Merthyr Tydfil County Borough Council
Carbon Management Plan (CMP)

Merthyr Tydfil → A Greener Valley

Established: *tbc*

Owner: Iain Goldsworthy

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Executive Summary

This Plan outlines Merthyr Tydfil County Borough Council's (MTCBC's) strategy to reduce CO_2 emissions arising from its' buildings (and the Leisure Trust's), streetlighting, fleet and business travel by 15% by 2025.

In doing so the Authority addresses the need to reduce expenditure during a period of austerity and provides a positive response to a Carbon Management Review conducted on behalf of the Welsh Government in 2012 which ranked the Council 21st out of 22 Local Authorities in Wales for Carbon Management.

A carbon management plan is an essential tool for public sector organisations to formulate a measurable and achievable strategy for reducing emissions and provides an opportunity to communicate the current progress and future initiatives.

Awareness of decarbonisation or carbon reduction is increasing in all spheres and there is a growing expectation for organizations to demonstrate their commitment to this increasingly significant agenda.

Local and national governments have communicated the priority given to this by introducing ambitious targets which will require organizations to embrace innovation and respond in increasingly creative ways. The Welsh Government has an aspiration for public bodies to be carbon neutral by 2030 and has communicated its focus on public sector by stating:

"The Welsh Public Sector must take a leadership role in an area of such significant impact upon our citizens, communities and businesses."

The objectives of the Carbon Management Plan are supportive of the Authority's environmental responsibilities under its' charter, of the Welsh Government's obligations under the Environment (Wales) Act 2015 and of the requirements placed on all public sector bodies in Wales by the Well-being of Future Generations (Wales) Act 2015.

Merthyr Tydfil County Borough Council will aim to reduce CO_2 emissions from its' service provision activities by 15% by **2025** reducing its' environmental impact and creating financial savings.

An annual CO_2 emissions reduction target of 3% has been set with consideration to reflect those imposed by the Welsh Government on the public sector. With the limited amount of physical and financial resources available within the Authority, it is essential that improvements in both housekeeping practices and investment in carefully chosen technical solutions will be needed to meet targets. Therefore this Plan focusses on 6 key areas:

1. Comply with all relevant legal and legislative requirements relating to energy use, consumption and efficiency.

2. Optimise the performance of the MTCBC Building Portfolio.

3. Creation of Formal Energy Strategy for schools to reduce energy costs and emissions.

4. Getting our house order-Improved Systems and Processes.

5. Communication and Training- Raising the Profile of Energy & Carbon Management within Merthyr Tydfil CBC.

6. Effective Metering and Monitoring –Reducing Avoidable Waste.

Progress So Far

Introduction

1.1 Programme Objective

This Plan contains the Council's strategy to reduce CO_2 emissions arising from the Authority's (and the Leisure Trust's) buildings, streetlighting, fleet and business travel by 15% by 2025.

The Plan addresses the need to reduce expenditure and represents a positive response to recent Carbon Management Reviews which ranked the Council 21st out of 22 Local Authorities in Wales for Carbon Management.

The purpose of the Carbon Management Plan is to outline a strategy to deliver a programme of inititatives to achieve our reduction targets and ultimately reduce the Authority's revenue expenditure.

1.2 Carbon Management Review 2015

A independent Review commissioned by the Authority in 2015 by Carbon Trust accredited consultants made a number of key recommendations that have been used to inform the strategy outlined within this Plan. These can be summarised as:

1. The Council should continue to operate a rigorous assessment of energy efficiency projects to maximise benefits from limited funding.

2. The introduction of improved data and energy management systems and software will create a large short-term workload but ultimately should free resource and give the authority the ability to report carbon emissions in line with pending Welsh Government Legislation and the Carbon Management Plan.

3.Reductions targets should be set at a consistent level to reinforce the message that continuous improvement is the norm and is equally important throughout the life of the Carbon Management Plan.

4.AMR data logging devices should be installed on gas and water meter devices within the authority to allow these utilities to be managed better.

5.Council wide targets should be delegated to key managers and a system of regular site level reporting introduced to inform and motivate.

6.A culture needs to be established where all employees take ownership for energy efficiency as the norm.

7.The draft Carbon Management Plan should be completed and adopted as a priority.

1.3 Stakeholders

During the past Carbon Management Reviews a need to engage with employees to encourage behavioural and cultural change was identified as an important area for improvement.

The strategy outlined within this Plan is intended to address the issue of staff engagement therefore various stakeholders have been consulted during the drafting of this document, including the Chief Executive, Corporate Management Team, Chief Finance Officer, Estates, Fleet Management, Education, ICT, Procurement and the Leisure Trust.

1.4 Progress So Far

Although funding has been limited the property services team along with other council departments have achieved some impressive results over the past couple of years. These are recorded in the Energy Savings Tracker (See Appendix 6.6). Some of these projects are summarised below.
This tracker will be continually updated as additional Energy Saving Projects and actions are implemented.

Technical Projects

The energy unit has completed a small number of carefully selected projects since 2015 that are achieving good rates of return and helping us to reduce our Carbon Emissions.

- Installation of Boilers and BMS in Civic Offices
- Installation of CHP at Merthyr Leisure Centre
- LED lighting upgrades in Cyfarthfa High School
- Cavity Wall Insulation in the Civic Offices

We will also ensure that only the most efficient equipment is used in replacement or new items for building services.

Street Lighting

We have also utilised Salix Finance to replace 90% of our streetlights and replace them with Energy Efficient LED lamps cutting our energy use by 65%.

Solar PV

Solar panel electricity systems also known as PV, capture the suns energy using photovoltaic cells and convert into electricity which is fed into the building on which it is mounted or if not needed fed into the National grid for others to use. The cells don't need direct sunlight to work and can still generate on cloudy days.

We now have 10 buildings with solar panels fitted and up until Dec 2018 they had produced a total of 1.49 MWh of electricity and saved over 597,000 tonnes of CO2 production. Unit 20 also had 30kw Solar Array fitted which will save over £90,000 over the life of the system.

Vehicle Trackers

Vehicle trackers have been installed in approximately 75% of our fleet vehicles. This technology provides information on fuel consumption, better fuel management and eliminating unwanted behaviour from drivers such as speeding. The introduction of this technology has contributed to fuel costs relating to fleet vehicles fuel consumption reducing by approximately 14%.

2. Carbon Management Strategy

The case for carbon management has been well established across the public and private sectors. A summary of the current drivers most relevant to the Authority are outlined below.

2.1 Financial Drivers

- For the financial year 2018-19 the Authority's gas, electric and water costs in buildings were approximately **£1.77M(Inc Leisure Trust).**
- Succesful carbon management can generate significant reductions in energy/water consumption and lead to worthwhile financial savings. Potential utility cost reductions from fully implementing this Plan are ultimately estimated to be between **£0.15-0.35M** per annum.
- Energy, water and vehicle fuel prices have all recently increased and are expected to continue to rise. MTCBC could face estimated base energy related pressures exceeding **£400,000** by the end 2025 Implementing this Plan will provide mitigation against future utility price increases and potential changes to energy taxes.
- The CRC scheme will cease at the end of the 2018/19 reporting year and the revenue generated by the associated Carbon Allowances element of CRC will be replaced by an enhancement to the pre-existing Climate Change Levy (CCL). Whilst CRC does not currently apply to the authority, the replacement of the scheme will result in an increase of CCL charges for Gas and electric of 67% and 45%. CCL does apply to the authority and will result in an increase in our energy costs from 2019.

- CRC Replacment Scheme-With the CRC coming to end in 2019, It is likely that Welsh Government will introduce a replacement reporting scheme in 2019/20. At present MTCBC do not have adequate data collection processes and software in place to report on Carbon Emissions. As a result, the authority is at reputational and financial risk due to not being able to report accurately.

2.2 Political and Reputational Drivers

There are a number of drivers currently creating political and reputational pressure to manage carbon responsibly particularly within the public sector including:

- A need to be financially responsible at a time of "austerity cuts" in public sector funding to reduce the risk of further job losses.
- Greater scrutiny from Welsh Government and increased public sector benchmarking. The Authority currently reports against a national indicator specific to CO_2 emissions reductions, namely:

  EEF/037 - % change in average Display Energy Certificate (DECs) scores.
- Welsh Government energy consumption reduction targets of 3% per annum which are likely to be more closely measured following the introduction of recent legislation.
- An increasing recognition of the positive image and marketing benefits generated by responsible energy and environmental management.
- A greater public and political awareness of sustainability.
- With the availability of Welsh Government interest free loans and repayable grants a "lack of funding" is no longer viewed as an acceptable justification for failing to act.
- The Welsh Government have issued renewable energy targets and carbon budgets in order to meet their ambition for Wales to be carbon neutral by 2030. Both of these could result in new legislation which will specifically target the public sector and increase both funding and resource requirements.
- It is likely that Welsh Government will require public bodies to measure and report on carbon emissions relating to buildings, transport and procurement from 2020 onwards. Therefore, it is important that MTCBC has the appropriate data collection processes and procedures in place to ensure accurate reporting.

2.3 Legislative Drivers

Legislation is an important driver and examples of the impact of recent legislation includes:

- The Well-being of Future Generations (Wales) Act 2015 which places a number of obligations on public sector bodies in Wales. The requirements of the Act are broken down into seven goals. These include a goal for a more prosperous Wales that is "*an innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change);…*".

- The Environment (Wales) Act 2016 which places a legal obligation on Welsh Ministers to tackle climate change by meeting greenhouse gas emissions reduction targets and to set carbon budgets. It is expected that these requirements will be cascaded through the public sector in Wales and the current Welsh Government reduction target of 3% per annum wil be more actively promoted.
- The Energy Performance in Buildings Directive (EPBD) introduced a large number of requirements, the most visible being the need for public buildings to display certificates showing their energy rating in a prominent position. The energy performance of public sector buildings is now comparable both with their own historical performance and against other buildings of a similar type.

2.4 Strategic Themes

- This Plan focusses on CO_2 emissions from the Authority's and Leisure Trust's buildings (energy and water), streetlighting, fleet and business travel.
- A range of cost effective measures will require implementation such as improving operational management through staff engagement, technical energy (water) efficiency projects, asset management planning, replacement and upgrading of the building stock and appropriate renewable energy schemes.
- It is proposed that technical projects are funded via Salix Finance. Salix Finance provides interest free government funding to the public sector to improve their energy efficiency, reduce carbon emissions and lower energy bills.
- An ongoing programme of culture change through the introduction of a AMR data logging devices and Monitoring and Targeting (M&T) methodology to reduce energy consumption and costs through improved operational management (housekeeping) will be implemented and managed by the Existing Energy Officer.(Pending adequate investment)

2.5 Targets

The level of target has been selected to make a clear statement of the Council's intent whilst remaining mindful of the level of physical and financial resources.

Therefore the Carbon Management Team recommend that the targets under this plan should be set at 3% per annum to align with Welsh Government targets.

3. Baseline, Targets and Business Case

3.1 CO_2 Emissions Scope and Baseline

The Authority(inc Leisure Trust) emits approximately **6489 tonnes of CO_2 per annum** at an annual cost of approximately **£2.4M** (based on figures for the 2018/19 reporting year)

An original baseline for 2014/15 was calculated. We have now updated our baseline for year 2018/19. The basline focusses on CO_2 emissions over which the Authority (and Leisure Trust) has direct control, namely:

- **Buildings** – currently numbering approximately **125** buildings used for direct service delivery including offices, schools, homes for the elderly, leisure centres, libraries, *(scopes 1 & 2).*
- **Street lighting** – on roads maintained/adopted by the Council *(scope 2).*
- **Fleet** – consisting of all the Council's operational vehicles *(scope 1).*
- **Business travel** – emissions generated by use of private vehicles by elected representatives and employees of the Council *(scope 3).*

Note: Emissions scopes are as defined in The Greenhouse Gas Protocol published by the World Resource Institute in 2004 which is briefly summarised by the Carbon Trust at:
http://www.carbontrust.com/resources/faqs/services/scope-3-indirect-carbon-emissions

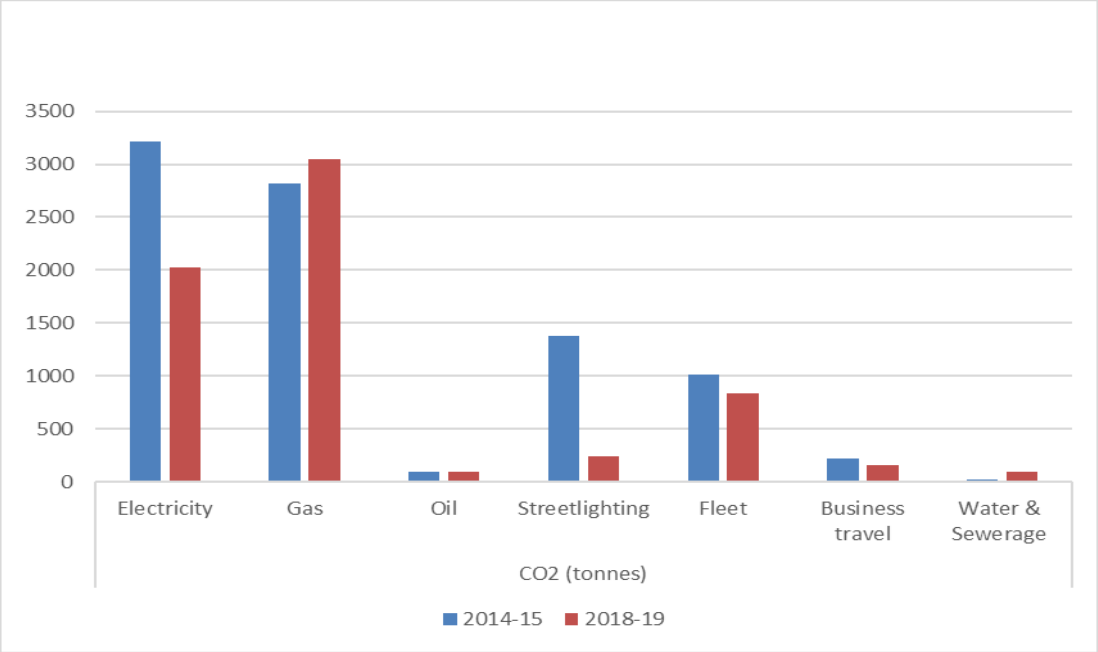


Fig. 3.1 CO_2 Emissions Comparison by Usage Category for Baseline Years

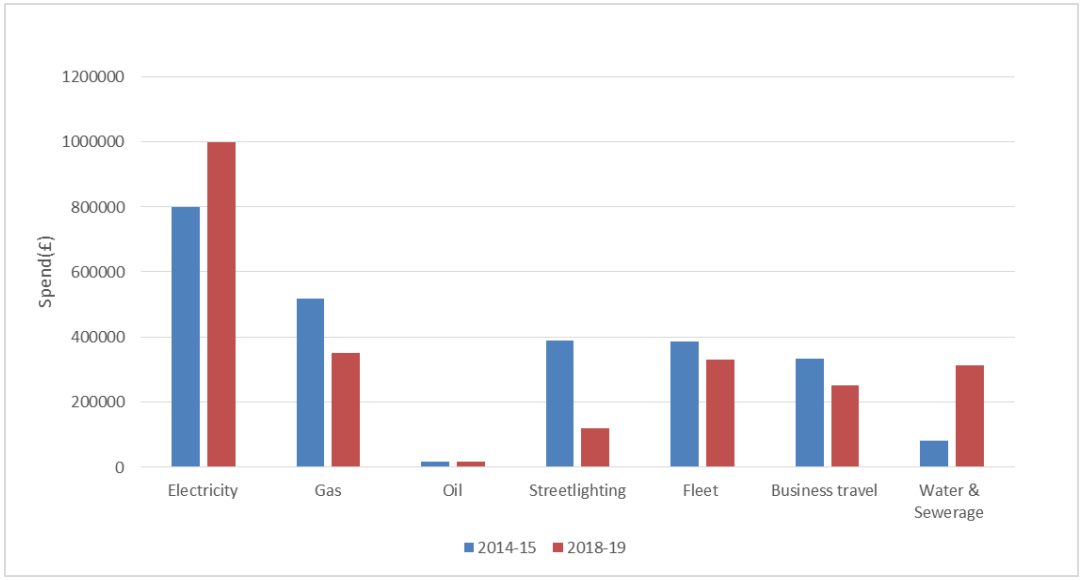
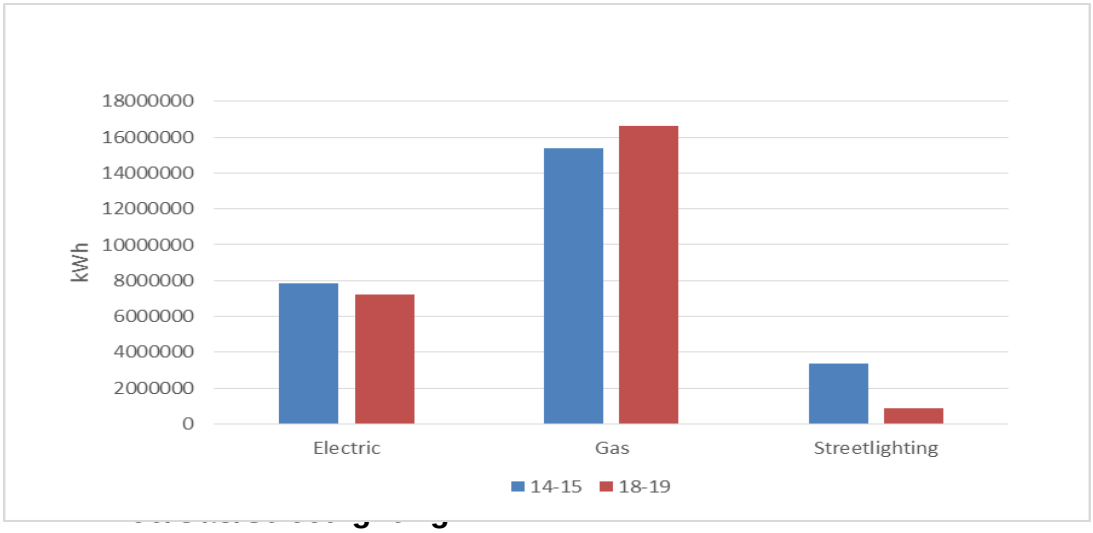


Fig. 3.2 Spend by Usage Category Source for Baseline Year



Usage	CO_2 Emissions					
	Tonnes/pa 2014-15	Tonnes/pa-2018/19	%	£/year 2014/15	£/year 2018/19	%
Electricity	2,911.6	2028	31	799,997	996,816	39.8
Gas	2,821.5	3050	47	518,004	349,981	18.8
Oil	92.7	92.7	1	17,332	17,332	0.7
Streetlighting	1,379.7	238	3.7	388,236	121,155	4.8
Fleet [1]	1,013.2	830	14	385,538	331,385	13.2
Business travel [2]	221.6	158	2	333,827	252,092	10.1
Total Energy	8,440.3	6396	-	2,442,934	2,068,761	
Water & Sewerage [3]	25.7	92	1	80,497	311,697	12.5
Total Usage	8,466	6489		2,523,431	2,380,458	

Table 3.1 Summary of Energy Data for Baseline Years 2014/15 & 2018/19

NOTES:

1. Estimated fleet emissions are based on the assumption that the fleet uses solely diesel bio blend (see appendix 6.3).
2. Business travel emissions are measured solely on the use of privately owned vehicles by staff.
3. Water/sewerage data is based on water supplies billed directly to the Authority or Leisure Trust. Water Usage data is for 17/18 as data could not be retrieved for 18/19

3.2 Baseline Calculation

CO_2 emissions are calculated by applying CO_2 conversion factors (see appendix 6.3) to raw energy consumption/journey distance data and have been recorded using an supplier invoices and MTCBC data. These factors are referenced from DEFRA Greenhouse Gas Reporting Guidelines and are periodically reviewed to reflect variations in the CO_2 intensities of individual fuels. Historically variations have been most noticeable for grid electricity where the CO_2 intensity is determined by the UK power generation mix at any given point in time. Due to a lack of electronic billing and energy management software within the authority this data gathering process took over 6 months and considerable staff time to complete.Also, some of the data is based on estimated reads and bills from suppliers which has a negative impact on the accuracy of the baseline.

Providing funding is made available to invest in Energy Management Software and resources, we will be able to cleanse and fill gaps in our data which may identify historical inaccuracies.At this point we will review our baseline calculations. Once data integrity checks are complete we will aim to recast and republish the baseline if necessary.

The following methods of data collection are used for baseline calculations and subsequent reporting:

- **Operational buildings** – actual consumption in kWh of electricity, gas and oil for each and every one of the buildings operated by the Authority and Leisure Trust.The data has been collected largely from supplier invoices.
- **Street lighting** – The Council's street lighting is largely unmetered but as each streetlight has a constant load, the consumption can be calculated from the lamp's rating and the hours that it is switched on. This work is carried out by Elexon to the BSCP520 standard. Elexon is the balancing and settlement code company which manages the electricity market and trading arrangements.

  The time that a lamp is switched on is calculated from the lighting regime which may be dusk to dawn, 24 hours or dusk to midnight. The actual times for the dusk and dawn each day of the year are used for the calculation.

  The power requirement is taken from the lamp and control gear rating which is multiplied by the on time to calculate the consumption. This method is used by electricity suppliers to calculate prices and the figures used in the CMP are those provided by suppliers.
- **Fleet** – data provided by the Fleet Manager on actual consumption of fuel in litres by the Authority's fleet, including vehicles that range from refuse compactors, road gritting lorries, 4x4 vehicles down to small vans for the use of highways inspectors and other members of staff.

  The primary method of fuelling is from public filling stations with payment made by fuel card.
- **Business travel** – data is provided by Payroll with regard to business miles claimed by staff. As all business travel payments to staff are calculated on a single "pence per mile factor" the current travelling claim forms do not require the claimant to state the type of fuel, vehicle engine size or the vehicle's carbon emissions therefore industry recognised assumptions and conversion factors have been used to estimate emissions.

3.3 Data Management

Robust data and processes are key elements of success and without them it will not be possible to demonstrate the tangible benefits of our efforts or to ensure the authority is compliant with its legislative and regulatory obligations in this area.

The availability of accurate data is essential to pro-active energy management and the ability to measure progress against targets. This requires an extensive network of utility metering and an effective system for manipulating the data collected. Such systems are commonly referred to as Monitoring and Targeting systems (M & T or aM & T where automatic reading of meters is incorporated).

At present MTCBC was only one of two local authorities, out of 22 in Wales,that did not benefit from Energy Management Software.We have recently purchased this software and will be utilising the various features of the product over the next 12-24 months. This software provides a central database for storage of utility and meter information, as well as assiting in automatic bill validation ensuring we are paying the correct amounts for the energy use.This software will also assist in the identification of excessive energy use quickly and enable users to understand operational energy use and raise awareness amongst staff.

3.4 Financial Value at Stake

If the difference in annual utility expenditure is considered for two scenarios, the first based on a “business as usual” scenario and the second on pro-active carbon management to acheive reduction targets, the cost of failing to act or the “value at stake” can be demonstrated .

Based on assumed energy price increases of 5% per annum and a 3% per annum reduction target the annual difference in utility expenditure can be seen in Fig. 3.2 below. On this basis the cumulative difference in expenditure or the total **“value at stake” is c. £1.23M** with annual **recurring savings of approximately £0.429M** beyond this.

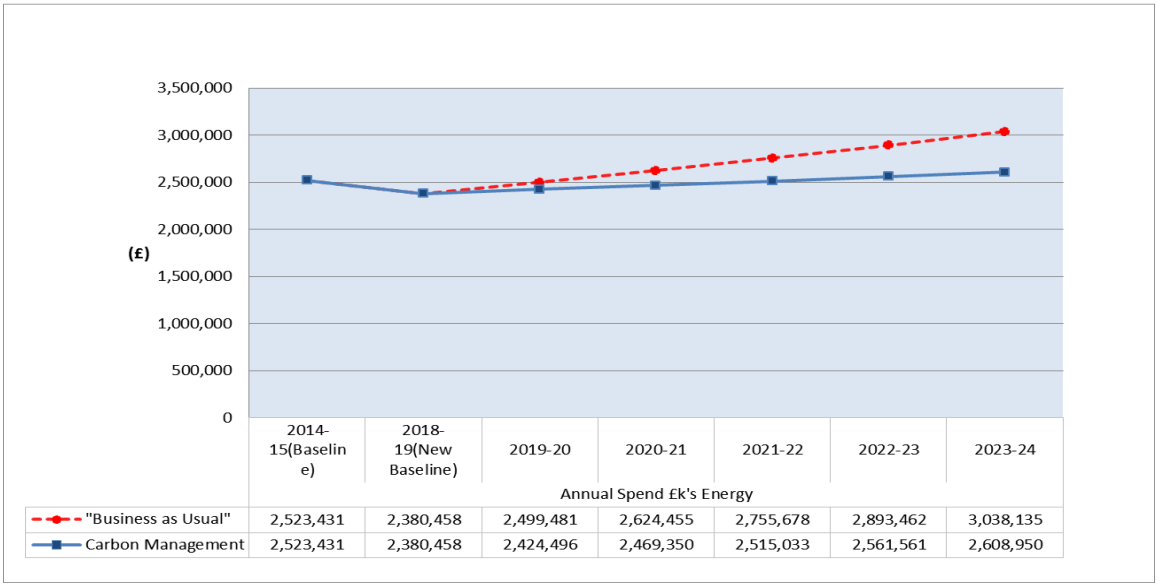


Fig. 3.2 Financial Value at Stake (£s)

3.5 Carbon Value at Stake

Similarly if the difference in CO_2 emissions is considered for the two scenarios the carbon "value at stake" is as shown in Fig. 3.3 below.

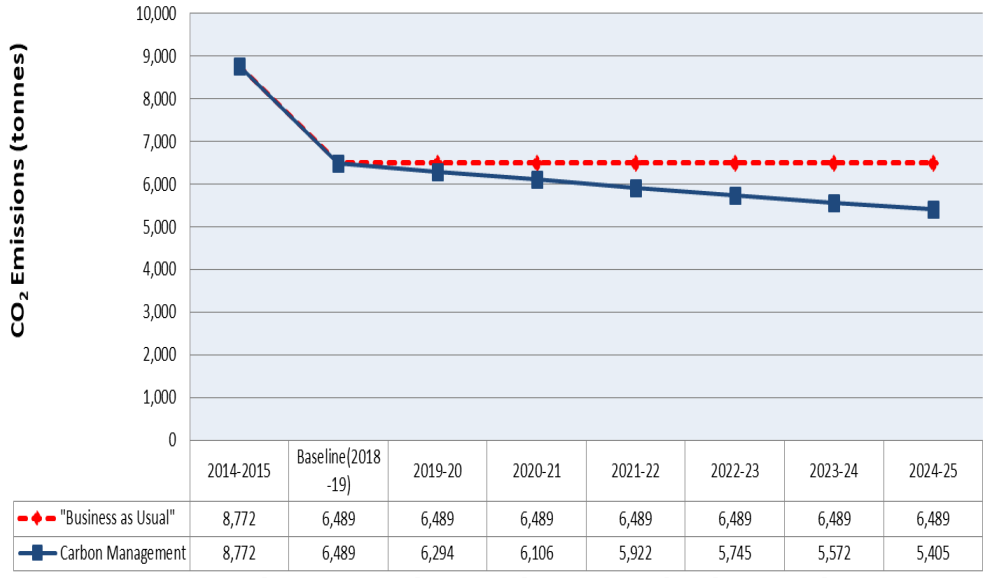


Fig. 3.3 Carbon Value at Stake (tonnes)

Based on this scenario and the cumulative difference in CO_2 emissions or the total **"carbon value at stake" is 3,890 tonnes** with an annual **recurring reduction in CO_2 emissions of 1,084 tonnes** beyond this.

4. Carbon and Cost Reduction Opportunities

4.1 Prioritising Projects

There are numerous potential opportunities to reduce energy and water consumption (hence carbon emissions) and costs, many of these will be site specific although some may be repeatable across the Authority.

These opportunities vary in terms of savings potential and implementation cost and hence their cost-effectiveness. It is usual when compiling a list of projects to prioritise the most cost effective measures, however, other factors may also need to be considered such as maintenance backlog issues, planned new build and refurbishment works and the potential for financial incentives, e.g. **RHI.** A further criteria used to rank potential projects is the energy (or carbon) hierarchy which is summarised below:

Meaner	**1. Reduce energy demand - use less energy**
Leaner	**2. Be more energy efficient**
Cleaner	**3. Use renewable and low carbon energy**

Fig. 4.1 Energy (or Carbon) Hierarchy

Applying this established prioritisation criteria to potential opportunities will tend to favour more cost effective projects and also discourage the generation of low carbon energy to be wasted by inefficient plant and equipment or poor operational management.

4.2 Action Plan

In order to meet our objectives a series of actions and activities have been identified which will help the council to deliver the degree of improvement required. It is recognised that this may be achieved in 6 key areas**:**

1.Comply with all relevant legal and legislative requirements relating to energy use, consumption and efficiency.

2.Optimise the performance of the MTCBC Building Portfolio.

3.Creation of Formal Energy Strategy for schools to reduce energy costs and emissions.

4.Getting our house order-Improved Systems and Processes

5.Communication and Training- Raising the Profile of Energy & Carbon Management within Merthyr Tydfil CBC

6.Effective Metering and Monitoring –Reducing Avoidable Waste

A co-ordinated and effective strategy and action plan can then be developed and implemented with specific defined activities and projects which will help deliver set reduction targets and savings.
(*REFER TO APPENDIX 6.1 FOR ACTION PLAN)

The following page's give more detail to the key areas listed above:

4.2.1 Comply with all relevant legal and legislative requirements relating to energy use, consumption and efficiency

The Energy Engineer will monitor changes in legislation and national policies to ensure compliance with regulatory requirements. These include:

- The 2008 Climate Change Act-Reduction of UK's greenhouse gas emissions by at least 80% (from the 1990 baseline) by 2050.
- Display Energy Performance Certificates(DECs)/Energy Performance Certificates(EPCs)
- Wellbeing of Future Generations Act 2015, which imposes a duty on councils to carry out sustainable development.
- Welsh Government Energy Efficiency in Wales Strategy 2016-2026/
- The Environment Acts commits Wales to a long term target of reducing emissions by at least 80% by 2050 as well as interim targets and 5 yearly carbon budgets.
- Minimum Energy Efficiency Standards.

4.2.2 Optimise the asset performance of the MTCBC Building Portfolio

To ensure we optimise the asset performance of our building portfolio the strategy will focus on the following key areas:

- **New build** -New buildings will aspire to achieve high standards of energy management performance and environmental quality. In particular, new capital builds which lend themselves to innovative forms of sustainable design and demonstrate Best Practice will be actively encouraged. To this end, the Energy Unit will contribute actively to the development and delivery of major construction projects.

  We will seek to minimise energy consumption associated with new buildings. This approach will include exceeding latest building regulations, specifying compliance with published good practice energy benchmarks from official sources, such as CLAW, DEFRA, CIBSE, RIBA and OGC and by making best use of low carbon design strategies where appropriate.

- **Capital Maintenance Programme-**Each year the Council allocates funding for the maintenance of its building assets. A programme is developed which is based on the condition, safety and legislative requirements of the estate with

the most urgent items receiving priority funding. Some of these improvement works have an impact upon the energy efficiency of the estate. We will strive to ensure that any building upgrades will consider their energy and carbon impact and only energy efficient equipment and plant will be installed.

- **REFIT-**Re:fit Cymru is a framework for Energy Conservation Retrofits within Public Sector buildings in Wales. It allows public bodies to include multiple buildings and saving measures within a single OJEU procured Energy Performance Contracting framework providing energy reduction and alternative energy schemes which have scale.

  The principle of the process is that the private sector is engaged to identify and deliver energy savings around the estate. The measures can be funded either directly from the Council or using Salix with the repayments for any debt coming from the energy savings of the scheme which are guaranteed by the engaged contractor.

  Re:fit Cymru was established in 2016. The key characteristics of Re:fit are:

  1) Any projects or amalgamation of projects must satisfy an overall 7-8 year or less simple payback based on the savings.
  2) The repayments can be spread over 10 years so that some savings are made from day one.
  3) The funding for the works under Re:fit will be from an interest free Salix Energy Efficiency Loan, from the Salix recycling fund, and potentially from Council capital funds if a combined funding approach is acceptable and beneficial.

- **Best Practise**-Identify best practice operating protocols for energy efficient building use. Building specific energy plans could be created and/or targets to ensure council owned buildings minimise excess energy use.

- **BEMS-**Continue to increase number of sites on Trend 963 Supervisor when funding becomes available or boilers are upgraded. Allowing better control of heating and ventilation systems which can result in energy and cost savings due to more efficient operation.

- **Property Rationalisation**

4.2.3. Support schools to reduce energy costs and emissions

Schools in MTCBC account for an estimated 60-70% of the councils total energy consumption from its buildings and streetlights. Schools are therefore key contributors to achieving our aims and objectives.
Going forward, our strategy is to help schools manage their energy and reduce the demand for energy from both the building but also the demand from building users,allowing schools more spend to be directed towards education, staff and school buildings.

This support service will be developed over the next 24 months and could include:

- Targeting Schools with dissemination of Energy Wastage data and good housekeeping practises.
- Assisting schools in developing no cost /low cost Action plans by identifying key actions that can be undertaken to reduce Energy Costs.
- Develop a coordinated approach to carbon management within schools.
- Provide ongoing training and guidance for schools on how to reduce energy usage.
- Identifying Energy and Cost Saving technical projects.
- Building Manager/ Caretaker training on how to operate the school in the most efficient manner.

4.2.4 Getting our house in order-Improved Systems and Processes

Data & Systems

In order to measure our efforts effectively, we need to establish a robust starting point. We will be implementing Systemslink energy management software to provide a system which provides powerful tools for validation of data and billing whilst enabling easier access to meaningful analysis on many levels.

Working on the basis of continual improvement, we will:

• Enhance our energy data so that it is accurate and complete.
• Work with our suppliers to enable better management of our data and billing.
• Assure ourselves that we are fully compliant with energy related legislation and reporting obligations.
• Continually improve our validation and integrity checks to enable maximum control.
• Receive, store, use and share our data to best effect to enable efficiency.

Improved data, and the means to interpret it effectively, are a fundamental part of the energy management toolkit. It should be held and controlled centrally to maximise consistency and integrity, but made available widely in simple, easy-to-understand formats so that efficiency opportunities are easily identifiable and the authority is incentivised to act upon them.

As we cleanse and fill gaps in our data, we may find that historical inaccuracies have resulted in a flawed baseline assessment. We plan to review our baseline calculations and assumptions once data integrity checks are complete and recast and republish the baseline if necessary.

Processes

Having good data is not effective in isolation – data is useless if you don't do anything useful with it. Validation will be carried out on contract charges and also, perhaps more importantly, on consumption patterns. This will enable instances of irregular consumption to be flagged and raised with routes for investigation. These queries and notifications will be managed by the Energy Unit who will be the conduit between MTCBC and our suppliers.

Information, Education & Building capability

We need to enable all areas of the authority to understand how they can start to control energy use and eliminate waste. Starting with providing information and raising awareness throughout the authority, we will strive to continually update and inform teams so that:

- Energy users know their responsibilities and what they can do to reduce their liabilities.
- Knowledge and best practice examples are shared.
- Simple, clear and relevant advice and guidance is provided throughout the business.

A suite of simple and clear guidance documents could be made available on a central information hub, so that advice is consistent.

We will aim to utilise Systemslink Web Reporting module, to enable users to understand operational energy use and also to measure the effectiveness of actions taken to reduce consumption. Training on the use of the system and deep dive action workshops would need to provided to enable the authority as a whole to make best use of the available information, understand what to look for and see how applying simple techniques can bring significant benefit in terms of reduction of cost and greenhouse gas emissions.

4.2.5 Communication and Training- Raising the Profile of Energy & Carbon Management within Merthyr Tydfil CBC

The behaviour of all staff and users of council buildings has impact on energy performance and utility costs. Their first main task in improving communication is creating a new communications plan. The plan will focus on utilising In house communication channels focused on the dissemination of energy good housekeeping practices in council buildings, aimed at staff and sub-contractors.

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• Simple, clear and relevant advice and guidance is provided throughout the business.

A suite of simple and clear guidance documents will be available on a central information hub, so that advice is consistent.

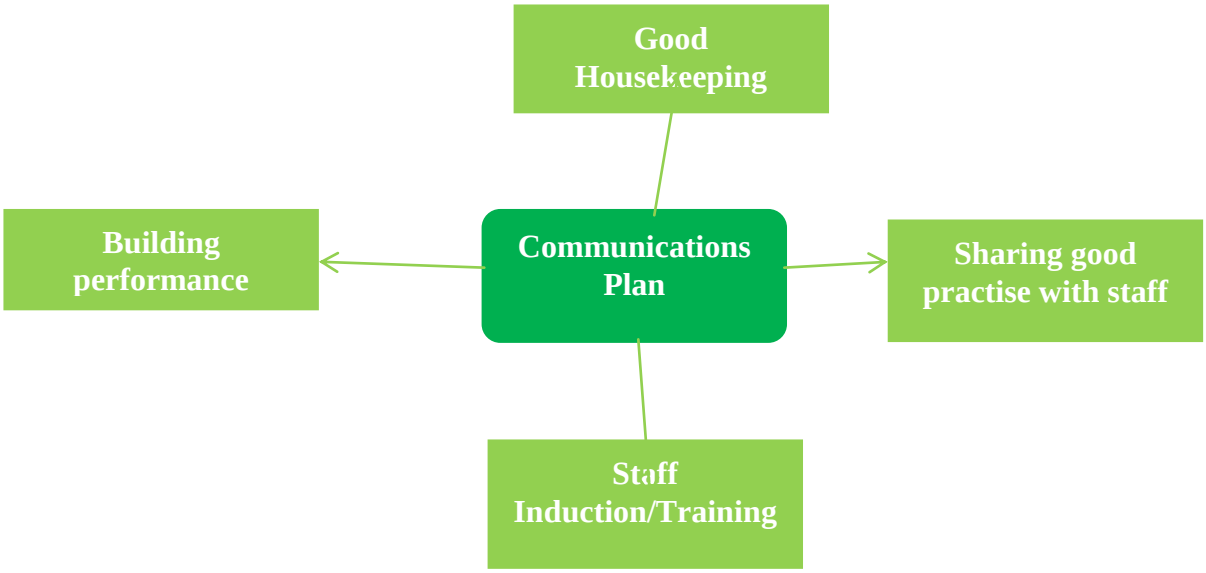
We will aim to utilise Systemslink Web Reporting module, to enable users to understand operational energy use and also to measure the effectiveness of actions taken to reduce consumption. Training on the use of the system and deep dive action workshops will need to be provided to enable the authority as a whole to make best use of the available information, understand what to look for and see how applying simple techniques can bring significant benefit in terms of reduction of cost and greenhouse gas emissions

The communication plan could be achieved through a variety of activities and media, delivered through external, top-down and peer-to-peer communication. The key aims are as follows:

- Inform external stakeholders of the council's activity in relation to carbon management.
- Keep staff informed of carbon reduction aims, projects and progress.
- Promote the changes staff can make to cut energy consumption via Intranet and emails.
- Sharing good practise and success stories with staff.
- Utilisation of energy reporting software to provide energy reports to key individuals in order to engage and drive down energy costs.

- Integrating energy efficiency into Council training and Staff induction programmes.

- Ensure building managers are trained to minimise their building's running costs and environmental impact.

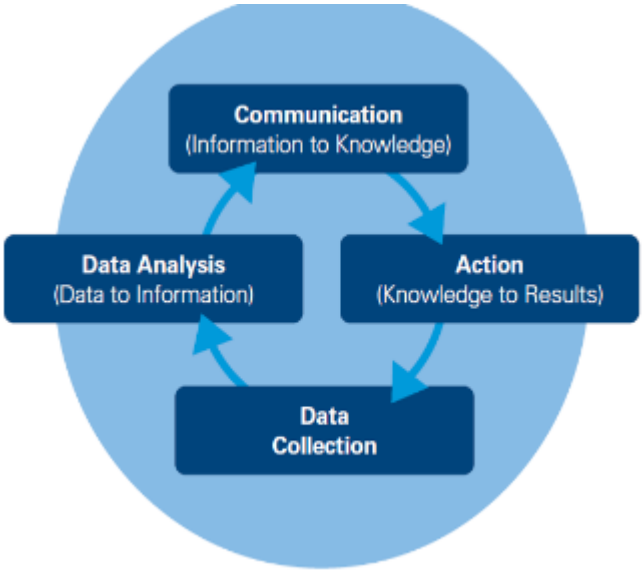


4.2.6 Effective Metering and Monitoring-Reducing Avoidable Waste

Energy metering and monitoring gives us a better understanding of the council's energy consumption and provides the opportunity to identify and tackle energy waste.

The primary function of any energy management system is to ensure that it is founded upon accurate energy consumption data. The Council has a large number of Automatic Meter Reading devices on its electricity meters but none on our gas and water meters. It is critical that budget is allocated to invest in AMR. AMR allows for the consumption to be measured by the Energy Suppliers on a half hourly basis. This ensures that energy bills are accurate (no estimates invoices) and gives us access to half hourly energy data.
It is hoped that by monitoring and analysing this data we will be in a better position to:

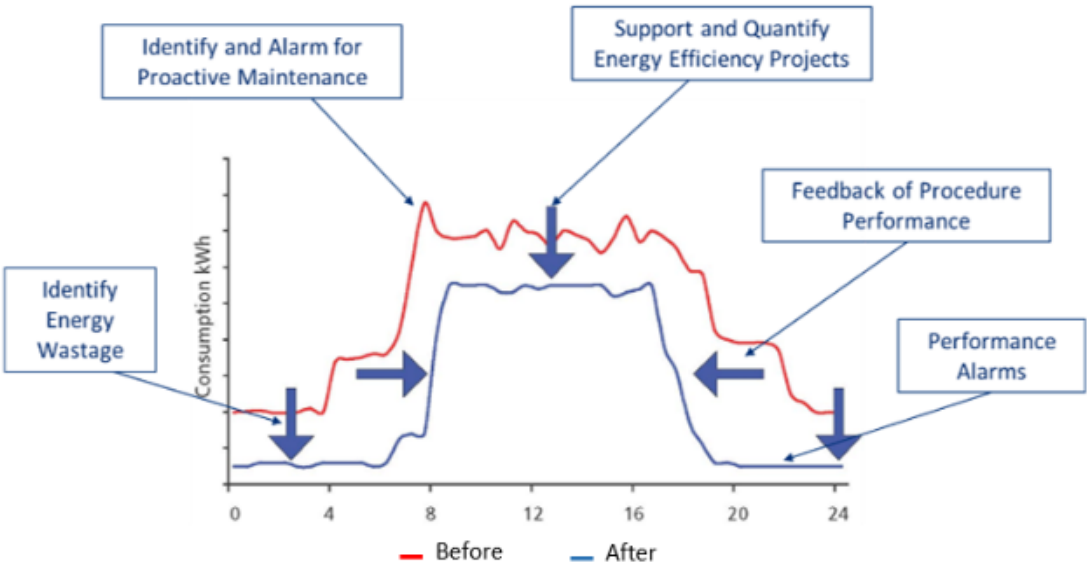
- Control energy usage and costs
- Identifying anomalies in consumption to allow any problems in a building to be corrected as soon as possible.
- Maintain occupant comfort resulting in additional benefits such as increased productivity in the workplace.



The following procedure will be implemented to reduce Avoidable Waste within MTCBC:

1. **Data collection:** Collation of all metering data in Systemslink Software

2. **Data Analysis:**
   - Verify Accuracy
   - Convert raw data into usable forms(Filter/Organise)
   - Compare data with previous weeks/years
   - Identify areas of interest or concern



You can achieve significant energy savings just by understanding your data. The red line on the graph shows the energy use over a typical day before any energy monitoring. The blue arrows highlight areas where energy savings may be achieved. The blue line demonstrates improved performance to be monitored and reported.

3. **Reporting:**
    - What are the results/key findings of the analysis?
    - Summary of key findings to management with more detailed reports to key end users and responsible persons.
    - Production of reports when excessive energy use in identified.

4. **Action:**
    - Data reports are acted upon.
    - Energy Audits carried out at problem sites.
    - Energy cost saving action plan created and implemented.

5. **Review and improve:**
    - Obtain feedback and Monitor Impact of energy action plan.
    - Frequently refresh analysis and use the greater understanding that the data gives to support wider energy management initiatives.

The implementation of this procedure will result in identifying poorly performing buildings and energy waste, enabling resources to be targeted effectively and facilitate the development of an energy efficiency investment programme.

Energy Audits

The Energy Unit will aim to carry out periodic energy audits based upon energy monitoring data and poorly performing buildings.

These Audits will aim to identify, quantify and prioritise tangible opportunities to reduce energy use, costs and carbon emissions in a building or on a site.The full co-operation of designated building managers and users will be required during these audits.

4.3 Buildings

Energy (and water) used in the Authority's buildings accounts for approximately **80%** of the carbon emissions and **71%** of the costs covered by the scope of this plan.

The Carbon Trust have usefully categorised potential carbon reduction opportunities within buildings and provides an indication of the likely percentage reductions for each as shown in Fig. 4.2 below.

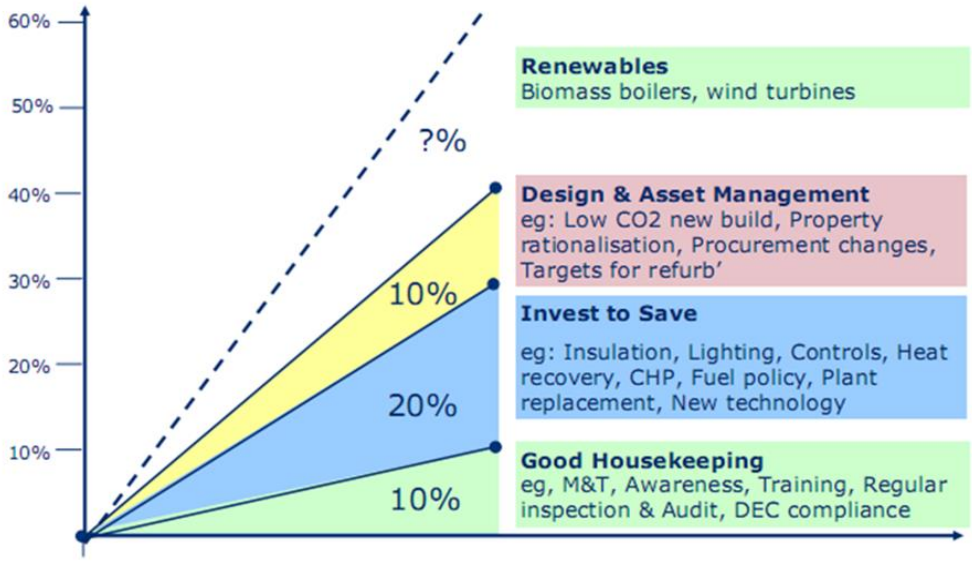


Fig. 4.2 Categorisation of Reduction Opportunities in Buildings

This diagram also ranks opportunities by cost effectiveness with the most cost effective being "good housekeeping" through to "renewables" being the least cost effective.

NB It should be noted that the cost effectiveness of "renewables" is highly dependent on the level of financial incentive applicable at the time of project delivery.

4.4 Streetlighting

Energy used for streetlighting within the County Borough accounts for approximately **3.7%** of the carbon emissions and **4.8%** of the costs covered by the scope of this plan.

Merthyr Tydfil County Borough Council has already made large savings by replacing all streetlighting fittings with dimmable LEDs remotely controlled by an electronic lighting management system.

Further savings could be realised by dimming fittings where and when appropriate. However, to do this would require individual risk assessments to be completed..

4.5 Fleet

Energy (and water) used in the Authority's directly owned or leased vehicles accounts for approximately **14%** of the carbon emissions and **13.2%** of the costs covered by the scope of this plan.

Potential opportunities can be broadly classed as relating to improved driver behaviour or the ongoing renewal of the fleet with electric or more efficient vehicles.

4.6 Business Travel

Energy used by vehicles owned by the Council's elected representatives or employees whilst on Council business accounts for approximately **2%** of the carbon emissions and **10%** of the costs covered by the scope of this plan.

Cost effective improvements in this area may be difficult to realise as anecdotally many journeys are relatively short and often not claimed for by staff.

5. Implementing and Embedding Carbon Management

In the context of scarce physical and financial resources the targets outlined in this plan are challenging and will necessitate the introduction of new ways of working.

5.1 Barriers to Progress

A number of potential barriers to progress have been identified along with potential mitigation measures.

Barrier	Potential Mitigation
Limited Funding MTCBC has limited direct capital funding to invest in energy efficiency improvements.	1. Proposed energy efficiency improvements will need to be rigorously assessed to form an Authority wide project list that reflects the most cost effective opportunities. 2. Planned new build and refurbishment projects should also be regarded as cost effective opportunities to improve energy efficiency. However, a policy of "lowest capital cost at all costs" can destroy these opportunities. 3. Appropriate external funding sources should be actively pursued. In particular, Salix Finance interest free loans or the Salix Finance Recycling fund. 4. The Council has historically made good use of funding arising from the Buildings Regulations requirement for "Consequential Improvements" this could also continue to provide a valuable source of funding.
Accountability Overall responsibility exists at Chief Executive level and within Property Services but is not cascaded down to operational site management. Poor energy management practices were noted as widespread during recent "after hours walkabouts".	1. Council wide targets should to be delegated to operational managers and performances compared to historical energy consumption. 2. Comparing the relative performance of individual sites and managers can identify waste and also serve to motivate.

Inadequate or Inappropriate Data The Authority need to invest in Energy Management Software which will greatly aid energy management and give the ability measure and report on carbon emissions. Accurate records of historical energy consumption data are essential to pro-active energy management. A lack of this data in an easily accessible format is a serious issue that should be addressed as a matter of priority.	1. This system should be regarded as a key energy management tool as accurate data is critical to effective energy management and be extended to as a minimum cover all fiscal meters. 2. AMR data logging devices should be installed on gas and water meter devices within the authority to allow these utilities to be managed better. 3. Data should be collated for the most recent year for which it can be regarded as complete and accurate. 4. Processing of utility supply invoices needs to be centralised. This will ensure invoices are properly validated and data is complete. 5. It is recommended that data is recorded by using supplier generated Electronic Invoices which can be batch imported on a monthly basis into the software. This proprietary software is in common use and is widely understood. Regular reporting of consumption data at site level should be introduced to provide motivation to improve.
Limited Resources This plan requires urgent and major improvements to data management and reporting. There will also be a requirement to identify, design, procure and deliver more than £1M of technical projects over the life of the plan. The Authority currently has a	1. The introduction of improved data and energy management systems will create a large short-term workload but ultimately should free resource and provide the opportunity to introduce regular reporting to encourage behaviour change. 2. The volume of technical projects to be delivered will require additional resources to deliver. A number of potential options have been considered but the appointment of an additional Energy Officer to design, procure and implement projects is believed to offer the most suitable solution. 3. The Authority need to establish a

single full-time Energy Officer predominately dealing with data handling, invoice processing, supplier liaison and with additional maintenance responsibilities.	culture where all staff take some ownership for energy efficiency as the "norm" but will also need to allocate additional dedicated resources to develop a more pro-active approach to energy management.
Policy and Procedures To achieve the proposed levels of reductions in CO_2 emissions over the next 5 years will require significant changes to established practices. .	Targets will motivate local management to improve performance but to overcome potential "barriers" policy guidance or reinforcement will need to be provided by Senior Management. It is recommended that targets are set at a consistent level throughout the life of the Carbon Management Plan. This would also reinforce a message that saving energy is equally important throughout the life of the Plan and more fairly accounts for the mobilisation period required to identify, procure and deliver the first tranche of projects.

5.2 Programme Management

Once the Carbon Management Strategy has been approved will aim to set up a Carbon Management Team.

The detailed implementation of the programme of individual carbon reduction measures and actions will be managed by an Authority wide Carbon Management Team who will need to meet at specified intervals.

Their progress will be overseen by the Carbon Management Board which could consist of CMT members.

5.3 Programme Implementation

Implementation of the Carbon Management Programme will be the responsibility of the Carbon Management Team Leader supported by an Energy Officer and the Energy Engineer.

The Energy Officer's responsibilities in relation to the programme will be:

- Validation of utility invoices.
- Collation of data from supplier invoices to inform carbon emissions monitoring tool.
- Development and management of regular reporting systems to identify waste and potential opportunities to improve operational management.
- Development and maintenance of monitoring and targeting systems to enable access to utility consumption profiles
- Provision of specialist energy awareness advice to end users in particular to reduce energy consumption by utilising data from M & T system.

The Energy Engineer's responsibilities in relation to the programme will be:

- Identification of potential projects including quantifying high level business cases.
- Completion of outline design proposals to enable preparation of budget costs.
- Preparation of detailed business cases for individual projects.
- Preparation of technical specifications and tender documents.
- Project management of individual schemes.
- Management of invest to save
- Verification of savings and completion of financial status reporting to Welsh Government and other funding bodies.

5.5 Communication and Training

Whilst the previously named Officers have specific areas of responsibility it is important to communicate to everyone that:

1. They each have a responsibility to reduce the Council's CO_2 emissions as this has important financial, environmental and social benefits.
2. It is also important the individual staff members and pupils are fully aware of their impacts and how their actions can make a difference.

The provision of regular feedback and the delegation of CO_2 reduction targets as part of a monitoring and targeting approach has been shown to be successful in raising awareness and providing the necessary motivation to realise cost effective saving of more than 10% from behaviour change and improved operational control.

Therefore the Authority need to develop and maintain the development of a Communication Plan as part of the implementation process for the Carbon Management Plan.

5.6 Policy Alignment

New and existing policies and strategies

There is a need to consider carbon management when drafting new policies and strategies.

Whilst Policies provide essential guidance within an organisation they can only be effective in achieving CO_2 reductions if adhered to.

An ongoing review all of the Authority's current policies and strategies to ensure that appropriate consideration has been given to carbon management needs to be undertaken and senior management commitment should be visibly demonstrated.

Key policy areas to be considered include:

New buildings

All new Welsh Government funded building works completed by the Authority to achieve a BREEAM "Excellent". However, even with the inclusion of renewable energy technologies, the Authority's recent experience has shown that it is difficult to meet this criteria.

It is essential therefore that careful consideration is given to energy performance during the design process. The Authority acknowledge that there is likely to be an additional capital cost associated with constructing energy efficient buildings but believe the resulting revenue savings from reduced energy consumption more than offset the additional capital cost.

As required by the Welsh Government this is accounted for by using a "Whole Life Cycle" costing approach on all new projects.

In addition, technologies such as air-conditioning that are recognised as being particularly high energy consumers should be avoided wherever possible through careful design that includes consideration of passive measures and the use of techniques such as free cooling.

Repair, maintenance and renewal schemes

The Authority currently has no formal policy in relation to energy efficiency standards when undertaking significant repair and maintenance works. The Authority believe that in respect of repair and maintenance works, ad-hoc arrangements and the requirement to conform to Building Regulation requirements already lead to energy efficient mechanical and electrical installations during refurbishment works.

There is therefore a need to provide formal policy guidance as to minimum technical standards for energy efficiency and the use of "whole life" costing methods for appraisal of potential projects. A formal 'Design and Refurbishment' Strategy has been prepared to assist. See appendix 6.3.

Heating policy

A formal “Temperature in the Workplace Policy” has been prepared see appendix 6.2., to assist in handling staff complaints professionally.

This Policy recognises the Council’s obligations to staff to maintain a comfortable working environment whilst using energy responsibly. This duty is discharged by maintaining the space temperature in buildings during normal working hours to recognised levels.

The Policy also provides guidance on handling complaints relating to thermal comfort and advice to staff on simple measures they can take to improve their thermal comfort during periods of abnormally cold or hot weather.

Lighting

Lightingin MTCBC accounts for high proportion of total electricity use in council buildings.

Staff at all levels shall be involved in making savings and this shall be achieved by notification at staff briefings and communications via email and intranet. A formal lighting Strategy has been prepared to assist. See appendix 6.5.

Cleaning staff shall be advised to turn off unnecessary lights, as they are often the last people to leave a building.

5.7 Finance and Investment

Due to scarce internal funding it is likely that the Carbon Management Plan will need to be funded almost exclusively using interest free loans and repayable grants, e.g. SALIX and Welsh Government Invest to Save.

However, existing revenue budgets and capital allocated for repair and maintenance schemes can also realise carbon savings if considered as part of the works.

Constant utility prices have been used in all calculations with the exception of the “value at stake” as previously described.

5.8 Annual Progress Review

The Energy Savings Tracker will be updated once a year to track financial, carbon and energy savings.

We could also consider reporting on:

- Overall CO_2 emissions reductions.
- CO_2 emissions reductions from buildings.
- CO_2 emissions reduction from streetlights.
- CO_2 emissions reduction from fleet.
- CO_2 emissions reductions from business travel.

The ability to report on the above metrics will depend on the amount of resource and time available to the energy unit to carry out the calculations.

Appendix 6.1 Action Plan

Action/ Project	Target	Anticipated Completion	Progress/Outcome
A1.Deliver REFIT Programme	100-130k estimated savings per annum.	1/01/2021	Currently out to Tender, Investment grade surveys to begin early 2020
A2. Secure funding and Install Systemslink Energy Management Software	Fully populated database	1/09/2020	Systemslink Installed in Aug 2019.Currently populating software with site and meter information.
A3. Installation of Energy Efficient Lighting Upgrade in 3 schools	New lighting installed	1/12/2019	2 Installations complete-12/09/19 Work to start on final school in October 2019
A4. Carry out historic Energy Invoice Audit of MTCBC Supplies	Lower Energy Spend	14/09/2019	Audit completed-Estimated savings of approximately £170k over a 5 year period
A5. Increasing number of sights linked to Trend 963 BMS Supervisor	20 sites on Trend 963 by 2025	Ongoing	Currently have 7 sites on Trend 963. Further 3 to be added in December 2019. Progress is dependent on how many boiler replacements are being carried out within the authority and new buildings are being constructed
A6. Creation of Energy Support Strategy for Schools	Improve Energy Efficiency in schools	TBC	Not Started
A7.Increase no of sites on GAS AMR	All sites have gas AMR –Better Management of Gas Consumption	2021	Exploring options of funding with Education. New gas supplier being appointed in 2021 which could make the installations more complex.
A8. Installation of Water AMR on Larger Sites	Improved control and identification of water waste in MTCBC sites	TBC	Not Started
A9.Improve visibility of water data in MTCBC	Energy Unit to have annual coverage of water date in Systemslink	TBC	Not Started
A.10 Implement Billing Validation	Identify billing errors within days of receiving electronic bills if and when they exist	TBC	Not Started
A.11 Implementation	Schools and other	TBC	Not Started

of web reporting module for sites	budget holders will have access to energy data. Enable users to understand operational energy use and also to measure the effectiveness of actions taken to reduce consumption		
A.12 Install Vehicle Trackers to remaining 25% of vehicles	Better management and monitoring of authority vehicles	TBC	Not Started
A.13 Reduce Business Travel by use of video conferencing (promoting existing facility at Civic & installing new at Unit 5)	Less use of vehicles to carry out council business	TBC	Not Started

Appendicx 6.2 Draft Temperature in the Workplace Policy Document

POLICY ON TEMPERATURE IN THE WORKPLACE

Purpose

This policy defines the Council's approach to providing heating in its' buildings. Providing a consistent level of comfort, along with managing energy effectively, are essential to the Council. The Council(Not including Leisure Trust) currently spends approximately £1.1 million on energy in buildings and consistent heating control is therefore essential in managing costs, as well as in meeting its commitment to continued carbon emissions reduction.

Health and Safety Legislation

The Workplace (Health, Safety and Welfare) Regulations 1992 cover a wide range of basic health, safety and welfare issues such as heating, lighting, workstations, seating and welfare facilities.

Whilst, the Workplace Regulations do not specify a minimum or maximum indoor workplace temperature, the Approved Code of Practice does recommend the following:

"*The temperatures in workrooms should normally be at least 16 degrees Celsius unless much of the work involves severe physical effort in which case the temperature should be at least 13 degrees Celsius*."

"*These temperatures refer to readings taken using an ordinary dry bulb thermometer, close to workstations, at working height and away from windows*."

However, the ACOP adds that this "…*does not apply to rooms or parts of rooms where it would be impractical to maintain those temperatures, for example in rooms which have to be kept open to the outside, or where food or other products have to be kept cold*."

HSE publication, Thermal Comfort in the Workplace, notes that "*thermal comfort is difficult to define"* and that *"the best that you can realistically hope to achieve is a thermal environment which satisfies the majority of people in the workplace*".

The Council's Commitment

The Council is committed to meeting its' legal obligation and additionally to seek to provide a thermal environment that satisfies the majority of people in the workplace, the majority of the time.

The council is also committed to the responsible use of the energy and supporting the Welsh Assembly Government in its' legal duty to promote sustainable development in Wales.

Temperature Guidance

Heating

To balance the requirements for thermal comfort and the responsible use of energy, the Council seeks to heat its' buildings to the standard set point during normal working hours which for office environments is given by the Chartered Institution of Building Services Engineers (CIBSE) as between 19-21 °C, we will therefore aim to heat our buildings to 20°C. Normal working hours *(generally within the range 07:00 – 19:00)* are agreed with the individual departments/building users and outside these hours, heating will be set back to lower temperatures appropriate to the background conditions and level of use.

Other areas may be heated to a lower level, e.g. Corridors, store rooms, toilets, sports halls etc.

It should be noted during particularly cold spells and following periods when the building has been unoccupied, that it may not be possible to achieve these temperatures by the start of the working day. In such circumstances the Council is committed to taking all reasonable steps to maintain at least the legal minimum temperature until "normal" levels are reached.

The use of portable electric or gas fired heaters within the Council's buildings is prohibited for reasons of safety, unless authorised by the Head of Property Services for short term use only, in limited critical areas, in the event of a sudden temporary fault with the main system.

Heating season

The heating season is dependent on many factors including internal & external temperatures and is therefore weather, not date dependant, but will generally run from 1st October – 30th April.

- In autumn, heating systems are turned on once maximum daily outside temperatures are forecast to fall below 14 °C for 5 consecutive days.
- In spring, heating systems are turned off once maximum daily outside temperatures are forecast to rise above 14 °C for 5 consecutive days.

Statutory maintenance also takes place over the summer period and therefore it may not be possible to start heating systems at short notice.

Supplementary heating - electric plug-in heaters

- During the heating season, where internal temperatures are below 19 °C during normal working hours, occupants can contact Responsive Repairs helpdesk in the first instance to check whether there are any problems with the heating system or whether local heating controls can be adjusted. Where problems are identified that cannot be quickly resolved, a request can be made for the use of an oil-filled radiator/portable heater.
- Requests for additional supplementary heating for health or other specific reasons must be approved by the Occupational Health Department.

- Individuals are not permitted to bring in/purchase their own local heaters and if found, these may be removed during routine health & safety inspections.
- Plug-in heaters must not be left on out of hours under any circumstances.

Small Power Equipment

MTCBC shall ensure that members of staff do not use their own equipment (in particularly personal fans, fridges, electric heaters and kettles) within council buildings. There are potential safety issues if personal equipment is used because the equipment would not have a Portable Appliance Test (PAT) certificate and energy consumption will be unrecorded. This Strategy empowers Building / Estate Managers and Site Responsible Officers to confiscate personal electric equipment unnecessarily consuming energy in a premises. Any exceptions must be approved in writing by the Building / Operational Manager.

In place of kettles and fridges the council provide kitchenettes with appropriately controlled (i.e. time clock controlled) water boilers/chillers, and efficient white goods (such as fridges/freezers). Where possible time switches shall be adopted on small equipment to ensure equipment is switched off outside of typical hours and weekends.

In replacement of end of life equipment/white goods, the council shall adopt a Strategy of replacement procurement of goods with a minimum of 'A' rating.

Cooling

Whilst there is no legal maximum temperature in the workplace, the Council recognises guidance published by the Chartered Institution of Building Services Engineers (CIBSE) and notes that temperatures in excess of 28°C for prolonged periods may prove uncomfortable.

However, it is likely that some areas, e.g. kitchens, swimming pools, etc. may experience these levels as the norm and will therefore need to consider this as part of a risk assessment process when drafting method statements and operating procedures.

The Council discourages the installation of comfort cooling/air conditioning due to the significant environmental and financial impact of such equipment. All requests for comfort cooling/air conditioning should be made through the relevant section head to the Head of Property Services, regardless of funding source, who will consider the use of such equipment only after thorough investigation and in extreme circumstances where no other means of reducing temperatures can be employed.

Thermal Comfort Queries

In the event of a breakdown or malfunction of a heating or cooling system the fault should be reported following the normal procedure, i.e. raising a maintenance request through the responsive repairs helpdesk.

Where there is an issue with thermal comfort that does not involve a breakdown or malfunction, in the first instance we will need to ascertain the temperature in the work area. Temperature data loggers are held by Property Services which record the temperature in an area every 30 minutes. These will be installed in the first instance to check the actual temperatures over several days. Should temperatures not meet the Council's target levels a maintenance request will be raised to investigate the cause of the problem.

In the event that temperatures are within the Council's target levels and a query with thermal comfort levels still exist then this should be referred to the line manager who will report on to the relevant section head. They will then need to jointly consider issues such as the type of work being carried out, the age, sex, state of health and degree of fitness of the individual and whether appropriate clothing is being worn.

Simple Ways You Can Ensure Thermal Comfort:

In Extreme Hot Weather

- Dress appropriately
- Consume cold drinks, water is preferable to carbonated drinks
- Use window shading, e.g. vertical blinds, curtains, etc.
- Use open-able windows to increase air movement
- Where open-able windows do not exist or are limited use desk or pedestal fans to increase air movement
- Site workstations away from direct sunlight or other sources of unwanted heat
- Take regular breaks to get cold drinks or cool down
- Make use of flexible work systems where possible to reduce exposure to periods of peak temperature

In Extreme Cold Weather

- Dress appropriately
- Keep windows closed wherever possible and reduce other draughts
- Site workstations away from cold spots if possible, e.g. next to windows
- Take regular breaks to get hot drinks or warm up
- Stay as active as possible to maintain good circulation
- Make use of flexible work systems where possible to reduce exposure to coldest periods
- Do not place furniture in front of radiators

Appendix 6.3 CO_2 Conversion Factors

Source	UK Government GHG Conversion Factors for Company Reporting, Version 1.0 for year 2016 (expiry 31/6/17)		
Date of calculation	24/10/2016	& 1/06/19	
2014/15			
Elec	0.40957	$kgCO_2/kWh$	Actual CO_2 (not equivalent)
Natural gas	0.18365	$kgCO_2/kWh$	Gross CV
Gas oil	0.25359	$kgCO_2/kWh$	Gross CV. Actual CO_2 (not equivalent)
Biofuel	0		Assume to be carbon neutral for reporting purposes
Water supply	0.344	$kgCO_2e/m^3$	Equivalent figure based on 'metered' volume
Water treatment	0.708	$kgCO_2e/m^3$	Equivalent figure based on volume to drain
Business Travel - car	0.2987	$kgCO_2/mile$	From Managed Asset - Vehicles, average size car & unknown fuel type
Fleet -Diesel	2.59007	$kgCO_2/litre$	From "Fuels" diesel bioblend
Fleet - business travel	0.2987	$kgCO_2/mile$	From "Managed Assets" average car unknown fuel
2018/19			
Elec	0.28088	$kgCO_2/kWh$	Actual CO_2 (not equivalent)
Natural gas	0.18362	$kgCO_2/kWh$	Gross CV
Gas oil	0.25359	$kgCO_2/kWh$	Gross CV. Actual CO_2 (not equivalent)
Biofuel	0		Assume to be carbon neutral for reporting purposes
Water supply	0.344	$kgCO_2e/m^3$	Equivalent figure based on 'metered' volume
Water treatment	0.708	$kgCO_2e/m^3$	Equivalent figure based on volume to drain
Business Travel - car	0.28272	$kgCO_2/mile$	From Managed Asset - Vehicles, average size car & unknown fuel type
Fleet -Diesel	2.59007	$kgCO_2/litre$	From "Fuels" diesel bioblend
Fleet - business travel	0.2987	$kgCO_2/mile$	From "Managed Assets" average car unknown fuel

Appendix 6.4 Refurbishment and Design Procedure

Regulations
Merthyr Tydfil Council will conform to all requirements of the building regulations regarding new build and refurbishment projects and ensure that all agents acting on our behalf do the same. The Council aims to exceed the regulatory standards where possible.

Approach to Design
MTCBC has a defined approach to design which is laid out in the following sections to ensure energy use is a key consideration.

- Evaluate the main criteria and drivers for the refurbishment or new build such as implementing a good working environment, improved space utilisation etc.
- Estimate how energy will be used in the building type including a thorough assessment of the equipment and small power that will be installed
- Consider how the use of the building may change in the future
- Minimise energy demand through choice of fabric, shape and configuration of a building
- The importance of air tightness
- Efficient building services
- Whole life assessment
- Sustainable Procurement
- Use of renewable technologies where appropriate
- Consider the operation of the building and post occupancy assessments.

Energy Performance
Within each new building or refurbishment project the Council shall consider energy performance in use of the premises and act to provide the most efficient solutions based on the building requirements.
Energy Performance Indicators such as kWh/m2/yr are used as energy consumption benchmarks, furthermore it is recommended energy consumption is estimated via CIBSE TM:54.
Targets will be put in place for all new build and refurbishment projects. Targets for refurbishment projects will depend on the scope of the works. For example, any lighting project should include targets for maximum lighting energy and maximum lux levels.

Electric Heating
Direct electrical space heating should be precluded for all Council buildings with the exception of:

- Temporary buildings (e.g. demountables on hire for <2-year period.)

- Small extensions that comprise one or two Individual rooms attached to or within an occupied building that is otherwise unheated.
- Sites that have sufficient electrical capacity and/or no gas available.

Commissioning
A holistic approach to commissioning should be taken to ensure that the whole building is commissioned, not just individual items of equipment. A commissioning plan should be developed at design stage to ensure that necessary metering and monitoring is installed to allow the required commissioning process to be assessed.

The commissioning process should be agreed at the commencement of the process and shall occur at stages throughout the project as elements of the project are completed, not just at the end of the project. Seasonal commissioning should be implemented as standard to ensure efficient year round operation.

Post Occupancy Surveys
The reassessment of buildings once occupied is a key step in understanding how the effective actions taken in designing or refurbishing the building have been. Reviewing buildings to ensure that they continue to perform as predicted and that they are updated, or adapted, as circumstances change is one area of best practice which the Council intends to develop further.

Use of Resources
Amounts of energy and water used during construction shall also be required to be minimised and monitored during the construction process. Those tendering for contracts should be as asked to establish what priority organisations they would give this.

BMS
A Building Energy Management System (BEMS) is a very useful mechanism that allows users to review the performance of controls and conveniently make adjustments. It can offer a closer control and monitoring of building services performance, including heating, ventilation and lighting.
A key aim of the BMS strategy is to update and standardise the systems installed. Currently, the Council operates a diverse BMS estate with in excess of ten different proprietary systems.
Taking this into account, all new systems will be Trend and connected to the Property Services Trend 963 system. This will allow the remote monitoring of Council Buildings Systems, negate the frequency of contractor call outs and potentially reduce energy running costs.

Metering

New build projects shall comply with Part L of the building regulations which enforces the installation of sub meters as part of the construction. Refurbishment projects shall ensure that where appropriate, sub meters are installed to aid the long term performance of the building.All new main supplies will also be equipped with smart metering technology to allow monitoring of consumption data and identification of waste.

Sustainability in Use

Consideration shall be given not just to the environmental impact of the construction itself, but of the building once it is in use. By installing facilities that are more energy and water efficient, such as low flush toilets, and heat pump systems, the environmental impact of the building once it is inhabited can be minimised.

FACILITY	EFFICIENCY DEVICE	RESOURCE USE AFFECTED	IMPACT
TAPS	Outlet devices, e.g. Push Taps Flow regulators Cartridges (in single lever mixer taps)	Water (and energy)	Up to 80% reduction Reduce the water flow to 3.5, 5 or 6 litres/min 32% less water than a standard tap when in full flow and 72% less when in low flow
WCS	Dual flush Leak-free siphon Delayed action inlet valve Rain/grey water recycling	Water	Up to 50% less water per flush Prevents loss through leakage Saves 25% 100% reduction of fresh water use

LIGHTING	LEDs Intelligent lighting system that uses natural light e.g. sun tubes Motion sensors Light sensors	Energy	90% less than incandescent Varied Can be 50% or more (varies by room use) Can be up to 50%
HEATING	Thermostatic radiator valves Combined Heat and Power Weather Compensation and Optimisation	Energy	15% of heating bill Minimum 10% energy savings
Renewable	Photovolatic Systems	Electricity	
Ventilation	Variable Speed Drives Heat Recovery Time Control C02 /Prescence Sensors	Electricity/Gas	Varied

Appendix 6.5

Internal Lighting Design Procedure

Lighting is essential for providing a pleasant and productive working environment so it is important to keep windows, skylights and light fittings clean. Staff shall report failing lamps and so that the Building Manager can have them replaced promptly. This will help maintain the desired light output and, in turn, provide a safer working environment. Controls are to be kept in good working order by ensuring timers are set to match occupancy hours and that occupancy sensors are clean.

Daylight is the only freely available light source. Well controlled daylight should provide a space with the best possible lighting effect, greater user comfort and with zero cost or CO2 emissions.

The budget holder shall upgrade any standard incandescent lamps to LEDs, which consume less energy and last much longer. Blackened, flickering, dim or failed tubes shall be replaced with triphosphor coated lamps, which provides a more natural, brighter light for the whole life of the tube.

Available lighting control solutions shall be evaluated on an annual basis (due to rapid change in technology/capital costs).

Lighting shall be controlled in each space to avoid any lighting being left on unnecessarily. If automatic lighting controls are installed, they should include the following methods and be commissioned correctly to give the maximum benefit from the systems.

- Movement sensor – occupancy control
- Light sensor – daylight linking.

Lighting levels and daylight factor shall be designed in line with CIBSE Lighting Guide (no.7) for offices and other lighting guides where appropriate.

Appendix 6.6-Savings Tracker

Site	Date of Installation/ Implemention	Project Description	Estimated/Actual Savings	Annual Savings(£)	Annual Energy Savings(kWh)	Annual Co2 Savings(Tonnes)	Type of Savings(£)	Cumulative Savings(£)
Technical Projects								
Unit 5	01/04/2015	Sensors fitted to warehouse lighting	Actual	182	1656	0.47	Year on Year	728
Civic Offices	01/04/2013	Energy Efficient Boiler and Controls Upgrade	Actual	10,000	280,000	51.41	Year on Year	50000
Cyfarthfa High School	01/05/2017	Replace DHW Calorifier and Boiler serving kitchen with gas fired storage Heater	Actual	294	2675	0.49	Year on Year	588
Cyfarthfa High School	01/11/2018	Energy Efficient Lighting Upgrade(LED)	Actual	7,049	58745	16.50	Year on Year	
Dowlais Junior School	08/08/2019	Energy Efficient Lighting Upgrade(LED)	Estimated	2,331	16,430	4.61	Year on Year	2331
Bedlinog Primary School	08/08/2019	Energy Efficient Lighting Upgrade(LED)	Estimated	2,191	15,000	4.21	Year on Year	2191
Greenfields School	01/09/2019	Energy Efficient Boiler and Controls Upgrade	Estimated	1,000	50,000	9.18	Year on Year	1500
Edwardsville Primary School	01/09/2019	Energy Efficient Boiler and Controls Upgrade	Estimated	500	16,666	3.06	Year on Year	500
Pantyscallog Primary School	TBC	Energy Efficient Lighting Upgrade(LED)	Estimated	3,000	28,000	7.86	Year on Year	3000
Gwaunfarren Primary School	TBC	Energy Efficient Lighting Upgrade(LED)	Estimated	2,378	19,737	5.54	Year on Year	2378
Rhydycar Leisure Centre	01/01/2017	Installation of Combined Heat and Power Unit	Actual	30,000	TBC	TBC	Year on Year	60,000
Operational Management /Behaviour Change								
Castle Street Multi Storey Car Park	02/01/2019	Regprogramming of Internal Lighting Time Controls	Actual	2,383	63563	17.85	Year on Year	1500
Civic Offices	01/03/2019	BMS Optimisation/Behaviour Change/ VER	Estimated	9,172	76441	21.47	Year on Year	9172
Coed Y Dderwen	01/03/2	Optimisation of Boiler Controls	Estimated	2,600	115,000	21	Year on	2600

Primary School	019						Year	
YGG Santes Tudful	01/03/2019	BMS Optimisation	Estimated	1,656	52807	10.27	Year on Year	1656
Abercanaid Primary School	01/03/2019	Behavioural Change	Estimated	1,214	84338	23.68	Year on Year	1000
Treharris Care Home	01/03/2019	BMS Optimisation	Estimated	2,663	22192	6.23	Year on Year	2663
Dowlais Infants	01/12/2019	BMS Optimisation/Property Rationlisation	Actual	688	5741	1.612	Year on Year	688
Afon Taf High School	01/03/2019	BMS Optimisation/Caretaker Training	Actual	7,155	209654	40.35	Year on Year	5000
Schools and Corporate Buildings		Holiday/ Half Term Switch Off Campaign	Estimated					
Design and Asset Management								
Afon Taf High School	01/04/2017	Phased remodelling of site. Outcomes will include a reduction in GIA from 12,086m^2 (from DEC) to 8,155m^2.	Actual	19,000	292001	gs-144839/es147162	Year on Year	38,000
Renewables								
Unit 20	01/08/2019	30kw Solar Array fitted to Unit(Inc Registration of Feed in Tariff)	Actual	4,904	20,433	5.73	Year on Year	4904
Energy Invoice Audit								
Afon Taf High School	02/01/2019	Reduction in Maximum Import Capacity	Actual	536	n/a	n/a	Year on Year	536
Civic Offices	02/01/2019	Reduction in Maximum Import Capacity	Actual	400	n/a	n/a	Year on Year	400
Unit 5	02/01/2019	Reduction in Maximum Import Capacity	Actual	535	n/a	n/a	Year on Year	535
Orbit Offices	02/01/2019	Reduction in Maximum Import Capacity	Actual	1,253	n/a	n/a	Year on Year	1253
Bargoed House	02/01/2019	Reduction in Maximum Import Capacity	Actual	800	n/a	n/a	Year on Year	800
Gurnos House	02/01/2019	Reduction in Maximum Import Capacity	Actual	750	n/a	n/a	Year on Year	750
Heolgerrig Primary School	02/01/2019	Reduction in Maximum Import Capacity	Actual	696	n/a	n/a	Year on Year	696
Edwardsville Primary School	02/01/2019	Reduction in Maximum Import Capacity	Actual	321	n/a	n/a	Year on Year	321

Red House-Leisure Trust	01/06/2019	Reduction in Maximum Import Capacity	Actual	4,104	n/a	n/a	Year on Year	4104
Rhydycar Leisure Centre-Leisure Trust	01/06/2019	Reduction in Maximum Import Capacity	Actual	4,474	n/a	n/a	Year on Year	4474
Cae Mari Dwn Sports Field	19/07/2019	Reduction in Maximum Import Capacity	Actual	1,200	n/a	n/a	Year on Year	1200
Bishop Hedley School	01/04/2019	CCL(Climate Change Levy)Rebate	Actual	10,103	n/a	n/a	One Off	10,103
Bishop Hedley School	01/04/2019	CCL Exemption	Actual	4,462	n/a	n/a	Year on Year	4462
Bargoed House	01/04/2019	CCL(Climate Change Levy)Rebate	Actual	9,491	n/a	n/a	One Off	9491
Bargoed House	01/04/2019	CCL Exemption	Actual	4,467	n/a	n/a	Year on Year	4467
Gurnos House	01/04/2019	CCL (Climate Change Levy)Rebate	Actual	9,321	n/a	n/a	One Off	9321
Gurnos House	01/04/2019	CCL Exemption	Actual	4,415	n/a	n/a	Year on Year	4415
Llysfane Care Home	01/04/2019	CCL (Climate Change Levy)Rebate	Actual	2,149	n/a	n/a	One Off	2149
Llysfane Care Home	01/04/2019	CCL Exemption	Actual	1,460	n/a	n/a	Year on Year	1460
Thomastown House	01/04/2019	CCL (Climate Change Levy)Rebate	Actual	1,192	n/a	n/a	One Off	1192
Thomastown House	01/04/2019	CCL Exemption	Actual	510	n/a	n/a	Year on Year	510
Unit 5	01/05/2019	Water Meter Downsizing	Actual	3,800	n/a	n/a	Year on Year	3800
Coed Y Dderwen Primary School	01/04/2019	Electricity Meter discrepancy resolution	Actual	3,150	n/a	n/a	One Off	3150
Fleet								
Install trackers to 75% of vehicles	01/01/2016	TBC	TBC	TBC				
Other								
Pen y Dre NLC	01/02/2019	Production of Energy Performance Certificates	Actual	900	n/a	n/a	One Off	900
							Total(£):	260888