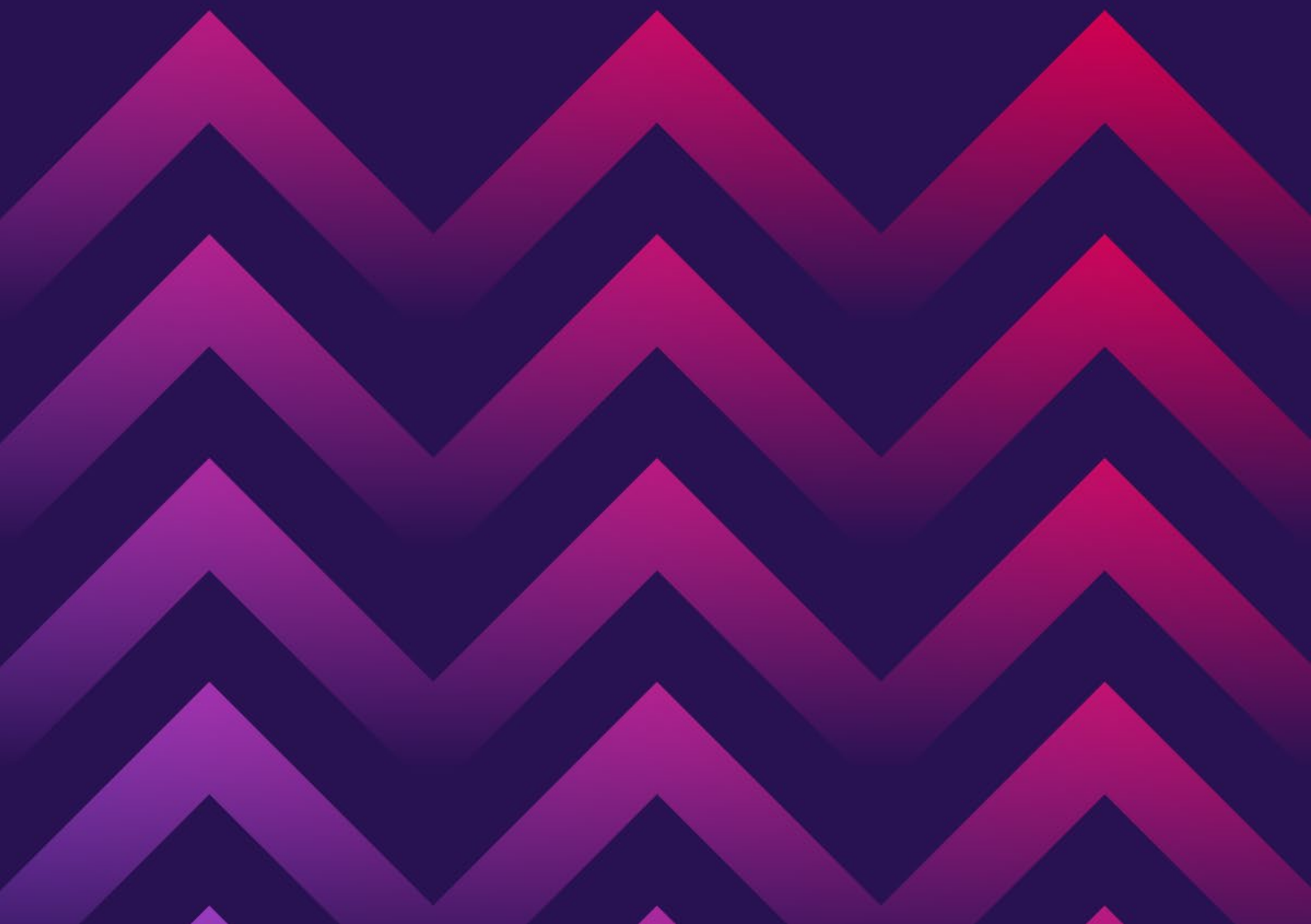
Urban Foresight

# Angus Sustainable Energy and Climate Action Plan

PREPARED FOR:

Angus Council



Urban Foresight

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# Executive Summary

**Recent years have seen an unprecedented increase in the recognition of the global threat posed by climate change and the need for national and local governments, alongside the private sector and local communities, to take action.**

In addition to strong national policy, tackling climate change requires committed action at a local level. Local authorities have a key role to play in helping to reduce carbon emissions and build resilience.

In the wake of the Covid-19 pandemic, there is an even greater appreciation and understanding of the value of the natural environment not only for our physical, but also our mental and emotional, wellbeing. As society begins to recover from the impact of COVID-19, building resilience and transitioning to a net zero economy remains a scientific and economic imperative.

In response to the evolving climate emergency, Angus Council has developed this Sustainable Energy and Climate Action Plan involving all Angus stakeholders and partners. The purpose of the SECAP is to support Angus in its commitment to sustainable development, environmental management and the transition to a low carbon economy. It provides a roadmap demonstrating how Angus can reduce its carbon emissions and increase the resilience of the region, whilst at the same time positioning Angus to capitalise on the significant economic opportunities offered by a low carbon economy.

Angus Council recognises the critical strategic leadership role it has in tackling climate change. To date, Angus Council has achieved significant reductions in carbon emissions from its estate, as well as taking steps to increase the resilience of the region to the impacts of climate change. However, more needs to be done to embed climate change into everyday decision making and place Angus at the forefront of the 'green recovery' and low carbon innovation.

The SECAP builds on findings from a Baseline Emissions Inventory, which details the region's carbon emissions, as well as a Risk and Vulnerabilities Assessment, which identifies relevant climate threats alongside potentially vulnerable sectors in Angus. Using this information, the SECAP sets out a series of concrete, deliverable actions with clear timelines and responsibilities. The actions are arranged according to 6 key sectors including Buildings; Energy; Transport; Land Use & Forestry; Agriculture & Food and Waste, as well as Governance and Process actions.

Equally important to the actions themselves, is the way in which they are delivered and their long-term impact. Any action can be significantly more valuable if it is delivered in a way that demonstrates and supports new ways of working, thereby empowering and inspiring ongoing action. For this reason, a set of core principles have been adopted to guide the delivery of the SECAP action plans, helping to define the how of implementation.

In line with these core principles, stakeholder engagement has been central to the development of the SECAP. In addition to this, throughout the SECAP's evolution, it has been informed by and adjusted according to the results of a Strategic Environmental Assessment (SEA). The SEA not only helps to better protect the environment but also increases public participation, ensuring that plans, programmes and strategies support sustainable development.

Climate change is an ever-evolving issue and as such, the SECAP is intended to be a living, evolving document. The actions within the SECAP will be reviewed regularly, to monitor progress and identify remedial actions, or new actions, that need to occur in order to achieve targets. This will ensure that the SECAP remains up to date and fully considers and reflects technological innovations, changing market conditions and the latest environmental best practice.

# Contents

# Background and Context

## Climate Emergency

**On 28th April 2019 Scotland became the first country to declare a climate emergency. It was soon followed by the UK parliament, making it the first national government to do so.**

Recent years have seen an unprecedented increase in the recognition of the global threat posed by climate change and the need for national and local governments, alongside the private sector and local communities, to take action[1].

In October 2018 the **Intergovernmental Panel on Climate Change (IPCC)** published a special report on the impacts of global warming of 1.5°C. Findings from this report indicated that human activities have caused global temperatures to rise by approximately 1°C since pre-industrial levels and that, if the global economy maintains business as usual, this figure is likely to reach 1.5°C between 2030 and 2052. The report concluded that, although any rise in temperature would have substantial consequences for natural and human systems, limiting global warming to 1.5°C compared to 2C, would significantly reduce climate-related risks. To restrict global warming to below 2°C or 1.5°C, cumulative carbon emissions from human activity need to be kept below a threshold, referred to as the carbon budget. According to the IPCC the global carbon budget needed to stay below a 2°C increase is 900GtCO2[2].

### Definition: Carbon Emissions

Greenhouse gases are gases present in the Earth's atmosphere that absorb and emit radiation emitted by the Earth's surface, the atmosphere itself, and by clouds. Water vapour (H2O), carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4) and ozone (O3) are the primary greenhouse gases in the Earth's atmosphere. In order to compare the emissions from different greenhouses gases they are converted, on the basis of their global warming potential, into a single value called carbon dioxide equivalents. In this document we mainly refer to carbon dioxide emissions for simplicity, but this should be understood to mean carbon dioxide equivalents unless otherwise stated.

## National and International Commitments

**The first ever, legally binding global climate agreement was signed in 2016; The United Nations Framework Convention on Climate Change (UNFCC) Paris Agreement[3].**

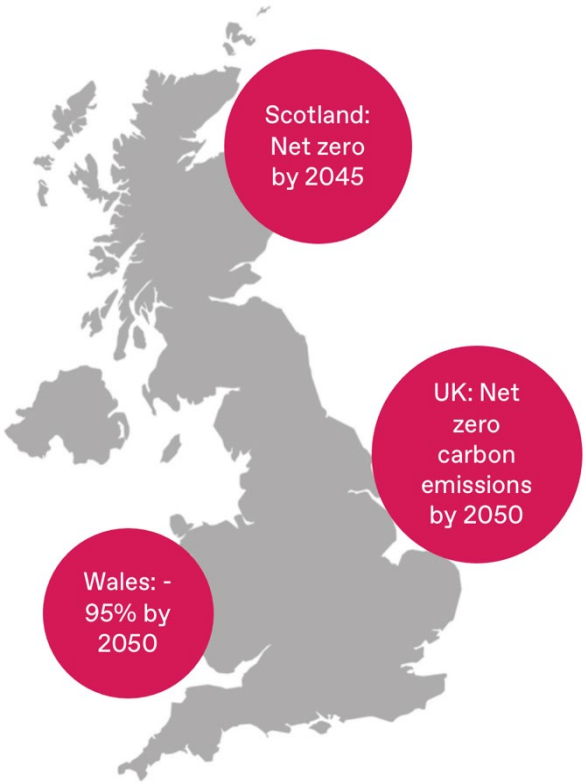
By signing the Paris Agreement, nations pledged to limit global warming to well below 2°C, ideally limiting it to 1.5°C. The UK signed and ratified the agreement in 2016.

In the previous year, all the United Nations Member States adopted the **17 Sustainable Development Goals[4]**, a global framework for eradicating poverty, fighting inequalities and

[1] BBC news. Available here.
[2] IPCC Special Report: 1.5C, 2018. Available here.
[3] UNFCC The Paris Agreement. 2016. Available here.
[4] UN Sustainable Development Goals. Available here.

tackling climate change. Although not legally binding, it required nations to take ownership of the goals and create national frameworks to help achieve them.

In June 2019, the UK Government amended the Climate Change Act (2008)[5] to commit the UK to reducing greenhouse gas emissions by at least 100% of 1990 levels by 2050. Based on advice from the UK Committee on Climate Change, Scotland took this one step further with the **Climate Change (Scotland) Act 2019**[6] (an amendment of the **Climate Change (Scotland) Act 2009**) which aims to achieve net-zero carbon emissions by 2045. This legally binding target includes interim targets of a 70% reduction in carbon emissions by 2030 and a 90% reduction by 2040. The **Scottish Climate Change Plan 2018-2032**[7] illustrates potential paths to achieve the targets set out in the previous Climate Change Act (2009) and is currently being updated to reflect the revised targets included in the current Act.




Alongside the reduction of carbon emissions, there are also key targets related to other sectors. **Scotland's Energy Strategy (2017)**[8] aims to generate over 50% of Scotland's energy consumption from renewable sources by 2030 and increase the productivity of energy use across Scotland by 30%. Alongside the efficient and sustainable production of energy, there is also the need to improve the energy efficiency of the building stock by improving insulation and reducing heat demand. **The Fuel Poverty Act (Scotland) 2019**[9] sets ambitious targets to tackle fuel poverty with no more than 5% of Scottish households in fuel poverty, and no more than 1% of households being in extreme fuel poverty, by 2040. In the mobility sector, the **National Transport Strategy (2020)**[10] aims to phase out petrol and diesel cars by 2032, with a 37% reduction in emissions from the sector overall.

**Definition: Net Zero**

Net-zero carbon emissions does not mean that no emissions are released, but rather that any amount that is released is balanced with the amount absorbed by the atmosphere. Carbon emissions can be captured by natural means, for example trees and peatland, as well as through human intervention for example carbon capture and storage.

Although actions need to be taken to mitigate climate change, it is also crucial that governments take the necessary steps to adapt to climate change. The Scottish Government's **Climate Change**

[5] UK Climate Change Act 2008. Available here.
[6] Climate Change Act (Scotland) 2019. Available here.
[7] Scottish Climate Change Plan: third report on proposals and policies 2018-2032. Available here.
[8] The future of energy in Scotland: Scottish Energy Strategy 2017. Available here.
[9] The Fuel Poverty (Scotland) Act. Available here.
[10] National Transport Strategy. 2020. Available here.

**Adaption Programme**[11] uses an outcomes-based approach, aligned with the UN Sustainable Development Goals, to set out how Scotland can prepare for the consequences of climate change.

[11] Climate Ready Scotland: climate change adaptation programme 2019-2024. Available here.

# Covid-19

**The Covid-19 pandemic, and the restrictions applied to manage its spread, have had an unprecedented impact on all aspects of society.**

As a result of the restrictions imposed during the pandemic, it is estimated that the daily global carbon emissions in April 2020 dropped by 17% compared to the mean daily estimates in 2019. Despite this steep drop, the total emissions during peak confinement was still equivalent to that in 2006, just 14 years ago[12].

Building resilience and transitioning to a net zero economy remains a scientific and economic imperative. As society begins to recover from the impact of COVID-19, there is a unique opportunity to redefine the way in which society functions and its relationship with the natural world.

This challenge is recognised by the Scottish Government's **Programme for Government 2020/21,** which sets out ambitions for a green recovery from the pandemic[13]. Low carbon, resource efficient and socially inclusive, a green recovery is key to creating a more resilient, sustainable and inclusive economy. The Programme for Government highlights the need for a national mission to create new green jobs with a particular focus on "young people, supporting retraining and investing in our Green New Deal to tackle climate change"[13]. In particular it brings forward commitments to transform how homes are heated, offering "the opportunity to meet our climate and environment ambitions, whilst building a better economy and creating jobs."[13]

This SECAP reflects these national ambitions, presenting a clear plan for a green recovery in Angus.

# Council Role

**In addition to strong national policy, tackling climate change requires committed action at a local level. Local authorities have a key role to play in helping to reduce carbon emissions and build resilience.**

As visible institutions, they have the opportunity to lead by example, embracing innovation, enabling positive behaviours, and developing policies that support business and citizens to do the same. Following the Climate Change (Scotland) Act 2019, local authorities are also required to submit an annual **Public Bodies Climate Change Duties Report**, detailing their compliance with climate change duties.

Angus Council recognises the critical strategic leadership role it has in tackling climate change and increasing the resilience of the region to the impacts of climate change. Significant progress has been made over the last few years through the work of the Climate Change Member Officer Group (MOG) comprising of senior staff and elected members, which has overseen, and been informed by, the three dedicated working groups on Carbon Emissions, Adaptation and Sustainability.

[12] United in Science 2020. Available here.
[13] Protecting Scotland, Renewing Scotland: The Governments Programme for Scotland 2020/2021. Available here

## Progress to date

To date Angus has achieved significant reductions in carbon emissions from its estate through reduced energy usage, improvements to the council housing stock, replacing street lighting with LEDs and introducing electric vehicles into the council fleet. The Council has also invested in renewable technologies, including the installation of Photo Voltaic Cells on key high-energy demand buildings such as Montrose Sports Centre[14].

Angus also has one of the highest recycling rates in Scotland and has ranked second out of 32 local authorities for household recycling rates[15]. In 2017, Angus signed an agreement with Dundee City Council for the treatment of residual waste at a waste to energy plant in Dundee, diverting waste away from landfills and reducing carbon emissions by 74% in 2018 in comparison to the previous year[16].

Angus Council has also been taking steps to increase the resilience of the region to the impacts of climate change. Together with the Scottish Government, the council has secured funding to deliver the multimillion-pound Arbroath Flood Protection Scheme, a national priority under the Flood Risk Management Strategy. In addition to this the council has also engaged in Partnership work in the Cairngorms National Park Authority that has delivered natural flood management projects, large scale riparian tree planting schemes and peatland restoration.

Angus has also demonstrated progress in promoting active, healthier and sustainable travel through a number of established community groups in Angus. For example, Angus Cycle Hub is indicative of many of the community projects currently underway in Angus. The Cycle Hub has engaged over 14,000 participants[17] and saved upwards of 73,000kg of carbon emissions through their bicycle recycling programme.

Angus Council has shown it can act decisively and effectively when it comes to responding to climate change but more needs to be done to strengthen the theme of climate change and embed it into the everyday actions and decision-making process of the council, influencing and enabling positive behaviours, driving change and making the council an exemplar of climate action and low carbon innovation.

[14] Angus Public Sector Climate Change Duties 2019 Summary Report. Available here.
[15] Angus Council Website. Available here.
[16] Angus Council Public Bodies Climate Change Duties: Annual Report October 2019. Available here.
[17] Angus Cycle Hub. Available here.

# The Angus SECAP

**In response the evolving climate emergency, and in order to support Scotland's national climate change targets, Angus Council has developed this Sustainable Energy and Climate Action Plan.**

Angus Council proposed developing a SECAP in the Council's 2019 Summary Report in accordance with the Climate Change (Duties of Public Bodies: Reporting Requirements) Scotland Order 2015. This was agreed and approved by Angus Council on 17th October 2019.

The purpose of the SECAP is to support Angus Council in its commitment to sustainable development, environmental management and the transition to a low carbon economy. It provides a roadmap demonstrating how Angus can both reduce its carbon emissions and increase the resilience of the region to the potential impacts of climate change through concrete, deliverable actions.

Angus's commitment to reducing carbon emissions and adapting to climate change is reflected across several of its strategic policies including the **Angus Community Plan 2017-2030**[18], The **Angus Local Development Plan 2016**[19]**, The Angus Food Growing Strategy 2020** and the **Angus Council Plan 2020-2024**[20]. The Council Plan sets out a vision for Angus as a *Great Place to Live, Work and Play* under three themes of *Economy, People* and *Place*. The central priorities of the Angus Community Plan include:

1. Reducing child poverty;
2. Improving mental health and wellbeing; and
3. Improving accessibility and connectivity.

Angus also recognises the importance of working together with neighbouring authorities to deliver the best outcomes for the community. **The Tayside Local Biodiversity Action Plan 2016-2026**[21], charts the way ahead in protecting the unique flora and fauna of the county, as well as their individual habitats, bringing together organisations, communities and individuals across Tayside. **The TAYPlan Strategic Development Plan 2016-2036**[22] sets out a vision for the TAYPlan area for 2036 including policies for mitigating carbon emissions and improving the region's resilience. The strategic outcomes of the plan include: a healthier population; an enhanced image for the region through sustainable economic growth; better quality environments to live, work and play in and living within the earth's limits. Working together with neighbouring authorities, **The Tay Cities Region Economic Strategy 2019-2039**[23] sets out a strategy for supporting economic growth across the region.

## Alignment with existing plans, policies and strategies

Although the SECAP focuses primarily on climate change it has the potential to influence many other aspects of society. It is important that is implemented in a fair and equitable way, ensuring that the benefits can be enjoyed by every member of society without unfairly disadvantaging those who are most vulnerable. In order to maximise benefits, and ensure its successful delivery,

[18] Angus Community Plan 2017-2030. Available here.
[19] Angus Local Development Plan 2016. Available here.
[20] Angus Council Plan 2019-2024. Available here.
[21] Tayside Local Biodiversity Action Plan 2016-2026. Available here.
[22] TAYPlan Strategic Development Plan. Available here.
[23] Tay Cities Region Economic Strategy. Available here.

it is also important that the SECAP is integrated and aligned with existing Plans, Policies and Strategies. Both of these principles are reflected in the SECAP core principles (see page 12).

The SECAP does not seek to replicate work already being undertaken but rather to draw together and focus attention on the key opportunity areas where more can be done to achieve national climate targets and maximise best value.

### Living document

The SECAP is intended to be a living, evolving document which will change through engagement with the people of Angus and as new opportunities and initiatives come forward. This first iteration of the SECAP, focuses on actions that are largely driven by the council and key public sector partners. As a major employer, landowner and energy consumer, the Council has significant influence over a large percentage of Angus' total carbon emissions.

The Council also acts as a developer (responsible for the design of new council housing); customer (responsible for sustainable procurement practices); enabler (providing leadership, education, advice, land use policy, business support); and protector (of the community, landscape and biodiversity). But no single person or organisation can tackle climate change alone. Through demonstrating strong political leadership and taking definite action, Angus Council seeks to inspire, encourage and enable residents, businesses and other public bodies to get involved and help drive the change to zero carbon. This is just the start of the journey, and as the SECAP goes forward the hope is to include even more partners, helping to secure a better, more sustainable future for everyone in Angus.

## Co-benefits

**Action on climate change is not only a necessity, but also an opportunity.**

Taking steps to mitigate and adapt to climate change can have multiple benefits, not only for the environment but also for society and the economy, these are referred to as co-benefits. Amongst many other benefits, decoupling economic growth from carbon emissions has the potential to reduce air pollution, improve health and wellbeing, enhance national energy security, increase resilience to energy price shocks, foster innovation and provide new employment opportunities. In 2016 alone, the renewable and low carbon sector in Scotland provided an estimated 49,000 jobs, with a turnover of over 11billion pounds[24].

[24] Climate Change Plan 2018-2032. Available here.

# Vision and Objectives

## Vision:

By 2030, Angus will be a major contributor to achieving Scotland's national climate change goals, and a leader in clean growth, environmental stewardship and sustainable communities

## Objectives:

### Buildings

- Support sustainable development in the region.
- Improve the energy efficiency of the existing building stock.
- Support the adaptation of Angus' built environment to ensure it is resilient to the impacts of climate change.

### Energy

- Grow renewable energy generation in the region.
- Promote the uptake and use of cleaner and/or alternative fuels.
- Ensure affordable access to energy and support sustainable energy projects.
- Improve energy efficiency of public infrastructure.

### Transport

- Increase the proportion of journeys in Angus made via active modes.
- Increase the use of zero and low emission vehicles in Angus.
- Reduce the carbon impact of freight and logistics in Angus.
- Increase Angus' resilience to climate change.

### Land Use & Forestry

- Provide access to good quality open space and natural environments to aid the wellbeing of citizens and visitors.
- Increase Angus' resilience to flooding and coastal erosion.
- Promote the development of sustainable neighbourhoods and communities.
- Enhance Angus' natural biodiversity.

### Agriculture & Food

- Support clean growth and innovation in the agricultural sector.
- Promote the use of sustainable, local produce.
- Increase the provision of food growing facilities in Angus.

### Waste

- Make it as easy as possible for households and businesses to recycle waste.
- Reduce food waste in Angus.
- Reduce the amount of waste going to landfill through repair and reuse initiatives.

### Governance & Process

- Ensure sustainability is a key priority in the council.
- Support sustainable procurement practices.
- Develop consistent approaches to measuring progress against climate goals across the region.
- Increase citizens' awareness of sustainability and the impacts of climate change.

# Principles

## Challenge

**Climate change is an issue which is of a fundamentally deeper and more complex nature than many of the other challenges that humanity has faced in years gone by.**

The use of fossil fuels and the generation of greenhouse gases are direct biproducts of multiple embedded and interdependent aspects of our way of life.

The impacts of increased carbon in the atmosphere play out in the global climate system and impacts are being felt differently in different parts of the world, regardless of the extent to which that geography has contributed to the problem. Within countries, poorer communities are at greater risk of the effects of climate change than those who are better off. They are also at greater risk of being negatively affected by poorly implemented mitigation measures.

Solutions need to be implemented over a multi-generational timescale, but it is clear that increased action is required urgently within the next few years. Contribution to those solutions must come from every part of society and new levels of cooperation are required to make every step taken effective and worthwhile.

Climate change relates to behaviours and ways of thinking built into our systems and processes that are difficult to unpick. But addressing the issue starts with being aware of this dynamic and seeking to do things differently.

For an Action Plan, such as this one then, looking to address climate change mitigation and adaptation in a particular region, it is equally important *how* actions are delivered as *what* the action is actually delivering. The actions included in this document can be significantly more valuable to Angus, if delivered in ways which demonstrate and support new ways of working that empower and inspire ongoing action.

## Core principles

Below are a set of core principles that are to be adopted in the delivery of this Action Plan which help to define the *how* of implementing the initiatives set out in the rest of the document. While actions will be updated and replaced on a regular basis, these principles are intended to shape the strategy taken in Angus over the long-term. They are aligned with both the United Nations' Sustainable Development Goals[25] and the dimensions of Angus' own Council Plan: Economy, People and Place.

### Definition: Sustainable Development Goals

The Sustainable Development Goals (SDGs) are at the heart of the 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015. This provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. The SDGs recognise that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

[25]UN Sustainable Development Goals. Available here.

## People

Climate action delivered in and for Angus should:

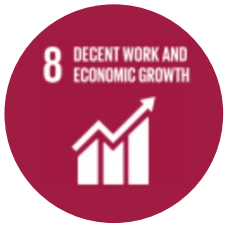

- **Be fair and equitable –**To be successful, climate action will need to be balanced with social and economic concerns in the region, and initiatives should not disproportionately disadvantage low income communities. While the burden of addressing climate change is one shared globally, it should be recognised that many citizens are already economically and socially disadvantaged; action should be undertaken in such a way as to ensure the benefits are shared widely, while the costs do not unfairly burden those most vulnerable. Instead it should be recognised that poverty is itself a contributing factor to climate change and the right climate actions can offer opportunities for change towards a fairer and more equitable society.


- **Be delivered in close partnership with local communities –** Climate action should seek to meaningfully involved all aspects of local communities. Strong social consensus on the goal and pathways to sustainability is fundamental. Social dialogue has to be an integral part of the institutional framework for policymaking and implementation at all levels.[26] To this end, climate action should make the most of the existing community groups, such as Sustainable Kirriemuir and support the establishment of new ones


- **Support skills development in the region –** Climate action should consider skills and expertise that will be required as the economy shifts in response to the climate emergency. Support should be provided to the local workforce for retraining either in relation to the new innovations which will help to mitigate climate change (see below) or is supporting the increased resilience of the region, such as peatland restoration or maintenance of heritage assets.

## Economy

Climate action delivered in and for Angus should:




- **Enable opportunities to contribute to the local economy** – Wherever possible, climate action should support the economic development and diversity of the area by supporting businesses, communities and partnerships. Funding through the Tay Cities Deal supports many key elements of this action plan which aims to drive the Region's economy over the next 10 years. Initiatives should 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.[27]

[26] Guidelines for a just transition towards environmentally sustainable economies and societies for all. International Labour Organisation. Available here.

[27] Just Transition Commission. Available here.

- **Embrace innovation** – Climate action should embrace innovative measures and technological advances. This relates to both major infrastructure initiatives - such as the £1bn Mercury programme – but also local, low cost measures such as utilising waste in innovative ways to create new revenue streams, for example Arbikie Distillery which uses potatoes and peas to produce vodka and gin.


- **Support emerging business models and practices** – Climate action should not be restricted to working within established concepts for business and governance and should take on board best practice from emerging sectors. Key examples of this relate to Circular Economy principles. This involves approaches to keeping existing products and materials in circulation for as long as possible, extracting the maximum value from them. The circular economy is one where businesses and consumers work together to make things last and get as much value from our products and resources as possible.[28]


## Place

Climate action delivered in and for Angus should:


- **Be joined-up and integrated** – Integrated thinking should be applied when delivering climate actions to avoid pitfalls of siloed thinking. Embedding sustainability and climate change in the decision making of Angus Council and key partners, will enable the identification of more opportunities to do things in less carbon intensive ways. Underpinning this will be partnership working with the likes of Cairngorms National Park Authority and Zero Waste Scotland.


- **Align with agreed priorities for development in the region** – Collaboratively developed strategies and policies create a helpful framework for climate-friendly development in Angus. Shared goals and policies can support consensus building and facilitate collaborative actions and enable joined-up thinking. Angus' Local Development Plan is a key document for decision making in this area; it already has climate considerations embedded in its approach and future iterations will have an even stronger focus on this area. Others such as the Tayside Local Biodiversity Action Plan 2016-26 and Active Travel Strategy will offer important guidance in specific areas.


- **Think global, act local** – Climate change is a global challenge that affects everyone, everywhere. Underpinning all meaningful climate action is the recognition that citizens of a particular region are also citizens of the world. Climate actions can often have local environmental, economic or social benefits. However, limiting the framework of action to local considerations ultimately runs the risk of being restrictive and misdirected.

[28] Circular Tayside. Available here.

# Baseline

## Baseline Emissions Inventory

**In order to understand how we can move forward it is important to understand where we are.**

A Baseline Emissions Inventory (BEI) was delivered in 2017 which sets a benchmark against which all future emission savings in Angus can be quantified. The year 2005 was selected as the baseline based on the accessibility of useful data, both from the North East region and nationally. A Monitoring Emissions Inventory (MEI) to track progress was carried out in 2012.

The BEI and MEI assessments are described below including a discussion on likely impact of the excluded sources.

### Emissions from energy, buildings, transport and waste

For both the baseline and monitoring year, data was collected on the volume of greenhouse gas emissions, as well as the energy consumption by sector (Buildings and Facilities; Street lighting; Transport and Waste).

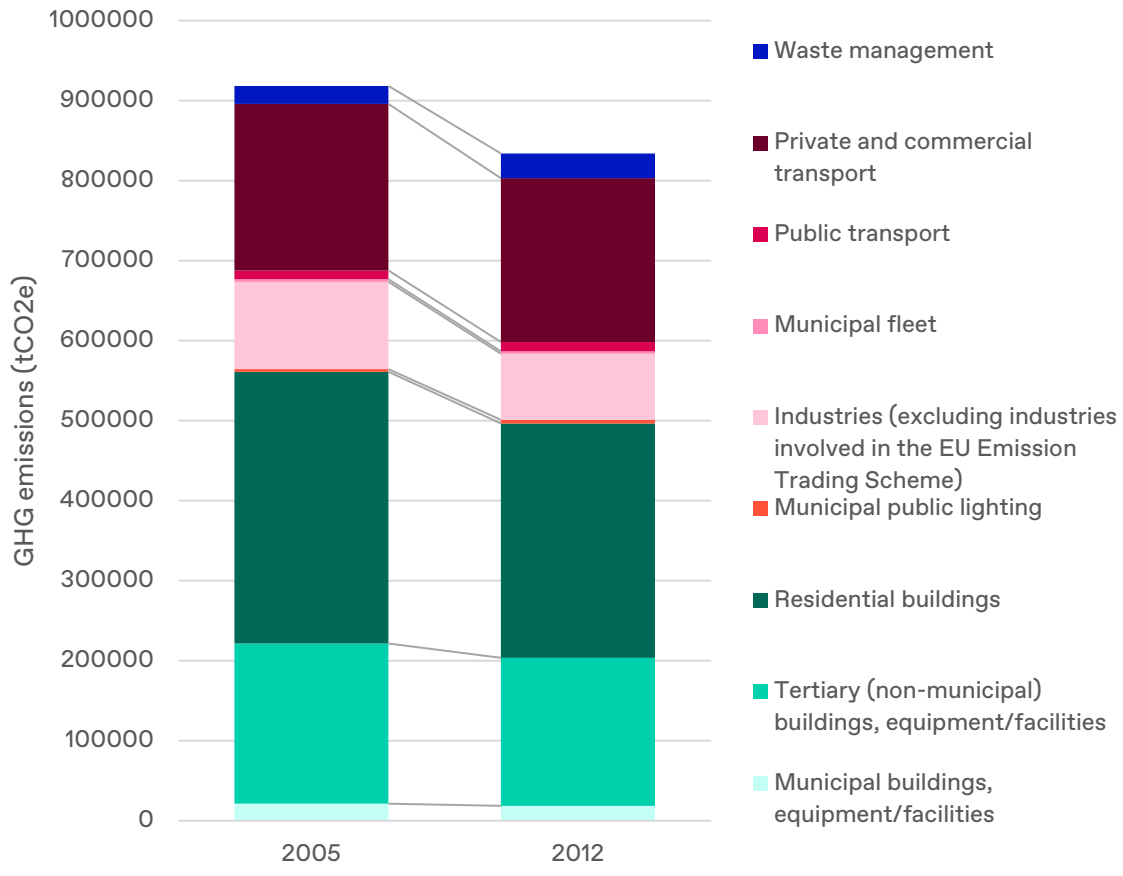



Figure 1: Angus GHG emissions in 2005 and 2012 from BEI sources by sector.

Figure 1 illustrates the emissions from each sector for 2005 and 2012. In order to facilitate comparison, emissions factors were used to translate all the emissions into carbon dioxide equivalents ($CO^2e$). For more details regarding the emissions factor approach, references and assumptions, please refer to the North East Scotland SEAP[29].

Between 2005 and 2012 Angus reduced its carbon emissions from the measured sources by approximately 84,376 tCo2e, a saving of approximately 9.2%. As can be seen in Figure 1, almost all of the sectors saw a reduction in emissions with the exception of Public Lighting and Waste. In 2012, Residential Buildings still remained the largest of these sources comprising 35% of the total, followed by transportation with 26.3%. Whilst the Buildings and Facilities sector remained a large source of emissions, significant progress was made between 2005 and 2012 with a decrease of 64,570 tCo2e. Transportation has seen a far more modest change with only a 2,898 tCo2 decrease in emissions.

## Emissions based on fuel type

Figure 3 shows Angus' GHG emissions from different fuel types in 2005 and 2012. As with the above assessment, data was collected on the volume of greenhouse gas emissions from Buildings and Facilities; Street lighting and Transport. Emissions from Waste management are excluded. As can be seen, electricity was the largest sources of emissions in 2005 and 2012.

Overall the GHG emissions by different fuel sources reduced by approximately 10% between 2005 and 2012. The most significant reduction in emissions was as a result of heating oil, with a 35% decrease. Emissions as a result of burning coal saw a significant increase of 69%, as did emissions as a result of diesel with a 19% increase. Gasoline, natural gas and electricity all saw a decrease in emissions.

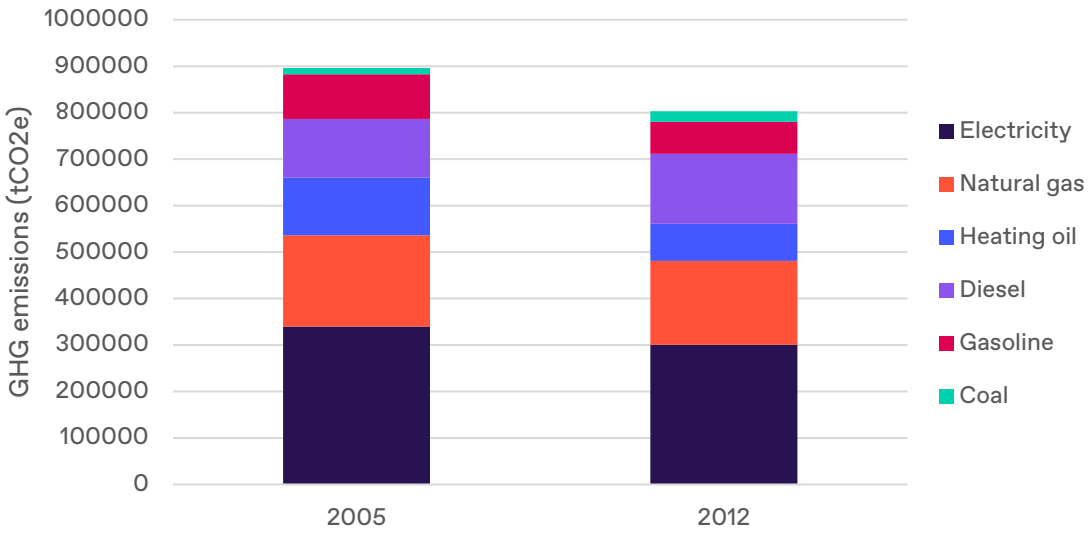



Figure 2: Angus GHG emissions in 2005 and 2012 from BEI sources by fuel type.

[29] North East Scotland Sustainable Energy Action Plan Annex III: Angus SEAP.

## Limitations

The BEI and MEI assessments are sufficient as a baseline for this SECAP and are useful in understanding how various sectors contribute to the carbon emissions in the region. However, they are limited in several regards:

- They do not include emissions as a result of industrial processes, agriculture and land use. These are all significant sectors, especially agriculture in the case of Angus;
- They do not include the absorption of GHG emissions as a result of carbon sinks;
- They are not easily updatable due to a lack of transparency in the methodology used; and
- The categorisations applied do not align with the national approach in Scotland. It will be important going forward to have a consistent approach across Scotland to ensure accuracy and consistency when reporting on national targets.

Due to these limitations, since 2012, no further carbon emissions assessments, using the same methodology, have taken place in Angus. However, since 2012 Scotland has seen significant changes in the composition of GHG emissions[30]. Although the categorisations and measurement methodology used at the national level varies from those used in the Angus BEI and MEI, it is useful to observe and assess emissions at a national level to help suggest a fuller and more up-to-date picture of GHG emissions in Angus. See Figure 2 below.

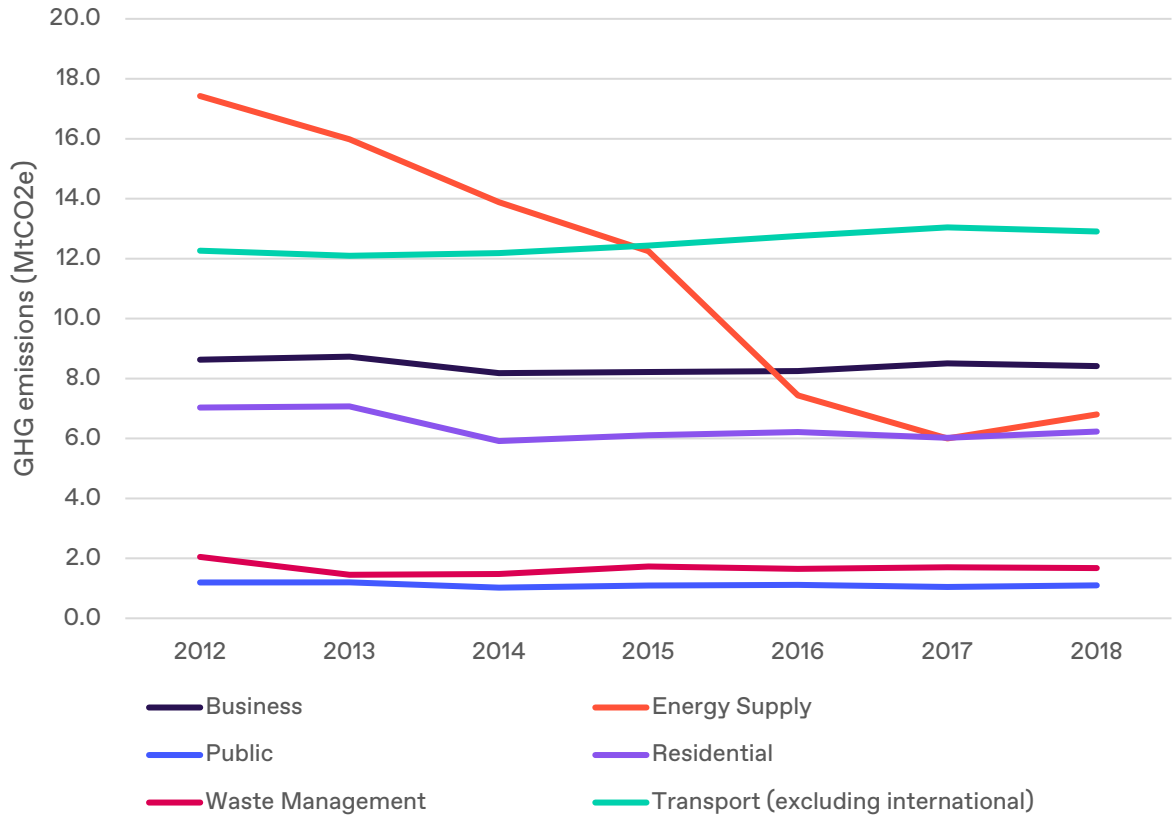



Figure 3: Scotland's GHG emissions for selected sectors only, 2012 – 2018.

[30] Greenhouse gas emissions 2018: estimates. Available here.

As can be seen the most dramatic change relates to the decrease in GHG emissions from energy supply. This is mainly due the complete cessation of coal use in electricity generation in Scotland and the significant increase in the use of renewables. In 2018 renewables were the single largest source of electricity generated in Scotland at 54.9%. Looking again then at Figure 2. It is reasonable to assume that the greening of Energy Supply at the national level since 2012 will have had a significant impact on Angus' own emissions.

## Emissions from agriculture and land use

In 2012, approximately 15% Scotland's greenhouse gas emissions were generated through agriculture.[31] This includes emissions from livestock, agricultural soils (excluding carbon stock changes), stationary combustion sources and off-road machinery.

While the sector has seen decrease at the national level since then, its overall share of Scotland's GHG emissions has increased; agriculture accounted for 18% of Scotland's emissions in 2018.

10% of Scotland's prime agricultural land, as well as 40% of Scotland's class 1 agricultural land is located in Angus. Therefore, it is reasonable to assume that agriculture in Angus accounts for a similar proportion of overall emissions in the region. So, while it has been excluded from the BEI assessment, it should not be ignored from considerations around Angus' climate action.

## Carbon sinks

Another important consideration when calculating carbon emissions is the effect of carbon sinks. Carbon sinks are natural systems that absorb carbon dioxide from the atmosphere. In 2018, land use, land use changes and forestry 'absorbed' approximately 5.4Mt of CO2e. The role of these sinks represents an offsetting of approximately 13% of Scotland's emissions[30].

With grasslands, peatlands, productive and native woodlands, Angus has the potential to offset a significant amount of carbon emissions through the preservation and expansion of these natural assets. Going forward, carbon sinks also offer an exciting business opportunity, with businesses and individuals able to sell 'carbon credits' through the UK Emissions Trading Scheme (ETS) which will replace the European ETS[32]. Forward thinking landowners in Angus are already taking advantage of national funding to finance woodland expansion and peatland restoration projects on their properties, positioning themselves not only to take advantage of the ETS but also increasing their resilience to the impacts of climate change.

## Emissions Monitoring

Going forward it is important for Angus to have a clear, consistent methodology for measuring carbon emissions. This methodology needs to encompass all the relevant sectors, offset against the impact of carbon sinks. This will not only ensure that the actions within the SECAP are having the desired effect, but it will also help to maintain motivation, ensuring that the benefits of the SECAP are clearly visible.

See action G6. There are several carbon emissions monitoring software programmes available that can provide a transparent and easy to use platform for calculating carbon emissions. Dundee City Council is currently trialling ClimateView software[33] and depending on the success of this trial a similar approach could be adopted by Angus Council.

[31] Greenhouse gas emissions 2018: estimates. Available here.
[32] Emissions trading scheme. Available here.
[33] ClimateView. Available here.

# Risk and Vulnerabilities Assessment (RVA)

**The effects of climate change are already being felt across the UK. In addition to reducing carbon emissions, it is essential that governments prepare for the potential consequences of climate change.**

According to an assessment by the Adaptation Sub-Committee of the UK Committee on Climate Change, Scotland's unique geography creates both resilience and vulnerabilities to the impacts of extreme weather and climate change. Many of Scotland's iconic industries including forestry, agriculture and whisky rely on climate sensitive natural resources and may be put at risk by changing weather patterns[34]. Key long-term climate change trends for Scotland include hotter and drier summers, milder and wetter winters, an increase in sea level and continued variable weather patterns. Scotland can also expect to see an increase in summer heat waves, extreme temperatures and drought alongside an increase in extreme rainfall events and a decrease in frost and snowfall[35]. All of these changes will challenge existing infrastructure including transport, communication, fuel and energy networks, and potentially impact the delivery of essential services to communities.

Angus Council recognises the impact of climate change on the lives of communities and has already made significant strides in helping the region adapt, including the production of two Local Climate Impact Profiles[36]. Over the past several years, significant investments have been made into flood protection schemes including the multimillion-pound Arbroath flood protection scheme, scheduled for completion in 2022. Together with the Cairngorms National Park Authority, Angus continues to investigate and deliver landscape scale approaches to natural flood management including woodland expansion and peatland restoration (see actions L.12 and L.13).

### Natural Flood Management

Man-made flood defences are essential in helping to tackle flooding. However, increasingly more focus is being placed on natural flood management techniques as a low-cost, sustainable and effective way of helping to manage flood risk. Woodland expansion and peatland restoration are two excellent, low maintenance solutions to flood management. Both trees and peatland increase water infiltration into the soil, slowing the flow of water and helping to reduce flood risks downstream. Studies have shown that targeted tree planting in upper catchment areas can reduce peak flood flows by up to 40%[35A]. In addition to flood management, woodlands and peatlands are also excellent carbon sinks, absorbing significant amounts of carbon dioxide.

During the development of the SECAP a Risk and Vulnerabilities Assessment (RVA) was undertaken to determine the nature and extent of climate related risks. The most vulnerable sectors in Angus were identified as well as the expected climate scenarios including extreme heat and drought, extreme precipitation, storms, floods and sea level rises. The potential impacts of each scenario were assessed against the most vulnerable sectors, highlighting key areas of focus for Angus Council going forward. The information from the RVA was used to inform the actions included in the

[34] Scottish Climate Change Adaptation Programme: An Independent Assessment. Available here.
[35] Adaptation Scotland. Available here.
[36] Angus Council Local Climate Impacts Profile 2nd edition. Available here.
[35A] Public Sector Climate Change Duties 2019 Summary report. Available here.

SECAP. The full RVA is included in Appendix II.

# Process of Delivery

**In addition to an in-depth evaluation of existing plans, policies and strategies as well as thorough assessment of environmental data, the SECAP has also been informed by, and shaped, through an extensive process of stakeholder engagement.**

## Stakeholder Engagement

In line with the principles of **working in close partnership** with community groups and **joined-up and integrated working**, co-operation and input was sought from a variety of stakeholders in the development of the SECAP. Key stakeholders included representatives from the council, community groups, businesses and third sector organisations.

Due to the limitations imposed as a result of the coronavirus pandemic, interviews were held virtually, bringing together, wherever possible, as many people as possible in a single interview to share ideas and gain new perspectives. The information gained from these interviews played a crucial part in the development of the SECAP and the actions contained within it.

Key stakeholders included Sustainable Kirriemuir, Keep Scotland Beautiful, Circular Tayside, the Cairngorms National Park Authority, the National Farmers Union, Zero Waste Scotland, River South Esk Catchment Partnership and Friends of the Earth Tayside.

## Action Planning

Based on the background research, including the BEI and RVA, an initial list of potential actions was drafted. This list was used as a starting point for the interviews, helping to facilitate discussions and to understand the individual concerns, priorities and objectives of each of the stakeholders. Following stakeholder feedback, the action list was further refined and adjusted, through an iterative process, until the final suite of actions was selected.

In order to ensure the successful delivery of the SECAP, each of the final actions has a named leader and, where relevant, a list of associated partner organisations. Each action also has an accompanying performance indicator as well as timescales for delivery and, where relevant, identified funding sources. Although many of the actions have already secured provisional funding, there are some which will require an initial feasibility study to determine their viability, and others for which funding still needs to be secured.

Funding for the larger, flagship projects has been provisionally secured through the Tay Cities Deal which includes a £26.5 million capital investment fund for Angus. This fund will be used to drive The Mercury Programme, a visionary partnership between government, public, private and community sectors. The purpose of the Mercury Programme is to "increase productivity through clean growth, protecting places for future generations to live, work and visit.[37]" Additional funding for specific projects will also be sought through national funds and programmes as well as through partnerships with key stakeholders, triggering private funds through supporting businesses and community initiatives.

[37] Tay Cities Deal. Available here.

In the wake of the Covid-19 pandemic, there are many unknowns and significant challenges facing the UK economy. The Tay Cities Deal and Mercury Programme provide an exciting opportunity to place Angus at the forefront of the green recovery, delivering sustainable economic growth, and new green jobs, whilst significantly reducing carbon emissions.

## Strategic Environmental Assessment

Throughout the development of the SECAP, it has been informed by and adjusted according to the results of a Strategic Environmental Assessment. The SEA helps to better protect the environment, increase public participation and ensure that plans, programmes and strategies support sustainable development. The purpose of a SEA is to minimise any potential negative effects on the environment and to enhance positive effects. Expert views are sought at various points in the preparation of the SEA, both from the public as well as the consultation authorities including NatureScot (previously Scottish Natural Heritage), Scottish Environmental Protection Agency (SEPA) and Historic Environment Scotland (HES). All documents associated with the SEA process are available to view on the Scottish Government's SEA database.

# Governance

## Governance structure

Effective governance will be required to ensure the successful delivery of this SECAP. Figure 4 below sets out the structure for how the SECAP will be governed.

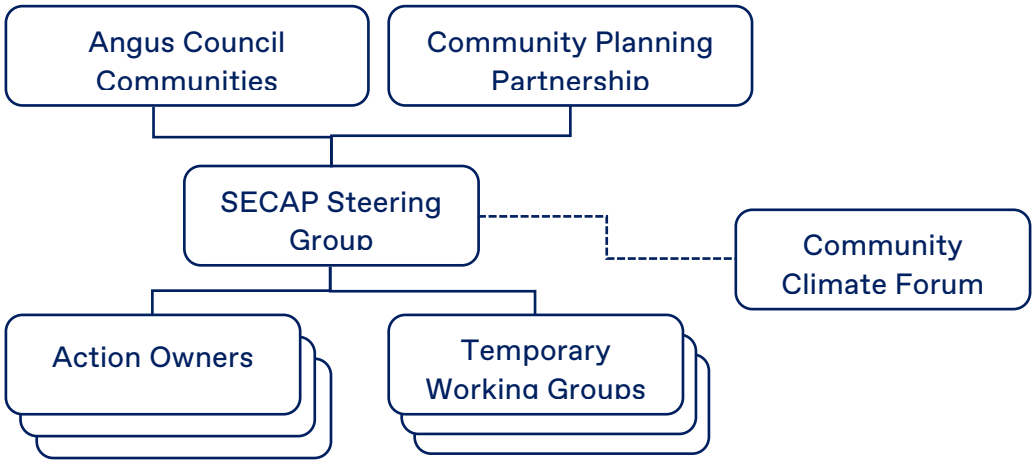



Figure 2: SECAP Governance Structure

## SECAP Steering Group

Central to this approach is the establishment of a SECAP Steering Group (see action G1). This will be an evolution of the Climate Member/Officers Group (MOG) which is currently in place in Angus. The table below provides high-level terms of reference for the Steering Group.

| Name | **SECAP Steering Grouping** |
|---|---|
| Purpose | - Has overarching responsibility for the delivery of the SECAP<br>- Accountable to the Community Planning Partnership and Elected Members in relation to delivery of the SECAP |
| Chair | Angus Council Senior Responsible Officer |
| Coordination | Angus Council SECAP Coordinator |
| Participation | - Current Climate MOG members<br>- Representation of any member of the Community Planning Partnership that can commit to sharing responsibility for the SECAP and that takes ownership of at least one live action in the plan<br>- Chair of the Community Climate Forum |
| Frequency | Convenes 4 times a year |
| Other terms of reference | - Agenda, attendance and minutes to be made publicly available<br>- Time-limited working groups can be formed for specific sub-purposes. This could be to explore some aspect relating to the SECAP in greater detail or to address some additional policy demand on the Steering Group. Working Groups would report back to the Steering Group and make recommendations |

Table 1: SECAP Steering group high level terms of reference.

## Project Owners and PACE Model

While the Steering Group will have overarching responsibility of the SECAP, responsibility for individual actions will rest with **Project Owners.** These will either be will be Angus Council officers (or teams) or appointed individuals belonging to another of the Steering Group organisations. They will be responsible for delivery of one or more actions in the SECAP and report progress to the SECAP Steering Group. Action owners will be determined using a PACE model.

Each project should specify how they will be delivered and by whom. To achieve this, each project will have a PACE acronym model applied to it. The PACE model is designed to enable fast decision making, accountability and consensus building needed to co-ordinate different stakeholder groups. Each letter within PACE specifies the level of ownership and responsibility for a given stakeholder as follows:

| Role | | Responsibility |
|---|---|---|
| **P** | **P**roject Owner | Responsible for planning and monitoring projects to ensure they are on time, on-budget and meet requirements. They coordinate and inform other stakeholders and seek necessary approvals. |
| **A** | **A**pprover | Responsible for reviewing key project milestones and approving any final decisions (usually a budget approver). |
| **C** | **C**ontributor | Responsible for providing expert consultation and enabling support (not a decision maker). |
| **E** | **E**xecutor | Responsible for “on the ground” project implementation. |

### Community Climate Forum

Also, to be established is a Community Climate Forum in line with the stated principles of climate action being **delivered in close partnership with local communities** and **being joined-up and integrated** (see action G2). The table below provides high-level terms of reference for the Community Climate Forum.

| Name | **Community Climate Forum** |
|---|---|
| Purpose | - To facilitate engagement around climate action with a broad range of interested parties throughout Angus<br>- To advise the Steering Group in relation to the SECAP and climate action |
| Chair | Elected by the Forum. Should not be part of Angus Council |
| Coordination | Angus Council SECAP Coordinator |
| Participation | Open to any individual or organisation living or working within Angus |
| Frequency | Convenes 4 times a year |
| Other terms of reference | - Agenda, attendance and minutes to be made publicly available<br>- Time-limited working groups can be formed for specific sub-purposes |

Table 2: SECAP Community Climate Forum high level terms of reference.

### Community Planning Partnership

Many of the benefits of climate change actions- known as co-benefits- are not always adequately considered or valued in the policy and decision-making process. In order to monitor and review the effectiveness of the SECAP a partnership approach is essential. Therefore, as shown above, the Community Planning Partnership Board will provide an overview and create a space for addressing any co-benefits and challenges that may arise. Reports on progress will be aligned to the Community Plan annual performance report which is published in the last quarter of the year and links a number of plans and strategies together to show the golden thread.

## Day-to-day coordination

This SECAP covers a diverse range of activities relating several different departments within Angus Council and partner organisations. While the Steering Group will play a key role in bringing this activity together, experience from other regions suggests that it will be helpful to have a focal point within the council for day-to-day management and communications.

It is also recognised that the fulfilment of this SECAP places additional time demands on council officers, many of whom are already at risk of being over-stretched.

As such, we will be appointing a SECAP Coordinator to work within Angus Council (see action G3). This will be a dedicated role responsible for:

- Coordinating management and reporting in relation to the SECAP;
- Managing SECAP refresh;
- Comms and promotion in relation to the SECAP;
- Light touch support for Action Owners;
- Facilitating Steering Group meetings;
- Facilitating Community Climate Forums;
- Linking back to Annual Statutory Reporting; and
- Acting as Action Owner for appropriate actions.

## Review Process

Although the actions within the SECAP will be reviewed regularly, a full review of the actions will take place every 2 years to monitor progress and identify remedial actions, or new actions, that

need to occur in order to achieve targets. This will ensure that the SECAP fully considers and reflects changes to technology, market conditions and environmental concerns.

In addition to this, a review of the SECAP will be triggered by major dislocation events, such as the Coronavirus. The Coronavirus has had a major impact on society, requiring an immediate response from national governments, local authorities, businesses and citizens. These major dislocation events would be of a scale and magnitude that has the potential to significantly alter the way in which society functions and its effect on the environment. These events would require a new approach from local authorities including potential changes to council policies, working practices, funding sources etc, and should be reflected in the SECAP.

# Action Plan

The core of the SECAP is the action plan which outlines how Angus can work towards achieving national targets by identifying key, deliverable actions covering both climate change mitigation and adaptation actions. Although often described separately, mitigation and adaptation actions cannot be viewed in isolation; any actions taken to reduce carbon emissions have the potential to impact an area's resilience and vice versa. Although two actions, when viewed separately, might both have positive outcomes, they could combine to create a new risk. On the other hand, mitigation and adaptation actions also have the potential to enhance and support one another, creating new synergies and benefits. This was a key consideration in the formulation of the final action lists, the intention being to maximise benefits and avoid or mitigate any potential negative interactions.

Alongside governance and process actions, the action plan is arranged according to 6 key sectors including:


Wherever possible, the actions build on existing projects and initiatives, helping to ensure that they are not only deliverable, but also have the necessary momentum and, wherever possible, funding in place to take them forward immediately. In the implementation of these actions, and any subsequent actions, the **core principles** (see page 12) should be central, guiding the long term shaping and delivery of the SECAP.

# Buildings

Buildings are a major source of greenhouse gas emissions in Scotland, with the residential sector alone accounting for roughly 15% of total emissions in 2017[38]. This figure only includes carbon emissions from the heating and cooling of homes, garden machinery and fluorinated gases (released from aerosols and inhalers). If the electricity to power homes was included, this figure would increase even further.

In order to meet climate change targets, it is important not only for new buildings to be designed and constructed in a sustainable way but also for the energy efficiency of the existing building stock to be improved[39]. Recent analysis by the International Energy Agency found that improving building efficiency was one of the most cost-effective ways to reduce emissions.

There are an estimated 52,500 households in Angus and this number is expected to rise to just over 55,000 in the next 17 years[40]. The social housing sector accounts for approximately 21% of the total housing stock with Angus Council owning and managing around 67% of these. The remaining 33% are owned by Registered Social Landlords. In order to increase the supply of good quality, sustainable and affordable housing, and contribute to national housing supply targets, the council together with Registered Social Landlords, will aim to develop around 120 new affordable homes per annum up to 2022[40].

## Fuel poverty

Fuel poverty is an important issue in Angus; approximately 33% of households in Angus experiencing fuel poverty[41]. A household is defined as experiencing fuel poverty when more than 10% of their income is spent on fuel, whilst households spending more than 20% of their income are considered to be in extreme fuel poverty. Fuel poverty and climate change are inextricably linked as taking action to improve the energy efficiency of homes, not only reduces the energy demand, and associated carbon emissions, but also reduces the amount households need to spend on fuel. Although several factors influence fuel poverty including fuel prices and household income, improving the energy efficiency of homes can make a significant difference.

One the core principles set out in this plan is that climate action in the region should be **fair and equitable**; actions should be undertaken in such a way as to ensure the benefits are shared widely, while the costs do not unfairly burden those most vulnerable.

[38] Scottish Greenhouse Gas Emissions 2018. Available here.
[39] Just Transition Commission: Advice on a Green Recovery. Available here.
[40] Angus Local Housing Strategy. Available here.
[41] Fuel poverty and extreme fuel poverty estimates. Available here.

## Building standards

Over the past 5 years the Council has led by example, delivering high quality, energy efficient homes. The council is well on its way to achieving its target of EESSH 1 compliance for all existing and new council housing stock by the end of 2020 and has already started work on achieving EESSH 2 by 2032.

Angus Council has adopted a "fabric first" approach to housing design (see action B4). The fabric first approach seeks to maximise the performance of the building fabric itself, for example through measures such as increased insulation and natural ventilation, before considering the use of mechanical or electrical systems. This approach not only saves money, but also requires less maintenance whilst providing a high level of energy efficiency.

### EESSH 1 and EESSH 2

The Energy Efficiency Standard for Social Housing (EESSH) is a Scottish Government standard which supports the vision of warm, high quality affordable and low carbon homes. EESSH 1 was introduced in 2014 and set targets for energy efficiency in social housing across Scotland up to 2020. Building on the progress already made, EESH2 looks towards 2032 and proposes a longer-term approach to improving energy efficiency across the social housing stock. EESH forms a crucial part of helping Scotland meet its climate change targets.

## Innovation

Angus Council is committed to **embracing innovation** and promoting high quality, sustainable developments. Funded through the Mercury Project, and working in partnership with the Scotland Innovation Centre, Angus Council will deliver a flagship low-carbon, housing led regeneration scheme at Timmergreens (see action B2). The project will demonstrate the smart, low carbon housing of the future and explore innovation, not only in new build housing but also in retrofitting existing housing.

The Council will also seek funding through the Social Housing Decarbonisation Fund Demonstrator, to run a pilot programme comparing and testing the efficacy of different retrofit technologies in improving energy efficiency (see action B3). Working together with academia and experts in the industry, the findings from the pilot will help inform future investments in the region and ensure that any retrofit projects maximise performance, practicality and value for money.

Beyond housing, Angus Council is also working with partners to deliver the Zero Four Business Park at Montrose (see action B1). The multimillion-pound, mixed use development has the renewable energy sector at its heart. The project will help kick-start the economy, supporting the green recovery following the Covid-19 pandemic. Angus council will support the development of carbon neutral starter units, promoting sustainable design and helping to minimise running costs for businesses.

## Behavioural change

In addition to improving the building stock another key factor in reducing carbon emissions is behaviour change. The most cost-effective way of reducing energy is by reducing the amount of energy used in the first place. This can be as simple as switching off appliances when not in use and reducing the temperature of washing machines. There are many initiatives and organisations that provide support to households across Scotland including Home Energy Scotland and Resource Efficient Scotland. Angus council is committed to playing its part by helping to facilitate the uptake of high-quality information and advice to support residents in reducing their energy consumption.

## Overview of actions

Table 3. below sets out the objectives and actions that have been identified in relation to buildings in Angus. A full description of each action is provided in Appendix 1.

| Objective | Action | Ref |
|---|---|---|
| Support sustainable development in the region | DELIVER Clean growth business units at Zero Four Business Park | B1. |
| | CONTINUE to implement Angus Agile Programme. | B9. |
| | RUN a pilot programme comparing and testing the efficacy of different retrofit technologies. | B3. |
| | CONTINUE to deliver high quality, energy efficient homes using a 'fabric first' approach and working towards full compliance with EESSH 2 by 2032. | B4. |
| | DELIVER Timmergreens low carbon housing-led regeneration scheme. | B2. |
| Improve the energy efficiency of the existing building stock | ENSURE continued decarbonisation of heating systems in the Angus Council property portfolio. | B5. |
| | PURSUE funding opportunities to 'Enerphit' existing Council Properties which have a low energy performance rating. | B6. |
| Support the adaptation of Angus' built environment to ensure it is resilient to the impacts of climate change | DEPLOY drainage and flood management in new developments, as appropriate | B8. |
| | DELIVER a maintenance and repair programme for historic buildings to ensure they are resilient to the impacts of climate change. | B7. |

Table 3: Building Actions.

# Energy

Using renewable energy rather than fossil fuels can significantly decrease emissions. The pace of investment and share of renewable energy as a proportion of energy generated in Scotland has increased considerably over the past decade and in 2018 the equivalent of 76.2% of gross electricity consumption in Scotland was from renewables[42].

The Scottish Government aims to generate 50% of Scotland overall energy consumption, including energy for heating, from renewable sources by 2030 and by 2050 the aim is to decarbonise the energy system almost completely.

Renewable and low carbon energy offers a huge opportunity for economic and industrial growth. Angus has clear strengths in a number of key requirements for the sector including the availability of natural resources, key infrastructure and skills, and is perfectly placed to take advantage of the opportunities offered.

## Innovation

There are a number of innovative projects in the pipeline to grow renewable energy generation in the region, positioning Angus as a leader in renewable technologies, creating new employment opportunities, fostering innovation and supporting long term sustainable growth in the region. These investments align with several of the SECAP key principles including **enabling opportunities to contribute to the local economy, supporting skills development** and **embracing innovation**.

In addition to providing business starter units at the Zero 4 site in Montrose, the project will also accelerate the delivery of net- zero solutions by creating an energy transition cluster including offshore wind, hydrogen and carbon capture technologies (see action E1). The development is strategically placed to help facilitate the delivery of offshore wind turbine developments in the North Sea, including the Seagreen offshore wind farm, by providing operation and maintenance facilities (see action E3).

### Seagreen Offshore Wind Farm

Seagreen is a £3billion offshore wind farm development by SSE located off the east coast of Angus, Phase one is currently under construction and the windfarm is expected to commence commercial operations in 2024. When completed, the project will be capable of powering 1 million homes each year with low carbon, renewable energy.

SSE forms part of the Forth and Tay Offshore Wind Cluster which was established to drive growth of offshore energy on the east coast of Scotland. It forms part of a wider network of clusters established in key areas across the UK to maximise the opportunities and benefits to local areas from the offshore renewables sector.

Angus Council is also exploring the potential of repurposing disused landfill sites for renewable energy generation (see action E4). Following its closure in 2017, Angus Council is currently examining the feasibility and business potential of remodelling the Restenneth landfill site for renewable energy generation through different technologies such as solar panels or biofuels.

[42] Energy Statistics for Scotland Q3 2019 Figures. Available here.

## Energy in rural communities

One of the challenges in sustainable energy and heat production in Angus is the rural location of many of the communities. Angus Council has received funding to a pilot a Local Heat and Energy Efficiency Strategy (LHEES). Through the project, six rural communities, off the gas grid, in different locations will be selected and their energy and heating needs considered alongside potential solutions (see action E6). This will inform the development of a 20-year strategy and framework for reducing energy demand and decarbonising the heat supply of buildings.

## Overview of actions

Table 4. below sets out the objectives and actions that have been identified in relation to energy generation and use in Angus. A full description of each action is provided in Appendix 1.

| Objective | Action | Ref |
|---|---|---|
| Grow renewable energy generation in the region | CREATE a North Angus Clean Growth Area in Montrose. | E1. |
| | EXPLORE the potential for repurposing the Restenneth landfill site for renewable energy generation through either Solar PV deployment or biofuels | E4. |
| | CONTINUE installing solar PVs on high energy use buildings and investigate/ pilot battery storage solutions. | E5. |
| | SUPPORT the delivery of the Seagreen Wind Energy project off Montrose Port. | E3. |
| | PRIORITISE the development of the Forth & Tay Offshore Wind Cluster. | E2. |
| Ensure affordable access to energy and support sustainable energy projects. | EXPLORE the potential of innovative models for investment and management of renewable energy generation infrastructure for rural communities. | E8. |
| | PILOT Local Heat and Energy Efficiency Strategy (LHEES) implementation with selected rural communities. | E6. |
| Improve the energy efficiency of public infrastructure | IMPROVE the efficiency of public lighting infrastructure and the performance of the supporting energy network, through opportunities presented by the streetlight replacement programme | E9. |
| | ENSURE adequate provision of Solar PVs and Battery Storage systems at EV charging hubs, where appropriate. | E7. |

Table 4: Energy Actions.

# Transport

Transport contributes significantly to Angus' carbon emissions and, as a sector, road transport was responsible for largest proportion of carbon emissions in Scotland in 2017[43].

As a largely rural area, the majority of households in Angus own one or more private fossil-fuelled cars. In 2017, the primary mode of transport in Angus was cars/vans (approximately 68%), followed by walking (27%). Approximately 4% of journeys were taken by public transport with the remaining 1% split between cycling (0.5%), taxis and other modes of transport[44].

There are a number of factors that influence the way in which people chose to travel including geography, cost and individual circumstances such as age and gender. Due to the rural nature of many of the areas within Angus, it is sometimes difficult to travel long distances without the use of a car. Although many services, facilities and employment opportunities can be found in the town centres, for many people long distance travel is a necessary part of daily life, especially when accessing more specific services such as specialist health care[45].

Tackling transport-related carbon emissions in the region then is largely about enabling people to access meaningful and cost-effective alternatives to using private fossil fuelled cars to access services and destinations. Actions are required to increase the use of more sustainable modes of transport, including walking, cycling and public transport, as well as reducing the need to travel in the first place. Using more sustainable modes not only has a positive impact on the environment, but also helps to improve citizens health and wellbeing through improved air quality and increased physical activity. It also helps to tackle social inequality by providing affordable access to opportunities, in line with the key principle of actions being **fair and equitable** in order to address transport poverty.

Transport is also particularly vulnerable to the impacts of climate change, with the increasing number of severe and frequent weather events, causing disruptions and damage to transport infrastructure[46]. This often disproportionately affects vulnerable communities who have fewer and less resilient transport option.

## Active travel

Many journeys are relatively short and could easily be undertaken by walking or cycling. In 2017 26% of journeys in Angus were less than 1km, with this number rising to just over 58% for journeys under 5km47.

There are several successful and well-established community groups in Angus promoting active travel and a healthier lifestyle. Angus Cycle Hub was formed in 2013 and is dedicated to supporting cycling and active travel. Since their incorporation they have won several awards and, as of 2015, have over 14,000 participants[48]. Through their bicycle recycling programme, they have saved upwards of 73,000kg of carbon emissions. Angus Cycle Hub is indicative of many of the community projects currently underway in Angus and shows the commitment and passion of Angus' citizens. In line with the key principle of **working in close partnership with communities**, the council is committed to supporting these groups to make a positive change in Angus (see action T4).

[43] Scottish Greenhouse Gas emissions 2017. Available here.
[44] Transport and Travel in Scotland 2017- Scottish Household Survey Local Authority results.
[45] Angus Local Transport Strategy. Available here.
[46] National Transport Strategy. Available here.
[47] Transport and Travel in Scotland 2017- Scottish Household Survey Local Authority results.
[48] Angus Cycle Hub. Available here.

## Low emission vehicles

In support of Scotland's ambition to phase out petrol and diesel cars and vans by 2032, Angus Council has taken measures to develop electric vehicle (EV) charging infrastructure. The use of EVs has increased dramatically over the last few years[49].

Work has begun on a new EV charging hub in Forfar as part of the "Angus on the Go" project and is expected to be completed in 2020/2021. Angus is also seeking funding through Transport Scotland's Switched On Towns and Cities Programme to implement EV charging hubs at Arbroath, following a successful bid to explore the feasibility of EV infrastructure in the area (see action T7).

As part of the Mercury project, Angus Council will develop a rural mobility hub at Brechin (see action T6). The hub will incorporate EV charging along with exploring alternative fuelling options such as hydrogen and biomethane. It will be supported through the use of Mobility as a Service tools, helping to position Angus at the forefront of innovative transport technologies. The council is also exploring the potential of including a freight consolidation centre as part of the hub, utilising low carbon vehicles for last mile deliveries in the area.

## Innovation

Also, as part of the Mercury project, Angus Council is in the initial phases of developing a drone port at Montrose. The drone port will form part of the Zero 4 Development and be the first of its kind in Scotland. With the drone industry set to expand dramatically over the next few years, Angus Council is keen to capitalise on the opportunities it offers by creating a world-class, pioneering facility, placing Angus at the forefront of rapidly advancing aerial technologies (see action T11). Drone technology can replace trips which otherwise would have been made through more carbon intensive means, such as helicopters and can be used to serve a variety of key sectors including construction, agriculture and healthcare.

[49] Angus leading the charge with electric vehicles. Available here.

## Overview of actions

Table 5. below sets out the objectives and actions that have been identified in relation to transport in Angus. A full description of each action is provided in Appendix 1.

| Objective | Action | Ref |
|---|---|---|
| Increase the proportion of journeys in Angus made via active modes | DELIVER the 2020 Angus Active Travel Strategy | T1. |
| | ENHANCE active travel networks, taking account priorities in the TAYplan Green Network Strategy | T2. |
| | SUPPORT Angus Cycle Hub community cycling programmes. | T4. |
| | ENHANCE infrastructure improvement and maintenance processes to encourage additional provision of facilities for pedestrians and cyclists | T3. |
| Increase the use of zero and low emission vehicles in Angus. | SUPPORT the implementation of the Tactran Regional Electric Vehicle Strategy | T5. |
| | IMPLEMENT a low carbon Mobility Hub at Brechin | T6. |
| | DELIVER offshore asset monitoring and repairs using drone technologies | T11. |
| | IMPLEMENT any recommendations of the fleet review that could reduce the carbon impact of the Angus Council vehicle fleet. | T8. |
| | IMPLEMENT an EV charging hub in Arbroath | T7. |
| | IMPLEMENT key parts of the Tactran Regional Transport Strategy. | T10. |
| | DEVELOP a Passenger Transport Strategy. | T9. |
| Reduce the carbon impact of freight and logistics in Angus | REDEVELOP the Montrose railhead to shift Montrose Port road freight transport to rail | T12. |
| Increase Angus' resilience to climate change. | DEVELOP policies to strengthen the resilience of Angus's transport network to the impacts of climate change, as part of the Tactran Regional Transport Strategy. | T13. |

Table 5: Transport Actions.

# Land Use & Forestry

Angus has a rich geography that includes coastal areas, prime agricultural land and a wide expanse of rolling hills and glens. Approximately three quarters of the population live within the seven main towns, Forfar, Kirriemuir, Montrose, Brechin, Arbroath, Carnoustie and Monifieth[50]. The remainder live in satellite villages or smaller settlements in more rural areas where, in the case of very remote rural areas, it can sometimes be a challenge to access services.

Angus' natural environment is one of its strongest assets and holds great value for both residents and the many tourists who visit the region each year. It is essential that the natural environment is protected and enhanced to ensure it can be treasured and enjoyed for many generations to come.

Angus Council recognises its responsibility in protecting the unique natural environment and cultural heritage of the region and this is reflected in the Angus Local Development Plan. The next iteration of the plan is currently under development. Climate change mitigation and adaptation will be key considerations in the plan, helping to drive and support sustainable development in the region. The council is also developing a Woodland and Forestry Strategy to help guide the development of woodlands and forests in Angus.

Following the Covid-19 pandemic, there is an even greater understanding and appreciation of the value of our shared green spaces. Angus Council is committed to providing access to good quality open spaces and natural environments to aid the wellbeing of citizens and visitors.

### Tourism in Angus

Tourism is an important sector in Angus, contributing approximately £240 million to the local economy and supporting close to 4000 full time jobs[49A].

As well as being home to world famous heritage attractions including Glamis Castle, Angus boasts miles of unspoiled landscapes and some of the best local produce in Scotland including Aberdeen Angus beef and Arbroath Smokies. Angus has some of the finest golf courses in Scotland, including the Carnoustie Championship Course, and welcomes thousands of visitors each year.

Many of Angus' tourism industries trade on the quality of the environment, and therefore it is imperative that it is protected and enhanced. The tourism industry has been one of those hardest hit by the coronavirus pandemic. As the industry recovers, it is an important opportunity to support a Green Recovery, helping to create a more vibrant, sustainable and resilient tourism industry in Angus.

## Green health

Over the past few years, Angus Council, together with select GP practices, has piloted and implemented social prescribing which helps people to access and use non-medical sources of support to improve their health and wellbeing. Going forward, Angus Council will build on this work by delivering a series of Green Health Initiatives, the aim being to increase communities' overall health and wellbeing through interaction with the environment (see action L2). The initiatives will include Green Health Prescriptions, a new referral process for health care professionals to direct patients towards nature-based interventions; and delivering a Moving Medicine Pilot, which provides clinicians with evidence based, condition specific information to help give advice on and encourage physical activity.

[50] Angus Local Outcomes Improvement Plan. 2017- 2030. Available here.
[49A] Invest in Angus. Available here.

## Green infrastructure

Together with delivering Green Health Initiatives, Angus Council's aim is to protect and enhance the functionality and connectivity of existing Green Networks within settlements and across Angus (see action L7). Green Networks are composed of green infrastructure. Green infrastructure can contribute to both climate change mitigation and adaptation and, if designed correctly, can perform many different functions including protection against flooding and erosion, strengthening habitat networks, enhancing biodiversity and improving air quality.

### Definition: Green Infrastructure

The European Commission defines green infrastructure as "the use of ecosystems, green spaces and water in strategic land use planning to deliver environmental and quality of life benefits.[49B]" Examples of green infrastructure include parks, open spaces, woodlands, wetlands, allotments and rivers.

## Adaptation and flood protection

When it comes to climate change adaptation, flooding and coastal erosion is of particular concern in Angus. The council has invested in, and delivered, several successful flood protection schemes including the Brechin Flood Protection Scheme[51]. Developed in partnership with the Scottish Environmental Protection Agency (SEPA), The Arbroath Flood Protection Scheme, ranked nationally as a priority project, is currently under construction with an estimated completion date of 2022. Recently more focus has been placed on natural flood protection measures which seek to protect, restore and emulate natural functions of catchments, rivers and the coast in order to manage flood risk. Studies have shown that tree planting along the contours of a hillside can result in a peak flood reduction of around 40%[52].

### Invasive Non-Native Species

As part of the Scottish Invasive Species Initiative, volunteers have been helping to remove invasive plant species from Angus riverbanks. In 2019, over 330 volunteers took up arms to help battle INNS in Angus, helping to protect and conserve Angus' rich natural environment

Invasive species not only have the ability to cause harm to native species, but they also have a large economic impact. It is estimated that invasive species cost the economy between £2-6billion per year in the UK [51B].

Angus Council, together with partners including the Cairngorms National Park Authority, continues to investigate and deliver landscape scale approaches to natural flood management including woodland expansion, peatland restoration and riparian tree planting schemes all of which are excellent land use management approaches to mitigate against the effects of climate change (see action L12 and L13). Volunteers have also been carrying out treatment of Invasive Non-Native Species (INNS) which has helped to reduce soil erosion and improve the stability of riverbanks during severe weather events (see action L9).

Following the success of the River South Esk Catchment Partnership, Angus Council will seek to expand this approach to other rivers, ensuring a co-ordinated and holistic approach to the management of catchments in the region (see action L5). Promoting and reflecting the key principles of **joined-up and integrated** working.

[49B] Green Infrastructure: design and placemaking. Available here.
[51] Angus Council. Brechin Flood Protection Scheme. Available here.
[52] Public Sector Climate Change Duties 2019 Summary Report Angus. Available here.
[51B] Non-native species, NatureScot. Available here.

## Overview of actions

Table 6 below sets out the objectives and actions that have been identified in relation to land use and forestry in Angus. A full description of each action is provided in Appendix 1.

| Objective | Action | Ref |
|---|---|---|
| Provide access to good quality open space and natural environments to aid the wellbeing of citizens and visitors | DEVELOP and EXPAND work around Angus' Green Health initiatives. | L2. |
| | IMPLEMENT the TAYplan Green Network Strategy as it relates to Angus. | L1. |
| | SUPPORT development of sustainable tourism. This would include food, transport and building energy efficiency. This activity contributes to the 4th Cairngorms National Park Partnership Plan and will deliver against the Tourism Declares initiative. | L14. |
| Increase Angus' resilience to flooding. | ENSURE the Shoreline Management Plan (SMP2) policies to mitigate coastal erosion are integrated into development control activities, as appropriate | L3. |
| | IDENTIFY opportunities for natural flood management or other enhancement projects arising from the flood risk plans | L6. |
| | EXPAND the integrated land use approach adopted by the River South Esk Catchment Partnership to other river catchments and involve relevant land managers. | L5. |
| | ENGAGE with community groups to educate and raise awareness amongst the public of flooding | L4. |
| Promote the development of sustainable neighbourhoods and communities. | DEVELOP guidance for enhancing green and blue networks in the region, enhancing and connecting networks. | L7. |
| | DESIGN and structure development to minimise environmental impacts and promote sustainable behaviours. | L8. |
| Enhance Angus' natural biodiversity | IMPLEMENT Tayside Local Biodiversity 2016-26 Action Plan. | L11. |
| | SUPPORT and PROMOTE third party organisations delivering Angus wide invasive non-native species (INNS) projects | L9. |
| | ENABLE/ ENCOURAGE temporary greening projects on vacant and derelict land. | L10. |
| | CONTINUE to support the delivery of peatland restoration projects. | L13. |
| | SUPPORT and PROMOTE woodland expansion in the 'Target' areas within Angus as identified by Angus Woodland and Forestry Framework and the Cairngorms National Park Forestry Strategy. | L12. |

Table 6: Land Use and Forestry Actions.

# Agriculture and Food

Angus has some of the best growing land in Scotland with over 40% of the A class agricultural land in Scotland. Farming is an important industry in the region and Angus is home to some of the most innovative agricultural business in the UK. With its reliance on weather patterns, agriculture is particularly susceptible to the impacts of climate change.

Agriculture is the second largest contributor to carbon emissions in Scotland, after transport, and as such is a critical sector to address in helping to meet national climate change targets. There are a number of steps agricultural businesses can take to reduce carbon emissions including optimising land use, utilising new technologies and turning waste into a resource. Actions like these not only help to reduce carbon emissions but also improve water and air quality, increase biodiversity, increase farm's financial security and at the same time increase Scotland's carbon sink[53].

## Innovation

Angus Council is committed to supporting innovation and clean growth in the agricultural sector. One of the key priority areas through the Mercury programme is Agri-Tech Innovation. A central Agri-Tech hub will be created in Forfar with several accompanying projects including a crop quality centre, delivered in partnership with Agrico; a precision farming centre delivered in partnership with SoilEssentials; an Innovation farm, developed together with the James Hutton institute and finally; a Neutral Spirit Still at Arbikie Highland Estate (see actions A1-A4). The Agri-Tech project will foster innovation in the industry, help drive a green recovery post Covid-19 and support several of the SECAP key principles by creating opportunities to **boost the local economy** and **supporting skills development** in the region.

Several farmers in Angus are already leading the way when it comes to reducing carbon emissions and adapting to the potential impacts of climate change. Backboath farm in Forfar, as well as Arable Ventures in Kirriemuir, are trialling and developing new ideas under the Scottish Governments Farming for a Better Climate Programme Soil Regenerative Agriculture Group[54]. Using a field to bottle approach, Arbikie distillery has been working towards becoming one of the world's most sustainable distilleries and recently launched the world's first climate positive gin[55].

## Good Food Nation

Access to healthy, fresh food, grown in a sustainable way can make a real and positive difference to people's health and wellbeing. Angus Council supports the Scottish Governments vision of becoming a "Good Food Nation, where people from every walk of life take pride and pleasure in, and benefit from, the food they produce, buy, cook, serve and eat each day." The Angus Food Growing Strategy is currently in development and sets out how the council will support food growing, help tackle food poverty and support local growers (see action A8).

[53] Agriculture and the Environment, Scottish Government. Available here.
[54] Farming for a better Climate. Available here.
[55] Arbikie Distillery. Available here.

## Overview of actions

Table 7. below sets out the objectives and actions that have been identified in relation to agriculture and food in Angus. A full description of each action is provided in Appendix 1.

| Objective | Action | Ref |
|---|---|---|
| Support clean growth and innovation in the agricultural sector | DEVELOP a Centre for Agricultural Sustainable Innovation at Forfar. | A1. |
| | DELIVER a Neutral Spirit Still at Arbikie Highland Estate. | A5. |
| | DELIVER a precision farming centre | A3. |
| | DELIVER an innovation farm. | A4. |
| | DELIVER a crop quality centre. | A2. |
| | PROMOTE the value and widespread adoption of nature friendly farming practices, to create healthier soil, woodlands and habitats across Angus. | A11 |
| Promote the use of sustainable, local produce | DEVELOP and support local food procurement practices by public sector organisations | A6. |
| | CONTINUE to promote local food and drink initiatives through the Angus Tourism Cooperative and Appetite for Angus | A7. |
| Increase the provision of food growing facilities in Angus | IMPLEMENT actions within the Angus Food Growing Strategy could reduce the carbon impact of food provision in Angus | A8. |
| | SUPPORT local growing initiatives and help identify partnership opportunities. | A10. |
| | IDENTIFY land that can be used for community growing initiatives in line with the Angus Food Growing Strategy. | A9. |

Table 7: Agriculture and Food Actions.

# Waste

The link between waste and carbon emissions is not always clear. Waste is often overlooked when it comes to carbon emissions, but the way in which we obtain, use and dispose of materials has a significant impact on carbon emissions. According to a report by Zero Waste Scotland, material consumption is responsible for approximately 60% of carbon emission in Scotland[56].

## Circular Economy

In our current "take, make, dispose" system, resources are extracted from the environment, manufactured into products and leave the economy as waste. The extraction of resources and waste disposal are both activities with high carbon impacts. An alternative to this model if the circular economy which seeks to design out waste and keep products and materials in use for as long as possible see figure 5. below. This is also reflected in the Scottish waste hierarchy where emphasis is placed on preventing waste in the first place and reusing products over recycling and finally landfill disposal, see figure 6.

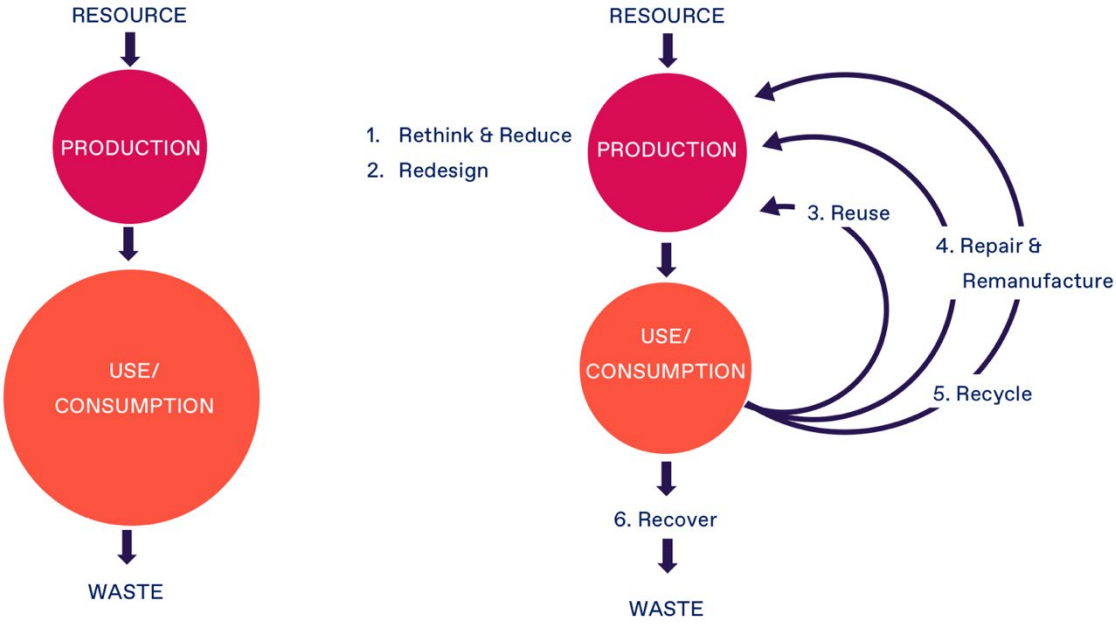



Figure 5: Linear versus Circular Economy.

Using the circular economy principles waste also becomes an opportunity, by utilising waste in new and innovative ways, businesses can create new revenue streams whilst minimising their impact on the environment.

Supported by Zero Waste Scotland, Circular Tayside is a major initiative to help businesses in the region identify and capitalise on circular economy opportunities. There are several projects already underway in Angus including Angus 3D Solutions, a sector-leading 3D printing start up that reduces waste in the design process and extends the lifespan of machinery by allowing obsolete parts to be manufactured from 3D scans. Together with Circular Tayside, and in line with the key principle of **supporting emerging business models and practices**, Angus Council is

[56] The Carbon Impacts of the Circular Economy Summary Report, 2015. Available here.

committed to supporting local circular economy initiatives and implementing circular economy principles in major developments (see action W6).

## Food waste

Started by Sustainable Kirriemuir, an action driven community group committed to tackling climate change, NOURISH is an ambitious two-year project to get the community growing food, learning about climate change and cutting food waste. Working with Angus Council and local schools the project will aim to cut food waste whilst at the same time providing healthy, fresh food for the community (see action W4).

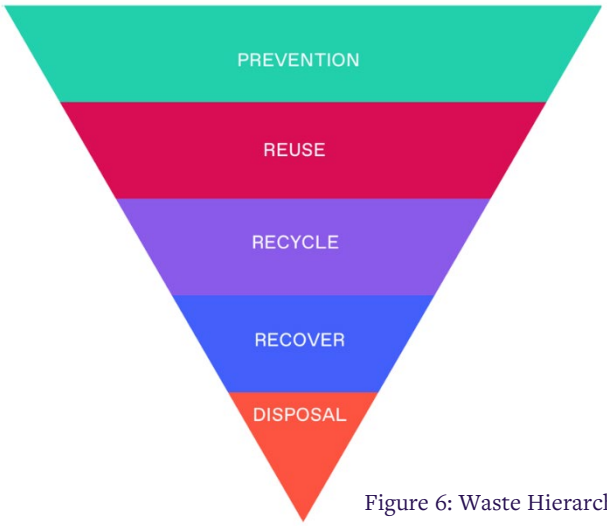



Figure 6: Waste Hierarchy

## Recycling

In 2019, Angus Council had the second highest household recycling rate in Scotland at 59.1% and sent the second lowest amount of waste to landfill of any Scottish authority at only 5.1 tonnes.

In November 2017 Angus Council in partnership with Dundee City Council commenced a 28 year contract with MVV Environmental Baldovie for the treatment of residual waste at a thermal treatment plant in Dundee. This means that all household residual waste in Angus is now treated at a thermal Waste to Energy plant rather than landfill, and as a result the Angus Council landfill at Restenneth, Forfar closed on 31 March 2018.

A review of recycling centre provision in Angus and the resultant removal of general waste skips from four out of seven recycling centres in February 2019 resulted in a significant increase in the recycling rate achieved, from 52.79% for the year March '18-February '19 to 60.54% for the year March '20-February '21.

Angus Council is committed to continuing to improve its waste services and recycling rates.

Across Scotland a new Deposit return scheme will be launched in July 2022. The scheme is designed to make it easy for people to do the right thing and will help tackle 'throw-away' culture. With the new scheme, people will pay a small deposit when they buy a drink in a single-use container and then get the deposit back when they return the empty bottle or can. Similar schemes are already in place across Europe and have been very successful in reducing litter and tackling climate change. Angus Council is currently working to align its kerbside waste collection services with the scheme ensuring an easy transition for residents (see action W1).

## Overview of actions

Table 8. below sets out the objectives and actions that have been identified in relation to waste in Angus. A full description of each action is provided in Appendix 1.

| Objective | Action | Ref |
|---|---|---|
| Make it as easy as possible for households and businesses to recycle waste | IMPLEMENT a programme to increase the use of recycling and food waste processing by customers of Angus Council's commercial waste management services | W3. |
| | IMPLEMENT alignment of kerbside collection services with the Scotland's Deposit Return Scheme to be rolled out in July 2022 | W1. |
| | CONTINUE the "Right Stuff, Right Bin" campaign, leveraging both on-line and print media | W2. |
| Reduce food waste in Angus. | CONTINUE programmes to redistribute surplus food to community organisations. | W5. |
| | SUPPORT local initiatives to reduce food waste. | W4. |
| Reduce the amount of non-household waste going to landfill through repair and reuse initiatives. | ADOPT circular economy principles in supply chains for major development projects in the region. | W6. |

Table 8: Waste Actions.

# Governance and Process.

Table 9. below sets out the objectives and actions in relation to governance and process. A full description of each action is provided in Appendix 1. A full explanation of the governance structure, including the day to day coordination of the SECAP, is included on page 21.

| Objective | Action | Ref |
|---|---|---|
| Ensure sustainability is a key priority in the council. | RECRUIT a SECAP Coordinator to for facilitating management, reporting and communication activities in relation to the SECAP | G3. |
| | EVOLVE the Climate Change Member Officers Group and accompanying Working Groups into a SECAP Steering Group and temporary working groups | G1. |
| | ESTABLISH a Community Climate Forum to engage community groups and advise on the development of the SECAP | G2. |
| Support sustainable procurement practices | ENCOURAGE partners to develop procurement policies which favour local suppliers, where appropriate | G5. |
| | DEVELOP and implement a sustainable procurement action plan for Angus Council. | G4. |
| Develop consistent approaches to measuring progress against climate goals across the region. | EXPLORE the potential of utilising carbon emissions monitoring software. | G6. |
| | EXPLORE the potential for utilising adaptation benchmarking and monitoring tools | G7. |
| Increase citizens' awareness of sustainability and the impacts of climate change. | SHOWCASE examples of low carbon best practice adopted by businesses in the region | G9. |
| | DEVELOP a communications strategy to raise awareness, and showcase sustainability across Angus and help people to understand and engage with climate change | G8. |

Table 9: Governance and Process Actions.

# Appendices

# Appendix I: Action Tables

## Buildings

| Action | Ref | Lead | Partners | Proposed Performance Indicators | Timescales Short (1-2yrs) Medium (2-6yrs) Long(6-10yrs) | Funding in Place |
|---|---|---|---|---|---|---|
| DELIVER Clean growth business units at Zero Four Business Park | B1. | Economic Development (AC) | Crown Estate Scotland, Zero Waste Scotland, Circular Tayside | To be established through the Mercury Programme | Medium | Proposed to be funded through the Mercury Programme |
| DELIVER Timmergreens low carbon housing-led regeneration scheme. | B2. | Housing(AC) | Property (AC), Scotland Innovation Centre, Forster Roofing | To be established through the Mercury Programme | Medium | Proposed to be funded through the Mercury Programme |
| RUN a pilot programme comparing and testing the efficacy of different retrofit technologies. | B3. | Property (AC) | The Scottish Energy Centre (SEC) at Edinburgh Napier University, SCARF, Tenant Steering Group (AC), Communities Team (AC), Community Housing Team (AC), Dundee and Angus College, University of Dundee | To be established as part of programme | Medium | Apply to the Social Housing Decarbonisation Fund Demonstrator |
| CONTINUE to deliver high quality, energy efficient homes using a 'fabric first' approach and working towards full compliance with EESSH 2 by 2032. | B4. | Property (AC) | - | % of council properties compliant with EESSH2 | Up to 2032 | Assessed on a project-by-project basis |
| ENSURE continued decarbonisation of heating systems in the Angus Council property portfolio. | B5. | Property (AC) | - | Proportion of low carbon heating systems in the Angus Council portfolio | Ongoing | Potential to apply to the Social Housing Net-Zero Heat Fund. (Before 18th of December 2020) |

| | | | | | | |
|---|---|---|---|---|---|---|
| PURSUE funding opportunities to 'Enerphit' existing Council Properties which have a low energy performance rating[57]. | B6. | Property (AC) | - | Number of Council Properties retrofitted | ongoing | Assessed on a project-by-project basis |
| DELIVER a maintenance and repair programme for historic buildings to ensure they are resilient to the impacts of climate change. | B7. | Property (AC) | Historic Environment Scotland. | Number of historic buildings retrofitted | Medium/Long | Funding not yet in place. Will be required |
| DEPLOY drainage and flood management in new developments, as appropriate | B8. | Property (AC) | Planning (AC) | % of new developments with measures deployed | Ongoing | Assessed on a project-by-project basis |
| CONTINUE to implement Angus Agile Programme[58]. | B9. | Property (AC) | - | Total carbon emissions from Angus Council office buildings | Short | Existing funding. |

[57] https://passipedia.org/certification/enerphit
[58] https://www.angus.gov.uk/sites/angus-cms/files/2019-02/The%20Council%20Plan%20_1.pdf

# Energy

| Action | Ref | Lead | Partners | Proposed Performance Indicators | Timescales Short (1-2yrs) Medium (2-6yrs) Long(6-10yrs) | Funding in Place |
|---|---|---|---|---|---|---|
| CREATE a North Angus Clean Growth Area in Montrose. | E1. | Economic Development (AC) | Property (AC), Crown Estate Scotland | To be established through the Mercury Programme | Medium | Proposed to be funded through the Mercury Programme |
| PRIORITISE the development of the Forth & Tay Offshore Wind Cluster. | E2. | Economic Development (AC) | Forth and Tay Offshore, EDF Renewables, SSE Renewables, Red Rock Power, SE | To be established in partnership with the Cluster | Long | |
| SUPPORT the delivery of the Seagreen Wind Energy project off Montrose port. | E3. | SSE Renewables | Economic Development (AC) Forth and Tay Offshore | To be established in partnership with SSE | Medium | Owned by SSE Renewables. |
| EXPLORE the potential for repurposing the Restenneth landfill site for renewable energy generation through either Solar PV deployment or biofuels | E4. | Environmental Management (AC) | | Costed options appraisal complete | Short | Funding not yet in place. Will be required |
| CONTINUE installing solar PVs on high energy use buildings and investigate/ pilot battery storage solutions. | E5. | Property (AC) | - | % of electricity supply to council properties from PVCs. | Short/ Medium | Salix Funding in place. |
| PILOT Local Heat and Energy Efficiency Strategy (LHEES) implementation with selected rural communities | E6. | Planning (AC) | Property (AC) | To be established as part of programme | Short/ Medium | Funding granted through LHEES under the Energy Efficient Scotland Programme. |
| ENSURE adequate provision of Solar PVs and Battery Storage systems at EV charging hubs, where appropriate. | E7. | Planning (AC) | Tactran | Increase in vehicle kms travelled by EVs in the region | Ongoing | Assessed on a project-by-project basis |

| | | | | | | |
|---|---|---|---|---|---|---|
| EXPLORE the potential of innovative models for investment and management of renewable energy generation infrastructure for rural communities | E8. | Economic Development (AC) | - | Costed options appraisal complete | Short | Funding not yet in place. Will be required |
| IMPROVE the efficiency of public lighting infrastructure and the performance of the supporting energy network, through opportunities presented by the streetlight replacement programme | E9. | Street Lighting Partnership | Transport (AC) | Reduction in energy usage from public lighting in Angus | Long | Funding not yet in place. Will be required |

# Transport

| Action | Ref | Lead | Partners | Proposed Performance Indicators | Timescales<br>Short (1-2yrs)<br>Medium (2-6yrs)<br>Long(6-10yrs) | Funding in Place |
|---|---|---|---|---|---|---|
| DELIVER the 2020 Angus Active Travel Strategy | T1. | Transport (AC) | Angus Cycle Hub, Tactran | See Angus Active Travel Strategy 2020 | Short | See Angus Active Travel Strategy 2020 |
| ENHANCE active travel networks, taking account priorities in the TAYplan Green Network Strategy | T2. | Transport (AC) | Tactran | Kms of designated active travel network in the region | Short/ Medium | See Angus Active Travel Strategy 2020 |
| ENHANCE infrastructure improvement and maintenance processes to encourage additional provision of facilities for pedestrians and cyclists | T3. | Transport (AC) | Planning (AC), Property (AC) | Kms of designated active travel network in the region<br>Frequency and quality of cycle storage facilities<br>Quality of pedestrian crossings and footpaths | Ongoing | Assessed on a project-by-project basis |
| SUPPORT Angus Cycle Hub community cycling programmes. | T4. | Transport (AC) | Angus Cycle Hub | Number of individuals engaged in community cycling programmes | Short/ Medium | Time-limited funding in place for several programmes from sources such as Transport Scotland's Smarter Choices, Smarter Places fund |
| SUPPORT the implementation of the Tactran Regional Electric Vehicle Strategy | T5. | Transport (AC) | Tactran, Dundee City Council, Perth and Kinross Council, Stirling Council | Increase in vehicle kms travelled by EVs in the region | Short | - |
| IMPLEMENT a low carbon Mobility Hub at Brechin | T6. | Economic Development (AC) | Transport (AC), Dalhousie Estates, Stracathro Estates | Hub developed and operational | Medium | Proposed to be funded through the Mercury Programme |

| | | | | | | |
|---|---|---|---|---|---|---|
| IMPLEMENT an EV charging hub in Arbroath | T7. | Transport (AC) | - | Increase in vehicle kms travelled by EVs in the region | Medium | Funding will be sought through Transport Scotland's Switched on Towns & Cities fund |
| IMPLEMENT any recommendations of the fleet review that could reduce the carbon impact of the Angus Council vehicle fleet. | T8. | Transport (AC) | - | Percentage of low carbon/ electric vehicle in the Council vehicle fleet. | Short | Dependent on recommendations. Some may be revenue saving measures. External funding could be sought for others, e.g. Transport Scotland Switched on Fleets |
| DEVELOP a Passenger Transport Strategy. | T9. | Transport (AC) | - | To be included in Passenger Transport Strategy. | Medium | - |
| IMPLEMENT key parts of the Tactran Regional Transport Strategy. | T10. | Transport (AC) | Tactran, Dundee City Council, Perth and Kinross Council, Stirling Council | See Tactran Regional Transport Strategy | Medium | - |
| DELIVER offshore asset monitoring and repairs using drone technologies | T11. | Economic Development (AC) | Transport (AC), Drone Technologies ltd. | Percentage of trips undertaken by drone. | Medium | Proposed to be funded through the Mercury Programme |
| REDEVELOP the Montrose railhead to shift Montrose Port road freight transport to rail | T12. | Economic Development (AC) | Transport (AC), Network Rail, Montrose Port Authority. | Reduction in road freight from Montrose Port. | Medium | Proposed to be funded through the Mercury Programme |
| DEVELOP policies to strengthen the resilience of Angus's transport network to the impacts of climate change, as part of the Tactran Regional Transport Strategy. | T13. | Transport (AC), Planning (AC), Coastal and flooding (AC) | Adaptation Scotland, Tactran. | To be included in Local Transport Strategy. | Short/ Medium | - |

# Land Use and Forestry

| Action | Ref | Lead | Partners | Proposed Performance Indicators | Timescales Short (1-2yrs) Medium (2-6yrs) Long(6-10yrs) | Funding in Place |
|---|---|---|---|---|---|---|
| IMPLEMENT the TAYplan Green Network Strategy as it relates to Angus. | L1. | Planning (AC) | Dundee City Council, Fife Council, Perth and Kinross Council | See TAYPlan Green Network Strategy | Short | See TAYPlan Green Network Strategy |
| DEVELOP and EXPAND work around Angus' Green Health initiatives. | L2. | Angus Alive | NHS Tayside | Number of Green Health Champions<br><br>Number of health centres/ surgeries delivering a green health signposting and referral service. | Short/ Medium | Funding not yet in place. Will be required |
| ENSURE the Shoreline Management Plan (SMP2) policies to mitigate coastal erosion are integrated into development control activities, as appropriate | L3. | Coastal and Flooding (AC), | Planning (AC) | To be established | Ongoing | Assessed on a project-by-project basis |
| ENGAGE with community groups to educate and raise awareness amongst the public of flooding | L4. | Coastal and Flooding (AC) | Communities Team (AC | Number of community engagement events held. | Short | Funding not yet in place. Will be required |
| EXPAND the integrated land use approach adopted by the River South Esk Catchment Partnership to other river catchments and involve relevant land managers. | L5. | Planning (AC), Coastal and Flooding (AC) | River South Esk Catchment Partnership<br><br>Angus Council | Number of River Catchment Partnerships operating in Angus | Short/ Medium | Funding not yet in place. Will be required |
| IDENTIFY opportunities for natural flood management or other enhancement projects arising from the flood risk plans | L6. | Coastal and Flooding (AC) | SEPA, River South Esk Catchment Partnership | Number of opportunities identified and implemented | Ongoing | Assessed on a project-by-project basis |

| | | | | | | |
|---|---|---|---|---|---|---|
| DEVELOP guidance for enhancing green and blue networks in the region, enhancing and connecting networks. | L7. | Planning (AC) | Property (AC), Transport (AC), Tactran | Effective guidance successfully established | Medium | - |
| DESIGN and structure development to minimise environmental impacts and promote sustainable behaviours. | L8. | Planning (AC) | Property (AC) | To be established | Ongoing | Assessed on a project-by-project basis |
| SUPPORT and PROMOTE third party organisations delivering Angus wide invasive non-native species (INNS) projects | L9. | Planning (AC) | Scottish Invasive Species Initiative, Tayside Biodiversity partnership, NatureScot | Number of non-native invasive species in Angus | Short | Funding through the Scottish Invasive Species Initiative. |
| ENABLE/ ENCOURAGE temporary greening projects on vacant and derelict land. | L10. | Planning (AC) | Property (AC) | % of vacant and derelict land in Angus. | Short | Assessed on a project-by-project basis |
| IMPLEMENT Tayside Local Biodiversity Action Plan 2016-26. | L11. | Tayside Biodiversity Partnership | Angus Council, Fife Council, Perth and Kinross Council | See Tayside Local Biodiversity Action Plan 2016-26 | Medium | See Tayside Local Biodiversity Action Plan 2016-26 |
| SUPPORT and PROMOTE woodland expansion in the 'Target' areas within Angus as identified by Angus Woodland and Forestry Framework and the Cairngorms National Park Forestry Strategy. | L12. | Cairngorms National Park Authority | Angus Council | Woodland expansion (ha) | Short | Funding available through the Scottish Forestry Grant Scheme |
| CONTINUE to support the delivery of peatland restoration projects. | L13. | River South Esk Catchment Partnership | Cairngorms National Park Authority, Angus Council | Restored peatland (ha) | Short | Funding available through NatureScot's Peatland ACTION fund. |
| SUPPORT development of sustainable tourism. This would include food, transport and building energy efficiency. This activity contributes to the 4th Cairngorms National Park Partnership Plan and will deliver against the Tourism Declares initiative. | L14. | Planning (AC) | Cairngorms National Park Authority | To be established | Short/ Medium | Work with Visit Scotland who were first national tourism organisation in the world to sign up to the Tourism Declares initiative. |

# Agriculture and Food

| Action | Ref | Lead | Partners | Proposed Performance Indicators | Timescales Short (1-2yrs) Medium (2-6yrs) Long(6-10yrs) | Funding in Place |
|---|---|---|---|---|---|---|
| DEVELOP a Centre for Agricultural Sustainable Innovation at Forfar. | A1. | Economic Development (AC) | Agrico, SoilEssentials, James Hutton Institute, Arbikie Highland Estate. | To be established through the Mercury Programme | Medium | Proposed to be funded through the Mercury Programme |
| DELIVER a crop quality centre. | A2. | Economic Development (AC) | Agrico | To be established through the Mercury Programme | Medium | Proposed to be funded through the Mercury Programme |
| DELIVER a precision farming centre | A3. | Economic Development (AC) | SoilEssentials | To be established through the Mercury Programme | Medium | Proposed to be funded through the Mercury Programme |
| DELIVER an innovation farm. | A4. | Economic Development (AC) | James Hutton Institute | To be established through the Mercury Programme | Medium | Proposed to be funded through the Mercury Programme |
| DELIVER a Neutral Spirit Still at Arbikie Highland Estate. | A5. | Economic Development (AC) | Arbikie Highland Estates. | To be established through the Mercury Programme | Medium | Proposed to be funded through the Mercury Programme |
| DEVELOP and support local food procurement practices by public sector organisations | A6. | Corporate Procurement Group (AC) | - | Percentage of public sector organisations prioritising local food procurement. | Short | - |
| CONTINUE to promote local food and drink initiatives through the Angus Tourism Cooperative and Appetite for Angus. | A7. | Economic Development (AC) | Angus Tourism Cooperative, Appetite 4 Angus | Number of food and drink initiatives promoted through the Angus Tourism Cooperative. | Ongoing | - |
| IMPLEMENT actions within the Angus Food Growing Strategy could reduce the carbon impact of food provision in Angus | A8. | Strategic Policy (AC) | - | See Angus Food growing Strategy. | Short/ Medium | See Angus Food Growing Strategy |

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| | | | | | | Potential additional funding through the Scottish Government Sustainable Agriculture Capital Grant Scheme. |
| IDENTIFY land that can be used for community growing initiatives in line with the Angus Food Growing Strategy. | A9. | Planning (AC) Parks (AC) | Sustainable Kirriemuir | Amount of land identified for community growing initiatives (ha. ) | Short/ Medium | |
| SUPPORT local growing initiatives and help identify partnership opportunities. | A10. | Strategic Policy (AC) | Sustainable Kirriemuir/Communities Team | Number of local growing initiatives in Angus. | Short | See Angus Food Growing Strategy. |
| PROMOTE the value and widespread adoption of nature friendly farming practices, to create healthier soil, woodlands and habitats across Angus. This will require supporting farmers and producers to access funding and technical advice for land management. | A11. | Strategic Policy (AC) | Soil Association Scotland, Scottish Forestry Integrating Trees Network, Nature Friendly Farming Network | Number of local nature friendly farming initiatives in Angus. | Short/ Medium | Agri-Environment Climate Scheme (AECS) funding will be available for businesses. |

# Waste

| Action | Ref | Lead | Partners | Proposed Performance Indicators | Timescales Short (1-2yrs) Medium (2-6yrs) Long(6-10yrs) | Funding in Place |
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| IMPLEMENT alignment of kerbside collection services with the Scotland's Deposit Return Scheme to be rolled out in July 2022 | W1. | Environmental Services (AC) | Zero Waste Scotland | To be established as part of the alignment | Short | - |
| CONTINUE the "Right Stuff, Right Bin" campaign, leveraging both on-line and print media | W2. | Environmental Services (AC) | - | % contamination rate in waste recycling. | Short | - |
| IMPLEMENT a programme to increase the use of recycling and food waste processing by customers of Angus Council's commercial waste management services | W3. | Environmental Services (AC) | Dundee and Angus Chamber of Commerce | % of businesses utilising Angus Council's commercial waste management recycling and food waste processing services. | Medium | |
| SUPPORT local initiatives to reduce food waste. | W4. | | Environmental Services (AC), S-Mart, Sustainable Kirriemuir, Keep Scotland Beautiful | Amount of food waste collected in Angus (kgs). | Ongoing | See Angus Food Growing Strategy. |
| CONTINUE programmes to redistribute surplus food to community organisations. | W5. | (AC) | Environmental Services (AC), S-Mart. | Amount of food waste redistributed in Angus (kgs). | Short | See Angus Food Growing Strategy. |
| ADOPT circular economy principles in supply chains for major development projects in the region | W6. | Economic Development (AC) | Zero Waste Scotland, Circular Tayside. | Number of developments including Circular Economy Principles. | Medium | |

# Governance and Process

| Action | Ref | Lead | Partners | Proposed Performance Indicators | Timescales Short (1-2yrs) Medium (2-6yrs) Long(6-10yrs) | Funding in Place |
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| EVOLVE the Climate Change Member Officers Group and accompanying Working Groups into a SECAP Steering Group and temporary working groups | G1. | Angus Council | Community Planning Partnership | Group established | Short | - |
| ESTABLISH a Community Climate Forum to engage community groups and advise on the development of the SECAP | G2. | Angus Council | To be established | Number of community groups represented on the Forum | Short | Funding not yet in place. Will relate funding for Action G.3 |
| RECRUIT a SECAP Coordinator to for facilitating management, reporting and communication activities in relation to the SECAP | G3. | Angus Council | - | Role established | Short | Funding not yet in place. |
| DEVELOP and implement a sustainable procurement action plan for Angus Council. | G4. | Corporate procurement group (AC) | Tayside Procurement Consortium | To be developed as part of the action plan | Short | - |
| ENCOURAGE partners to develop procurement policies which favour local suppliers, where appropriate | G5. | Corporate procurement group (AC) | Dundee and Angus Chamber of commerce, Community Climate Forum | % of partner organisations adopting identified procurement policies | Ongoing | - |
| EXPLORE the potential of utilising carbon emissions monitoring software. | G6. | Angus Council | Dundee City Council, Fife Council, Perth and Kinross Council, Scottish Government | Costed options appraisal complete | Short | Dependant on software selected.<br><br>Some engagement with Scottish Government underway around a joined up approach and funding. |

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| EXPLORE the potential for utilising adaptation benchmarking and monitoring tools | G7. | Angus Council | Adaptation Scotland | Costed options appraisal complete | Short | Dependant on adaptation tool selected.<br>Adaptation Scotland Benchmarking tool freely available. |
| DEVELOP a communications strategy to raise awareness and showcase sustainability across Angus and help people to understand and engage with climate change | G8. | Angus Council | Angus community groups | Dependent on communication platforms to be utilised, e.g. could be based on social media metrics | Ongoing | Funding not yet in place. Will relate funding for Action G.3 |
| SHOWCASE examples of low carbon best practice adopted by businesses in the region | G9. | Economic Development Angus Council | Circular Tayside, Dundee and Angus Chamber of Commerce | Dependent on communication platforms to be utilised, e.g. could be based on social media metrics | Ongoing | - |

# Appendix II: Risk and Vulnerability Assessment

| Expected Impacts | Likelihood of Occurrence (unlikely, possible, likely, unknown) | Expected Impact Level (low, moderate, high, unknown) | Timeframe (short-term, medium-term, long-term, unknown) | Proposed Indicators | Possible Actions |
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| **Buildings** | | | | | |
| Increased cooling demand in the summer due to increased temperatures. | Likely | Low to Moderate | Long term | No. of buildings retrofitted for adaptive resilience e.g. natural ventilation.<br><br>Average daily air temperature. | Ensure new buildings are designed, and existing buildings retrofitted, to maximise natural ventilation. |
| Higher costs associated with higher energy demands for cooling including capital costs, maintenance and running costs. | Likely | Low to Moderate | Long Term | Costs associated with heating and cooling. | Ensure new buildings are designed, and existing buildings retrofitted, so as to improve energy efficiency and minimise heating and cooling requirements. |

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| | | | | | Scale up PV implementation across council properties and high energy use buildings. Promote the implementation of renewable technologies on individual properties e.g. PVs and air source heat pumps. |
| Additional repair and maintenance costs due to greater water runoff. | Possible | Low to Moderate | Long Term | Climate related repair and maintenance costs. | Enhance Green Networks across Angus, including SUDs to store and manage surface water runoff. Promote natural flood management practices and the use of permeable paving.<br><br>Identify opportunities for natural flood management or other enhancement projects arising from the flood risk plans.<br><br>Deploy drainage and flood management in new developments, as appropriate. |
| Flood damage to homes, businesses, schools and community buildings. | Likely | High | Medium Term | Number of flood events.<br><br>Number of buildings impacted by flood events.<br><br>Number of people impacted by flood events. | Enhance Green Networks across Angus, including urban and rural SUDs to store and manage surface water runoff. Promote natural flood management practices and the use of permeable paving.<br><br>Identify opportunities for natural flood management or other enhancement projects arising from the flood risk plans.<br><br>Deploy drainage and flood management in new developments, as appropriate. |

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| | | | | Infrastructure impacted by flood events. | Careful consideration of flooding issues required in determining the scale and location of future development through the Angus Local Development Plan to avoid any exacerbation of current flood problems. |
| Storm damage to homes, businesses, schools and community buildings. | Likely | High | Medium Term | Number of buildings damaged by extreme weather conditions/ events. | Support community capacity building to deal with extreme climate events.<br><br>Work with the Chamber of Commerce and Adaptation Scotland to assist local businesses in planning for climate risk management.<br><br>Monitor climate related maintenance costs of building. |
| Damage to the historic environment and heritage assets as a result of increased temperatures, flooding, storms, landslides etc. | Likely | High | Medium Term | Number of heritage assets damaged by extreme weather conditions/ events. | Deliver a maintenance and repair programme for historic buildings in Angus to ensure that they are resilient to current and future climate change impacts. |
| Climate impacts on businesses and local economy e.g. material damage and increased insurance costs. | Likely | High | Short Term | Costs associated with climate adaptation.<br><br>% Increase in insurance cost. | Work with the Chamber of Commerce and Resource Efficient Scotland to assist local businesses in planning for climate risk management. |

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| Damage to buildings and communities as a result of increase sea level and coastal erosion. | Likely | High | Medium Term | Number of buildings damaged as a result of coastal erosion/ flooding.<br><br>Number of buildings needed to be vacated due to coastal erosion/ flooding events. | Ensure the Shoreline Management Plan (SMP2) policies are integrated into development control activities, as appropriate.<br><br>Undertake coastal and Watercourse inspections and organise repairs and maintenance under current legislation and the Tay Estuary and Montrose Basin Local Flood Risk Management Plan. |
| **Transport** | | | | | |
| Flooding impact on transport infrastructure including road network, cycling and walking paths, and rail network. | Likely | High | Short Term | Number of flooding events.<br><br>Number of days with public service interruptions. | Implement the Tay Estuary and Montrose Basin Local Flood Risk Management Plan and the Angus Shoreline Management Plan 2 (SMP2).<br><br>Enhance Green Networks across Angus, including SUDs to store and manage surface water runoff. Promote natural flood management practices and the use of permeable paving.<br><br>Deploy drainage and flood management in new developments, as appropriate. |

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| | | | | | Careful consideration of flooding issues required in determining the scale and location of future development through the Angus Local Development Plan to avoid any exacerbation of current flood problems. |
| Flooding impact on public transport services. | Likely | High | Short Term | Number of flooding events.<br><br>Number of days with public transport interruptions. | Implement the Tay Estuary and Montrose Basin Local Flood Risk Management Plan and the Angus Shoreline Management Plan 2 (SMP2).<br><br>Enhance Green Networks across Angus, including urban and rural SUDs to store and manage surface water runoff. Promote natural flood management practices and the use of permeable paving.<br><br>Deploy drainage and flood management in new developments, as appropriate.<br><br>Utilise technology to co-ordinate and communicate up to date transport information including expected delays and alternative travel options available. |
| Higher maintenance costs for transport infrastructure as a result of increased temperature and damage due to climate impacts such as flooding or storms. | Likely | Moderate | Long Term | Costs associated with climate related transport infrastructure maintenance costs. | Review transport management plans and ensure sufficient budget for infrastructure maintenance.<br><br>Deploy drainage and flood management in new infrastructure developments, as appropriate. |

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| Higher temperatures affecting transport use e.g. less walking and cycling. | Possible | Low | Long Term | Walking and cycling rates, | Enhance Green Networks to counter the heat island effect. Provide adequate shading on walking/ cycling routes. |
| **Energy** | | | | | |
| Damage to electrical/ gas infrastructure and power generation facilities by flooding or storms | Likely | High | Short Term | Number of services interrupted. | Develop a Persons at Risk Register in partnership with the NHS to help identify members of the community vulnerable to interruptions in supply of power, heating, water and other essential services.<br><br>Implement the Tay Estuary and Montrose Basin Local Flood Risk Management Plan and the Angus Shoreline Management Plan 2 (SMP2).<br><br>Enhance Green Networks across Angus, including SUDs to store and manage surface water runoff. Promote natural flood management practices and the use of permeable paving.<br><br>Deploy drainage and flood management in new developments, as appropriate.<br><br>Careful consideration of flooding issues required in determining the scale and location of future development through the Angus Local Development Plan to avoid any exacerbation of current flood problems. |
| Damage to IT infrastructure due to high temperatures, flooding or storms resulting in interruptions | Possible | High | Medium Term | Number or service interruptions. | Increase back up capacity of Council servers. |

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| to business and associated economic impacts. | | | | | |
| Increased cooling energy demand. | Likely | Moderate | Long Term | Increase energy demand in the summer. | Ensure new buildings are designed, and existing buildings retrofitted, so as to improve energy efficiency and minimise heating and cooling requirements.<br><br>Scale up PV implementation across council properties and high energy use buildings. Promote the implementation of renewable technologies on individual properties e.g. PVs and air source heat pumps. |
| **Water** | | | | | |
| Higher temperatures leading to water shortages and higher water demand. | Possible | High | Long Term | Total water consumption per capita. | Scottish Water will continue to review and develop their Water Resource Plan to ensure it can cope with projected drought conditions; including reinforcement of reservoirs and expanding the supply network.<br><br>Develop a Persons at Risk Register in partnership with the NHS to help identify members of the community vulnerable to interruptions in supply of power, heating, water and other essential services.<br><br>Increase rainwater harvesting and water conservation education programmes. |
| Flooding of sewers due to heavy rainfall and sea level rise. | Possible | High | Medium term | Number of water quality warnings. | Continue to improve and maintain Angus' Public Sewer and Mains Water systems to improve drinking water quality and reduce sewage discharge to the water environment. |

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| | | | | | Continued communication of water quality information via the electronic display at Monifieth, SEPA website and Angus Council website. |
| Flooding and/ or drought causing water quality problems. | Likely | High | Medium term | Number of water quality warnings. | Continue to improve and maintain Angus' Public Sewer and Mains Water systems to improve drinking water quality and reduce sewage discharge to the water environment.<br><br>Continued communication of water quality information via the electronic display at Monifieth, SEPA website and Angus Council website. |
| Damage to water infrastructure due to flooding, storms, landslides, and high winds. | Likely | High | Medium term | Average length of supply interruptions | Continue to improve and maintain Angus' Public Sewer and Mains Water systems to improve drinking water quality and reduce sewage discharge to the water environment.<br>Implement the Tay Estuary and Montrose Basin Local Flood Risk Management Plan and the Angus Shoreline Management Plan 2 (SMP2).<br><br>Enhance Green Networks across Angus, including SUDs to store and manage surface water runoff. Promote natural flood management practices and the use of permeable paving.<br><br>Deploy drainage and flood management in new developments, as appropriate. |

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| | | | | | Work with Adaptation Scotland to increase Angus' resilience to the impacts of climate change. |
| Threat of cracked pipes and leakages caused by high temperatures and drought. | Possible | Moderate | Long term | Number of water leaks reported. | Continue to improve and maintain Angus' Public Sewer and Mains Water systems to improve drinking water quality and reduce sewage discharge to the water environment.<br><br>Continued communication of water quality information via the electronic display at Monifieth, SEPA website and Angus Council website.<br><br>Scottish Water to monitor pipes for heat damage as part of the Water Resources Plan, adding in mitigation measures as required. |
| Risks to business operations due to water scarcity. | Likely | Moderate | Long term | Number of days with scarcity warning. | Scottish Water will continue to review and develop their Water Resource Plan to ensure it can cope with projected drought conditions; including reinforcement of reservoirs and expanding the supply network.<br><br>Increase rainwater harvesting and water conservation education programmes.<br><br>Work with the Chamber of Commerce and Resource Efficient Scotland to assist local businesses in planning for climate risk management. |
| Sea level rise risk on businesses | Likely | High | Medium term | % change in sea level. | Implement the Angus Shoreline Management Plan 2 (SMP2). |

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| | | | | | Ensure the Shoreline Management Plan (SMP2) policies are integrated into development control activities, as appropriate.<br><br>Undertake coastal and Watercourse inspections and organise repairs and maintenance under current legislation and the Tay Estuary and Montrose Basin Local Flood Risk Management Plan. |
| **Waste** | | | | | |
| Facilities damaged due to extreme weather e.g. flooding, landslides, storms. | Likely | High | Short Term | Number of days with service disruptions. | Regularly review waste management facilities to ensure they are secure and watertight. |
| Increased food waste and more food damaged as a result of increased temperatures, potential flood damage etc. | Possible | Low to moderate | Long term | % food waste. | Carry out food waste reduction campaigns and assist community groups working to reduce food waste.<br><br>Implement the Angus Food Growing Strategy Action Plan. |
| Interrupted waste collections due to extreme weather events impacting on road network or disruptions to site access. | Likely | Moderate | Medium Term | % Change in solid waste collected / recycled / disposed of. | Plan co-ordinated, prompt and effective communication to inform residents of service disruptions, alternative options available and estimate of when normal services will resume. |
| Increased storm damage resulting in more debris e.g. tree branches etc. requiring collection and disposal. | Likely | Moderate | Short Term | Volume of storm damaged vegetation/ debris collected. | Ensure funding available to cope with extra collection and disposal of windblown vegetation/ debris. |

| Land Use Planning | | | | | |
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| Increased surface runoff. | Likely | High | Short Term | % change in runoff of rainwater overflows (due to change in soil infiltration). | Implement the Tay Estuary and Montrose Basin Local Flood Risk Management Plan.<br><br>Enhance Green Networks across Angus, including SUDs to store and manage surface water runoff. Promote natural flood management practices and the use of permeable paving.<br><br>Deploy drainage and flood management in new developments, as appropriate.<br><br>Careful consideration of flooding issues required in determining the scale and location of future development through the Angus Local Development Plan to avoid any exacerbation of current flood problems. |
| Heat island effect. | Likely | Moderate | Medium term | % increase in temperatures in urban areas. | Enhance Green Networks to counter the heat island effect. Promote tree planting and provide adequate shading on walking/ cycling routes. |
| Coastal flooding. | Likely | High | Medium Term | % of coastline designated for managed realignment. | Implement the Angus Shoreline Management Plan 2 (SMP2).<br><br>Ensure the Shoreline Management Plan (SMP2) policies are integrated into development control activities, as appropriate. |

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| | | | | | Undertake coastal and Watercourse inspections and organise repairs and maintenance under current legislation and the Tay Estuary and Montrose Basin Local Flood Risk Management Plan.<br><br>Careful consideration of flooding issues required in determining the scale and location of future development through the Angus Local Development Plan to avoid any exacerbation of current flood problems. |
| Surface flooding. | Likely | High | Medium term | Number of flooding events. | Enhance Green Networks across Angus, including SUDs to store and manage surface water runoff. Promote natural flood management practices and the use of permeable paving.<br><br>Identify opportunities for natural flood management or other enhancement projects arising from the flood risk plans.<br><br>Deploy drainage and flood management in new developments, as appropriate.<br><br>Careful consideration of flooding issues required in determining the scale and location of future development through the Angus Local Development Plan to avoid any exacerbation of current flood problems. |
| Long term positive impact on reduced freeze thaw cycle, | Possible | Moderate | Long Term | % change in salt use and road | Monitor freeze-thaw related road maintenance requirements. |

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| therefore less road maintenance and less salt use. | | | | maintenance due to freezing conditions | |
| **Agriculture and Forestry** | | | | | |
| Potential impact of climate change, including increased temperatures, in creating new conditions that may allow existing pests and disease to spread and new threats to become established. | Likely | High | Medium Term | Number of new pests and diseases affecting agriculture and forestry.<br><br>% increase in the number of existing pests and diseases affecting agriculture and forestry. | Monitor levels of pests and diseases.<br><br>Support the development of new crop and grassland varieties, livestock breeds and tree genotypes and introducing new species better suited to future climate conditions and resilient to pests, diseases and other factors. |
| Soil quality may be altered due to changes in rainfall pattern and increased temperatures. | Likely | High | Medium Term | Soil quality. | Improving soil, water and crop management to reduce erosion, flooding, compaction and losses of soil organic carbon, and to improve the efficiency of water and fertiliser use. |
| Changes to natural habitats and biodiversity may degrade the environment and limit the volume of productive land and water. | Likely | High | Medium Term | Number of invasive non-native species. | Support and promote third party organisations delivering Angus wide invasive non-native species (INNS) projects<br><br>Ensure the implementation of the Tayside Local Biodiversity Action Plan 2016-26 to safeguard and enhancing existing habitats and species. |

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| Potential impact of increased volatility in the global commodity market due to exposure to extreme climatic events on supply and cost of food. | Likely | Medium | Long Term | Cost of imported goods. | Implement the Angus Food Growing Strategy Action Plan.<br><br>Promote and support local community food hubs food growing initiatives.<br><br>Support innovation in the agricultural sector to identify new technologies to increase productivity and resilience. |
| Impact of increased frequency and severity of summer droughts causing problems for water quality and supply. | Likely | High | Medium Term | Number of days with service disruptions. | Improving water supply for agriculture by increasing capacity for water capture and storage. |
| Increased risk of extreme weather events including flooding, storms, landslides etc. | Likely | High | Medium Term | Number of extreme weather events.<br><br>Crop yields. | Actively manage woodlands to improve forest structure, diversify tree species, increase resilience to greater weather variability and extreme events and improve infrastructure so it can cope with wetter conditions. |
| Reduction in suitable land for agriculture and forestry due to flooding and increase seal level. | Likely | High | Medium Term | % increase in sea level.<br><br>Number of flooding events. | Enhance Green Networks across Angus, including SUDs to store and manage surface water runoff. Promote natural flood management practices and the use of permeable paving.<br><br>Identify opportunities for natural flood management or other enhancement projects arising from the flood risk plans.<br><br>Deploy drainage and flood management in new developments, as appropriate. |

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| | | | | | Careful consideration of flooding issues required in determining the scale and location of future development through the Angus Local Development Plan to avoid any exacerbation of current flood problems. |
| **Environment and Biodiversity** | | | | | |
| Altered flora and fauna due to changes in water and air temperature, increased drought, storm and flood events. | Likely | High | Medium term | Number of actions implemented from the Tayside Local Biodiversity Action Plan 2016-26. | Ensure the implementation of the Tayside Local Biodiversity Action Plan 2016-26 to safeguard and enhance existing habitats and species. The plan should be integrated across sectors and the broader green network and adopted corporate- wide to ensure biodiversity protection and enhancement are prioritised in all relevant projects and developments.<br><br>Work with local community groups to increase areas of 'wild' habitats, to include biodiversity recording and monitoring schemes and changes to green space maintenance regimes to reduce intensive methods and machine use in parks and green spaces where possible.<br><br>Support and promote third party organisations delivering Angus wide invasive non-native species (INNS) projects |
| Loss of trees due to increased occurrence of high winds, pests and diseases. | Likely | High | Medium Term | Number of climate appropriate trees planted. | Identify suitable areas for tree planting with climate appropriate species and with consideration of how planting interacts with surroundings e.g. air quality, active transport, biodiversity etc. |

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| | | | | | Actively manage woodlands to improve forest structure, diversify tree species, increase resilience to greater weather variability and extreme events and improve infrastructure so it can cope with wetter conditions. |
| Coastal flooding and sea storm surges. | Likely | High | Medium Term | % sea level rise. | Implement the Angus Shoreline Management Plan 2 (SMP2).<br><br>Ensure the Shoreline Management Plan (SMP2) policies are integrated into development control activities, as appropriate.<br><br>Undertake coastal and Watercourse inspections and organise repairs and maintenance under current legislation and the Tay Estuary and Montrose Basin Local Flood Risk Management Plan.<br><br>Careful consideration of flooding issues required in determining the scale and location of future development through the Angus Local Development Plan to avoid any exacerbation of current flood problems. |
| Potential impact of climate change on the balance of Scotland's ecosystems and ability to transform Scotland's habitats and biodiversity, adding to existing pressures. | Likely | Moderate | Medium Term | Number of invasive non-native species. | Support and promote third party organisations delivering Angus wide invasive non-native species (INNS) projects<br><br>Ensure the implementation of the Tayside Local Biodiversity Action Plan 2016-26 to safeguard and enhancing existing habitats and species. |
| Health | | | | | |

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| Increase in illness due to hygiene issues as a consequence of water shortages | Possible | High | Medium Term | Number of water quality related illnesses. | Scottish Water will continue to review and develop their Water Resource Plan to ensure it can cope with projected drought conditions; including reinforcement of reservoirs and expanding the supply network.<br><br>Increase rainwater harvesting and water conservation education programmes.<br><br>Public health information campaigns to address increase in sun/heat/air and water quality related illnesses. |
| Increase in heat related illnesses e.g. Lyme disease and food poisoning (due to production, storage and preservation issues in higher temperatures) | Likely | High | Medium Term | Number of climate related illnesses. | Public health information campaigns to address increase in sun/heat/air and water quality related illnesses. |
| Increased storms leading to higher injury risk e.g. falling branches, roof tiles, debris | Likely | High | Short Term | Number of A&E attendances related to people injured due to extreme weather events. | Continuous review and update of emergency response plans. |
| Access to fresh food due to food shortages and food supply interruptions. | Likely | High | Short Term | Number of community growing projects. | Implement the Angus Food Growing Strategy Action Plan.<br><br>Promote and support local community food hubs food growing initiatives. |

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| | | | | Cost of essential food items. | Support innovation in the agricultural sector to identify new technologies to increase productivity and resilience. |
| Decline in mental health and wellbeing due to extreme weather events e.g. flooding causing isolation and loneliness. | Likely | High | Short Term | Mental illness referrals. | Develop and expand work around Angus' Social Prescribing and Green Health Initiatives.<br><br>Work with NHS Tayside linking health care and greenspace initiatives |
| Increased sun exposure related illnesses such as sunburn/ stroke/ skin cancer. | Likely | High | Short Term | Heat/ sun related health care contacts. | Public health information campaigns to address increase in sun/heat/air and water quality related illnesses. |
| Potential negative effects on the population's health as a result of localised increase in emissions from increased road traffic. | Possible | Moderate | Medium Term | Illness related to poor air quality. | Implement the Angus Active Travel Strategy.<br><br>Support the implementation of the Tactran Regional Electric Vehicle Strategy.<br><br>Support for the establishment and promotion of low emission car clubs in the region.<br><br>Promote and support lift share schemes at a regional and local level. |
| Increase in atopic disease due to longer pollen season | Possible | Moderate | Long Term | Increase in reported atopic diseases. | Public health information campaigns to address increase in sun/heat/air and water quality related illnesses. |
| **Civil Protection and Emergency** | | | | | |
| Increased extreme weather events including flooding, landslides, | Likely | High | Long Term | Number of climate related emergencies | Continue to monitor and update emergency plan. |

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| storms posing a risk to human safety. | | | | that require a response. | Develop a Persons at Risk Register in partnership with the NHS to help identify members of the community vulnerable to interruptions in supply of power, heating, water and other essential services.<br><br>Help communities enhance their capacity to respond to and recover from resilience incidents. |
| Increased risk of coastal flooding. | Likely | High | Long Term | Number of climate related emergencies that require a response. | Continue to monitor and update emergency plan.<br><br>Implement the Angus Shoreline Management Plan 2 (SMP2).<br><br>Ensure the Shoreline Management Plan (SMP2) policies are integrated into development control activities, as appropriate.<br><br>Undertake coastal and Watercourse inspections and organise repairs and maintenance under current legislation and the Tay Estuary and Montrose Basin Local Flood Risk Management Plan.<br><br>Careful consideration of flooding issues required in determining the scale and location of future development through the Angus Local Development Plan to avoid any exacerbation of current flood problems. |
| Increased insurance costs | Possible | Low | Long Term | Increase in climate related insurance costs | Monitor insurance costs to identify any climate related increases and adjust budgets accordingly. |

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| Loss of services e.g. water/ power. Infrastructure networks are closely inter-linked and failure in any area can lead to wider disruption across these networks. | Likely | High | Long Term | Duration without services/ utility. | Develop a Persons at Risk Register in partnership with the NHS to help identify members of the community vulnerable to interruptions in supply of power, heating, water and other essential services.<br><br>Continue to monitor and update emergency plan. |
| **Tourism** | | | | | |
| Extreme weather impacting tourist activities due to closure of venues related to tourism e.g. golf courses | Likely | Moderate | Medium Term | % change in tourist activities. | Develop a communication plan to keep visitors informed of disruptions and alternative options available.<br><br>Utilise technology to co-ordinate and communicate up to date information including expected delays and alternative options available.<br><br>Help visitors and residents make sustainable choices for food, travel, recreation and resource use. |
| Climate impacts on tourist related businesses including problems with weather proofing, transport disruptions, disruption to suppliers, higher maintenance and cooling costs etc. | Likely | Moderate | Medium term | Number of weather-related attraction closures. | Work with VisitScotland and Angus Tourism Co-operative to help business prepare for climate change.<br><br>Implement the Angus Food Growing Strategy Action Plan.<br><br>Promote and support local community food hubs food growing initiatives.<br><br>Ensure new builds/ developments incorporate climate adaptation measures e.g. permeable paving. |
| Higher water demand due to drier summers. | Likely | Moderate | Medium term | % increase in water use. | Strategic water refill points installed and promoted. |

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| Higher costs for maintenance and repair due to higher rainfall, extreme heat and storms. | Likely | Moderate | Medium term | Increased maintenance costs for tourism related industry. | Ensure new buildings are designed, and existing buildings retrofitted, so as to improve energy efficiency and minimise heating and cooling requirements.<br><br>Enhance Green Networks across Angus, including SUDs to store and manage surface water runoff. Promote natural flood management practices and the use of permeable paving.<br><br>Identify opportunities for natural flood management or other enhancement projects arising from the flood risk plans.<br><br>Deploy drainage and flood management in new developments, as appropriate. |
| Sea level rise risk on waterfront tourist venues. | Likely | High | Medium term | % change sea level. | Implement the Angus Shoreline Management Plan 2 (SMP2).<br><br>Ensure the Shoreline Management Plan (SMP2) policies are integrated into development control activities, as appropriate.<br><br>Undertake coastal and Watercourse inspections and organise repairs and maintenance under current legislation and the Tay Estuary and Montrose Basin Local Flood Risk Management Plan.<br><br>Careful consideration of flooding issues required in determining the scale and location of future development |

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| | | | | | through the Angus Local Development Plan to avoid any exacerbation of current flood problems. |
| Loss of beach cover. | Likely | High | Medium Term | % change in beach cover | Implement the Angus Shoreline Management Plan 2 (SMP2).<br><br>Ensure the Shoreline Management Plan (SMP2) policies are integrated into development control activities, as appropriate.<br><br>Undertake coastal and Watercourse inspections and organise repairs and maintenance under current legislation and the Tay Estuary and Montrose Basin Local Flood Risk Management Plan.<br><br>Careful consideration of flooding issues required in determining the scale and location of future development through the Angus Local Development Plan to avoid any exacerbation of current flood problems. |
| Reduction of bathing water quality. | Possible | Moderate | Medium term | Number of water quality warnings. | Continue to improve and maintain Angus' Public Sewer and Mains Water systems to improve drinking water quality and reduce sewage discharge to the water environment.<br><br>Continued communication of water quality information via the electronic display at Monifieth, SEPA website and Angus Council website. |

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