



# Creating a Pathway to a **Climate-Friendly Cotswolds**

A Layman's Guide to Small World Consulting's  
Carbon Baseline Assessment Technical Report



# Introduction

In 2021 the Cotswolds National Landscape Board commissioned Small World Consulting (SWC) to map the climate footprint of the landscape. This guide presents the results of SWC's analysis of the climate impacts from what residents, visitors and businesses consume, and how we use the land in the Cotswold National Landscape (CNL). SWC has undertaken similar work for all National Parks and several Areas of Outstanding Natural Beauty, and by applying the same calculations to many areas, we will have strong foundations for working together.

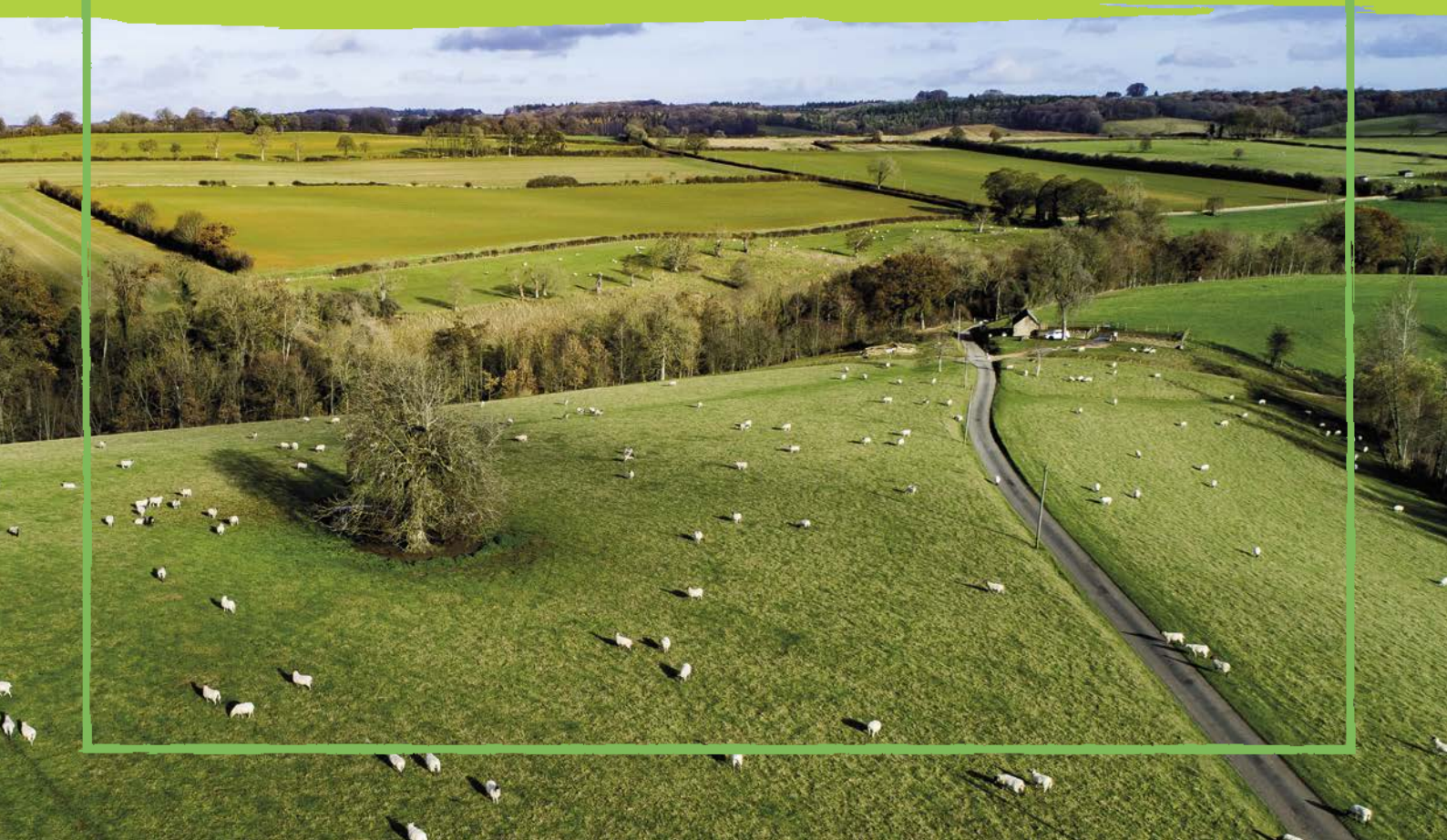
All landscapes are constantly evolving, whether through natural processes or human activity. Some climate change is already unavoidable, and this will drive further transformation. The Cotswolds will have hotter summers; milder, wetter winters, and more extreme weather events. This means it is inevitable that treasured Cotswolds views, wildlife and plants will be permanently affected. The crops which currently thrive here will also change, as farmers must find species and varieties that are suitable for the new climatic and

soil conditions. So, preserving the Cotswolds exactly as it is today is simply not possible. The questions are: how do we want the landscape to adapt and change to contribute to limiting climate change, and what changes are we willing to make to our own behaviour to avoid the need for more extreme changes to the landscape?

It's time for urgent action, and so what matters are the insights into the relative impacts of different sources of emissions, and the opportunities to start tackling the

problem. We can always adjust the pathway as new data and solutions emerge.

Detailed results and a technical explanation of the calculation can be found in the full report by SWC which also summarises ways to tackle climate change. In this guide, we focus on the headlines specific to the Cotswolds, which we can all use to have well-informed discussions about how we want to shape a climate-friendly future for the Cotswolds.







## Introduction continued

The global objective is to achieve net zero emissions of greenhouse gases (GHGs) by 2050 to limit warming and avoid the worst consequences of climate change.

This requires us to reduce rapidly our GHG emissions (gases that make the climate hotter, for example from burning natural gas or using petrol). In addition, we must remove all the remaining, unavoidable emissions from the atmosphere, for example through growing trees which absorb carbon dioxide from the atmosphere and then store it for a long time.

The Cotswold National Landscape Board is committed to endorsing a pathway to net zero emissions (or better) by 2050 (or sooner). A pathway which respects this area's precious beauty; provides a vibrant place to live, work and visit; produces food and restores nature; and contributes to residents' and visitors' physical and mental wellbeing. The first step, fulfilled by the SWC report, was to create an evidence-base to determine current emissions, and the potential options for reaching net zero. Next, we want to engage local communities and partners in considering SWC's findings and recommendations, allowing us to find the best approach to

reducing emissions and increasing land-based carbon removal, while conserving and enhancing CNL's natural beauty and maintaining the social and economic wellbeing of local communities. This guide to SWC's analysis is part of the engagement. Once the CNL Board endorses a pathway towards net zero emissions, we will work with our partners to follow it as they develop and deliver their own responses to the climate emergency.

Agreeing a pathway will be a challenge, but many communities, businesses and farmers are already rising to this challenge, and in the words of Sir David Attenborough,

*“If we can do something about it, then do it. We can do it. We must do it.”*



# Headlines

Let's start with some headlines, based on SWC's analysis of emissions in 2019:

**The resident population** in the Cotswolds is just over 163,000 people. Our greenhouse gas (GHG) emissions arise primarily from what we eat and drink (estimated at 22% of our total emissions), flying (16%), and vehicle fuel and household energy (both 13%). In total, our emissions are around 26% higher than the UK average per person. In particular, compared to UK averages:

Our food and drink footprint is around **10%** higher than average

Electricity and driving are around **35%** and **30%** higher

Emissions from flying are estimated to be 2½ times (**250%**) higher

**Visitors' emissions**, including travelling to/from the Cotswolds, are equivalent to about half of total residents' emissions. Their emissions overwhelmingly come from travelling to/from the Cotswolds, rather than what they do, buy and eat while they are here. In particular,

Emissions from travelling are dominated by flying (**48%**) and road fuel (**41%**)

Of the remaining **11%**, while visitors are here, about half their emissions are due to food and drink

**16 million** people currently visit the Cotswolds every year.





# How big is the challenge?

To offset the GHG emissions of Cotswolds residents, visitors and businesses just for 2019, we would need to plant the equivalent of 10,800 football pitches (7,400 hectares) with broadleaf trees, and let them grow for over 100 years.

To put that in context, currently the total woodland cover in the Cotswolds is estimated at around 25,000 hectares, or nearly 14% of the area. Another way of envisaging the challenge, is that if we only

planted trees to offset all the GHGs we emit, the whole of the Cotswolds would be covered in trees by 2050. Of course, no one is suggesting that, but it demonstrates the scale of challenge, and why we need

to tackle emissions across a wide range of activities, and not think tree planting alone would solve the problem.





# What does “net zero” mean, and why is it important?

The United Nations define net zero as:

*“Cutting greenhouse gas emissions to as close to zero as possible, with any remaining emissions re-absorbed from the atmosphere, by oceans and forests for instance.”*

Achieving this target by 2050 should limit global warming to 1.5°C compared to pre-industrial temperatures. In 2019, law was introduced requiring the UK to bring its greenhouse gas emissions to net zero by 2050.

In 2022, the Cotswold National Landscape Board adopted a commitment *“to identify a scenario which allows us to endorse a path to net zero emissions (or better) by 2050 (or sooner).”*

Small World Consulting’s analysis provides us with a baseline and set of recommendations as the basis for consulting on what that pathway should be.



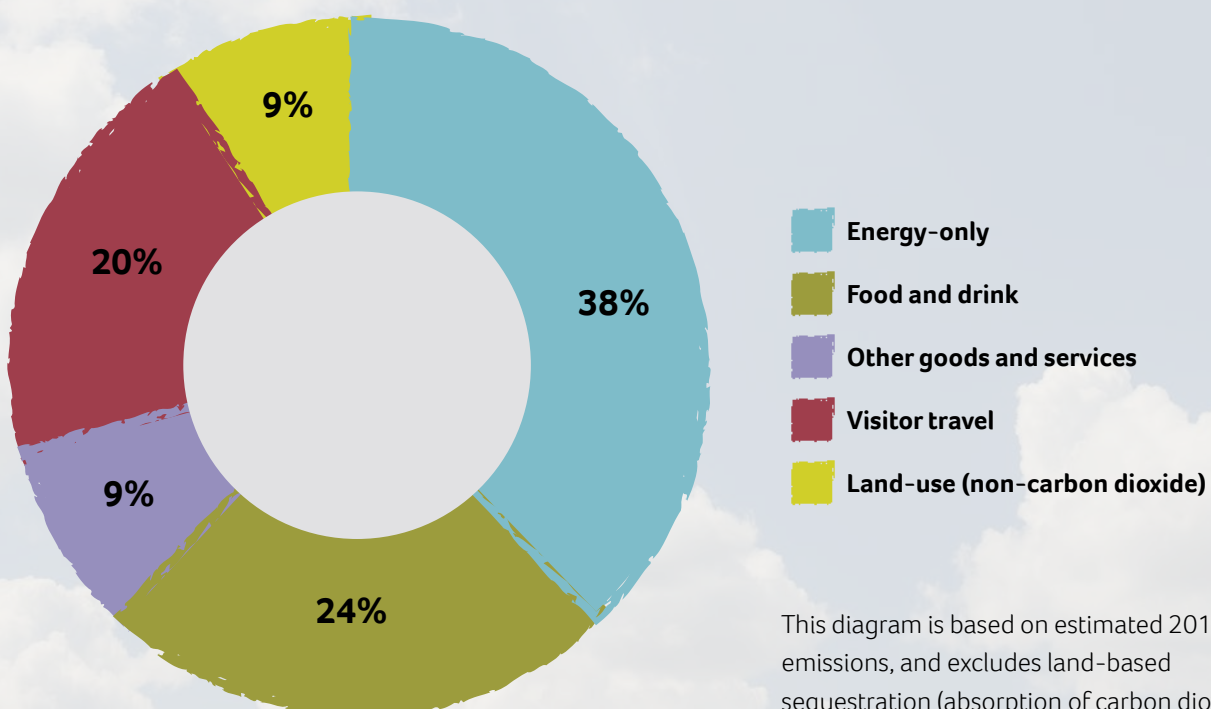
# Small World Consulting's analysis

SWC made recommendations focused on consumption: what residents and visitors buy and do within the Cotswolds, and how visitors travel to and from the Cotswolds. They focused on six priority categories:

- **Energy-only** emissions (such as heating buildings, electricity use and road fuel) by residents, visitors and businesses, excluding residents' emissions from flights
- **Food and drink** consumed by residents and visitors
- **Other goods and services** purchased by residents and visitors, such as clothing, electronic equipment and cars
- **Visitor travel** to and from the Cotswolds, excluding visitors' flights due to the difficulty in apportioning these emissions given visitors tend also to spend time elsewhere in the UK
- **Land-use (non-carbon dioxide)** component, which means primarily emissions from livestock digestion and from fertiliser use
- **Land-use (carbon dioxide)** component, which mostly covers the beneficial contribution of land management because trees, hedges and healthy soils absorb carbon dioxide from the air (sequestration).

These six categories were selected as the best-fit between the competing objectives of covering everything of significance within policymakers' influence; keeping the boundary simple to describe; avoiding double counting, and making use of any data readily available so we can track progress. The calculations are based on no significant change to the number of residents or visitors.

## Relative emissions of the different categories



This diagram is based on estimated 2019 emissions, and excludes land-based sequestration (absorption of carbon dioxide)

## Small World Consulting's Analysis continued

The priority categories do not include emissions from through traffic (which is significant) and non-energy emissions from businesses' supply chains. Including them would have led to considerable double counting. These emissions will be tackled both by UK-wide and local efforts to decarbonise transport and other key sectors of the economy, while international supply chains require other countries to decarbonise too.

The rate of reduction required to reach net zero by 2050 for each category is set out in the following table. The calculations are based on no significant change to the number of residents or visitors in the future. The rate of reduction and level at which further reduction cannot be achieved are based on what is currently considered the limit in terms of technology and changes to our behaviour. This is a challenging pathway, illustrating the

scale and urgency of action needed. It would mean a slightly better than a net zero Cotswolds by 2050, but only if we start making a difference immediately. It is worth noting that these targets are already four years behind because they use 2019 as the baseline (pre-pandemic), and so every year that the annual targets are not met, they will have to increase in order for the Cotswolds to reach net zero by 2050.

<b>Emission category</b>	<b>Annual reduction</b>	<b>Likely long-term residual emissions as a percentage of present-day level</b>
<b>Energy-only</b>	13.6%	5%
<b>Food and drink</b>	5%	30%
<b>Other goods and services</b>	5%	10%
<b>Visitor travel</b>	10%	7.5%
<b>Land-use (non-carbon dioxide)</b>	5%	30%
<b>Land-use (carbon dioxide)</b>	Constant annual targets in terms of hectares of trees and hedges planted, or switched to more sustainable agricultural management	





# Energy-only

## What does this cover?

Emissions relating to energy use within the Cotswolds by residents, visitors, local businesses and service providers. This includes emissions from roads (except from through-traffic); electricity, gas and oil consumed in our homes and commercial buildings; energy used in constructing and maintaining buildings, and by our local schools and hospitals, and water and sewerage companies. It does not include residents' flights, nor emissions from supply chains for local businesses and public sector organisations.

## Where are we now?

This category counts for 38% of total emissions from the priority areas, primarily from heating buildings, electricity use, vehicle fuel, and other industry energy use, for example in construction.

## What is proposed?

A 13.6% reduction every year to a target of 5% of present-day emissions.

Decreasing our use of energy or greenhouse gas emissions from energy production by nearly 14% a year is a challenging but achievable target. SWC propose that this is achieved by replacing oil or gas boilers with electric heat pumps, improving home insulation, lowering the thermostat temperature, and switching to renewable electricity sources (solar, wind, tidal and/or hydro-electric power) with tariffs backed by Power Purchase Agreements. Switching to electric heat pumps and insulating buildings will achieve the biggest reductions in emissions, but there may be issues to do with affordability. Increases in demand for electricity to accommodate heat pumps (and electric vehicles) will need both improved grid connections and community renewable energy production.

Not all our renewable energy needs to be generated within the Cotswolds, for example because of widespread decarbonising of the national electricity generation and use of electric vehicles. What is critical is that homes and businesses switch to verified renewable sources. Additional key activities would include:

- Low carbon new buildings, for example using less conventional concrete and steel, and more timber or other low carbon alternatives, and
- Low carbon transport, such as electric cars (especially if they are recharged using renewable sources), electrified public transport and cycling.

Moving to electric cars will help significantly – although how the electricity is generated and how the cars are produced will make a difference – as would buying smaller cars and/or car sharing. Similarly, electric bikes use just 5% of the energy of an electric car.





# Food and drink



## What does this cover?

Whatever residents and visitors eat and drink. This includes everything bought from shops, restaurants, take-aways, pubs, hotels and B&Bs, and reflects both how it is produced and how far it has been transported.

## Where are we now?

Emissions from food and drink are significant. They account for 24% of residents' footprint, and 52% of visitors' emissions while they are here.

## What is proposed?

A 5% reduction every year to a target of 30% of present-day emissions. This assumes 3% reduction per year from dietary change (as set out in the National Food Strategy), 1% per year from waste reduction and 1% per year from other changes, including technology.

There are three main ways of reducing total emissions from food and drink:

1. Reducing emissions from producing, processing and transporting items of food,
2. Reducing food waste, which can reduce an individual's carbon footprint from food by up to 12%, and
3. Changing our diet to include more low carbon products. This includes "less and better meat", and more plants, including fruits, vegetables, nuts, wholegrains, peas and beans.

How a product was produced on-farm, and subsequently processed and transported, will impact on its associated emissions. Beef from an animal fed on imported grain will have different levels of emissions to one fed on local pasture, especially if the manure from the pasture-fed cow is used instead of artificial fertiliser.

Gradual dietary changes are also very important since plants tend to have considerably lower GHG emissions and land area requirements to provide the same nutrients and calories compared to animal products.

Navigating choices which reconcile climate, nature, local farmers' livelihoods, health and affordability are complex, especially as our understanding of all these aspects and their interconnections deepens. Accordingly, it needs collaboration between policymakers, farmers, food producers and retailers, public health organisations and local people.





## Other goods and services

### What does this cover?

All purchases of non-food and drink items, such as clothing, electronic equipment, furniture, soft furnishings and cars.

### Where are we now?

This category accounts for about the same level of emissions as estimated

from local livestock and applying synthetic fertiliser, or just over a third of the food and drink priority category.

### What is proposed?

A 5% reduction every year to a target of 10% of present-day emissions. This includes supply

chains for these goods reducing their emissions. It also envisages developing a more circular economy that involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products for as long as possible, rather than throwing them away and buying new.



# Visitor travel

## What does this cover?

Visitor travel on land to/from the Cotswolds and within the area, but not overseas visitors' flights to/from the UK. Visitors' flights are omitted primarily due to the practical difficulty of tracking how many other places they visit in the UK in addition to the Cotswolds.

## Where are we now?

Around 16 million people visit the Cotswolds every year. Tourism supports almost 31,000 jobs, about 8% of the total. Indeed, we have one of the highest number of visitors of

all National Parks and AONBs, and one of the highest proportions of overseas visitors.

Visitors' travel to the Cotswolds vastly exceeds the emissions while they are traveling around the area. Nearly 80% of visitors' footprint is due to travelling to and from the Cotswolds, and nearly half of that is flights (assuming only 10% of the overseas visitors' trip to the UK takes place in the Cotswolds area, which is understood to be a common pattern).

## What is proposed?

A 10% reduction every year to a target of just 7.5% of current emissions. This is based on visitor numbers remaining stable. This should be achieved in similar ways to how residents will contribute to meeting their target for emissions from travel, for example, increasing use of electric vehicles and public transport both for the travel to, from and within the Cotswolds. Additional savings could be from encouraging longer stays, which will reduce the relative footprint of traveling to and from the Cotswolds per each trip.







## Land-use (non-carbon dioxide)

### What does this cover?

These emissions come primarily from livestock (methane generated by digestive systems of cattle and sheep, as well as from their manure) and synthetic fertiliser use (in the form of nitrous oxide).

### Where are we now?

Emissions from this type of land use are estimated to be equivalent to about a third of emissions arising from what residents and visitors

eat and drink (which are produced overwhelmingly outside the Cotswolds due to the nature of food supply chains in the UK).

### What is proposed?

A 5% reduction every year to a target of 30% of present day emissions.

Many farmers are already moving towards toward more climate- and nature-friendly farming. However,

SWC's recommendations requires further transition, which focuses on adopting regenerative farming practices (explained later) to reduce emissions from synthetic fertilisers, adopting cutting-edge livestock management technologies (for example in breeding and food supplements), and reducing the overall number of livestock as part of the gradual dietary change.



# Land-use (carbon dioxide)



## What does this cover?

Land management is also part of the solution, since carbon can be sequestered (absorbed) by trees, hedgerows, grasslands and other healthy soils. Increasing sequestration is crucial to addressing the climate emergency, and in many cases also contributes to supporting wildlife by enhancing and creating new habitats. We

can increase the amount of sequestration by planting trees as new woodlands, orchards, in public places like parks and schools, or small groups of trees. We could also restore hedges and orchards. With the increase in the uptake of regenerative farming, farmers are increasingly managing soils on their farms in ways which sequester and retain more carbon by increasing soil organic matter.

## Where are we now?

The Cotswold landscape currently absorbs about 8.5% of the estimated emissions from the five sources covered by this analysis.



## Land-use (carbon dioxide) continued



### What is proposed?

In order to make up the remainder of the pathway to net zero not achieved under the other five categories, SWC calculate that we would need to plant:

1. 700ha of new woodland every year across the Cotswolds – a total of 21,000ha by 2050, which is about 4½ times the size of Cheltenham or 7 times the size of Bath. This would nearly double the current woodland cover to around 22%, and compares to a total increase of 4,000ha as part of the Cotswolds Nature Recovery Plan. These figures do not include trees planted to replace ash trees lost to ash dieback, nor beech trees which die due to the more frequent and intense drought conditions expected from unavoidable climate change.
2. Just over 50km every year of new hedgerows – from 2019-2050, that's over 1500km of new hedgerow.
3. 360ha every year of new agro-forestry, which involves using the same land for crop or livestock farming and tree planting. While this increases carbon sequestration by improving soil management, the increase is estimated to be less than 20% achieved by planting the same area with trees.
4. A significant increase in cover crops of nearly 2,500 ha every year as part of farmers moving towards regenerative techniques. Cover crops are planted to cover the soil to reduce erosion, retain nutrients and sequester carbon, rather than for their harvested value
5. An increase of over 350ha every year in use of legumes such as clover, to reduce the need for artificial nitrogen applications to grasslands and sequester carbon (again part of the regenerative farming techniques)



## Land-use (carbon dioxide) continued

Nearly three-quarters of sequestration assumed in the pathway comes from new native broadleaf woodland, compared to the combination of agroforestry, new hedgerows, and use of legumes and cover crops. Broadleaf trees, such as oak, beech, small-leaved lime and wild cherry, tend to absorb more carbon in the long run and are generally better for wildlife than coniferous trees such as pine, although conifers often absorb carbon more quickly.

It is important to remember that the deeply cherished Cotswold landscape is largely the result of farming, and replacing sheep and cattle with other types of farming or with trees will change that appearance. Significantly, many Cotswold farmers' livelihoods are based on livestock farming. In addition, some fields currently used for grazing sheep and cattle cannot

just be converted to arable farming, for example those which are too steep to use a tractor, or where the soil is too thin.

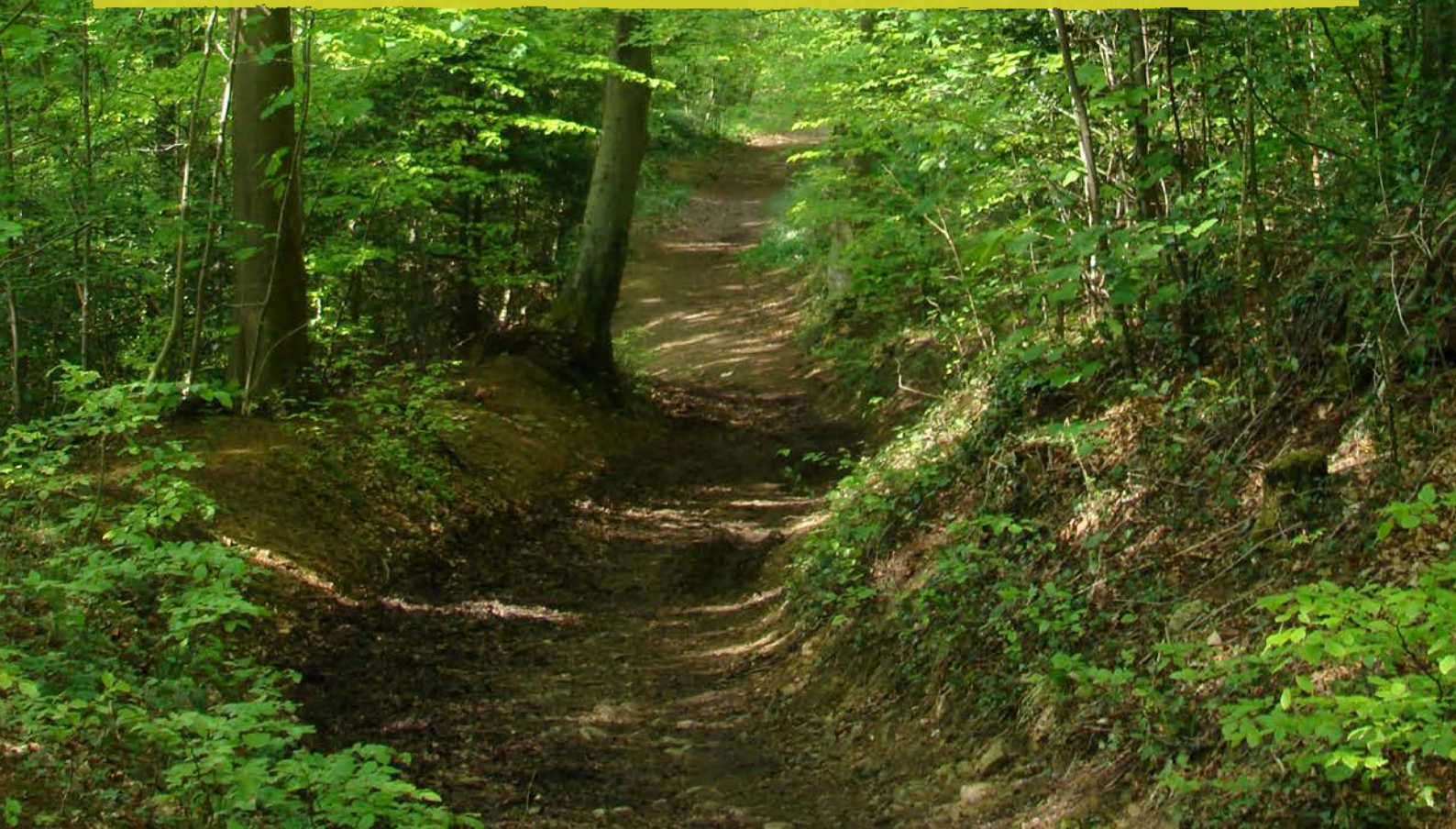
It is important to note that trees and hedges absorb carbon quite slowly when they are first planted, and then as they get bigger and grow faster, their absorption increases; it peaks after 20–30 years, and then the rate of sequestration declines. This is why it is important to start planting trees soon.

Equally, it is important to consider the 'right tree, right place, right reason'. Tree species need to be planted in locations where they will thrive, enhance the landscape and best support wildlife, and where they would not block our choicest views nor hinder the recovery of nature. Consideration also needs to be given to planting tree species which are suitable for our future climate

(higher temperatures, increased average rainfall, more frequent flood events, and more drought periods).

Planting and managing woodland must be funded, either by the wood being commercial (the UK is the world's second largest importer of wood), or through contributions from public or private finance, whereby companies pay for trees to be planted to offset some of their unavoidable corporate carbon emissions.

Finally, we need to consider the impact of planting trees in fields which are currently used to produce food. Many of the countries from which we currently import our food are becoming increasingly water-stressed due to climate change, and so long term supplies may be jeopardised, and growing our own food becomes more important.





# Exclusions

Because SWC's analysis focused predominantly on what is consumed rather than made in the Cotswolds, their recommendations exclude several categories, most significantly emissions from:

- Residents' flights, because this is considered outside local authorities' influence. However, as highlighted in the headlines, people in the Cotswolds on average fly a lot
- Business supply chains, because the focus is on emissions from consumption and land use, rather than from production
- Through traffic (these emissions are estimated to be greater than those caused by residents' traffic)



# Next Steps

National Parks and AONBs cover around 25% of England, and the Cotswolds is the third largest of these protected landscapes, after the Lake District and the Yorkshire Dales. As such, these areas need to pull their weight in delivering the UK's legally-binding commitment to achieve net zero status by 2050.

Equally, as the nation's most cherished landscapes, we need to be sensitive as to how tackling climate change impacts on the natural beauty of these areas. Similarly, the Cotswolds is not a museum, but somewhere people live and work, as well as love to visit. For example, 86% of the land in the Cotswolds is used for farming.

Accordingly, the CNL Board will consult on the optimum pathway to a climate-friendly Cotswolds by discussing SWC's findings and proposals and alternatives with local communities and partners. We want to reach consensus about a pathway which tackles the climate and nature crises we face; delivers the purposes for designating the Cotswolds as a

protected landscape; continues to ensure the Cotswolds provides both residents and visitors a place that lifts their spirits; and offers farmers and other businesses a place to earn their livelihoods.





**Cotswolds Conservation Board**


Cotswold Business Centre  
2 A P Ellis Road, Upper Rissington  
Cheltenham, Gloucestershire GL54 2QB  
07841 663607


[info@cotswoldsaonb.org.uk](mailto:info@cotswoldsaonb.org.uk)  
[cotswoldsaonb.org.uk](http://cotswoldsaonb.org.uk)

The Cotswolds National Landscape is a designated Area of Outstanding Natural Beauty (AONB), managed and looked after by the Cotswolds Conservation Board.

 [CotswoldsAONB](#)

 [CotswoldsAONB](#)

 [aonbcotswolds](#)

 [cotswoldsaonb](#)