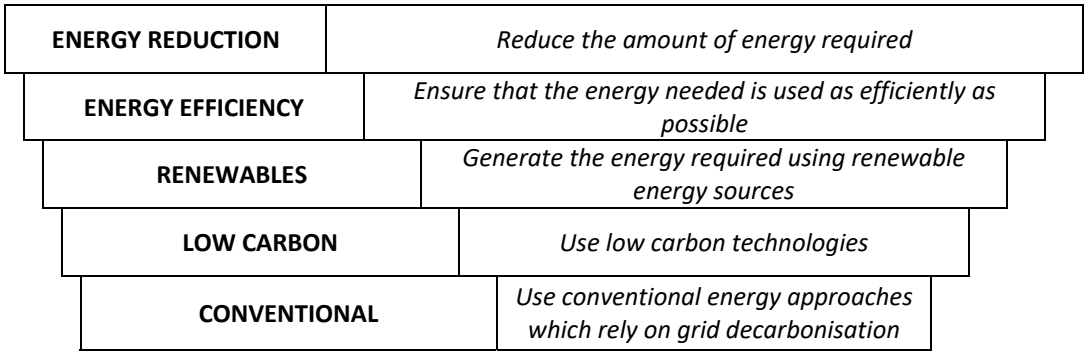
ENERGY STRATEGY AND ACTION PLAN (Appendix 1)
FEBRUARY 2022

Introduction & Background

In March 2019 the council declared a climate emergency with an ambition of reaching net zero by 2030. Energy use contributes around 83% of the council's carbon emissions and it is therefore recognised that measures are needed to reduce consumption across its services, increase the volume of energy from low carbon sources and to act as an exemplar in promoting a reduction in the impacts of energy consumption across the city.

The scope of this strategy is primarily focused on the council's own energy usage. A separate 'Better Homes' strategy, linked to the council's Housing Strategy, is currently being developed to address the decarbonisation of housing within Leeds.

In setting out this strategy and action plan it is important to acknowledge the hierarchy that represents a recognised approach to managing energy, whereby reducing the demand for energy is the first principle, before then meeting demand through the greenest method available. This approach has been adopted in the development of the energy strategy.



Context

National Policy

In 2019 the UK became the first major economy to introduce legislation to reduce its greenhouse gas emissions to zero by 2050. The government's *10 Point Plan for a Green Industrial Revolution* was published in November 2020 with the aim of setting foundations for enabling growth towards a greener future by laying out funding and support across 10 areas, including advancing offshore wind power generation, driving the growth of low carbon hydrogen and accelerating the shift to zero emission vehicles.

The *Heat and Buildings Strategy* published in October 2021 sets out the government's vision for a greener future through the transition to high-efficiency low carbon buildings. It acknowledges that, in order to meet net zero, all heat in buildings will need to be decarbonised, which will mean moving away from burning fossil fuels for heating. In doing so it has set the ambition of phasing out the installation of new gas boilers by 2035. Furthermore, in the *Net Zero Strategy* (October 2021) the government builds upon the *10 Point Plan,* laying out a wide variety of key commitments across all sectors, such as taking action so that all grid electricity will be from zero carbon sources by 2035, accelerating deployment of low cost renewables, delivering 40GW of offshore wind by 2030, aiming for 5GW of UK hydrogen production by 2030, making heat pumps as cheap to buy and run as

gas boilers by 2030, and ending the sale of new petrol and diesel cars and vans from 2030, with all cars and vans from 2035 required to be zero emissions.

Whilst this strategy sets out the council's main areas of action to reduce the impacts of energy use from its activities, it must be acknowledged that the strategy will only be achieved if a range of national infrastructure and policy changes, along with significant funding, are delivered by government.

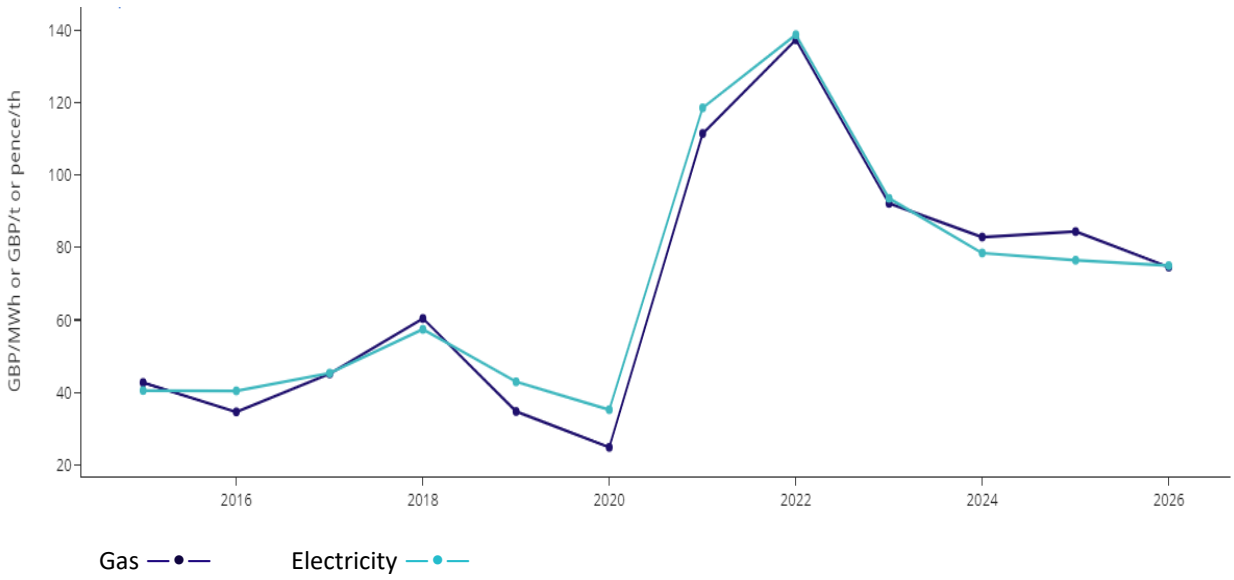
National Energy Trends

In July 2021 the government set in law the sixth carbon budget following the recommendations set out by the Climate Change Committee (CCC) in December 2020, *The Sixth Carbon Budget – The UKs Path to Net Zero*. The CCC's report recognises that emissions from electricity production have fallen 74% since 1990, with a 65% reduction over the last 10 years due to a combination of coal fired power stations closing, electricity demand falling and renewable generation capacity increasing. However, it also states that much more is needed across other sectors, since, for example, 99% of all miles driven are still in petrol or diesel vehicles, and less than 5% of the energy used for heating buildings is from low-carbon sources.

The CCC's report sets a balanced pathway for achieving net zero by 2050. Key points within this report are decarbonising electricity generation by 2035 and predominantly decarbonising production by 2030, largely through phasing out unabated fossil fuel generation and significantly increasing wind and solar generation. The report recognises an increase in demand for electricity through the transition to a more electrified economy (e.g. electric vehicles, heat pumps, etc.), with a doubling in demand by 2050.

Over the last year energy markets in Europe have been thrown into turmoil with increases in energy demand across the globe, reductions in supply, and other political and economic factors, with the result that costs have increased to unprecedented highs. The chart below shows the evolution of gas and electricity spot market prices over recent years and indicative prices looking ahead, and this all reinforces the economic case for action.

UK gas and electricity prices



Strategic Aims and Key Themes

The overall aim of the council's energy strategy is for its energy consumption to be 100% from zero carbon sources by 2030 in line with the climate emergency ambition of becoming net zero by this time.

Given the very significant costs of energy, especially in the context of the current position with global markets and council budget pressures, managing these cost impacts is also a key priority.

The strategy therefore sets out a proposed pathway for the council to minimise the environmental and financial costs of its energy usage, accepting that it will be necessary to review and update the strategy as national policy evolves.

The key outcomes of the energy strategy will be to deliver a range of social, environmental and economic benefits as follows:

- Reduce greenhouse gas emissions;
- Contribute towards air quality improvements;
- Ensure better controlled and managed buildings;
- Achieve better energy cost certainty and stability;
- Increase investment in local low carbon energy generation;
- Increase local employment and skills development via the green economy.

To achieve this a range of actions need to be delivered across the following key themes:

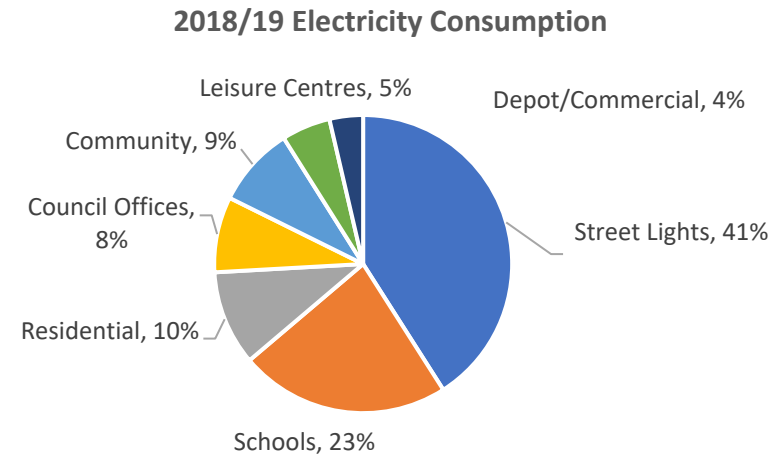
1. Reducing energy consumption;
2. Increasing energy efficiency;
3. Increasing local renewable energy production;
4. Converting the council's vehicle fleet from petrol/diesel to electric;
5. Changes to the approach to energy purchasing.

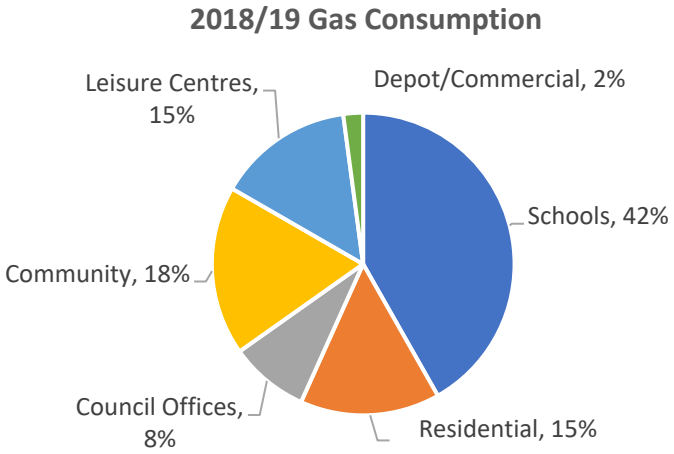
Current Position

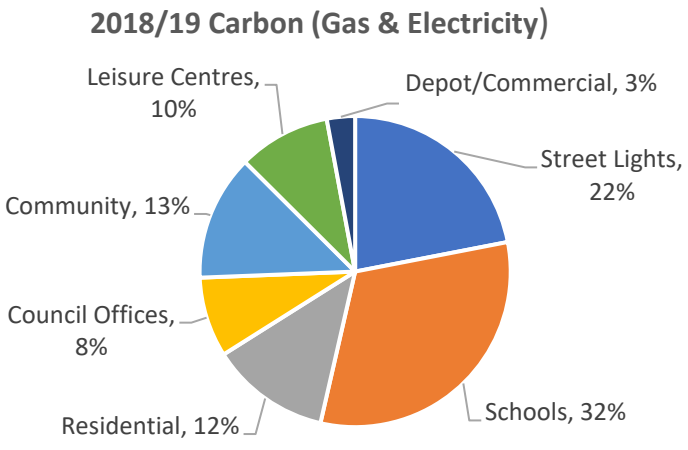
In 2018/19, just ahead of the declaration of the Climate Emergency for Leeds, the council consumed around 159,000 MWh of gas and 123,000 MWh of electricity across our corporate estate and the schools whose energy supply we manage on their behalf. This can be broadly broken down into the following energy supply or building types:

- Community – including community centres/hubs, libraries, one-stop centres, museums, parks, changing rooms, public conveniences, crematoria;
- Council offices – also including civic buildings, data centres;
- Depot/commercial – including waste sites, markets, commercial units;
- Leisure centres;
- Residential – including landlord supply communal areas, care homes, independent living, sheltered housing, secure units, district heating, etc.;
- Schools – also including adult training, early years and specialist inclusive learning centres;
- Street lighting – also including other highways infrastructure supplies.

Electricity and gas consumption for 2018/19 across these groups, and the combined carbon emissions, are shown in the charts below:







Since this time the council has been working across all areas to reduce this consumption and its impacts, and to determine the council's strategy as outlined in the Key Themes section below.

Key Themes

1 – REDUCE DEMAND FOR ENERGY

The council has a substantial portfolio of around 700 operational buildings and seeks to use these as efficiently as possible, guided by the Estate Management Strategy which was approved in November 2021. This may involve further rationalisation of the estate where this can be achieved without detriment to service levels and quality. Notable recent examples in the city centre include the disposal of the Leonardo, Thoresby and 2 Great George Street buildings and the leasing out of St George House, but this is a city-wide programme with other buildings vacated in the last eighteen months including Hough Top at Pudsey and Shire View at Headingley.

The council has moved to a more agile way of working which balances both home working and working from the council's buildings, and this has changed the requirements for our estate. In addition, the ongoing transformation in ways of working and providing our services will continue to inform changes to estate provision and the potential to deliver further building releases.

It also remains important to improve how we monitor energy usage to understand where further energy savings can be achieved through better energy management. Improving our reporting of this data to service managers and our facilities management teams will help to drive energy reduction measures. A detailed audit of the highest consuming sites will be completed to identify potential measures that will reduce consumption levels.

In addition to this, further council-wide communications campaigns need to be delivered to raise awareness and influence behaviours across building users and managers.

2 – INCREASE ENERGY EFFICIENCY

In order to reduces its emissions, the council also needs to maximise the efficiency of its building stock. Introducing energy efficiency measures, such as installing LED lighting, can be relatively easy to implement and deliver significant reductions in energy consumption.

Streetlighting

One of the council's main users of energy is street lighting, accounting for around 40% of electricity consumption based on the 2018/19 figures shown above. A four year programme to transfer the city's streetlighting to run on LEDs by October 2023 was commenced in 2019 at a rate of around 1,900 new lanterns installed per month.

Once complete it is expected that this scheme will reduce the council's electricity consumption by almost 31 million kWh per year, equating to over 40,000 tonnes CO2e saved cumulatively by the end of 2030.

Council Buildings

The council has been working to deliver energy efficiency improvements across its corporate estate. Through the government's Public Sector Decarbonisation Scheme (PSDS) the council has secured around £25m of grant funding from BEIS that has allowed 42 council buildings across its estate to have decarbonisation and energy efficiency measures installed. The buildings include leisure centres, offices, depots, heritage assets (i.e. Civic Hall, Town Hall, Central Library and Art Gallery, City Museum) homes for older people and a number of schools.

The majority of this £25m is being used to deliver schemes that decarbonise heat via air source heat pumps (ASHPs) and district heating network connections (see section below on decentralised heating). However, it also covers additional measures such as the installation of solar PV, LED lighting, double glazing and building energy management systems. All of the installation works across the 42 buildings will be completed by the end of March 2022, and once complete it is estimated that an annual carbon saving of 3,800 tonnes will be achieved. The council has now also received approval of funding bids to government for decarbonisation measures on a further 10 sites to a value of £4.3m.

The table below shows examples of the decarbonisation measures that are being installed on a leisure centre and a home for older people, along with the associated costs and benefits. Despite the CO_2 benefit, the installation of the ASHP alone on each example is shown to increase energy bills due to the increased cost of electricity required to power the ASHP being greater than the historical cost of gas. However, the introduction of the additional measure of solar PV to power the heat pump provides a net saving on the leisure centre, although this is not the case for the home for older people, where there is an overall adverse impact on the annual energy bill due to the 24/7 consumption profile of these sites and the limitations on the size of solar array that can be installed.

	Air Source Heat Pumps			**Solar PV**		
	Capital cost	**Impact on energy bill (annual)**	**CO2 impact (annual)**	**Capital cost**	**Impact on energy bills (annual)**	**CO2 impact (annual)**
Leisure Centre	£724,000	Increase £16,600 (21%)	Save 148.51 t/CO2e	£147,000	Save £24,600 (31%)	Save 10.75t/CO2e
Home for older people	£281,000	Increase £4,400 (20%)	Save 56.78t/CO2e	£65,000	Save £2,900 (13%)	Save 2.99t/CO2e

The high capital cost associated with ASHPs means that they are currently only affordable using grant support. Delivering solar PV alongside ASHPs is an effective means of decarbonising the additional electricity required by the heat pumps. However, whilst there is a business case for investing in solar PV as a stand-alone measure, the case cannot be readily made when this is being used to offset the higher electricity demand of the ASHPs, with the solar PV element then also requiring financial support to enable delivery.

In light of this, ASHPs currently represent a means of delivering high levels of CO_2 savings, but not a means of reducing energy bills. Achieving a viable business case in bidding for future funding for these schemes may therefore only be possible currently based on the ability to put forward groups of sites which can be assessed overall in terms of their performance and net cost rather than individually. However, within the *Heat and Buildings Strategy* the government has set the ambition of working with industry to reduce the costs of heat pumps by at least 25-50% by 2025 and towards parity with gas boilers by 2030, and achieving this aim would clearly improve the economics for this technology and these schemes.

Subject to further government funding becoming available and the cost of low carbon technologies reducing, the council will continue to deliver a programme of energy efficiency and decarbonisation measures year-on-year so as to ultimately cover all buildings where this is demonstrated to be feasible.

New Build

As the council's service requirements evolve there will inevitably be a need for new buildings to be constructed to replace or add to existing assets, with these ranging from care homes and schools to service depots. The council intends to act as an exemplar in terms of the energy efficiency of these new buildings alongside its ongoing work to strengthen climate related local planning policies through the Local Plan Update.

The energy strategy for these buildings will be based on a 'fabric first' approach to ensure that materials and measures are installed to ensure high levels of energy efficiency. This will involve additional up-front capital costs. However, this has to be considered against future energy costs and the higher cost of retrofitting energy efficiency measures at a later stage. In addition, the heating systems in new buildings will not involve the installation of gas boilers.

3 – RENEWABLE ENERGY

As well as the obvious carbon reductions, renewable energy delivers a range of other benefits. Renewables generation helps to hedge the council from the volatile market price changes associated with fossil fuel based generation. More local generation can also potentially avoid the inefficiencies through losses of energy during transmission. Furthermore, it can result in local job creation and can provide opportunities for community benefit.

In January 2020 the council's executive board approved the objective to move to 100% of its electricity usage to be provided from green sources through entering into a new power purchase agreement (PPA) with a renewables generator, with an ambition to move increasingly towards more locally produced renewables between now and 2030.

The last two years have seen major change in the energy sector due to COVID lockdowns, resulting new ways of working, estate rationalisation, the accelerated installation of energy efficiency measures across our buildings and schools, changes in government policy and the unprecedented level of energy price increases seen over the last year. This has created significant uncertainty in terms of being able to predict our future energy requirements.

However, with the new landscape emerging, the council is now looking to enter into a medium-term PPA with a renewable energy generator alongside the re-procurement of its electricity supply contract. It is envisaged that this agreement would support the development of a new renewable asset, with the generated energy attributed to the council's consumption, and approval is being sought to secure an agreement for up to 65% of the council's current electricity demand.

Alongside this the council will continue to explore the potential for large-scale renewables generation within Leeds. The council, in partnership with the West Yorkshire Combined Authority and First West Yorkshire, has already delivered a substantial solar scheme at the Stourton Park and Ride site. This includes battery storage, with the majority of the electricity generated being used to meet the site's requirements, including vehicle charging. However, the feasibility of a large-scale installation will be assessed, including a site selection process to evaluate needs and constraints, and assessing potential brownfield prior to consideration of greenfield sites, and non-Green Belt before Green Belt.

The council's energy supply contracts will remain flexible so as to be able to accommodate and adapt to the changing landscape and our changing energy requirements. It is anticipated that the proposed PPA will be integrated into the electricity supply contract,

effectively as an additional forward purchase amongst the others that are currently routinely made. The council will also explore a transition to a ‘green tariff’ for the remainder of its electricity requirement.

Alongside the ongoing decarbonisation of the national electricity grid and the reduction in our demand through rationalisation and energy efficiency measures, the proposals above will support the progressive wholesale move over to the council’s electricity demand being met wholly from renewables.

Although the wholesale transition from gas is more challenging due to the national strategic infrastructure changes required to decarbonise the existing gas grid, the council has been expanding its portfolio of low carbon heating assets across its estate through the ongoing programme of decarbonisation measures (see section 2 above), including installation of heat pumps and solar PV, and also through the expansion of decentralised heating systems as outlined below.

The government’s *Hydrogen Strategy* sets out how it plans to scale up hydrogen production capacity, although a national strategic decision for the role of hydrogen in heating buildings is yet to be taken. Decisions at a national level on production, storage and supply are required to understand the viability of hydrogen in heating buildings. However, the government’s *Heat and Buildings Strategy* sets out that hydrogen will play a key role in delivering their Net Zero Target as it provides a versatile option for replacing high-carbon fuels, and commits to developing the evidence base necessary to take strategic decisions by 2026.

In light of these national strategic aims and uncertainties in relation to natural gas, a prudent and balanced strategy for the council is to retain some level of mixed economy of its energy from both electricity and gas grids, as the future energy mix comprises a range of low-carbon technologies all working together to achieve net zero.

Decentralised Heating

The council promotes the use of decentralised energy systems where there is opportunity to do so as a viable means of taking control of energy provision and moving away from traditional energy generation sources such as gas boilers.

The council has led the way in the city through the development of the district heating network (DHN) know as ‘Leeds PIPES’. The council has significantly invested in Leeds PIPES to develop a city-wide network of the type that has become prevalent in countries such as Denmark.

Heat for the network is produced at the Recycling and Energy Recovery Facility (RERF) where the household black bin waste produced in Leeds is processed. Heat from the RERF is transported in the form of hot water through a 10km network of super-insulated underground pipework directly into the city centre. It is estimated that the network can provide up to around 100 GWh of heat per year and is currently anticipated to provide approximately 26 GWh in 2022/23 to a range of customers, with further expansion planned. The council’s own major civic buildings in the city centre are connected, with these being the Town Hall, Civic Hall, Library and Art Gallery and City Museum, with the heat supply from the network replacing the need for traditional gas boilers in these buildings. This alone will save 1,413 tonnes of CO_2 per year.

Within their 6th Carbon Budget, the CCC set a scenario where existing energy from waste plants such as the RERF are retrofitted with carbon capture and storage systems from the

late 2020s, with their balanced pathway scenario setting out that retrofitting should start from 2040. Although still in development at this stage, CCS provides a potential means of decarbonising emissions at energy from waste plants, which in the case of the RERF would fully decarbonise the heat supplied through the Leeds PIPES network, as well as the electricity exported by the RERF.

4 – TRANSPORT

The council has a vehicle fleet of 1,325 vehicles across its service areas with over 30 different vehicle types. These can be broadly categorised as follows:

- **Vans** (including box vans, EV vans - small/medium/large) – **60%**
- **Passenger vehicles** (welfare uses, minibuses, MPV's) – **15%**
- **Tippers & flatback** (from 3.5t up to 18t) – **13%**
- **Refuse collection vehicles** (over 7.5t) – **6%**
- **'Cars'** (including car derived vans, EV cars, 4x4's) – **2%**
- **Trailers** (up to 3.5t) – **2%**
- **Miscellaneous/specialist vehicles** (including mobile libraries, hydraulic platform, pick-up, rolonoff) – **2%**

The council has made significant progress in moving its fleet away from diesel and petrol by progressively introducing electric vehicles, with 355 electric vehicles currently in use and a further 5 on order. The council also has one of the first UK fleets to make use of home charging, with 95 chargers now installed at the homes of council officers. This reduces the energy demand at fleet sites and also mitigates the need for expensive upgrades to power supplies. This measure has been introduced using the OZEV Home Charge Grant, which has offered a contribution towards the charging infrastructure that would not have been available for installation at council depots. The council are also trialling 'vehicle to grid' and wireless charging at fleet sites as part of the Innovate UK funded projects to trial new technology.

The council will continue to increase the number of EVs routinely within its fleet based on replacement lifecycle.

5 – ENERGY PURCHASING

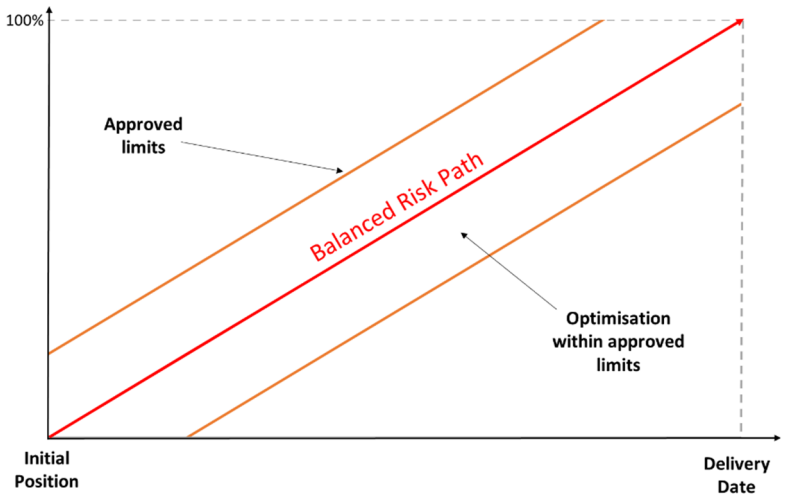
The global energy price market can always be volatile, but the last year has seen unprecedented levels of price increases as illustrated above. This is due to the convergence of a range of global factors, including geo-political issues affecting gas supplies to Europe, major infrastructure maintenance outages, low UK gas storage levels and increasing costs associated with fossil-fuel based energy generation and its carbon impacts.

The council currently purchases its energy via a supplier through its gas and electricity supply contracts, which are due to expire at the end of March 2024. Alongside preparations to re-procure these energy supply contracts, including the separate renewables power purchase agreement referred to above, the council is also reviewing its strategy for hedging against the volatility of energy market prices.

The council's energy purchasing strategy enables purchases of gas and electricity to be made for future periods, following a trajectory with a target for 80% to be secured in advance of the delivery period, and starting to purchase 30 months in advance. Any unsecured volume is then purchased at the 'day ahead' (or spot) price.

This approach enables the council to have budget certainty for an increasing proportion of its energy for future budget years rather than being exposed to the volatility of shorter term market prices, also allowing purchases to be made gradually over a longer period and at more favourable points in time in respect of market conditions rather than, for example, at a single, arbitrary point in time each year.

This 'balanced risk path' (illustrated in the diagram below) includes upper and lower tolerances either side of the pathway to allow a degree of flexibility, but has been established to ensure that neither an insufficient nor excessive proportion is purchased.

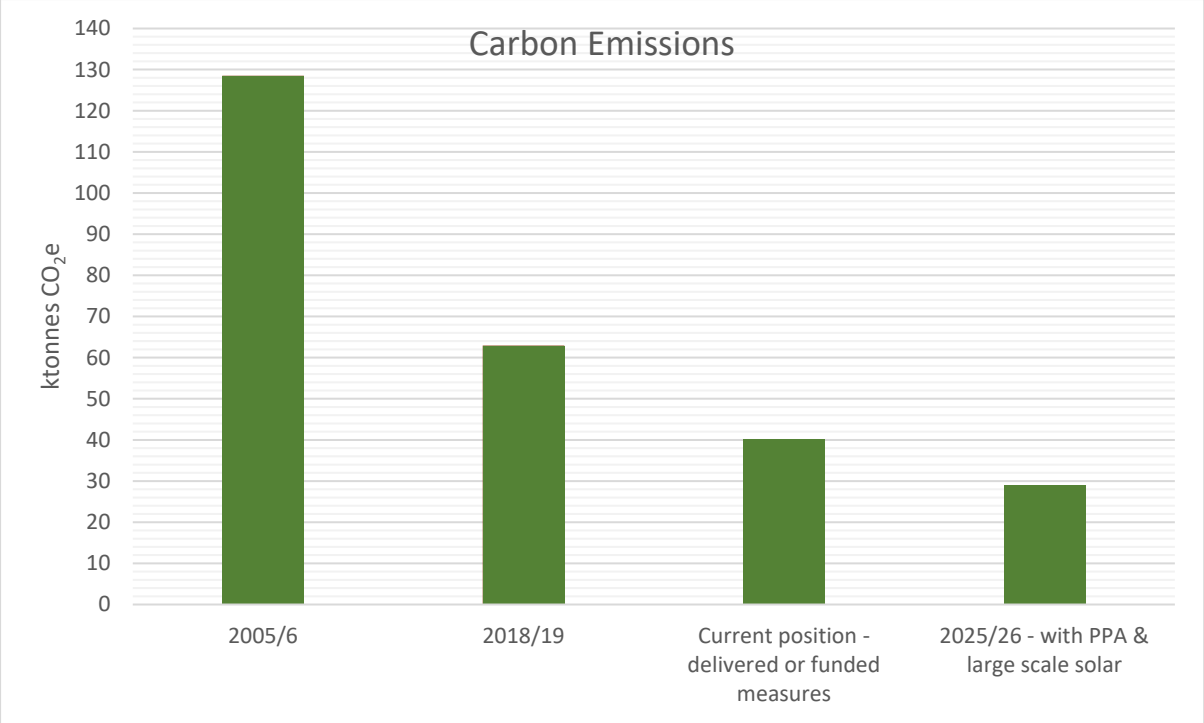


The value of this approach has been borne out particularly over the last year with the extraordinary level of price increases observed, since the council had already hedged the majority of energy for this last year and into next year. Nevertheless, the market increases have still produced substantial budget pressures, and beyond this time our level of forward purchases becomes progressively less, and the council's exposure to high energy prices increases.

Energy prices currently available for the short to medium term are hugely higher than they have been historically for the same periods. However, although longer-term prices remain substantially higher than historically, they are still significantly lower than the short to medium term prices available. The council is reviewing the current purchasing strategy in light of the current market position to determine whether it requires amendment to provide greater flexibility to fix longer-term prices where this is considered beneficial in terms of the balance of risk and the need for budget certainty. This is expected to be presented to the council's executive board in March 2022.

Measurement and improvement

Huge reductions in carbon emissions from the council's activities have been made over recent years when comparing against 2005/6 emissions, the year for which the first overall carbon calculations have been made. Very substantial reductions have also been secured since the council declared the Climate Emergency in 2019, which can be seen in the chart below by comparing 2018/19 emissions with the latest position based on the measures outlined in the sections above which have either already been implemented or are fully funded and being delivered. The future impacts of further measures such as securing a renewable power purchase agreement for electricity and delivering a large-scale solar facility are also illustrated below.



Conclusion and recommendations

In spite of the huge reductions in carbon emissions achieved, significant further action and change is required if the net zero target in respect of energy impacts from the council's activities is to be met. As well as the supporting action and change required from government to enable targets to be met, this challenge will be met by the council through a programme of ongoing action and improvement across the whole scope of areas covered above, including:

- Reductions in energy through more efficient use of council buildings;
- Ongoing programme of works to install renewables, reduce reliance on gas and implement energy efficiency measures across the corporate estate;
- A renewables power purchase agreement to support bringing forward a new renewable asset for the supply of a substantial proportion of the council's electricity;
- Increases in local renewable energy generation, including exploring the feasibility of local large-scale renewables schemes;
- Continued transition of the council's fleet to electric.

Delivery of this strategy will be supported through the following recommendations to Executive Board:

- Approve procurement of new contracts or a single contract (including authority to spend) for the ongoing supply of gas and electricity to the council to follow on from the planned expiry of the existing contracts on 31st March 2024;
- Approve procurement of a medium to long-term power purchase agreement (PPA) with a renewable energy generator for the purchase of electricity as part of the council's strategy to achieve net zero carbon from its activities;
- Commit to delivering 10% of the council's electricity demand through locally based renewables generation by 2025/26;

- Note the intention to bring an amended energy purchasing strategy to Executive Board in March 2022 for approval;
- Note the intention to develop design guidance for the council's new build programme to support our net zero target;
- Adopt a new electric vehicle charging infrastructure strategy and action plan.