



Decarbonisation Road Map and Communications Plan

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Date: August 2026

Version: 1.0

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Glossary

1.5° c: The maximum number of degrees of average global temperatures above pre-industrial levels (i.e., between 1850 and 1900) that must be achieved if catastrophic climate changes are to be avoided.

Carbon Credits: Tradable instruments that convey a claim for the removal or avoidance of GHG emissions.

Carbon Dioxide: A colourless gas that occurs naturally from industrial processes and other human activities.

Carbon Dioxide Equivalent (CO²e): A common scale for measuring the emissions from all greenhouse gases, presented as metric tonnes (t) or metric kilo tonnes (kt) (i.e., metric tonnes divided by 1000).

Carbon Footprint: Direct and indirect GHGs associated with a specific product or activity.

Carbon Sequestration: The process of storing carbon so that it doesn't enter the atmosphere and contribute to climate change.

Decarbonisation: or carbon reduction is the process of reducing the amount of GHG emissions an organisation produces.

Direct emissions: Emissions owned or controlled by an organisation.

Emissions: In this report, 'emissions' is used to refer to GHG emissions, measured in terms of carbon dioxide equivalents.

Fugitive emissions: Leak of gases caused by energy production.

Greenhouse Gases (GHG): Gases in the earth's atmosphere that trap heat, creating the greenhouse effect, leading to global temperature increases. These include carbon dioxide, methane and nitrous oxide.

Indirect emissions: Emissions resulting from an organisation's activities but controlled by others (e.g., when the organisation buys, uses and disposes of products).

Net Zero: is achieved when the amount of GHG emitted into the atmosphere because of an organisation's activities are counterbalanced by the removal of an equivalent amount (i.e., when emissions are 'cancelled out' by GHG removal or sequestration).

Net Zero Journey/Road Map: The plan and process for reaching net zero.

Insetting/Offsetting: The process of removing carbon/GHG from the atmosphere to balance out GHG emissions (i.e., to achieve net zero). Insetting refers to measures undertaken internally within an organisation. Offsetting is measures taken elsewhere. This may include purchasing carbon credits or carrying out sequestration activities (e.g., tree planting).

Scope 1 emissions: GHGs directly relating to an organisation's activities. For example, its consumption of gas for heating and fossil fuels for transportation and machinery.

Scope 2 emissions: GHGs generated by the production of purchased electricity.

Scope 3 emissions: Generally, value chain emissions generated up or downstream from an organisation because of its activities. For example, emissions in the supply chain, from waste disposal or transmission and distribution emissions for purchased electricity.

1. Executive Summary

This document outlines Thornbury Town Council's (TTC) strategic roadmap to achieve net zero emissions by 2030, aligning with the global goal of limiting warming to 1.5°C above pre-industrial levels. It provides a comprehensive plan for reducing greenhouse gas (GHG) emissions across all council operations, including buildings, grounds, vehicles, and ancillary activities, while fostering climate resilience and community engagement.

Overall Emissions

- TTC has already implemented effective measures to reduce emissions, resulting in a 50% reduction in emissions since 2022. Implementation of the recommended measures in this plan will result in a total 84% reduction in emissions by 2030. If 'big ticket' items* were included, this would result in an overall reduction of 94% in emissions from 2022 levels.

*'Big Ticket' items, for example heat pumps at the Town Hall, are included in this document for thoroughness, but their implementation is unlikely to be realistic by 2030 due to financial, technological and practical constraints. Headline calculations are therefore based on these measures not being implemented.

Reducing Emissions focuses on three main areas:

- Reducing TTC's reliance on fossil fuels (for example by replacing diesel vehicles with electric).
- Improving our renewable energy generation and storage.
- Reconfiguring and retrofitting buildings and operations to improve energy efficiency.

Reductions and Residual Emissions

- If all recommended measures are implemented, a reduction of 13.84 tCO₂e should be experienced over the plan period (2026-2030).
- 7.08 tCO₂e of remaining emissions will require insetting and/or offsetting. This will require planting of approximately 265-300 trees. While trees are maturing (which can take up to 40 years) TTC should investigate options for outsourcing offsetting.
- If 'big ticket' items were included, residual emissions would reduce to 2.58 tCO₂e.¹

Funding and Payback Periods

- Financial Payback Periods: Most recommended measures have payback periods of 5–10 years, showing long-term savings and environmental benefits.

¹ The Asian Forest Cooperation Organisation. <https://afocosec.org/act-main/>

- Primarily, improvements will be funded by savings made on energy consumption, via planned and preventative maintenance measures, and through planned projects (e.g., Pavilion reconfiguration).

Communications Plan

A multi-phase communications strategy is proposed to:

- Engage stakeholders through in person events, our website and social media.
- Promote transparency by sharing progress reports and milestones.
- Encourage community participation in active travel, energy-saving initiatives, and local climate projects.
- Leverage partnerships with schools, local organisations, and neighbouring councils to amplify impact.

Climate Resilience

- Recognising that climate change is happening despite measures being taken to avert it, this report also focuses on climate resilience in three areas:
 - Policy Alignment: Ensuring TTC's actions align with national and local policies.
 - Resilience Planning: Incorporating flood risk management, sustainable landscaping, and energy-efficient building design to adapt to climate change impacts.
 - Long-Term Vision: TTC aims to become a model for sustainable community governance.

Conclusion

- TTC's Decarbonisation Road Map provides a clear, actionable path to net zero by 2030. By combining technological upgrades, building reconfiguration and retrofitting, behavioural changes, and community engagement, the council can further significantly reduce its carbon footprint while creating a more sustainable, resilient, and equitable future for Thornbury.
- Headline figures are provided below in figures 1.1 – 1.4

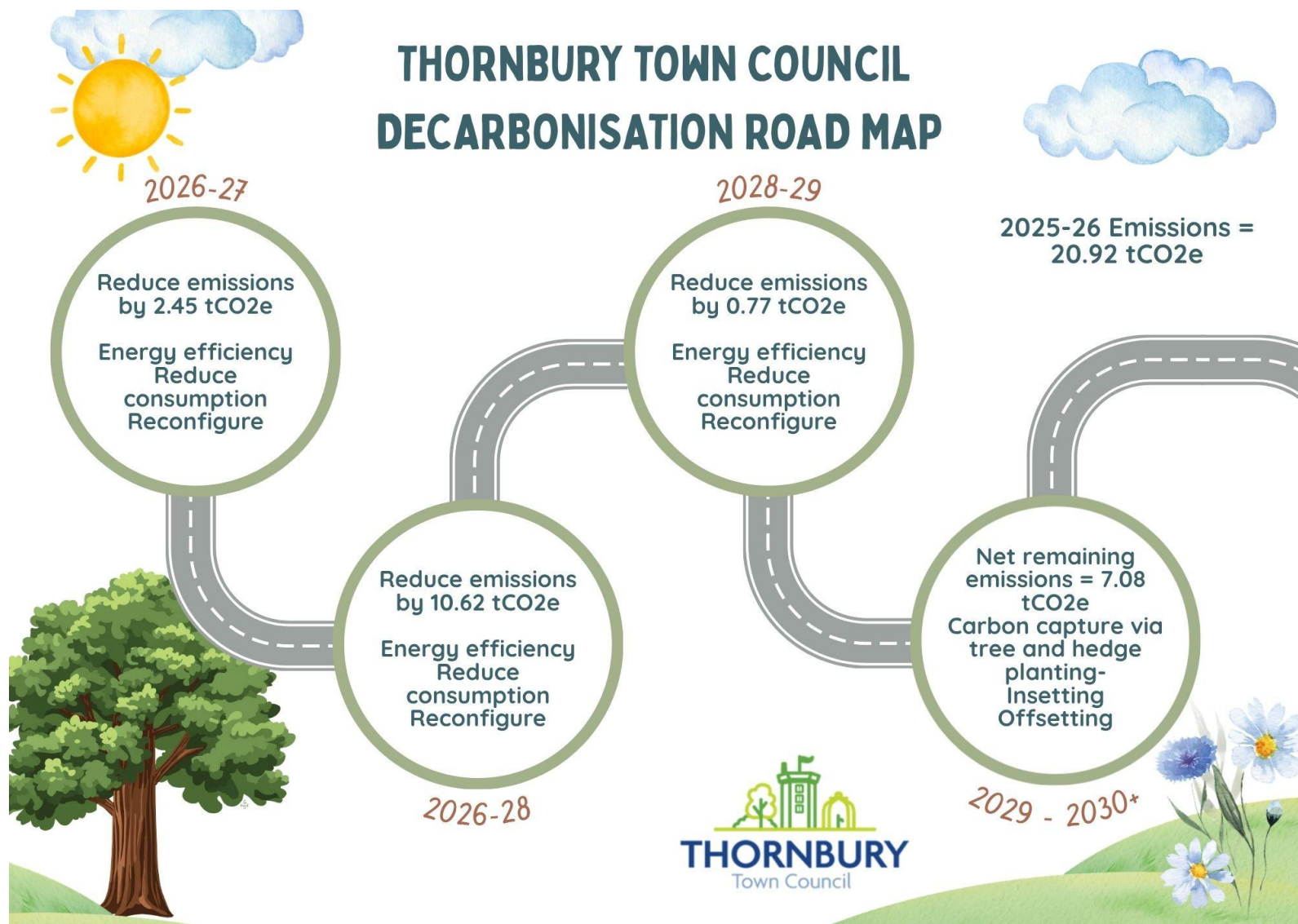


Figure 1.1: TTC Decarbonisation Road Map journey

Figure 1.2: TTC Decarbonisation Road Map – Reductions and Residual Emissions by Scope

With 'big ticket' items			
Scope	Starting Emissions (tCO ₂ e)	Emissions Reduction (tCO ₂ e)	Residual Emissions (tCO ₂ e)
1	19.56	18.74	0.82
2	0	0	0
3	1.36	-0.4	-0.4
Total	20.92	18.34	2.58

Without 'big ticket' items			
Scope	Starting Emissions (tCO ₂ e)	Emissions Reduction (tCO ₂ e)	Residual Emissions (tCO ₂ e)
1	19.56	13.68	5.88
2	0	0	0
3	1.36	0.16	1.2
Total	20.92	13.84	7.08

Figure 1.3: TTC Decarbonisation Road Map – Reductions and Residual Emissions by Operational Area

With 'big ticket' items				
Operation	Scope	Starting Emissions (tCO ₂ e)	Emissions Reduction (tCO ₂ e)	Total Residual Emissions (tCO ₂ e)
Town Hall	1	11.85	11.85	0
Town Hall	2	0	0	0
Town Hall	3	1	-0.36	-0.36
Sub-total		12.85	11.49	-0.36
Mundy Playing Fields	1	2.6	2.47	2.47
Mundy Playing Fields	2	0	0	0
Mundy Playing Fields	3	0.3	-0.08	-0.08
Sub-total		2.9	2.39	2.39
Cemetery	3	0.07	0.04	0.04
Bakery Annexe	3	0	N/A	N/A
Ancillary Operations	1	5.1	4.42	0.68
Total		20.92	18.34	2.58

Without 'big ticket' items

Operation	Scope	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Total Residual Emissions (tCO2e)
Town Hall	1	11.85	8.51	3.34
Town Hall	2	0	0	0
Town Hall	3	1	0.01	0.99
Sub-total		12.85	8.52	4.33
Mundy Playing Fields	1	2.6	0.75	1.85
Mundy Playing Fields	2	0	0	0
Mundy Playing Fields	3	0.3	0.11	0.19
Sub-total		2.9	0.86	2.04
Cemetery	3	0.07	0.04	0.03
Bakery Annexe	3	N/A	N/A	N/A
Ancillary Operations	1	5.1	4.42	0.68
Total		20.92	13.84	7.08

Figure 1.4: TTC Decarbonisation Road Map – Reductions and Residual Emissions by Timescale

With 'big ticket' items				
Timescale/Year	Operation	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Residual Emissions (tCO2e)
Short (2026-27)	Town Hall	12.85	0.22	12.63
Short (2026-27)	MPF	2.9	0.31	2.59
Short (2026-27)	Cemetery	0.07	0.01	0.06
Short (2026-27)	AO	5.1	1.91	3.19
Sub total		20.92	2.45	18.47
Medium (2027-28)	Town Hall	12.63	8.3	4.33
Medium (2027-28)	MPF	2.59	0.39	2.2
Medium (2027-28)	Cemetery	0.06	0.03	0.03
Medium (2027-28)	AO	3.19	1.9	1.29
Sub total		18.47	10.62	7.85
Long (2028 - 2030+)	Town Hall	4.33	2.97	1.36
Long (2028 - 2030+)	MPF	2.2	1.69	0.51
Long (2028 - 2030+)	Cemetery	0.03	0	0.03
Long (2028 - 2030+)	AO	1.29	0.61	0.68

Sub total		7.85	5.27	2.58

Without 'big ticket' items				
Timescale/Year	Operation	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Residual Emissions (tCO2e)
Short (2026-27)	Town Hall	12.85	0.22	12.63
Short (2026-27)	MPF	2.9	0.31	2.59
Short (2026-27)	Cemetery	0.07	0.01	0.06
Short (2026-27)	AO	5.1	1.91	3.19
Sub total		20.92	2.45	18.47
Medium (2027-28)	Town Hall	12.63	8.3	4.33
Medium (2027-28)	MPF	2.59	0.39	2.2
Medium (2027-28)	Cemetery	0.06	0.03	0.03
Medium (2027-28)	AO	3.19	1.9	1.29
Sub total		18.47	10.62	7.85
Long (2028 - 2030+)	Town Hall	4.33	0	4.33
Long (2028 - 2030+)	MPF	2.2	0.16	2.04
Long (2028 - 2030+)	Cemetery	0.03	0	0.03
Long (2028 - 2030+)	AO	1.29	0.61	0.68
Sub total		7.85	0.77	7.08

2. Document Purpose

Since widespread industrialisation took place in the 19th century, particularly in the global north, human consumption of fossil fuels (oil, gas and petroleum) and the industrialisation of agriculture have increased the volume of carbon, methane and nitrous oxide (greenhouse gases - GHG) in the Earth's atmosphere. GHGs effectively 'trap' heat in the atmosphere, resulting in increasing average global temperatures. A rapidly warming climate impacts all of Earth's systems, increasing the likelihood of extreme weather events, altering ecosystems beyond species' ability to adapt, and endangering human and other-than-human life across the planet.

To counteract this, international legal agreements have been reached to try and limit the increase in global average temperatures to 1.5 degrees Celsius above pre-industrial levels by 2050. While urgent global and national actions are vital for achieving this goal, local action is also essential.

Reflecting the need for local action, in 2021 Thornbury Town Council (TTC) declared a Climate and Nature (Ecological) emergency and in 2022 the Climate and Nature Committee was convened. The Council has been tracking its GHG emissions since 2022 and has made excellent reductions in its carbon output since then. This is in line with the Council's ambition to tackle the climate emergency by working with others in the area to help Thornbury become climate neutral by 2030. Estimates suggest that in 2023, South Gloucestershire emitted 1579.5 ktCO²e. Thornbury was responsible for approximately 79.5 ktCO²e or 79,500 tonnes of CO²e (5%).²

Some decarbonisation actions have already taken place across several TTC sites. However, there is no comprehensive plan or approach to decarbonisation and therefore no clear sight of whether achieving net zero by 2030, even when limiting this ambition purely to TTC operations, is feasible. This document's aim is to fill that gap, thereby:

- Allowing the size of the remaining net zero challenge to be more clearly understood.
- Enabling a consistent, prioritised plan for emissions reduction across sites.
- Giving a clearer picture of the time and money required to achieve net zero for TTC's operations.
- Providing a way of more clearly tracking progress and measuring the success of our actions.
- Identifying any remaining emissions after all practicable actions have been taken so that mitigation can be considered.
- Outlining how TTC can share its decarbonisation journey with the wider town, thereby encouraging carbon reduction across the area.

The latest scientific research indicates that the world is likely to exceed or very quickly breach the 1.5-degree target in the next 20 years. Given this, consideration in this road map will also be given to climate resilience, or how TTC and the wider town will need to adapt to a rapidly changing climate and the inevitable challenges this will bring. The following graphic depicts the range of impacts that may be experienced due to our changing climate.

² National Atmospheric Emissions Inventory, South Gloucestershire, 2023, [<https://naei.energysecurity.gov.uk/laghgapp/>].

Impacts of Climate Change

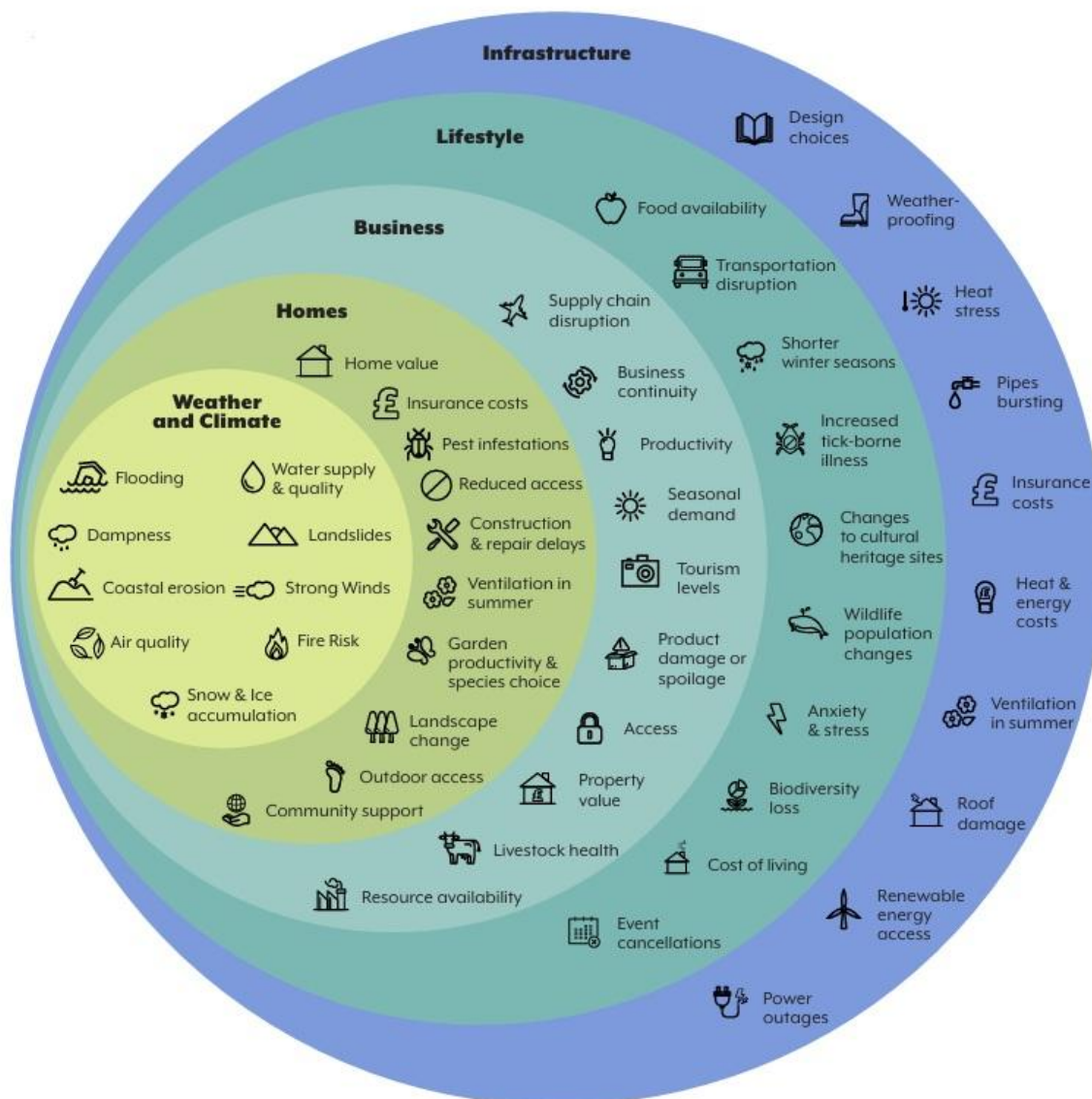


Figure 2.1: Potential Impacts of Climate Change

Source: The Highland Council, Net Zero Strategy, <https://www.highland.gov.uk/downloads/download/495/net-zero-strategy>

3. Scope, Intent and Method

The intention of this report is to provide a clear and realistic road map for achieving net zero in TTC's operations. It will articulate how the Council's decarbonisation journey will be communicated to a wider audience with the goal of encouraging and supporting town-wide decarbonisation. It will also begin to outline what climate adaptations and mitigations may be needed in TTC's operations to cope with global heating exceeding 1.5 °c above pre-industrial levels in the next 20 years.

Figure 3.1 provides a visual representation of the different scope emissions. For the purposes of this report, the following emissions are in scope:

- Scope 1: Direct emissions from TTC operations (e.g., buildings, land use, TTC Fleet vehicles and equipment).
- Scope 3: Water consumption, waste generated from own operations, transmission and distribution emissions from electricity consumption.

The following are out of scope of this report:

- Scope 1: Emissions from the wider town/county, including transportation, domestic housing, agriculture and land use, etc. Whilst these are out of scope of this report, the communications plan in [Section 11](#) will outline how we intend to communicate our decarbonisation journey and how this, alongside the wider activities of the Climate and Nature Action Plan, will support and encourage decarbonisation in the wider town/area.
- Scope 2: Electricity used by TTC is either generated on-site via solar arrays at the Town Hall and Mundy Playing Fields or is provided by a 100% renewable energy supplier (Octopus). As such, emissions from electricity are not included in the report. Should a decision be made to move away from a renewable energy supplier, this report would need to be revisited and updated.
- Scope 3: Emissions generated in the supply chain by purchased goods and services. Whilst these are out of the scope of this report, the sustainable purchasing and procurement guidelines seek to reduce TTC's environmental harm from its consumption of goods and services and should therefore be viewed as complimentary to this report.

Emissions from the wider town/county, including residents' consumption of goods and services or travelling beyond our area boundary. Again, whilst these are out of the scope of this report, the communications plan in Section 10, and the wider activities of the Climate and Nature Action Plan, supports the decarbonisation of the wider town/area.

In addition to the above, the Bakery Annexe on the High Street has been excluded from this report. The use of this building is being phased out, and the future of the site is not determined. If TTC decides to repurpose or rebuild on this site, an assessment of its impact on TTC's net zero targets should be carried out.

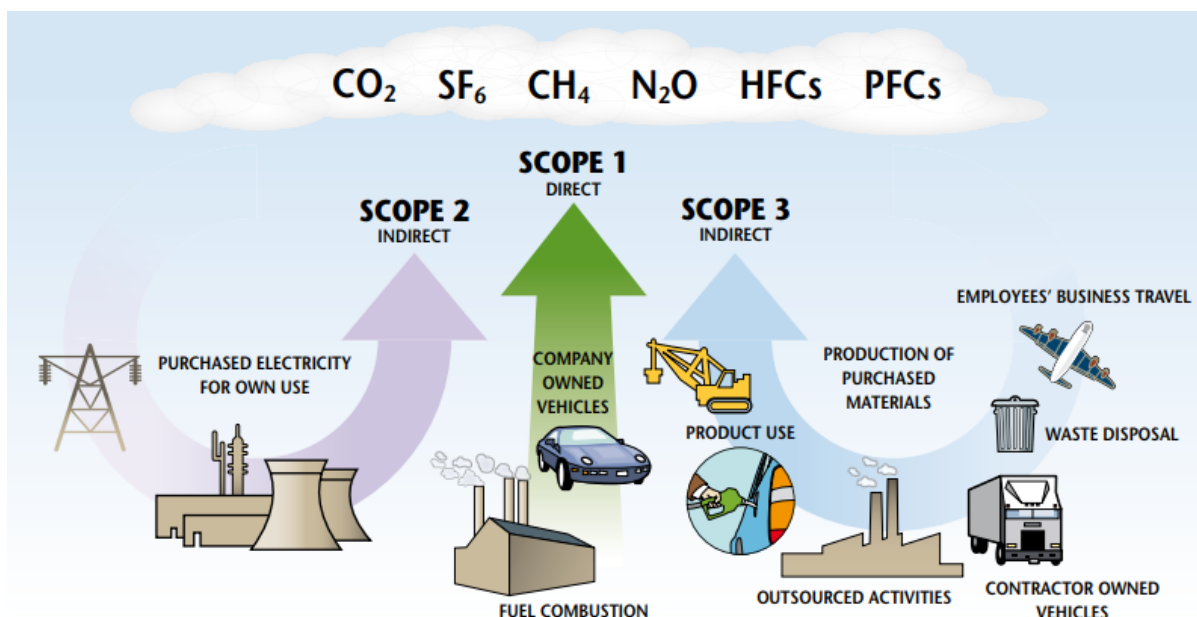


Figure 3.1: Emissions Scope Examples

Source: University of Michigan

The carbon emissions figures used in this report are calculated by applying conversion factors provided by the Department for Business, Energy & Industrial Strategy (BEIS) to TTC's consumption data for 2025-26. Emissions are reported as tCO_2e (carbon dioxide equivalent).

The baseline tCO_2e figures used are from the 2025-26 carbon report for Thornbury Town Council, which can be found here [insert link to website page].

Costs, energy savings and tCO_2e savings have been estimated via a desktop exercise. As and when measures additional to planned projects or maintenance are progressed, more accurate figures will be obtained and presented in officer papers to the relevant council committees.

Full calculations and calculation logic can be requested by emailing climateandnature@thornburytowncouncil.go.uk.

4. Stakeholder Analysis

Internally to TTC, the following committees are most concerned with the decarbonisation road map:

- Climate and Nature Committee
- Finance and General-Purpose Committee
- Full Council Committee

Hierarchically, the recommendations from this document will be reviewed by the Climate and Nature Committee. Accepted recommendations will be passed on to the relevant committee (F&GP and/or Full Council) depending on their nature.

While the whole document will be reviewed and passed to the relevant committees for recommendation and approval, individually costed measures will be recommended for inclusion in budgets in line with the usual processes and the Financial Regulations.

Council officers have been involved in the decarbonisation journey to date. Further measures, as detailed in this document, will be socialised with officers as relevant and necessary. Levels of interest will vary depending on roles and responsibilities.

Engagement with the wider community will be detailed in the communication and engagement plan in Section 10.

Figure 4.1: Stakeholder Matrix

Stakeholder Group	Interests	Potential Concerns	Influence	Impact	Engagement Approach
Town Councillors	Credible climate action; financial stewardship; positive public response	Costs, risks, public reaction, deliverability	High	High	Papers to Climate and Nature Committee, Finance and General-Purpose Committee and Full Council.
Council Officers & Staff	Practical operations; improved efficiency	Disruption; training needs, costs	High	High	Early involvement; training; clear procedures
Building Users	Comfort; reliability; cost	Disruption during works; Practical use of facilities	Medium	High	Direct updates; clear timelines
Contractors	Clear scopes; stability	Timeline conflicts	High	High	Early involvement; clear briefs

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South Gloucestershire Council	Alignment with climate goals; funding	Coordination; timelines	Medium	Medium	Sharing of advice and information.
Residents	Lower bills; climate action	Spending concerns; amenity changes	Medium	High	See communication plan (section 10)
Local Businesses	Cost savings; local reputation	Disruption; unclear benefits	Medium	Medium	See communication plan (section 10)
Community Groups	Climate progress; collaboration	Slow progress	Medium	Medium	See communication plan (section 10)
Schools & Youth Groups	Education; youth initiatives	Capacity constraints	Medium	Medium	See communication plan (section 10)
Faith Groups	Community wellbeing; stewardship	Retrofit costs	Medium	Medium	See communication plan (section 10)
Local Media	Local stories; updates	Access to information	Medium	Medium	See communication plan (section 10)
Visitors & Commuters	Well-maintained spaces	Low engagement	Low	Low-Medium	See communication plan (section 10)

5. Approach

This document takes an operational approach to planning for net zero, as detailed in figure 5.1 below.



Decarbonisation Road Mapping Framework

Capital Strategy/Sustainable Purchasing Guidelines

Site/Operation	Town Hall	Cemetery and Chapel	Mundy Playing Fields	Bakery Annexe/67 High Street*	Ancillary Operations (e.g., mowing, maintenance)
Decarbonisation Measures	Buildings	Fixtures and Fittings	Machinery	Vehicles	Training and Behavioural Change
Emission Types	Heating (Scope 1 Emissions)	Electricity (Scope 2 Emissions)	Water & Waste Water (Scope 3 Emissions)	Waste (Scope 3 Emissions)	Fuel (Scope 1 Emissions)

* Operations at the Bakery Annexe are ceasing. Therefore, it has been excluded from this Road Map. Scope 2 emissions for electricity have been excluded (see section 3 above)

Figure 5.1: Decarbonisation Road Mapping Framework

6. Benefits and Opportunities

The direct benefits of decarbonisation of TTC operations are:

- Reduced carbon emissions, supporting the TTC ambition to achieve net zero by 2030.
- Cost savings resulting from reduced energy and materials consumption.
- Increased energy security.
- Becoming more climate resilient, with an enhanced ability to withstand climate-change related shocks.

Decarbonisation of TTC operations also offers TTC opportunities to:

- Become a community leader in decarbonisation, assisting residents and local businesses with their own decarbonisation journeys, conferring the benefits outlined above.
- Raise the profile of TTC within the wider community of local authorities.
- Become a decarbonisation leader, opening opportunities for gaining funding support beyond the precept.

In general, decarbonisation offers the following benefits to the wider community:

- Cleaner air.
- Lower living costs.
- Reduced flood risk.
- Improved water security.
- Reduced risks from extreme weather.
- Sustainable living conditions for present and future generations.

7. Emissions Recording – 2022 - 2026

TTC has been calculating and recording its emissions since 2022. The table below summarises the reductions already experienced because of actions taken to decarbonise operations. Full details of these calculations, the methodology used, and their breakdown by site/operation are available in the respective year's carbon reports.

Figure 7.1: Year on Year Emission Comparison Table

Emission Type	2022-23	2023-24	2024-25	2025-26	Total % reduction 2022-23 to 2025-26 (including electricity)	Total % reduction 2022-23 to 2025-26 (excluding electricity)
Scope 1	28.82	19.16	21.73	19.56	32.13%	32.13%
Scope 2	6.31	6.17	8.22	0.00/4.28†	32.17%	100.00%
Scope 3	7.02	2.49	2.57	1.36	80.63%	80.63%
TOTAL	42.15	27.83	32.52*	20.92	40.21%	50.37%

* The increase in electricity emissions between 2023-24 and 2024-25 was largely driven by the installation of Thornbury Football Club's bar area at the Mundy Playing Fields pavilion.

† Two figures are given here. 0.00 represents the removal of electricity emissions from carbon reporting due to the Council's use of renewable energy. 4.28 is the net consumption of electricity, including a 50% reduction used in 2025-26 reporting for the electricity consumption of the Football Club at the MPF.

Figure 7.2: Actions Already Taken to Decarbonise TTC Operations

Actions already taken to decarbonise include:

Operation	Years	Action Taken
Town Hall	2022-23	Installation of LED Lighting
	2022-23	Installation of solar panels
	2023-26	Behaviour changes (switching off appliances, turning down radiators, closing curtains in chamber, etc.)
	2024-25	Improved insulation in loft space
	2024-25	Installation of secondary double glazing (partial)
	2024-25	Installation of radiator reflectors
	2024-25	Ventilation timer controls
	2024-25	Apex roof insulation
	2025-26	Cleaning of solar panels
	2025-26	Installation of magnetic secondary double glazing (partial)
	2025-26	Installation of valve jackets in boiler room
	2025-26	Installation of chimney sheep in volunteer link room
	2025-26	Installation of water immersion heater timer
	2023-24	Conversion of diesel vehicle to electric vehicle
	2022-26	Replacement of some fossil fuelled equipment with battery powered equipment

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All sites/operations	2024-26	Reduced mowing regime and removal of some areas from regular mowing
	2022-26	Increase in tree cover and hedgerow planting
	2022-26	Increase in recycling, reduction in waste
	2022-26	Conscious buying decisions to switch (where practicable) to environmentally friendly options

8. Milestones and Reporting

TTC has a target to reach net zero by 2030. What this means in practice, is that once all practicable measures have been taken to decarbonise TTC's operations, there will be a remaining carbon balance that will need to be either inset or offset to reach net zero. Various offsetting schemes are available, but the recommendation is that, in the first instance, TTC carries out inseting on its own land to offset carbon (for example via tree or hedge planting). Once inseting opportunities have been exhausted, it should work with a local charity or similar UK-based group to offset its remaining carbon.

It is worth noting that inseting or offsetting via tree planting etc. is not an instantaneous solution. Offsetting purchase may be required in the short term to compensate for the residual emissions while trees and hedges planted establish.

Decarbonisation measures are listed against each site as short-, medium-, and long-term. For the purposes of this report, these timescales are defined as follows:

- Short – Delivery at end of 2026-27 financial year
- Medium – Delivery at end of 2027-28 financial year
- Long – Delivery at end of 2028-2029+ financial year (net zero target date)

There may be measures that will be delivered beyond 2030. In such cases, inseting or offsetting will be required until the carbon saving from the relevant decarbonisation measure is realised.

There will also be changes to operations during these timescales which will have a negative or positive impact on carbon emissions (for example, increased use of the chapel increasing emissions or reduced mowing regimes reducing emissions). As such, the figures quoted in this document should be viewed as point in time. Dynamic calculations and flexibility in the measures required to address TTC carbon emissions is therefore required.

Carbon reporting measuring progress against this decarbonisation plan will be carried out at the end of each financial year. Interim reports on progress on the delivery of decarbonisation measures will take place every two months as a standing agenda item at the Climate and Nature Committee.

9. Decarbonisation Measures

9.1: Town Hall

Thornbury Town Hall was built in the late 18th century as a residential dwelling, before being converted to a police station and courthouse in 1860. There has, however, been a recorded building on this site since at least 1590. The building was acquired by Thornbury Town Council in the 1990s and was subsequently converted to offices and meeting rooms. There are separate offices at the rear of the building which are reached via a discreet entrance. These are rented out to a third party, but services such as heating, electricity and water are shared with the main Town Hall building. The current building is of an historic nature and is Grade II listed. It occupies a prominent place at the centre of the High Street. As such, it comes with

several challenges in terms of retrofitting it for the purpose of achieving significantly reduced emissions.



Some energy efficiency measures have already been put in place at the Town Hall, resulting in a good reduction in energy use since the 2022 baseline was set. The remaining measures that should be considered for implementation are listed below, along with estimated costs, energy cost savings and carbon savings.

Figure 9.1.1: Thornbury Town Hall, High Street, Thornbury

Source: Wikipedia

Figure 9.1.2: Town Hall Decarbonisation Plan

Ref.	Proposed Measure	Location	Timescale	Rationale/Notes	Estimated Cost (additional measures only)	Estimated Energy Saving (KwH per year)	Energy cost (per KwH) Gas or Electricity as relevant (£)	Potential Cost Saving per year (£)	Carbon Saving (tCO ² e)
TH1	Installation of low velocity heat recirculation ceiling fans in the Council Chamber	Town Hall	Short	The council chamber has a high apex ceiling and is only partially insulated. It is also infrequently used. These factors result in it being one of the less energy efficient areas of the Town Hall, as identified in an Energy Efficiency report compiled by Severn Wye in January 2024. Options for improving the thermal efficiency of the chamber are limited by the room's design, historical features and use considerations. Low velocity heat recirculation fans would prevent heated air from rising and collecting in the apex of the room, instead forcing it back down into the area it is needed. This would result in an estimated 30% thermal efficiency improvement in the chamber.	£1000	1178	£0.08	£94	0.22

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TH2	Separation of heating systems - Town Hall and rented offices	Town Hall	Medium	At present, the occupants of the rented offices are using the building 24/7. As the heating and hot water systems are currently linked, this means the main Town Hall must be heated 24 hours per day, 7 days per week, despite being used only during office hours. During the colder months, the heating is therefore on for 168 hours per week over 24 weeks, or for 4032 hours per year. This results in 78% of the building being heated outside of office hours unnecessarily. Separating the two systems would result in significant savings. Heating the main Town Hall Monday to Friday, from 7am to 7pm would reduce heating hours by 108 per week for the main building. Assuming heating is used for 24 weeks of the year, this could reduce heating in the main Town Hall by 2592 hours per year, or by 64%. Installing thermostatic radiator valves that are controlled via a smart system would be a relatively low cost and low impact option for separating the heating systems. Room thermostats could also be installed with minimum invasive work. This would also allow less frequently used rooms to be controlled separately. The cost figures here are based on a quotation received for such a system in Feb 2024 with an uplift of c. £700 applied for increased costs in the interim period.	£8,000.00	41157	£0.08	£3292.57	7.53
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TH3	Installation of fully double-glazed replacement window units and/or secondary double glazing	Town Hall	Medium	Around 25% of the Town Hall's windows have fully installed secondary double glazing. The windows in the council chamber have wooden-framed secondary glazing. The remaining windows (excepting those in the public toilets) have magnetic Perspex secondary double glazing. Whilst magnetic secondary glazing improves thermal performance by around 30% over single glazed windows alone, it is not as efficient as fully fitted secondary or double glazing. Converting all windows to fully double-glazed units would require listed building planning permission, which is unlikely to be granted on the most prominent faces of the building. It is not therefore considered a viable option in the short or medium term. Some windows, such as those in the over 60s tearoom, have listed shutters, meaning fully fitted secondary glazing is not viable. In these cases, the existing magnetic secondary glazing is considered the most viable option. Converting the remaining magnetic secondary glazed windows to fully fitted secondary glazed windows would reduce heat loss by a further 30% in these areas. Savings are based on a 30% improvement in thermal efficiency in 60% of the building	£0	4167	£0.08	£333.36	0.76
TH4	Installation of lighting sensors/automatic lighting	Town Hall	Medium	At present, all lighting at the Town Hall is controlled via wall switches. Lighting is generally switched off outside office hours or when rooms are not in use. However, the installation of sensors would ensure lighting is only used when actually needed. Savings are based on a 5% reduction in electricity costs resulting from the installation of sensors	£0	642	£0.28	£179.76	0.01

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TH5	Replacement of gas central heating at Town Hall with gas alternative	Town Hall	Long	At present, heat pump options for the Town Hall are limited. A system that is sufficient in size and capacity for the entire building is likely to be expensive and require a large amount of retrofitting. Radiators and pipework would likely need to be upgraded. Once installed, there may be slightly higher costs to run a heat pump system, but it is more efficient at converting energy input to energy output, so these additional costs should not be significant. Installation of heat pumps would remove the need for gas consumption at the Town Hall, thus eliminating these scope 1 emissions.	£70,000.00	Replace gas usage with electricity	£0.08 (Gas) £0.28 (Electricity)	£1518.72 (Gas) -£5600.00 (Electricity) -£4082 (net)	3..17
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Figure 9.1.3: Town Hall Summary by Scope (with 'big ticket' items)

Town Hall with 'big ticket' items				
Operation	Scope	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Total Residual Emissions (tCO2e)
Town Hall	1	11.85	11.85	0
Town Hall	2	0	0	0
Town Hall	3	1	-0.36	1.36
Total		12.85	11.49	1.36

Figure 9.1.4: Town Hall Summary by Scope (without 'big ticket' items)

Town Hall without 'big ticket' items				
Operation	Scope	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Total Residual Emissions (tCO2e)
Town Hall	1	11.85	8.51	3.34
Town Hall	2	0	0	0
Town Hall	3	1	0.01	0.99
Total		12.85	8.52	4.33

Figure 9.1.5: Town Hall Summary Timescale (with 'big ticket' items)

Town Hall with 'big ticket' items				
Timescale/Year	Operation	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Residual Emissions (tCO2e)
Short (2026-27)	Town Hall	12.85	0.22	12.63
Medium (2027-28)	Town Hall	12.63	8.3	4.33
Long (2028 - 2030+)	Town Hall	4.33	2.97	1.36

Figure 9.1.6: Town Hall Summary Timescale (without 'big ticket' items)

Town Hall without 'big ticket' items				
Timescale/Year	Operation	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Residual Emissions (tCO2e)
Short (2026-27)	Town Hall	12.85	0.22	12.63
Medium (2027-28)	Town Hall	12.63	8.3	4.33
Long (2028 - 2030+)	Town Hall	4.33	0	4.33

Figure 9.1.7: Return on investment summary (financial) of Town Hall Measures

Measure Ref.	Cost	Return on Investment – Financial (Years)
TH1	£1,000	11
TH2	£8,000	2
TH3	£7,000 (PPM)	21
TH4	£2,500 (PPM)	14
TH5	£70,000	46

Town Hall Recommendations and Comments

Balancing the cost of installation (carbon and financial) against savings (carbon and financial), the recommendation is that measures TH1 – TH2 are progressed as a priority. TH3 and TH4 should be considered as an option during routine maintenance as part of the Planned Preventative Maintenance (PPM) schedule.

At present, TH5 is not recommended, due to the high financial cost, the degree of retrofitting it would require and the negative impact it would have on electricity consumption. Furthermore, the current gas-fired boiler was only installed in 2021 and as such has a useful life that extends beyond the life of this road map. However, the recommendation not to proceed with heat pump installation should be reviewed as non-gas heating system technology develops, particularly for commercial and/or historic buildings and as and when additional renewable electricity generation is a viable option at the Town Hall. Additionally, funding and grant options should be kept under review to see if financial assistance becomes available for retrofitting commercial, public and/or historic buildings. TH1 – TH3 will need to be fully implemented before any alternative heating solution is considered.

It should be borne in mind, however, that a continuing reliance on gas central heating at the Town Hall leaves TTC vulnerable to disruptions to energy supplies caused by geopolitical or climate-related factors, as well as uncontrolled cost increases for gas. Furthermore, the current system heating does not offer a solution for cooling the building, which may impact the ability of TTC to function in extreme heat conditions. Both factors may render the current solution unfit for purpose in the coming years.

9.2: Mundy Playing Fields

The Mundy Playing Fields, which are located just off the main High Street, were gifted to the people of Thornbury by Mrs Violet Mundy in 1937. They are the largest single recreational area in Thornbury and comprise a children's play area, outdoor gym, football pitches, a pavilion, public toilets, picnic areas, tennis courts and grassed areas. There are recently planted wildflower areas, native hedges and trees, alongside more established trees and shrubs. There is a stream running through the site, which is partly culverted, as well as several drainage ditches which provide good potential for wildlife connectivity. The playing fields are used for public recreation, as well as large events such as the annual fireworks and carnival. The weekly Park Run takes place on the site. There are current projects being planned or underway to upgrade the water and sewerage systems, install a Multi-Use Games Area (MUGA), refurbish the pavilion, and put in a natural water play feature which will include de-culverting the stream.



Figure 9.2.1: Thornbury Town FC Pitch on a Match Day with Pavilion in Background

Source: Thornbury Town Football Club

Thornbury Town Football Club play their home matches on the site and run several grassroots teams for younger players. They operate a bar in the pavilion and use home, away and officials changing rooms and toilets. As the team have successfully moved up through the football leagues, they have upgraded some ground facilities (stands, fencing) in line with Football Association requirements. Thornbury Town FC also have a container storage unit on site.

TTC uses the upstairs area of the pavilion as an office, rest room and drying area for grounds maintenance staff. There is a TTC storage container and a recently erected machine store. The pavilion building was constructed from the 1970s onwards and its layout and facilities have not evolved in line with the increased and changing uses made of it. As such, there is an early-stage plan to upgrade the pavilion facilities. Plans of the current pavilion layout can be seen in Figure 9.2.2 below.



Figure 9.2.2: Mundy Playing Field Pavilion – Current Ground and First Floor Plans
Source: View Architects

Figure 9.2.3: Mundy Playing Fields Decarbonisation Measures

Ref.	Proposed Measure	Location	Rationale/Notes	Timescales	Estimated Cost (additional measures only)	Estimated Energy Saving (Kwh per year)	Energy cost (per kWh) Gas or Electricity as relevant	Potential Cost Saving per year	Included in maintenance or redevelopment plan?
MPF1	Improved pipe insulation	Plant room/Boiler Room	A thermal efficiency survey of the Town Hall demonstrated the volume of heat lost through uninsulated pipes and pipe joints. Presently, the pipes at MPF are inconsistently and/or poorly insulated or not insulated at all. Pipe insulation could be quickly installed relatively cheaply. Hot water efficiency could be immediately improved by around 10%.	Short	£1,200.00	1352	£0.08	£108	No
MPF2	Installation of radiator reflectors in upstairs staff area	TTC Staff Area	Heating in the upstairs staff quarters is used throughout the year (see MPF4). Radiator reflectors could be installed without cost (spare reflectors are left over from TH installation) and would result in an improvement in	Short	£0.00	304	£0.08	£24.32	No

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			thermal efficiency of 5%.						
MPF3	Improved ceiling insulation	TTC Staff Area	The current state of insulation in the staff area is unknown. Investigations should be carried out and insulation improved where it is inadequate. This will immediately improve the thermal efficiency in the staff area by an estimated 15%.	Medium	£500	890	£0.08	£71.20	TBC
MPF4	Separation of staff drying room from main staff area	TTC Staff Area	At present, the main staff drying room (for clothing, boots, etc.) is in the first floor flat. Its heating is linked to the gas system for the whole flat, meaning that when it is required, which can be year-round, the whole flat has to be heated. Separating the drying room from the main staff quarters would allow it to be independently heated, thereby reducing overall energy consumption	Medium	£0	1550	£0.08	£124.00	Yes

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			in the staff area. Based on an 80% reduction in heating need on 29% of heating days.						
MPF5	Advice to football club re: reducing energy consumption - for example, insulating jackets for kegs, putting fridges on bluetooth controlled timers, ensuring fridges are full at all times, empty fridges are switched off, etc.	Thornbury FC bar and kitchen	Currently, the football club bar area has drinks cooling equipment running 24/7, 365 days per year. Reducing use of the bar cooling fridges and equipment to just days when the bar is used would remove need for cooling on an estimated 240 days per year, resulting in a 66% decrease in energy consumption. This is a best practice measure that will not result in any direct	Short	£0.00	N/A	N/A	£2027 – this is the estimated current excess cost to TTC	Yes

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			savings (carbon or financial) for TTC.						
MPF6	Installation of false ceilings	Officials change Away change Public Toilets	At present, the home, away and officials changing rooms and the public toilets have uninsulated apex ceilings. Any heating in these areas rises to the apex, making these rooms, which are already poorly insulated, even more inefficient to heat. Costs and savings are calculated for installing a fire-resistant, fully insulated false ceiling in 3 buildings which are infrequently used, resulting in a 30% thermal	Medium	£1500	N/A	N/A	£69	TBC

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			efficiency improvement.						
MPF7	Separation of electricity supply Thornbury Town FC/TTC	Pavilion	While the separation of the electricity supply between TTC and Thornbury Town FC would not automatically result in lower energy consumption, it has two main advantages: - It allows TTC to accurately measure their own energy consumption on the site, thereby more accurately informing energy efficiency conversations. - It incentivises the Football Club to put energy saving measures in place (see MPF5) This is a best practice measure that will not result in any direct carbon savings for TTC. It will, however, reduce TTC's financial commitments by an estimated 50% for the MPF.	Medium	N/A	N/A		£2308 – this is the estimated annual cost to TTC of the FC's electricity consumption	Yes

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			Lighting in all buildings is currently operated by manual switches. While many buildings are not used frequently (for example changing rooms), some, such as the public toilets, are in daily use. Installation of lighting sensors would reduce the amount of time lighting is needed and would prevent lights being left on unnecessarily or accidentally. Savings are based on a 5% reduction in overall electricity costs.						
MPF8	Installation of lighting sensors in all buildings	Pavilion		Medium	£1,200.00	412	£0.28	£115.36	Yes
MPF9	Additional electric car charging points enabling conversion of petrol/diesel vehicles to electric	Machine Store	Additional electric vehicles will require new charging points at the MPF machine store.	Medium	£2000	-3000	£0.28	-£840.00 This should be offset against the cost of diesel and petrol, which for 2025-26 totalled £2733.54	No
MPF10	Extended solar array	Machine Store Public Toilets Officials/Away change	Based on the extension of the solar array to 4x that used at the Town Hall, with a 50% reduction applied for power returned to the grid.	Long	£15,000	4180	£0.28	£1170.40	No

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			While TTC uses a renewable energy supplier, scope 3 T&D emissions are still generated by electricity consumption. Generating and being able to store energy on-site via solar and battery capture, reduces both cost and emissions. This is because the fugitive emissions involved in centralised electricity generation are avoided and the cost of energy used is greater than the tariff gained from selling excess energy back to the grid. With additional solar/battery storage a 4- year carbon payback period is needed to account for the carbon generated by its manufacture.						
MPF11	Installation of battery storage for solar	Plant room/Boiler Room		Long	£8,000.00	4180	£0.28	£1170.40	No
MPF12	Replacement of gas boiler with heat pump/solar	Pavilion	Replacement of all current gas heating elements (flat heating, water heating) with heat pump and solar array	Long	£50,000	9429	£0.08	-£2800.00	No

Figure 9.2.4: Mundy Playing Fields Summary by Scope (with 'big ticket' items)

Mundy Playing Fields with 'big ticket' items				
Operation	Scope	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Total Residual Emissions (tCO2e)
Mundy Playing Fields	1	2.6	2.47	0.13
Mundy Playing Fields	2	0	0	0
Mundy Playing Fields	3	0.3	-0.08	0.38
Total		2.9	2.39	0.51

Figure 9.2.5: Mundy Playing Fields Summary by Scope (without 'big ticket' items)

Mundy Playing Fields without 'big ticket' items				
Operation	Scope	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Total Residual Emissions (tCO2e)

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Mundy Playing Fields	1	2.6	0.75	1.85
Mundy Playing Fields	2	0	0	0
Mundy Playing Fields	3	0.3	0.11	0.19
Total		2.9	0.86	2.04

Figure 8.2.6: Mundy Playing Fields Summary Timescales (with 'big ticket' items)

Mundy Playing Fields with 'big ticket' items				
Timescale/Year	Operation	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Residual Emissions (tCO2e)
Short (2026-27)	MPF	2.9	0.31	2.59
Medium (2027-28)	MPF	0	0.39	2.2
Long (2028 - 2030+)	MPF	0.3	1.69	0.51

Figure 8.2.7: Mundy Playing Fields Summary Timescales (without 'big ticket' items)

Mundy Playing Fields without 'big ticket' items				
Timescale/Year	Operation	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Residual Emissions (tCO2e)
Short (2026-27)	MPF	2.9	0.31	2.59
Medium (2027-28)	MPF	2.59	0.39	2.2
Long (2028 - 2030+)	MPF	2.2	0.16	2.04

Figure 8.2.8: Return on investment summary (financial) of Mundy Playing Fields Measures

Measure Ref.	Cost*	Return on Investment – Financial (Years)
MPF1	£1200	11
MPF2	Using old stock	N/A
MPF3	£1000	
MPF4	£0	Included in Pavilion redevelopment plan
MPF5	£0	Included in Pavilion redevelopment plan
MPF6	£0	Included in Pavilion redevelopment plan
MPF7	£0	Included in Pavilion redevelopment plan
MPF8	£1200	10

MPF9	£1000	See ancillary operations
MPF10	£15,000	13
MPF11	£8000	7
MPF12	£50,000	66

* Where works are already planned as part of the Pavilion redevelopment, costs have not been included here.

Mundy Playing Field Recommendations and Comments

The pavilion redevelopment plan will go a long way to making operations more energy and carbon efficient. Officially separating metering for TTC and the Football Club will, furthermore, allow a much more accurate view of actual TTC operational carbon emissions at the site.

Added to short-term wins, the redevelopment works will reduce emissions by 0.75 tCo2e (Scope 1). To drastically reduce the emissions from the pavilion, longer-term, more expensive works should be considered. In particular, the extension of the solar array and accompanying battery storage should be considered, particularly as and when vehicles are converted to run on electricity. Being able to self-generate and store electricity, particularly during the summer months when grounds maintenance is at its peak, has the potential to make significant financial and carbon savings.

Alternative renewable energy sources should also be considered, in particular the installation of a wind turbine. This would further reduce our reliance on outside sources of energy.

The heating and hot water systems could, in time, be converted to a heat pump or similar, electrically powered system. The redevelopment should bear this possibility in mind and ensure that the building is as prepared as possible for this eventuality. The redevelopment works should aim to improve the overall thermal efficiency of the building, thereby making it as ready as possible for a heat pump retro fit. Also, it is recommended that the generation and storage of site-based renewable energy is made a pre-requisite for conversion to an electrical heating or hot water system.

9.3: Cemetery and Chapel

Thornbury Cemetery and the associated mortuary chapel (Figure 8.3.1) were founded in the late 19th century. Management and ownership of the cemetery was passed to the then Parish Council in 1897. Since then, it has been managed and maintained by the Council on behalf of the people of Thornbury.

The chapel has not actively been used for its original purpose some years, resulting in it falling into a state of some disrepair. A recent project has, however, restored parts of the chapel, replacing the floor, installing updated electrics and decorating (see Figure 8.3.2).

Figure 9.3.1: Thornbury Cemetery Chapel

Source: Thornbury Roots



In addition to the cemetery grounds and chapel, there are facilities for the use of the cemetery supervisor and other TTC staff. These comprise a small storage/sitting area, kitchenette and toilet. There are plans to close this facility and replace it with toilets and other conveniences that can be used by members of the public and staff. This will increase the useability of the chapel, making it viable for memorial services, community events, and classes.

The restoration of the chapel and the introduction of public facilities at the site will inevitably increase the consumption of energy on the site, which is currently low. Therefore, it is important that works to increase

the energy efficiency of the chapel building are prioritised to minimise the impact of additional use. The figures quoted below assume a 50% uplift in energy consumption at the cemetery compared to the 2025-26 baseline.

Figure 9.3.2: Thornbury Cemetery Chapel Interior

Source: Alan Stealey



Figure 9.3.3: Cemetery and Chapel Decarbonisation Measures

Ref.	Proposed Measure	Location	Timescales	Rationale/Notes	Estimated Cost	Estimated Energy Saving (Kwh per year)	Energy cost (per Kwh) Gas or Electricity as relevant	Potential Cost Saving per year	Carbon Saving (tCO ² e)
C1	Secondary glazing	Chapel	Medium	The windows in the chapel are leaded and single glazed. They add considerably to the character of the building and as such cannot be replaced. Specialist contractors can provide options for secondary glazing in ecclesiastical buildings. You could expect to reduce heat loss by around 75%.	£2,000.00	1118	£0.28	£313.04	0.02
C2	Improved door insulation	Chapel	Short	The current doors have reasonably large gaps at the middle and bottom. Installation of brushes or other suitable insulation would be low cost and would reduce heat loss.	£100.00	78	£0.28	£21.84	Cost saving only
C3	Switch off screens for CCTV when not in use	Chapel Staff Area	Short	This is an easy fix that costs nothing but immediately saves energy. While savings are not large, this is a best practice procedure that should be adopted on all sites.	£0.00	600	£0.28	£168.00	0.01

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C4	Install light sensors	Chapel Staff Area	Medium	The Chapel and any new facilities, as infrequently used buildings, would benefit from installation of lighting sensors, saving an average of 5% on overall electricity costs.	£500.00	59	£0.28	£16.52	Cost saving only
C5	Install infra-red heating system	Chapel	Medium	Infra-red heating heats objects and people rather than the air. It is immediately effective, removing the need to preheat an area before use. For infrequently used rooms with high ceilings, such as the chapel, this is an ideal heating solution. There is no baseline to compare to, as the chapel isn't currently heated. However, in a building of this type, infra-red heating would reduce energy use 30% over other electric heating solutions.	£7,000.00	338	£0.28	£94.64	0.01
C6	Replace doors with lobby (see St Mary's Church)	Chapel	Long	As per C2, the current chapel doors are leaky and open directly on to the outdoors. Every time the doors are opened, cold air is admitted, increasing the need for heating when the building is in use. Secondary doors and a porch could reduce heat loss by 10%.	£10,000.00	78	£0.28	£21.84	Cost saving only

Figure 9.3.4: Cemetery and Chapel Summary by Scope

Cemetery and Chapel				
Operation	Scope	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Total Residual Emissions (tCO2e)
Cemetery	3	0.07	0.04	0.03
Total		0.07	0.04	0.03

Figure 9.3.5: Cemetery and Chapel Summary by Timescales

Cemetery and Chapel				
Timescale/Year	Operation	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Residual Emissions (tCO2e)
Short (2026-27)	Cemetery	0.07	0.01	0.06
Medium (2027-28)	Cemetery	0.06	0.03	0.03
Long (2028 - 2030+)	Cemetery	0.03	0	0.03

Figure 9.3.6: Return on investment summary (financial) of Mundy Playing Fields Measures

Measure Ref.	Cost	Return on Investment – Financial (Years)
C1	£2000	6
C2	£100	5
C3	£0	Immediate
C4	£500	30

C5	£7000	74
C6	£10,000	458!

Cemetery and Chapel Recommendations and Comments

Estimating the energy use of the chapel and Cemetery at present is speculative as the future use of the chapel and the reconfiguration of the staff area and installation of public toilets is not yet known.

It is recommended that low-cost options, such as C2 and C3 are progressed as a priority. C1 and C5 should be considered as and when use of the building is extended, perhaps as part of the staff area redevelopment/installation of public toilets.

As and when the staff area is changed and/or public toilets are redeveloped, energy efficient and emissions reducing design and build principles should be adopted as a matter of course.

9.4: Ancillary Operations

9.4.1: Vehicles and Equipment

In addition to TTC's buildings, there are vehicles and equipment that are used by TTC staff, primarily for the maintenance of the grounds managed by TTC. Some of these vehicles and equipment currently run on and otherwise consume fossil fuels, adding to Scope 1 emissions. There are already plans in place to phase out the use of fossil fuels in TTC equipment and replace fossil fuel-powered machines with electric equipment. Where a replacement is already planned, I have recorded the cost as zero in the Road Map. At present, there are some pieces of equipment for which no viable alternative exists. Where this is the case, this is noted below and the emissions allocated to these pieces of equipment account for the remaining Scope 3 emissions generated by TTC machinery. The additional electricity that electrically powered equipment will require has already been accounted for in Section 8.2, so is not recounted here.

To balance the environmental impact of replacing the vehicles with the positive environmental impact of their replacement, vehicles should be used for the maximum viable period before replacement. Their emissions should therefore continue to be counted until they are replaced. As the recommendation is that current vehicles are run to the end of their current lifespan, there are no additional capital costs involved in the replacement of vehicles for decarbonisation purposes.

Figure 9.4.1.1: Current Grounds Maintenance Equipment Running on Fossil Fuels

Equipment Description	Location	Fuel Type	Year of Purchase	Expected lifespan	Replacement Options	Replacement Due	Replacement Planned?	Estimated Net Cost of Replacement	Total Emissions Share	Reduction on replacement (tCo2e)
										5.1
New Holland Tractor - WX58 0MH	MPF	Diesel	Not known - registered in 2008	15 - 20 years	Electric	2023-2028	No	£45,000.00	10%	0.51
Ransome Ride on Mower - WX19 EJJ	MPF	Petrol	2019	10-15 years	Electric	2029-2034	No	£30,000.00	10%	0.51
Toro Brush Cutter (Mower) BRC-28	MPF	Petrol	2024	5-10 years	Electric	2029-2034	No	£350.00	2%	0.1
Honda HP500B Power Carrier 163cc 4-Stroke Engine	CEM	Petrol	2021	10-20 years	Electric (not yet available in UK?)	2031 - 2041	No	N/A	1%	0
Generator	MPF	Diesel	2018	15-30 years	Hydrogen (technology evolving)	2033-2048	No	N/A	1%	0

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Amazon Profihopper - WX25 EHE	MPF	Diesel	2025	10-15 years	No current realistic alternative	2035-2040	No	N/A	10%	0
Ford Transit Van - CV11 KFC	MPF	Diesel	Not known - registered in 2011	250k miles Currently 65k on clock (approx.)	Electric		No	£60,000.00	38%	1.9
ATCO Quatro 16S Mower (Holy Mowers)	CY	Petrol	2021	5-10 years	Electric	2026-2031	Yes	£0.00	2%	0.1
Stihl Path Blower	CEM	Not known	2022	5-10 years	Electric	2027-2032	Yes	£0.00	1%	0.05
Stihl Path Blower	MPF	Not known	2022	5-10 years	Electric	2027-2032	Yes	£0.00	1%	0.05
Chain Saws x2	MPF	FF			Electric	2026	Yes	£0.00	2%	0.1
Husqvarna Mower	MPF	FF			Electric	2026	Yes	£0.00	2%	0.1
John Deer Mower	CEM	FF	2018		Electric	2026	Yes	£0.00	2%	0.1
John Deer Mower	MPF	FF			Electric	2026	Yes	£0.00	2%	0.1
Stihl Strimmers x3	CEM/MPF	FF	2019		Electric	2026	Yes	£0.00	3%	0.15
Echo Brush Cutter SRM520ES (Strimmer)	MPF	FF	2022		Electric	2026	Yes	£0.00	1%	0.05
Echo PB - 770 BackPac Blower	CEM	FF	2021		Electric	2026	Yes	£0.00	1%	0.05
Eco PB770 BackPac Blower	MPF	FF	2021		Electric	2026	Yes	£0.00	1%	0.05
Masport 18" Mowers x2	CEM	FF	2023		Electric	2026	Yes	£0.00	4%	0.2
Masport 800st Mower	CEM	FF	2023		Electric	2026	Yes	£0.00	2%	0.1
Masport Rotarola 18" SP Roller Mowers x2	CEM	FF	2021		Electric	2026	Yes	£0.00	4%	0.2
								£135,350.00	100%	4.42

Figure 9.4.1.2: Ancillary Operations Summary by Scope

Ancillary Operations				
Operation	Scope	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Total Residual Emissions (tCO2e)
Ancillary Operations	1	5.1	4.42	0.68
Total		5.1	4.42	0.68

Figure 9.4.1.3: Ancillary Operations Summary by Timescale

Ancillary Operations				
Timescale/Year	Operation	Starting Emissions (tCO2e)	Emissions Reduction (tCO2e)	Residual Emissions (tCO2e)
Short (2026-27)	AO	5.1	1.91	3.19
Medium (2027-28)	AO	3.19	1.9	1.29
Long (2028 - 2030+)	AO	1.29	0.61	0.68

9.4.2: Water Supply, Treatment, Waste Generated from Own Operations

Currently, water supply and treatment accounts for 0.72% of total overall emissions. As such, I have not generated specific targets for water and water treatment reductions.

However, the Climate and Nature Action Plan has an ambition to reduce our reliance on potable water. This will become increasingly important as dryer, hotter summers make drought more frequent. Assuming that we can improve our rainwater harvesting and perhaps incorporate grey water collection and reuse at the Mundy Playing Fields and Cemetery, we may see a moderate reduction in water consumption. For the purposes of this road map, I have estimated a 10% cumulative reduction in water consumption over the reporting period.

Waste generated from our own operations is the largest contributor to scope 3 emissions, and accounts for 3.63% of total overall emissions. Ongoing initiatives are in place to reduce waste. For the purposes of this report, I have assumed a cumulative 20% reduction in waste generated over the reporting period.

Figure 9.4.2.1: Water Supply, Treatment, Waste Emission Reduction and Remaining Emissions

Emission Type	Starting Emissions	Reduction Over Plan Period	Net Remaining Emissions
Water Consumption	0.13	0.01	0.12
Water Treatment	0.02	0.00	0.02
Waste Generated	0.76	0.15	0.61
Total	0.91	0.16	0.75

9.5.3: Active Travel and Decarbonisation Leadership

Although Scope 3 emissions from staff travel are not included directly in this report, TTC's Climate and Nature Committee are committed to taking a holistic view of the impact of TTC operations, as well as providing clear leadership on decarbonisation to the wider population. As such, there are several initiatives that the Council may wish to consider adopting to reduce staff travel emissions and provide good practice decarbonisation leadership. These are detailed below.

Figure 9.5.3.1: Active Travel and Decarbonisation Leadership Initiatives

Source: TTC

Measure	Category	Scope Emissions	In scope?	Reason for recommendation	Notes/Links
Cycle to Work Scheme	Active Travel	Scope 3	No	Encourage active travel among staff	https://www.cyclinguk.org/article/guide-cycle-work-scheme
Provision of bicycle(s) to navigate between TTC sites	Active Travel	Scope 1	Yes	Reduce emissions	
Electric car salary sacrifice scheme	Decarbonisation Leadership	Scope 3	No	Employee benefit Best practice Zero cost to employer	https://discover.octopusev.com/salary-sacrifice-for-employers/
Carbon literacy training - staff and councillors	Decarbonisation Leadership	Scope 1, 2 & 3	Yes	Support staff and councillors with TTC and personal decarbonisation	TTC can work towards becoming a certified carbon literate organisation https://carbonliteracy.com/carbon-literate-organisation/
Electric car charging points for staff in staff car parking areas	Decarbonisation Leadership	Scope 1 & 3	Partially	Direct support for staff to charge vehicles Fleet vehicles can be charged	Government subsidies (up to £500 per socket) available to support installation of electric charging points at workplaces https://www.find-government-grants.service.gov.uk/grants/workplace-charging-scheme-2#summary
Offer sustainable travel leave	Decarbonisation Leadership	N/A	No	Provide best practice leadership	https://www.sustainabletravelleave.org/

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				Adds to employee benefits package	
Explore local options for carbon offsetting schemes	Decarbonisation	Scope 1,2 & 3	Yes	Offers local charities and organisations an opportunity to benefit from offsetting expenditure. Better offsetting traceability. Multiple benefits for the community and environment.	

10. Funding Options and Payback Periods

There are currently no direct funds to support Town and Parish Councils with decarbonisation. There are some regional funds, but these would need to be accessed via South Gloucestershire Council. Other funding requires the generation of community energy (i.e., energy that would be accessible for us and for the wider community to use). Figure 10.1 shows options for TTC. If required, these could be investigated further. However, in the first instance, TTC should seek to self-fund initiatives based on reinvesting energy cost savings gained from decarbonisation activities into further decarbonisation measures.

Funding Scheme	What it Funds	Direct Access for Town Councils? Notes	
Local Net Zero Hubs	Project development, feasibility	✓ Yes	Best route for early-stage support
Community Energy Fund	Community renewables, heat, retrofit	✓ Yes	Grants ~£30–40k typical
Local Net Zero Accelerator	Large-scale project bundling	✗ Not directly	Work via principal authority
Mayoral Renewables Scheme	Regional renewable rollout	✗ Not directly	Delivered via combined authorities
LGA SIP Programme	Training, tools, carbon literacy	✓ Yes	Capacity-building, not capital

Figure 10.1: Decarbonisation Funding Options for Town and Parish Councils

Source: Copilot

Figure 10.2 outlines the total monetary costs of all suggested decarbonisation measures, broken down by operation and by short-, medium- and long-term delivery. The table also shows the total cost of the measures and the monetary savings made as a result over 1 year and over the plan period, providing a net overall cost/saving. It also provides an estimate of carbon savings the measures would enable. It separates out the ‘big ticket’ items, such as heat pumps and the chapel lobby to give a range of costs/savings commensurate with the recommendations made above.

Figure 10.2: Decarbonisation Measure Costs and Savings – All Measures

Source: TTC

Operation	Time Scale	Cost	Saving Over 1 year	Cumulative Saving by End of Plan Period	Net Cost/Saving
Town Hall	Short	£1,000.00	£94.00	£376.00	-£624.00
	Medium	£17,500.00	£3,805.00	£11,415.00	-£6,085.00
	Long	£70,000.00	-£4,082.00	-£4,082.00	-£74,082.00
	Total	£88,500.00	-£183.00	£7,709.00	-£80,791.00
	Less Heat Pump	-£70,000.00	£4,082.00	£4,082.00	
		£18,500.00	£3,899.00	£11,791.00	-£6,709.00
Mundy Playing Field	Short	£1,200.00	£108.00	£432.00	-£768.00
	Medium	£5,200.00	£2,711.00	£8,133.00	£2,933.00
	Long	£73,000.00	£294.00	£294.00	-£72,706.00
	Total	£79,400.00	£3,113.00	£8,859.00	-£70,541.00
	Less Heat Pump	-£50,000.00	£2,800.00	£2,800.00	
		£29,400.00	£5,913.00	£11,659.00	-£17,741.00
Chapel/Cemetery	Short	£100.00	£22.00	£88.00	-£12.00
	Medium	£9,500.00	£425.00	£1,275.00	-£8,225.00
	Long	£10,000.00	£22.00	£22.00	-£9,978.00
	Total	£19,600.00	£469.00	£1,385.00	-£18,215.00
	Less lobby	-£10,000.00	-£22.00	-£22.00	
		£9,600.00	£447.00	£1,363.00	-£8,237.00

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Ancillary Operations	Total	£135,350.00	£1,893.00	£7,572.00	
	Less additional cost of replacement (fossil fuel alternative)	£25,000.00			
	Total cost of non-electric replacement equipment	£160,350.00			
	Net Saving	£25,000.00	£1,893.00	£7,572.00	£34,465.00
Misc. Scope 3	Long	£0.00	£0.00	£0.00	£0.00
Offsetting Costs		£600.00	-£600.00	-£2,400.00	-£2,400.00
Total Cost/Saving (with big ticket items)		£162,500.00	£4,692.00	£23,125.00	-£139,375.00
Total Cost/Saving (without big ticket items)		£42,500.00	£11,705.00	£32,385.00	-£10,115.00

*As all equipment would need replacing at the end of its useful life anyway, this figure shows the cost saving experienced by replacing with electric rather than fossil fuelled alternatives.

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Figure 10.3: Decarbonisation Measure Costs and Savings – Recommended Measures Only

Source: TTC

Operation	Time Scale	Cost	Saving Over 1 year	Cumulative Saving by End of Plan Period	Net Cost/Saving
Town Hall	Short	£1,000.00	£94.00	£376.00	-£624.00
	Medium	£8,000.00	£3,293.00	£9,879.00	£1,879.00
	Long	£0.00	£0.00	£0.00	£0.00
	Total	£9,000.00	£3,387.00	£10,255.00	£1,255.00
Mundy Playing Field	Short	£1,200.00	£132.00	£528.00	-£672.00
	Medium	£5,200.00	£2,711.00	£8,133.00	£2,933.00
	Long	£23,000.00	£294.00	£294.00	-£22,706.00
	Total	£29,400.00	£3,137.00	£8,955.00	-£20,445.00
		£29,400.00	£3,137.00	£8,955.00	-£20,445.00
Chapel/Cemetery	Short	£100.00	£22.00	£88.00	-£12.00
	Medium	£2,500.00	£425.00	£1,275.00	-£1,225.00
	Long	£0.00	£0.00	£0.00	£0.00
	Total	£2,600.00	£447.00	£1,363.00	-£1,237.00
		£2,600.00	£447.00	£1,363.00	-£1,237.00

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Total Cost/Savings		£41,000.00	£6,971.00	£20,573.00	-£20,427.00
Ancillary Operations	Total cost of electrically powered replacement equipment	£135,350.00			
	Total cost of fossil-fuelled replacement equipment	£160,350.00			
	Net saving from replacing with electrically powered equipment	£25,000.00		£25,000.00	£25,000.00
	Additional cost of electricity for charging*	£840.00			
	Saving on fossil fuels	£2,734.00			
	Net saving on fuel	£1,894.00	£1,894.00	£1,894.00	£1,894.00
	Net Savings	£25,000.00	£1,893.00	£7,572.00	£34,465.00
Offsetting Costs		£600.00	-£600.00	-£2,400.00	-£2,400.00
Total overall cost/saving					£11,638.00
	* if electricity supplied by the grid. If renewables installed at MPF this cost will reduce.				

11. Communications Approach and Plan

As well as undertaking its own decarbonisation journey, TTC is committed to supporting Thornbury residents and businesses to undertake their own decarbonisation journey. This may take the form of telling the story of our journey, sharing best practice, discussing the challenges and opportunities created by decarbonisation, or signposting to further help and resources.

The plan below gives a broad outline of the topics and formats that engagements might take. However, full details will be available via the annual Climate and Nature Communications and Events plan, which will be discussed at the Thriving Nature working group and noted at the Climate and Nature Committee. The Climate and Nature Communications and Events plan will be aligned with the wider TTC Communications Strategy.

Detail	Communication Type	Delivered via	Frequency	Audience
Carbon Report detailing in scope TTC carbon emissions	Report	Email	Annual	Officers and Councillors
TTC Decarbonisation Roadmap	Report	Email	Once	Officers and Councillors
TTC Decarbonisation Roadmap - Shareable	Report/Graphics	Website social media Press	Once	Public
Decarbonisation Jargon Buster	Report/Graphics	Email Website social media	Once	Officers and Councillors Public
Decarbonisation Online Training	Training	Online	Once	Officers and Councillors
Decarbonisation Roadshow - Businesses/Commercial Buildings	Stand/Talks	In Person	Annual	Local businesses and organisations
Decarbonisation Roadshow - Public/Residential Buildings	Stand/Talks	In Person	Annual	Residents In collaboration with CATSA/ST?
Updates on progress against plan	Report	Email Committee	Bi-monthly	Climate and Nature Committee
Reports and recommendations for decarbonisation measures	Officer Report	Email Committee	As needed	Climate and Nature Committee F&GP Committee Full Council
Updates on progress against plan	Report/Graphics	Website/social media	Quarterly	Public
Climate resilience workshops	Stand/Talks	In Person	Annual	Officers and Councillors Public

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Annual progress report	Report/Graphics	Website social media Press	Annual	Officers and Councillors Public
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Figure 11.1: TTC Decarbonisation Roadmap Communications Plan

Source: TTC

12. Climate Mitigation and Resilience

Climate change mitigation is largely concerned with reducing the severity of climate change by limiting the release of GHGs and extracting those that remain from the atmosphere.³ This report is primarily concerned with introducing measures to reduce TTC's carbon footprint, thereby mitigating against climate change.

However, given the accelerating rate of climate change and the impacts that are already being felt, it is also necessary to consider measures to improve climate change resilience, defined as adaptations that can help 'to prepare for, respond to, and recover from the impacts of hazardous climate events' (see Figure 12.1).⁴

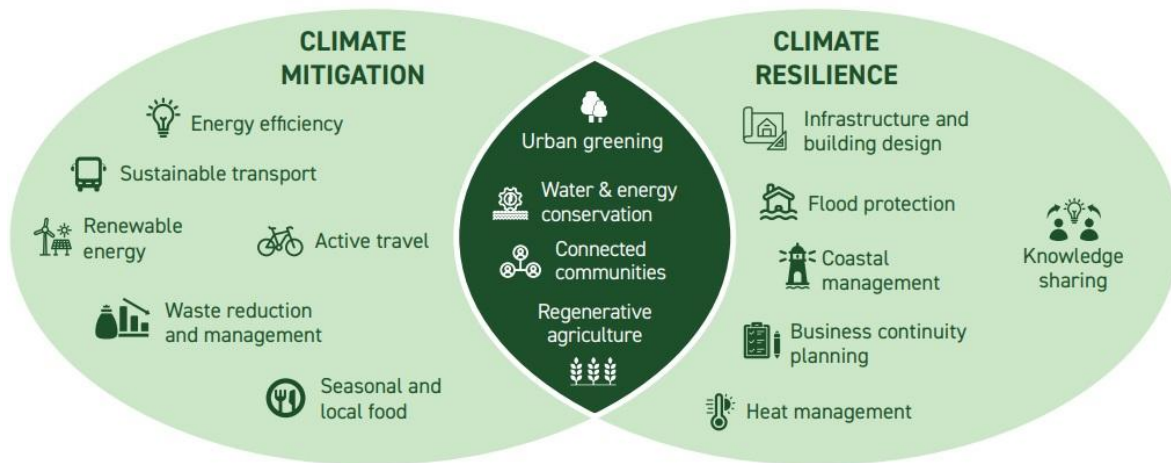


Figure 12.1: Climate Mitigation and Climate Resilience

Source: West of England Combined Authority.

As global heating accelerates, it is likely that springs and summers in the UK will continue to get dryer and hotter and autumns and winters will be milder and wetter.⁵ Such seasonal alterations have the potential to create weather-related issues year-round, where hazardous weather events and conditions cause threats to life and livelihood for all species. Climate change will, therefore, create economic, social, political, environmental and practical challenges that will have broad ranging impacts, as outlined in [Figure 2.1](#).

Extreme weather events and environmental conditions could include, but are not limited to:

- Drought
- Increasing incidences of extreme heat/heat waves
- Flooding
- Increasingly severe and more frequent storms

³ The Highland Council, Net Zero Strategy, p. 77.

⁴ The Highland Council, Net Zero Strategy, p. 77

⁵ Gov.UK, Climate Change Explained, <https://www.gov.uk/guidance/climate-change-explained#impacts-of-climate-change>

- Sea level rises
- Threats to food security
- Changing seasonality of extreme weather
- Increasing biodiversity loss and mass species extinction

The impacts of climate change will be experienced and felt internationally, nationally, regionally and locally, to varying degrees, depending on local environmental, economic and social conditions. For Thornbury, there are several areas that should be highlighted as being of particular importance.

- While Thornbury is not considered at particular risk of flooding, flooding events have occurred here in the past and repeats could become more severe or more frequent. The town's proximity to the flood plains of the Severn Estuary, which has the second highest tidal range in the world, highlights the potential for hazardous-to-life levels of flooding in future.
- Along with many other areas of Southern England, the Southwest has experienced decreasing levels of summer rainfall and increasing incidences of drought in recent years. Unusually for an historical town, Thornbury does not directly intersect with a main watercourse or river. Additionally, our proximity to large urban conurbations that have high water demand makes us vulnerable to issues caused by water shortages.
- As of the 2021 census, almost a quarter of Thornbury residents were over the age of 65.⁶ Compared to county and national averages, we have a greater percentage of people aged between 75 and 84 and over the age of 85 living in our area.⁷ Older people are at a greater risk of illness, hospitalisation and death during heatwaves, meaning that increasing incidences of days that are categorised as very hot (i.e., over 30° c) are of particular concern for this section of the town's residents.
- While Thornbury has a slightly above-county average of people living without any deprivation markers (relating to education, employment, health, or housing), there are still over 45% of residents with one or more deprivation markers.⁸ Those who are already vulnerable due to economic or social deprivation are expected to be further disadvantaged by climate change, in particular where it threatens services and infrastructure.
- In the past 30 years, species abundance and health have declined by between 30% and 40% in the UK. Ecosystems that are already under pressure face a greater threat of collapse as non-native species increase, storms become more frequent and severe, sea levels rise, the seasons shift, and drought becomes more prevalent due to climate change. A decline in soil health, biodiversity and wildlife has a direct and deleterious impact on air quality, food production, and human health and wellbeing.

TTC's ability to directly influence these factors is limited and initiatives are being progressed at national and regional levels to address the need for greater climate resilience in the UK.

Awareness of the challenges that the town is likely to face, and initiatives to key Thornbury into regional, national, and international programmes of resilience are, however, needed. There are

⁶ South Gloucestershire Council, Thornbury: Ward Profile, <https://beta.southglos.gov.uk/static/fbf1149d9f5e7198889cc26382e7314d/Thornbury-ward-1.pdf>, p. 1.

⁷ Thornbury Ward Profile, p. 2.

⁸ Thornbury Ward Profile, p. 3.

also areas where the Town Council can use its influence and decision-making processes to support greater climate resilience.

These areas include:

- Planning Policy and Consultation
- Grounds Management
- Landscape design and land use
- Building design, retrofit and use
- Collaborations with organisations locally and nationally to enhance Thornbury's climate resilience.

12.1 Planning Policy and Consultation

TTC is not a planning authority at present. It is, however, consulted on new planning applications and has a neighbourhood plan. The current iteration of the neighbourhood plan is valid until 2036, taking it beyond the life of this Decarbonisation Road Map and TTC's net zero ambitions.⁹

The neighbourhood plan provides a framework for planning and development in the area, influencing subjects such as housing, service provision, employment, education, and protection of the natural environment. The plan includes a section on sustainable design and construction, pointing out that development should seek to minimise its environmental impacts before, during and after building takes place.

Given the issues outlined above, new and redeveloped housing and commercial building in the area should give priority to:

- Embedding renewable energy generation and storage
- Providing a means to renewably heat and cool air
- Designing to minimise heat loss in winter and heat retention in summer
- Treating water as a valuable commodity by capturing rain and grey water
- Not developing on areas prone to flooding
- Including nature-based solutions to potential flooding in design and build
- Achieving biodiversity net gain to mitigate any negative impacts on local biodiversity
- Providing active travel and public transport solutions
- Providing local opportunities for good, well-paid employment

12.2 Grounds Management

TTC manages playing fields, a cemetery, play areas and other green spaces on behalf of the people of Thornbury. In recent years, the grounds maintenance regime has been adapted to balance the needs of people and wildlife. Some areas have been actively enhanced for wildlife via planting, whilst others are now managed more sympathetically via reduced mowing or adapted management.

In addition to the direct decarbonisation measures already detailed in this report, grounds maintenance protocols should seek opportunities to capture and reuse water where possible and develop planting plans that minimise water use.

⁹ Thornbury Town Council, Thornbury Neighbourhood Plan, 2019-2036, <https://localcouncilwebsites.blob.core.windows.net/thornbury-town-council/page/policies-procedures/submissionversionthornburyneighbourhoodplan.pdf>

The adoption of ‘no dig’ and organic principles should be considered in areas where this is practical and possible. These principles minimise the emission of carbon into the atmosphere and improve soil sustainability.

12.3 Landscape Design and Land Use

Developments in our managed green spaces, should, wherever practicable, seek to work with the topography, hydrology and geology of the site in question. For example, the project to replace the splashpad at the Mundy Playing Fields will seek to provide a sustainable, long-term play solution that provides enhancements for biodiversity alongside entertainment for families and other playing field users. The project to replace the splashpad aims to minimise the risk of localised flooding in the playing fields by working with the natural features of the land. It also takes a responsible approach to the management of water by assessing and mitigating against TTC’s downstream impacts.

Similarly, the development of a memorial woodland and wellbeing garden at the cemetery will seek to work with the natural features of the land to minimise flooding in areas where it is not wanted and develop watery habitats where the land suggests they would be welcome.

Any land use frameworks or strategies should, as in these two examples, prioritise nature-based solutions that are beneficial for people and wildlife, alongside sustainable design and development.

12.4: Building Design, Retrofit and Use

To maintain a workable environment so that the Council can continue to provide its services to the residents of Thornbury, TTC’s own buildings should follow the same design and development principles as outlined above in section 11.1. These include:

- Embedding renewable energy generation and storage
- Providing a means to renewably heat and cool air
- Designing to minimise heat loss in winter and heat retention in summer
- Treating water as a valuable commodity by capturing rain and grey water

Additionally, with regards to the use of buildings and other assets, TTC should consider measures such as:

- Reviewing working patterns to accommodate changing weather conditions
- Enabling hybrid working, including the provision of online council committee meetings (as and when legislation allows)

TTC should also develop and put in place strong business continuity plans and risk assessments and mitigations, so that its operations can be maintained in emergency situations.

12.5: Working with others

As mentioned above, Thornbury is not isolated or alone in facing into and dealing with the climate crisis. To maximise the Town’s climate resilience, all possible resources should be leveraged. Opportunities to work with regional and national authorities to maximise Thornbury’s climate resilience should be sought. TTC should also seek out and collaborate with local business, residents, schools, and voluntary and non-profit organisations to promote, support and encourage climate resilience actions. These may include, but are not limited to:

- Emergency planning
- Flood planning

- Education
- Community energy schemes
- Local food growing
- Nature-based solutions to flooding, drought, etc.
- Sustainable commercial and domestic practices
- Biodiversity enhancement