Worcestershire Local Area Energy Planning & LAEP Map development

WLEP Board is asked to note:

a) the progress against actions since WLEP Board Meeting 31.03.2023
b) the cost options to develop a dynamic Local Area Energy Map with and without digital twin capacity
c) the cost options to develop a static Local Area Energy Plan by external suppliers
d) the current position of dynamic LAEP Map development
e) the future developments planned for LAEP work

1.1 Background to Worcestershire Local Area Energy Planning / LAEP Map development

1.1.1 The Worcestershire Local Enterprise Partnership in collaboration with Worcestershire County Council are developing a whole systems approach to Local Area Energy Planning (LAEP). The scope of this work aims to inform County-wide strategies & interventions to decarbonise heat, transport, and business & industrial processes to better prepare Worcestershire for the energy system transition and help meet local and national net zero ambitions.

1.1.2 The Department for Energy Security and Net Zero (DESNZ), Ofgem and Energy Systems Catapult support the development of Local Area Energy Plans. Whilst LAEP development is not a statutory obligation and remains unfunded in England, many Local and Combined Authorities are developing LAEPs, to understand and proactively respond to the strategic and interconnected challenges and opportunities of the energy system transformation. The Department for Energy Security and Net Zero (DESNZ) confirm that a Local Area Energy Plan works better as a digitalised visual methodology enabling auto data updates from Network Operators.

Energy Systems Catapult in their UKRI commissioned report on 'The future of local area energy planning in the UK'[1] define a LAEP as:

"LAEP is a data driven and whole energy system, evidence-based approach that is led by local government developed collaboratively with defined stakeholders. It sets out to identify the most effective route for the local area to contribute towards meeting the national net zero target, as well as meeting its local net zero target."

1.1.3 Energy Systems Catapult in their report: Local Area Energy Planning: The Time and Place is Now published in September 2023, proposes that the UK Government should adopt ESC commissioned LAEP guidance as the nationally endorsed model for place-based whole energy system decarbonisation planning and provide funding for LAEP development, estimated at c. £40m.

1.1.4 In partnership with Energy Network Operators & Local Planning Authorities, the initial focus of the Worcestershire LAEP has established greater visibility of the energy demands on the network driven by new residential and commercial developments and identified any correlating network capacity constraints. Early analysis based on data from 2022 has

[1] https://es.catapult.org.uk/tools-and-labs/local-area-energy-planning/

identified that 50% of the County's development sites have electricity network capacity constraints and 30% have gas network constraints. It has highlighted the potential barriers to inward investment and the scope for decentralised low carbon generation opportunities. Renewable sources of energy have been identified to include solar assets and biomethane injection and capacity in the County. Energy and waste heat export potential from Severn Trent Waste Treatment works has been quantified to inform plans for future heat networks.

1.1.5 As the transition to net zero also requires demand reduction and peak load smoothing to minimise electricity demand, the scope of the LAEP also includes taking into account the current energy efficiency of properties in the County, to include property fuel types, property age, levels of household carbon emissions and risk of excess cold. Early analysis indicates a widespread need to upgrade existing housing stock to minimise demand on grid capacity and defer the need for costly grid reinforcements as well as reducing energy costs for bill payers and improving energy security. Potential natural and built environment barriers and constraints have been identified, such as conservation areas, listed buildings, and flood risk zones, and continue to be mapped.

1.1.6 As a result of the LAEP mapping work undertaken in 2022, two districts positioned for significant growth have been identified as priority areas that could benefit from further Local Area Energy Planning: Wychavon and Malvern Hills District.

2.1 Progress to date

2.1.1 Further to actions raised at the WLEP Board: 31 March 2023, the LAEP mapping work & initial findings, have been socialised more widely with the LAEP Stakeholder Group and WCC Cabinet Member with Responsibility for the Environment. There is broad support from the WLEP Board, WCC and other LAEP stakeholders to develop a dynamic LAEP Map as a continually updated resource and serve as a strategic planning and enabling tool.

It is recognised that the LAEP Map could help focus opportunities from a business and energy perspective:

- enable proactive land use planning, identifying interventions to unlock developments
- identify energy provision and retrofit opportunities that could stimulate business opportunities, skills development, employment and inward investment
- provide an evidence base to support the justification for grant funding

2.1.2 The WLEP & WCC have explored options for dynamic LAEP Map development, to include LAEP Map visualisation in a GIS environment hosted by WCC, or via an external supplier-led development of a LAEP Map with digital twin capacity. The external Digital Twin developers/suppliers that have been approached apply ongoing licence fees or support and maintenance costs either at County or Local District Council level.

2.1.3 Digital twin capacity has the potential to accelerate local area energy planning and low carbon technology deployment. It has the capacity to link and contextualise data across a range of sources. Building on a linked data foundation, it enables predictive models and integrated co-simulations, e.g. carbon emission reductions, transport simulation and flooding simulation, air quality etc. It facilitates the rapid analysis of modelled interventions based on targets, budget etc before commissioning detailed design.

2.1.4 Dynamic LAEP Map development costs are outlined in Appendix 1. These costs have been provided at a County Council level covering the 6 local planning authorities and are also summarised below:

i) **WCC GIS/BI Team: In-House LAEP Map Development without digital twin:**

WCC In house development of development of a basic LAEP Map visualisation without digital twin capacity. The WCC IT Board have approved the LAEP Map project and would be able to permit resource to develop LAEP Map visualisation.

- Dependant on (optional) ArcGIS license upgrade:

Build Cost ranges from: £5,550 to £16,668

Maintenance Cost & Refinements ranges from: £6,460 to £8,641 p.a.

ii) **Slingshot Simulations: LAEP map visualisation & digital twin:**

Slingshot Simulations have two cost options: Purchase option or Annual Lease.

Both options provide access for 18 named user accounts.

Note that a small professional services fee may apply dependant on the scope of configuration required for existing WCC data sets – or this could form part of technical support.

- **Purchase Option: County Council Level**:

  Purchase Option License Fee: £150,000

  Annual Purchase Option License Fee: £26,250 p.a.

  (License fee is applicable from Year 2 and costs cover 6 LPAs & WCC)

Or/

- **Annual Lease Option at County Council Level:** £60,000 p.a.

iii) **Advanced Infrastructure: LAEP map visualisation & digital twin:**

Advanced Infrastructure provide one cost option with unlimited licensed user access

- **Annual License Fee: County Council Level:** £120,000 p.a.

2.1.5 The costs to develop a static Local Area Energy Plan by external providers such as Energy Systems Catapult (ESC) or Brighton and Hove Energy Services Cooperative (BHESCo) have also been outlined in Appendix 2. The costs to develop a static Local Area Energy Plan for the County would cost in the range of c. £44k to £160k. It should be noted that the LAEP Guidance developed by ESC advises that Local Area Energy Plans need to be updated every 3 to 5 years. While a static Local Area Energy Plan can provide a route map to guide decarbonisation, its capacity to demonstrate real-time variations to the plan, such as the impact of a faster or slower solar PV rollout, or any regulatory / technological changes that may occur since its publication are limited.

2.1.6 Other potential sources of funding for dynamic LAEP Map development have also been explored, such as:

- **Innovate UK Net Zero Living Digital Accelerator:** Funding available £300k. IUK competition to fund the development of a digital application to meet place-based net zero challenges for heat and power. This required a business-led application with a public sector end user (WCC). The WLEP identified 5 local companies and invited them to submit an expression of interest. The digital application provided by the selected company was able to provide a dynamic LAEP Map (without digital twin capacity) and enable collaborative input from across LAEP stakeholders to streamline data refresh activities. However, the ongoing support and maintenance costs post the IUK grant funded build phase were considered unsustainable by WCC GIS and Sustainability Teams, as public sector end users, so the decision was taken not to progress with the bid submission.

- **River Severn Partnership: 5G Innovation Region:** Funding awarded £3.755m. The Department for Science, Technology & Innovation (DSIT) are looking to establish 8-10 5G 'Innovation Regions' across the UK. 5G Innovation Regions will build on the 5G Testbeds and Trials programme to drive innovative applications powered by 5G and other advanced wireless connectivity from proof of concept to widespread adoption.

  Shropshire, Worcestershire & Warwickshire County Councils submitted an Expression of Interest to DSIT in early June which indicated that Energy Modelling/Digital Twin could be a potential project, possibly as a use case for digital monitoring on the RSP's Water Management scheme in Shropshire.

  The WLEP presented a paper on Worcestershire LAEP to the 5GIR Team, to include Shropshire County Council (as Lead LA) and RSP Board Innovation Lead from BCU to identify if this could be included as part of the bid. The 5GIR Team reported that they required tangible 5G / Advanced Wireless Technology use cases that have been identified as part of the LAEP Map work.

  The number of targeted sectors for the final bid were refined from Food Manufacturing, Agri-Tech and the Green Economy (to include Climate - Disaster Relief/Resiliency) to Rural Industries (Agri Tech + Food Manufacturing), Water and the Public Sector, to reduce the risk of challenge on scope scale. The 5GIR Team note that the Net Zero agenda remains a key component throughout the chosen sectors and will continue to engage with the Green Economy Sector to support all activities and workstreams following their successful bid outcome.

- **Slingshot Simulations: Early Adopter Programme:** The Digital Twin developer / supplier offered cost neutral access to dynamic LAEP Map and digital twin development as part of their Early Adopter Programme running with other Local Authorities. This would pilot proof of value for an identified near term use case in Local Priority Area. However, access to this programme required an identified & agreed future procurement pathway with Slingshot Simulations.

- **Advanced Infrastructure:** The Digital Twin developer / supplier could consider a 'LAEP Lite' version of their product, costs to be confirmed. They are able to offer trials with some set up costs that could be discounted from the licence if bought. However, Advanced Infrastructure report they are holding off this offer, as they are currently constrained on resource. Advanced Infrastructure are currently developing a LAEP digital twin for West Midlands Combined Authority as part of an Ofgem funded project with National Grid Energy Distribution (NGED).

- **Midlands Net Zero Hub (MNZH):** The Hub aim to report on cross Hub working group looking at funding for LAEPs & cross Hub group looking to bid into some funding, c. winter 2023.

3.1 Development of LAEP visualisation tools / digital twins by DNO's

3.1.1 Several Distributed Energy Operators are developing LAEPs with digital twin capacity, to include:

- **NGED:** National Grid Energy Distribution are working with West Midlands Combined Authority and Advanced Infrastructure on the PRIDE[2] (Planning Regional Infrastructure in a Digital Environment) Project. This project aims to develop a digital twin building on Advanced Infrastructure's existing LAEP+ platform. LAEP+ is a spatial analytics platform for Local Authority and Energy Network users to identify sites for low carbon technologies and to accelerate deployment with the use of granular data and digital twins. At NGED Future Solutions webinar 16 November, NGED stated that they are looking to make the digital twin tool available to all Local Authorities in their licence area although it is unclear what the timescales would be and if access would be free or if licence costs would apply. Advanced Infrastructure report that they have currently only been commissioned to deliver a feasibility study and small scale pilot of the LAEP tool as part of the PRIDE Project.

- **UK Power Networks**: Distributed Electricity Network Operator for London, the east and south east of England commissioned Advanced Infrastructure with the development of a LAEP tool with digital twin capacity in April 2023 as part of their Collaborative Local Energy Optimisation (CLEO) Project. The LAEP tool is entitled: 'Your Net Zero Hub'[3] and allows Local Authorities to layer local input such as decarbonisation strategies and action plans, local market trends, social inclusion policies and transport plans upon UK Power Networks infrastructure data. Local Authorities and other energy system stakeholders will be able to rapidly evaluate different approaches to deploying Low Carbon Technologies (LCT). In addition, a social impact assessment capability will be included allowing LAEP options to be sensitivity tested against their impact on social considerations such as poverty and vulnerable customers. The LAEP Tool is now live and free to use by the 133 Local Authorities within the UK Power Network licence area.

- **SSEN Distribution** commissioned Advanced Infrastructure with the development of SSEN's Local Energy Net Zero Accelerator (LENZA)[4]. The tool shows local authorities the condition of the electricity network in their area, allowing them to more effectively install low carbon technologies. It depicts live capacity on the network, as well as predicted constraints, using a traffic-light system to show whether a new energy asset could be accommodated on the existing network or where further development is required.

4.1 Current Position: Dynamic LAEP Map development

4.1.1 The WLEP have consulted with the two Local Priority Areas, Wychavon and MHDC to understand their position on the preferred format for the development of a dynamic LAEP Map. Wychavon & MHDC prefer the WCC in-house build of LAEP Map as they cannot justify the costs against the level of intervention they deliver.

4.1.2 The WLEP also consulted with WCC Planning & Transport. They have identified that the Community Infrastructure Levy (CIL) cannot be used to fund LAEP Map development.

[2] https://www.nationalgrid.co.uk/sif-projects

[3] https://www.yourlocalnetzerohub.co.uk/

[4] https://www.ssen.co.uk/our-services/tools-and-maps/lenza/

4.1.3 On 6 October, WCC Sustainability & Planning determined that WCC do not have the budget to afford the external development of a LAEP Map with Digital Twin capacity as the costs are in the range of c. £60k to £120k p.a. However, WCC recognise the value of a LAEP Map and are exploring the option for in-house development by WCC GIS Team. WCC's IT Board approved the GIS Team resource requirements to deliver the dynamic LAEP map as an in-house build in mid July 2023.

4.1.4 The WLEP and WCC are continuing to update the static Local Area Energy maps with new data and are also creating new map layers and refining existing maps.

5.1 Future developments

5.1.1 The LAEP Next Steps Group recognise the opportunity for the LAEP work to assist strategic planning in the County to facilitate the energy transition process, alongside the updating of LAEP maps. Once the static LAEP maps have been updated as part of the annual data refresh, the aim is to hold workshops in Local Priority Areas conducted with NGED and Gas Network Operators, relevant officials and elected members.

5.1.2 The Energy Transition Workshops will involve:

- 1:1 Briefing sessions on updated LAEP Map with County Planning & District Level Planning Teams to identify priorities and challenges at County and District Level.
- Report back to County & District priorities to Elected Members at County and District Level.
- Scope for Energy Transition Workshop potentially coordinated by NGED as stakeholder convenor for cross energy vector consultation to inform Ofgem's Regional Energy Planning with Regional Energy Strategic Planners[5].

5.1.3 It is understood that WCC will take ownership of the development of dynamic Local Area Energy Map and Local Area Energy Plan, although timeframes are yet to be determined.

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[5] https://www.ofgem.gov.uk/publications/ofgem-green-lights-regional-energy-planning-roles-speed-net-zero-transition

Appendix 1: Dynamic LAEP Map development costs

LAEP Map Development: County Council Level costs covering all 6 Local Planning Authorities

Example cost projection over 5 years

COUNTY COUNCIL LEVEL COST PROJECTION OVER 5 YEARS							
SUPPLIER	Y1	Y2	Y3	Y4	Y5	TOTAL COST OVER 5 YEARS*	
WCC GIS/BI TEAM						£	
Build Cost without License Upgrade	5,550						
Build Cost with License Upgrade	16,668					**WCC GIS/BI TEAM**	
Maintenance Cost & Refinements without License Upgrade		6,460	6,460	6,460	6,460	BUILD & MAINTENANCE w/o License upgrade	31,390
Maintenance Cost & Refinements with License Upgrade		8,641	8,641	8,641	8,641	BUILD & MAINTENANCE with License upgrade	51,232
SLINGSHOT SIMULATIONS: County Council Level costs:						**SLINGSHOT SIMULATIONS**	
PURCHASE OPTION	150,000					PURCHASE & MAINTENANCE	255,000
SOFTWARE LICENSE FEE: MAINTENANCE & SUPPORT		26,250	26,250	26,250	26,250		
ANNUAL LEASE OPTION	60,000	60,000	60,000	60,000	60,000	ANNUAL LEASE	300,000
ADVANCED INFRASTRUCTURE: County Council Level costs:						**ADVANCED INFRASTRUCTURE**	
ANNUAL LICENSE FEE	120,000	120,000	120,000	120,000	120,000	ANNUAL LICENSE FEE	600,000
						* based on no change to current costs	

Appendix 2: Costs to develop a static Local Area Energy Plan

i) **Energy Systems Catapult (ESC): LEAR / LAEP costs**

Costs to develop further maps & a LAEP Map & Energy Pathways analysis by ESC:

Local Area Energy Representation (LEAR): Data sweep to build up a Local Area Energy Plan (LAEP). The ESC has recently increased costs to produce a LEAR due to inflationary pressures and a change in the market conditions.

- £20k – £25k, per typical local authority area: potential for efficiencies if combining LA's.
- c. 4 months to produce
- Visualisation of data can be provided (live model/ secure login access) & is priced separately. LEAR provides snap-shot, remodelling updates incurs additional costs
- Can feed in any data sets already developed

Local Area Energy Plan (LAEP):

- £141k - £160k for full LAEP per local authority area depending on the scope, size and scale of the LAEP, potential efficiencies in regional LAEP delivery etc.
- c. 12 months to deliver
- Involves stakeholder engagement and technical modelling capabilities to deliver a decarbonisation pathway for a place. Energy Path Networks – pathway to reach Net Zero

Scaled Down / Mini LAEPs:

- **Neighbourhood Energy Plan: £57k - £68k:** An initial assessment of the opportunities for decarbonisation of an area served by a primary substation based on the information currently available c. 4,000 homes.

- **Growth Zone (Sites) Energy Plan: £83k - £119k:** Local Area Energy Plan for a smaller area (i.e. at MSOA level)**:** This aims to deliver a detailed plan and aim to provide a 'concept design' output for an area. It could look at barriers around grid constraints that are limiting growth by working with the DNO /other key stakeholders to develop an optimised pathway, aligning to a wider Net Zero target. Stakeholders engaged and brought in on a site / zone decarbonisation plan. Development of an outline plan on the specific interventions to work around existing grid constraints optimised for stakeholder preferences i.e. cost, wider economic benefits, time etc. **ESC is actively seeking partners to trail this.**

Project Specific Datasets

The ESC has recently updated its service offer to include Project Specific Datasets with the aim to assist Local Authorities considering the initial feasibility of Net Zero Energy Projects:

Costed options include:

One off download: £1k - £6k (depending on the data set)

- Area wide, snapshot in time
- One time download
- Formats compatible with GIS and analytical programs

Ongoing access: £1.2k - £7.2k (data is updated and improved regularly)

- 24/7 access to latest data
- Download as many times as you like
- On-going updates and improvements

Ongoing access + visualisation: £28k - £67.6k (per year depending on the data)

- Create full maps & data stories
- Assess suitability of different sites for net zero projects
- Dashboards and report builder
- Scenario analysis and modelling

ii) **Brighton and Hove Energy Services Cooperative (BHESCo): LAEP costs:**

- County Council Level: Costs to develop a LAEP covering the 6 local districts: £44,184, excl VAT.
- District Level: Costs to develop a LAEP for the two Local Priority Areas: Wychavon & MHDC: 24,958 for, excl VAT

BHESCo LAEP development proposal included in Appendix 3.

Appendix 3: Brighton and Hove Energy Services Co-operative (BHESCo) LAEP Proposal

Introduction to BHESCo

Brighton and Hove Energy Services Co-operative (BHESCo) is a not-for-profit social enterprise that helps communities formulate practical, actionable local area energy plans by leveraging its experience in the development of renewable energy generation, energy efficiency systems and transport decarbonisation plans. We have delivered more than 60 successful projects in Sussex and our reach is growing nationally. We are an active member of Community Energy England, working with other community energy organisations throughout the country to ensure that our projects deliver industry best practice.

Our proposal

BHESCo would develop a plan that builds on the Energy Strategy produced by the Worcestershire LEP. To create exceptional value for less cost, our plan would be an abridged version of the guidance for LAEP developed by the Energy Systems Catapult. The energy transition presents the greatest opportunity for communities to create jobs while stimulating new economic value streams. Investment in renewable energy, energy storage, energy efficiency improvements to properties, electric vehicle and hydrogen HGV transport infrastructure can add significant gross value added (GVA) while building independence and affordability through development of a local energy provision and energy savings. Our approach is grounded in the creation of value in the low carbon sector, while tacking fuel poverty throughout the energy transition. With only 5.4% of renewable energy generated locally, there are opportunities for growth in the region, creating clean energy generation and control over costs by ensuring that some or all of this generation is owned by the communities served.

To optimise our work efficiency, we will engage with relevant staff at Worcestershire County Council and the relevant constituencies, which may include Worcester, Malvern Hills, Wyre Forest, Bromsgrove, Redditch and Wychavon, as well as the County's partners, including but not limited to National Grid Electrical Distribution (NGED)and Cadent, to identify, understand and articulate energy challenges and opportunities associated with current and future technologies and trends.

Local Area Energy Planning (LAEP) is a mechanism for a whole system approach to the planning and design of Net Zero Local Energy Systems. We do not create a digital twin, as our experience is that this is cost prohibitive as a tool, where a community engagement approach to decarbonisation is more effective in driving down the cost of the energy transition. Much of the resistance to the transition to the clean energy stems from people's objection to change. Instead of a digital twin, we use a GIS model for the purposes of preparing our plan. We combine this with our suggestions for engagement with local communities based on our vast experience. This is a less expensive and more effective way of achieving the aims and targeted timelines of the energy plan.

Our report will consist of our conclusions and recommendations in the following activities:

- Identify successful pilots taking place across the country (and further afield) that could be replicated and developed within the County to achieve energy reduction goals.

- Identify current barriers to rolling out new technology and suggestions to how these can be overcome (e.g. skills shortages, lack of capacity on the grid, lack of funding/incentives etc.)

- Develop a detailed pathway outlining energy infrastructure changes needed across the county so it can meet its ambition of halving its carbon emissions by 2030. This will include:

o Consideration and evaluation of technologies and projections of future trends to meet the County's carbon neutral targets including thermal insulation, heat pumps, district heating, electric resistive heating, hydrogen storage, solar photovoltaics (PV), wind turbines, hydropower,

anaerobic digestion, electric vehicles (EVs), biofuels, infrastructure needs, demand flexibility and energy storage.

o A definition and description of the transformation needed across each local authority area within the County accompanied by an implementation plan supported by a robust and objective evidence base.

o An outline plan to engage businesses, residents, and partners to support the county to meet its carbon neutral by 2050 goal, identifying potential projects including the investment required to meet the desired outcomes within the agreed timescales. As the county is 30% rural, with 14% of properties off the gas grid, burning high carbon fuels, surrounded by two areas of outstanding natural beauty, it is important that actions are staged to deliver value added across the economy.

o Identification of funding opportunities to secure additional resources and support implementation

Our Fees
We propose to conduct the services described above for a fee of £24,958 for Wychavon and Malvern Hills districts only, excluding VAT.

A report for all six local authorities included in Worcestershire County Council would involve a fee of £44,184, excluding VAT.