



**Cyfoeth
Naturiol
Cymru**
**Natural
Resources
Wales**

Carbon Positive Project

Summary Report

January 2018



Our Carbon Positive Project

Natural Resources Wales (NRW) is committed to positive action on climate change. We recognise the importance of pursuing opportunities to minimise the effect our own activities have on emissions and storage of greenhouse gases (largely carbon dioxide) (our carbon impact). NRW has a unique and broad organisational remit, including being custodian and manager of 7% of Wales' land area. This brings with it challenges and opportunities to decarbonise, i.e. to reduce our emissions and to protect and enhance the carbon captured on the land and water we manage (the estate).

Welsh Government funded NRW to deliver the Carbon Positive Project to show leadership in decarbonisation in Wales' public sector and to share our approach and experience to encourage further decarbonisation across the public sector and beyond. The Project forms part of NRW's wider work on climate change, which includes assessing and managing climate risks across our remit through adaptation action and our role in enabling renewable energy development on the estate.

Over the last two and a half years, the Carbon Positive Project has developed a systemic approach to explore how our organisation can address its carbon impact across buildings, transport, land and operational assets, and procurement of goods and services. It has evaluated NRW's net carbon status, accounting for both greenhouse gas emissions across our operations and the carbon captured annually (sequestration) across the estate, as well as estimating the existing stores of carbon (carbon stocks) on the estate. The Project has identified opportunities to reduce the carbon impact of our organisation (mitigation measures) and delivered projects to demonstrate these measures.

For NRW, the Project will also put in place a plan for future implementation to steer the delivery of mitigation measures across the organisation. For the wider public sector and others, we have captured our experience of delivering the Project, which will help support organisations to explore the challenge and opportunities provided by adopting a systemic approach to decarbonisation.



Delivering decarbonisation and well-being: the legislative context

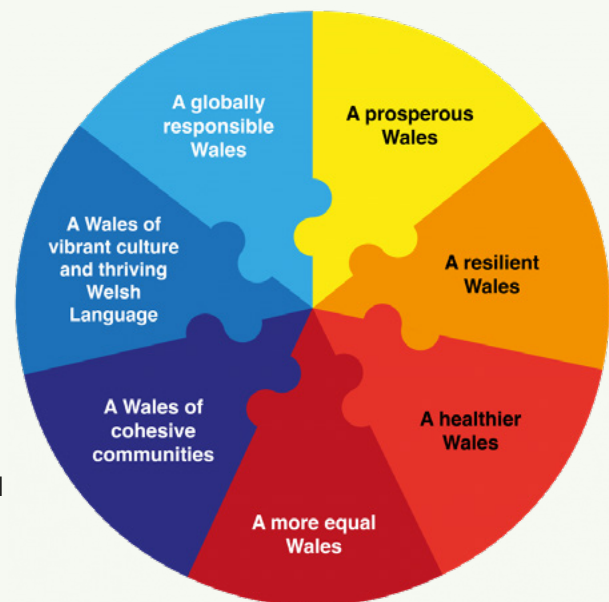
The Environment (Wales) Act 2016¹ and the Well-being of Future Generations (Wales) Act 2015² together provide a legislative framework to enable the sustainable development of Wales. They principally do this by requiring the sustainable management of natural resources and providing a framework for improving the social, economic, environmental and cultural well-being of Wales.

Addressing climate change impacts and decarbonisation are crucial to achieving the objectives of the Acts. The Environment Act requires the achievement of an overall 80% reduction in greenhouse gas emissions by 2050. The Well-being of Future Generations Act sets seven Well-being Goals (below), which provide a shared vision for Wales to work towards that include the development of a low carbon economy.

The Carbon Positive Project helps NRW deliver on its purpose, the requirements of the Environment Act and its contribution to the Well-being Goals, by:

- Contributing to achieving emissions reductions for the Welsh public sector to meet the current 2016-2020 Carbon Budget.
- Showing leadership in the public sector to help drive progress towards the ambition for a carbon neutral Welsh public sector by 2030.
- Alongside decarbonisation, seeking to optimise multiple benefits, including better working environments for our staff, greater recreational opportunities for communities, enhanced biodiversity, and improved air and water quality.
- Through our procurement and supply chains, help stimulate the move to a low carbon resource efficient economy by working with suppliers.
- Supporting the Sustainable Management of Natural Resources (SMNR) by taking account of multiple benefits that contribute to maintaining resilient ecosystems and communities when prioritising the delivery of mitigation measures.
- Contributing to the delivery of the Well-being Goals, particularly a prosperous Wales and a resilient Wales Goals where addressing climate change is specifically mentioned, but also the globally responsible Wales Goal.

Well-being Goals



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¹ Further information is available at: <http://gov.wales/topics/environmentcountryside/consmanagement/natural-resources-management/environment-act/?lang=en>
² Further information is available at: <http://gov.wales/topics/people-and-communities/people/future-generations-act/?lang=en>

How we delivered a comprehensive approach to carbon management

1 Calculating our net carbon status

- We collated greenhouse gas emissions data from buildings, transport, management of the estate and the procurement of goods and services.
- We estimated carbon stocks and sequestration rates in the habitats on the estate.
- We found that we are a net carbon positive organisation – storing more carbon annually than we emit through our operations.

2 Evaluating options for mitigation

- We identified and evaluated measures to reduce emissions, enhance sequestration and protect carbon stocks across the organisation and the estate.
- We developed an approach for prioritising options for delivery through evaluating costs, carbon savings and wider benefits.
- We found that there are a breadth of options open to us, which can yield both cost and carbon savings, as well as wider benefits.

3 Demonstration projects

- We delivered over 20 projects to demonstrate potential mitigation options, including: LED lighting, biomass boilers, solar photo voltaic (PV), electric vehicles and charging points, woodland planting, peatland restoration, and trialling a carbon planning tool in our civil engineering contracts.
- We found many staff wanted to lead carbon reduction projects in their area of work. Some projects were more challenging, particularly newer technologies and where we needed to learn new skills.

4 Communications and working with others

- We learnt from organisations managing their own carbon impact in new and ambitious ways.
- We collaborated with our colleagues to gather ideas and worked across the organisation to begin embedding carbon management into our activities.
- Through sharing our experience and approach, we aim to facilitate and encourage positive action on decarbonisation across Wales' public sector and beyond.

5 Recording experience and planning future implementation

- We are producing a series of publications to record and share our experience and approach, including:
 - Carbon Positive Project strategic summary report
 - Calculating NRW's Net Carbon Status technical report
 - Evaluating NRW's Mitigation Options technical report
 - Demonstration project case studies.
- Our next step is to build our mitigation opportunities into a plan for implementation, to embed carbon management throughout the organisation.



Calculating our net carbon status

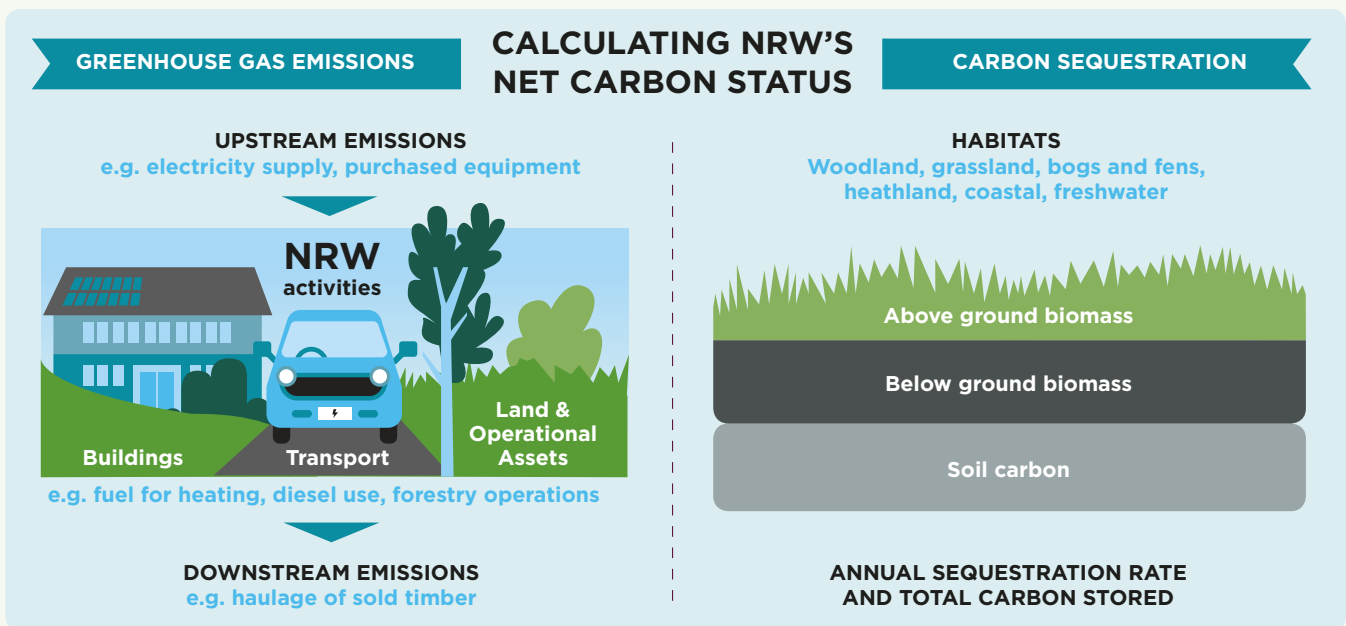
To calculate the organisation's net carbon status, we used freely available emissions data and followed accepted calculation standards where possible, to enable others to replicate our approach.

Net carbon status has been defined within the Project as the annual balance between the quantity of greenhouse gas (GHG) emitted by the organisation's operations (our emissions) and the quantity of carbon captured (sequestered) in habitats on the NRW estate. Two elements of work were undertaken to provide figures for the calculation of NRW's net carbon status:

1. **Development of a GHG emissions inventory** for NRW, quantifying emissions arising from assets and operations. This was calculated following the guidelines given in the GHG Protocol³ Corporate Standard and reported emissions of six GHGs in common units of carbon dioxide equivalents (CO₂e)⁴.

2. **Estimation of the carbon sequestered annually** in the vegetation and soils of habitats on the NRW managed estate, also reported in as CO₂e. Alongside carbon losses and gains, total carbon already stored in each habitat type (carbon stocks) was also estimated to provide an understanding of the wider role of the estate for carbon. However, carbon stocks do not form part of the net carbon status calculation.

We took a comprehensive approach to understanding NRW's carbon impact as an organisation, as outlined in the diagram (below). The approach accounted for emissions and sequestration associated with assets and land within our operational control, in addition to some emissions arising outside of our operational control which were a consequence of our activities.



Our GHG inventory went beyond the standard approach of solely considering direct emissions from our activities (scope 1 emissions) and electricity use (scope 2 emissions), to understanding the wider carbon impact of our organisation, including: procurement of goods and services, our staff's commute and haulage of sold timber (scope 3 emissions).

Given NRW's significant role as a land owner and manager, estimating the carbon sequestered in the vegetation and soils of the range of habitats on the estate was a crucial element of our organisation's overall carbon status. We estimated the carbon sequestration and stocks on the estate using published data and conducting additional modelling work with industry experts on woodland and peatland (which makes up 84% of the area of the estate).

³ The Greenhouse Gas Protocol provides a comprehensive global framework to measure and manage greenhouse gas (GHG) emissions. Further information is available at: <http://www.ghgprotocol.org>

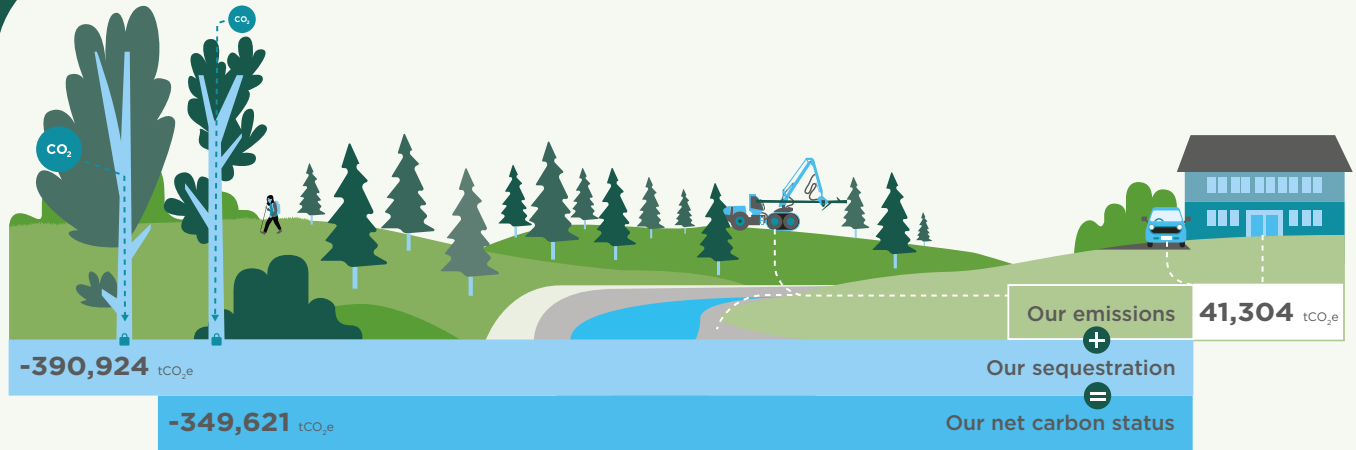
⁴ Emissions of CO₂, CH₄, N₂O, HFCs, PFCs and SF₆ have been reported as carbon dioxide (CO₂) equivalents based on their comparative global warming potential.

Key results: our net carbon status

Our net carbon status is the balance of our emissions and sequestration (as shown below), where emissions to the atmosphere are reported as positive numbers and negative numbers indicate removal of carbon from the atmosphere.

In 2015/16 NRW sequestered 349,621 tonnes of carbon dioxide equivalents (tCO₂e) more in habitats on the estate than it emitted through its operations, which gives us a net carbon positive status.

NRW is a net carbon positive organisation



Key results: our net carbon status

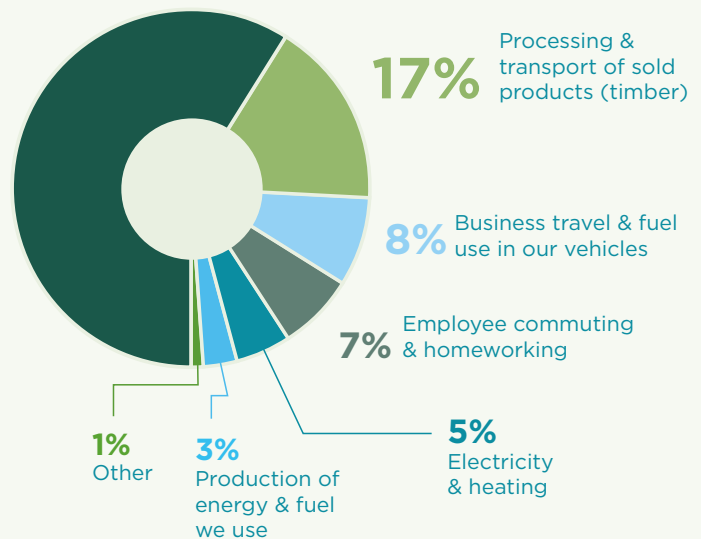
By source

In the 2015/6 baseline year, NRW's total emissions were estimated to be 41,304 tCO₂e. The pie chart (right) sets out our emissions by their source. Purchased goods and services, and processing and transport of sold timber products are our main sources of emissions.

Note: figures presented have not been independently verified and may be subject to change.

59%

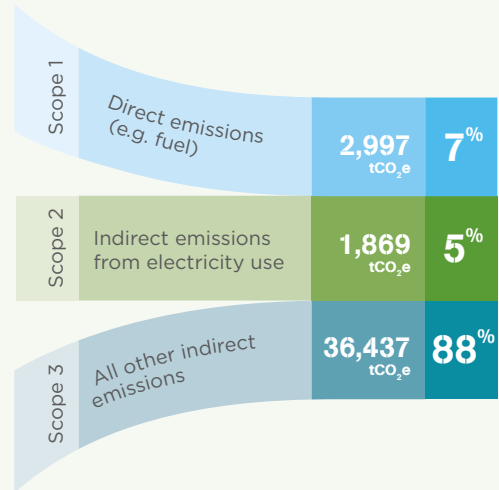
Purchased goods & services
(e.g. civil engineering, timber harvesting, IT equipment)



By scope

The Greenhouse Gas Protocol defines three categories of GHG emissions, scope 1, 2 and 3, which provide a framework for emissions accounting and reporting. Considered from NRW's perspective, the three emissions categories are:

- **Scope 1** - direct GHG emissions to the atmosphere from sources owned or controlled by NRW, e.g. fuel combustion in owned boilers and vehicles
- **Scope 2** - indirect emissions to the atmosphere from the generation of electricity purchased by NRW for use in assets and buildings under our operational control
- **Scope 3** - other indirect emissions that arise at sources outside of NRW's operational control but that are a consequence of our activities, e.g. purchased materials, contractor services, employee commute



Total scope 1 and 2 emissions were 2,997 and 1,869 tCO₂e respectively, whilst scope 3 emissions were estimated to be 36,437 tCO₂e.

Scope 1 and 2 breakdown

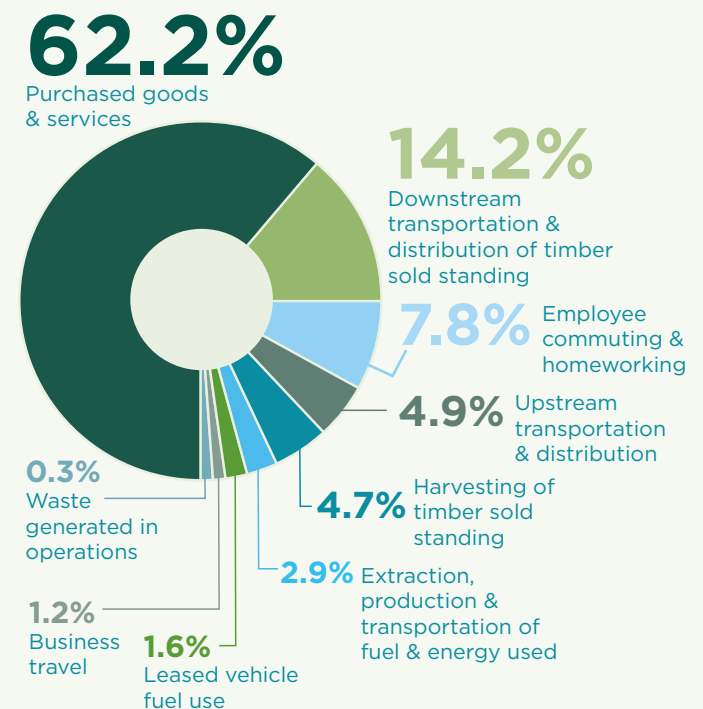
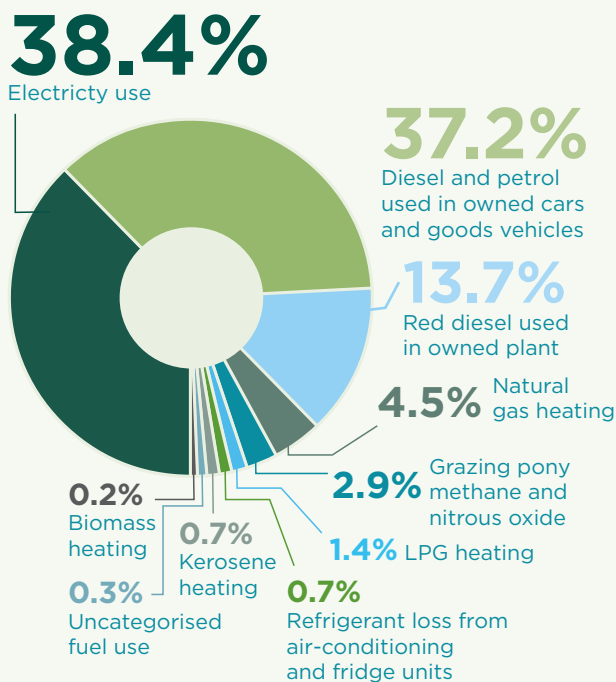
The breakdown of our scope 1 and 2 GHG emissions by source (below) highlights fuel use in NRW vehicles and electricity use as the main sources of emissions.

Within our vehicle fuel use, diesel and petrol in owned cars and goods vehicles was the most significant source of emissions. Within our electricity use, our manned sites, such as offices and depots, accounted for 63% of total electricity emissions and unmanned sites, such as pumping stations and telemetry assets, accounted for 37%.

Scope 3 breakdown

This breakdown of our scope 3 GHG emissions by source (below) shows that supply chain emissions associated with the goods and services we purchase (our procurement) is the largest contributor, accounting for 62% of scope 3 emissions.

We grouped organisational spend into eight broad categories of goods and services for reporting. Within these the main emissions sources were: work carried out by contractors (e.g. on flood schemes (flood asset delivery), forest harvesting; facilities management and ICT), and work carried out under agreements (e.g. reservoir operating agreements).



Key results: Carbon sequestration & stocks

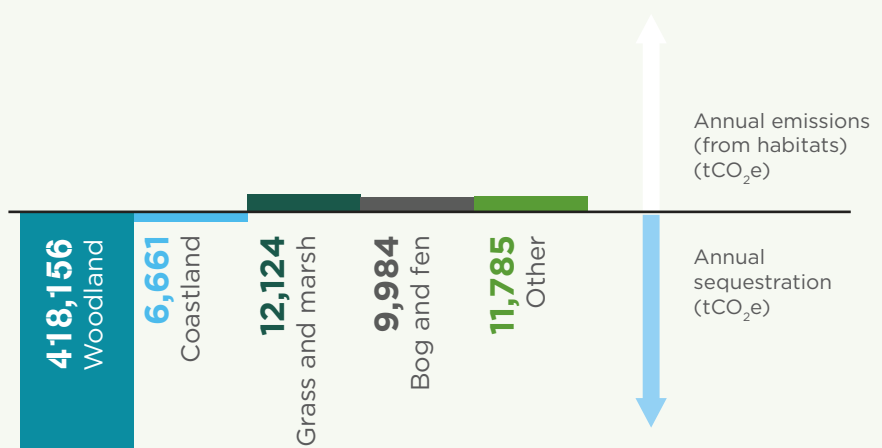
Carbon sequestration

In the 2015/6 baseline year, the habitats on the estate are estimated to have sequestered -390,924 tCO₂e. This total is a GHG balance, where emissions from habitats are subtracted from the total sequestration to give a net carbon sequestration figure for the estate. A negative figure indicates that carbon is being removed from the atmosphere and stored in the habitats.

The diagram (right) sets out the estimated emissions and sequestration from the habitats on the estate.

Sequestration on the estate is dominated by removals of carbon in woodland habitats (-418,156 tCO₂e in the baseline year). Clearfell conifer woodland was the primary contributor to this, with almost equal sequestration contributions from soil, litter and harvested wood products.

Coastal habitats are also making a small contribution to removals on the estate (-6661 tCO₂e). All other habitats are net emitters (i.e. emitting GHG into the atmosphere), apart from open

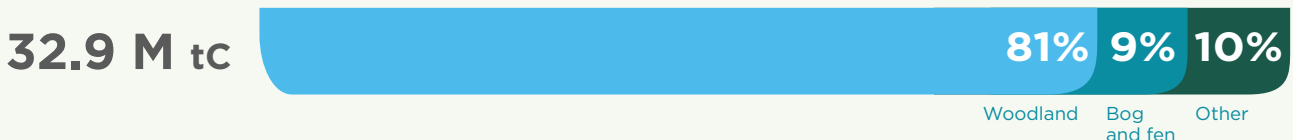


water, rock exposure and waste, for which no emissions or removals were assumed. Grassland, marsh, bog and fen habitats are the largest sources of habitat emissions to the atmosphere. Overall, these habitats on the estate are net emitters because of emissions from areas of underlying modified deep peat soils.



Carbon stocks

Alongside carbon sequestration, total existing carbon stocks in each broad habitat type were estimated to provide an understanding of the wider role of the estate for carbon. The habitats on the estate store an estimated 32.9 million tonnes of carbon (tC).



Woodland and scrub habitats hold 80.9% of total stocks, and bogs and fens a further 9.1% of the total.

If released, these stocks would give rise to an estimated 120.5 million tCO₂e, nearly 3,000 times our annual emissions from operations.

This highlights the importance of continuing to protect the carbon stored in habitats on the estate.

Identifying our options for mitigation

Based on the results of the net carbon status calculation, we identified where to focus effort to identify options for mitigation, i.e. measures available to reduce our carbon impact, by either:

Reducing carbon emissions by consuming less and adopting lower carbon alternatives, both within the organisation and our supply chain, or by,

Enhancing sequestration and/or protecting carbon stocks by managing key habitats, such as woodland and peatland, on the estate to enhance the amount of carbon being stored each year (our sequestration) and/or to protect existing stores of carbon (our carbon stocks).

We adopted four organisational categories to structure our identification and evaluation of options for mitigation: **buildings, transport, land and operational assets**, and **procurement**.

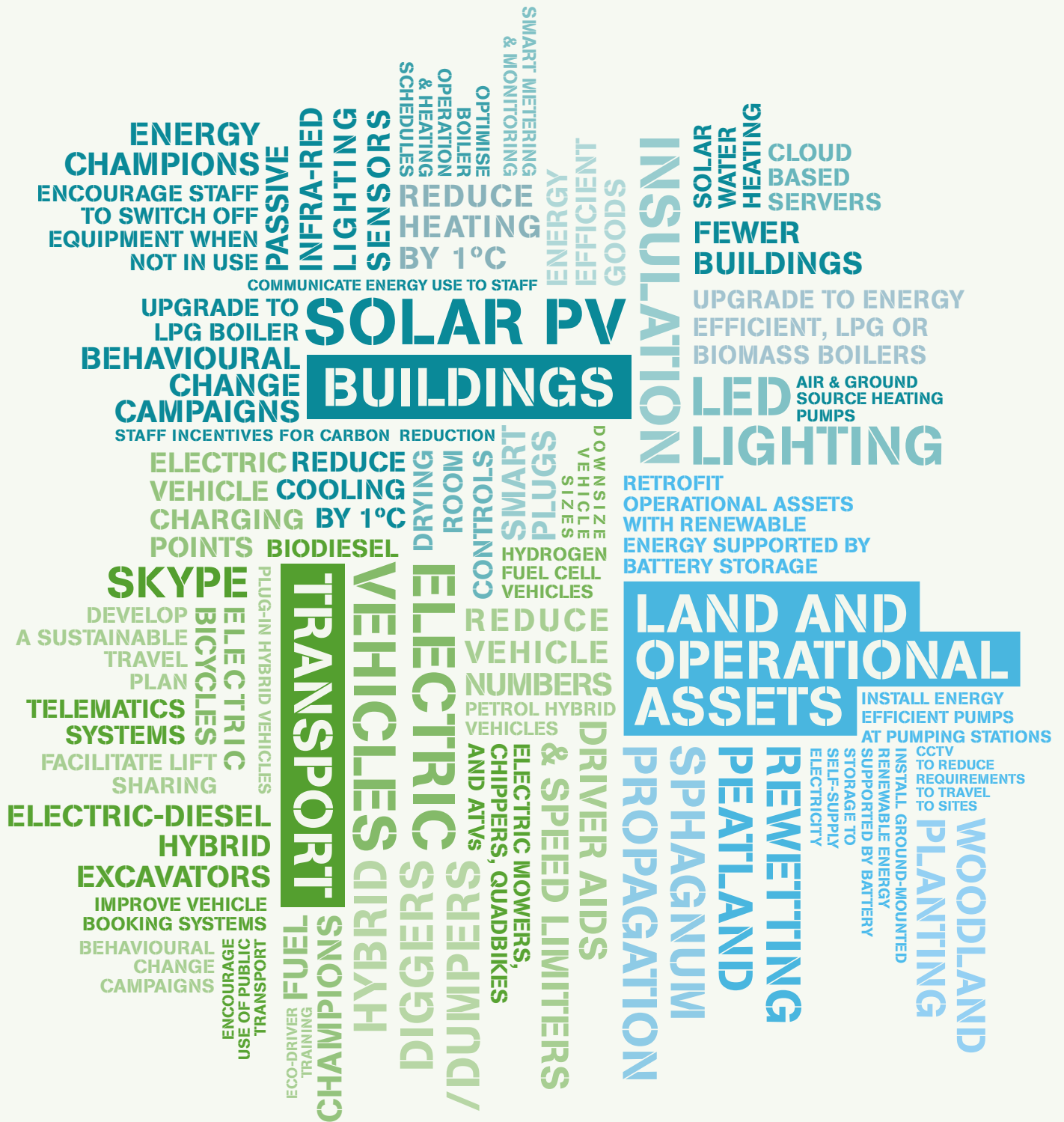
Organisational category	Priorities based on our net carbon status calculation
Buildings	<ul style="list-style-type: none"> • electricity use in offices and depots • heating fuel use
Transport	<ul style="list-style-type: none"> • fuel use (primarily diesel and petrol use across our fleet and plant) • downstream timber haulage • employee commuting
Land and operational assets	<ul style="list-style-type: none"> • management of habitats, primarily peatland and woodland, to protect and enhance carbon stocks • use of the estate for renewable energy generation • electricity use in operational assets, such as pumping stations
Procurement	<ul style="list-style-type: none"> • work carried out by contractors (e.g. on flood schemes, forest harvesting, ICT) • work carried out under various agreements (e.g. reservoir operating agreements)

Options were identified under each of the four categories by:

- reviewing published literature
- researching the approaches taken by other organisations
- gathering ideas from our staff
- understanding our previous experience
- exploring the potential to expand existing mitigation measures in NRW
- delivering a range of demonstration projects
- performing a gap analysis to understand other options to address key areas of our carbon impact not tackled by the above

Considering a broad range of opportunities

We considered a very broad range of potential options that might be appropriate to our organisation, as illustrated below. While not an exhaustive list of the mitigation options we identified, it shows how each category has a variety of potential options to reduce our carbon impact.



Reducing carbon in our procurement

Tackling our procurement related emissions was challenging because of the diversity of goods and services purchased, the number of suppliers we use, and our limited influence over some areas of the supply chain.

These challenges meant it was not possible to identify a full list of mitigation measures in the same way as for buildings, transport, and land and operational assets. Instead we identified generic interventions (illustrated below) from published literature and approaches of other organisations, which could be tailored to meet different needs. We also delivered demonstration projects to trial some new approaches.



We considered these generic interventions in terms of NRW's current procurement policy and procedures, and our emissions hotspots, and came up with three types of action to progress mitigation:

1. **Strengthening existing procurement policy, guidance and procedures**, such as, requiring regular review of energy efficiency technical specifications in equipment purchases to keep pace with technological advances.
2. Focussing on introducing **targeted carbon criteria into key frameworks and contracts** associated with **emissions hotspots**, for example, requiring engineering contractors to complete a carbon planning tool.
3. Developing **new approaches to help identify and incorporate carbon criteria** into contracts and frameworks, including creating lists of suggested criteria to guide staff, e.g. to reduce travel related emissions in contractor services.

The actions we identified are specific to NRW emissions hotspots and procurement procedures, however, the concepts will be transferable to other organisations. Developing measures to reduce carbon in procurement is a long-term process requiring collaboration between procurement, sustainability and operational colleagues, as well as a commitment to influence suppliers, and to explore the improvements possible through national frameworks set by the National Procurement Service.

Evaluating the identified mitigation measures

We created a shortlist of mitigation measures that were identified as potentially suitable for implementation in NRW. To understand the contribution each identified measure could make to support decarbonisation, we conducted a detailed evaluation, which researched and collated information on financial costs and savings, carbon savings or capture (carbon benefit) and wider benefits the measure would deliver. Gathering this information involved a combination of conducting desk-based research, seeking the experience of others, evaluating the results from our demonstration projects, and commissioning pieces of work with industry experts. Information gathered, included:

- **carbon benefit** – for each measure, we estimated the potential carbon emission reductions or additional sequestration it would provide on an annual basis and over the lifetime of the measure.
- **financial costs** – for each measure, we captured financial implications of adoption, including:
 - capital cost
 - annual maintenance or recurring costs
 - lifetime of the measure
 - payback period
 - potential financial support, e.g. grants and other financial incentives
 - potential cost savings, e.g. reduced energy costs
- **wider benefits** – with some measures, we also recorded where the measure would deliver wider benefits. For example, delivering improved water quality, reduced air pollution, improved staff working conditions.

A robust evidence base for action

For some specific measures, e.g. low emission vehicles, we engaged industry experts to support the identification of options by gathering financial costs and carbon savings/capture and to understand wider benefits and the potential adoption across the organisation. This provided further robust evidence upon which to make decisions on implementing mitigation measures in the future. We commissioned assessments on:

Energy use in our buildings – building audits were carried out to understand the energy use and efficiency of our buildings, and the potential for low carbon technologies to reduce carbon emissions. We also commissioned advice on developing behavioural change campaign materials.

Low emission transport solutions – a strategic fleet carbon review was undertaken to understand the potential role of low emission technologies in our fleet and plant. Our current fleet and plant composition and journey details were analysed to identify opportunities to reduce our diesel and petrol use and their associated emissions, whilst providing value for money. The review considered options for low emission vehicles (e.g. electric vehicles), fuel options (e.g. biofuel) and software solutions (e.g. telematics), as well as more efficient vehicle use to facilitate reductions in fleet size and driver training.

Renewable energy generation – a renewable energy resource assessment was used to understand the potential for renewable energy generation on the estate. Generating renewable energy on the estate to supply our buildings and assets could reduce our organisation's dependency on electricity from the grid and reduce both our emissions and costs. The study involved a pre-feasibility resource assessment to understand hydro, wind and solar energy generation potential on the estate and assets.

Peatland restoration – a desk-based mapping study was carried out to understand the potential for habitat restoration to reduce the rate of emissions from modified deep peat soils. This involved a mapping exercise to attach emissions estimates to peatland habitat and condition categories on the estate. Alongside current emissions from the habitats, the emissions savings possible through a range of restoration scenarios were estimated. Two sets of emission savings estimates were provided – restoration of habitats on deep peat to a modified bog or fen condition, and restoration to a near natural bog or fen condition.

Understanding potential scale of adoption

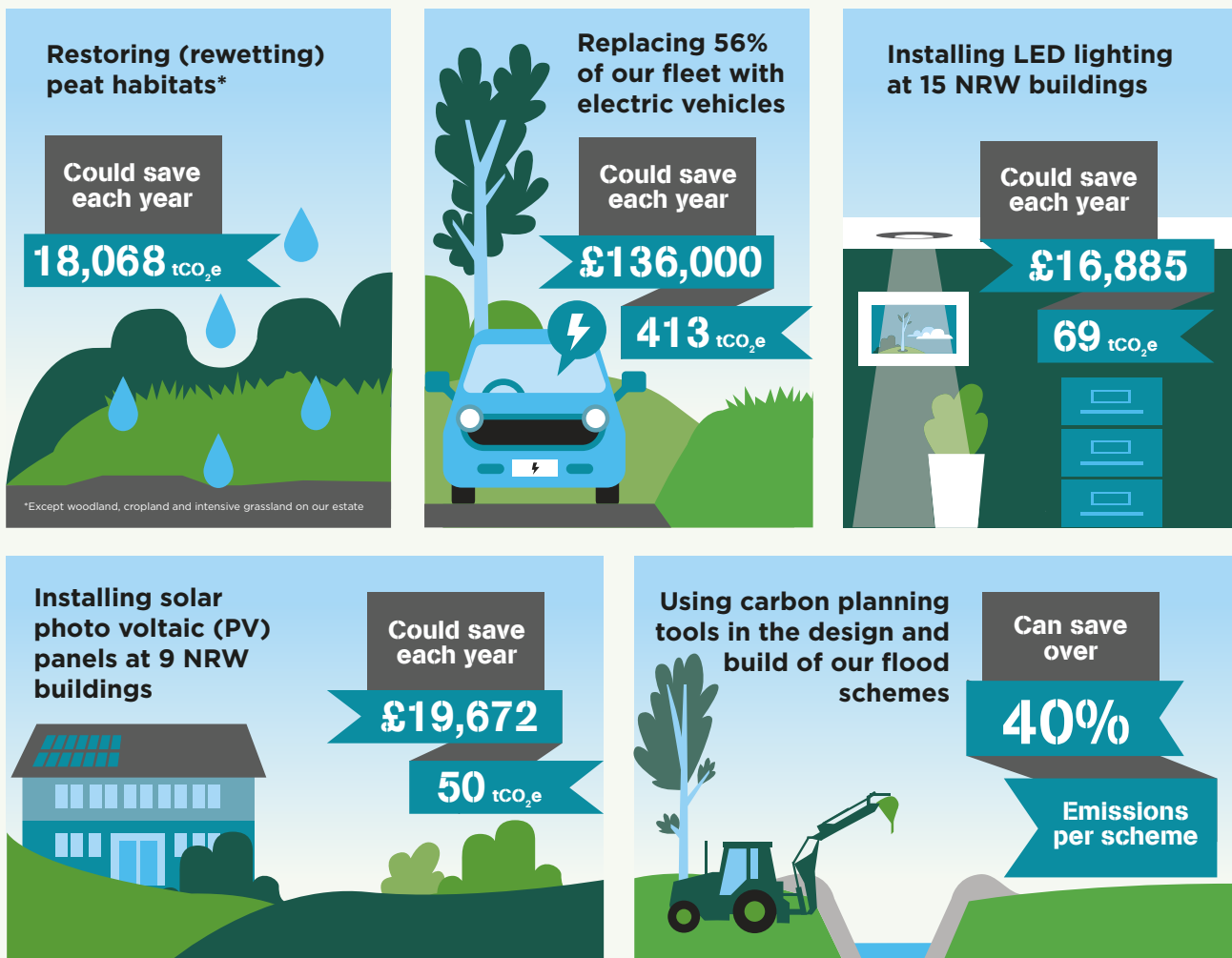
Once we had evaluated each measure, we estimated its potential scale of adoption across NRW to understand how much each measure could contribute to reducing the organisation's overall carbon impact. We expressed the results as savings per year across the whole of the organisation.

One of the key challenges in evaluating the potential of mitigation measures is how to estimate the scale of uptake possible across a large and varied organisation. To address this, we explored two scales of adoption, based upon current knowledge:

Theoretical maximum - the theoretical maximum is the highest uptake possible of a measure across NRW without considering any constraints or challenges to delivering the measure. For example, installing LED lighting at all our buildings.

Feasible maximum - this is the highest possible uptake of a measure when considering some constraints. These constraints include existing business strategies and priorities, ownership, technology readiness, and land use. The feasible maximum is not influenced by the cost of implementation. For example, installing LED lighting at the 15 NRW buildings which have been deemed suitable through building audits.

Below are some examples of the scale of adoption possible for some mitigation measures identified for NRW.



Demonstration projects

To better understand our opportunities to reduce emissions, enhance sequestration and protect carbon stocks, we delivered over 20 demonstration projects to showcase mitigation opportunities, gather real world costs and carbon savings, and to improve our net carbon status.

Buildings

LED lighting was installed in 11 of our buildings, which will save **43.6 tCO₂e** and over **£11,000** each year.

Coed y Brenin Visitor Centre's new **biomass boiler** will have saved approximately **25 tCO₂e⁵** in its first year of operation.

The installation of **solar PV** at nine NRW buildings will provide self-generated renewable energy that is predicted to save **50 tCO₂e** per year.



Transport

In May 2017, we introduced three **electric cars** into our fleet and installed six **charging points** at four offices and two Visitor Centres at Coed y Brenin and Bwlch Nant yr Arian.

Each car will save an estimated **1 tCO₂e** and over **£900** each year against our typical fleet vehicles, as well as providing wider benefits including reduced noise and air pollution. We've seen up to 75% utilisation of the electric cars and high staff confidence in using them. The charging points also support visitors to travel more sustainably to our offices and visitor centres.

We have also recognised the contribution active travel can make to reducing emissions from both business travel and staff commuting and installed five **secure bike storage units**.



Land and Assets

Woodland – three sites have been planted with new, native mixed broadleaved woodland, including four hectares at Gethin Forest, Merthyr Valley, which will store around **2,000 tCO₂e** each year. The new woodlands have also provided wider benefits, including: remediation of post-industrial spoil and improving recreational access to support improved health and well-being of the local community.

Peatland – **over 60 hectares** of degraded peatland habitat have been restored at Cors Caron, Cors Fochno and in the Tywi Forest. This will protect stored carbon, and potentially reduce flood risk.



Operational Assets – solar PV has been installed at Cifrew gauging station, which will generate over **900kWh** of renewable electricity each year to power it. We have scaled up this measure and installed solar PV onto 42 hydrometry and telemetry assets in South East Wales. Each installation will not only reduce our energy bills but also cut the journeys associated with asset maintenance.



Procurement

Our analysis of emissions associated with our organisation's purchased goods and services indicated that forest harvesting, road and restocking activities by contractors are significant sources of emissions. We therefore carried out a study to **refine forestry operations emissions** estimates, using NRW and contractor data on typical machine and material use. Over half of all forestry operations emissions on the estate arise from work completed by contractors on NRW's behalf, demonstrating the importance of using procurement frameworks and contracts to influence supply chain emissions. The next steps are to work with forestry colleagues to identify potential mitigation measures, such as use of biofuel in forestry plant, strategic logistics using GPS trackers in haulage lorries, and to determine how measures can be integrated into relevant contracts and frameworks.

We are **trialsing a carbon planning tool** to reduce carbon emissions from the civil engineering contracts used to design and build flood schemes (flood asset delivery). Our civil engineering procurement framework requires construction contractors to complete the tool at the build stage, detailing energy, transport and material carbon impacts of the construction process and reductions achieved. We have trained key staff to use the tool and are setting up internal governance to support its use. The Environment Agency and their contractors have achieved over 40% carbon emissions reductions in the construction of major flood defence schemes using the tool.

Planning future implementation

The opportunities identified through the evaluation of mitigation options will help build a strategic, costed and prioritised programme of delivery for NRW to address our carbon impact over the next 3-5 years. Supported by a robust evidence base, this programme will facilitate delivering necessary action for decarbonisation across our organisation.

Achieving decarbonisation across the organisation will be challenging. A change in culture will be required to consider carbon alongside more conventional priorities such as cost and time and much of the necessary delivery of decarbonisation will need to be incorporated within the day-to-day decision making and work of our staff, contractors and partners.

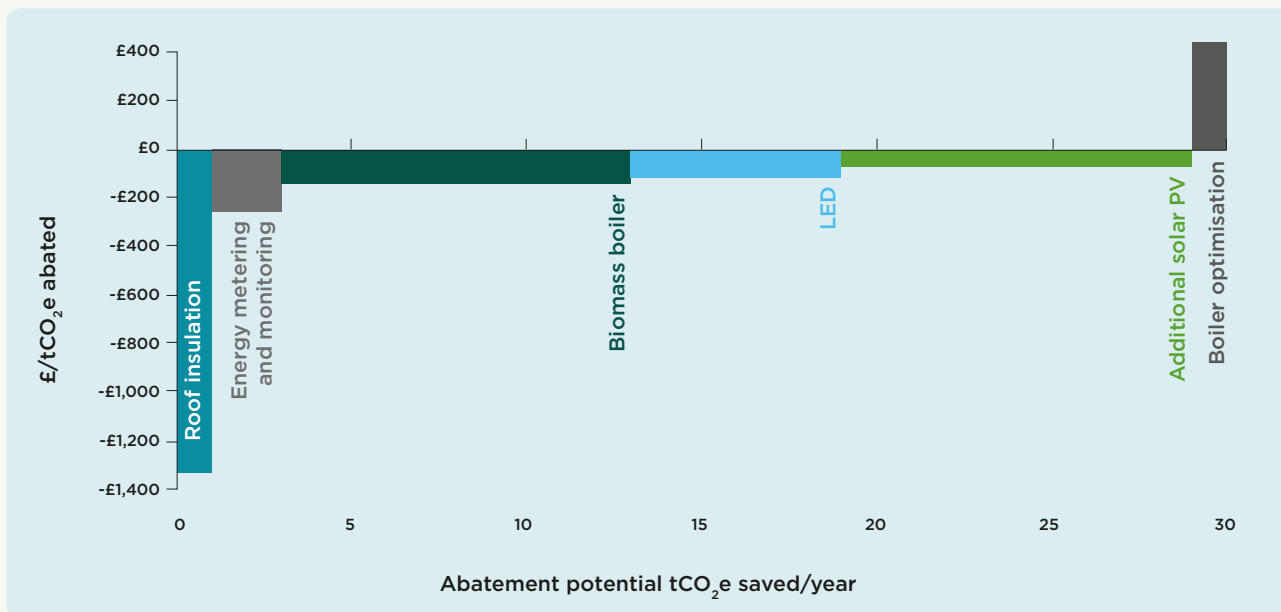
Prioritising measures for delivery

Mitigation measures will be prioritised using:

- **carbon benefit** - using the total carbon savings or sequestration over the lifetime of the measure.
- **costs** - understanding the lifetime cost of each measure by calculating the Net Present Value (NPV)⁶ where possible.

To provide a **cost per unit of carbon benefit achieved**, the Net Present Value (NPV) is divided by the tonnes of carbon dioxide equivalent (tCO₂e) saved over the lifetime of the measure. This will allow us to prioritise measures based on which of the options would provide the greatest carbon benefit for the least cost.

As part of our consideration and where suitable, we are using Marginal Abatement Cost Curves (MACCs) to help prioritise measures. An example MACC of an NRW office is seen below. Each bar represents a low carbon option. Here the width and height of the bars represents the carbon reduction and cost per tCO₂e saved, respectively, relative to business as usual.



Delivering wider benefits

Alongside financial cost and carbon benefit, we will recognise and seek to maximise the wider benefits measures can provide beyond decarbonisation. This will strengthen the business case to deliver mitigation measures and maximise our contribution to the Well-Being Goals.

Learning from our experience

Through delivering the Carbon Positive Project, we have gained experience and learning to support our future work on decarbonisation. The key learning highlighted below may also help inform other organisations in exploring and managing their carbon impact.

Gaining organisational commitment

- Adopting a systemic approach to organisational decarbonisation is essential for NRW not only to demonstrate progress towards the ambition of a carbon neutral public sector but also as an essential component of our contributions to the Well-being Goals and to embrace the five ways of working – long term, prevention, integration, collaboration, involvement – set out in the Well-being of Future Generations Act.
- Understanding the wider priorities of the organisation and its staff is important to successfully embedding changes. Decarbonisation may not be the driving factor for decisions or change for others and so highlighting or building in multiple benefits to measures can help engage others to facilitate successful delivery.

‘taking a whole organisation approach to understanding our carbon impact was critical to identifying our priorities’

- While the case for decarbonisation is clear, to achieve this it is essential to put in place governance, organisational structures, budgets and targets that will ensure that carbon management is embedded across the organisation. While certain sections of the organisation may be obviously involved in delivery, e.g. those who deliver corporate services such as buildings and fleet, it is essential that ownership of the decarbonisation goal is spread across all parts of the organisation.
- Whilst embedding the delivery of decarbonisation across teams is a key objective, we found central coordination through a project provided the essential focus to plan and coordinate this delivery in a strategic way.

- Decarbonisation requires an iterative approach and clear, long-term organisational commitment. An adaptive management approach is also essential to respond to change such as: new technological advancements in mitigation measures, a continually developing evidence base and evolving organisational structures and priorities.

‘Staff were pleased to see their organisation taking positive action on climate change.’

- There is a risk that tackling decarbonisation is seen by some as something to be addressed in the future, or when more time and resources are available. Making it a clear corporate priority should include reinforcing the need to deliver current opportunities, as well as putting in place an implementation plan and ensuring that new opportunities are built into corporate planning and targets as they arise.



Engaging with others

- At the beginning of the Project, we benefitted from talking to other organisations who had taken ambitious and innovative approaches to decarbonisation. This helped us to understand the necessary steps to deliver the Project and highlighted potential challenges and opportunities, as well as building confidence in what was possible and identifying potential options to our organisation.

‘learning from organisations with ambitious approaches to carbon management provides inspiration’

- Whilst planning future implementation, we have identified potential for collaboration in delivering mitigation measures, such as electric vehicle charging infrastructure, renewable energy generation and woodland planting. These opportunities should be explored further to help optimise the multiple benefits possible from delivering decarbonisation and to benefit from the experience of others during delivery.
- The measures that we have identified and evaluated for NRW are, mostly, commonly used low carbon technologies. Therefore, we had the opportunity to learn from the experience of others across the public, private and third sectors. This also means the potential for others to learn from our experience will not be limited to public sector bodies.

‘many mitigation options we have identified can be taken forward by others now’

- It is essential to build and maintain strong relationships to ensure that individuals and teams from across the organisation will buy in to decarbonisation and champion its delivery.
- In our organisation, we found individuals and teams who have already acted independently to reduce emissions within their own work area. However, moving to incorporate others’ work as part of a more strategic plan to decarbonise can result in tension initially. It is crucial that these individuals and teams are involved in the new approach from the outset and feel that their experience and achievements are valued and utilised. With others who were less open to considering decarbonisation as part of their remit, it was necessary to set out the potential benefits for their work area, as well as explaining the role they could play in achieving decarbonisation.

‘working collaboratively with colleagues from across the organisation has been crucial to delivery’

- Delivering our demonstration projects in collaboration with staff from across the organisation helped to communicate the purpose of the Project and showcase the potential for decarbonisation in NRW. The interest generated through delivering the demonstration projects, e.g. our electric vehicles, raised the profile of decarbonisation in the organisation and resulted in others, both within and outside the organisation, coming forward to get involved.

‘delivering mitigation work on the ground engages colleagues and catalyses further action’

- Clear and consistent communications play a key role in engaging others. Regular communications are important to make others aware of ongoing work, how they can contribute and why it should be delivered. We held regular staff webinars to update on project progress and to ask for input/feedback, and published short project updates periodically.
- It can be difficult to influence perceived priorities. For example, many of our staff perceived lights and computer monitors being left on as a key priority for action on decarbonisation, as they may not be aware of the scale of carbon impact associated with areas of the organisation they do not engage with (e.g. procurement, timber haulage).
- Internal expertise is essential but can often be limited, particularly in areas where factors such as technology, process, market, or science are specialist or are evolving rapidly. To deliver work effectively, an understanding of skills gaps is essential to highlighting where external support may be required. The ease of delivering our demonstration projects differed notably between those where we had staff expertise, such as peatland restoration and those where we had no previous experience as an organisation, for example installing EV charging points. In future, more time should be planned for the delivery of measures new to the organisation to mitigate these risks.

Basing decisions on robust evidence

- Sound data is essential to provide a robust evidence base, both for understanding and managing an organisation's carbon impact. For example, our Environmental Management System gave a strong basis upon which to build our net carbon status calculation. Where information wasn't already collected consistently or was partial for the organisation, it was challenging to source quickly and efficiently as it was often held by different individuals across the organisation. The time needed to gather organisational data for emissions calculations should not be underestimated, for example, we spent many months ensuring that our electricity use estimates did not have any omissions.
- The calculation of an organisation's net carbon status must be built upon best available information at the time of calculation, accepting that some assumptions and uncertainties will be unavoidable when time is limited. These can be refined over time through improved data collection procedures, if the calculation is revisited. However, it should be recognised that calculating an organisation's net carbon status is principally to enable priorities to be identified and to evaluate progress against. Therefore, once an implementation plan is in place, a review of the net carbon status will only be necessary periodically.

'understanding your carbon impact/footprint is only a stepping stone to identifying your mitigation opportunities – reasonable estimates are good enough to kick start action'

- Assumptions are an inevitable part of any approach to decarbonisation. It's important to be clear on the assumptions made and to apply them consistently to enable confident comparisons, e.g. to be able to compare the cost and carbon savings of LEDs against solar PV installations. Once assumptions have been made, it's important to accept them and move forward with confidence.
- Contingency should be built into cost estimates used for planning future implementation. We found that desk-based estimates of the costs of mitigation measures were often significantly different to the actual cost once site specific practicalities had been considered, e.g. the typical cost of installing an EV charging point varied depending upon the existing electrical infrastructure at individual sites and the need for ground works.

Conclusion

NRW's Carbon Positive Project has demonstrated how an organisation can comprehensively address its carbon impact. The Project has become an organisation-wide initiative, raising the profile of decarbonisation and developing a robust evidence base for ongoing commitment to reducing our carbon impact.

We have shared our learning and experience to support other organisations to decarbonise and our future implementation will also provide further opportunities for learning. The Project has also highlighted opportunities to explore collaboration in delivering mitigation measures across Wales' public sector and beyond, e.g. electric vehicle charging infrastructure, renewable energy and woodland planting.

Wales' legislation enabling sustainable development has helped to shape our approach and optimise the multiple benefits from our decarbonisation. It will also provide the framework for NRW's ongoing, long-term action to prevent climate change, and commitment to improving the socio-economic, environmental and cultural well-being of Wales.



Find Out More

This Summary Report sets out the approach and experience of our Carbon Positive Project, including our key findings and learning, and is aimed at sharing our experience and learning to encourage further decarbonisation across Wales' public sector and beyond.

Further detail can be found in a series of technical reports and case studies:

Calculating NRW's net carbon status – a technical report detailing our approach to understanding our organisation's carbon impact and our net carbon status.

Evaluating NRW's mitigation options – a technical report setting out our approach to identifying and evaluating mitigation options to reduce emissions, enhance sequestration and protect carbon stocks, and to present details of suitable measures.

Demonstration project case studies – a series of case studies describing our experience of delivering each of the pilot projects to showcase some of NRW's mitigation opportunities.

All Project materials are available via the Project's webpage:
www.naturalresources.wales/carbonpositive

#BeCarbonPositive

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