



Energy Across the Authority

Sixth edition





APSE (Association for Public Service Excellence) is a not for profit local government body working with over 300 councils throughout the UK. Promoting excellence in public services, APSE is the foremost specialist in local authority front line services, hosting a network for front line service providers in areas such as waste and refuse collection, parks and environmental services, leisure, school meals, cleaning, housing and building maintenance.

APSE Energy is part of the APSE family and focuses on energy, climate change and sustainability. We are keeping our members up to date with developments across this varied and dynamic agenda. As a group of over 130 local authorities with different geographies, responsibilities, experience and expertise we are coming together to learn from and share with each other. We all recognise the importance of these topics and that we are at different points on the journey as we look to maximise the benefits of working together. APSE Energy provides a series of events enabling officers and councillors to come together in person and virtually; a range of material about technologies, business models, legislation, best practice, case studies and research; an advocacy role to promote the role of the sector within these agendas and; consultancy support for those requiring expert support to make progress with projects.

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1. Foreword

Six years on from the first wave of local authority climate emergency declarations, councils across the UK continue to lead the way in delivering practical climate action. As we move ever closer to 2030, a milestone year for many local authorities in terms of local net zero targets, the pace of work within local government has accelerated, with energy efficiency, resilience and decarbonisation remaining central to the agenda.

The past year has seen a continued progression in the way councils approach sustainability and climate governance. There is growing recognition among councillors, officers and local partners, that achieving net zero is not simply an environmental challenge, but a wider opportunity to create healthier, fairer and more resilient communities. While national policy landscapes and funding mechanisms continue to change, with the closure of the Public Sector Decarbonisation Scheme (PSDS) marking a significant transition point, local authorities are continuing to innovate, adapt and collaborate to deliver tangible results.

2024 marked the year that average global temperatures exceeded 1.5°C above pre-industrial levels. This milestone reinforces both the urgency and importance of action and local delivery. Across the UK, councils are responding through a growing portfolio of climate initiatives, from renewable energy generation and building retrofit to behaviour change, nature recovery and sustainable transport. These projects demonstrate that progress is being made despite challenges, and that local action remains a cornerstone of national and global climate ambitions.

Through our publications, briefings, events and forums, APSE Energy remains committed to supporting local authorities in sharing knowledge, building capacity and celebrating success. The case studies featured in this year's edition of Energy Across the Authority showcase the diversity and determination of councils across the country, demonstrating the real impact of local climate leadership. If you are inspired by any of the case studies within this document and would like to find out how APSE Energy could support the development or delivery of your project, feel

free to get in touch; we would be happy to help.

As we approach the critical years ahead, we hope these examples provide inspiration and practical insight to help every authority continue its journey towards a cleaner, more sustainable future.

Phil Brennan
Head of APSE Energy



2. Executive Summary

This is the 6th edition of APSE Energy's Energy Across the Authority. The aim of this publication is to provide members with insight into the diverse and innovative projects being delivered by local authorities across the UK, showcasing the range of ways councils are engaging with the energy and climate change agenda.

Each of the 9 case studies featured demonstrates local government leadership in the face of the climate emergency and highlights the practical action being taken to decarbonise operations, improve resilience and deliver tangible benefits for local communities. From local energy generation and retrofit schemes to community engagement and sustainable infrastructure, these examples show how councils are turning strategy into delivery.

Westmorland and Furness – Passivhaus EnerPHit office

In 2024, Westmorland and Furness Council completed the retrofit of Voreda House, the first council office building to secure a Passivhaus EnerPHit certificate. The project incorporated insulated cladding, triple glazing, roof insulation, and air source heat pumps, delivering measurable energy and cost savings since opening.

Hackney Council – Solar microgrid on social houses

The Residential Solar PV Pilot, launched by Hackney Light and Power, aimed to reduce carbon emissions and tackle energy poverty. The pilot delivered 1 MW of solar PV across three estates using microgrid technology to provide locally generated, affordable solar energy directly to residents. Participating households will save between 10–20% on their energy bills and the scheme is projected to cut carbon emissions by 300 tonnes each year.

East Dunbartonshire Council – Climate-Ready Park

East Dunbartonshire Council have revitalised two parks, creating new habitats, improving access and introducing natural flood management measures. The 'Climate-Ready Park' has established nearly 10,000 m² of

new water storage capacity, 20,000 m² of wildflower meadow, and a 33-plot allotment site, as well as a new pump track for local BMX riders — enhancing both climate resilience and community wellbeing.

Highland Council – Energy benchmarking tool

Highland Council developed an innovative online energy benchmarking tool to better manage energy use and carbon emissions across its estate. By considering factors such as building age, function, occupancy, and heating system, the tool enables more targeted energy-saving actions. Early use across schools and offices has already delivered measurable reductions in energy consumption and utility costs.

Lancashire County Council – Biochar on council owned land

Between 2022 and 2024, Lancashire County Council trialled annual biochar applications across two agricultural sites, totalling six hectares. The project demonstrated how biochar can lock carbon into soils for thousands of years while improving fertility and productivity. Initial analysis has shown increases in soil carbon and nitrogen, supporting both sequestration and land health.

Dorset Council – solar powered pothole machine

Dorset Highways procured the UK's first all-electric asphalt storage hot box, replacing a traditional propane-fired unit. The machine has delivered annual carbon savings of over 80 tonnes and financial savings exceeding £10,000 in propane costs, demonstrating how innovation in day-to-day operations can contribute to wider decarbonisation goals.

Bedford Borough Council – Solar farm on capped landfill

Bedford Borough Council constructed a 4.2 MW solar array on a closed landfill site, transforming a brownfield site into a productive clean-energy asset. The installation generates enough electricity to power around 1,000 homes annually, saving over 900 tonnes of carbon each year and generating over £500,000 in income during its first year of operation.

Comhairle nan Eilean Siar – Solid Recovered Fuel from non-recyclable waste

In 2023, Comhairle nan Eilean Siar became the first UK local authority to use

Advatec's XO22 digester. The system converts non-recyclable household waste into Solid Recovered Fuel, which replaces coal in industrial use with 95% lower carbon emissions. The scheme diverts 100% of non-recyclable waste from landfill and saves around 4,400 tonnes of CO₂e annually.

Walsall Council – Engaging with school children to promote energy retrofits

Walsall Council adopted a community-centred approach to tackling fuel poverty, linking school education with household energy action. More than 470 fuel-poor households have received tailored one-to-one support, leading to over £1.5 million of funded retrofit measures, including insulation and solar PV installations, and supporting a culture of climate awareness across the community.

In addition to these case studies, Energy Across the Authority also includes a selection of shorter case studies from across the UK. Together, these examples reflect the continued commitment of local authorities to lead by example and accelerate progress towards net zero.



3. Why are local authorities engaged?

Local authorities have always played a central role in supporting their communities and local economies. Energy underpins every aspect of daily life and is central to the services councils provide. The municipalisation of energy is about local authorities taking a proactive role in this agenda: using their assets, skills and leadership to ensure energy efficiency, generate clean energy, reduce costs, improve energy security and tackle fuel poverty.

But the impact of this work goes far beyond energy bills. Councils are increasingly recognising that energy is inseparable from the wider sustainability and climate agenda. Decisions about how energy is produced, supplied and used have direct consequences for housing, transport, health, air quality, biodiversity and economic resilience.

Councils are uniquely placed to bring energy into the heart of their work. By investing in renewable generation, delivering local energy services, and embedding energy into their climate action plans, they can make a direct impact on issues such as air quality, affordability, and resilience. At the same time, they can generate income and reduce their own corporate energy bills.

Energy is not a side issue; it is embedded in everything councils do. Improving housing stock through energy efficiency reduces fuel poverty and improves health outcomes. Decarbonising transport cuts emissions and air pollution, supporting public health and climate targets. Green skills and employment programmes linked to local energy projects strengthen the economy and create future opportunities. In this way, the municipalisation of energy becomes a driver for sustainability across the whole range of council services.

Through innovative projects and policies, councils are already demonstrating how local leadership in energy can increase revenue. Solar

farms, the decarbonisation of leisure centres, and schemes to provide affordable renewable power to businesses are creating cleaner, more affordable energy while stimulating local economies and green jobs.

APSE Energy supports this journey by providing knowledge, consultancy, advocacy and opportunities for learning. While we do not give investment advice, we help councils design policies and projects that deliver real local outcomes: efficient energy management, affordable clean energy, carbon reductions, green jobs and more resilient communities.

The municipalisation of energy is therefore not just about power use or generation. It is about embedding energy into the broader sustainability agenda, ensuring councils can play a central role in tackling climate change and building thriving, fairer, low-carbon localities.



4. What is the local authority role?

Although there is no statutory requirement for councils to meet net zero, most have declared climate emergencies and set ambitions well ahead of the UK Government's 2050 target. Local authorities are key to this agenda because of the influence they hold as major employers, service providers, asset owners and community leaders.

The starting point is their own operations. Councils are significant energy users and reducing their consumption cuts both costs and emissions. From switching to green tariffs, installing efficiency measures, and comparing tariffs, to investing in on-site generation and specifying low-carbon alternatives in procurement, there are clear opportunities to lead by example. Leisure centres, civic buildings and community facilities are often heavy energy users, so fitting heat pumps or solar panels can achieve substantial savings.

Beyond their own footprint, councils can shape the wider energy system. Government policy is moving towards a more decentralised grid, and local generation projects, such as solar farms, rooftop PV, heat networks, and private wire agreements, help ease pressure on national infrastructure while providing affordable power locally. Electric vehicles and heat decarbonisation are also areas where councils play a central role. By rolling out charging points, investing in low-emission fleets, and supporting clean air zones, local authorities can drive behaviour change while improving public health.

Energy, however, cannot be viewed in isolation. It is deeply connected to the broader sustainability agenda. Councils are responsible for housing standards, transport systems, waste management, education, public health and green spaces. Decisions in each of these areas affect both carbon emissions and community resilience. For example, raising the energy efficiency of housing stock reduces fuel poverty, cuts emissions and improves health outcomes. Decarbonising public transport fleets and rolling out charging infrastructure for electric vehicles improves air quality, reduces carbon and encourages sustainable mobility. Protecting and enhancing green spaces supports biodiversity, mitigates flooding, and provides vital spaces for recreation and wellbeing.

The climate crisis requires councils to see energy as a driver of change across all these areas. Heat decarbonisation is a clear example of this interconnectedness. From heat networks to heat pumps local authorities will be central in testing, deploying and scaling solutions that reduce dependence on fossil fuels. National funding streams such as the Warm Homes Local Grant Scheme and ECO provide opportunities for councils to deliver projects that not only meet climate objectives but also address social issues such as fuel poverty and poor housing conditions.

Strategic planning is equally important. Local Area Energy Plans (LAEPs) in England, Wales and Northern Ireland, and Local Heat and Energy Efficiency Strategies (LHEES) in Scotland, as well as Regional Energy Strategic Plans (RESPs), provide roadmaps to net zero at a local level. These plans enable councils to integrate energy with wider issues such as health, wellbeing, education, digital infrastructure and economic development.

As the smart cities agenda develops, energy will become ever more central. Data-driven solutions, new asset classes like EV charging and technology-enabled services will shape how councils manage infrastructure. Ensuring energy is integrated into these strategies will be vital for resilience and sustainability.

Ultimately, the role of local authorities is not limited to managing their own consumption or delivering isolated projects. They are leaders within their communities, and their actions signal the importance of climate change and sustainability to residents, businesses and partner organisations. By embedding energy within the wider agenda, housing, transport, health, wellbeing, biodiversity and skills, councils can act as powerful agents of change. They can demonstrate that climate action is not an additional task but a way of improving the quality, affordability and resilience of the services they already provide.

APSE Energy supports local authorities in fulfilling this role, providing research, surveys, briefing papers and practical tools to help councils understand the challenges, explore opportunities and deliver meaningful local outcomes. In this way, councils can use the municipalisation of energy not only to cut costs and emissions, but to tackle the wider climate crisis and create thriving, sustainable localities for the future.



5. Case Studies

5.1 Westmorland and Furness Council – Passivhaus EnerPHit office

Background:

In March 2023, Westmorland and Furness Council was established as a new unitary authority, covering the towns of Barrow, Kendal and Penrith alongside surrounding rural areas. The transfer of assets from the former district councils included Voreda House in Penrith, a former NHS and tax office building.

Initially purchased by Eden District Council, the building was earmarked for redevelopment into a modern, environmentally efficient central office for staff. Construction began in March 2022, and the project was taken on by the new authority a year later, the project was completed in May 2024. The following month, Voreda House achieved the distinction of becoming the first council office building in the UK to secure Passivhaus EnerPHit certification.

Overview:

The project was delivered by Westmorland and Furness Council's internal Capital Programme Team, working alongside 2030 Architects and Collinson Construction. Greengauge Building Energy Consultants provided specialist advice to ensure compliance with Passivhaus standards and secure EnerPHit certification.

Rather than a full rebuild, the strategy focused on retrofitting the existing structure. The concrete exterior was stripped and replaced with a steel frame and insulated cladding system to improve thermal performance and eliminate thermal bridging. The roof was overlaid with insulation and a single-ply membrane, achieving an overall U-Value of $0.148 \text{ W/m}^2\text{K}$.

Heating and cooling are provided by air source heat pumps, supplemented by rooftop solar panels capable of meeting around a third of the building's energy demand. Triple glazing, improved airtightness, and enhanced insulation further improve the building's energy efficiency.



Opened to staff and the public in June 2024, Voreda House now houses a wide range of services, from Adult Social Care and Children's Services to Housing, Public Health, and Waste.

Challenges and Overcoming Them:

Delivering a project of this complexity was not without obstacles. Early specialist surveys revealed asbestos within the building and foundations, requiring careful removal and resulting in additional costs. Structural defects in the concrete core also needed reinforcement with steel to ensure stability.

The wider construction context added further pressure. Work was undertaken during the COVID-19 pandemic, when material shortages and price inflation created significant challenges for contractors and the project team.

A thorough review of the work programme ensured the scheme remained on track, with proactive management and adaptation to changing circumstances key to achieving the required Passivhaus standards.

Outcomes:

Since opening, Voreda House has demonstrated measurable energy and financial benefits. Within its first four months of operation (May–August 2024), energy consumption fell by more than 68%, translating to savings of over £15,000 compared with the combined running costs of the two buildings it replaced - Penrith Town Hall and Mansion House. Voreda House has since won 'Green Project of the year' at the UK Green Business Awards.

The retrofit will also deliver long-term benefits. Enhanced insulation and ventilation ensure consistent fresh air, improving staff wellbeing, while the robust design extends the building's durability. The project reduces carbon emissions significantly, aligning with the council's Climate Action Plan and commitment to reaching net zero by 2037.

Externally, the scheme has gained attention within the industry. It was highlighted at the 2024 UK Passivhaus Conference and is recognised as a

leading example of sustainable retrofit in local government.

Staff response has also been positive. Feedback surveys revealed strong approval for the building's bright, modern atmosphere and its variety of workspaces. Many noted that the design encourages collaboration, meeting one of the council's post-pandemic objectives. A dedicated users' group has since been established to support continued staff involvement in building operations.

Future Plans:

Voreda House is central to Westmorland and Furness Council's long-term strategy for sustainability and service delivery. As one of three anchor buildings across the authority's footprint, it improves accessibility for residents while reducing operational costs.

The building's role goes beyond providing office space. It represents a key step within the council's wider Carbon Management Strategy, which identifies buildings, transport, supply chain, and residual emissions as the primary sources of greenhouse gas emissions. By investing in retrofits like Voreda House, alongside renewable energy and supplier engagement, the council aims to cut Scope 1 and 2 emissions to net zero by 2037, contributing to the UK's wider 2050 target.

The lessons learned from the project, particularly around asbestos management, structural remediation, and the challenges of retrofitting to exacting eco standards, will inform future schemes. While not every building is suitable for this level of retrofit, Voreda House demonstrates what can be achieved with the right approach.

Just six months after opening, it was already fulfilling its objectives: lowering costs, reducing carbon emissions, improving collaboration, and delivering high-quality services to the public. It stands as both a local achievement and a national example of how councils can balance operational needs with climate ambitions.

5.2 Hackney Council – Solar microgrid on social houses

Background:

Hackney has long faced barriers to rolling out renewable energy at scale. Its dense urban environment, combined with regulatory complexities, has made solar deployment more challenging than in other parts of the UK.

In 2019, Hackney Council declared a Climate Emergency and launched its Climate Action Plan. One of its ambitious targets was to install 6 MW of solar power on council-owned properties by 2030. Achieving this goal required not just investment but also innovative approaches to energy generation and distribution.

The Residential Solar PV Pilot, launched by Hackney Light and Power (HLP), represents a major step forward. Designed to tackle energy poverty, reduce carbon emissions, and test new technologies, the pilot delivered 1 MW of renewable capacity across three estates: Frampton Park, Whiston Estate, and Wren's Park. By using advanced microgrid technology, the scheme provides locally generated, affordable solar energy directly to residents.

Overview:

The pilot combines rooftop solar PV installations with microgrid technology. Following structural surveys, solar panels were fitted to estate rooftops to maximise efficiency and output. Electricity generated is distributed directly to participating households through the microgrid, enabling residents to access renewable energy at below-market rates.

Any surplus power is exported to the national grid, generating additional revenue. Residents are supported with smart meters, giving them real-time insight into their consumption and encouraging energy efficiency.

Hackney Council invested £1.96 million in the project, covering development and installation costs. Income is generated through



energy sales to residents, communal supply, and export tariffs. Surplus revenue is reinvested into local energy projects or used to further reduce residents' bills, ensuring the scheme remains financially sustainable while maximising social benefit.

Challenges and Overcoming Them:

Delivering the UK's first scheme of this kind required overcoming regulatory and technical hurdles. Traditional landlord-tenant arrangements often prevent tenants from benefitting directly from renewable energy. By designing a microgrid that delivered financial savings directly to residents, the council resolved this issue.

Another barrier was regulatory approval. The project team worked closely with Ofgem, including through participation in sandbox trials, to ensure compliance and establish a workable framework for future schemes.

Building trust among residents was equally important. Many were unfamiliar with microgrids or sceptical about potential savings. Hackney Council prioritised communication from the outset, holding information sessions, workshops, and one-to-one engagement with tenants and resident associations. Special support was provided for vulnerable households to make participation inclusive. This tailored engagement approach proved key to securing strong buy-in across the three estates.

Outcomes:

Participating households will save between 10–20% on their energy bills, a significant contribution at a time of high costs. By addressing fuel poverty directly, the scheme eases financial pressures on residents while demonstrating the wider social value of local renewable energy projects.

The project also creates economic benefits for Hackney. Contractors and apprenticeships were prioritised within the borough, generating local job opportunities and supporting skills development.

From an environmental perspective, the pilot is projected to cut carbon emissions by 300 tonnes each year. It also enhances energy security,

reducing reliance on the national grid and strengthening resilience against future energy supply disruptions.

The initiative has also positioned Hackney as a leader in municipal energy innovation. It shows that councils can deliver large-scale renewable projects in urban settings, overcoming barriers that have historically slowed progress.

Future Plans:

The Residential Solar PV Pilot is only the beginning. Hackney Council intends to expand the programme significantly, with a goal of delivering an additional 5 MW of solar capacity by 2030. Future phases are likely to integrate battery storage, enabling greater efficiency and providing renewable power around the clock. The council is also exploring synergies with its green transport agenda, including electric vehicle charging infrastructure linked to the microgrid.

Performance data on energy output, cost savings, and carbon reduction is being closely monitored to inform the expansion and ensure the model remains both effective and replicable. By sharing lessons learned, Hackney hopes to provide a template for other local authorities looking to combine decarbonisation with social impact.

5.3 East Dunbartonshire Council – Climate-Ready Park

Background:

In 2015, East Dunbartonshire Council undertook an Open Space audit which found that two neighbouring green spaces in Bishopbriggs, Woodhill and Etive Parks, were failing to meet acceptable standards of provision. At that time, the parks were characterised largely by amenity grass, a play park of poor quality, and a simple path network with little to offer in terms of biodiversity or opportunities for recreation. The findings of the audit fed directly into the council's Open Space Strategy, which recommended the development of a masterplan to address these shortcomings. The strategy was subsequently supported by the Green Network Strategy and integrated into the council's Local Development Plan 2. Each stage of the process was informed by community consultation to ensure that local needs and priorities were reflected.

The plan identified habitat creation, access improvements, and climate change adaptation as essential components in creating a more robust and attractive green network. However, the urgency of improvement works intensified in 2018 when flooding affected 24 properties in the immediate vicinity of the park's culvert. Both sewage and surface water contributed to the flooding, which required a significant intervention from the council. In response, the Streetscene Technical Support team collaborated with colleagues from the Roads Service's Technical and Engineering Services team to rethink the parks' design. This collaboration laid the foundations for the development of a Green Infrastructure Plan to establish what became known as the "Climate-Ready Park."

Overview:

The Climate-Ready Park concept was shaped by hydrological flood modelling, which applied future climate change scenarios to determine the scale of basins required to divert and retain surface water from both the parkland and surrounding roads. Alongside flood management, the masterplan sought to create a multi-functional landscape that could deliver recreational, environmental and community benefits.

One of the key proposals was the introduction of an allotment site, designed to promote food growing and sustainable living among residents. The project also integrated extensive biodiversity measures, including the planting of trees and the sowing of over 20,000 m² of wildflower meadow, while recreational improvements were delivered through the construction of a large pump track to provide high-quality facilities for cyclists, skaters, and the wider community.

The pre-construction phase revealed the need for adjustments to the initial design. Trial pits and soil testing identified elevated lead levels on one of the proposed allotment areas, making it unsuitable for food production. Although the results did not preclude the land's use as general open space, the decision was made to relocate food-growing activities to the disused ash pitch, which had been identified in the local Pitch Strategy as surplus to requirements. Land Registry checks also revealed multiple ownerships within the park, requiring the design team to restrict interventions to areas under council ownership. Despite these complications, sketch designs were developed and presented to the local community through a drop-in session and online consultation. Planning approval for the finalised scheme was secured in December 2022.

Challenges and Overcoming Them:

Delivering the Climate-Ready Park involved tackling a series of practical and logistical challenges. The most significant arose from the substantial groundworks required to create swales, wetlands, and basins, which collectively amounted to around 8,000 m³ of excavated material. Managing such a large volume of spoil posed a sustainability issue; however, the project team devised an innovative solution by reusing the soil on site. The material was reshaped into bunds and formed the foundations for the pump track, ensuring that no soil had to be removed from the park.

The scale of works also created potential disruption for the community, particularly given the parks' popularity for informal recreation. To mitigate this, the council and its contractor worked to maintain access wherever possible. Construction was phased across the summer and autumn of 2024, with reinstatement works, including top-soiling and seeding, scheduled for spring 2025. This careful programming balanced the need



Potential interpretation board highlighting aims of the climate resilient park and SuDS works



Indicative nectar rich bulb planting either side of reinforced grass path along top of SuDS basin bund



Potential wildflower play mounds set adjacent to Menthith Park to provide play and visual interest. Mounds constructed from site won material where reasonably practicable



Potential marginal aquatic and wetland grass species within linear SuDS swale features supporting water flow, visual amenity and biodiversity



Log pile hibernacula to support ecological interest within site



Potential Bike/BMX track



Potential climate resilient focal garden inspired by the Forestry Commission's The Resilience Garden, which celebrates plant species that are likely to perform important functions as climate changes. Includes specific interpretation boards to explain purpose and function of focal garden



Indicative image to show potential for additional avenue trees along path



Potential aspiration to create wildflower meadow serving to enhance biodiversity and visual amenity. The reduced maintenance demand of wildflower meadows also feeds into climate resilient design as reduced carbon footprint from limiting mowing, strimming and maintenance vehicle movements



Potential granite public art sculpture set within climate resilient ornamental shrub planting echoing larger sculpture on high point of park



Potential agricultural meadow for foraging birds - annual wildflowers with barley and oats

Potential entrance feature



Potential use of granite sculpture to mark high point of the park and inspired by works by Scottish sculptor Ronald Rae. Additional potential to incorporate memorial features for local community in light of Covid-19 pandemic to help install sense of communal ownership of park



Potential native scrub planting to increase habitat cover and support biodiversity



Climate resilient ornamental and tree planting to provide soft separation between play area and parking area

for efficient delivery with the importance of minimising community inconvenience.

Technical challenges were also overcome in the design process. Soil contamination concerns were resolved by relocating the allotments, while the issue of fragmented landownership was addressed by tailoring the masterplan to land within council control. Throughout these challenges, continuous community engagement ensured that local residents were kept informed and retained a sense of ownership over the evolving project.

Outcomes:

Although still in the process of final reinstatement, the project has already delivered significant outcomes. The creation of swales, wetlands, and basins has introduced nearly 10,000 m² of new water storage capacity, providing a sustainable mechanism for managing stormwater and reducing flood risk to nearby properties. The establishment of a 33-plot allotment site, complete with polytunnels, raised beds, and a community space, has not only expanded opportunities for local food production but has also created a new focal point for community activity.

Biodiversity has been substantially enhanced, with the introduction of wildflower meadows, nectar corridors, wetland habitats, and tree planting. Over 20,000 m² of wildflower meadow have already been established, transforming the parks from largely sterile grassland into ecologically rich spaces that support pollinators and other wildlife. The pump track, created from excavated soil, has added a dynamic recreational feature that caters to a wide range of users and has already become a valued asset for the community.

Beyond physical improvements, the project has catalysed social outcomes. A dedicated Allotment Association has been established, and plans are underway to form a Friends of Woodhill and Etime Park group, as well as a Pump Track users' group. Engagement activities led by the council's Greenspace Officers and Countryside Rangers, including wildflower and tree planting days with schools and residents, have strengthened community ties and fostered a sense of stewardship.

Future Plans:

The success of the Woodhill and Etive Parks project places it firmly within a broader policy context. It directly supports the aims of the Local Development Plan 2 by delivering a climate-ready open space that provides flood resilience, new recreational opportunities, and food-growing facilities. It aligns with the Bishopbriggs Town Centre Strategy, which seeks to improve accessibility to green space and enhance local amenity, and contributes to the council's Open Space Strategy by raising the quality of provision well above the standards identified in the original audit.

Biodiversity outcomes contribute to the council's Local Biodiversity Action Plan by restoring semi-natural features and strengthening ecological networks in a densely populated area. The introduction of wildflower meadows and pollinator habitats supports the Scottish Government's Pollinator Strategy, while the wetland and meadow habitats contribute to national climate change and clean air objectives by sequestering carbon, filtering pollutants, and increasing resilience to extreme rainfall. The creation of allotments delivers against the emerging East Dunbartonshire Food Growing Strategy and the duties set out in the Community Empowerment (Scotland) Act 2015. At the same time, the project advances public health goals through the provision of active recreation and opportunities for healthy eating.

Looking forward, the council intends to replicate the approach at other sites across East Dunbartonshire, building on the experience gained at Woodhill and Etive Parks. The project is seen as a model of collaborative working between council teams, external partners, and local communities, pooling expertise and resources to deliver nature-based solutions to climate and environmental challenges. By embedding lessons learned and continuing to strengthen community involvement, future initiatives will seek to extend the benefits of climate-ready open spaces throughout the authority area.

5.4 Highland Council – Energy benchmarking tool

Background:

Highland Council's Energy Team has developed and launched an innovative online energy benchmarking tool designed to transform the way the authority manages energy consumption and carbon emissions across its property estate. With over 1,000 non-domestic properties spread across a geography the size of Belgium, the council faced a particular challenge in monitoring and reducing energy use in a consistent and effective way. Non-domestic buildings, including schools, offices, and depots, account for more than 60% of the council's operational emissions, making them a critical focus of the Net Zero Strategy, which commits the council to reaching zero operational emissions by 2045.

Prior to the tool's introduction, the council lacked a comprehensive system for monitoring and reporting performance across such a diverse asset base. Existing solutions were either too generalised or too complex to adapt to the council's needs, leading to missed opportunities for energy savings. The benchmarking tool was created to fill this gap. It enables transparent, accessible, and user-friendly analysis of energy performance, allowing stakeholders to identify inefficiencies, compare properties, and target areas for improvement.

The development was shaped by a guiding principle of accessibility: any property's performance should be viewable within three clicks, metrics should be meaningful without requiring technical expertise, and the overall system should contribute to greater openness and transparency in the council's use of data.

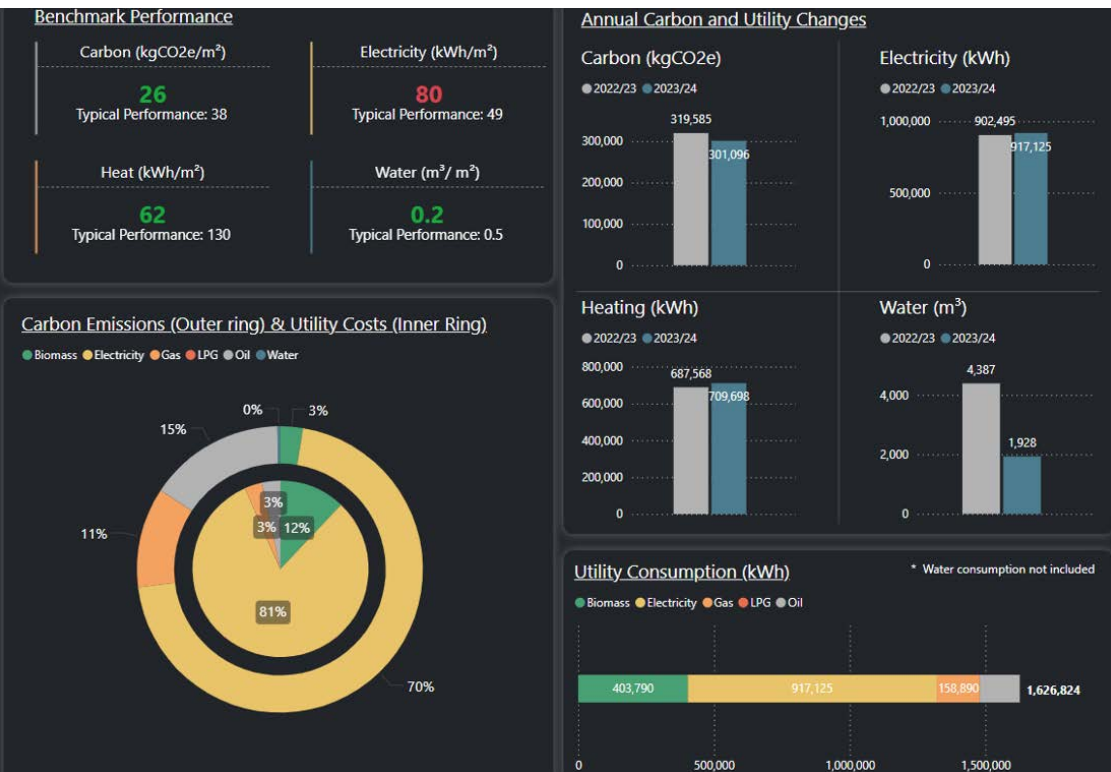
Overview:

The Energy Team spearheaded the project, collaborating closely with colleagues from IT, property management, and data services to ensure smooth integration with existing systems. Engagement with facilities managers and property users provided valuable insights into the energy characteristics of individual sites, while consultation with schools, local

authorities, and external stakeholders ensured that the tool was not only practical for Highland Council but scalable for wider use.

The benchmarking system draws on six years of collaborative work across Scottish local authorities to establish accurate, contemporary performance standards for public sector buildings. Unlike traditional benchmarking tools, which rely heavily on single metrics such as kWh/m², Highland Council's system incorporates a range of factors, including building age, function, occupancy, location, and heating system type. This allows for more precise and meaningful assessments, helping to contextualise energy performance and highlight specific interventions.

The tool also makes use of advanced analytics and predictive modelling. By combining data from smart meters with historical consumption records, it can project future energy use and help forecast demand. Visualisation features present this data in a user-friendly format, making the system as useful to facilities managers and energy officers as it is to the general public or school groups.



Challenges and Overcoming Them:

Developing and launching the tool was not without obstacles. One of the main challenges lay in the diversity of the council's building stock. The estate covers over 1,000 properties, many of them remote and off the gas grid, with a wide variety of heating systems and operational patterns. This meant that the level of variation was much greater than initially anticipated, and the development team had to build in additional layers of customisation to ensure that the tool could account for these differences.

Another challenge was the validation of energy consumption data. Utility invoices formed the backbone of the data collection process, but long-term estimated readings and legacy metering issues complicated the analysis. Instead of relying purely on automated calculations, the team carried out detailed individual assessments to ensure the accuracy of the baseline data.

There were also challenges in ensuring that end users could interpret the data effectively and take meaningful action. To address this, the Energy Team refined the user interface, produced supporting training materials, and engaged directly with building managers to demonstrate the tool's functionality. These refinements ensured the tool was not only technically robust but also practical and usable across a range of skill levels.

Outcomes:

The benchmarking tool has delivered a range of positive outcomes since its launch. Within the first two months, it was accessed more than 600 times, demonstrating strong levels of engagement. Many properties, including schools and offices, have already acted on the insights generated, resulting in measurable reductions in both energy consumption and utility costs. One school, for example, achieved a 15% reduction in heating energy use after implementing measures identified by the tool.

The tool has also encouraged behavioural change. Properties that discovered poor performance through the benchmarking process proactively contacted the Energy Team for support, signalling a cultural shift toward accountability and continuous improvement. The transparency of the tool has been praised by both internal and external

stakeholders, and its role in informing discussions at the council's Climate Change Committee reflects its strategic value.

Beyond immediate operational benefits, the tool has also attracted external recognition. Other local authorities have approached Highland Council for guidance on developing similar systems, and the benchmarking framework has been highlighted as a potential model for replication across the wider public sector.

Future Plans:

Looking ahead, the Energy Team plans to expand the tool's functionality to capture real-time data from smart meters and integrate renewable energy generation data, enabling a more comprehensive picture of both consumption and on-site production. Additional features such as demand forecasting and advanced scenario modelling will further strengthen the tool's ability to inform long-term decision-making.

At a strategic level, the council sees the tool as an evolving platform that will continue to support its Net Zero journey. By embedding continuous monitoring and transparent reporting into its operational culture, Highland Council is better positioned to meet its emissions targets while delivering financial savings and improving resilience.

The project has also created a framework for collaboration. As other local authorities and organisations explore the adoption of similar systems, Highland Council has an opportunity to play a leadership role in sharing knowledge and supporting replication, amplifying the wider impact of its innovation. In doing so, the council not only strengthens its own approach to energy management but contributes to a collective move toward a more sustainable public sector in Scotland.

5.5 Lancashire County Council – Biochar on council owned land

Background:

Lancashire County Council has been pioneering a creative initiative to integrate regenerative agricultural practices into public land management. The project aims to explore how these practices can support councils in meeting net-zero objectives, offering a complementary approach to existing strategies such as woodland establishment, habitat restoration, and renewable energy schemes. While such measures are valuable, they are not always compatible with other essential land uses, prompting the Lancashire County Council to consider alternative methods.

Although the council has relatively little land under active agricultural use, it is responsible for extensive areas of managed grassland in the form of parks, playing fields, school grounds, and highway verges. These areas share many characteristics with agricultural grasslands, making them a suitable testing ground for regenerative practices. Central to the project is the application of biochar, a stable form of carbon created by heating biomass in a low-oxygen environment. Once added to soil, biochar can lock carbon away for thousands of years while also offering potential improvements to soil quality and productivity.

The initiative was originally part of the three-year AgricaptureCO2 programme, funded through the EU's Horizon framework. This international collaboration investigated the potential for regenerative agriculture to address the climate crisis, enhance resilience for land managers, and improve profitability for farmers. The council was the only local authority within the consortium, working alongside a diverse range of partners to facilitate knowledge exchange across the UK and Europe.

The driver for the council's involvement was rooted in its 2020 commitment to transition the Lancashire economy away from carbon by 2030, address the biodiversity crisis, and improve social inclusion. Emissions modelling revealed that even with strong action on energy efficiency and carbon reduction, residual emissions would remain. This highlighted the

importance of offsetting measures, such as biochar application, which could be integrated into existing land uses without undermining their primary function.

Overview:

Between 2022 and 2024, the pilot project trialled annual biochar applications across two agricultural sites in Lancashire, covering a total of 6 hectares. The first application, carried out in October 2022, involved spreading biochar sized between 10–20mm using a vertical muckspreader attached to a tractor. In addition, one hectare received 630 tonnes of PAS100 compost, followed by the planting of native broadleaf species managed as coppice with English oak standards. This was interspersed with strips of eucalyptus coppice and standards, designed to test the compatibility of biochar with different planting regimes.

To establish a robust evidence base, baseline soil samples were collected before the first application by a researcher from Bangor University and the Biochar Demonstrator Project. Each site was sampled 27 times using the recognised 'W' method, measuring parameters such as pH, electrical conductivity, moisture content, organic matter, ammonium, nitrate nitrogen, phosphorus, and the carbon-to-nitrogen ratio. Post-application samples were taken after each year's spreading, allowing the project to build a detailed picture of soil responses over time.

When the EU funding programme ended, Lancashire County Council chose to continue the work independently, completing the third round of applications in 2024. The decision to sustain the trial reflected both the promise shown in early results and the growing importance of carbon sequestration initiatives within the council's net-zero strategy.

Challenges and Overcoming Them:

The project presented a series of practical and logistical challenges. Weather was perhaps the most fundamental. Wet conditions often left the ground too soft for heavy machinery, delaying applications, while spreading could only take place after silage cuts, when grass was short enough for biochar to make contact with the soil. Dry, still days were also essential to reduce the dust generated during application, especially



given the proximity of residential properties. To address this, the team applied the biochar damp and adapted schedules to coincide with seasonal silage cuts.

Budgetary constraints added another layer of complexity. At present, UK-produced biochar is relatively expensive compared to imports, meaning the project initially had to source material from abroad despite the additional lifecycle emissions of transport. This highlighted the tension between affordability and sustainability, underscoring the need for a more competitive domestic biochar market in future.

Monitoring also presented challenges. While baseline and annual sampling produced valuable data, the team recognised that more frequent analysis would have provided a clearer picture of soil carbon dynamics. However, resource limitations made this impractical within the scope of the pilot.

There were also stakeholder hurdles to overcome. Agricultural and local authority stakeholders initially expressed scepticism about the effectiveness of biochar and its potential impact on yields. Lancashire County Council tackled this by maintaining a proactive engagement strategy. The lead project officer presented findings at agricultural and carbon market events, hosted a knowledge-sharing event at one of the trial sites, and made use of webinars, online forums and local media coverage to communicate progress. Collaborating with academic institutions and demonstrating tangible benefits, such as improved grass growth after the first year, helped build confidence and dispel concerns.

Outcomes:

Early results from soil analyses have been encouraging. Increases in soil carbon content point to successful incorporation of biochar and the potential for meaningful carbon sequestration. There are also signs of higher nitrogen levels, which could help reduce fertiliser use and associated emissions in the long term.

The project has strengthened the council's broader climate action programme by providing evidence on the viability of offsetting measures. The findings are already feeding into organisational planning, including

the financial assessments underpinning different net-zero target dates.

Beyond technical outcomes, the project has achieved significant engagement and visibility. Feedback from district councils, agricultural stakeholders, and the public has been positive, with many expressing interest in biochar's potential role in climate action. The pilot has also contributed to national momentum: Lancashire County Council's leadership has helped establish a UK biochar network, now involving more than 100 members from across the public sector. This network is proving a valuable platform for sharing knowledge and building consensus around best practice.

Future Plans:

Looking forward, Lancashire County Council intends to expand the scope of its trials to explore how biochar could be applied to other land uses within its estate, such as parks, playing fields, and managed grasslands. The council also plans to assess the financial feasibility of purchasing biochar linked with carbon credits as part of a formal offsetting framework for its organisational emissions.

Work is also underway to investigate whether biochar could be produced locally from resources such as household green waste or timber felled due to ash dieback. This would not only cut the carbon footprint associated with importing biochar but also create a circular economy model for waste streams within the county. However, achieving this goal will depend on the ability of the UK biochar market to scale up production and reduce costs.

Ultimately, the pilot has positioned the council at the forefront of local authority experimentation with regenerative practices. By combining rigorous scientific monitoring with active stakeholder engagement, the council has built a foundation for future action that balances environmental ambition with practical considerations. The next phase will determine how biochar can be embedded within wider land management strategies, ensuring that Lancashire's public estate plays an active role in achieving net zero while also contributing to biodiversity and community benefits.

5.6. Dorset Council – solar powered pothole machine

Background:

Dorset Highways has been proactive in responding to the council's climate and ecological emergency declaration and the commitment to become a carbon-neutral council by 2035, with the wider county following by 2045. The highways service is a significant contributor to the council's carbon footprint, particularly through its transport operations and the use of construction materials. In recognition of this, Dorset Highways sought innovative ways to reduce emissions while maintaining high standards of service delivery.

A key opportunity emerged with the procurement of asphalt storage equipment. Asphalt hot boxes are essential for highway maintenance, enabling surfacing material to be stored at workable temperatures so local crews can undertake continual patching and defect repairs. Traditionally, these units are powered by propane gas or diesel-electric hybrids, with associated emissions and costs. When Dorset Highways' existing propane-fired unit approached the end of its useful life, the service explored more sustainable options.

This coincided with a major investment in renewable energy at the Dorchester depot. A new 415-panel, 165 kW solar array had been installed, funded through the Government's PSDS. The array was designed to exceed baseline electricity demand, making the depot a net exporter of energy on many days. Dorset Highways identified an opportunity to align this surplus renewable energy with an innovative new approach to asphalt storage.

The decision was made to commission the first low-energy, all-electric asphalt storage hot box in the UK. This bold step demonstrated Dorset's willingness to engage directly with manufacturers at the research and design stage, taking a leadership role in testing unproven but potentially transformative technology.



Overview:

The new eco all-electric hot box was installed at Dorset Highways' Dorchester depot, replacing the previous propane-fired unit. Uniquely, the unit was designed for single-phase electricity supply, a significant achievement given the scale of the equipment. Through improved insulation and efficient design, the energy demand was reduced to the equivalent of running fewer than two standard kettles, despite the unit's ability to heat up to 20 tonnes of asphalt.

The procurement represented a like-for-like investment: the all-electric unit was the same price as a conventional propane equivalent, but with the added benefit of increased capacity from 12 tonnes to 20 tonnes. The alignment with the solar array created a particularly effective synergy. On many days, the hot box operates entirely on renewable electricity generated onsite, significantly reducing operational carbon emissions and costs.

The initiative not only addressed immediate operational needs but also

aligned with wider strategic objectives. It maximised the value of the council's renewable energy investment, reduced reliance on fossil fuels, and positioned Dorset as a leader in innovative, low-carbon highways management.

Challenges and Overcoming Them:

The decision to commission the UK's first all-electric asphalt hot box carried inherent risks. The technology was at an early stage of development, and there was scepticism about its feasibility and reliability. Dorset Highways initially expected that a three-phase power supply would be necessary, which would have required costly upgrades to the depot's electrical infrastructure. However, close collaboration with the manufacturer led to design refinements that brought energy demand down to manageable levels on a single-phase supply.

Operational challenges also had to be addressed. Integrating a major new piece of equipment into depot systems required careful planning, while monitoring energy flows from the solar array to the hot box demanded new approaches to energy management. By maintaining close engagement with the supplier, Dorset Highways was able to navigate these barriers.

The greatest challenge was the decision itself: whether to take the safe option of replacing the propane unit with another conventional model, or to commit to a new and untested technology. The success of the project has since validated that decision, with the supplier going on to deliver further units to other local authorities and contractors, demonstrating the scalability and transferability of the approach.

Outcomes:

The results have exceeded expectations. The new hot box has delivered annual carbon savings of 80,443 kg, while also saving £10,831 per year in propane costs. When powered by the depot's solar array, the carbon emissions from operation fall to zero, ensuring that Dorset Highways is maximising the environmental value of its renewable energy investment.

The improved insulation and design of the hot box have further enhanced efficiency, reducing overall energy consumption. The unit's modular heating system, which uses multiple zones but activates only one at a time, ensures that energy use remains low while maintaining performance.

The project has also demonstrated strong alignment with Dorset's corporate responsibilities and commitments. By visibly linking innovation in highway operations with the council's climate and ecological emergency response, the initiative has provided a clear example of how frontline services can contribute to net-zero goals. Importantly, it has also protected the council from volatile energy costs at a time when many other organisations have faced steep price increases.

Future Plans:

Looking ahead, Dorset Highways is exploring ways to build on the success of the electric hot box. The most immediate opportunity is to introduce battery storage at the depot, allowing surplus solar energy generated during the day to be stored and used to power equipment at night. While current costs remain high, the service is confident that prices will fall as adoption of battery technology increases, making this a realistic medium-term goal.

The council is also installing a dedicated meter for the hot box to enable precise monitoring of its energy use, which will further support the evidence base for expanding the technology. The solar array itself was deliberately over-specified to accommodate future demand, including charging infrastructure for the vehicle fleet and electric-powered tools, ensuring that the depot is well-positioned to continue its transition to low-carbon operations.

By taking the initiative to adopt untested but innovative technology, Dorset Highways has established itself as a sector leader. The project provides a transferable model for other councils and contractors, demonstrating how sustainable procurement and renewable energy can be combined to deliver carbon reductions, cost savings, and operational improvements.

5.7 Bedford Borough Council – Solar farm on closed landfill

Background:

In 2022, Bedford Borough Council secured £1,867,500 in funding from the South East Midlands Local Enterprise Partnership (SEMLEP) to support the development of a 4.2 MW solar array at Elstow closed landfill. The project represented an ambitious and forward-thinking approach to repurposing a challenging brownfield site while supporting the council's wider ambitions for carbon reduction, renewable energy generation, and environmental enhancement.

The SEMLEP contribution formed part of a total £2,282,500 capital investment by the council, enabling re-profiling of the landfill to create suitable slopes for the installation of over 8,000 photovoltaic panels. The project also included the design, installation, and connection of the solar array, along with the supporting infrastructure required to export renewable electricity to the grid.

Elstow is a 30-hectare former landfill that had been partially capped with clay and inert materials under existing planning approval. Completing the capping and restoration works remained a key regulatory requirement, governed by both planning conditions and the Environment Agency's (EA) environmental permit for the site. The council's proposal to transform this closed landfill into a solar energy generator not only offered a means of reusing otherwise unproductive land but also set an example of how local authorities can turn legacy waste infrastructure into valuable clean-energy assets.

Overview:

The Elstow Solar Project was one of the most ambitious renewable energy developments ever undertaken by Bedford Borough Council. The 4.2 MW solar array spans approximately 8,000 panels installed across the carefully re-profiled slopes of the landfill. The system is capable of generating enough renewable electricity to power around 1,000 homes each year, saving over 900 tonnes of carbon annually.

Delivered in partnership with a range of specialists, the project required coordination between internal teams and external consultants, including APSE Energy consultants. Together, they brought the technical, environmental, and regulatory expertise necessary to deliver a complex engineering scheme on a constrained and sensitive site.

The project achieved full grid connection and was successfully commissioned in May 2022. Originally, the council anticipated an annual income of around £111,000 through the sale of electricity to nearby commercial units via a private-wire arrangement. However, when that agreement did not progress, the council instead negotiated a Spill Power Purchase Agreement (PPA) with its electricity supplier. This proved unexpectedly beneficial, generating five times the forecast income in the first year thanks to strong wholesale energy prices.

Challenges and Overcoming Them:

Working on a closed landfill site brought a series of technical and regulatory challenges. Strict EA criteria governed soil levels, capping integrity, and environmental protection. Any breach of the cap during installation could have compromised both the site's stability and its compliance with environmental permits. The design and construction teams therefore developed an innovative ballast-based support system that avoided intrusive groundworks while still securely anchoring the panels.

The greatest obstacle, however, came from grid connection constraints. Bedford lies within a heavily restricted area of the UK electricity network, where limited grid capacity meant the Distribution Network Operator (DNO) imposed a curtailment on export levels. This required costly network upgrades and a managed export cap of 3.5MW, limiting the full potential output of the 4.2MW system. The restriction also prevented the council from including battery storage within the project, constraining flexibility in how generated power could be used or stored.

Despite these setbacks, the council's project team remained determined to deliver. Close collaboration with UK Power Networks and technical consultants ensured that the design was adjusted to operate within the constraints. The team also had to respond quickly to last-minute supply

chain issues, including the unavailability of the originally specified solar panels. A rapid procurement revision prevented delays to delivery and installation.

There were further challenges during the final connection works, which took longer than planned and added unforeseen costs. Nonetheless, the project was completed successfully within the expected timeframe.

Outcomes:

The Elstow Solar Project has been a resounding success both financially and environmentally. In its first year of operation the array generated over £500,000 in income, far exceeding the original projections. This windfall was largely due to favourable Spill PPA prices during a period of high energy market volatility. Even as wholesale prices stabilised, the project continued to perform strongly, generating £355,000 in 2023/24 and maintaining a valuable revenue stream in 2024/25.

Although the volatile energy market has reduced the scale of income compared to the exceptional early figures, the project continues to provide a significant financial return on investment, contributing directly to the council's budget and helping to fund future green initiatives. It has also proven to be a strong example of responsible land reuse, transforming a difficult, contaminated site into a productive, renewable asset.

Beyond its financial and carbon benefits, the project has created an environmental and educational legacy. Wildflowers have been introduced across the solar array area to promote biodiversity and improve habitat quality. Cranfield University has shown interest in the site as a case study for research and teaching, recognising its innovation and contribution to sustainable land management.

Future Plans:

While the Elstow Solar Project has delivered substantial results, the council continues to explore ways to build on its success. The high cost of grid infrastructure upgrades has, for now, limited opportunities to expand capacity or add battery storage. However, the council remains engaged with UK Power Networks to explore long-term solutions for strengthening



the local grid and unlocking additional renewable potential.

Future ambitions for the site are wide-ranging. Plans are being developed for an anaerobic digestion (AD) facility alongside the existing recycling operations, designed to process food waste collected within the borough. The AD plant could complement the solar array, generating renewable gas and further enhancing the site's contribution to the local circular economy. The longer-term vision is to establish a Green Technology and Innovation Park at Elstow, incorporating electric vehicle charging infrastructure for the council's fleet, particularly its waste collection vehicles.

The experience gained through this project has also shaped the council's approach to future renewable investments. Lessons learned around PPAs, energy market volatility, and certification processes, such as delays in obtaining Renewable Energy Guarantees of Origin (REGO) certificates, are being used to inform more resilient income models, including fixed-price electricity auctions for greater budget certainty.

The Elstow Solar Project stands as a powerful example of local government innovation, turning a once polluted and unusable landfill into a hub of renewable energy generation, biodiversity restoration, and financial resilience. It demonstrates what can be achieved when ambition, collaboration, and environmental responsibility come together to deliver meaningful local impact.

5.8 Comhairle nan Eilean Siar – Solid Recovered Fuel from non-recyclable waste

Background:

The Outer Hebrides face distinctive challenges when it comes to waste management, shaped by their geography, infrastructure, and dispersed island communities. Non-recyclable waste collected from the southern isles must travel long distances, crossing two ferries and more than 90 miles, to reach landfill on the Isle of Lewis. This process is not only costly but also carbon intensive, adding transport-related emissions to an already unsustainable waste system.

Recognising the need for a more sustainable and locally managed solution, Comhairle nan Eilean Siar formed a partnership with biotechnology company Advetec to trial an innovative waste treatment approach. In 2023, the council installed the XO22 digester on the Isle of Benbecula, marking the first use of this technology by a UK local authority. The system transforms household black-bag waste into Solid Recovered Fuel (SRF), a sustainable, coal-replacing material that can be used in energy-intensive industries.

The initiative represents a fundamental shift in how the islands manage their waste: from disposal and export to local treatment and resource recovery. By creating a circular economy model in one of the UK's most remote regions, Comhairle nan Eilean Siar has positioned itself as a leader in sustainable waste and energy innovation.

Overview:

The XO22 digester operates as a compact mechanical biological treatment system, capable of processing around 10 tonnes of non-recyclable waste per day. Using Advetec's proprietary bacterial blends, the system accelerates the breakdown of organic matter and stabilises the material, reducing waste volume by up to 50%. The process produces SRF, a clean-burning fuel with carbon emissions approximately 95% lower than coal, offering a renewable energy source that supports industrial decarbonisation.

For Comhairle nan Eilean Siar, this technology offers a way to address multiple strategic priorities simultaneously, waste reduction, energy generation, carbon savings, and cost efficiency. By diverting waste away from landfill, the council is reducing methane emissions, lowering transport costs, and ensuring compliance with Scotland's forthcoming biodegradable landfill ban, due to take effect in 2026.

Each tonne of SRF produced prevents approximately 1.21 tonnes of CO₂e emissions compared with using coal, making the system not only environmentally beneficial but also aligned with Scotland's and the council's net-zero ambitions. The initiative also demonstrates how technology-led innovation can empower small and remote communities to meet complex regulatory and environmental targets independently.

Challenges and Overcoming Them:

Introducing an advanced waste technology on a remote island came with a series of logistical and regulatory challenges. One of the key hurdles was the transport and installation of the digester on Benbecula, a process that required careful coordination across multiple ferry routes, limited port infrastructure, and local contractor capacity.

There were also regulatory and environmental considerations, given the need to ensure full compliance with environmental permitting and waste-handling standards. Working closely with Advetec and environmental regulators, the council established robust monitoring processes to demonstrate that the XO22 could safely process residual waste and deliver outputs suitable for use in energy generation.

Another challenge was ensuring operational efficiency within the constraints of a small island context. Historically, non-recyclable waste from the southern isles had to be transported to landfill at significant cost. By locating the XO22 on Benbecula, the council was able to remove the need for cross-island waste transport altogether, cutting ferry journeys and heavy vehicle mileage. This not only improved reliability but also significantly reduced emissions and costs.

Finally, as the first local authority in the UK to implement the XO22 technology, Comhairle nan Eilean Siar took on the role of a national pilot. This meant managing risk and navigating the uncertainties associated with a first-of-its-kind installation. Through proactive engagement, cross-sector collaboration, and close partnership working with Advetec, these risks were effectively mitigated. The council's leadership and willingness to innovate have provided a blueprint for others looking to deploy similar systems across the UK.

Outcomes:

The results of the XO22 installation have been transformative. The system now diverts 100% of non-recyclable waste from landfill, helping Comhairle nan Eilean Siar progress towards its zero-waste targets while saving approximately 4,400 tonnes of CO₂e each year. These carbon savings come from both avoided landfill emissions and reduced transport requirements, alongside the environmental benefits of replacing fossil fuels with SRF.

The project has also created new opportunities for local employment and skills development, supporting a greener and more self-sufficient community. By retaining waste treatment within the islands, the council is keeping resources and investment local, while enhancing resilience and operational control.

From a financial perspective, while the initiative is driven more by cost avoidance than by direct income, it delivers substantial savings compared to traditional landfill disposal. Reduced transportation and landfill fees, coupled with a more predictable waste management model, have strengthened the council's financial sustainability in the long term.

Beyond its operational success, the project has sparked academic and industrial interest, particularly from institutions such as Cranfield University, which view the Benbecula facility as a valuable case study in circular economy practice and rural innovation. The installation has also enhanced the Outer Hebrides' reputation as a region committed to environmental leadership and forward-thinking approaches to sustainability.



Future Plans:

Building on the success of the Benbecula project, Comhairle nan Eilean Siar is exploring options to scale and replicate the use of biotechnology-based waste treatment across other islands. The council intends to monitor performance data from the XO22 system closely to inform future investments in similar technologies, both locally and in partnership with other authorities facing comparable geographic and logistical challenges.

The next stage of work will focus on optimising the use of SRF produced on Benbecula, with the potential to establish agreements with industrial users or energy recovery facilities across Scotland. This would further embed the circular economy approach, transforming local waste into a marketable, low-carbon resource that contributes to national decarbonisation goals.

In parallel, the council continues to prepare for the 2026 landfill ban by identifying additional opportunities for waste prevention, reuse, and recycling. The success of the XO22 project provides a strong foundation for this transition, demonstrating that even the most remote communities can pioneer effective, scalable solutions for waste and energy management.

Ultimately, the initiative reflects the Outer Hebrides' capacity for innovation and resilience. By turning logistical and environmental challenges into opportunities for carbon reduction, energy creation, and community empowerment, Comhairle nan Eilean Siar has not only met the immediate needs of its islands but also set a national precedent for sustainable local government practice.

5.9 Walsall Council – Engaging with school children to promote energy retrofits

Background:

Walsall Council has taken an innovative, community-centred approach to tackling fuel poverty and improving energy efficiency in some of the borough's most deprived areas. Working in partnership with Hillary Primary School and Achieve Your Goals CIC, the council is delivering bespoke education packages on energy and renewable technologies to around 700 pupils. The aim is to empower children to become messengers for change, sharing energy-saving knowledge with their families in their first language.

Hillary Primary School sits within one of Walsall's most diverse and deprived communities. 81% of pupils live in the most deprived decile bands nationally, and 76% speak English as an additional language. This unique context has positioned the school as a trusted community hub, capable of reaching households that traditional council communications might not engage effectively.

The initiative builds on the long-standing experience of Walsall's Home Energy and Fuel Poverty Team, whose accessible and impartial advice services have consistently driven high levels of resident engagement. The council's success in retrofit delivery is reflected in its ECO4 Flex participation rate of 28%, which significantly exceeds national and regional averages.

Overview:

The school-led project aims to create a bridge between educational learning and practical climate action at home. Through lessons integrated into the curriculum, covering literacy, numeracy, and science, pupils learn about energy efficiency, renewable energy and everyday behavioural changes that reduce energy use. Monitoring equipment has been installed at the school, allowing pupils to track energy consumption in real time and better understand how usage affects both carbon emissions and household bills.

Teachers have been trained to deliver these sessions confidently, ensuring that messages about energy saving are passed on to families in culturally relevant and accessible ways. Alongside classroom learning, the school hosts community engagement activities including drop-in sessions, workshops, and one-to-one advice events where residents can learn about retrofit funding, insulation options, and renewable technologies.

The project's delivery has been strengthened through collaboration with Achieve Your Goals CIC and local community organisations such as Nash Dom CIC, which provide translation support and help overcome cultural and linguistic barriers. Partnership working with Walsall Trading Standards has also been integral, helping residents distinguish trusted installers and avoid rogue traders; an issue that has become increasingly prevalent as awareness of retrofit funding grows.

Challenges and Overcoming Them:

Reaching residents in a community with high deprivation levels and multiple languages required creative engagement methods. Many households lacked access to digital platforms and had limited literacy in English, meaning that conventional outreach approaches were less effective. By positioning the school as a central communication channel, Walsall Council was able to build trust and reach residents through familiar and reliable relationships. Teachers and pupils became intermediaries, explaining key energy concepts in community languages and encouraging families to explore available support.

Technical challenges also emerged due to the area's housing stock, which consists largely of older Victorian terrace properties. These homes often require bespoke retrofit solutions, with issues such as limited space for insulation and structural complexities to navigate. The council addressed these by working closely with contractors to ensure measures were compliant with PAS2035 standards and suitable for the local building types.

Another key challenge was overcoming scepticism and confusion around retrofit schemes. Many residents were wary of being misled or were uncertain about eligibility. In response, the council's team delivered

face-to-face sessions, home visits, and tailored advice to guide residents through the full process, from understanding grants to post-installation support.

Outcomes:

The initiative has already generated significant community and environmental impact. Over 470 fuel-poor households have received bespoke, in-person support, with each engagement averaging more than seven hours of one-to-one assistance. This has translated into over £1.5 million worth of funded energy efficiency measures across the community, including 60 external wall insulation installations, 9 loft insulations, and 59 solar PV systems. Collectively, these improvements are estimated to save residents around £78,500 in energy costs annually.

Feedback from residents has been highly positive, with many reporting a noticeable improvement in home comfort and reductions in energy bills. One household described the impact as “transformative,” noting that their home stayed warmer in winter and cooler in summer for the first time.

The school has also benefited directly, with teachers observing increased enthusiasm and engagement from pupils who see the tangible impact of their lessons at home. The collaboration has strengthened community cohesion, built local confidence in retrofit schemes, and demonstrated the powerful role schools can play in supporting the transition to a low-carbon future.

Future Plans:

Following the success of the pilot, Walsall Council plans to expand the model to six additional schools by 2026 as part of the borough’s Devolution Deal Retrofit pilot. The council intends to maintain the “golden thread” between schools, families, and council services, ensuring the approach continues to grow organically within the community.

Future developments include establishing community energy champions, residents trained to provide peer-to-peer support and share knowledge across neighbourhoods, and exploring opportunities to link retrofit engagement with local training and employment pathways.

Through this approach, Walsall Council is demonstrating how education, trust, and community partnership can break down barriers to energy efficiency. By placing children and schools at the centre of climate action, the council is not only addressing fuel poverty but also fostering a long-term cultural shift towards sustainability that reaches every household in the community.



6. Case Study 'Shorts'

Wigan Council – School Streets

In September 2020, Wigan Council became the first Greater Manchester authority to launch a School Streets scheme, piloted outside Lamberhead Green Primary School in Pemberton. Since then, the initiative has expanded to 7 School Streets covering 9 schools, the highest number in the city region.

School Streets temporarily close roads around schools to motor vehicles during drop-off and pick-up times, creating safer, cleaner, and more accessible spaces for walking and cycling. Exemptions are granted only to those who need essential access, while “park and stride” locations allow parents who travel by car to complete the final part of the journey on foot. Schemes are supported by new signage, temporary barriers, and marshals from the school community.

The results have been clear: reduced congestion, improved road safety, cleaner air, and increased active travel. At Lamberhead Green, travel surveys showed car use dropping while walking and cycling rose significantly. A year after the scheme began, follow-up surveys confirmed that these benefits were being sustained with car use decreasing by 50% and the park and stride use increasing from 0 to 26%. Teachers, parents, and residents have generally welcomed the schemes, and initial concerns from some local residents were overcome through strong community engagement. Framing the project as being driven by the children themselves has been particularly effective in winning support.

To complement the schemes, schools are supported to develop travel plans and, where School Streets are not suitable, alternatives such as “walking bubbles” are introduced. These encourage families to walk at least the last five minutes to school, helping spread the benefits of reduced traffic and safer streets.

Looking ahead, Wigan aims to be the first Greater Manchester authority

with 10 School Streets, with ambitions to extend the model further. The council is also aligning the programme with wider strategies, including Vision Zero, the Travel to School Strategy, and the Greater Manchester Air Quality Strategy. These efforts not only improve safety and wellbeing today but also contribute to the borough's commitment to achieving net zero by 2035 and eliminating fatal or life-changing road injuries by 2040.

Renfrewshire Council – Food waste

Renfrewshire Council has committed to reaching net zero by 2030 and creating a zero-waste, circular economy. A waste composition analysis in 2022 revealed that 61% of general waste could have been recycled, with food waste the largest contributor at 33% of the total weight. Tackling food waste was therefore identified as a key priority, both to cut carbon emissions and to increase recycling performance.

To address this, the council rolled out a large-scale programme to ensure that 100% of households, including those in flats, rural areas and other non-standard properties, have access to food waste collections. Alongside extending collections, every household now receives an annual supply of free liners, with indoor food caddies available on request, while targeted campaigns, bin stickers, leaflets, and online resources promote participation.

For communal properties, new food waste containers with restricted lids were introduced to prevent contamination, supported by the distribution of reusable sacks to make recycling more convenient for residents. In rural areas, the garden waste service was expanded to 5,000 homes, while 1,000 sack collection households were given the infrastructure to recycle food waste for the first time. Collectively, these measures removed barriers to recycling and standardised services across the borough.

Early results are very positive. Between January and March 2025, Renfrewshire collected 336 tonnes more comingled food and garden waste compared to the same period in 2024, a 22.7% increase. Based on projected food-to-garden waste ratios, this equates to a carbon saving of around 288 tonnes CO₂e. More than 3,000 households have requested

food waste caddies, showing strong engagement and enthusiasm for the new service.

Looking ahead, Renfrewshire is exploring ways to build on this progress. Reuse pilots are underway at Household Waste Recycling Centres, collecting small electrical items for resale by the Salvation Army, with plans to expand to more sites and materials. A booking system for HWRCs and a new waste collection schedule are also being introduced to improve service efficiency, reduce residual waste, and increase recycling rates. Together, these measures are supporting Renfrewshire's wider journey towards net zero, a circular economy, and a more sustainable future.

Cambridge City Council – i-Tree Eco Project

The Cambridge i-Tree Eco Project is a pioneering initiative to quantify the environmental and economic benefits of the city's urban forest. Delivered in partnership with Anglia Ruskin University, Forest Research and Treeconomics, the project assessed the structure, diversity, and ecosystem services of Cambridge's trees, including carbon storage, pollution removal and stormwater mitigation.

Unusually, the project was the first in the UK to engage untrained resident volunteers in data collection. This approach, adapted in response to the COVID-19 pandemic, enabled safe community participation and fostered public ownership of the city's green infrastructure. Volunteers received guides and training resources, ensuring reliable data while deepening awareness of the importance of urban trees.

The findings highlight the critical role of Cambridge's urban forest in tackling the climate crisis. Each year, the city's trees sequester more than 2,000 tonnes of carbon, store 88,000 tonnes overall, and remove 22 tonnes of air pollutants, alongside preventing nearly 100,000m³ of stormwater runoff. Together, these services are valued at over £1 billion, offering both environmental and economic justification for continued investment in urban forestry.

Beyond the figures, the project has shaped local planning policy and

APSE Energy Services

APSE Energy is a collaboration of over 130 local authorities who are working towards the vision of the municipalisation of energy. Councils having a greater role in energy management within their locality might be something as simple as advertising cheaper energy tariffs that residents can sign up to. It can also involve more in-depth measures such as installing large scale solar farms or establishing a local behaviour change or education programme. We have 4 work strands, forming an overall objective of helping members remain up to date with developments in energy and climate change.

Learning: We deliver a range of seminars, meetings, webinars, and practical workshops focused on specific themes, featuring expert speakers and industry specialists. We also collaborate with partners to help members stay informed about emerging technologies, services, and business models in the commercial sector. Attendance at our events is free for any member authority. The Big Energy Summit is a two-day annual conference bringing together government representatives, industry leaders, and experienced local government officers. All conference costs, meals, and accommodation are covered for up to two representatives from each APSE Energy member authority. Separate summits are held annually in England and Scotland. Across all our events, we create opportunities for learning, networking, and sharing best practice across the sector.

Knowledge: APSE Energy enhances our members' knowledge by providing a range of briefings and technical notes, which keep officers and councillors up to date with developments in the sector. Our monthly newsletter highlights key publications, services, and projects, and shares information relevant to local authorities' energy agendas. We produce comprehensive research publications on a regular basis, addressing topics such as Biodiversity Net Gain, air quality, retrofitting historic buildings, using design in planning to address climate change and a variety of other topics.

Advocacy: We undertake an advocacy role to highlight energy related issues impacting local authorities and to engage with key stakeholders across government, the wider public sector, professional bodies, and industry organisations. We promote the vision of greater municipalisation of energy and showcase the projects that councils are delivering to meet that vision. Through links to government departments such as DESNZ, we champion the aims of the collaboration and raise matters that are of importance to our members. APSE Energy also represents members' interests in relation to key policy and legislative developments.

Consultancy: APSE Energy offers a consultancy service, via APSE Synergy, with energy sector expert Associates. Our associates specialise in the local authority context and understand the councillor–officer relationship, internal processes, and the role of energy within wider council services. They combine professional expertise, academic qualifications, and significant hands-on experience across a wide range of technologies and project types.

Membership of APSE Energy means being part of a movement that seeks alternatives to reliance on big energy suppliers. It supports councils in making the most of their assets while addressing issues such as energy security, fuel poverty, emissions reduction, and cost management. Membership also promotes councils as local leaders on the energy and climate change agenda, recognising their vital role in shaping sustainable places and communities.

APSE Energy is recognised across the sector as a trusted supporter and credible partner. While we work with a network of industry experts through our valued Associates, we do not offer, and are not regulated to provide, investment advice or construction and design services.

We encourage member councils to explore the benefits of renewable energy and energy-saving measures across their operations and within their localities, to the benefit of both the environment and local residents. This should always be done with the appropriate due diligence and the professional advice of in-house experts and qualified practitioners at every stage of development.

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