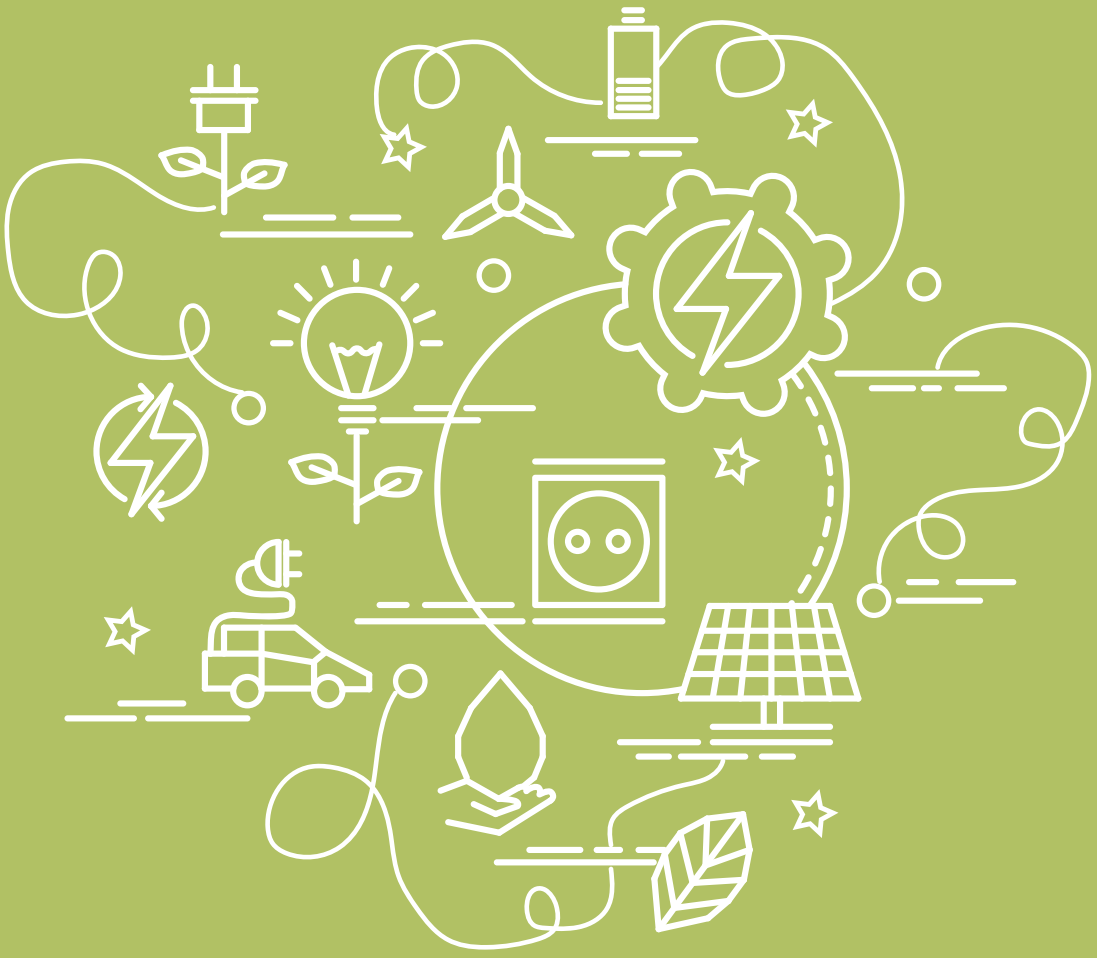
apse energy

APSE Energy Consultancy Case Studies

Energising Local Government



APSE Energy Consultancy

The Association for Public Service Excellence (APSE) is a not-for-profit membership based organisation dedicated to promoting excellence in the delivery of frontline services to local communities. We work with more than 300 local authorities across the UK.

APSE Energy is part of the APSE family and is a collaboration of over 130 pioneering local authorities who are working to address issues across the energy, climate change and sustainability agenda.

One element of APSE Energy's offering is consultancy support across a range of activities related to this agenda. This document provides case study examples of a number of consultancy projects that APSE Energy associates have worked on for local authorities. APSE Energy associates are recognised energy industry experts with substantial experience in dealing with energy and climate projects within the local authority environment. They understand the processes within local government and the importance of building support for a project. They have experience in different technologies, products and services and are skilled at supporting local authorities to look at their assets through an 'energy, climate change and sustainability' perspective.

The following are some of the consultants' areas of expertise:

- Strategic understanding of a local authority's role in the energy and climate change agenda;
- Measuring carbon baselines, developing/reviewing climate emergency strategies and action plans;
- Producing trajectory reports enabling movement from current position meet net zero targets;
- Energy audits/feasibility studies for individual buildings decarbonisation projects;
- Heat decarbonisation plans for the council's estate or groups of properties;
- Embedding climate change and energy into local plan policies;
- Strategic and early phase support for projects including heat networks;
- Solar PV (land, building, carport based) battery and storage options;

- Identifying and addressing grid access and capacity matters;
- Infrastructure to electrify the fleet, vehicle charging and depot works;
- Support with business cases, monetary calculations and funding information;
- Bidding for funds such as PSDS or Scotland's PSHDF;
- Feasibility into projects and projections for outcomes from wind generation projects.

APSE Energy can provide support such as:

- Helping to write or update energy/climate/sustainability strategies by, holding workshops with managers/councillors; incorporating assets into strategy; drawing up action plans;
- Assisting councils with monetary calculations for specific projects such as solar farms;
- Providing market intelligence and assisting understanding of cost comparisons on renewable technologies and projects;
- Providing advice on grid connections, grid applications and discussions with District Network Operators (DNOs);
- Supporting discussions with potential customers of energy generated by the Council;
- Acting as a technical support or critical friend on existing or planned heat networks;
- Supporting specific technologies such as solar, batteries, wind, heat pumps and lighting;
- Plus a variety of other bespoke consultancy services.

Consultancy support varies in duration, from a single day to ongoing support over many months and is tailored to each specific job to suit each local authority's circumstances. We work to a jointly agreed proposal which describes the project, duration, cost, outputs and associates undertaking the work.

Why not make contact to talk about your project and the type of help you require? There is no pressure to work with us. We will help where we can and you may follow the many hundreds of councils we have worked with successfully before.

APSE is a not-for-profit organisation which exists solely for the benefit of the local government sector. All fees generated through consultancy, or our other services, remain within the sector and are used for the benefit of our members.

If you wish to know more about APSE Energy or our consultants, please contact Phil Brennan, Head of APSE Energy on 0161 772 1810 or at pbrennan@apse.org.uk, James Jefferson, Principal Advisor at jjefferson@apse.org.uk or Charlotte Burke, Energy & Climate Officer at cburke@apse.org.uk

Disclaimer

Whilst APSE Energy works across industry experts through our valued Associates we do not offer, and are not regulated to offer, investment advice in energy or indeed in construction and design services. Member local councils are encouraged to fully explore the benefits of renewable energy and energy saving measures across their authority and their locality to the benefit of the local environment and local citizens, however this should always take place with the secure knowledge and advice of their own council experts, including in-house finance teams, and appropriate professionals at every stage of development.

Solar

Warrington Borough Council's 3 solar farms are considered amongst the UK's largest and most technically advanced solar + battery storage projects.

The first was completed in December 2019 - a 34.7MW solar farm near York, which is pioneering a new commercial model using 30 MWh of battery storage and sophisticated technologies to maximise revenues and help balance the grid. The project generates enough energy to supply a town (10,000 homes) and demonstrates how local authorities can partner with developers to deliver projects that cut carbon, supply clean electricity, and generate millions of pounds for councils to fund essential services. The council has also purchased a 25.7MWp solar farm in Hull, alongside 24mWh of battery storage, the solar farm generates enough electricity to power 8,000 homes. Warrington's most recent solar farm is in Cirencester. Completed in 2022, the 23 MWp Cirencester Hybrid Solar Farm is 88 acres in size and combines over 43,000 bifacial solar panels on trackers with 51 MWh of energy storage, the Cirencester solar farm is a DC Coupled system unlike York and Hull which are a more standard AC Coupled system. The combination of all 3 solar farms has enabled Warrington Borough Council to become the first local authority in the UK to produce all of its own electricity as well as being able to trade energy and benefit financially to fund other activities in the green agenda.

Across the installation of the 3 solar farms, APSE Energy's associates assisted the council in the following ways:

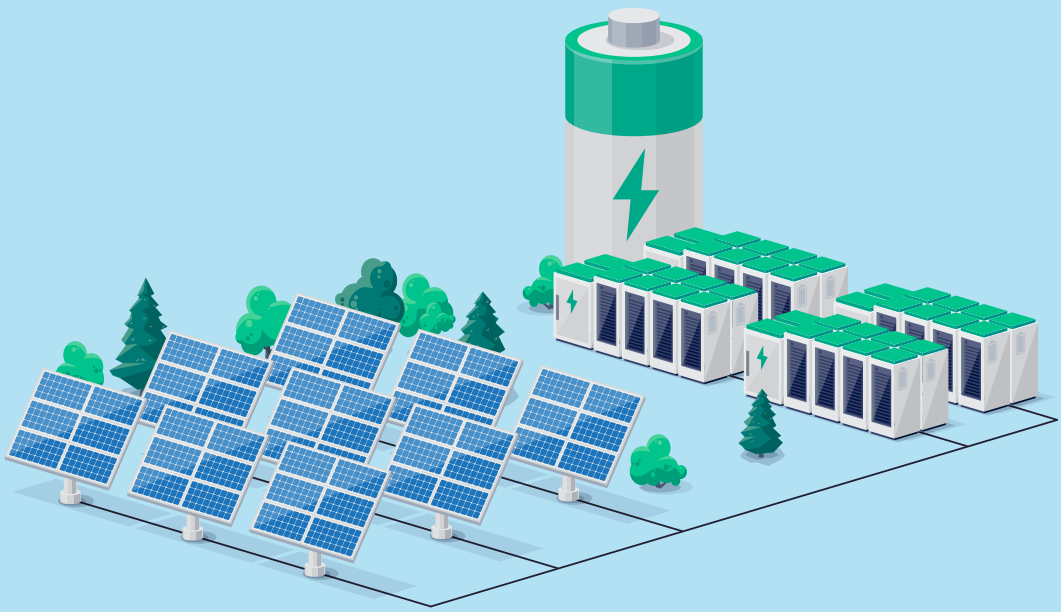
- A review and supporting the council's evaluation of the operating models that had been provided to the council;
- Providing advice to the council in their discussions with
    - Gridserve when considering Operation and Maintenance contracts, Management Services provision, BESS (Battery Energy Storage System) Optimisation Services, Power Purchase Agreement (PPA):
    - Statkraft regarding a PPA for the Cirencester and York solar farms, and in discussions with Geldards solicitors covering legal issues;
    - EON for the BESS PPA and;

- Npower for the solar PPA for the Hull solar farm.
- Supported the council with REGO and Capacity Market applications.

Overall APSE Energy was able to support Warrington with this project, helping them avoid unnecessary costs and delays, and supporting their dealings with other organisations.

Key Points

- Project - 3 solar farms
- Council - **Warrington Borough Council**



Energy Audit

Energy efficiency and energy management should be high on the list of priorities for those councils who are serious about managing energy, energy efficiency and reducing emissions. Monitoring the performance levels of buildings and energy equipment is a vital element in looking after the council's estate. We can help with energy audits ranging from a large leisure centre to support for energy bill validations.

Blackburn with Darwen Council were scheduled to retrofit an existing boiler at Darwen Leisure Centre and required some advice about options prior to making the decision.

APSE Energy, in discussion with the council, assessed the data provided to check the performance of the CHP (Combined Heat and Power); establishing the level of energy/carbon/ monetary savings expected to be achieved over the lifetime of the CHP unit. This work included load modelling, analysis of system inputs and outputs (mains gas input and heat and power output), as well as the maintenance regime.

The next stage involved the following:

- A site investigation to assess the CHP;
- A review of heating and automatic controls to assess the systems in term of promoting efficient and effective operation of the CHP;
- Overview of the installed system and integration with the controls, connections, time zones and system sizing;
- A review of system performance;
- Comparison of the energy/carbon/ costs between using the CHP and stopping its use;
- Options for energy saving measures;
- A detailed report highlighting how the performance of the unit could be improved.

This review enabled the client to make an informed decision about whether to spend on an upgrade to the existing system or invest in a new heating system.

Key Points

- Project - Energy audit of a specific asset in this case CHP
- Council - **Blackburn with Darwen Council**
- Expert Associate

"Although we have engineers working in the council, we needed some specific support to look at a boiler system at a leisure centre. We weren't 100% sure whether to invest in a new system. APSE Energy's associate brought expert engineering knowledge and an understanding of the practical considerations of energy use in a leisure centre. It turned out to be invaluable help."

Gwen Kinloch
Environment & Sustainability Manager
Blackburn with Darwen Council

Carbon Footprinting - Council Operations

The vast majority of local authorities have now made a climate emergency declaration and most of these are accompanied by a target date for net zero carbon. Whether there is a date or not, the current consciousness around this agenda means that it is vital for any organisation to be able to track its own performance in terms of carbon emissions. That means identifying the current carbon footprint and being able to monitor it simply on a regular basis.

Many local authorities have capacity issues which mean they are unable to accomplish this task. There is a need to understand the organisation's services and those elements that contribute to emission levels, identify Scopes, recognise the data required, apply appropriate factors and analyse the outputs. It is also necessary to put into place a relevant process to maintain access to the data, update it and populate the relevant model as well as ensuring the process can be replicated in future. This is a fundamental part of ensuring a successful approach to climate action.

APSE Energy have worked with Three Rivers District Council (and many others) to establish, monitor and compare the council's Scope 1, 2 and 3 greenhouse gas (GHG) emissions over a number of years.

Scope 1, 2 and some Scope 3 greenhouse gas emissions of the council's own operations have been calculated based on data provided by the council. The outcomes were compared with previous year's figures to identify trends and progress over time.

We provided a simple template to enter details of the data we required from the council, which was: annual energy data for building portfolio, kWh usage taken from energy bills, annual data for vehicle fleet, and vehicle type, size, fuel type, amount of fuel used and distance travelled (km). Scope 3 GHG emissions of the council's own operations were included where appropriate.

The council is left with a report and spreadsheet with all the information provided to APSE Energy. The latter is in a format which is clear enough for the council to undertake a similar exercise in future years if it so wishes. We held a Teams meeting to talk through report

and spreadsheet, explain recommendations and any questions.

Capacity issues are a common feature of local government and energy and climate matters are not immune. Monitoring emissions is an important exercise and APSE Energy can complete it, quickly and effectively, for a very small fee.

Key Points

- Project - Baseline carbon footprint
- Council - **Three Rivers District Council**

Carbon Reduction Trajectory to the Net Zero Target Year

In 2019 Waverley Borough Council declared a climate emergency and committed to becoming a carbon neutral council by 2030. The council prepared a Carbon Neutrality Action Plan to provide a statement of the councils' areas of focus to achieve a carbon neutral borough. It offers a framework for change and will continually evolve as projects and actions are developed further.

APSE Energy produced an updated carbon baseline and trajectory for Waverley Borough Council, which replaced the original one produced in 2020. The updated baseline includes a recalculation of emissions based on actual usage and adjustments to the forecast emissions based on projects that have been completed and more detailed information on proposed projects and associated savings.

The carbon footprint was undertaken in line with best practice guidance by the Greenhouse Gas Protocol and calculated using the relevant annual carbon conversion factors for the carbon dioxide equivalent (CO2e) published by the Department for Energy Security and Net Zero.

The emissions are allocated to Scopes 1, 2, and 3 which enables more detailed tracking of reductions over time. The actions detailed within the trajectory report should reduce emissions by 89% for Scope 1 & 2 emissions between 2020 and 2030. When including Scope 3 emissions the reduction is equivalent to 59% for Scope 1, 2 & 3 emissions between 2020 and 2030.

The trajectory suggests a range of interventions for the council to reach net zero carbon on council owned assets by 2030, including being more energy efficient in buildings, installing air source heat pumps, generating power, transitioning to electric vehicles and developing a tree planting scheme. The trajectory assumes that hard-to-reduce emissions can be offset through a 500kWp solar farm and a tree planting scheme.

The trajectory report and spreadsheet should be seen as a dynamic document and updated as projects are completed and new emissions data received to ensure it is a tool.

There is an estimation of the costs to implement these interventions, with the trajectory also including predicted financial benefits for the council.

Key Points

- Project - Carbon trajectory
- Council - **Waverley Borough Council**

Solar Farm Feasibility Study

Solar energy is probably the easiest large-scale renewable technology to make operational. The Government have set the target of reaching 70GW of solar energy generation by 2035, therefore it can be expected that an increasingly large priority will be placed upon the deployment of solar PV in the years leading up to 2035.

There are potentially a range of factors which can cause a significant delay but in the main there are a set number of stages to be achieved before a council will know whether a project is worth allocating resources to.

APSE Energy has worked with many local authorities on the early stages of a solar farms, solar on roofs and solar carports. Derbyshire County Council is one such council. In this case, we produced a stage 1 report which addresses the main issues that can derail a scheme so that substantial resources are not wasted on a project due to a problem which could have been identified early in the process.

The council knows it will have carbon emissions to offset in the future and is planning for that situation. Having worked with the council on potential solar farm sites previously, we carried out an initial assessment on a number of sites for the deployment of solar PV. This was then sifted down to 4 sites, which were inspected to assess whether it would be worthwhile pressing ahead with a solar farm project.

There are 4 main stages of a feasibility study. The first is a site visit to consider issues such as orientation, shading, access and ground conditions. In Derbyshire County Council's case, this involved inspecting the 4 previously mentioned sites. Of these sites, it was found that 1 was suitable to proceed with at this stage, as it had already had an accepted grid offer from the Distribution Network Operator. There were other sites that could be taken forward but they would take longer to come to fruition.

A project must align with the council's financial plans. To assist in viability considerations we supported the council by producing

3 income and cost spreadsheets (including battery storage) for a site based on building out the installation by the end of 2025.This approach allows the council client the opportunity to review and work with different scenarios and carry out their in-house verification of viability issues.

The final report brought all of the issues which emerged together and highlighted others such as connections to the grid, planning matters, battery technology and communications with the local community.

The report with recommendations, can be used by decision makers, whether senior officers or councillors, to take an informed decision on whether to take the project to stage 2, avoiding advancing resources on 'unknowns'.

Key Points

- Project - Feasibility for a solar farm
- Council - **Derbyshire County Council**

Heat Decarbonisation Plan

Wirral Council has set the target of reaching Net Zero carbon by 2030 and in order to reach this goal, it will be vital to decarbonise heat across the council's estate. Europa Pool Leisure Centre is Wirral Council's highest energy user and therefore is likely to represent the greatest opportunity for the council to achieve large carbon savings. APSE Energy was appointed to produce a Heat Decarbonisation Plan (HDP) for the leisure centre, with the aim of helping the council to understand the challenges and opportunities in reducing its carbon emissions with an emphasis on moving away from gas-based heating systems. However, although the HDP focussed on moving away from gas-based heating systems, this subject is more complex than simply replacing gas boilers with an alternative heating source, a whole-building approach is required to reduce demand and achieve the most significant savings.

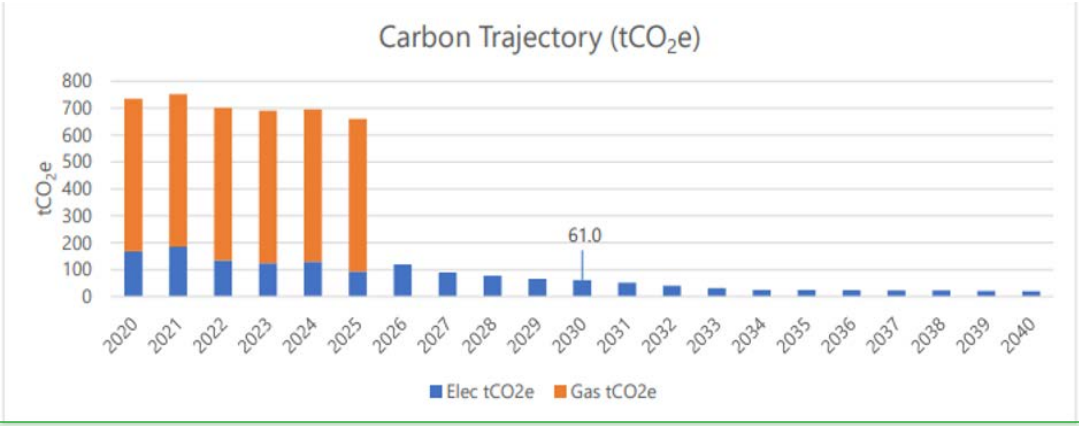
The site was visited and a site analysis was conducted. The survey looked at the building fabric, lighting, heating domestic hot water and ventilation services, and sustainable technologies that were already in place at the site. Through the analysis APSE Energy consultants were able to develop informed suggestions on the most effective routes to achieving significant carbon and monetary savings, with certain measures being eligible for funding through the Public Sector Decarbonisation Scheme.

Core recommendations made to the council in the HDP were the installation of triple glazing, air source heat pump, solar PV carport and LED lighting, estimated costs were provided for each of these measures, alongside breakdowns of carbon savings, annual budget savings and payback periods allowing the council to consider options in its approach.

The HDP provides a suggested programme of works for the decarbonisation measures:

- 2024 – Upgrade to LED lighting; and Installation of PV solar array;
- 2025 – Proposed fabric improvement projects; and Upgrading mains incoming electrical capacity;
- 2025 – Installation of ASHP for space heating and HT-ASHP for DHW.

The below chart shows the carbon trajectory for the leisure centre if all gas-fired equipment is removed from site and the proposed heating systems alongside all energy-efficiency programmes are implemented before the council's net-zero target of 2030, following the above programme of works. It is clear that there is potential for rapid reductions in carbon emission levels, with continued reductions as the grid decarbonises. The trajectory accounts for both carbon savings from PV generation used onsite as well as the surplus generation in the site's carbon accounting. However, the final PV system size would determine the carbon savings that could be realised.



Key Points

- Project - Leisure Centre Heat Decarbonisation Plan
- Council - **Wirral Council**

Leisure Centre Energy Audit

Leisure centres use large amounts of energy especially those with swimming pools so when local authorities are looking to reduce their energy use and cut carbon emissions, leisure centres are often a good place to begin. In order to make reductions it is vital to have current performance data to hand, both to know where to look for the actions that will be taken and to track change over time. We can support councils by carrying out a site visit to help them understand the current circumstances, equipment and controls and appraising options.

Maidstone Borough Council commissioned APSE Energy to conduct an energy audit of Maidstone Leisure Centre to understand what the options were for ensuring it was as energy efficient as possible and understanding of the viability of installing low and zero carbon technologies to reduce the energy consumption and carbon emissions.

APSE Energy visited the site and undertook an analysis of the existing installed mechanical and electrical plant and equipment, made a review of energy saving opportunities and used the findings to provide a feasibility study to consider the available solutions. This work was carried out by an appropriately qualified associate partner.

The analysis consisted of visual inspections of the installed plant and equipment, analysis of existing consumption and future demand levels once new electric heating was installed. It also checked existing electricity capacity, provided commentary on current plant arrangements and estimates of capital costs, energy usage and emissions reduced once new equipment had been installed, based on prevailing market issues.

The suggestions for action related to improved energy management, energy efficiency, potential generation and collecting data as well as monitoring performance and enhancing procedures.

Recommendations from the report included:

- Installing LED lighting;
- Upgrading glazing;

- Installing solar PV to be used on site and exported;
- AHU with heat recovery;
- 4-pipe chiller;
- Replacing boilers with new condensing boilers;
- Ensuring pool covers are applied each night.

The kind of expertise required to produce this kind of report and recommendations has been lost from many councils but APSE Energy are able to support councils looking to understand the options for their assets by accessing our wide network of associates in specialist fields.

Key Points

- Project - Leisure Centre Energy Audit
- Council - **Maidstone Borough Council**

Climate Emergency Strategy

Producing a climate change strategy can be a long project due to the variety and scope of existing and potential projects and partners, options of new technologies and relevance to all areas of the local authority. Current corporate policies such as those related to energy, sustainability, asset management and carbon management, as well as service-based policies, must be built into a climate change strategy. Therefore, writing one is an important job.

A number of councils have turned to APSE Energy for help because of the following:-

- We are informed about activity across the sector.
- We can bring knowledge of approaches common within councils.
- We can introduce a robustness to strategies and plans through challenge.
- We can add capacity where it may be lacking.

We have been able to meet with key officers and councillors to ensure buy-in to the strategy and action plan, identify trends, outline existing and potential projects, manage the process and act as a critical friend throughout. We have provided advice on communications, risk, target setting, working with partners and engagement with the public and local businesses.

Although we can write a strategy and action plan for a local authority if that is required, we are happy to work alongside officers and act as a supporter, knowledge bank and advisor throughout the process. That way we are able to help build capacity within the organisation and ensure the strategy is 'owned' internally.

The projects noted in this document are all linked to the climate emergency agendas within the local authorities in question and were contributory elements within their action plans.

Further Consultancy Support

Further examples of consultancy work that APSE Energy consultants can undertake for local authorities include the following:

- Heat networks
- Wind turbines
- EV infrastructure
- Sustainability strategies
- Engagement strategies
- Energy management support
- Energy bill validations
- Embedding sustainability and climate change into local development plan policies

If you wish to know more about APSE Energy, the topics noted in this document or our consultants, please contact Phil Brennan, Head of APSE Energy on 0161 772 1810 / 07920 801014 or at pbrennan@apse.org.uk, or James Jefferson , Principal Advisor at jjefferson@apse.org.uk or Charlotte Burke Energy & Climate Officer at cburke@apse.org.uk

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