YORKSHIRE DALES NATIONAL PARK AUTHORITY **ITEM 5**

Date: **20 September 2022**

Report: **YORKSHIRE DALES NATIONAL PARK GREENHOUSE GAS ASSESSMENT**

Purpose of the report

1. To brief Members on a new detailed assessment of Greenhouse Gas emissions from the National Park.

RECOMMENDATION

2. It is recommended that the Authority:
    - notes the results of the greehnhouse gas emission baseline assessment for the Yorkshire Dales National Park; and,
    - comments on the findings of the assessment, and how best to use the information to develop future strategy.

Strategic Planning Framework

3. The information and recommendation contained in this report are consistent with the Authority's statutory purposes and its approved strategic planning framework, and in particular:

    - **National Park Management Plan 2019-2024**
      "By 2040 the Yorkshire Dales National Park will be…resilient and responsive to the impacts of climate change, storing more carbon each year than it produces."

Background

4. 'Climate Leadership' is one of the four priority areas for which National Parks England (NPE) have – collectively – agreed delivery plans. One of the key actions in that delivery plan is to:
    - *Secure additional funding to establish a consistent Carbon Budget baseline for all ten National Parks to understand how and where to prioritise actions to reach net zero by the fastest possible time, a monitoring framework to report by, and progress towards net zero*.

5. Following some initial work done by the Lake District National Park Authority, Small World Consulting (based at Lancaster University) was commissioned in 2021 to

produce the carbon baseline assessment for each UK National Park (and several AONBs). The assessments for the final tranche of 5 English National Parks, of which the Yorkshire Dales is one, have been part-funded by Natural England.

6. The assessments are intended to provide a comprehensive review of the 'greenhouse gas footprint' of each National Park across key sectors, including both residents and visitors. They also include a set of indicative Paris-aligned target recommendations for transitioning to a low-carbon economy. All the assessments are based on the best available data (using figures from 2019 to avoid any distorting effects from the impact of Covid during 2020 and 2021).

7. Members should note that the report uses a **'consumption-based'** assessment of the greenhouse gas emissions. This differs from the more traditional '**production-based'** reporting, which is the basis for all Government targets and monitoring. A production-based assessment covers only the emissions that are directly *produced* within the area (whether by people or businesses or from land), plus those arising from production of the electricity *used* within the area. However, the consumption-based approach adopted here includes indirect emissions that are embodied in the goods and services consumed by residents and visitors within the National Park. In doing so, it provides a fuller picture of the climate impact of people's lifestyles, and brings into focus some significant areas of climate impact that a production-based assessment overlooks. The most important of these are the impacts of:

    - food;
    - items purchased by residents (such as cars, clothes, IT equipment, household goods and furnishings); and,
    - residents' and visitors' travel to and from the National Park, outside its boundaries.

8. A significant proportion of the sources of these newly-revealed emissions are well outside the remit of the Authority (geographically and statutorily). Nonetheless, the information provides useful context for developing the wider approach to achieving the Government's statutory targets for 'net zero' within this National Park.

Consideration

9. The final assessment was only received on 12 September A copy of the Executive Summary is attached as an **Annex** to this report. The full report can be accessed on the Authority's website here.

10. The report provides a wealth of information, and it has not been possible in the short time available to unpack all of the details. However, in summary, the key challenges highlighted by the assessment are:

    - Using the consumption-based methodology, the overall level of emissions is 915,000 tCO_2e per year (compared to the 'production-based' figure of 733,000). **NB** this does not mean emissions are actually any higher;
    - Greenhouse gas (GHG) emissions per resident are well above the UK average reflecting both the dispersed population (emissions from driving = 42% higher than

UK average); and the aged housing stock (emissions from domestic heating = 15% higher than UK average).

- The total emissions created by visitors (including travel to and from the Park) is broadly equal to the emissions created by residents;
- Emissions from land use (livestock, fertiliser, degraded peatland etc) are also broadly equal to those from residents.

11. The report goes on to provide some idea of the scale of the changes that would potentially be needed within the National Park to support the achievement of the UK net zero target by 2050. This indicative 'pathway' would lead to the National Park reaching net zero by 2033 (and thereafter becoming a growing 'carbon sink' to offset emissions in other parts of the country). It includes targets for reducing emissions from:
    - Energy use by residents, visitors and industry
    - Food and drink consumed by residents and visitors
    - Other goods purchased by residents and visitors
    - Visitor travel to and from the National Park
    - Land use (methane and nitrous oxide)
    - Land use (CO_2)

12. The report highlights both:
    - the need to *reduce* emissions significantly across every sector; and,
    - the relative importance of the National Park as a potential source of 'nature-based' solutions – *sequestering* carbon through new woodland, restored peatland and better-managed soils.

13. These nature-based solutions are the areas for action that fall most obviously within the Authority's remit – being directly linked to the special qualities for which the National Park was designated. The National Park Management Plan – and the more recent Dales Woodland Strategy – already set out ambitious targets for reducing emissions from land-use.

14. The Authority cannot, nor would it wish to, seek to 'control' the lifestyle of residents. Nor can it determine how visitors choose to travel to the National Park. However, the report does provide some helpful indicators of priorities for action by our constituent local authorities and others to support local communities that want to take action - , including supporting behaviour change and the shift to a low-carbon lifestyle.

Next steps

15. Subject to Members' views today, the information in the assessment will be used to inform the development of the next National Park Management Plan, work on which will start next Summer.

Conclusion

16. The climate change and nature emergencies remain an existential threat globally, and to the future of the National Park. Understanding the sources and broad scale of emissions from different sectors is critical to cost-effective action. The Small World Consulting report provides a wealth of information, illuminating some important sources of emisisons that are not normally visible in local emisisons accounting. Whilst most of these sources lie outwith the Authority's statutory remit, the report provides valuable context to help inform the setting of climate change objectives in the next National Park Management Plan, and future action by the Authority to tackle those areas – like land management – that fall within our remit.

Gary Smith
Director of Conservation and Community

12 September 2022

Executive summary

Background

As the world wakes up to the climate and wider environmental emergency, rapid reduction of greenhouse gas emissions and sustainable land management are becoming increasingly central to the local, national and international policy agendas.

Together, the UK's 15 National Parks (NPs) and 46 Areas of Outstanding National Beauty (AONBs) are home to over 1.5 million residents, attract approximately 250 million visitors per year, and account for around 18% of the UK's land area. If these protected landscapes can become exemplars of low-carbon transition and environment-conscious land management, their national and international profiles could give them a level of influence that far outweighs the scale of their own emissions. The exciting and creative challenge for each protected landscape is to work together with local partners, and at scale, to achieve rapid action towards net zero, while simultaneously creating better places for people to live, work and visit.

This report

This report, for the Yorkshire Dales National Park, is one of a series of methodologically compatible reports produced for each UK National Park and Welsh AONB, with the Cotswolds AONB and Cannock Chase AONB also joining. They are designed to provide a robust and consistent evidence basis for climate action, matched to the unique characteristics and circumstances of each protected landscape, as we enter an era in which climate mitigation and sustainable land management become ever more central to all our lives, our work and to all policy decisions.

This report contains a consumption-based assessment of the greenhouse gas emissions attributable to residents and visitors, including travel to and from the landscape (Figure 1), and a set of Paris-aligned target recommendations for transitioning to a low-carbon economy.

Consumption-based emissions reporting differs from more traditional production-based reporting, such as that used by the UK in setting its 2050 net zero target. A production-based assessment would cover only the emissions that are directly produced within the boundary of the landscape whether by people or businesses or from land, plus those arising from production of the electricity used within the landscape. However, the consumption-based approach adopted here covers, in addition, all indirect emissions that are embodied in the goods and services consumed by residents and visitors within the landscape. In doing so, it better reflects the full climate impact of people's lifestyles, and brings into focus for policymakers important areas of climate impact that a production-based assessment overlooks. The most important of these are the impact of food, of other purchased items (such as cars, clothes, IT equipment, household goods and furnishings), and of residents' and visitors' travel to and from the landscape, outside its boundaries.

Accounting for emissions from land use and management is also crucial for National Parks and AONBs. These landscapes are mostly rural, with comparatively small populations and large areas of land under various forms of use for agriculture, forestry, and other land management activities. Land-based emissions originate predominantly from ruminants (methane), synthetic fertiliser use

(nitrous oxide), and degrading peatlands (mostly CO_2). These emissions are, to a degree, compensated by carbon sequestration in existing woodlands, meadows, hedgerows, and healthy peatlands, while agricultural soils could also sequester carbon under certain types of management. Reducing land-based emissions and scaling up land-based carbon sequestration efforts is going to be crucial for addressing the joint climate and ecological emergencies.

One feature of consumption-based reporting is that it does not include emissions from industry (except where an industry's goods and services are consumed by residents and visitors). Therefore, for perspective, this report also includes a simple estimate of emissions related to industries within the National Park or AONB, including their supply chains. It is important to note that there is some inevitable overlap between industry-related emissions and residents' and visitors' emissions, for example when people buy from local businesses within the area. Likewise, there is an overlap between emissions from agriculture as an industry sector and land-based emission within each landscape. Figure 1 illustrates the relationship between the main components of our central assessment and the industry emissions.

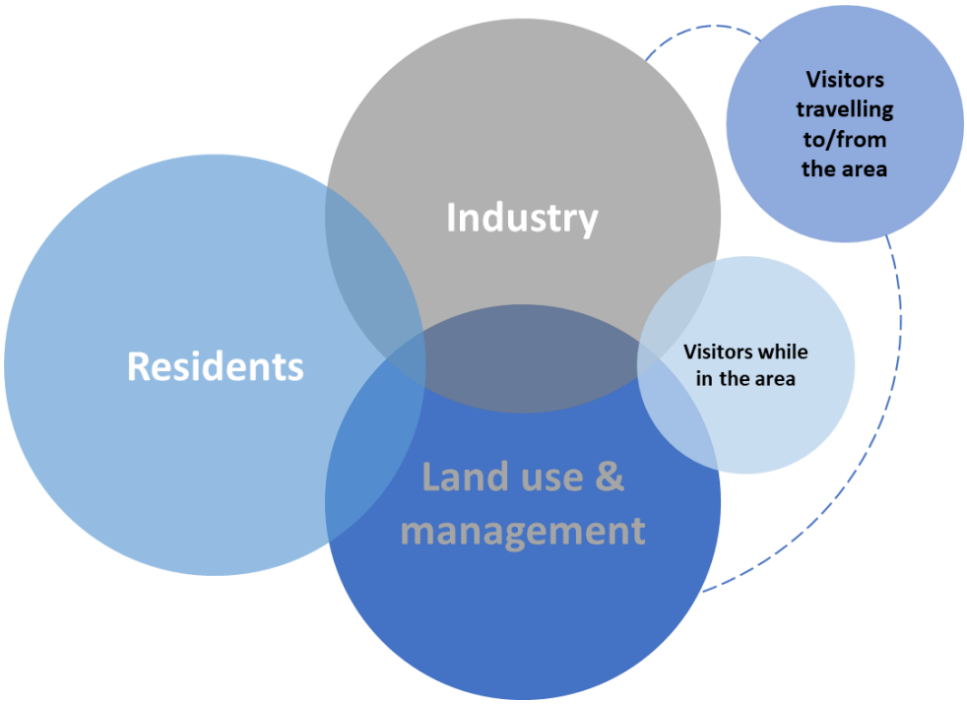


Figure 1: Boundaries of the greenhouse gas footprint assessment

This report also includes a scenario for Paris-aligned greenhouse gas emission targets across six key areas. These areas have been chosen in order to find a "best fit" between competing desires: to cover everything of significance within the influence of local policymakers, to keep the boundary simple to describe, to avoid double-counting, and to make use of any data readily available for tracking progress. As a result, the scope for the target areas is slightly different from that of the overall emissions assessment. The six target areas are:

- Energy-only emissions by residents, visitors and industry
- Food and drink consumed by residents and visitors
- Other goods purchased by residents and visitors

- Visitor travel to and from the National Park or AONB
- Land use non-CO_2 component (including emissions from livestock and fertilisers)
- Land use CO_2 component

Limitations and uncertainties

Due to the complexity of supply chains and the limitations of available data, consumption-based emissions estimates always contain a considerable degree of uncertainty. However, given current constraints on data availability, these estimates are sufficiently robust to provide an evidence basis for carbon management and target setting. The estimate of industry-related emissions is particularly crude, being based on comparatively simple revenue data and generic UK-wide emission factors.

Results

Yorkshire Dales National Park	
Annual emissions from residents	**337,127 tCO_2e** (15.0 tCO_2e per person per year)
Annual emissions from visitors while in the National Park	**121,060 tCO_2e** (18.5 $kgCO_2e$ per visitor-day)
Annual emissions from visitors travelling to/from the National Park	**213,285 tCO2e** (43.2 $kgCO_2e$ per visit)
Annual industry emissions	**191,574 tCO_2e**

Key highlights

The Yorkshire Dales National Park is the third-largest UK National Park by area behind Cairngorms and the Lake District, but has a comparatively small residential population and a moderate number of visitors given its size.

The Yorkshire Dales residents' consumption is roughly 15% above the UK average (excl. public services), which is on the higher side among all National Parks and AONBs on the current programme. The consumption data shows that the residents' health expenditure is the highest among all National Parks and AONBs analysed, consistent with the National Park having a disproportionately high share of the population aged over 65 compared to the UK average[1].

In a given year, the footprint of the residents of the Yorkshire Dales National Park is estimated to be around 18% higher than the UK average. Several fossil fuel-based sources of greenhouse gas emissions are particularly high. The residents' emissions from flying are estimated to be around 48% higher than for an average UK resident. Driving emissions and other transport emissions (excl. driving) are around 42% and 35% above the UK averages, respectively. The Yorkshire Dales household electricity footprint is around 23% higher than the UK average. Household fuel emissions

[1] Yorkshire Dales Management Plan, 2019-2024, Annual Report, 2021, NPMP-Annual-Report-2021.pdf (yorkshiredales.org.uk).

(excluding vehicle fuel) are around 15% above those of an average UK resident, although this estimate has high uncertainty since multiple properties are off the gas grid in the National Park, and because there is insufficient data for residual fuel use (oil, coal, biomass). It must be noted that our estimates for emissions from household fuel and electricity use do not include renewable energy solutions such as solar panels and heat pumps, nor do they factor in the uptake of electric vehicles. As of 2019, the share of these technologies across households was comparatively low and no suitable data with sufficient geographical detail was available.

The Yorkshire Dales National Park has a below-average share of visitors staying overnight among all landscapes on the programme (around 13%). Average duration of stay for overnight visitors is around 3.4 days which is also on the lower side. Estimated average mileage travelled on land to get to the Dales is just below the average among all National Parks and AONBs analysed (around 106 miles) and is dominated by cars, while relatively few visitors come from overseas. The visitors' footprint while travelling to and from the National Park is dominated by vehicle fuel (60%), followed by flying (22%). The footprint of travelling to and from the Park is just over 75% higher than while in the Park. The total footprint of all visitors (both in the Park and while travelling to and from) is almost equal to that of the residents.

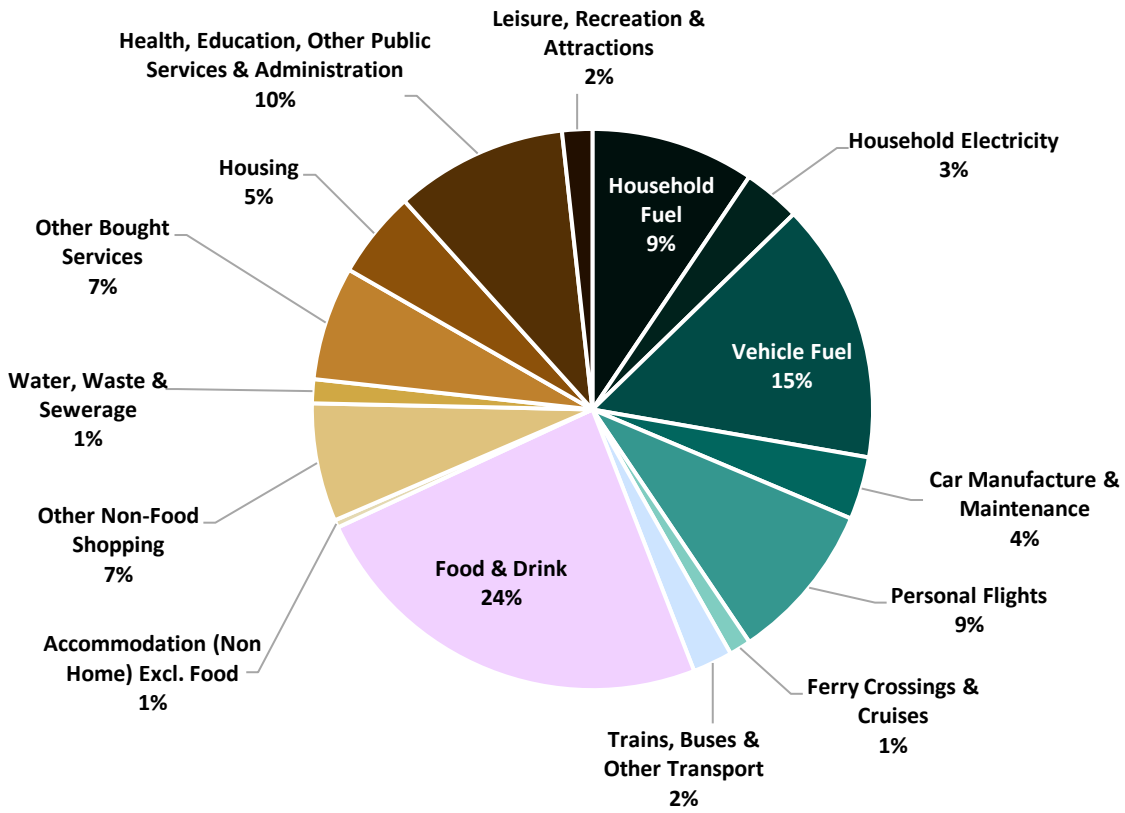
The industry footprint of the Yorkshire Dales National Park is dominated by agriculture (55%). Farming within the National Park is predominantly sheep and cattle production[21]. A fundamental difficulty with estimating industry footprint is that locations where companies are registered and where the required business data is available do not always match with the locations of business activities and emissions. Another challenge is the insufficient number of sectors reported in the business data that matches closely to the boundary of a protected landscape, which forces us to apply generic UK-wide emissions factors.

The Dales is estimated to have a sizeable traffic footprint from the major A and B roads (A683, A684, A685, A6108, B6260, B6265 and B6270), which amounts to around 13% compared to the total footprint of the residents. Through-traffic is estimated to account for around 40% of the emissions from the major A and B roads.

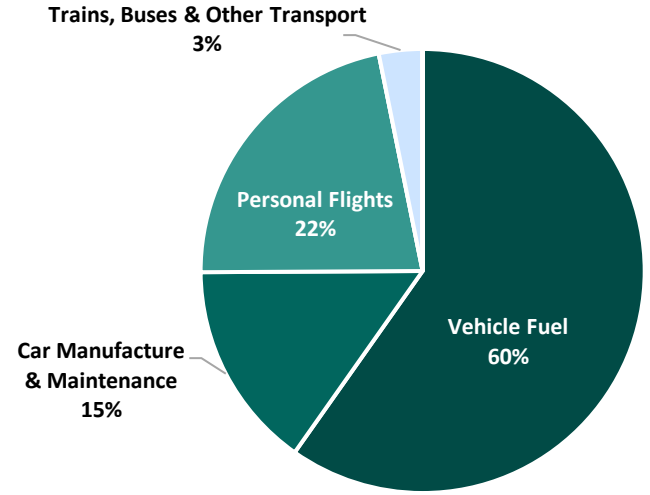
Targets scenario

A minimum Paris-aligned target trajectory has been constructed for each of the six elements of the targets, as illustrated in Figure 6. When combined, they would result in a net zero date of 2033 for the Yorkshire Dales National Park. We note that the net zero date reflects the unique characteristics of the landscape, including the land use types and their respective areas, the number of residents and visitors and their consumption patterns, and the level and type of industrial activity. It also assumes the recommended decarbonisation and carbon sequestration efforts, including land use change, ratchet up to the required levels immediately in the base year of the assessment. In reality, the high levels of ambition for different sectors explored in this report are likely to take several years to achieve, given that post-COVID emissions have largely rebounded, and that decarbonisation trends to date have been relatively small in magnitude compared to what we know is required for keeping global warming below the safer 1.5°C limit from the Paris Agreement. These factors are expected to push the projected net zero year back by several years. The net zero date should therefore not be taken in isolation as a level of ambition.

Residents: 337,127 tCO_2e



Visitors travelling to and from the National Park: 213,285 tCO_2e



Visitors while in the National Park: 121,060 tCO_2e

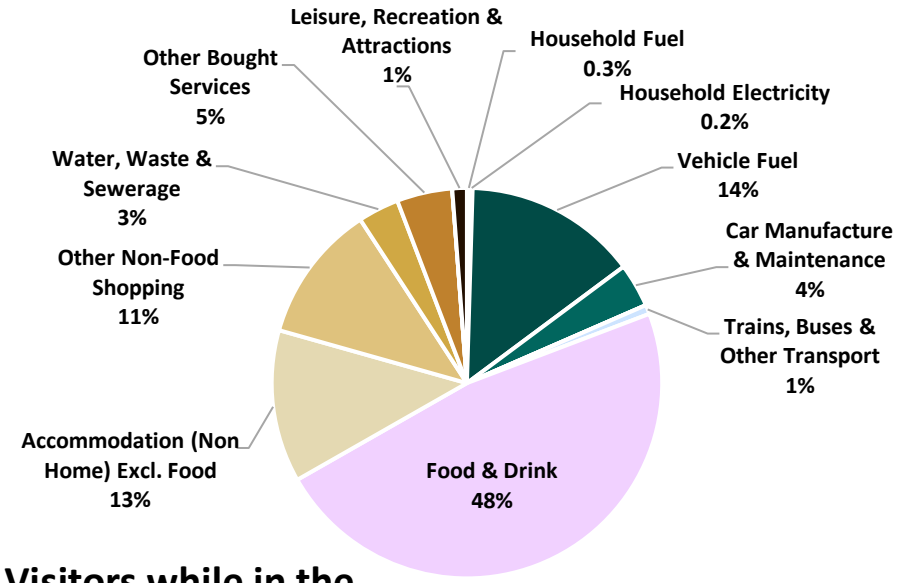


Figure 2: (Left) Residents' GHG emissions in Yorkshire Dales National Park by percentage

Figure 3: (Top Right) Visitors' GHG emissions on the way to & from Yorkshire Dales National Park by percentage

Figure 4: (Bottom Right) Visitors' GHG emissions while in Yorkshire Dales National Park

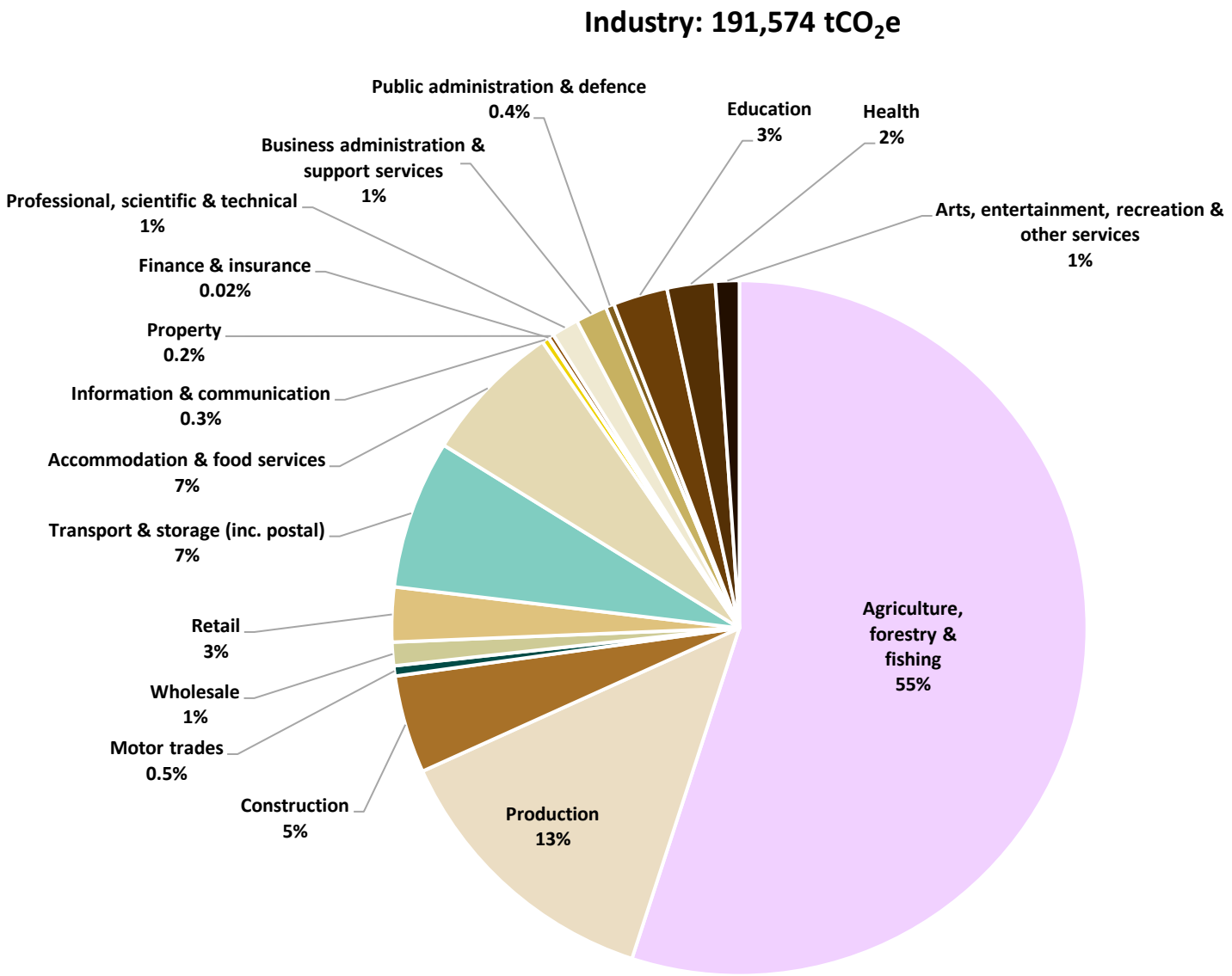


Figure 5. An estimate of emissions from industries within the Yorkshire Dales and their supply chains (scopes 1, 2 and upstream scope 3)

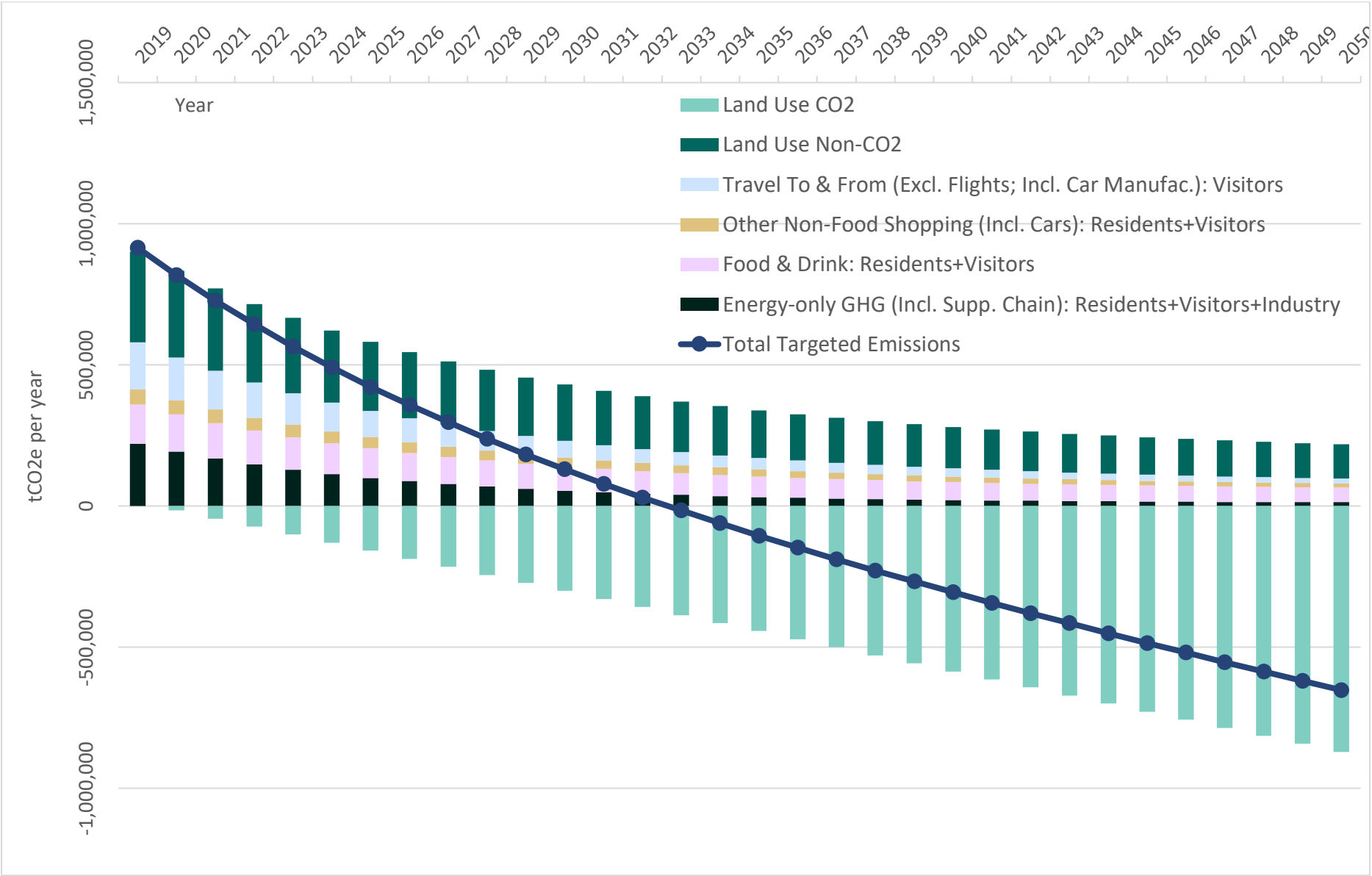


Figure 6: Recommended consumption-based target pathways resulting in net zero emissions in 2033 for the Yorkshire Dales National Park.