



Comisiynydd
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Dyfodol
Cymru

**Future
Generations**
Commissioner
for Wales

The Future Generations Report 2020



Let's create the future together

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Chapter 5

Areas of focus

Future Generations Report 2020

Areas of Focus: Decarbonisation

| | |
|--|-----------|
| The predicted future for our climate | 04 |
| The Vision - A low carbon future | 05 |
| People's perception of decarbonisation | 09 |
| Your voice | 10 |
| Challenges and opportunities for change | 11 |
| • Understanding our emissions and where to prioritise action | 12 |
| • Tackle the climate and nature crises through a holistic approach, capitalising on the role of young people | 17 |
| • Deliver a just transition | 23 |
| • Implement solutions at scale to achieve multiple benefits | 27 |
| • Invest more in tackling the Climate Emergency | 35 |
| Recommendations | 39 |
| Resources | 44 |



Decarbonisation

Climate change is one of the biggest challenges facing future generations.

The [World Economic Forum Global Risks Report 2020](#) clearly shows that climate change is the stand-out long-term risk the world faces, with failure to mitigate and adapt to climate change as the key concern.

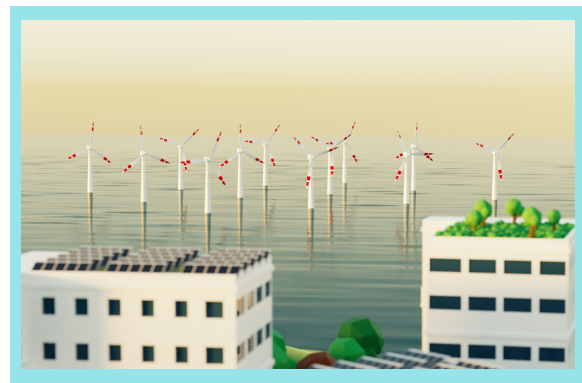
A landmark report by the United Nations Intergovernmental Panel on Climate Change published in 2018 warned us that we had less than 12 years to avoid climate breakdown, stating that urgent and unprecedented changes are needed to avoid catastrophic warming, and to keep global temperature rise to a maximum of 1.5°C above pre-industrial levels.

Going beyond this, even by half a degree, will significantly worsen the risks of drought, floods, extreme heat and poverty for hundreds of millions of people.

"Our way of doing things is reaching its limit. The current system is no longer working for businesses, people or the environment."

-The Ellen MacArthur Foundation

Decarbonisation is a cross-cutting issue central to all our work and vital for future generations.



Decarbonisation

The predicted future for our climate

Trends to watch:

- The climate is changing because of emissions of greenhouse gases (GHG) resulting from human activity; since the late 19th century, the global average temperature has risen by 1.1°C.
- Atmospheric carbon dioxide (CO₂) levels are continuing to rise and have reached 414 ppm – [the highest levels seen in human history](#).
- Across the world, [we emit over 36 billion tonnes of CO₂ per year](#) and this continues to increase.
- There are very [large inequalities in per capita emissions across the world](#): ranging from 17 tonnes per person in Australia and USA to 0.1 tonnes per person in countries in Sub-Saharan Africa. The global average is 4.8 tonnes per person.
- The UK's CO₂ emissions peaked in 1973 and have declined by around 38% since 1990, faster than any other major developed country and [compares to a 23% reduction across EU](#).
- Overall, emissions in Wales have fallen by 25% since the [1990 base year](#) but they need to reduce dramatically in the next decade – the target is 45% by 2030.
- Many impacts of climate change are already being experienced such as a warmer climate, severe weather events, flooding and sea level rise and they will continue to get worse.

Predictions for a possible future:

- Global warming is likely to be the greatest cause of species extinctions this century; the [Intergovernmental Panel on Climate Change says a 1.5°C average rise may put 20-30% of species at risk of extinction](#), whilst a warming of 2°C or more will mean that most ecosystems will struggle to survive.
- With further warming we can expect further disruption and irreversible losses of natural habitats and resources.
- Depending on how successful the world is at reducing emissions, global temperatures by 2100 are likely to rise by between 1.5°C and over 4°C above pre-industrial levels which [could lead to catastrophic impacts](#) including extreme weather events, further decline in biodiversity, migration and poverty for hundreds of millions of people.
- The latest set of [climate projections for Wales \(from the 2018 UK Climate Projections\)](#) are showing an increased chance of milder, wetter winters and hotter, drier summers, rising sea levels and an increase in the frequency and intensity of extreme weather events.

Adapting to climate impacts will need to be a priority including how we respond to the risks of increased flooding, severe weather events and increased temperatures on people, ecosystems and the built environment.



The Vision - A low carbon future

By 2050 businesses, public services, the voluntary sector and government will have worked together to achieve the target of reducing emissions to zero whilst contributing to all national well-being goals.

Our future generations will be living in a world where they don't have to fear their future; a low-carbon society that consumes within its means, has zero net emissions, and is not contributing to climate impacts globally. ([A Prosperous Wales](#) and [A Globally Responsible Wales](#))

People will be supported to develop skills and secure decent work ([Please see the section on Skills in Chapter 5 for more information](#)), procure goods and services in a fair and local way, with the foundational economy generating local wealth and employment. We will have quality, future-proofed jobs fit for the globalised low carbon economy and have the right growth and skills to lift people out of poverty whilst improving health and the environment. ([A Prosperous Wales](#), [A More Equal Wales](#), [A Globally Responsible Wales](#) and [A Healthier Wales](#))

Wales will have a well-being economy ([Please see the section on A Prosperous Wales in Chapter 3 for more information](#)) which serves people and the planet first and will be reoriented to what an economy should actually deliver: an equitable distribution of wealth, health and well-being, while protecting our natural resources for future generations and other species. ([A Prosperous Wales](#), [A More Equal Wales](#) and [A Resilient Wales](#))

[Costa Rica](#) offers us a viable climate future – an example of what is possible, it has implemented a refreshingly ambitious plan to completely decarbonise its economy by 2050. In the lead-up to this, last year with its economy still growing at 3%, Costa Rica was able to derive 98% of its electricity from renewable sources.

Our environment and communities will be more resilient to major environmental problems, such as flooding and declining biodiversity. Air, water and soil will be clean, we will be healthier, and a just transition will help us achieve our potential and make Wales a more equal society. ([A Healthier Wales](#), [A More Equal Wales](#) and [A Resilient Wales](#))

Fossil fuels will be firmly in the past and we will be investing in more sustainable solutions. We will be self-sufficient in renewable energy with a mixture of community-scale and larger scale wind, solar, hydro and renewable heat generation across Wales. ([A Prosperous Wales](#))



Source: [Selamat Made](#)



People will live in active homes and will work in active buildings that generate (and store) their own energy. ([A Prosperous Wales](#))

Our buildings will be resource efficient and designed for adaptability and deconstruction at the end of their lives. They will be cheaper to run, and their adaptability will enable people to can stay in their homes longer in life. Because we will be using clean energy, the cost will be minimised, and fuel poverty will be eliminated. ([Please see the section on Housing in Chapter 5 for more information](#)) ([A More Equal Wales](#) and [A Prosperous Wales](#))

Our planning system will be carbon neutral and will also act as a mechanism to reduce carbon emissions through tree planting. Placemaking will improve people's access to the natural environment, with high quality green infrastructure, which helps enhance biodiversity and improve resilience to floods and droughts. ([A Wales of Cohesive Communities](#))

People will reconnect with nature through cultural opportunities, derelict and abandoned places will be turned into parks that use culture to share knowledge and raise aspirations about biodiversity improvement ([A Wales of Vibrant Culture and Thriving Welsh Language](#))



Source: [Wikipedia](#)

[Denmark](#) is expected to generate 69% of its energy from renewable sources by 2022, [making it a world leader](#).

[China](#) surpassed its 2020 solar panel target by 2018 and is the global market leader for hydropower, bioenergy for electricity and heat, and electric vehicles. They are making use of technological innovations designed to clean the air, for example, [100-metre-tall smog-sucking tower in the city of Xian](#).

Homes as Power Stations - [Pobl Group](#) are working with Neath Port Talbot Council and Swansea University to integrate innovative technology developed by the University into homes, building beyond the concept of carbon neutral homes towards overproduction of energy.

[The Billion Tree Tsunami](#) project in [Pakistan](#) added 350,000 hectares of trees through planting and natural regeneration, in order to restore depleted forests and fight the effects of climate change.

[Ideas, People, Places](#) - Arts Council of Wales collaboration with communities looked to embed culture in a number of innovative regeneration projects.

Involving people in a people-centred creativity project reclaiming unused community spaces in Maindee, South Wales.



The smart design of cities, communities, and neighbourhoods will help us be more efficient and reduce our carbon footprint. Technology will enable remote working and reduce the need to travel. (Please see the section on Planning in Chapter 5 for more information.)

In cities and built up areas the places that people need to access daily - schools, workplaces, shops and health care services – will be more accessible by walking or cycling eliminating the need to drive. For long-distance trips, people will be travelling on a low carbon integrated, accessible public transport network or in a low carbon vehicle. Our towns and cities will be designed around people, not vehicles and people will no longer need to travel outside of their (often Welsh speaking) community to access goods, services and job opportunities. (Please see the section on Transport in Chapter 5 for more information.) (A Prosperous Wales, A Globally Responsible Wales, A Healthier Wales, A Wales of Cohesive Communities and A Wales of Vibrant Culture and Thriving Welsh Language)

Placemaking will also ensure that all communities (urban and rural) will have equal access to cultural facilities and events or can reach them easily at the right time through an integrated and green transport system. (A Wales of Vibrant Culture and Thriving Welsh Language and A Wales of Cohesive Communities)

Seoul, South Korea - the city's population has actually increased four times since the 1980s, but its geographic footprint has hardly changed. This is because people live more densely and over 90% of the population - close to 7 million people a day - take some form of public transportation - whether rail, road, water, or bike-paths - to work and play.

Shenzhen city in China became the world's first to make all buses electric – their fully electric transport system has led to gas consumption in public transport being reduced by a drastic 95%.

Gothenburg, Sweden has introduced a fleet of electric buses that use 80% less energy than standard diesel vehicles. The buses charge in just three to six minutes, and 100,000 people currently use them monthly.

Copenhagen, Denmark is aiming to be the world's first carbon-neutral capital by 2025. Their action plan has four pillars: energy consumption, energy production, mobility, and city administration initiatives. It is well on the way to reaching its goal: by 2017 Copenhagen had already cut its CO2 emissions by 38% from 2005 levels, and its neighbourhood heating system has cut carbon emissions by 20%. It is one of the most bike-friendly cities in the world with 375km of cycle tracks and several pedestrian/bike bridges over the harbour.



Source: [EDDIE](#)



Wales will be greener than ever – with forest cities instead of concrete monstrosities. Green infrastructure will be considered the norm and not an innovation. This will not only remove carbon emissions but also the feeling of living on a once-again green planet will transform society and improve people’s physical and mental health. (Please see the sections on Planning in Chapter 5 and A Healthier Wales in Chapter 3 for more information.) (A Resilient Wales and A Healthier Wales)

Food production and the management of land and natural resources will be more efficient and less wasteful. (A Resilient Wales)

The way we use our land, including agricultural practices, will promote sustainable management of our natural resources meaning that our land can act as a carbon sink and not pollute the air or waters. Natural ecosystems and biodiversity will be enhanced and protected. (Please see the section on Planning in Chapter 5 for more information.) (A Resilient Wales)

The Netherlands is a leader in sustainable agriculture. They use technology, for example geothermal energy to heat greenhouses and hydroponic systems to reduce the need for water. They also pipe waste CO2 from local shell refineries into the greenhouses to [reduce the amount going into the atmosphere](#).

A Canadian company called [Enerkem](#) has developed with a technology that extracts the carbon from rubbish that can’t be recycled and turns the carbon into a gas that can be used to make biofuels like methanol and ethanol, as well as chemicals which can be used in thousands of everyday products. The city of [Edmonton, Canada](#), for example, now reuses [90% of its waste, saving more than 100,000 metric tons of landfill every year](#).

[Singapore](#), one of the densest cities in the world is now a model of green planning. Over the past two decades, the city set aside hundreds of acres and planted 3 million trees for an urban garden that acts as the lungs of the city. It also created one of the largest fresh water nature reserves on the planet.

British start-up [Winnow](#) has developed smart meters that analyse rubbish in commercial kitchens to measure what food gets thrown away, and identify ways to reduce waste.

[Quebec](#) diverts supermarkets’ unsold produce to feed 400,000. They are fighting food insecurity by helping more than 600 supermarkets donate all unsold produce, meat and baked goods to local food banks. The program seeks to eliminate greenhouse gases equivalent to 1,500 cars.

Cultural and linguistic interventions will be valued as mechanisms for social change and will be seen as key tools for addressing climate change (A Wales of Vibrant culture and thriving Welsh language).

To support the achievement of the well-being goals in relation to decarbonisation, I have:

Advised and supported Welsh Government’s decarbonisation team to embed the Well-being of Future Generations Act into their decarbonisation programme

Highlighted how Welsh Government’s budget should have a greater focus on decarbonisation, through publishing a Ten Point plan to fund the Climate Emergency

Engaged a range of stakeholders, and in particular young people, to inform our work

See Chapter 6 ‘My Focus’ for more information.



People's perception of decarbonisation

Listening to what people think and believe is an important part of involvement. That is why, in this section, I want to give a flavour of what people have told me, since the beginning of my term and in relation to this report.

Concerns about climate change reached a record high in 2019 (85% in UK). Although people generally don't relate to decarbonisation as a specific topic, they do relate to issues such as active/public transport, green energy, housing, biodiversity and air quality and are clearly concerned about these issues as well as wider environmental issues such as plastic pollution.

People have emphasised:

- The importance of having a more proactive government with stronger targets and regulation.
- The importance of maintaining and restoring nature and natural environments in order to absorb carbon.
- A need for more sustainable and improved food growing and agriculture.
- The lack of a secure, fair and sustainable food system should be recognised as a key challenge
- Their desire for lower or no carbon industry in Wales and recognising the economic potential.
- A need and opportunity for education and awareness of 'carbon literacy'
- Their belief that "Biodiversity is the environmental heartbeat for Future Generations"



i would like to thank the following people and organisations for their contribution to my thinking and work in this area:

- Alex Chapman, New Economics Foundation;
- Paul Allen, Centre for Alternative Technology;
- Community Energy Wales;
- Institute of Welsh Affairs;
- Members of Wales Environmental Link and other environmental NGOs including WWF and Friends of the Earth.

In addition to this involvement, I also have carried out my statutory duty to monitor and assess progress by public bodies in meeting their well-being objectives and the requirements of the Act in general and conducted research. As a result of these activities, I have identified the following opportunities and challenges.



Your Voice

In engaging with over 5,000 people, the below views are representative of the key issues which have been shared with my office in forming this report

“Rapid electric car chargers every 30 miles along A roads in Wales. All houses retrofitted to be as energy efficient as possible, solar panels on every south facing roof. Better public transport - much more regular, cleaner.”

(The People's Platform)

“The climate and ecological emergency: we (western societies) are currently living in a way that is bound to leave our planet unable to sustain human life. Not only are we causing the extinction of a multitude of species, we are sacrificing our future human generations for the sake of luxuries that do not even enrich our lives in any meaningful way.”

(The People's Platform)

“Need to shift the mindset, change behaviour – simple steps – education through projects like Pembrokeshire Eco Champions – all public bodies should have one.”

(The People's Platform)

“A Wales that is at least carbon neutral, with a healthy and well trained and educated population including in citizenship, sustainable economy with jobs for all, good health and social care, strong welcoming communities that respect our heritage and language, and strong regulations to maintain our environment and ecology”

(The People's Platform)

“Food systems that act to grow healthy food accessible for all. [We need] policies that act on the urgency of climate emergency and link this to health and nature.”

(The People's Platform)

“2050 is way too late! And where is the money going to come from for a climate emergency?”

(Our Future Wales event)

Challenges and opportunities for change

- The climate is changing because of emissions of greenhouse gases (GHG) resulting from human activity; since the late 19th century, the global average temperature has risen by 1.1°C and the global sea level [has risen by about 20cm.](#)
- Rising temperature is leading to changes to our weather, causing sea level rise, oceans to become more acidic and loss of habitats.
- 2019 was the second hottest year on record after 2016, with eight of the ten hottest years on record [occurring in the last decade.](#)
- Children are among the worst affected by climate change including suffering undernutrition because of food security, disease transmission, air pollution and extreme weather events, whilst older populations are vulnerable to the health effects of climate change especially extremes of heat with [220 million heatwave exposures globally in 2018.](#)
- The main contributors to greenhouse gas emissions in Wales are the power and industry sectors
- Since 2010, renewable electricity generation in Wales has trebled. In 2018, renewable generators in Wales produced electricity equating to 50% of Wales' use.

The Paris Agreement

To limit the most damaging impacts of climate change, we need to reduce greenhouse gas emissions globally. The Paris Agreement requires the 197 countries that signed it in 2015 to address climate change. This landmark agreement aims to combat climate change and to accelerate and intensify the actions and investment needed for a sustainable low carbon future.

It charts a new course in the global climate effort by committing nations to take ambitious efforts to address climate change and adapt to its effects, with enhanced support to assist developing countries to do so.

The Paris Agreement's central aim is to strengthen the global response by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.



Source: [Wikipedia](#)



Understanding our emissions and where to prioritise action

What future generations need

We need to reduce our emissions in Wales by at least 95% by 2050, preferably sooner, to avoid catastrophic climate change. The progress to date has not been fast enough which means we need to reduce our emissions dramatically in the next decade to achieve the target of 45% reduction by 2030.

This means that in Wales we need:

- To make an urgent transition to a low carbon economy and society. (Please see the section on a Prosperous Wales in Chapter 3 for more information.)
- A greater focus on decarbonising transport, housing and land-use – as these are devolved to Wales. (Please see the section on Transport, Housing and Planning in Chapter 5 for more information.)

We need every organisation in Wales to understand the carbon footprint of their organisations, and also at project level, so that they are clearly able to identify the carbon impact of their decisions and where the biggest carbon savings could be.

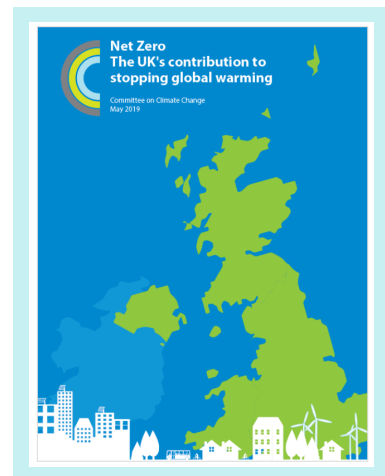
Delivering a net-zero future will require concerted policy action over the next three decades across every emitting sector of the economy, with stronger actions in the short term.

"In moments of crisis, only imagination is more important than knowledge."

Albert Einstein

The UK Committee on Climate Change (UK CCC) has provided very detailed advice to the UK, Welsh and Scottish Governments on what needs to be done; and in their Net Zero report, they have called for action to:

- Increase renewable energy
- Make buildings more energy efficient
- Reduce emissions from farming
- Ensure better planning, design and build of homes and
- Restore forests and peat lands to capture carbon.



Where are we now

There is good scientific evidence to show the climate is changing because of emissions of greenhouse gases (GHG) resulting from human activity. Most emissions derive from our demand for energy, with greenhouse gases being emitted when fossil fuels are burnt to meet those demands. There are also other emissions attached to industrial processes and our use of land e.g. agriculture.



Welsh Government monitors the level and sources of emissions in Wales at a national level, but there isn't sufficient focus on how all sectors, organisations and individuals across Wales can support our carbon reduction targets

Figure 2: Sectoral shares of emissions in Wales and the UK (2015)

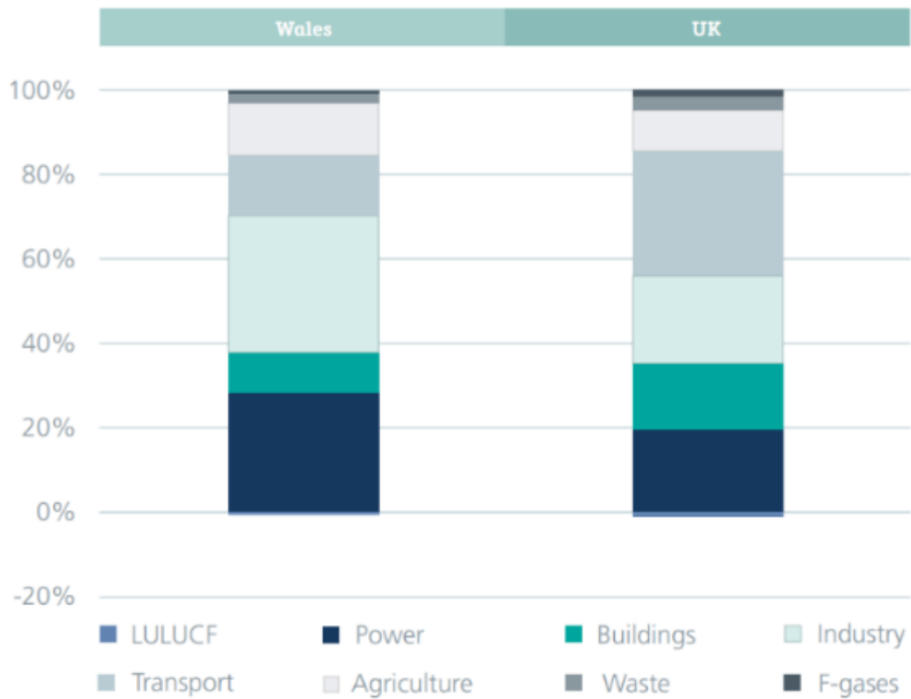
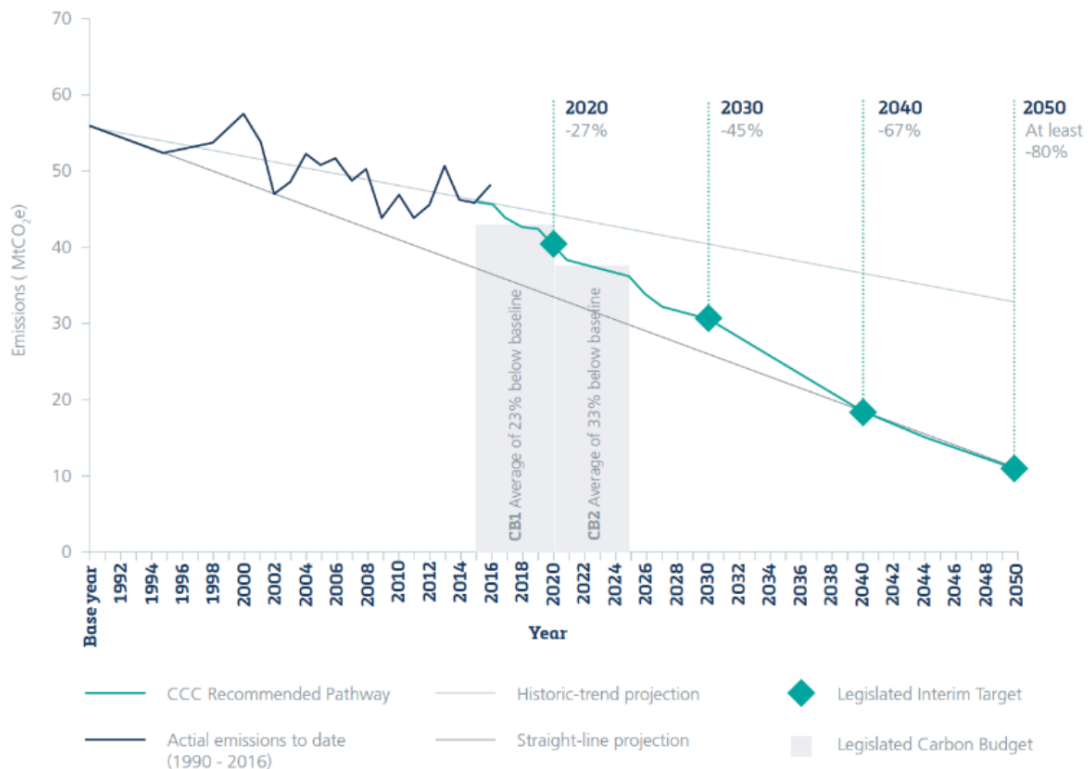


Figure 3: Total Welsh emissions – historic data and future projections incorporating UKCCC advice



Source - [Prosperity for All: A Low Carbon Wales](#)



The main contributors to greenhouse gas emissions in Wales are the power and industry sectors (see Fig 2 – the share of Wales’ emissions across sectors in comparison to UK emissions).

Wales has a higher share of industry, manufacturing and gas power generation capacity than the UK as a whole, meaning that a large proportion of emissions comes from a small number of sites. Other challenges are that we have more homes off-grid, a higher proportion with inefficient solid walls, and our agriculture sector consists of thousands of small farms.

Overall, greenhouse gas emissions in Wales have fallen by [25% in the 27 years since the 1990 base year](#) but they need to reduce dramatically in the next decade – 45% by 2030 (see Fig 3).

Emissions from transport sector aren’t reducing quickly enough so there needs to be more support and investment in active travel and public transport.

The transport sector accounts for 14% of Wales’ greenhouse gas emissions, reducing only by around 3% since 1990. The national transport strategy has not been updated since 2008, funding for public transport is inadequate, and although a pioneering Active Travel Act was introduced in 2013 levels of walking and cycling haven’t increased.

Greater leadership is needed to achieve decarbonisation of our transport sector and the challenging emission targets. Support is also needed for increased capacity at local level to support the changes needed to encourage modal shift ([Please see the section on Transport in Chapter 5 for more information.](#))

Many public bodies are mapping emissions in respect of energy consumption and many in respect of their estate and operations more generally, however this only accounts for a proportion of their emissions and these need to be expanded to cover transport, procurement and land use.

Public bodies should have a thorough understanding of their current emissions in order to plan how these can be reduced.

Understanding your carbon footprint

A good example of how this can be done is the [Carbon Positive Project](#), which evaluated [Natural Resources Wales’](#) net carbon status, accounting for both GHG emissions and carbon sequestration across the whole of Natural Resources Wales’ owned and managed estate. Natural Resources Wales calculated emissions across the full range of their activities and operations, including buildings, transport, land, assets and the procurement of goods and services. The findings of the project suggest that, whilst buildings are important, other areas are far more important. For example, Natural Resources Wales estimated that nearly 60% of their emissions were a result of the procurement of goods and services.

The [NHS Wales Shared Service Partnership](#) has also commissioned a carbon footprint assessment of NHS Wales, providing a comparison to a similar exercise undertaken in 2009-10. The exercise found that NHS carbon emissions were:

- Buildings Use - 30%
- Transport - 21%
- Procurement - 49%



There have been positive developments in the social housing sector with innovative approaches to building low carbon homes but we are still building homes in Wales which are not carbon neutral which means our ambition on decarbonising homes is not matched by actions

An independent report on decarbonising Wales' homes was published in 2019: [Better Homes, Better Wales, Better World - Decarbonising existing homes in Wales](#). Our 1.4 million homes are responsible for 27% of all energy consumed and 15% of all demand-side greenhouse gas emissions. The report calls for the entire housing stock to be retrofitted to be far more energy efficient (beyond Standard Assessment Procedure (SAP) 90 to achieve an EPC Band A rating) by 2050, prioritising homes in social ownership and homes in fuel poverty over the next decade. As well as contribution to emission targets, a national retrofit programme would lead to wider economic and health benefits (see [Housing chapter for further details and recommendations](#)).

The publication of Planning Policy Wales 10 is a significant step in the right direction, but the focus must now be on ensuring consistent implementation to ensure land use planning supports targets to reduce emissions.

Planning Policy Wales will play a significant role with regards to land use planning and development. A key feature of the new policy is the introduction of hierarchies for transport, energy and waste, which public bodies should follow in the making of their strategic and Local Development Plans, along with the management of developments.

I have expressed concerns about the draft National Development Framework, as it must not weaken the work set out in Planning Policy Wales. In particular, the proposed framework currently favours the expansion of airports and ports, which is not in line with the Welsh Government's decarbonisation targets or the goals of a prosperous and resilient Wales (Please see the section on Planning in Chapter 5 for more information.)

The impact of the COVID-19 crisis on emissions:

Streets are empty, cities are silent, factories are closed, and skies are quiet. Air pollution and greenhouse gas emissions have plummeted as countries try to contain the spread of coronavirus. As industries, transport networks and businesses have been forced to close, it has brought a sudden [drop in carbon emissions](#):

- In China, emissions fell by 25% at the start of the year as people were instructed to stay at home, factories closed, coal use fell by 40% at the six largest power plants, and the proportion of days with "good quality air" was up 11.4% compared with the same time last year in 337 cities
- In Europe, satellite images show nitrogen dioxide (NO₂) emissions fading away over northern Italy with a similar pattern being seen in in Spain and the UK
- Levels of pollution in New York have reduced by nearly 50% compared with this time last year.



The slowdown in China, the world's largest emitter, has avoided some 250 million metric tonnes of carbon emissions — more than half the annual carbon emissions of the United Kingdom. Whilst in the European Union, declining power demands and depressed manufacturing could cause emissions to fall by nearly 400 million metric tonnes this year, a figure that represents about 9 percent of the [EU's cumulative 2020 emissions target](#). Global carbon emissions from the fossil fuel industry could fall by a record 2.5bn tonnes in 2020, a reduction of 5%, as the pandemic triggers the [biggest drop in demand for fossil fuels on record](#). However reduced emissions of this scale within one particular year are very unlikely to have an impact on global levels of greenhouse gases in the atmosphere.

As well as the toll of early deaths, the pandemic has brought widespread job losses and threatened the livelihoods of millions as businesses struggle to cope with the restrictions that have been put in place. Economic activity has stalled and stock markets have tumbled, with thousands of people losing their livelihoods, alongside the falling emissions.

However, this is not happening as a result of the right government decisions in terms of climate policies, and isn't in line with the drive towards a decarbonised, sustainable economy that many have been advocating for decades.

Whether the changes we are seeing in the short-term will lead to longer-term impact will depend on a number of factors: how long the current measures last; the impact on consumer demand because of lost wages; and how the economy recovers. Times of change can lead to the introduction of lasting habits, so there are opportunities to continue the behaviour change we have seen around the world which are good for the climate – travelling less (especially air travel), cutting down on food waste and reducing consumption, and using technology to support remote working. If governments don't take the right measures to include support for clean energy and jobs in new economic stimulus packages, then this short-term decline could easily be wiped out in the rebound of the economy once COVID-19 is brought under control.

It has also had an impact on global climate negotiations as a key United Nations climate change conference – COP26 due to take place in Glasgow in November 2020 – has been postponed.

The crisis has also shown the difference that communities can make when they look out for each other – there are hundreds of examples of where communities have taken big steps to support each other and that's one lesson that could be invaluable in dealing with climate change. The speed and extent of the response has given some hope that rapid action could also be taken on climate change if the threat it poses was treated as urgently.



[Analysis by Carbon Brief](#) suggests the pandemic could cause global emissions cuts this year in the region of 1,600m tonnes of CO₂ (MtCO₂), equivalent to more than 4% of the global total in 2019, the largest ever annual fall in emissions, more than during any previous economic crisis or period of war. Efforts to stimulate the economy must focus towards sectors such as clean energy and supporting the transition to a low carbon economy that is required by the Well-being of Future Generations Act.

Even this would not come close to bringing the 1.5°C global temperature limit within reach. Global emissions would need to fall by more than 6% every year this decade – more than 2,200 MtCO₂ annually – in order to limit warming to less than 1.5°C above pre-industrial temperatures in line with the Paris Agreement.



Tackle the climate and nature crises through a holistic approach, capitalising on the role of young people

What future generations need

Public bodies need to embrace the Well-being of Future Generations Act to tackle climate change both to reduce emissions and prepare for climate impacts in a more holistic manner. This includes through finding more innovative and creative solutions, involving people, raising awareness and prompting action through wider cultural and behavioural change.

We need to tackle the nature crisis and climate emergency simultaneously by seeking nature-based solutions such as tree planting, protecting key habitats and restoring peatlands. Implementation of solutions needs to be accelerated significantly to address these crises at a greater pace and scale; involving people in these decisions and enabling them and others to take positive action to safeguard their future will be critical in the next decade. We need to tackle the climate and nature crises together because of their interdependencies and potential multiple benefits ([Please see the section on a Resilient Wales in Chapter 3 for more information](#)).

Although awareness and concern is at an all-time high the UK Committee on Climate Change have said that “delivery must progress with far greater urgency”. Many of the UK’s current plans are insufficiently ambitious; others are proceeding too slowly, even for the current 80% target. For instance:



- 2040 is too late for the phase-out of petrol and diesel cars and vans, and current plans for delivering this are too vague
- Over ten years after the Climate Change Act was passed, there is still no serious plan for decarbonising UK heating systems and no large-scale trials have begun for either heat pumps or hydrogen
- New technology such as carbon capture (usage) and storage, which is crucial to the delivery of net-zero GHG emissions is yet to get started
- Afforestation targets for 20,000 hectares/year across the UK nations (due to increase to 27,000 by 2025), are not being delivered, with less than 10,000 hectares planted on average over the last five years. The voluntary approach that has been pursued so far for agriculture is not delivering reductions in emissions.

Where are we now

The UK has led the world on climate legislation – the Climate Change Act (2008) made the UK the first country in the world to establish a long-term legally binding framework to cut carbon emissions. The Environment (Wales) Act 2016 has introduced a similar obligation for Wales – a duty to develop carbon budgets and a long-term target to reduce emissions by 95% by 2050 with the UK as a whole aiming for net zero by 2050.

In March 2019 Welsh Government published their first plan – [Prosperity for all: A Low Carbon Wales](#) - which contains 100 policies and proposals to support their statutory targets, as well as highlighting how these link to the national well-being goals. In April 2019 they were the first Government to declare a Climate Emergency and in October 2019 they published an update on the top things they were doing in response to the emergency such as investing £30 million on improving active travel, allocating more than £500,000 for electric vehicle charging infrastructure, securing nearly £20 million in EU investment to establish a world leading marine energy sector in Wales, and investing in the circular economy and banning some single use plastics.

However, progress to decarbonise homes, buildings and transport remains slow despite publication of reports and commitments to update regulations or develop new strategies. The allocation of an additional £140 million capital funding to address the climate and nature emergencies (in the 2020-21 budget) is welcome but much more will be needed to support our emission reduction targets. A range of actions being taken by other public bodies is discussed elsewhere in the chapter.

A UK Climate Assembly has recently been established bringing together over 100 people from all walks of life to discuss how the UK should meet the net zero target and I would urge the Welsh Government to establish a similar mechanism to engage citizens in Wales.



Young people have made a significant impact on securing action on climate change in Wales

Public awareness, especially amongst the younger generation, has increased considerably in the last 12 months - 2019 was the year when children and young people showed politicians and decision makers across Wales and the world that they must do more to act on climate change.



The Welsh Fridays for Future movement alongside work of the Youth Parliament and the many other children and young people campaigning and lobbying politicians, has been one of the most significant areas where future generations themselves are holding politicians to account and forcing action. The Welsh Government are showing that they are listening – engaging young people in dialogue. Two conferences specifically for young people have recently been held in North and South Wales and the Minister for Environment, Energy and Rural Affairs has met with myself, the Children’s Commissioner and young climate activists to discuss progress.

Young people are now demanding greater action and climate justice, calling on global leaders to take urgent action

Children and young people are demanding action at a national level but also taking action locally through eco councils and local campaign groups. They are questioning the use of single use plastics for their milk, lobbying to secure FairTrade cotton in their school uniforms and leading the way on walking and cycling to school.





Tuesday 22nd October 2019

Dear Sir/Madam

My name is Ethan peir I am 11 years old and I go to Gwaunmeisgyn primary school and I am writing to you today because I'm scared about what's happening to the world slowly. In school we have been learning about global warming.

Firstly I would like to start with plastic in the ocean. I think to stop this we should stop making plastic bottles like Coke, Fanta, Pepsi and many other bottles. And we should stop putting meat into black plastic because you cannot recycle it.

At the moment I think schools should look at number 13 on the global goals list. My concerns are the rising sea levels because I don't want to end up in the ocean swimming with all of the sea creatures.

I was inspired by Greta Thunberg as soon as she started talking my mind changed and I wanted to try to change the world just like her. So I go litter picking in my local woods. Thank you for reading this letter yours faithfully Ethan peir

Tuesday 22nd October 2019

Dear Sir/Madam,

My name is Cerys Hayes, I am Ten years old and I go to Gwaunmeisgyn primary school. I am writing to you to express my concern about climate change.

Many people throw their litter in the sea, because of that 100,000 sea life die a year. It would be a dream come true for me and the pupils in my school to find out that other pupils in our world are trying to make a difference.

To conclude I want you to know that my school is trying their hardest to stop climate change because the younger generation (us) do not want the wildlife to live without a home. Please help make a difference.

Yours Faithfully Cerys Hayes



“The youth have inherited this broken planet. We did not ask for this and we do not want it, but we are left with little choice. If we don’t act now our children will be born into a world of diminished resources, diminished wildlife and diminished hope. This is not fair.

Mother nature has no voice, but she is giving us signs of her suffering. She gasps for air as we cut down her lungs, she lets out screams of greenhouse gases as we burn her blood, she looks pale and ill as we bleach her corrals and tears run down her ice cap cheeks and fall into a forever deepening pool of saline sadness.

Let Wales be a shining beacon in this time of darkness. It is amazing that Wales is committing to a low carbon future today. The strategies set out today are huge steps in the right direction and they fill me with genuine hope”.

Excerpts from speech given by Sion Sleep, graduate from Uprising’s Environmental Leadership programme at launch of Prosperity for all: A Low Carbon Wales (21 March 2019)

"Our education system is not addressing climate change as a crisis, it brushes over some details and tells you 'this is happening by the way', but doesn't go into the severity. I appreciate education is important, but one day of my education - if this has the impact we want it to have - will be so much more powerful."

Beth Irving, Atlantic college, organiser of Youth strike for Climate

“This [EU] target [to cut greenhouse gas emissions by at least 40% by 2030] is not sufficient to protect the future for children growing up today. If the EU is to make its fair contribution to stay within the carbon budget for the 2C limit then it needs a minimum of 80 percent reduction by 2030, and that includes aviation and shipping... There is simply not enough time to wait for us to grow up and become the ones in charge."

Greta Thunberg

Young people are on the march!

In 2019, public awareness of climate change rose sharply, driven by the schools strikes, Extinction Rebellion, high impact IPCC reports, improved media coverage, a BBC One climate change documentary and the UK and other governments declaring a climate emergency.

Empowerment of the first truly globalised generation has catalysed this new urgency. Young people can access knowledge at the click of a button. They know climate change science is real and see through the deniers’ lies because this generation does not access traditional media – in fact, they bypass it, and awareness and concern will continue to grow.



[WWF's Earth Hour](#) is a global campaign during which millions of people turn off their lights to raise awareness of climate change. Iconic cultural landmarks, along with millions of homes, businesses and political leaders across the world switch off their lights for one hour at the end of March each year to celebrate our natural world and as a rallying call to protect it.

In 2019 [Head4Arts](#), a community arts organisation which operates in the South East Wales Valleys, organised four creative and community events across the Valleys to support Earth hour using arts and creative activities including making cranes, papers lanterns and storytelling to engage people within the community and encouraging them to take positive action on climate change



Welsh Government is beginning to take action to address the climate and nature crisis together

Examples of this include their recent commitment to develop a National Forest for Wales to create areas of new woodland and help to restore and maintain some of Wales' unique and irreplaceable ancient woodlands. [The Plant! scheme](#) is an excellent initiative that was set up in 2008 which plants a tree for every child born or adopted in Wales, with an additional tree being planted in Uganda since 2014. Over 300,000 trees have been planted in Welsh woodlands whilst 1,600 families being supported in Uganda.

In 2019, the Intergovernmental Panel for Biodiversity and Ecosystem Services report highlighted that nature is in crisis. WWF claim that global warming is likely to be the greatest cause of species extinctions and the IPCC says a warming of 2°C or more will mean that most ecosystems will struggle to survive. Nature is declining globally at unprecedented rates, the rate of species extinction is accelerating with a million species under threat, with grave impacts on people around the world. Many of the world's threatened species live in areas that will be severely affected by climate change, and [climate change is happening too quickly for many species to adapt](#).

Welsh Government and public bodies need to use the Act as a framework for tackling these crises, using opportunities to involve and engage with a wide range of stakeholders and communities, and considering how to encourage wider cultural and behavioural change to support the societal transformation that is needed.



Well-being objectives and steps set by public bodies and Public Services Boards must match the public's increasing awareness and expectation around the nature and climate crises

There are 68 well-being objectives or steps (out of a total of 295), set by 33 public bodies, that broadly relate to the natural environment, with some examples referencing biodiversity and nature. However, these objectives do not always translate into action in other policy areas such as decarbonisation. This leads to missed opportunities to deal with these two crises and maximise the benefits of nature-based solutions to both human and planetary health (Please see sections on a Prosperous Wales and a Resilient Wales in Chapter 3 for more information.)

Realising the Natural Capital of Welsh Peatlands

The collaborative project - [Realising the Natural Capital of Welsh Peatlands](#) - funded by Welsh Government's Sustainable Management Scheme has National Park Authorities, landowners, non-government organisations, farmers and community organisations working together to bring Wales' peatlands into sustainable management. Through coordinated action and collaboration, they are delivering multiple environmental benefits through peatland restoration. The aim is longer term sustainable management supported through Payments for Ecosystem Service including the adoption of the Peatland Code. Other critical activities will lead to more coordinated and coherent approaches covering external funding, training, education, Payment for Ecosystem Service procurement, monitoring and research activities relevant to Welsh peatlands and the high carbon storage potential they hold.

Deliver a just transition

What future generations need

Decarbonisation will require a [fundamental reshaping of our economic system](#). To increase our economic prosperity, in line with becoming a more Prosperous Wales (Please see section on a Prosperous Wales Chapter 3 for more information), we need to create an environment where all of the Welsh economy can contribute to clean growth without leaving any communities behind.

We need to reshape industry and realise the potential for job creation from clean industries and sectors such as renewable energy to offset job losses elsewhere (fossil fuel power stations) which means a [just transition](#) for people and places is essential. This is also a central demand of trade unions and a core commitment under the Paris Agreement on climate change.

We need to address climate change because it is an [equality and social justice](#) issue and it will disproportionately affect the most vulnerable communities in Wales and across the world. We need a just transition because in many cases the most vulnerable communities have historically contributed the least to the problem but will suffer the greatest impact. Vulnerable communities are more likely to be exposed to the risks, and impacts of climate change, without the ability to cope with or recover from those impacts.

Future generations need governments and public bodies to consider decarbonisation in its widest sense, and see it as an opportunity to address social and economic inequalities in Wales including poverty and access to economic opportunities, whilst taking account of its [effect on places and people](#).



Where we are now

Over half of Wales' emissions are currently derived from the power and industry sectors so decarbonising these sectors will have significant impacts on people and communities

Wales' low carbon economy is currently estimated to consist of 9,000 businesses, employing 13,000 people and generating [£2.4 billion turnover in 2016](#). Whilst there are opportunities - it is worth remembering the outcomes of previous 'unjust transitions', where shifts in the economic base of an area were not accompanied by protections for affected workers. The closure of the South Wales coalfields in the 1980s offers a stark example of the social costs that have followed for decades.

The concept of a just transition is fairly new but has gained a lot of traction; the UK Committee on Climate Change have called for a just transition to be part of the process of achieving net zero in the UK, while the Scottish Government has put in place a Just Transition Commission to help it deliver decarbonisation. The principles agreed by the Scottish Commission can be summarised as:

- Plan, invest and implement a transition to environmentally and socially sustainable jobs, sectors and economies, building on Scotland's economic and workforce strengths and potential
- Create opportunities to develop resource efficient and sustainable economic approaches, which help address inequality and poverty
- Design and deliver low carbon investment and infrastructure, and make all possible efforts to create decent, fair and high value work, in a way which does not negatively affect the current workforce and overall economy.

The Welsh Government has made an important commitment to establish a Climate Justice Advisory Group but this needs to be done as a matter of urgency

We need to ensure the transition in Wales is equitable and avoids unintended consequences.

Welsh Government's aspirations around clean growth, low carbon jobs and global market advantages, which deliver wider benefits such as better places to live and work, clean air and water, and better health, will only be realised if they take a whole government approach and work collectively with public services, business, and the voluntary sector.



I am seeing some positive progress that this is happening, for example Welsh Government collaborated with a range of stakeholders when developing its low carbon plan. But efforts need to be scaled up and given a greater priority so that public bodies and Public Service Boards across Wales understand the role they can play to support a just transition in their local areas.

[The Act provides the framework](#) for promoting a just transition approach, supporting a more integrated approach to decarbonising the economy through a place-based model that is in line with the definition of a Prosperous Wales. It will help people see decarbonisation as an opportunity for a more balanced locally-based economy, rather than a threat to existing workforces, whilst also supporting other well-being goals. Wales is on the start of this journey, encouraging integration and collaboration between sectors but there is more that needs to be done.

[Cross-government policies](#) that enable a just transition are important because research (in England) has identified that Black, Asian and minority ethnic communities are most likely to live in poorer quality homes with poorer environmental or energy ratings; are more likely to suffer from health problems related to air pollution; and are less likely to have the time, money, or resources, to engage in climate-friendly initiatives. Wales' approach to the decarbonisation agenda should protect the rights and opportunities of those who may become vulnerable as part of the transition. Welsh Government has developed a matrix to help them consider all aspects of well-being when developing low carbon policies and proposals and I would welcome this being adopted across all of Government.

The links between climate change and public health are becoming increasingly clear and are being recognised by some health bodies

A [key Lancet report](#), published in 2019, considered the impacts of climate change on human health and also the impact of the health sector on climate change (the sector is currently responsible for around 5% of global emissions). A child born today will experience a world that is more than four degrees warmer, and across the world children are among the worst affected by climate change including undernutrition because of food security, disease transmission, air pollution, extreme weather events.

Older populations are vulnerable to the health effects of climate change especially extremes of heat with 220 million heatwave exposures globally in 2018. Downstream risks such as migration, poverty, conflict and mental illness will affect people of all ages and nationalities. They conclude that without accelerated intervention this new era will come to define the health of people at every stage of their lives.

Public Health Wales and Welsh Government have started to consider this particularly in terms of the impact of climate change on health. Very few health boards have clear well-being objectives or steps relating to decarbonisation, so further work is needed to ensure that climate mitigation and adaptation are considered across all activities.

Public Health Wales has a step that includes [“support wider stakeholders to prepare for the impacts of climate change”](#) to support their work on adaptation and preparing for the effect of climate change.



Aneurin Bevan University Health Board has a step relating to the need for the health sector to decarbonise: 'Reduce our negative environmental impact through a responsible capital building programme and a sustainable approach to the provision of building services including: carbon and waste management, undertaking procurement on a whole life cycle cost basis and support local sourcing, promoting sustainable and active travel and, advocating improvements in environmental health'.

Other health boards are taking steps but are not always joining the dots in a coherent way. Swansea Bay University Health Board for example has reduced gas and electricity consumption and has used the 'ReFIT - Green Growth' loans via Welsh Government which enables the organisation to borrow money to fund carbon-reducing schemes. But this does not appear to be linked to their well-being objectives and therefore opportunities to consider the wider opportunities that decarbonisation could deliver to their core duties of improving the of health of their population are being missed.

All public bodies should recognise and act on the health impacts of climate change and in particular consider the disproportionate impact on the most vulnerable.

There needs to be a collaborative approach to planning and preparing for flooding and coastal erosion. Wales will also need to adapt to the impacts of climate change as severe weather events increase in frequency and severity. Two severe storms earlier this year caused major flooding to many communities in Wales as defences were overwhelmed leaving thousands of homes and businesses underwater.

I welcome the publication of [“Prosperity for All: A Climate Conscious Wales” – a climate change adaptation plan for Wales](#). The plan responds to the risks which require most urgent action, identified in the Climate Change Risk Assessment for Wales and details tangible actions to reduce the risks of climate change to Wales over the next five years. It highlights key risk areas, where more action is needed, and will require collaboration by public bodies and others:

- Risks to infrastructure (from all sources of flooding)
- Risks to public water supplies from drought and low flows
- Some land management practices exacerbating flood risk
- Risks to ecosystems and agriculture businesses from changes in climatic conditions



However, whilst actions to prevent flooding are important Wales, like many other countries, will need to be prepared for the wider impacts on housing, health and the economy. Whilst it is too early to assess the full costs of the recent flooding which affected significant parts of Wales the First Minister has estimated that the costs could amount to £180 million for flood damage repairs in Rhondda Cynon Taf alone. [Current estimates show over 245,000 properties in Wales are at risk of flooding from rivers](#), the sea and surface water. The Welsh Government already invests an average of over £54 million per annum in flood and coastal risk management until 2020, but a [longer-term settlement would help with strategic planning and adaptation](#).

Similarly whilst the level of immediacy is different, we are likely to face increasing problems with coastal erosion in parts of Wales, especially in some of the worst affected areas such as Fairbourne in Gwynedd; here plans are being prepared to relocate 850 residents and dismantle the entire village as flooding and storm surges are predicted to make Fairbourne uninhabitable, making them Wales' first climate refugees. The UK Committee on Climate Change has estimated that around 370,000 homes are at risk along the English coastline and almost 9,000 properties could be lost to coastal erosion. This places an impossible pressure on the local authority to rehouse people as well as deal with the associated detriments to health infrastructure and services.

The Government therefore must plan now in terms of how Wales will deal with all of these issues, enquiring that the appropriate legislation, policy and funding is in place.

Implement solutions at scale to achieve multiple benefits

What future generations need

Future generations need to see rapid decarbonisation across Wales' economy and society. Many organisations and research institutes, including the Centre for Alternative Technology through their [Zero Carbon Britain](#) project, have demonstrated that we already have many of the solutions - from renewable energy and energy efficiency to food, diets and land-use. We need public bodies and Public Services Boards to take every opportunity to implement these solutions locally, as well as implementing solutions at scale to help us build a zero-carbon world. We also need far greater political will and wider cultural change to support the transition.

“The science says we must, the technology says we can, time to say we will!”

Paul Allen, Centre for Alternative Technology

The report '[Zero Carbon Britain: Rising to the Climate Emergency](#)' models the changes to energy, buildings, transport, industry, diets and land use that could reduce energy demand by 60%, provide 100% renewable energy, and cut emissions from agriculture and industry whilst creating natural carbon capture through reforestation and peatland restoration.



We need to adopt a similar combination of ‘powering down’ energy use through increased efficiency and behaviour change; ‘powering up’ clean renewable energy supplies; and transforming land use to allow the UK to reach net zero greenhouse gas emissions without having to rely on as yet unproven technologies, such as carbon capture and storage or direct air capture.

We need to maximise the multiple additional benefits that these solutions could deliver for example improvements to health and well-being via better diets, more exercise, improved air quality and a reduction in fuel poverty. Other benefits include the creation of green jobs and an increase in biodiversity both through tackling climate change and through freeing up land to allow nature to thrive.

The low carbon transition will require a similar social transformation and it will be important for Government to understand the role people can play in relation to adopting ‘climate friendly’ behaviours and actions. Current and future generations will need new, compelling narratives to inspire and mobilise mainstream participation in solutions, adoption of technologies and change in behaviours. Government should nurture public engagement with action on climate change and also enable consumers to take specific concrete actions that deliver large emissions reductions.

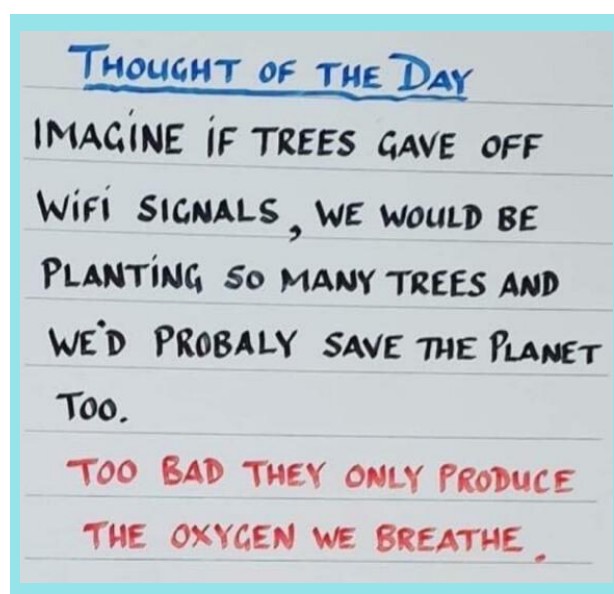
We need all public bodies to have clear objectives and steps on decarbonisation, to support the transition to a low carbon economy and society in their areas, and to enable Wales to meet its statutory targets. In addition, as well as having specific objectives on decarbonisation.

Public Bodies need to ensure that all well-being objectives, including those relating to jobs, skills and health, seek opportunities to contribute to reducing emissions and considering the impacts of climate change as this isn’t currently the case.

Where we are now

There are promising signs of progress on the shift to clean energy, but all opportunities should be embraced in Wales is to meet its targets

Much of our economy has historically been driven by fossil fuels; last century Wales was at the forefront of the industrial revolution leading to fossil fuels powering our homes and businesses, heating our buildings and transporting goods. With technological advances, low carbon solutions and increased leadership we can transition to an energy system based on renewables, providing economic, social and environmental benefits to Wales. However, despite the science and technology, progress to implement practical low-carbon solutions at the scale and pace that is needed has been too slow.



I am seeing some encouraging progress in that the:

- UK's emissions have declined by around 38% since 1990, faster than any other [major developed country](#) because of its shift to cleaner electricity, reduced fuel consumption by business and industry and reduced electricity use.
- UK emissions from electricity generation, waste and buildings have also fallen by 64%, 69% and 20% since 1990, whilst this is positive emissions from transport have [increased by 4% since 1990](#).
- A transformation in the UK's electricity system has resulted in the UK's windfarms, solar panels, biomass and hydro plants generating more electricity than the combined output from power stations fired by coal, oil and gas, in the third quarter of 2019.

Since 2010, renewable electricity generation in Wales has trebled so by 2018 renewable generators produced electricity equating to 50% of Wales' use with a target to generate the equivalent of 70% of Wales' electricity consumption from renewable sources by 2030. [The Institute for Welsh Affairs' 'Re-energising Wales: A plan for Wales 100% renewable energy future'](#) shows how Wales can move to 100% renewables by 2035. The ten areas highlighted include funding, a long-term greener homes programme, retaining the benefits of renewable energy in local communities, using planning as a lever, future proofing the grid and improving capacity and expertise.



Source: [Wikimedia](#)

2019 broke virtually every clean energy record in the world -

The most investment in clean energy; the most new renewable capacity (a third more than in 2014); the cheapest ever solar power (in [Chile](#), where it's half the cost of coal); the longest a country has been run entirely on renewable electricity – 113 days over this summer in [Costa Rica](#).

There are promising signs of change but scale and pace of progress by Welsh Government and Public Bodies will need to be increased significantly during the next decade if we are to achieve progress towards our more ambitious targets, including achieving a carbon neutral public sector by 2030.

In 2019 the UK became the first major economy to set a net-zero climate goal, following advice from the UK Committee on Climate Change, and Welsh Ministers have also accepted the challenging target for Wales to achieve net [zero emissions no later than 2050](#). A high proportion of Wales' emission come from a small number of industrial sources so phasing out coal-fired plants such as Aberthaw will support this, as well as reducing emissions from our industrial sector which is being led by [RICE \(Reducing Industrial Carbon Emissions\)](#), an industry-led decarbonisation group.

Innovation and Industry

Innovation in the industrial sector will be crucial to meet our emission reduction targets and budgets in a way that will secure the most industrial and economic advantage for Wales from the global transition to a low carbon economy. Whilst the global shift to decarbonisation offers Wales opportunities to grow our economy it also highlights the challenges faced by industry and business.



The Reducing Industrial Carbon Emission project is an example of innovation meeting this challenge. Driven by a consortium of researchers and industrial partners in [South and West Wales](#), funded by the European Regional Development Fund, it focuses on delivering transformational change through the adoption of innovative processes to reduce Wales' CO2 emissions and decrease Welsh Heavy Industry's energy & raw material consumption. The Reducing Industrial Carbon Emission project will work with local supply chain companies to test how carbon dioxide produced from heavy industrial processes can be innovatively used to make high value products and industrially important chemicals.

Another positive example is the focus on low carbon heat in [Bridgend](#): Bridgend County Borough Council was selected to be part of the UK Smart Systems and Heat Programme in October 2014, alongside Greater Manchester and Newcastle. They are developing two demonstration heat projects in the county:

1. A pioneering geothermal scheme in Caerau, utilising groundwater in former mine shafts in the Llynfi Valley along with heat pump technology, providing low carbon heat to the Caerau Community (supported by Welsh Government's Smart Living programme) and
2. Bridgend town centre district heating scheme involving public and civic buildings, leisure centre and some residential properties (supported by the Welsh Government Energy Service).

While developing these demonstrator projects, Bridgend County Borough Council is hosting trials of smart initiatives developed by the Energy Systems Catapult, including 'EnergyPath' - a suite of software tools to assist Local Authorities to create designs for future-proofed and economic local heating solutions, specific to the Authority.

Bridgend are also part of the FREEDOM Project – this stands for Flexible Residential Energy Efficiency Demand Optimisation and Management, and is a joint Wales & West Utilities and WPD £5m innovation project in the Bridgend 'living heat laboratory'. Using an air-source heat pump and high-efficiency gas boiler hybrid system in 75 residential properties, the project clearly demonstrates the value that an integrated approach to deploying low-carbon smart technologies can deliver. Project estimates suggest that a hybrid approach to decarbonising our heating that is combined with green gas growth could lead to as much as an 80% reduction in carbon emissions from domestic heat.



Source: [Piqsels](#)



I welcome the establishment of a new centre in Cardiff focusing on behaviour change. The new [Centre for Climate Change and Social Transformations](#) based at Cardiff University is working with partners across the UK to achieve a fundamental change in our understanding of how to transform lifestyles and systems of governance for a sustainable, low-carbon future.

"We want to work closely with people and organisations to achieve positive low-carbon futures - transforming the way we live our lives, and reconfiguring organisations and cities."

Prof. Lorraine Whitmarsh, Director

The Centre is a global hub for understanding the transformations that are required to address climate change. They will research and develop the social transformations needed to produce a low-carbon and sustainable society, developing solutions to enable us, as a society to live differently – and better – in ways that meet the urgent need for rapid and far-reaching emission reductions.

Despite the commitment to a carbon neutral public sector by 2030, less than half of public bodies have a specific well-being objective or step on decarbonisation or reducing their emissions. In contrast, the vast majority of Public Services Boards do.

Decarbonisation is reflected across 34 well-being objectives/steps of 20 of the 44 public bodies and 13 of the 19 Public Service Boards.

As part of my monitoring and assessing work, I have provided specific advice to the 44 public bodies on reducing their emissions and tackling climate change particularly in areas where they have control such as procurement, transport and buildings. Our advice was that we would like to see public bodies:

- Accelerating action to reduce emissions, whilst bringing wider well-being benefits.
- Map the areas over which they have control and which have the biggest emissions, and to have a plan in place to reduce them.
- Focus on carbon reduction through procurement, ultra-low emissions vehicles (fleet), buildings, fossil fuel divestment, decarbonising heat, transport and tourism.

I am also encouraging them to consider links with planning and placemaking, nature and green infrastructure.

Natural Resources Wales should be commended on their efforts to be a carbon positive organisation. This is an area where they've led the way through their Carbon Positive project which is being rolled out to other public sector organisations, as I've noted above.

Over the last decade good progress has been made by many public bodies on energy management and carbon reduction, however these efforts need to shift towards other areas such as transport, planning, procurement and land use. Support is being provided by Welsh Government on the target for the public sector to carbon neutral by 2030.



Progress to celebrate:

- South Wales and Mid and West Wales Fire and Rescue Service, [Caerphilly](#), [Conwy](#) and many other councils have rolled out solar panelling on their own buildings and community buildings like schools.
- [Transport for Wales](#) has committed to 100% renewable electricity for all stations with half of this energy being produced in Wales
- [Monmouthshire County Council](#) have developed a solar farm on council-owned land in Crick that has the capacity to generate enough electricity to power around 1,400 homes.
- [Cardiff Council](#) is moving forward with plans to develop a £15m solar farm on a former landfill site. It is estimated that the solar farm could generate £21m of green energy over a 35-year period.

As highlighted in the [section on A Prosperous Wales in Chapter 3](#), the focus in relation to low-carbon has traditionally been on buildings, energy and estates, and not about the wider economy. The definition of A Prosperous Wales requires public bodies to maximise their contribution to “an innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change” which should include their approach to supporting a low carbon economy and society.

However, as well as having objectives focussed on decarbonisation, public bodies will need to ensure that all well-being objectives, including those relating to jobs, skills and health, are reducing emissions and considering the impacts of climate change. They should also ensure that their well-being objectives are not contradictory in relation to decarbonisation: for example, one local authority has an objective to 'Create a better, enhanced environment and infrastructure that will benefit our communities, businesses and volunteers' and the steps include: 'Develop a Highways Management Plan in line with Welsh Government guidelines'.

The declaration of a climate emergency by a number of local authorities is focusing action on reducing emissions.

It is encouraging to see a considerable shift in awareness and commitment, particularly over the last 12 months as more and more councils and public bodies are declaring a climate emergency due to growing public awareness and pressure, and are increasingly recognising the urgency of climate and environmental issues.



Around 230 councils across the UK, 11 in Wales, declared a climate emergency in 2019.

Local authorities across the world are declaring a ‘climate emergency’

More than 1,200 local authorities around the world declared a “climate emergency” in 2019. These civic declarations have also kicked off a wave of civic activism. In Wales, [Carmarthenshire County Council](#) has become the first local authority to publish a climate change action plan detailing how it will work towards becoming net zero carbon in the next 10 years. Last year the authority became one of the first councils in the UK to declare a climate emergency, pledging to becoming net carbon zero by 2030, and actions include developing new carbon reductions from council’s buildings, purchasing more energy efficient fleet, collaboration with other public bodies to deliver wider change, exploring opportunities for tree planting and renewable energy generation on council-owned land.

[A further ten councils](#) have now declared a climate emergency and are coming forward with ambitious plans:

Since declaring a climate emergency in June 2019, [Swansea Council](#) have been working towards the development of a charter which will see them meet the Welsh Government commitment to a carbon neutral public sector by 2030. The authority has replaced around 45 of its vans with electric versions; installed solar panels on school and community buildings; planted trees, shrubs and grassed areas on The Kingsway and Orchard Street; and developed a new strategy in partnership with Natural Resources Wales requiring more city centre green infrastructure. Working with the city region they are also developing the Swansea Bay Tidal Lagoon proposition which, if taken forward, would significantly increase renewable energy electricity production in the area, especially with a floating solar farm incorporated in the design.

Alongside this the region proposes to build 3,300 houses in [Swansea](#), [Neath Port Talbot](#), [Carmarthenshire](#) and [Pembrokeshire](#) which generate their own power, and to retrofit another 7,000.

Notably [Swansea Council](#) has also followed my advice and moved just under a quarter of its total investments (£500 million) in its pension fund from fossil fuel companies to a low-carbon fund.



In response to their declaration Cardiff Council [have committed to](#):

- Transform Cardiff's sustainable transport infrastructure and public transport services, through a multi-billion pounds investment programme into rail, bus, cycling and walking
- Manage the city's rapid population growth in a sustainable way through taking forward the review of Cardiff's Local Development Plan, underpinned by sustainable development and well-being principles
- Build on Cardiff's status as the UK's leading recycling city by driving up city recycling rates and promote a circular economy for recycled materials.
- Lead a low-carbon transition in the city's transport system, converting ninety Council vehicles to electric power by 2021, working with the city's bus companies to replace older buses with new electric and low carbon buses, and putting in place EV infrastructure across the city.
- Remove single-use plastics from Council venues and work with partners to develop a city-wide response to single-use plastics in all public services.
- Deliver a programme of energy projects, including a new Sustainable Heat Network in the city centre in partnership with the Welsh Government.

[Gwynedd Council](#) declared a climate emergency in July 2019, and recently passed an amendment to the Council's (corporate) plan to include reducing its carbon footprint as a major objective giving it the same priority as improving housing and the economy. The council's carbon emissions have been cut by almost 40% over the past ten years by investing nearly £8 million in more energy efficient boilers and heating systems in their buildings, better insulation, solar panels, installing energy-saving LED lamps on their streets and cutting down on car journeys. Increasing electric vehicle charging points and introducing electric vehicles to the authority's fleet will be among Gwynedd Council's priorities over the coming years.

It is encouraging to see these declarations, and I congratulate the actions being taken by public bodies, but decision makers should be supported to fully understand what actions they should be taking to address the climate and nature emergencies.

A number of public bodies including the National Museum of Wales, Public Health Wales and Community Housing Cymru have undertaken [Carbon Literacy Training](#) which provides an awareness of the carbon costs and impacts of everyday activities, along with the ability and motivation to reduce emissions on an individual, community and organisational basis.

We need decision makers and citizens to be carbon-literate so that they are able to make decisions to support decarbonisation at every opportunity.



Invest more in tackling the Climate Emergency

What future generations need

Future generations need the Government in Wales and other countries to prioritise funding in addressing the Climate Emergency. A group of environmental non-governmental organisations have called on the UK Government to allocate at least £42 billion of public expenditure per year to help address the climate and nature emergency, which [equates to around 5% of government spending](#) (or around 2% of GDP). (See [section on finance in Chapter 2](#))

Decisions made as part of the annual budget process should be supported by transparent assessments of carbon impact so that people can clearly understand whether funding is leading to an increase or decrease in emissions

Welsh Government should also articulate how actions in key plans such as [Prosperity for all: Low Carbon Wales](#) will be funded and also the level of cross-government investment needed in relation to achieving targets to reduce emissions from sectors such as transport and buildings.



Meeting with Extinction Rebellion

Oslo Climate Budget:

When Oslo launched its budget in 2017, the city began tracking its carbon emissions alongside its finances. It's the first of its kind; a pioneering approach which the city considers to be its most important tool for achieving its climate targets.

“By introducing a Climate Budget along with the financial budget we aim to count carbon reductions the way we count money.”

Raymond Johansen, Governing Mayor of Oslo

Oslo's climate budget is a good example of how a region can prioritise, measure and fund the actions needed to ensure it is meeting its climate targets. Oslo also has an ambitious goal of being zero-carbon by 2030. Local governments and businesses work collaboratively and are responsible for implementing the measures in the budget and report progress three times during the year.

There are seven core areas of corporate change are listed within the Well-being of Future Generations Act's Statutory Guidance including procurement and financial planning. We need decarbonisation to be integral to all activities in Wales as well as being a key consideration in these seven core areas due to the impact they can have on emissions. For example, Natural Resources Wales identified that 55% of its emissions are caused by the procurement of goods and services so the carbon impact of buying these goods and services needs to be measured and monitored so that the public sector can achieve the target of being carbon neutral by 2030.



Where we are now

Action reflecting the urgency of tackling climate change was lacking but this has been more evident in the last year since the declaration of a climate emergency by Welsh Government and a number of local authorities. However it is concerning that Welsh Government are still not able to comprehensively explain the carbon impact of their spending decisions.

“Clear direction and funding from Welsh Assembly (we don't have time for the UK government to sort their priorities so need Wales to be the pioneers) to frame all actions and policy decisions by the need to reduce carbon emissions (improving green transport links, promote lift sharing, encourage working from home or in local business hubs); protect our remaining biodiversity and reverse the recent trends of species loss (plant more trees - link this with flood protection, wildflower verges, guerrilla veg gardening, community food growing space); support regenerative agriculture (support our rural economy but also to build food security across Wales) and diversify agricultural output. Funding for community groups for small projects - eg setting up/running repair cafes, skill sharing workshops with simple funding applications process.”

People's Platform

The UK government currently spends around £17 billion on climate and nature – this needs to be increased by a further £25 billion of additional spending to address the climate emergency.

It is very difficult to calculate how much Welsh Government is currently spending on decarbonisation as this is not assessed so the information is not available.

In 2018, I calculated that approximately only 1% of current funding is supporting direct action on decarbonisation, (however due to lack of transparency in the budget other budget lines could also be making an indirect contribution).

It remains the case that Welsh Government is not assessing the net carbon impact of budget decisions, which means they cannot tell us whether the way in which they are spending their money is leading to an [increase or decrease in carbon emissions](#). There is no consistent approach to undertaking carbon impact assessments for major infrastructure projects, it is not clear how the carbon impact is informing decisions (on projects or funding) and there is no central collation of carbon impact assessments across Government. It is important that the Government understand this themselves and is able to explain to the public the extent to which their spending decision are either contributing to an increase or a decrease in carbon emissions.

The Welsh Government have increased direct funding for the climate and nature emergency but it is clear that they will need to invest more in funding action if they are to meet their carbon reduction targets.

In June 2019 I published a [Ten Point Plan to fund Wales' Climate Emergency](#) which includes proposals for increasing investment in key areas including sustainable transport, low/zero carbon buildings and homes, renewable energy, land and nature-based solutions.



Although it's difficult to calculate the exact amount of funding needed, we know that responding to the climate emergency will require a much greater level of investment than we are currently seeing.

My Plan recommends a total allocation of £991 million to support decarbonisation in the Welsh Government budget for 2020-21 which is in line with the UK Committee on Climate Change (UKCCC) estimates of around £30 billion over the period to 2050 (or 1-2% of GDP).

I welcomed the announcement of £140 million in new capital funding for climate and environment in the draft 2020/21 budget, along with a £59 million (37%) increase in total spending on sustainable travel bringing the total allocation to £219 million. Whilst I welcome the rise in capital investment in active travel, public transport, and electric vehicle infrastructure by £80 million, this appears to have been met by a similarly significant rise in capital investment in new roads. As such, the proportion of capital spent on active and public transport is still slightly below the 60% level recommended in my 10 Point Plan. The £140 million package also includes £25 million capital funding to extend the Innovative Housing Programme, £8.2 million for a carbon neutral house project within Coleg Y Cymoedd and funding to address our nature crisis; although these allocations fall short of what I recommended in my Plan.

Whilst the budget has focused investment at measures "which current evidence supports as being the areas where Welsh Government can have the greatest impact to deliver our first carbon budget" there is no detailed evidence to show how they have prioritised spending decisions according to carbon impact.

This means the Government cannot tell us whether the way in which they are spending their money is leading to an increase or decrease in carbon emissions.

As a result, despite efforts to invest in sustainable travel, we are concerned that the Government's other capital investments, such as in roads, may be undermining its carbon reduction progress.

Spend that could be classified as 'decarbonisation' has increased in the last year, however Government may be underestimating this figure and our analysis shows that direct investment in decarbonising actions could be closer to £500 million, increasing by around 28% since the previous budget. There appears to be no evidence that Government has a clear process to classify or assess how much they are currently spending (or need to spend) on decarbonisation actions to deliver the statutory carbon budgets or targets. And, although the recent Wales Infrastructure Investment Plan pipeline update 2019 mentions additional investment of £14.5 million for active travel, it isn't clear how overall it is prioritising measures to address the climate emergency with 64% of Welsh Government's transport budget currently allocated to building roads.

The Government, must from now on, forensically analyse every aspect of its expenditure, especially capital spend, in terms of carbon impact and publish details on the overall carbon impact of their budget.



All public bodies need to take action to divest their pension funds from fossil fuels

Alongside budget decisions I have already [advised](#) that public bodies should also be demonstrating how the Act is influencing wider investment decisions for example investments and pension divestment; and how these decisions are considering the long-term and climate risk. Since issuing this call, [Cardiff](#), [Carmarthenshire](#), [Monmouthshire](#) and [Powys](#) councils have voted for the divestment of their funds from fossil fuels, but the final decision needs to be taken by the Fund Trustees.

The Welsh Assembly Member Pension Scheme took a decision to move nearly all their investments away from fossil fuel companies and set themselves a [timeline for divesting the rest](#). [Swansea Council](#) which manages the pension fund for Neath Port Talbot Council and a number of other employers in the area, have transitioned £0.5bn of assets into a low carbon index tracking fund after a programme of trustee training which resulted in the adoption of the fund's Environmental, Social, Governance (ESG) Policy that has targeted a reduction in its carbon footprint.

However, whilst this is encouraging progress the majority of public sector pension funds continue to invest almost £1 billion each year in fossil fuels which is not sustainable in light of the climate emergency and incompatible with the declarations by public bodies.

Financial investors are cooling on fossil fuels

Campaign groups have long argued for fossil fuel divestment, but they have recently been joined by institutional investors such as Climate Action 100+, which is using the influence of its US\$35 trillion of managed funds, arguing that minimising climate breakdown risks and maximising renewables' growth opportunities are a fiduciary duty. Divesting from fossil fuels and increasing sustainable investments, or 'Divest-Invest' action, is an effective way for cities, pension funds and other investors to protect their assets and take advantage of the economic opportunities presented by the world's transition towards a green economy. [C40's spotlight On: Cities Divest-Invest](#) provides cities with information, tools and practical examples from around the world on making the case for and implementing a Divest-Invest mandate. This collection of resources unpacks the social, environmental and financial arguments surrounding fossil fuel divestment and sustainable investment, including technical information on fiduciary duty and financial performance.



Meeting with UN Special Envoy on Climate Change



Decarbonisation

Recommendations for Welsh Government

Key Recommendation

Welsh Government should set out a long term investment plan of how they will fund the climate emergency and support more ambitious commitments and targets for sectors within their control. (see related recommendations in Transport and Housing chapters)

Policy Recommendations

Welsh Government should...

- Assess the carbon impact of their spend, especially capital spend, and should also publish details on the overall carbon impact of their budget and major investment/infrastructure decisions.
- Require all publicly funded buildings to be carbon neutral: urgently amend the building regulations (Part L and Part F) and enforce stricter building and infrastructure standards to ensure that we are not building “old” new schools, hospitals and other infrastructure that will contribute to climate change and not be fit for future generations.
- Resource and prioritise carbon and eco-literacy training for all politicians, elected members and senior officers of public bodies in Wales to ensure we have the necessary skills and understanding to make the right decisions for the climate.
- Ensure the new “National Strategy for Flood and Coastal Erosion Risk Management” provides a comprehensive and holistic plan for responding to flooding and coastal erosion, with adequate funding that is focussed on preventative measures including nature based solutions.



Decarbonisation

Recommendations for Welsh Government

Process Recommendations

In their day to day actions Welsh Government should **stop**:

- Providing funding any new housing programmes or developments which are not at least carbon neutral.
- Supporting and funding carbon intensive infrastructure.
- Encouraging habitat loss and deforestation.
- Encouraging carbon intensive agriculture.
- Putting pressure on our natural resources.
- Encouraging the use of fossil fuels.

In their day to day actions Welsh Government should **start**:

- Securing investment for a national retrofit programme to improve the energy efficiency of Wales' housing stock.
- Continuing to promote and incentivise local renewable energy schemes.
- Establishing a Climate Justice Advisory group to involve relevant stakeholders in decisions on how Wales' transition is providing funding and support for the delivery of sustainable and active travel.
- Acting on the health impacts relating to climate change, particularly the disproportionate impact on the most vulnerable.
- Ensuring that all decisions including pension fund investments are compatible with climate emergency.
- Promoting and incentivising individual solutions to support behaviour change, that people can adopt at home and/or work to deliver a wider cultural shift in communities across Wales.
- Restoring forests and peatland and encourage more sustainable land-use to protect nature.
- Taking action to address the climate and nature crisis together.



Decarbonisation

Advice on setting well-being objectives for all public bodies and boards covered by the Well-being of Future Generations Act (including Welsh Government)

Please refer to the chapter on Setting Good Well-being Objectives, but in setting their objectives specifically in relation to decarbonisation all public bodies and boards covered by the Well-being of Future Generations Act (including Welsh Government) should:

- Ensure that all well-being objectives, including those relating to jobs, skills and health, seek opportunities to contribute to reducing emissions and consider the impacts of climate change.
- In setting well-being objectives public bodies should ensure they have a significant focus on decarbonisation. They should also ensure that decarbonisation is a key consideration in all objectives that have been set, and in taking steps to meet all well-being objectives.
- Accelerate their action on reducing emissions, helping meet Wales' target of a carbon-neutral public sector by 2030. This means mapping the areas over which you have control, and which have the biggest emissions, and having a plan in place to reduce them. Immediate areas of focus should include carbon reduction through procurement, ultra-low emissions vehicles (fleet), buildings, fossil fuel divestment, decarbonising heat, transport and tourism. (Also a recommendation in the section on A Prosperous Wales in Chapter 3).

In setting their **steps**, public bodies and boards covered by the Well-being of Future Generations Act (including Welsh Government) should focus in the following areas and should:

- Work with Welsh Government to develop a mechanism for assessing the carbon impact of budget decisions and allocations.
- Build on progress in relation to reducing emissions from energy use and buildings, and increase the focus of their decarbonisation efforts on transport, housing, land use and procurement in line with the ambition of achieving a carbon neutral public sector by 2030. (See specific recommendations in other chapters)
- Require all publically funded building to be carbon-neutral.
- Have an understanding of their current emissions in order to plan how these can be reduced.



Decarbonisation

Recommendations for all public bodies and boards covered by the Well-being of Future Generations Act (including Welsh Government)

Process Recommendations

In their day to day actions they should **stop**:

- Encouraging the use of fossil fuels.
- Encouraging habitat loss and deforestation.
- Encouraging carbon intensive agriculture.
- Funding carbon intensive infrastructure.
- Putting pressure on our natural resources.

In their day to day actions they should **start**:

- Thoroughly understand their current emissions in order to plan how these can be reduced.
- Resourcing and prioritising carbon and eco-literacy training for all elected members and senior officers to ensure they have the necessary skills and understanding to make the right decisions for the climate.
- Ensuring support and sufficient capacity to achieve a carbon neutral public sector by 2030.
- Reducing their need for energy and using energy more efficiently.
- Encouraging the development of local renewable energy schemes.
- Reducing their need for resources and use resource more efficiently.
- Reducing consumption and encourage a circular economy.
- Prioritising local sustainable and active travel schemes.
- Building zero carbon buildings and homes, and retrofitting existing buildings and homes.



Process Recommendations (continued)

In their day to day actions they should start:

- Acting on the health impacts relating to climate change, particularly the disproportionate impact on the most vulnerable.
- Ensuring that all decisions, including pension fund investments, are compatible with the climate emergency.
- Promoting and incentivising individual solutions to support behaviour change, that people can adopt at home and/or work to deliver a wider cultural shift in communities across Wales.
- Considering and taking action to address the climate and nature crisis together.
- Restoring forests and peatland and more sustainable land-use to protect nature.



Resources / Useful Information

Future Generations Commissioner for Wales

- [Ten Point Plan to fund Wales' Climate emergency.](#)
- [Future Generations Framework](#)
- [Future Generations Framework for Scrutiny](#)
- [Future Generations Framework for service design](#)

Welsh Government

- [WG Future Trends Report](#)
- [Prosperity for All: Low Carbon Wales \(2019\)](#)

Other

- [UK Committee on Climate Change: Net Zero Report \(2019\)](#)
- [Centre for Alternative Technology \(CAT\) - Zero Carbon Britain](#)
- [Institute of Welsh Affairs - Re-energising Wales](#)
- [The C40 Knowledge Hub - cutting-edge insights and practical resources from leading climate cities.](#)
- [Cities 100 Report – 100 global cities leading on climate action](#)





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Dyfodol**
Cymru

**Future
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