

A tall purple orchid with white and purple speckled petals stands prominently in the foreground of a lush green field. The field is filled with various wildflowers, including many bright yellow ones. In the background, rolling green hills are visible under a clear blue sky with a few wispy clouds.

Zero Carbon Shropshire Plan Version 1, December 2020

Shropshire Climate Action Partnership

Photo: Geoff
Taylor www.geofftaylorphotography.com

Summary

Shropshire Climate Action Partnership (SCAP) is a partnership of, by and for Shropshire, established in August 2020. It was set up with an initial objective to create a practical Zero Carbon Shropshire Plan (ZCSP) by the end of 2020 (capable of implementation from 1 January 2021) working to achieve net zero carbon Shropshire by the end of 2030. This first phase of activity has been undertaken entirely through voluntary efforts by a team of more than 100 residents and employees in Shropshire enterprises, community groups and councils.

SCAP set out its vision for a sustainable Shropshire as follows:

‘Shropshire will become net zero carbon by 2030. Starting immediately, organisations, businesses and communities across Shropshire will participate in a collaborative approach to rapid decarbonisation¹; large-scale restoration of biodiversity and the natural environment; and the development of sustainable, resilient and inclusive communities and the enterprises required for a sustainable future.’

This publication represents the latest ‘work in progress’ available from SCAPs working groups, and the foundation for further work in 2021. It also provides a call for immediate emergency response to the climate and ecological emergency and a series of recommended actions suitable for implementation by individuals, households, community groups, councils and government.

The main conclusions reached from our work to date are:

1. Shropshire residents and businesses, in common with most of the UK, are responsible for carbon dioxide (CO₂) emissions about twice the global average.
2. The Paris Agreement has demonstrated the urgent need for Shropshire – in keeping with the rest of the UK – to stop using fossil fuels by 2030. The consequences of failure are dire.
3. Shropshire has a carbon footprint close to 6MtCO₂e per year, about 12tCO₂e per person.
4. The technologies and solutions we need to achieve net zero carbon Shropshire by 2030 are all available and affordable.
5. A linear decarbonising pathway to net zero has been put forward, and about 70% of the changes we need have so far been identified, leaving further work in 2021 to develop a more comprehensive plan.
6. Immediate actions are recommended from January 2021 that will achieve significant reductions if acted upon by households, businesses and councils across Shropshire.
7. Time is pressing and the biggest risk is failure to mobilise on the necessary scale for immediate implementation of the ZCSP. All sectors of Shropshire life will need to work together on an emergency footing.
8. The zero carbon journey for Shropshire represents the biggest commercial opportunity of our time, and offers an excellent opportunity for employment and sustainable economic growth.

¹<https://www.sustainablegoals.org.uk/decarbonisation-really-means/>

Shropshire Climate Action Partnership

Our Ambition for Shropshire

Each year starting right away

Shropshire will need to achieve the following:



20,000 homes

insulated to high standards
suitable for switchover and
switch from gas or oil heating to
using heat pumps



Investment of £200M
in Shropshire renewables



500 acres of solar farms
(or wind farm equivalent) installed and

powering the grid and
private wire demand

2,000

electric car charge points
for community car share
and car club vehicles



8,000 acres
of Shropshire
marginal land
re-wilded
or planted with
woodland

10% reduction
of car use
by shifting to
active travel
public transport
and reduced commuting



Recovery, renewal and protection
of **10% of Shropshire**
peatlands and wetlands

10% reduction in waste
collection volumes by reducing
short life purchases
and single use packaging
and promoting re-use of materials



10% of highways budgets
dedicated to shifting from car
to prioritise active travel

500 miles
of new hedgerow laid



For Shropshire Climate Action Partnership by Niki Holmes: Arts Emphasis © 2020

Foreword

I am a Shrewsbury resident, worried for the future for my children and grandchildren.

In my sixty years we have seen:

CO₂ emissions quadrupling as humanity burns perhaps a million years of carbon depositions annually, leading to the current existential threat of the **climate emergency**.

The destruction of half the world's life, leading to mass extinction comparable to the dinosaurs and an **ecological emergency** now putting much of the remaining life on earth at risk.

Who would have thought that 'progress' in my generation – a car on the drive, central heating, meat every day instead of once a week, foreign delicacies, technological goods on demand, holidays abroad – could threaten all life on the planet?

I look back today to buying my first car in 1978, filling the tank with that wonder, fossil fuel petrol, in blissful ignorance of the destructive path I was following. The consequences of such actions are still being felt today and will be adding to catastrophic climate change for decades to come.

Shropshire is rightly proud of its role as the birthplace of the Industrial Revolution. A revolution that led to increasing quality of life and material wealth across the world. The inventions and spirit of enterprise from Ironbridge became Shropshire's greatest export. However, this heritage, as well as doing tremendous good across the world has left a destructive legacy, and every day reveals more starkly the runaway consequences when production has no regard to sustainability.



Photo: iankellsall1 on Pixabay

Ironbridge Gorge, birthplace of the Industrial Revolution

Awesome developments of scientific enquiry and space technologies have brought us the ability to monitor the entire planetary ecosystem in a way unimaginable to Abraham Darby just 240 years ago. They have been able to show us the true extent of the destruction of the last fifty of these years. Would that we could have known of this disastrous turn of events just 28 years ago, when the problem was only half what it is today!

And yet, in 1992, the world's best scientists met at the UN, concluding the existence of a real and present danger, and the need for immediate action. That call went largely unheeded in the subsequent 28 years. Instead, resource exploitation and carbon emissions have doubled and today both race out of control at a higher pace than ever before.

Today, we inhabit a planet in which these trends have destroyed half the living world and we have a few brief years to prevent the destruction of the other half, including ourselves. Thankfully we now have the technologies to take a bold new direction towards a sustainable future – if we work together and put sustainable development above all other priorities. Of course it would be absurd to imagine there was any higher priority. It is now clear the problem is not lack of solutions, but lack of common action working to a common plan.

David Attenborough puts it succinctly:

“Nature once determined how we survive. Now we determine how nature survives.”

We can adapt to a new sustainable future, and flourish in it. In fact we can already see that the sustainable future will deliver a better return on investment than ‘business as usual’. So let's harness our collective Shropshire ingenuity and spirit of enterprise to lead in this new industrial revolution as we did in the first one – individuals, communities and enterprises working in partnership to achieve net zero carbon together by 2030.

The Zero Carbon Shropshire Plan set out here and on our website (zerocarbonshropshire.org) is about building a successful, prosperous and sustainable future for Shropshire, our lovely county, whilst nurturing and rewilding our de-natured land. Sustainability means having a solid foundation of economic, social and environmental pillars, and this decade must see the renewal of all three if we are to succeed.

Covid-19 has shown us that we can change overnight if we have to. With sustainable enterprises and local agriculture we can meet our needs – more, we can thrive – reviving our rural and town communities, confident that the changes we make will lead to sustainable success. This plan shows us a way forward. We can do it if we work together and act now.

Mark Fermor, Director, ZCSP Task Force

Contents

Summary	1
Foreword.....	4
Introduction	8
What's the big deal about carbon?.....	8
Why does it matter that the planet is getting hotter?	8
How does this affect life on Earth?	9
Why does this matter to us?	10
What is in this plan?.....	11
Who are we? Introducing the Shropshire Climate Action Partnership	12
Why do we need a plan?.....	13
Messages from the future	13
Why do we need to be net zero carbon in Shropshire by 2030 when the target for the world as a whole is 2050?	16
Shropshire's carbon footprint and carbon budget	16
Why is it so essential that we must do it even if it means turning all our lives upside down?	17
Can't we continue our lives as normal and then capture the carbon in the future once we've developed the technologies?.....	18
What can we do?	21
What is the plan?	21
What will happen if we delay a year?	22
What are the five big challenges?.....	22
Energy	23
What's this all about?	23
What do we need to do?	23
How do we do it?	24
What would this mean for us?.....	24
Buildings.....	25
What's this all about?	25
What do we need to do?	25
How do we do it?	25
What would this mean for us?.....	26
Transport.....	27
What's it all about?	27
What do we need to do?	28
.....	Error! Bookmark not defined.

How do we do it	29
What would this mean for us?	29
Stuff we buy and use... then throw away	30
What's this all about?	30
What do we need to do?	30
How do we do it?	30
What would this mean for us?	31
Land use and biodiversity	32
What's this all about?	32
What do we need to do?	32
How do we do it?	33
What would this mean for us?	33
What do we need to do right now?	34
Recommendations for action	34
A sense of scale	34
Zero Carbon Shropshire Plan in numbers	35
What can we do now to get off fossil fuels?	35
Individuals and households.....	36
Businesses	37
Councils and public bodies.....	39
Community groups.....	43
Central government and national public bodies	45
How you can get involved.....	48
Glossary of abbreviations / acronyms	49
References and further reading.....	52

Introduction

“Right now we are facing a man-made disaster of global scale, our greatest threat in thousands of years: climate change. If we don't take action, the collapse of our civilization and the extinction of much of the natural world is on the horizon.”

Sir David Attenborough

The Industrial Revolution began the rapid and massive global consumption of fossil fuels, which then released their carbon into the atmosphere. We are still using these fuels today, literally adding fuel to the fire. It is this carbon which is warming the Earth to a dangerous degree, causing the climate to change very quickly. We see the effects of this, for example, in changing weather patterns, destructive fires and floods and rising sea levels. We are facing a climate and ecological emergency.

The good news is that we **can** do something about this. But only if we act now.

“We are the first generation to feel the effect of climate change and the last generation who can do something about it.”

Barack Obama

What's the big deal about carbon?

Carbon dioxide (CO₂) occurs in the atmosphere naturally. It traps the sun's heat and makes it warm enough for plants and animals to survive. Plants need CO₂ to produce their food and could not exist without it. This means animals and humans couldn't exist without it either, because they need plants for food. In short, without CO₂ in our atmosphere we wouldn't be here!

The trouble is that lots of things that humans do – such as driving cars, making things in factories and generating electricity from power stations – currently use fossil fuels. Coal, oil and gas are all carbon deposits formed from animals and plants that died millions of years ago. When we burn them they give off that carbon in the form of CO₂ – much more CO₂ than occurs naturally. In fact, since humans started building and using machines that burn fossil fuels about 200 years ago, the amount of CO₂ in the atmosphere has gone up by **over 45%**.

On top of that, other gases that trap heat in the atmosphere are also given off by burning fossil fuels, farming animals, using fertilisers and other things humans do. All this means Earth is getting hotter. This situation is described as 'global heating' and the CO₂ and other gases that cause it as 'greenhouse gases'.

Why does it matter that the planet is getting hotter?

Well, for us in Shropshire, this means we have warmer, longer summers than we used to. You might think this is a good thing, but unfortunately, it also makes our weather more destructive and disrupts natural habitats. We get more torrential rain, which can lead to floods like we had at the start of 2020, and new diseases. We get more droughts and water shortages, which means farmers can't grow the food we need to eat and much of our wildlife dies. We also get more stiflingly hot days, which can make people ill and results in more deaths.

The list goes on, but many people around the world have it far worse than we do. For example, sea ice that formed thousands of years ago is melting due to global heating, making the level of the sea higher and meaning some areas where people and wildlife used to live are now under water. The people who

once lived there have been forced to move elsewhere, but all the plants and many of the animals have simply died. To make things worse, ice is good at cooling Earth by reflecting the sun's heat back into space. If it melts it can no longer do this and the planet gets even hotter.

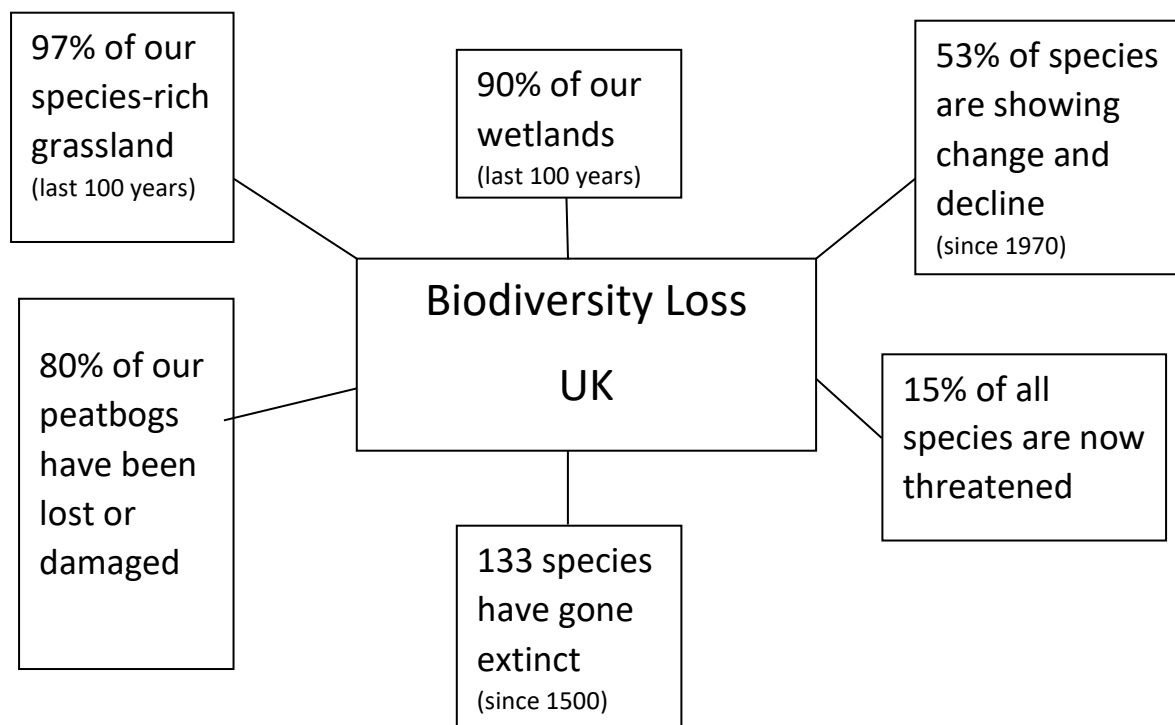
How does this affect life on Earth?

So, greenhouse gases given off by burning fossil fuels have led to global heating, which is causing serious problems for all life on Earth. 'Biodiversity' refers to the variety of animal and plant life that exists in a given area. Today, biodiversity is in dramatic decline across Shropshire, the UK and the wider world.

"We cannot tackle the climate crisis without similar ambition to meet the nature crisis head on – the two are inseparable. The climate crisis is driving nature's decline; the loss of wildlife and habitats leaves us ill-equipped to reduce our emissions and adapt to change."

Craig Bennett, The Wildlife Trusts

Nationwide we have lost²:



In Shropshire, currently only six of our 127 water bodies are acknowledged to be as clean or 'nature-friendly' as they should be. Woodland cover is below the national average at 9.3% (UK 13%) and we have lost many hedgerows and other important habitats for wildlife. Insect life is being lost at the rate of about 2.5% per year, threatening life higher up the food chain, including humans.

²<https://www.forestryengland.uk/blog/protecting-peatlands#:~:text=In%20the%20UK%2C%20at%20least,important%20for%20climate%20and%20nature.>

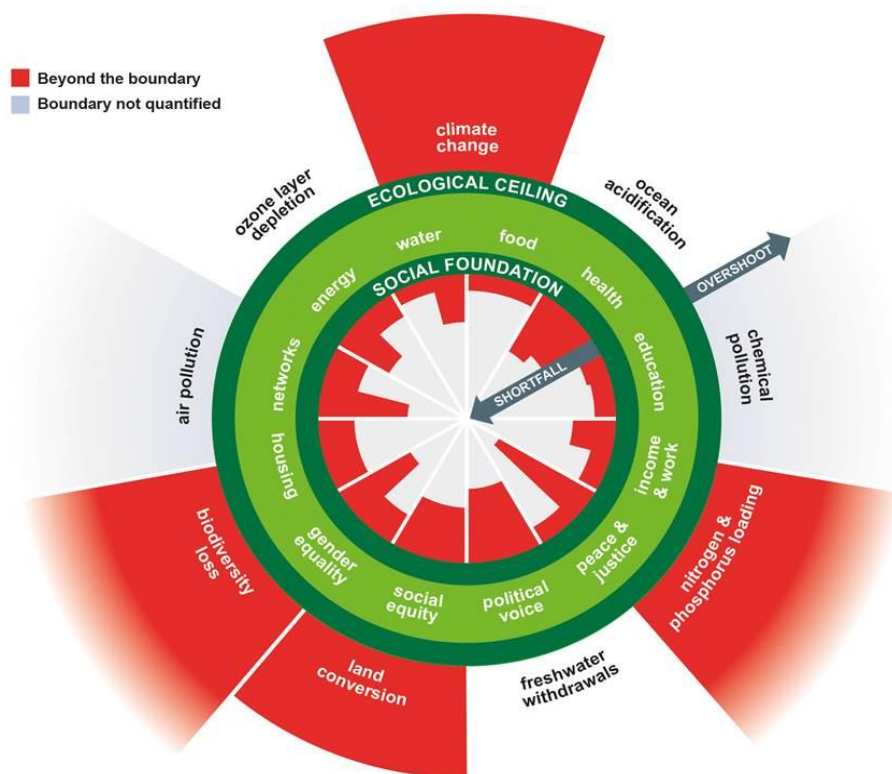
Why does this matter to us?

All human life depends on the natural services that feed, water and protect us. These include:

- Purifying our air and water
- Providing us with food
- Removing waste materials (decomposition)
- Cycling nutrients and maintaining soil fertility
- Stabilizing Earth's climate (moderating floods, droughts, winds and temperature extremes)
- Pollinating plants, including many crops
- Controlling pests and diseases
- Providing medicines and ingredients
- Delivering cultural, health and well-being benefits

These natural services are the product of healthy ecosystems and good levels of biodiversity, so there is a strong connection between climate change, loss of biodiversity and human well-being. Climate change is altering every bit of nature, and the loss of nature – for instance through forest destruction – contributes to climate change. Our decisions and actions for the future have to address both of these crises. The planetary health diagram below illustrates the areas where we are exceeding the planet's capacity, overshooting ecological limits. All these areas need to be tackled now for Shropshire to achieve a sustainable future.

Image: Kate Raworth and Christian Guthrie/The Lancet Planetary Health³



³[https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(17\)30028-1/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(17)30028-1/fulltext)

What is in this plan?

Our plan is a statement of where we are today, where we must get to, and how we can get there. Shropshire is not the first county to go down this road and the plan draws on the ideas and experience of others. Cornwall, for example – a county like Shropshire, where tourism is a major part of the economy – is also planning to be carbon neutral by 2030⁴. The actions we need to take are affordable, we have the know-how, and the outcome will be good for our health, wealth and happiness.

We all have a part to play, by looking at our lives and seeing what we can change to help the planet and ourselves. As active citizens of Shropshire – as householders, employers and employees, students, voters and consumers – we have the power to make a difference.

If you live, work or study in Shropshire, we invite you to join us and also ask that you share the facts with your friends and family and extend an invitation for them to join us too: <https://zerocarbonschropshire.org/sign-up/>

“We now have the opportunity to create the perfect home for ourselves, and restore the rich, healthy and wonderful world that we inherited.”

Sir David Attenborough

⁴<https://letstalk.cornwall.gov.uk/climate-change>

Who are we? Introducing the Shropshire Climate Action Partnership

We are Shropshire residents, communities and businesses, who share a vision for a sustainable, prosperous county. Together we make up the Shropshire Climate Action Partnership (SCAP), a not-for-profit organisation formally launched in August 2020.

When we refer to Shropshire we are referring to the geographical county, which includes the unitary authority areas of Shropshire Council and Telford and Wrekin Council. The county has an area of 1346 square miles and a population of 483,000 people.

Right now, we have more than a hundred volunteers from all walks of life. We involve small enterprises, large landowners, charities, councils and community organisations. Together, we have been working to make and implement a plan suitable for Shropshire's rapid decarbonisation; the large-scale restoration of biodiversity and the natural environment; and the development of sustainable, resilient and inclusive communities and the enterprises required for a sustainable future.

Together we make up the Shropshire Climate Action Partnership (SCAP), a not-for-profit organisation formally launched in August 2020.

In addition to our volunteers and our supporters and organisational members, SCAP is overseen by a Steering Group comprising representatives from the following organisations:

CREST University Centre Shrewsbury	Shrewsbury Food Hub
Environment Agency	Shropshire and Telford Community Energy
Green Shropshire Xchange	Shropshire Association of Local Councils
Harper Adams University	Shropshire Chamber of Commerce
Marches Energy Agency	Shropshire Council
Marches Local Enterprise Partnership	Shropshire Hills AONB Partnership
National Farmers Union	Shropshire Wildlife Trust
Severn Trent Water	South Shropshire Climate Action Group
Shrewsbury and Telford Hospital NHS Trust	Wrekin Housing Group
Shrewsbury Business Improvement District	

Why do we need a plan?

Since the 1950s, the burning of fossil fuels and CO₂ emissions have accelerated at an alarming pace. This trend has been seen in all parts of the world, but most of the world's population are not responsible for emission rates on the scale that we are in the UK – the average UK resident has a carbon footprint about twice the global average.

Through these emissions we are having a catastrophic impact on the carbon cycle – with consequences being felt across the planet: as a result of high atmospheric CO₂ levels, the global average temperature has already increased by more than 1°C⁵ since the start of the Industrial Age. Without more significant and sustained action, the world is set to exceed the 1.5°C limit laid down in the United Nations Paris Agreement between 2030 and 2040⁶. This limit was set to recognise a threshold or 'tipping point' above which we will face more catastrophic consequences. For example, where rising global temperatures melt the Arctic permafrost and allow release of CO₂ and methane from carbon-rich soils⁷, which would then accelerate global heating, destabilising the planet and causing it to become a hostile 'hothouse Earth'⁸) The World Meteorological Organisation recently warned that there is a 20% chance we will breach the 1.5°C threshold by 2025⁹.

Global heating¹⁰ is recognised as an existential crisis for much of life on Earth, and the solution is to stop burning fossil fuels as rapidly as possible, and to reduce activities that release other powerful greenhouse gases. Reductions will need to come from changes we make to transport, housing, diets, how much electricity and other energy we use and our choices in what products we buy, where these come from, and whether we discard or re-use them. It will also be essential for us to restore our natural world.

'Net zero carbon' refers to achieving an overall balance between emissions produced and emissions taken out of the atmosphere. This can be achieved by dramatically reducing the use of fossil fuels and balancing any residual greenhouse gas emissions with carbon capture

We need a common plan we can all work to, because individually our actions will lack coordination, and the lesson of the last 28 years is that fragmented initiatives will not deliver the change we need at the scale we need it. Achieving change in all our lives and in the structures of our shared society will require common action, working to a common plan we can all believe in.

Messages from the future

As a generation that will be more affected by these climate and biodiversity changes, we asked our young members to consider what the future might hold. They wrote us two messages looking back from 2030. The first reflects a future if we continue with the current 'business as usual' approach, the second reflects a more hopeful outlook, one where we listened and took action in time.

⁵<https://climate.nasa.gov/evidence/>

⁶<https://news.un.org/en/story/2020/03/1059061>

⁷<https://www.carbonbrief.org/explainer-nine-tipping-points-that-could-be-triggered-by-climate-change>

⁸<https://www.bbc.co.uk/news/science-environment-45084144>

⁹https://hadleyserver.metoffice.gov.uk/wmolc/WMO_GADCU_2019.pdf

¹⁰<https://www.theguardian.com/environment/2019/may/17/why-the-guardian-is-changing-the-language-it-uses-about-the-environment>



Dear reader,

The year is 2030, and reality has finally hit. We have lost the battle. Remember when you used to turn the lights off to 'save the polar bears'? Well, they are no more... at least not where they used to belong. In this new future, zoos are more like a history book of what life once was. This is evidence of the biggest war mankind has ever lost, the one against itself. Now we are in the middle of the [sixth mass extinction](#) event.

We did not reach our goal of zero carbon by 2030. In fact, carbon emissions are higher in Shropshire thanks to massive [inland migration](#) from flood-hit coastal regions. It was not just Shropshire that failed of course. Globally, nations failed to reach their targets – too little was done too late. Dramatic changes have taken place to compensate for this. A global 'One Child Policy' was agreed on as a solution by world governments, although this is causing uproar. Threats of nuclear war from nations competing for water and arable land resources have the world in fear.

We were made blatantly aware of the situation, yet nothing changed. Governments chose power over necessary action, judging that voters would refuse to change their habits.

Now the consequences of our ignorance are upon us. We have depleted the world's [natural resources](#), and there is an urgent demand for new sources of energy. In this new rush, new rules are being forced through, disregarding communities and the environment. Nuclear power is our leading source of energy, and the side-effects of dependency on it are becoming apparent. When nuclear goes wrong, we know the [historic cost](#). History is repeating itself.

Failure to reach agreed targets has led to a rise in global temperatures. The ice caps have gone, destroying our world's natural equilibrium. The extra water has disturbed the ocean currents, including the [North Atlantic Drift](#), crucial to the UK's climate. This has led to freak weather conditions becoming more frequent, causing turmoil.

Mankind has now hit over 10 billion people and we are running out of space. To maximise space efficiency, Shropshire is becoming an urbanised metropolis, with quick-build high-rise flats taking over, as these are the only feasible form of accommodation now. Houses are a luxury for the rich and our once beautiful rural Shropshire is no more.

Another dilemma in these trying times is the struggle to produce enough food – scarcity is leading to price rises, poverty and inequality. Forests are being cut down for farming to compensate for the land lost, causing yet more atmospheric CO₂. [Monoculture](#) environments are swamped in fertilisers and pesticides to ensure maximum yield, crushing biodiversity. This, juxtaposed with climate changes, has caused [pollinator](#) populations to plummet.

Other unprecedented events are becoming an issue. Mosquitoes in Shropshire you ask? [Malaria](#) is now a common problem as mosquitos have migrated north with the rising temperatures. Acid rainfall is another new dilemma – we must wear hats outside – and erosion is destroying historical buildings. [Weil's disease](#) is more prevalent. Frequent flash flooding is contaminating our water supplies as the old infrastructure is incapable of managing the waste and run-off from so many new buildings.

This is a plea from the future. Please change! What is to come is worse than you anticipate.

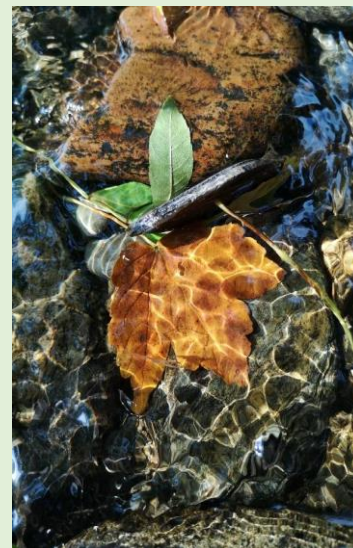
The Young SCAP Team

Dear reader,

You may recall that back in 2019, climate emergencies were declared by both Shropshire Council and Telford & Wrekin Council. This letter is let you know how some important changes – driven by the young people of Shropshire –have helped to mitigate the effects of climate change.

Diet

The proportion of people who have switched to a more plant-based diet in a bid to cut their carbon emissions has been tremendous. There has been a surge in new vegan, vegetarian and plant-based cafes and restaurants that have environmental stability in mind. Furthermore, community allotments and orchards have become the norm. As a result of this change in diet, the countryside is changing. Animals are still reared, but roam more freely in a restored, re-wilded environment under trees grown for crops and sustainable wood, acting as natural woodland managers. As nature recovers, healthy, organic foods, grown locally, are becoming the norm.

**Transport**

On the whole, there has been less travelling, due to an increasing number of people working online. In addition, the considerable uptake of well-planned public transport has been observed with a drop in the number of private vehicles being used, thus decreasing carbon emissions. Many people travel by electric bikes, which have increased in range and are adapted to carry goods, as the local shop and local suppliers make a return to the heart of communities.

Housing and green spaces

As a consequence of fewer homes being built on green land, we have been able to protect our green spaces and wildlife havens. There has been a transition to use more sustainable materials and renewable energy. This has led to higher overall biodiversity of flora and fauna across the county, which is a good indicator of environmental health. The countryside is a great place to be, and is available to all.

Outdoor education

We have made it an official priority for all schools in Shropshire and Telford & Wrekin to provide at least one hour of outdoor activity every day. Numerous forest schools have been set up alongside a greater collaboration with environmental conservation organisations. As a result, young people have influenced older generations, raising more awareness about environmental issues in their families. These changes have created new jobs in eco-education and eco-tourism, as people find adventure through nature on their doorstep.

Community support

Various environmental campaigns have been set up with the backing of local communities. A greater percentage of people in the area have engaged with nature, resulting in positive lifestyle changes. All this is supported and encouraged by local councils, who recognise the public benefits.

Well-being

After the trauma of Coronavirus in 2020, we all recognised the importance of physical and emotional well-being. The changes to diet, transport, housing and reconnecting with nature have caused real improvements in overall health. The NHS has seen reductions in GP and hospital numbers, food poverty has been reduced, and mental health helplines are finally becoming quieter, as people reconnect with nature and each other.

Finally, we would like to say a big thank you to everyone who has supported us through the past decade to reach the ultimate goal of net zero carbon emissions. We hope that many more encouraging results are to come that benefit our planet for both wildlife and people!

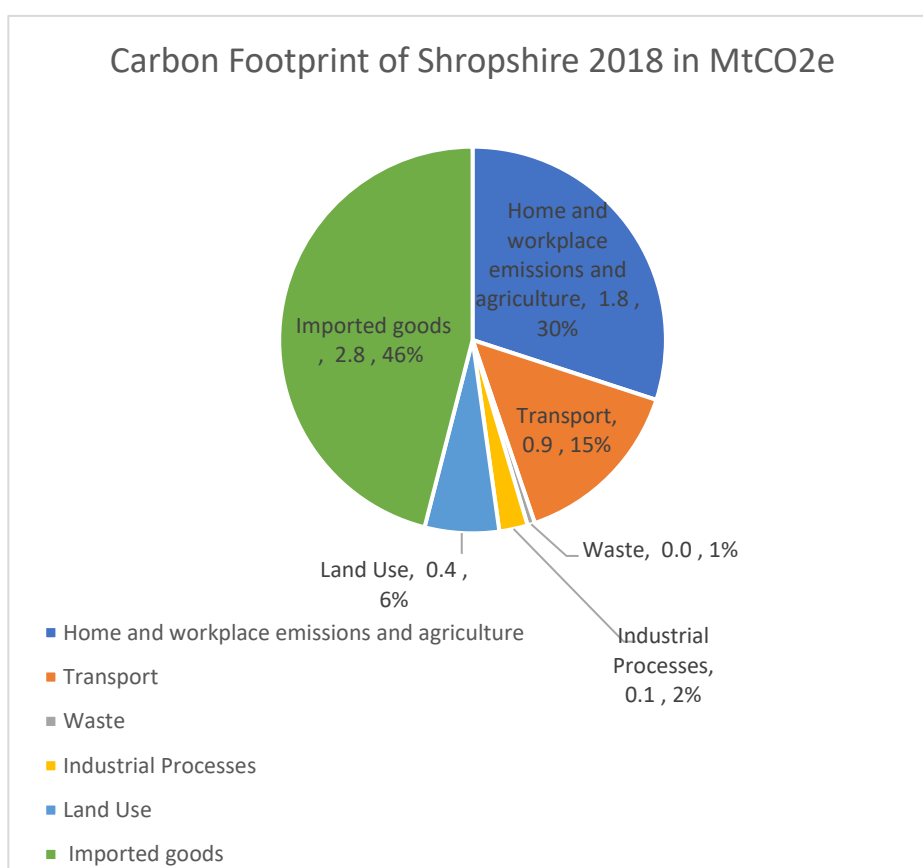
The Young SCAP Team

Why do we need to be net zero carbon in Shropshire by 2030 when the target for the world as a whole is 2050?

Different countries have vastly different carbon footprints and will have different roles to play in making the world net zero carbon. The UK and North America cause more than twice the damage per capita than the rest of the world and as major polluters it is necessary for us to take the most significant action. In our wealthy, technology-rich countries we have the resources to develop the solutions needed¹¹. We are able to take actions that many poorer nations are unable to.

A huge amount of emissions from countries such as China and Vietnam result from the manufacture and supply of consumer goods. Almost half of Shropshire's carbon footprint comes from the overseas production of these goods and their transport to the UK.

We need to substantially reduce our consumption, especially of imported goods, while driving global sustainability standards so that we achieve net zero in our supply chain too.



Shropshire's carbon footprint and carbon budget

The pie chart above shows the latest indicative breakdown of our carbon footprint, which we estimate at 6.1MtCO₂e/year, and the table below shows the targets for reducing this carbon footprint to get Shropshire to net zero carbon by 2030. This is based on a linear reduction pathway.

¹¹https://i3connect.com/gcii/country_profiles#:~:text=Commercialised%20cleantech%20is%20Denmark's%20strong,put%20Denmark%20in%201st%20place.

We also show the individual carbon footprint of a typical Shropshire person, currently 12.6tCO₂e/year, and the annual reduction for each of us to get to net zero carbon by 2030.

Shropshire Carbon Budget. First estimate for 2021 to 2030													
	Mt CO2 equivalent												Totals
<u>Shropshire county total footprint</u>	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
Consumption Footprint	6.1	5.5	5.0	4.4	3.9	3.3	2.8	2.2	1.7	1.1	0.6	0	36.5
Remaining Budget at year end	17.2	11.7	6.7	2.3	-1.6	-4.9	-7.7	-9.9	-11.6	-12.7	-13.2	-13.2	
Carbon capture required in addition to emission reductions, to remain within Paris limits					-1.6	-3.3	-2.8	-2.2	-1.7	-1.1	-0.6	0.0	-13.2
Shropshire compliance with Paris Agreement limits	17.2	11.7	6.7	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
<u>Shropshire resident individual footprint</u>	t CO2 equivalent												
Shropshire resident consumption footprint	12.6	11.5	10.3	9.2	8.0	6.9	5.7	4.6	3.4	2.3	1.1	0.0	
Shropshire resident additional capture required to keep within Paris Agreement limits					-3.33	-6.87	-5.73	-4.58	-3.44	-2.29	-1.15	0	-27.4

Your carbon footprint is the total amount of greenhouse gas released in how you travel and heat your home and what you eat, and the production and consumption of all the goods and services you use, wherever in the world they are produced.

Based on our commitments in the Paris Agreement, the Tyndall Centre for Climate Change Research¹² has set maximum CO₂ emission budgets¹³ for all UK local authority areas. For the county of Shropshire (Shropshire Council and Telford & Wrekin Council unitary areas combined), from 2020 to 2100, this figure stands at 17.2MtCO₂e.

Given a total budget of 17.2 MtCO₂e, this means Shropshire has **2 years and 8 months** left at current 6.1MtCO₂e burn rate before we reach the Paris Agreement limit. Any further emissions will need to be recovered later in the decade if we are to end up with net zero by 2030 in line with Paris Agreement. Even if we achieve the linear reduction pathway to reach net zero carbon by 2030, you can see from the table above that Shropshire will also need to offset a further 27.4 MtCO₂e during this decade to rebalance for the excessive emissions that we will release.

This means we need to embark on carbon capture on a massive scale within the next two years, but the problem we have is that there are no reliable, cost-effective ways that this can be achieved in full. Doubling Shropshire tree cover (in the form of a 'Marches Forest') would make a contribution. There is also an opportunity for Shropshire, with our excellent land assets, to develop renewable energy beyond our own needs and export this energy to the wider industrial region of the West Midlands. This would 'offset' their carbon, and count as emissions avoided towards our total budget. The use of offsetting in these ways is a hotly contested issue though, and does not reduce our need to radically reduce fossil fuel use starting right away.

Why is it so essential that we must do it even if it means turning all our lives upside down?

Across the world most of us have been behaving as if there will be time to solve climate change and CO₂ emissions later, but after 28 years of warnings, we are finally in the last chance saloon. In order to keep within the Paris Agreement limits we need to reduce our carbon footprint by more than half

¹²<https://www.tyndall.ac.uk/>

¹³<https://carbonbudget.manchester.ac.uk/reports/>

by 2025¹⁴. For the first time in the history of humanity, all the world's nations reached a unanimous agreement: to implement the Paris Agreement, because the consequences of failing to take the action agreed to would be devastating. It is essential that we in Shropshire act to keep within the limits set out in this agreement, and also take responsibility for the consequences of our consumer choices in terms of overseas emissions.

The pace of change needed to achieve this is akin to putting UK on an emergency footing across all aspects of our lives. Even if we accepted the UK Government 2050 target (detailed below), the immediate next few years would require the same pace of change. Immediate reduction is fundamental. The critical thing is that we start right away because each tonne of carbon we avoid emitting now means one less tonne to capture later, at much greater cost.

Can't we continue our lives as normal and then capture the carbon in the future once we've developed the technologies?

"Avoiding dangerous climate change is impossible – dangerous climate change is already here. The question is, can we avoid catastrophic climate change?" David King, UK Government Chief Scientist

The scale of global emissions and escalating changes to our climate and environment is causing huge changes already. We do not have time therefore to rely on carbon capture and storage, or similar pathways. Even with the latest promised government funding, these would only capture less than 1% of UK emissions by 2030, and at considerable cost – including further emissions. Globally, emissions are heading for 50GtCO₂e/a and an optimistic scenario for global technology solutions¹⁵ suggests capture of less than a quarter of emissions by 2050 – which is twenty years too late and insufficient scale to prevent exceeding the Paris Agreement limits.

Overall, it must be recognised that it is far harder and more costly to put a tonne of carbon back in the ground than it is to emit it in the first place. The imperative is for an immediate and wholesale shift away from burning fossil fuels.

Why are we adopting a more ambitious target than the UK Government?

In December 2020, the UK Government announced 'an ambitious new target' of at least 68% reduction in greenhouse gas emissions by 2030, relative to 1990 levels¹⁶. Unfortunately, this does not reflect the full picture. In practice, this target only represents a 14% reduction from 2018 to 2030, because:

- 1 The UK has already seen a 43% reduction in 'domestic' or 'terrestrial' emissions (i.e. emissions from most activities taking place within the UK's borders) over the period 1990 to

¹⁴<https://carbonbudget.manchester.ac.uk/reports/E06000051/>

¹⁵<https://energypost.eu/10-carbon-capture-methods-compared-costs-scalability-permanence-cleaness/>

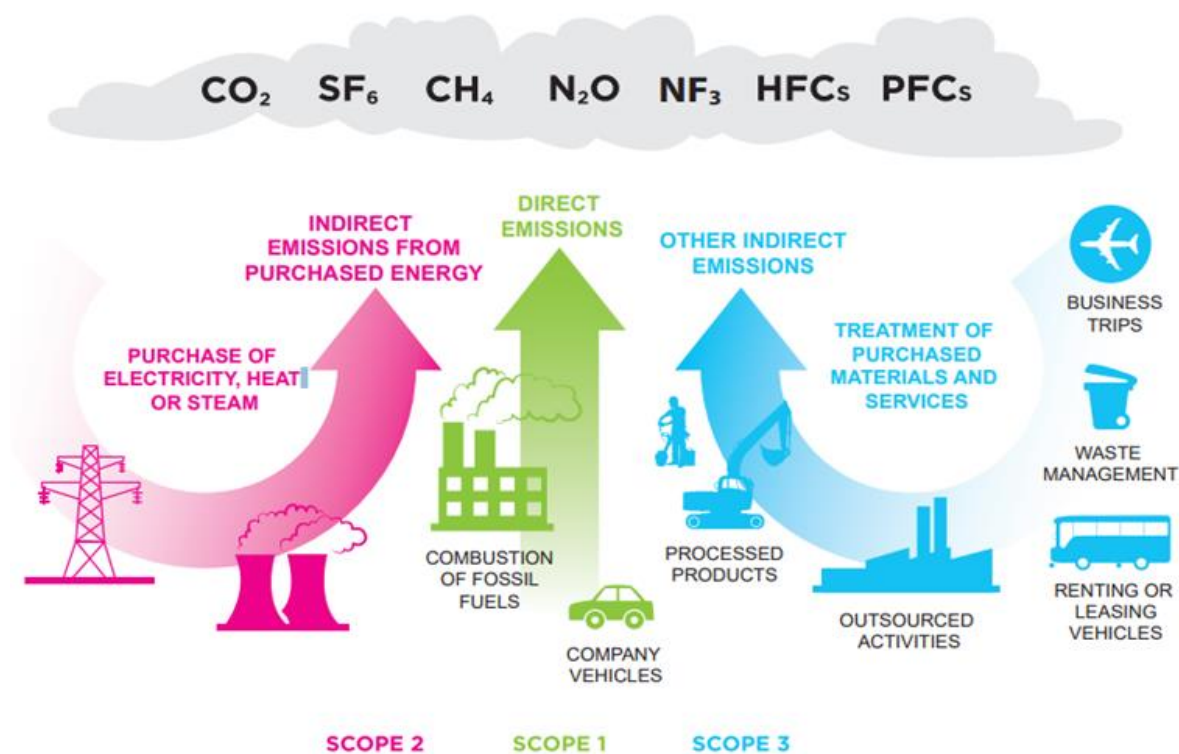
¹⁶<https://www.gov.uk/government/news/uk-sets-ambitious-new-climate-target-ahead-of-un-summit>

2018. Therefore the UK would only need a *further* 25% reduction in domestic emissions from 2018 to 2030, in order to achieve the overall 68% target.

- 2 However, all of these targets exclude imports, i.e. the carbon footprint that the UK has outsourced to overseas production (approximately 46% of our national footprint); as well as excluding all emissions from air travel, air freight, shipping, burning biomass and peat, and peatland extractions.
- 3 Taking all of the above into account, the UK Government's new target only represents about a 14% reduction in the UK's **overall carbon footprint** from 2018 to 2030 (using 1990 figures as a baseline).

Also, as the UK Government's target of 'net zero carbon' by 2050 is only addressing domestic emissions, it cannot achieve a net zero carbon footprint for the UK. If the omissions shown above continue at the current scale, it would only get about halfway there.

Our true situation is that, over recent decades, the UK has outsourced almost half of its emissions overseas. Pristine forests of the world are cut down, and factories in Asia use energy from the burning of fossil fuels to deliver the goods and produce we order. We are therefore responsible for some of the emissions of those countries in proportion to our purchases.



Furthermore, 2050 has no basis in science and there is a global consensus amongst the world's scientists and the UN that even reaching net zero carbon by 2030 might be too late to arrest catastrophic climate change without requiring large scale carbon capture, which would be impossible to achieve in time.^{17,18} In fact 2050 is the deadline that was set by the UN for the entire world to be net zero but only on the basis that UK achieves over 50% reduction by 2030¹⁹. The new Ten Point Plan

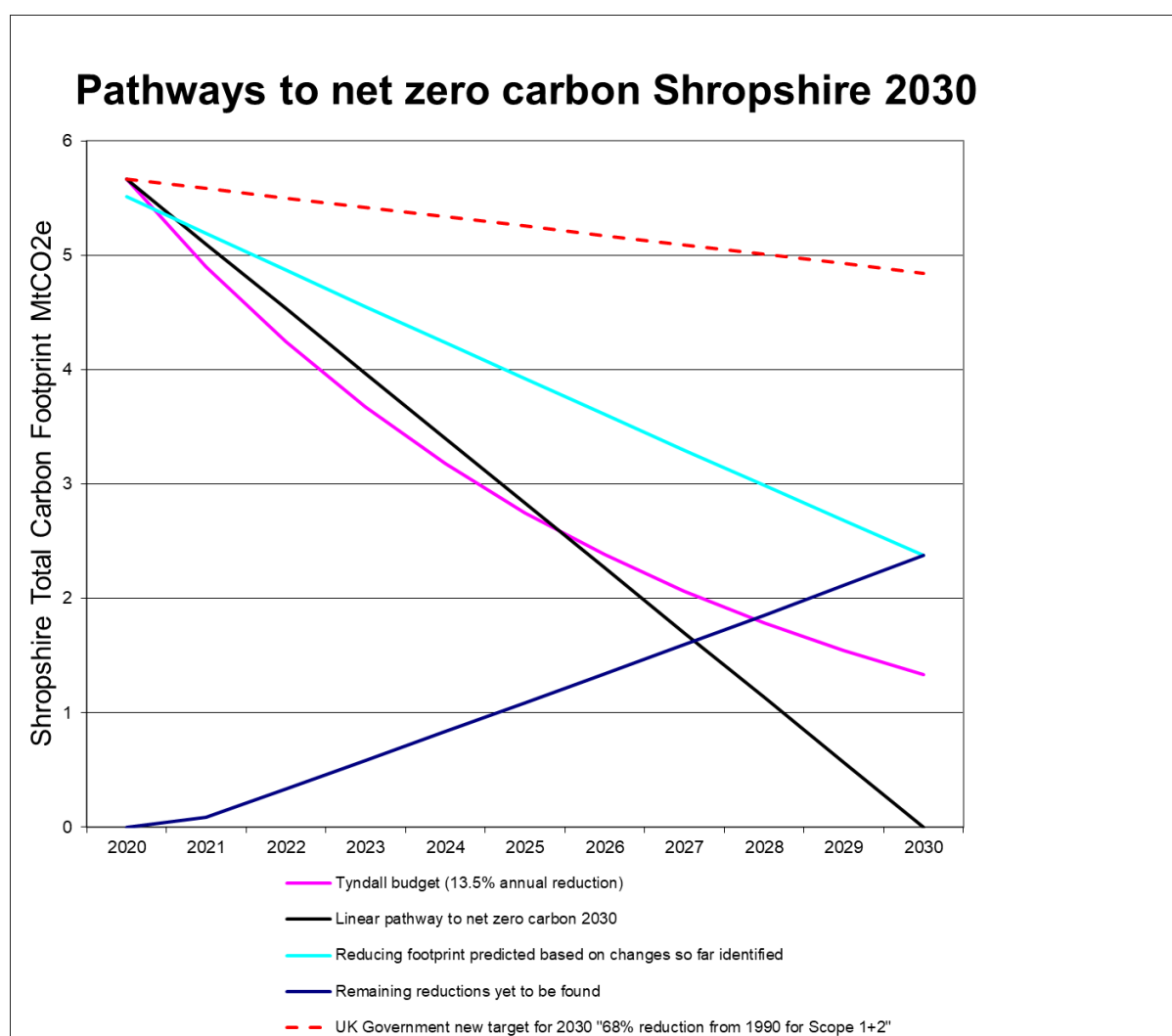
¹¹<https://www.ipcc.ch/sr15/chapter/spm/>

¹²<https://energypost.eu/10-carbon-capture-methods-compared-costs-scalability-permanence-cleaness/>

from the UK Government for example, describes innovation to achieve carbon capture of the order of 10Mt/year as ‘one of the most innovative and ambitious... we have known’, but is only expected to reduce UK’s carbon footprint by less than 2% by 2030.

In developing this Zero Carbon Shropshire Plan we have recognised the challenge is for the **total carbon footprint** of Shropshire to reach net zero by 2030, and we have adopted a linear pathway to net zero over the decade. This is shown on the graph below, along with what the UK Government promised in their latest target for ‘68% reduction by 2030 from 1990 levels’ (the UK Government is only counting Scope 1 and Scope 2 and omits Scope 3²⁰).

By this time next year, Shropshire needs to have mobilised its resources and achieved significant and demonstrable reductions to local carbon emissions. We will need to have reduced imports and be escalating some very major decarbonisation projects at significant pace and scale beyond anything our county has seen since the Second World War. The actions are all practical but the challenge will be to do them at the scale and pace we need – a huge step change for all of us.



¹⁹<https://www.un.org/press/en/2020/sgsm20411.doc.htm#:~:text=The%20decisions%20we%20make%20now,reach%20the%201.5%20Celsius%20goal.>

²⁰<https://www.savemoneycutcarbon.com/learn-save/what-is-the-difference-between-scope-1-2-and-3-emissions/>

What can we do?

Many changes are already taking place in the county, with some peatlands, heathlands and wetlands being restored, reduced car use, and trees being planted. But these are only very small beginnings.

We need to urgently stop using fossil fuels, reduce meat consumption, and restore nature. Across Shropshire we need to reduce fossil fuel use by at least 10% during 2021. Each one of us can achieve such a change quite easily, but achieving it across the whole county will be hugely challenging and we will need to work together across all sectors of Shropshire life.

“[We should] change from viewing nature as something that’s optional or ‘nice to have’ to the single greatest ally we have in restoring balance to our world.” World Wildlife Fund

For our own health and well-being we can begin to increase our connection with nature and acknowledge our dependence on it for our survival, as well as appreciating its awesome beauty and complexity. By investing in nature we are investing in our own planetary life support systems, as recognised by recent government policies such as ‘public money for public goods’, with the 25-year environment plan established using natural capital accounting methods, which helps to show the true overall costs and benefits²¹. Natural solutions are available to help solve the climate and ecological emergency. Wetland and peatland restorations, for instance, help clean our water, capture carbon and provide homes for wildlife. We can plant more trees to not only provide us with timber and store carbon, but also increase biodiversity and give us beautiful places to visit and enjoy.

We can all make a difference. This process can even start in small green spaces like our own backyards. Leaving a wild corner or a log pile in a garden provides homes for many insects and small creatures, which in turn become food for small mammals and birds. Did you know that we have lost over 90% of our hedgehogs since the 1970s? Leaving a leaf pile along a fence in the autumn could give a hedgehog a home, while deciding never to use chemicals in your garden will help save the lives of numerous creatures and allow the organisms in your soil to recover.

What is the plan?

Shropshire **must** become net zero carbon by 2030. SCAP’s priority was to develop this plan through community-wide consultation on the technical, economic, environmental and social factors relevant to achieving net zero carbon.

It is clear that there is no time to lose and a lot to be gained. Starting immediately, individuals, organisations, businesses and communities across Shropshire will collaborate to achieve immediate reductions in the use of fossil fuels from January 2021 onwards. We will support large-scale restoration of the natural environment, the development of resilient and inclusive communities, and the enterprises required for a sustainable future. We will track progress so that we can fine-tune our plans as we go.

The good news is that if we work together, about 80% of the reduction we need is within the power of Shropshire’s producers and consumers to achieve. The remainder will rely on national government.

²¹<https://www.gov.uk/government/publications/25-year-environment-plan>

Shropshire can respond to this emergency by changing behaviours and community-wide commitments to disinvest from unsustainable products and services. There are significant opportunities for carbon reduction through buying local produce and through investing in local manufacturing as well as sustainable new products and technologies. These changes will also hugely benefit our local economy.

“Transition to net zero emissions is the greatest commercial opportunity of our age.”

Mark Carney, former Bank of England Governor²²

What will happen if we delay a year?

A year’s delay will lead to a further 6MtCO₂e emissions, a third of our remaining Paris Agreement budget. The only carbon capture option available to us at sufficient scale to recapture these emissions by 2030 would be the planting of woodland. To capture an additional 6MtCO₂e, this would entail planting an additional 400,000 acres of woodland²³ by 2023 – covering almost half of Shropshire. This further demonstrates the need for immediate action to stop the use of fossil fuels, making clear that current carbon capture options are simply not scalable or cost-effective in the required timescale.

What are the five big challenges?

The plan addresses the areas that make the greatest contribution to CO₂ emissions and biodiversity loss in Shropshire:

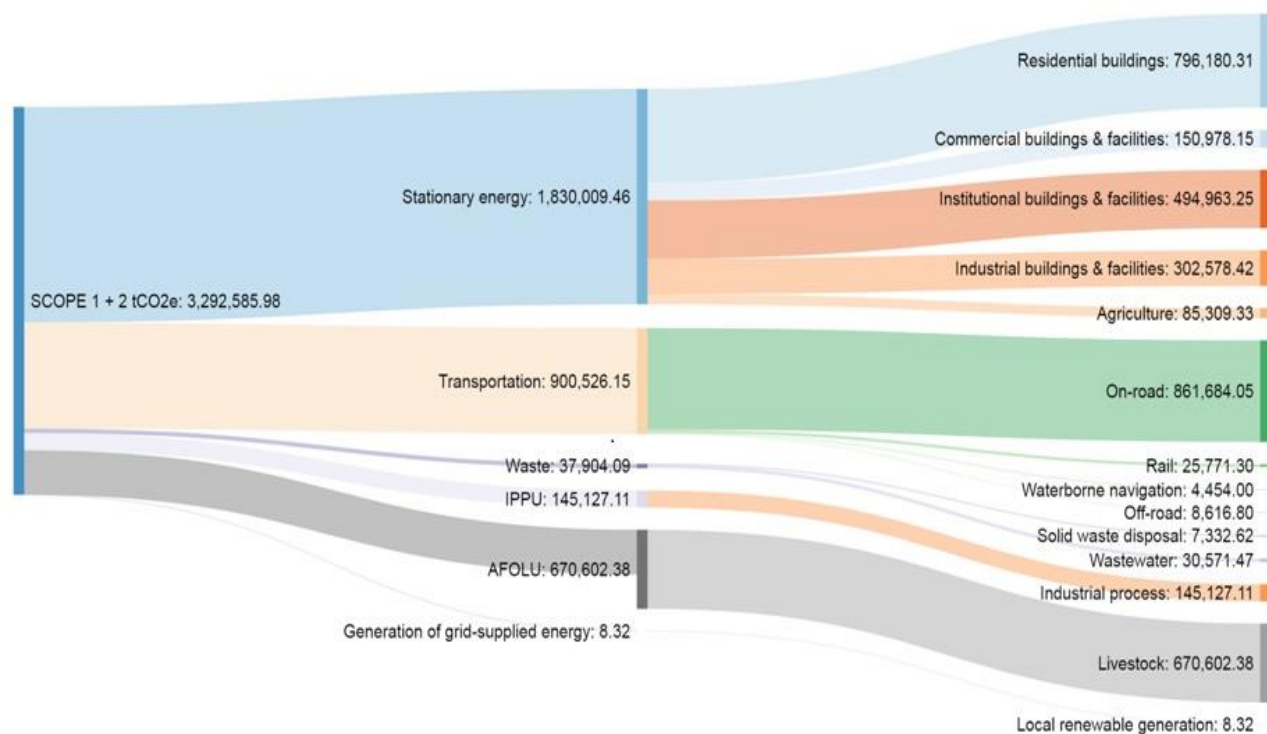
- Energy, through its generation and use
- Buildings
- Transport
- Stuff we buy and use... then throw away
- Land use and biodiversity

A summary of each of these five major challenge areas is presented below, following which we provide recommendations for practical action in many areas where immediate steps can be taken. More detailed analysis and recommendations are presented separately by our working groups and will be published online, at zerocarbonsbropshire.org

²² <https://www.bloomberg.com/news/articles/2020-11-09/carney-calls-net-zero-ambition-greatest-commercial-opportunity>

²³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/689431/A5_Leaflet_WC_Carbon_Code_V4_Web.pdf

Energy



SCATTER 2020 baseline Shropshire County, Scopes 1 and 2

What's this all about?

Over the next couple of years, we need to make a rapid transition from natural gas, oil and other fossil fuels to renewable energy sources, including electricity (from wind, solar or hydro-sources), methane from anaerobic digestion, 'green' hydrogen, carbon-neutral synthetic fuels or biomass.

What do we need to do?

Electricity demand will increase perhaps 60% due to charging EVs, powering air and ground-source heat pumps. In addition there is an opportunity for production of green hydrogen fuel for HGV / heavy agricultural use. We also envisage that the renewable energy sector can become a major local industry with significant employment and wealth generation for Shropshire. We have therefore also projected a 30% surplus by 2030 to create an element of power 'export' from Shropshire to adjacent industrial regions. The present Shropshire electricity usage is about 2300 GWh per year and we estimate that this will rise to about 4800 GWh p.a. by 2030 (of which 1300GWh of this increase is for hydrogen generation to meet current HGV energy demand and enable almost an end to diesel use by 2030). Given the non-industrial nature of Shropshire, this is consistent with the Climate Change Committee estimates for the same period²⁴. The key steps are:

- Focus on renewable electricity as the main source of power.

²⁴<https://www.theccc.org.uk/publication/sixth-carbon-budget/>

- Increase electricity generation so that Shropshire can be at least self-sufficient by 2030 using renewable sources and also become an exporter of electricity to generate wealth and employment locally.
- Use this to support domestic electric vehicle charging to replace petrol and diesel car use, and air and ground-source heat pumps to replace mains gas and oil heating of buildings.
- Replace HGVs with hydrogen-powered vehicles (generate this hydrogen from renewables, not from methane reprocessing), electric vehicles and rail freight.
- Create storage systems of all sorts to store surplus electricity.
- Improve electricity distribution infrastructure, with an emphasis on local generation/storage and markets.
- Develop an energy map of Shropshire to show practical investment opportunities for heat distribution and renewable power generation and local demand 'matchmaking' on-grid and off-grid opportunities to meet the anticipated future demand. This will also support local planning departments and councils with taking a more strategic approach, without which the infrastructure we need for net zero carbon Shropshire 2030 cannot get built in time.

How do we do it?

- Support DNOs in making grid investment cases to enable local commercial investment opportunities for self-sufficiency plus additional supply towards West Midlands urban areas with fewer land assets.
- Installation of about 5,000 to 10,000 domestic solar energy systems per year.
- Installation of about 1,000 to 2,000 electric car charge points per year for car club and community car share use and battery energy storage for grid use at peak times.
- Create a number of large-scale photo-voltaic arrays (solar farms, PV) and wind farms (wind and PV offer commercial opportunities at similar cost but have different site factors and a mix of, for example, 1/3 PV and 2/3 wind offers the opportunity to maintain better continuity of supply and balance grid loads).
- Generation to be used for:
 - Production of green hydrogen as HGV and agricultural fuel – opportunities may favour off-grid locations for distribution by tanker to vehicle operators or local use.
 - Renewable electricity generation to meet Shropshire's needs and more to create a major local industry and employer taking advantage of our significant land assets.

What would this mean for us?

- Significant reduction in emissions from cars and HGVs.
- All deliveries in towns by small electric vehicles or cargo bikes.
- Car owners and car clubs rewarded for using their vehicle batteries as part of the county's energy management.
- Domestic heating CO₂ emissions much reduced.
- An alternative to oil-fuel heating for off-gas-grid properties.
- Significant commercial opportunities in renewables for landowners and investors
- A high-tech energy economy for Shropshire, with associated high-value employment

Buildings

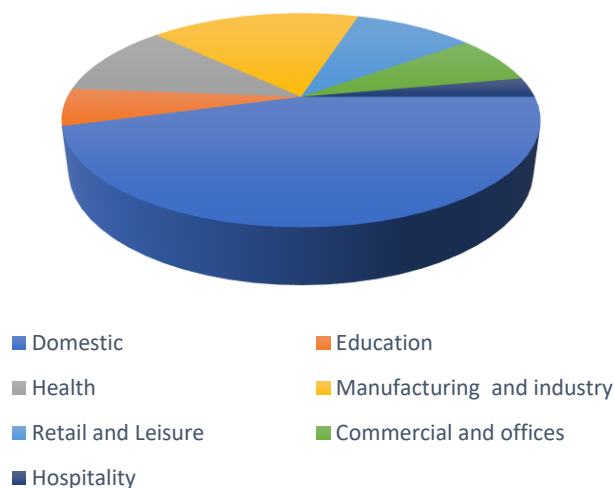
What's this all about?

More than a million tonnes of CO₂ are emitted by Shropshire buildings every year. Our own homes cause half of these emissions – mostly from heating with gas. To reach our zero carbon target we must make all of our buildings much more energy efficient and heat them with low-carbon electricity. This will also improve comfort in our homes, benefiting our health and our pockets!

What do we need to do?

- Eliminate the use of fossil fuels in heating buildings and in construction.
- Significantly reduce the demand for heating.
- Retrofit and refurbish existing buildings.
- Install more and more efficient insulation.
- Replace boilers with heat pumps.
- Use 'smart controls' to make heating systems more efficient.
- Build to the highest environmental standards.
- Share heat between buildings using heat networks.

Building carbon emissions across Shropshire

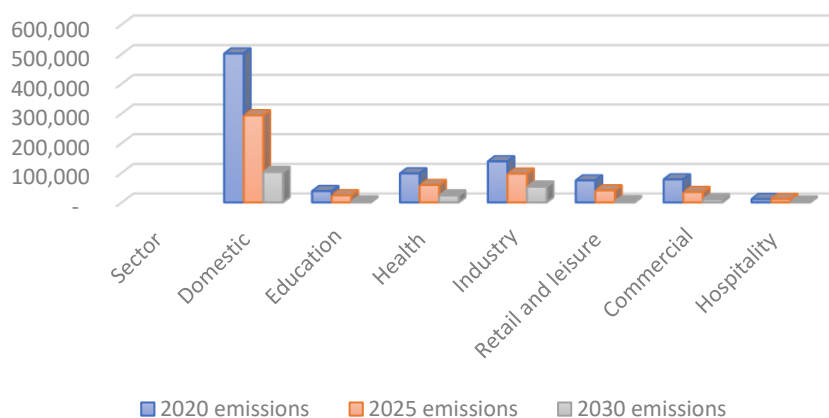


How do we do it?

- Enforce high environmental standards.
- Educate and inform – raise awareness of the improvements that are needed!
- Demand better of our politicians, our council, our planners, and our builders.
- Establish equitable ways of funding the changes that every household and workplace must make.
- Create thousands of 'green' jobs across the county and develop skills training to support this.
- Ensure new housing developments and houses themselves are designed to integrate space for both wildlife and people, as well as to reduce carbon emissions and minimise water usage.

The SCAP Buildings Working Group has developed an outline plan for decarbonising Shropshire buildings and new builds. The projected reductions in each of the main property sectors is shown here for the best case scenario (very significant investment required and a major programme of retrofitting to improve Shropshire buildings).

Outline Buildings Plan: Projected tCO₂e emissions reductions from Shropshire buildings (best case scenario showing annual Scope 1 only)



What would this mean for us?

We can look forward to a brighter, warmer, healthier future!

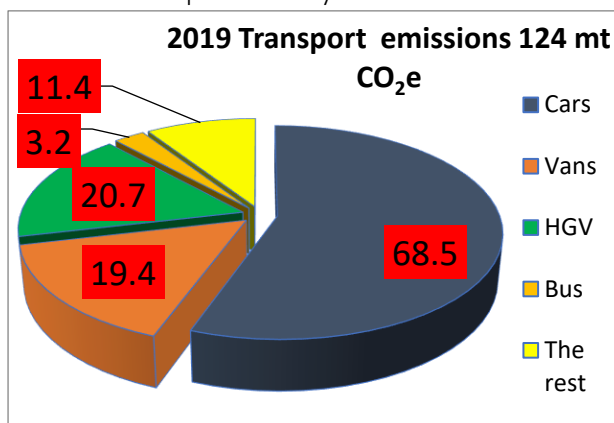


¹⁴<https://www.worldgbc.org/news-media/green-building-improving-lives-billions-helping-achieve-un-sustainable-development-goals>

Transport

What's it all about?

All other main sectors of the economy have been reducing GHG emissions. Transport – the biggest emission source – has not, showing no significant fall since 1990. 20% of the UK GHG emissions came from road transport used by both households and industry, with aviation accounting for a further 8%.

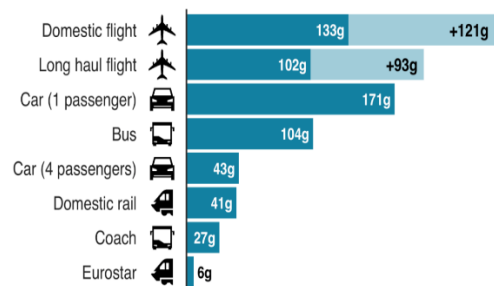


Almost 46% of each household's emissions related to transport.

Emissions from different modes of transport

Emissions per passenger per km travelled

CO₂ emissions Secondary effects from high altitude, non-CO₂ emissions



Note: Car refers to average diesel car

Source: BEIS/Defra Greenhouse Gas Conversion Factors 2019

BBC

Internal combustion engine (ICE) powered road transport pollutes, causing 28,000-36,000 deaths per year UK equivalent to between 210 and 270 deaths in Shropshire directly related to exhaust pipe pollution. Currently, of the 337,400 registered motor vehicles in Shropshire, 1,493 were Ultra Low Emission Vehicles (ULEV)¹. Nationally, sales of battery electric vehicles (BEVs) are increasing rapidly.

The problem is not simply about the vehicles - in rural areas new residential development has increased household emissions by 11%, and increases the amount of travel 6 fold compared to urban housing.

Public transport has had an uncertain time. Trips by bus have reduced in this decade from 6.2m to 4.3m journeys per annum (30.6%), whilst rail passenger numbers have increased by 83% over the same period.

Carbon footprint of cars

Emissions from cars over a 150,000 km lifetime (tonnes of CO₂ equivalent)

Lifetime Emissions	Embodied Carbon	
38.7	6.9	<--- Average Eu Car
25.5	6.45	<--- Prius Eco
10.95	10.95	<--- Nissan Leaf 40kWh (Norway)
15.3	10.95	<--- Nissan Leaf 40kWh (UK)
18.75	10.95	<--- Tesla 3 UK (US batteries)
26.7	18.9	<--- Tesla 3 UK (Asian batteries)

Source: Carbon Brief Factcheck:

How electric vehicles help to tackle climate change

<https://www.carbonbrief.org/factcheck-how-electric-vehicles-help-to-tackle-climate-change>

Encouraged by international agreements and recent government policy, sales of ICE vehicles are reducing whilst ULEVs are increasing. Hydrogen and BEV buses are being manufactured in the UK in growing numbers. It should always be recognised that all types of transport have large embodied manufacturing emissions as well as operating emissions.

Our local representatives have started to recognise the benefits. Telford and Wrekin Council adopted a Cycling and Walking Strategy in 2017, and Shropshire Council has adopted guidance for local authorities on designing high-quality, safe cycle infrastructure.

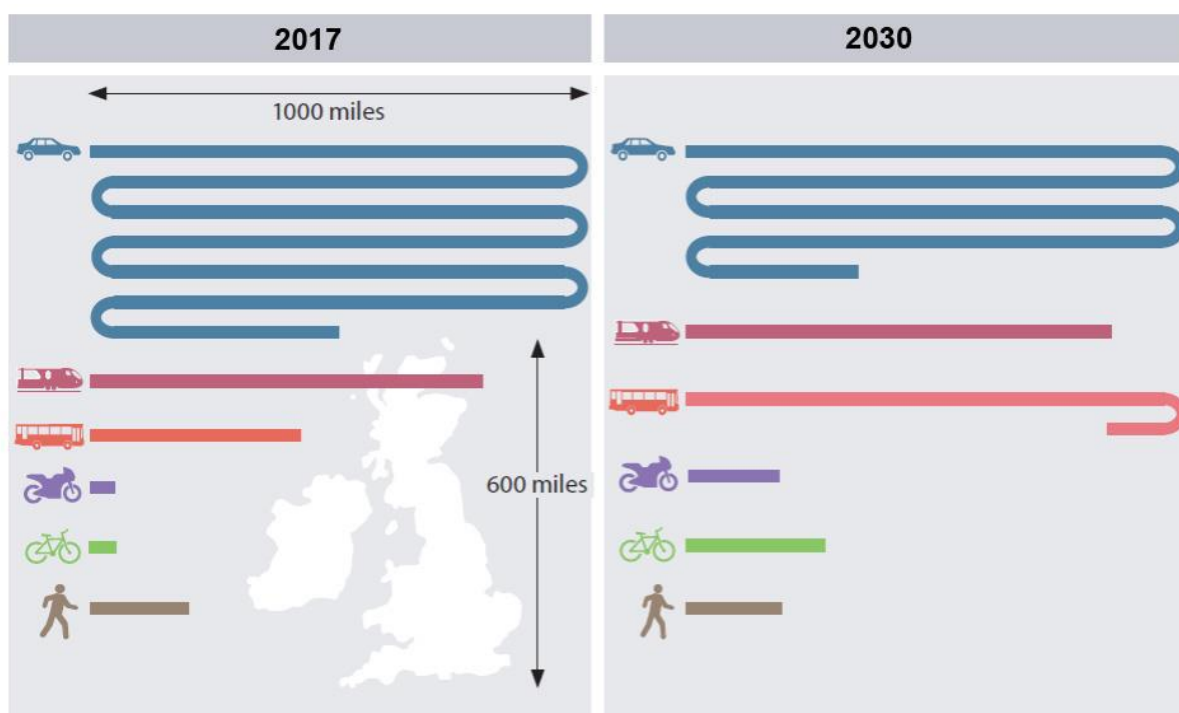
What do we need to do?

Change quickly – don't put it off – time is short.

Reshape our lives to be able to move and engage with minimum impact upon the climate.

Local travel should be by walking and cycling. **Longer distance travel** by public transport or by ULEV. **Car clubs** can reduce embedded carbon and provide transport for those who do not own a car, and with a suitable app also encourage car sharing as community transport. **Public transport** is preferred within urban areas. Work travel and overall car journeys are reduced.

As a result, **vehicle mileage** within the county is halved, with the roads clear for essential users powered by ULEV. Air miles by the area's population are substantially reduced, with recreational flights and cruises falling by 60%.



'Average distance travelled per person per year by various modes of transport in 2017 and zero carbon Shropshire 2030'

Adapted from a graphic courtesy of Centre for Alternative Technology

Every significant settlement needs attractive public transport and guaranteed availability of car club vehicles to provide confidence that one can live in rural Shropshire and travel at low cost without needing to purchase a car. New housing and industrial developments should be sited to have ready access to local amenities and served by frequent, attractive and economical public transport. Expansion of rural housing should cease unless backed up by appropriate infrastructure. Existing development will be equipped with residential charging facilities.

Road freight will be more efficient: reduction in part load deliveries and empty return trips. Distribution hubs in urban centres will permit “last delivery mile” system using eCargo bikes and BEV vans. Central government will take action to eliminate HGV emissions, by either a switch to fuel cell/green hydrogen power or “electric motorways”, with battery power for the local journey. Switching 30 % of freight to rail should be investigated.

How do we do it

For the greatest reduction in emissions: For People and Business

- Walk, cycle or use the train or bus. If you drive, drive less.
- Rather than buying a car, investigate a car club which uses EVs.
- Do not buy a petrol or diesel vehicle. Buy EV
- If you fly, take the train fly less, fly shorter, fly modern, fly economy
- If you’re thinking of a cruise, work out the carbon emissions first
- Goods Vehicle Operators – engage with industry moves to lower emissions.

For local authorities, public transport operators

- Initiate car clubs
- Implement zero emission public transport and high frequency pod services
- Build homes only where good infrastructure minimises carbon emissions
- Provide new railway stations; electrify or hydrogen power; solar PV alongside tracks.
Local Cycling and Walking Infrastructure and Low Traffic Neighbourhoods
- Lower speed limits – 20mph in built up areas; 50 on A roads 40 elsewhere
- Widespread EV charging infrastructure.

What would this mean for us?

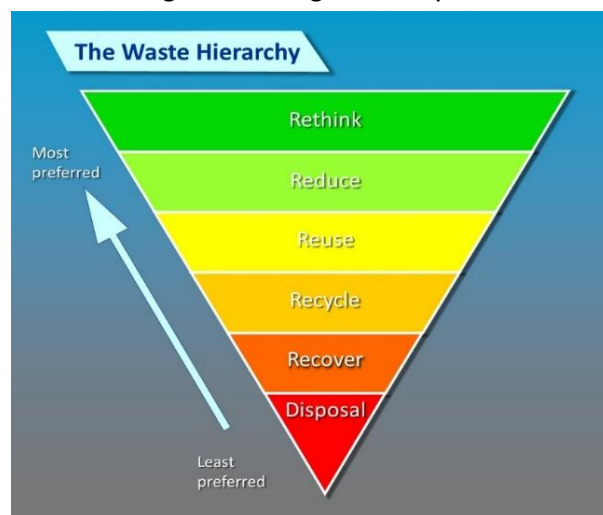
In the end this is what it comes down to – we must halt car, van and HGV emissions

Our county will be far cleaner and quieter, our air will be better, and we will all be healthier. What’s more our planet will be more sustainable.

Stuff we buy and use... then throw away

What's this all about?

Getting raw materials out of the ground, manufacturing products and transporting them – this forms the single biggest contribution to carbon emissions for the typical Shropshire resident. In 2019, our average [carbon footprint](#) was [12.6 tonnes](#) of CO₂ – about twice the global average. If everyone on Earth had the same lifestyle as the average person in Shropshire, we would need 2.5 planets.



From this.....



To this....



What do we need to do?

- Make sure materials are kept in circulation for as long as possible.
- Switch to a more plant-based, seasonal diet
- Choose products made from renewable or recycled resources avoiding single use plastics
- Support local businesses and ones whose values are environmental and ethical.
- "Buy less, choose well." (Vivienne Westwood).

How do we do it?

Work out your own carbon footprint and use that to see where you can easily make changes

zerocarbonschropshire.org/calculate-your-carbon-footprint/

- Minimise what you buy and aim for things that will have a long life and can be repaired
- **Buy local and seek out products that use Circular Economy principles**
- Shift your diet away from meat and towards more plant-based meals

- Use your consumer power to avoid excess packaging and waste.

Start or support local groups or entrepreneurs who:

- Set up Repair shops
- Sell plastic free goods
- Arrange local surplus food shares from gardens and allotments
- Run “libraries of things” e.g. for: tools, appliances, equipment and toys.

If you can't find a group in your local area, why not set one up?

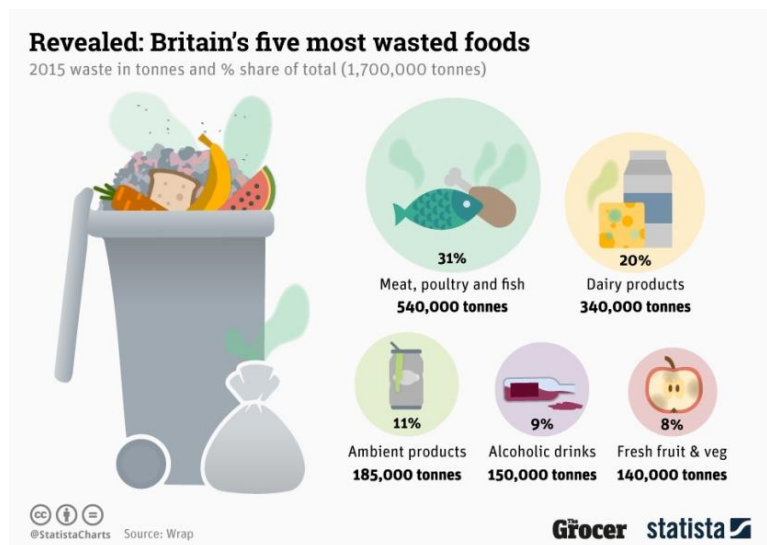
What would this mean for us?



Land use and biodiversity

What's this all about?

Our agricultural policies have supported rising food production but brought other problems – like greenhouse gas emissions, loss of soil fertility and loss of biodiversity. This is not sustainable. Over half our wildlife species are showing change and decline, and natural habitats have become too fragmented to support wildlife effectively.



What do we need to do?

- Make space for nature at the heart of our farming and planning systems to bring nature into the places where most people live their daily lives.
- Change and implement policy to reward farmers for moving to carbon zero, carbon storing and nature friendly farming methods.
- Create nature recovery networks that allow wildlife and people to thrive, including in our gardens, road verges, and parks.
- Change our shopping and eating habits to stop waste, use local supply chains, and have more plant-based meals.
- Use natural processes to solve problems like flooding, for instance tree planting and beaver introductions.

How do we do it?

- Ask our elected representatives to back funding for zero carbon and nature friendly farming, change planning policy and insist on zero carbon and people/nature friendly building.
- Support farmers in undertaking carbon and nature surveys of their farms.
- Substantially reduce our reliance on chemical fertilisers.
- Coordinate landowners towards a mutually beneficial approach for the reparation and maintenance of river catchment systems.
- As consumers, be selective and demand 'greener' provenance of farm produce.
- Use the green space we have in our communities for tree and wildflower planting.
- Make our gardens nature friendly; avoid using chemicals and peat. Have a "wild corner," make a log pile, a pond, a bee friendly border, make compost.
- Shop locally for local seasonal foods.
- Change to more sustainable and healthy diets. Eat more plant-based meals.
- Pressure companies to label food so consumers can better understand the carbon footprint of food.
- Get involved in conservation. Join a local wildlife or environmental group.

What would this mean for us?

Nature is recovering on our farms, in our towns and villages, along our road verges and hedges and in our gardens. Children grow up with trees to climb, ponds to investigate and fields to explore. Our air and water are clean, and in restored uplands the trees and peat bogs are back, reducing flooding and locking up CO₂ from the air. People are happier, healthier, and safer. Shropshire has had a new revolution – a green one.



What do we need to do right now?

Just as with managing personal finances, when managing your carbon footprint it is important to have a budget to work to. We suggest you use the [carbon calculator on our website](#) to measure your footprint and plan reductions. We also advocate setting a personal goal. For many of us an achievable goal maybe a CO₂ budget of 5tCO₂e/year – which would be a hugely significant step in the right direction.

To illustrate the main areas of our personal footprint and what can be done to reduce it, the following table represents a typical UK person and shows some of the changes that can be made rapidly, and with positive financial consequences.

Footprint	Today	Reduce to	The big wins
Food	3.5	1	On average, going from meat every day to once a week, and buying local produce.
Domestic transport	1	0.3	Stop using petrol/diesel cars. Reduce commuter travel. Cycle and walk short journeys. Get bulky shopping delivered. Sell your car and share or use car clubs or rental.
Heating	2.5	1	Increase insulation and exchange oil/gas boiler for a heat pump.
Electricity	2	0	Change to green tariff and invest in renewables (make sure the electricity company promises to use your money to build new sources of green energy). Replace all lighting with LEDs and purchase energy-efficient appliances.
'Stuff'	2.2	1	Halve the amount you purchase by being selective. Reduce, reuse and repair, and join a library of things.
Flights overseas	1	0.2	Fly every five years instead of every year.
Emissions from peat	0.6	0.3	Stop buying peat products. Join the campaign to restore half our peat bogs in a decade.
Net carbon footprint	12.8	3.8	Plant some trees and invest in the Shropshire Climate Bond. Further actions by government and local authorities will be required to close the gap.

Recommendations for action

A sense of scale

In order for Shropshire (which currently gets about 80% of its energy from fossil fuels) to stop using almost all fossil fuels by 2030, we need to be realistic about the scale of changes needed, and set our scale of ambition appropriately.

In our plan we have set out to give a sense of the scale of the actions needed. This does not mean that we have accurately defined the details at this stage. Instead we have given an indication of the order of magnitude of the changes required.

Zero Carbon Shropshire Plan in numbers

In order to keep on track for our target of net zero carbon Shropshire 2030, we suggest the following actions will be required every year, starting right away:

- 20,000 homes insulated to high standards and suitable for switching from gas and oil heating to heat and air pumps.
- 500 acres of solar farms (plus wind farms) installed and powering the grid and private wire demand, and creation of 120GWh/year of electricity generation capacity to provide green hydrogen for HGV/agricultural use.
- 8,000 acres of marginal Shropshire land re-wilded or planted with woodland.
- 500 miles of new hedgerow laid.
- Recovery, renewal and protection of 10% of Shropshire peatlands and wetlands.
- 10% of highways budgets dedicated to shifting priority from car to active travel.
- 10% reduction of car use by shift to active travel, public transport, and reduced commuting.
- 2,000 electric car charge points for community car share and car club vehicles.
- 10% reduction in waste, by reducing short-life purchases and single-use packaging, and promoting re-use of materials
- £200M investment in the Shropshire Climate Bond.

In general if we achieve less in one area, then this will need to be balanced by more work in another. The biggest threat to this plan is that an insufficient scale of response and actions being taken too slowly. The consequences of this would be either the very much more costly investment in carbon capture later to recover the situation, or even worse, higher levels of CO₂ in the atmosphere and a worsening climate crisis.

What can we do now to get off fossil fuels?

While some steps to address climate change and biodiversity loss require changes to government policies or action by large utilities, there are many actions individuals can take to both reduce individual carbon footprints and increase pressure on governments to change. In Shropshire, the average carbon footprint per person is over 12tCO₂e, and we can take action today to reduce this very significantly through the choices we make – in ways that will leave us better off in both health and finances.

The first step in taking action is to calculate your own carbon footprint to find out the changes that will have most impact given your personal circumstances. You can find a calculator at: zerocarbonschropshire.org/calculate-your-carbon-footprint/ (for businesses and organisations, see carbonfootprint.com/small_business_calculator.html).

We believe that for most of us a 25% reduction in footprint should be achievable by making changes in our consumer choices with immediate effect. The table below lists some of the immediate actions we can all take this year to rapidly reduce our fossil fuel emissions. We present our recommendations for individuals and households, businesses, councils, community groups and central government, and will be pleased to expand on these ideas and assist with detailed planning if you would like to get in touch with us.

More information on many of these actions is presented on our website zerocarbonschropshire.org and we can also offer further advice and assistance.

Individuals and households

	Title	Description of actions	Potential carbon savings	Other potential benefits
Energy	Switch to a renewable energy supplier offering a proper green tariff.	This will enable you to power your home using renewable, carbon-free energy. Look for an energy supplier that provides renewable energy to the grid too. Some of the leading suppliers include Ecotricity and Good Energy.	High	
	Reduce energy use in the home.	Examples include: <ul style="list-style-type: none"> • Turn down thermostat • Install LED lighting • Replace gas boiler with heat pump • Only heat rooms you use For more advice and ideas see: shropshire.gov.uk/private-sector-housing/keep-shropshire-warm-energy-saving-advice	High	Cost savings over time.
Buildings	Reduce heat loss around the home.	Key measures include: <ul style="list-style-type: none"> • Roof insulation • Draught-proofing • Cavity wall insulation • Double and triple glazing windows • Improved wall insulation Government grants are available: gov.uk/green-deal-energy-saving-measures .	High	Cost savings over time.
Transport	Reduce car use.	Walk, cycle, work from home, use public transport, car share or join a car club.	High	Cost savings, health benefits.
	Choose an electric vehicle.	If you have to use your own car, choose an electric vehicle (EV) when you replace it.	High	Cost savings over time.
	Avoid or reduce flights.	Avoid flying altogether, stay nearer to home, when booking holidays work out the carbon emissions and look for ways to reduce them (e.g. rail travel).	High	Cost savings on travel, enjoy a different experience of travel.
Consumption	Shift to a more plant-based diet.	Consider the carbon footprint of your food choices, source food grown locally and seek meat-free alternatives. Use up leftovers.	High	Cost savings, health benefits.
	Buy less and avoid waste.	Reduce purchases, re-use products (e.g. repair, donate to charity shops) and recycle if re-use is not an option. Avoid single-use plastics.	High	Cost savings.
Land use and biodiversity	Create a wildlife-friendly garden	Plant trees. Leave areas unattended. Add a pond, log-piles, animal shelters or birdboxes. Avoid using any pesticides. Plant flowers for	Medium	Benefits to local biodiversity,

	Title	Description of actions	Potential carbon savings	Other potential benefits
		bees and insects, plant native wildflower seeds. Avoid buying peat and make your own compost.		health and well-being.
Community	Get more actively involved in community projects and campaigning.	Get involved in taking action against climate change and for biodiversity: <ul style="list-style-type: none"> • Continue reading and learning • Write to your MP and local councillors • Join conservation and wildlife groups • Raise sustainability issues at work • Switch to an ethical bank that doesn't invest in fossil fuels • Make sure your savings and pension are not invested in fossil fuels • Join SCAP and other local groups or campaigns 	High	Health and well-being, social involvement, self-development.

Businesses

	Title	Description of actions	Potential carbon savings	Other potential benefits
Energy	Switch to a renewable energy supplier, offering a green tariff, when your energy contract is renewed.	This will enable you to power your premises using renewable, carbon-free energy. Look for an energy supplier that provides renewable energy to the grid too. Some of the leading suppliers with business tariffs include Ecotricity and Good Energy.	High	Cost savings.
	Reduce energy use.	Audit processes to minimise waste of energy, reduce heating costs through: <ul style="list-style-type: none"> • Improved energy management systems • Installing LED lighting • Replacing gas boilers with heat pumps 	High	Cost savings.
	Identify and invest in opportunities for generation of electricity.	This could include installing solar panels and wind turbines, collaborating with other organisations in the vicinity.	High	Cost savings over time.

	Title	Description of actions	Potential carbon savings	Other potential benefits
Buildings	Reduce heat loss from business premises.	Key measures include: <ul style="list-style-type: none"> • Roof insulation • Draft proofing • Cavity wall insulation • Double and triple glazing windows, • Improved wall insulation (external or internal) 	High	Cost savings over time.
	Promote and adopt the latest environmental standards for all buildings.	Adopt the most forward-thinking measurement tools, rigorous build standards, and appropriate materials for use.	High	Cost savings over time.
Transport	Incentivise employees to reduce petrol and diesel car use, switch company vehicles to EVs when renewed.	Encourage walking and cycling (e.g. through provision of secure bike shelters and showers). Allow working from home. Promote public transport, incentivise car sharing, promote car clubs and install EV charging points.	High	Cost savings, health benefits for employees and reduced absences.
	Avoid or reduce business flights.	Avoid flying, use alternative forms of travel, use videoconferencing.	High	Cost savings on travel.
Consumption	Minimise waste throughout business processes, identify and exploit opportunities to join the circular economy.	Consider waste as a resource. Reduce purchases, re-use materials where possible and recycle if re-use is not an option. Divert food waste to schemes where it can be shared and consumed or composted.	High	Cost savings, create growth opportunities.
	Review and improve your supply chain and purchasing practices.	<ol style="list-style-type: none"> 1. Is the product you are purchasing made from recycled and recyclable materials? 2. Is it designed and built for durability, energy efficiency and with a low carbon footprint? 3. Does the manufacturing process have an adverse impact on air or water quality or biodiversity? 	High	Improve reputation, improve sustainability of supply chain, create growth opportunities.

	Title	Description of actions	Potential carbon savings	Other potential benefits
		<p>4. Have the people who have been involved in the production of the item been treated ethically?</p> <p>5. Is the item packaged in the minimum required to keep the product clean and safe, and is the packaging biodegradable or universally or easily recycled?</p>		
Land use and biodiversity	Assess and reduce the impact of your operations on biodiversity, and support improvement actions, including carbon sequestration.	Investigate and support natural solutions to reduce and sequester carbon, regenerate agriculture and protect and increase biodiversity and vital ecosystems (e.g. soil/water/air) throughout business processes and your supply chain.	High	Improve reputation, improve sustainability of supply chain, create growth opportunities.
Community	Develop capabilities to take advantage of a low-carbon economy.	To exploit the opportunities associated with a circular, low-carbon economy, assess needs and invest in staff training and development, apprenticeships, research and development. Join relevant industry groups and networks.	High	Organisational development, business growth opportunities.

Councils and public bodies

	Title	Description of actions	Potential carbon savings	Other potential benefits
Energy	Take a lead by de-carbonising energy use in public infrastructure.	<p>This includes:</p> <ul style="list-style-type: none"> Switching to renewable energy suppliers Improved energy management systems Reducing energy used in street lighting Replacement of gas boilers in public buildings Publicising changes 	High	Cost savings, inspire other organisations through leadership.
	Identify and publicise opportunities for low-carbon heat networks.	Develop a county-wide energy map to highlight areas of opportunity for low-carbon development and evaluate and develop local low-carbon heat network opportunities.	High	Inspire investment in low-carbon technologies.
	Promote and enable planning	Ensure that local plans encourage the installation of solar farms, wind turbines,	High	Inspire investment in

	Title	Description of actions	Potential carbon savings	Other potential benefits
	approvals for local investments in the generation of electricity.	heat networks, storage solutions, and low-carbon infrastructure.		low-carbon technologies.
Buildings	Take the lead by ensuring new public buildings are designed to be carbon negative.	We must ensure that the new Shropshire hospital is carbon negative, and a benchmark for all new large developments. The same rule applies to all new council offices, schools etc.	High	Cost savings over time, Inspires use of low-carbon technologies.
	Ensure carbon reduction and localisation is embedded into all planning and development policies.	Enforce the most forward-thinking measurement tools, rigorous build standards, and appropriate materials for use. Promote small-scale developments by local companies. More competition can result in more innovative design and use of materials, improved build quality and benefits to the local economy. This also builds local capacity for low-carbon development.	High	Inspires investment in low-carbon technologies, builds local capacity.
	Accelerate the retrofitting of existing buildings to reduce carbon impacts	Establish local regulation mechanisms to encourage the retrofitting of poor-performing buildings. Promote this with funding schemes, publicity, investment in training and skills development.	High	Inspires investment in low-carbon technologies, builds local capacity.
Transport	Accelerate the decarbonisation of public transport.	Create a plan for the rapid decarbonisation of public transport, through investments in existing technologies such as electrification, electric vehicles and hydrogen power.	High	Health and well-being.
	Accelerate the decarbonisation of private transport by investing in schemes to reduce petrol and diesel car use.	Promote and support schemes to encourage: <ul style="list-style-type: none"> - Walking and cycling - Use of public transport - Use of car-sharing and car clubs - Reduced HGV emissions Lower speed limits to 20 mph in built-up areas; 50 mph on A roads, 40mph elsewhere. Invest in/permit the development of EV street charging, EV charging hubs and EV forecourts.	High	Cost savings on travel, health and well-being benefits.

	Title	Description of actions	Potential carbon savings	Other potential benefits
		Avoid rural developments that encourage car use.		
Consumption	Minimise waste throughout public processes.	Consider waste as a resource. Reduce purchases, re-use materials where possible and recycle if re-use is not an option.	High	Cost savings, create growth opportunities for the circular economy.
	Review and improve the public supply chain and current waste management practices to support the circular economy in Shropshire.	Ensure that public purchases and waste management practices promote localism, and the development of the circular economy in Shropshire.	High	Create economic growth opportunities locally.
Land use and biodiversity	Assess and reduce the impact of public sector operations on biodiversity, and support improvement actions – including carbon sequestration.	Investigate and support natural solutions to reduce and sequester carbon, regenerate agriculture and protect and increase biodiversity and vital ecosystems (e.g. soil/water/air) throughout public processes and the supply chain.	High	Demonstrate public leadership, improve sustainability of supply chain, create local growth opportunities.
	Support the regeneration of ecosystems and promote biodiversity in Shropshire.	Create a database of potential project sites and wildlife corridors, working with landowners and managers, businesses, local communities and conservation groups, across urban and rural spaces.	High	Benefits to local biodiversity, health and well-being.
Community	Strengthen regulation to support the circular economy.	Councils to strengthen and enforce legal requirements on businesses to implement the principles of ‘producer responsibility’, which are: reduce consumption, increase reuse of materials, sort waste for recycling and promote the circular economy. Establishing a point of contact on every council would facilitate speedy resolution when particular issues arise (e.g. replacing street-lights, etc.).	High	Demonstrate public leadership, create local growth opportunities.
	Consult on, and agree financing of, ecological and climate mitigation solutions.	As all citizens and organisations will benefit from the energy improvements, ecological and climate mitigation solutions, there should be an open and urgent discussion on	N/A	Demonstrate public leadership, community engagement.

THE ZERO CARBON SHROPSHIRE PLAN

	Title	Description of actions	Potential carbon savings	Other potential benefits
		the financing of the necessary changes, with all options considered.		

Community groups

	Title	Description of actions	Potential carbon savings	Other potential benefits
Energy and buildings	Create awareness of options to de-carbonise energy, and reduce heat loss from buildings.	Publicise and advise on: <ul style="list-style-type: none"> Carbon footprinting Renewable energy suppliers Insulation of buildings Government grants for improvements 	High	Cost savings for homeowners.
Transport	Reduce the use of petrol and diesel cars.	This includes: <ul style="list-style-type: none"> Setting up safe walking and cycling schemes Publicising public transport options Setting up car clubs and car sharing Organising trials and events for EVs and electric bikes 	High	Cost savings, health and well-being.
Consumption	Set up a 'library of things'.	A library of things is an excellent way to avoid purchasing expensive items that you only use occasionally. Reduce clutter and promote re-use by clearing the shed and taking useful items to your local library of things.	High	Cost savings, health and well-being, social involvement.
	Set up re-use and repair workshops and communities.	Encourage re-use and repair of goods, and use of second-hand outlets. Support and grow re-use communities such as Trash Nothing, Freecycle, Freegle, and charity shops.	High	Cost savings.
Land use and biodiversity	Support carbon calculations for farms.	Fund and support completion of 100 farm carbon calculations to identify key sources of emissions.	High	Cost savings, benefits to local biodiversity.
	Promote biodiversity, and support the regeneration of ecosystems in Shropshire.	Create a database of potential project sites and wildlife corridors, working with landowners and managers, businesses, local communities and conservation groups, and councils, across urban and rural spaces.	High	Benefits to local biodiversity, health and well-being.
	Promote and support natural solutions for carbon sequestration.	Investigate and support natural solutions to reduce and sequester carbon, regenerate agriculture, protect and increase biodiversity and vital ecosystems. This includes actions to: <ul style="list-style-type: none"> Share knowledge between landowners Improve the organic carbon content of soils, and soil retention 	High	Cost savings over time, benefits to local biodiversity, improved capacity in local communities.

	Title	Description of actions	Potential carbon savings	Other potential benefits
		<ul style="list-style-type: none"> Plant trees Re-wet peatlands 		
Community	Engage local communities in taking action.	SCAP and partners to engage local communities through information, education and events (when possible) to become involved in zero carbon Shropshire initiatives through, e.g. green spaces, gardens, allotments, consumer power, health issues, or through stakeholder organisations.	High	Cost savings, health and well-being, social involvement.
	Build community capacity for change.	SCAP and partners to develop and/or promote toolkits to support community initiatives which reduce consumerism and waste, such as repair cafés, The Rubbish Diet, Fight the Plastic, etc. Update the Green Guide for Shropshire. Run educational seminars on the circular economy.	High	Grow local economy, social involvement.
	Hold Shropshire to account by monitoring progress.	<p>Monitor carbon reduction targets and publish progress annually, to ensure Shropshire moves up the league table of green, low-carbon regions.</p> <p>Hold elected representatives at both national and local level to account on progress towards zero carbon, and improving biodiversity.</p>	High	Inspire investment in low-carbon technologies.

Central government and national public bodies

	Title	Description of actions	Potential carbon savings	Other potential benefits
Energy	Change the legal and regulatory framework for the national energy infrastructure to anticipate the demands of climate change.	Regulation changes are needed immediately to reflect the projections of change needed over short, medium and long terms to achieve zero carbon, including displaced emissions. Creation of a clear and holistic energy planning legal framework, anticipating the effects of and the demands caused by climate change needs to be an absolute priority.	High	Cost savings.
	Finance and support the remodelling of the energy grid to support renewable energy.	Grid architecture remodelling, incorporating the technological innovations and strategies needed for a highly resilient energy network should be the foundation of a new approach to energy, especially in dispersed populations like Shropshire.	High	Cost savings, inspire other organisations through leadership.
	Promote planning policies that support renewable energy solutions.	Ensure local planners are encouraged to support the installation of solar farms, wind turbines, heat networks, storage solutions, and low-carbon infrastructure	High	Inspire investment in low-carbon technologies.
Buildings	Ensure standards for low-carbon buildings are promoted in all national planning policies and building regulations.	Enforce the most forward-thinking measurement tools, rigorous build standards, and appropriate materials for use.	High	Inspires investment in low-carbon technologies, builds local capacity.
	Accelerate the retrofitting of existing buildings to reduce carbon impacts through appropriate investments and support.	Continue to provide grants for businesses and householders to improve buildings. Promote local low-carbon technology businesses and retrofit. Support apprenticeships/job creation/up-skilling in the construction industry.	High	Inspires investment in low-carbon technologies, builds local capacity.
Transport	Accelerate the decarbonisation of public transport.	Provide funding for the rapid decarbonisation of public transport, through investments in existing technologies such as electrification, electric vehicles and hydrogen power.	High	Health and well-being.

	Title	Description of actions	Potential carbon savings	Other potential benefits
	Accelerate the decarbonisation of private transport by investing in schemes to reduce petrol and diesel car use.	<p>Promote and support schemes to encourage:</p> <ul style="list-style-type: none"> - Walking and cycling - Use of public transport - Use of car-sharing and car clubs - Reduced HGV emissions <p>Lower speed limits nationally to 20 mph in built-up areas; 50 mph on A roads, 40 mph elsewhere.</p> <p>Invest in the development of EV street charging solutions, EV charging hubs and EV forecourts.</p>	High	Cost savings on travel, health and well-being benefits.
Consumption	Minimise waste throughout public processes	Consider waste as a resource. Reduce purchases, re-use materials where possible and recycle if re-use is not an option.	High	Cost savings, create growth opportunities for the circular economy.
	Improve the public supply chain to benefit the circular economy nationally.	Ensure that public purchases and waste management practices promote the development of the circular economy.	High	Cost savings, create economic growth opportunities in the circular economy.
Land use and biodiversity	Support the regeneration of ecosystems and promote biodiversity.	Ensure that planning policies, environmental and agricultural legislation, land-use grants and subsidies support the regeneration of ecosystems and natural carbon sequestration.	High	Cost savings, benefits to biodiversity, health and well-being.
Community	Strengthen regulation to support the circular economy	<p>Government must strengthen and enforce legal requirements on businesses to implement the principles of 'producer responsibility' which are: reduce consumption, increase reuse of materials, sort waste for recycling and introduce laws to support the circular economy.</p> <p>Establishing a point of contact on every council would facilitate speedy resolution when particular issues arise (e.g. replacing street-lights, etc.).</p>	High	Demonstrate public leadership, create business growth opportunities.
	Consult on, and agree financing of, ecological and	As all citizens and organisations will benefit from the energy improvements, ecological and climate mitigation solutions, there should be an open and urgent discussion on	N/A	Demonstrate public leadership, engage public.

THE ZERO CARBON SHROPSHIRE PLAN

	Title	Description of actions	Potential carbon savings	Other potential benefits
	climate mitigation solutions.	the financing of the necessary changes, with all options considered.		

How you can get involved

Shropshire Climate Action Partnership welcomes all who live or work in Shropshire to join us as Supporters. You can sign up at zerocarbonshropshire.org/sign-up/ and get involved with our working groups too, if you have time and would like to join a growing band of highly motivated people across Shropshire who are helping us to tackle the climate and ecological emergency.

We also welcome community groups, charities, neighbourhood associations, housing associations, town and parish councils – and indeed any organisation with an interest in Shropshire – to become an Organisational Member of SCAP. We are also particularly interested to welcome new business members who would like to show their commitment to Shropshire achieving net zero carbon by 2030, and also benefit from the networking and learning available through SCAP and our wider links with the Shropshire Chamber of Commerce and other local business organisations. The sign up page for new organisational Members is zerocarbonshropshire.org/member-sign-up/

You can also contact us via our website zerocarbonshropshire.org/contact-us/, by email to admin@ZeroCarbonShropshire.org or by post to:

Shropshire Climate Action Partnership
Suite 9, Old Bank Buildings
Bellstone
Shrewsbury SY1 1HU

Glossary of abbreviations / acronyms

Abbreviation	Terminology
AATF	Approved Authorised Treatment Facilities
AFOLU	Agriculture, Forestry & Other Land Use. (Emission measurement group)
AONB	Area of Outstanding Natural Beauty
BEV	Battery Electric Vehicle
BEIS	Department for Business, Energy and Industrial Strategy
Bn	Billion (also 'b' or 10 ⁹ in notation)
CAT	Centre for Alternative Technology
C&I	Consumption and Industrial
CCS	Carbon capture and storage
CHP	Combined Heat and Power plant
CNG	Compressed Natural Gas
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide equivalent
CH ₄	Methane
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DHL	Dalsey, Hillblom & Lynn (USA & German, Parcel & Courier Service)
DME	Dimethyl ether (synthetically produced alternative to diesel fuel)
DNO	Distribution Network Operator (Electricity Company i.e. SSE or WPD)
DSO	Distribution system Operators
DWPT	Dynamic Wireless Power Transfer
E100	Ethanol is a fuel for ICE vehicles in its pure form, used as a gasoline additive to increase octane and improve vehicle emissions.
EA	Environmental Agency (Sub department of Defra)
ELMs	Environmental Land Management scheme
ERF	Energy Recovery Facility
EV	Electric Vehicle
FCEV	Fuel Cell Electric powered Vehicle
FTA	Freight Transport Association (Logistics UK) inc. Road, Shipping & Air
GHG	Greenhouse Gas
g	gram
Gt	Giga Tonne (Gt of CO ₂ e)
H ₂	Hydrogen
HDV	Heavy Duty Vehicle (lorries, 'buses and coaches)
HGV	Heavy Goods Vehicle
HRC	Household Recycling Centre
IEA	International Energy Agency
IBA	Incinerator Bottom Ash
IBAA	Incinerator Bottom Ash Aggregate
ICE	Internal combustion engine (UK sales ban 2030)
IPv6	An Internet Protocol version 6 address (a newer URL system)
IPPU	Industrial Production or Product Use (Emission measurement)

Glossary continued

Abbreviation	Terminology
J	Joule (a measurement of energy)
k	Kilo (1,000 or 10 ³ in notation)
km	Kilometre
kW	Kilowatt
kWh	Kilowatt hour (kWhr) 1 kWh = 3.6 MJ
kWp	Kilowatt peak (Usually related to Solar energy generation performance)
LA	Local Authority
LEP	Local Enterprise Partnership (Marches LEP; inc. Herefordshire, Shropshire, T&WC)
LEERS	Logistics Emissions Reduction Scheme
LGV	Light Goods Vehicles (less than 3.5 tonnes in weight)
LNG	Liquid Natural Gas
LPG	Liquid Petroleum Gas
LULUCF	Land use, land-use change, and forestry
mb/d	Million barrels per day (oil)
MJ	Mega Joule
Mt	Mega Tonne (Tonne = metric tonne)
NOx	Nitrous Oxide (N ₂ O) (Ozone depleting GHG)
NHS	National Health Service
NRN	Nature Recovery Network
OLEV	Office for Low Emission Vehicles (DfT)
ORR	Office of Rail & Road (DfT)
PCC	Per Capita Consumption (used in water industry)
PEM / PEMFC	A Proton Exchange Membrane Fuel Cell (hydrogen fuel cell)
PHE	Public Health England
PHEV	Petrol Hybrid Electrical plug-in Vehicle
PM	Particulate Matter
PSV	Public Service Vehicles (Bus or Coach)
PV	Photo-voltaic (Solar energy panel)
R&D	Research and Development
RHA	Road Haulage Association
SCAP	Shropshire Climate Action Partnership
SCATTER	Setting City Area Targets and Trajectories for Emissions Reduction, is a free GHG reporting tool for UK local authorities. https://scattercities.com/
Scope 1	Covers direct emissions from owned or controlled sources of an individual or a company.
Scope 2	Covers indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting company.
Scope 3	Covers all other indirect emissions that occur in a company's value chain.
SOx	Sulphur Oxides (SO ₂ Sulphur Dioxide, SO ₃ Sulphur Trioxide emissions)
SME	Small or Medium sized Enterprises
SMR	Steam methane reforming (Hydrogen production)

Glossary continued

	Abbreviation	Terminology
	SSSI	Site of Special Scientific Interest
	STW	Severn Trent Water (water provider authority / area)
	Syngas	Can be used to produce; methanol, DME and hydrogen, or converted via the Fischer–Tropsch process to produce a diesel substitute, or a mixture of alcohols that can be blended into gasoline.
	tCO ₂ e	Tonnes of Carbon Dioxide equivalent
	tpa	Tonnes per annum
	TRIMIS	Transport Research and Innovation Monitoring and Information System
	T&WC	Telford & Wrekin Council
	TWT	The Wildlife Trust
	ULEV	Ultra-Low Emission Vehicles
	URL	Unique Resource Locator
	V2G	Vehicle to Grid
	V2H	Vehicle to House
	VECTO	Vehicle Energy Consumption calculation TOol
	WE	Water Electrolysis
	WG	Work Group (SCAP themed research and writing group members)
	WRATE	Waste & Resource Assessment Tool for the Environment (EA toolkit)
	WWF	World Wildlife Fund
	Yr	Year
	ZCB	Zero Carbon Britain (The CAT outline & toolkit programme)

Measurements

Factor	Name	Symbol	Use
10 ¹	deka	da	Graphs & accounting
10 ²	hecto	h	Graphs & accounting
10 ³	kilo	k	Everyday notation
10 ⁶	mega	M	Everyday notation
10 ⁹	giga	G	Everyday notation
10 ¹²	tera	T	Everyday notation
10 ¹⁵	peta	P	Global valuations / trading, i.e. country comparison
10 ¹⁸	exa	E	Global valuations / comparisons
10 ²¹	zetta	Z	Global communication networks
10 ²⁴	yotta	Y	Global communication networks
	Mega	=	1,000,000 (Million)
	Giga	=	1,000,000,000 (Billion)
	Tera	=	1,000,000,000,000 (Trillion)

References and further reading

Fischer–Tropsch process. (2020). https://en.wikipedia.org/wiki/Fischer–Tropsch_process

Zero Carbon Shropshire. (2020). <https://zerocarbonshropshire.org>

Adlen, Ella; Hepburn, C. (2019). *10 Carbon Capture methods compared: costs, scalability, permanence, cleanness*. <https://energypost.eu/10-carbon-capture-methods-compared-costs-scalability-permanence-cleanness/>

Anthesis Group; Nottingham City Council; BEIS; Greater Manchester Combined Authority; Tyndall Centre for Climate Research. (2020). *What is SCATTER?*
<https://scattercities.com>

Bassetti, F. (2019). *Environmental Migrants: Up to 1 Billion by 2050*.
<https://www.climateforesight.eu/migrations-inequalities/environmental-migrants-up-to-1-billion-by-2050/>

Carbon Footprint Ltd. (2020). *Calculate Your Carbon Footprint*.
<https://zerocarbonshropshire.org/calculate-your-carbon-footprint/>

Carbon Footprint Ltd. (2020). *Business Calculators: Carbon Footprint Calculator Tools for Small Businesses*. https://www.carbonfootprint.com/small_business_calculator.html

Earth.org. (2020). *Sixth Mass Extinction of Wildlife Accelerating- Study*.
<https://earth.org/sixth-mass-extinction-of-wildlife-accelerating/>

Forestry Commission. (2020). *Creating new woodland: Woodland Carbon Code. Planting trees to tackle the effects of climate change*.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/689431/A5_Leaflet_WC_Carbon_Code_V4_Web.pdf

Forestry England. (2020). *Forests of bogs*. <https://www.forestryengland.uk/blog/protecting-peatlands#:~:text=In the UK%2C at least,important for climate and nature>

GOV.UK. (2020). *Green Deal: energy saving for your home*. <https://www.gov.uk/green-deal-energy-saving-measures>

GOV.UK. (2020). *UK sets ambitious new climate target ahead of UN Summit*.
<https://www.gov.uk/government/news/uk-sets-ambitious-new-climate-target-ahead-of-un-summit#:~:text=A new plan aims for,decade%2C compared to 1990 levels.&text=The Prime Minister has today,2030%2C compared to 1990 levels>

Health and Safety Executive. (2020). *Leptospirosis (Weil's Disease and Hardjo)*.
<https://www.hse.gov.uk/agriculture/zoonoses-data-sheets/leptospirosis.pdf>

- Jacobson, M. Z. (2019). *The 7 reasons why nuclear energy is not the answer to solve climate change*. <https://www.leonardodicaprio.org/the-7-reasons-why-nuclear-energy-is-not-the-answer-to-solve-climate-change/>
- Kukreja, R. (2020). *What is Monoculture?* <https://www.conserve-energy-future.com/advantages-disadvantages-examples-monoculture.php>
- Kuriakose, Jaise; Jones, Chris; Anderson, Kevin; Broderick, John; McLachlan, C. (2020). *Setting Climate Commitments for Shropshire: Quantifying the implications of the United Nations Paris Agreement for Shropshire*. <https://carbonbudget.manchester.ac.uk/reports/E06000051/>
- Masson-Delmotte, V; Zhai, P; Pörtner, H-O; Roberts, D; Skea, J; Shukla, PR; Pirani, A; Moufouma-Okia, W; Péan, C; Pidcock, R; Connors, S; Matthews, JBR; Chen, Y; Zhou, X; Gomis, MI; Lonnoy, E; Maycock, T; Tignor, M. and W. T. eds. (2018). *IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global*. <https://www.ipcc.ch/sr15/chapter/spm/>
- NASA. (2020). *Climate Change: How Do We Know?*
- Office for National Statistics. (2020). *The decoupling of economic growth from carbon emissions: UK evidence*. <https://www.ons.gov.uk/economy/nationalaccounts/uksectoraccounts/compendium/economicreview/october2019/thedecouplingofeconomicgrowthfromcarbonemissionsuk-evidence>
- Raworth, K. (2017). A Doughnut for the Anthropocene: humanity's compass in the 21st century. *The Lancet*, 1(2), E48–E49. [https://doi.org/https://doi.org/10.1016/S2542-5196\(17\)30028-1](https://doi.org/https://doi.org/10.1016/S2542-5196(17)30028-1)
- Shropshire Council. (2020). *Keep Shropshire Warm - energy saving advice*. <https://www.shropshire.gov.uk/private-sector-housing/keep-shropshire-warm-energy-saving-advice>
- The Wildlife Trusts. (2020). *Bees and pollinators*. <https://www.wildlifetrusts.org/wildlife-and-wild-places/saving-species/save-bees-and-pollinators>
- Tyndall Centre for Climate Change Research. (2020). *The Tyndall Carbon Budget Tool*. <https://carbonbudget.manchester.ac.uk/reports/>
- UN Environment Programme. (2019). *We're gobbling up the Earth's resources at an unsustainable rate*. <https://www.unenvironment.org/news-and-stories/story/were-gobbling-earths-resources-unsustainable-rate>
- United Nations. (2020). *Flagship UN study shows accelerating climate change on land, sea and in the atmosphere*. <https://news.un.org/en/story/2020/03/1059061>

United Nations. (2020). *Net-Zero Emissions Must Be Met by 2050 or COVID-19 Impact on Global Economies Will Pale Beside Climate Crisis, Secretary-General Tells Finance Summit*. [https://www.un.org/press/en/2020/sgsm20411.doc.htm#:~:text=The decisions we make now,reach the 1.5 Celsius goal](https://www.un.org/press/en/2020/sgsm20411.doc.htm#:~:text=The%20decisions%20we%20make%20now,reach%20the%201.5%20Celsius%20goal)

United Nations Association – UK. (2020). *What decarbonisation really means*. <https://www.sustainablegoals.org.uk/decarbonisation-really-means/>

Voosen, P. (2020). Ancient warming threw this crucial Atlantic current into chaos. It could happen again. *Science*. <https://doi.org/10.1126/science.abb9157>

World Green Building Council. (2020). *Green building: Improving the lives of billions by helping to achieve the UN Sustainable Development Goals*. <https://www.worldgbc.org/news-media/green-building-improving-lives-billions-helping-achieve-un-sustainable-development-goals>

World Health Organization. (2019). *Malaria*. <https://www.who.int/news-room/fact-sheets/detail/malaria>

World Meteorological Organization. (2020). *Global Annual to Decadal Climate Update. Target years: 2020 and 2020-2024*. <https://hadleyserver.metoffice.gov.uk/wmolc/>

Worldwide Fund for Nature (WWF); Cleantech Group. (2017). *Global Cleantech Innovation Index - Country Profiles*. [https://i3connect.com/gcii/country_profiles#:~:text=Commercialised cleantech is Denmark's strong,put Denmark in 1st place](https://i3connect.com/gcii/country_profiles#:~:text=Commercialised%20cleantech%20is%20Denmark's%20strong,put%20Denmark%20in%201st%20place)