

# Weymouth Town Council Mitigation Measures

Carbon Trust

June 2020





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# 1

## Summary of Organisations



## About Carbon Trust

**Our mission is to accelerate the move to a sustainable, low carbon economy.**

The Carbon Trust is an independent, expert partner of leading organisations around the world, helping them contribute to and benefit from a more sustainable future through carbon reduction, resource efficiency strategies and commercialising low carbon technologies.



# About Weymouth Town Council



Weymouth Town Council, recently formed from Weymouth and Portland Borough Council, is now one of the country's largest town councils.

Its services cover everything from events and celebrations to cemeteries, public toilets, allotments, parks, gardens, beach and the promenade.

# 2

## Executive Summary



# Executive Summary

## Background

- The need for taking immediate and bold action on climate change is being increasingly recognised by businesses, government and the general population.
- The amount of action that needs to be taken, and the speed at which this must be done has been recognised by the UK through its ratification of the Paris climate agreement – to limit global temperature rise to well below 2°C.
- Consequently, the UK has declared a climate emergency, and the independent committee on climate change has laid out what needs to be done for the UK to become net-zero carbon by 2050.
- Weymouth Town Council has acknowledged their role in the need to take action and have themselves passed a motion to achieve net zero carbon emissions by 2030.
- This report builds off the Carbon Footprint assessment, highlighting projects and activities that can be undertaken by the council to help reduce the overall footprint.
- It should be noted that the observations, suggestions and saving estimates presented in this report are not intended to provide an investment grade assessment of technical and financial feasibility. They have been developed to support the business case for improving energy efficiency and require further detailed feasibility analysis before taking action.

## Executive Summary - Actions

| Project               | CAPEX (£)                  | Financial Savings (£/yr) | Carbon Savings (tCO <sub>2</sub> e/yr) | Simple Payback (yrs) |
|-----------------------|----------------------------|--------------------------|--|----------------------|
| LED Lighting          | £8,966                     | £1,210                   | 2.2                                    | 7.4                  |
| Building Mount PV     | £32,775                    | £4,889                   | 9.0                                    | 6.7                  |
| Fleet Electrification | £307,512 - £325,512        | £5,322                   | ~18.2                                  | 57.8 - 61.1          |
| Waste Management      | -                          | -                        | 4.6                                    | -                    |
| <b>Total</b>          | <b>£349,253 - £367,253</b> | <b>£11,421</b>           | <b>34</b>                              | <b>30.5 – 32.2</b>   |



## Executive Summary - Actions

### Business Travel and Commuting

- Encouraging the use of public transport
- Ensure all employees have up to date IT and are able to propose E-working/meetings where possible to reduce travel time
- Purchase of company electric vehicle for business travel
- Reward or financial incentive schemes
- Cycle to work schemes

### Leased Buildings

- Building fabric upgrades
- Electrification of heating (where possible)
- LED Lighting and controls
- Building integrated solar PV

### Water Demand

- Push/automatic taps
- Tap/showerhead aerators
- Low flow toilets
- Water butts

### Sustainable Contracting

- Mandatory reporting of scope 1 & 2 emissions
- Suppliers must have emission reduction targets
- Environmental/sustainability standards e.g. ISO 50001 (Energy Management), ISO 20121 (Sustainable Events), PAS 2050 and/or 2060
- Use of electric vehicles
- Use of the Better Buying Index

# 3

## Carbon Footprint

# GHG Protocol and Emissions Scopes

The globally accepted carbon accounting standard known as the World Resources Institute (WRI) Greenhouse Gas (GHG) Protocol defines direct and indirect organisational emissions as follows:

- Direct GHG emissions are emissions from sources that are owned or controlled by the reporting entity.
- Indirect GHG emissions are emissions that are a consequence of the activities of the reporting entity, but occur at sources owned or controlled by another entity.

The GHG Protocol further categorises these direct and indirect organisational emissions into three broad scopes:

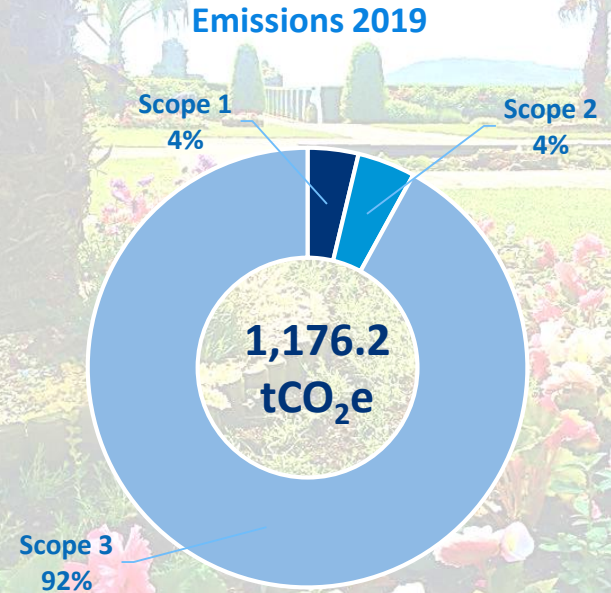
- **Scope 1:** All direct GHG emissions.
- **Scope 2:** Indirect GHG emissions from consumption of purchased electricity, heat or steam.
- **Scope 3:** Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. T&D losses) not covered in Scope 2, outsourced activities, waste disposal, etc.



## 2019 Emissions



- The total green house gas emissions from Weymouth Town Council in 2019 were **1,176 tCO<sub>2</sub>e**.
- The vast majority (see right) of emissions fall under 'scope 3', these are indirect emissions that are predominantly a result of the contracts and leased buildings held by the council.
- The remaining 8% of emissions are
  - scope 1 – direct burning of fuels, and
  - scope 2 – purchased electricity.

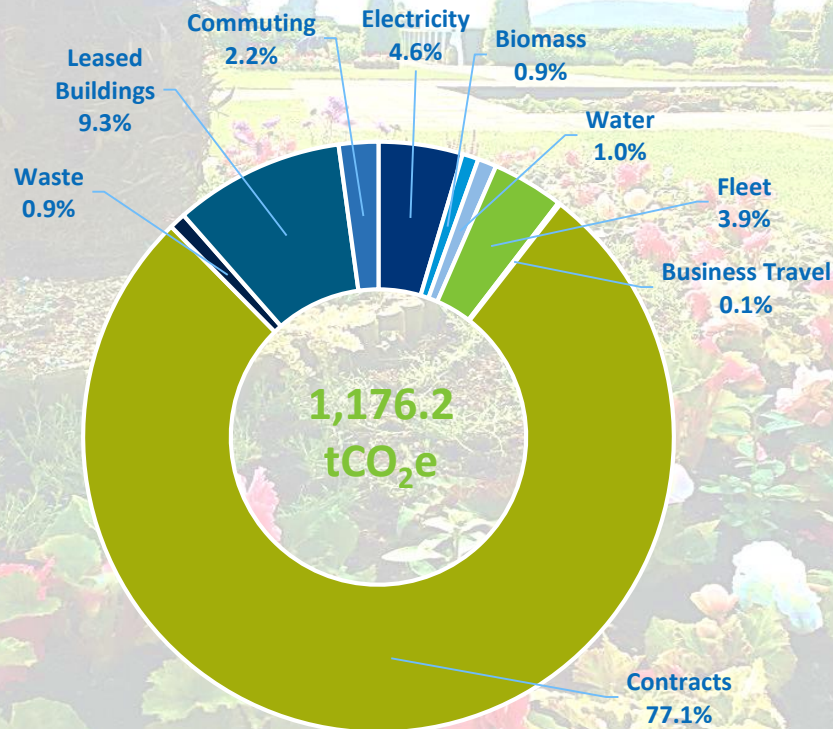


## 2019 Emissions



- The pie chart on the right further highlights the council's sources of emissions.
- It is clear how significant contracts held by the council are to the total footprint (77% of all emissions).
- Leased buildings also contribute to 9% of total emissions as part of scope 3.
- Other significant sources are electricity (5%), as well as the transport fleet that the council operates (4%).

Emissions by Source 2019



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## UK Policy Context



## UK Policy

### Committee on Climate Change

- The Committee on Climate Change (CCC) 2018 report has had a major impact on UK policy.
- The report highlighted 25 national policies that are either in place or need to be enacted to achieve an 80% reduction in carbon emissions by 2050 (since updated to net zero by 2050).
- Below are some policies considered applicable to Weymouth Town Council's measured footprint:
  1. Low carbon power auctions (grid decarbonisation)
  2. All new vehicles to be low carbon post 2040
  3. 13% of all new HGVs to be low carbon post 2040
  4. No new builds to be connected to the natural gas grid post 2025 and all replacement heating systems to be low carbon post 2035

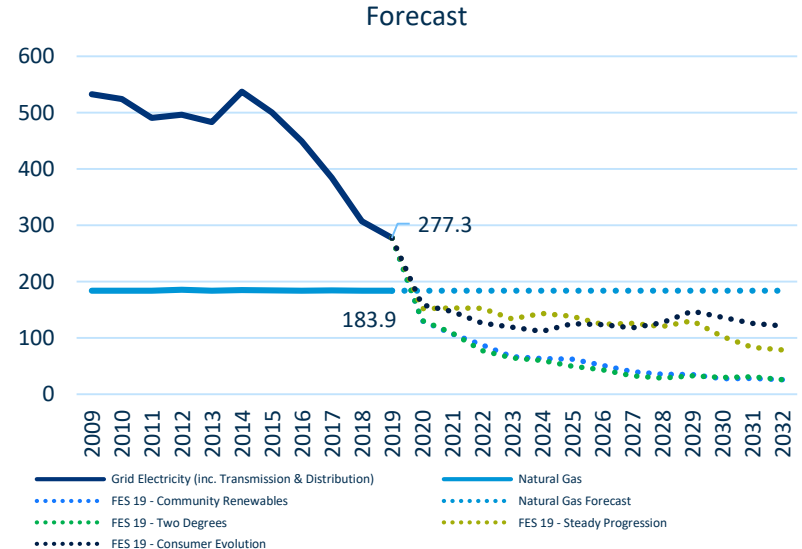
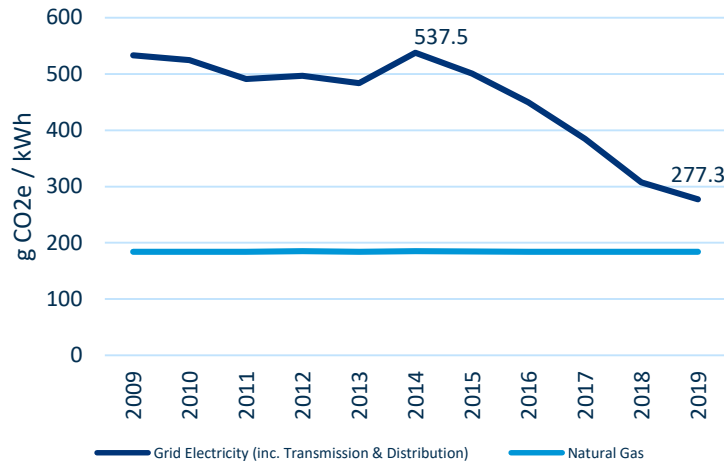


# UK Policy

## Grid decarbonisation

- The carbon intensity of power is transforming. This is important context when considering carbon reporting, and the future decarbonisation challenge; in particular with regards to decarbonisation of heat.

75% reduction in electricity emissions between 2018 and 2030



## UK Policy

Natural gas consumption will reduce to zero through full electrification

### Low Carbon Heating

- This policy aims to be two pronged, with no new builds in the UK to have a gas connection post-2025 and any replacement boiler after 2035 to be “low carbon”.
- It is assumed in modelling this policy that any replacement heating system will be an air source heat pump (i.e. grid electric emissions factor and not biogas)
- Weymouth Town Council already has predominantly electric heating, however it is important to consider low carbon heating with any future plans within the council.

### Low Carbon Vehicles

- Under this policy it is anticipated that 80% of cars and light goods vehicles (LGV) will be electric by 2050. More recent policy has brought forward the planned ban of the sale of new diesel and petrol cars and vans to 2035 (previously 2040).
- The UK government only anticipates 13% of HGVs to be electric by 2050. Reflecting the difficulty in electrifying heavy goods vehicles.

# 5

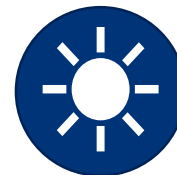
## Projects – Scope 1 & 2



## Opportunity Register – LED Lighting

| Ref. | Site                              | Annual Energy Savings |      | Cost (£) | Simple Payback | Financial Return |      | Carbon Impact             |
|------|-----------------------------------|-----------------------|------|----------|----------------|------------------|------|---------------------------|
|      |                                   | kWh                   | £    |          |                | NPV              | IRR  | Year 1 tCO <sub>2</sub> e |
| R1   | Beach Rescue & Hut                | 495                   | £74  | £900     | 12.1           | £323             | 7%   | 0.14                      |
| R2   | Beach Store – Queen Street        | 61                    | £9   | £2,676   | 291.1          | -£2,525          | -14% | 0.02                      |
| R3   | Victoria Street Store             | 319                   | £48  | £1,339   | 28.0           | -£551            | -1%  | 0.09                      |
| R4   | Swannery Toilets                  | 2906                  | £436 | £1,326   | 3.0            | £2,297           | 31%  | 0.81                      |
| R5*  | Wyke Gardens – community building | 0                     | £0   | £252     | -              | -                | -    | -                         |
| R6   | Greenhill Toilets                 | 672                   | £101 | £564     | 5.6            | £817             | 17%  | 0.19                      |
| R7   | Nothe Gardens Accommodation       | 300                   | £45  | £252     | 5.6            | £365             | 17%  | 0.08                      |
| R8   | Lynch Lane - Nursery              | 3317                  | £497 | £1,657   | 3.3            | £2,818           | 28%  | 0.92                      |

\*Building not in use, but still opportunity to upgrade lighting.



## Opportunity Register – Roof Mount PV

| Ref. | Site                                | Est. Annual Energy Savings |        | Cost (£) | Simple Payback | Financial Return |     | Carbon Impact             |
|------|-------------------------------------|----------------------------|--------|----------|----------------|------------------|-----|---------------------------|
|      |                                     | kWh                        | £      |          |                | NPV              | IRR | Year 1 tCO <sub>2</sub> e |
| R1   | Overcombe Toilets                   | 996                        | £149   | £855     | 5.7            | £1,606           | 17% | 0.3                       |
| R2   | Pier Toilets*                       | 3,618                      | £542   | £3,420   | 6.3            | £5,971           | 16% | 1.0                       |
| R3   | Swannery Toilets                    | 3,226                      | £484   | £2,565   | 5.3            | £5,404           | 19% | 0.9                       |
| R4   | Lodmoor Toilets                     | 4,726                      | £708   | £3,990   | 5.6            | £7,684           | 17% | 1.3                       |
| R5   | Beach office (Feed to toilets)      | 2,760                      | £414   | £2,280   | 5.5            | £4,538           | 18% | 0.8                       |
| R6   | Library (opposite Commercial Road)* | 17,293                     | £2,592 | £19,665  | 7.6            | £23,053          | 12% | 4.8                       |

\*subject to consent of freehold asset owner.



## Projects



### Roof Mount PV - Designs



Beach Office – feed underground WC



Overcombe WC



Lodmoor WC



Pier WC



Swannery WC



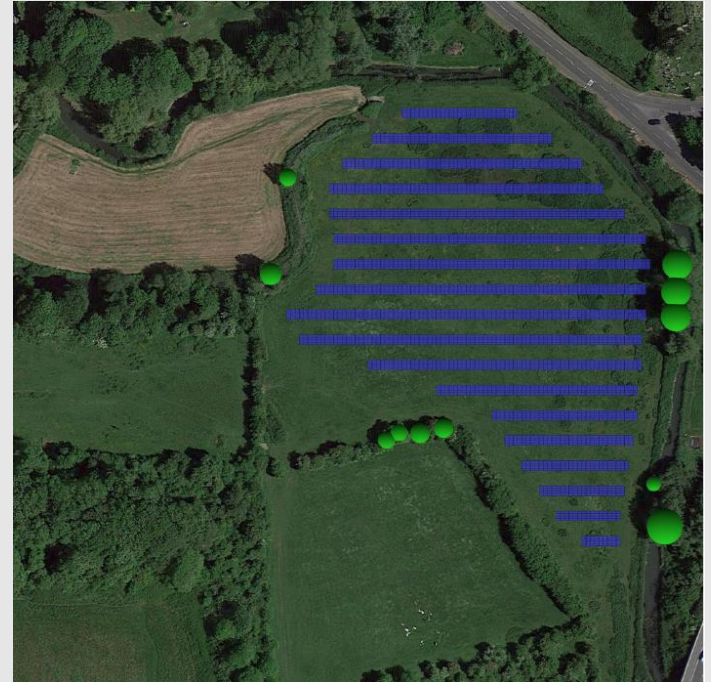
Library



## Solar Farm Example – Tumbledown Farm

All current land holdings were assessed for potential to hold a solar farm. The area at Tumbledown Farm (right) was used to produce a worked example for a solar farm. Costs and savings below show high level estimates for a project of this size.

| Size                  | 1MW       |
|-----------------------|-----------|
| Capital Cost          | £610,000  |
| Development Cost      | £71,600   |
| Operational Cost (pa) | £12,750   |
| Export Income (pa)    | £65,000   |
| Generation (kWh)      | 1,252,000 |
| Simple Payback        | 13 years  |



Note:  
Exported  
electricity  
cannot be  
used to offset  
residual  
emissions



## Solar Farm Example – Ryemead Lane

The land held at Ryemead Lane (right) was also used to produce a worked example for a solar farm. Costs and savings below show high level estimates for a project of this size. Planning permission is a foreseen issue for a solar development in this location.

Note:  
Exported  
electricity  
cannot be  
used to offset  
residual  
emissions

| Size                  | 563kW    |
|-----------------------|----------|
| Capital Cost          | £340,000 |
| Development Cost      | £53,000  |
| Operational Cost (pa) | £7,200   |
| Export Income (pa)    | £34,000  |
| Generation (kWh)      | 660,364  |
| Simple Payback        | 10 years |





## Fleet Replacement- EV

- The current fleet operated by Weymouth Town Council consists of 18 vehicles, comprised of a mix of diesel vans, pickup trucks, passenger cars, one electric vehicle and garden machinery.
- To quantify this project, it is assumed that all vehicles will be replaced by comparable electric vehicles and the mileage per vehicle will remain constant. The electric vehicle and wood chipper were not included in the final assessment.

| Type                            | Number | Cost to Replace (£) | Saving (£)* | Carbon Saving (tCO <sub>2</sub> e) |
|---------------------------------|--------|---------------------|-------------|------------------------------------|
| Diesel Van Class III (Flat Bed) | 7      | £204,785            | £2,898      | 6.5                                |
| Diesel Van Class I              | 1      | £23,472             | £218        | 0.3                                |
| Diesel Van Class III            | 1      | £29,255             | £451        | 5.9                                |
| Industrial Mowers               | 6      | £42,000 - £60,000** | £1,522      | ~5.2                               |
| Small Petrol Car                | 1      | £8,000              | £233        | 0.2                                |

\*Includes vehicle tax savings where appropriate

\*\*Dependent on type of mower, market needs to develop further for electric replacements.

18.2  
tCO<sub>2</sub>e  
Saving



## Charge Points

Electrification of the fleet will also require the install of charge points for vehicles, the size and number of charge points required will depend on:

- Vehicle routes and use
- Parking locations
- Re-charge time
- Local grid constraints

An example of costs is provided in the table below.

| Items             | 3.5 kW | 7 kW   | 22 kW  |
|-------------------|--------|--------|--------|
| Charge Point cost | £1,890 | £1,890 | £1,890 |
| Installation      | £2,000 | £5,000 | £5,000 |

Costs informed by market tests in 2019 with e.on and charge master.

### OLEV Workplace Charging Scheme (WCS)

- Voucher-based scheme that provides support towards the up-front costs of the purchase and installation of electric vehicle charge points.
- Grant of £500 for each charge point socket, and can support up to 20 charge point sockets per body (limited to a maximum of 75% total cost)

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## Projects – Scope 3





## Projects – Scope 3

### Scope 3 Emission Accounting

- As highlighted Weymouth Town Council are responsible for a much wider footprint outside of what they can directly influence. This is their scope 3 emissions, typical sources include:
  - Contracts and procurement
  - Leased buildings
  - Upstream emissions from energy usage
  - Staff commuting
  - Business travel
  - Waste and water management
- Emissions arising from these sources can be reduced from the corporate and everyday decisions made by the council.
- Scope 3 emissions can often dwarf both scope 1 and 2 emissions, and therefore it is an area the council should investigate further and aim to reduce in the future.



## Projects – Scope 3

### Contracts

- It is suggested that Weymouth Town Council actively engage with their contractors and supply chain to
  - a) start documenting their carbon footprints and
  - b) ask contractors to set emissions reduction targets
  - c) assess the necessity of certain suppliers/contractors
- Through these steps it is possible to acquire a more accurate picture of the individual contractors' emissions, an important activity to move away from the use of less accurate and representative EEIO values, as well as being able to forecast their potential emission reductions and thus the council's own.
- Furthermore, not only should the council engage with current contractors, they should also set criteria when determining future contractors and suppliers. Examples may include:

- Mandatory reporting of scope 1 & 2 emissions
- Suppliers must have emission reduction targets
- Hold environmental/sustainability standards e.g. ISO 50001 (Energy Management, ISO 12121 (Sustainable Events), PAS 2050 and/or 2060
- Use of electric vehicles
- Use of the Better Buying Index

## Projects – Scope 3

### Contracts – Events Focus

To fully understand the actual footprint of a specific event you would need to work closely with all suppliers and contractors involved.

The graphic on the right details all aspects that would need to be considered. Different data types would have to be gathered for each category or each company would provide Weymouth with their own carbon footprint for the event.

Procurement criteria could be put in place to ensure all organisations/companies working as part of an event must produce a carbon report at the end of the contract.



## Projects – Scope 3



### Leased Buildings

- Weymouth Town Council has a number of buildings that it leases out and has no direct control over its energy usage.
- The council can aim to reduce emissions from leased buildings by retrofitting them with energy efficient measures and leasing them at a premium cost, as well as encouraging energy efficient behaviour and green electricity tariffs from lessees.
- Moving forward Weymouth should also look to obtain energy data from these buildings to obtain a more accurate understanding of the buildings scope 1 and 2 emissions.

- Primary measures to consider could be:

- Building fabric upgrades
- Electrification of heating (where possible)
- LED Lighting and controls
- Building integrated solar PV

## Projects – Scope 3



### Waste

- Emissions associated with waste production are mainly attributed to the municipal waste collected on Weymouth Sands and the 26 x 1,100L seasonal bins, which are sent to be incinerated. These two waste streams make up 87% of waste emissions.
- The current UK recycling rate target is 50% by 2020 and 65% by 2035 for the public sector.
- According to the data provided, Weymouth Town Council only recycles 11% of its collected waste.
- To reduce emissions from waste disposal and effective waste management protocol needs to be put in place. This should follow the simple waste hierarchy of 'Reduce, Reuse, Recycle' across all forms of waste.

If 50% of waste was recycled it would reduce the total carbon footprint by **4.6 TCO<sub>2</sub>e**.

|                            | Mass (kg) | Split |
|----------------------------|-----------|-------|
| Municipal to Incineration  | 462,490   | 87%   |
| Glass/Cans to Recycled     | 20,605    | 4%    |
| Commercial to Recycled     | 36,209    | 7%    |
| Commercial to Incineration | 12,809    | 2%    |

## Projects – Scope 3



### Water

- The contribution of water use to overall carbon footprint is relatively small, however simple measures can help to reduce the impact.
- Public toilets are the largest contributor, simple solutions to reduce demand could be:

- Push/automatic taps
- Tap/showerhead aerators
- Low flow toilets

- Allotment demand is more difficult to control but encouraging or providing the use of water butts could help to reduce this area of demand.

|                           |       |
|---------------------------|-------|
| Allotments                | 16.5% |
| Public taps/access points | 11.6% |
| Other buildings           | 5.6%  |
| Toilets                   | 66.2% |

## Projects – Scope 3



### Business Travel & Commuting

- These categories only form just over 2% of Weymouth Town Council's total footprint. Commuting being the main contributor, with business travel being very minimal.
- The council can aim to reduce the impact of these measures through active engagement with its employees.
  - Encouraging the use of public transport
  - Ensure all employees have up to date IT and are able to propose E-working/meetings where possible to reduce travel time
  - Purchase of company electric vehicle for business travel
  - Reward or financial incentive schemes
  - Cycle to work schemes

# 7

## Projects Summary



## Summary of Projects

| Project               | CAPEX (£)                  | Financial Savings (£/yr) | Carbon Savings (tCO <sub>2</sub> e/yr) | Simple Payback (yrs) |
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| Waste Management      | -                          | -                        | 4.6                                    | -                    |
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## Summary of Projects

### Business Travel and Commuting

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# 8

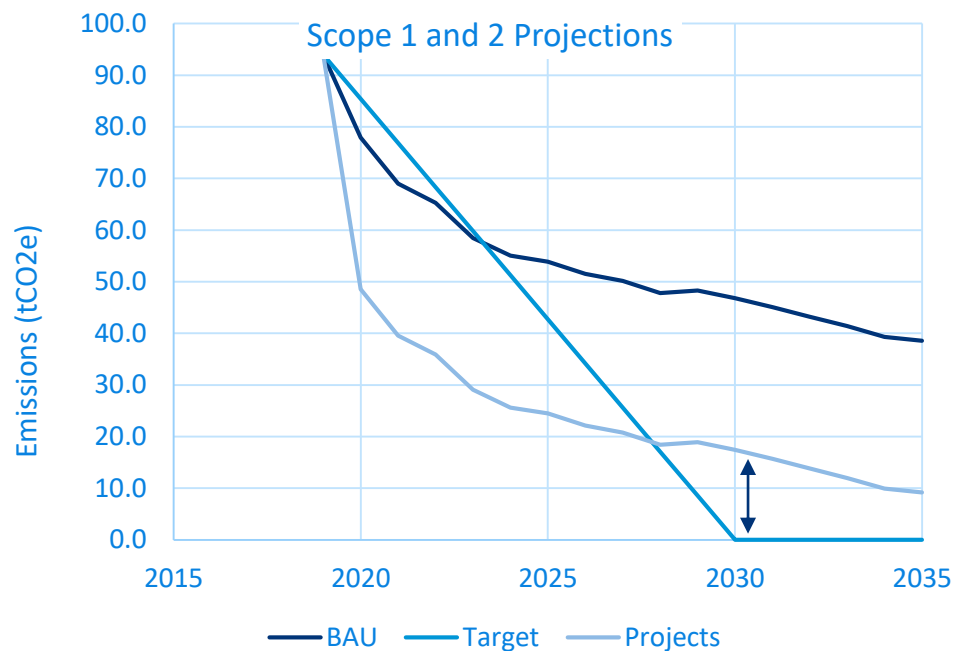
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## Gap to Target

# Gap to Target

## Scope 1 & 2

- The graph on the right shows the projections for scope 1 and 2 emissions, taking into account natural grid decarbonisation.
- BAU – Business as Usual, the case if Weymouth did nothing.
- The quantifiable projects detailed in this report influence the 'Projects' line trajectory:
  - LED, Solar PV, Fleet electrification
- If all projects were implemented, Weymouth Town Council would need to offset 17.4 tCO<sub>2</sub>e in 2030 to be carbon neutral (scope 1 & 2 emissions).



## Gap to Target

Below is the gap to target, with  
no action on reducing scope 3  
emissions

2030 gap to target  
1,099.6 tCO<sub>2</sub>e

- The proposed pipeline of projects alone do not meet the level of emissions reductions required to meet a net-zero target, mainly due to its scope 3 footprint.
- Reduction in scope 3 emissions from projects are hard to quantify and depending on the methods undertaken reductions could vary massively.
- Weymouth will need to continually monitor its progress, using the data collection method in the carbon footprint report as a format moving forward.
- For Weymouth to meet their carbon neutral target, they will need to consider offsetting these remaining carbon emissions. There are numerous methods for offsetting carbon emissions, each with their pros and cons, these methods are discussed in the following slides.

## Gap to Target



### Decarbonising Heating

- The decarbonisation of heating can be achieved through either the reduction of demand through energy efficiency measures or the replacement of fossil fuel heating systems with low carbon alternatives.
- Page 15 shows how the carbon intensity of electricity per kWh will soon drop below gas. This means simply that heating buildings electrically will produce less carbon emissions than with gas.
- Weymouth Town Council have electric heating throughout its owned premises and operate one biomass boiler. This means that heating systems across the estate are already considered to be 'low carbon'. As such recommendations for heating system replacements were undertaken.
- However, it is recommended that the council undertake a full review of the control systems in place at all premises on a regular basis to ensure systems are operated at full efficiency. Most controls will be subject to 'drift' over time, so it is important to optimise regularly.

## Gap to Target



### Renewable Generation

- Building renewable generators where the electricity is exported to the grid or private wired elsewhere, cannot be considered an offset as this will result in double counting of emissions reductions where these are reported through renewable energy certificates / guarantees of origin.
- Investing in renewables is an excellent means to engage with the local community and enable others to reduce their carbon footprint, an essential activity when considering borough wide emissions. However, as the carbon reductions will be accounted for elsewhere the council itself will not be able to realise any carbon reductions as an offset.
- The export of renewable electricity is accounted for in the grid average factor, which is used to measure scope 2 emissions.

## Gap to Target

### Green Energy Suppliers

#### *Location versus Market Approach*

- At present there are two methodologies that can be used to account for scope 2 emissions, a location based or market-based approach. A location-based approach is used as the formal reporting method and uses an emission factor based on all generating supplies of electricity to the grid (national grid). This is the approach that has been used within this report. The introduction of any renewable generators exporting to the grid is captured in a lower UK wide grid emission factor, that everyone benefits from within their carbon accounting.
- Alternatively, a market-based approach looks at where the consumer of electricity purchases their electricity from, such that if a consumer makes the conscious decision to purchase electricity from a 'green' supplier then this is accounted for in their carbon footprint. An organisation can report their market-based footprint if desired, but can only report this alongside the location-based approach (which must be reported).
- Under a market-based approach if a consumer of electricity wishes to offset their entire scope 2 emissions, then they could simply ensure that they purchase electricity from a 'green' supplier that offers a 100% renewable tariff. Under a location-based approach this form of 'offsetting' wouldn't be possible.



## Gap to Target



Official  
Reporting  
Guidance to  
be released  
next year by  
GHG  
Protocol

### Tree Planting

- Trees and organic matter are excellent vessels for removing CO<sub>2</sub> directly from the atmosphere and have the ability to fix this carbon through plant growth and directly into the soil. Tree planting as a carbon offsetting programme needs to be implemented carefully, ensuring a variety of tree varieties are planted to encourage an increase in biodiversity and avoid monocultures. Tree planting can be an activity carried out locally, involving the local community in both the planting of the trees and creating new green spaces for them to enjoy; alternatively, the council can support projects elsewhere in the UK or indeed internationally.
- Assuming a typical tree will absorb 10 kgCO<sub>2</sub> every year, the council will need to plant approximately 109,960 trees. This equates to a land area of almost 60 acres of woodland that would need to be planted.
- Unfortunately this is a very high level rule of thumb, in reality a tree will not start absorbing carbon at this rate until it is fully matured. Accounting for the sequestration of carbon from trees and other natural carbon sinks already within WTC's boundary, is also not fully understood. The GHG Protocol will release reporting guidance on this next year.
- Therefore, it recommended that this activity is planned for later in WTC's journey to Net Zero, when full guidance and accounting methods are available. Other measures should be taken to reduce the overall carbon footprint first.



Offsets can range in price, typically \$10-20 per tonne of CO<sub>2</sub>e

## Carbon Offsetting

- There are a variety of offsetting schemes available that have been 'gold certified' that can offer businesses and individuals the chance to offset the emissions they produce. Such schemes will involve carbon reduction projects such as tree planting, biodiversity restoration, international renewable installation.
- Engaging with the offsetting provider is recommended to ensure the scheme you purchase in to matches your expectations and social values.
- If this is an option that WTC wish to pursue, **it should be taken as a last resort once all other feasible carbon reduction measures have been carried out.**
- The quality and type of carbon offset that is chosen is of upmost importance, and the supposed emission reductions resulting from that offset must be quantified and verified.

<https://www.goldstandard.org/>

# Appendix

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## Appendix: Assumptions

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- All opportunities included have each been assessed independently in terms of their potential for saving energy and payback. The overall savings figures shown may not fully be achievable due to interactions between measures. All costs and savings in this report are indicative only and subject to further technical and financial feasibility study.
- Annual carbon saving based on 2019 'Greenhouse gas reporting: conversion factors' published by Department of Business, Energy & Industrial Strategy (BEIS).
- Costs provided are indicative figures for supply and install only. No cost allowance is included for M&V and other on costs such as contingency, overhead and profit, asbestos removal, design, project management, VAT, business rates etc.
- All calculations undertaken using data and information provided directly from Weymouth Town Council.
- Capital cost for solar calculated at £950/kW.
- LED lighting savings calculated on a m<sup>2</sup> basis, using CIBSE w/m<sup>2</sup> averages for luminaire types.

## Appendix: Data Sources

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- Energy, vehicle mileage, utilities data – Weymouth Town Council
- Emission Factors – BEIS
- UK consumption and emission factors projections – BEIS, National Grid Future Energy Scenarios
- Policies – Climate Change Committee
- UK building consumption – Chartered Institute of Building Service Engineers (CIBSE)



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