LIGHTHOUSE
SCHOOLS PARTNERSHIP

Carbon Reduction Plan

Produced by Lighthouse Schools Partnership with support from Powerful Allies, Jenny Heath and Lauren Thomas

March 2022

Introduction

The Lighthouse Schools Partnership is a Trust of 24 schools, 21 primary schools and 3 secondary schools, across North Somerset and Bath and North East Somerset. At the Lighthouse Schools Partnership we are passionate about the environment and reducing the impact that we are having on the climate and our planet.

The Board of Trustees have set a target of being Carbon Neutral by 2035 and this Carbon Reduction Plan is designed to help us achieve this ambition. The Board of Trustees approved our plan on 23rd March and will monitor progress against our target and regularly review this plan.

Plans for decarbonisation must encompass reducing school-related emissions, as well as focusing on the reduction of the direct emissions from the Lighthouse Schools Partnership as an organisation. Education, energy, travel, partnerships, waste, and biodiversity are all key factors in the carbon reduction efforts of the Trust, and form an important part of our overall plan.

We want to support our pupils to be aware of and act on reducing their own carbon footprint. We will do this through education and incentives to act in an eco-friendly manner. Although not all actions in our plan directly reduce the greenhouse gas emissions for the Trust, they are all related to producing a carbon neutral environment and encouraging pupils, staff and our communities to reduce their impact on the environment and to increase awareness of the Climate crisis. As part of this, schools are creating individual action plans, so steps can be made towards our carbon neutral aim at a school level.

These individual plans will use the same set of goals as outlined within our overall plan. However, schools may take different paths towards the outcomes and may need different time scales. Plans will be monitored through regular discussions between schools and the Trust.

As well as this Trust wide plan there are also plans for each school/group of schools in the Trust. The plans for each school contain site plans and thermography reports to identify where heat is being lost from the buildings.

By the end of this academic year, all schools in the Trust will have established their own action plans to help them achieve carbon neutrality at a school level. These action plans will be owned by the whole school community – Governors, leaders, staff, environment team, pupils and any other interested parties. Individual school plans will be based on the Trust's Carbon Reduction Plan but contain more detailed plans that are specific to the school, and dates for achievement.

A Haysom

Adele Haysom
Chair of Board of Trustees

"At school and through education, we can raise awareness of the climate crisis and leave a legacy for future generations. The Lighthouse Schools Partnership is a leader in implementing these ideas, driven by the student body and passionate members of staff. Through our contribution to this plan, we have found that fighting climate change can be a positive and successful experience. "

Jenny Heath and Lauren Thomas
Ex students of Chew Valley School

LIGHTHOUSE SCHOOLS PARTNERSHIP

POWERFUL ALLIES
PREMIER GREEN ENERGY PARTNERS

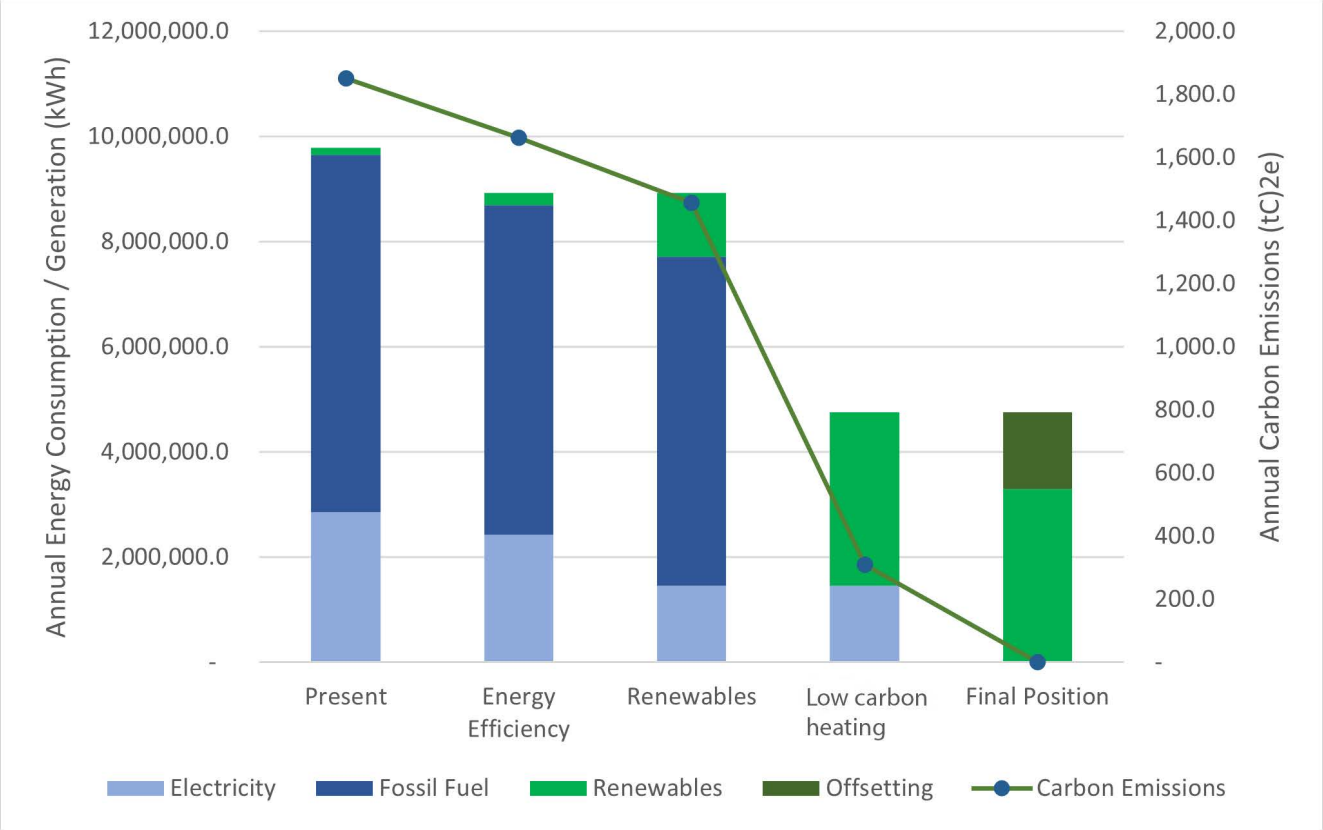
"We want to support our pupils to be aware of and act on reducing their own carbon footprint"

Contents

1. Executive Summary

Where are we now:

The chart below represents the potential carbon footprint for the Trust should we achieve the goals identified in this plan:



To help us to achieve our 2035 Carbon Neutral target we have established 6 carbon reduction target areas:

01 Education – pupils, staff and communities

02 Energy and Water

03 Partnership

04 Biodiversity

05 Travel and Transport

06 Waste and Recycling

Each of these areas are discussed in further details and this will inform the actions plans that the Trust and schools develop as a result of this plan.

Streamlined Energy and Carbon Reporting

Streamlined Energy and Carbon Reporting (SECR) was introduced in 2019. SECR requires obligated companies to report on their energy consumption and associated greenhouse gas emissions within their financial reporting for Companies House.

The SECR for the Lighthouse Schools Partnership for the last two years is provided below. Please note that the output for both these years were affected by COVID-19 and associated lockdowns. They are therefore not comparable with each other or previous or subsequent years.

	Baseline Reporting Year 2019-2020	Current Reporting Year 2020-2021
	UK GHG Emission and Energy Data	UK GHG Emission and Energy Data
Energy consumption used to calculate emissions (**kWh**); all mandatory energy sources are included.	8,312,194.6	9,673,275.2
Scope 1: Emissions from the combustion of Natural Gas (**tCO_2e**)	966.6	1,219.9
Scope 1: Emissions from combustion of other Fuels for heating and Transport(**tCO_2e**). (See evidence pack)	58.2	39.1
Scope 1: Emissions of Biomass Pellets (**tCO2e**)	NA	NA
Scope 3: Emissions from business travel in employee-owned vehicles, where the company repaid mileage claims (**tCO_2e**) (average vehicle / fuel source unknown)	7.4	0.9
Scope 2: Emissions from purchased Electricity (**tCO_2e**)	657.2	598.3
Total gross CO_2e based on above (tCO_2e)	1,689.5	1,858.3
Intensity Ratio: (**kg CO_2e**) gross based on mandatory fields above per pupil: **9,212 pupils**	183.4 kg CO_2e per Pupil (9,212 pupils)	196.6 kg CO_2e per Pupil (9,450 pupils)

2. What is Carbon Neutral?

Net-Zero carbon emissions mean that an activity releases net-zero carbon emissions into the atmosphere. Carbon neutral means that any CO2 released into the atmosphere from our activities is balanced by an equivalent amount being removed. This can be achieved by increasing the amount of trees and green spaces able to absorb some the remaining carbon released.

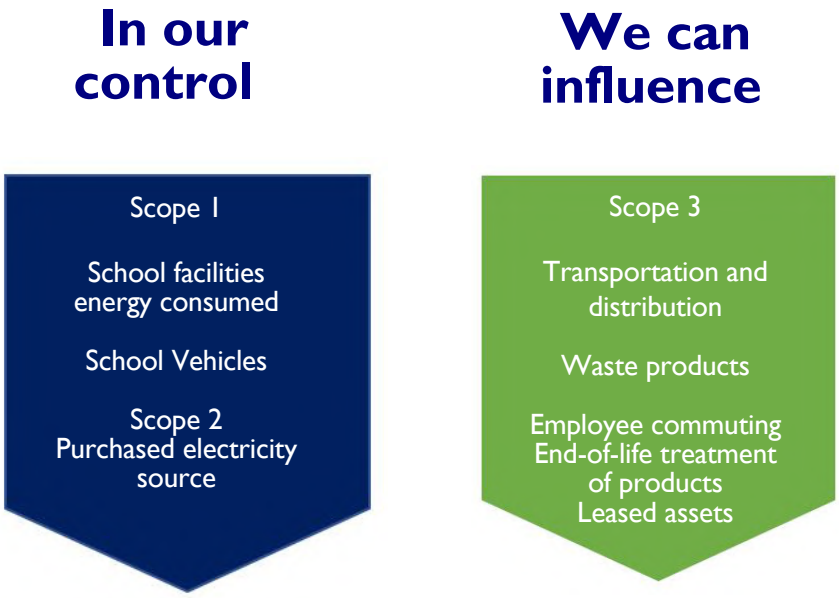
We are aiming to be Carbon Neutral by 2035

Emission Scope;
This term first appeared in the Green House Gas Protocol of 2001 and today, scopes are the basis for mandatory reporting in the UK.

Scope 1 — Covers the Green House Gas (GHG) emissions that we make directly — for example while running our boilers and cookers.

Scope 2 — These are the emissions that we make indirectly – like when the electricity or energy we buy for heating and cooking, is being produced for us to use.

Scope 3 — In this category go all the emissions associated, not with the Trust itself, but that we are indirectly responsible for, up and down our value chain. For example, from buying products from our suppliers.



3. Lighthouse Schools Partnership Carbon Analysis

Lighthouse Schools Partnership school building stock spans many periods of time, from Grade II listed buildings to more modern 'Low Carbon' teaching facilities. Many of the building are pre-1970s' before heat losses were fully understood.

We have a good understanding of the condition of our school buildings and their mechanical and electrical (M&E) infrastructure and have detailed condition surveys for all of our schools. The M&E infrastructure is maintained through a suite of Trust wide compliance contracts and prioritised for upgrade or replacement as part of a 5-year plan driven by our building condition and M&E surveys.

The Trust comprises of 56 buildings across the North Somerset and Bath and North East Somerset area, each with differing energy supplies, metering arrangements and electrical capacities. Most of the schools are heated by Natural Gas, with three sites utilising Gas Oil / Kerosene for heating and one which is all electric.

Our schools are open to their pupils and staff for 195 days per annum. In addition to this schools will be open at other times during the evenings, weekends and school holidays for use by their community and to enable other activities such as essential maintenance to be undertaken.

The Trust has been investing in projects that reduce our energy use and carbon emissions over recent years.

A map of our school estate is provided below:

This includes projects such as replacement windows and heating systems at Backwell Secondary School, Chew Valley Secondary School, Wraxall, Yatton and Blagdon Primary Schools. Further projects including windows and external building insulation at Gordano Secondary school have also been completed.

These projects, of approximately £3m in cost, have had significant beneficial impact for the schools in both environmental and financial terms. We are currently delivering a further roofing and window projects of approx. £1.2m and our 5-year estates development plan includes a further investment in projects that will reduce our carbon emissions of nearly £1.4m.

According to the London Energy Transformation Initiative (LETI) 'Net Zero Operational Carbon', for Low Energy Use by 2030 for a new school will be required to achieve a Display Energy Certificate Rating of 'B40' or better. This emphasises the importance of Building Fabric improvements, to minimise heating demand and reduce potential for overheating and subsequent cooling. At present only three building out of our 56 buildings achieve a rating better than or equal to a DEC B40, whilst two further buildings could potentially be improved to achieve this with minimal investment.

Some schools within the Trust already have onsite generation from Solar PV Arrays, and one school has its own wind turbine. There is scope to increase this significantly and this will be a key tool in reducing our carbon emissions.

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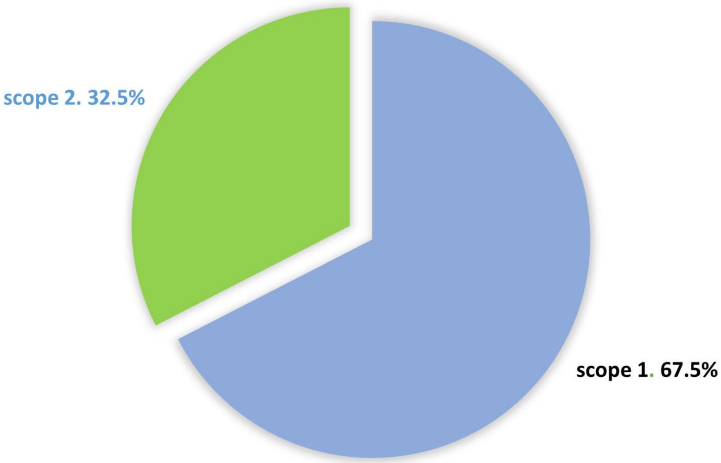


Chart 1 – Scope 1 and 2 Emissions 2020/21

The carbon emissions associated with each school are shown in the table below. The total Scope 1 and 2 emissions was 1,838.45 tCO2e (2020-21), the use of Fossil Fuels (Scope 1), contributed 67.5% and electricity (Scope 2) 32.5% of emissions attributable to energy consumption, although the Electricity was generated from Zero Carbon sources (The Lighthouse Schools Partnership procures only 100% Renewable Electricity from Zero Carbon Renewable sources, the grid supplied electricity, is certified as zero carbon).

The greatest proportion of emissions arise from fossil fuel use in heating, hot water, and catering.

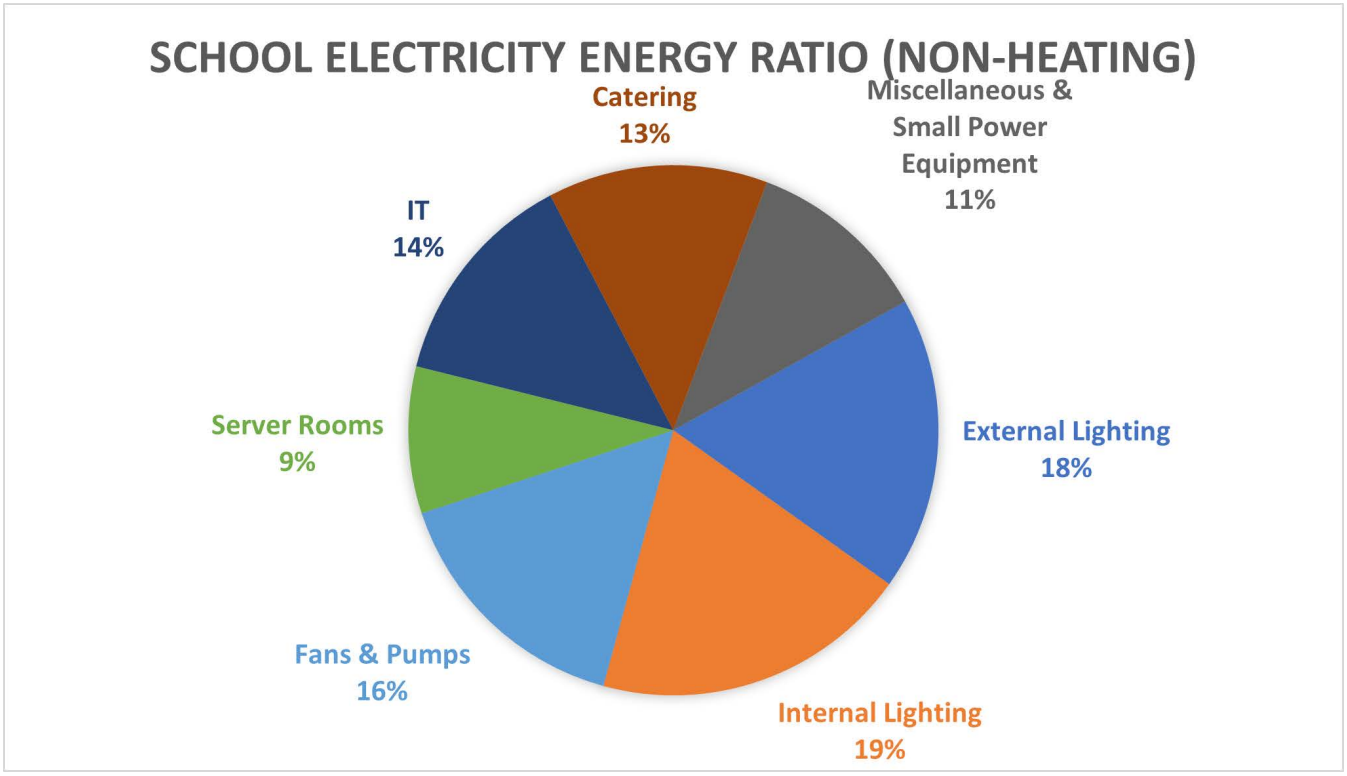
Building	Fuel Type	Carbon Emissions (tCO_2e)	Gross Internal floor area m2	Carbon Emissions (tCO_2e) per m2
Backwell C of E Junior School	Natural Gas	34.42	1,624	0.021
Backwell School	Natural Gas	406.90	16,230	0.025
Bishop Sutton Primary School	Natural Gas	32.65	1,616	0.020
Blagdon Primary School	Natural Gas	17.37	795	0.022
Chew Valley School	Natural Gas	247.85	12,493	0.020
East Harptree	Natural Gas	6.96	380	0.018
Flax Bourton Primary	Heating Oil	23.55	1,249	0.019
Gordano	Natural Gas	483.97	24,008	0.020
Grove Junior & Hannah More Infants	Natural Gas	70.28	2,725	0.026
High Down Infants & Junior	Natural Gas	129.44	4,044	0.032
Northleaze Primary	Natural Gas	22.66	1,395	0.016
Portishead Primary	Natural Gas	52.38	1,372	0.038
St Mary's Primary	Natural Gas	16.99	658	0.026
St Peter's Primary	Natural Gas	63.44	3,281	0.019
Stanton Drew Primary	Electricity	8.34	293	0.028
Ubley Primary	Heating Oil	8.53	512	0.017
West Leigh Infants	Natural Gas	29.23	999	0.029
Whitchurch Primary	Natural Gas	51.63	1,721	0.030
Winford Primary	Natural Gas	42.77	2,344	0.018
Wraxall Primary	Heating Oil	7.19	501	0.014
Yatton Infants & Juniors	Natural Gas	81.91	3,132	0.026
Total		**1,838.45**	**81,372**	**0.023**

Annual Building Energy consumption across all sites is outlined below, this is split between 36 Electricity, 35 Gas, and three Gas Oil / Burning Oil supplies:

Energy Source	Consumption (kWh)	Emissions (tCO_2e)	Benchmark	Actual
Electricity	2,851,931.3	605.6	40 kWh/m²/year	41.1 kWh/m²/year
Gas	6,660,395.3	1,219.9	150 kWh/m2/year	100 kWh/m2/year
Gas Oil/Burning Oil	140,272.2	35.5	150 kWh/m2/year	95.9 kWh/m2/year

Heating, hot water, and catering fossil fuels use accounting for 70.5% of total energy use.

The cost of Electricity, gas and oil amounted to just under £700k in the 2020-21 financial year across the Trust.



4. How we will become Carbon Neutral

1. Education – pupils, staff and communities

Education is a key aspect of fighting the climate crisis. Schools must aid pupils, staff, and the community firstly in understanding the climate crisis, and then in making sustainable choices in their school and lifestyle. Schools also play a key role in preparing students for future employment, and have a duty to consider the environment in this role. The education of pupils in the severity of the climate crisis and how they can fight it is vital to their future, and the future of the planet.

We make the following commitments in relation to education:

To improve the awareness of environmental issues amongst our pupils, staff, and communities

- We will include climate change education on all school curricula, so that pupils continue to learn about climate change throughout their school careers
- We will encourage all schools to include age-appropriate lessons about the science behind climate change in science and geography lessons in particular
- We will encourage schools to look for all opportunities to include climate crisis issues in the curriculum
- We will aim to choose a teacher education program for all Lighthouse schools to provide, e.g. UN EduCCate program, and investigate a means to fund this
- We will encourage all schools to provide teacher training related to climate change, and how to educate pupils on this important issue
- We will encourage teachers to consider ways in which the climate crisis can be incorporated into their curricula, even if their subject does not appear to be directly related to the climate crisis
- We will encourage all schools to hold awareness-raising events within the school on a regular basis, including assemblies, campaigns and other means of raising the profile of climate issues
- We will encourage schools to investigate opportunities for awareness raising within the wider community, such as providing supporting information to parents/carers, based on the curricula children follow within school

To enable our pupils, staff, and communities to have the knowledge and skills to be able to make informed decisions around living sustainably

- We will encourage climate change teaching to consider the measures that can be taken to tackle the climate crisis, both on an individual level and at a community/country/international level
- We will encourage schools to teach pupils about their responsibility to the planet when making lifestyle decisions
- We aim to enable all schools to provide education for teachers on measures they can take within or outside of school to be more environmentally friendly, and how they can encourage their students to take similar steps

- We will encourage schools to educate on and encourage climate-friendly behaviour around schools, e.g. encouraging people to turn the lights off, so that pupils can identify simple actions against the climate crisis
- We will encourage schools to support any education or measures within their school by providing information to those supporting pupils, so that the take-up of sustainable measures is increased

To prepare our pupils for employment in the green sector, or to support sustainability within their employment

- We will encourage all schools that provide career fairs to include green/environmental sector companies within their fairs where possible, and to ask all represented parties to talk to students about what their business is doing for the planet
- We aim to educate pupils about the possibility of careers in the green sector when considering future pathways that pupils may take after school
- We will encourage schools to teach about the importance of careers in the environmental sector as part of climate change education
- We aim to hold awareness raising events for both pupils and staff about how sustainability can be supported within employment, for staff to take action now and pupils to take actions in their future jobs

To facilitate opportunities for pupils, staff, and communities to engage and contribute to the environmental and sustainability aspirations of the Trust and wider community

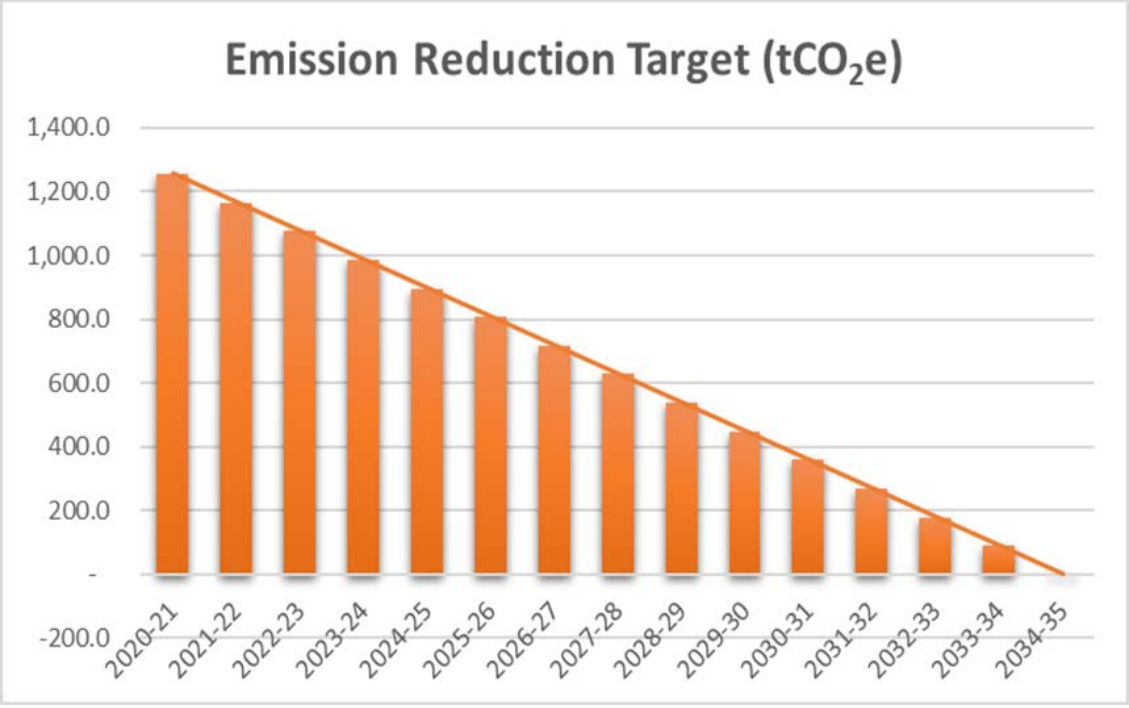
- We aim that all schools will have a climate representative, and the Trust will aim to facilitate the cooperation of climate representatives across the schools
- The Trust will aim to utilise this network of climate representatives when making decisions about the sustainability and environmental aspirations of the Trust
- All pupils will be encouraged to support their school climate representative in whatever way is most appropriate for the school
- The Trust will encourage the formation of pupil groups to tackle climate issues within schools, and aim to provide information for schools to facilitate this
- The Trust will aim to facilitate events to encourage pupils' cooperation across the Trust on climate issues
- We aim to provide a platform where students and teachers can share ideas and experience related to the climate crisis and their experience within schools, to allow best practice to be followed across the Trust
- We will encourage regular consultations between schools, pupils, staff, and community with regards to school carbon reduction plans, to ensure that all views are considered
- We will encourage the publication of environmental outcomes both at a school and at a Trust level, so that these can be scrutinised by all interested parties
- We will encourage schools to communicate all steps that they are taking against the climate crisis to staff, pupils, and the wider community. This will provide an example for others to follow, and allow engagement in this process on a wider basis

2. Energy and Water

Reducing energy usage is the quickest way to directly reduce school emissions, and therefore is key in achieving our goal of carbon neutrality by 2035. This will include measures taken by individuals to save energy within school, as well as a range of fabric improvements. In addition, the production of clean water is energy intensive, as is the treatment of dirty water, and so reducing water usage within schools is also a key factor in reducing indirect school energy usage. Monitoring energy and water usage will be important in determining the success of any measures taken.

Powerful Allies, our energy partner, were invited to carry out a review of our school estate and produce a carbon reduction plan.

Overview
This section of the plan is primarily focused on the decarbonisation of the school estate to meet the 2035 carbon neutral target that we have set. To achieve this we will need to reduce Greenhouse Gas Emissions by at least Seven Percent per year, based on 2020/21 building fuel usage of Natural Gas and Heating Oils, as illustrated below:



The minimum annual reduction targets included above cannot be met by efficiency measures alone and will require improvements to Building Fabric, Heating, Ventilation, Controls, Waste Heat Recovery, Pipework Insulation, Fuel Switching, Behavioural Change, Low Carbon Heating and Renewable Technologies, if fossil fuel use is to be eliminated.

There are 5 key strands to the energy and water elements of our carbon reduction plan:

a) Fuel switching from the use of fossil fuels

b) Improve the fabric of our school buildings to waste less energy

c) Introduce energy and water conservation measures

d) Increased onsite generation of zero carbon electricity

e) Ensure that any residual energy purchased is from 100% REGO Backed Renewable Zero Carbon Generation

Fuel switching will increase demand on the electricity infrastructure and potential operating cost, hence, there needs to be a notable reduction in demand for electricity, which can be achieved through energy conservation measures, increased onsite generation of zero carbon electricity and optimisation of buildings, to ensure they operate as efficiently as possible.

Current annual Building Energy consumption across all sites is outlined below, this is split between 36 Electricity, 35 Gas, and three Gas Oil / Burning Oil supplies:

Energy Source	Consumption (kWh)	Emissions (tCO_2e)	Benchmark	Actual
Electricity	2,851,931.3	605.6	40 kWh/m^2/year	41.1 kWh/m^2/year
Gas	6,660,395.3	1,219.9	150 kWh/m2/year	100 kWh/m2/year
Gas Oil/Burning Oil	140,272.2	35.5	150 kWh/m2/year	95.9 kWh/m2/year

There is scope to reduce carbon, consumption and cost, with heating, hot water, and catering fossil fuels which account for 70.5% of total energy use. Total Carbon dioxide emissions using DEFRA 2021 Conversions, is 1,861 tCO2e, with 67.5% of emissions associated with heating, hot water, and catering. The remaining 32.5% is associated with electricity use. The contracted electricity is from 100% Renewable Energy Generation, to minimise the environmental impact of school operations.

Energy benchmarking data is provided in technical Appendix A.

We have recently secured funding through the Public Sector Decarbonisation Scheme for some decarbonisation work to be implemented during 2022, the estimated Annual Carbon Savings are 122 tCO2e. Details of the scheme are provided in technical appendix B.

Decarbonising, by transitioning to a low carbon heating solution, will be technically challenging and cost prohibitive in some of the Trust's buildings. Whilst these buildings may produce greater emissions of carbon dioxide equivalent (CO2e), continued advancements in technology and wider adoption, should reduce the cost of the technology and energy use. Developments in Green Hydrogen ready boilers and increased availability of Biomethane 'Renewable Gas', (which has almost one-thousandth of the embedded CO2e of Natural Gas) distributed through a piped network, would significantly reduce emissions of CO2e, whilst utilising the existing infrastructure with significantly lower investment. The cost of Renewable Gas is around 35% higher than Natural Gas, so heating efficiencies need to be achieved to minimise operating costs. Retrospectively improving building fabric, upgrading heating technology and infrastructure are cost intensive, whilst yielding only modest cost-savings, due to the relatively low cost of gas, but are essential in significantly reducing emissions of CO2e and future energy costs associated with the electrification of heating buildings.

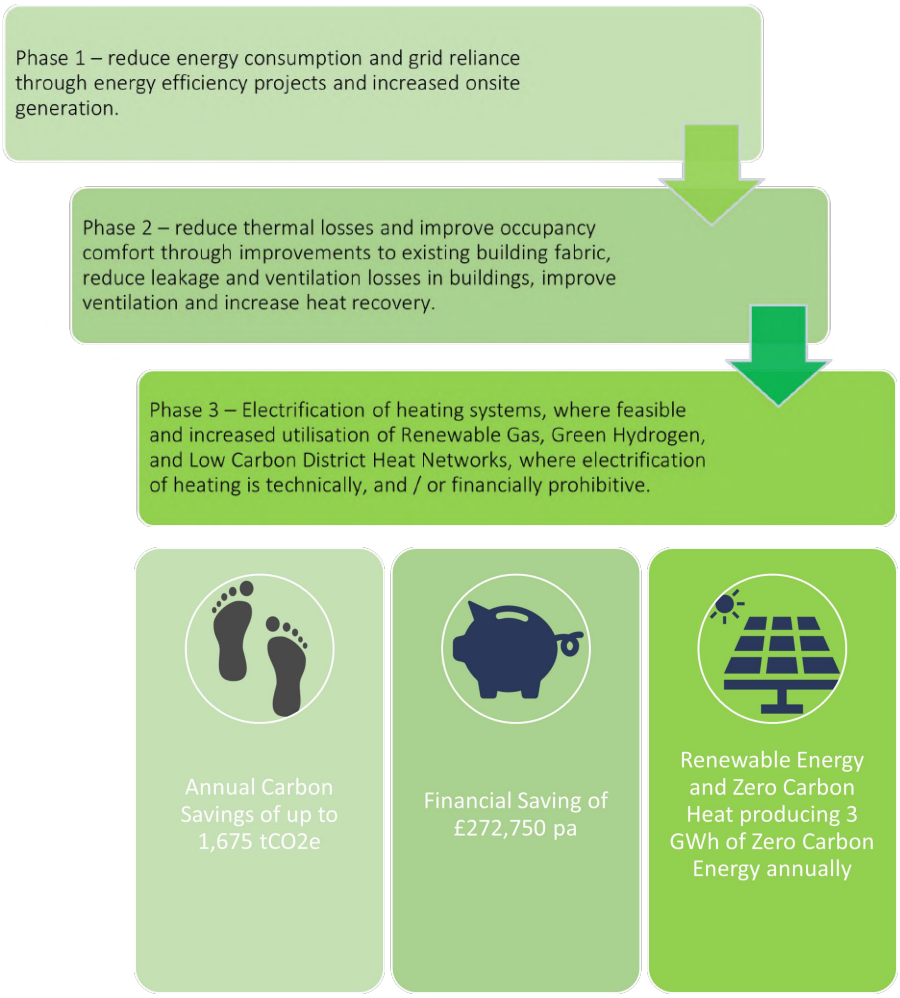
The cost difference between Natural Gas and Electricity is around 6:1, so switching from a Natural Gas Fired Boiler to an Electric alternative, would cost around five-times more to operate, as gas boilers are less efficient than electric. Therefore, any plans to decarbonise the school estates heating, must first look to reduce thermal demand, through building fabric improvements enabling the buildings to operate at reduced system temperatures and the recovery of heat generated.

In addition to reducing thermal demands, switching to electrically generated heating, will require reductions in electricity demand for non-heating services. Increased electrical demand from the heating may also require increasing electrical capacity to the schools. Additional Electrical Capacity can be difficult to achieve, whether schools are in rural or densely populated areas, due to limited available capacity from the grid, and this needs to be considered at an early stage.

Achieving our carbon neutral goal by 2035 would require 40% of electricity to be generated from onsite renewables The funding achieved by the Trust through the Public Sector Decarbonisation Scheme includes provision of further Solar PV, increasing the total installed renewable electricity to around 9% - 10% of the 40% required for the Decarbonisation Plan outlined in the chart above.

Increased generation from Solar PV to reduce the grid imported electricity, should be tempered to avoid over investment, as schools are generally closed during peak generation months. The shoulder months Spring and Autumn would reap the benefit of Solar PV, whilst Winter generation is lower than any other period. Battery storage solutions may provide an opportunity to harness generation and to offset normal weekday consumption. Batteries would also offer schools the opportunity to reduce their electricity cost by regenerating the batteries at night, on a lower electricity tariff, and utlilising the electricity during the day. Schools could also potentially earn revenue from the batteries, as more renewable energy generation is added to the grid, the National Grid will often pay for excess energy that can be put back into the electricity network. As well as supporting a transition to a low carbon electricity network, battery storage will also protect schools from power outages. Wind Turbines may also present opportunities where suitable sites can be identified.

Decarbonisation needs to be undertaken in a phased and targeted manner:



We make the following commitments in relation to Energy and Water:

- Upgrade remaining energy meters to smart meters
- We will encourage all schools to monitor their energy usage levels so that the effect of any measures taken can be evaluated, and any areas for improvement identified
    - Introduce Energy Sparks in all schools. Energy Sparks is an online energy analysis tool and energy education programme specifically designed to help schools reduce their electricity and gas usage through the analysis of smart meter data. This information is publicly available and open to scrutiny by all stakeholders. Energy Sparks is a registered charity working for the public benefit.
    - We will encourage all schools to hold awareness campaigns to remind staff and pupils to switch off electrics when not in use – such as projectors and computers
    - We will encourage schools to work with IT departments to reduce unnecessary usage of electric equipment, and investigate means to increase efficiency in the usage of such equipment
    - We will encourage schools to work with IT departments to consider when computers and other technology are needed, and to reduce the time they are switched on to this period
    - Where new equipment is brought, we will encourage schools to buy energy efficient equipment that wastes less energy where this is financially feasible
    - We will encourage schools to dispose of IT equipment sustainably
- We will aim to reduce the energy needed for lighting across the Trust, through awareness raising and where possible, new lightbulbs/technology
    - We aim to replace all lightbulbs with LED bulbs, and investigate into grants and means of funding for this process
    - Where feasible, lighting should be on automatic switches, so that unnecessary energy is not wasted by having lights on when they are not needed
    - We will encourage all schools to run awareness raising campaigns to encourage staff and pupils to switch lights off when they are not needed, i.e., if the room is empty, or if there is enough natural light
- To replace fossil fuel boilers with low carbon alternatives. Where this is technically challenging or cost prohibitive, to replace with green hydrogen ready boilers.
- We will work with schools to investigate opportunities to generate their own power through solar panels, small hydropower stations and wind turbines, where appropriate
- Target uncommitted resources from SCA funding, once health and safety and the most pressing and condition issues have been funded, to enable building fabric improvements. It is estimated that reducing the internal temperature setting by as little as 1 degree Celsius, could reduce fossil fuel consumption by 8% per year, and further increasing the role out of LED lighting could yield electricity savings of approximately 11% per year.
- We will encourage schools to hold awareness campaigns around heating, educating staff and pupils on keeping windows and doors shut to minimise heat loss and other measures that will reduce energy loss from buildings

3. Partnership

Under the heading of partnership, we consider how we will work with a range of organisations to help to achieve our carbon reduction plans for example suppliers, providers and contractors, Local Authorities, Church and Diocese, business partners, community organisations and other education providers etc.

We make the following commitments in relation to our partnership working:

- We will ensure that carbon reduction is a key consideration in our procurement and contract management and will evaluate if the approach of prospective partners is in alignment with our sustainable values
- We will encourage our partners to establish their own environmental policies and carbon reduction targets
- We will encourage our partners to support our carbon reduction goals and we will share our plans as set out in this document

We have a vibrant business partnership scheme called LSP Partners. We are already working actively with our business partners to support carbon reduction. In November, we held a climate focused business breakfast where we shared our ambitions with our business community and asked for their engagement and support.

4. Biodiversity

We make the following commitments in relation to Biodiversity:

- Encourage the inclusion of biodiversity considerations in all decision making about the use of a school site:
    - This means taking biodiversity and habitats into consideration before any new building/ construction plans are put in place.
- Establish clear policies and procedures which provide clear expectations for staff and pupils in respect of biodiversity:
- The goal is to achieve respect for wildlife and plants on the school property from staff and students. This will encourage biodiversity to continue without any inhibitions.
- Improve staff and student awareness and engagement with biodiversity issues via embedding biodiversity issues and considerations within the school e.g. a tree's role in reducing carbon dioxide and their importance in reducing the schools carbon footprint.
- Engage staff and students in biodiversity and environmental awareness activities
- Utilising school grounds for biodiversity projects:
    - This means promoting the development and (where possible) restoration of wild and natural habitats across school grounds.
    - Introducing and enhancing wildflower areas where possible with species that are appropriate for local conditions and not invasive.
    - Facilitating opportunities for natural habitat creation i.e. if a tree has fallen in a space that is not harming school grounds, leaving it to become a habitat.

5. Travel and Transport

We make the following commitments in relation to travel and transport:

Monitoring and education

- We will conduct regular surveys into school transport and travel arrangements (to include staff and pupil travel to school, as well as school trip transport) to ensure that progress is being achieved, and identify areas for further improvement
- We aim to increase the knowledge and awareness of pupils, parents/carers and staff on the environmental impact of different modes of transport/travel
- We aim to increase the knowledge and awareness of pupils, parents/carers and staff on the importance of transport/travel to the climate crisis

Home to School transport

- We will investigate and utilise grants opportunities to support sixth form students to access public transport for home to school transport
- We will work with Local Authorities to maximise the occupancy on home to school transport vehicles
- We will work with Local Authorities and transport providers to improve their understanding of the importance to the environment and school air quality e.g. that bus enginesremain switched off when not in use
- We will engage with Local Authorities and transport providers to encourage their coaches to be as eco-friendly and efficient as possible
- We will engage with Local Authorities and transport providers to encourage them to develop carbon reduction and offsetting plans e.g. carbon neutral petrol schemes

Pupil transport

- We will investigate funding opportunities to develop bicycle facilities (storage for bikes and equipment) to ensure that it is freely and easily available to all pupils
- We will provide information to all pupils on the benefits of walking/cycling to school, and incentivise where possible
- We will work with Local Authorities to investigate and encourage means to help pupils walk/cycle to school safely e.g. providing more pavements and 20 mph speed limits around all schools etc.
- We will investigate funding opportunities for all primary schools to provide Bikeability courses, or similar, to ensure that children have the necessary skills to cycle to school
- We will encourage car-sharing amongst pupils through education of pupils and parents/carers on the associated economic and environmental benefits

Staff transport

- We aim to increase the knowledge and awareness of staff on the possibilities for car-sharing, and consider incentives to encourage car-sharing where possible
- We will educate and encourage staff to cycle/walk to school where possible, and investigate funding opportunities to improve bicycle facilities
- We will encourage the take up of the salary sacrifice scheme for bicycles and to introduce a salary sacrifice scheme for electric cars

Facilities

- We will investigate funding opportunities so that every school can provide an electric vehicle charging point by 2035, and encourage their use by staff
- We will investigate funding opportunities to develop bicycle facilities (storage for bikes and equipment)

School trips

- We will develop a set of guidelines that schools can adopt and adapt to make school trips as eco-friendly as possible
- We will encourage school trips to take place as close to school as possible to minimise travel emissions
- We will encourage school trips to take place by foot or public transport where feasible
- We will avoid flying for school trips unless absolutely necessary

Business meetings

- We will undertake business meetings via video call where possible to reduce transport emissions
- Where possible we will undertake business meetings within walking/cycling distance
- Where staff must drive to a meeting, car sharing will be encouraged to minimise the number of trips taking place
- We will review the staff expenses policy to incorporate alternative methods of transport such as electric cars/bicycles, to incentivise car sharing for business travel and to reflect the introduction of local clean air zones.

Waste and Recycling

- To gather data outlining the current waste output from schools. This could be completed via weighing amounts of waste in different bins. The data will include:
    - The amount of organic food waste produced by each school in an average week with data including the source of the most food waste (preparation, production or plate) and amount of catered pupils having hot meals
    - The amount of plastic/ non recyclable waste produced per week
    - The amount of printing produced per week
    - The amount of recycling produced per week

- Using the waste data, we will devise services and practices which will be effective in reducing waste. We anticipate the following key areas of waste will feature in the data and can make the following commitments in anticipation:

Paper

- Decrease amount of printing e.g. avoiding print off worksheets. Instead, promoting the use of digital alternatives to print, including making use of digital documents, email and PowerPoint presentations instead.
- Making appropriate use of workbooks. This includes effectively using all the space in the workbooks and not having students start a new page when space is still available on the previous page.

Food Waste

- Reducing the amount of food being thrown out at the end of the day via the waste data collected surrounding the amount of students wanting catered food.
- Potentially creating events/ competition surrounding zero waste. This could include students with the least food waste being rewarded.
- Expand the practice, already used in some schools, to work with other organisation to recycle food water into other useful products such as energy or fertiliser.

Plastics

- Reduce and ultimately remove disposable plastics bottles in catering operations/ vending machines in favour of water fountains for reusable water bottles - reducing the environmental impact of plastic bottles that are used.
- Working with the Trust's catering provider(s) to reduce, and ultimately remove, disposable plastic (even if biodegradable) in pre-packaged food in favour of reusable Tupperware or compostable materials such as cardboards or beeswax.

Implement initiatives to reuse products that pupils or staff no longer use. This includes:

- Creating a space in which textbooks can be donated by older pupils (who are no longer using/ have left school etc) to younger pupils/ pupils in need of textbooks.
- Creating a space in which old uniform can be donated.
- Creating a space in which outdoor pursuits clothing can be donated to be used by pupils e.g. those partaking in DofE or Ten tors, etc.

Create sustainable plans to dispose of school equipment. This includes:

- Cooperating with businesses to dispose of IT equipment sustainably.
- Increasing the amount of recycling bins on school sites. These bins should be clearly labelled and monitored in order to ensure they are being used to their full potential.

Put in place initiatives to raise awareness for reducing and recycling waste within the school such as:

- Holding awareness raising events for the reuse of items, for example: holding a clothes swap.
- Holding zero waste competitions to raise awareness for recycling.
- Not using posters and printouts in order to raise awareness, instead try holding assemblies outlining the danger of plastics and waste in relation to climate change.
- Implementing food labelling on packaged food. This raises awareness for the amount of carbon used to produce food products.
- Communicating the overall approach through a clear marketing campaign on an ongoing basis. All the above will need to be achieved by working with, and delivered by, school staff.

Achieving our target of being carbon neutral by 2035 will be an exciting yet challenging journey. Some of the key challenges that we anticipate are detailed below:

- Infrastructure – power capacity for additional electrification, the availability of district heating networks, the availability of low carbon hydrogen (Government ambition to produce 5GW by 2030)
- Resources – identifying the necessary funding to implement carbon reduction projects such as building fabric improvements and low carbon heating alternatives such as heat pumps
- Planning restrictions – e.g. conservation areas, listed building status

5. Energy Action Plan

Action Plans

High level energy related opportunities, listed below, are prioritised according to simple payback calculations. Action plans at school level will continue to be developed with engagement from the whole school community. Once complete, these actions plans will be consolidated at a Trust level to ensure that they can be implemented as effectively as possible. This will enable us to establish a detailed implementation plan with resources and timescales allocated. We will be able to commission Trust wide design, procurement, project and contract management as well as supporting schools with their individual initiatives. Consolidating action plans will also provide an opportunity to share good ideas and innovative practice. The process will be managed by the Trust's Chief Financial and Operating Officer, sponsored by the Chair of the Trust's Audit and Risk Committee and supported by an appropriate project team. Whilst our progress will be monitored by the Board of Trustees, our pupils and communities will also be able to monitor our progress through regular updates and through our use of Energy Sparks.

Priority	Opportunity	Potential Annual Savings (pa)		Estimated Capital Cost £	Estimated Savings £ (pa)
		tCO_2	kWh		
1	Complete LED Lighting Upgrades	66.6	313,712	175,679	50,194
2	Increase Visibility of Energy Consumption	49.9	260,671	7,125	14,753
3	Building Fabric Improvements	171.9	938,492	523,202	23,462
4	Improved Controls	33.2	173,781	85114	10,912
5	Increase Renewable Energy Generation	206.6	972,976	1,130,000	155,676
6	Increase Use of Renewable Gas	765	0	0	(36,000)
7	Heat Pumps	382.0	2,085,538	1,152,260	52,138
	Total	**1,675**	**4,745,170**	**3,067,622**	**272,750**

6. Technical Appendices

Appendix A. Energy benchmarking data

School	Electric Benchmark	Electric Actual	Heating Benchmark	Heating Actual	Metering	Sub-Metering	Heating Fuel	Electrical Capacity	Comments
Backwell Juniors	40	29.82	139.69	80.62	Yes	NA	Gas	51kVA	
Backwell The Arc	40	39.81	139.43	149.57	No	Required	Gas	484kVA	whole site supply
Backwell Sixth Form Centre	40	66.48	153.49	0	Yes	Yes	Electric (Air-to-Air)	349kVA	
Backwell Main Block	40	39.81	139.43	149.57	No	Required	Gas	484kVA	whole site supply
Backwell Lower School	40	48	145	86	Yes	Required	Gas	484kVA	whole site supply
Backwell Art Block	40	39.81	139.43	149.57	No	Required	Gas	484kVA	whole site supply
Backwell Sports Hall	95	46	321	113	No	Required	Gas	484kVA	whole site supply
Backwell Science Block	40	46	146	124	No	Required	Gas	484kVA	whole site supply
Backwell Mendip and Quantock House	40	46	146	124	No	Required	Gas	484kVA	whole site supply
Backwell History Block	40	46	146	124	No	Required	Gas	484kVA	whole site supply
Backwell Sedgemore and Cotswold House	40	46	146	124	No	Required	Gas	484kVA	whole site supply
Backwell Business Studies	40	46	146	124	No	Required	Gas	484kVA	whole site supply
Bishop Sutton Primary School	40	38.28	153.4	100.78	Yes	NA	Gas	69kVA	

School	Electric Benchmark	Electric Actual	Heating Benchmark	Heating Actual	Metering	Sub-Metering	Heating Fuel	Electrical Capacity	Comments
Blagdon Primary School					Yes	5No. Electricity Supplies	Gas		
Chew Valley Music	40	39	146	55	Gas Only	Required	Gas	414kVA	whole site supply
Chew Valley Food Tech	40	39	146	56	Gas Only	Required	Gas	414kVA	whole site supply
Chew Valley L Block	40	28.88	153.4	122.07	Gas Only	Required	Gas	414kVA	whole site supply
Chew Valley Sports Hall	95	28.89	337.53	50.41	Gas Only	Required	Gas	414kVA	whole site supply
Chew Valley M Block	40	28.87	153.4	91.21	Gas Only	Required	Gas	414kVA	whole site supply
Chew Valley English Block	40	28.88	153.4	81.58	Gas Only	Required	Gas	414kVA	whole site supply
Chew Valley Children's Centre					Gas Only	Required	Gas	414kVA	whole site supply
Chew Valley Art Block	40	28.87	153.4	73.59	Gas Only	Required	Gas	414kVA	whole site supply
Chew Valley Humanities	40	42	141	19	Gas Only	Required	Gas	414kVA	whole site supply
Chew Valley Design Tech	40	42	141	50	Gas Only	Required	Gas	414kVA	whole site supply
East Harptree C of E Primary School	40	84	141	181	Yes	2No. Electricity Supplies	Gas	2 x 69kVA	
Flax Bourton Primary School	40	56	143	70	Yes	Oil / Heat Required	Oil	150kVA	

School	Electric Benchmark	Electric Actual	Heating Benchmark	Heating Actual	Metering	Sub-Metering	Heating Fuel	Electrical Capacity	Comments
Gordano Old Sports Hall	95	40	317	59	No	Required	Gas	700kVa	whole site supply
Gordano Social & Dining Building	40	40	144	159	No	Required	Gas	700kVa	whole site supply
Gordano Maths Block	40	40	144	159	No	Required	Gas	700kVa	whole site supply
Gordano Science Block	40	40	144	159	No	Required	Gas	700kVa	whole site supply
Gordano Drama, Music & Arts	40	40	144	159	No	Required	Gas	700kVa	whole site supply
Gordano Assembly Hall & Admin Block	40	40	144	59	No	Required	Gas	700kVa	whole site supply
Gordano Main Block	40	40	144	59	No	Required	Gas	700kVa	whole site supply
Gordano Sports Hall	95	40	317	59	No	Required	Gas	700kVa	whole site supply
Gordano English	40	40	144	59	No	Required	Gas	700kVa	whole site supply
Gordano Sixth Form	40	40	144	59	No	Required	Gas	700kVa	whole site supply
Grove Junior School	40	57.6	153.4	138.36	Yes	2No. Electricity Supplies	Gas		
Hannah More County Infant School	40	20.95	153.4	117.19	Yes	2No. Electricity Supplies	Gas		
High Down Infant School	40	37	140	135	Yes	Required	Gas	140kVA	whole site supply

School	Electric Benchmark	Electric Actual	Heating Benchmark	Heating Actual	Metering	Sub-Metering	Heating Fuel	Electrical Capacity	Comments
High Down Jnr Main Block	40	54	152	109	Gas Only	Required	Gas	140kVA	whole site supply
High Down Jnr A Block	40	37	140	135	Gas Only	Required	Gas	140kVA	whole site supply
High Down Junior School	40	37	140	135	Gas Only	Required	Gas	140kVA	whole site supply
High Down Jnr Blocks 3R 3L & 4D 4F	40	37	140	135	Gas Only	Required	Gas	140kVA	whole site supply
Northleaze Primary School	40	28.68	153.4	49.85	Yes	NA	Gas	45kVA	
Portishead Primary School	40	41.68	153.4	94.42	Yes	Required for Demountable	Gas	75kVA	
Whitchurch Primary School Main	47	33	159	12	Yes	Yes (Gas) not monitored	Gas		
New 4 Classroom Block					Electric Only	Yes (Gas) not monitored	Gas		
Ubley School	40	49	142	44	Yes	Oil / Heat Required	Oil		
Stanton Drew Primary School					Yes	Required for Demountable	Electric (Storage)	70kVA	
St. Mary's C of E Primary School	40	63.06	153.97	68.82	Yes	NA	Gas		
St. Peters C of E Primary School					Yes	NA	Gas	69kVA	
St. Peters C of E Primary School					Yes	NA	Electric (Air-to-Water)	110kVA	MD 44kVA

School	Electric Benchmark	Electric Actual	Heating Benchmark	Heating Actual	Metering	Sub-Metering	Heating Fuel	Electrical Capacity	Comments
West Leigh County Infant School	40	37.77	153.4	97.17	Yes	NA	Gas		
Winford Primary School	40	36.19	147.58	81.41	Yes	NA	Gas	50kVA	
Wraxall Church School	40	51	142	44	Yes	Oil / Heat Required	Oil		
Yatton Infant & Jnr School	40	47.05	153.4	99.52	Yes	NA	Gas		

The above table highlights some schools which exceed the Electricity Benchmark for the type of building, whilst the same buildings are generally much lower than benchmark for heating. During the physical inspections of the building, it was apparent this is partly due to the increased use of portable heaters. The use of portable electric heaters and lack of building energy data, due to multiple buildings, being supplied from a single electricity connection, is potentially masking the worst performing buildings and there is a risk of over investment in buildings which may be more energy efficient than assumed, due to the apportionment of energy by building, based on Gross Internal Area (GIA).

As such it is recommended that buildings be individually monitored to provide greater granularity of energy consumption, resulting in more accurate Display Energy Certificates, but also reducing the risk of investing in the wrong areas. Additionally, there needs to be a greater understanding of why portable electric heaters are being used, as the use of the heaters increases electrical loads on the building, which may result in oversizing of new supplies, due to the demand being skewed by the additional loads from supplementary heating. There is also a risk that newly installed Low Carbon Heating systems, may not resolve the primary reason of why supplementary heating is being utilised.

Research has not identified any planned District Heating Schemes / local Heat Networks, which the schools may be able to access as Low Carbon Heating solutions.

Technical Appendix B – Public Sector Decarbonisation Scheme – Project details

Lighthouse School Partnership have successfully won a bid for funding for the decarbonisation of heating for eight of the trust school, these are:

1. Chew Valley
2. Bishop Sutton
3. Blagdon
4. East Harptree
5. High Down Infants
6. St Mary's CEVA
7. St Peter's
8. West Leigh

The Public Sector Decarbonisation of Heating Scheme requires that school buildings with fossil fuel boilers at the end of their serviceable life, which have been identified as requiring imminent replacement with a Low Carbon Heat Pump.

Heat Pumps operate on electricity rather than fossil fuels, such as Natural Gas, Oil or LPG and produce zero emissions in operation. The deployment of Heat Pumps are as key, if we are to reduce global warming and climate change, by reducing our reliance on fossil fuels and the emissions of carbon dioxide and other greenhouse gasses attributable to the combustion of fossil fuels for heating.

As such, funding has been allocated under the Public Sector Decarbonisation Scheme for the boilers at the above schools are to be replaced with Heat Pumps and to reduce operating costs, solar photovoltaic panels (Solar PV), or fabric improvements are also to be included.

Chew Valley School

Chew Valley School has a Solar PV Array and benefits from the Feed-in-Tariff (FiT), therefor no additional Solar PV can be installed at Chew Valley without losing the financial benefit provided by the FiT.

As operating costs from Air Source Heat Pumps can be more expensive than generating heat from natural gasheaters, it is proposed that packaged Air Handling Unit Air Source Heat Pumps, with Heat Recovery are installed. The system performance of these types of systems are significantly higher than those from other forms of Air Source Heat Pumps, and do not require radiators or underfloor heating to be used for the distribution of heat. These systems provide clean fresh air via ductwork into the teaching space, as the three buildings Food Tech, Design and Technology and the Admin Block (M-Block) currently use warm air heating, this has been identified as a suitable replacement system.

To further reduce operating cost of the replacement heating systems, given that no further Solar PV can be installed, funding is to include the roofs of these three buildings / zones to be upgraded with significantly improved insulation, reducing heat losses. The roofing is planned to be upgraded on the two-storey section of M-Block, Food Tech, and Design.

1. Chew Valley – Food Tech, Air Source AHU c/w Recuperator or AIR-TO-AIR Heat Pump with Fan Coils (79,500), new roof 323m2 / £62,985, total £142,484
2. Chew Valley – CDT, Air Source AHU c/w Recuperator or AIR-TO-AIR Heat Pump with Fan Coils (79,500), new roof 686m2 / £133,770, total £213,270
3. Chew Valley – M-Block (2-storey section only), Air Source AHU c/w Recuperator or AIR-TO-AIR Heat Pump with Fan Coils (79,500), new roof 297m2 / £57,915, total £137,415

Bishop Sutton School

Bishop Sutton is to be converted to Air Source Heat Pump(s) from the existing boiler plant, this will increase electricity spend at the school, but remove the cost of heating from gas. Balancing the additional cost of electricity with the saving from the use of natural gas, will be supported by a Solar PV array which will reduce year-round electricity demand, although higher winter electricity bills will be a consequence of the switch to electric heating. This represents an investment cost of around £114,100, Low Carbon Heat Pumps £106,100 and 8kWp Solar PV circa £8,000, unfortunately given the multiple awkward roof areas more Solar PV is unlikely to fit.

Blagdon School

Blagdon is to be converted to Air Source Heat Pump(s) from the existing boiler plant, this will increase electricity spend at the school, but remove the cost of heating from gas. Balancing the additional cost of electricity with the saving from the use of natural gas, will be supported by a Solar PV array which will reduce year-round electricity demand, although higher winter electricity bills will be a consequence of the switch to electric heating. This represents an investment cost of around £73,600, Low Carbon Heat Pumps £63,600 and 10kWp Solar PV circa £10,000.

East Harptree School

East Harptree is to be converted to Air Source Heat Pump(s) from the existing boiler plant, this will increase electricity spend at the school, but remove the cost of heating from gas. Balancing the additional cost of electricity with the saving from the use of natural gas, will be supported by a Solar PV array which will reduce year-round electricity demand, although higher winter electricity bills will be a consequence of the switch to electric heating, the overall cost of electricity should be lower than Stanton Drew, which is a comparable building. . This represents an investment cost of around £100,100, Low Carbon Heat Pumps £90,100 and 10kWp Solar PV circa £10,000.

High Down Infants School

High Down Infants is to be converted to Air Source Heat Pump(s) from the existing boiler plant and connected to the existing heating system as these are convector fan radiators, this will increase electricity spend at the school, but remove the cost of heating from gas. Balancing the additional cost of electricity with the saving from the use of natural gas, will be supported by an additional 45kWp Solar PV array producing around 43,000 kWh of zero carbon electricity per year, reducing year-round electricity demand, although higher winter electricity bills will be a consequence of the switch to electric heating. This represents an investment cost of around £251,700, Low Carbon Heat Pumps £206,700 and 45kWp Solar PV circa £45,000.

St Mary's School

St Mary's CEVA is to be converted to Air Source Heat Pump(s) from the existing boiler, this will increase electricity spend at the school, but remove the cost of heating from gas. Balancing the additional cost of electricity with the saving from the use of natural gas, will be supported by a 15 kWp Solar PV array, which will reduce year-round electricity demand, although higher winter electricity bills will be a consequence of the switch to electric heating. This represents an investment cost of around £105,100, Low Carbon Heat Pump £90,100 and 15kWp Solar PV circa £15,000.

St Peter's School

St Peter's Harbour Building is to be converted to Air Source Heat Pump(s) from the existing boiler plant connected to the underfloor heating circuits, this will increase electricity spend at the school, but remove the cost of heating from gas. Balancing the additional cost of electricity with the saving from the use of natural gas, will be supported by a 20 kWp Solar PV array which will reduce year-round electricity demand, although higher winter electricity bills will be a consequence of the switch to electric heating. This represents an investment cost of around £157,500, Low Carbon Heat Pumps £137,500 and 20kWp Solar PV circa £20,000.

West Leigh Infants School

West Leigh is to be converted to Air Source Heat Pump(s) from the existing boiler plant, this will increase electricity spend at the school, but remove the cost of heating from gas. Balancing the additional cost of electricity with the saving from the use of natural gas, will be supported by a 25 kWp Solar PV array which will reduce year-round electricity demand, although higher winter electricity bills will be a consequence of the switch to electric heating. The main hall will require Mechanical Ventilation and Heat Recovery (MVHR), due to the height of the space and building fabric to minimise heating costs. This represents an investment cost of around £157,500, Low Carbon Heating with MVHR in Hall £132,500 and 25kWp Solar PV circa £25,000.

The planned solutions should provide a modest reduction in energy costs; however, the energy savings were calculated based on the current energy costs for the schools. Due to the significant increase in the wholesale price of energy, the cost savings will need to be carefully recalculated, the gas rates are 'Fully Fixed' for the next few years, whilst electricity costs have risen significantly over the past few months and future electricity rates are not yet know. Over the next few weeks and months, there will be increased activity at the schools, whilst a full technical solution and design is planned. All works are planned to be done during school holidays, so it is considered the work will have minimal impact on school operation.

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