



# BASELINE EMISSIONS INVENTORY (BEI) REPORT (MITIGATION) ANNEX 2

Meath County Council Climate  
Action Plan 2024 - 2029



## CORE



## ADDITIONAL



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## Acronyms

Acronym	Full Form
BEI	Baseline Emissions Inventory
BER	Building Energy Rating
CAP	Climate Action Plan
CAROs	Climate Action Regional Offices
CCRA	Climate Change Risk Assessment
CDP	County Development Plan
CH <sub>4</sub>	Methane
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> eq	Carbon dioxide equivalent
CRA	Climate Risk Assessment
CSO	Central Statistics Office
DEFRA	Department for Environment, Food and Rural Affairs
DZ	Decarbonisation Zone
ESB	Electricity Supply Board
EPA	Environmental Protection Agency
F-gases	Fluorinated gases
GAA	Gaelic Athletic Association
GHG	Greenhouse gases
HFCs	Hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
kt	kilotonne
kWh	kilowatt hours
LA	Local Authority i.e., Meath County Council
LULUCF	Land Use, Land Use Change & Forestry
M&R	Monitoring & Reporting
MCC	Meath County Council
m <sup>2</sup>	Square metre
NF <sub>3</sub>	Nitrogen Trifluoride
NIR	National Inventory Report
N <sub>2</sub> O	Nitrous oxide
PFCs	Perfluorocarbons
PRTR	Pollutant Release and Transfer Register
RCP	Representative Concentration Pathways
SEAI	Sustainable Energy Authority of Ireland
SF <sub>6</sub>	Sulphur Hexafluoride
t	tonne
UN SDGs	United Nations sustainable development goals

## 1.0 Executive Summary

The Baseline Emissions Inventory (BEI) presents an overview of baseline greenhouse gas (GHG) emissions from various sectors in 2018 for County Meath and shows the impact different sectors in County Meath has on Ireland's overall carbon emissions. It provides the necessary information to make informed decisions to lower the County's carbon emissions and achieve the 51% reduction in greenhouse gas emissions (GHG) by 2030. It also assists Meath County Council to lead, enable and inspire on targeted actions and measures and monitor progress over time.

In 2018, the baseline year, greenhouse gas (GHG) emissions within County Meath Administrative Area was 4,254kt CO<sub>2</sub>eq.

### Meath County Council - Direct Emission Baseline

Meath County Council's buildings, operations and activities account for <1% of the total CO<sub>2</sub>eq emissions of County Meath.

#### Meath County Council Emissions (ktCO<sub>2</sub>eq)

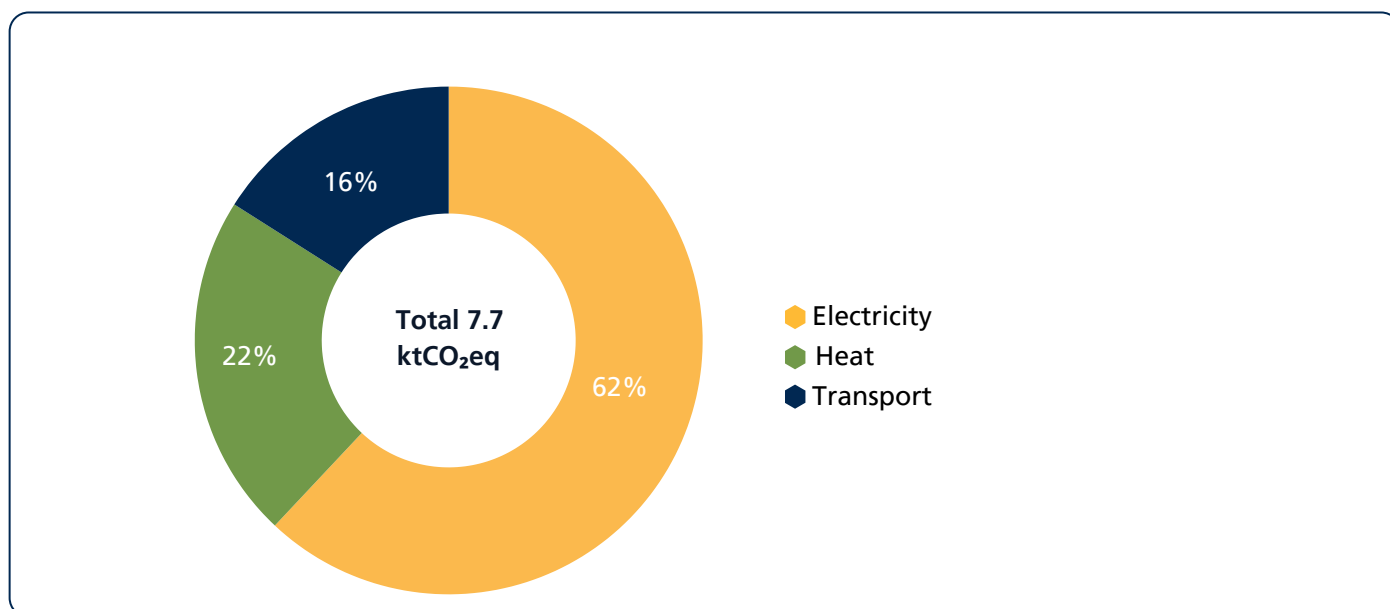


Figure 1 - The Figure above shows the emissions by Meath County Council source.

Emission Source	Energy Use (kWh)	% of Energy Use	Emissions (kt CO <sub>2</sub> eq)	% of Emissions
Electricity	12,501,772	49%	4.7	62%
Heat	8,067,693	32%	1.7	22%
Transport	4,884,457	19%	1.3	16%

Table 1 – The table above shows the emissions by Meath County Council source.

## County Meath - Emission Baseline

The main sources of emissions within County Meath are industrial processes (29%), agriculture (25%), manufacturing and commercial (13%) and transport (10%) respectively. The sectors outlined below align with the sectors addressed by the National Emissions Inventory.

### County Meath - Emission Baseline (kt CO<sub>2</sub>eq)

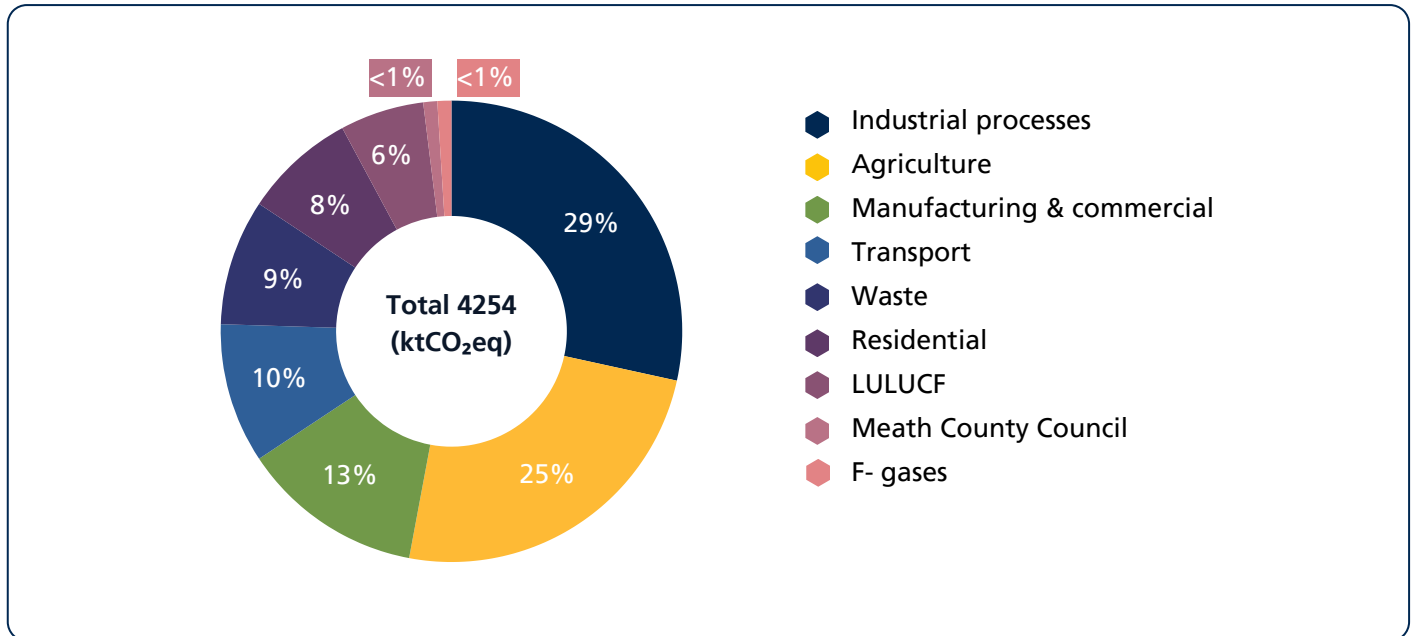


Figure 2 – The Figure above shows the emissions per each sector in County Meath.

Sector Category	Sector Emissions County Meath (ktCO <sub>2</sub> eq)	Sector Emissions as % of County Meath Total Emissions	Sector Emissions per National Inventory*
Industrial processes	1,230	29%	3.80%
Agriculture	1,054	25%	38.40%
Manufacturing and commercial	556	13%	8.40%
Transport	419	10%	19.10%
Waste	378	9%	1.40%
Residential	353	8%	10.00%
LULUCF	264	6%	Not available
Meath County Council**	8	<1%	1.1%**
F-gases	0.0004	<1%	1.20%
<b>Total</b>	<b>4,254</b>		

Table 2 – The table above outlines the emissions per sector and percentage of the total emissions for each emission category for County Meath and the also the percentage of emissions for each sector on a national level.

\* Source: EPA: Greenhouse Gas Emissions by sector in 2022

\*\* Categorized as Public Services in the national inventory

The total emissions in Ireland in 2018 according to the Ireland National Inventory Report is 67,312 ktCO<sub>2</sub>eq. Based on this data, County Meath makes up 6% of the National GHG Emissions Total.

## Decarbonising Zones Emission Baseline

The nine Decarbonising Zones (DZs) account for 19% of total emissions in County Meath, totalling 824 ktCO<sub>2</sub>eq. The four main sectors where the emissions were material across the nine Decarbonising Zones were residential, manufacturing & commercial, transport and waste. Further breakdown of emissions within each of the decarbonising zones are available in Section 5.0 decarbonising Zones of Meath County Council's Climate Action Plan.

### Decarbonising Zones Emission Baseline (ktCO<sub>2</sub>eq)

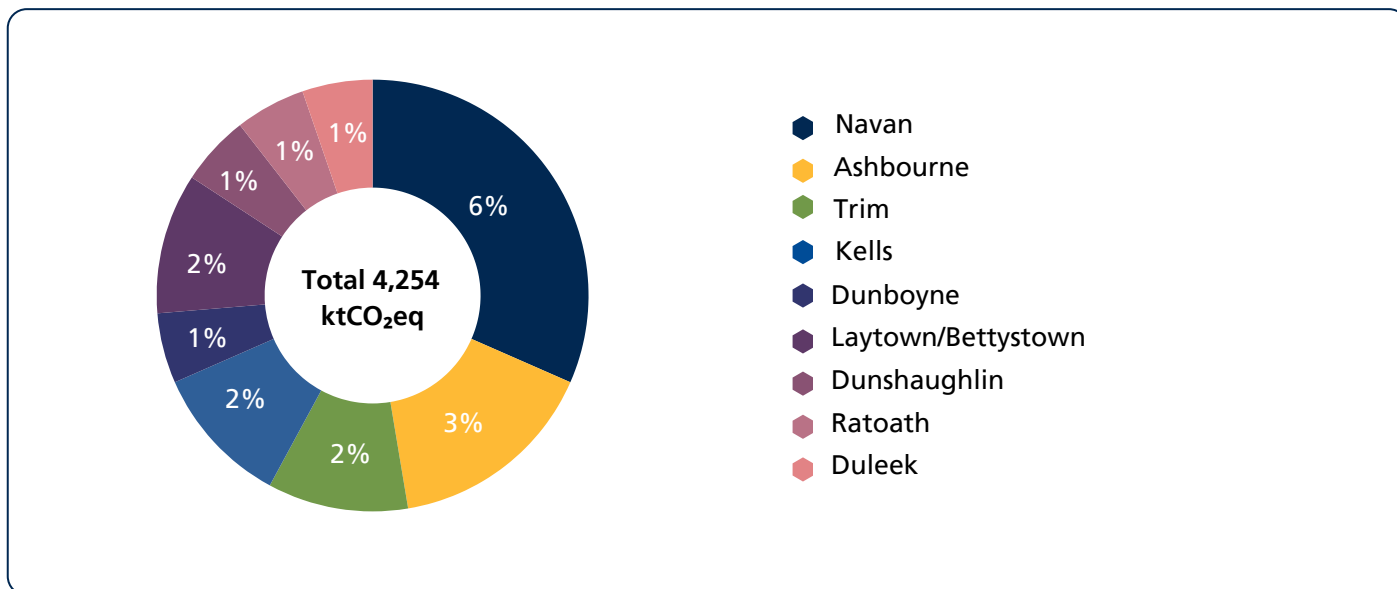


Figure 3 – The Figure above shows the ktCO<sub>2</sub>eq per Decarbonising Zone within County Meath.

	DZ Total	
DZ Zone	ktCO <sub>2</sub> eq	% of County Emissions
Navan	269	6
Ashbourne	118	3
Trim	84	2
Kells	71	2
Dunboyne	61	1
Laytown/Bettystown	83	2
Dunshaughlin	51	1
Ratoath	53	1
Duleek	33	1
<b>Total of all DZ's</b>	<b>824</b>	<b>19%</b>
<b>Remaining Meath</b>	<b>3430</b>	<b>81%</b>

Table 3 – The table above shows the ktCO<sub>2</sub>eq per each Decarbonising Zone within County Meath across the residential, manufacturing & commercial, transport and waste sectors as well as the percentage of the county-wide emissions.

## Conclusion

The Climate Action and Low Carbon Development (Amendment) Act, 2021 commits Ireland to reach a legally binding target to deliver a reduction of 51% by 2030.

An overall emission reduction of 2,170 ktCO<sub>2</sub>eq (reducing the BEI of 4,254 ktCO<sub>2</sub>eq to 2,084 ktCO<sub>2</sub>eq) is required for the County Meath across all sectors to achieve the target to reduce GHG emissions by 51% by 2030.

The Figure below shows the current emissions in County Meath and the 2030 target emissions reduction by sector (National Sectoral Targets).

### Current Emissions in County Meath V 2030 National Sectoral Targets (ktCO<sub>2</sub>eq)

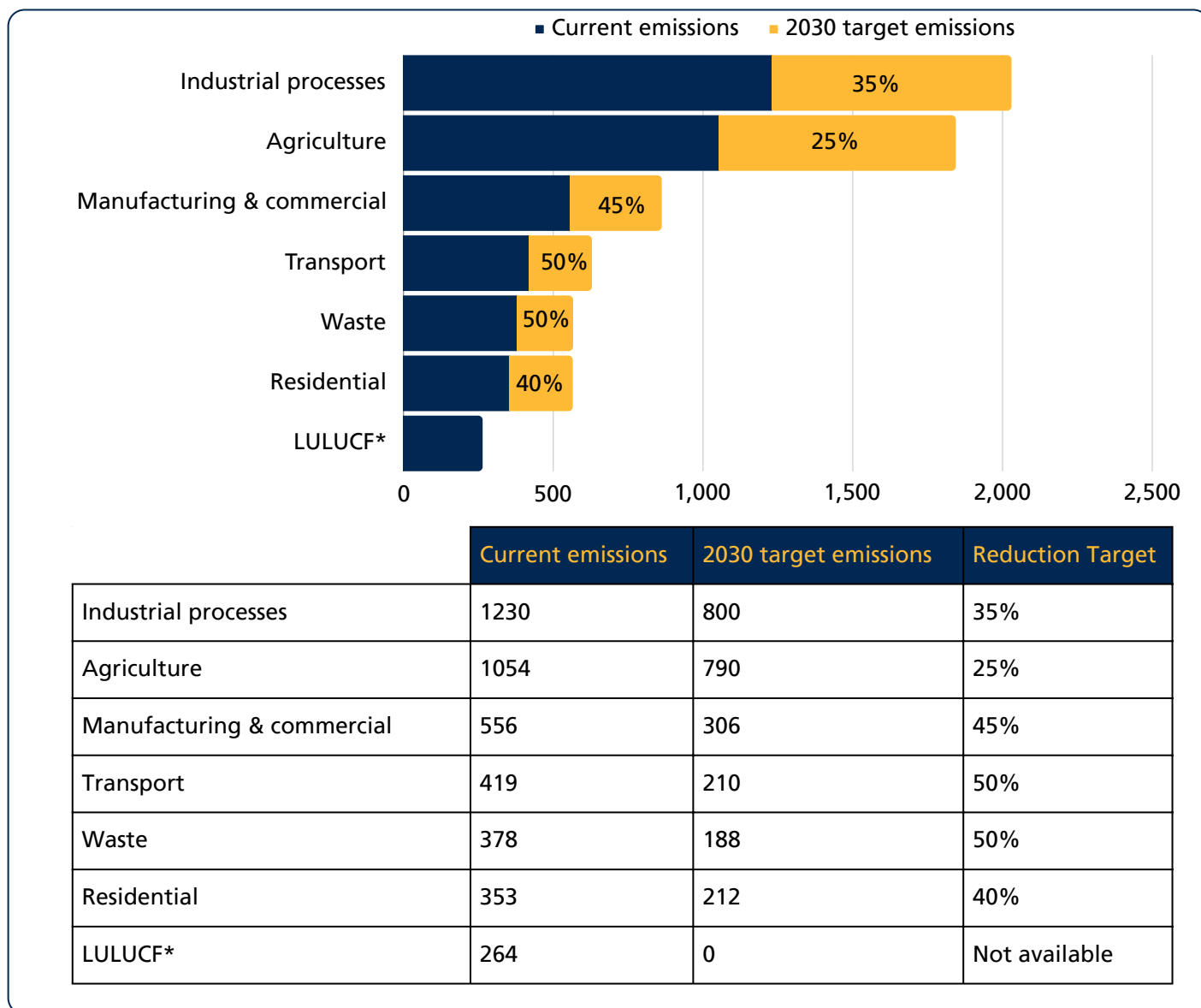


Figure 4 – Current emissions in County Meath V 2030 target emissions for County Meath.

\*A national percentage reduction target has currently not been set for the LULUCF sector.

Meath County Council will show leadership by carrying out actions to achieve the target to reduce GHG emissions by 51% by 2030 across the Council's services and operations.

Meath County Council will effectively enable and inspire climate mitigation within County Meath and support in the delivery of emission reductions across the various sectors and decarbonising zones.

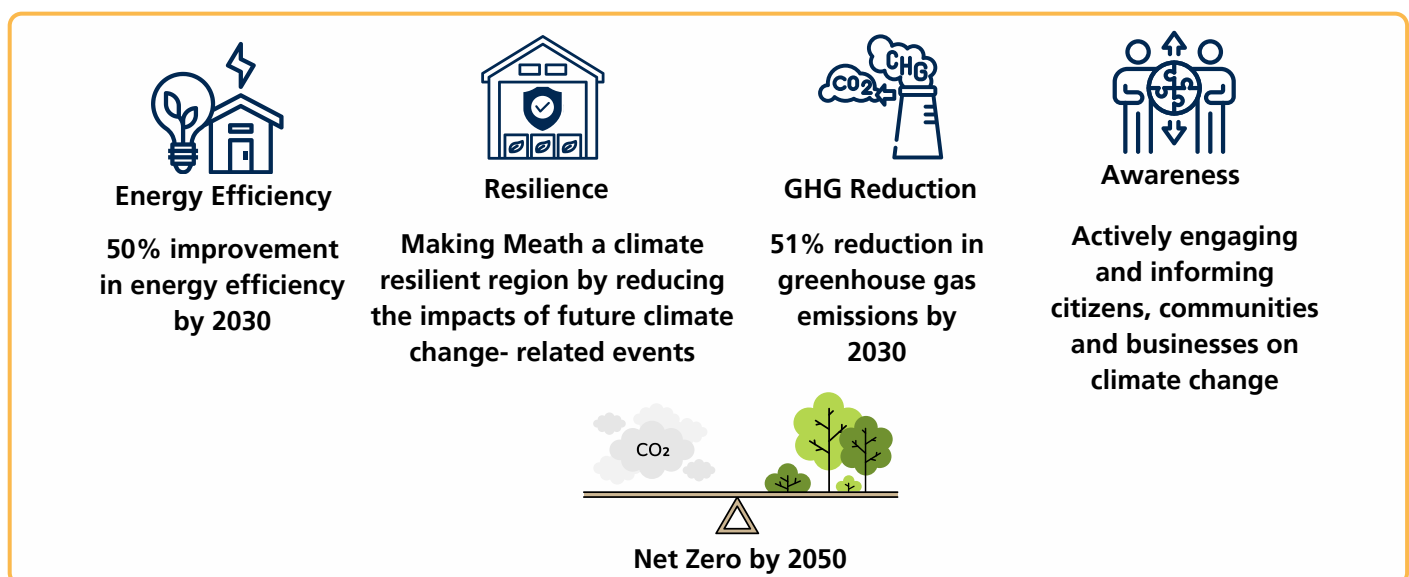
## 2.0 Introduction

The National Climate Action Plan 2023 (CAP23) and the National Adoption Framework 2019, recognise that the local authorities have a critical role to play in achieving a 51% reduction in Greenhouse Gas Emissions (GHG) by 2030. CAP23, requires each local authority to develop Local Authority Climate Action Plans, which include targeted actions informed by evidence to achieve this reduction. It is therefore necessary to establish current emissions and to identify emission sources.

The Climate Action Plan will target how Meath County Council is contributing to the state's climate goals and to take action to adapt to the effects of climate change by working across the County as an implementing body with local communities, businesses and the National Government.

To inform these actions, Meath County Council has developed a Baseline Emissions Inventory (BEI) Report. The BEI Report measures the amount of greenhouse gases emitted in the baseline year (2018) and provides a sectoral breakdown of the results.

Meath County Council's ability to plan for and take effective action to mitigate climate change and monitor progress is dependent on having access to good-quality data on GHG emissions. The baseline emission inventory (BEI) represents an evidence-based approach to understanding the contribution of different activities and in determining where best to focus mitigation efforts, identifying opportunities and designing effective actions to help reduce emissions. The baseline emission inventory will also allow the monitoring and tracking of progress towards meeting those targets and the efficacy of any measures introduced, through future updating of the emissions inventories.



The baseline emissions inventory takes three principal forms, namely:

1. Meath County Council's emissions (direct emissions). This includes accounting for emissions related to all assets directly owned, operated or within the full control of the Council.
2. County Meath emissions across a range of pre-defined sectors as is defined by the Administrative Area of the Meath County Council.
3. Decarbonising Zones (DZ) emissions across a range of pre-defined sectors - Ashbourne, Duleek, Dunboyne, Dunshaughlin, Laytown/Bettystown, Kells, Navan, Ratoath and Trim. A further breakdown of emissions within each of the decarbonising zones is available in Section 5.0 Decarbonising Zones of Meath County Council's Climate Action Plan.



The Baseline Emissions Inventory has been undertaken as per the Local Authority Climate Action Plan Guidelines 2023 (Technical Annex C: Climate Mitigation Assessment). A tiered approach was utilised to establish the baseline emission baselines:

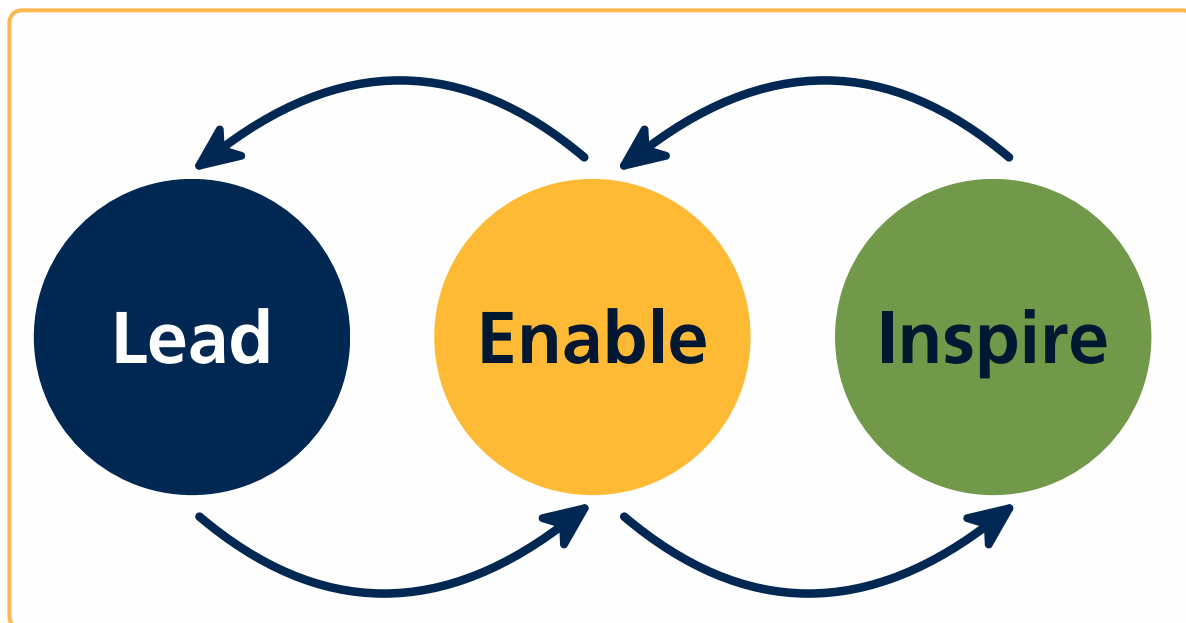
- County Meath Emission Baseline – Tier 2 Bottom-up Approach
- Decarbonising Zones Emission Baseline - Tier 3 Bottom-up Spatially-led Approach

The data collated and analysed to inform the Baseline Emission Inventory is relative to the baseline year 2018.

Meath County Council has three roles when it comes to the accountability of greenhouse gas emissions (GHG) within its administrative area:

- Direct control and remit over emissions from Council operations and services (public lighting, fleet, local authority owned and operated buildings and facilities, social housing, etc.)
- Direct influence on emissions through Council functions (planning, procurement, infrastructure delivery, etc.)
- Indirect influence on emissions (collaboration, facilitation, awareness building, promotion with communities, private sector, etc.)

The baseline emissions inventory will be revised and updated in line with each revision of County Meath's Climate Action Plan, incorporating new national guidance and updated data sets.



### 3.0 BEI Data Collection and Methodology

GHG emissions are reported as Carbon Dioxide (CO<sub>2</sub>) or Carbon Dioxide equivalent (CO<sub>2</sub>eq). Carbon Dioxide enters the atmosphere through burning fossil fuels (coal, natural gas, and oil), solid waste, trees and other biological materials, and also as a result of certain chemical reactions (e.g., cement production).

The other main GHGs are Methane (CH<sub>4</sub>) and Nitrous Oxide (N<sub>2</sub>O). Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices, land use, and by the decay of organic waste in municipal solid waste landfills. Nitrous Oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater. The Global Warming Potential (GWP) of CH<sub>4</sub> and N<sub>2</sub>O has been factored to allow for reporting in CO<sub>2</sub>eq within this report. Where the term 'emissions' in and of itself is used in this report, this refers solely to the aforementioned GHG emissions, and does not include any non-GHG emissions (e.g., Sulphur Oxides, SO<sub>x</sub>).

#### Meath County Council

Meath County Council Scope 1 and 2 emissions were taken from its Monitoring & Reporting (M&R) System that requires annual reporting on energy use and emissions. Emissions are broken down into electricity, heating and transport per the M&R system and energy use is broken down into public lighting, council buildings and fleet.

#### County Meath

##### Baseline Emissions Inventory Method

Meath County Council's Baseline Emissions Inventory (BEI) is informed by the technical guidance 'Technical Annex C: Climate Mitigation Assessment', ensuring a robust and consistent approach across all local authorities to the development of their BEIs. As per the guidance, Meath County Council adopted both Tier 1 and Tier 2 approaches to produce our BEI.

##### Tier 1 "Top-down" Assessment

- The Tier 1 approach is the simplest and quickest approach to estimate carbon emissions at the County Council level.
- The approach is informed by publicly available data, including the Environmental Protection Agency's (EPA) MapEire database as well as the Central Statistics Office (CSO).

##### Tier 2 "Bottom-up" Assessment

- The Tier 2 approach allows for a more detailed look at drivers and hotspots of carbon emissions through use of more detailed datasets.
- This approach is informed predominantly by publicly available data, including Central Statistics Office (CSO), Transport Omnibus and the Environmental Protection Agency (EPA).

## **Decarbonising Zones**

The Tier 3 spatially led approach was used to develop the baseline emissions inventory as per the technical guidance in Annex D along with data from the County wide BEI.

### **Two-step approach**

It is important to note that the guidance outlines a 'Two step approach' for the Countywide BEI to avoid double counting for electricity emissions. The Energy Industries category primarily is comprised of emissions from electricity generation and the emissions are assigned to the location of the electricity generation station instead of the locations of homes, businesses and other activities that consume the electricity.

To avoid double counting of electricity emissions, the Residential and Manufacturing and Commercial categories do not account for electricity emissions in these sectors. Per the MapEire 2019 database, there are no emissions from the Energy Industries category in County Meath so the two-step approach is not applicable. Electricity emissions are included in both the Residential and Manufacturing and Commercial categories outlined above.

### **Agriculture**

The 2020 CSO Agriculture Census was used to get the number of type of livestock as well as the hectareage of cereals and crops in County Meath. The 2018 data was pulled from the 2021 Ireland National Inventory Report (NIR) to allocate the emissions associated with County Meath's livestock. Teagasc data on crop emissions was used to calculate emissions per hectare. The NIR report does not include energy use on the farms. Comprehensive data for farm energy use in Ireland was not available, so UK data from DEFRA was used as a proxy. It was assumed that all farms are the average size of a farm per the CSO farm size data, which is 43.8 hectares, when calculating the farm energy use.

### **F-gases**

Emissions data from MapEire was used for this sector.

### **Industrial processes**

MapEire and Climate Trace data was used for this sector to get a complete view of emissions. The Ireland emission data was pulled for the large industrial plants located in County Meath for the baseline year of 2018. Some of the emissions would be representative of the manufacturing and combustion occurring at the plants, so an allocation was made between industrial processes and manufacturing and commercial based on the MapEire allocation of emissions at the large industrial plant locations.

### **Land Use Land Use Change & Forest (LULUCF)**

Emissions data from MapEire was used for this sector.

## **Manufacturing & Commercial**

The Valuation Office (VO) data was pulled for each of the building categories listed on the website. Non-domestic CSO data was pulled regarding average CO<sub>2</sub> emissions and average area by building type and county. The VO data contains area data for all commercial buildings in Meath and was reviewed for any data entries that were showing a unit other than area. These entries were removed to ensure only actual areas remained. The building types per the VO were then mapped to the CSO non-domestic building types. For any VO entries that did not include an area, the CSO area was used as a proxy. Emissions were then calculated based on the area and emission data. ESB metered electricity data was pulled from the CSO to calculate the associated emissions. The emissions from the Meath cement plants were not included in the VO data, so Climate Trace data was used to include the emissions associated with manufacturing and combustion from the cement plants. Refer to the methodology on industrial processes for how this was allocated.

## **Residential**

The Central Statistics Office (CSO) 2016 census data was used to determine the number of private households within Co. Meath. Per the CSO, the data is broken down into 5 types of accommodation: House/Bungalow, Flat/Apartment, Bed-sit, Caravan/Mobile home and Not Stated. Next the Building Energy Rating (BER) public search results for Co. Meath were pulled from the Sustainable Energy Authority of Ireland (SEAI) BER database. The dwelling type description per the BER results and the accommodation type per the CSO are named differently. In order to appropriately utilise both sets of data, the accommodation types per the CSO were mapped to the dwelling types per the BER data. It is important to note that not all buildings in Co. Meath have a BER which is a limitation of this sector. Data was utilised from publicpolicy.ie on BER trends to get a % average for the energy rating and applied this allocation across the residencies without a BER. Next the allocation between houses and apartments as described above was used. The BERs per the SEAI are broken down into a letter and number grade for each BER (e.g., A1, A2, A3) whereas the public policy data is broken down into a letter grade only (e.g., A). The BER was mapped from the public policy data to the SEAI BER with the largest number of ratings. Next, a pivot table was conducted on the BER data to get a total count of the number of dwellings in each BER, the sum of the area of all dwellings in each BER, and the average CO<sub>2</sub> rating (kg/ CO<sub>2</sub>/m<sup>2</sup>/year) per each BER in Co. Meath. The average area was validated against the CSO. To understand the fuel breakdown for residential, the CSO fuel data was used.

## **Transport**

The category and number of vehicles registered in County Meath was provided by the Department of Transport. The SEAI Energy in Transport report as well as the CSO Transport Omnibus was used to gather emission and mileage data for the various transport types. For private cars, it was assumed that all private cars were the average age of a private car, which was 9 years old per the 2014 Energy in Transport Report. It should be noted that the most recent SEAI Energy in Transport Report is from 2014 which is a limitation of this sector. MapEire data was used to calculate the railway emissions.

## **Waste**

EPA search located the landfills and incinerators located in County Meath. Emissions from landfills included both operating and closed landfills in the county. The Pollutant Release and Transfer Register (PRTR) EPA database was used to identify the emissions for each of these waste sites in County Meath. CH<sub>4</sub> and NO<sub>2</sub> emissions were converted to CO<sub>2</sub>eq. MapEire data was used for the emissions related to domestic wastewater treatment, composting and open burning. SEAI data was used for energy and the associated emission factor related to Irish water.

## 4.0 Baseline Emissions Inventory

### 4.1 Meath County Council Baseline Emissions Inventory

Below is the energy use and emissions break down for Meath County Council's operations. Meath County Council strives to be the exemplar in reducing the emissions that the Council has direct control over. Meath County Council's total emissions are 7.7ktCO<sub>2</sub>eq, this makes up less than 1% of total emissions in County Meath.

#### Meath County Council Emissions (ktCO<sub>2</sub>eq)

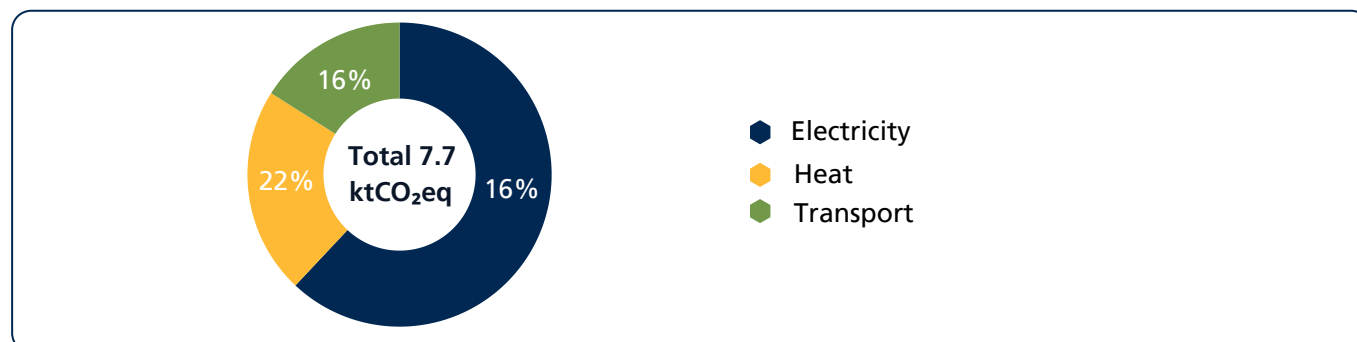


Figure 5 - The Figure above shows the emissions by source.

Emission Source	Energy Use (kWh)	% of Energy Use	Emissions (kt CO <sub>2</sub> eq)	% of Emissions
Electricity	12,501,772	49%	4.7	62%
Heat	8,067,693	32%	1.7	22%
Transport	4,884,457	19%	1.3	16%

Table 4 - The table above shows the emissions by source.

#### Meath County Council Electricity Use (kWh)

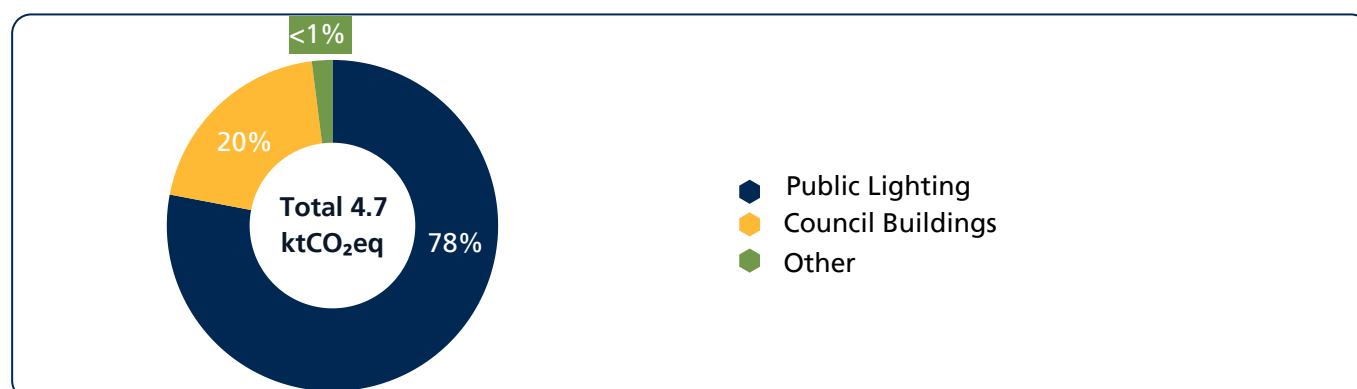


Figure 6 - The Figure above breaks down the electricity sector in table 4 above by Meath County Council's most significant operations.

Emission Source	Energy Use (kWh)	% of Energy Use	Emissions (kt CO <sub>2</sub> eq)	% of Emissions
Public Lighting	9,655,168	78%	3.7	78%
Council Buildings	2,484,947	20%	0.9	20%
Other	181,248	1%	0.1	1%

Table 5 - The table above shows the energy use within the electricity sector for Meath County Council's most significant operations.

## 4.2 County Meath Baseline Emissions Inventory

The resulting outputs is the baseline emission inventory (BEI) for County Meath, provides an evidence base for the development of the Climate Action Plan for the County.

An overview of the emissions in each sector are depicted in the Figure and table below. The sector emissions are then broken down in further detail within this section.

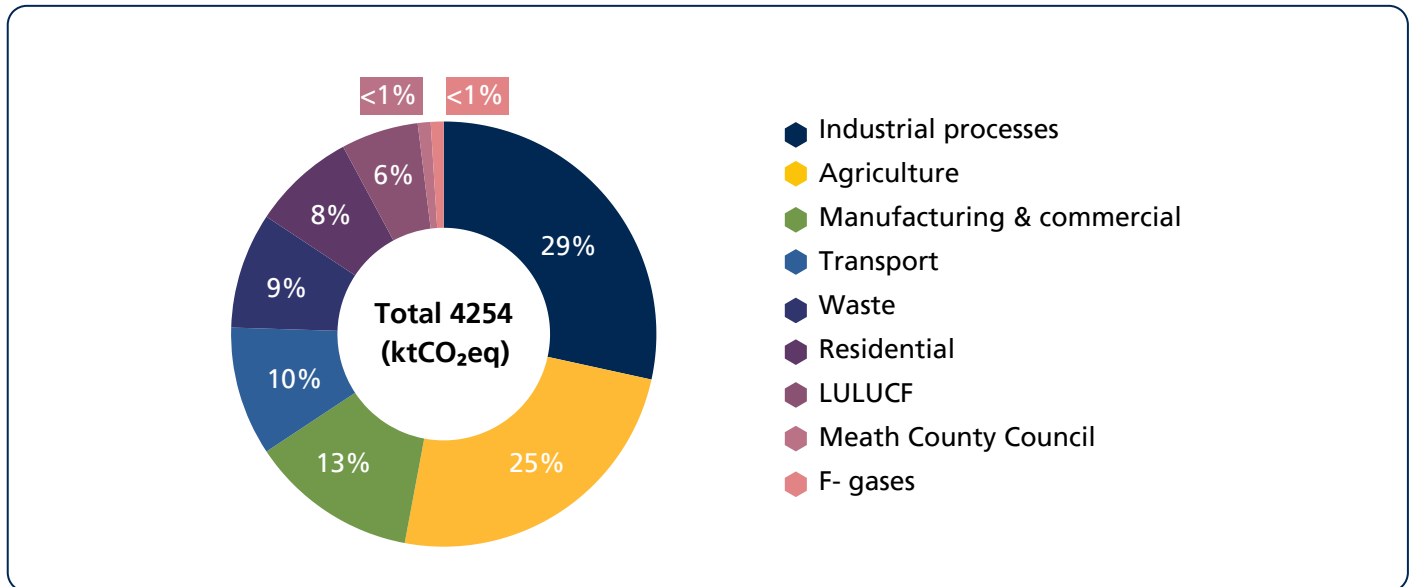


Figure 7 – County Meath- Emissions Baseline (ktCO<sub>2</sub>eq).

Sector Category	Sector Emissions County Meath (ktCO <sub>2</sub> eq)	Sector Emissions as % of County Meath Total Emissions	Sector Emissions per National Inventory*
Industrial processes	1,230	29%	3.80%
Agriculture	1,054	25%	38.40%
Manufacturing and commercial	556	13%	8.40%
Transport	419	10%	19.10%
Waste	378	9%	1.40%
Residential	353	8%	10.00%
LULUCF	264	6%	Not available
Meath County Council**	8	<1%	1.1%**
F-gases	0.0004	<1%	1.20%
<b>Total</b>	<b>4,254</b>		

Table 6 – The table above outlines the emissions per sector and percentage of the total emissions for each emission category for County Meath and the also the percentage of emissions for each sector on a national level.

\*Source: EPA: Greenhouse Gas Emissions by sector in 2022

\*\*Categorised as Public Services in the national inventory.

### 4.2.1 Agriculture

Agricultural GHG emissions come from energy usage on-site for machinery and farm buildings, manure and soil management including urea and chemical fertiliser application, land use and methane produced from cattle and other livestock. Agricultural activity includes livestock farming (including beef, dairy, sheep, pigs and poultry) and crops farming (including cereals, vegetables and legumes).

Agriculture contributes the second largest percentage of emissions in County Meath. The percentage emissions from agriculture in Meath is 25% which is significantly less than the percentage emissions from agriculture at a national level which is 38.4%. This is due partly to the significantly higher contribution from industrial processes in Meath versus the national inventory which has an effect of reducing relatively the other sectors percentage contribution within the County.

Below is a breakdown of the different agricultural activities within this category in County Meath and their related emissions.

#### Agriculture Emissions (ktCO<sub>2</sub>eq)

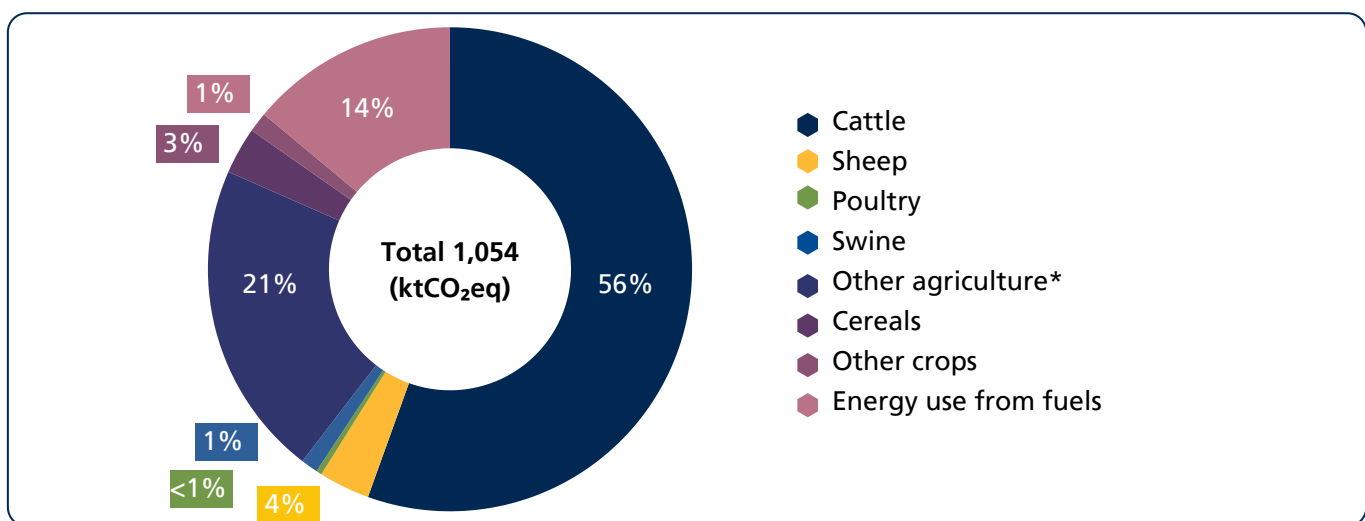


Figure 8 – The Figure above shows the emissions by agricultural activity.

Sector	Emissions (kt CO <sub>2</sub> eq )	Emissions (% of sector total)
Cattle	585	56
Sheep	36	4
Poultry	4	<1
Swine	12	1
Other agriculture*	223	21
Cereals	33	3
Other crops	14	1
Energy use from fuels	147	14
<b>Total</b>	<b>1,054</b>	

Table 7 – The table above shows the emissions by agricultural activity.

\*Other agriculture consists of indirect nitrous oxide emissions, direct nitrous oxide emissions from managed soils, limestone calcium carbonate emissions, and urea application emissions represented in ktCO<sub>2</sub>eq.

Cattle is the highest contributor to agricultural emissions. This includes beef and dairy agriculture. Cattle and sheep are ruminants and produce methane from enteric fermentation. Methane (CH<sub>4</sub>) is the most significant greenhouse gas in Irish agriculture. On a national level, it contributed 62.6% of all agricultural emissions in 2022. Methane’s contribution to global warming is estimated at 28 times that of carbon dioxide, over a 100-year period.

Nitrous oxide (N<sub>2</sub>O) is the second most significant greenhouse gas in Irish agriculture. Agriculture produces 90% of N<sub>2</sub>O emissions in Ireland. The main contributions are:

- through the application of synthetic fertilizers on pastures - 38%
- the deposition of animal excreta during grazing - 23%
- manure management - slurry storage and spreading – 14%

Nitrous oxide (N<sub>2</sub>O) is a powerful GHG with a global warming potential 265 times greater than carbon dioxide (CO<sub>2</sub>) and has a lifespan of 100 years.

A further breakdown of the sources within the energy use from fuels sector above is shown in the table below:

### Energy Usage in the Agriculture Sector (ktCO<sub>2</sub>eq)

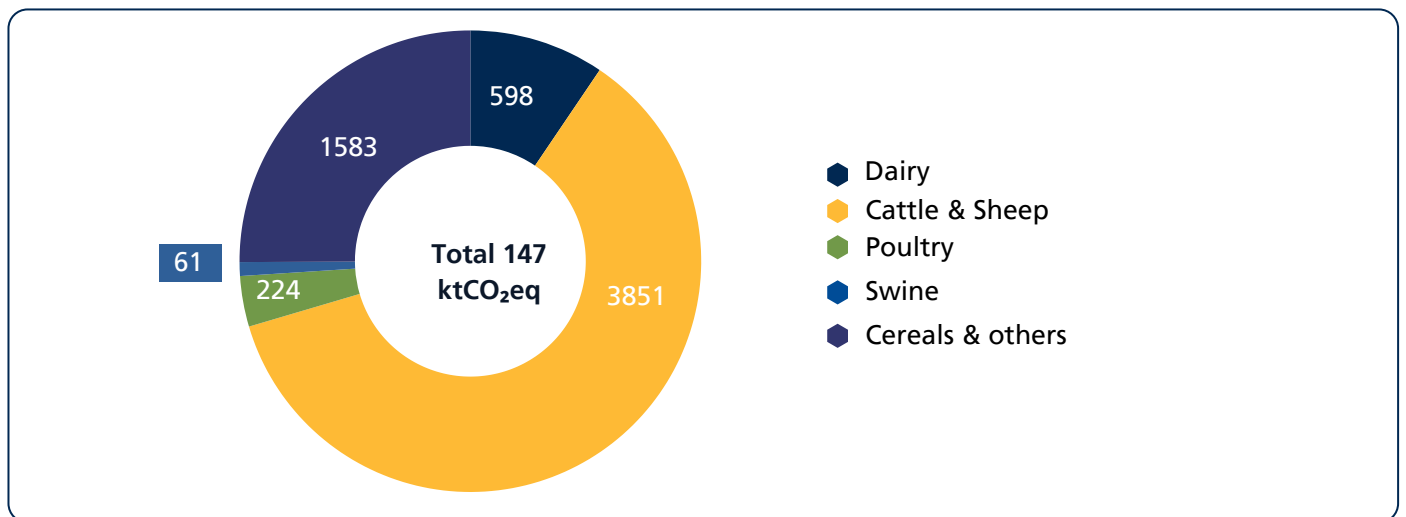


Figure 9 – The Figure above shows the emissions within the agricultural energy use from fuels category.

Type of farm	Number of farms	Emissions (ktCO <sub>2</sub> eq)			Total
		Red diesel	Electricity	Road fuel and other fuel	
Dairy	598	10	3	2	15
Cattle & Sheep	3,851	29	13	9	51
Poultry	224	3	24	11	38
Swine	61	1	2	< 1	4
Cereals & others	1,583	25	9	5	39

Table 8 – The table above shows the emissions within agricultural energy use from fuels.



#### 4.2.2 F-gases

These gases comprise of HFCs (Hydrofluorocarbons), PFCs (Perfluorocarbons), SF6 (Sulphur Hexafluoride) and NF3 (Nitrogen Trifluoride). These gases used mostly for refrigeration, air-conditioning and as propellants in aerosols and fire extinguishers. They are much more potent than the naturally occurring greenhouse gas emissions (carbon dioxide, methane and nitrous oxide). These gases make up less than 1% of Meath's emissions.

Below is the F-gases related to County Meath.

#### F-gases (ktCO<sub>2</sub>eq)

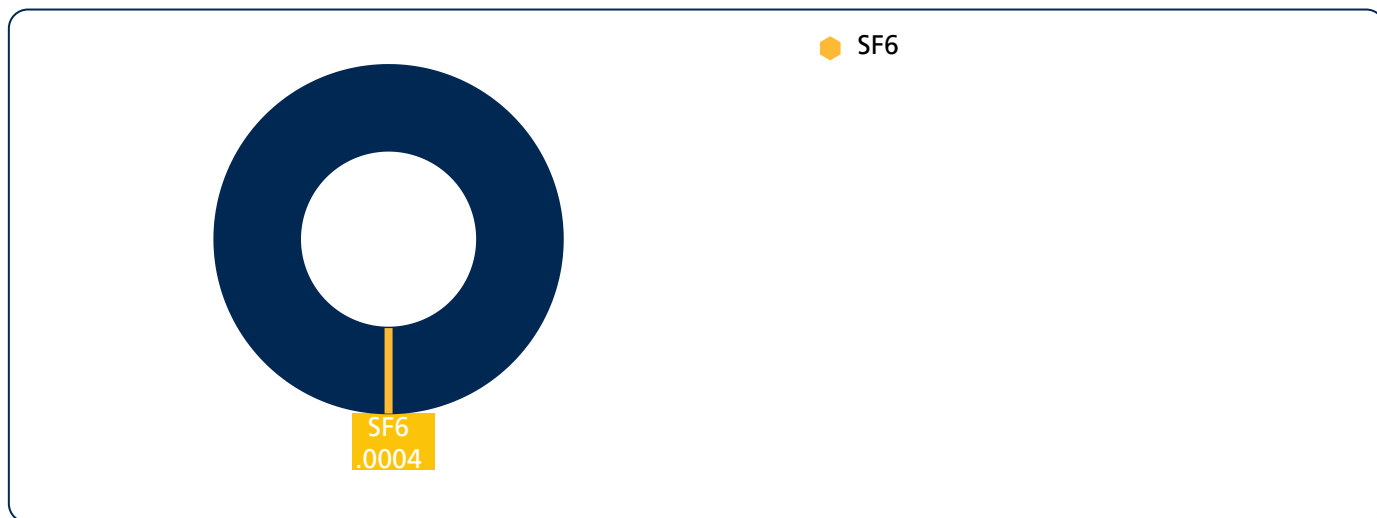


Figure 10 – The Figure above shows the emissions related to F-gases in County Meath.

F-gas	Emissions (ktCO <sub>2</sub> eq )
SF6	.0004

Table 9 – The table above depicts the emissions related to F-gases in County Meath.

### 4.2.3 Industrial Processes

The industrial processes sector estimates GHG emissions occurring from industrial processes, from the use of GHG in products and from non-energy uses of fossil fuel carbon. These processes include, but are not limited to, cement production, lime production, ceramics, solvent use, as well as the food and beverage industry. The emissions in this category are from industrial processes rather than combustion. This sector accounts for emissions occurring from industrial processes. This sector does not account for fuel combustion related to these processes.

Industrial processes contribute the largest component of emissions in Meath and are significantly higher at 28% when compared to this sectors percentage of emissions in the national emissions inventory being 3.8%, due to the significant contribution from the cement industry in Meath. This sector is almost entirely comprised of emissions related to cement production at two large cement plants.

#### Industrial Process Emissions (ktCO<sub>2</sub>eq)

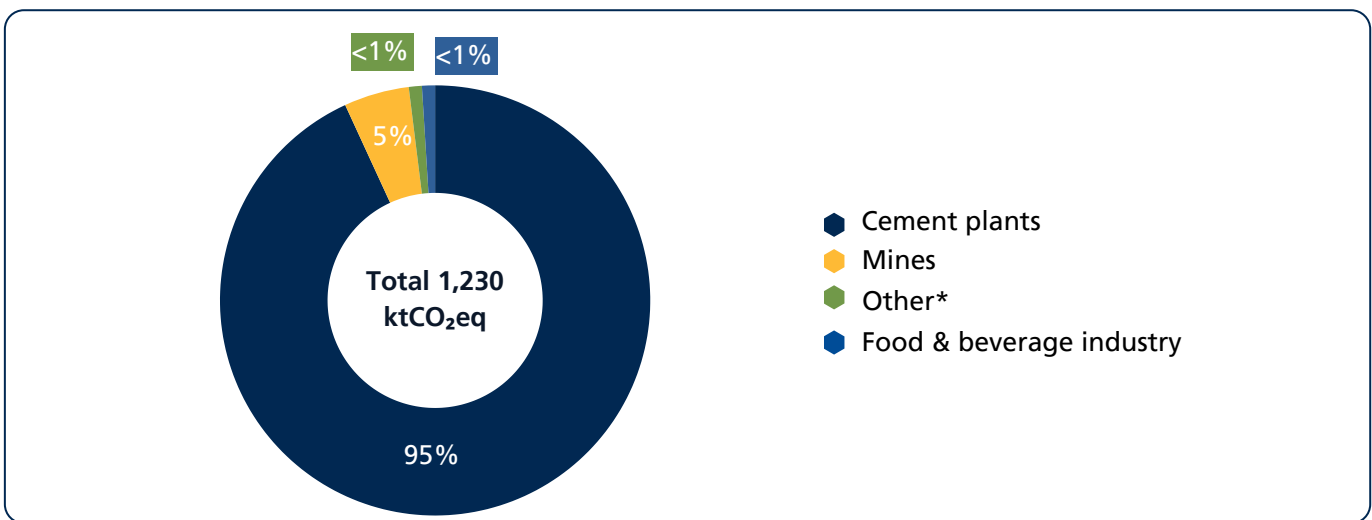


Figure 11 – The Figure above shows the emissions by type of industrial process.

Sector	Emissions (ktCO <sub>2</sub> eq )	Emissions (% of sector total)
Cement plants	1,168	95
Mines	56	5
Other*	5.86	< 1
Food & beverage industry	0.17	< 1

\*Other includes lubricant use, paraffin wax use, ceramics, domestic solvent use, other solvent use and other product use  
 Table 10 – The table above shows the emissions by type of industrial process.

#### 4.2.4 Land use land use change and forestry (LULUCF)

Emissions and removals from land use, land use change and forestry including, forest land, cropland, grassland, wetlands, settlements, other land types as well as through the harvesting of wood products. This sector also accounts carbon sinks. The carbon sinks are a result of forest land, cropland, and harvested wood product. Carbon sinks are elements of the environment that are able to absorb carbon dioxide from the atmosphere.

LULUCF is not currently included in National Emissions Inventory.

See below for a breakdown of total sinks and emissions as well as land cover in County Meath.

**LULUCF Emissions and Sinks (ktCO<sub>2</sub>eq)**

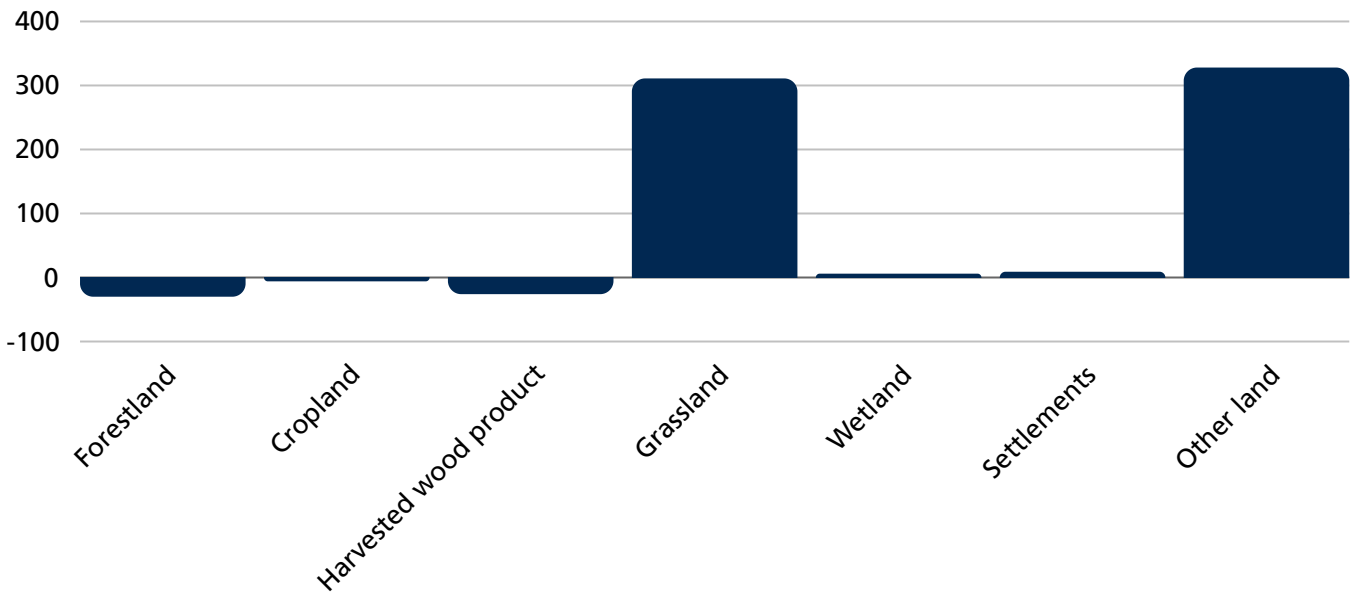


Figure 12 – The Figure above shows the carbon sinks and emissions within the LULUCF sector.

Sector	Sink or emission	Emissions (ktCO <sub>2</sub> eq )
Forestland	Sink	-30
Cropland	Sink	-6
Harvested wood product	Sink	-26
Grassland	Emission	311
Wetland	Emission	6
Settlements	Emission	9
Other land	Emission	328
Net emissions		264

Table 11 – The table above shows the carbon sinks and emissions within LULUCF sector.

Emissions are responsible for emitting GHGs into the atmosphere whereas carbon sinks are elements of the environment that are able to absorb carbon dioxide from the atmosphere. The total presented in this table is the total emissions offset by the carbon sinks to show net emissions for the LULUCF category.

A percentage national emissions reduction target has not currently been set for the LULUCF sector. Increasing the land cover associated with carbon sinks will be a key lever for LULUCF.

#### 4.2.5 Manufacturing and Commercial

The manufacturing sector accounts for onsite combustion of fuels (oil & gas) during manufacturing and construction processes. This includes during the manufacturing and construction of iron & steel; non-ferrous metals; chemicals; pulp, paper and print; food & drink processing, pharmaceutical industries). It also includes combustion for combined heat and power for own use in these industries. In commercial services, oil and gas are used predominantly for space heating, but also for water heating, cooking and, in some sub-sectors, laundry. Sports facilities are included within this sector.

Below is a breakdown of the different sectors within this category in County Meath and their related emissions.

#### Manufacturing and Commercial Emissions (ktCO<sub>2</sub>eq)

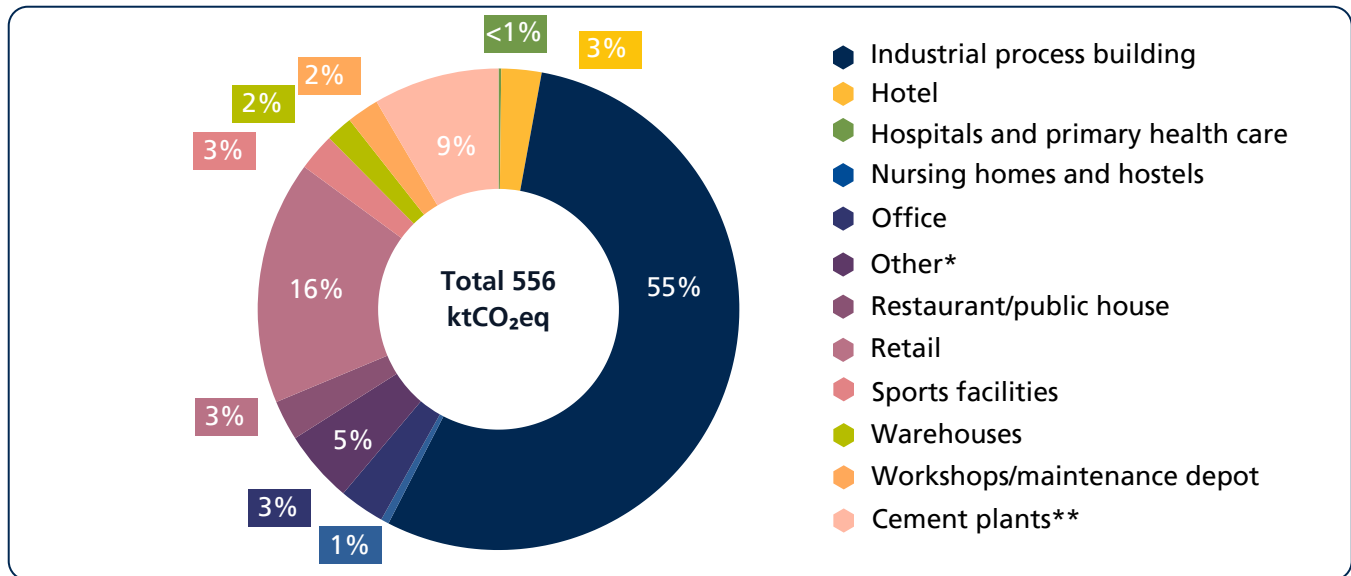


Figure 13 – The Figure above shows the emissions by manufacturing and commercial activity.

Sector	Emissions (ktCO <sub>2</sub> eq )	Emissions (% of sector total)
Hospitals and primary health care	< 1	< 1
Hotel	15	3
Industrial process building	304	55
Nursing homes and hostels	3	1
Office	17	3
Other*	27	5
Restaurant/public house	15	3
Retail	91	16
Sports facilities	14	3
Warehouses	10	2
Workshops/maintenance depot	12	2
Cement plants**	47	9

Table 12 – The table above shows the emissions by manufacturing and commercial activity.

\*Other includes all facilities not captured in the other categories including quarries, schools, creches, cinemas etc.

\*\* The emissions for cement plants only includes the stationary combustion occurring at the plants, the other emissions related to cement production are included within industrial processes.

For the manufacturing and commercial sector, the 2030 target is a reduction in emissions of 45%. This would require a reduction of 250 ktCO<sub>2</sub>eq in order to reach the emissions target of 306 ktCO<sub>2</sub>eq . Reducing emissions from the combustion related to industrial processes will be the key lever for this change.

## Sustainable sports and amenities

Sport plays a key role in the culture of Meath and to support this important element of our society the emissions associated with sport in the county was calculated as part of the manufacturing and commercial sector above. Sports facilities account for 14 ktCO<sub>2</sub>eq during the baseline year, approximately 3% of the manufacturing & commercial sector emissions.

The output from this can be further improved in future iterations of Meath's climate action plan through the gathering of more granular data in relation to the emissions relating to transportation around sporting activities.

Due to the key role that sport plays in Meath's society and the access it has to the community it could also be a core stakeholder in communicating the climate change message. The GAA has proven success supporting cultural issues like living healthy lifestyles. These clubs can be used to understand the attitudes and intentions of their members in the hope of potentially modifying behaviors to live a more sustainable lifestyle.

### 4.2.6 Residential

This sector accounts for all emissions from fuel combustion in households for domestic space and hot water heating. The primary sources of space heating (i.e. boilers) are oil and gas, while secondary sources (i.e. fireplaces) are predominately solid fuel.

A BER measures the energy performance of a home. They range from A1 (most efficient) to G (least efficient). They are calculated based on the energy required by the building for heating, cooling, ventilation and lighting by SEAI registered BER assessors. The National Climate Action Plan aims to retrofit 500,000 homes to a B2 BER or better. A BER rating has been established for the housing stock within County Meath and is split by type of dwelling.

A summary of the number of dwellings, average emissions and total emissions per each BER rating is shown below.

BER Rating	Number of dwellings	AverageCO <sub>2</sub> /m <sup>2</sup> /yr (kg)	Emissions(kt CO <sub>2</sub> eq)	Emissions (% of total residential sector)
Flat/Apartment				
A1	7	4	< 1	< 1
A2	232	8	< 1	< 1
A3	333	11	< 1	< 1
B1	85	18	< 1	< 1
B2	254	22	1	< 1
B3	712	27	2	< 1
C1	579	32	1	< 1
C2	1,350	37	4	1
C3	490	43	2	< 1
D1	844	51	3	1
D2	364	61	2	< 1
E1	369	70	2	< 1
E2	127	79	1	< 1
F	145	92	1	< 1
G	207	145	2	< 1

BER Rating	Number of dwellings	AverageCO <sub>2</sub> /m <sup>2</sup> /yr (kg)	Emissions(kt CO <sub>2</sub> eq)	Emissions (% of total residential sector)
House/Bungalows				
A1	355	4	0	< 1
A2	3,579	8	4	0
A3	5,536	11	8	1
B1	643	20	2	2
B2	1,251	25	6	1
B3	6,013	30	28	8
C1	13,790	36	68	19
C2	5,030	41	27	8
C3	3,808	48	23	7
D1	7,868	56	55	16
D2	2,177	68	18	5
E1	3,215	79	29	8
E2	872	91	9	2
F	1,651	106	19	15
G	2,199	182	37	11

Table 13 – The table above shows the number of dwellings, by dwelling type, in each BER rating and the associated emissions.

#### Number of dwellings per BER Rating

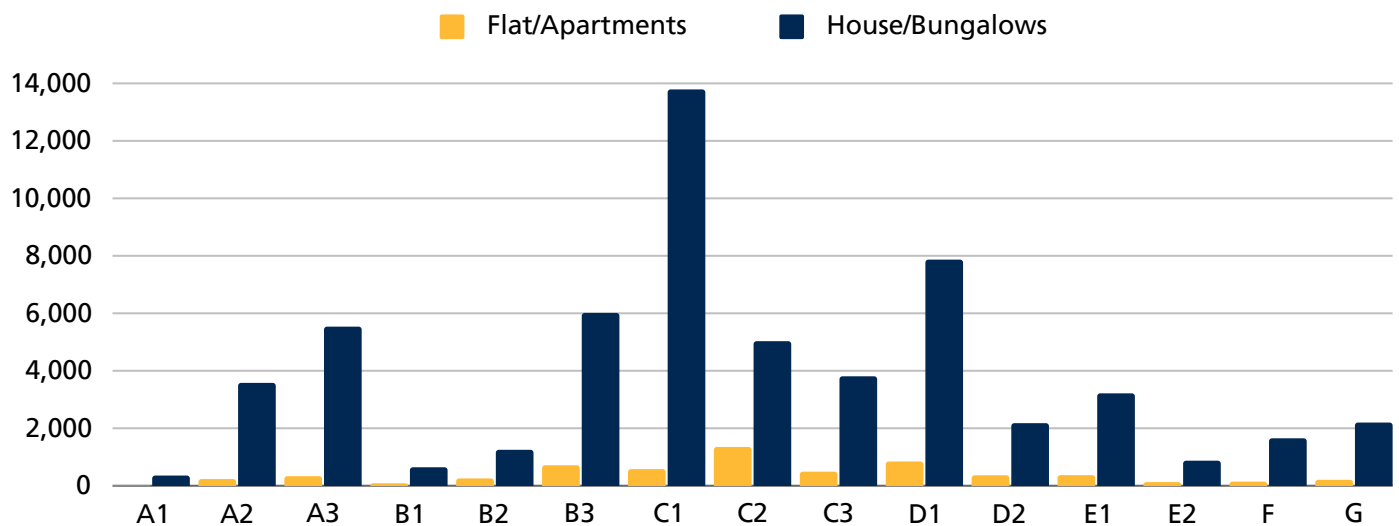


Figure 14 – The Figure above shows the number of dwellings in County Meath per each BER rating.

Energy ratings as recorded in 2018 has been analysed across the subset of residential housing (including social housing) and are noted as follows:

- Flat/Apartments make up 5% of emissions from this sector and the most common BER rating is C2, with an estimated 1,350 dwellings falling under this category. Average CO<sub>2</sub> emitted per sq. m each year for this BER rating is 37 kg.
- House/bungalows make up the remaining 95%, and the most common BER rating is C1, with an estimated 13,790 dwellings falling under this category. Average CO<sub>2</sub> emitted per sq. m each year for this BER rating is 36 kg.

## Meath County Council Social Housing

The table below shows a breakdown off all BER ratings that have been established for the social housing stock of County Meath and split by type of dwelling. Of the 4,210 social houses in County Meath, 2,911 have a BER rating.

BER Rating	Number of dwellings	BER Rating	Number of dwellings
Flat/Apartments		House/Bungalows	
A1	0	A1	24
A2	10	A2	215
A3	17	A3	373
B1	2	B1	34
B2	4	B2	30
B3	10	B3	106
C1	23	C1	314
C2	24	C2	462
C3	31	C3	335
D1	15	D1	310
D2	5	D2	178
E1	4	E1	124
E2	4	E2	103
F	2	F	93
G	0	G	59
Total:	151	Total:	2760

Table 14 – The table above shows the number of dwellings, by dwelling type in each BER rating for the social housing stock in County Meath.

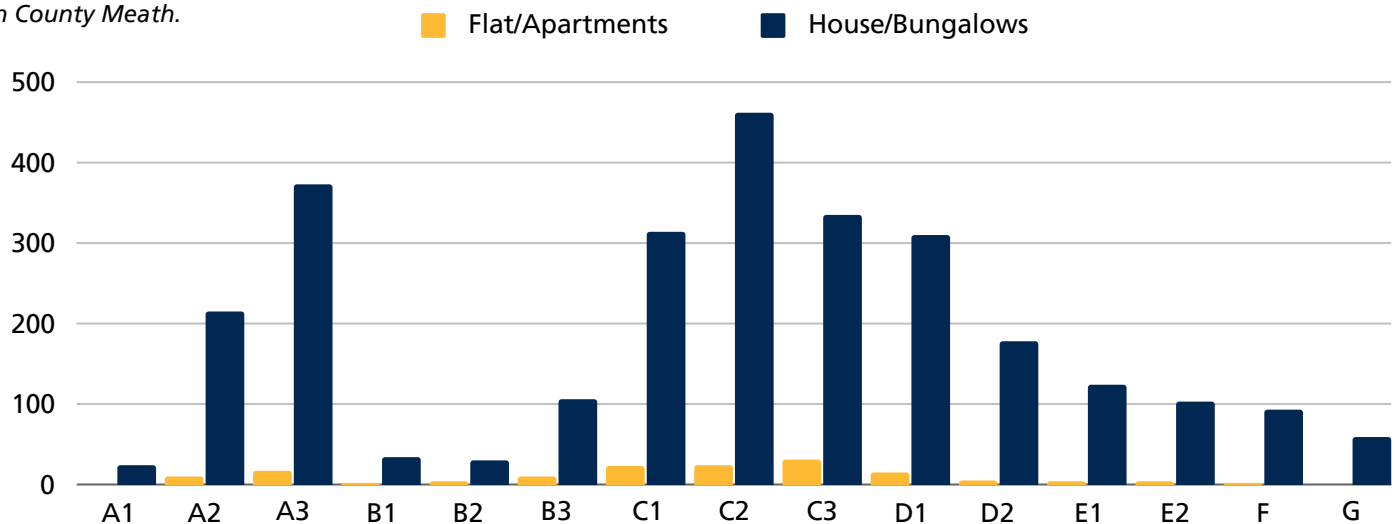


Figure 15 – The Figure above shows the number of social housing dwellings in County Meath per each BER rating.

Energy ratings for social housing as recorded in 2018 has been analysed and are noted as follows:

- Flat/apartments: in the subset of housing the most common BER rating is C3, with an estimated 80 dwellings falling under this category. The average CO<sub>2</sub> emitted per sq. m each year for this BER rating is 43 kg.
- For house/bungalows: in the subset of housing the most common BER rating is C2, with an estimated 953 dwellings falling under this category. The average CO<sub>2</sub> emitted per sq. m each year for this BER rating is 41 kg.

Additionally, a breakdown of the fuel usage within the residential sector is outlined below.

### Fuel Type by Number of Buildings (ktCO<sub>2</sub>eq)

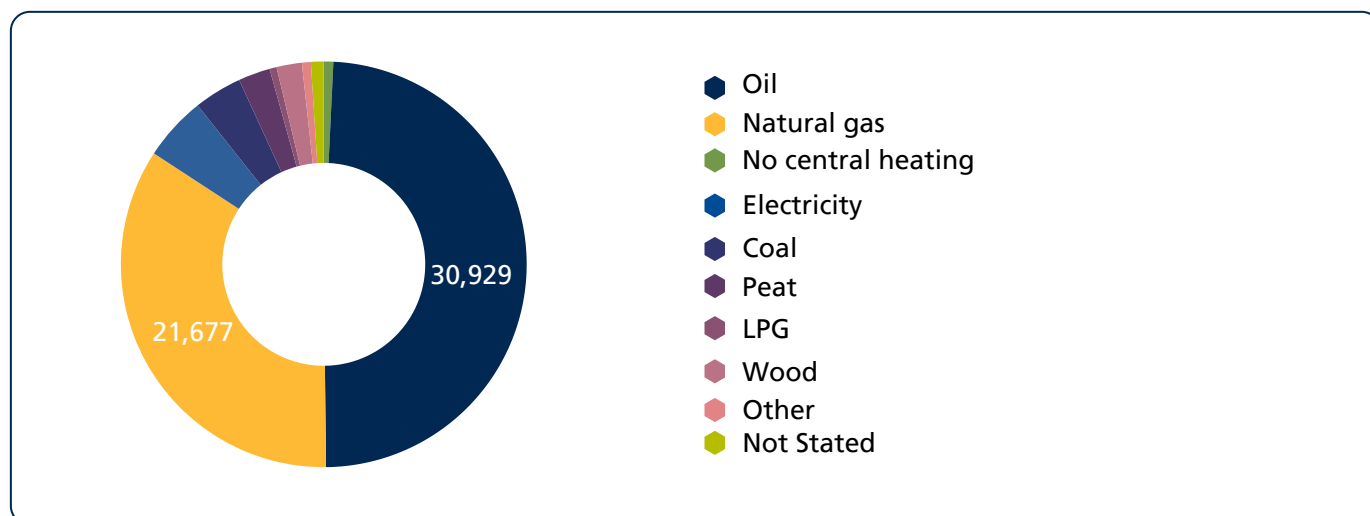


Figure 16 – The Figure above shows the fuel type by number of buildings.

Fuel type	Number of dwellings
No central heating	478
Oil	30,929
Natural gas	21,677
Electricity	3,225
Coal	2,413
Peat	1,601
LPG	351
Wood	1,274
Other	447
Not stated	642

Table 15 – The table above shows the breakdown of the central heating fuel used in the residential sector by number of dwellings.

For the residential sector, the 2030 target is a reduction in emissions of 40%, or 141 ktCO<sub>2</sub>eq, would require total emissions to be 212 kt CO<sub>2</sub>eq. Improving the BER ratings for houses in Meath will be the key lever for this change. Availing of programmes such as the Energy Efficiency Retrofitting Programme (EERP) will be a crucial for many households as they aim to improve their BER ratings in coming years. The 10-year programme reflects a significant upscaling from 'shallow' to 'deeper retrofit' and calls for the 'retrofit' of 500,000 homes on a national level to a B2 BER standard by 2030. It is anticipated that approximately 36,500 are expected to be local authority owned homes. Works eligible under the EERP include attic/cavity wall insulation or external wall insulation where required, windows and doors replacement, heat pump installation and ancillary and associated works. There are criteria laid out in the legislation to be considered when applying for funding under this programme.



## 4.2.7 Transport

This sector accounts for the burning of diesel and petrol in combustion engines (passenger cars, light duty vehicles, heavy duty vehicles and buses, railways, etc.) as well as those involved in pipeline transport (transmission of natural gas and fuel consumption in gas production)

Within this sector, 58% of emissions is related to the use of private vehicles, 30% is related to goods vehicles, 1% is related to railways and the remaining 12% is related to other vehicles such as tractors, forklifts, and public service vehicles.

### Transport Emissions (ktCO<sub>2</sub>eq)

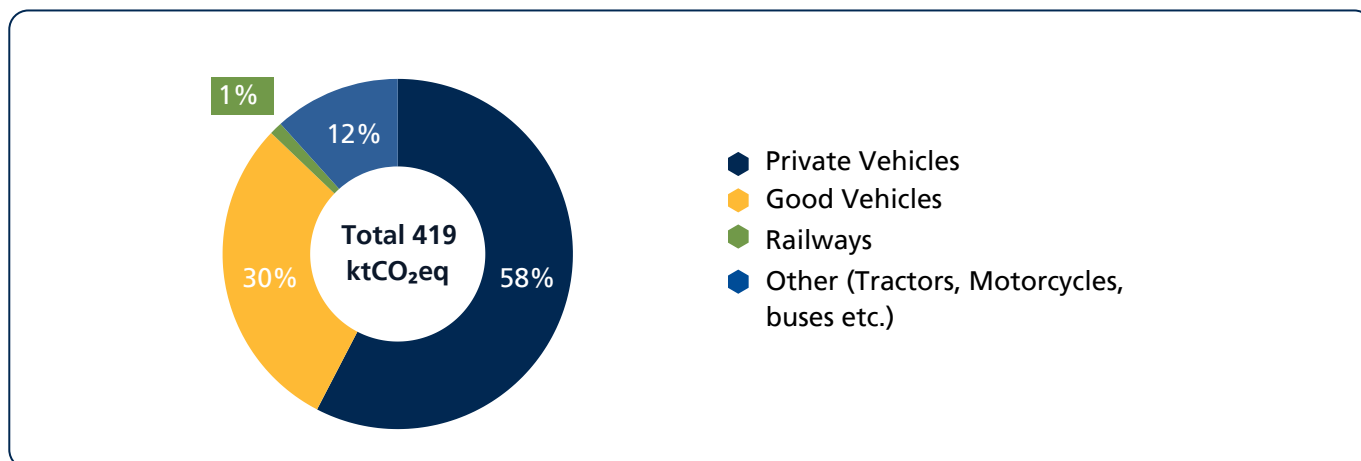


Figure 17 – The Figure above shows the emissions by type of vehicle.

Sector	Emissions (ktCO <sub>2</sub> eq)	Emissions (% of sector total)
Private Vehicles	242	58
Good Vehicles	124	30
Railways	5	1
Other (Tractors, Motorcycles, buses etc.)	49	12

Table 16 – The table above shows the emissions by type of vehicle.

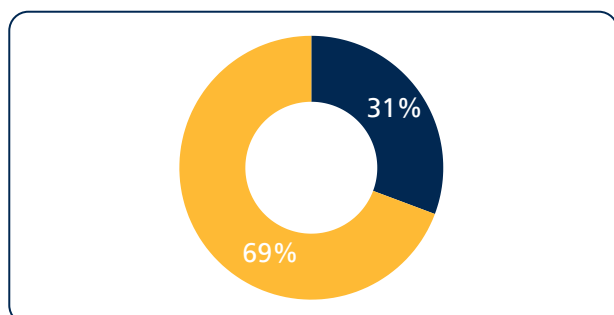


Figure 18 – The Figure above shows the breakdown in fuel for private vehicles.

Fuel	Emissions (ktCO <sub>2</sub> eq)	Emissions (% of fuel breakdown)
Petrol	74	31
Diesel	167	69

Table 17 – The table above shows the breakdown in fuel for private vehicles.

For the transport sector, the 2030 target is a reduction in emissions of 50%. This would require a reduction of 210 kt CO<sub>2</sub>eq in order to reach the emissions target of 210 kt CO<sub>2</sub>eq. Transitioning to more EVs will be the key lever for the transport sector.

#### 4.2.8 Waste

The waste sector includes emission estimates from solid waste disposal, composting, waste incineration (excluding waste to energy), open burning of waste and wastewater treatment and discharge.

Below is a breakdown of emissions located in County Meath.

#### Waste (ktCO<sub>2</sub>eq)

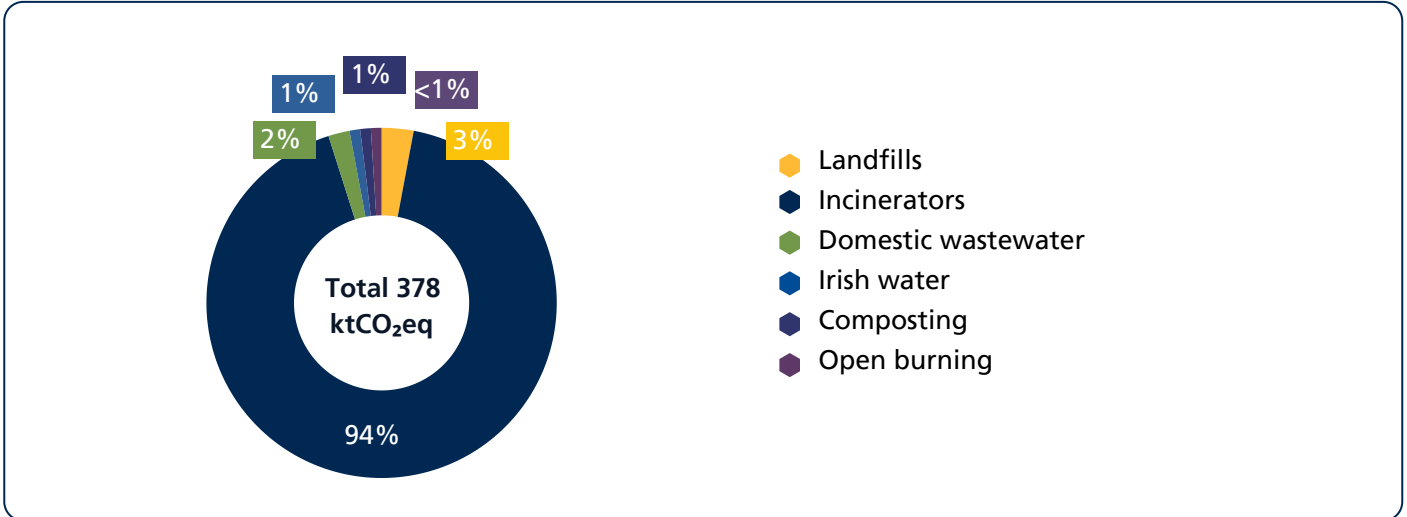


Figure 19 – The Figure above shows the emissions per type of waste.

Sector	Emissions (kt CO <sub>2</sub> eq)	Emissions (% of sector total)
Landfills	11	3
Incinerators	354	94
Domestic wastewater	6	2
Irish water	2	1
Composting	5	1
Open burning	0.21	< 1

Table 18 – The table above shows the emissions per type of waste.

For the waste sector, the 2030 target is a reduction in emissions of 50%. This would require a reduction of 189 ktCO<sub>2</sub>eq in order to reach the emissions target of 189 ktCO<sub>2</sub>eq. Reducing the amount of waste that goes to landfill and incineration by increasing recycling and composting will be a key lever for the waste sector.

### 4.3 Decarbonising Zones Baseline Emissions Inventory

The nine Decarbonising Zones (DZs) account for 19% of total emissions in County Meath, totalling 824ktCO<sub>2</sub>eq. The four main sectors where the emissions were material across the nine Decarbonising Zones were residential, manufacturing & commercial, transport and waste. Further breakdown of emissions within each of the decarbonising zones are available in Section 5.0 Decarbonising Zones of Meath County Council's Climate Action Plan.

#### Decarbonising Zones Emissions (ktCO<sub>2</sub>eq )

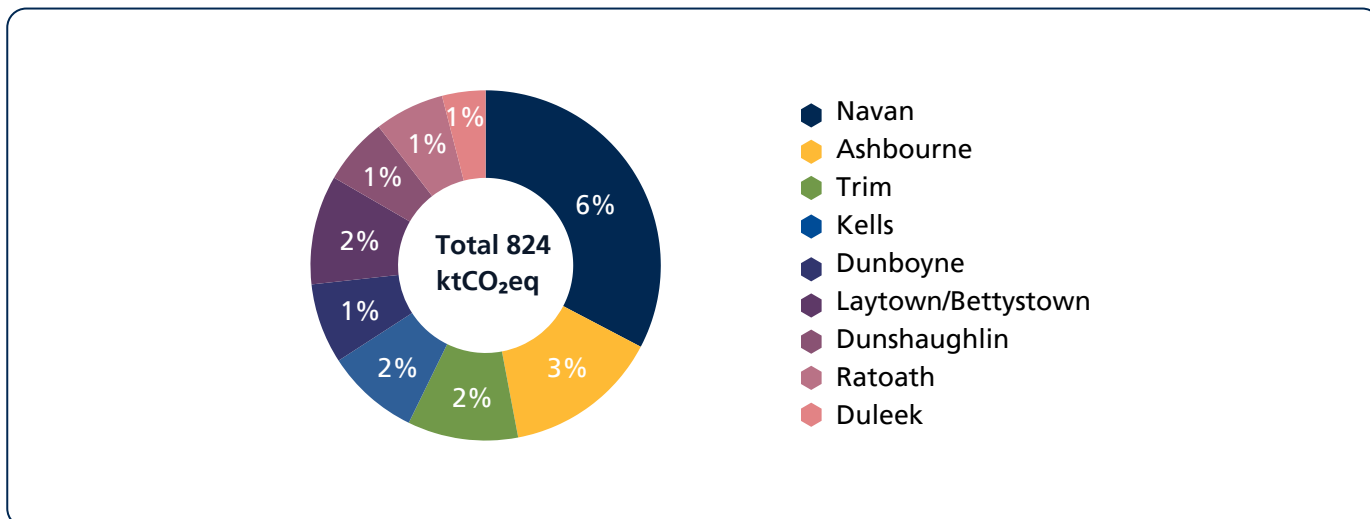


Figure 20 – The Figure above shows the ktCO<sub>2</sub>eq per Decarbonising Zone within County Meath.

DZ Zone	DZ Total	
	ktCO <sub>2</sub> eq	% of County Emissions
Navan	269	6
Ashbourne	118	3
Trim	84	2
Kells	71	2
Dunbooyne	61	1
Laytown/Bettystown	83	2
Dunshaughlin	51	1
Ratoath	53	1
Duleek	33	1
<b>Total of all DZ's</b>	<b>824</b>	<b>19</b>

Table 19 – The table above shows the ktCO<sub>2</sub>eq per each Decarbonising Zone within County Meath across the residential, manufacturing & commercial, transport and waste sectors as well as the percentage of the county-wide emissions.

## 5.0 Key Findings and Conclusion

In conclusion, the BEI assessment was performed for Meath County Council, County Meath, and nine DZs located throughout County Meath as noted within this annex. Meath County Council accounts for emissions of 7.6 ktCO<sub>2</sub>eq, representing less than one percent of County-wide emissions in Meath of 4,254 ktCO<sub>2</sub>eq. Additionally, the DZs identified account for 824 ktCO<sub>2</sub>eq, representing 19% of county-wide emissions for the material sectors identified.

The Figure below shows the current emissions in County Meath and the required 2030 target emissions levels for County Meath. A reduction of 51% of total emissions is required for all sectors combined.

**Current Emissions in County Meath V 2030 National Sectoral Targets (ktCO<sub>2</sub>eq )**

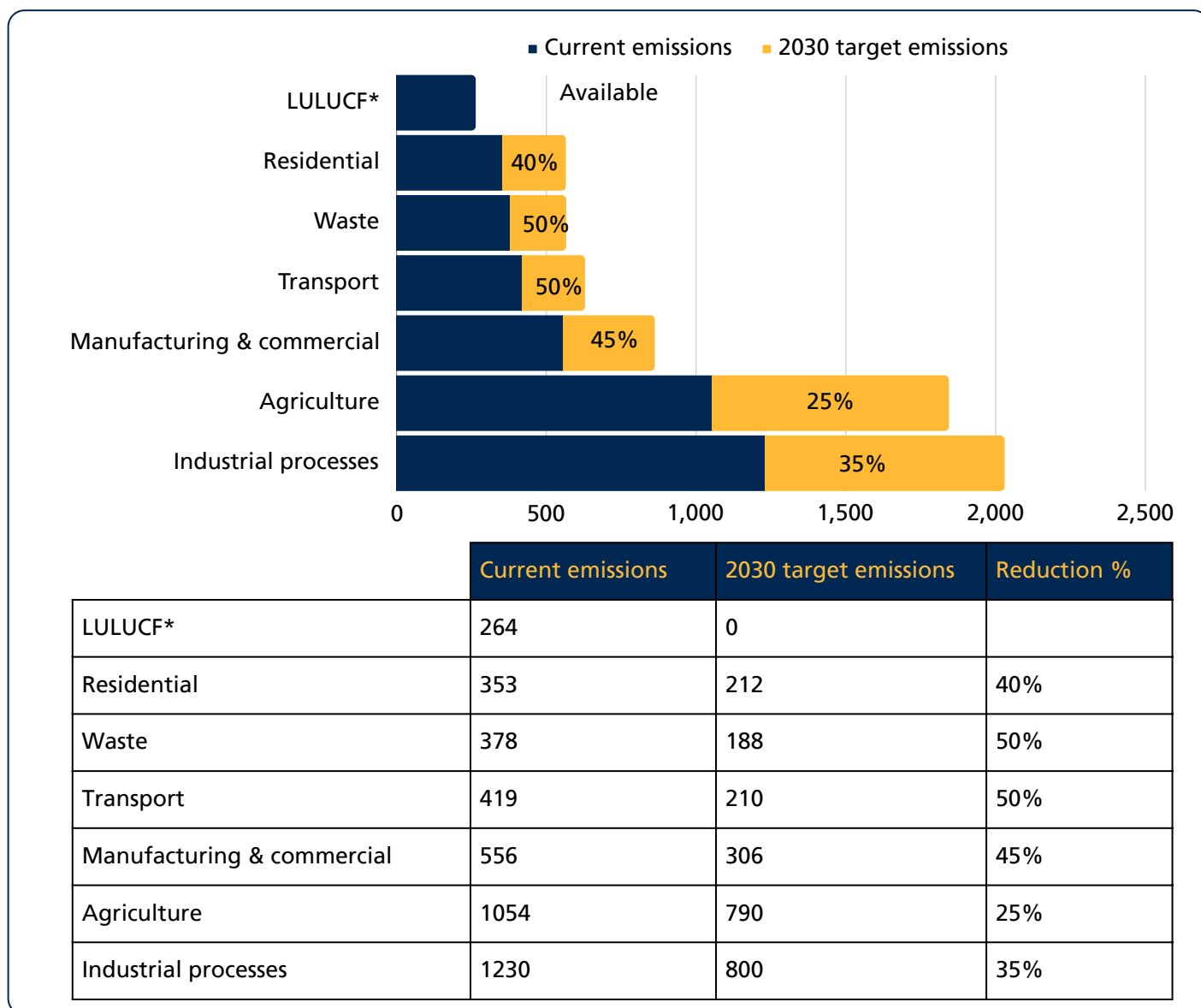


Figure 21 – Current emissions in County Meath V 2030 target emissions for County Meath.

\*A national percentage reduction target has currently not been set for the LULUCF sector.

For the industrial processes sector, the 2030 target is a reduction in emissions of 35%. This would require a reduction of 430 ktCO<sub>2</sub>eq in order to reach the emissions target of 800 ktCO<sub>2</sub>eq. Reducing emissions related to the cement production in Meath will be the key lever for this change.

For the agriculture sector, the 2030 target is a reduction in emissions of 25%. This would require a reduction of 264 ktCO<sub>2</sub>eq in order to reach the emissions target of 790 ktCO<sub>2</sub>eq . Reduction in this sector would be achieved through collaboration the local farming community across the county and participation in Teagasc and the Department of Agriculture, Food and the Marine initiatives.

For the manufacturing and commercial sector, the 2030 target is a reduction in emissions of 45%. This would require a reduction of 250 ktCO<sub>2</sub>eq in order to reach the emissions target of 306 ktCO<sub>2</sub>eq for this sector. Reducing emissions from the combustion related to industrial processes will be the key lever for this change. For the transport sector, the 2030 target is a reduction in emissions of 50%. This would require a reduction of 210 ktCO<sub>2</sub>eq in order to reach the emissions target of 210 ktCO<sub>2</sub>eq . Transitioning to more EVs will be the key lever for the transport sector.

For the waste sector, the 2030 target is a reduction in emissions of 50%. This would require a reduction of 189 ktCO<sub>2</sub>eq in order to reach the emissions target of 189 ktCO<sub>2</sub>eq . Reducing the amount of waste that goes to landfill and incineration by increasing recycling and composting will be a key lever for the waste sector.

For the residential sector, the 2030 target is a reduction in emissions of 40%. This would require a reduction of 141 ktCO<sub>2</sub>eq in order to reach the emissions target of 212 ktCO<sub>2</sub>eq for this sector. A focused approach to improving the BER ratings for houses in Meath will be a key lever for this change.

For the LULUCF sector, a national percentage reduction target has currently not been set. However, increasing the land cover associated with carbon sinks will be a key lever for LULUCF reduction.

This assessment will inform appropriate actions to be taken within County Meath to achieve the 2030 and 2050 national emissions targets, refer Section 6.0 Climate Action of Meath County Council's Climate Action Plan.

## 6.0 References and resources

- EPA MapEire 2019 local authority database
- CSO 2016 Census data
- SEAI BER public search results
- BER trends – publicpolicy.ie
- Valuation Office
- CSO 2009-2022 non-domestic data
- EPA: Greenhouse Gas Emissions by sector in 2022
- Climate Trace cement data
- Department of Transport vehicle data
- SEAI 2014 Energy in Transport report
- CSO 2019 Transport Omnibus
- CSO 2020 Agriculture census
- Teagasc 2020 Sectoral Roadmap
- EPA Ireland's National Inventory Report 2021: Greenhouse Gas Emissions 1990-2019
- DEFRA 2011/2012 Farm Energy use
- EPA Pollutant Release and Transfer Register
- SEAI conversion factors

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