

North Lincolnshire's Carbon Budget and Pathway to Net Zero - All Targets Missed



By Mark Bannister

The Paris climate targets

As a result of COP21 in Paris in 2016, the UK government, along with all other 195 countries, signed up to:

'limiting global warming well below 2 °C ... and pursuing efforts to [limit to] 1.5 °C'

where the temperature values are the values above pre-industrial levels [1].

The UK government has also committed to achieving 'Net Zero' CO₂ (and the other greenhouse gasses) by 2050.

'Net Zero' CO₂ refers to reaching a point where our remaining CO₂ emissions are balanced-out by additional removal of CO₂ from the atmosphere, such as by additional tree planting.

The Net Zero Problem

Achieving 'Net Zero 2050' is, however, not enough to ensure we keep to temperature limits. It is possible to achieve Net Zero 2050 and emit enough CO₂ to take us far above the temperature limits agreed in Paris. What really counts is how much additional CO₂ we emit before we reach Net Zero - this is our remaining '**budget**'.

Global and National Carbon Budgets

Budgets can be defined at the national scale. The Tyndall Centre [2] has calculated a 'fair' carbon budget from 2020 to 2100 for the UK to be:

1150Mt CO₂ for a 33% chance of staying below **1.5deg**

2050Mt CO₂ for a 66% chance of staying below **1.7deg**

Assumptions for what is and is not included in these figures are summarised below [3].

Budgets can be used to define the reductions necessary over time ('pathways'), helping to establish interim and long-term objectives so that we don't just keep 'kicking the can down the road'.

What is a 'fair' budget?

'Fair' in this case is based on equity between nations and refers to the fact that the economic capability and physical capacity to reduce emissions varies between nations. Less developed nations than ourselves will inevitably need a greater carbon budget than the UK to enable them to fully decarbonise, leaving a developed nation like ourselves with a smaller remaining carbon budget.

North Lincolnshire Emissions and Carbon Budgets

Historic emissions for North Lincolnshire up to 2020 are published by the UK government department for Business, Energy & Industrial Strategy, (BEIS) [4].

Although many will be aware of a global or even a national carbon budget, **what is far less well known is that carbon budgets have been calculated down to the local authority level by the Tyndall Centre** [2]. As local authorities have powers over sectors such as transport, buildings, and waste, carbon budgets will help define local government policies across these sectors, providing the data to justify initiatives such as to reduce energy demand, increase renewable energy resources, improvements in public transportation, design standards of new infrastructure and waste management.

It also enables communities to check progress in meeting climate change targets where they actually live, giving more ownership and understanding to the level of changes required in our local communities and industries.

There are several methods for coming to a 'fair' calculation for the part of the remaining UK carbon budget that can be allocated to North Lincolnshire. It could be based on population, a measure of economic activity, or 'Grandfathering'. Grandfathering is defined as taking the known average historic emissions for the 5 year period 2015-2020 for both North Lincolnshire and the UK and using that fraction as the start point for the pathway from 2020 to Net Zero in 2050. The Grandfathering method gives North Lincolnshire by far the biggest remaining carbon budget (due to the many carbon-intensive industries we have), so we can be pretty sure that will be the method favoured by North Lincolnshire Council.

What do the Council Say?

Theme 1 – Net Zero and Sustainable Energy

Aim 1 – By 2030 the council will achieve net zero

Aim 2 – Clean Growth

Aim 3 – Embedding decarbonisation in our economic growth

Aim 4 – Net zero living is easy and accessible

- Total carbon emissions in North Lincolnshire are more than 7.4 million tonnes.
- 6.6 million tonnes of this comes from industry and commerce.
- 12,200 tonnes comes from the council. By 2030 we will have ended this.

North Lincolnshire council's policies are given in: [Themes and Aims to achieve a Green Future](#).

Although there are generalised aims, there is no sign of any pathway. The only data is that also produced in the North Lincolnshire Council 'News Direct' [5] - total carbon emission of "more than 7.4Mt" and "6.6Mt of this comes from industry and commerce".

When asked for further details (what year is this valid for?, what emissions are included? what are excluded?, do you have a pathway to Net Zero?,...), unfortunately, the council would not or could not give an answer, so some assumptions are necessary.

The North Lincolnshire Emissions Pathway to Net Zero

To be consistent with the Tyndall Centre data, we must subtract an amount for land use, land use change and forestry (LULUCF). We take this to equal the known 2020 value of 0.1 Mt CO₂, which leaves us

with an estimate of:

7.3 Mt CO₂ for North Lincolnshire total emissions for 2021.

With no pathway forthcoming from the council (have they even calculated one?), we have to look elsewhere.

Thankfully, we have some solid data from The Tyndall Centre [2], which has calculated 'fair' carbon budgets from 2020 for all local authorities. Using this data with some minor changes to align with BEIS data, results in the following carbon budgets from 2020 for North Lincolnshire:

23 Mt CO₂ for a 33% chance of staying below **1.5deg**

41 Mt CO₂ for a 67% chance of staying below **1.7deg**

At current emissions of 7.3Mt / year, the 'fair' North Lincolnshire carbon budget for 1.5deg will be exceeded next year (2023) and the 'fair' budget for 1.7deg will be exceeded in 2025.

If these limits are passed, this means either we expect others to make sharper emissions cuts than their own fair allocation (including the undeveloped world), or we

are in the realms of deploying Negative Emissions Technologies (NETS) to suck emissions from the atmosphere, which are completely unproven at anything like the scale needed.

Fig.1 below shows that North Lincolnshire 2021 CO2 emissions **increased by 13%** compared to the previous year instead of the required yearly **reductions of 14%** to meet even the 1.7 deg limit, likely due to a re-bounce in the economy after the Covid lockdown.

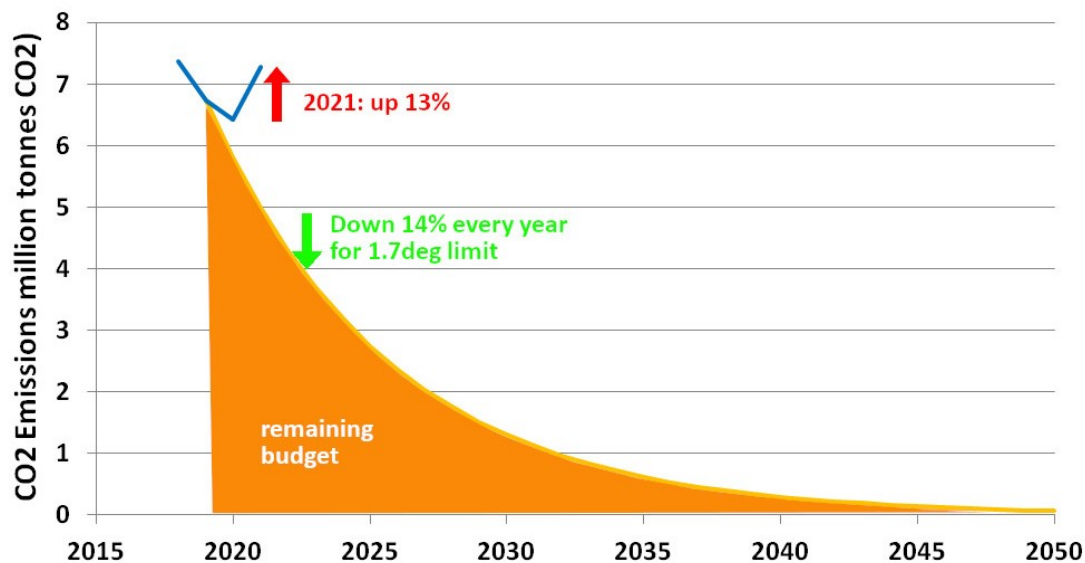


Fig.1: North Lincolnshire CO2 Emissions up to 2021 (blue) [1]; 'fair' remaining budget and pathway with a 67% chance of keeping within 1.7deg (amber) [2].

Every year we do not follow the pathway means we have less budget left and the required yearly emission reductions are even higher.

How can this be described as anything other than utter failure?

The scale of the changes needed are enormous, yet still we are not making the radical changes to our lives and systems that are needed.

As Kevin Anderson of the Tyndall Centre says "there are no non-radical futures ahead of us". We just need to choose which one we are going to take: will it be the one where we make radical changes to our own lives and systems and gift a habitable world to our children and future generations, or the one where we fail to make these changes and gift to them a world that is uninhabitable over vast regions of the planet?

With the data in front of you, down which road do you think both our local and national politicians are taking us?

North Lincolnshire Net Zero 2050

The Tyndall Centre also gives the government pathway to Net Zero in 2050 using the 'CCC balanced net zero' (BNZ) pathway.

Note that this pathway has NOT been derived based on constraints of meeting any temperature limit, incredible as this sounds.

It is, instead, described by the government as the “*highest possible ambition*” and more weakly as having per capita estimates for the UK within the range they estimate for global averages for the period 2020 to 2050. However, this justification and the per capita estimates, both at the UK and global scale, rely heavily on the future deployment of 'Negative Emissions Technologies (NETs) which are completely unproven at scale.

The North Lincolnshire pathway associated with this is reproduced in the figure below, along with the 'fair' pathways:

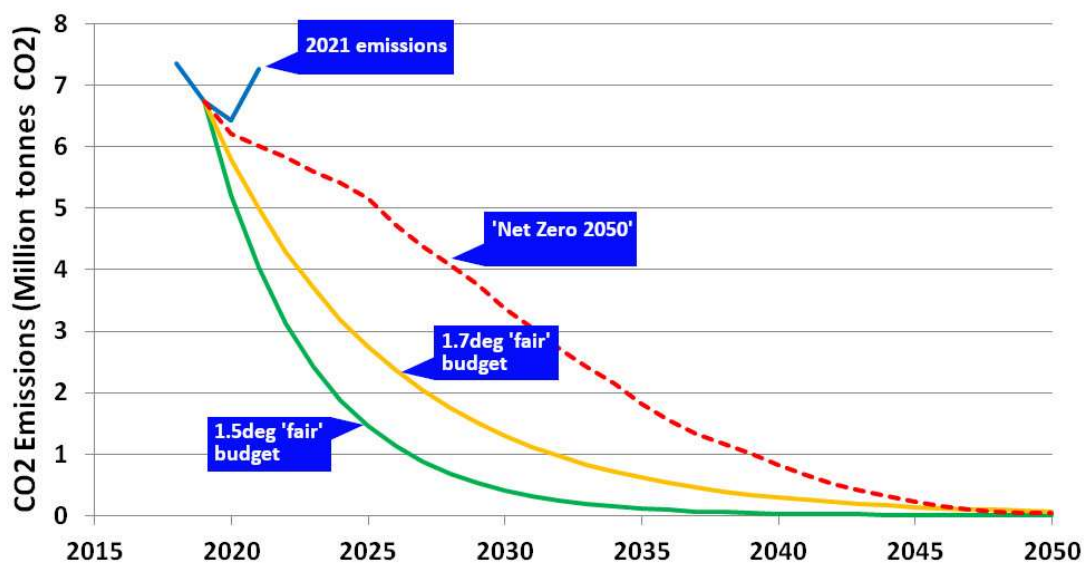


Fig.2: North Lincolnshire CO2 Emissions up to 2021 (blue) [1]; 'fair' budget and pathways with a 33% chance of keeping within 1.5deg (green); 67% chance of keeping within 1.7deg (amber) [2]; Net Zero 2050 (CCC BNZ) pathway (red) [2].

As can be seen in Fig.2 we are not even following the governments own 'Net Zero 2050' pathway, which 'only' requires a 7% reduction every year.

Other news items to follow will look at:

- Who are the biggest emitters in North Lincolnshire and do they have a pathway to Net Zero in 2050 that has even a 66% chance of keeping within 1.7deg?
- Are North Lincolnshire Council corporate emissions really on a pathway to reach Net Zero in 2030?

Watch this space.

In the meantime, I am happy, of course, to change any of this data if North Lincolnshire Council will engage and point out any errors in any assumptions used or any errors in the data itself.

Notes:

[1] United Nations, Paris Agreement, U. Nations, Editor. 2015, United Nations: <https://unfccc.int/process-and-meetings/the-paris-agreement/the-parisagreement>.

[2] Jaise Kuriakose, Chris Jones, Kevin Anderson, Carly McLachlan, John Broderick, **What does the Paris climate change agreement mean for local policy? Downscaling the remaining global carbon budget to sub-national areas**, Renewable and Sustainable Energy Transition, Volume 2, 2022, 100030, ISSN 2667-095X,

<https://doi.org/10.1016/j.rset.2022.100030>.
(<https://www.sciencedirect.com/science/article/pii/S2667095X22000149>)

[3] Assumptions and what is and is not included in the local authority emissions:

There is a choice of emission accounting systems such as which greenhouse gas emission types to include (CO₂, methane and nitrous oxide). The figures shown here are for CO₂ only. They also show "territorial" emissions only, meaning emissions that occur only within the UK's borders. The data show emissions related to energy use allocated on an "end-user" basis (where emissions are distributed according to the point of energy consumption). Agricultural emissions in this data are only related to the fossil fuels burned in the sector (e.g. farm machinery). Shipping, aviation, military-related and cement production emissions are also excluded, as they are deemed national overheads.

The remaining budgets for CO₂ emissions use AR6 assumptions that non-CO₂ emissions (e.g. methane, nitrous oxide) are also reduced consistent with the median reductions from IPCC's deep mitigation scenarios).

The figures quoted by North Lincolnshire Council of total emissions for North Lincolnshire of 7.4 Mt are assumed to be for 2021; include LULUCF and are consistent with the BEIS figures in terms of scope.

[4] <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2020>

[5] [North Lincolnshire Council News Direct Issue 35 page10](#)