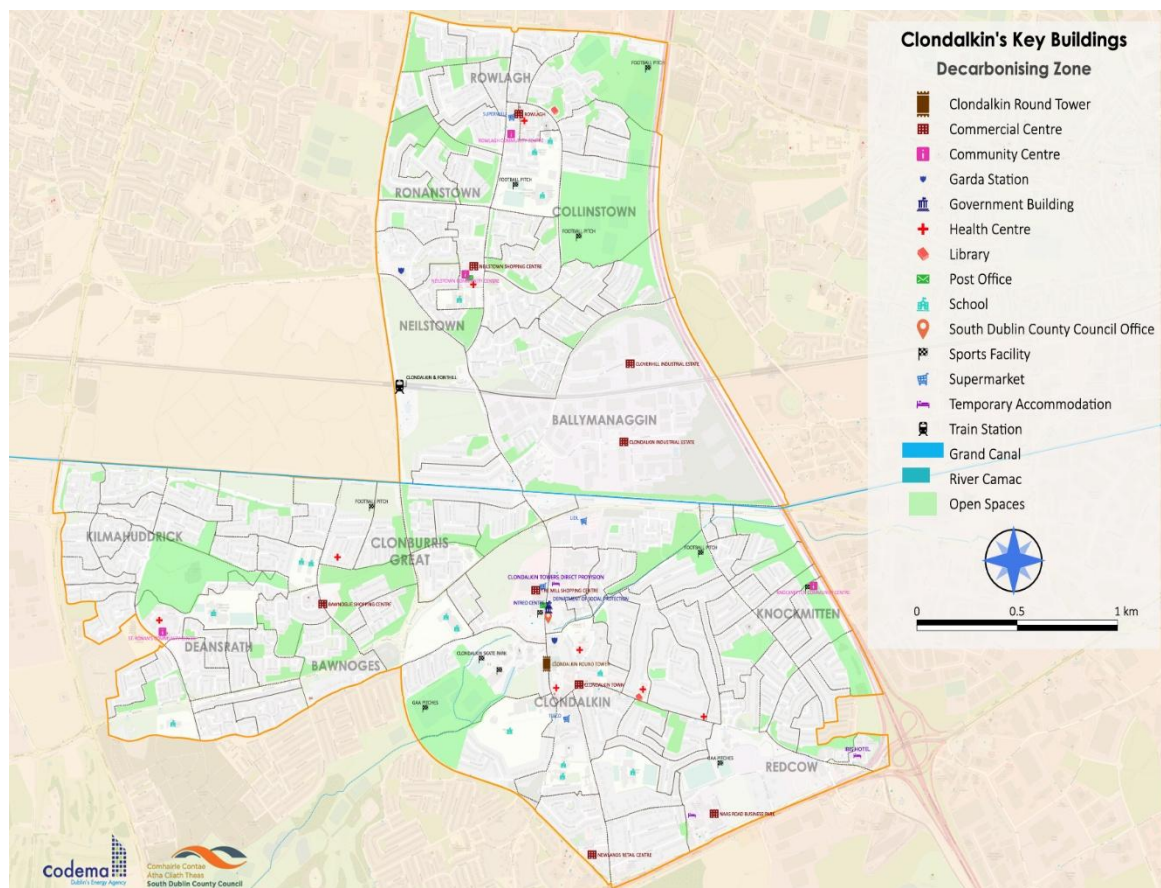


Figure 2: Location of Clondalkin DZ and key buildings

1.2 The Clondalkin DZ today

To meet the target of a 51% reduction in GHG emissions by 2030, it is important to understand the Clondalkin Decarbonising Zone and the research behind it, namely:

- 1) The current emissions in the Decarbonising Zone.
- 2) The location of these emissions in Clondalkin.
- 3) The core activities producing these emissions.
- 4) The purpose of these activities.

The DZ presents a unique opportunity for energy planning and climate action. The plan is based on the characteristics of the area, including actions that benefit the community and how these elements can work together to reduce or remove greenhouse gases from the process. By creating these zones, different approaches and projects can be trialled and tested, allowing other communities to replicate these ideas based on their needs.

1.2.1 Sizing, population, zoning and infrastructure

Clondalkin is a town and suburb, located to the south-west of Dublin, just outside the M50. The area that makes up the Clondalkin Decarbonising Zone is shown in Figure 1 and Figure 2. The zone extends to the M50 in the east, the N7 & Red Cow in the south, Coldcut Road and the Liffey Valley Shopping Centre in the North and Fonthill Road in the west. The area is mainly used for residential purposes, covering 52.6% of the total area. The remaining area is made up of open space including parks (22.8%), enterprise and business (11.2%), areas to provide strategic development (6.7%), town centres (3.8%), development of local centres (1.6%) and village centres (1.3%). The total area of the Clondalkin DZ is 8.11 km², including 10,935 households, and 413 commercial and industrial buildings. The population of the Clondalkin DZ is approximately 33,000 (15% of the population is aged 60 or over, 29.3% is younger than 20 years old and the remaining 55.7% are aged between 20 and 60 years old).⁵ In addition to the town centre, residential and open spaces, Clondalkin has important public amenities, as shown in Figure 4.

1.2.2 Transport Links

Clondalkin-Fonthill train station is the main station within the Clondalkin DZ, while Kishoge train station, located just outside the DZ was opened in 2024. These stations connect the DZ with Heuston and Connolly Stations in the city centre. Other key transport links that border the zone include the M50 on the east and the N7 along its southern border. Dublin Bus routes 13, 51d, 68, 68a and 69, as well as the Nitelink service 69n, also serve the area.

The Red Cow Park and Ride hub is located just outside the southeastern tip of the zone, offering significant access not only to the Luas network but also to private and public coach and express bus services serving the city centre and a selection of rural and intercity routes.

1.3 Clondalkin after the DZ

If delivered effectively the Clondalkin DZ Plan could mean a measurable improvement in overall quality of life for those who live, work and play in the area. Reduced transport emissions, enhanced public spaces and more sustainable energy use could mean cleaner air and lower noise levels as car dependency decreases and safer walking, cycling, and public transport options are expanded.

Collectively, these changes would create a healthier, quieter, and more vibrant environment, making Clondalkin a more desirable place to live, work, and spend time, while also strengthening the local economy and community wellbeing.

To successfully achieve the target of the DZ action is required from across society. The plan identifies a set of actions which can assist us.

SDCC has developed a series of SMART actions—Specific, Measurable, Assigned, Realistic, and Time-bound—each supported by defined Key Performance Indicators (KPIs) or tracking measures, to reduce the impacts of our activities in the DZ.

To ensure the effective implementation of the DZ plan, it is recommended that all pathways towards implementation be pursued simultaneously. This approach will not only support the achievement of emission-reduction goals but also enable the Clondalkin community to actively engage in climate action. It is essential that the community is actively involved and consulted throughout this process, so that actions accurately reflect local realities and include a broad spectrum of perspectives.

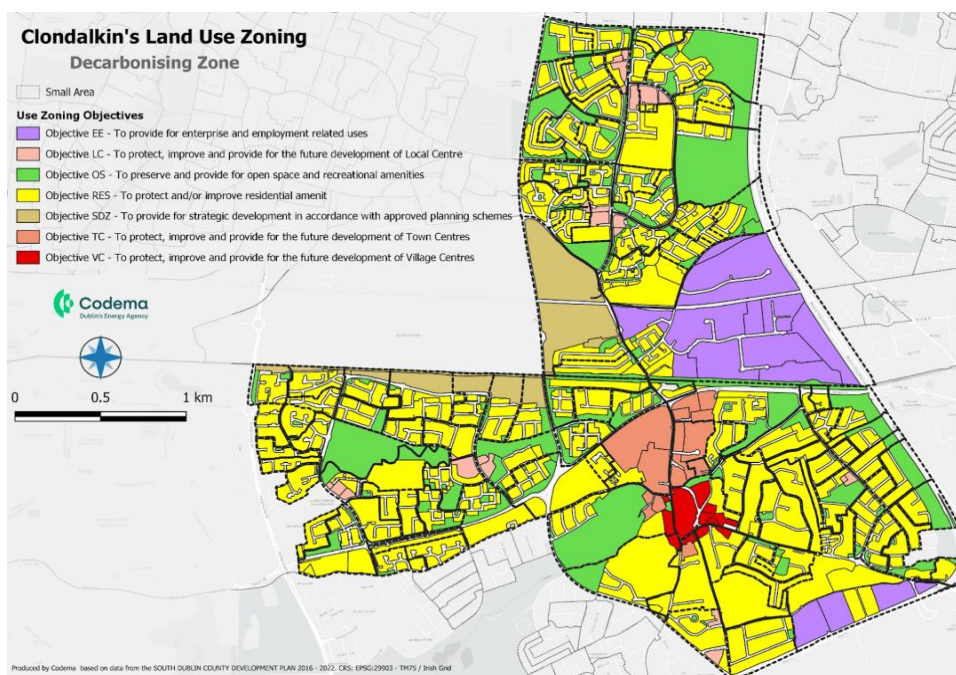


Figure 3: Land use Zoning in Clondalkin DZ

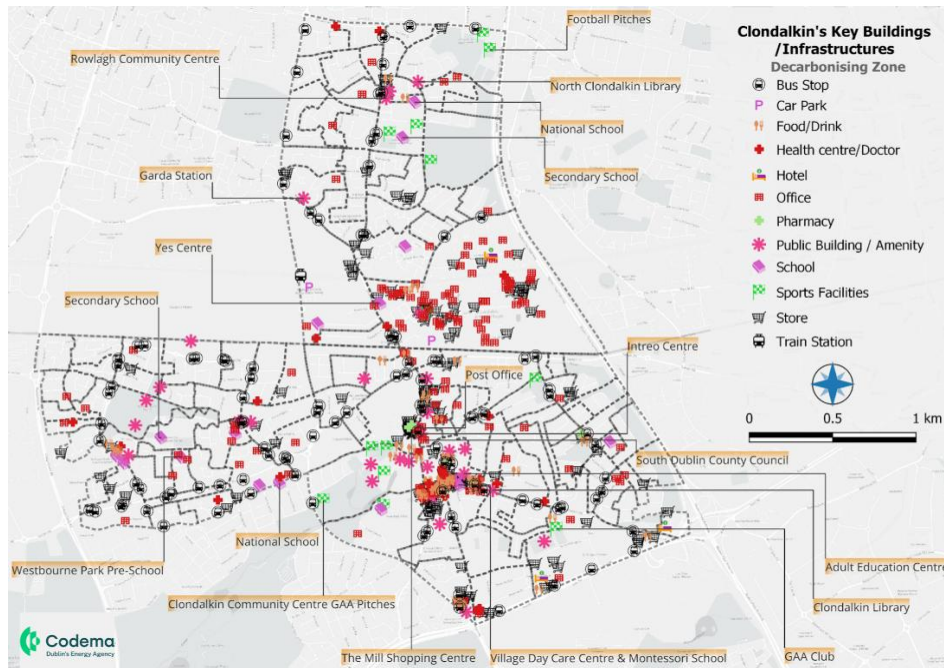


Figure 4: Amenities and public places in Clondalkin DZ

2. Community Engagement

Community engagement played a vital role in the development of the Clondalkin DZ plan and implementation strategy for two key reasons. Firstly, in addition to understanding the DZ from a technical perspective, it is also important to understand the DZ from the perspective of the community and their lived experience. Secondly, the DZ guidelines² emphasize a bottom-up approach, requiring the co-creation of climate actions with local stakeholders from the Clondalkin community.

The following section provides an overview of the engagement process and summarises the outcomes of various engagement activities conducted within the Clondalkin DZ.

2.1 The Engagement Process

A Local Engagement Plan (LEP) was produced which outlined the engagement activities scheduled for implementation in the Clondalkin DZ community from May 2024 to April 2025. A community survey and on-the-ground community engagement was conducted to support the development of the LEP and to create a plan that was tailored to the Clondalkin DZ community. A timeline of all engagement activities can be found in Figure 5 below:

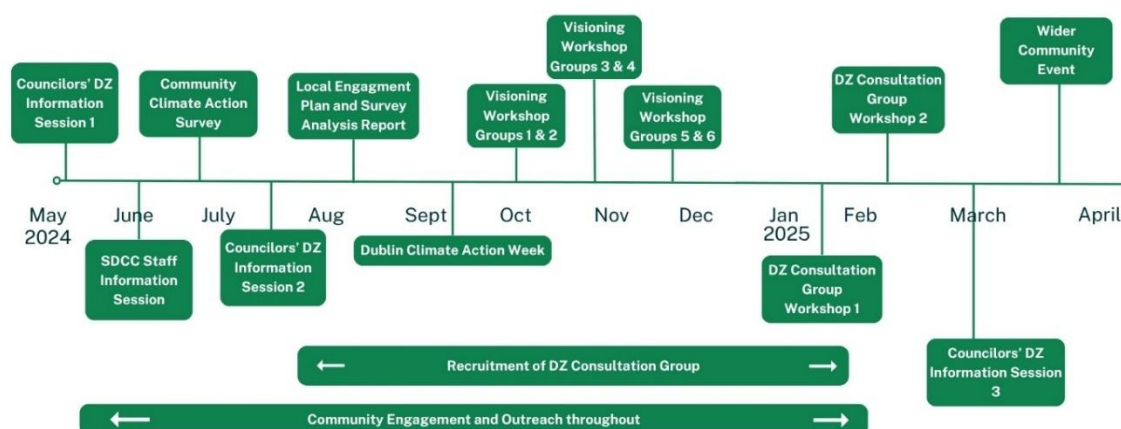


Figure 5: Engagement process timeline for the Clondalkin DZ

A breakdown of the engagement process is included below:

1. Stakeholder mapping

An initial stakeholder mapping process, supported by direct community engagement, was used to identify key groups, understand local needs, and develop tailored, proactive strategies to strengthen relationships and enhance the effectiveness of the Clondalkin DZ plan.

2. A community climate action survey

The community climate action survey ran from May 24th to July 7th 2025 and received a total of 244 responses from both online and hard-copy submissions.

3. Library information sessions and wider engagement

Library information sessions and other in-person wider engagement activities were conducted throughout the engagement period to include as many community members as possible in the process.

4. Engagement of local councillors

In total, three information sessions were held with local councillors throughout the DZ process - one in May 2024, another in July 2024 and the final session in March 2025.

5. Community visioning workshops

Six visioning workshops were held between October and December of 2024 with six individual community groups to create a representative and shared vision for the Clondalkin DZ.

6. Two Clondalkin DZ consultation group workshops

Individuals who expressed interest in continuing in the DZ process were invited to take part in further workshops to advance the co-creation of the DZ plan. The workshops took place on the January 22nd and March 5th, 2025.

7. A wider community event

A wider community event was held at the end of the DZ engagement process to showcase the work completed with community members during the workshops and to validate this information with the wider community. The total number of attendees at the event held on the 29th of March 2025, was 29 adults and 5 children.

2.2 Key insights from community engagement

Understanding barriers to action within a community is essential for designing effective and inclusive responses to climate and sustainability challenges. By identifying the specific social, infrastructural, and informational obstacles residents face, tailored climate actions that reflect real needs, build trust, and enable meaningful participation can be implemented.

The key insights are derived from discussions held during the six visioning workshops, the two DZ consultation group workshops and the final wider community event, which provide valuable qualitative context to complement the survey findings, and the initial community engagement conducted when creating the LEP. Through analysis of these additional key insights, the below five themes emerged.

- **Local amenities**

The provision of well-distributed, high-quality local amenities plays a key role in supporting decarbonisation, particularly within “15-minute town” and compact growth models. These planning approaches aim to reduce car dependency by ensuring that daily needs are accessible within a short walk or cycle from home, contributing to lower emissions and improved quality of life.

- **Green spaces and environmental wellbeing**

Green spaces are valued as essential to both physical and mental wellbeing. Corkagh Park was frequently identified as a key asset, while residents expressed the need for safer, family-friendly outdoor areas. There is also significant local interest in enhancing natural amenities like the Camac River and the canal, though concerns persist regarding safety, anti-social behaviour, and the lack of supporting infrastructure such as public bins and lighting.

- **Community connectivity, education and youth**

Many residents expressed concern that Clondalkin is losing its traditional, village-like character due to ongoing development. Stakeholders emphasised the importance of in-person engagement, improved communication of climate action resources or support services, and the creation of “third spaces” such as community cafés, parks, and libraries to foster informal interaction. Inclusive sports facilities and youth-focused initiatives were also highlighted as key to social integration and community resilience. Early environmental education for children was seen as vital to building long-term awareness and responsibility.

- **Traffic, transport and road safety**

Transport remains a major barrier to sustainable living in the Clondalkin DZ, with car dependency driven by limited public transport options and the absence of shared mobility schemes. Safety concerns were consistently raised, particularly regarding children’s travel to school. Key issues include traffic congestion, inadequate pedestrian crossings, and narrow roads. These challenges

underline the need for investment in safer walking and cycling infrastructure and more accessible, affordable public transport solutions to support a low-carbon transition.

- **Barriers to climate action**

Understanding and addressing barriers to climate action is vital to achieving an inclusive and equitable transition. In Clondalkin, community engagement revealed key obstacles such as high upfront costs for home energy upgrades, which often limit access for lower-income households despite available grants. Social housing tenants, particularly older residents, reported inadequate communication and a lack of support in understanding and using new technologies like heat pumps and smart meters. Tailored information, better outreach, and targeted supports are essential to ensure all residents can meaningfully participate.

2.3 Community vision, mission and objectives

Developing a vision, mission and objectives provides the Clondalkin community with an opportunity to share their hopes and desires for the future of their locality, discuss how they might achieve that vision and identify key areas to focus on. Additionally, as recommended by Annex D guidelines, these core elements should “not only inform stakeholder engagement but be refined by the input and contribution of the stakeholders”. As previously mentioned, an engagement plan was developed and implemented throughout the DZ to address this requirement. To ensure that the vision and mission statements and objectives fully encompass the aspirations of the Clondalkin community, they were created “in partnership with local stakeholders”, as recommended in the Annex D guidelines.

2.3.1 Clondalkin DZ vision and mission statement

The below vision and mission statements were developed through a series of facilitated exercises held over several workshops and at a wider community-based event.

Clondalkin DZ community vision
“In 2050, Clondalkin is a vibrant, connected, inclusive, resourceful community. It is a community which takes action and supports initiatives aimed towards vulnerable communities. It is full of life and nature with sufficient and accessible services for all to enjoy and thrive.”
Clondalkin DZ community mission
“We will support green energy solutions which are community-driven and initiatives that enhance local infrastructure, green spaces and services.
We will explore and support the practical implementation of these initiatives by being proactive and encouraging community members of all ages to take action.
We will focus on reliable, sustainable transport and improved, inclusive social connectivity, warm energy-efficient homes and education with the aim of encouraging and supporting sustainable living with the community.”

Table 1: Clondalkin DZ community vision and mission statements

2.3.2 Community objectives and opportunities

Although the overarching objective of the DZ is to decarbonise as soon as possible, it is crucial to identify place-specific objectives that speak to not only the unique characteristics of Clondalkin but also the lived experience of the community. As key themes emerged from community visions, conversations and discussions throughout the engagement process, 5 main objectives and 37 corresponding community actions were identified. For the purposes of the wider community event,

these actions were simplified to enhance clarity and legibility for display; however, the core intent and direction of each action was carefully preserved. A list of these objectives is available in Table 2 below.

	Objective 1: Identify opportunities to upgrade existing housing and future developments to meet energy-efficient standards.
	Objective 2: Create a self-sustaining, socially connected community, which is supported by the necessary amenities.
	Objective 3: Improve use of and access to public transport and spaces, increase shared mobility schemes and enhance safe walking and cycling infrastructure.
	Objective 4: Support enjoyment of nature and a healthy environment by prioritising, protecting and enhancing green and blue spaces.
	Objective 5: Support the local community to engage in climate action by providing education, support and resources.

Table 2: The five community objectives developed through workshops with local stakeholders

2.4 Community Actions in the DZ

Having engaged with the community SDCC set about identifying what climate actions could be delivered to assist the Clondalkin community in achieving the DZ target.

Table 3: Community Engagement Actions

Community Engagement									
DZ Plan Ref.	Opportunity	SDCC Actions	SDCC Tracking Measures	Co-Benefits	LA Role (Direct, Facilitate, Advocacy)	Timeframe	Potential Partners	Potential Community Actions	Relevant SDGs
DZ1	Deliver an awareness programme to engage communities across the DZ to increase understanding of climate change	• Deliver climate/environmental education programme in the DZ • Deliver Dublin Climate Action Week (DCAW) events in the DZ • Use targeted campaigns to increase knowledge of climate issues. • Strengthen existing networks and create new climate change links to encourage businesses to engage with climate action. • Deliver a DZ Conference in Clondalkin to highlight the projects being delivered in the area and to give communities the opportunity	• Number of events/engagements • Number of green flags awarded in the DZ annually • Number of school children reached • Yearly tracking DCAW events e.g. online engagement on DCAW website • number of events/attendees • Number of campaigns delivered annually • Number of businesses engaged in the DZ	Inclusivity, public participation	Direct	Commencement: Ongoing Duration: Until 2029	Schools, Community Groups, SEAI, local community groups, DZ consultation group, HSE, local pharmacies, national Government* (DECC, Dept of Housing, Local Government and Heritage)	• Promote green jobs among young people in the community • Collaborate with SDCC on community climate action initiatives • Share information on grant assistance available to people over 60	SDG 4: Quality Education SDG 13: Climate Action SDG 17: Partnership for Goals

Clondalkin Decarbonising Zone

		to engage in the delivery of climate actions.							
DZ2	Identify opportunities to utilise libraries in Clondalkin as climate hubs.	• Monitor and develop the Home Energy Savings Kit scheme in SDCC libraries, including developing a youth friendly version, with a potential rollout in schools. • Engage with communities and residents across the DZ, through local pop-up awareness raising events, on home energy upgrades, funding and other supports available.	• Number of kits in SDCC libraries • Borrowing rates • Schools kit developed • % of schools with HESKs in the DZ • Number of community groups engaged in the DZ	Inclusivity, public participation	Direct	Commencement: Ongoing Duration: Until 2029	Codema	N/A	SDG 3: Good Health and Well-being SDG 7: Affordable and Clean Energy SDG 9: Industry, Innovation and Infrastructure SDG 11: Sustainable Cities and Communities SDG 12: Responsible Consumption and Production SDG 13: Climate Action SDG 17: Partnership for Goals
DZ3	Engage with external organisations to support the delivery of their climate projects/programmes	• Engage with the Sustainable Energy Authority of Ireland's (SEAI) local mentor to encourage community participation in the Sustainable Energy Communities Programme • Work with local clubs to implement GAA Green Clubs	• Number of SECs participating •Number of engagements/on-going communication with potential SECs • Number of clubs participating; SDCC Lead in place • % increase of participating clubs in the Clondalkin DZ	Inclusivity, public participation	Direct, Facilitate	Commencement: Ongoing Duration: Until 2029	SEAI, SECs	N/A	SDG 13: Climate Action SDG 17: Partnership for Goals
DZ4	Deliver the Community Climate Action Programme.	• Engage and activate a wide cohort of eligible organisations across the DZ to apply for the CCAP	• No. of groups engaged in the DZ	Scope 1,2,4 emissions, Energy security.	Direct	Commencement: Ongoing Duration: Until 2029	Department of Climate, Energy & Environment;	•Encourage participation by your local community	SDG 13: Climate Action SDG 17:

Clondalkin Decarbonising Zone

		• Oversee the delivery of all projects ensuring Programme compliance and maximise fund impact. • Use the programme to promote projects local climate action • Examine additional climate funding opportunities for community organisations within the DZ	• Total amount spent on local community climate change projects in the DZ	Local food production, Biodiversity enhancement Circular economy enhancement Public participation Climate literacy			Community organisations in DZ	organisations and share information on the grant assistance available • Secure funding to deliver community climate action initiatives	Partnership for Goals	
DZ5	Identify key opportunities to engage with communities throughout the county, working with the Climate Action Team.	• Support Tidy Towns initiatives which promote climate mitigation or adaptation measures. • Work in collaboration with artists, and in partnership with the SDCC Climate Action Team, to develop creative art initiatives that engage the population of the county in conversations about climate action.	• Number of initiatives supported annually; • Total number of community projects supported • Total cost of investment in community projects;	Inclusivity, public participation	Direct, Facilitate	Commencement: Ongoing Duration: Until 2029	Community groups, SECs, Artists, SDCC Climate Action Team	• Community can collaborate with SDCC to identify opportunities for improved use of public spaces.	SDG 13: Climate Action SDG 17: Partnership for Goals	

3. Delivering Evidence based Climate Action in the Clondalkin DZ

This section outlines the approach to delivering evidence-based climate action in the Clondalkin DZ with the overarching objective of achieving a 51% reduction in greenhouse gas emissions by 2030, using 2018 as the baseline year.



A Baseline Emissions Inventory (BEI) was carried out to determine the sources of greenhouse gas emissions within the Clondalkin DZ and to identify the sectors contributing most to overall emissions.

The BEI provides a snapshot of current greenhouse gas (GHG) emissions in the area. It examines emissions from homes, transport, commercial and public activities, industry, electricity use, and waste management. The BEI identified total emissions of 109,875 tCO₂e in 2018 and provides a foundation for tracking progress and informing targets interventions. Using this baseline data (Figure 6), it's possible to see where the biggest carbon savings can be made.

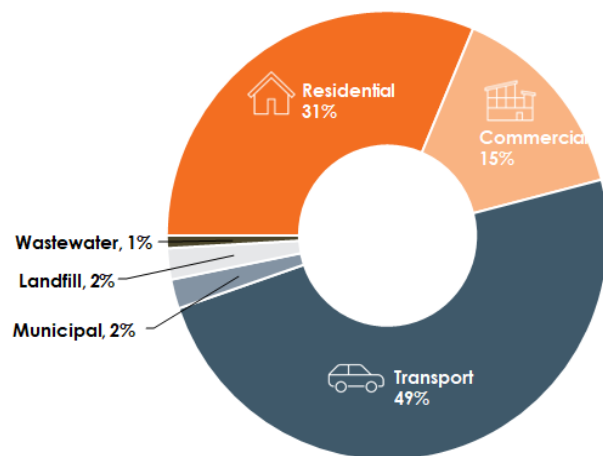


Figure 7: Baseline emissions inventory for the Clondalkin Decarbonising Zone

Figure 6: Implementing Climate Action in the Clondalkin DZ

Building on this baseline, the report introduces climate pathways, which set out a range of feasible and impactful measures to reduce emissions across the DZ. These pathways consider the deployment of low-carbon technologies, renewable energy systems, and spatial planning solutions to support a transition to more sustainable energy use. From this analysis several key interventions were identified, in strategic areas Residential, Commercial, Transport and Local Authority.

Collectively, the identified interventions have the potential to deliver a substantial share of the required emissions reductions, contributing approximately 40,451 tCO₂e (36.83%) towards the overall target of 56,036 tCO₂e. This relationship between the baseline emissions, required reductions, and expected impact of priority actions is illustrated in Figures 7 - 10 below.

Following the completion of the Baseline Emissions Inventory (BEI) and the identification of climate pathways, we can then outline the **Opportunities for Climate Action in Clondalkin**.

3.1 Key interventions

Key interventions across the four strategic sectors—Residential, Commercial, Transport, and Local Authority—are essential to achieving the DZ targets. Figures 7 – 10 outline the potential impact of delivering these interventions. Calculations are based on a range of assumptions and benchmark data (see appendices for details).

The most impactful interventions are outside the scope of SDCC, so lead stakeholders and delivery partners have been identified for each to outline implementation pathways.

Collectively, the identified measures are expected to reduce emissions within the DZ by 36.83% (40,451 tCO₂e), moving significantly toward the overall target of a 51% reduction. The remaining emissions reductions required to reach the 51% target will be achieved through grid decarbonisation and additional actions addressing Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs).

As many of the solutions required to reduce emissions are technology-based with a high relative cost for stakeholders, estimated potential levels of investment could be in the region of €599 million. These estimates, which include cost and carbon-reduction potential, are based on a series of assumptions and benchmarks, with details provided in the appendices. For each action a lead stakeholder and delivery partners have been identified to demonstrate how implementation could be delivered.

However, while these interventions are critical for meeting the DZ targets, they should not be seen as a substitute for energy efficiency and energy sufficiency measures. Reducing overall energy and fuel demand across all four sectors remains fundamental.

Further information on the calculations, assumptions, and benchmarks can be found in Appendix 3.

4. Opportunities for Climate Action in the DZ and Implementation

A diverse mix of actions will be required to deliver the vision for the Clondalkin DZ and to achieve the 51% emissions-reduction target by 2030. This is a dynamic plan that will evolve over time as new opportunities emerge. Actions span multiple sectors and involve scientific analysis, project delivery, community engagement, and strong governance structures to support the systemic change needed for a thriving, climate-friendly Clondalkin.

4.1 Energy in the DZ

Residential and commercial energy use in the Clondalkin Decarbonising Zone is a major driver of emissions, with heating, electricity demand, and building performance representing key opportunities for targeted reductions. Gaining insight into existing energy demand and the location where emissions are generated, will help inform and prioritise effective energy and emission reduction measures. The baseline also serves as a critical reference point for assessing the impact of future actions and interventions.

4.1.1 Residential emissions and profile

An estimated 10,935 households are located in the DZ area. The total residential emissions baseline amounts to approximately 34,400tCO₂e, accounting for 31% of all emissions in the DZ.

The following maps (Figure 11 - 14) which display residential emissions, Building Energy Ratings (BERs) and heating systems helps us to understand the type of homes and heating systems in the Clondalkin DZ and where home energy upgrades or retrofits can have the greatest impact on emissions and air quality. They also highlight the scale and nature of the work required to improve the energy performance of the residential building stock.

The maps look at 'small areas' within the DZ. A 'small area' is the smallest geographical breakdown used in Ireland for statistical purposes, and each small area includes between 80 to 120 buildings. Figure 12 below shows the spatial breakdown of residential emissions in the DZ per small area, highlighting the areas of highest, and lowest emissions, from the residential sector. Darker colours indicate areas where home energy upgrades could deliver the most significant reductions.

Figure 13 below shows the average Building Energy Rating (BER) of the houses in each small area in the Clondalkin DZ. The BERs are largely in the mid to lower ranges with C3, D1, D2 ratings reflecting the ageing building stock in this area, and highlighting the considerable work required to meet the national aims of improving the BER of our building stock. A Building Energy Rating (BER) certificate rates a home's energy performance on a scale between A and G. A-rated homes are the most energy efficient, while G-rated homes are the least energy efficient.

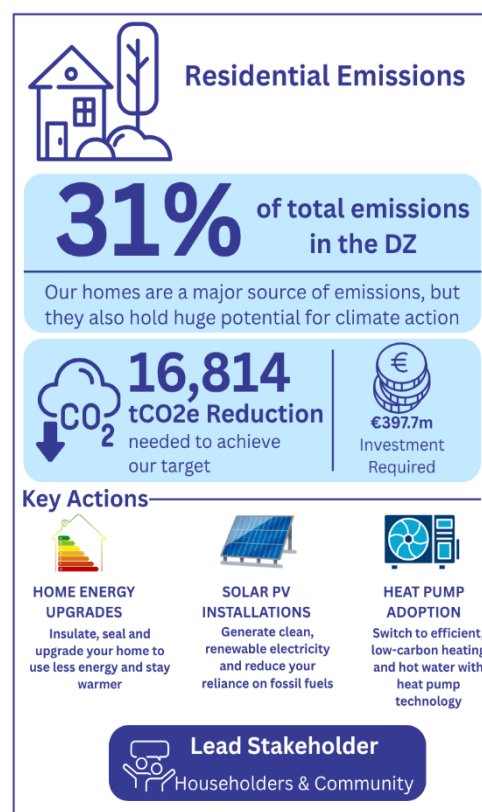


Figure 8: High impact residential interventions in the DZ

Figure 14 below shows the areas where the primary heating fuels – gas, oil, and electricity are used in the Decarbonising Zone. Natural gas is the main fuel source for residential heating (75%), followed by oil (12%) and electricity (9%). Other fuels include coal, wood, peat, and Liquefied Petroleum Gas (LPG).



Figure 9: Overall climate pathway to 2030 rounded to the nearest 10tCO₂e (excluding emissions from waste)

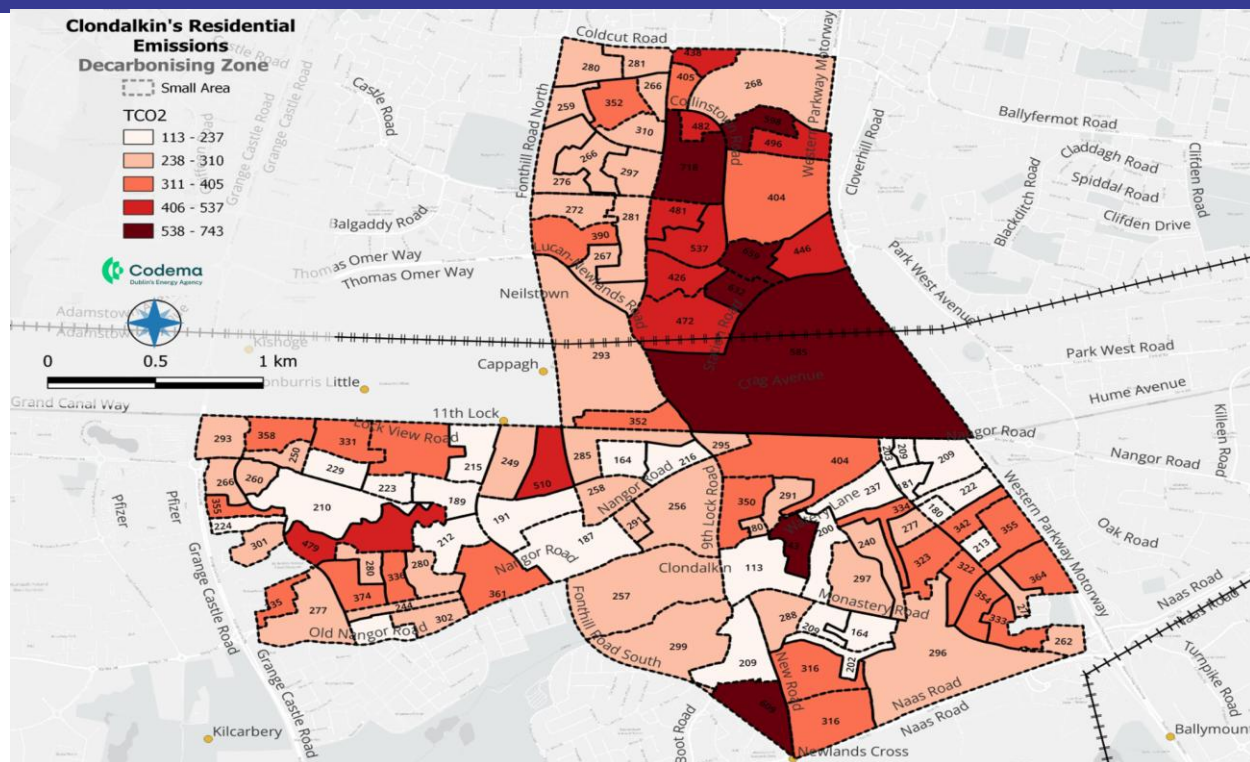


Figure 10: Residential emissions in Clondalkin DZ

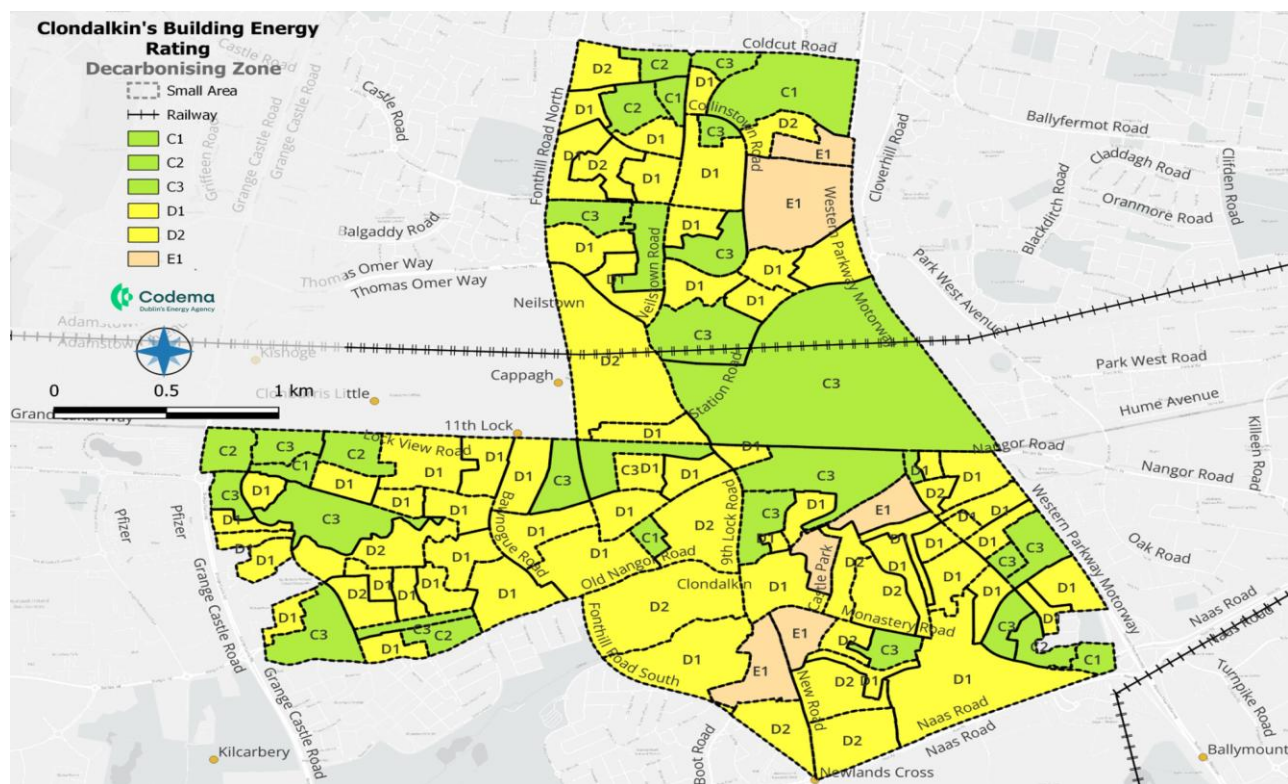


Figure 11: Clondalkin DZ median Building Energy Ratings

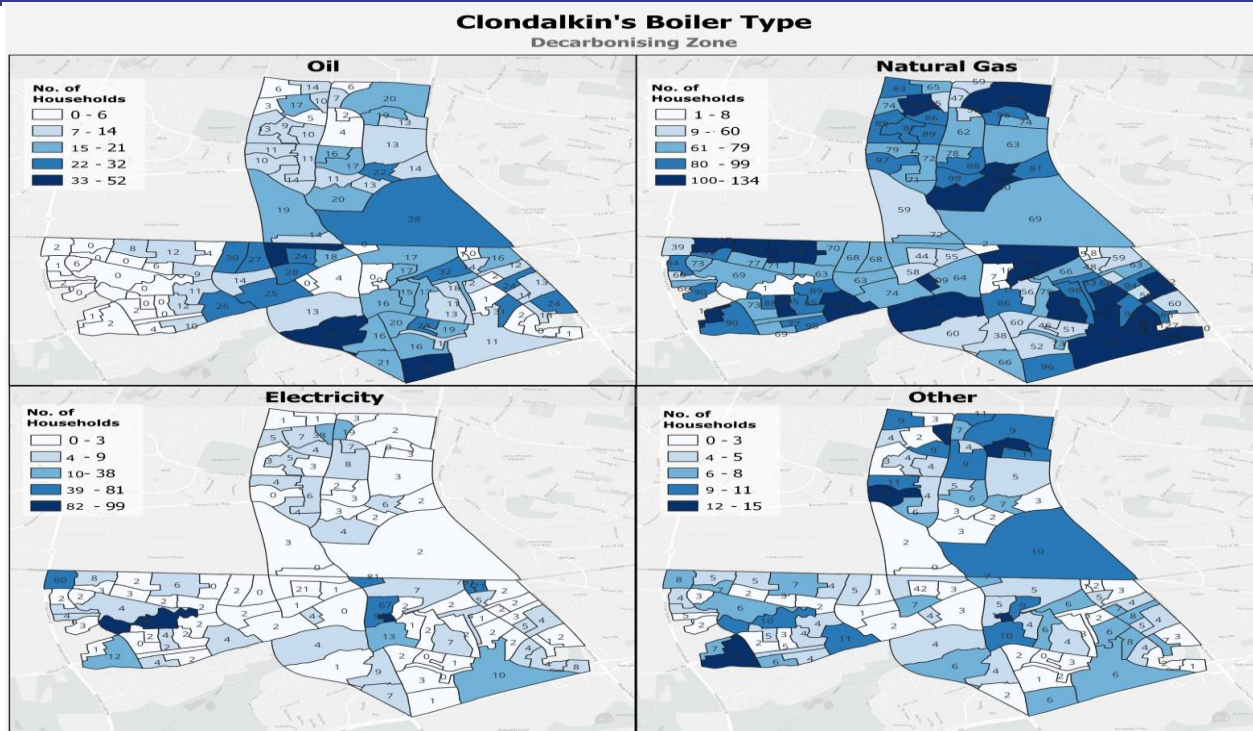


Figure 12: Clondalkin DZ boiler types

4.1.2 Residential Climate Pathways to 2030

A potential emissions pathway for the residential sector of the Clondalkin DZ is presented below in Figure 15. Emission reduction measures are presented in green and are ranked in terms of cost-effectiveness from left to right.

These measures are:

- 1) electricity supply.
- 2) installation of solar photovoltaics (PV) on residential rooftops.
- 3) home energy upgrades.

A 5% increase in emissions is expected in a 'Business As Usual' (BAU) scenario, which is based on population and economic growth scenarios developed in Codema's Dublin Regional Energy Master Plan (DREM) and drawn from the Economic and Social Research Institute (ESRI) sources. This scenario does not account for future planned development and considers population and economic growth exclusively.

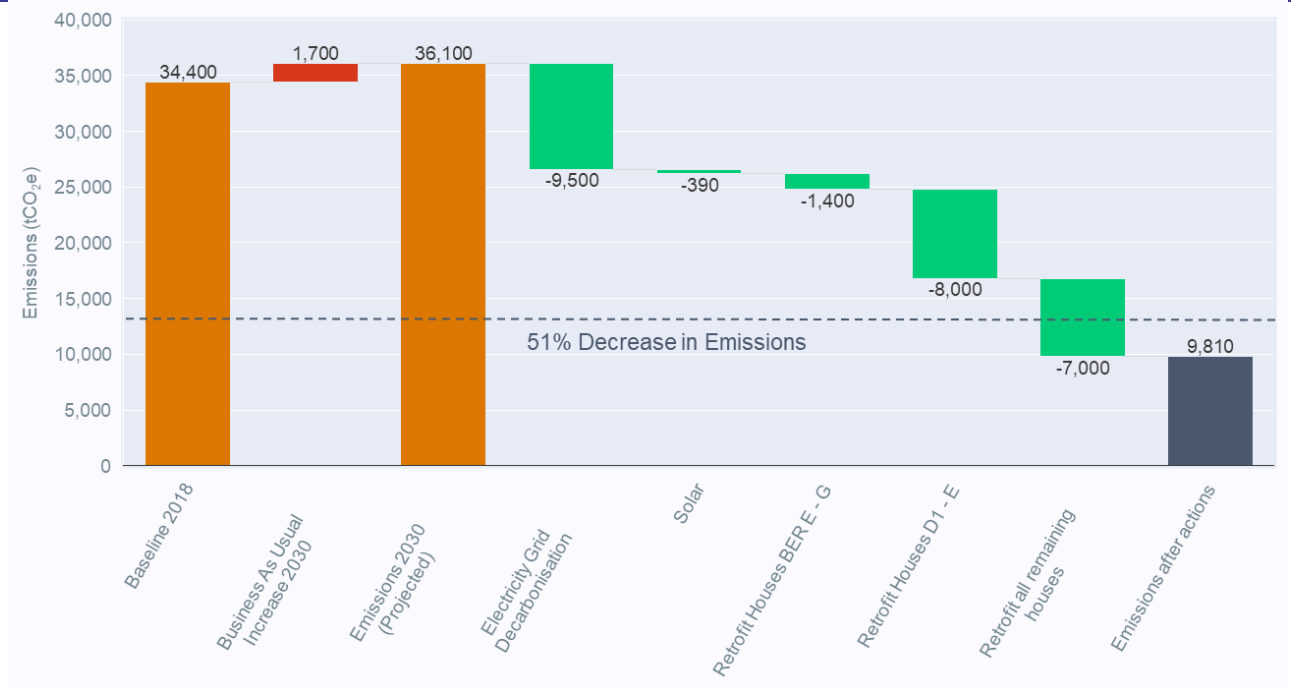


Figure 13: Residential climate pathway to 2030

- Electricity Supply

Electricity grid decarbonisation means using cleaner sources such as wind and solar to generate electricity to power our homes and businesses. Future electricity grid decarbonisation will reduce emissions by 28% (9,500 tCO₂e) in the Clondalkin DZ (based on the SEAI's projections from the Gap-to-Target Model). This leaves an additional 9,700 tCO₂e for the public sector and private households to tackle, in order to reach the target of 51% GHG emissions reduction by 2030.

- Solar PV and home energy upgrades

Installation of solar photovoltaic (PV) panels on residential rooftops and energy upgrades of 10,935 homes to a B2 BER standard could potentially reduce annual emissions in the DZ.

Retrofitting all 10,935 homes to a B2 standard will result in a 14.96% (16,429tCO₂e) reduction in emissions in the DZ. Home energy upgrades measures may involve the installation of, attic and wall insulation, ventilation and airtightness measures.

- Rooftop solar PV panels: According to the Dublin Regional Energy Masterplan approximately 10% of all roof space (commercial, residential etc.) is suitable for solar PV. This means 1,094 solar photovoltaic installations at 4kWp (which is recommended for urban dwellings) has the potential to reduce emissions by 0.36% of the baseline.
- Data shows that approximately 5,460 homes in the DZ have a Building Energy Rating (BER) between D1 and G. If all these homes were upgraded to a B2 BER standard, it would result in an estimated 8.56% reduction in the total emissions baseline.
- Home energy upgrades on the remaining 5,479 homes with BER ratings between C1 and D1 offer potential to reduce emissions a further 6.38% in the total emissions baseline.
- 2,352 social housing units were identified to be located within the DZ. Six per cent (149) of the total social housing stock has been retrofitted thus far, representing a reduction in 296tCO₂e per annum.

4.2 Commercial emissions and profile

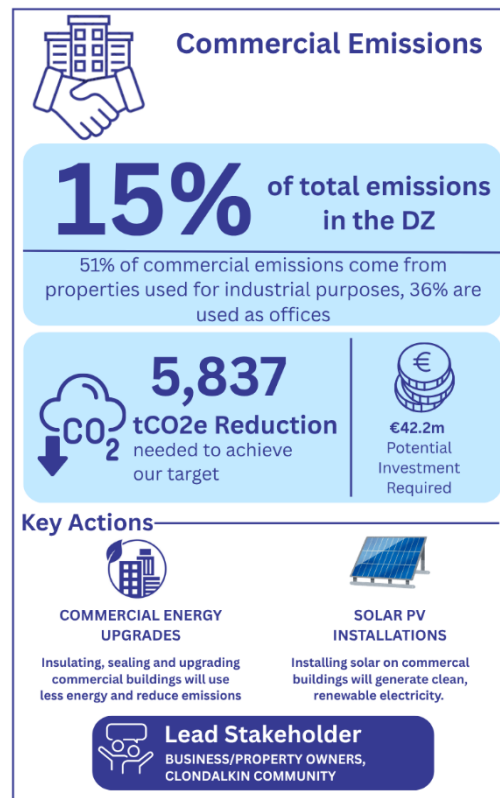


Figure 14: High impact commercial interventions in the DZ

Four hundred and fifteen commercial properties were identified to be operating within the DZ (two buildings fall under the Emissions Trading Scheme (ETS) and have not been considered as a part of this analysis as they would be reporting on their emissions separately with the Environmental Protection Agency). Of these commercial properties, over half (~51%) are used for industrial purposes, and over a third (~36%) are used as offices. The rest of the properties consist of health centres, hospitality, leisure, retail and miscellaneous uses.

Commercial Property Type	%
Fuel / Depot	0.2%
Health	1.0%
Hospitality	2.4%
Industrial Uses	51.6%
Leisure	1.5%
Miscellaneous	3.4%
Office	36.1%
Retail (Shops)	3.9%

Table 4: Percentage of commercial property types in Clondalkin DZ

The total emissions from the commercial sector amounts to approximately 16,100tCO₂e. This includes small, medium and large businesses, from high-street retail shops and supermarkets to office buildings and industrial activities. It also includes public sector buildings.

Figure 17 shows where emissions from the commercial sector arise within the DZ. Understanding the areas of highest and lowest emissions helps us identify where future emission reduction and renewable energy projects can have the greatest impact within this sector.

Small areas with a high concentration of emissions in Figure 17 correlate directly with the density of commercial properties in the region. This is highlighted by the concentration of emissions arising from Clondalkin industrial estate to the east of the DZ. Notable commercial properties that are high emitters include hotels and industrial areas within the zone.

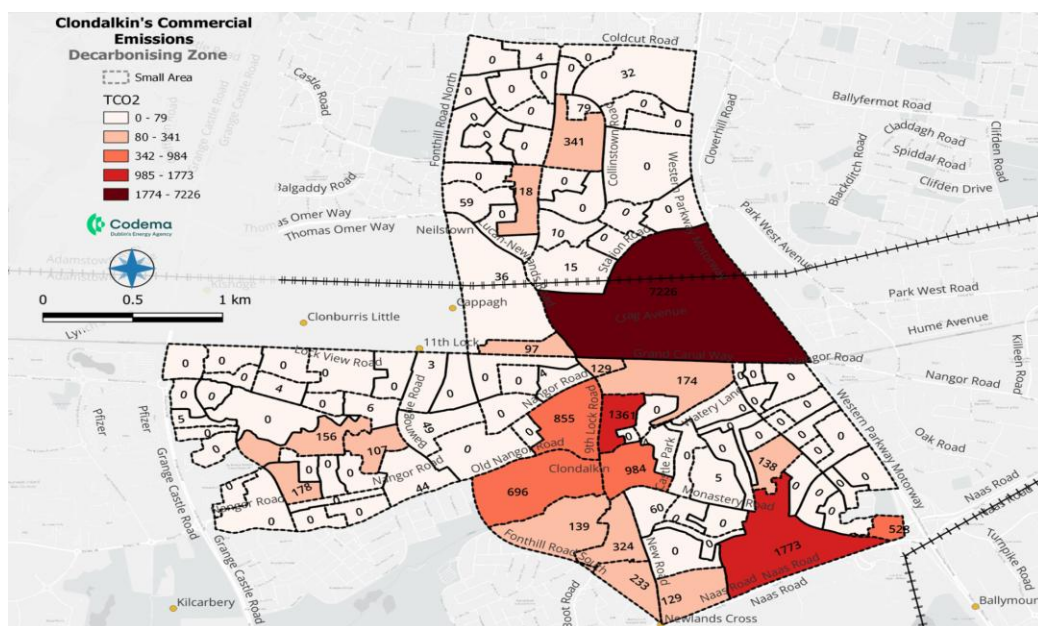


Figure 15: Clondalkin DZ commercial emissions

4.2.1 Commercial and public sector climate pathway to 2030

A potential emissions pathway for commercial emissions within the DZ is presented in Figure 17.

below. The measures are presented in order of cost per tonne of CO₂ saved, meaning the measures on the left of the chart are estimated to provide more value for money. The commercial sector refers to commercial buildings and public buildings (local authorities and all other public sector bodies). It is anticipated that an increase in annual emissions from the DZs commercial sector of 790tCO₂e will arise by 2030. This reflects a greater demand due to increase in commercial services for an increased population.

The demand of all commercial properties existing within the DZ based on valuation office data was calculated by multiplying the floor areas of the properties by typical benchmarks based on the type of buildings.

The main areas for reducing emissions in the commercial sector are: 1) electricity supply and 2) the decarbonisation of heat.

- Electricity Supply

Similar to the residential sector, the decarbonisation of the electricity grid will contribute 5,800tCO₂e towards the 51% reduction in the commercial sector.

- Decarbonisation of heat

In the commercial and public sector, completion of a selection of the following projects could allow the DZ to meet its targets:

- As with the residential sector the DREM calculated that approximately 10% of commercial buildings with available roof space are suitable for solar. Using an assumed capacity of 0.2 kWp per m², this equates to an approximate 0.18% (196 tCO₂e) reduction in the total emissions baseline.
- Decarbonising the heat consumption of the top 11 commercial users, which include a recycling facility, two hotels, three warehouses, a gymnasium, a centre for asylum seekers, a department store and two supermarkets could deliver a 2.55% reduction in the total emissions baseline. This calculation assumes the installation of heat pumps and fabric upgrades to improve energy efficiency.
- Reduce the remaining 80% of commercial heat consumption by focusing on other major commercial users. This includes 9 retail buildings, 47 industrial sites, 7 hospitality venues, 8 office buildings, 3 healthcare facilities, 2 leisure centres, and 3 miscellaneous properties. Together, these account for an estimated 2.55% reduction in the total emissions baseline.
- Implement lighting upgrades within the top 80% of commercial users, delivering an estimated 0.09% of total emissions baseline.
- Decarbonising priority SDCC buildings within the zone through the DeliverEE project is expected to deliver a 0.49% (545 tCO₂e) reduction in total emissions baseline.
- Street lighting upgrades, based on 2023 public lighting data will deliver a 0.05% (50 tCO₂e) reduction in total emissions baseline).

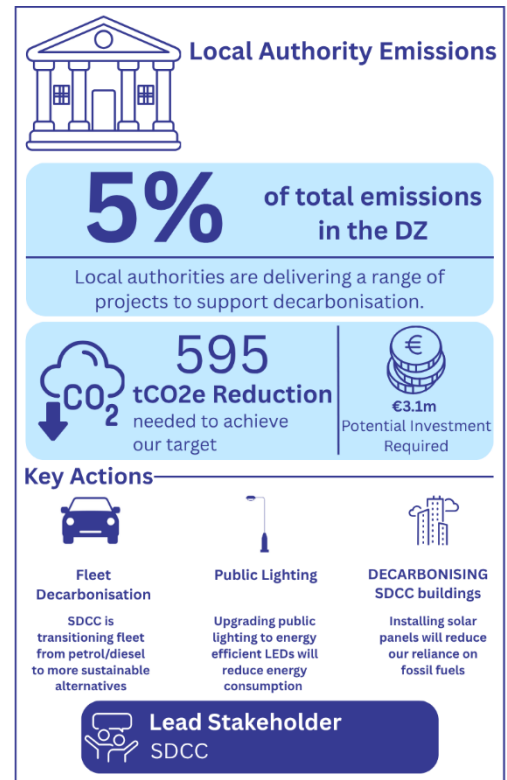


Figure 16: High impact local authority interventions in the DZ



Figure 17: Commercial and public sector climate pathway to 2030

4.2.2 Spatial energy planning and climate pathways

Having looked at climate pathways for each sector, spatial energy planning can help inform how to prioritise projects and crucially, where to place them. This section includes a sample of climate action measures, presented spatially, to support the pathways identified above. Spatial energy planning, in the context of climate action, is a strategic approach to managing land use and development. Essentially, it means looking at the area and deciding ‘what goes where’ to reach the goal of a 51% reduction in emissions by 2030, while minimising environmental impact and ensuring we have the required infrastructure in place to serve both new and existing developments with low-carbon and low-cost technologies to promote a more sustainable future for Clondalkin.

Where could solar PV be installed?

An initial analysis in Figure 18 highlights the potential rooftop solar electricity opportunity in the Clondalkin DZ, showing that, at a high level, many buildings have the potential to consider solar panels for electricity. This map is an initial indicator of the potential of solar panels, estimated using land classifications from the European Environment Agency Urban Atlas⁶. Further building-specific consideration is needed to determine the true potential for solar panels. Additional factors for consideration include shading, roof pitch and access.

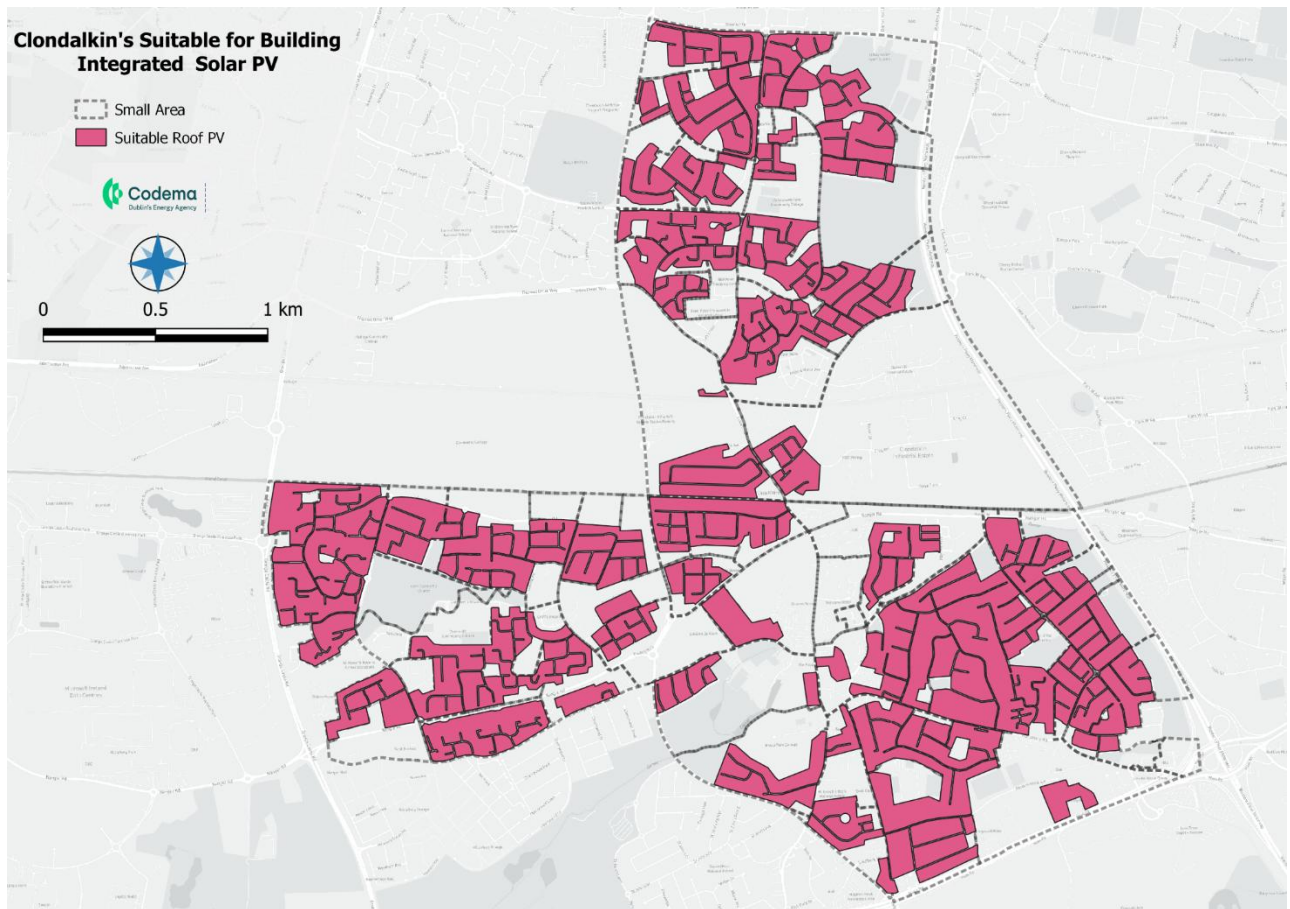


Figure 18: Potential rooftop solar electricity opportunity in Clondalkin DZ

Figure 18 illustrates the areas with potential for residential solar only. It considers the land classification of 'residential' in the DZ and can be considered an overestimation of the true area of residential roof space. It is estimated that 10% of all roof space (commercial, residential etc.) is suitable for solar PV.

Where could heat pumps be installed?

A heat pump provides heat to a building by capturing heat from outside and moving it inside. It uses electricity to do this; however, the quantity of heat delivered into your home is about three times greater than the quantity of electricity used to power the system. Heat pumps are recognised as an important way to increase renewable energy in heating. About 1,700 homes in the Clondalkin DZ may be suitable for heat pumps without further insulation and energy efficiency measures. The remaining 9,200 homes are likely to require further insulation and energy efficiency measures before they are suitable for heat pump installations. Figure 19 below shows the percentage of houses potentially suitable for heat pumps in each small area - the darker colours on the map help to show the areas where greater numbers of suitable houses are located.

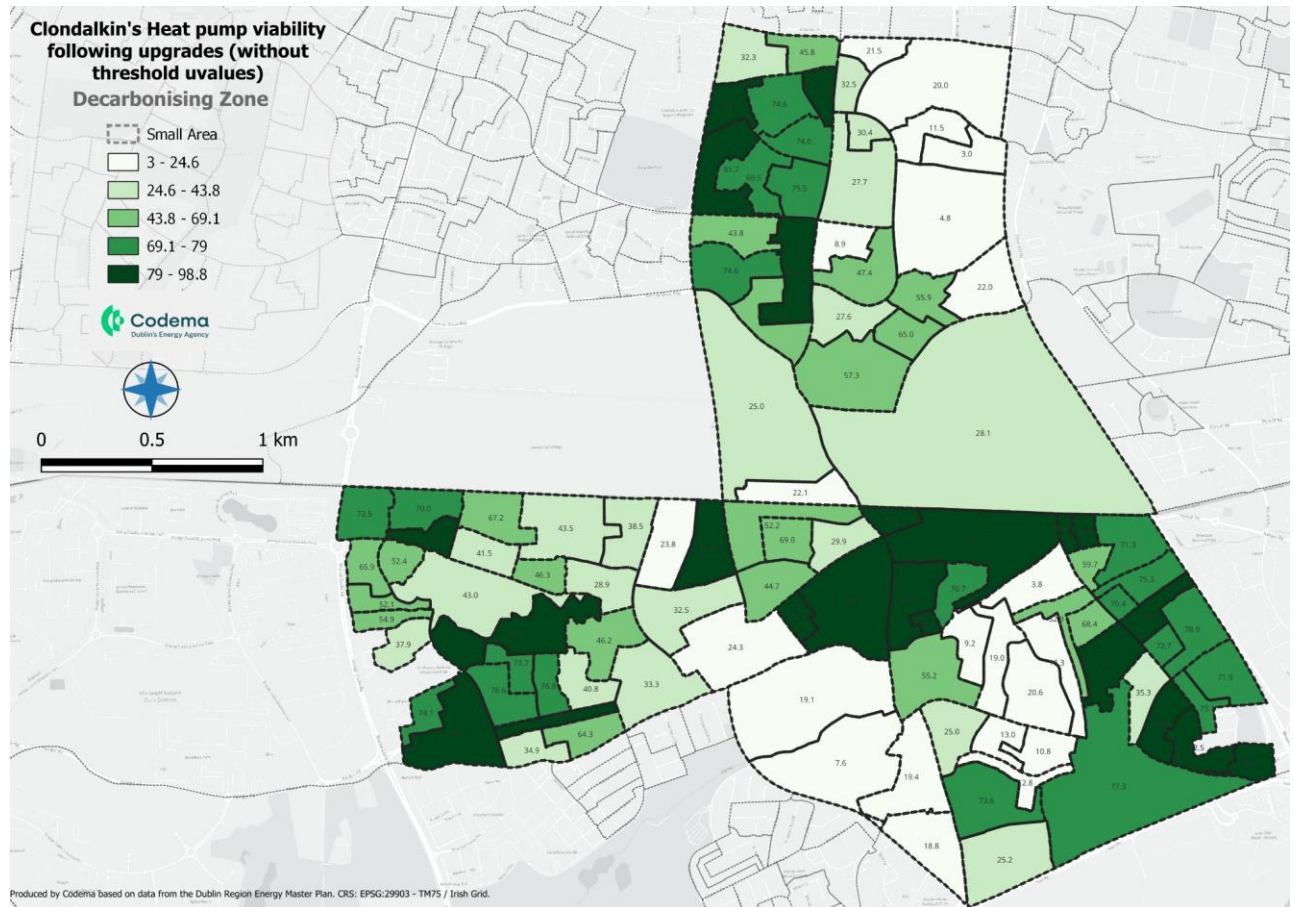


Figure 19: Heat pump suitability potential in Clondalkin DZ

Table 5: DZ Plan Action list: Energy & Buildings

Energy & Buildings									
DZ Plan Ref.	Opportunity	SDCC Actions	SDCC Tracking Measures	Metrics (tCO ₂ e/annum saved)	Potential Benefits	LA Role (Direct, Facilitate, Advocacy)	Potential Partners	Potential Community Actions	Relevant SDGs
DZ6	Upgrade residential housing stock within the DZ.	•SDCC to deliver building energy performance upgrades of Council housing stock in the DZ. • Progress the EnergyCloud pilot and continue to identify opportunities to expand EnergyCloud across social housing in the DZ.	• Number of homes retrofitted to a B2 BER standard through insulation upgrades and the installation of heat pumps; • % of social housing stock in the DZ upgraded • The median BER distribution across the DZ • Main fuel source for residential heating the DZ 2024 v 2029	Home energy upgrades could reduce emissions by 11,818 tCO ₂ e Installation of Solar PV on 10% of residential housing stock could reduce emissions by 385 tCO ₂ e/annum saved	Clean air, energy poverty, health, employment, energy security	Direct, Facilitate, Advocacy	Codema, CARO, Contractor s, Resident orgs, SEAI, SECs and mentors, Friends of the Earth (FoE), Residential Tenancy Board (RTB), The Housing Agency, HSE, community centres, local community groups	• Improve affordability and accessibility of retrofit schemes by participating in group buying scheme • Encourage landlords to improve energy efficiency of rental properties • Engage with, promote and share impartial information and advice on energy-efficient technology like heat pumps with other citizens	SDG 7: Affordable and Clean Energy SDG 9: Industry, Innovation and Infrastructure SDG11: Sustainable Cities and Communities
		• Work with local Mentor to explore the potential for an SEC to be set up within the DZ.	SEC Established						
		• Explore potential for a Demonstration House, to allow residents view a home that has been retrofitted. For guided tours and education purposes.	Demonstration house delivered						
		• Develop a programme to encourage private homeowners and landlords of the benefits of availing of SEAI funding for retrofits including heat pump installations, PV installations and battery storage installations.	• Number of engagement events; - Number of households engaged;						
		• Use the tenant energy awareness toolkit to provide climate / energy awareness and training for the operation of the new energy systems installed.	• Number of engagement events; • Number of households engaged; • Report the number of users of the energy saving toolkit.						

Clondalkin Decarbonising Zone

		Explore opportunities to work with Obligated Parties in the DZ in the delivery of energy initiatives.							
DZ7	Upgrade LA buildings (including Depots) within the DZ to make them as energy efficient as possible.	- Install solar PV on suitable SDCC owned buildings, focusing on community centres and libraries - Progress energy efficiency works, including retrofits, in council-owned and operated buildings - ISO50001 Certification and BMS achieved for SDCC-owned buildings within the DZ. - Progress Energy Performance Contracts (EPC) for SDCC-owned buildings in the DZ - Develop the sensitive retrofit of historic/protected structures across Clondalkin with the aim of improving energy efficiency and building climate resilience. - Investigate opportunities to install solar panels at Depots (roofs / solar car port etc), with the aim of supplying renewable energy.)	- Number of LA buildings retrofitted/fitted with Solar PVs - Number of solar PV panels installed (Total kWp installed; - Energy consumption for each SEU. - ISO Certification achieved - Measurement of energy saved on buildings awarded EPC - Number of buildings with solar PV installed;	Decarbonisation of SDCC buildings in the DZ could reduce emissions by 545 tCO ₂ e	Clean air, energy poverty, health, employment, energy security	Direct	Codema, Contractors	N/A	SDG 7: Affordable and Clean Energy SDG 9: Industry, Innovation and infrastructure SDG11: Sustainable Cities and Communities SDG 13: Climate Action
DZ8	Upgrade private commercial buildings within the DZ.	- Develop a programme to inform the commercial sector in the DZ of the benefits of upgrading the energy performance of buildings e.g. heat pumps, solar PV electricity generation, highlight grants available and payback periods. - Explore opportunities for engagement with commercial sector - improving efficiency of building energy management systems. - Deliver Climate Innovation Programme to engage with businesses in the DZ	- Number of large emitters identified; - Number of large emitters successfully engaged; - Emission reductions from large emitters; - Programme delivered - Number of businesses attended	Commercial buildings energy upgrades could reduce emissions by 5,641 tCO ₂ e/annum saved Installation of Solar PV suitable buildings in the DZ could reduce emissions by 196	Clean air, energy poverty, health, employment, energy security	Facilitate, Advocacy	SDCC LEO, Chamber of Commerce, DZ consultation group, Codema, SEAI, EirGrid, local businesses	Assist SDCC in identifying the biggest current carbon emitters.	SDG 7: Affordable and Clean Energy SDG 9: Industry, Innovation and infrastructure SDG11: Sustainable Cities and Communities SDG 12: Responsible Consumption and Production SDG 13: Climate Action

Clondalkin Decarbonising Zone

				tCO2e/annum saved Lighting: 114 tCO2e/annum saved					
DZ9	Upgrade street lighting within the boundaries of the Clondalkin DZ, mainly including SOX and SON lights.	Complete the Public Lighting SOX and SON Upgrade Programme, for the replacement of all SOX (low-pressure sodium lamps) with energy-efficient LEDs.	% of LED lights in total stock	Street Lighting Upgrades could reduce emissions by 50 tCO2e/annum saved	Clean air, energy poverty, health, employment, energy security	Direct	N/A	N/A	SDG 7: Affordable and Clean Energy SDG 9: Industry, Innovation and Infrastructure SDG11: Sustainable Cities and Communities SDG 12: Responsible Consumption and Production SDG 13: Climate Action
DZ10	Decarbonise , where feasible, plant and hand-held tools deployed by SDCC within the DZ.	- Identify which plant are feasible for decarbonisation. - Identify which hand-held tools are feasible for decarbonisation.	% or number of plant decarbonised. % or number of hand-held tools decarbonised.	This action mitigates Scope 3 emissions for SDCC; a factor yet to be considered in the emissions inventory. More data is required.	Co-Benefits : Clean air, energy poverty, health, employment, energy security	Direct	IGBC	N/A	SDG 11: Sustainable Cities and Communities SDG 13: Climate Action

4.3 Transport in the DZ

4.3.1 Transport emissions and profile

In the Clondalkin DZ, approximately 97% of transport-related emissions are generated by road trips and 3% from rail transport. Figure 20 shows the ways that people within the DZ travel to work, school or college and Figure 21 highlights the roads in the DZ with the highest associated emissions. These figures illustrate data from the 2016 census and emissions from the National Transport Authority model respectively. Figure 20 indicates a significant opportunity to reduce car dependency, as nearly half of all trips within the DZ were made by car. This evidence can help inform the development of more sustainable travel options for the zone.

Below is a modal share breakdown of the proportion of each type of journey for commuters within the DZ. This shows that the majority of trips within the DZ are by private vehicle (49.7% trips), followed by on foot journeys (18.9%) and by bus traffic such as Dublin Bus, coaches or minibuses (15.2%). Travel using the train, DART or LUAS accounts for 2.6% of journeys.

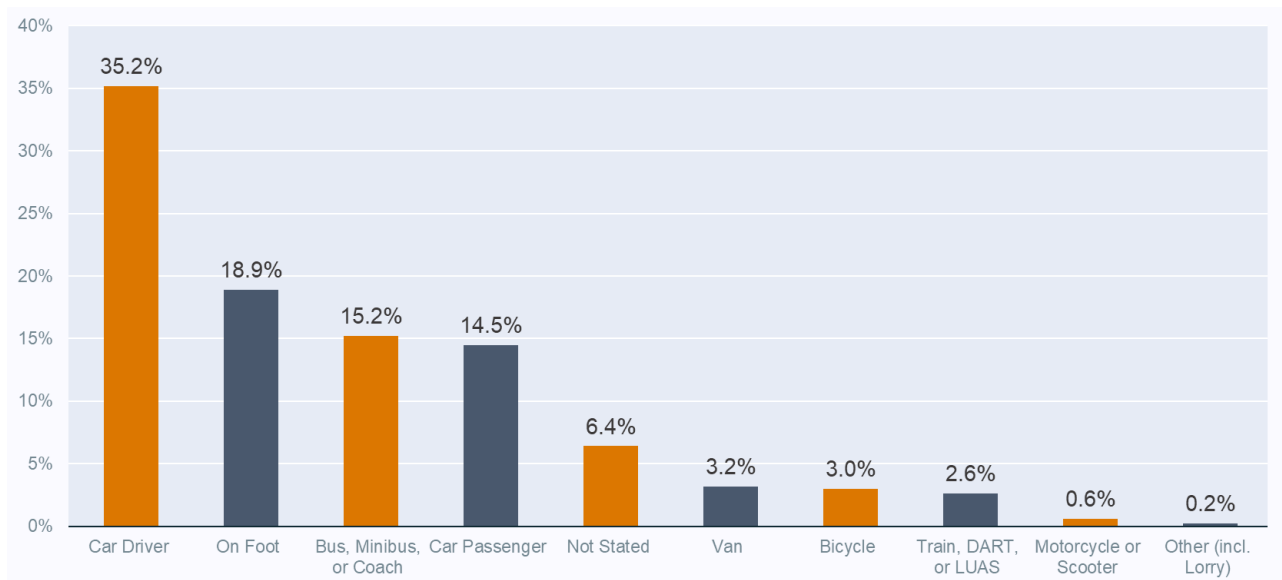


Figure 20: Clondalkin DZ transport mode breakdown

As data sources for the modal share breakdown were based on overall kilometres travelled within the entire South Dublin area, to calculate the proportion of distance travelled yearly by each vehicle type within the Clondalkin DZ was estimated based on the DZ population and modal share breakdown.

Emissions from the roadways in the DZ are closely linked to the volume of vehicle traffic. As shown in Figure 21, the highest levels of traffic-related emissions originate from Nangor Road and Ninth Lock Road, which are centrally located within the DZ. Similarly, high transport emissions can also be attributed to the Southern and Eastern boundary of the DZ, where the Naas bypass and the M50 ring road are situated. Although traffic on these routes falls largely outside the council's control, the high vehicle numbers contribute significantly to local air pollution and overall emissions.

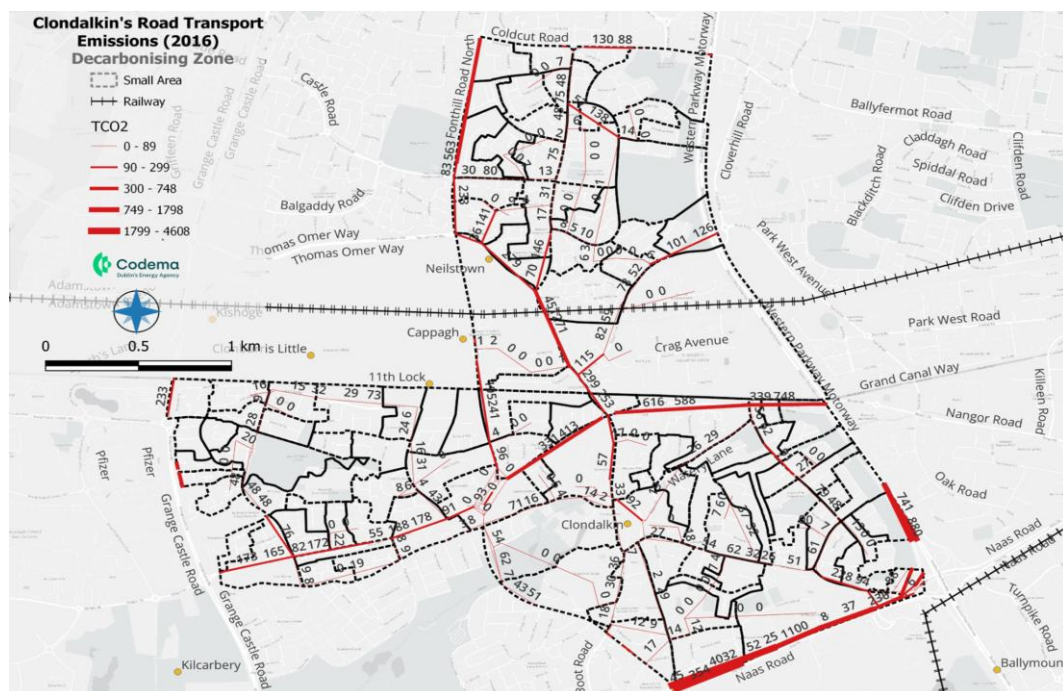


Figure 21: Clondalkin's road transport emissions

4.3.2 Transport Climate Pathways in the DZ

Current modelling from the National Transport Authority (NTA) suggests that there may be a 3% increase in transport emissions in this zone by 2030, while rail emissions are projected to increase by 65%. This modelling includes transport projects planned this decade including the DART expansion through South Dublin and into Kildare (non-tunnel elements), radial core bus corridors and revised routes and services under the BusConnects programme. It does not include the impacts of SDCC's Cycle South Dublin scheme, a fully completed Greater Dublin Area cycle network, the Lucan LUAS or potential demand management measures on the M50.

A potential emissions pathway for transport emissions within the Clondalkin DZ is shown in Figure 22 below. The measures are presented from the most cost-effective (€ per tonne CO₂) on the left, to the most expensive (€ per tonne CO₂) on the right and include 1) bus electrification, 2) light goods vehicles, 3) heavy goods vehicles, and 4) car use and active travel. More detail on what is included in these measures is included below.

- Bus electrification

In relation to buses in the DZ, it will be necessary for 70% of all buses (public and private) to be electrified. It is the intention of the NTA to deliver a fully low-emission public urban bus fleet by 2030, consisting of battery electric, diesel hybrid and hydrogen fuel cell vehicles, with a fully zero-emissions fleet by 2035. This is likely to provide the greatest contribution towards the 70% target, as

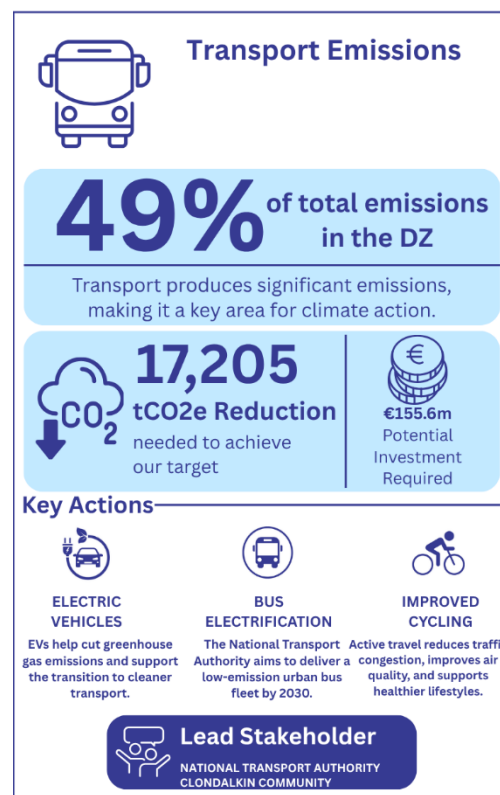


Figure 22: High impact transport interventions in the DZ

regional and private bus services will be more difficult to decarbonise. This measure will result in a 0.73% decrease in emissions from the baseline.

- Light goods vehicles (LGVs)

Vehicles considered as LGVs include commercial jeeps, vans and smaller trucks (public and private). To meet the 2030 targets for the Clondalkin DZ, a 5% reduction in vehicle-kilometres is required, supported by improved freight logistics, a 10% shift to e-cargo bikes, and a 40% transition to electric vehicles (EVs). Together, these measures are projected to reduce emissions by 5.19% from the baseline.

According to the Dublin Region Energy Masterplan (DREM), the 2030 scenario assumes a 5% decrease in total vehicle-km due to more efficient logistical planning. It was assumed that 40% of the remaining vehicle-km would be travelled via electric vehicles, with a further 10% of vehicle-km shifting to e-cargo bikes.

For 2050, the same 5% reduction in vehicle kilometres resulting from improved efficiencies was assumed, with 25% of vehicle-km shifted to e-cargo bikes. The remaining vehicle-km were all travelled by electric van.

These calculations are based on the proportion of LGVs within the DZ, estimated using the DZ population relative to the wider South Dublin population.

- Heavy goods vehicles (HGVs)

Vehicles considered as HGVs include large and articulated trucks. For Clondalkin DZ to reduce emissions in line with national targets, a reduction of 5% in vehicle kilometres will be necessary as well as a shift of 20% of HGVs to electric vehicles and 5% to rail freight. This measure will result in a 5.1% decrease in emissions from the baseline.

- Car travel and active travel

Prioritising active travel—such as walking and cycling—and expanding public transport options across the Clondalkin DZ will be essential to achieving a 39% reduction in car use or car-kilometres travelled within the zone. This shift is expected to deliver a 14.94% reduction in emissions from the baseline.

Furthermore, switching 38% of cars in the DZ to EVs will be necessary to meet 2030 targets. This assumes a ratio of 10 EVs per public charger. SDCC is currently delivering the first phase of installing fast chargers at key locations across South Dublin. Within the DZ and surrounds, the Clondalkin Leisure Centre, Bawnogue, and St. John's Wood Car Park sites have been identified.



Figure 23: Transport climate pathway to 2030

Table 6: DZ Plan Action list: Transport

Transport										
DZ Plan Ref.	Opportunity	SDCC Actions	SDCC Tracking Measure	Metrics (tCO ₂ e/ annum saved)	Potential Co-Benefits	LA Role	Timeframe	Potential Partners	Potential Community Actions	Relevant SDGs
DZ11	Explore opportunities to increase cycling in the DZ	• Implement the Cycle South Dublin programme in the DZ	• Number of linear metres of cycle lanes in the DZ (m)	Potential of modal shift in the DZ could reduce emissions by 534 tCO ₂ e/ annum saved	Clean air, Ecosystem health	Direct, Facilitate	Commencement: Ongoing Duration: Until 2029	Transport for Ireland (TfI), Transport Infrastructure Ireland (TII), National Transport Authority (NTA), Scools, Community Groups	• Use and advertise bike maintenance and repair services in the area; • Support school walking / cycling buses	SDG 3: Good Health and Well-Being SDG 9: Industry, Innovation and Infrastructure SDG 10: Reduced Inequalities SDG 11: Sustainable Cities and Communities SDG 13: Climate Action SDG 17: Partnership for the Goals
		• Maintain high standard of active travel routes throughout the DZ	• Number of meters maintained							
		• Continue the development of pedestrian improvements, aligning with the Pedestrian Enhancement Plans.	• Number of improvements implemented							
		• Ensure active travel schemes and initiatives make walking, and cycling more accessible for all users, including those with reduced mobility, disabilities and the elderly, to further opportunities for increasing a sustainable modal shift.	• Number of initiatives							
		• Examine options for increasing permeability in the area, with active travel schemes and potential for pedestrian areas.								
		• Deliver a network of secure, public bicycle and personal transportation parking to accommodate a variety of bike types.	• Number of secure bike parking sites in the DZ							

Clondalkin Decarbonising Zone

		• Deliver a Public Bike Sharing Scheme in the DZ, ensuring bikes can be used across other DLAs.	• Number of public bikes installed • Track level of on usage							
		Explore opportunities for areas for use of as “last-mile” delivery hubs.								
		• Deliver a Public Bike Library in DZ.	• Bike Library delivered • Track level of usage.							
		• Implement the Safe Routes to School Programme and implement the School Streets Initiative in the DZ	• Number of Safe Routes to School / school zones; • Number of schools participating in School Streets Initiative • Monitor transport modes used for school runs in the DZ • Monitoring level of traffic around school gate in the DZ							
		• Deliver primary school cycle training in schools in the DZ	• Number of schools participating; • Number of children participating							
DZ12	Facilitate, support and guide national agencies in delivering improvements to the public transport network in the DZ	• Engage with TFI, NTA, TII to increase the use of public transport in South Dublin	• Number of bus routes electrified; • Abated emissions (tCO₂e).	Converting the bus fleet within the DZ to fully electric could reduce emissions by 802	Clean air	Facilitate , Advocacy	Commencement: Ongoing Duration: Until 2029	Dublin Bus, TII, TFI, DZ Consultation group, Schools, Community groups	• Actively participate in consultations for improved public transport infrastructure including bus	SDG 7: Affordable and Clean SDG 9: Industry, Innovation and Infrastructure SDG 11: Sustainable Cities and Communities

Clondalkin Decarbonising Zone

				tCO2e/a num.					shelters and routes	
DZ13	Aim to decarbonise private vehicle travel within the DZ.	- Engage with car sharing scheme operators to increase the number of shared vehicles available in the DZ, with a focus on the provision of electric vehicles. - Install air quality & traffic monitors within DZ, to measure progress of reduction in fossil fuelled transport.	% of electric vehicle owners in the DZ; - Abated emissions (tCO2e).	Decarbo nisation of private vehicles could reduce emission s by 16403 tCO2e/a num saved	Clean air, Ecosyst em Health, Public safety	Direct, Advocacy	Commenceme nt: Ongoing Duration: Until 2029	National Transport Authority (NTA), TII	Promote safe road user behaviour campaigns for drivers, cyclists, e-bikes and e-scooters	SDG 3: Good Health and Well-Being SDG 7: Affordable and Clean SDG 9: Industry, Innovation and Infrastructure SDG 11: Sustainable Cities and Communities SDG 13: Climate Action SDG 17: Partnership for the Goals
DZ14	Decarbonise SDCC Fleet	- Continue decarbonisation of SDCC fleet - Continue the roll out of alternative fuels and monitor their use to ensure decarbonisation of larger vehicles, having appropriate regard to the lifecycle impacts and sustainability of alternative fuel options. - Deliver an ongoing driver education programme to staff to promote efficient driving behaviours.	% of fleet electrified or using alternative fuels in the DZ; % of relevant staff that have completed Eco-Driver training		Clean air, Ecosyst em Health, Public safety	Direct	Commenceme nt: Ongoing Duration: Until 2029	TII	N/A	SDG 7: Affordable and Clean SDG 9: Industry, Innovation and Infrastructure SDG 11: Sustainable Cities and Communities SDG 13: Climate
DZ15	Improve Staff mobility	Aim to reduce kilometres travelled by private ICE vehicles within work hours and incentivise modes such as cycling, electric vehicles.	Distance travelled reduced (km).		Clean air, Ecosyst em Health,	Direct	Commenceme nt: Ongoing Duration: Until 2029	TII	N/A	SDG 7: Affordable and Clean SDG 9: Industry, Innovation and Infrastructure

Clondalkin Decarbonising Zone

		Assess staff commuting patterns and identify opportunities to promote sustainable and active travel to, and from, work.			Public safety					SDG 11: Sustainable Cities and Communities SDG 13: Climate Action
DZ16	Implement the Dublin Local Authority Electric Vehicle Charging Strategy, (aligning with the National EV Charging Infrastructure Strategy 2022-2025).	Install and monitor charging stations within the DZ.	Charger usage within the DZ (kWh).		Clean air Ecosystem health Public safety	Direct	Commencement: Ongoing Duration: Until 2029	ZEVI, Codema, ESB	Promote use and awareness of EV charger locations in the Clondalkin DZ	SDG 7: Affordable and Clean SDG 9: Industry, Innovation and Infrastructure SDG 11: Sustainable Cities and Communities SDG 13: Climate Action SDG 17: Partnership for Goals

4.4 Flood Resilience and Nature Based Solutions in the DZ

SDCC is highly engaged with implementing adaptation measures to reduce the impacts of climate change. Within the DZ these include reducing flood risk through improved drainage, sustainable urban drainage systems (SuDS) and other nature-based solutions to protect homes, businesses and infrastructure.

Table 7: DZ Plan Action list: Flood Resilience

Flood Resilience								
DZ Ref.	Opportunity	SDCC Actions	SDCC Tracking Measures	Metrics (tCO ₂ e/annum saved)	Potential Co- Benefits	LA Role	Potential Partners	Relevant SDGs
DZ17	Adapt to increased flooding events through defence, monitoring and flood response.	• Progress the River Camac Flood Alleviation Scheme (FAS) in conjunction with DCC and the OPW	• Completion of each Stage of the Camac FAS project (1-5) • Number of properties protected • Number of minor works schemes progressed in the DZ • metres of riparian corridors protected		Public safety The River Camac FAS will protect over 400 properties when it is completed	Direct, Facilitate	Office of Public Works (OPW)	SDG 11: Sustainable Cities and Communities SDG 12: Responsible Consumption & Production SDG 13: Climate Action SDG 15: Life on Land SDG 17: Partnership for Goals
		• Identify and progress minor works schemes to resolve recurring flood issues, where possible, ensuring the schemes are designed and implemented to include Sustainable Drainage Systems (SuDS) / nature-based solutions / protection of biodiversity and avoidance of habitat fragmentation.						
		• Develop, protect and conserve riparian corridors, in line with County Development Plan and Greater Dublin Strategic Drainage Study (GSDSDS), increasing riparian corridor connectivity where possible, and similarly for floodplains around rivers and watercourses subject to flooding.						
DZ18	Promote and encourage SuDS in the DZ.	• Drive the implementation of SuDS in SDCC Capital projects within the DZ, including new builds, retrofits etc, and monitor the level of implementation.	• Number of projects developed		Public safety	Direct, Facilitate	OPW	SDG 9: Industry, Innovation and Infrastructure SDG 11: Sustainable Cities and Communities SDG 13: Climate Action SDG 17: Partnership for Goals

		Promote and encourage the implementation of SuDS to external Developers - ensure implementation of SuDS in planning applications in line with SDCC SuDS Guidance	- Square metres of permeable paving (m²) - No. of engagement events (social media posts, articles, events) per year					
		Identify opportunities to implement SuDS in the DZ e.g. Rain Gardens, planters linked to down pipes of housing roof drainage, to slow down water during flooding, water butts connected to roof drainage.	% of hard surfaces retrofitted - Number of sites identified - Monitor each site for one year					
DZ19	Improve the general maintenance plan for the stormwater and surface water network, with the aim to link to flood event forecasting and incorporate data of locations with known issues.	Review gully maintenance plan and operations for improvements, considering areas with recurring issues and smart technology opportunities.	number of gullies cleaned		Public safety	Direct, Facilitate	Commencement: Ongoing Duration: Until 2029	SDG 9: Industry, Innovation and Infrastructure SDG 11: Sustainable Cities and Communities SDG 13: Climate Action SDG 17: Partnership for Goals

Table 8: DZ Plan Action list: Nature Based Solutions

Nature Based Solutions								
DZ Ref.	Opportunity	SDCC Actions	SDCC Tracking Measures	Metrics (tCO ₂ e/annum saved)	Potential Benefits	LA Role	Potential Community Actions	Relevant SDGs
DZ20	Manage tree mapping data and ensure the maintenance of	Estimate of carbon sequestration potential based on tree mapping data	- Carbon sequestered - Native trees,		Ecosystem health Scope 4 Emissions	Direct, Facilitate	Encourage residents to maintain and	SDG 11, SDG 13, SDG 15, SDG 17

Clondalkin Decarbonising Zone

DZ21	tree management system to evaluate carbon sequestration data associated with trees in the Clondalkin DZ and investigate further opportunities for carbon sequestration where possible.	• Map potential to increase native tree planting and hedgerows across the DZ. • Retain existing native trees in Clondalkin, in so far as possible; • Support / develop small urban 'Miyawaki' native mini woodlands • Look to maintain and increase natural meadows, where appropriate, across the DZ • Map potential for Green and Blue roofs on buildings within DZ. • Explore potential for installing ponds by collaborating with community groups & schools for ponds on school grounds and other private land, such as on churches, local businesses' lands etc.	hedgerows and meadows planted / maintained;	Currently there are 39 allotments located in Corkagh Park	Ecosystem health	Direct, Facilitate	plant more native trees	SDG 3, SDG 6, SDG 9, SDG 11: Sustainable Cities and Communities SDG 13: Climate Action SDG 15: Life on Land SDG 17
	Support the Biodiversity Action Plan 2020-2026.	• Expand and refine the evidence base for the County Habitat Map to identify key habitats / locations for nature-based solutions and use the data to develop management and mitigation plans for these nature-based adaptation projects into the future • Support the provision of Community Gardens for local food production across the Clondalkin DZ, in partnership with Community	• Pilots developed; • Number of Community Gardens • Number of allotments used				• Support the protection of natural spaces in the area • Residents to engage on the value of "no mow may" and "no-dig" cultures	

Clondalkin Decarbonising Zone

		Centres, Schools and other local groups						
		• Deliver awareness educational campaigns to promote biodiversity in the DZ						
DZ22	Mitigate the heat impacts of climate change on the DZ.	• Develop a public awareness campaign on heatwave hazards during the summer months.			Ecosystem health, public safety	Direct	N/A	SDG 11: Sustainable Cities and Communities SDG 13: Climate Action SDG 15: Life on Land

4.5 Circular Economy in the DZ

The circular economy aims to reduce waste at all stages of the economic cycle and preventing waste is a central concept of the circular economy. Climate action in the Decarbonising Zone can be further enhanced by actions related to the circular economy and waste management.

The circular economy focuses on reducing waste across all stages of the economic cycle, with waste prevention as a core principle. In the Decarbonising Zone, climate action and emissions reduction can be further strengthened by implementing targeted circular economy and waste management actions.

Table 9: DZ Plan Action list: Circular Economy and Resource Management

Circular Economy & Resource Management							
DZ Ref.	Opportunity	SDCC Actions	Tracking Measures	Potential Benefits (Co-Benefits + tCO ₂ e/annum saved)	LA Role (Direct, Facilitate, Advocacy)	Timeframe	Relevant SDGs
DZ23	Monitor and improve internal waste and water management systems in all SDCC buildings within the DZ.	• Monitor water usage	• 0% growth in waste generated over the life of the Waste Management Plan for a Circular Economy • % reduction of individual waste streams across SDCC; • Cubic meters of water saved (m³); • Annual tonnage of food waste (t); • Energy used (MWh)	Circular economy, ecosystem health, energy security, water quality, Scope 3 Emissions	Direct, Facilitate	Commencement: Ongoing Duration: Until 2029	SDG 7: Affordable and Clean Energy SDG 11: Sustainable Cities and Communities SDG 12: Responsible Consumption and Production SDG 13: Climate Action SDG 17: Partnership for Goals
		• Work with SDCC contractors to reduce waste and energy consumption in Clondalkin Civic Offices					
DZ24	Support and promote the implementation of the targets of the National Waste Management Plan for a Circular Economy 2024-2030 within the DZ.	• Identify opportunities to eliminate waste and maximise the use of resources as outlined in the plan	• Establish a baseline and reduce food waste by half by 2030 • Tonnes of glass collected; • Tonnes of textiles collected at bring banks; • Number of bring bank locations in the DZ	Circular economy, Ecosystem health, Water quality	Direct, Facilitate, Advocacy	Commencement: Ongoing Duration: Until 2029	SDG 6: Clean Water and Sanitation SDG 11: Sustainable Cities and Communities SDG 12: Responsible Consumption and Production SDG 13: Climate Action SDG 17: Partnership for Goals
		• To provide for, and maintain, a network of bring banks in the DZ to facilitate recycling of materials.					
		• Identify outdoor locations for recycling bin trial site(s) in the Clondalkin DZ and deliver a pilot project					

		• Identify further areas for the installation of drinking water fountains. • Monitor and enforce waste regulation in the Clondalkin DZ • Work with local community groups and businesses to explore potential for single-use plastic free cafés and restaurants in DZ.					
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4.6 Implementing the DZ Plan

Implementing the Clondalkin DZ Plan will require a coordinated, partnership-based approach that translates the actions identified in the Plan into a live delivery programme. The Plan already sets out the key areas for action — community engagement, energy and buildings, transport, flood resilience, nature-based solutions and circular economy — and identifies SDCC’s role across these as direct delivery, facilitation and advocacy depending on the measure.

SDCC Climate Action Team is working with internal departments and in collaboration with external partners to deliver many decarbonising projects around the DZ. Working with external partners including community groups, schools, businesses, residents and government agencies such as the SEAI, NTA and the OPW.

This is particularly important because the Plan notes that the most impactful interventions are not all within SDCC’s direct control, meaning implementation will depend on strong coordination, influence and partnership working.

A practical implementation approach should prioritise actions that deliver the greatest emissions reductions while also responding to the community vision for a connected, inclusive and resourceful Clondalkin. The Plan identifies a 2018 baseline of **109,875 tCO₂e** and states that **56,036 tCO₂e per annum** must be reduced by 2030 to achieve the 51% target. Key delivery priorities include residential retrofit and solar PV, commercial building upgrades, active travel and public transport improvements, private vehicle decarbonisation, SDCC building upgrades, flood resilience measures, biodiversity enhancement and circular economy initiatives. Progress should be tracked through the measures already included in the action tables, such as homes retrofitted, businesses engaged, cycle infrastructure delivered, bus routes electrified, community groups supported, SuDS projects implemented and waste-reduction indicators. Annual reporting and ongoing community engagement would help ensure the Plan remains transparent, responsive and capable of adapting as new funding, data and delivery opportunities emerge.

Appendix I: References

1. **Climate Action and Low Carbon Development (Amendment) Act 2021:**
<https://www.irishstatutebook.ie/eli/2021/act/32/enacted/en/html>
2. [*Guidelines for Local Authority Climate Action Plans*](#). Government of Ireland, 2024
3. [*Climate Action Plan 2025*](#). Government of Ireland, 2025.
4. [*Climate Action Plan 2019*](#). Government of Ireland, 2019.
5. Central Statistics Office (CSO), 2016
6. [Urban Atlas | European Environment Agency's home page](#)” European Environment Agency. Accessed April 18, 2025

Appendix II: Evidence-base data sources and methodologies

Table 10: Evidence-base data sources

Theme	Data source overview
Evidence-base data sources	
Location	South Dublin County Council
Land Zoning	South Dublin County Development Plan 2022-2028
Population	CSO 2016
Infrastructures	OpenStreetMap (OSM), Valuation Office
Transport	National Transport Authority
Residential Emissions	Dublin Region Energy Master Plan
Commercial Emissions	Dublin Region Energy Master Plan
Transport Emissions	Dublin Region Energy Master Plan
BER	Dublin Region Energy Master Plan
Boiler Type	CSO 2016
Modal Share (Transport Mode Breakdown)	CSO 2016
Building Integrated Solar PV	Dublin Region Energy Master Plan
Residential Climate Pathway	Combination of Data
Commercial Climate Pathway	Combination of Data
Transport Climate Pathway	Combination of Data
Heat Pump Viability	Dublin Region Energy Master Plan
Heat Pumps versus District Heating Cost Comparison	Dublin Region Energy Master Plan

Appendix II: contd

Table 11: Evidence-base methodologies

Sector	Methodology
Sectoral Methodology Summary	
Residential	- A synthetic residential building stock was created for the Dublin Region Energy Masterplan (which has been used to estimate emissions from the residential sector for the DZs); The purpose of this is to generate a complete energy dataset for the housing stock. The synthetic building stock for the residential sector is based on two main data sources: - The Central Statistics Office's (CSO) census - SEAI's Building Energy Rating (BER) Research Tool
Social Housing	- Emissions for social housing in the DZ were modelled using: - data on the total number of social housing within the DZ provided by SDCC. The floor areas of each house were estimated using typical floor areas within Ireland from the Government Design Quality Standards. Energy consumption benchmarks from the Chartered Institution of Building Services Engineers (CIBSE) - UK CIBSE Guide F: Energy Efficiency and UK CIBSE: TM46.
Commercial	The two main data sources for the commercial sector are a detailed list of all rateable commercial buildings, which was provided by the Valuation Office, and CIBSE benchmarks. The VO data includes a list of the commercial properties, their location, respective floor areas and are also broken down into different categories and types of use. The building category was then used to assign every individual building an energy benchmark.
Transport	The main source of information for transport emissions is the Regional Modelling System provided by the National Transport Authority (NTA). Emissions calculations were carried out by the ENEVAL tool – which displays all pollutants captured by the tool on a GIS map for the Eastern Region.
Municipal	- The SEAI's Monitoring and Reporting system (M&R), which is used to track the public sector's progress towards their energy efficiency and emissions target data. - Street lighting dataset extracted from SDCC's streetlights were taken from data.gov and the Dublin Local Authorities' streetlights management system.
Waste	- Using the EPA Pollutant Release and Transfer Register (PRTR) database, emissions of all the landfills registered in the Dublin Region (2018) were calculated. - To estimate the emissions per capita for the Clondalkin DZ for landfills used population data for 2018 (calculated from the 2016 census and provisional population data from the 2022 census).

Wastewater

- The research paper '*Greenhouse Gas Emissions from WasteWater Treatment Plants*' 2016 Parracivine et al. was used to extract reference Greenhouse Gas (GHG) emissions per capita (tCO₂e per person) depending on the type of processes used in a typical wastewater treatment plant.
- The Ringsend WasteWater Treatment Plant (WWTP) is modelled by comparing its own treatment processes to that of a typical plant, resulting in an estimated bespoke emissions per capita (tCO₂e per person) for the Ringsend WWTP.
- The emissions per capita calculated for Ringsend WWTP was then applied to the estimated 2018 Clondalkin DZ population (calculated from the 2016 census and provisional population data from the 2022 census).

Appendix III: Assumptions for action costs and carbon emissions reductions

Costs and carbon reductions have been identified as the two primary metrics for evaluating and quantifying the impact of individual actions. The cost of each action has been estimated using a range of assumptions informed by technical expertise and published cost data for renewable energy and low-carbon technologies. Carbon emissions reductions have similarly been estimated using a defined set of assumptions based on established methodologies. Further detail on the methodology used to calculate baseline emissions is provided in the accompanying evidence base methodology report.

- **Costs**

All cost information was sourced from the Dublin Region Energy Masterplan unless otherwise stated.

Residential solar PV renewable energy generation:

According to the Dublin Region Energy Masterplan (DREM), 10% of roof space is suitable for solar PV. There were 10,935 houses within the Clondalkin DZ boundary at the time of the analysis, meaning 1,094 solar photovoltaic installations at 4kWp (recommended for urban dwellings) at 900 kWh/kWp (from the solar map) and a cost of €1,200/kWp gives a cost estimate of €5.25M.

Residential energy performance upgrades:

Retrofitting 10,935 homes to a BER B2 standard will result in a 14.96% reduction in emissions from the DZ baseline. The average retrofit cost according to SDCC is €34,000. The installation of an air source heat pump, which serves as a core element, may be complemented by improvements like wall and attic insulation, windows, airtightness, advanced ventilation, and solar PV. However, solar has been considered in a previous calculation.

The total number of energy performance upgrades needed to achieve the necessary target is 10,935 from the baseline as no residential properties were above a BER C1.

Commercial solar PV:

Making the assumption that solar would cost €1,200/kWp, the commercial sector solar PV generation would cost €2,666,500.

Commercial building energy performance upgrades:

Cost based on total heat demand of top commercial users. Cost of heat pumps for top 11 commercial users is €18,846,823. Cost of boiler assumed to be €1,600/kW at 0.85 assumed efficiency and fabric upgrades assumed to be one hundred times area (m²) (€20,766,274).

Local council building energy upgrades:

Estimated capital investment of implementing Pathfinder projects within the DZ (Clondalkin leisure centre, Clondalkin Offices, North Clondalkin Library, Bawnogue Community Centre, Knockmitten Community Centre, Neilstown Community Centre, St. Ronan's Community Centre) .

Street lighting upgrades:

Cost per lamp of €732 based on retrofit of 205,000 public lights through an investment of €150 million.

Bus electrification:

Assuming €100,000 per charger and a ratio of 10 EVs per charger (taken from Table 16 in the Dublin Region Energy Masterplan). 1,304,934 km travelled by bus within the DZ during the baseline year.

Car measures for private owners:

Estimated cost of EV charging infrastructure is €1,716,683. The estimated cost of primary and secondary cycling infrastructure is €18,896,000. The estimated cost of switching cars to EVs is €74,317,040. Finally, the estimated cost in increase in bus km is €56,178,454.

- **Emissions**

The emissions reduction for the actions identified in relation to the SDCC Climate Action Plan have been quantified below:

Residential solar PV renewable energy generation:

In Appendix D of the Dublin Region Energy Masterplan, 10% of total roof space is deemed suitable for PV, i.e. it did not experience shading, was not already occupied by roof-mounted plant, had a flat roof or in the case of a pitched roof, had a general southerly orientation (within 90° of due south). 1,094 solar PV panels are to be installed at 4kWp (which is recommended for an urban dwelling).

Residential energy performance upgrades:

Estimated emissions reduction from the retrofit of all homes within the DZ (10,935 homes). The assumptions made include the installation of an air source heat pump, which serves as a core element, may be complemented by improvements like wall and attic insulation, windows, airtightness, advanced ventilation, and solar PV. However, solar has been considered in a previous calculation.

Commercial solar PV:

As stated previously, 10% of the roof area is assumed to be suitable for solar. Assuming 0.2kWp per m², install solar on all buildings with available roof space for at least 5kW.

Private building energy performance upgrades:

Heat pumps and retrofits for top 11 commercial energy users. Assuming all fossil fuel usage is heating, upgrade buildings that produce top 80% of emissions with heat pumps. Assuming that all of these buildings require building fabric upgrades.

Local council building energy upgrades:

The estimated tCO₂e saved per annum from implementing DeliveREE projects that have received funding from the European Commission -Horizon 2020 research and innovation programme, and SEAL's Pathfinder Programme (Clondalkin leisure centre, Clondalkin Offices, North Clondalkin Library, Bawnogue Community Centre, Knockmitten Community Centre, Neilstown Community Centre, St. Ronan's Community Centre) based on electricity and gas savings.

Street lighting upgrades:

Yearly emissions reduction from upgrading 2,393 luminaires. This was taken directly from public lighting data.

Bus electrification:

802tCO₂e was based on an assumed 41% increase in vehicle kms and a target of 70% electrification by 2030. Research indicates that the number of buses in the area to be currently 25 (based on population) and will increase to 31.

Car measures for private owners:

16,403tCO₂e was based on 197,767,777 km travelled by car within the DZ in baseline year.

Clondalkin DZ Implementation Plan

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