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BASELINE EMISSIONS INVENTORY REPORT

Baseline Emissions Inventory Report for County Longford

Prepared for:

Longford County Council

AN LONGFORT CONNECTED
Comhairle Chontae An Longfoirt
Longford County Council
People • Place • Opportunity

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Abstract: This report presents the findings of a baseline emissions inventory study carried by Fehily Timoney and Company (FT) on behalf of Longford County Council. The report presents a 'helicopter overview' of baseline greenhouse gas emissions from various sectors in a year. This baseline report aims to raise awareness of climate change and the impact that different sectors in the midlands region have on Ireland's overall carbon emissions. It provides Longford County Council with the necessary information to make informed decisions on climate change actions to lower the county's carbon emissions. The sectors that have been included in this analysis are residential, commercial and industrial, industrial processes, agriculture, transport, waste and wastewater, and land use, and land use change and forestry (LULUCF). Emissions associated with the local authority's own operations have also been accounted for.

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1. INTRODUCTION

This report presents the findings of a 'Tier 1' Baseline Emission Inventory (BEI) study carried out by Fehily Timoney and Company (FT) for the county of Longford. The study has been carried out on behalf of Longford County Council. The report evaluates and determines the baseline greenhouse gas (GHG) emissions from various societal sectors in the county in 2018 and allows Longford County Council to measure the emission reductions required to achieve the emission reduction target of reducing GHG emissions by 51% by 2030. This baseline report aims to raise awareness of climate change and the impact that different sectors in the midlands region have on Ireland's overall carbon emissions. It provides Longford County Council with the necessary information to make informed decisions on climate change actions to lower the county's carbon emissions.

The sectors that have been included in this analysis residential, commercial and industrial, industrial processes, agriculture, transport, waste and wastewater, and land use, and land use change and forestry (LULUCF).

The methodology is based on the Tier 2 'Bottom Up' Approach defined in Annex C to the Draft Local Authority Climate Action Plan Guidelines.

The national emission reduction target of 51% by the end of 2030 is based on the GHG emissions reported for the end of 2018, in the national GHG emissions inventory. Accordingly, the data collated and analysed to inform this BEI is relative to the baseline year of 2018, or the nearest year possible to 2018.

GHG emissions are reported as Carbon dioxide (CO_2) or Carbon dioxide equivalent (CO_2-eq) in this report. The Global Warming Potential (GWP) of other GHGs (e.g., Methane, CH_4) has been factored to allow for reporting in CO_2-eq. Where the term 'emissions' in and of itself is used in this report, this refers solely to GHG emissions, and not non-GHG emissions (such as Sulphur oxides, SO_x, or Nitrogen oxides, NO_x).

2. CONTEXT

2.1.1 Climate Change Challenges

Climate change refers to the long-term changes in the earth's weather patterns or average temperatures. In Ireland this is demonstrated by rising sea levels, extreme weather events and changes in the eco-system. Extensive research and a significant body of evidence has shown a correlation between the increasing global average temperature and the increasing quantity of GHG released into the atmosphere, particularly from anthropogenic sources.

Changes in weather patterns and climate can have significant adverse impacts on the environment and human beings. The Intergovernmental Panel on Climate Change (IPCC) published the Climate Change 2022: *Impacts, Adaptation and Vulnerability in 2022*. Included in this report is an outline of observed impacts of climate change on the environment and human beings. These include impacts from inland flooding, damages to infrastructure, impacts from infectious disease, displacement, animal and livestock health and productivity, mental health and water scarcity derived from climate change.

The seriousness of the potential impacts and risks associated with climate change is reflected in the vast quantity of legislation that has been introduced to mitigate those impacts and risks, beginning with the establishment of the United Nations Framework Convention on Climate Change (UNFCCC) treaty in 1992. Subsequent significant, international treaties, agreements have been made and international gathering taken place since, including, the Kyoto Protocol, the Paris Agreement, 2030 Climate and Energy Policy Framework and the twenty-seven UNFCC, Convention of the Parties (COP) conferences that have taken places since its formation.

The Paris Agreement was the first-ever universal, legally binding global climate change agreement, adopted at the Paris climate conference (COP21) in December 2015.

There are many significant additional benefits to reducing GHG emission levels and increasing the share of renewable energies. These include a decrease in dependency on fossil fuels, which in turn results in a higher security of energy supply, better health, lower energy costs, an increase in the county's competitiveness, and a more sustainable economy.

2.1.2 2030 Energy and Emission Targets

The EPA has confirmed that Ireland has exceeded its 2020 target for GHG emissions by 6.73 Mt CO_2-eq. Projections indicate that Ireland can meet its targets over the 2021 – 2030 period but only with the full implementation of the Climate Action Plan and use of flexibilities the European Effort Sharing Regulation (ESR) provides.

The Climate Action and Low Carbon Development Act 2015 specifies that a national low carbon transition and mitigation plan and sectoral adaptation plans be drafted and approved by the Government in relation to climate change for the purpose of pursuing the transition to a low carbon, climate resilient and environmentally sustainable economy. The act required the establishment of the Climate Change Advisory Council and the creation and approval by the government of a National Mitigation Plan (to be published every five years), National Adaptation Framework and an Annual Transition Statement.

In 2017, the first National Mitigation Plan for Ireland was published but replaced in 2019 with the publication of a Climate Action Plan (Government of Ireland, 2019). In 2021, this Climate Action Plan (CAP) was subsequently updated. The 2021 plan sets out actions that must be taken to ensure delivery of commitments in the Programme of Government and the Climate Act 2021 (e.g., reducing GHG emissions by 51% by 2030 and to achieve net zero emissions by 2050). The achievement of this target will require significant, unanimous effort across all government departments and local authorities.

2.1.3 Baseline Emissions Inventories - *Setting Local and Regional Targets*

A key element of the Climate Action and Low Carbon Development Act as amended, relevant to local authorities is the requirement for local authorities to prepare individual climate action plans (CAPs) for their functional area. The plans include climate mitigation and adaptation measures and are required to be updated every five years. Local Authority Development Plans must also be aligned with their CAP.

The primary goal of the national CAP is to ensure a just transition to a climate neutral Ireland using *'an integrated, structured and evidence-based approach.'* The CAP also states, *'our capacity to anticipate and plan for a just transition requires the development of a robust evidence base to support policy development and effective ongoing monitoring'*. Furthermore *'data will play a critical role in assisting local authorities in forecasting where changes will occur (or are already underway), and who will be most impacted'*.

Longford. The BEIs will be a contemporary snapshot in time of emissions in County Longford and will act as a reference point on which specific county wide and/or sectoral targets can be established to manage and reduce GHG emissions.

The BEIs will also allow the monitoring and tracking of progress towards meeting those targets and the efficacy of any measures introduced by the local authority, through future updating of the emissions inventories.

Assessing sectoral contributions will define where reductions in GHG emissions are most needed to achieve GHG emissions targets. By assessing sectoral contributions to climate change and the risks they pose with respect to climate change, local authorities can rank sectors and sub-sectors with respect to their counties contribution to climate change and make informed, practical decisions on how they can contribute to and influence mitigating these risks within each sector in partnership with relevant stakeholders.

CAPs will be established for a duration of five years. It is expected that, at a minimum, and to maintain an up-to-date and accurate evidence base to inform decision making, BEIs would be revised at least every five years in line with each revision of the local authority CAPs. However, it is also advised that BEIs should be updated when new, significant evidence, data etc. is available.

3. BASELINE EMISSIONS INVENTORY

3.1 Residential

3.1.1 Methodology

The following methodology was used to determine emissions from the Residential sector.

- Map EIre on combustion related GHG emissions for the residential sector in the county was sourced.
- Central Statistics Office (CSO) data on metered electricity consumption for the residential sector in the county was sourced. GHG emissions associated with electricity consumption were calculated using the Sustainable Energy Authority Ireland (SEAI) emission factor for electricity in 2018.
- Residential sector GHG emissions for the county and per capita were calculated having regard to the above data.
- An estimate for main source of heating fuel for dwellings in the county was made using data from the CSO, which in turn is sourced from the Building Energy Rating (BER) database. This data was used to determine the number of dwellings in the county that rely on the following fuel types as their main source of space heating: Mains Gas, LPG, Heating Oil, Electricity, Solid Fuel. This aids the characterization of Residential sector emissions, providing an additional layer of insight.

3.1.2 Results

A breakdown of residential sector emission for the county for the baseline year is presented in Table 3-1 and Figure 3-1.

Table 3-1: Overview of Residential Emissions

Combustion Emissions in the County (from space heating and hot water) tCO_2-eq	84,565.55	68.65%
Electricity Emissions in the County (from electrical appliances and lighting) tCO_2-eq	38,624	31.35%

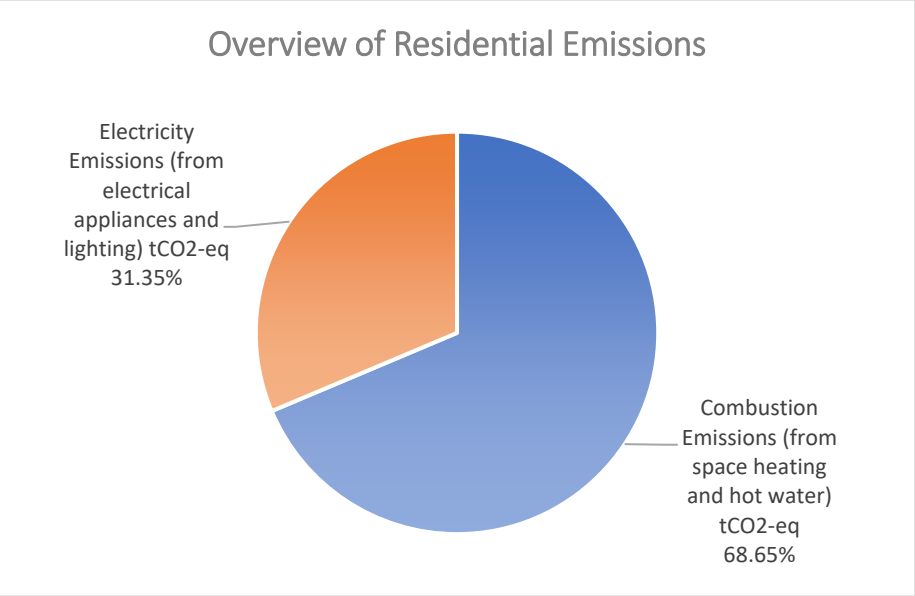

Figure 3-1: Overview of Residential Emissions

The majority of residential sector emissions are from the combustion of fuels for space heating and hot water (69%). Electricity related emissions account for 31% of residential emissions in the county.

The calculated emissions per capita in the baseline year for the county was 3.01 tCO_2-eq.

For an additional level of insight, a breakdown of main space heating fuels used at dwellings in the county is provided in Figure 3-2.

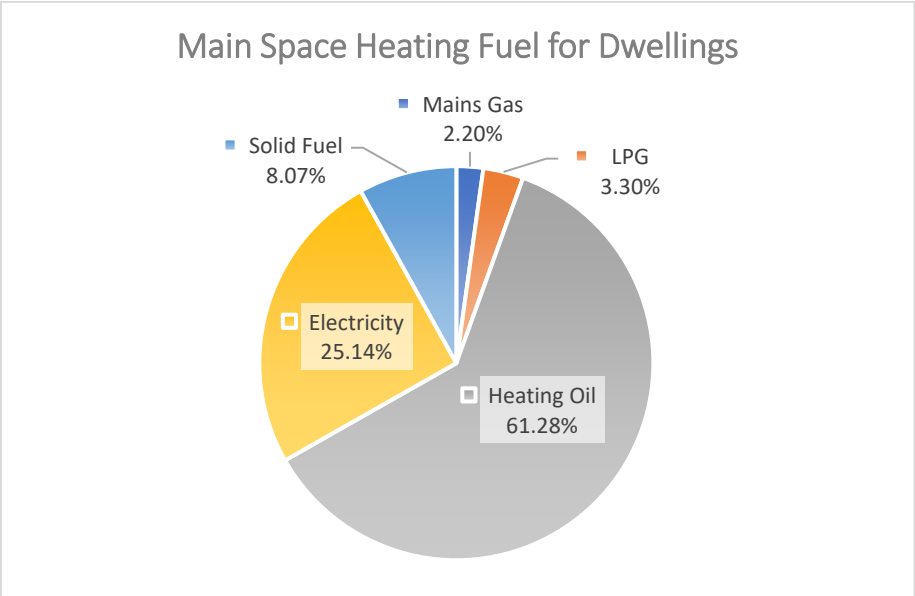

Figure 3-2: Breakdown of Main Space Heating Fuel for Dwellings

Heating oil is the primary source of main space heating fuel in the county (61%). It is commonly used in detached and semi-detached dwellings in rural areas. The combustion of heating oil generates a higher level of emissions per unit of energy compared to the combustion of many other heating fuels such as gas or LPG. The use of heating oil has significant contribution to residential sector emissions in the county.

Electricity accounts for 25% of main space heating fuel use in the county. This is a relatively high figure. This practice is generally more common in apartments.

A noteworthy number of dwellings use solid fuel as a main space heating fuel (8%). This is likely due to the presence of a significant level of bogland in the county and the relatively high number of dwellings that use peat sourced from these lands as their main space heating fuel. Solid fuel burning will generate a relatively higher level of emissions compared to other commonly used space heating fuels due to its carbon intensity.

3.1.3 Assumptions and Limitations

The following assumptions and limitations exist in relation to the Residential sector data:

- The 'Top Down' methodology employed in this instance results in a broad, high-level estimation of GHG emissions from this sector in the county. A degree of 'uncertainty of measurement' therefore exists in relation to the emissions data.
- All assumptions and limitations relating to Map EIre national inventory emission data apply to the emissions data presented, as this data is informed by Map EIre data.
- The CSO database for heating fuel type only considers dwellings in the county that have had BER Ratings completed from them. The use of BER data is limited in that it only provides data for dwellings that have had BERs carried out on them, which only represents a proportion of the general housing stock. BER data does however provide a good representation of the housing stock generally given the level of BERs carried out on housing in the county.

3.1.4 Data Sources

1. Map EIre / Environmental Protection Agency National Emission Inventory, Local Authority Emissions, 2021.
2. Central Statistics Office, Metered Electricity Consumption, 2018.
3. Central Statistics Office, Main Space Heating Fuel Per County, 2018.
4. SEAI, Energy in Ireland, 2018.
5. CSO, Census of Population, 2016.

3.2 Commercial and Industrial

3.2.1 Methodology

The following methodology was used to determine emissions from the Commercial and Industrial sector.

- Raw data on commercial and industrial sector combustion related GHG emissions for 2018 was sourced from the Map EIre / the EPA's National Emission Inventory (2021) for the county. This emissions data is broken down by emissions from the combustion of fossil fuels in the commercial services sub-sector and the manufacturing sub-sector.
- Total non-residential electricity use levels for 2018 for the county was sourced from Electricity Supply Board (ESB) / CSO databases on metered electricity consumption. This total is then multiplied by the SEAI's electricity emission factor for 2018 to determine electricity related GHG emissions in the commercial and industrial sector for the year.
- The total GHG emissions in tCO_2 for the county is then calculated by adding the combustion and electricity GHG emissions.

3.2.2 Results

The commercial and industrial sector in the county generates 71,551 tCO_2. 77% of these emissions are due to electricity consumption in the sector, whilst 23% are due to combustion related emissions (See Figure 3-3).

70% of combustion related emissions originate from the commercial services sub-sector. 30% of combustion related emissions originate from the manufacturing sub-sector (See Figure 3-4).

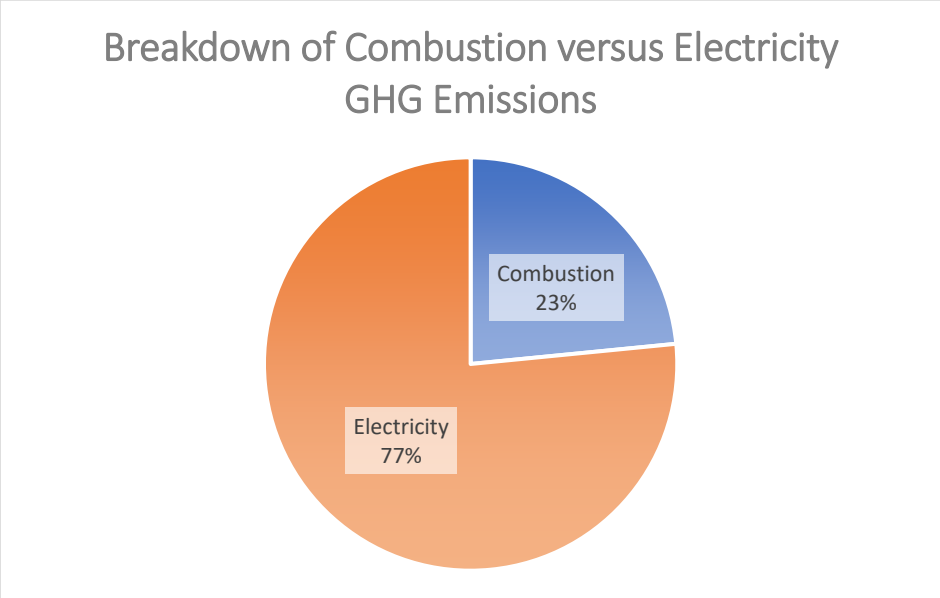

Figure 3-3: Percentage Breakdown of GHG emissions in the Commercial and Industrial Sector (combustion versus electricity)

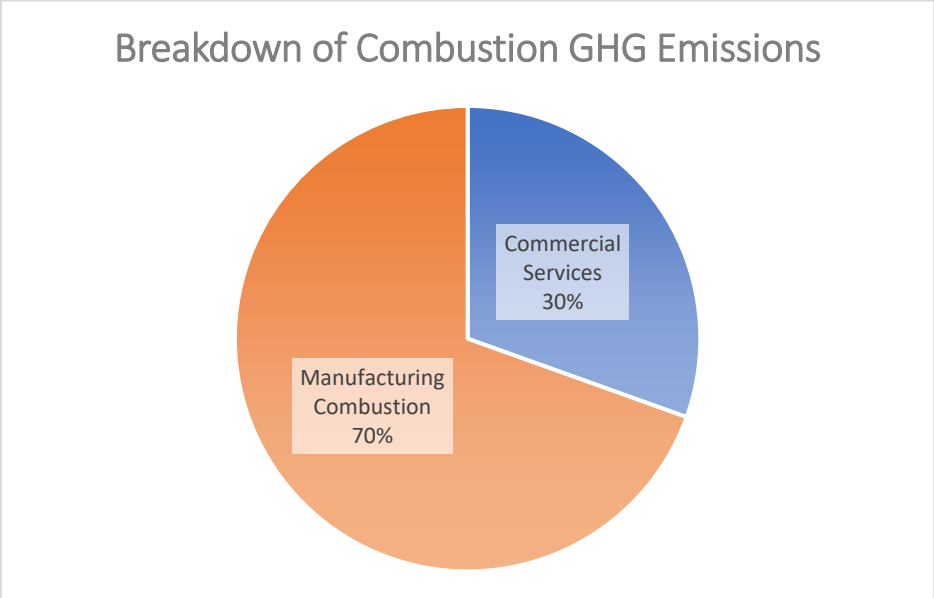

Figure 3-4: Percentage Breakdown of combustion GHG emissions (commercial services versus manufacturing combustion)

3.2.3 Assumptions and Limitations

The following assumptions and limitations exist in relation to the Commercial and Industrial sector data:

- The 'Top Down' methodology employed in this instance results in a broad, high level estimation of GHG emissions from this sector in the county. A degree of 'uncertainty of measurement' therefore exists in relation to the emissions data.

- All assumptions and limitations relating to Map EIre national inventory emission data apply to the emissions data presented, as this data is informed by Map Eire data.

No other assumptions and limitations exist in relation to the Commercial and Industrial sector data. It is noted that 'Industrial Processes' is considered as a separate category within this report.

3.2.4 Data Sources

- Map EIre / Environmental Protection Agency, National Emission Inventory, Local Authority Emissions, 2021.
- MEC03 - Metered Electricity Consumption. Central Statistics Office. <https://data.cso.ie/>. Accessed on the 23rd November 2022.
- Energy in Ireland – 2019 Report. Sustainable Energy Authority of Ireland, 2019. <https://www.seai.ie/publications/Energy-in-Ireland-2019-.pdf>

3.3 Industrial Processes

3.3.1 Methodology

The following methodology was used to determine emissions from the Industrial Processes sector.

- A breakdown of emissions for the sector was obtained from the Map EIre database. The Access database file contains emissions from all sectors for all Irish counties separated into different sub-categories. The emissions data for Industrial Processes specific to the county was extracted.
- The GHG Emissions from the database are categorised into various pollutants (i.e. CO_2, CH_4, N_2O and SF_6). The emissions figures for these pollutants were converted to CO_2-eq with reference to the GWP value for each substance.

3.3.2 Results

A breakdown of industrial process related emissions is provided in Table 3-2 and illustrated in Figure 3-5.

Table 3-2: Breakdown of Industrial Processes Emissions

Industry Category	GHG Emissions (tCO_2eq)
Mineral	75.97
Chemical	0.00
Metal	0.00
Non-energy Products from Fuels and Solvent Use	1,052.33
Electronics	0.00
Product Uses as Substitutes for ODS	0.00
Other Product Manufacture and Use	4,173.03
Other - Food and Beverage	76.17

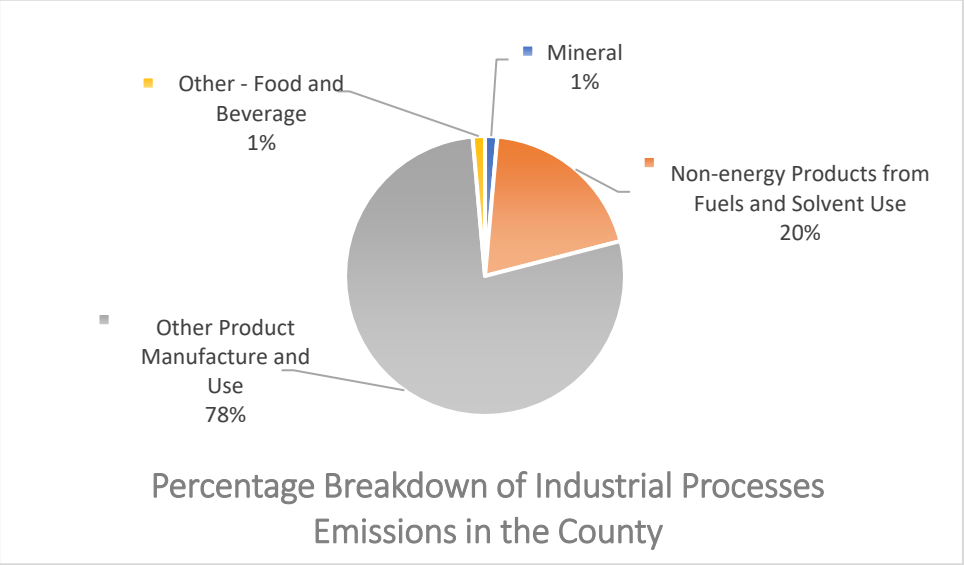

Figure 3-5: Breakdown of Industrial Processes Emissions

GHG emissions from industrial processes in the county arise from 4 main subcategories. Emissions from 'Other Product Manufacture and Use' are the highest (78%) at 4,173 tonne CO_2eq, followed by 'Non-energy products from fuels and solvent use' (20%) at 1,052 tonne CO_2eq, A relatively minor level of emissions arise from 'Other - Food and Beverage' (1%) and 'Minerals' (1%).

3.3.3 Assumptions and Limitations

The following assumptions and limitations exist in relation to the Industrial Processes sector data:

- The 'Top Down' methodology employed in this instance results in a broad, high-level estimation of GHG emissions from this sector in the county. A degree of 'uncertainty of measurement' therefore exists in relation to the emissions data.
- All assumptions and limitations relating to Map EIre national inventory emission data apply to the emissions data presented, as this data is informed by Map EIre data.

3.3.4 Data Sources

- Map EIre / Environmental Protection Agency National Emission Inventory 2021.

3.4 Agriculture

3.4.1 Methodology

County level agricultural data was obtained from the CSO's Census of Agriculture. This data was broken down into different agricultural activities relevant to the county.

Once all data was obtained, a breakdown of agricultural sector related emissions was developed. These emissions were broken into two categories, as follows:

- Livestock (sum of cattle (suckler and dairy), pigs, sheep and poultry).

- Managed Soils (sum of direct and indirect N_2O emissions, limestone emissions and urea application emissions).

Livestock emissions at county level was determined with reference to national emissions statistics, the national herd, and the herd in the county. This was considered to be the most representative and accurate method for determining emissions for livestock.

Managed soils emissions at county level were estimated with reference to national emission statistics for direct and indirect N_2O emissions, limestone emissions and urea application emissions; and the area of managed agricultural soils nationally compared to the area of managed soils in the county.

3.4.2 Results

A breakdown of livestock numbers in the county is presented in Table 3-3

Table 3-3: Breakdown of Livestock Numbers in the County

Breakdown of Livestock Numbers in the County	
Livestock Type	**Livestock Numbers**
Dairy Cows	11,817
Other Cattle and Cows	108,013
Sheep	57,926
Pigs	84,865
Poultry	27,200

Cattle farming is the primary type of livestock farming in the county. Other cattle and cows (for beef production) constitute 37% of total livestock numbers within the county. In terms of numbers, this is followed by pigs, then sheep, poultry and dairy cows.

A breakdown of agricultural related emissions in the baseline year is presented in Table 3-4.

Table 3-4: Breakdown of Agricultural Emissions

Type	CO_2-eq Emissions (tCO_2-eq)
Livestock	
Cattle	216,241.54
Sheep	8,367.47
Pigs	17,717.88
Poultry	257.79
Managed Soils	
Managed Soils	108,267
Totals	

Type	CO_2-eq Emissions (tCO_2-eq)
Total Livestock	242,584.68
Total Managed Soils	108,266.77
Overall Total	350,851.45

A breakdown of livestock related emissions is presented in Figure 3-6.

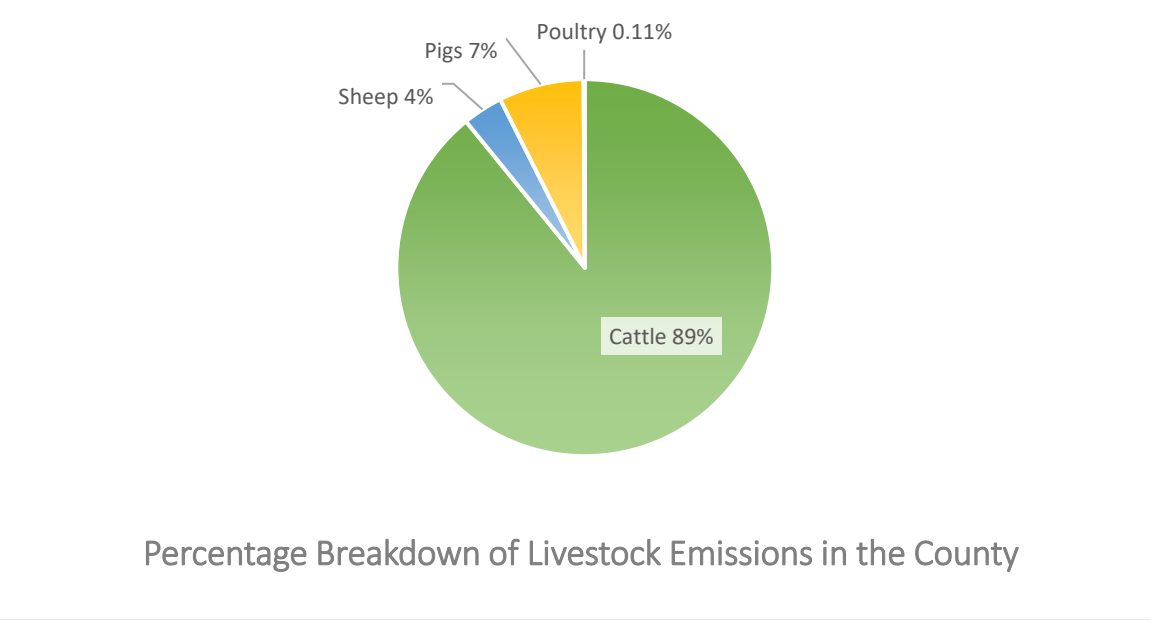

Figure 3-6: Percentage Breakdown of Livestock Emissions

Emissions from cattle (beef and dairy cows) combined contribute the most in terms of livestock related emissions by far, accounting for 89% of CO_2-eq emissions from agriculture in the county. Cattle produce much more methane emissions than other livestock, and due to the higher global warming potential of methane, their impact is much larger on the environment. Emissions associated with sheep, pig and poultry farming are relatively low by comparison.

Managed soils in the county generated 108,266 tCO_2-eq emissions in the baseline year.

Agricultural emissions for the county broken down by the two overarching categories, total livestock, and managed soils combined are presented in Figure 3-7.

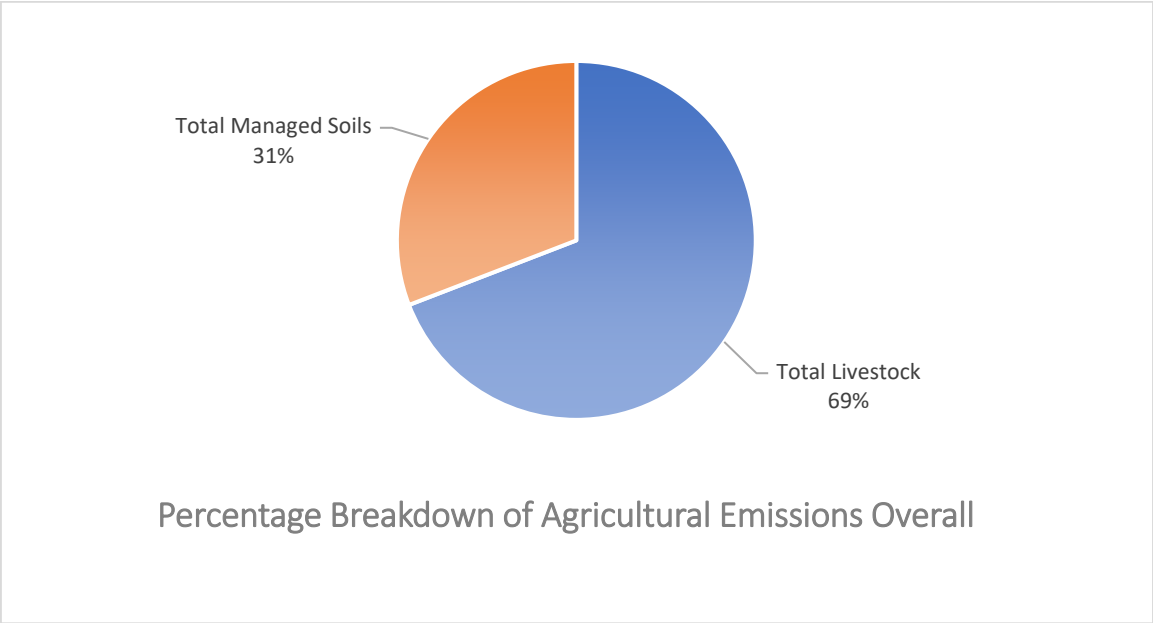

Figure 3-7: Percentage Breakdown of Agricultural Emissions Overall

Livestock emissions account for the majority of emissions from the sector overall (69%). Managed soils emissions are lower by comparison, yet still significant (31%).

3.4.3 Assumptions and Limitations

The following assumptions and limitations exist in relation to the Agricultural sector data:

- The 'Top Down' methodology employed in this instance results in a broad, high-level estimation of GHG emissions from this sector in the county. A degree of 'uncertainty of measurement' therefore exists in relation to the emissions data.
- All assumptions and limitations relating to Map EIre national inventory emission data apply to the emissions data presented, as this data is informed by Map EIre data.
- National emissions data for 'Other Livestock' defined in the EPA's national emission inventory has been assumed to relate to Poultry. This 'Other Livestock' category includes poultry, goats, horses and mink, however, in terms of population, poultry accounts for the vast majority of livestock under this category.
- It is assumed that all managed agricultural soils in the county release the same level of emissions. In reality, emissions levels will vary depending on the type and level of fertilizer, lime or urea application on those soils based on their specific use (i.e., pasture, wheat, barley, potatoes).

3.4.4 Data Sources

- Map EIre / Environmental Protection Agency, National Emission Inventory 2021.
- Central Statistics Office, Census of Agriculture, 2020.

3.5 Transport

3.5.1 Methodology

The following methodology was applied to determine transport related emissions in the county:

- GHG emissions data for the transport sector was sourced from the Map EIre database / the EPA's National Emission Inventory 2021. This database provides a breakdown of emission for a number of transport sub-categories. Various emission types (CH_4, N_2O) reported were converted to tCO_2-eq using the GWP for each type of emission.
- For an additional layer of insight, an estimation of GHG emissions per single unit of each vehicle type is made by dividing emissions associated with each vehicle type by vehicle population. The CSO's Transport Omnibus from 2018 was reviewed to ascertain the vehicle population in the county for 2018 for each vehicle type.

3.5.2 Results

Detail on GHG emissions associated with each transport category in the county is provided in Table 3-5 and illustrated in Figure 3-8.

Table 3-5: Breakdown of Transport Emissions in the County

Transport Category	GHG Emissions (tCO_2-eq)
Passenger cars	103,751.77
Light-duty trucks	27,822.32
Heavy-duty vehicles	59,712.25
Motorcycles	240.49
Railways	1,824.48

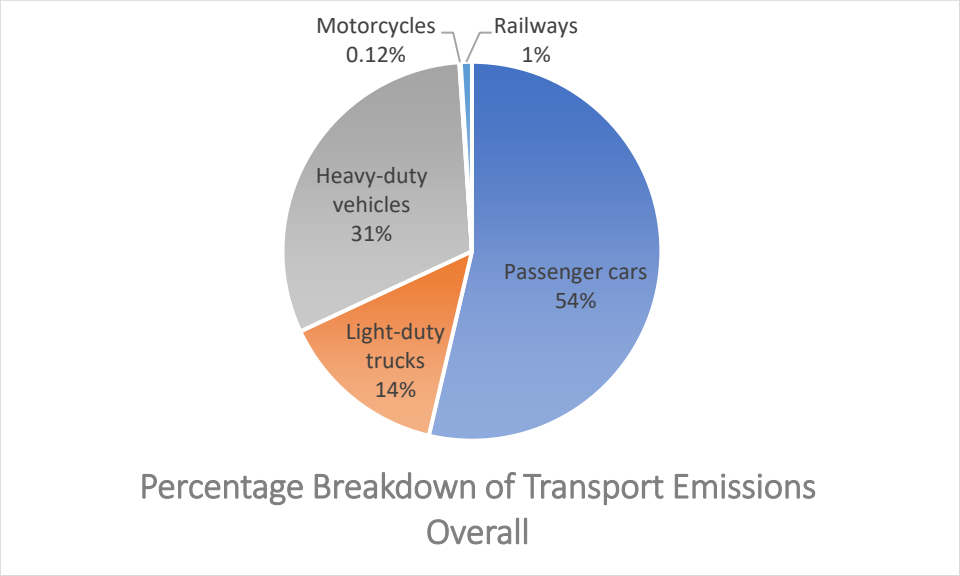

Figure 3-8: Breakdown of Transport Emissions in the County

Passenger cars are the primary source of transport related GHG emission in the county (54%), followed by heavy duty vehicles (31%), then light duty trucks (14%). Emissions from railways are relatively minor, which reflects the low level of railway services in the county. Emissions from motorcycles are relatively minor, which reflects the low number of this type of vehicle in the county. Transport related emission in the county were closely similar to other counties in the midlands region

An estimation of emissions per single unit of each vehicle type is presented in Figure 3-9.

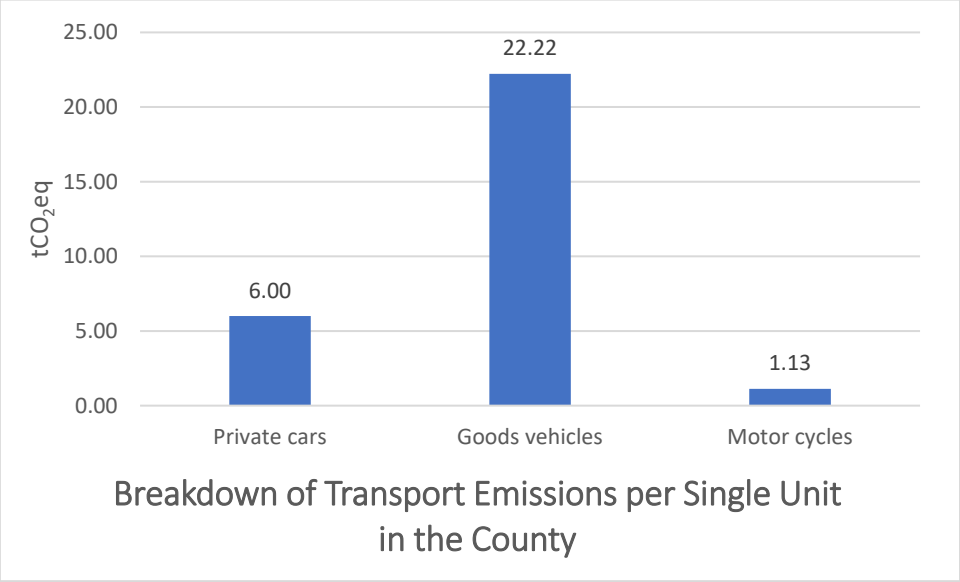

Figure 3-9: Emissions per Single Unit of Vehilce Type

Goods vehicles are the most carbon intensive vehicle type in the county. This reflects the relatively high level of carbon emissions associated with these weight laden vehicles. Private cars are next most carbon intensive vehicle type in the county, followed by motorcycles.

3.5.3 Assumptions and Limitations

The following assumptions and limitations exist in relation to the Transport sector data:

- The 'Top Down' methodology employed in this instance results in a broad, high-level estimation of GHG emissions from this sector in the county. A degree of 'uncertainty of measurement' therefore exists in relation to the emissions data.
- All assumptions and limitations relating to Map EIre national inventory emission data apply to the emissions data presented, as this data is informed by Map EIre data.
- When determining emissions per single unit of vehicle type goods vehicles (as defined by the CSO) were assumed to be inclusive of both light duty trucks and heavy-duty vehicles. Heavy duty vehicles were also inclusive of buses.

3.5.4 Data Sources

- Map EIre / Environmental Protection Agency, National Emission Inventory 2021.
- Transport Omnibus 2018, Central Statistics Office, 2018.

3.6 Waste and Wastewater

3.6.1 Methodology

3.6.1.1 Waste

Qualitative analysis of the waste sector in the county was carried out to determine the level of GHG emissions associated with the sector. The following waste categories defined in the EPA's National Emission Inventory 2021 were examined.

- Managed Waste Disposal,
- Composting,
- Anaerobic Digestion (AD),
- Incineration, and
- Open Burning of Waste.

Using national emissions data for the managed waste disposal, incineration and open burning of waste categories defined in the EPA's National Emission Inventory 2021, emissions associated with this sector for the county were estimated for the county on a pro-rata basis considering national and county population levels. The accumulated emissions data for these waste activities in the county were combined to determine emissions in tCO_2-eq for the baseline year.

There are no composting or anaerobic digestion facilities in the county. Thus, there are no emission in the county from these categories of waste facility.

For open burning of waste, there is no local data on GHG emissions from this unregularized and uncontrolled activity.

3.6.1.2 Wastewater

Using national emissions data for the wastewater sector defined in the EPA's National Emission Inventory 2021, emissions associated with this sector for the county were estimated for the county on a population pro-rata basis.

3.6.2 Results

3.6.2.1 Waste

A breakdown of the emissions from the waste sector in the county is presented in Table 3-6 and illustrated in Figure 3-10.

Table 3-6: Emissions from the Waste Sector in the County

Waste Category	National GHG Emissions 2018 (tCO_2eq)	County GHG Emissions (tCO_2eq)
Managed Waste Disposal Sites	692,700	5,946
Waste incineration	20,300	174
Open burning of waste	3,630	31
Composting	42,000	0
Anaerobic Digestion at biogas facilities	2,400	0

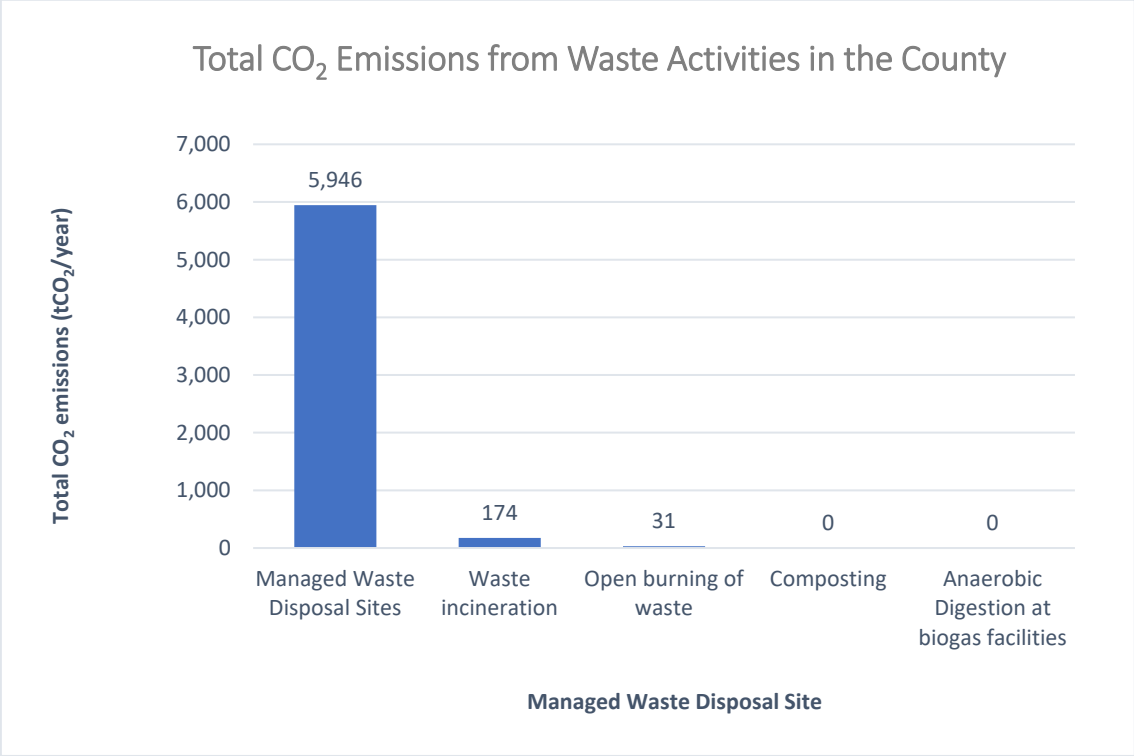

Figure 3-10: Emission from the Waste Sector in the County

The waste sector in the county generated 6,151 tCO_2 in the baseline year. 97% of waste sector emissions originate from managed waste disposal sites, namely managed landfills including closed or historic landfills still generating Methane and Carbon dioxide emissions due to the decomposition of waste inside the waste bodies of the landfills.

3.6.2.2 Wastewater

Estimates for GHG emissions from the wastewater sector in the county for the baseline year are presented in Table 3-7.

Table 3-7: Wastewater Emissions

Sector Category	National GHG Emissions 2018 (tCO_2eq)	County GHG Emissions 2018 (tCO_2eq)
Domestic Wastewater	147,900.00	1,269.5

3.6.2.3 Summary

A summary of the key findings for the waste and wastewater sectors is presented below:

- Total emissions from the waste sector in the county were estimated to be 6,151 tCO_2-eq.
- The majority of waste sector emissions in the county are generated by managed landfills.

- Total emissions from the wastewater sector in the County were estimated to be 1,269.5 tCO_2-eq, which represents a small fraction of domestic wastewater emissions nationally.

3.6.3 Assumptions and Limitations

The following assumptions and limitations exist in relation to the Waste and Wastewater sector data:

- The 'Top Down' methodology employed in this instance results in a broad, high-level estimation of GHG emissions from this sector in the county. A degree of 'uncertainty of measurement' therefore exists in relation to the emissions data.
- All assumptions and limitations relating to Map EIre national inventory emission data apply to the emissions data presented, as this data is informed by Map EIre data.
- Managed waste disposal related to all regularized landfills including operational landfills and closed or historic landfills.

3.6.4 Data Sources

- Map EIre / Environmental Protection Agency, National Emission Inventory, EPA, 2021.
- EPA IE licence, IPC licence, waste licence and WFP search databases and licence files for landfills contained within them - accessed 28/11/2022.

3.7 Land Use, Land Use Change and Forestry (LULUCF)

3.7.1 Methodology

The following methodology was used to determine emissions from the LULUCF sector.

- A breakdown of emissions for the sector was obtained from the Map EIre database. The Access database file contains emissions from all sectors for all Irish counties separated into different sub-categories. The emissions data for LULUCF specific to the county was extracted.
- The GHG Emissions from the database are categorised into various pollutants (i.e. CO_2, CH_4, N_2O and SF_6). The emissions figures for these pollutants were converted to CO_2-eq with reference to the GWP value for each substance.

3.7.2 Results

A breakdown of GHG emissions relating to land use, land use change and forestry for the various land uses in the county for the baseline year is presented in Table 3-8 and Figure 3-11.

Table 3-8: Breakdown of LULUCF Emissions in the County

Sector Category	GHG Emissions (tCO_2eq)
Forestland	-56,082.63
Cropland	-508.85
Grassland	155,556.71

Sector Category	GHG Emissions (tCO_2eq)
Wetlands	40,498.01
Settlements	1,430.45
Other land	0.00
Harvested wood products	-5,537.52

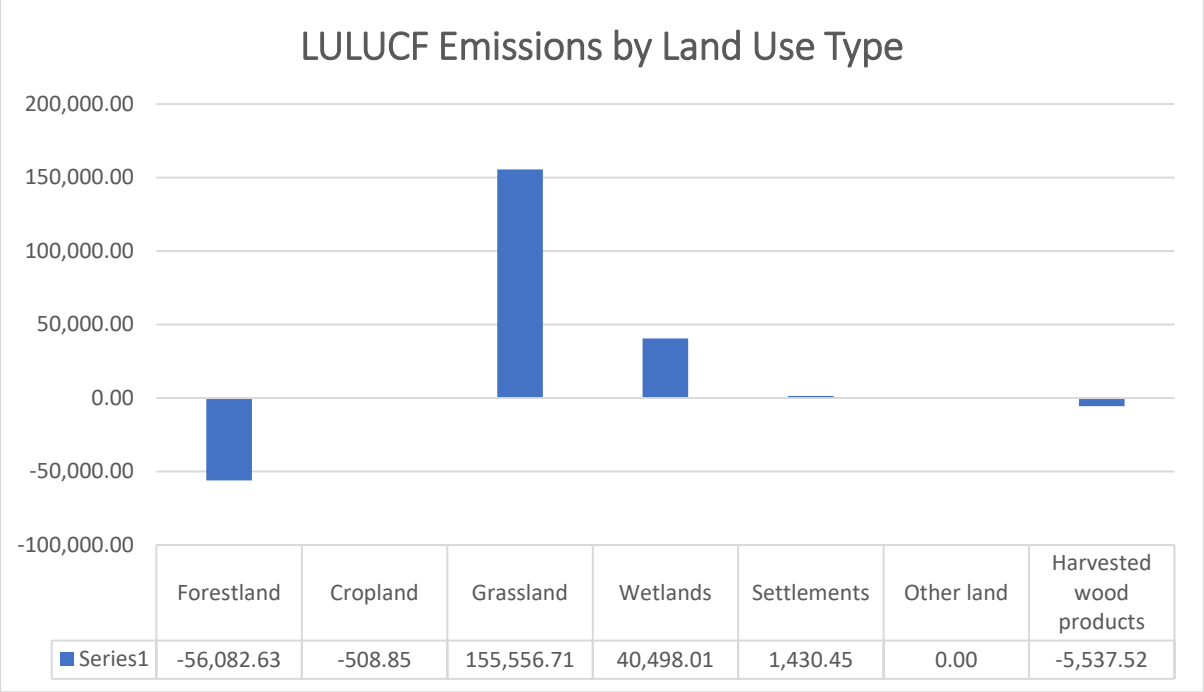

Figure 3-11: Breakdown of LULUCF Emissions in the County

Grassland in the county is the land use type that contributes most in terms of emissions, followed by the Wetlands, Settlements and Other Land categories. Forestland and Cropland serve to absorb CO_2 considering both CO_2 gains and losses overall. Forestland and Cropland generally absorb more carbon (e.g., through vegetative photosynthesis) than they release (e.g., through deforestation or harvesting). In terms of harvested wood products (HWP), after harvest, atmospheric carbon (C) is immediately sequestered by vegetation re-growth. This temporal mismatch between oxidation of HWPs and C uptake by vegetation generates a net sink.

3.7.3 Assumptions and Limitations

The following assumptions and limitations exist in relation to the LULUCF sector data:

- The 'Top Down' methodology employed in this instance results in a broad, high-level estimation of GHG emissions from this sector in the county. A degree of 'uncertainty of measurement' therefore exists in relation to the emissions data.
- All assumptions and limitations relating to Map EIre national inventory emission data apply to the emissions data presented, as this data is informed by Map EIre data.

3.7.4 Data Sources

- Map EIre / Environmental Protection Agency, National Emission Inventory 2021.

3.8 Local Authority

As detailed in Annex C to the Draft Local Authority Climate Action Guidelines, public sector including local authority GHG emissions are captured under the sectors dealt with so far in this report (e.g., Institutional emissions are captured under the Commercial sector, Public Transport emissions are captured under the Transport Sector). The guidance advises that a separate BEI for local authority GHG emissions is prepared, however, having regard to the local authority's responsibility establish a GHG emission baseline and deliver on its own targets for GHG emission reductions.

GHG emissions data for the local authority was sourced from the county council's SEAI monitoring and reporting database. This data is presented in Table 3-9 and Figure 3-12.

Table 3-9: GHG Emissions Data for the Local Authority

Category	GHG Emission tCO_2-eq
Electricity	1,313
Thermal	161
Transport	610
Total	2,084

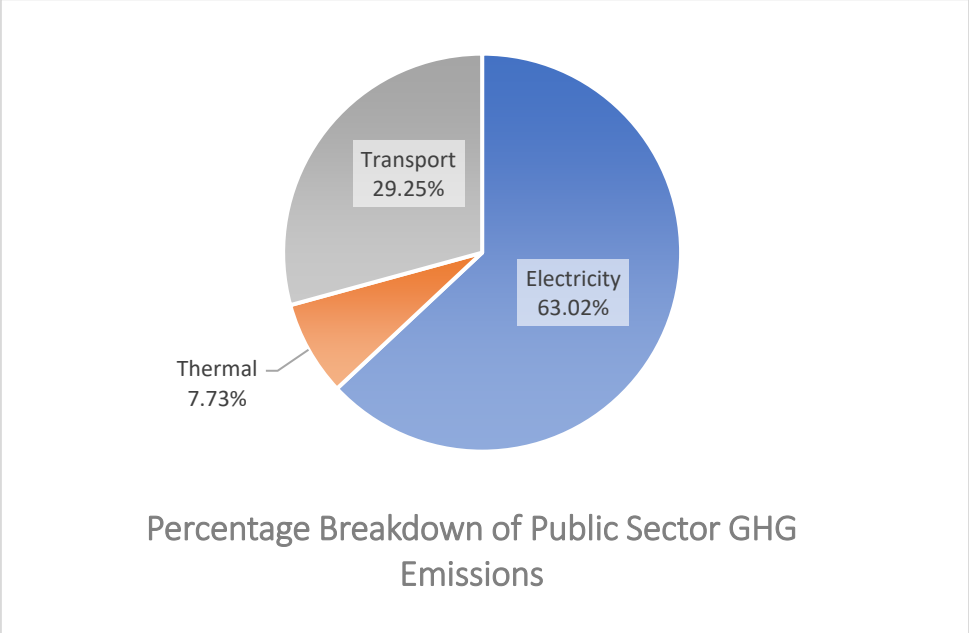

Figure 3-12: Percentage Breakdown of GHG Emissions for the Local Authority

4. OVERVIEW AND MAIN CONCLUSIONS

The analysed sectors in the county generated 887,098 tCO_2-eq in the baseline year, overall. A breakdown of these emissions and targeted emission levels for 2030 by sector is presented in Table 4-1.

Table 4-1: Breakdown of Emissions Per Sector in the County

Sector	2018 Emissions tCO_2-eq	Percentage Breakdown	Sectoral Emission Ceiling Reduction Percentage 2030	Target Emissions 2030 tCO_2-eq	Reductions Required tCO_2-eq
Residential	123,190	14%	40%	73,914	49,276
Commercial and Industrial	71,551	8%	45%	39,353	32,198
Industrial Processes	5,378	1%	35%	3,495	1,882
Agriculture	350,851	40%	25%	263,139	87,713
Transport	193,351	22%	50%	96,676	96,676
Waste and Wastewater	7,421	1%	50%	3,710	3,710
LULUCF	135,356	15%	-	-	-
Total	887,098	100%	-	-	-

**Commercial and Industrial GHG emissions are unable to be disaggregated considering the methodology applied to calculate GHG emission for these sectors and the available data that underpins the calculations (e.g., electricity use data sourced from the CSO is only available for the 'non-residential sector' and does not differentiate between the commercial and industrial sector). As such, the more conservative 'Commercial' sectoral emission ceiling reduction has been applied.*

*** Finalization of the sectoral emission ceiling for the LULUCF sector has been deferred for up to 18 months from July 2022 to allow for the completion of a national land use review.*

A percentage breakdown of emissions in the baseline year is provided in Figure 4-1.

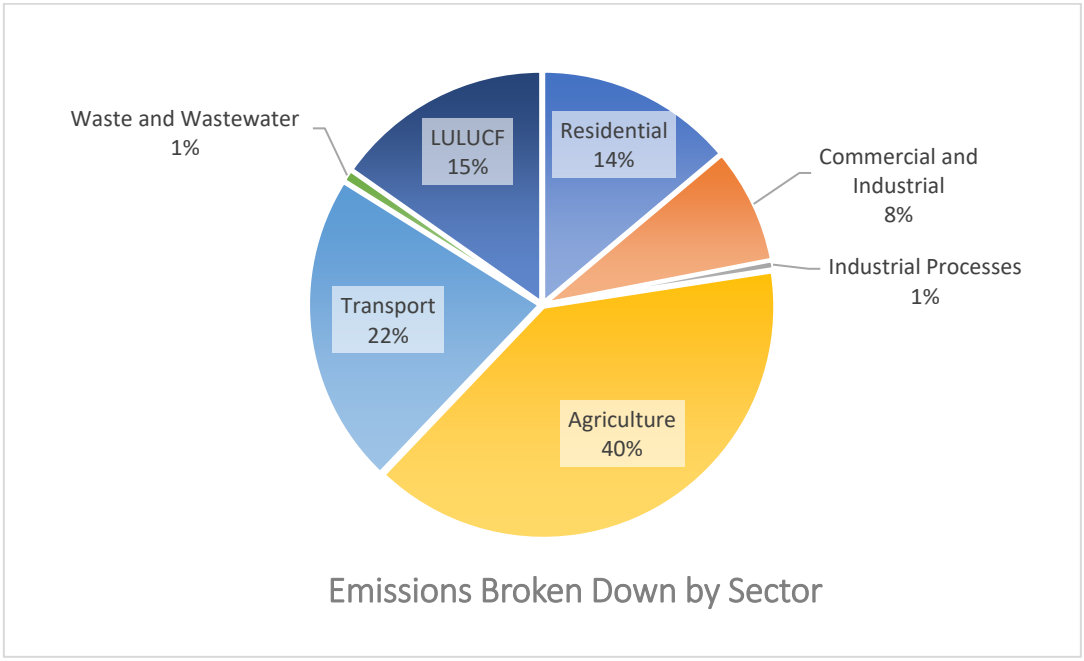

Figure 4-1: Breakdown of Emissions Per Sector in the County

The top three sectors in the county in terms of GHG emission levels were Agriculture, Transport and Land Use, Land-Use Change and Forestry producing 40%, 22% and 14% of tCO_2-eq respectively, of the total emissions in the county. From this analysis, these sectors should be the main targets of energy and emission initiatives.

An illustration of the target emissions for 2030 broken down by each sector is provided in Figure 4-2.

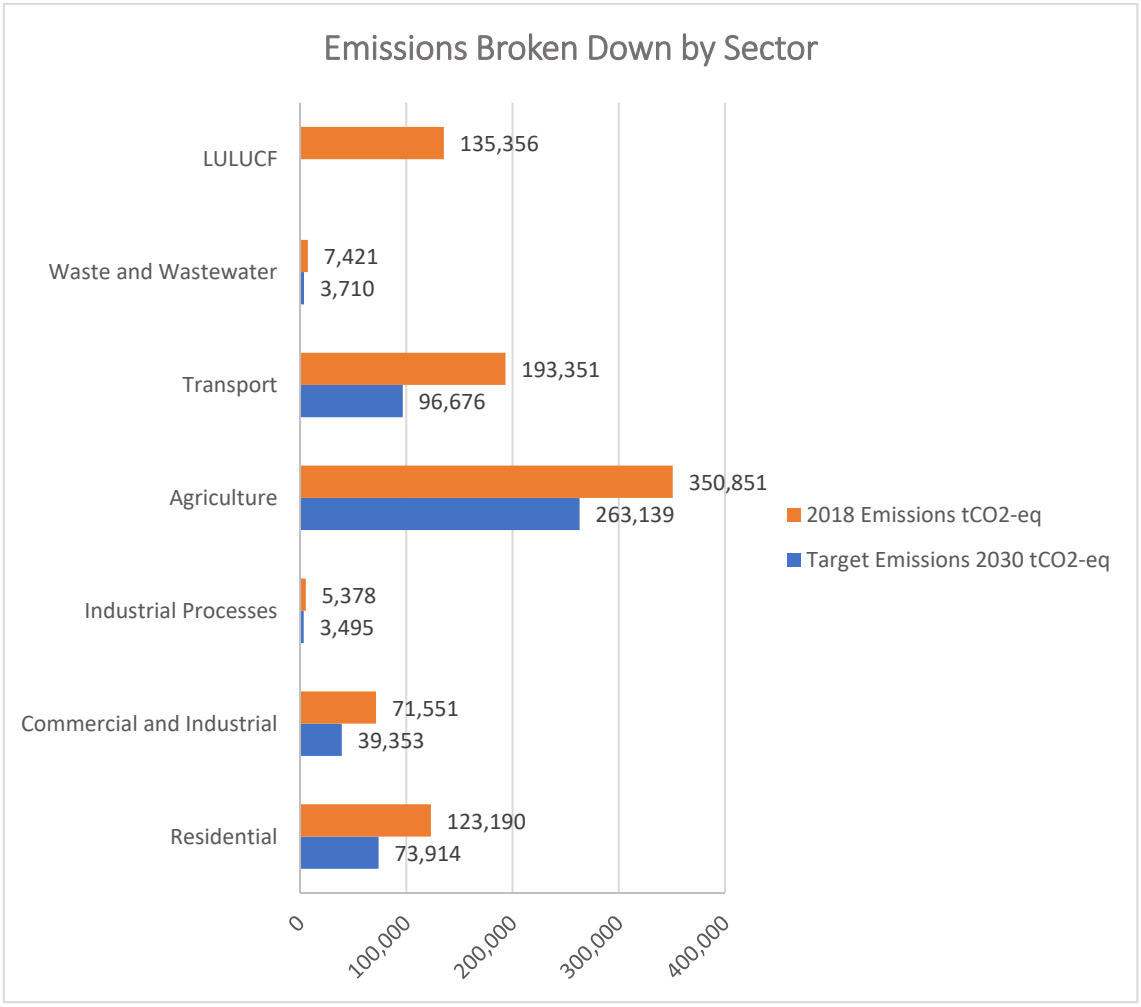

Figure 4-2: County Longford 2018 Baseline Emissions and Target Emissions 2030 Broken Down by Sector

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