



Climate-Resilient Opportunities for Generations Ahead

LEITRIM GREENHOUSE GAS EMISSIONS  
BASELINE REPORT  
EXECUTIVE SUMMARY

December 2019





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This report has been prepared by Good Energies Alliance Ireland

### Researchers

Jules Portier; Siri Karavida

Jules Portier

Nicolò G. Tria; Alexandra Peralaiika

Nicolò G. Tria

### Sector

Industry, Commercial & Public services

Residential, Transport, Energy industries

Forestland, Wetland

Agriculture, LULUCF

### Editors

Nicolò G. Tria; Jules Portier; Aedin McLoughlin

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## DISCLAIMER

Although every effort has been made to ensure the accuracy of the material contained in this publication, complete accuracy cannot be guaranteed. This greenhouse emissions inventory has been put together to the best of our faculty, given the data and knowledge gap, especially for what concerns the sinks category, and the degree of uncertainty that affects carbon accounting studies. The advice of relevant experts has been sought during the preparation of this publication, however the views contained within it are those of GEAI. All or part of this publication may be reproduced without further permission, provided the source is cited.

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# EXECUTIVE SUMMARY

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## BACKGROUND

The CRÓGA Project (Climate Resilient Opportunities for Generations Ahead) was developed by Good Energies Alliance Ireland (GEAI) as part of their work to support the just transition to a low carbon economy in Ireland. Such a just transition must work at the levels of individual and communities as well as nationally. GEAI is taking an area-based approach to the issues of greenhouse gases (GHG) emissions and how to incentivise actions to reduce these. The CRÓGA project initially focuses on County Leitrim, although its methodology can be used for other counties or areas.

In this report, all greenhouse gases (GHG) emissions are reported as carbon dioxide CO<sub>2</sub> equivalents for the purpose of comparability. In common parlance, we also refer to CO<sub>2</sub> emissions as carbon emissions.

CRÓGA (which means “brave” in Irish) has three phases:

Phase 1: Determination of levels of GHG emissions and sequestration in the main activity sectors of Leitrim. This report constitutes Phase 1 of the CRÓGA project for County Leitrim.  
Phase 2: Through Climate Dialogue, GEAI will work with individuals, communities, stakeholders and local and statutory organisations to develop a Just Transition plan for Leitrim that will put at its core the well-being of the residents while moving towards a sustainable future.  
In Phase 3, CRÓGA will hopefully stand on its own and community-led, county-wide carbon offset/reduction measures will be implemented, stemming from the climate dialogues initiated. Best practices are shared and lead the way for other communities to follow.

## CARBON EMITTING AND CARBON ABSORBING SECTORS IN LEITRIM

Six sectors of activity in Leitrim are responsible for the vast majority of GHG emissions. These are: Transport; Energy industries, Residential; Commercial and Public Services, Industry and Agriculture: Two sectors have the potential to store or absorb carbon emissions: Forestry and Wetlands. These are: Transport; Energy industries, Residential; Industry; Commercial and Public Services and Agriculture. Two sectors have the potential to absorb carbon: Forestland and Wetland. Each of these sectors are studied.

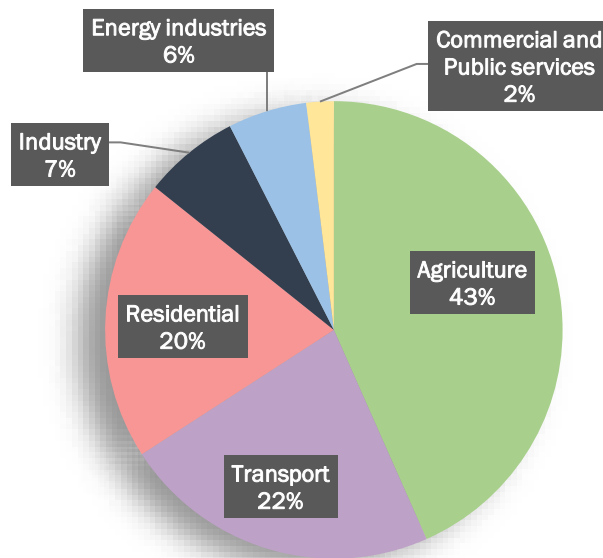
### Net carbon emitters

1. Transport
2. Energy industries
3. Residential
4. Industry
5. Commercial and Public Services
6. Agriculture

### Net carbon sinks

7. Forestland
- Uncertain
8. Wetland

*Figure 1: Relative contribution of each GHG emitting sector in Leitrim*



*Source: GEAI calculations on cited data*

## TRANSPORT

This sector includes emissions from combustion of fuels used in road and rail in County Leitrim. It includes cars, lorries, buses, trains and farming vehicles. The transport sector emits around **97,815 tons CO<sub>2</sub> equivalent** per annum in County Leitrim. This represents **22%** of total Leitrim carbon emissions.

- In the county, we travel more by car and less by public transport than at the national level
- Private transport (mainly cars) represents 55% of the transport emissions
  - Around 14,100 cars are registered in County Leitrim – one (1) car for 2.3 inhabitants
  - The average age of cars registered in County Leitrim is eight (8) years
  - The average annual distance travelled by car is 20,654 km
- Goods vehicles emit 33% of the transport emissions
- Leitrim's public transport services include one train service, two national bus services and six "local link" services.

## ENERGY INDUSTRIES

This sector includes emissions from electricity generation (produced by local renewable energy and by national electricity mix from the national electricity grid), petrol refining and other (national waste to energy incineration, briquetting manufacture and fugitive emissions). The Energy industries sector emits around **24,243 tons CO<sub>2</sub> equivalent** per annum, or **6%** of total county emissions.

- 86% is emitted by electricity generation (from the national electric grid), and 14% by petrol refining and other.
- In Leitrim, around 132,021 MW hours of electricity (132,021 million electricity units) is consumed per year (44% Residential, 28% Business, 28% Industry).
- Seven wind farms in County Leitrim produce around 84,280 MW hours (84,280 million electricity units) per year. This represents 64% of annual consumption of electricity in Leitrim.
- Wind electricity production save Leitrim from an electricity consumption that would have emitted around 36,795 tons CO<sub>2</sub> equivalent.
- The rest of electricity needed, 47,740 MW hours (47,740 million electricity units), is provided by the national electricity grid. The national electricity generation is a mix of gas, wind, coal, peat, oil and hydro.

## RESIDENTIAL

This sector includes emissions from combustion for residential space and water heating. It emits around **86,406 tons CO<sub>2</sub> equivalent** per annum in County Leitrim. It represents **20%** of total emissions.

- The main fuel used for space heating in Leitrim is 66% oil and 17% electricity.
- The level of GHG emissions from fossil fuels depends a lot on the age of the house.
- Average emissions are 6.9 tons CO<sub>2</sub> equivalent per house, higher than the national value (around 5.4 tons CO<sub>2</sub> equivalent), explained by a higher (+18%) energy consumption per m<sup>2</sup>, and, the use of oil and solid fuels in Leitrim instead of gas.

If electricity and transport are added to Housing emissions, total Residential emissions are **161,710 tons CO<sub>2</sub> equivalent**, which equates to 13 tons CO<sub>2</sub> equivalent per household per year or 5 tons CO<sub>2</sub> equivalent per person per year.

## INDUSTRY

This sector includes emissions from combustion for industries. Industry in Leitrim emits around **29,399 tons CO<sub>2</sub> equivalent** per year, **7%** of total county emissions, reflecting the low level of industry activity in the county.

The main emitter activity is manufacturing, 92% of the Industry sector emissions.

If electricity and transport are added to Industry emissions, total Industry emissions are 73,632 tons CO<sub>2</sub> equivalent, around 17% of the total county emissions.

## COMMERCIAL AND PUBLIC SERVICES

This sector describes emissions from building space and hot water heating (Transport and Electricity are not included.) In Leitrim, the Commercial and Public Services sector includes Retailers, Public Administration and Services. It emits around **8,406 tons CO<sub>2</sub> equivalent** per year

in County Leitrim. It represents **2%** of the total county emissions. In County Leitrim, the biggest employer in this sector is Public Administration, Education and Healthcare, employing 4,557 people, as many as the other enterprises combined.

If electricity and transport are added to Commercial and Public services emissions, total Commercial and Public services emissions are 22,651 tons CO<sub>2</sub> equivalent, around 5% of the total county emissions.

## AGRICULTURE

In comparison with other counties, the farming structure of Leitrim is small-scale and non-intensive. Leitrim agricultural emissions amount to **188,520 tons CO<sub>2</sub> equivalent** per year, less than 1% of total agriculture emissions in Ireland.

Nonetheless, agriculture is the highest emitting sector in the county:

- It accounts for almost **43%** of Leitrim's total emissions
- Emissions per farm amount to 51.3 tons CO<sub>2</sub> equivalent
- The sector carbon load is 3.5 tons CO<sub>2</sub> equivalent per thousand euro of farm produce.

70% of Leitrim farms specialise in beef productions and livestock farming accounts for about 90% of all farming activities in the county. Total cattle population has declined over the past 20 years by 30%, from around 90,000 to 62,000 head. Sheep numbers remain about the same.

- GHG emissions released by a) enteric fermentation and b) managed soils amount to 91% of the total emissions released from Leitrim agriculture.
- Enteric fermentation refers to the digestion process of ruminant animals, a process that produces the powerful greenhouse gas methane (CH<sub>4</sub>).
- Managed soils refers to the addition of nitrogen to soils through use of fertilisers (anthropogenic) or manure deposition on pastures.
- Emissions are split almost equally between fertiliser usage and manure inputs. 91% of Leitrim's managed soils emissions are nitrous oxide, a GHG gas over 200 times more potent than carbon dioxide.
- Manure management (storage, treatment and spread of manure), while it generates both methane and nitrous oxide, accounts for only 7.4% of total emissions
- Liming and urea application are not widely used in Leitrim and therefore are less significant sources of emissions from soil management, 1.5% of total CO<sub>2</sub>eq per year.

## FORESTLAND

Our estimate suggests that the current area devoted to **forestland** in Leitrim has the ability to sequester **190,174 tons CO<sub>2</sub> equivalent** from the atmosphere, per year. This equates to 6.3 tons CO<sub>2</sub> equivalent removed per hectare of forestland per year. In addition to the above, the total carbon stored in Leitrim forestland is deemed to be 12.6 million tons CO<sub>2</sub> equivalent.

Forest cover in Leitrim amounts to 30,061 hectares. This includes non-commercial forests as well as commercial plantations. The proportion of forestland to total land area in Leitrim is 18.9%, well above the national average of 11%. In the County, the non-native Sitka Spruce tree is the most common species, accounting for 61.3% of the total standing tree stock and 95% of the standing conifers.

Our estimates indicate that about 45 hectares of forestland, virtually all Sitka Spruce, are clear-felled yearly in Leitrim. Around 30% of the total tree volume is left on the forest floor after logging, because it has no commercial value. Roughly 10% of harvested wood is pulpwood, which is converted into wood-fuel by a Leitrim-based firm.

Sitka timber is used in a range of applications, primarily for construction material (e.g. planks, rafters), also for pallets, fencing, packaging, paper and manufacturing.

In Leitrim, the yield from Sitka Spruce is c. 12% above the national average. The gross economic value of the sector in Leitrim is about €27 million, 44% of which comes from wood processing. Forestry in Leitrim employs about 230 people, 55% of which are Leitrim residents.

## WETLANDS

Irish wetlands include undisturbed wetlands (16.4% of total land-use in 2017) and managed peatlands (0.8%). Peat soils or bogs cover 20.6% of the national land area and contain more than 75% of the national soil organic carbon. In Ireland there are two main kinds of bogs – Raised bogs and Blanket bogs (the most common). Leitrim wetlands cover more than 20.5% of total land area. There are 35,513 hectares of blanket bogs and 5,876 hectares of raised bogs. 8,153 hectares (c. 20%) are under the protected area network. A portion of the upland mountain bogs are found to be in good health, whereas the rest is of low quality and in poor maintenance condition.

Bog vegetation is able to remove and store (sequester) carbon from the atmosphere through photosynthesis; Carbon uptake depends on the bog being “active”, i.e. water table close to the surface, peat-forming, catching and storing carbon. The process is carbon negative only if the bog is undisturbed. If bogs are disturbed, e.g. by drainage, (tree) planting or peat extraction, the rate of decomposition of the peat soil increases substantially, releasing CO<sub>2</sub>. Small-scale mechanised turf-cutting alone could release around 2.3 tons of carbon per hectare from the degraded areas of peatland.

It is difficult to ascertain the carbon activity of Leitrim bogs due to lack of updated statistics. There is no definite answer as to whether the bogs in Leitrim are currently net carbon absorbing or releasing systems. For the purpose of this report, wetlands carbon activity in Leitrim is deemed a zero-sum activity and dismissed in the calculations.

## OTHER LAND USES

Grassland is the prevailing use of land in Leitrim, accounting for 58% of total land area (92,097 ha). At national level, grassland emits 6.9 million tons CO<sub>2</sub> equivalent per year. However, grassland



characteristics in Leitrim lean more towards a close-to-nature regime, so it is likely that that figure is proportionally much lower. Moreover, those emissions are not considered man-made and are not added to this GHG inventory.

All the tree and non-tree sparse woody patches that not included in our definition of forestland are classified as hedgerows, scrub and woodland (HSW). Leitrim has around 11,000 hectares HSW cover, almost 7% of Leitrim total land area. HSWs are critical features of the Irish rural landscape due to the key role they play in land management and ecosystems (e.g. niche for biodiversity and carbon sequestration). A conservative figure of carbon sequestration by Leitrim HSW area is **21,800 tons** CO<sub>2</sub> equivalent per year (most likely up to **36,300 tons**). With supports for increase of hedgerows biomass, HSWs could provide an even larger contribution as carbon sinks.

#### EMISSIONS DISTRIBUTION ACROSS ALL LEITRIM STAKEHOLDERS



The above chart gives details of emissions from all major stakeholders in Leitrim. When transport and energy are distributed among the sectors, it becomes even more obvious that farms and households are the two biggest emitters of GHG, by far. Mitigation efforts must therefore focus on overall emissions reduction from those sectors, with a corresponding emphasis on increasing sequestration by semi-natural native woodlands and bogs and off-setting through renewable energy generation.

TOPICS FOR  
CLIMATE DIALOGUE  
on reducing area-based  
greenhouse gas emissions

## 1. TRANSPORT

- *Changing vehicle type – e.g. electric cars – and providing infrastructure;*
- *Lowering the number of cars or distance travelled – car pooling, public transport and shared fleet;*
- *Promoting alternative means of transport – cycling, personal transportation, walking;*
- *Change fuel type – e.g. biofuel, hydrogen, etc.*

## 2. ENERGY

- *Lowering electricity use – via energy efficiency and energy saving;*
- *Fossil fuels – reduction, substitution;*
- *Renewable energy – distributed solar photovoltaics and repowering of windfarms;*
- *Individual and community access to the grid – feed-in tariff and incentives.*

## 3. RESIDENTIAL

- *Lowering energy use – insulation, double or triple glazing, retrofitting;*
- *Upgrading technology of space heating – from open fires to more efficient stoves, solar thermal, heat pumps, geothermal, etc.;*
- *Upgrading fuels for space heating – from solid fuels, oil and gas to renewable fuels and biofuels.*
- *Cost implications and community incentives (e.g, SECs);*
- *Ring-fencing carbon tax for a leave-no-one-behind transition.*

## 4. COMMERCIAL AND PUBLIC SERVICES SECTOR

- *Retrofit public building stock / Retrofit private buildings;*
- *Raise public employee awareness about climate impact and how to reduce it at work;*
- *Use renewable energy (sustainable wood energy, solar thermal, heat pumps...);*
- *Implement sustainable transport plans for employees;*
- *Decentralisation and digitalisation of services.*

## 5. INDUSTRY

- *Improve industry processes efficiency;*
- *Decarbonize the processes;*
- *Being local renewable energy producer and/or consumer;*
- *Switch to electric/biofuel fleet;*
- *Set sustainable transport plans for employees.*

## 5. AGRICULTURE

- Agriculture in Leitrim is low-intensity and close-to-nature when compared with farming systems in other parts of Ireland. For such reasons its GHG emissions are likely the lowest in the country;
- Leitrim farming emissions are less than 1% of the national total;
- Leitrim's agriculture economic performance constitutes 11% of the Border Region and 2% of the State;
- The last five-years-average net income is estimated at €11,221 euro per farm per year.

Due to the predominance of beef production and livestock farming in local livelihoods and cultures, and a population of 62,000 cattle, farming still is the largest carbon emitter in the county, 43% of the total. Two-thirds of these emissions come from enteric fermentation (digestion processes of ruminants). The rest comes from soil management, including use of fertilisers (organic and synthetic) and deposition of manure on pastures.

However, those figures cannot be taken in isolation:

- Leitrim farmers lead the way on the move towards low carbon impact farming, engaging more and more in agricultural practices that entail more sustainable uses of farming inputs (land, feedstuff and fertilisers);
- Many Leitrim farms include High Nature Value land, combining farming with the provision of fundamental ecosystem services, like preservation of biodiversity;
- Farms in Leitrim include hedgerows and native woodlands that sequester carbon, grassland which state is close-to-nature, and peatland under conservation/rewetting.
- Agriculture emissions are entirely offset by forestland.

Regenerative farming, High Nature Value farming, agroforestry and silviculture are farming regimes that with the right combination of fine-tuned financing and planning, can deliver:

- a just income for farmers;
- food sovereignty and security;
- ecosystem services, like water purification, biodiversity protection and climate regulation.

Those regimes should be prioritized in the impending Common Agricultural Policy, in an equitable fashion that encourages the role of Leitrim farmers as nature guardians.

### TOPICS FOR CLIMATE DIALOGUE

1. *How can farmers diversify and evolve to improve their sustainability?*
2. *Could agroforestry and silvipasture provide a new income stream without being disruptive?*
3. *Is High Nature Value farming viable? What does this entail for the typical farm?*
4. *Are adequate supports available under the new CAP to encourage ecological and climate-resilient farming practices?*
5. *Is there a trade-off between nature conservation-based subsidies and livestock production subsidies?*
6. *Is there a rights and powers gap between farmers and other value-chain players?*

## 6. FORESTRY

1. *Given that afforestation is most effective and quick action to sequester carbon, should we encourage more forestry in Leitrim?*
2. *The trade-off between quick-return climate mitigation policy vs. other fundamental ecosystem services shall be addressed;*
3. *How can farmers be encouraged to include forestry as a way of diversifying their farming practices, especially by planting native species and incorporating silvopasture?*
4. *A County Land Use Plan should be undertaken to govern commercial plantations, repurposing the use of land for the common good;*

## 7. WETLANDS

- *More studies are needed on the potential of local wetlands to provide carbon sequestration and biodiversity;*
- *How do we encourage regeneration/rewetting of bogs in Leitrim and other counties?*
- *New incentives for rewetting or otherwise regenerating our bogs to be incorporated in the new CAP?*

# CONTACTS

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Good Energies Alliance Ireland

Ballinaglera Community Hall

Ballinaglera N41A2N8

Co. Leitrim

[goodenergies@geai.ie](mailto:goodenergies@geai.ie)

071 9643117

Dr. Aedín McLoughlin

Good Energies Alliance Ireland CEO

[aedin@geai.ie](mailto:aedin@geai.ie)

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