Sunderland City Council Carbon Plan 2017-20:

The Carbon Challenge

On Earth, indisputable scientific evidence shows that human activities are changing the natural greenhouse. Over the last century the burning of fossil fuels like coal and oil has increased the concentration of atmospheric carbon dioxide (CO_2).

These greenhouse gas emissions have increased the greenhouse effect and caused Earth's surface temperature to rise. The primary human activity affecting the amount and rate of climate change is greenhouse gas emissions from the burning of fossil fuels. Recognising the global challenge, the Paris Agreement entered into force on 4 November 2016, and brought together 55 nations in a pact to keep a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels, and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.

The UK Government recognised the commitment required to prevent these temperature increases, and set out in legislation the 2011 UK Carbon Plan. The plan which requires all Local Authorities to reduce their greenhouse gas emissions by 34% by 2020 remains the overarching policy for the UK.

As an organisation that uses carbon-based fuels, Sunderland City Council is contributing to climate change. Therefore we have a statutory obligation to manage the carbon emissions that arise from these activities.

By committing to the Paris Agreement and the EU Covenant of Mayors Carbon Reduction Commitment, Sunderland City Council already recognises the urgent need to tackle Climate Change. Carbon emissions impacts upon cost efficiencies for the council. The cost of carbon-based fuels has increased significantly in recent years, and energy markets remain volatile. This is putting additional financial pressure on Council budgets and services.

Sunderland City Council, along with all other Local Authorities, is facing cost pressures at a time when demographic changes are increasing the demand for services. By reducing carbon emissions in a systematic way, spending on energy and carbon related costs can be reduced. This will help to meet cost saving targets and allow reinvestment in services.

The Carbon Vision

Sunderland City Council has developed a Carbon Management Plan (CMP) to reduce the carbon emissions from its own operations over the next 3 years to 2020. This will serve two key purposes:

- to reduce the Council's own contribution to Climate Change
- to reduce the Council's energy costs

This plan takes into account the ever changing basis of the availability of data, changes to the asset base, scale and scope of services provided, technology changes and changes in the National Grid.

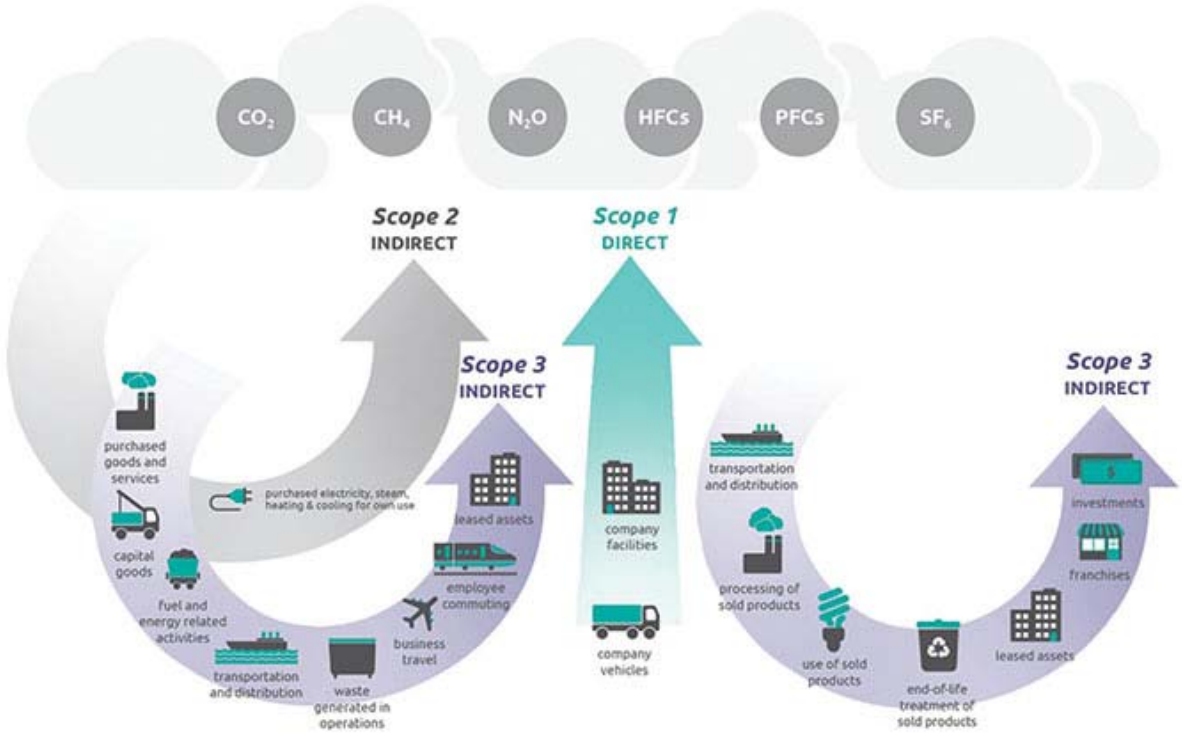
Sunderland's aims are in line with its commitment to both the EU Covenant of Mayors and the Paris Agreement;

"The talks at the COP21 conference in Paris have culminated in a global deal, with the whole world now signed up to play its part in halting climate change. In other words, this generation has taken vital steps to ensure that our children and grandchildren will see that we did our duty in securing the future of our planet. What is so special about this deal is that it puts the onus on every country to play its part" Prime Minister David Cameron, Climate Economic Forum, 2015

Carbon Baseline

The CMP has been drafted in line the Green House Gas Emissions Protocol 2008, which requires all organisations to report Scope 1, 2 & 3 emissions. The reporting period is 2016/2017 including targets to 2020, using 2007 figures as the baseline for comparisons.

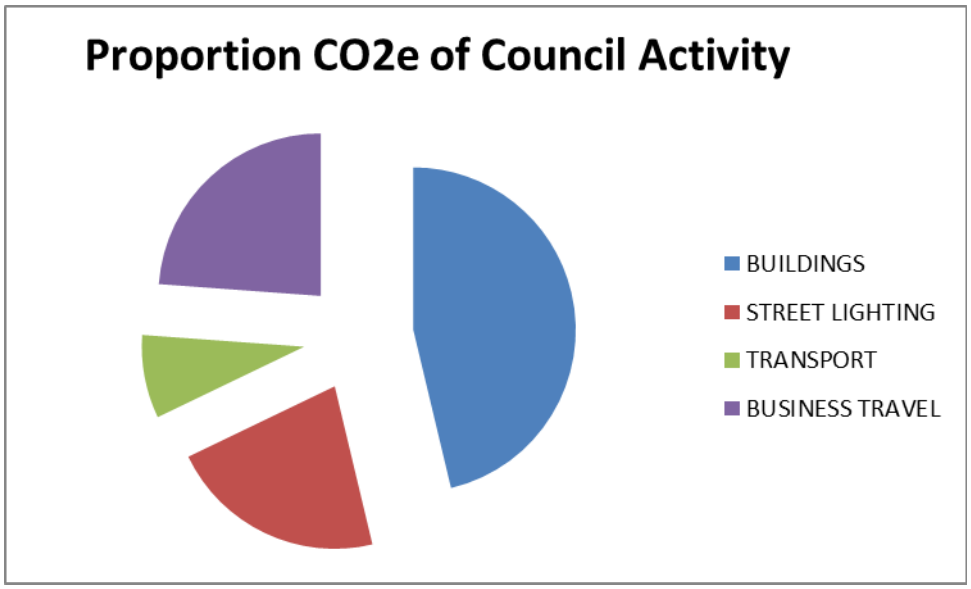
This report shall be reviewed annually.



Scope 1, 2&3 Emissions; Carbon Trust

Sunderland City Council produced approximately 54,252 tonnes of carbon dioxide directly (Scope 1/2) from its buildings, fleet, streetlights, and 16,979 tonnes indirectly (Scope 3) via business travel activity in 2016/17.

	BUILDINGS	STREET LIGHTING	TRANSPORT	BUSINESS TRAVEL	TOTAL
CO_2 emissions (tonnes)	32,958.2	15,386.4	5,908	16,979	71,231.6
Proportion	46.27%	21.6%	8.29%	23.84%	100%
Costs(£)	7,830,330	4,249,465	918,146	4,314,103	17,312,044
Proportion	45.23%	24.54%	5.30%	24.93%	100%



- **Buildings.** The council owns and operates 590 properties, including schools, offices and council depots. Gas and electricity meter readings provide estimate of the energy used. Sunderland city council has greatly reduced the number of buildings it holds responsibility for, partly due to a Building Rationalisation Project which has seen the consolidation of council services into fewer buildings, and partly due to many schools converting to academy status and no longer being LA maintained.

- **Fleet.** The council operates a fleet of over 500 vehicles, involved in refuse collection, street cleaning, highway maintenance and many other activities. Records of fuel supplied through the refuelling depot at South Hylton have been used to calculate the fleet emissions. These emissions do not include emissions from private vehicles or council lease cars on business mileage, or transport contracted out on the council's behalf, such as school buses.

- **Streetlights**. The council operates over 49,500 streetlights. Their electricity consumption is estimated from an inventory of all lamp wattages, plus estimates of their burning hours (dusk till dawn, or 24 hour), agreed by both the electricity supplier, npower, and Distributed Network Operator, , Northern Powergrid.

- **Business Travel**. In the Council's original carbon report (2007 – 2012), business travel was not included as this was not an obligatory reporting measure. In light of changes in reporting procedures, (detailed later

in this report), the figures provided within this report will afford a new baseline going forward for carbon emissions from Business Travel. Progress will be reviewed every 3 years. The above costs are calculated on the average price per mile;

1. Rail: 12.4p per mile – long distance average price
2. Coach: 3.8p per mile
3. Air: £308 average price per domestic flight

- **Value Chain**. In the original CMP report, emissions from the Councils supply chain were not included as this was not a requirement at the time. However, changes to reporting procedures now enable consideration of Scope 3 supply-chain emissions that may arise. A separate report will be prepared to consider Scope 3 emissions from procurement activity and that information will be backdated (for baseline purposes) and fed into the next review of this plan.

Original targets to 2012.

Sunderland's original Carbon Plan set a target to reduce the Council's carbon emissions by 10%, relative to 2006/7, by the end of 2011/12, and 34% of 1990 levels by 2020 (In line with the UK Carbon Plan). This was arrived at using the following information;

- **Business as usual**. Between 2007-2012, expansion plans within council services, particularly new leisure centres and street-lighting improvements, was set to see emissions increase by 7.9%, or 5,450 tonnes
- **Major Initiatives**. Ongoing initiatives at the time, around efficiencies and smarter working were programmed and funded, eg. Building Schools for the Future and rationalisation of council property. These were intended to reduce emissions by 6.3%, or 4,450 tonnes
- **Carbon Plan Opportunities**. The opportunities which were identified in the 2007/8 Carbon Plan, were intended to reduce emissions by a further 9.8%, or 6,950 tonnes.

In conclusion, the net results of these three factors were intended to be:

- Reduce annual emissions of CO2 by 6,250 tonnes CO2 by March 2012, reflecting an absolute reduction of 9% compared to the 2006/7 baseline
- Limit the rise in energy costs to £0.8M over 5 years, reflecting a £2.0M saving compared to the Business as Usual scenario

Changes to policy framework since 2007

Greenhouse gas emissions are categorized into three groups or 'scopes' by the most widely-used international accounting tool, the Greenhouse Gas (GHG) Protocol. While scope 1 and 2 cover direct emissions sources (e.g., fuel used in company vehicles and purchased electricity), scope 3 emissions cover all indirect emissions due to the activities of an organisation.

In 2008 the Climate Change Act set out the world's first legally binding targets. It aims were to:

- improve carbon management and help the transition to a low-carbon economy in the UK
- show the UK is committed to taking its share of responsibility for reducing global greenhouse gas emissions by developing negotiations on a post-2012 international climate change agreement
- To cut carbon emissions by 80% of 1990 levels by 2050.

This remains the overarching legislation for the UK with regards to carbon management (see Appendix 1).

- Since 2008 we have also seen the introduction of the UK Carbon Plan, in 2011, which saw the first of five carbon budgets. Carbon budgeting refers to a system in which the total amount of greenhouse gas emissions over a certain period of time are constrained. The first five carbon budgets have been put into legislation and will run up to 2032 (See Appendix 2).
-
- The legal framework has also changed with regards to the UK cremation industry since 2007. Crematoria nationwide, were initially required to abate 50% of mercury emissions across the UK by the end of 2012. Sunderland City Council signed up to the CAMEO (TMAC) Scheme as part of abatement actions. http://www.cameoonline.org.uk/scheme-rules/

  The crematoria emissions fall into scope 3 category of emissions and as such are now to be included in this report.

In conclusion, the result of these policy changes means that the original Carbon Plan did not incorporate all of the data and reporting requirements, only evaluating Scope 1 & 2 emissions. These were Transport, Buildings, and Streetlighting, all of which fell under Scope 1 and 2 emissions.

As best practice we are now intending to include some Scope 3 emissions in our reporting process. This new data will be used as a baseline from which to measure progress on Scope 3 emissions going forward.

Carbon Costs

Energy

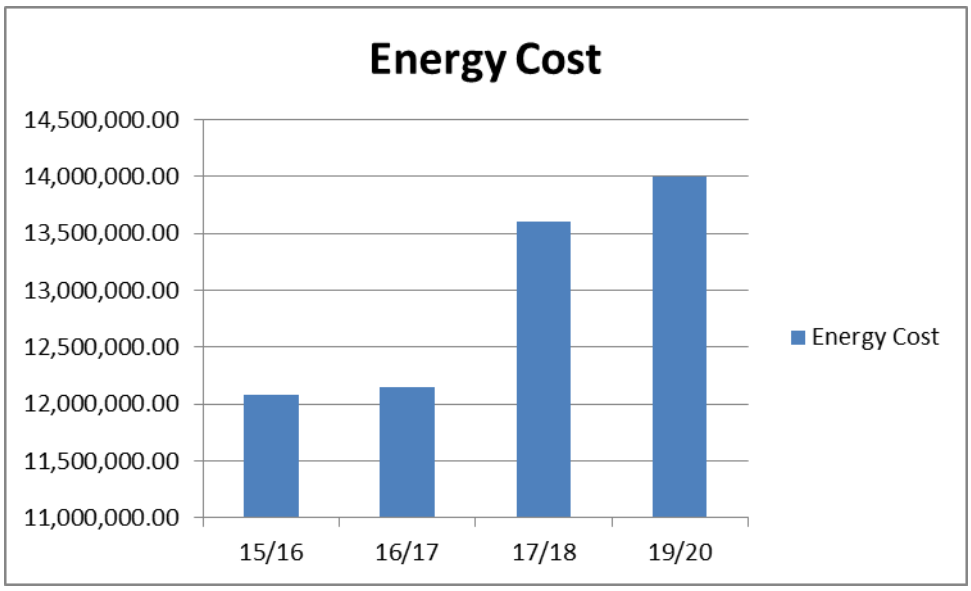
The price of gas and electricity in the industrial and commercial sector is extremely volatile. The cost of gas has fallen over the last three years with particularly large falls in the most recent year. In January 2016 gas was 33 pence per therm compared to the peak price of 66 pence per therm in January 2015. The price of gas in 2017 was approximately 45 pence per therm. Electricity generally is less volatile than gas due to the diverse nature of electricity generation however the price is still influenced by the wholesale cost of gas. This diverse mix of electricity generation means that the carbon intensity of electricity has been steadily declining thanks to less coal-fired electricity generation and new methods of energy generation, such as;

- Increased use of photovoltaic (solar)
- Expansion of wind turbines
- Hydro Power
- Increased marine power (wave energy converters & tidal stream/barrage devices – still an emerging technology)
- Nuclear Power

In the medium to long term the pressures on price appear to be mixed as companies consider the reduction in wholesale price as well as rising infrastructure costs. The most reliable way to reduce energy bills in the medium to longer term is always through energy efficiency improvements to reduce consumption.

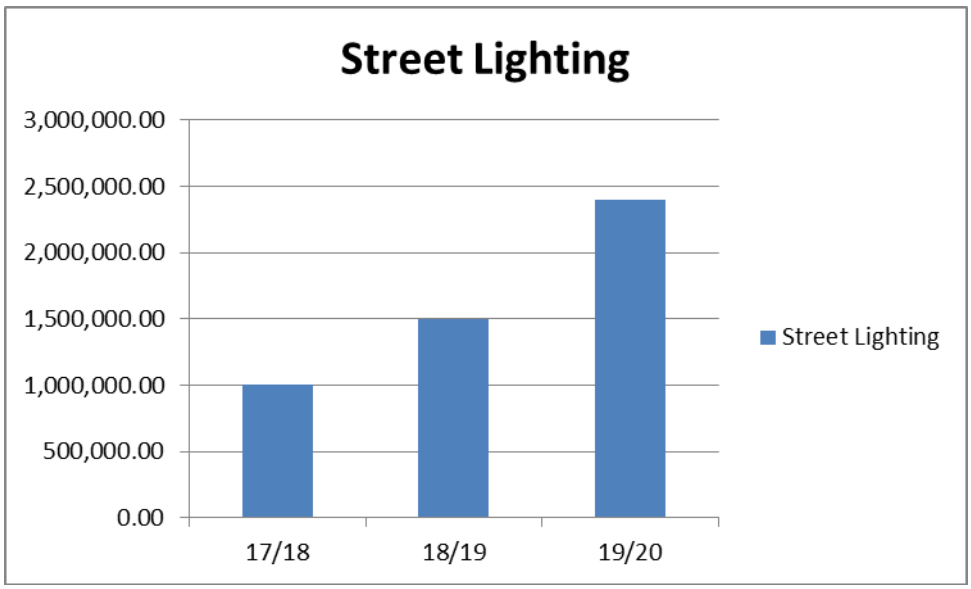
The unit cost of energy is made up of the commodity cost and non-commodity costs (transportation/use of system/carbon levies). 10 years ago this was in the ratio of 75:25 however this has changed dramatically and is now moving toward a 40:60 split and is expected over the coming years to move to a 25:75 ratio. It is worth noting that all electricity generation technologies emit CO2 at some point during their life cycle and no technologies are entirely 'carbon free'.

So taking these considerations into account, and assuming that the council continued in a "business as usual" capacity, it was anticipated that the Council's energy bill for 2015 would be £ 12.8m.



Fuel expenditure for 2015 was in fact £13.9m, a further 8% higher than anticipated costs. Should energy prices continue to rise, we would anticipate a fuel bill of approximately £13.6m by 2018. By 2020 electricity costs could rise by an additional 10% due to electricity market reform measures and increased distribution costs, and further government levies, meaning expenditure could surpass £14million. Time of use is also becoming very important as demonstrated by the cost of electricity use during peak periods (16:00 – 19:30 Mon-Fri) which is almost 4 times more than at other times of the day. It is difficult for the Council to minimise energy use in buildings at these times due to current operating/working practices so alternative solutions such as storage of energy are being investigated.

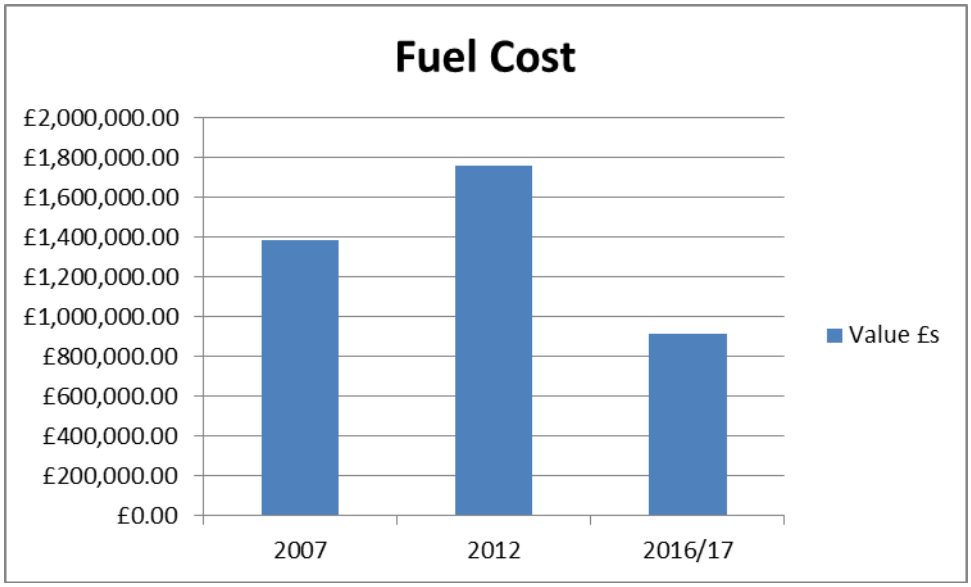
The graph below shows the aniticpated savings from streetlighting as the work comes to an end by 2020. It is anticipated that the overall savings by 2020 will be £2.4million.



Transport

From our baseline in 2007/8 of 4932t CO2e, we have seen an overall 20% increase in emissions to current levels of 6979.34t CO2e (see below).

The significant financial savings in contrast to the carbon increases, (down by £841,801.71 compared to 2007) suggest that more journeys are being made using less fuel efficient vehicles. However, it is important to bear in mind that cost parameters vary greatly from 2007 to present day. This combined with other variables, including aging vehicles and conversion factor changes, may be an influencing factors on the differences we see.

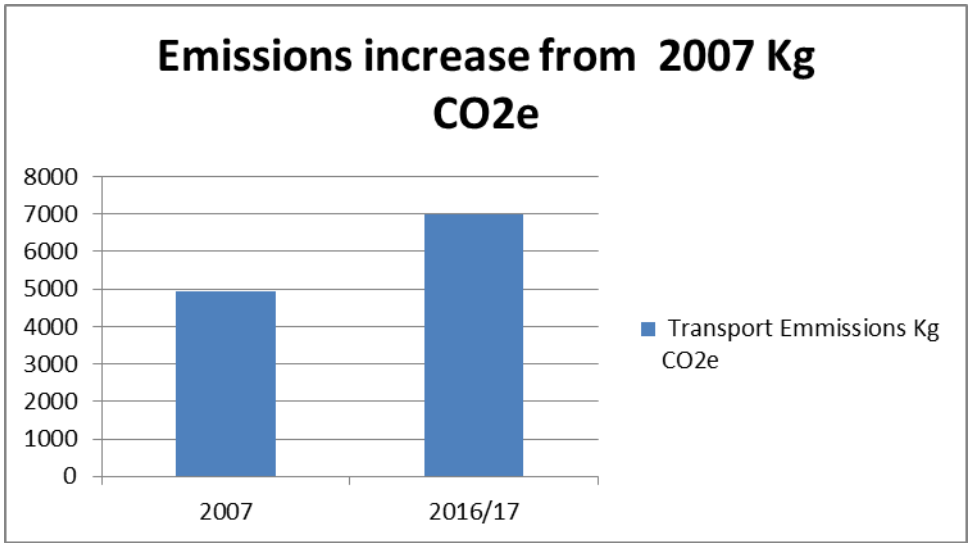


Although we have greatly increased the usage of electric vehicles, our use of diesel has not reduced.
The proportion of electric and unleaded fuelled vehicles remains significantly smaller than our fleet of diesel vehicles.

The city council contributed to a jointly commissioned report published in 2016 with the University of Sunderland, Nexus and Amap, to establish the environmental and financial benefits for increasing the amount of city council and university business transport modes from conventional to a range of green transport including electrical battery powered vehicles (EV's). This report highlighted certain technological issues still to be resolved with larger goods vehicles and those other light vehicles used for specialist works. It also provided further evidence to the city council that for light goods vehicles used on typical council business, there is a strong case for replacing light diesel engine vans with electric battery powered ones. In its future light vehicle programme replacement programme the council will aim to presume to replace light diesel vehicles with electric powered vehicles.

Although the conversion of refuse vehicle engines from older Euro 4 and Euro 5 to the latest Euro 6 engines is required by legislation, and is carried out via the councils vehicle replacement programme, it is expected to yield improved results in terms of CO2e reductions .The council and the wide freight is still evaluating the impact of these changes.

Council changes to its regular refuse and recycling collection services in 2017 means it is expected that there will be fewer vehicles and net vehicle miles travelled will result. The council fleet manager will monitor the impacts of the refuse collection changes, and the newer larger goods Euro 6 engine, and light vehicle fleet acquired from 2017.

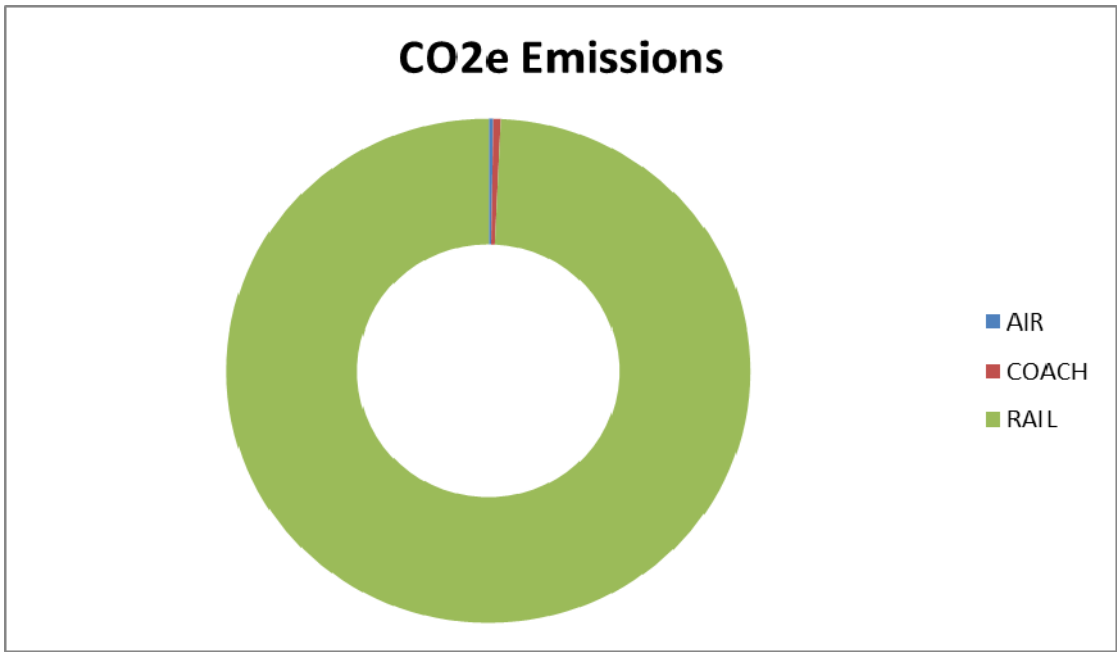


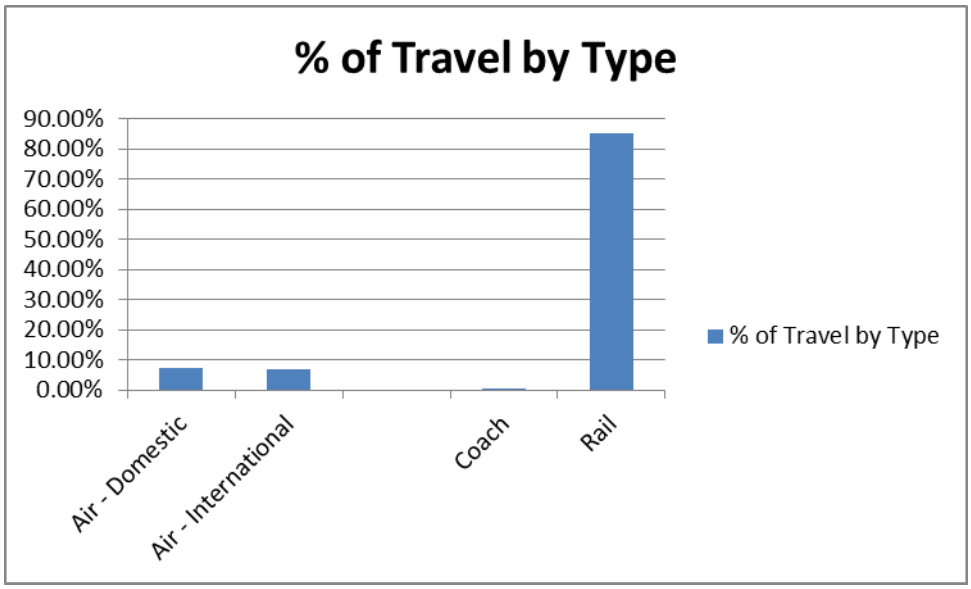
Bearing all of the above in mind, and without significant data from 2007 to analyse the emissions in more detail, it is proposed that the current emissions are used as a new baseline going forward.

Alongside new techonologies and methods of reporting emissions in more detail, we now have the capabilities to regularly monitor our outputs and provide accurate data going forward.

Business Travel

Sunderland City Council was indirectly responsible for 16,979t CO2e of carbon emissions through its business travel activities from April 2016 to March 2017. The majority of these emissions arose from rail travel as rail is the most frequently used mode of travel (85%). These are categorised as "Scope 3" emissions for reporting purposes.





Business travel is strictly regulated via the corporate procurement department which approves all travel requests and prevents unnecessary journeys. As business travel was not considered in previous reports, the 2016/17 (under Scope 3), these figures provide a new baseline for future reporting.

New Carbon Plan Targets

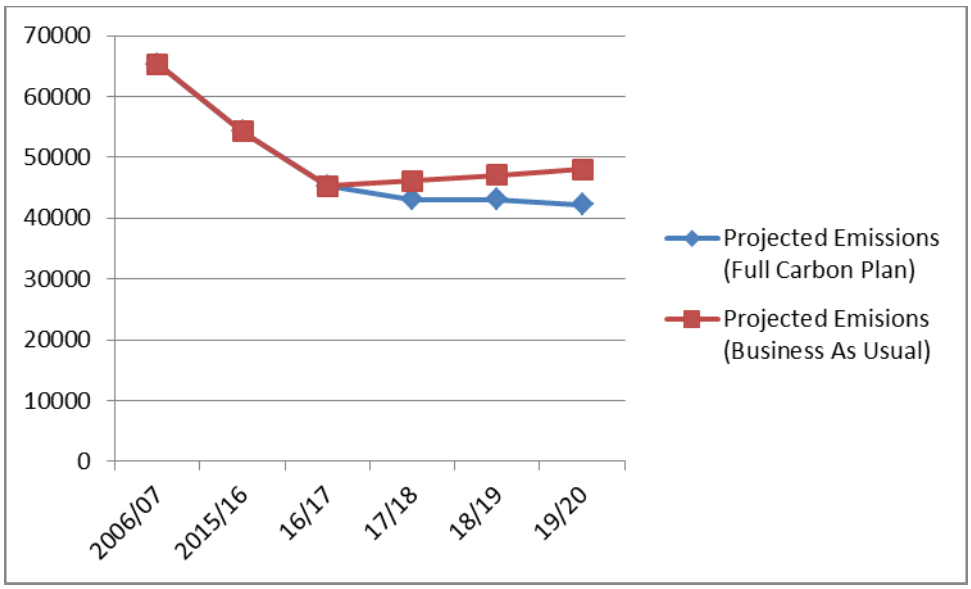
This Carbon Plan sets out a target to reduce the Council's carbon emissions by an overall 34%, relative to 2006/07, by the end of 2020. This equated to 22,199 t CO2e.

We have seen a saving (Buildings, Streetlighting and Fleet) of 11,040t CO2e since 06/07.

It is anticipated we will save a further 9,000 tonnes of CO2, once the Streetlighting project is completed in 2018, leading to a total saved of 20,040t CO2e.

It is estimated that the 2159t CO2e required to meet the 34% target, will necessitate an approximate £3,840,685.00 investment.

The graph below shows the projected emissions for Business As Usual against a fully implemented Carbon Plan.



Action Plan

The following actions and projects are planned, taking into account the target requirements as laid out in the CMP and the One Planet Living concept.

The One Planet Living concept contributes to furthering citywide actions for Sunderland. The One Planet Living framework is built around ten principles of sustainability that relate to environmental, economic and social aims. By gradually making changes to the way we do things we will make Sunderland a more sustainable community - one which lives within the planets available resources.

One Planet Living uses ecological foot printing and carbon foot printing as its headline indicators. It is based on **ten** guiding **principles** of sustainability as a framework and has become an increasingly popular method of making sustainable living a reality on a national and international stage. The ten principles are shown below;

Fig 2 One Planet Living Principles;

Major Initiatives and Investment Plan

These projects are already funded and are underway to deliver other service aims, but will have significant carbon savings resulting from their implementation.

Major Initiatives and Investment Plans	Carbon Saving, tonnes	Notes of annual costs and savings	Scope	Status and other comments	One Planet Living Principles Met
Residential LED Streetlighting Commencing 2016, 23 000 street lights will be replaced with LED lighting. This will impact on current usage, it is envisaged that savings of approximately 6 800 000 kWh, equating to £820 800 (inc carbon tax) of electricity will be made.	3646 tonnes	£820 800 (2018/19)	1	This to improve lighting provision and will reduce the energy consumption of public street lighting network and associated public lighting. Further savings will be realised through reduced maintenance costs for the remaining period of the PFI agreement	1
Major Roads and High Speed Routes LED Streetlighting Programme Commencing summer 2017 a further 24000 street lights will be replaced with LED lighting. It is envisaged that savings of 12,000,000 kWh equating to £1,600,000 (inc carbon tax) of electricity will be made	5421 tonnes	£1,600, 000 (2019/2020)	1	This to improve lighting provision and will reduce the energy consumption of public street lighting network and associated public lighting. Further savings will be realised through reduced maintenance costs for the remaining period of the PFI agreement	1
Household Waste Management – Increasing the existing amount of waste diverted from HW to the Energy from Waste facility to recycling by 2,000 tonnes per annum through introducing of recycling incentives and collection changes.	TBC	TBC	3		2
Replacement of Existing Crematoria Equipment Replacement of equipment required due to age and new legislation re mercury abatement	20tonnes	£15000	3	Project temporarily postponed due to incident. New equipment will be installed by Nov 2017. Moving from electric to gas will not provide significant co2 savings.(Current output est. to be 160co2e per year)	1,2,10

Opportunities

These projects will be highly visible and symbolise the efforts being made by the Carbon Plan to the public. These do not necessarily have the largest carbon savings, but have maximum visibility and will involve partnership between different council directorates.

Flagship proposals and property	**Carbon Saving, tonnes**	**Notes of annual costs and savings**	**Scope**	**Other comments**	**One Planet Living Principles Met**
Energy conservation programme A programme of insulation, heating improvements, voltage optimisation and lighting control schemes are ongoing for council property	350 tonnes	£100000	1	Based on £500000 investment primarily in LED lighting in long term retained operational properties	1
Battery Storage The project is a small scale renewable energy pilot that aims to test the effectiveness of solar PV and new battery storage technology on public owned buildings within the city. The battery storage will help to avoid high electricity costs at peak times of use.	360 tonnes (est)	£2m after payback over 12 years – £365,000 annually.	1	The project will also achieve the following outputs; • 0.55 megawatts in additional capacity of renewable energy production • 874,166 kWh/year decrease of annual energy consumption of public buildings	1
Internal Communications campaign An internal communications campaign is currently being planned, offering monthly tips and hints on cutting carbon emissions at work and tied into the Health and Wellbeing Agenda.	1109 tonnes (est)		n/a	To enforce the green message, provide guidance and training to staff and support the delivery of the CMP.	1,2
Development of an internal **Green Champions Network** with the support of Climate Change North East.	N/a – these projects enable carbon reduction to be made elsewhere	Nil cost other than minimal staff time (voluntary basis)	n/a	To enforce the green message, provide guidance and training to staff and support the delivery of the CMP.	1 – 10

Transportation

These projects will reduce fuel consumption and user cleaner fuels in both the councils fleet and business travel on behalf of the council.

Fleet proposals	Carbon Saving, tonnes	Notes of costs and savings	Scope	Status and other comments	One Planet Living Principles Met
The replacement of 10 specialty Refuse Recycling Collection vehicles from Euro 4 engines to Euro 6 engines as per the fleet replacement policy in 2017/18.	TBC	TBC	2	Enquiries are ongoing regarding the efficiency and anticipated carbon savings of the Euro 6 model.	1,3
The reduction of 5 refuse collection vehicles due to moving to fortnightly household refuse collection. (see reference to increased waste recycling of 2,000 tonnes per annum above)	29 tonnes	£25,000	2		1,3
In 2017 the refuse collection fleet will be updated with in cab route planning and monitoring devices known as Bartec Collective.		TBC	2	Route optimisation to maximise productivity and reduce emissions, will help reduce the amount of miles travelled each year by working smarter this is due to become live in July 2017.. The software component will ensure routes travelled are always the most efficient and the direct communication link of trucks with the customer service network (CSN) will provide real time information to enquiring residents via CSN to reduce missed bin collections and unnecessary return journeys.	1,3
The replacement of approximately 70 lease vehicles which are between 5 and 10 years old with newer more fuel efficient vehicles.	Information pending go ahead of		2	Emissions savings to be analysed on an ongoing basis.	1,3

AS part of this programme increase the number of EV's replacing light diesel engines in front line services by 10 in 2017/ 2018 would save? And further help improve visibility and promote the benefits of EV's	replacements				
For Future Consideration					
Facilitate expansion of electric car fleet usage with promotion of the increased in the availability of charging points, and the go smarter to work scheme which has increased the use EV pool cars for council and public use.	N/a		2	Further investigation into feasibility required.	1,3
					1,3

Policy and Procurement

These initiatives aim to change the policy and procedural background to strengthen all of the above, as well as exploiting contractual and purchasing opportunities that lead to cost and carbon savings.

	Carbon Saving, tonnes	Notes of costs and savings	Scope	Status and other comments	One Planet Living Principles Met
Service and project planning. To include carbon management principles in the corporate service planning process, and project management systems. It is intended to develop a robust means of capture from commissioned services for future carbon calculations. As future business model will be around commissioned services it is necessary there is a commitment to a proportionate reduction.	N/a – these projects enable carbon reduction to be made elsewhere		n/a		1-10

Finance

Cost area	Cost implication
Energy expenditure for 2015/16	£12.08 million
Forecasted annual energy bill in 2017/18 (Business as usual)	£12.15 million
Forecasted annual energy bill in 2017/18 (Full Carbon Plan)	£11.7 million
Forecasted annual energy bill in 2017/18 (Full Carbon Plan)	£11 million
Additional capital investment required to achieve Carbon Plan target (subject to business cases being developed for individual projects)	£4 million

Business cases for each project will be put together and considered on a case-by-case basis, to develop the most appropriate funding mechanisms relevant to the projects. This will draw on the following sources:

- Existing and future revenue budgets and capital programme. For projects with favourable paybacks, that can be justified from internal sources of funding
- Grant finance. Exploiting grants for specific low-carbon technology, or Invest to Save financing mechanisms, to improve payback of proposals
- Loan finance. Either prudential borrowing, or use of internal reserves, to fund larger projects on an Invest to save basis.

Management

The Carbon Plan is led by Les Clark, Chief Operating Officer – Place, and managed by Andrew Perkin, Lead Policy Officer for Economy & Sustainability. The Sustainable Sunderland Group, made up of Heads of Service and above, meets quarterly to oversee implementation of the Carbon Plan. The Sustainable Sunderland Group, made up of officers, will take responsibility for delivery of Carbon Projects by set annual work programmes and managing individual projects. This will meet 3 times over each year.

Carbon Board Member	Position	Respective team member
Les Clark	Chief Operating Officer – Place	
Andrew Perkin	Lead Policy Officer for Economy & Sustainability	Dianne Pattison, Policy Officer
Andrew Atkinson	Energy Manager	Elaine Terret, Energy Technician
Ian Bell	Place Management Fleet and Transport Manager	Peter Metcalfe, Fleet Management and Compliance Officer
Colin Curtis	Assistant Head of Place Management	Graham Hoban, Building Maintenance Manager
Karen Lounton	Place Management - Bereavement & Registration Services Manager	Pamela Collins Environmental Health
Janet Bonsor	Place Management - Housekeeping and Janitorial Services Manager	
Graham Kelly	Market Engagement and e-Procurement Manager	

A review of the Carbon Plan will be undertaken annually to ensure Sunderland City Council is meeting its obligations with regard to carbon emissions reductions, in line with its national and European commitments.

Contacts

For more information, please contact:

Andrew Perkin
Lead Officer for Economy, Place and Sustainability
PO Box 102
Civic Centre
Sunderland
SR2 7DN
0191 5531451
Andrew.perkin@sunderland.gov.uk

OR

Dianne Pattison
Policy Officer for Sustainability
PO Box 102
Civic Centre
Sunderland
SR2 7DN
0191 5532436
dianne.pattison@sunderland.gov.uk

OR

Andrew Atkinson
Energy Manager
PO Box 102
Civic Centre
Sunderland
SR2 7DN
0191 5612728
Andrew.atkinson@sunderland.gov.uk

Or follow the links below if you want to explore carbon management opportunities, either in your place of work, or in the home:

In the workplace -	Carbon Trust – http://www.energysavingtrust.org.uk/
In the home -	Energy Saving Trust - http://www.energysavingtrust.org.uk/