ENGINEERS IRELAND

Submission on 'Public Consultation on Carbon Budgets'

For the attention of Department of the Environment, Climate and Communications

08/02/2022

1. Introduction

Engineers Ireland welcomes the ongoing work towards combating the climate crisis particularly setting into law the goal of reduced carbon budgets and developing routes to reach these targets. We share our members' wish for a clear and sustainable future by reducing the carbon budget of Ireland.

The ambitious goal of a climate neutral economy by 2050 and a 51% emissions reduction by 2030 compared to 2018 levels is challenging. With the current projections from the EPA showing only a 19% reduction, more work is required. However, Covid has proven that large societal change is possible, and that with enough impetus goals like this can be achieved.

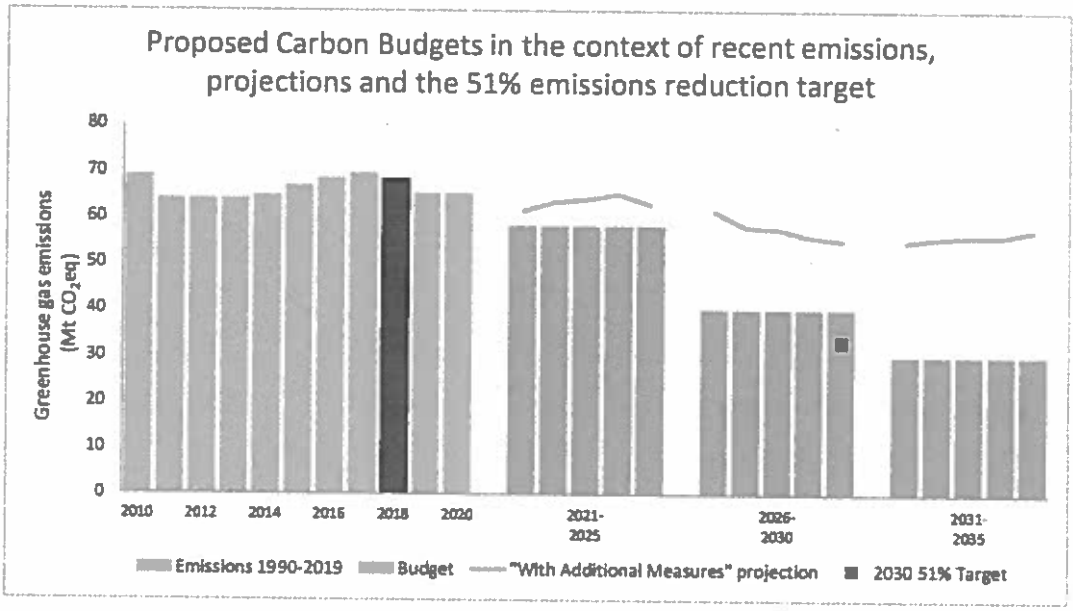

Figure 1 The proposed carbon budget in context of recent historic emissions [1]

To achieve these reductions change must be organised at all levels of society, from government to individuals. These changes will create economic and social gaps and engineering solutions, supporting appropriate alternatives, will be required to fill these gaps to maintain and enhance our standard of living.

The need for multidisciplinary skills and cross-sectoral approaches are important in managing a sustainable environment. Engineers are well equipped to manage such complex projects, which often feature conflicting requirements. Education on carbon literacy and skills for a zero-carbon future will be needed to ensure decisions are carefully considered from multiple perspectives.

Key actions recommended:

- An immediate discussion is required amongst all stakeholders in energy generation, on an alternative baseline power supply such as: nuclear, green hydrogen, or improved connectivity with Europe through the proposed super grid to achieve carbon budget goals by 2030
- Incentivise the use of alternative travel options like video conferencing, public transport, walking, or cycling
- Encourage local councils to utilise available funding efficiently to develop cycle routes and greenways and encourage people to use them, while also creating local digital hubs to reduce commuting travel distance
- Generate a supporting campaign and CPD program for indoor vertical farming, and in tandem create grants for allowing land to be rewilded
- Continue the roll out of 5G and National Broadband Plan to allow opportunities for growth of the "internet of farm"
- Guide farmers towards a more sustainable path, focusing on reducing methane production through changes in supplementary feed, reduced reliance on chemical fertilisers, and using sexed semen for dairy herds
- Continue the work on Targeted Agricultural Modernization Scheme (TAMS) to encourage installation of new solar panels on farms
- Provide education to the public through social and traditional media campaigns on how natural processes work and their functions, particularly around flood management
- Identify areas under current risk of flood damage and utilise natural flood defences
- Mandate future off-shore power infrastructure developments to include a positive effect on biodiversity, by creating protected waters and reefs around erected off-shore turbines

2. Energy

Energy is a huge aspect of sustainability and is intertwined into every aspect of modern society, both in terms of energy usage and energy generation. The energy used in Ireland can be split into three broad categories: heat, transport, and electricity. The most versatile form of energy is electrical energy. Electrical energy can be transformed into anything that we need, from domestic and entertainment, to heating and transport. To achieve our climate goals energy use must move towards electrical power and away from burning fossil fuels for heating and transport. The major issue with electrical energy is consistency of supply and energy storage.

With current technology, electrical energy storage isn't practical for large scale usage. Options like batteries or pumped storage hydropower do not have the available power density to provide sufficient baseline energy. This means that electricity is generated as needed on a predicted usage requirement. This supply and demand model has a flaw in that energy providers must estimate energy usage requirements to ensure continuous supply, with excess energy wasted. This energy model has become more complicated by renewable energy connected to the grid as it is weather dependent, potentially creating even more excess energy. A baseline power generation system is required, which can be powered up

Engineers Ireland, 22 Clyde Road, Ballsbridge, Dublin, Ireland. D04 R3N2
Tel: +353 (0) 1 665 1300 | Email: info@engineersireland.ie | Web: www.engineersireland.ie

and down fast, and delivered where needed all over Ireland. This baseline is currently supplied by fossil fuels as the majority energy source, currently about 86%. There is growth in renewables being used, but in 2020 they only provided 13% [2] - an 11% increase over the past 15 years. An alternative baseline will be needed to reach the 2050 targets. This baseline must be controllable, reliable, and responsive. Alternative solutions are at various levels of development, but none are currently available in Ireland, promising solutions include green hydrogen, Generation IV nuclear reactors, or improved system integration across the island of Ireland and connections to the proposed EU super grid, a high-capacity ultra-high voltage direct current (UHVDC) power network.

Transport is the single largest proportion of energy usage in Ireland at 34.5% [2], of which nearly 50% of emissions are created by private car usage. The most significant way to reduce this emission in the short term is to reduce short distance travel in cars, using alternatives, like video conferencing, public transport, walking or cycling. To reduce travel further digitalisation is required, including investment in small local digital hubs [3] and the successful rollout of the National Broadband Plan. Local digital hubs can be pivotal in small towns and villages encouraging people to live and work remotely, removing strain on transport infrastructure, as well as stimulate local economies. In addition to local digital hubs a long-term switch to alternative transportation is needed, this can be done by improvements in cycle infrastructure, improved bus services, and supporting infrastructure for electric vehicles. This must be organized at local government levels to ensure funding is utilised appropriately.

Call to Action:

- An immediate discussion is required amongst all stakeholders in energy generation, on an alternative baseline power supply such as: nuclear, green hydrogen, or improved connectivity with Europe through the proposed super grid to achieve carbon budget goals by 2030
- Incentivise the use of alternative travel options like video conferencing, public transport, walking, or cycling
- Encourage local councils to utilise available funding efficiently to develop cycle routes and greenways and encourage people to use them, while also creating local digital hubs to reduce commuting travel distance

3. Agriculture

Agriculture in terms of energy used is only a small contributor to the carbon emissions at about 2% of Ireland's energy use [2], but overall Agriculture is a significant generator of CO2 in Ireland in multiple ways. The largest impact of agriculture is the use of land and the creation of grasslands from wetlands and forests. The national land drainage work [1] carried out in the 1950s to 1970s has been very successful creating grasslands but at the cost of biodiversity, and habitat. The carbon value and cost of these transformations need to be understood by farmers, potentially through a process of carbon credits, which have a clear financial value.

Small farmers and part time farmers efficiency should be measured and audited to ensure land usage is optimised against carbon budgets. Alternative farming techniques could be considered and CPD offered to free up some land which can be reallocated to wilding projects or similar for carbon credits. The use of horticultural lighting for sustainable food production inside vertical farms could provide this. Indoor farming like this has numerous benefits by

Engineers Ireland, 22 Clyde Road, Ballsbridge, Dublin, Ireland. D04 R3N2
Tel: +353 (0) 1 665 1300 | Email: info@engineersireland.ie | Web: www.engineersireland.ie

using less: energy, water, and land use than traditional farming. It also allows all year growing cycles reducing the need to import food from other countries, again reducing the carbon footprint. With farms like these in place with smaller land area requirements, grants to encourage rewilding projects can be created in tandem to reallocate land usage.

Digitalisation has the potential to reduce the carbon budget of farming by streamlining activities, known as the "internet of farm" this involves using 5G and broadband services to position remote sensors, and remote automation processes around the farm, reducing the number of activities and journeys a single farmer must do. "Internet of farm" is still in its infancy as the digital infrastructure on farms is low. As this infrastructure develops this area of technology will increase.

Support schemes for livestock farmers to transition to a more sustainable way of farming that specifically targets schemes for appropriate breeds of cattle, alternative feed diets to reduce methane production in livestock, improved nitrogen use efficiency and clover usage to reduce reliance on chemical fertilisers, and the use of sexed semen for dairy herds. There are currently schemes in place for farmers to move to organic farming but, for several reasons, these aren't overly attractive. Therefore, a middle ground that moves farmers towards a more sustainable path that results in less emissions would be a significant step forward for the sector.

Ireland should continue the work of the Targeted Agricultural Modernization Scheme (TAMS) to support on-farm solar energy installation. This can subsidies carbon costs in other areas, and feed power back into the grid. Solar farm panels could be positioned on less desirable farmland, allowing it to be rewilded to a certain extent between the solar panels. This would create meadow areas supporting biodiversity and insect life, while also providing an energy source.

Call to Action:

- Generate a supporting campaign and CPD program for indoor vertical farming, and in tandem create grants for allowing land to be rewilded
- Continue the roll out of 5G and National Broadband Plan to allow opportunities for growth of the "internet of farm"
- Guide farmers towards a more sustainable path, focusing on reducing methane production through changes in supplementary feed, reduced reliance on chemical fertilisers, and using sexed semen for dairy herds
- Continue the work on Targeted Agricultural Modernization Scheme (TAMS) to encourage installation of new solar panels on farms

4. Biodiversity

As an island nation, Ireland needs to consider biodiversity in terms of land and sea. One of the major reductions in biodiversity over the past 100 years has been the systematic engineered approach to converting wild land into arable land and the general industrialisation of farming and fishing. Industrialisation has provided many benefits to our lives but has had a heavy impact on nature.

To increase biodiversity on land agricultural methods will need to be reviewed as discussed above. It's estimated that about 64% of Irelands land surface is agricultural land and 10% is forestry. This leaves 26% for all housing, cities, and wilderness. This transformation of land usage over the last hundred years have created unexpected issues. Notably in recent years

Engineers Ireland, 22 Clyde Road, Ballsbridge, Dublin, Ireland. D04 R3N2
Tel: +353 (0) 1 665 1300 | Email: info@engineersireland.ie | Web: www.engineersireland.ie

the increase in flooding. We must overcome the legacy of hard engineering approaches to flood management before some of these natural habitats can be restored and their functions regained. [4] This can be done by soft engineering of public education through ad campaigns and the use of natural processes for functions like flood defences, such as utilising tree walls and shrubs to absorb surface water. This prevents large volumes of runoff water entering rivers causing the banks to burst.

There is an alarming rise in dead zones in the global seas where the oxygen levels have reached a level too low to support marine life. In 2008 there were 400 of these zones recorded globally and in 2019 it increased to 700 [5]. If the sea reaches a level where it cannot support life the results would be catastrophic. Biodiversity in the sea must be protected, but over half of key biodiversity areas are not protected globally. Ireland is obligated to protect 10% of its costal and marine areas, with an increase to 30% by 2030 - currently it has just 1.32% protected waters. [6] Immediate action is required on this. Utilisation of offshore energy infrastructure can be used to help create markers and barriers creating protected waters. These protected areas would protect fish stock and support coastal biodiversity by preventing large industrial fishing vessels entering the areas. With the increased need for erecting more offshore power, a level of biodiversity support measures can be included into the planning permission for the power systems, this can include seeding areas with fish and plants, and creating artificial reefs.

Call to Action:

- Provide education to the public through social and traditional media campaigns on how natural processes work and their functions, particularly around flood management
- Identify areas under current risk of flood damage and utilise natural flood defences
- Mandate future off-shore power infrastructure developments to include a positive effect on biodiversity, by creating protected waters and reefs around erected off-shore turbines

ENDS

Submitted by:

[redacted]
Policy Officer
Engineers Ireland
22 Clyde Road,
Ballsbridge, Dublin 4.
D04 R3N2

Tel: [redacted]
Email: [redacted]

ENGINEERS IRELAND

References:

[1] Climate Change Advisory Council, "Carbon Budget Technical Report," October 2021.

[2] SEAI, "Energy Use Overview," [Online]. Available: https://www.seai.ie/data-and-insights/seai-statistics/key-statistics/energy-use-overview/.

[3] Engineers Ireland, "State of Ireland 2020".

[4] NPWS, "6th National Report to the Convention," 2019.

[5] UN, [Online]. Available: https://sdgs.un.org/goals/goal14.

[6] Department of Culture, Heritage, and the Gaeltacht, "Ireland 6th National Report to the Convention on Biological Diversity," 2019.

Background to Engineers Ireland
With over 25,000 members from every discipline of engineering, Engineers Ireland is the voice of the engineering profession in Ireland. Engineers Ireland was established in 1835 making us one of the oldest and largest professional bodies in the country. Members come from every discipline of engineering and range from engineering students to fellows of the profession.

Our responsibility is to
- Promote knowledge of engineering
- Establish and maintain standards of professional engineering and engineering education
- Provide opportunities for Continuing Professional Development (CPD)
- Maintain standards of professional ethics and conduct
- Ensure that professional titles are granted to qualified candidates
- Act as the authoritative voice of the engineering profession in Ireland

Our Vision Statement
Engineers Ireland: a community of creative professionals delivering sustainable solutions for society.

Our Mission Statement
Engineers Ireland is an institution that enables the engineering community to progress their professional development and make a sustainable impact on society, advocates for the profession, quality assures education and encourages the future generations of engineers.

Engineers Ireland, 22 Clyde Road, Ballsbridge, Dublin, Ireland. D04 R3N2
Tel: +353 (0) 1 665 1300 | Email: info@engineersireland.ie | Web: www.engineersireland.ie