

An aerial photograph of Dublin, Ireland, showing a mix of modern city buildings and industrial structures. In the foreground, a teal-colored overlay covers the left side of the image. In the background, two prominent tall chimneys rise above a cluster of industrial buildings. A river flows through the city, with a bridge visible in the lower right. The sky is filled with soft, white clouds.

SUMMARY DOCUMENT

Dublin Region Energy Master Plan

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Overview

The Dublin Region Energy Master Plan provides realistic, evidence-based pathways for the Dublin Region to achieve its carbon emission reduction targets to 2030 and 2050. It is the result of three years worth of research by Codema's energy planning team to identify the greatest potential to reduce emissions related to heat, electricity, transport and buildings in Dublin.

For the first time in Ireland, the Dublin Region Energy Master Plan uses spatially-driven energy scenario modelling to identify the cost-optimal solution that considers the socio-economic impact at a local level in Dublin, based on the specific energy “characteristics” or profile of a particular area. Put very simply, this means that the master plan has looked at ‘what should go where’ for every area of Dublin, based on the type of area it is and the technologies that are best suited to reducing energy-related emissions within that area.

The master plan also brings together national government plans and policies to show the impact they will have on Dublin.

To define the pathways for Dublin to meet its 2030 and 2050 targets, Codema first had to get a good understanding of the current situation in the county; this was followed by projecting the future business-as-usual energy demand and emissions (for the buildings, heat, electricity and transport sectors), and then identifying the low-carbon potential for these sectors. All of this information was then used to determine the net-zero pathway for Dublin.

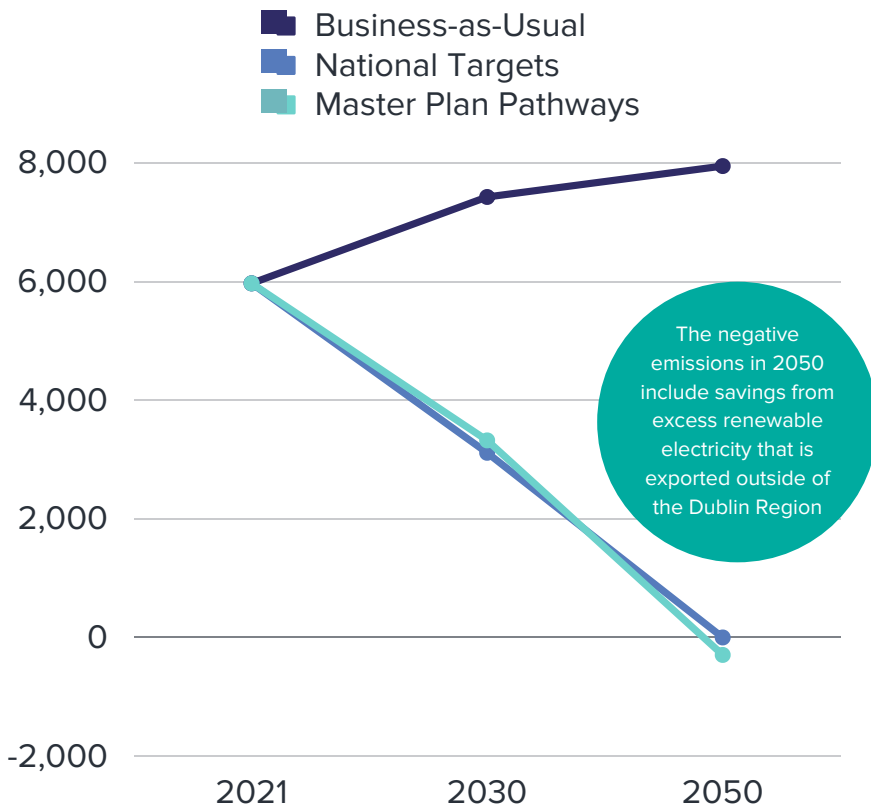
The headline figures from this master plan show that:

- Dublin's total energy-related emissions account for 5,969 ktCO₂
- The current gap to the 2030 target amounts to approximately 2,856 ktCO₂ (requiring a 48% reduction in emissions from current levels)
- A reduction of 5,969 ktCO₂ will be needed to meet the 2050 net-zero target
- Heat accounts for the majority of energy-related emissions within the Dublin region at 46%, followed by transport at 28% and electricity at 26%
- The sectors that have the highest impact on emissions are the residential and transport sectors, which combined, contribute around 57% to total emissions
- Commercial buildings and services, data centres and industrial (non-ETS) buildings account for 19%, 16% and 3% of total energy-related emissions, respectively
- Public sector emissions - which includes all public buildings located in the Dublin Region - represent approximately 5% of the total

The pathways to net-zero emissions proposed by this masterplan will seek to reduce our emissions by a total of 4,103 ktCO₂ by the year 2030 and 8,240 ktCO₂ by 2050, compared to future Business-as-Usual projections. This will at the same time greatly reduce emissions of other harmful pollutants and improve air quality in the county. A breakdown of the key findings across heat, electricity, transport and buildings in Dublin can be found in the following sections, along with key policy recommendations to achieve these emission reductions.

Dublin's Energy-Related Emission Reduction Targets

Gap to 2030 and 2050 targets



Heat accounts for

46%

of total energy-related emissions in Dublin

57%

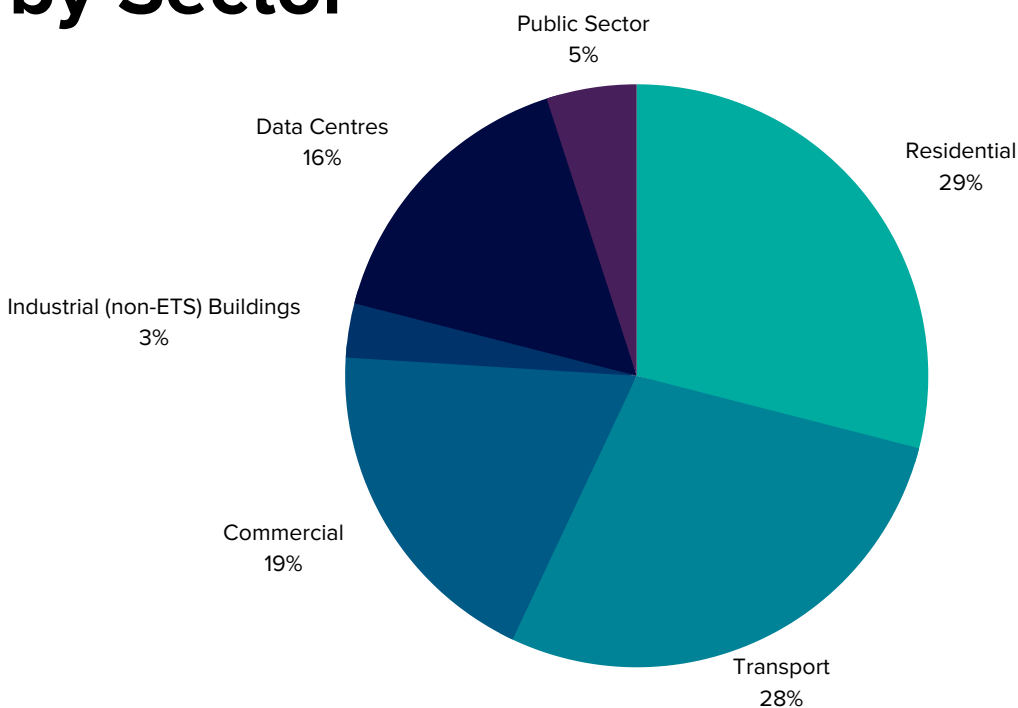
of Dublin's energy-related emissions come from the residential and transport sectors

Reduction of

5,969

ktCO2 needed to get Dublin to net-zero by 2050

Dublin's Energy-Related Emissions by Sector



Key Pathways

To reduce emissions in Dublin



District heating could supply 87% of Dublin's heat demand by 2050



Heat pumps can supply 13% of Dublin's heat demand by 2050



Offshore wind presents the greatest potential for renewable electricity generation



Active travel and public transport should be prioritised over cars



Areas most at risk of energy poverty in Dublin should be prioritised for upgrades



Heating in Dublin

Key Findings



Key Insights

- District heating is the most feasible low-carbon heating option for Dublin, as it could supply 87% of the county's heat demand by 2050; this equates to 538,983 homes and 41,394 businesses being supplied with district heating.
- There is 3,579 MW of heat available from renewable and waste heat sources in Dublin that is currently not being used. If we used this heat for district heating networks in Dublin, it would produce 24,244 GWh of heat per year, enough to heat the equivalent of over 1.6 million homes.
- These heat sources could reduce the total fossil fuel bill for Dublin by almost €1 billion per year and reduce the region's exposure to price fluctuations and security of supply issues in the oil and gas markets.
- The total cost of developing district heating across Dublin by 2050 is estimated at €7.7 billion. The majority of this investment (€4.1 billion) will go to local workers working on the installation of the network, providing 4,354 direct construction jobs. Once built, the network will also create a new local heat market estimated at €959 million per year in 2050. Much of this money previously would have left the country to pay for imported fossil fuels but instead could now support new permanent, local jobs.
- Heat pumps are the most feasible option for 13% of Dublin's total heat demand by 2050, serving 72,528 homes and 5,600 businesses.

87%

of Dublin's
heating
demand
could be
supplied
through
district
heating by
2050

These waste heat sources could reduce Dublin's fossil fuel bill by almost

€1B

per year

There is enough renewable and waste heat sources in Dublin to heat the equivalent of

1.6 million homes



Policy Recommendations for Heat

1

Evidence-Based Zoning

Evidence-based zoning for district heating should be introduced and requirements put in place for buildings in these areas to be able to connect to a local network (both the demand and supply side).

2

Fair Treatment of Low-Carbon Heat

Low-carbon heat sources including waste heat should be treated fairly in Part L building regulations (in line with Articles 15 and 23 of the Renewable Energy Directive).

3

Financial Support

Make financial support more easily available for these low-carbon solutions, by providing up-front capital grant funding for low-carbon heating and allowing district heating networks to earn credits under the proposed Renewable Heat Obligation (RHO).

4

Review Heat Loss Threshold

The heat loss threshold required to secure grants for heat pumps should be reviewed to explore the potential for increasing the allowable heat loss index. This may enable more homes to qualify for support but without exceeding limits that would result in poor heat pump performance.

Policy Recommendations for Heat

5

New Business Heat Models

Adopt business heat models that support the ongoing efficient and reliable performance of heating systems by linking installer revenues to ongoing system performance.

6

Support Capacity Building

Support capacity building across the supply chain for both district heating and heat pumps (planning, construction and installation, design, finance, legal, policy and regulation).

7

Protect Customers

District heating is currently unregulated in Ireland. Customer protection will be required in order to ensure fair heat prices and that a good level of service is maintained by heat networks.

8

Prioritise Efficiencies

Fuels such as natural gas and hydrogen should not be used for space heating and hot water where more efficient and lower-carbon alternatives exist (e.g. heat pumps, district heating).

Electricity in Dublin

Key Findings



Key Insights

- Offshore wind has the greatest potential to generate renewable electricity in the Dublin area, with an estimated 5,241 GWh of generation by 2030 and 13,124 GWh in 2050. This electricity could cater for the equivalent of 1.2 million homes in 2030 and 3.1 million homes in 2050.
- Utility-scale solar PV also presents a great opportunity for renewable electricity production in Dublin, with potential estimated at 854 GWh in 2030 and 1,057 GWh in 2050.
- The opportunity for building-integrated PV in Dublin is estimated at 84 GWh in 2030 and 270 GWh in 2050, which equate to the electrical demand for 19,984 and 64,394 homes, respectively.
- Sites within the Dublin Mountains show the best potential for a wind energy Strategic Energy Zone (SEZ) in Dublin. These sites could accommodate 87 x 3.5 MW wind turbines and could produce 510 GWh of electricity per year, saving 165,603 tCO₂ per year.



Offshore wind presents the greatest potential to generate renewable electricity in Dublin.

Offshore wind could produce

13,124

GWh

of renewable electricity by
2050

Offshore wind presents the greatest potential to generate renewable electricity in Dublin and could provide electricity for the equivalent of

3.1 million homes



Policy Recommendations for Electricity

1

Enable Infrastructure

The development of enabling infrastructure needs to be supported to maximise Dublin's potential to generate renewable energy.

2

Maximise Local Generation

To reduce their climate impact, significant electricity consumers such as data centres and other large industrial sites should maximise on-site renewable generation and ensure any remaining demand is supplied through renewable Power Purchase Agreements (preferably those which match hourly site demand), which finance renewable electricity projects within Ireland or its territorial waters.

3

Make Use of Waste Heat

Ensure that the waste heat produced on site by servers, on-site power generation, etc. be characterised and made available for use for planned or existing district heating networks in the area. This has the added benefit of reducing the electrical and water consumption of large cooling systems such as those found in data centres and other industrial and commercial sites.

4

Minimise Grid Impact

Minimise impact on the grid as much as possible. This will be assessed by relevant parties such as EirGrid in accordance with data centre grid connection processing procedure to ensure that grid integrity is maintained. Connection to district heating networks can also reduce the electricity demand associated with significant electricity consumers such as data centres and other large industrial sites and in heating the buildings connected to the network, when compared with individual heat pumps.

Transport in Dublin

Key Findings

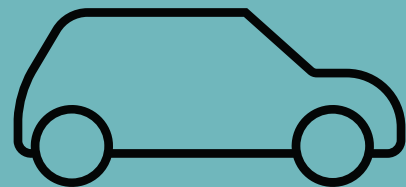


Key Insights

- Cars account for 65% of transport emissions in Dublin and may be costing the county up to €2.8 billion per year in external societal costs.
- Even if the Government's ambitious EV targets are met, the number of kilometres driven by fossil-fuelled cars in Dublin will still need to be reduced by at least 23%, in order to meet the 2030 emissions target.
- Reducing car dependency and enabling a shift to active travel and public transport needs to be the number one priority, followed by the electrification of a reduced car fleet.
- While electrification of transport can significantly reduce energy demand and emissions for Dublin, EV charging infrastructure needs to be provided in a way that does not prioritise private cars over active travel or public transport users. Up to 4,600 rapid charge points may be required by 2030 to meet the demands of 213,000 electric vehicles.

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Policy Recommendations for Transport

1

Prioritise Active Travel

Active travel is the simplest, quickest and most cost-effective way to reduce emissions associated with personal transport, particularly for shorter journeys. Dublin is a highly urbanised county, with huge potential for active travel if the appropriate policies are put in place. The accelerated delivery of the Greater Dublin Area Cycle Network will be key to unlocking this potential. This network must be designed in a manner to ensure that walking and cycling routes are safe, comfortable and attractive for all ages and abilities.

3

Accessibility and Inclusivity

Financial incentives to reduce transport emissions need to be rebalanced in favour of active travel and public transport rather than private car ownership. In the design of new transport networks, the distinct travel needs of all user groups, and in particular women, must be given far greater consideration.

2

15 Minute Neighbourhoods

The Government's Five Cities Demand Management Study identified the '15 Minute Neighbourhoods' concept as a key priority to address carbon emissions, congestion and air quality issues in Dublin. To help enable this, City and County Development Plans should consider adopting a strict limit on the distance between new developments and regularly-used amenities (e.g. shops, schools, etc.) with good active travel and public transport links between both.

4

Reallocation of Road Space

Additional powers are required to allow local authorities to reallocate existing road space to more sustainable modes and to implement low-traffic neighbourhoods and filtered permeability schemes. Reallocating public space away from traffic can also provide additional safe space for nature, for people to socialise and for children to play. Legislation to provide for experimental road traffic orders, allowing for trials of 6-18 months, should be enacted.

Buildings in Dublin

Key Findings



Key Insights

- The master plan has identified areas in Dublin that are most at risk of energy poverty and should be prioritised for energy efficiency upgrades. These include households in Ballyfermot, Ballybough, Cabra, Clondalkin, Clonskeagh, Coolock, Finglas, Inchicore, Kilmainham, Kimmage, Tallaght and sections of the north and south quays in the inner city.
- Minimum energy efficiency standards for rented properties should be introduced and proper structures put in place to help landlords achieve this.
- Funding schemes for energy efficiency upgrades also need to be addressed, with particular attention to long payback periods and high upfront costs in both the residential and non-residential sector.
- A simple energy assessment form should be submitted with all planning applications to facilitate more accurate forward planning. This form should include general information relating to energy use within the development, such as annual and peak demand for heat and electricity, floor area, BER, heating system details, details of renewables on site and EV charging details.

12

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Planning Dublin's Energy Future



The Importance of Energy Planning

In Ireland, there is a real need to bridge the gap between energy and spatial planning.

Traditionally, energy planning in Ireland is primarily focused at a national level and there is little integration with spatial planning, particularly at a local authority level.

Bottom-up energy planning allows us to consider holistic energy solutions that combine different energy systems, rather than having different solutions or technologies working in isolation.

Local-level energy planning is key to helping

local authority areas achieve 2030 and 2050 emission reduction targets.

Therefore, we need to build on city and county-wide development plan energy policies, focusing on more evidence-based and spatially-appropriate policies and objectives.

Now is the time to ensure environmental considerations for sustainable development are integrated within the planning system at the earliest opportunity and to stop treating sustainable energy planning and spatial planning as separate processes.

At a local level, local authorities in Ireland have to meet a number of legal climate action obligations and targets. Energy planning can help support local authorities to meet these requirements in areas such as:

- Preparation of County/City Development Plans
- Identification of Strategic Energy Zones and Decarbonising Zone assessments
- Preparation of climate mitigation plans and EU Covenant of Mayors SECAPs
- Roll out of low-carbon infrastructure
- Carbon and energy assessment of planning applications

KEY PLANNING RECOMMENDATIONS

Guidelines for local-level energy planning are provided to local authorities, with the scope to base energy planning policies and objectives on a robust, spatial understanding of the existing and future energy synergies across sectors at a local authority scale.

Energy planning becomes a requirement for implementing local-level energy plans with clear pathways and long-term commitments to reducing energy-related emissions.

In order to support more cost-effective and sustainable development of infrastructure (electricity grid, heat networks, transport infrastructure, etc.) higher building density should be promoted within the county as part of the various local authority county development plans.

A GIS-based database of low-carbon technology installations within the County should be maintained. This should include information on the size, type, grid connection details (where applicable) and energy generation (kW peak, annual kWh) of each installation. This will allow tracking of progress towards targets and updates to allow pathways to respond to future cost fluctuations and account for the proportion of the identified potential that has been realised.

Benefits for Dublin

If all of the recommendations within this Dublin Region Energy Master Plan were carried out, it could potentially:

- Reduce energy-related emissions by 4,103 ktCO₂ by the year 2030
- Reduce energy-related emissions by 8,240 ktCO₂ by 2050
- Increase renewable electricity generation in the Dublin Region by 14,780 GWh by 2050. This is enough electricity to power the equivalent of 3.5 million homes.
- Decrease electricity production costs by a total of €519 million per year by adopting renewable energy technologies (onshore and offshore wind, utility-scale solar PV and building integrated solar PV) .
- Avoided carbon costs of €24 billion (when accounting for the shadow price of carbon).
- Increase direct jobs by over 182,500 by 2050.
- Reduce pollution and provide better air quality.

Next Steps

Zero Together

The findings from the Dublin Region Energy Master Plan will be used as the evidence-base for the Zero Together Roadmap for Dublin, which Codema is currently developing together with a team of leading frontrunners from a range of sectors.

For the first time, Zero Together aims to bring these different sectors together to work towards the same goal of moving Dublin away from fossil fuels as soon as possible, with the ultimate aim of developing the county into a clean and healthy region to live, work, study and visit.



Our Process

There are three key strands to the Zero Together process for Dublin:

- A leading Transition Team to agree and inform on the best strategy for Dublin
- Use the Dublin Region Energy Master Plan as a starting evidence-base to inform the roadmap
- Host a Citizens' Jury to ensure that the people of Dublin are involved in how we plan to move our county away from fossil fuels

No single organisation, individual or sector can fully transform Dublin into a clean, healthy and sustainable county. However, by motivating local communities, businesses and public authorities to work together towards the same goal and empowering citizens to take ownership of this transition, we can achieve a carbon-neutral Dublin that has many local benefits and a positive global impact.

For further information
on the Dublin Region
Energy Master Plan,
visit www.codema.ie

Acknowledgements

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