



What Does Climate Change Mean For Farmers?



It is no secret that climate change presents major challenges for the agricultural sector, as it does for all sectors of the economy. It is undeniably the most significant challenge that agriculture has ever faced. It is a challenge that we feel we can most certainly embrace and overcome by working in unity with all members of society, we believe that it is possible to meet the Government's ambitious targets of a 51% reduction in carbon emissions across the Irish economy by 2030.

The aim of this information booklet is to provide the farming sector with a clear understanding and explanation of climate change, how it affects farmers and how the industry can reach its emissions targets. Having worked directly with farmers for twenty-five years, EASYFIX has developed innovative technologies and solutions to meet the challenges and emissions targets laid down by EU Government policy.

We appreciate that tackling climate change will involve many changes in farming practices and accept that some difficult decisions will have to be made. However, we are confident that by coming together, adopting and utilising the technologies available to us at EASYFIX, that we as an industry, with Government support, can play a major role in meeting our emissions targets and with NO reduction to the National Herd. In so doing we acknowledge our commitment to the environment and safeguarding sustainable agriculture into the future.

Farmers are being asked to improve their environmental practices and the sustainability of their operations. At EASYFIX, we have developed partnerships with some of the World's leading research institutions and universities in order to ensure that we can provide our customers with the best performing and most sustainable products on the market, all whilst helping you to face very real challenges such as reducing emissions on farm.

Best regards,



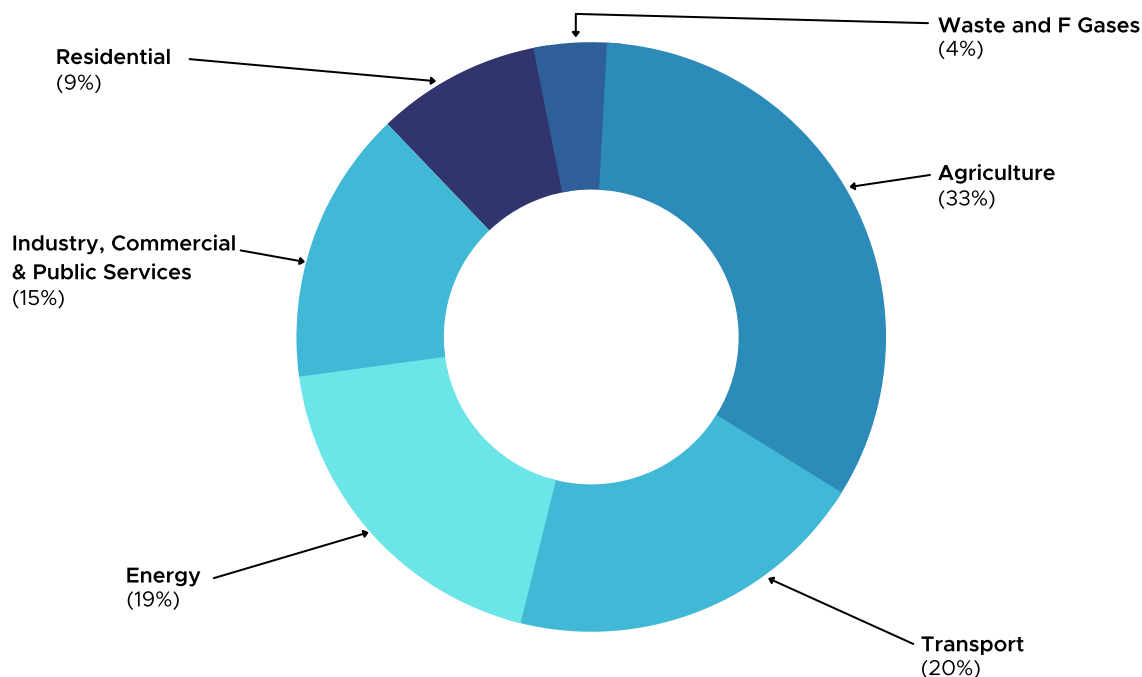
Michael Earls
Managing Director

Introduction

Climate change dominates our news headlines every day and everyone acknowledges we have a climate change problem. This is a challenge that needs to be met head-on. Society must take responsibility and make changes in order to avoid a climate crisis. Unfortunately, it appears that agriculture is being unfairly targeted as the main contributor to this crisis.

The current debate has focused too narrowly around reducing the national herd, which is too simplistic and indeed, is counter-productive as it adversely impacts both farm and wider rural economic sustainability. It has resulted in polarisation of positions, with the emissions debate pitting farmers against environmental campaigners at the very time they should be working in partnership to address urgent climate issues.

Greenhouse Gas Emissions by Sector (2017)



The chart above illustrates that agriculture is responsible for 33% of greenhouse gas (GHG) emissions, the majority of which are short-lived for up to a decade. However, the farming industry should not be responsible for 100% of the burden to reduce GHG's.

In contrast, farmers can play a key role in sequestering CO₂, which is responsible for the vast bulk of long-term climate change. Therefore, farmers need to receive recognition for the positive impact they have on the environment.

In order to fully understand and deal with the challenge, we need to look at the main drivers of emissions and the solutions that are there to meet the ambitious targets for emission reductions in agriculture.

Greenhouse Gas (GHG) Emissions - What Are They?

GHG's are gases that trap heat from the Earth's surface causing warming in the lower atmosphere and slow down the loss of energy from Earth. The major GHG's that cause climate change are carbon dioxide, methane and nitrous oxide.

In order, the most abundant greenhouse gases in the Earth's atmosphere are:

- Carbon Dioxide
- Methane
- Nitrous Oxide
- Ozone
- Chlorofluorocarbons (CFC's)
- Hydrofluorocarbons (includes HCFCs and HFCs)

Agricultural Emissions

The main focus for agriculture in terms of emissions reduction are:

- Ammonia (the main source of Nitrogen loss)
- Methane (the main GHG)

What about Ammonia - is it a GHG? - No.

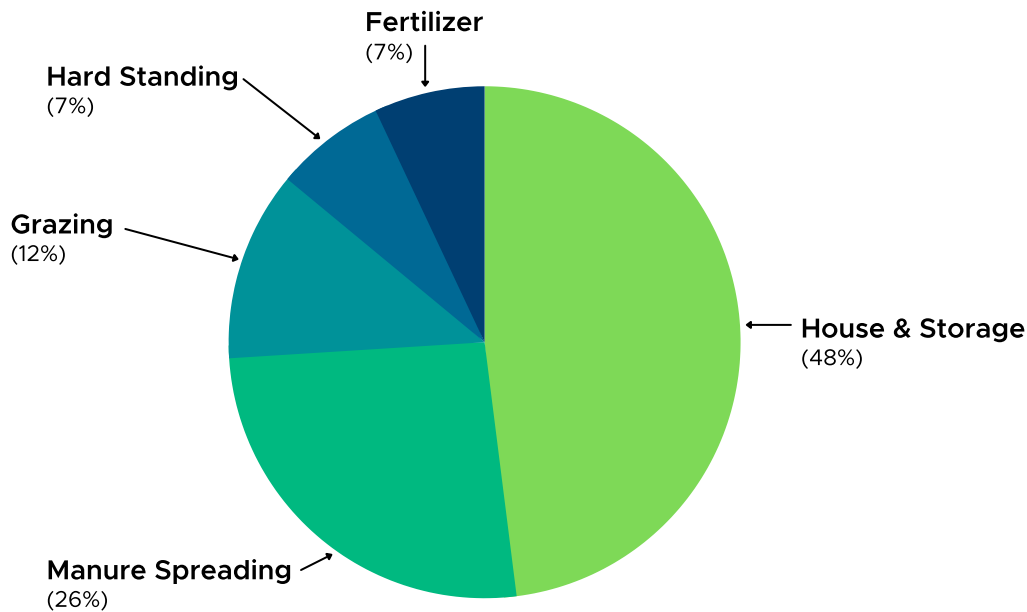
Ammonia emissions represent a major loss of valuable nitrogen for plant growth - over €130 million per annum in Ireland. Reducing ammonia emissions on-farm during storage or spreading is an opportunity not to be missed.

What Is Ammonia?

- Ammonia, also known as NH_3 , is a colourless gas with a distinct odour composed of nitrogen and hydrogen atoms. In simple terms, it's a gaseous form of nitrogen and air pollutant.
- Ammonia is not a greenhouse gas but it can contribute indirectly to greenhouse gas emissions.
- Ammonia emitted into the air is subsequently deposited as nitrogen onto land and water surfaces. Nitrogen deposition occurs in gaseous form close to the source (dry deposition) or through rainfall (wet deposition), often many miles from the original ammonia source.
- Excessive nitrogen deposition can lead to significant biodiversity loss through reduction of plant species and changes in ecosystem structure.

Sources of Ammonia in Agriculture

In Ireland, agriculture is responsible for 99% of ammonia emissions. The EU average is 92%. The main sources of ammonia on farms are as follows:



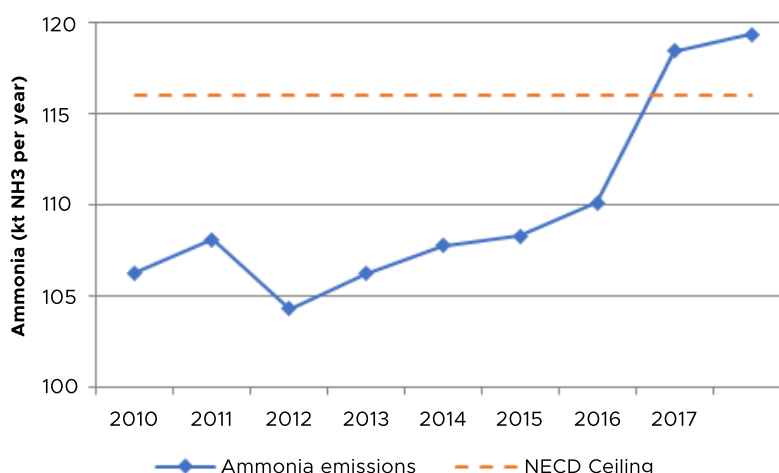
Livestock excreta contains high amounts of ammonia and is the origin of 75% of all ammonia emissions from agriculture in the EU.

Emissions Targets - Ammonia

Ireland is subject to the National Emission Ceilings Directive (NECD) (EU, 2001), which sets limits for long-range air pollutants in EU member states.

According to the NECD, Ireland's target ammonia emissions limits, to be achieved by 2020, were 116 kilotonnes of NH₃ with a 1% reduction on this ceiling and 5% from 2030.

However, ammonia levels have increased by 14% between 2012 and 2018 due to increasing dairy cow numbers as well as increased fertilizer use. As a result, Ireland has been in breach of the National Emission Ceilings Directive (NECD) since 2016 (see below).



*National ammonia emissions from 2010-2018.

Reducing Ammonia

Looking at the sources of ammonia emissions, there are a number of steps that farmers can take to reduce ammonia emissions.

Manure spreading is responsible for 26% of ammonia emissions. That said, the adoption of Low Emission Slurry Spreading (LESS) can reduce ammonia emissions by up to 60%.

However, the investment in equipment, even with government support, is expensive and it is very difficult to see adoption rates high enough to make a significant impact. Many farmers, particularly in the beef sector, would find it hard to justify the investment.

According to a June 2021 Environmental Protection Agency (EPA) report, only 16% of Slurry was being applied by LESS technology.



Fertilizer is responsible for 7% of ammonia emissions. The use of protected urea can help reduce ammonia emissions by 79% (Teagasc).

Protected urea is simply normal urea coated with a urease inhibitor (NBPT) to reduce ammonia emissions. Unlike urea, protected urea can be spread during the main grazing season – essentially replacing the use of calcium ammonium nitrate (CAN).

Through the use of LESS and Protected Urea 33% of ammonia emissions can be addressed but high levels of adoption of these techniques are required to meet our ambitious targets.

DID YOU KNOW?

The largest source of ammonia on farm comes from Housing and Manure Storage.

Housing and Manure Storage

Accounting for 48% of all ammonia emissions, housing and manure storage must form an integral part of reducing ammonia. Of the 48%, two-thirds comes from housing while one-third comes from manure storage.

The good news is there are solutions available that meet this challenge. One possible solution researchers are looking into is acidification of manure, however, there is still a lot of work to be done before this is adopted at farm level and the long term impact on soils is unclear.

Housing and Manure Storage Cont'd.

Over many years EASYFIX has developed a wealth of experience working around the globe and have developed solutions that can deliver strong emission reductions.

EASYFIX Slat Rubber is proven to deliver a 31% reduction of ammonia in housing. This has been tested and certified in Wageningen University in Holland. As well as delivering a significant reduction in ammonia there are also added benefits to animal welfare, comfort and performance.

Also, through a recent acquisition, **EASYFIX Slurry Technology can reduce ammonia by 51%***, while also improving the nutrient value of slurry and further reducing the need for artificial fertilizer. **(WUR 850, Wageningen University, Holland)*

The implementation of these solutions can make a serious contribution to meeting Ireland's ambitious emissions targets set out for the agricultural industry.



Methane - What is it?

Methane is a colorless, odourless gas occurring abundantly in nature and as a product of certain human activities. Its chemical formula is CH₄.

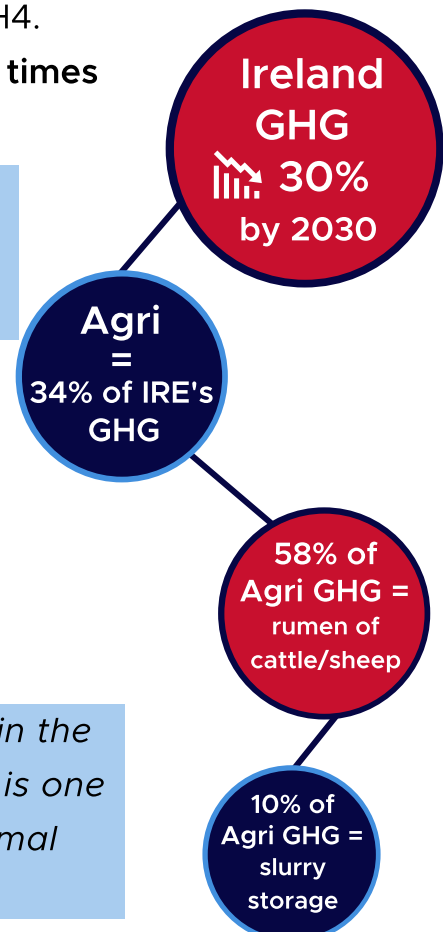
Globally, it is the second most important greenhouse gas. **It is 28 times more potent than carbon dioxide** and also causes air pollution.

In line with EU legislation, Ireland will need to decrease national GHG emissions by 30% by the end of 2030. Reducing CH₄ will be key to meeting our targets.

Agriculture accounts for 34% of Irish GHG emissions. The reporting of Irish GHG emissions in 2020 attributes 58% of Irish agriculture emissions to methane produced by the rumen of cattle and sheep, which occurs through enteric fermentation.

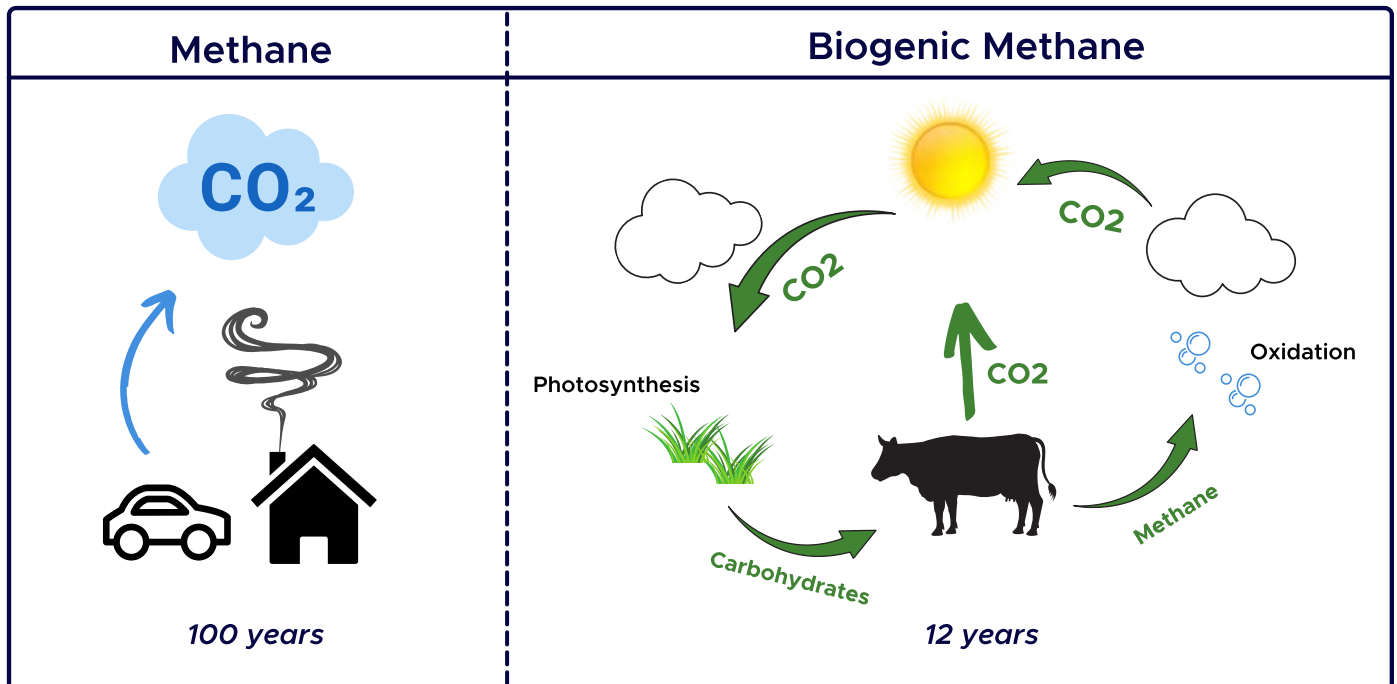
A further 10% of national agricultural emissions originated from methane associated with the storage of manure.

Enteric fermentation occurs when methane (CH₄) is produced in the rumen as microbial fermentation takes place. Enteric methane is one by-product of this digestive process and is expelled by the animal through belching or flatulence.



Methane Vs Biogenic Methane

Currently, there is much debate around biogenic methane and the warming effect that it has. Efforts are being made to review the lifecycle of biogenic methane. Assuming animal numbers stay the same, the current biogenic methane lifecycle is projected to be 12 to 15 years. However, under current GWP100 (Global Warming Potential) guidelines, the warming effects of the gas are based on a 100-year time horizon.



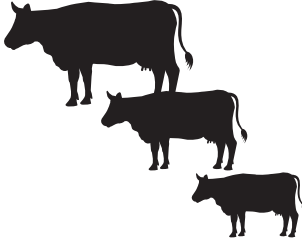



As part of the biogenic cycle, plants absorb carbon dioxide from the air and through the process of photosynthesis convert it to glucose and use this to make plant fibres and other carbohydrates.

Ruminants are then able to break down this fibre in the rumen, emitting a portion as methane. After approximately 12 years, the methane is converted to carbon dioxide through hydroxyl oxidation. That carbon is the same carbon that was removed by photosynthesis. It is therefore recycled carbon and there is no net change in atmospheric CO₂.

In the case of fossil fuel carbon, the CO₂ produced is effectively new carbon released from permanent carbon stores and therefore must be treated differently because it inputs additional CO₂ into the atmosphere and contributes to global warming.

Measures To Reduce Methane

There are a number of areas being explored currently regarding methane reduction. These include:

<p>Breeding Initiatives</p> 	<p>Diet</p>  <p>Additives to feed etc.</p>
<p>Increased Performance</p>  <p>Take beef cattle for example; reduced days to slaughter without compromising carcass merit. A 13% increase in performance will reduce methane emissions by 19%.</p>	<p>Slurry Treatments</p>  <p>Slurry treatments to inhibit microbes or aerate slurry</p>

EASYFIX also have solutions to address the issue of methane. One of the key measures to reduce methane is around better health and performance. In Ireland animals are housed, on average, for 40% of their life so improving performance for this period can greatly help reduce methane.

Numerous trials have shown the increased performance of animals while housed on EASYFIX Slat Rubber (right). It has helped reduce the number of days to beef whereby animals can be finished up to 21 days earlier than animals on concrete slats.



Measures to Reduce Methane Cont'd.

This will have a significant impact on methane produced given an animal emits on average 230g of methane per day. A reduction of 21 days would save about 70,000 tonnes CO2 emissions per year in methane savings. To put it into context, the annual beef kill in Ireland is 1.7m and 50% or more are slaughtered from housing. Reducing the days to beef on that volume of animals can have a significant impact on methane, animal comfort, welfare and performance.

EASYFIX Slurry Technology can also play an important role in the reduction of methane. Research has proven that aerated slurry can reduce methane emissions by 54%.

With an increased focus on micro renewables such as Anaerobic Digestion (AD) this can also increase the output of AD plants.

Carbon Credits

Carbon credits can be traded across the globe and large corporations can become carbon neutral by simply writing a cheque. In future, farmers can position themselves to be able to trade carbon and finally get paid for the work they do as custodians of the land. It is important to keep in mind the huge carbon stores that farmers are managing – grassland, hedgerows, wetlands etc.

Summary

Climate change is happening and everyone has a role to play. Agriculture is one part of the solution but all sectors must play their part and take responsibility.

Farmers can also look upon this challenge as an opportunity whereby developing more sustainable farming practices and making more efficient use of slurry on farm, can lead to greater profitability and protection of family farms in Ireland.

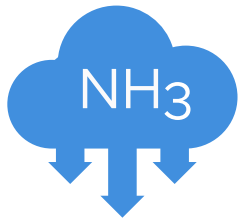
Change is a big part of the process and ensuring that while adopting new technologies farmers are recognized and rewarded for all the good work when measuring environmental impacts of farming.

EASYFIX Solutions

EASYFIX are committed to investing in research and development that can deliver solutions that are viable to implement at farm level, we are currently looking at solutions that will be rolled out in the coming years that will help achieve Ireland's emissions targets.

Currently, our EASYFIX Slurry Technology & Slat Rubber can deliver reductions in Ammonia and Methane once implemented on-farm, along with reducing emissions there are also many additional benefits that ensure farmers have a fast return on investment.

EASYFIX Slurry Technology



Reduces Ammonia Emissions by 51% ✓



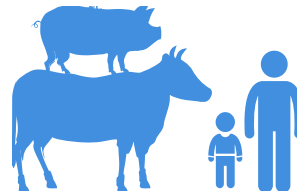
Reduces Methane Emissions by 54% ✓



Eliminates the Need for Agitation ✓



Increases Nutrient Value of your Slurry ✓



Safer for both Animals & Farmers ✓

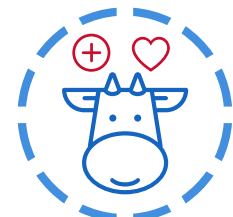
EASYFIX Slat Rubber



Reduces Ammonia Emissions by 31% ✓



Increased animal performance leads to a reduction in methane ✓



Increases Cow Comfort, Welfare & Performance ✓

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