centre for sustainable energy

LUC

Renewable Energy Study: Cheltenham Borough, Gloucester City, and Tewkesbury Borough

Part 1: Strategic Potential

Executive summary

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1.1. Cheltenham Borough, Gloucester City, and Tewkesbury Borough councils are preparing to publish a new strategic and local plan for consultation: the Cheltenham, Gloucester and Tewkesbury Strategic and Local Plan (SLP), with the key consultation stages being undertaken between 2023 and 2026.

1.2. To support development of the SLP, CSE and LUC were commissioned to deliver a two-part study providing a detailed review of planning considerations related to climate change and renewable energy, a summary of the technical potential for renewable energy in the SLP area, and recommendations for next steps and further actions to support deployment of renewable and low carbon energy sources.

1.3. This report and its technical appendices form part one of the study, which explores renewable energy potential at a strategic level (i.e. not looking at specific sites). Part two of the study, to be conducted following the first stage of public engagement on the new plan (the first Regulation 18 Consultation), will explore area-specific opportunities, and provide recommendations for renewable energy policies.

Introduction

1.4. The UK's approach to decarbonisation[1] relies on the electrification of heat generation and transport, and the total phasing out of fossil fuel electricity generation, with a Government commitment to fully decarbonise the power system by 2035. This means all communities have a responsibility to increase the use of and supply of renewable energy if the UK is to meet its carbon reduction commitments.

1.5. The rapid scale-up of low-carbon electricity generation and the infrastructure required to deliver it must be achieved whilst also ensuring reliable, affordable and resilient supply. A whole-system approach is the most effective way to achieve that change, with an integrated approach to energy and spatial planning and a comprehensive energy plan which reflects how renewable technologies can be best tailored to deliver against local spatial development ambitions. This renewable energy study is a step towards this for the Cheltenham, Gloucester and Tewkesbury area, providing an initial evidence base to support the policy choices made in the new SLP.

[1] UK Government (2021), Net Zero Strategy: Build Back Greener, www.gov.uk/government/publications/net-zero-strategy

Planning for renewable energy

1.6. The development of the local plan is one of the most powerful tools available to a local area to shape its vision for a sustainable future. It is recommended that the SLP treats climate change related issues (both mitigation and adaptation) as central to policy formulation, visioning and strategic objective setting.

1.7. Through the Planning and Compulsory Purchase Act 2004[2] Local Planning Authorities (LPAs) have a legal duty to ensure that local plans contribute to the mitigation of, and adaptation to, climate change. The National Planning Policy Framework states that plans should include "mitigating and adapting to climate change"[3] as a core objective and is clear that the planning system "should support the transition to a low carbon future in a changing climate"[4]. National Planning Practice Guidance[5] confirms that LPAs should develop a "positive strategy for the delivery of renewable and low carbon energy" and encourages LPAs to identify suitable areas for renewable energy generation. This is particularly important for onshore wind power as, currently, for a wind farm to gain approval a scheme must be in a zone designated for wind energy in a local plan, a neighbourhood plan, or a supplementary planning document (or, alternatively, permitted through a Local Development Order, Neighbourhood Development Order or a Community Right to Build Order).

1.8. Planning policy and guidance makes clear however, that any potential adverse impacts of renewable energy development must be addressed – from ensuring that development has community backing, to undertaking suitable environmental impact assessment, and avoiding any negative impacts on designated areas. Proposals in National Landscapes (previously Areas of Outstanding Natural Beauty) and Green Belt areas will need particularly careful consideration of the balance between the benefits of renewable energy and any harmful impacts.

Current renewable energy installations in the SLP area

1.9. There are 6,775 renewable electricity sites recorded in the area with a total installed renewable capacity of 83.8 MW[6]. The bulk of this is produced by six large sites recorded

[2] UK Government, Section 19 of the Planning and Compulsory Purchase Act 2004, www.legislation.gov.uk/ukpga/2004/5/section/19
[3] UK Government (2023), National Planning Policy Framework, www.gov.uk/government/publications/national-planning-policy-framework--2
[4] Ibid.
[5] UK Government, Planning Practice Guidance, www.gov.uk/government/collections/planning-practice-guidance
[6] Figures from the 2021 renewable electricity statistics published by the Department for Energy Security and Net Zero (DESNZ) and the Renewable Energy Database – see chapter 4 of the main report for further details.

in the Renewable Energy Planning Database (REPD). There are 30 more applications recorded in the planning system. The majority of operational sites and planning applications are for solar photovoltaic (PV).

1.10. Compared to the UK average of 296 domestic PV installations per 10,000 households, Gloucester has slightly fewer installations (264 per 10,000 households) and Cheltenham and Tewkesbury have above average numbers (366 and 420 per 10,000 households respectively). Compared to the England average of 36 domestic RHI installations per 10,000 households, Gloucester and Cheltenham have fewer installations (5 and 13 per 10,000 households respectively). Tewkesbury is above average (43)[7].

1.11. There are two communal heat networks in the area, both located in Gloucester and both using heat pumps. One is operational and the other is under construction.

Renewable energy potential

1.12. Nine renewable and low carbon energy resources and technologies have been explored in detail for this study. The assessment is a desk-based exercise involving industry-standard assumptions and/or GIS mapping to establish the technical potential for renewable energy generation of each resource or technology.

1.13. 'Technical potential' in this context means the exploitable energy (electricity or heat) from a given resource, that could be theoretically deployed within a set of technical constraints. It does not consider wider constraints imposed by landscape, political or financial issues. The technologies covered include:

Power generation technologies and infrastructure:

- Onshore wind
- Ground-mounted solar
- Rooftop solar
- Hydropower
- Electricity grid constraints & battery storage

Heat sources, technologies and infrastructure:

- District heating or cooling networks
- Heat pumps
- Biomass
- Energy from waste

1.14. Figure 1 summarises the technical potential for renewable energy within the SLP area from all sources assessed. As is emphasised throughout this study, this theoretical

[7] Figures taken from UK Government published Feed-in-Tariff and Renewable Heat Incentive statistics – see chapter 4 of the main report for further details.

technical potential does not take into account any issues affecting deployment, or the fact that one technology may need to be chosen over another in some areas.

1.15. Figure 1 shows 20% of the total theoretical generation potential from wind and 20% of the total theoretical generation potential for ground mounted solar. This 20% figure has been chosen for illustrative purposes only, it is not based on any assessment of realistic deployment as we are yet to determine optimal deployment scenarios for the area (these will be developed in part two of the study).

1.16. As this shows, there is technical potential within the SLP authorities to cover the energy requirements of the area. However, based on the illustrative 20% deployment figure, there would be little headroom:

- 4,208 GWh total annual energy demand
- 4,556 GWh annual technical renewable energy potential

1.17. To realise this scale of theoretical potential would require:

- 2,692 wind turbines of different scales (for 20% of potential)
- Solar farms equating to an area of around 45km^2 (approximately 9% of the total study area)
- 44,153 rooftop solar installations and a total panel area of 140.46km^2
- Hydropower at five barriers in Tewkesbury
- The use of biomass, energy crops and biogas from animal slurry in place of natural gas heating.

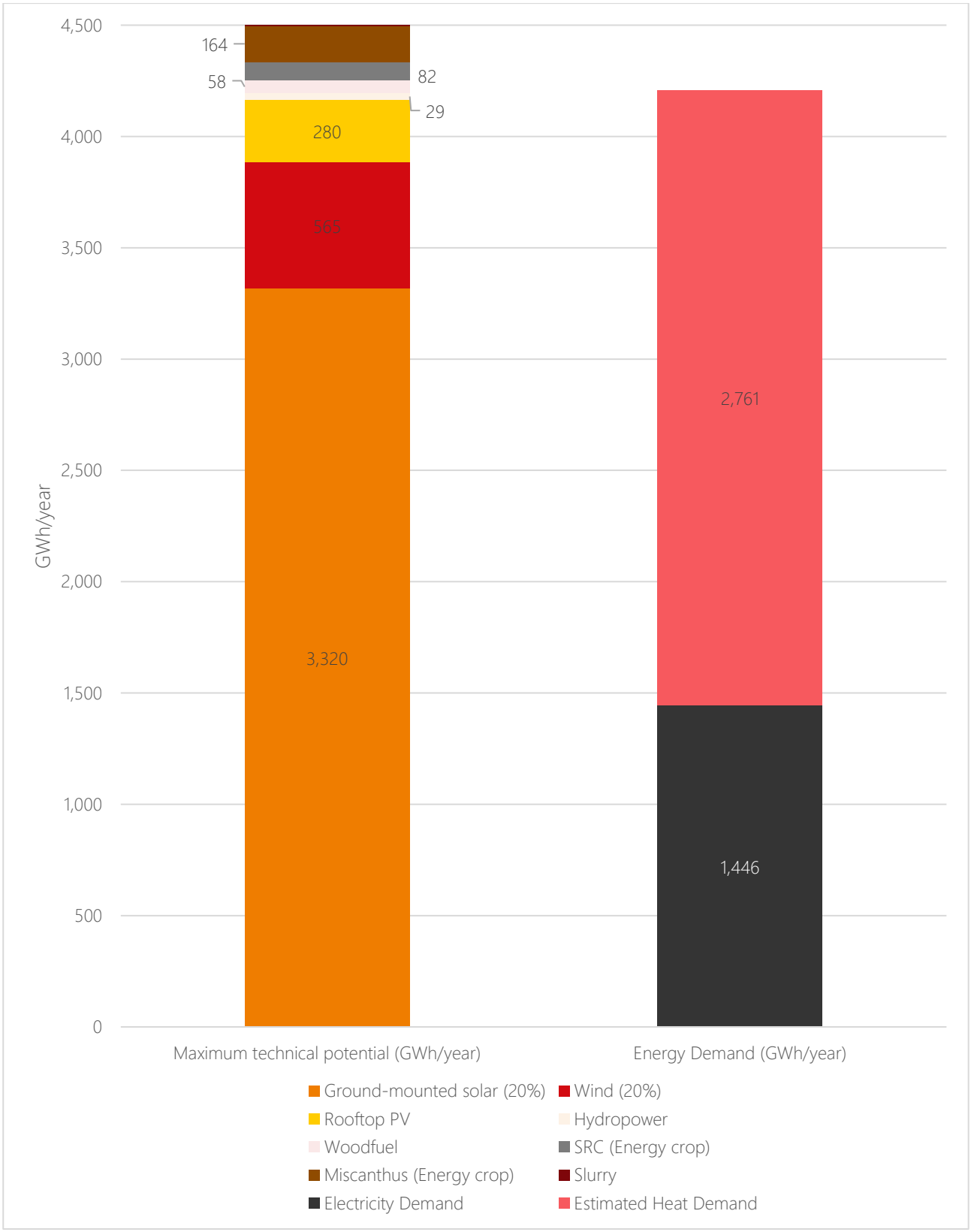

Figure 1 Summary of the theoretical technical potential of renewable energy sources compared to energy demand in the SLP authorities

1.18. To realise any scale of renewable energy potential, sufficient network capacity and timely grid connections are required. A high-level review of existing grid constraints has been undertaken as part of this study, showing that many of the substations in the area are constrained, with low generation headroom. This may hinder connections of renewables to the electricity network or require grid improvements. However, this status is likely to change with infrastructure upgrades throughout the SLP period. Policies that encourage energy storage, demand side response, and smart energy technologies will be needed and policy will have to be flexible to allow for future scenarios, changes in national policy and the grid being upgraded, or better balanced.

Next steps

1.19. Part two of this study will look in more detail at different approaches to renewable energy deployment and provide recommended wording for local plan policies. It will include:

- Identifying areas with most potential across all technologies and compiling these into a shortlist of the most promising sites.
- Undertaking a landscape sensitivity assessment to provide a more detailed evidence base for what scale of wind turbine and solar development (i.e. very large, large, medium, small) may be appropriate in areas of technical potential and where wind turbines may not be suitable (i.e. due to the potential impacts on protected or valued landscapes).
- Exploring specific opportunities for renewable energy generation that fall within the land holdings of the authorities and County Council, as well as the types of business models and delivery vehicles that may be appropriate to develop renewable energy systems on council-owned sites.
- Developing deployment scenarios with trajectories that illustrate the energy generation and carbon reduction potential of the technologies modelled and their relative roles in contributing to a future net zero system.
- Calculating a carbon baseline for each area to understand how the deployment of renewable technologies under each of the scenarios will contribute to the authorities' commitments regarding carbon neutrality.

Emerging recommendations

1.20. As the three councils move towards the new local plan over the next three years, action on climate change should be an integral part of the culture of plan-making and must be embedded and integrated into policy formulation. As is shown in the Planning for

Renewable Energy chapter of the main report, only by treating climate change related issues as central to policy formulation will a Local Planning Authority have effectively discharged its legal obligations. To this end, climate change should be central to the local plan vision, objectives, and policies, and the councils should be able to demonstrate how the plan as a whole contributes to the Climate Change Act national carbon budget regime.

1.21. The following recommendations will support this, helping to shape a positive strategy for renewable energy and move closer to realising the technical potential highlighted in this report. These recommendations are outlined further in chapter 17 of the main report, and will be explored in more detail in part two of this study.

1. Developing policies for renewable energy. Building on the understanding of technical potential provided through parts one and two of this study, we recommend that specific targets for renewable energy are set in the local plan. These should be linked to the technical potential identified, and an overall carbon budget for the area. We recommend that the mapping produced is used to inform the local plan policies map, which is particularly important for enabling the deployment of onshore wind.

2. Developing policies for demand flexibility and energy storage features. As time goes on and more renewable energy is utilised on the grid, it will become more important to shift demand and store energy. To future-proof the local plan, we recommend development of a policy which encourages energy storage, demand side response, and smart energy technologies.

3. Developing binding net zero policies for new buildings framed around energy use intensity. We recommend the use of a fabric-first policy framed around energy (rather than a carbon percentage reduction), that provides a quantifiable, and easily verifiable way of ensuring that new development is net zero. Reducing demand in this way is an essential component in achieving an efficient low carbon energy system.

4. Carbon offsetting. The local plan should provide a framework for carbon offsetting for new development, ensuring that the electricity demand from new development is met entirely from new renewable energy generation, where possible on-site, or through additional new off-site renewable generation. This structure is like carbon offsetting, but instead of funding off-site carbon savings, contributions fund the creation of additional renewable energy to offset the impact of the development.

5. Carbon auditing the local plan and setting a carbon budget. LPAs will need a clear grasp of their area's baseline emissions to demonstrate how policies are in line with the legally binding carbon emission reduction targets in the Climate Change Act.

6. Viability considerations. It is essential that the renewable energy policies that emerge from this renewable energy study are tested as part of the local plan viability assessment. Viability will be a key area which will be tested at examination.

7. Community engagement and empowerment. To build community support for renewables deployment we recommend undertaking community engagement exercises across the areas identified as having technical potential for renewables deployment, and taking steps to enable and support community groups to engage in the planning process for renewable energy development.

8. Carbon literacy training. In local authorities that have been successful in developing ambitious policies around climate change and renewable energy generation, the prioritisation of climate change from leadership has been a key enabler. Climate literacy training for senior leadership (including Members) and all officers involved in plan making and decision making is strongly recommended.

9. Local Area Energy Plans. To inform the authorities' decarbonisation strategy it would be beneficial in future to consider developing a Local Area Energy Plan (LAEP). An LAEP would complement the renewable energy study by considering the entire energy system within the area: heat, electricity, transport, supply chains (from energy generation to transporting it into homes and businesses), systems (physical, digital, market and policy systems) and would consider the changes needed to decarbonise in the most cost-effective manner and at the fastest rate possible.