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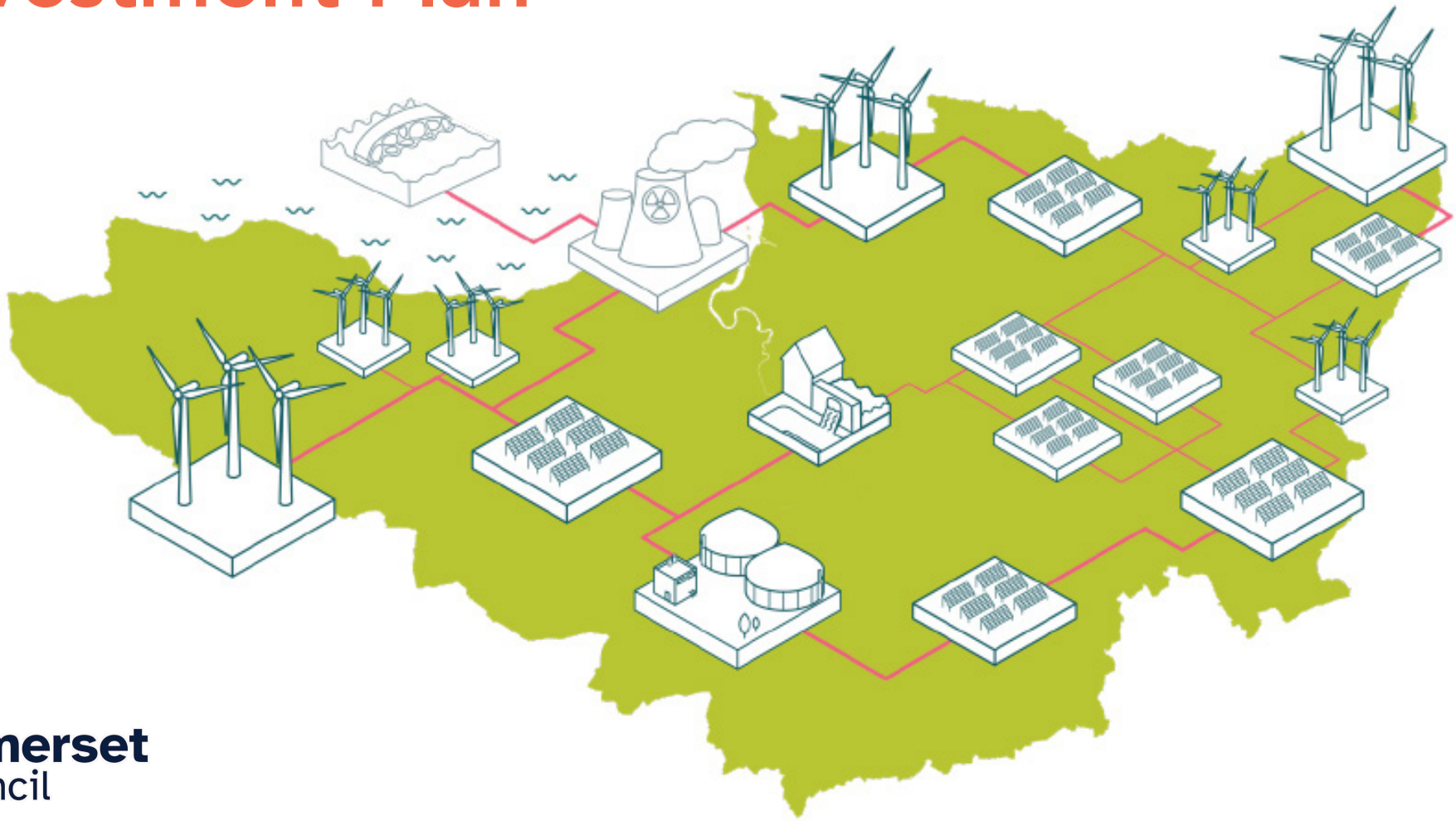
Somerset Energy Investment Plan



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Overview

Foreword

I am delighted to celebrate the completion of this project: we now have a detailed, evidence-based map of opportunities and constraints for renewable energy generation in Somerset.

As we progress on our journey to net zero, understanding where we are now and the possibilities for future renewable energy generation is crucial. The Somerset Energy Investment Plan is a key objective in the Somerset Climate Emergency Strategy originally developed, funded and agreed by all five previous councils. A great deal of the initial work was done in partnership before the unitary council was founded and we have continued the project despite the challenges of the Local Government Reorganisation.

This project was conceived before the current financial emergency facing Somerset Council and others. Our current limited resources mean that careful consideration will need to be paid to governance, with the council taking on the role of enabler and co-ordinator rather than lead investor. However some of this work will help to inform the new Local Plan for Somerset. Partnership working will continue to be key, particularly around community involvement and attracting private sector finance.

Despite these current challenges, the negative impacts of climate change are accelerating and the imperative to address the cause, alongside building community resilience, has never been greater. This project brings us one step closer on this challenging journey. My thanks to Regen, the Somerset Council Climate & Environment Team, Planning, Assets, Economic Development, Elected Members and all of the stakeholders for their collective work to deliver this plan.

Cllr Dixie Darch
Lead Member for Environment and Climate Change

Net Zero Pathway key milestones

GENERATION AND STORAGE

In 2022, the equivalent of 29% of Somerset's electricity demand was generated from local renewable sources, which is equal to 5% of total energy demand.

By 2023, large-scale solar made up c.350 MW, 73% of all local installed renewable electricity capacity.

By 2030, installed renewable capacity reaches c.920 MW. Approximately six additional onshore wind turbines are installed, totalling 16 MW.

Priority opportunities:
Develop a land use framework to underpin the development of robust Local Plan policies on renewables

Develop a portfolio approach to decarbonise the Council's own estate by 2030

By 2040, at least 150 MW of battery capacity is installed, with just over a third being domestic.

By 2040, installed renewable capacity reaches c.1.7 GW. Around 40 large wind turbines are developed.

Future opportunity:
Explore how hydrogen electrolysis plants could use excess power from Hinkley Point C and renewables projects to displace fossil fuel demand in difficult-to-electrify sectors.

By 2050, Installed renewable capacity reaches c.2.2 GW.

By 2050, all power is from zero carbon national and local sources.

By 2050, as many as 3,700 FTE jobs could be created installing new rooftop solar.

2022 > New local plan expected before 2030 **2030 >** RIO-ED3 DNO price control post 2028 **2040 >** **2050**

By 2022, approximately 7,300 domestic heat pumps were installed in Somerset.

In 2022, 42% of homes were rated EPC C or above.

In 2022, <1% of road vehicles were electric. 20% of new vehicle registrations were battery electric.

By 2030, the heat pump uptake rate accelerates to 13,500 new installations per year to meet near-term targets.

Priority opportunities:
Engage with the new Regional Energy Strategic Planner to influence investment in the electricity network.

The proposed gigafactory at the Gravity site could bring 4,000 to 7,500 direct jobs.

Work with partners to trial innovative approaches to rural public transport and provide support for low-income households to access EVs.

Lead a Net Zero Heat Village trial to demonstrate how to deliver zero carbon heat in an off-gas rural village.

By 2035, all homes have achieved EPC C or above.

By 2040, pure electric vehicles make up 93% of total vehicles registered in Somerset.

By 2045, heat pump uptake slows substantially to c.5,000 new installations per year.

Future opportunity:
Explore how geothermal resources near Yeovil could be used in heat networks.

By 2050, domestic heat pumps total 277,000 installations – 82% of homes.

By 2050, nearly 100% of all vehicles are electric.

By 2050, around 1,970 FTE jobs could be created for heat pump installers.

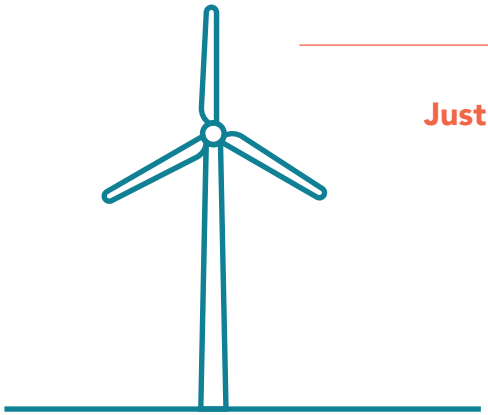
By 2050, only zero carbon heating and transport remain.

ENERGY DEMAND

Overview

Executive summary

Inspired by the Somerset Climate Emergency Strategy, this Somerset Energy Investment Plan sets out the current evidence on the energy system in Somerset and analyses the local resources to inform a potential Net Zero Pathway for Somerset.



Just **5%**

of local energy demand is supplied by local renewable energy

The Pathway created has been used, alongside extensive stakeholder engagement, to identify opportunities for energy investments in Somerset, their potential economic and local benefits, policy development for Somerset Council and options for delivering action.

To date, progress on decarbonisation of Somerset's energy system has been slow:

— Around 1.2% of homes have a heat pump installed
— 42% of Somerset's homes and 44% of non-domestic buildings are rated Energy Performance Certificate (EPC) A to C
— Less than 1% of road vehicles registered in Somerset are electric
— The equivalent of just 5% of local energy demand is supplied by local renewable energy, with only one large-scale wind turbine in operation.

When considering available wind resources, higher windspeeds tend to be in the upland areas that are designated as National Park and National Landscapes and there are also significant numbers of protected habitats and radar constraints. Solar resources are prevalent across Somerset. However, grid connection availability is the major blocker to the development of new generation and storage projects, with transmission works planned out to 2038 taking a toll on distribution network availability.

The Somerset Net Zero Pathway has been developed to explore the potential for the area to decarbonise energy use, generation and flexibility by 2050 at the latest.

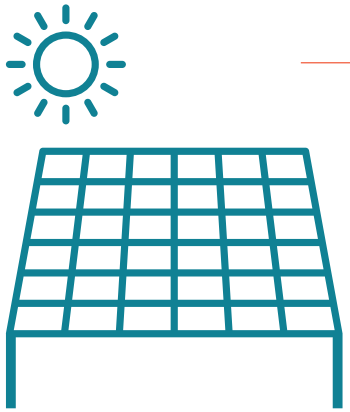
It will be challenging to achieve from the demand side with:

- Retrofit as a crucial element, requiring upgrades to two thirds of homes and non-domestic buildings to achieve at least EPC C by 2035
- Domestic heat pumps needing to reach c.277,000 installations by 2050, averaging c.10,000 installations per year
- EV uptake increasing to 351,300 vehicles, averaging 9,300 vehicle new EV registrations per year.

Under the Net Zero Pathway, the equivalent of approximately 45% of Somerset's future expected electricity demand is met by local renewable generation by 2050, with a total of:

- 1,410 MW large-scale solar
- 528 MW rooftop solar
- 154 MW wind
- 247 MW battery storage

The Energy Plan also models a 100% sensitivity. In addition to the current pipeline of projects and the Net Zero Pathway capacity, a further c.2.8 GW of solar and c.400 MW of onshore would be required to deliver the equivalent of 100% of future energy demand from local renewables. This level of deployment is unlikely to be achieved, given Somerset's wind resources are fairly limited outside of the National Park and National Landscapes and given other constraints such as grid capacity, skills availability and market forces. However, Somerset is part of the UK's energy system and achieving net zero is not dependent on generating 100% of energy demand from local sources – national scale projects, including offshore wind and Hinkley Point C, will have a role to play alongside local renewables. In the future, there is a possibility of additional local contributions from geothermal and tidal power.



By 2050

45%

of Somerset's future expected electricity demand is met by local renewable generation

The Energy Investment Plan sets out six key opportunity areas for Somerset to invest in energy decarbonisation, with recommendations for Council actions and estimates of potential jobs, investment and Gross Value Added (GVA) creation.

1. Decarbonisation of the Council's own estate and operations: priming the market

The Council has substantial land holdings, which have been assessed for solar and wind opportunities. Ten sites have been identified as having considerable potential for solar or wind development. There is the potential for projects to generate income for the Council through investment returns or simply through leasing sites. Working in partnership with community energy organisations and high energy users could help to develop new projects with business models that bring local economic benefits.

The Council also owns a wide range of other energy using assets, from leisure centres, to car parks and vehicle depots. These sites could incorporate energy efficiency measures and small-scale renewables that cut energy bills and/or generate income. Some sites could also act as anchor loads for district heat networks.

By investing in renewables and energy efficiency measures on its own estate, the Council can help to prime the local market. To do so, it must ensure that the procurement approach it uses enables local businesses to deliver the opportunities, growing the local supply chain.

A portfolio approach to decarbonising the Council's estate could be taken, bundling together the high and low-value projects to create one investable package and working with a private-sector partner to deliver them – as Bristol is with its City Leap project. This approach is levering in private finance and development skills, while also offering community benefits and support to the local supply chain.

2. Large-scale solar, wind and battery storage development: seizing the opportunities for the rural economy

With excellent solar and some wind resources across Somerset, opportunities for new generation projects are widespread, with opportunities to bring income and other co-benefits to the area's rural communities. Storage projects are also needed to bring flexibility and grid services to the energy system.

The Council is considering developing a land use framework for Somerset. The development of this framework presents an opportunity to reconsider the planning balance between landscape, farming, renewable generation, energy storage and nature, by drawing together relevant spatial datasets to enable informed discussion.

The Council is due to develop a new Local Plan, presenting the opportunity to include positively worded policies for solar and wind and to embed these through guidance and training for officers and councillors.

There are opportunities for the Council to support community energy organisations across Somerset to develop local generation and storage projects, working in partnership on sites, developing supportive planning policy or offering funding or access to expertise.

3. Unlocking energy efficiency and retrofit: the #1 opportunity for energy jobs and GVA creation

Retrofit of existing buildings presents the greatest opportunity for energy jobs and GVA creation in the area. Retrofit support programmes are essential to unlock these benefits across every segment of the market from social housing to 'self-funding' homeowners.

4. Electrifying heat demand: high levels of off-gas properties present an opportunity to accelerate heat pump uptake

High levels of off-gas properties present an opportunity to accelerate heat pump uptake in Somerset, underpinned by heat zoning analysis. Innovative approaches, such as a Net Zero Heat Village trial, that work with local communities to electrify heating are needed. Coastal areas or rivers could offer the opportunity to trial water source heat pumps in partnership with local organisations.

5. Electrification and demand reduction for transport: building on existing work to plan the necessary infrastructure

Somerset is a predominantly rural county, with largely rural transport networks and a few major transport corridors. Decarbonising transport will rely on ensuring the charging infrastructure is in place across this rural setting to support the transition to electric vehicles, as well as supporting novel approaches to rural public transport. The M5 and A303 corridors presents an opportunity to develop charging hub models that combine generation with chargepoints and other services and support the summer surge demand.

6. The Energy System: Extending the local authority role in influencing local energy systems and infrastructure

Grid constraints are severely affecting the potential for new generation projects to connect in Somerset. Transmission works with timescales out to 2038 are a critical issue. Engagement between the Council and the Distribution Network Operators is essential to ensure that network investment is in line with local ambitions and needs. The new Regional Energy Strategic Planner provides an opportunity for the Council to be involved in the strategic development of the area's network infrastructure.

Hydrogen could provide a low carbon energy source for difficult-to-decarbonise sectors in the area, such as heavy transport, shipping, aviation, and some high temperature industrial processes. The Council could work with industry stakeholders to develop strategic activity on hydrogen development. There may be opportunities in the future to produce hydrogen from nuclear power at Hinkley Point C, as well as alongside renewable generation.

A number of additional opportunities were identified through the stakeholder engagement process and analysis.

These represent opportunities that may be at an earlier stage in their development or have less of a role for the Council to deliver. These are:

7. Rooftop solar deployment on existing properties

8. Large-scale tidal lagoons

9. Rural generation schemes, such as anaerobic digestion and hydropower

10. Geothermal

This Somerset Energy Investment Plan sets out the key opportunities for decarbonising Somerset's local energy system.

Take action

The council will need to:

— prime the market
— plan for decarbonisation
— pursue partnerships

Next steps

Recommendations are made throughout for actions that the Council should or could take to prime the market, plan for decarbonisation, or work in partnership with external organisations. Pursuing partnership opportunities is essential, as these present the potential to leverage external finance and skills.

However, delivering the actions will inevitably require Council time, resources, skills and funding. The Council will need to consider how to deliver these opportunities within the current financially constrained environment. The next step will be for the Council to consider this Plan internally and with external stakeholders and partners. It should further prioritise the actions recommended, drawing up internal action plans with allocated resources and funding for each area.

Local skills hubs are needed to develop the necessary skills in the workforce. While Hinkley Point nuclear power station represents a national-scale project out of scope of this study, there will be opportunities to work with the developers and workforce on legacy skills and jobs programmes that could tie in with local decarbonisation needs. The development of the Gigafactory factory at the Gravity site near Bridgwater offers further potential for economic benefits, with a significant increase in job opportunities.

Introduction

Somerset's climate emergency declarations

The five former councils of Somerset (Somerset County Council, Mendip District Council, Sedgemoor District Council, Somerset West and Taunton Council and South Somerset District Council) each recognised or declared a climate emergency in 2019. While each declaration is slightly different, all aspired to achieving carbon neutrality in their own operations and to work towards achieving this across the geography of their administrative area. The Councils worked together to produce Somerset's Climate Emergency Strategy, which was published in November 2020. The Strategy included the goals:

— To decarbonise the Local Authority and public sector estates and reduce our carbon footprint

— To work towards making Somerset a carbon-neutral county by 2030.

In April 2023, the councils became a single unitary authority for the area – Somerset Council. Somerset Council remains committed to delivering against the Climate Emergency Strategy, which included the need to deliver an Energy Plan for Somerset – this report.

Somerset's Energy Investment Plan

The decarbonisation of the energy system – including how energy is used, generated and stored – is central to delivering the Council's climate pledge. The energy transition offers opportunities for Somerset to benefit from new jobs and investment, and to create a fairer energy system that benefits those living in Somerset.

Somerset currently meets the equivalent of approximately 5% of its total energy demand from local renewable energy generation. Achieving net zero will mean that 100% of Somerset's energy demand needs to be met from zero carbon sources. To achieve this, Somerset's energy demand needs to be significantly reduced through measures to boost energy efficiency, reduce demand and electrify heat and transport. The remaining demand needs to be met from renewable sources – whether local or national – with supporting infrastructure, flexibility and storage in place.

This plan sets out the current evidence on the energy system in Somerset and analyses the local resources to inform a potential Net Zero Pathway for Somerset. This Pathway has been used, alongside stakeholder engagement, to identify opportunities for investment in Somerset, their potential economic and local benefits, potential policy development for Somerset Council and options for delivering action.

A NOTE ON NET ZERO DATES

The Net Zero Pathway analyses the demand, generation and storage projects that would be needed to achieve a net zero energy system in Somerset. The Pathway achieves net zero by 2050 – 20 years later than 2030, which the Somerset Climate Emergency Strategy aims to work towards. This is because the Pathway is based on Committee on Climate Change projections and Distribution Network Operator scenarios that achieve net zero by 2050. For Somerset to achieve net zero earlier requires going ahead of the national projections – which are already challenging to achieve. Significant local focus, investment and effort will be needed to bring net zero in Somerset forwards ahead of 2050 – however, there would be significant climate and economic benefits if this can be achieved.

Key facts

The majority of Somerset is made up of relatively flat lowlands, including the Somerset Levels and coastal areas around the Bridgwater estuary. These are key areas for wildlife and nature preservation, while also making Somerset prone to flooding events. A large proportion of Somerset's remaining land sits within protected upland landscapes, including Exmoor National Park and four National Landscapes, including the Mendip Hills which was declared as a 'super' National Nature Reserve in 2023.

Somerset's main settlements are Taunton, Yeovil and Bridgwater, which are mid-sized towns. The county's largest sources of employment are the aerospace, agriculture and food and drink sectors. Roughly half of residents live in rural areas.

Population (ONS, 2021):

573,000

Broad Rural-Urban Classification 2011:

Predominantly Rural

Households (2021 census):

264,935

Households connected to the gas network:

71%

Area in hectares:

345,000

of which 73% is agricultural and 16% forest, open land and water (DLUHC 2022)

Major settlements:

Taunton
Yeovil
Bridgwater

Economic GDP (ONS, 2021):

£14.3 billion

Average GDP per head:

£24,700

above the national £22,400 average (ONS, 2021)

02

Baseline energy trends

Trends summary

Energy demand decarbonisation trends:

— Somerset is quite typical for progress on decarbonisation.

— Decarbonising national electricity supply has led to a 36% reduction in emissions since 2005.

— However, energy consumption has only fallen slightly over the same period.

— Somerset is slightly ahead of the national average for heat pump installations as a result of its higher number of off-gas grid properties.

— Building energy efficiency has seen only slow improvement, in line with national trends.

— Two-thirds of homes and non-domestic buildings need retrofitting with energy efficiency measures.

— There has been slow progress in electric vehicles as they make up less than 1% of all road vehicles, but recent trends suggest this is accelerating.

Somerset renewable generation – baseline and pipeline:

— Somerset generates the equivalent of approximately 29% of its annual electricity consumption from local renewable electricity generation. Because electricity is currently a small part of energy use, this is c.5% of Somerset's total annual energy consumption.

— Solar PV dominates existing and proposed renewable energy capacity. The pipeline of sites wanting to connect is over 650 MW.

— There is only one large-scale wind turbine operating in Somerset and 43 small-scale turbines.

— Battery storage has one 30 MW site, but over 400 MW in the pipeline.

— The Hinkley Point C reactors under construction are expected to contribute 3.2 GW when commissioned (now expected 2029 to 2031) but this is accounted for nationally rather than in this study.

— High-carbon and fossil generators remain, with new sites in planning.

Reduction of

36%

in emissions since 2005

2/3

of homes and non-domestic buildings need retrofitting

Less than

1%

of vehicles are electric, but this is accelerating

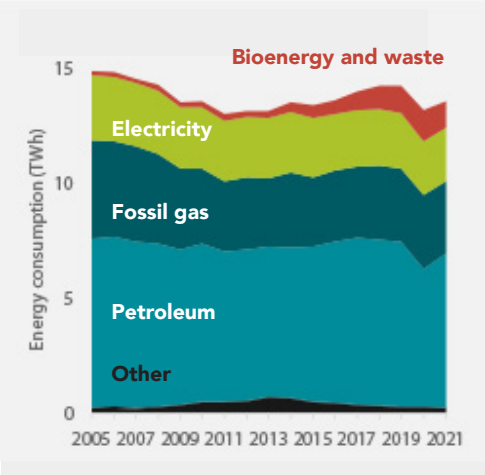
The equivalent of

29%

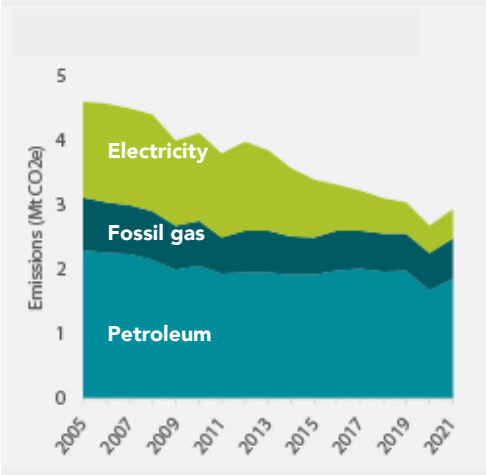
of annual electricity demand is generated from local renewable sources

Decarbonising national electricity supply has led to a 36% reduction in emissions since 2005

Somerset energy consumption by fuel



Somerset emissions by fuel*



Data sources: UK local authority and regional greenhouse gas emissions national statistics: 2005-2021, DESNZ; Sub-national total final energy consumption data, 2005-2021, DESNZ
*Excludes non-energy emissions from agriculture, LULUFC and waste management

Somerset's energy consumption trends have remained broadly similar since 2005. At present, demand is split roughly equally between the domestic, commercial and industrial and transport sectors, with transport taking the largest share at 36%. In 2021, energy use was dominated by fossil fuels, with 49% of all energy consumption coming from petroleum and a further 23% from fossil gas. Electricity made up just 17%.

Total energy consumption in 2021 was 13.52 TWh. This is 8.9% lower than 2005 levels. 2020 saw a significant drop in consumption as a result of the COVID-19 pandemic, with demand 7.4% lower than 2019 levels.

Following an increase in 2021, national trends show a renewed drop in demand in 2022, attributed to high energy prices and record warm temperatures.

Despite limited reductions in energy demand since 2005, Somerset's emissions from energy consumption have reduced significantly. Transport and heat demand remain largely dependent on high carbon energy sources. But over this period, the carbon factor for GB electricity has reduced significantly due to the uptake of renewables and replacement of coal with increased use of fossil gas, resulting in a 36% emissions reduction from energy use in Somerset since 2005.

Somerset has more homes off gas than the South West and national average

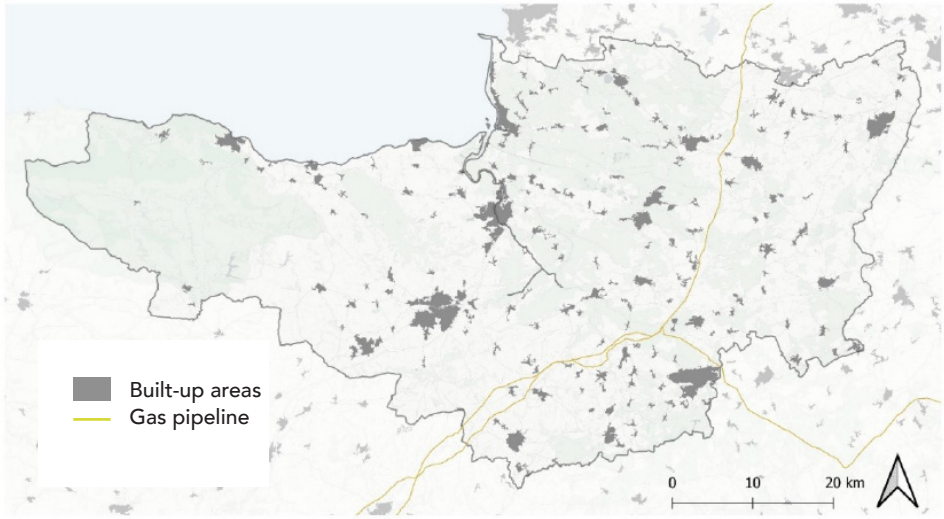
Heating in Somerset is largely met by mains gas, which makes up 71% of all household heating. This is a lower proportion compared to the South West, which is 75% on gas, and the national average of 84%. On-gas properties are clustered in the towns and along the gas lines that connect these population centres.

Other forms of fossil-fuelled heating, including oil, liquified petroleum gas (LPG) and coal, provide 12% of Somerset's heat demand. Electric heating, including direct electric, electric boilers and storage heaters, makes up approximately 15% of all domestic heating. Around 1% of domestic properties with an Energy Performance Certificate (EPC) are part of a community heating scheme.

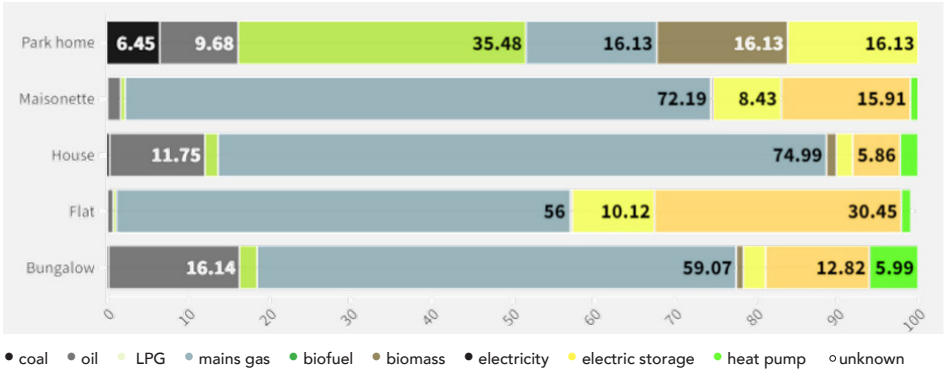
The uptake of domestic heat pumps has increased, with an estimated 470 heat pumps installed in 2022 compared to 340 installations in 2021. There are approximately 7,300 domestic heat pumps in Somerset in 2023.

Non-domestic heat: Approximately 31% of non-domestic heat demand is from fossil gas, while 57% is met from grid-supplied electricity. Non-domestic heat pump uptake in Somerset is increasing in momentum, with approximately 3,300 installations in total. A total of 348 were installed in 2023, compared to 158 in 2021.

Built-up areas in Somerset



Main heat technology by dwelling type[1] %



Source: Microgeneration Certification Scheme data

At least two-thirds of homes and non-domestic buildings need retrofitting

A total of 42% of Somerset's homes are rated EPC A to C, compared to 44% nationally. Only 3% fell within the A and B ratings. If new-builds are excluded from the analysis, only around 34% of households in Somerset fell within the EPC ratings of A, B and C as of 2022, up from 31% in 2015. This points to a significant domestic retrofitting challenge. Meanwhile, 44% of non-domestic EPCs have been given a rating of A, A+, B and C.

11.3% of households in Somerset were in fuel poverty in 2021 compared to the South West average of 11.9% and the national average of 13.1%*. Areas with the highest fuel poverty include Halcon (32%) and Lambrook (22%) in Taunton, Hamp in Bridgwater (22%) and Watchet (18%). Moreover, recent energy price rises have likely pushed more people into fuel poverty than the latest (2021) figures suggest.

Approximately 18% of homes with an EPC are insulated or have a 'good' or 'very good' wall energy efficiency rating. At least 79% of households had windows that were double or triple glazed.

To meet net zero targets, in 2017 the UK government committed to a target for all homes to achieve an EPC of C or above by 2035. This would require improvements to the majority of the 66% of homes in Somerset that currently fail to meet this standard.

The Climate Change Committee's Sixth Carbon Budget outlines that non-domestic properties need to achieve an EPC rating of C or above by 2030-2032. This means around two-thirds of non-domestic buildings in Somerset will need retrofitting.

Domestic EPC rating in Somerset

Non-domestic EPC rating in Somerset

* According to the 2021 Fuel Poverty Strategy, in England a household is in fuel poverty if:
— their home has a Fuel Poverty Energy Efficiency Rating (FPEER) of band D or below and
— if, after subtracting their modelled energy costs and housing costs, their residual income is below the poverty line

Source: Energy Performance Certificates. Visualisation: Regen

Slow progress in EVs, which make up less than 1% of all road vehicles

As with much of the UK, most of Somerset's road vehicles operate on diesel or petrol (98.6%).

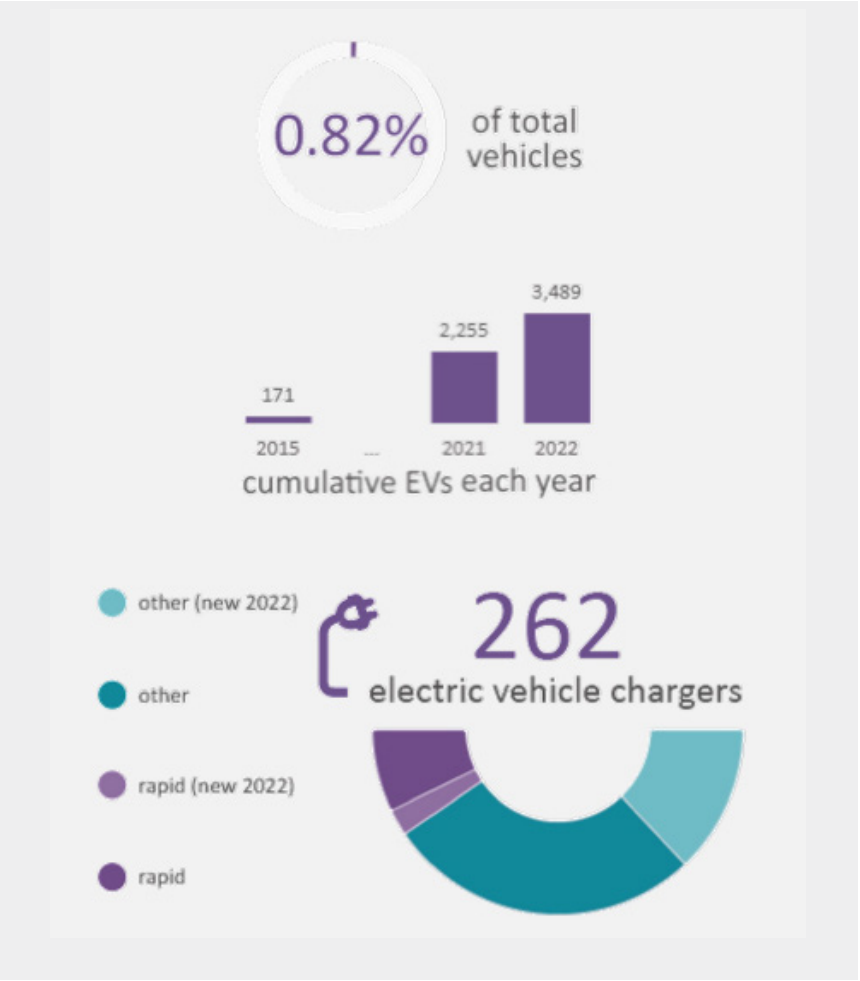
In total, road vehicles covered 4.4 billion miles across the Somerset area, the majority of which were undertaken by cars (75%). The proportion of adults cycling as a form of transportation at least once per month has decreased in recent years from 8.4% in 2016 compared to 5.5% in 2021.

The electrification of transport has made slow progress to date. As of 2022, battery electric vehicles make up only 0.82% of vehicles registered in Somerset, while hybrids made up 0.5%.

However, recent trends show an acceleration in the transition to electric vehicles (EVs). The total number of EVs registered in Somerset by the end of 2022 was c.3,490 – an increase of nearly 1,250 registrations in a single year. 20% of all new vehicle registrations in 2022 were pure battery EVs – with rapid growth expected as manufacturers ramp up EV production and consumer demand rises.

There are plans in development for a gigafactory at the Gravity business park near Bridgwater, which represents a significant opportunity for skills development, investment and infrastructure benefits.

By 2022, 262 chargers were installed across Somerset according to the Department for Energy Security and Net Zero statistics. See the Somerset EV charging strategy for further details.



Data source for baseline EV data: DfT VEH0105

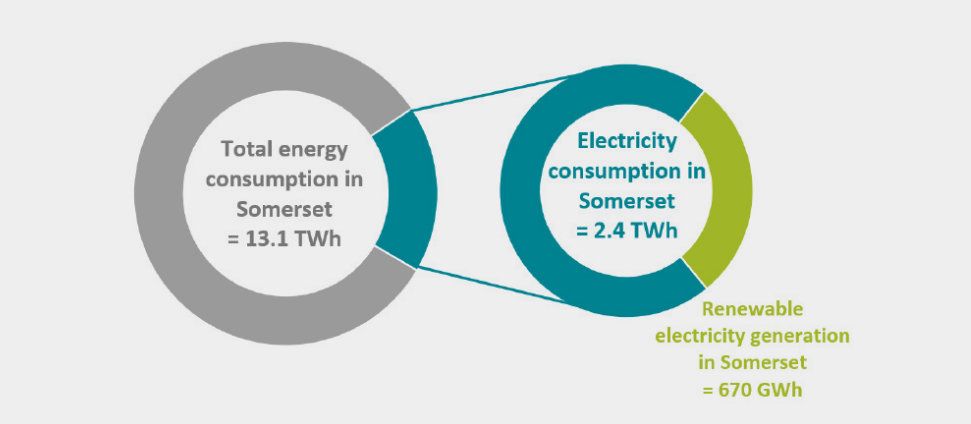
Renewable electricity generates the equivalent of 5% of the area's total annual energy consumption

In 2022, Somerset generated approximately 670 GWh from renewable electricity sources on an annual basis. Electricity demand was approximately 2,350 GWh, with total energy demand from all sources approximately 13,145 GWh.

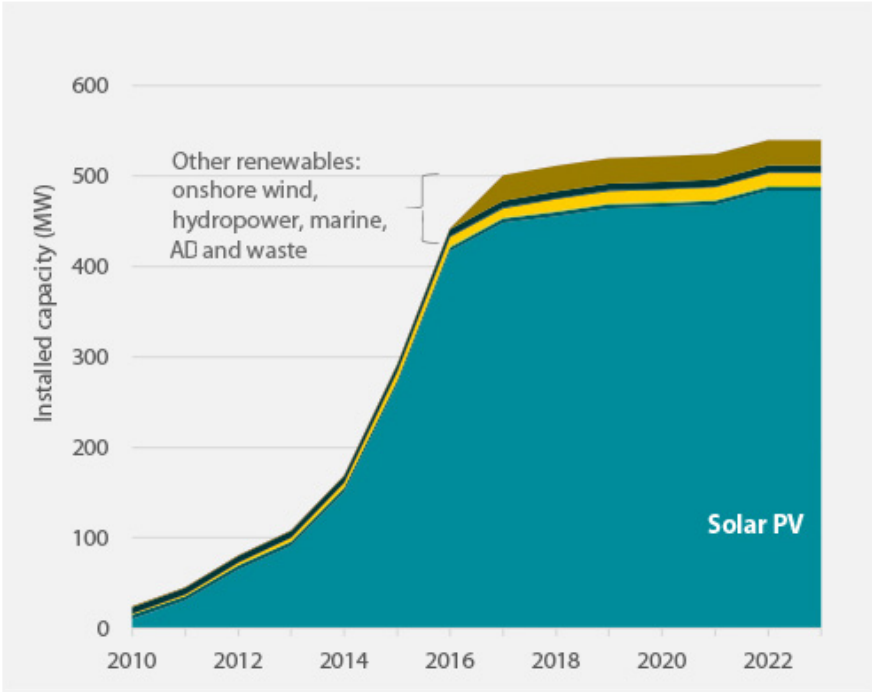
Therefore, Somerset generated the equivalent of approximately 29% of its annual electricity consumption and 5% of its total annual energy consumption from local renewable electricity generation in 2022.

In 2023, renewable electricity capacity totalled over 520 MW. There has been a significant slowdown in deployment of new renewable energy projects since 2017. This is due to a combination of subsidy reductions and network constraint issues.

Renewable electricity generation in Somerset is equivalent to:
29% of Somerset's total electricity consumption
5% of Somerset's total energy consumption



Somerset renewable electricity capacity over time



Data sources: BEIS, Renewable electricity by local authority 2014 – 2021. NGED & SSEN ECR.

Solar PV dominates existing and proposed renewable energy capacity

In August 2023, renewable technologies made up 82% of Somerset's total installed electricity generation capacity. Ground-mounted solar deployment dominated, with a total of 313 MW. The highest annual rate of solar installation was in 2015, when 146 MW of capacity was installed. In 2023, there was 653 MW of ground-mounted solar projects in development.

There was at least 46 MW of domestic and 32 MW of non-domestic rooftop solar installed in Somerset by August 2023. Rooftop PV installation rates have since fallen, but recent years have seen an uptick, with 11 MW installed in 2022 and another 12 MW installed by August of 2023.

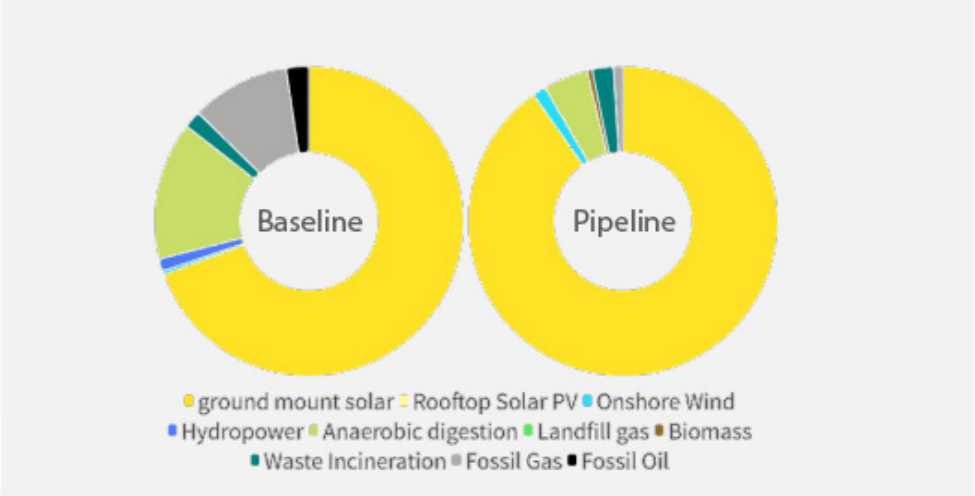
Organic waste technologies make up the second-largest renewable capacity in Somerset – with landfill gas engines totalling 71.2 MW and anaerobic digestors 8.6 MW.

Just over 2 MW of onshore wind is currently installed in Somerset – with the majority at Ecotricity's Shooters Bottom turbine to the east of the Mendips. There are at least 43 small turbines across Somerset totalling approximately 366 kW.

Hydropower makes up less than 1 MW across a few scattered micro-sites, most of which are housed in old watermills. There is no marine or offshore generation currently operational in Somerset.

There are 140.6 MW of renewable projects currently operating in Somerset that are owned by local organisations, community organisations, farms or householders. Local businesses make up the majority of this with ownership of 74 MW. Community organisations have ownership of at least 15.3 MW.

Baseline and pipeline[1] installed capacity in Somerset



Technology	Baseline Sites	Baseline (MW)	Pipeline sites	Pipeline (MW)
Ground-mounted solar PV	75	313	40	653
Rooftop solar PV	21,044	78	N/A	N/A
Anaerobic digestion	19	11	0	0
Landfill gas	5	32	2	25
Hydropower	<10	<1	2	0.085
Onshore wind	44	2.4	--	--
Biomass	--	--	1	3.9

1. Pipeline capacity refers to any site found in planning and/or applied for and accepted a distribution network grid connection offer.

Hinkley Point C offers opportunities for skills and the supply chain, while battery storage has the potential for rapid development

Nuclear

Somerset is home to Hinkley Point nuclear power station, with two new reactors under construction – Hinkley Point C. A recent announcement from EDF delayed the expected commissioning date to 2029, with 2031 as a worst case delay. Hinkley Point C is expected to contribute 3.2 GW when commissioned and is one of only a small number of new nuclear power stations being constructed in the UK. As such, Hinkley is a national resource that will contribute to the overall decarbonising of GB's electricity network. It falls outside of the scope of the Somerset Net Zero Pathway. However, there may be opportunities to link in local renewable development with Hinkley's supply chain development and skilled labour force.

Battery storage

Battery storage totals just 30 MW of capacity, made up primarily by the council-owned Fideoak site which provides grid services to the network. Rapid deployment could take place in the near term, as there are a further 487 MW of batteries in the pipeline. However, many of these applications may be speculative and may not come to fruition. There are sites in the pipeline that are due to offer standalone grid services and others that are co-located on site with renewable generation. The largest site identified in the pipeline is at Rodden Farm near Frome. It has applied for a 75 MW grid-connection offer.

Fideoak battery site near Taunton (28 MW)

Technology	Baseline sites	Baseline (MW)	Pipeline sites	Pipeline (MW)
Battery storage[1]	2	30	15	487
Nuclear	--	--	1	3,200

Photo credit: British Solar Renewables

1. The total number sites in planning are unlikely to be built in entirety due to the speculative nature of projects applying for gid connections.

Fossil-fuelled and high carbon generation is still expanding

Fossil-fuelled sites

Approximately 14% of Somerset's installed electricity generation capacity is made up of fossil-fuelled gas, oil and waste sites, totalling 80 MW, of which 70 MW come from fossil fuels. The largest oil site is 9.8 MW located at Whatley Quarry. The largest fossil gas site is the 15 MW Yeovil Power Generation Plant. A further 7.2 MW is being developed at the same location by Conrad Energy.

Energy from waste

There is one energy from waste incineration site located at the Bridgwater resource recycling centre. The site, located at Showground Road near the M5, is going through final testing in early 2024 before becoming fully operational. The 7.8 MW site was granted planning permission in 2015 and began construction in 2019. It applied for a new planning permission under SCC/3761/2020 in 2020 since councillors determined that further consultation was needed. The second application was granted subject to conditions in July 2021.

An additional 2.5 MW Advanced Conversion Technology (ACT)[1] site has been granted a grid connection offer, located at the Marston Trading Estate in Frome, according to SSEN's embedded capacity register.

Technology	Baseline sites	Baseline (MW)	Pipeline sites	Pipeline (MW)
Waste incineration	1	10	1	2.5
Fossil gas	9	57	1	7.2
Fossil oil	4	13	--	--

1. Advanced Conversion Technology (ACT) refers to innovative and sophisticated methods of converting waste materials into energy, with a focus on maximising efficiency, minimising environmental impact, and often incorporating technologies that go beyond traditional waste-to-energy methods.

03

Energy generation resources

Key messages

Somerset has considerable renewable energy resources, many of which are relatively underdeveloped.

Widespread solar

Somerset's solar resource is significant and geographically widespread, due to the high availability of undeveloped rural land.

Onshore wind

Onshore wind resources are also promising, although there is only one large-scale turbine and a few small sites in operation. For onshore wind, radar and landscape concerns are the key constraints, with the highest windspeeds within protected landscape areas.

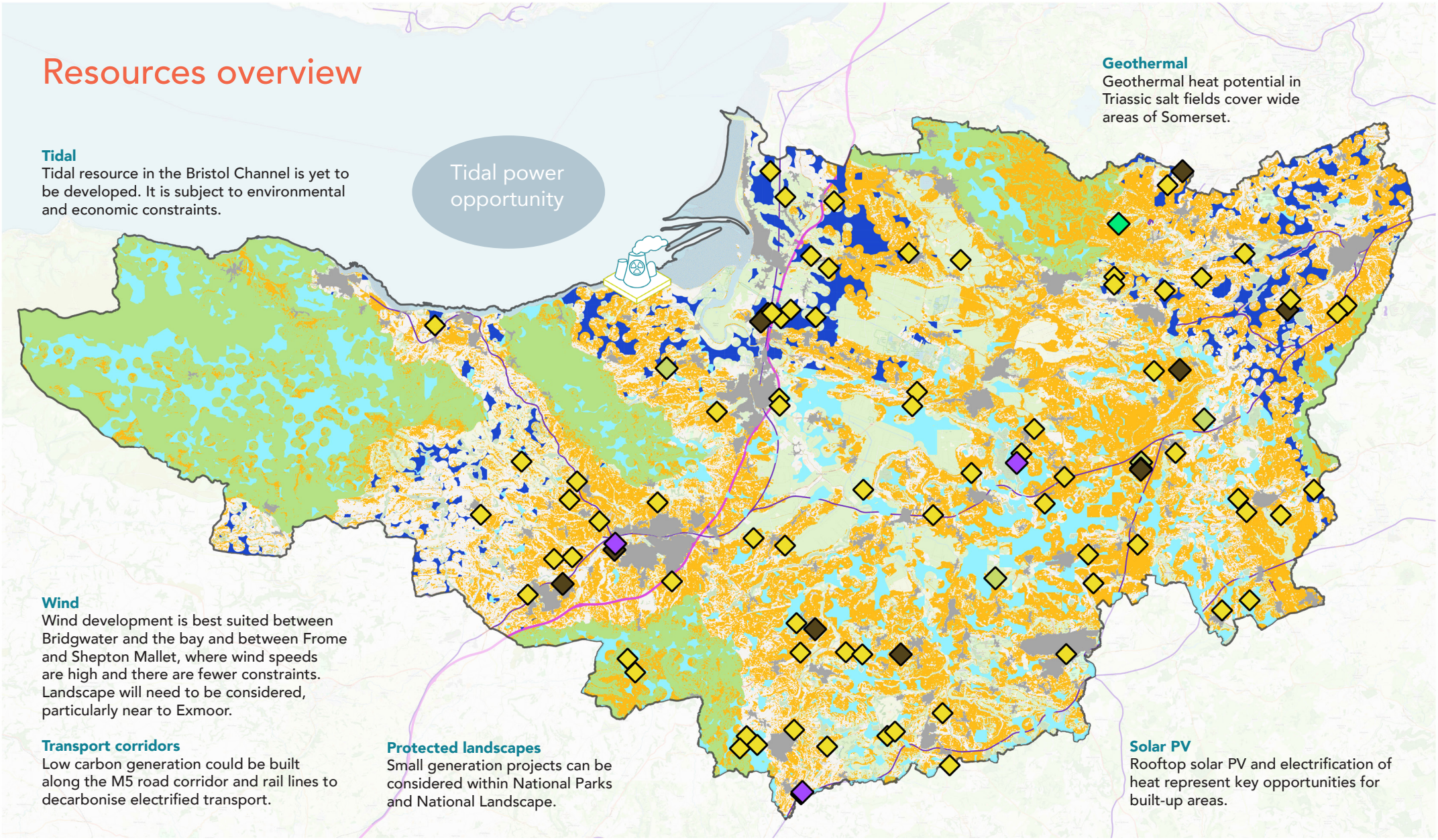
Other opportunities

There are also some limited opportunities for green biogas generation and small hydropower.

Major barriers

Grid constraints present a major barrier to connecting new sources of renewable generation in Somerset. In particular, upgrades needed to the high-voltage transmission network are the key blocker to accessing grid capacity.

Resources overview



Tidal
Tidal resource in the Bristol Channel is yet to be developed. It is subject to environmental and economic constraints.

Geothermal
Geothermal heat potential in Triassic salt fields cover wide areas of Somerset.

Wind
Wind development is best suited between Bridgwater and the bay and between Frome and Shepton Mallet, where wind speeds are high and there are fewer constraints. Landscape will need to be considered, particularly near to Exmoor.

Transport corridors
Low carbon generation could be built along the M5 road corridor and rail lines to decarbonise electrified transport.

Protected landscapes
Small generation projects can be considered within National Parks and National Landscape.

Solar PV
Rooftop solar PV and electrification of heat represent key opportunities for built-up areas.

Operational projects
- Anaerobic digestion
- Battery storage
- Landfill gas
- Solar PV
- Wind

Resource areas
- Best wind areas
- Promising wind areas
- Solar resource area

Geographical features
- Railway
- M5
- Built-up areas
- National Parks and National Landscapes

Solar baseline, pipeline and resource potential in Somerset

KEY

Operational solar sites

- Solar PV

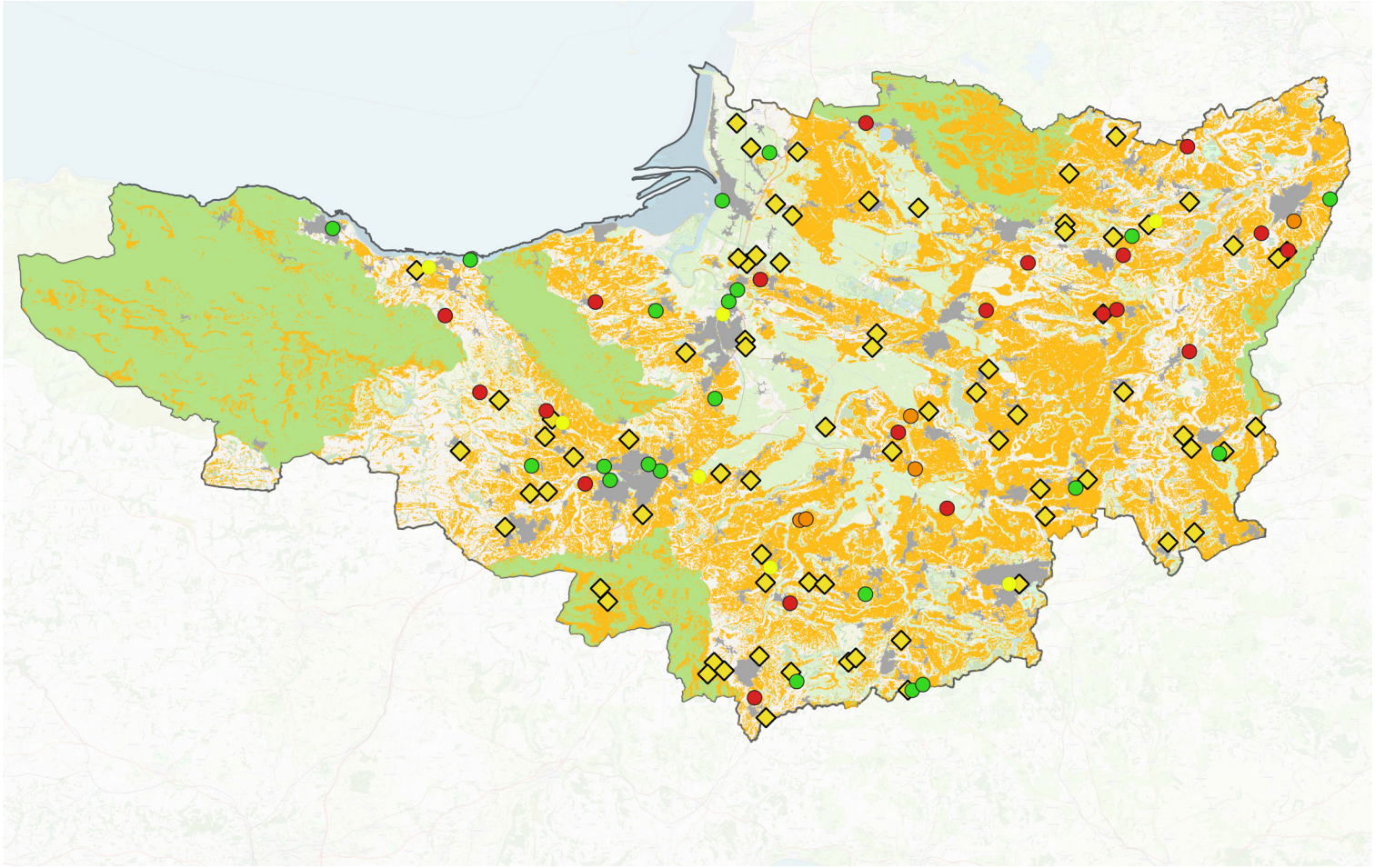
Solar sites in planning

- Approved
- Application submitted
- Application withdrawn
- Abandoned/refused

Geographical features

- Solar resource area*
- Built-up areas
- National Parks and National Landscapes

*only high-level constraints removed



Somerset's solar resource is geographically spread, with operational sites across the area

Analysis of potentially suitable land for solar power shows widespread availability across Somerset, outside of Exmoor National Park and the National Landscapes. This is reflected in the distribution of existing sites, which are situated across the county outside of these designated landscapes. Within Somerset's designated landscapes, there may still be suitable locations for solar for individual businesses or properties in proximity to existing built forms, so long as they avoid open moorland and high coastal heaths. For example, several multi-MW sites have already been developed in the Blackdown Hills.

Regen's high-level resource assessment, which accounts for key technical, network and planning considerations, identifies 160,000 ha of land area that could potentially be suitable for large-scale solar PV, with a further 20,000 ha in areas where constraints may need further consideration. The degree of solar uptake under the Net Zero Pathway is feasible alongside other land use requirements such as new developments and land required for phosphate reduction and nutrient neutrality. Considerations on biodiversity net gain will be required for each new site.

Detailed site-specific analysis considering localised constraints and planning considerations would be needed to take any potential site forward to development, but the overall finding is that there is more than enough solar resource and available land to deliver the Somerset Net Zero Pathway. Network capacity constraints currently represent the greatest barrier to deploying solar in Somerset.

Rooftop solar PV

There were more than 13,000 rooftops with solar PV installed across domestic and non-domestic properties in 2023. Recent electricity price rises have resulted in an increase in the rate of installations. To reach an additional 364 MW of domestic rooftop installations by 2050, 120,000 rooftops will need to be fitted with an average 3.4 kW domestic installation, including new-builds. To meet non-domestic rooftop solar PV targets of 118 MW, around 12,000 businesses with an average 10 kW installation would be needed.

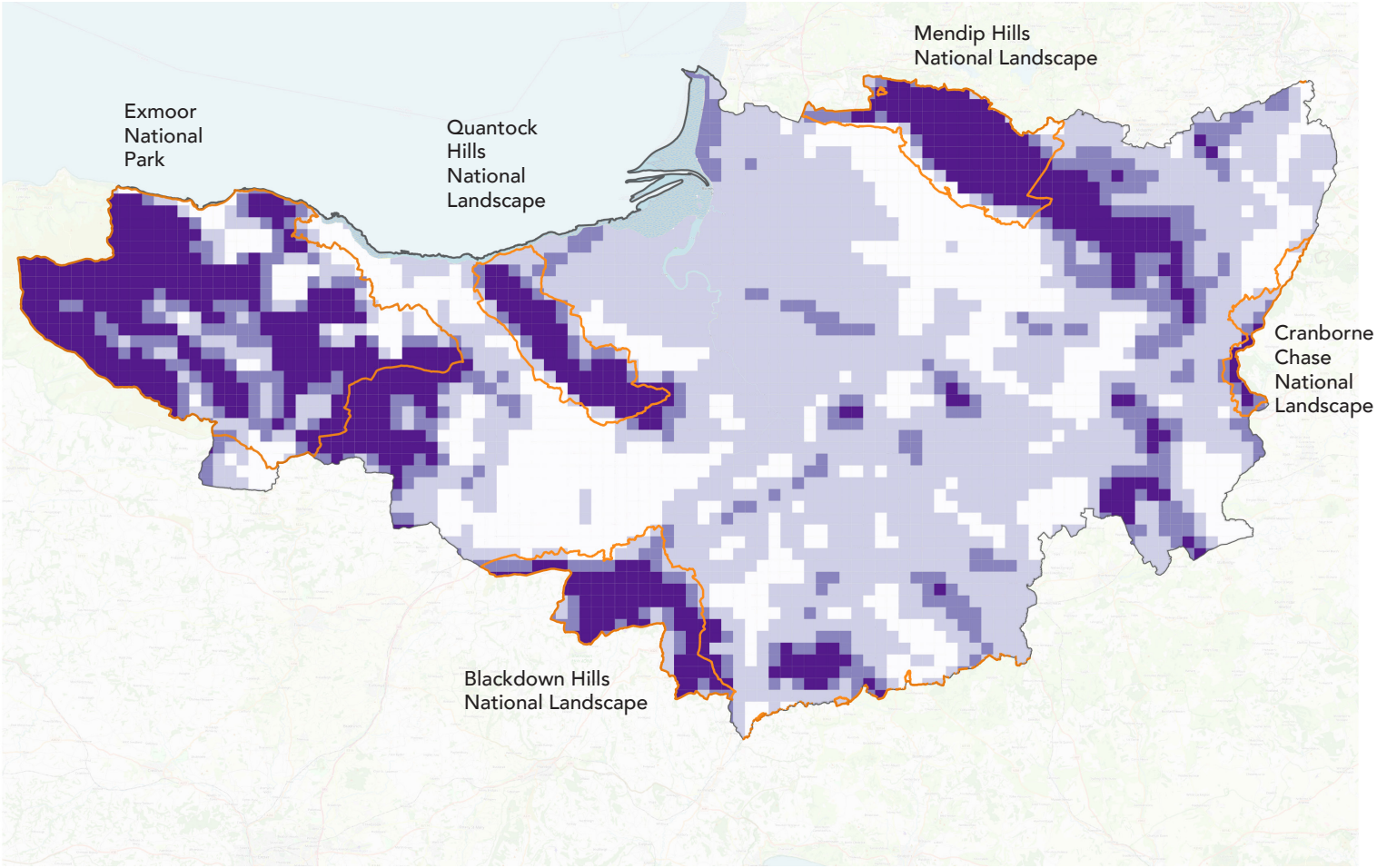
Wind speed and designated landscapes

Somerset's topography and protected landscapes means that hilly areas with the highest wind speeds are focused in and close to the five protected landscape areas.

KEY

Wind (onshore)
Wind speed (m/s)

- 0-5.9
- 5.9-6.5
- 6.5-7
- 7- 95
- National Landscapes and National Park



Onshore wind baseline, pipeline and resource potential

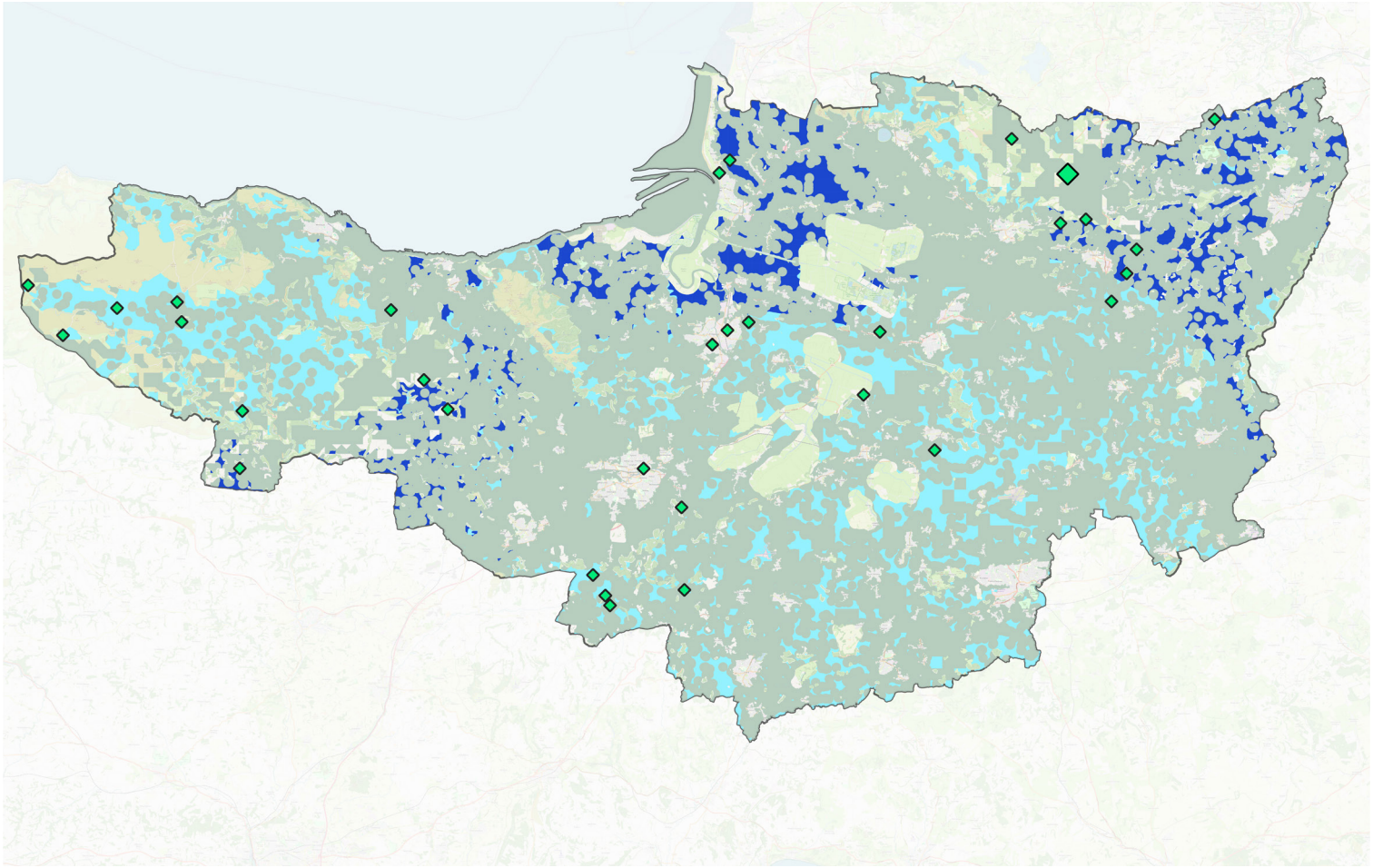
KEY

Operational wind sites

- Large turbines
- Small turbines

Resource areas

- Best wind areas
- Promising wind areas
- Wind allocation area



Areas with high windspeeds are focused around designated landscapes

Regen's analysis of the onshore wind resource divides the potential resource into three categories. Best wind areas fall outside of the 20-mile radius around military airbases, as well as being lower-grade agricultural land outside of designated landscapes. These areas are relatively limited – key constraints are the potential radar issues and that the highest wind speed are within designated landscapes. The best wind areas are focused in the north-east of the county in the former Mendip district, particularly between Frome and Shepton Mallet, and near the Bristol channel in the former Sedgemoor district.

Promising wind areas fall within the 20-mile airbase radius, and include areas of partial constraint, including national designated landscapes and areas of high agricultural grade. Some promising wind areas fall within Exmoor National Park, Mendip Hills and Quantock Hills – these hillier areas have higher wind speeds but are subject to landscape considerations.

The wind allocation area considers all areas that are not significantly constrained – e.g. areas outside of urban areas, country parks, nature reserves or habitat protection areas.

Current national planning policy as set out in the National Planning Policy Framework has discouraged wind development in England in recent years. The 2023 amendment to footnote 54, though ostensibly designed to ease planning for onshore wind, did not go far enough to have a significant impact. In particular, there remains a requirement for wind turbines to be within an allocation set out through the local plan, supplementary planning documents or neighbourhood plan. In Somerset, only Exmoor National Park's local plan currently allocates areas for wind, outlining that small-scale wind turbines with a maximum 20m height may be permissible on areas not characterised as open moorland or high coastal heaths.

The wind allocation area is designed to be taken into the new local plan or in a Supplementary Planning Document to meet the requirements of the National Planning Policy Framework. It is deliberately broad to enable developers to select sites on the basis of detailed site selection processes, rather than to rule out sites using coarser blanket criteria.

There are some limited opportunities for green biogas

Biogas baseline, pipeline and resource potential in Somerset

KEY

Baseline bioenergy projects

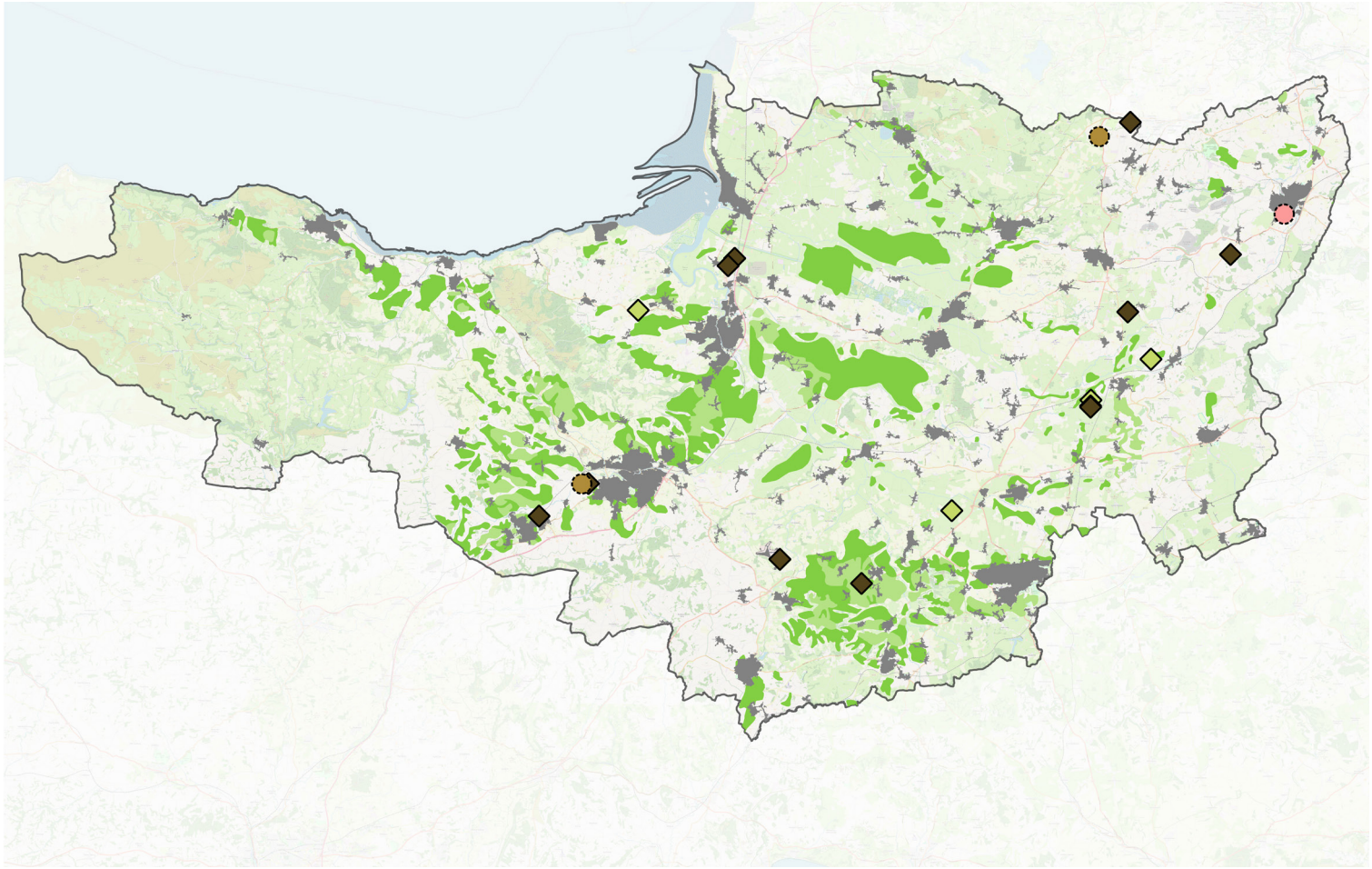
- Anaerobic digestion
- Landfill gas

Pipeline bioenergy projects

- Advanced Conversion Technology
- Landfill gas

Geographical features

- Built-up areas
- Agricultural land grade 1
- Agricultural land grade 2



Bioenergy and green gas

The Council already collects and processes food waste, limiting the amount of unused feedstock available for additional new biogas plants in the county. Over 23,000 tonnes are sent annually for reprocessing at Somerset biogas plants, including anaerobic digestion (AD) facilities at Cannington and Walpole (Viridor) near Bridgwater.

From March 2025, as as part of the Simpler Recycling policy, all businesses will be required to separate out and recycle food waste. This may offer additional opportunities for AD. Agricultural waste may also offer additional resources for use in AD.

Somerset Council is currently undertaking a resource assessment to establish the potential scale and location of the resource. As of 2023, there was approximately 11 MW of anaerobic digestion in Somerset across 19 sites.

Landfill gas is likely to be less prominent as a technology in the future as the 2025 landfill ban comes into force. Sites like Dimmer Landfill gas are starting to see a reduction in supply. Sewage gas sites are likely to remain at similar installed capacities as in 2023.

Hydropower

Hydropower resource is largely limited by the topography of Somerset. A number of very small-scale low head sites have already been developed, often on historic mill sites. According to Mendip Power Group, a further 7 MW of resource could be developed across Somerset, although abstraction licence costs and high capital costs poses a significant barrier to development of these small and micro-scale sites.

Grid constraints are a major barrier to decarbonising energy

Generation and demand constraints

Grid constraints, caused largely by the transmission Statement of Works process, coupled with large volumes of projects wishing to connect to the network, are a key barrier to meeting net zero decarbonisation goals in Somerset, and across the UK. The capacity maps on the next page show downstream generation and demand constraints across the east of the county in particular. Although generation projects have historically been most affected by constraints, some of the largest demand connections may also encounter issues.

To alleviate distribution-level constraints, there is a need for more investment and collaboration to bring forward the necessary levels of investment and release capacity in the queues. The Distribution Network Operators (DNOs) have business plans in place that will create some of the required investment, but not necessarily at the level and pace required to deliver the area's net zero ambitions.

DNOs will also identify investment required on the distribution network by performing an optioneering assessment. The cost benefit-style assessment decides whether to signpost a substation for review, delay reinforcement with flexible asset procurement, or directly reinforce grid hardware to release capacity. The map on the following page shows several substations that have been flagged by the assessment.

Every area of grid in Somerset is subject to transmission works. This means that connections above a certain size may be dependent on upstream upgrades to the transmission network, which are not scheduled to take place until 2038. When these upstream constraints from the transmission network are considered, much of the unused distribution capacity on both demand and generation sides of the equation becomes constrained.

Until upstream transmission constraints are released, most larger projects and some smaller projects that attempt to connect to the network will be met with significant delays.

Ongoing grid reform and future network plans

To address grid-related delays, the Government, Ofgem and Electricity System Operator have produced a Connections Action Plan which sets out actions to significantly reduce connection timescales, including:

- Raising entry requirements for new projects
- Removing stalled projects from the queue (some networks have already actioned the release of capacity on their networks, including National Grid Electricity Distribution)
- Better using existing network capacity, through engineering assessments and flexible connection offers
- Better allocating existing network capacity, moving away from the current first-come, first-served process
- Strengthening data, processes, obligations and incentives to give customers visibility of available capacity and to deliver timely connections
- Developing longer-term connections process models aligned with strategic planning and market reform.

In addition to distribution connections reform, transmission capacity additions will need to address long lead times. There have been several key developments to accelerate the delivery of critical transmission projects, including £19.8bn of onshore transmission investment, as sanctioned by Ofgem via its Accelerated Strategic Transmission Investment decision in 2022.

Transmission works are the key blocker to accessing grid capacity

National Grid Electricity Distribution (NGED)

Scottish and Southern Electricity Networks (SSEN)

KEY

Distribution Network optioneering assessment decisions

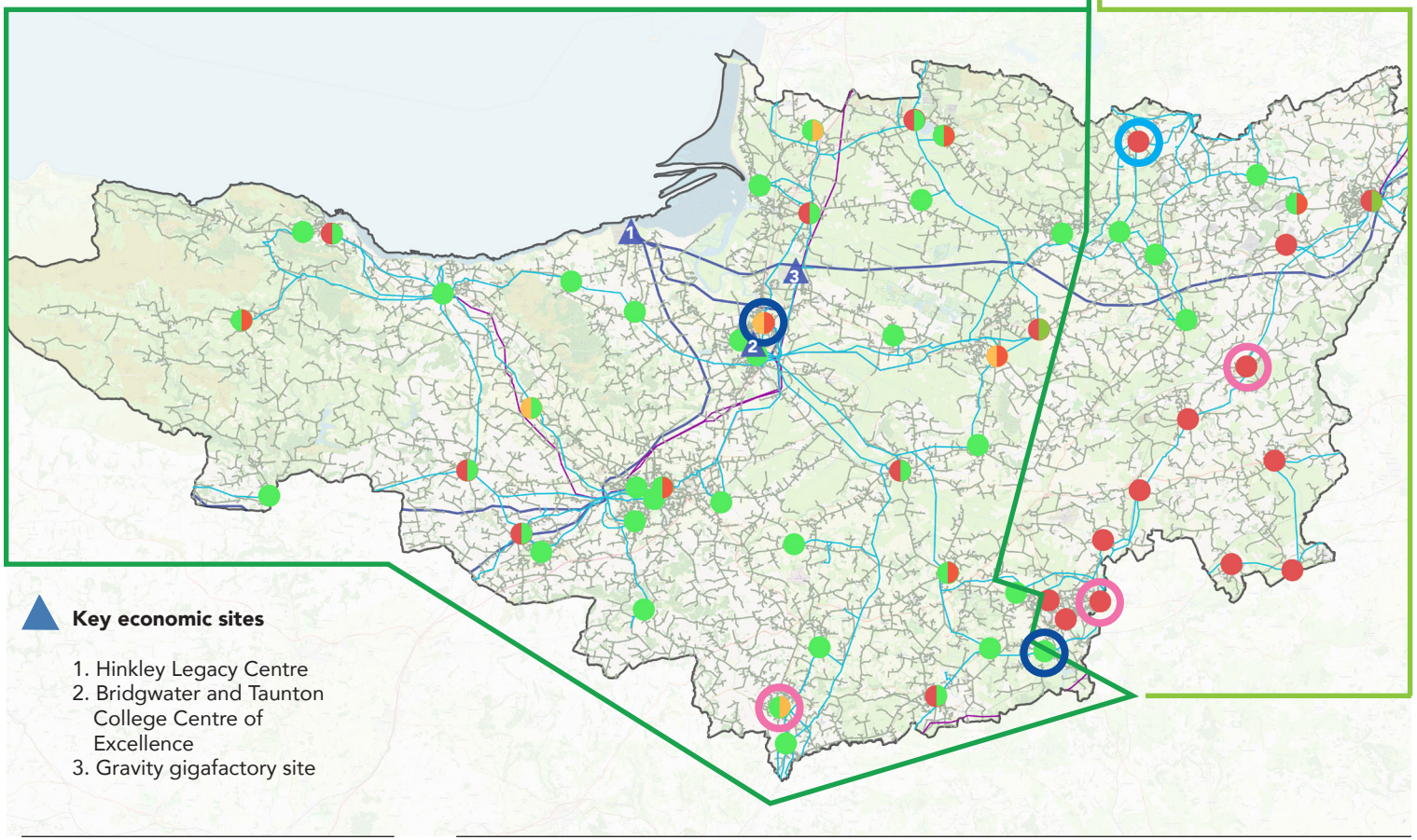
Signposting
Bridgwater – Bath Road:
no flexibility needed until 2025
Yeovil – Coker Tee:
no flexibility needed until 2027

Reinforcement
Woodcote – Chard:
Reinforcement of 33kV circuits.
Completion in 2025.
Yeovil BSP:
Flexibility for two years then reinforce to release 11MVA in 2026
Brunton:
Reinforcement of 17km of EHV overhead line, 8MVA released by 2028

Flexibility
Chewton Mendip:
flexibility until 2027

Primary substation constraints
- Partially constrained
- Unconstrained
- Constrained

Left = demand
Right = generation



Key economic sites

1. Hinkley Legacy Centre
2. Bridgwater and Taunton College Centre of Excellence
3. Gravity gigafactory site

Gridlines
- 132KV
- 33KV
- 11KV

- Some areas of Exmoor have no access to the electricity network.
- Substations around Taunton, to the south and to the west of Somerset have good availability on both demand and generation – but are likely to be subject to transmission works.
- Both areas have transmission works out to 2038.
- Former Mendip has some demand and generation grid availability, with some constraints depending on the substation.
- SSEN's side of the network is heavily constrained for both generation and demand projects.

Geothermal presents an untested opportunity, while hydrogen production could be linked to Hinkley Point C and other generation sources

Geothermal

Somerset is situated in an area with geothermal potential for heating thanks to the sedimentary basin located under the Quantock hills and surrounding areas. According to a study by the British Geological Survey geologists, carboniferous limestone such as in the area around Wookey Hole and Mendip Hills, could provide deep geothermal potential for use in heat networks in the region. The research shows that the estimated temperature range is 10-100°C with heat potential values exceeding 250 PJ/km2. This resource is at an early stage with further studies needed into its viability.

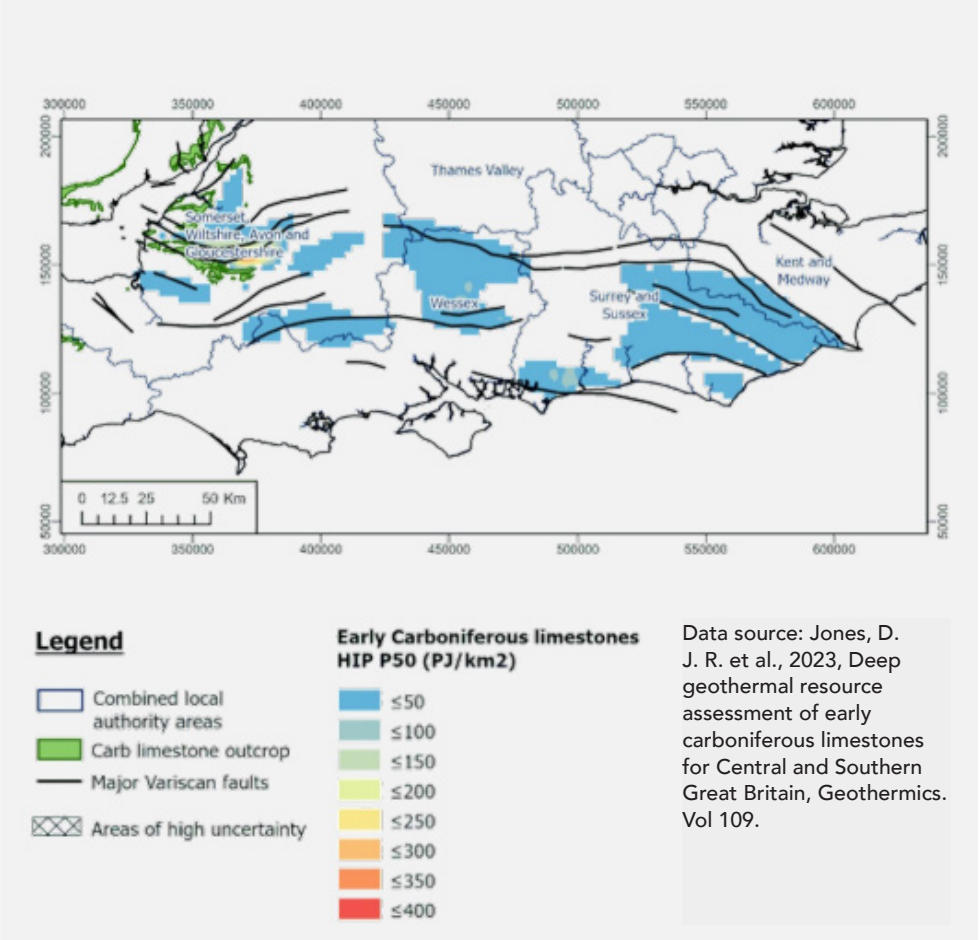
Hydrogen

In the future, hydrogen could provide a low carbon energy source for difficult-to-decarbonise sectors such as heavy transport, shipping, aviation and some high-temperature industrial processes. It may also play an important role in long duration system balancing as a multi-vector fuel, using very low-cost electricity during times of over-supply to convert, store and transport renewable energy for many applications. It is unlikely to be used in domestic heating and the majority of transport applications as electrification provides a lower-cost, more efficient and further developed alternative.

In Somerset, there may be opportunities to co-locate hydrogen electrolysers with renewable generation or alongside potential sources of hydrogen demand. Somerset's rail and motorway infrastructure could offer potential sites to co-locate hydrogen production with demand for hydrogen for heavy transport and alongside renewable resources.

There may be potential for hydrogen production at Hinkley Point. EDF Energy, working with partners and government investment, is developing a trial to install a solid oxide electrolyser at its Heysham site in Lancashire to produce nuclear-powered hydrogen. The trial is in design stage, with the potential to begin construction in 2024. If successful, the technology could be rolled out to other nuclear sites, such as Hinkley.

Geothermal resources in central and southern Great Britian



Data source: Jones, D. J. R. et al., 2023, Deep geothermal resource assessment of early carboniferous limestones for Central and Southern Great Britain, Geothermics. Vol 109.

Offshore wind and wave opportunities are low, while tidal resources show significant, as-yet undeveloped potential

To date, no offshore wind and marine projects have been developed in Somerset waters. Offshore wind resource in the Bristol channel is low compared to average wind speeds in the Celtic Sea. Wind speeds in the channel closest to Somerset do not exceed 9.5 m/s. Wave potential is also low, with 1.5m wave heights making wave development in the channel unviable.

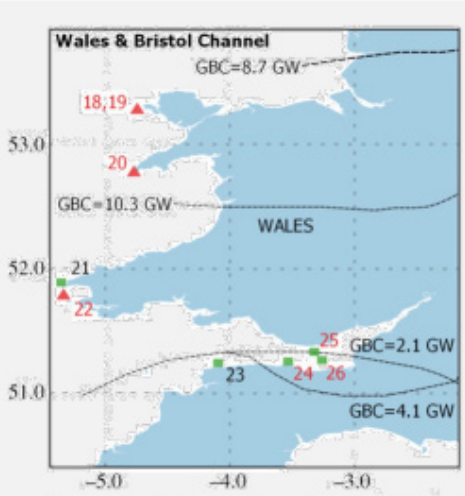
The channel is subject to several constraints, including major shipping routes and marine wildlife habitats. The Atlantic Array offshore wind site would have been the closest to Somerset, but was cancelled in 2013 due to commercial and technical challenges. Floating offshore sites currently in development in the Celtic Sea are likely to make landfall either in north Devon or Wales.

Tidal opportunity in Bristol Channel

The most promising offshore opportunity is tidal, with spring peak flow ranging from 0.5-2.5 m/s in most areas of the Bristol Channel. A study by Carbon Trust investigated the energy potential of two tidal sites at the West Somerset Lagoon (close to Minehead) and Mackenzie Shoal. The study explores shipping, fishing and national designation constraints.

The West Somerset Lagoon project (2.5 GW) could generate up to 6.5 TWh/year with flexible head and pumping function, according to analysis by Cardiff University. WSL could provide coastal protection against waves, storm surge and sea level rise, thereby reducing coastal erosion and flood risk in the region. An environmental mitigation strategy has been prepared and discussions have taken place between the potential developer, funders and Somerset Council. However, there is currently no route to market for this project and it has remained in early-stage development over an extended period.

Tidal resources in the Bristol Channel

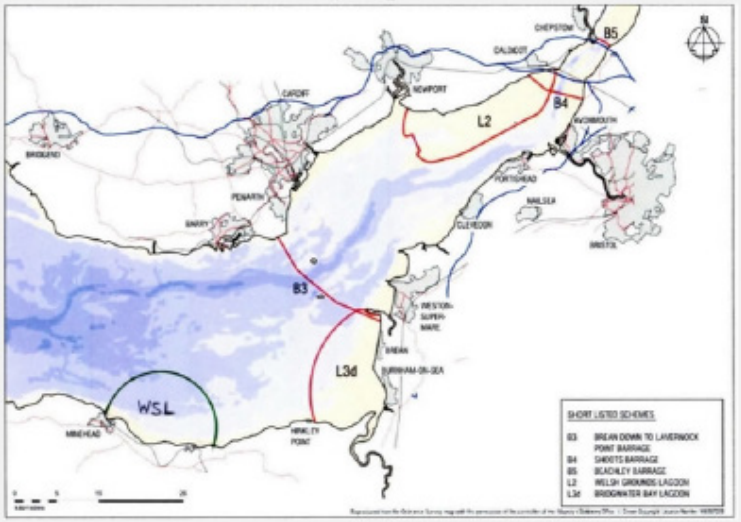


24. Minehead

25. Barry

26. MacKenzie Shoal

Source: Coles, E. et al., 2021



Source: West Somerset Lagoon, Tidal Engineering & Environmental Services

04

Net Zero Pathway

Net Zero Pathway summary

Key elements		Net zero targets areas	
Demand	**Energy demand** Somerset's energy demand needs to be significantly reduced through technology shifts, energy efficiency and demand reduction measures. Both electric vehicles and heat pumps are significantly more efficient than the technologies they are replacing.	**Heat decarbonisation** Retrofit is a crucial element of the Pathway, with all homes needing to achieve at least EPC C by 2035. The high proportion of off-gas properties provides an opportunity for Somerset to lead the way on heat pump installation. Somerset will need to increase domestic heat pump installations from a total of c.7,300 in 2022 to c.9,700 every year out to 2050.	**Electric vehicles:** Somerset needs over 90% of road vehicles to be electric by 2040. Alongside an increase in public transport use and active travel, the higher efficiency of electric vehicles means Somerset's 4.3 TWh of road transport petroleum energy consumption could be replaced by 1.2 TWh of electricity. An average of 9,300 new electric vehicle registrations are needed per year – compared to just 1,250 registrations in 2022.
Generation	**Energy generation** The remaining demand needs to be met from renewable and low carbon electricity sources – whether local or national.	**Renewable generation** The equivalent of 45% of Somerset's 2050 electricity demand could be met by local renewables.	Generating the equivalent of 100% of 2050 electricity demand from local resources would be very challenging. It would require considering wind turbines in protected landscapes or additional very large-scale generation such as tidal power.
System	**Energy System** Demand and supply for energy need to be balanced on the system. Somerset needs the right supporting infrastructure, flexibility and storage assets.	**Energy storage** Balancing demand and supply needs storage technologies. Storage deployment – for example, batteries or hydrogen electrolysis – is a critical cornerstone of achieving the Net Zero Pathway.	The Net Zero Pathway includes 247 MW of battery storage, around half of this from domestic batteries.

Somerset's Net Zero Pathway is focused on electrification of energy demand, in line with national trends

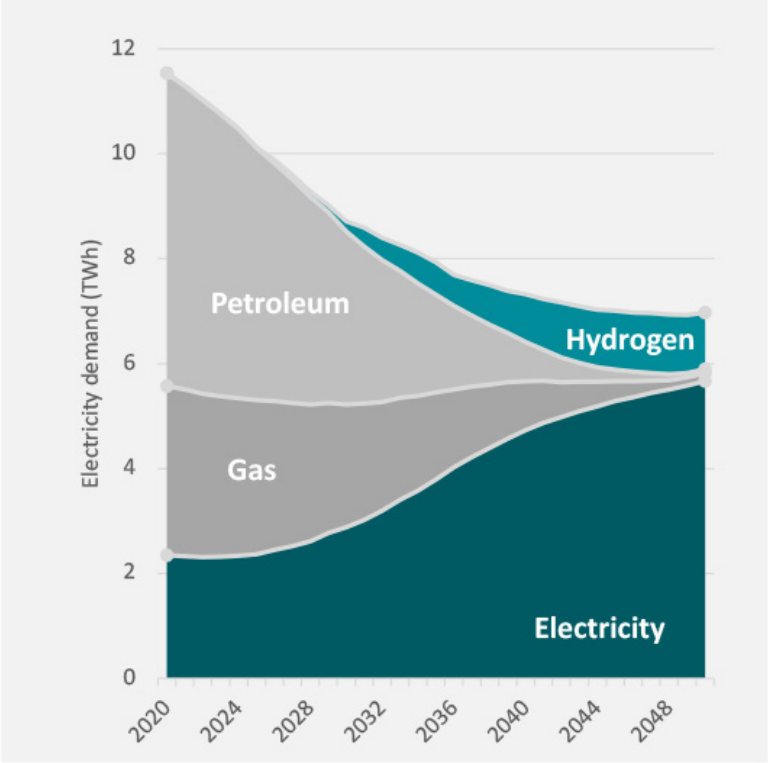
Achieving net zero will mean that 100% of Somerset's energy demand needs to be met from zero carbon sources. To achieve this, Somerset's energy demand needs to be significantly reduced through energy efficiency and demand-reduction measures. The remaining demand then needs to be met from renewable sources – whether local or national – with supporting infrastructure, flexibility and storage in place.

Somerset does not need to rely solely on local renewable generation of energy as the area is not an energy island – it is part of the GB energy system. National-scale projects outside the area, including offshore wind, nuclear and pumped storage, and inside the area – Hinkley Point C – will contribute to the overall decarbonisation of Somerset's electricity supply. However, for the area to play its part in decarbonising the GB energy system – as well as reaping the benefits of the transition – local renewable generation needs to increase significantly.

Somerset's Net Zero Pathway explores the changes to demand and generation that are needed to support the local delivery of net zero. It has been developed drawing on the national local net zero scenarios that most closely reflect local ambition and decarbonisation opportunities, in particular from the Climate Change Committee's (CCC) pathways and local analysis from the network operators' Distribution Future Energy Scenarios (DFES).

The CCC's Balanced Pathway, forming the basis for the UK's recommended Sixth Carbon Budget, illustrates the CCC's recommended net zero pathway that primarily relies on existing technologies, with moderate assumptions about behavioural change and innovation. The local DFES Leading the Way and Consumer Transformation scenarios are ambitious and credible decarbonisation scenarios that focus on existing technologies and assume significant lifestyle and infrastructure changes.

Somerset's energy demand transition for net zero (by fuel, informed by trends in CCC's Balanced Pathway excluding gas fuel supply)



A NOTE ON NET ZERO DATES

This Net Zero Pathway analyses the demand, generation and storage projects that would be needed to achieve a net zero energy system in Somerset. The Pathway achieves net zero by 2050 – 20 years later than 2030, which the Somerset Climate Emergency Strategy aims to work towards. This is because the Pathway is based on Committee on Climate Change projections and Distribution Network Operator scenarios that achieve net zero by 2050. For Somerset to achieve net zero earlier, requires going ahead of the national projections – which are already challenging to achieve. Significant local focus, investment and effort will be needed to bring net zero in Somerset forwards ahead of 2050 – however, there would be significant climate and economic benefits if this can be achieved.

Electrification means electricity consumption is predicted to at least double under Somerset's Net Zero Pathway

Somerset's Net Zero Pathway is dominated by electrification of demand. There is only a minor role for hydrogen and this is focused in hard-to-decarbonise sectors, such as heavy industry and long-term energy storage.

In Somerset, and across the UK, the transition of fossil-fuel energy consumption to electricity and hydrogen is projected to at least double electricity consumption by 2050. Current electricity demand in Somerset is 2.3 TWh and this is projected to rise to 5.9 TWh when applying CCC Balanced Pathway trends to Somerset.

However, overall energy demand is expected to decrease under the Net Zero Pathway, with unabated fossil fuel use reducing to zero. Electric vehicles and heat pumps are at least four times as efficient compared to their fossil-fuelled counterparts. As a result of switching to electrified heat and transport together with moderate assumptions on demand reduction and energy efficiency, the Net Zero Pathway results in much lower total energy consumption. By 2050, following the CCC's Balanced Pathway trends, overall energy demand is nearly 45% lower than the existing baseline.

Some of the key energy assumptions of the Somerset Net Zero Pathway include:

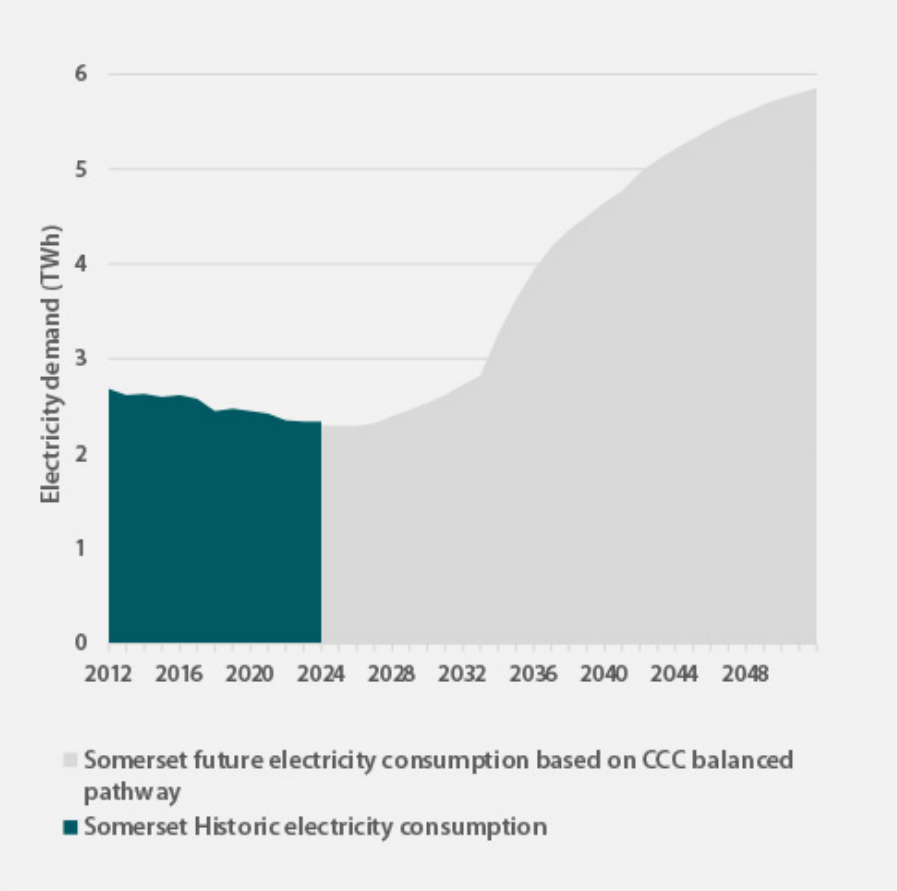
— Fuel switch away from fossil fuel consumption to electricity with a minor supporting role for hydrogen.

— An overall decrease in total energy consumption facilitated by an increase in electricity consumption using more efficient technologies, such as heat pumps and electric vehicles.

— Moderate energy efficiency and behaviour change assumptions, including the uptake of building efficiency measures and increases in public and active transport.

— Expansion of renewable and low carbon energy supply, principally onshore wind and solar PV.

Future electricity demand in Somerset



The high level of off-gas properties provides the opportunity for Somerset to lead the way on heat pumps

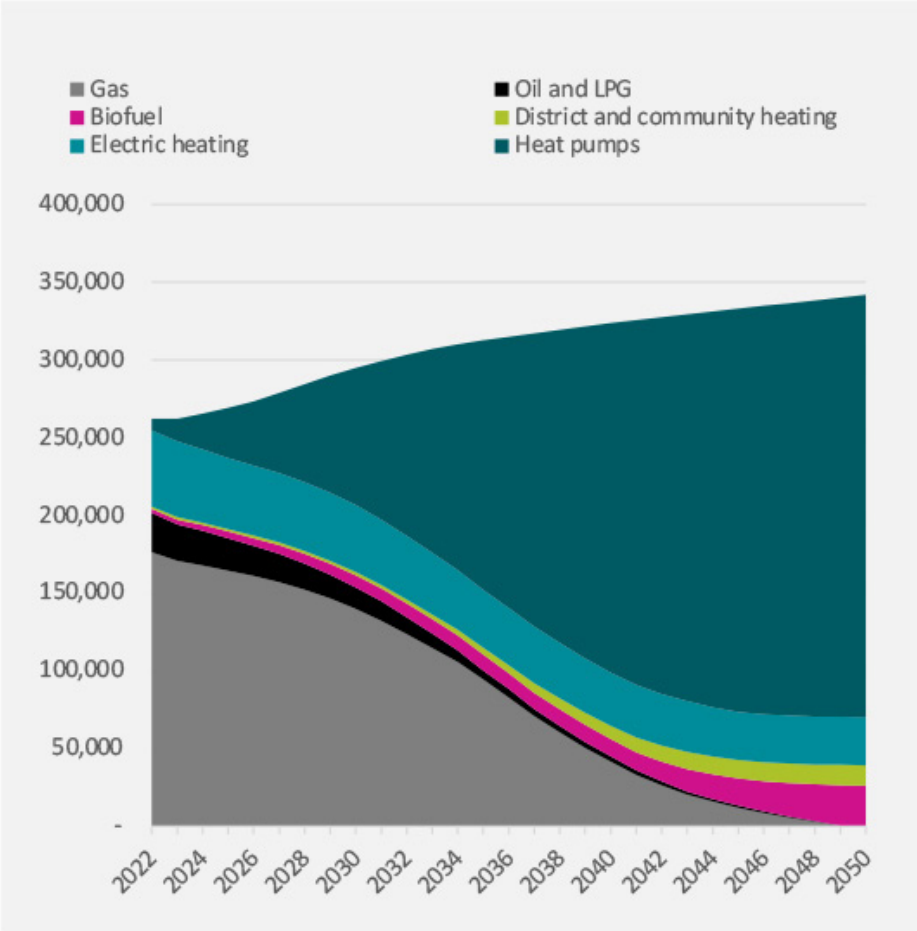
Under the Net Zero Pathway, heat in Somerset is expected to transition from predominantly fossil fuelled systems to heat pumps. The high number of off gas homes provides the opportunity to accelerate the transition in Somerset. The cost differential between high-cost off-gas fossil systems and heat pumps makes a more compelling investment case than the shift from relatively low-cost gas boilers to heat pumps. Heat pumps are expected to supply 82% of homes by 2050.

Under the pathway, electrical heating, such as direct electric and storage heaters, is likely to continue to play a similar role to at present, supplying heat with low upfront capital costs to smaller properties such as flats and park homes.

Hydrogen's role in heating is expected to be limited in Somerset, with a focus on industrial applications, and thus is not reflected in domestic heat projections. At the national level, the government is due to give a decision on the role of hydrogen for domestic heating in 2026. Current evidence from independent researchers points towards hydrogen being focused on applications other than domestic heat, such as hard-to-decarbonise industries and heavy transport. Biofuels will also play only a limited role out to 2050, contingent on the availability of sustainable feedstocks.

District heating could be the solution for denser areas of a limited number of settlements, such as Taunton and Yeovil. For example, Somerset West & Taunton Council received Heat Network Delivery Unit funding to explore the potential for heat networks in the Taunton area in 2021 and commissioned a study. There may be some potential for lower-density community-based schemes in more rural settings.

Somerset domestic heating technology projections



Data source: NGED and SSEN DFES 2022. FES 2022. Regen analysis.

Somerset will need to increase annual domestic heat pump installations from 470 in 2022 to c.9,700 each year

Net Zero Pathway key statistics – Heat		
Domestic heating technology	**% of installations baseline (2022)**	**% of installations by 2050**
Direct electric heating	14.7%	7.8%
Heat pump	2.5%	81.6%
Bioenergy	1.0%	6.4%
Gas	71.0%	0.0%
Oil	10.2%	0.0%
Community and district heating	0.6%	3.9%

Under the Net Zero Pathway:

— Domestic heat pumps will need to increase substantially from c.7,300 installations in 2022 to c.277,000 by 2050, averaging just over 9,700 installations per year out to 2050.

— Hydrogen will play a small role, focused in industrial/non-domestic settings in later years, and thus is not included in domestic heat projections.

The government has increased the Boiler Upgrade Scheme by 50% to £7,500 for people installing low carbon heating such as heat pumps– with potential positive impacts on the heat pump market.

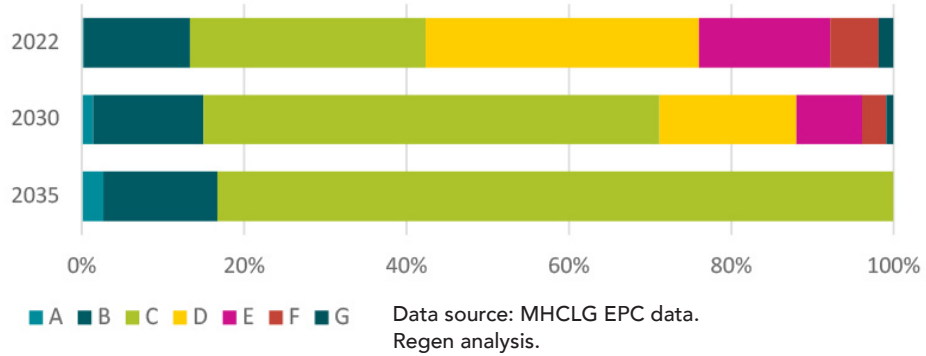
However, there has been a delay to the ban on installing oil and LPG boilers and new coal heating for off-gas grid homes to 2035, instead of phasing them out from 2026. This is likely to impact the delivery of Somerset's Net Zero Pathway, particularly in off-gas areas.

Retrofit is a crucial element of the Net Zero Pathway, with all homes needing to achieve at least EPC C by 2035

At present, 42% of Somerset's homes have an EPC score of A to C. The UK's Clean Growth Strategy set a target to upgrade as many UK houses to at least EPC Band C by 2035 "where practical, cost-effective and affordable", and for all fuel-poor households, and as many rented homes as possible, to reach the same standard by 2030. However, recent government policy changes have rowed back on the UK's energy efficiency target commitments. For example, there will no longer be the requirement for rented homes to achieve EPC C by 2025 for new tenancy agreements. This policy shift makes the route to achieving the required energy efficiency measures to meet net zero less certain.

The Net Zero Pathway assumes all homes in Somerset achieve at least EPC C by 2035. EPC C is used as a proxy measure for achieving energy efficiency levels in line with net zero. In practice, each home will need retrofitting to a net zero compliant standard with energy efficiency measures, smarter heating controls and a zero carbon heat source. Given flaws in the EPC methodology (see note), this net zero compliant standard could be above or even in some circumstances below EPC C.

Somerset's Net Zero Pathway EPC score projections



Data source: MHCLG EPC data. Regen analysis.

Despite these flaws, achieving EPC C across all homes is a useful target to set until a better measure is established nationally or until the methodology underpinning EPCs is reformed. EPC C across all homes represents a challenging target to meet by 2035, requiring immediate and continued action on retrofit. There may need to be further measures installed in some homes in Somerset beyond 2035, bringing them above EPC C. A review of progress and the latest evidence should be undertaken by 2030, potentially requiring new local targets to be set.

LETI's Climate Emergency Retrofit Guide and Somerset West & Taunton's Net Zero Toolkit offer current guidance to reduce heat demand in homes through a complete set of measures to fully contribute to net zero.

A NOTE ON THE EPC

EPCs have been used as the measure of energy efficiency in the Pathway due to them being the current national approach to understanding energy efficiency. However, it is noted that EPCs are flawed as a way of measuring efficiency as they are based on the Standard Assessment Methodology (SAP) that include metrics on the cost of energy, which can deprioritise low carbon heat technologies due to the low price of gas. A consultation took place in early 2024 on reforming the SAP methodology to make it fit for a net zero future. Reforms are expected to be implemented in 2025.

CCC 6th Carbon Budget energy efficiency implications

Measure	Balanced Pathway date
All new buildings are zero carbon	2025 at the latest
Rented homes achieve EPC C	2028
Standards for lenders targeting EPC C across the housing portfolio	2025-2033
All homes for sale EPC C	2028
All commercial efficiency renovations completed	2030

To replace fossil fuels with electricity and reduce transport emissions, more than 90% of road vehicles need to be electric by 2040

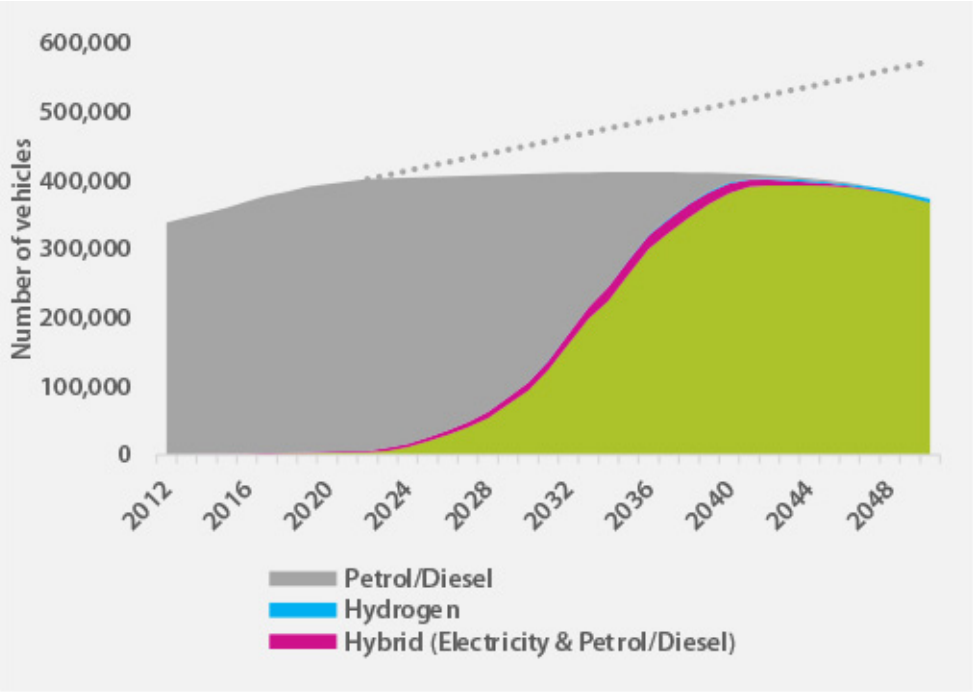
The Net Zero Pathway for transport focuses on uptake of electric vehicles, with over 90% of road vehicles being electric by 2040. To support this, the installation of 0.7 GW of EV charging capacity is required by 2030, and 1.6 GW by 2050. Alongside an increase in public transport use and active travel, the higher efficiency of electric vehicles means Somerset's 4.3 TWh of road transport petroleum consumption could be replaced by 1.2 TWh of electricity.

Over 80% of EV uptake is projected to be in households with off-street parking – leaving 20% of households needing on-street, hub or destination-based charging solutions. Ensuring there is sufficient charging capacity along the M5 corridor will be another challenge, particularly considering the summer surge in journeys to and through Somerset.

Less than 1% of road vehicles are projected to be hydrogen-fuelled under the Pathway. Hydrogen refuelling stations could be served by on-site electrolysis, or have hydrogen delivered by tankers. Hydrogen vehicles are likely to be focused in the HGV and agricultural sectors. The M5 corridor could, therefore, be a key hydrogen refuelling route, acting as a hub for dispersing hydrogen to agricultural areas in Somerset, as well as through the South West peninsula.

The Net Zero Pathway estimates that the mileage of personal vehicles reduces due to increasing consumer demand for public transport and innovations such as autonomous vehicles. Some households will reduce their number of vehicles, facilitated by the wider array of transportation options, such as car clubs, autonomous vehicles and improved public transport. However, as a predominantly rural area, it is assumed these transport mode shifts will be less than the national average.

Vehicle uptake projections in Somerset



Data source: NGED and SSEN DFES 2022, Regen analysis.

An average of 9,300 new EV registrations are needed per year, compared to just 1,250 registrations in 2022

Under the Net Zero Pathway:

— EVs must increase by c.345,500 to reach the required number by 2050, averaging 9,300 new EV registrations per year.

— This could be achieved if there is a large market-driven shift, and if EV charging infrastructure is in place.

— Hydrogen is expected to play only a small role as a transport fuel and be limited to HGVs and agricultural vehicles.

The Somerset EV Charging Strategy estimates that between 1,160 and 1,440 public charge points would be required by 2030. Assuming the same ratio of public EV charge points is required by 2050, approximately 4,250 public EV chargers could be needed by 2050. Of these, approximately 5% are expected to be rapid chargers and 95% fast chargers (7-22kw), according to the Somerset EV Charging Strategy.

Net Zero Pathway key statistics – EVs		
Technology	**Number of road vehicles in 2022**	**Number of road vehicles by 2050**
Electric cars	5,400	265,700
Electric LGVs	300	62,500
Electric HGVs	--	2,900
Electric motorbikes	100	20,200
TOTAL EVs	5,800	351,300
Fossil fuel vehicles	396,000	0

The 2030 ban on the sale of new fossil-fuelled vehicles has been a critical tool in the UK's transition to EVs, inducing investment from car manufacturers. The current government's decision to push back the ban from 2030 to 2035 is likely to have negative effects on buyer and investor confidence, delaying the transition across the UK and impacting the delivery of Somerset's Net Zero Pathway.

The equivalent of 45% of Somerset's 2050 electricity demand could be met by local renewables

The Net Zero Pathway is ambitious in relation to renewable generation, particularly compared to the current baseline. It represents more than a fourfold increase in local renewable generation.

The Somerset Net Zero Pathway assumes that Somerset is part of the UK's net zero energy system, in which each area of the UK is doing its part to further net zero goals. National-scale projects, including offshore wind and Hinkley Point C, will have a role to play. As a result, Somerset does not need to balance local energy demand with local renewable generation.

Under the Net Zero Pathway, Somerset's local renewable electricity generation meets the equivalent of 45% of Somerset's annual projected electricity demand by 2050. The Pathway includes significant and challenging growth in renewables:

- Solar PV capacity would need to increase by near five times, resulting in 0.8% of Somerset's land area occupied by ground-mounted solar PV and around 34% of domestic rooftops with solar panels.
- Onshore wind would need to grow to 154 MW from just over 2 MW of installed wind capacity.
- A total of 90 MW of other technologies, such as anaerobic digestion and small-scale hydro, are also needed.

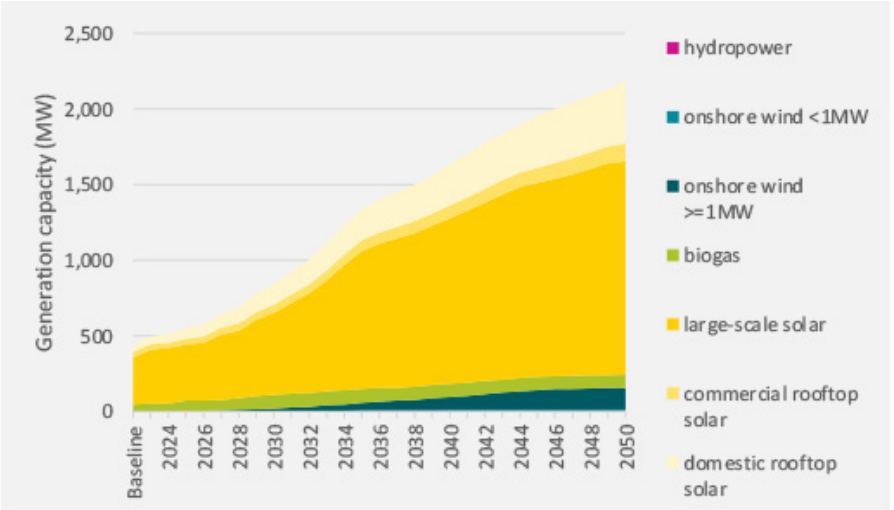
Onshore wind development in England has stalled since 2015 due to requirements in the National Planning Policy Framework (NPPF). The current government has proposed amendments to the NPPF which may have a limited positive impact on wind development. Further national planning reforms and local positive policy development will be critical to the future development of onshore wind.

Net Zero Pathway key statistics

Technology	Total capacity by 2050 (MW)	Generation (TWh)
Solar PV	1,939	1.9
Onshore wind	154	0.4
Other	90	0.5
Total	2,183	2.8

Reference: Somerset's projected 2050 electricity demand = 5.9 TWh. Therefore, this pathway's renewable electricity generation is equivalent to 45% of 2050 annual electricity demand.

Renewable generation uptake in Somerset

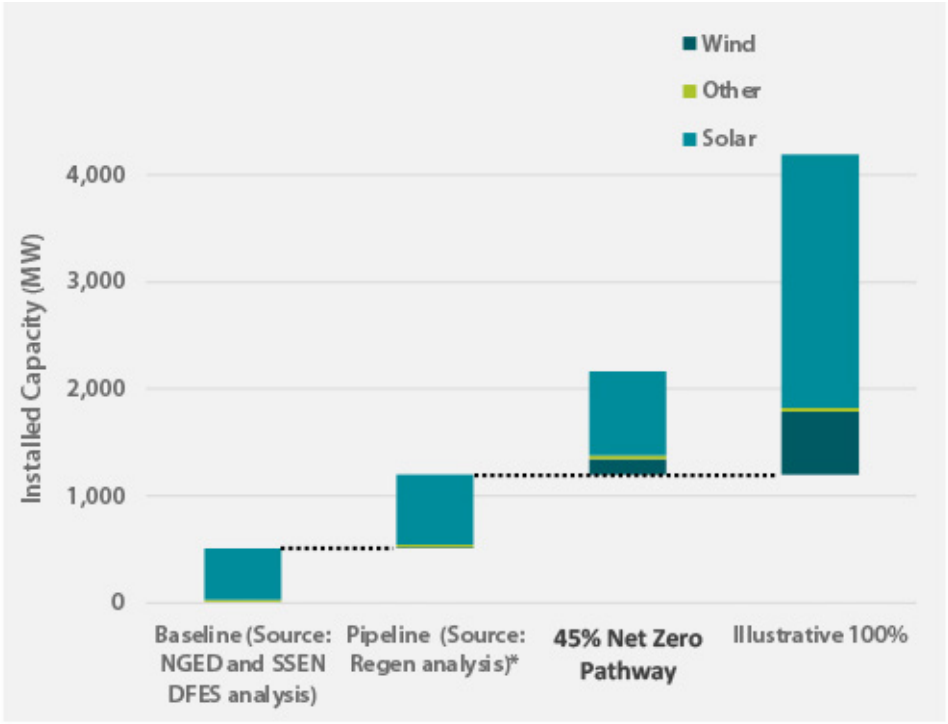


Generating the equivalent of 100% of 2050 electricity demand from local resources would be very challenging

To further explore the potential for renewable generation in Somerset, a 100% sensitivity was developed. This illustrates the scale of onshore renewable electricity deployment necessary to meet the equivalent of 100% of Somerset's annual electricity consumption by 2050.

Additional capacity required by technology	Baseline (MW)	Pipeline (MW)	Net Zero Pathway (MW additional capacity beyond baseline & pipeline)	Illustrative 100% sensitivity (MW additional capacity beyond baseline & pipeline)
Large-scale solar	313	653	444	2,400
Domestic rooftop solar	46	n/a	364	200
Commercial rooftop solar	32	n/a	86	250
Onshore wind	2	0	152	400
Hydropower	<1	0	3	5
Other	27	47	3	60
Marine	0	0	0	50
% of 2050* consumption	45%			100%
Total Generation (TWh)	2.7 TWh			5.9 TWh

Installed capacity required to meet Net Zero Pathway and 100% sensitivity



*Pipeline buildout subject to planning and/or grid agreement success.

This 100% sensitivity is illustrative only and, given market conditions, installation rates, grid constraints and Somerset's resources, is unlikely to be achievable. Going beyond 45% requires some significant changes, for example considering large-scale wind as a viable option within the area's protected landscapes or delivering a very large-scale project, such as tidal generation.

Regen recommends that the Council aims to achieve the Net Zero Pathway's outcome of the equivalent of 45% of energy demand from local renewables. See Annex 1 for a more detailed breakdown of the 100% sensitivity and associated average annual instalment targets.

Storage deployment is a critical cornerstone of achieving the Net Zero Pathway

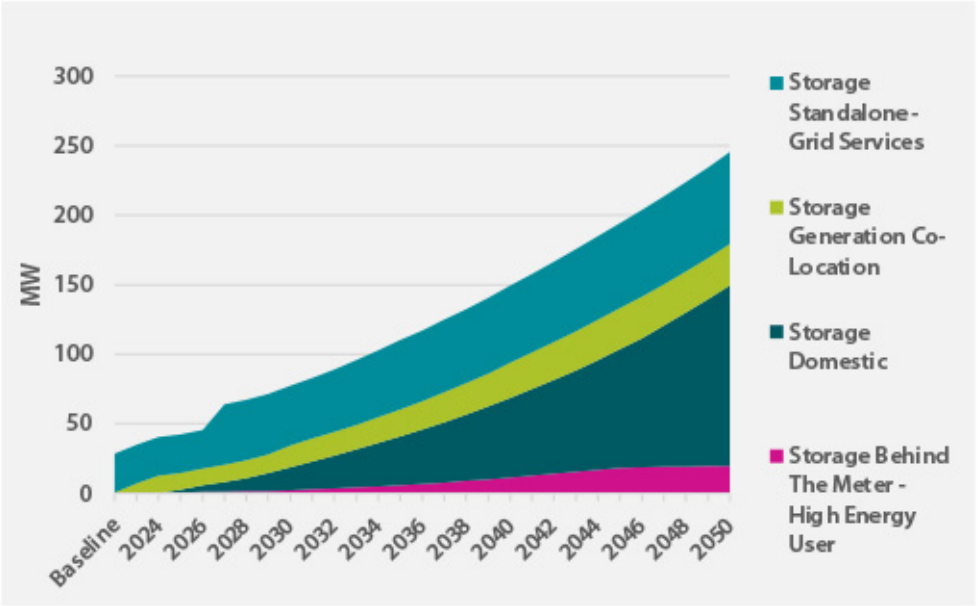
Storage has a critical role to play in the UK's future energy system, with a range of potential functions including short-term balancing and operating reserves, ancillary services for grid stability, long-term energy storage and restoring grid operations following a blackout.

To date, only one large-scale storage site has been commissioned in Somerset – a battery project on a site owned by the Council. However, a further 487 MW of batteries are in the connection pipeline.

The Net Zero Pathway calls for a total of 247 MW of storage capacity in Somerset by 2050, 53% of which could be made up of domestic batteries. This is around half the current pipeline total – however, the pipeline (which is taken from the DNOs' connection agreement registers) is likely to include a large number of speculative applications that may not proceed to development.

While storage can play a role in overcoming grid constraints, these can also impact on the deployment of storage. Somerset's constrained networks may be a barrier to delivering the projects needed for the Net Zero Pathway. The development of positive local planning policy will be a critical enabler to the deployment of storage in the future.

Battery storage uptake in Somerset



Pumped storage plays a significant role in the UK's energy system at present – focused on four very large sites in Scotland and Wales. Other options such as compressed air, gravity storage and hydrogen for long duration or inter-seasonal storage are relatively undeveloped in the UK market to date. These are too early stage to include in the Pathway, but could be reviewed as opportunities in the future. There may be potential for hydrogen generation to be developed at Hinkley Point C to provide electricity storage and grid services.

05

Priority investment opportunities

Six key themes

These themes are identified as priority areas for investment in Somerset. They bring together the key actions that the Council could unlock that will help to deliver Somerset's Net Zero Pathway.

1

Decarbonisation of the Council's own estate and operations: priming the market.

2

Large-scale solar, wind and battery storage development: seizing the opportunities for the rural economy.

3

Unlocking energy efficiency and retrofit: the number one opportunity for energy jobs and Gross Value Added creation.

4

Electrifying heat demand: high levels of off-gas properties present an opportunity to accelerate heat pump uptake.

5

Electrification and demand reduction for transport: building on existing work to plan the necessary infrastructure.

6

The energy system: extending the local authority role influencing local energy systems and infrastructure.

These investment areas have been identified using the following criteria:

— Presenting a significant opportunity to deliver the Net Zero Pathway.

— Presenting the most immediate opportunities for Somerset in terms of investment or jobs.

— Having important whole-system and infrastructure implications in Somerset for the net zero transition.

— Subject to challenges where the private sector acting alone cannot unlock a solution.

Within each priority area, there are opportunities for the Council to act in relation to:

Priming the market: Supporting the local supply chain – using the Council's purchasing power and making use of its land ownership.

Planning: Supporting the deployment of zero carbon initiatives through local plans, strategies and data mapping – using the Council's planning powers.

Partnerships: Working together with the public, private and communities sector to develop innovative approaches to installing zero carbon technologies – using the Council's convening skills and access to funding to unlock opportunities that would be difficult for others to deliver in isolation.

By leveraging these three approaches, the Council can make the most of its skills, assets, funding and resources to deliver the Somerset Energy Investment Plan.

Economic assessment

The priority investment areas are explored in detail, with potential job creation, Gross Value Added (GVA) and investment potential identified and recommendations on council activity.

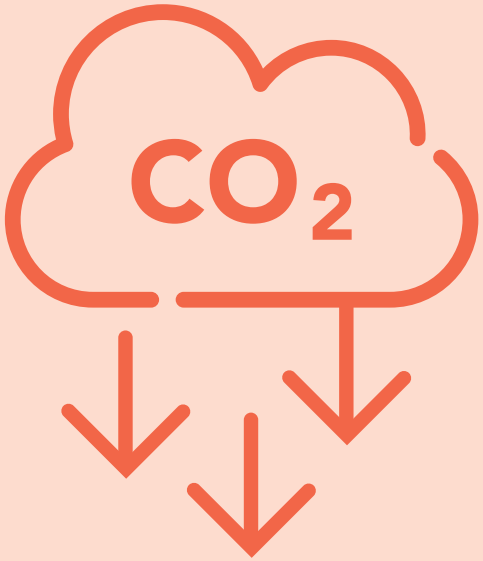
A key element of the Energy Investment Plan is identifying where Somerset can benefit economically. Where possible, Regen has used existing research and data to estimate how much investment is likely to be required and the associated local jobs and GVA to indicate the total economic benefits of such investment.

Numbers of full-time equivalent (FTE) jobs referenced in the report are estimates of total jobs related to activities that could be within Somerset. Job numbers are estimated over the lifetime of the project: in the near term, job numbers may be higher.

To note, there are a wide variety of estimates related to the economic impact of these sectors, the numbers quoted in this report should be seen as approximate, based on recent studies where available. See Appendix 2 for details of the methodology.

1

Decarbonisation of the Council's own estate and operations: priming the market



Council role

The Council is a major land and asset owner in the county. The Council committed in its Climate Emergency Strategy to 100% of local authority energy demand being met through locally generated and locally owned renewable energy by 2030.

The opportunity

The Council has substantial land holdings which have been assessed for solar and wind opportunities. Ten sites have been identified as having considerable potential for solar or wind development. There is the potential for projects to generate income for the Council through investment returns or simply through leasing sites.

The Council also owns a wide range of other energy-using assets, from leisure centres, to car parks and vehicle depots. These sites could incorporate energy efficiency measures and small-scale renewables that cut energy bills and/or generate income. Some sites could also act as anchor loads for district heat networks.

By investing in renewables and energy efficiency measures on its own estate, the Council can help to prime the local market. To do so, it must ensure that the procurement approach it uses enables local businesses to deliver the opportunities, growing the local supply chain.

Challenges

Availability of finance is a significant barrier to developing projects. The Council has recently withdrawn £3 million in capital funding from the development of a solar farm on an old landfill site near Bridgwater, due to financial pressure on its budget and delays with the ability to get a suitable grid connection with the DNO. Originally, Somerset County Council was due to be the main source of capital funding for the project, which was granted planning permission in 2022. However, the new unitary Council has removed the capital budget due to the Council's financial position and is now investigating other external methods of operating and funding the project.

Staff resources to work on project development is also a critical issue.

Selling of assets also represents a barrier to investment as the Council needs to decide which assets to retain following its move to becoming a unitary authority.

RECOMMENDATION THEMES

1.1 Developing generation and storage sites on council land in partnership with local organisations and community groups

1.2 Retrofitting Council assets and buildings

1.3 Developing a portfolio approach to decarbonising the estate

1.1 — Developing generation and storage sites on council land in partnership with local organisations and community groups

1.1.1

The Council could play a proactive role in developing new solar, wind and storage projects in Somerset, using a range of approaches:

a. **Virtual Power Purchase Agreements (VPPA):** The Council could procure local renewable energy from local developers to meet some of its corporate electricity demand. By agreeing Virtual Power Purchase Agreements with companies and communities developing new sites, the Council could use its purchasing power to prime the local renewables market, supporting the development of new generation sites.

b. **Building renewables on the Council's land:** Regen identified 10 Council sites with considerable potential to host solar or wind projects. Investing in renewables on these sites has the potential to create returns for the Council, with the size of the return dependent on the amount of risk the Council is able to take and the resulting business model used.

There may be the potential to work in partnership with local community energy organisations to co-develop sites. The Council is well situated to collaborate with the several existing community energy organisations in Somerset that already actively contribute to the net zero transition.

Working with community energy organisations can bring additional benefits to unlock potential sites: from better engagement with and buy-in from the local community, to access to development expertise and access to community finance. For example, the UK Infrastructure Bank offers preferential rates for local generation alongside community finance via the local authority lending rate. This could provide an opportunity for joint ventures with community energy organisations. £10 million grant funding for community energy groups is available through the Net Zero Hub.

c. **Opportunities for private wires to high-energy users**

Some council-owned sites with renewable potential are close to high energy users and have the potential to offer the development of private wire opportunities. Private wires can increase the amount of energy being used locally, minimise transmission and distribution losses and deliver on energy users' decarbonisation aims. For example, there are council plots with renewable energy opportunities near several NHS hospital sites that may benefit from direct private wire arrangements. Hospitals identified nearby council land assets include Bridgwater Community Hospital, Shepton Mallet Community Hospital and Minehead Community Hospital.

The Council should engage with high energy users situated near council land assets that are viable for new energy generation projects to gauge interest in partnerships that develop private wire arrangements.

1.2 — Retrofitting Council assets and buildings

1.2.1

The Council should develop a retrofit plan for all council-owned buildings, including offices, leisure facilities and heritage assets that delivers a net zero estate by 2030.

The Council should identify either external or internal expertise to work closely with the property services department to create a retrofit plan of all council owned assets. The plan should consider opportunities to install energy efficiency measures, flexibility such as storage and small-scale energy generation and low carbon heat. Some assets, such as leisure centres, may be suitable as anchor loads for district heat network. Opportunities for solar PV on car parks could be considered.

This own-estate retrofit plan will need to be considered in deciding which assets are to be disposed of – with the potential need to sell assets that are unsuitable for retrofit or with high retrofit costs. Site visits by a retrofit coordinator and energy bill analysis will be essential to ensuring retrofit plans are comprehensive and accurate.

1.2.2

The Council should work with the supply chain to ensure its procurement approach for retrofit is accessible to local companies, helping to build the skills in the local area and retain the investment benefit locally.

There is an opportunity for the Council to use its purchasing power to prime the retrofit supply chain in Somerset. It should ensure that procurement criteria consider giving added weight to local companies offering additional social value, supporting the development of local supply chains.

1.2.3

The Council should transition council fleets, buses and refuse vehicles to EVs.

There may be opportunities to cluster fleet charging demand. Power generation and storage could be co-located with charging depots to reduce the cost and carbon emissions of charging vehicles. The Council can also require all new service contract suppliers to move to EVs.

1.3 — Developing a portfolio approach to decarbonising the estate

1.3.1

The Council should meet with Bristol City Council to discuss the City Leap approach and explore the potential for replicating it in Somerset

Decarbonising the Council and public sector estate requires many different measures with different business cases and payback periods. Some will be high value (such as commercial rooftop solar) and others, such as retrofit, are lower.

To tackle this issue, Bristol City Council has developed a first-of-a-kind project, Bristol City Leap. City Leap started from a prospectus outlining different low carbon investment opportunities needed in the city – blending the high and low value projects to create one investable package. After a procurement exercise, Bristol City Council developed a joint venture and concession agreement between the city and a private partner (Ameresco) that is set to last for 20 years. The partnership will attract finance into areas to develop renewables and other net zero interventions like heat networks and retrofit.

A number of other areas such as Greater Manchester are now looking to replicate this portfolio approach.

Somerset Council has access to the City Leap framework, which it could use to procure feasibility studies.

A City Leap-style approach would enable a comprehensive public sector decarbonisation plan to be developed and delivered in partnership with the private sector, with the potential to prime local supply chains.

CASE STUDY

Bristol City Leap

Overview: Bristol City Leap is a first-of-its-kind partnership between a local authority and private investor/developer. It aims to secure over £1 billion investment into net zero infrastructure projects in the Bristol region over the next 20 years.

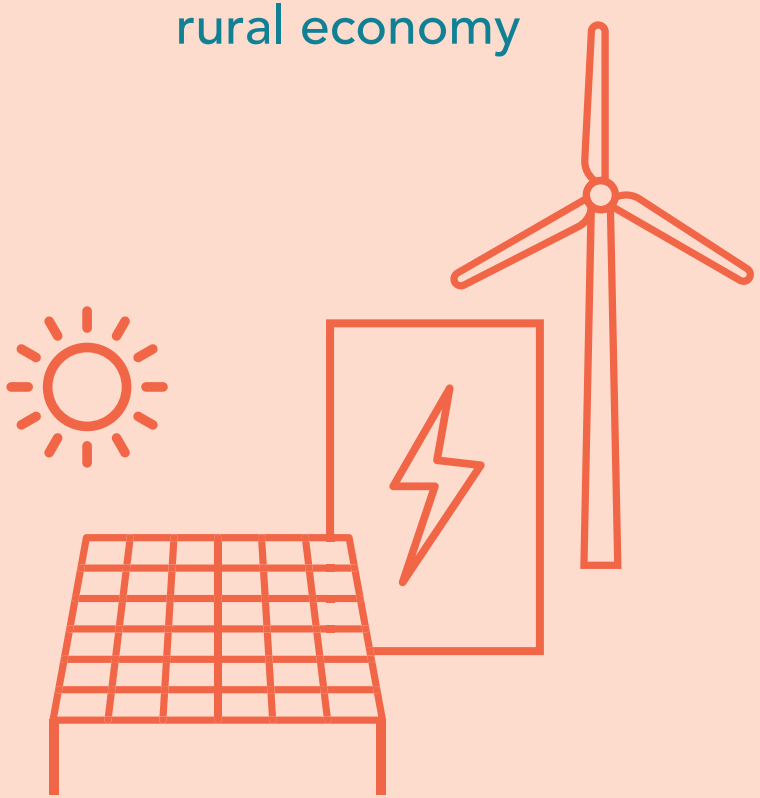
Delivery model: Bristol City Leap is both a joint venture and concession agreement between Bristol City Council and private sector partner, Ameresco. The two organisations have created a 50/50 joint venture company to develop new net zero projects, with Bristol City Council granting Ameresco first right of refusal to develop net zero infrastructure across its estates – including land, social housing and commercial property. It is both a joint venture and concession agreement because it will cover multiple project sites rather than single project site.

Financed by: The joint venture is financed entirely by Ameresco, with the private developer committing to invest £434 million in low carbon energy infrastructure like heat pumps and heat networks in the first five years of the partnership. Bristol City Council will benefit from the leasing income from Ameresco developing on its assets and from a 50% share of the income generated by the assets after loan paybacks and operational costs. Because the partnership has been agreed to cover a 20-year period, Ameresco stands to benefit financially from the guarantee of long-term investment, therefore de-risking the investment in the joint venture.

Community benefits: As part of the deal, Bristol City Council insisted that there would be opportunities for community benefits. These include the development of a community benefit fund and could in future include opportunities for communities to crowd-fund to contribute to certain projects.

2

Large-scale solar, wind and battery storage development: seizing the opportunities for the rural economy



Council role

The Council can develop positive planning policy and practices for solar, wind and battery storage, as well as working with community groups, developers and the agricultural sector to ensure these technologies are developed and deliver benefits to the local area.

The opportunity

Solar and onshore wind play a critical role in delivering the generation required for Somerset's Net Zero Pathway, while battery storage is needed to provide flexibility and grid services. According to government statistics, new onshore wind is currently the cheapest of any electricity generation type. Projects commissioning in 2025 are expected to have a levelised cost of electricity (LCOE)[1] that is less than a third of new combined cycle gas generation. Large-scale solar PV costs are slightly higher than onshore wind at present, but are expected to fall below wind by 2035.

These technologies can deliver local benefits through, for example:

— Low cost, low carbon electricity generation and storage
— Community benefit fund creation and community investments
— Creating income for landowners, including the agricultural community
— Generating business rates which are retained by the Council
— Creating local jobs.

Locally and community-owned and developed renewables and storage tend to bring greater benefits to the local economy, through local investment returns, greater focus on community benefit funds and greater engagement with the needs of the local community. Positively worded planning policy and practice can help to unlock these benefits from projects.

The Council is due to develop a new Local Plan, presenting the opportunity to include positively worded policies for solar and wind and to embed these through guidance and training for officers and councillors.

1. LCOE is an estimation of the cost of production of electricity, calculated by adding up all the capital and operational costs of production and dividing by the total amount of energy a project is expected to generate.

Challenges

— Somerset is a rural area, with large amounts of agricultural land and many protected landscapes and ecological sites. As a result, there are sometimes conflicting pressures between different land uses and with nature. Negative public opinion has hindered project development in some areas, especially for onshore wind, but increasingly for solar PV as site sizes have increased, and for storage as a relatively new technology. Competition with agricultural land has been raised as a concern in recent solar farm planning decisions in Somerset. Meanwhile, the agricultural community are struggling to diversify their income in an increasingly difficult economic environment.

— National planning policy for onshore wind has been and remains a key blocker to project development.

— Developers – whether private, public or community-based – need to bring forward sites in the area. To do this in the current subsidy-free environment, they will need a secure source of income to be financeable; agreeing Power Purchase Agreements offers one potential solution, but identifying off-takers willing to enter into an agreement can be difficult.

— Grid connection costs and availability of connections are impacting the ability to develop new sites in Somerset (See page 33)

Technology	Additional capacity by 2050	Jobs (FTE)	GVA (£m)	Investment required (£m)
Large solar	1,097 MW	2,400	1,800	320
Wind	152 MW	170	300	170
Storage*	217 MW	440	250	340

* includes domestic, commercial and utility-scale batteries

RECOMMENDATION THEMES

2.1 Setting out a vision for land use and energy that delivers co-benefits for nature and the agricultural and rural community.

2.2 Positive local planning policy could transform delivery in appropriate locations.

2.3 Supporting local and community development of new solar, wind and storage projects.

2.1 — Setting out a vision for land use and energy that delivers co-benefits for nature and the agricultural community

2.1.1

The Council should facilitate the debate around appropriate land use in Somerset through the development of a land use framework.

The Council is considering developing a land use framework for Somerset. The development of this framework presents an opportunity to reconsider the planning balance between landscape, farming, renewable generation, energy storage and nature, by drawing together relevant spatial datasets to enable informed discussion.

Public engagement should be undertaken to review how the criteria used in the land use framework should be updated to accommodate appropriate renewable and storage development, while meeting climate emergency objectives.

The public and communities will need to be provided with relevant information to allay concerns and enable an informed debate. Engagement could take a range of formats, from surveys to information events or citizens' juries. Similarly, councillors will need training and guidance to understand the detailed issues and to inform their views.

2.1.2

The Council should consider how to reduce negative impacts and encourage biodiversity enhancements through its renewable energy policies by consulting with biodiversity experts.

National policy now requires major developments to deliver 10% biodiversity net gain, with small sites having the same requirement from April 2024.

Local planning policy could be used to support developers to deliver biodiversity net gain, by minimising negative impacts and maximising opportunities for enhancements. For example, requiring ground-mounted solar to be a minimum height off the ground can help to enable habitat growth around the panels. Biodiversity experts can provide input to developing positive local policy through early engagement. Lightsource's review of biodiversity at its Wilburton Solar Farm in Cambridgeshire provides a useful case study of how local biodiversity can improve when a solar farm is commissioned.

2.1.3

The Council should consider how to support the coexistence of renewables and agriculture, reviewing best practice on existing schemes, working with the rural community and developing appropriate local planning policy and guidance.

Competition with agricultural land has been raised as a concern in several recent solar farm planning decisions in Somerset. Co-location models that mix renewable energy generation and storage with agricultural use can reduce public concerns about land usage.

Solar UK highlights how solar is beneficial to farmers, providing additional revenue streams, abating climate change and being used strategically on land that requires soil recovery. According to BlueWeave Consulting, the UK Agrivoltaic industry was valued at £129 million in 2022. Examples include:

- Eden Renewable's Forest Gate Solar Farm in Wiltshire will include sheep grazing and biodiversity net gain.
- In France, farmers have developed large-scale solar farms capable of growing food crops alongside solar generation – see, for example, this 2.5 MW trial where the moveable panels provide shade to crops.

The Council should work with a range of groups, including the agricultural community to develop local planning policy to set out best practice for co-locating energy projects with both arable and

pastoral agriculture. The Council could also work with farmers' groups to make farmers aware of the benefits of renewables and share funding opportunities, such as the solar grants due to be available from Defra.

2.2 — Positive local planning policy to transform delivery in appropriate locations

2.2.1

The new Local Plan could include robust planning policy to support the development of high-quality large-scale solar, wind and energy storage projects that maximise local benefits, subject to other considerations such as social, environmental and economic factors.

— The new Local Plan documents and evidence base can start to have an impact before being formally adopted. The Council could prioritise developing robust energy policies and evidence so that they might start to have weight in the pre-adoption period.

— The Council should consider setting a renewable energy target in its local plan to link the findings of this Somerset Energy Investment Plan to local planning policy. The target would serve as an indicator to developers that the Council is taking a positive approach to renewable energy development.

— Strict planning regulations for high carbon generation should be developed to prioritise cleaner alternatives. South Gloucestershire Council is developing a policy that restricts the development of new fossil-fueled energy generation.

— Areas suitable for onshore wind should be allocated through the local plan or a separate Supplementary Planning Document – as required by the National Planning Policy Framework if wind turbines are to be approved. At present, none of the district local plans include the allocation of areas for wind, with the exception of Exmoor National Park's Local Plan, which includes areas for small-scale turbines. A broad approach to these zones, excluding only the most significantly constrained areas, will enable developers and the Council to work together on a site-specific basis when projects start to be developed, rather than ruling out potentially suitable sites due to blanket criteria. Cornwall Council has taken this approach to its wind allocations.

— The majority of the windiest and therefore most effective locations for wind are in the National Landscapes. Through the local plan or SPD engagement processes, discussion should be had about whether wind generation with community support could be enabled in these areas.

— The Council should develop policies that support the development of storage in appropriate locations. Recent storage planning applications have been turned down in other areas of the UK as storage has not been viewed by planning committees as having a clear role in the energy transition and has been seen to represent industrialisation of the countryside. Guidance for planners and councillors should be developed that identifies the clear role of storage in the Net Zero Pathway and sets clear criteria for how to accommodate storage in Somerset's rural areas.

— Setting net zero requirements for new housing and commercial developments will support the delivery of local on-site and near-site renewable energy projects. Every major development should be required to demonstrate how it has maximised the incorporation of local renewable generation.

— The Council could consider including positive encouragement for locally owned renewables through its planning policy, which might include developing a local ownership target or requirement. The Welsh Government has introduced local ownership requirements and a target.

— The Council should use planning policy to encourage on-site co-location of energy producers with energy users to reduce overall demand on the networks and improve distribution losses.

2.2.2

The Council should engage with the Local Government Association and other influencing groups to ask central government to alleviate planning restrictions on onshore wind in England.

National planning policy is currently the biggest blocker to onshore wind in England. The Council should work with relevant organisations to ask all political parties for change.

2.3 — Supporting local and community development of new solar, wind, storage and innovation projects

2.3.1

The Council can provide direct support to community energy organisations developing generation, storage and flexibility projects.

Community energy organisations have the potential to deliver generation projects that will contribute to Somerset's net zero ambitions and deliver local benefits – from local investment and jobs to community benefit funds. Approximately 74 MW of renewable installations in Somerset are owned by local businesses and c.17 MW by community energy groups. The Council should support community energy to deliver decarbonisation projects in Somerset. Support might include:

— Developing a peer support network, enabling organisations to share learning and develop joint projects. Devon County Council has successfully fostered an effective peer network for Devon community energy groups, funding the initial cost of a secretariat and meeting costs, as well as offering grants to groups.

— Co-developing sites within the Council's control (see 1.1).

— Offering seed financing or feasibility funding for community groups to initiate new projects and offering council staff time to support project development. Plymouth City Council seed-funded and provided staff resources to establish Plymouth Energy Community.

— Developing planning policy that provides support to community-led schemes, as Cornwall Council has through its Climate Emergency DPD. Offering low-cost early engagement on new planning applications for community schemes.

— Coordinating links between community energy organisations and other stakeholders. For example, through stakeholder engagement as part of developing this plan, a key opportunity has been identified for the Council to act as a coordinator linking the NHS with community energy organisations to provide on-site renewable generation.

— Working with communities to pilot innovative approaches, such as microgrid development or development of Demand Side Response trials.

Microgrids and local energy markets

There may be a role for communities, the Council and private sector to play an intermediary role for consumers who don't understand demand side response and flexibility, need or technicalities.

Local energy markets and microgrids, perhaps in the form of Independent Distribution Network Operators, can bypass grid constraints entirely. Local energy markets can use demand shifting, reduction and generation to reduce electricity prices and link generation with demand on a local level. Several communities have engaged with microgrid solutions in the past with varying degrees of success.

The Frome microgrid, supported by Frome Renewable Energy Co-op, has already received a £40,000 grant to investigate a low carbon microgrid and heat network for a new 300 home and 25,000 sq ft commercial space development in Saxonvale.

3

Unlocking energy efficiency and retrofit:
the #1 opportunity for energy jobs and GVA creation

Council role
The Council has a role in developing housing retrofit and skills programmes that are scalable and fit for purpose.

The opportunity
At present, 42% of Somerset's homes have an EPC of A to C. The Net Zero Pathway assumes all homes in Somerset achieve at least EPC C by 2035. There may also need to be further measures installed in some homes in Somerset beyond 2035, bringing them above EPC C. This will require a significant, widespread programme of upgrades to most homes. Similarly, around two-thirds of non-domestic buildings in Somerset need retrofitting. Retrofit will not only directly reduce energy bills but will also reduce the system cost of reaching net zero.

11.3% of households in Somerset are in fuel poverty. While this figure is below the national average, it represents a significant proportion of the population and will have increased during the recent energy price crisis. Working with social housing providers and the Council's social housing stock presents opportunities to tackle retrofit needs and fuel poverty.

Retrofit offers the greatest potential of any of the opportunities identified in this plan for job and GVA creation. To deliver energy efficiency works at scale across Somerset in a timely manner, a large workforce is needed. Somerset is uniquely placed to facilitate a skills transfer programme in partnership with Hinkley Point C, as a large workforce will be available once the construction is complete.

Jobs, GVA and investment required to meet Net Zero Pathway

Homes Requiring Retrofit Measures*	Jobs (FTE)	GVA (£m)	Investment required (£m)
145,378	6,575	3,920	851-1,798

*not including households with A-C ratings, scaled to total households in Somerset.

Challenges

— 13.7% of Somerset's housing stock in 2021 was owned by social housing providers or the Council, according to the national census. Access to funding is crucial to deliver measures to this tenure type.

— Low-income families, those in fuel poverty and tenants living in private rented homes lack the levers to invest in energy efficiency measures.

— The cost and disruption of household works can deter homeowners from retrofitting homes – even if they're classed as 'able to pay'.

— Conservation areas and listed building requirements may limit the potential for retrofit measures in some homes.

— Builders and tradespeople are not upskilled in retrofit skills, creating a gap between the need and the ability to deliver. There is a need for significant investment in supply chains and skills.

— Recent government policy changes associated with the rollout of energy efficiency have rowed back on energy efficiency commitments. For example, there will no longer be the requirement for rented homes to achieve EPC C by 2025 for

RECOMMENDATION THEMES:

Recommendations have been organised under the following themes:

3.1 Comprehensive retrofit support programmes are needed for every segment of the market.

3.2 Using the new local plan to support retrofit and deliver zero carbon homes.

3.3 Facilitating local hubs to develop local skills.

3.1 — Comprehensive retrofit support programmes are needed for every segment of the market

3.1.1

The Council should produce a plan to decarbonise all council stock, sharing learning with other social housing providers.

The district councils previously had plans to decarbonise their housing stock in place – see, for example, the Somerset West and Taunton Low Carbon Retrofit plan which set a target for all homes to achieve EPC C by 2030 and for complete replacement of fossil fuels in homes by 2050. Somerset West and Taunton were also awarded £2.5 million from the Social Housing Decarbonisation fund.

With the creation of the unitary council in April 2023, these plans are being revisited and amalgamated into a single plan. The Council should review opportunities to bid for national funding, such as the Social Housing Decarbonisation fund and any subsequent

opportunities, to create a funded programme for all Council homes. The programme should demonstrate innovation and share learning with other social housing providers. The programme should use procurement criteria that enable local companies to deliver work and invest in the necessary skills and training.

3.1.2
The Council should review plans to support low-income households who do not live in social housing.

The Council currently offers a range of funding to support low-income households with energy costs and retrofit. For example, the Home Upgrade Grant scheme provides grant support for energy efficiency measures for low-income households that live off the gas grid in homes rated EPC D or below. The Council also provides Safe, Warm and Secure grants and loans, which include some provisions for low-income households living in the private rented sector. The Council should review the effectiveness of these funds and how to extend retrofit support across low-income households and the private rented sector, consulting with households and private landlords.

3.1.3
The Council should build on existing work with community energy organisations and local providers to extend support for the 'self-funding' market.

The self-funded segment is another critical element in building the market and supply chain for retrofit – those householders who have the financial means to invest in retrofit measures, but not always the motivation, understanding or access to skilled providers. Community energy organisations and other local bodies are often very effective in acting as trusted sources of advice and information for householders on energy issues. For example, Frome Town Council runs a Healthy Homes team that can provide in-home advice on energy issues. Working with community groups can support targeted area-based delivery of retrofit programmes, e.g. on a street-by-street or village basis.

The Council already provides support for those with the potential to self-fund measures, with Somerset Energy Saver web pages setting out key facts and funding information, access to low-cost loans provided via Lendology CIC and access to a free home energy advice line from the Centre for Sustainable Energy. The web pages should be updated to include information about the Boiler Upgrade Scheme to facilitate heat pump uptake. Information could be improved with links to impartial evidence sources and case studies. For example, the Council could promote the Net Zero Toolkit that Somerset West and Taunton Council adopted and promoted, which offers guidance on both new build and retrofitting homes.

In 2023-2024, the Council worked with Somerset Climate Action Network and Frome, Glastonbury and Bruton Town Councils to access funding from MCS Charitable Foundation, to build on the 2022 Somerset Retrofit Accelerator project (see case study). The one-year Retrofit Somerset project is trialling tools to support retrofit through a one-stop shop approach and by March 2024 will have developed a business plan for how this advisory and signposting service could be funded and resourced.

Somerset Council should consider how it can further resource and access funding to work with local groups to support the self-funded market – building on the retrofit resources already in place.

CASE STUDY

Retrofit Accelerator project

The Somerset Retrofit Accelerator project was a partnership between Frome, Bruton and Glastonbury Town Councils, the four District Councils in Somerset, Somerset Independence Plus and the Centre for Sustainable Energy. This one-year pilot was funded by the UK Community Renewal Fund in 2022. It aimed to develop the supply chain for low carbon, whole-house retrofitting of homes in Somerset through:

- 50 discounted Home Retrofit plans for Somerset households in partnership with Futureproof
- 30 paid places on the Futureproof Essentials course for local construction professionals
- Creating new online resources through a Green Directory for Somerset
- Somerset Green Open Homes events that showcased low carbon homes through virtual online tours.

The resources created are accessible online and could be further developed into an information campaign to improve consumer buy-in that communicates co-benefits such as health, comfort, wellbeing and energy bill savings. The resources could be consolidated with those on the Somerset Energy Saver web pages.

3.2 — Using the new local plan to support retrofit and deliver zero carbon homes

3.2.1

The Council could review the potential for conservation areas and listed buildings to incorporate low carbon and energy efficiency measures – and issue appropriate guidance.

Retrofitting historic properties or buildings within conservation areas can be held back by both the need to gain prior approval for some measures and by homeowners' uncertainty as to what might be permissible. For example, unless otherwise stated in the conservation area's Article 4 directions, solar panels are permitted development within a conservation area unless they are on a wall facing a highway – this means that planning permission is generally not required, although prior approval may be required.

Bath & North East Somerset Council has led the way in developing guidance on retrofitting for historic and listed building stock through its Energy efficiency, retrofitting and sustainable construction supplementary planning document.

A 2024 report from UK government, Adapting historic homes for energy efficiency: a review of the barriers, highlights that many historic homeowners find it difficult to find the guidance they need to retrofit their homes.

Somerset Council should consider developing a Supplementary Planning Document that offers support and guidance on appropriate retrofit measures and low carbon technology such as solar panels, including in conservation areas and listed buildings.

3.2.2

The Council could use its local plan to set retrofit targets, giving political backing to investment in retrofit.

The rollback of national energy efficiency targets, e.g. for the private rented sector, presents an opportunity for Somerset to demonstrate local ambition by setting out local retrofit targets that can be enshrined in its local plan. For example, the Council could set higher EPC targets for the private rented sector to achieve. While these would not have a planning lever for existing buildings, they would showcase the Council's ambition in a formal document. Targets could also be developed through a Somerset Retrofit Strategy, which could bring together targets, data, funding opportunities and actions.

3.2.3

The Council could adopt zero carbon housing and non-domestic standards in its local plan to improve local ambition.

The Future Homes Standard is currently out for consultation and is due for implementation in 2025. It aims to ensure that new homes built from 2025 onwards will produce 75-80% less carbon emissions than homes built under the current Building Regulations. While this is a significant step up from current regulations, it does not constitute a true zero carbon homes standard. Every building that is constructed that is not built to zero carbon standards increases the need for future retrofits.

Bath & North East Somerset and other partners developed an evidence base and were successful in getting zero carbon standards approved in their new Local Plan. With the development of Somerset's new local plan, there is the opportunity to embed local zero carbon building standards. The Council should also build on Somerset West and Taunton's Climate Positive Planning guidance, which supports the consideration of climate issues in new developments, and their Net Zero Toolkit, which aims to make net zero carbon new build and retrofit more accessible.

3.3 — Facilitating local hubs to develop local skills

3.3.1

The Council could facilitate or coordinate local hubs to develop local skills for low carbon heating and retrofit installations.

With the potential for 6,500 jobs in the retrofit market and a further 2,000 delivering heat pumps in Somerset, there is a need to ensure skilled workers are available to fulfill those roles. The Council should collaborate with education sector partners, such as Bridgwater and Taunton College, Yeovil College and Weston College, to create local retrofit hubs specialising in low carbon technology and fabric installations in each major population centre. The Council is working on its new economic development strategy, which provides an opportunity to focus further on developing low carbon skills programmes.

CASE STUDY

Gravity Business Park gigafactory

Somerset is soon to host a 40 GWh gigafactory just outside of Bridgwater. It could create around 4,000 jobs. The whole site, if it was developed in line with the local development order, could accommodate c.7,500 jobs. A skills taskforce at Bridgwater & Taunton College is set to capture information on skills requirements to provide courses and training materials for the new labour force.

3.3.2

The Council should lead a skills transfer programme in partnership with educational institutions that uses facilities and workforces brought into Somerset by projects such as Hinkley and the gigafactory.

Hinkley Point C has brought jobs to the Somerset area, and through its centres of excellence, such as the one at Bridgwater and Taunton College, and legacy programme will continue to impact net zero supply chains in the area post-construction. Investments have already been made into skills around electrical cabling, fitting, mechanical installation and training. Programmes have been developed for major infrastructure projects that can be repurposed and expanded upon. Existing resources include:

— National College for Nuclear

— Somerset Energy Innovation Centre

— Supply chain integrator for Hinkley

— Hinkley's accommodation campus.

The peak workforce at Hinkley has been 10,000 people on site. Many of the jobs created involve electrical engineering-type skills. These jobs could be transferred to initiatives such as at Gravity, or to supply chains for floating offshore wind, heat pumps and solar.

4

Electrifying heat demand:
high levels of off-gas properties present an opportunity for heat pumps

Council role
The Council can collaborate with the housing sector, installers, skills development organisations and consultants to deliver programmes to support households to switch to electrified heat.

The opportunity
Somerset currently has higher than the national average numbers of homes off-gas and higher than the national average uptake of domestic heat pumps. This presents an opportunity to lead the way in heat electrification in rural areas.

Under the Net Zero Pathway, heat in Somerset is expected to transition from predominantly gas to heat pumps. Heat pumps are expected to supply 82% of homes by 2050, with around 277,000 heat pumps needing to be in operation across Somerset's homes. This requires an annual installation rate of around 10,000 heat pumps per year – far above the current annual rate.

Jobs, GVA and investment required to meet Net Zero Pathway

Technology	Additional installations by 2050	Jobs (FTE)	GVA (£m)	Investment required (£m)*
ASHP	151,404	1,083	1,732	1,352
GSHP	68,269	887	1,420	1,227

*only includes cost of installation & connection to existing heat pump network.

Challenges

— The government's delay to the ban on installing oil and LPG boilers and new coal heating for off-gas homes to 2035 will have a slowing effect on the market for heat pumps. Gas connections are still being made for new developments in Somerset.

— Heat pumps have high upfront costs which can discourage consumers. Costs are expected to decrease nationally, as rollout increases in response to government interventions, such as the Clean Heat Market Mechanism. The Boiler Upgrade Scheme is currently providing funding for new domestic installations.

— Public perception of heat pumps remains a key barrier, with misinformation in the national press and, in some cases, poor-quality installations affecting views.

— The electrification of heat will require significant investment in the electricity network to ensure new heat pumps can be connected.

RECOMMENDATION THEMES

Recommendations have been organised under the following themes:

4.1 Targeting low carbon heat rollout using planning policy and zoning analysis.

4.2 Net Zero Heat Village Trial: a local community approach to exploring net zero in rural areas.

4.1 — Targeting low carbon heat rollout using planning policy and zoning analysis

4.1.1

The Council could use its new Local Plan to stop new gas connections.

Setting zero carbon standards in the local plan for new homes and new commercial developments will stop new gas connections from being made. This is essential for achieving the energy transition. For the avoidance of doubt, the Council could use its policy to specifically state that new connections will not be acceptable through planning. The policy could set out a heat hierarchy that prioritises the lowest carbon approach for new developments and takes a fabric-first approach.

4.1.2

The Council should commission a heat zoning analysis, aided by data from a housing stock analysis, to identify areas and neighbourhoods best suited to heat pumps and district heating.

The UK government is due to publish a methodology on undertaking heat network zoning in 2024. This will be focused on large-scale heat network opportunities and will be a statutory requirement for local planning authorities to undertake. Somerset Council should expand the remit of the zoning work to make it more relevant to Somerset, as opportunities for urban networks are limited. Working with housing stock data, demographic data and the heat network zoning methodology, the Council should undertake heat zoning analysis for Somerset that identifies areas with potential for:

- Small-scale rural heat networks – e.g. higher-density rural locations that are off the gas grid or have opportunities to use waste heat.
- Early heat pump rollout – e.g. off-gas locations with high levels of fuel poverty that could be targeted for an area-based programme such as a Net Zero Village Heat trial (see next page).
- Gas disconnection opportunities – e.g. end-of-the-line locations where a wholesale switch to heat pumps could support disconnection trials for communities.

4.1.3

The Council should work closely with the DNOs to inform their network investment strategy, sharing details of electrification programmes and pushing the networks to invest in the needed network capacity.

Sufficient demand connection capacity on the distribution network is essential to enable heat pump rollout at the scale needed for the Net Zero Pathway. The Council should work collaboratively with the DNOs on their investment strategy and develop the heat zoning analysis to identify areas suitable for early electrification. See 6.1

4.1.4

The Council should consider developing a water source heat pump innovation trial in partnership with local businesses or public sector organisations.

Water source heat pumps could provide an opportunity to supply heat networks and can attract innovation trial funding. This could be developed in the form of a trial in partnership with local public institutions or businesses to showcase the benefits of water source heat. The Council can link in wider sustainability objectives such as fuel poverty alleviation, improved air quality and retrofit energy efficiency to increase the chances of eligibility for funding applications.

River-based heat pumps could be developed, e.g. on the River Parrett. Marine source heat has high potential around the coast in areas with high heat demand, such as in Minehead.

The Council should engage with Bristol City Council, which has successfully developed a water source heat pump in central Bristol, to learn from their experience. A first step could be to engage with key businesses with high heat demand along the coast in Minehead or Watchet that could provide anchor loads, such as Butlins, to test their appetite.

4.2 — Net Zero Heat Village Trial: a local community approach to exploring net zero in rural areas

4.2.1

The Council should work in partnership with community energy organisations to develop a Net Zero Heat Village trial.

Off-gas rural villages where current heating is supplied from high carbon, often high-cost sources are prime targets to be first movers to electric heating solutions. Working with a local community, a Net Zero Heat Village trial could take a community-based approach to planning and installing measures to deliver net zero in a specific village.

Technologies might include batteries, renewable generation on rooftops and nearby land assets, heat pumps, energy efficiency measures, heat networks, flexibility services and waste heat.

Coordinating a whole-community approach will need consumer buy-in and support and significant up-front engagement to ensure the community is on board and supportive of the trial. Active communities may already have considered how to approach heat decarbonisation, e.g. Curry Rivel has undertaken a low carbon heat feasibility study funded by Somerset County Council.

Key steps in developing a trial might include:

- A stocktake of existing schemes (see Cornwall's Heat Pump Village case study) to learn from best practice approaches.
- Engaging with the South West Net Zero Hub, central government and the DNOs to explore funding opportunities such as innovation grants.
- Carefully considering how to select a community or communities to work with. One potential approach to selecting a community could be to undertake a competitive application process.

4.2.2

The Council should work in partnership with community energy organisations on other approaches to heat decarbonisation.

The Council should actively engage with community energy organisations across Somerset on their ambitions for decarbonising heat. Community energy organisations have on-the-ground expertise and knowledge of their local communities and a supportive approach from the Council will help them to deliver on their ambitions.

CASE STUDY

Cornwall's Heat Pump Village – Heat the Streets

In Cornwall, a successful heat network led by Kensa Utilities uses ground source heat pumps connected to shared ground loop arrays. The project, located in Stithians, encompasses 98 households, reducing the carbon footprint of each existing home by approximately 70%. New builds see a carbon savings closer to 28%. On average, the project has saved people £628 per year on their electricity bills.

Jobs and GVA: £3.8m of GVA was fed into the local economy (£39,000 per household that participated). 50 people were employed outside of the Kensa team.

5

Transport electrification and demand reduction:
building on existing work to plan the necessary infrastructure

Council role

The Council is currently producing an updated local transport plan, to replace the current plan that runs until 2026. In relation to this energy plan, two key Council roles within transport planning are most relevant:

— Overseeing the installation of the charging infrastructure needed to support electric vehicle (EV) rollout.

— Encouraging Somerset residents to adopt active travel and public transport, reducing overall vehicle miles.

The opportunity

— The Net Zero Pathway for transport focuses on the uptake of EVs, with over 90% of road vehicles being electric by 2040. To support this electrification, the Pathway requires the installation of 0.7 GW of EV charging capacity by 2030 and 1.6 GW by 2050.

— The Net Zero Pathway estimates that the mileage of personal vehicles will reduce due to increasing consumer demand for public transport and autonomous vehicles. As a predominantly rural area, it is assumed these transport mode shifts in Somerset will be less than the national average.

Jobs, GVA and investment required to meet Net Zero Pathway

Public charge points needed	Additional capacity by 2050*	GVA (£m)	Investment required (£m)
7-20 kw EV chargers	4,054	25.1	13.2
Rapid EV chargers	213	8.2	4.3

* Estimated EV charger uptake based on Somerset EV Charge Strategy projections

In addition to installation costs, network connection costs can vary from £1,000-£3,000 for small connections of single rapid chargers to up to £75,000 for 20 rapid chargers.

Challenges

— Grid connections and charge point availability are key barriers to EV adoption.

— EV adoption rates are slower than needed at present, due in part to high upfront costs.

— Charging facilities for electric buses will need to plan for nighttime surge charging, which could pose a strain on the network.

— Electric buses are more costly than internal combustion engine buses. According to First Bus, a single electric bus could cost as much as £370,000. Running costs are also unpredictable until trialled.

— The cost of trialling new bus routes in rural areas is a barrier where routes prove not to be economically viable. The commerciality of these new routes can be a challenge. It may be difficult to predict if customers will use the new routes once in place, which presents a financial risk.

RECOMMENDATION THEMES:

Recommendations are organised under two themes:

5.1 Developing public charging infrastructure and actions to support the rollout of electric vehicles.

5.2 Public transportation action plan: an innovative approach is needed to support rural public transport.

5.1 — Developing public charging infrastructure and actions to support the rollout of electric vehicles

5.1.1

The Council should use the 2024 refresh of its EV strategy to continue its focus on destination and on-street charge point deployment, to serve tourist destinations, schools, workplaces and those without off-street parking.

The Council has a 2020 EV charging strategy in place, which sets out 24 recommendations for the Council to support the delivery of charging infrastructure from introducing new parking standards for new developments to installing chargepoints across the council estate. The Council should continue to deliver against the strategy and introduce parking standards within its new local plan that require the provision of electric charge points in new car parks. The 2024 strategy refresh is an opportunity to review its impact to date and increase the ambition of the actions where needed.

5.1.2

The Council could work in partnership with the private sector and DNOs to explore innovative approaches to developing EV charging infrastructure to support local charging needs and to bring co-benefits to the area.

In September 2023, the Council passed the first stage in a funding application to receive £3.8 million of Local Electric Vehicle Infrastructure (LEVI) funding. If successful, the Council can use the funding to continue to roll out chargers across the area.

To ensure that electricity fuelling the EV transition is green, the Council could promote the co-location of solar panels. The M5 corridor and other major routes such as the A303 present a specific opportunity to ensure the charging infrastructure and supporting energy generation is in place to support high levels of EV rollout. Other services could be provided alongside charging hubs, such as shops and cafes.

The Council could work with DNOs on innovative solutions to charging infrastructure, such as the modular approach to substation development being used at Exeter services to support the installation of large numbers of rapid chargers. Charging hubs could also be considered in locations with high incidences of on-street parking, including rural towns. The Council could work with rural communities and the DNOs to explore the challenges of the EV rollout in rural areas.

5.1.3

The Council should consider undertaking a public communications campaign to communicate the economic benefits of reducing emissions to air quality to encourage consumers to switch to EVs.

5.1.4

The Council should work with partners to support the development of approaches that enable those on lower incomes to access EVs. For example, EV car-sharing hubs offer an opportunity for a wider range of consumer archetypes to participate in the EV market without making a full EV purchase.

CASE STUDY

Blandford Hill Green Eco Hub in Dorset

The eco hub combines 15 MW ground-mounted solar PV, 3 MW battery storage and EV charging for 19 vehicles on the A354. It also provides a local shop and services for the area. It was granted planning permission in 2022 and is currently under construction.

5.2 — Public transportation action plan: an innovative approach is needed to support rural public transport

5.2.1
The Council should continue to pursue joint funding opportunities to decarbonise bus fleets.

Many buses in Somerset still use internal combustion engines, posing an opportunity to switch to electric fleets. The Council should pursue joint funding opportunities to decarbonise bus fleets, such as Zebra schemes and Bus Service Improvement Plans. The Council should support bus companies to work with the DNOs on electric bus charging plans, including how to enable surge charging overnight.

5.2.2
The Council should work in partnership with transport providers and communities to develop innovative approaches to rural public transport.

Somerset has large rural areas that are not currently accessible by public transport, which opens the market for new and innovative business models to reach Somerset residents. The Council can pursue innovative business models for public transportation such as new bus route trials jointly funded by the Council and First Bus and shared taxis.

Some services like Westlink, which operates in the West of England area offer on-demand bus services where demand is too low for routes to run regularly on a fixed timetable. Community-based solutions also exist, such as Wivey Link, which uses five vehicles driven by volunteers and offers pre-bookable personal transport in the Wiveliscombe area, with concessions for bus pass holders.

5.2.3
The Council could work in partnership with rail companies to open new stations on existing rail lines and consider how to better integrate rail and bus travel to enable end-to-end public transport use.

New stations are proposed at Langport, Somerton, Chard Parkway and Wellington that would transform the potential for rural populations to access the national and local rail networks. Better linking existing and proposed stations with bus timetables and active travel routes will support passengers to complete their journeys without using cars.

In addition to local plans, Peninsula Transport, the South West regional transport body, is developing a regional transport strategy that aims to join up transport plans across the region, including plans to decarbonise rail and freight.

5.2.4
The Council could continue to promote active travel through local planning and infrastructure delivery

The Council should continue to invest in improved cycle and walkway infrastructure and access funding where possible to encourage residents to choose more active means of travel. E-scooter rental schemes are already being trialled in Taunton, Yeovil and other towns in Somerset.

Through the new local plan, the Council should require all new residential developments to include active travel and public transport infrastructure before properties are occupied. The new local transport plan should promote active travel.

6

Grids and flexibility:
extending the local authority role on influencing local energy systems and infrastructure

Council role
Although there is currently no statutory role in energy for local government, the right energy infrastructure is crucial for both local environmental goals and local economic opportunity. Councils are responding to this issue with various approaches.

The opportunity
Increasingly, energy network capacity has become a blocker to local action by Somerset Council and other local stakeholders. Transmission works with timescales out to 2038 are a critical issue constraining new connections in Somerset. Opportunities for the Council include:

— Clear lines of two-way communication are needed between the Council and both National Grid Energy Distribution (NGED) and Scottish & Southern Energy Networks (SSEN) to better communicate future net zero and economic plans.

— Build capacity in the Council to understand local energy issues, areas of network constraint, alternative connections and local approaches to overcome temporary constraints and network investment plans. This knowledge needs to be reflected in local economic and transport plans.

— The new Regional Energy Strategic Planners (RESPs) are likely to establish new democratic processes in local energy infrastructure planning as well as setting regional priorities. There is an opportunity to influence how these planners develop and operate.

— Hydrogen presents a potential new strategic resource that the Council can steer the development of.

Challenges
— Local authorities have no statutory role in energy or energy planning and lack adequate resources and funding to support collaboration with grid operators.

— Electricity networks may not deliver information to local authority actors in an accessible manner, especially for non-energy sector experts.

RECOMMENDATION THEMES

Recommendations are organised under three themes:

6.1 Engagement and capacity, understanding energy system needs in local plans and planning process.

6.2 Influencing the RESP, developing local and regional priorities.

6.3 Steering the strategic development of hydrogen in Somerset.

6.1 — Engagement and capacity, understanding energy system needs in local plans and planning process

6.1.1

The Council should engage in two-way dialogue with both DNOs and the Gas Distribution Network (GDN) to join up local plans and network plans.

Energy Networks Association, which represents all the DNOs and GDNs, recently published a guide on how to foster collaboration between network operators and local authorities. It includes a role for local authorities to engage early with network operators on their plans for medium- and longer-term decarbonisation and development in their local area.

From the network operators' side, they should respond to the Council's enquires about energy planning, providing tailored support and accessible and relatable information on network processes. This should include information about potential plans to release network capacity – for example, NGED released 10 GW of capacity in October 2023 for 'shovel ready' projects.

In addition, the DNOs undertake Distribution Future Energy Scenario analysis to underpin their network investment plans. The Council should play an active role in engaging with the DNOs on the DFES, feeding in local knowledge and plans.

Development of this Somerset Energy Investment Plan has developed these relationships between Council officers and representatives from National Grid Electricity Distribution, Scottish and Southern Electricity Networks and Wales & West Utilities, with network representatives attending steering group meetings. Continued dialogue will be essential to ensuring the benefits of closer collaboration are realised.

The Council should nominate a representative to meet regularly with the DNOs and GDN for an open dialogue on the Council's plans. This regular dialogue will support the Council to plan energy projects and to develop appropriate planning policy that supports delivery in areas where there is network capacity. It will support the network operators to understand where new projects may be developed and to deliver network investment that supports local ambitions.

When planning for future generation and demand projects, it is advised that the Council engages early on with the network operators with specific parcels of land in mind and performs a 'connections surgery' to obtain up-to-date network information and anticipate network plans to release capacity. By staying ahead of these plans, local authority-led generation and demand projects may increase their chances of obtaining network capacity where it becomes available.

SSEN through its Regional Energy System Optimisation Planning (RESOP) project developed the Local Energy Net Zero Accelerator (LENZA). This GB first tool collaboratively shares data between utilities and local authorities in order to assist with LAEPs. The tool is now being rolled out on a phased basis to local authorities across SSEN's licence areas. The Council should engage with SSEN on how to use the tool effectively.

6.1.2
The Council should look for opportunities to be involved in network innovation projects working in partnership with the network operators. The Council should use the Smarter Networks portal to search for collaboration opportunities and attend network innovation funding events.

6.1.3
The Council should commit to building capacity and internal resources to understand network issues.

The Council should dedicate officer time and resources to developing internal knowledge and understanding of network issues and alternative connection processes such as Active Network Management and microgrids, and network investment processes – enabling the Council to have a more informed dialogue with the DNOs and GDN.

6.2 — Influencing the RESP, developing local and regional priorities

6.2.1
The Council should support the development of the RESP – allocating resources to influence its development so that it delivers vital network infrastructure.

The new RESPs proposed by Ofgem, as the energy regulator, are likely to establish new democratic processes into local energy infrastructure planning as well as setting regional priorities. There is an opportunity to influence how these planners develop and operate.

The creation of RESPs was announced in November 2023 and is looking to establish eight and ten regional bodies, run by the National Energy System Operator, based on the boundaries of the Regional Transport Boards. The draft boundaries include Somerset in the Peninsula Transport area with Devon and Cornwall. Adjacent counties Wiltshire and Dorset are included in the Western Gateway RESP.

Ofgem is undertaking a process of detailed design to understand key elements of functionality, governance and boundaries. They are launching this process at the end of January 2024 with the aim to consult on a policy document in the second half of the year.

The RESPs themselves are anticipated to be started by 2026 and influence the next round of electricity distribution network operator business plans for the next investment period from 2028 (ED3).

It is crucial that this next investment period delivers the infrastructure that Somerset and other areas need to make net zero a reality. It is therefore a priority that the Council plays an active role in the development of the RESP and the strategic priorities that go into the next round of investment planning.

6.2.2
The Council should work with local authorities in the region to develop strategic priorities and start processes of cross-boundary collaboration on energy infrastructure.

Cross-boundary collaboration will be essential to the success of the RESP process. The Council should strengthen its strategic approach to working with Devon and Cornwall on energy infrastructure issues.

6.3 — Steering the strategic development of hydrogen in Somerset

Council role

The Council can play a role in setting the strategic direction for the role that hydrogen will play in the future energy system of Somerset.

The opportunity

Hydrogen could provide a low carbon energy source for difficult-to-decarbonise sectors, such as heavy transport, shipping, aviation and some high-temperature industrial processes. It may also play an important role in long duration system balancing as a multi-vector fuel, using very low-cost electricity during times of over-supply to convert, store and transport renewable energy for many applications. Nascent hydrogen clusters are beginning to form in other areas of the South West, such as:

— Langage Green Hydrogen near Plymouth, which has planning permission to produce hydrogen from renewable generation for use by local mining companies. It has also been offered a Low Carbon Hydrogen Agreement by government.

— Canford Renewable Energy in Dorset produces hydrogen from a 5 MW solar farm and landfill gas power station for use in heavy transport.

In Somerset, there may be opportunities to co-locate hydrogen electrolysers with renewable generation. Hinkley Point C could be a source of significant quantities of 'pink' hydrogen – hydrogen produced to store excess energy generated by the nuclear power station when electricity demand is low. Wales and West Utilities, the gas distribution network operator, is keen to explore these opportunities further.

Challenges

— There is growing evidence that hydrogen is not the solution for decarbonising domestic heat or most transport. Hydrogen village heating trials in Whitby and Redcar were cancelled in 2023. However, there remain advocates of hydrogen for these uses from those with vested interests. These arguments are delaying action on electrification.

— Business models for developing hydrogen production from renewable and nuclear generation are at an early stage.

6.3.1

The Council should set out a strategic statement that it will prioritise hydrogen for hard-to-decarbonise sectors such as agricultural transport, aviation, industrial applications and long duration energy storage.

Stakeholders to involve could include the South West Net Zero Hub, Wales and West Utilities, EDF Energy and Hydrogen South West to explore the future role of hydrogen in Somerset and appropriate net zero applications. The statement should include a commitment that the future of heating and transport in Somerset is focused on electrification.

6.3.2

The Council could work in partnership with EDF Energy to explore the potential to produce 'pink' hydrogen at Hinkley Point C.

This opportunity is at a very early stage, with EDF Energy currently exploring its viability at another location. Hinkley Point C is also still under construction. The Council should keep a watching brief on this opportunity. Wales and West Utilities is keen to be involved in discussions.

6.3.3

The Council could work in partnership with aerospace experts and local airports to explore the development of air transportation hydrogen hubs.

This could be done in collaboration with the South West Net Zero Hub and the Local Economic Partnership, Leonardo and the aerospace innovation centre.

6.3.4

The Council could work with industry based in Somerset to collaborate on clean hydrogen strategies.

Stakeholders that could be interested in a collaboration on clean hydrogen could be the Bridgwater gigafactory or Somerset's various minerals and aggregates businesses.

6.3.5

The Council should encourage feasibility studies in the Triassic saltfield near Bridgwater to understand the possibility of future hydrogen storage.

The Council could work in partnership with neighbouring authorities, such as Dorset and North Somerset, to jointly explore this opportunity.

7-10

Other investment opportunities

A number of additional opportunities were identified through the stakeholder engagement process and analysis

Opportunities are:

7. **Rooftop solar deployment**
8. **Large-scale tidal lagoons**
9. **Rural generation schemes, including anaerobic digestion and hydropower**
10. **Geothermal**

7 — Rooftop solar: Deployment will be predominantly market led, but a boost to the supply chain is needed

Council role

The Council could work with installers to facilitate rooftop PV development on council-owned buildings and social housing. The Council can require new domestic and commercial developments to be net zero carbon, which will facilitate the deployment of on-site solar.

The opportunity

Rooftop solar offers a significant opportunity for individual households and businesses, as well as council buildings, to rapidly decarbonise their energy use, without significant planning, cost or technical barriers, or disruption.

Although subsidies for solar have been much reduced since the closure of the Feed-in Tariff, the Smart Export Guarantee offers some income potential and recent installation rates have increased in response to high energy prices. This can also be an opportunity to reduce on-site electricity bills and, during times of peak supply, provide revenue streams and opportunities to sell power back to the grid. For example, solar PV owners can take advantage of

schemes like Outgoing Octopus to monetise their electricity export. According to Solar Energy UK, a typical home with solar panels could have an increased sale price of at least £1,800 plus annual energy bill savings of at least £300.

Co-locating solar panels with EV charge points can support lower charging costs and overcome local grid constraints. Emerging technologies, such as solar film, may enable buildings with previously unviable roofs to adopt solar panels.

Challenges

— Grid constraints can present a challenge to connecting projects above the small domestic scale, where primary or upstream constraints are present.

— Access to finance remains a key challenge for householders and businesses considering investing in solar PV. For larger-scale projects, agreeing a Power Purchase Agreement can be complex.

— Access to impartial advice on the potential pros and cons of installing solar PV can be a barrier for some potential customers.

— Local supply chains across Somerset are fairly well-developed, with some well-established companies. Training courses are available at colleges within Somerset. However, the rapid increase in deployment required to meet the Net Zero Pathway will require over 3,700 more skilled installers in Somerset.

Technology	Additional capacity by 2050	Jobs (FTE)*	GVA (£m)	Investment required (£m)
Commercial	86 MW	700	140	90
Domestic	364 MW	3,000	590	510

*Equivalent to 28 rooftop systems installed per worker per year (184,350 rooftops).

RECOMMENDATIONS

7.1.
The Council can lead by example by installing rooftop solar on all viable estate buildings, prioritising the use of local firms to support supply chain development.

7.2.
The Council can encourage high energy users to develop solar installations for on-site operations where feasible and not already installed, through informational campaigns and guidance highlighting the business case.

7.3.
The Council could support homeowners to understand the benefits of installing solar on their roofs, providing impartial information about potential bill savings and costs, e.g. through Somerset Energy Saver web pages.

7.4.
The new local plan could include a net zero carbon requirement that supports the delivery of appropriate solar PV.

7.5.
The Council could work with local solar firms and colleges to boost jobs, apprenticeships and upskilling programmes for the sector.

8 — Large-scale tidal lagoons: a potential nationally significant energy opportunity – if national backing can be secured

Council role

Private developers and financers will play a key role in progressing large tidal projects, which would need central government backing as nationally significant projects. The Council could offer political support for a national-scale tidal project within Somerset.

The Council has a role during pre-planning for Nationally Significant Infrastructure Projects to represent the local perspective, for example ensuring that local habitat protection guidelines are met. The Council has a role to educate local communities about the potential benefits of the marine and offshore energy sectors in terms of local skills, flood and sea level rise protection, contribution towards fighting climate change and potential ecosystem benefits of designs that work to enhance local marine habitats rather than harming them.

The opportunity

The 2.5 GW West Somerset Lagoon project is in early-stage development, requiring access to a viable investment model with government backing. If constructed, it could enable Somerset to be a net exporter of renewable energy, supplying electricity to meet local demand, as well as for use in other areas of the UK. The presence of a large tidal project could boost local jobs and supply chains and position Somerset as a leader in marine energy.

There may be skills and investment opportunities for Somerset from offshore wind opportunities in development in the Celtic Sea. Although these will be mainly supported by ports in Wales, Devon and Cornwall, there may be some opportunities for jobs and skills development in Somerset.

Jobs, GVA and investment required to meet Net Zero Pathway: Tidal lagoons are not included in the Net Zero Pathway projection figures due to the national-scale of the projects. However, the proposed 2.5 GW West Somerset Lagoon is estimated to cost £8.5 billion with a 15% contingency to construct, plus a levelised cost of energy of £74/MWh. It could bring as many as 8,250 full-time equivalent (FTE) construction jobs and 300 FTE mechanical and electrical installation jobs to the Somerset area plus an estimated 100 permanent operational jobs.

Challenges

- To address ecosystem and habitat-related concerns, projects like the West Somerset Lagoon have identified compensation measures, such as bird refuge islands, acoustic fish deterrents and new fish passes.
- Any large tidal project requires high levels of capital investment from private partners and some form of UK government backing.

RECOMMENDATIONS

8.1

The Council should consider whether to publicly and politically support the development of large-scale tidal lagoons in the area. It could work with developers to raise awareness of the opportunity and co-benefits. It could undertake a campaign to influence government to consider the lagoon as a nationally significant project. Without national support, the lagoon will be difficult to progress.

8.2

If national interest is secured in the lagoon, there are a range of supportive actions the Council could take, including working with developers to ensure local skills and training are in place and to communicate benefits to the public.

8.3

The Council could support jobs, supply chain and skills development of the offshore sector more broadly, such as working with neighbouring areas to support floating offshore wind.

9 — Rural generation schemes: a limited role in delivering the Pathway, but with the potential to offer locally targeted benefits

Council role

The Council can promote and reduce planning barriers for small-scale rural generation schemes such as small-scale hydropower and anaerobic digestion. There is also an opportunity to engage with dairy and food farmers to encourage the adoption of anaerobic digestors.

The opportunity

The Net Zero Pathway includes an increase in AD deployment in Somerset and a small increase in hydropower capacity, across several small sites. Somerset has a large agricultural sector and food and drink sector, with the potential for waste to be used for new AD plants.

Although sustainability and air quality concerns have reduced the focus on biomass as a low carbon heating option in the UK, there may be opportunities in rural areas, such as Exmoor, to access waste biomass, including hedgerow clippings, for use in small-scale biomass boilers.

A limited amount of further hydropower potential could be developed for local self-consumption in areas with sufficient head and flow. Feasibility could be coordinated through existing groups such as South Somerset Hydropower Group and Mendip Power Group.

Jobs, GVA and investment required to meet Net Zero Pathway

Technology	Additional capacity by 2050	Jobs (FTE)	GVA (£m)	Investment required (£m)
Hydropower	2.8 MW	6	0.8	0.2

Challenges

— Feedstock availability for AD will be limited and variable over time. High capital costs and low revenues have limited the deployment of AD since the closure of the Feed-in Tariff and the Renewable Heat Incentive. AD is most successful when using high-energy inputs, such as food waste, which are often subject to longer-term disposal contracts and so can be difficult to access.

— Hydropower opportunities are limited in Somerset due to lack of high-flow and high-head rivers. Potential opportunities tend to be micro-scale and capital costs are high compared to income potential, particularly without available subsidies. As a well-developed technology, capital costs are unlikely to reduce significantly. Fish screening legislation and abstraction licence requirements add to these costs.

RECOMMENDATIONS

9.1

The Council could encourage permitting and develop local planning policy and guidance that supports small renewable generation sites such as AD and hydropower. In developing AD policy, the Council should consider:

a. Any future AD strategies should target cattle farmers to maximise value and methane absorption to reduce scope 1 emissions.

b. Waste feedstocks should be prioritised, with the use of agricultural land to provide energy crops limited.

9.2

The Council can choose to work alongside organisations like British Hydropower Association to influence the Environment Agency on revising permitting requirements and to ask central government to introduce support mechanisms for small hydropower.

10 — Geothermal: an early stage opportunity with yet-unknown potential

Council role

The Council can explore the potential for geothermal to provide heat for heat networks, working with commercial partners. The Council can support the NHS to develop its geothermal ambitions.

The opportunity

There is some geothermal potential around the Quantock and Mendip hills in Somerset. This resource is at an early stage of exploration. Geothermal energy is suitable for heat network and net zero village trials. Noise and visual impact are minimal, with sound not exceeding 45 decibels in the recent Eden Geothermal project in Cornwall. There may also be opportunity to explore the potential for heat recovery from mine water from the former coal mines in the Mendip area.

There is interest from local stakeholders, particularly at Yeovil Community Hospital, within the context of decarbonising steam-heated buildings. Food and drink manufacturing organisations use heat for hygiene at 65 and 85°C, which is suitable for geothermal. Heat networks, geothermal or otherwise, can be planned in areas with new housing developments to coincide with building works and maximise benefits from the new network.

The first stage of any large geothermal project is a feasibility study and options appraisal, which will cost c.£25,000 depending on scope. Geothermal's levelised cost of energy can be relatively low, with projects achieving as low as $26/MWh in France.

Challenges

Investment for feasibility stages would be challenging, but some funding streams exist for later development stages. This results in high capital risk for initial project planning stages.

RECOMMENDATIONS

10.1.

Working with commercial partners, the Council could apply for funding for a feasibility study to explore the permeability and presence of water at depths of 1,500m near Yeovil for district heating. Other areas may also be explored further, such as communities near the Quantocks. There may be opportunities to work across area boundaries with neighbouring authorities, for example with Dorset Council, which is exploring similar opportunities.

10.2.

The Council can provide political support for projects with the NHS, such as de-steaming the Musgrove Hospital site using geothermal heat.

Next steps

This Somerset Energy Investment Plan sets out the key opportunities for decarbonising Somerset's local energy system and some longer-term or lower-priority areas to consider. Recommendations are made throughout for actions that the Council should or could take to prime the market, plan for decarbonisation, or work in partnership with external organisations. Pursuing partnership opportunities is essential, as these present the potential to leverage external finance and skills.

However, delivering the actions will inevitably require Council time, resources, skills and funding. The Council has recently announced the need for very significant budget cuts from April 2024 to enable it to balance the books. As a result, allocating resources and funding to non-statutory energy actions will be challenging. However, the jobs, GVA and investment potential of delivering the opportunities in this action plan are significant and in many cases rely on council action to be realised. The Council will need to consider how to deliver these opportunities within the financially constrained environment.

The next step will be for the Council to consider this Plan internally and with external stakeholders and partners. It should further prioritise the actions recommended, drawing up internal action plans with allocated resources and funding for each area.

Summary of all recommendations

1—
Decarbonisation of the Council's own estate and operations: priming the market

1.1 Developing generation and storge sites on council land in partnership with local organisations and community groups

1.1.1 The Council could play a proactive role in developing new solar, wind and storage projects in Somerset, using a range of approaches.

1.2 Retrofitting Council assets and buildings

1.2.1 The Council should develop a retrofit plan for all council-owned buildings, including offices, leisure facilities and heritage assets that delivers a net zero estate by 2030.

1.2.2 The Council should work with the supply chain to ensure its procurement approach for retrofit is accessible to local companies, helping to build the skills in the local area and retain the investment benefit locally.

1.2.3 The Council should transition council fleets, buses and refuse vehicles to EVs.

1.3 Developing a portfolio approach to decarbonising the estate

1.3.1 The Council should meet with Bristol City Council to discuss the City Leap approach and explore the potential for replicating it in Somerset

2—
Large-scale solar, wind and battery storage development: seizing the opportunities for the rural economy

2.1 Setting out a vision for land use and energy that delivers co-benefits for nature and the agricultural community

2.1.1. The Council should facilitate the debate around appropriate land use in Somerset through the development of a land use framework.

2.1.2. The Council should consider how to reduce negative impacts and encourage biodiversity enhancements through its renewable energy policies by consulting with biodiversity experts.

2.1.3. The Council should consider how to support the coexistence of renewables and agriculture, reviewing best practice on existing schemes, working with the rural community and developing appropriate local planning policy and guidance.

2.2 Positive local planning policy to transformdelivery in appropriate locations

2.2.1 The new Local Plan could include robust planning policy to support the development of high-quality large-scale solar, wind and energy storage projects that maximise local benefits, subject to other considerations such as social, environmental and economic factors.

2.3 Supporting local and community development of new solar, wind, storage and innovation projects

2.3.1. The Council can provide direct support to community energy organisations developing generation, storage and flexibility projects.

3—
Unlocking energy efficiency and retrofit: the #1 opportunity for energy jobs and GVA creation

3.1 Comprehensive retrofit support programmes are needed for every segment of the market

3.1.1. The Council should produce a plan to decarbonise all council stock, sharing learning with other social housing providers.

3.1.2. The Council should review plans to support low-income households who do not live in social housing.

3.1.3. The Council should build on existing work with community energy organisations and local providers to extend support for the 'self-funding' market.

3.2 Using the new local plan to support retrofitand deliver zero carbon homes

3.2.1. The Council could review the potential for conservation areas and listed buildings to incorporate low carbon and energy efficiency measures – and issue appropriate guidance.

3.2.2. The Council could use its local plan to set retrofit targets, giving political backing to investment in retrofit.

3.2.3. The Council could adopt zero carbon housing and non-domestic standards in its local plan to improve local ambition

3.3 Facilitating local hubs to develop local skills

3.3.1. The Council could facilitate or coordinate local hubs to develop local skills for low carbon heating and retrofit installations.

3.3.2. The Council should lead a skills transfer programme in partnership with educational institutions that uses facilities and workforces brought into Somerset by projects such as Hinkley and the gigafactory.

4—
Electrifying heat demand:
high levels of off-gas properties present an opportunity for heat pumps

4.1 Targeting low carbon heat rollout using planning policy and zoning analysis

4.1.1. The Council could use its new local plan to stop new gas connections.

4.1.2. The Council should commission a heat zoning analysis, aided by data from a housing stock analysis, to identify areas and neighbourhoods best suited to heat pumps and district heating.

4.1.3. The Council should work closely with the DNOs to inform their network investment strategy, sharing details of electrification programmes and pushing the networks to invest in the needed network capacity.

4.1.4. The Council should consider developing a water source heat pump innovation trial in partnership with local businesses or public sector organisations.

4.2 Net Zero Heat Village Trial: a local community approach to exploring net zero in rural areas

4.2.1. The Council should work in partnership with community energy organisations to develop a Net Zero Heat Village trial.

4.2.2. The Council should work in partnership with community energy organisations on other approaches to heat decarbonisation.

5—
Transport electrification and demand reduction:
building on existing work to plan the necessary infrastructure

5.1 Developing public charging infrastructure and actions to support the rollout of electric vehicles

5.1.1. The Council should use the 2024 refresh of its EV strategy to continue its focus on destination and on-street charge point deployment, to serve tourist destinations, schools, workplaces and those without off-street parking.

5.1.2. The Council could work in partnership with the private sector and DNOs to explore innovative approaches to developing EV charging infrastructure to support local charging needs and to bring co-benefits to the area.

5.1.3. The Council could consider undertaking a public communications campaign to communicate the economic benefits and additional co-benefits of reducing emissions and air quality to encourage consumers to switch to EVs.

5.1.4. The Council should work with partners to support the development of approaches that enable those on lower incomes to access EVs.

5.2 Public transportation action plan: an innovative approach is needed to support rural public transport

5.2.1. The Council should work in partnership with bus companies to support their transition to electric fleets.

5.2.2. The Council should work in partnership with transport providers and communities to develop innovative approaches to rural public transport.

5.2.3. The Council could work in partnership with rail companies to open new stations on existing rail lines and consider how to better integrate rail and bus travel to enable end-to-end public transport use.

5.2.4 The Council could continue to promote active travel through local planning and infrastructure delivery

6—
Grids and flexibility:
extending the local authority role on influencing local energy systems and infrastructure

6.1 Engagement and capacity, understanding energy system needs in local plans and planning process

6.1.1 The Council should engage in two-way dialogue with both DNOs and the Gas Distribution Network (GDNs) to join up local plans and network plans.

6.1.2 The Council should look for opportunities to be involved in network innovation projects working in partnership with the network operators.

6.1.3 The Council should commit to building capacity and internal resources to understand network issues.

6.2 Influencing the RESP, developing local and regional priorities

6.2.1 The Council should support the development of the RESP – allocating resources to influence its development so that it delivers vital network infrastructure.

6.2.2 The Council should work with local authorities in the region to develop strategic priorities and start processes of cross-boundary collaboration on energy infrastructure.

6.3 Steering the strategic development of hydrogen in Somerset

6.3.1 The Council should set out a strategic statement that it will prioritise hydrogen for hard-to-decarbonise sectors such as agricultural transport, aviation, industrial applications and long duration energy storage.

6.3.2 The Council could work in partnership with EDF Energy to explore the potential to produce 'pink' hydrogen at Hinkley Point C.

6.3.3 The Council could work in partnership with aerospace experts and local airports to explore the development of air transportation hydrogen hubs.

6.3.4. The Council could work with industry based in Somerset to collaborate on clean hydrogen strategies.

6.3.5 The Council should encourage feasibility studies in the Triassic saltfield near Bridgwater to understand the possibility of future hydrogen storage.

7—
Rooftop solar Deployment: will be predominantly market led but a boost to the supply chain is needed

7.1. The Council could lead by example by installing rooftop solar on all viable estate buildings, prioritising the use of local firms to support supply chain development.

7.2. The Council could encourage high energy users to develop solar installations for on-site operations where feasible and not already installed, through informational campaigns and guidance highlighting the business case.

7.3. The Council could support homeowners to understand the benefits of installing solar on their roofs, providing impartial information about potential bill savings and costs, e.g. through Somerset Energy Saver web pages.

7.4. The new local plan could include a net zero carbon requirement that supports the delivery of appropriate solar PV.

7.5. The Council could work with local solar firms and colleges to boost jobs, apprenticeships and upskilling programmes for the sector.

8—
Large-scale tidal lagoons:
a potential nationally significantenergy opportunity – if national backing can be secured

8.1. The Council should consider whether to publicly and politically support the development of large-scale tidal lagoons in the area. It could work with developers to raise awareness of the opportunity and co-benefits. It could undertake a campaign to influence government to consider the lagoon as a nationally significant project. Without national support, the lagoon will be difficult to progress.

8.2. If national interest is secured in the lagoon, there are a range of supportive actions the Council could take, including working with developers to ensure local skills and training are in place, to anticipate planning hurdles in advance and to communicate benefits to the public.

8.3. The Council could support jobs, supply chain and skills development of the offshore sector more broadly, such as floating offshore wind, through its economic development functions.

9—
Rural generation schemes:
a limited role in delivering the Pathway, but with the potential to offer locally targeted benefits

9.1. The Council could encourage permitting and develop local planning policy and guidance that supports small renewable generation sites such as AD and hydropower. In developing AD policy, the Council should consider:

a. Any future AD strategies should target cattle farmers to maximise value and methane absorption to reduce scope 1 emissions.

b. Waste feedstocks should be prioritised, with the use of agricultural land to provide energy crops limited.

9.2. The Council could choose to work alongside organisations like British Hydropower Association to influence the Environment Agency on revising permitting requirements and to ask central government to introduce support mechanisms for small hydropower.

10—
Geothermal: an early stage opportunity with yet-unknown potential

10.1. Working with commercial partners, the Council could apply for funding for a feasibility study to explore the permeability and presence of water at depths of 1,500m near Yeovil for district heating.

10.2. The Council could provide political support for projects with the NHS, such as de-steaming the Musgrove Hospital site using geothermal heat.

06

Appendices

Appendix 1:
Scenario methodology Somerset's electricity generation Net Zero Pathway compared with a sensitivity delivering the equivalent of 100% of 2050 demand

Somerset's Net Zero Pathway achieves local renewable generation that meets the equivalent of 45% of local 2050 electricity consumption. The level of solar and wind deployment needed to meet the equivalent of 100% consumption levels is represented in the table below. These figures are illustrative only and, given market conditions, grid constraints and Somerset's resources, are unlikely to be achievable.

Technology	Baseline (MW)	Pipeline (MW)	Additional capacity needed to meet 45% by 2050[1]	Annual average build-out (MW)[2]	Total 45% target land use	Additional capacity needed to meet 100% by 2050[3]	Annual average build-out (MW)	Total land use for Illustrative 100% capacity
Large-scale solar	**313**	**653**	**444**	**42**	**2,853 Ha (0.8% of Somerset)**	**2,400**	**49**	**6,732 HA (2.0% of Somerset)**
Domestic rooftop solar	**46**	**--**	**364**	**14**	**120,000 roofs[4]**	**200**	**56**	**179,500 roofs[6]**
Commercial rooftop solar	**32**	**--**	**86**	**3**	**12,000 roofs**	**250**	**6**	**16,900 roofs**
Onshore wind	**2**	**--**	**152**	**6**	**61 turbines[5]**	**400**	**22**	**222 turbines**

1. Calculated using Regen analysis of NGED and SSEN DFES net zero 2050 scenarios.
2. Starting in 2024.
3. Based on very high levels of Somerset's resources being deployed.
4. Assumes a 3.4 kW average for domestic rooftops and a 10 kW average for commercial rooftops. These are upper estimates, not accounting for improved technologies over time. In the Net Zero Scenario, c.34% of all domestic roofs will have a rooftop system installed by 2050.
5. Estimating wind's impact on land use can be misleading. According to the Energy and Climate Intelligence Unit, around 1% of land taken up by a wind farm is used by turbines, leaving 99% for other potential uses such as farming or ecosystem services.
6. In the 100% sensitivity, c.50% of all domestic roofs will have a rooftop system installed by 2050.

Appendix 2:
Economic benefits methodology

Generation costs have been calculated in terms of capital expenditure (CAPEX) as opposed to operational expenditure. For the purposes of these energy plans, initial investment is more pertinent to securing project funding.

Operational costs (OPEX) have been calculated and considered for some technologies to inform the strategic direction of technology uptake in the Pathway. For example, higher abstraction licence costs of hydropower limit the amount of uptake of this technology. Similarly, operations and maintenance of anaerobic digestion is considerably higher than wind and solar at all scales.

Building energy efficiency improvements were calculated using Somerset's EPC recommendations. To avoid double counting heat installation costs, all recommendations relating to the installation of electrified heating or small-scale generation technologies were excluded. Results were scaled to the estimated total number of houses in Somerset, giving the estimated total cost for all housing in Somerset.

Sources & assumptions:

1. Renewable Generation: Department for Energy Security & Net Zero 2023, Electricity Generation Costs 2023. All costs are calculated in 2021 real GBP prices and the medium scenario was taken. For certain technologies where several cost categories overlap (i.e. AD and AD CHP), an average value was taken. All generation costs have been calculated in 2021 real GBP and not adjusted for inflation.
2. Small-scale wind: Micro Certification Scheme data extract for small-scale wind included 7 data points on installation costs for small wind turbines. The average cost per kW (£9,437.88) was used.
3. Battery storage: National Renewable Energy Laboratory (NREL) 2023, 2021 Annual Technology Baseline (ATB) Cost and Performance Data for Electricity Generation Technologies. Battery technology CAPEX costs were estimated taking an average value across battery storage duration values. This leads to significant variation, e.g. in utility-scale batteries which see a CAPEX of $621 for 2hr storage versus $2,465 for 10hr battery storage units, and thus could be overestimated. All values have been converted to GBP using a 0.79 GBP per USD exchange rate.
4. Retrofit: The cost of energy efficiency retrofits was estimated via the EPC certificate recommendations to improve the overall energy efficiency of buildings. Assumptions of average cost by EPC rating were calculated for available data and infilled where cost was not available for that EPC (A-C: £4,000; D: £7,300; E: £11,100; F: £13,900; G: £15,400). The same was done for minimum and maximum values to provide a range of uncertainty.
5. Heat: Heating costs have been calculated using the March 2023 Renewable Heat Incentive RHI monthly deployment data. Cost values for the most popular installation size were taken, e.g. 2-10 kW for ASHP and 6-15 kW for GSHP.
6. EV Chargers: Costs for EV chargers align with assumptions used in the Somerset EV Charging Strategy, which bases its cost estimates on the UK Government Electric Vehicle Charging in Residential and Non-residential Buildings consultation.

The local benefit to the economy from developing Somerset's Net Zero Pathway out to 2050 was calculated through Gross Value Added (GVA) and Full Time Equivalent (FTE) multipliers for each technology from a variety of sources ranked by recentness of publication and relevancy.

FTE refers to the number of job years, in other words, a full year of one person being employed full time. This does not equate to the total number of jobs or persons employed. The multipliers used refer to direct jobs that are likely to be Somerset-based, which in most cases are limited to on-site construction and installation jobs.

GVA is a measure of value added through a projection of goods and services while subtracting taxes on production. As GVA estimates vary, a central estimate for each technology was used, and the minimum and maximum were also calculated to show the range of possibility and inherent variability of jobs and GVA estimation. Where sources provided a significant outlier, it was removed from the calculated average to avoid skewing final numbers. The ONS GVA multiplier of 1.7 is used as a benchmark.

FTE multiplier sources

BVG Associates, 2017, Economic benefits from onshore wind farms

Renewable UK & Vivid Economics, 2019, Quantifying the economic benefits of onshore wind to the UK - Vivid Economics research

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Solar Energy Industries Association (SEIA), 2020, National Solar Jobs Census 2020

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GVA multiplier sources

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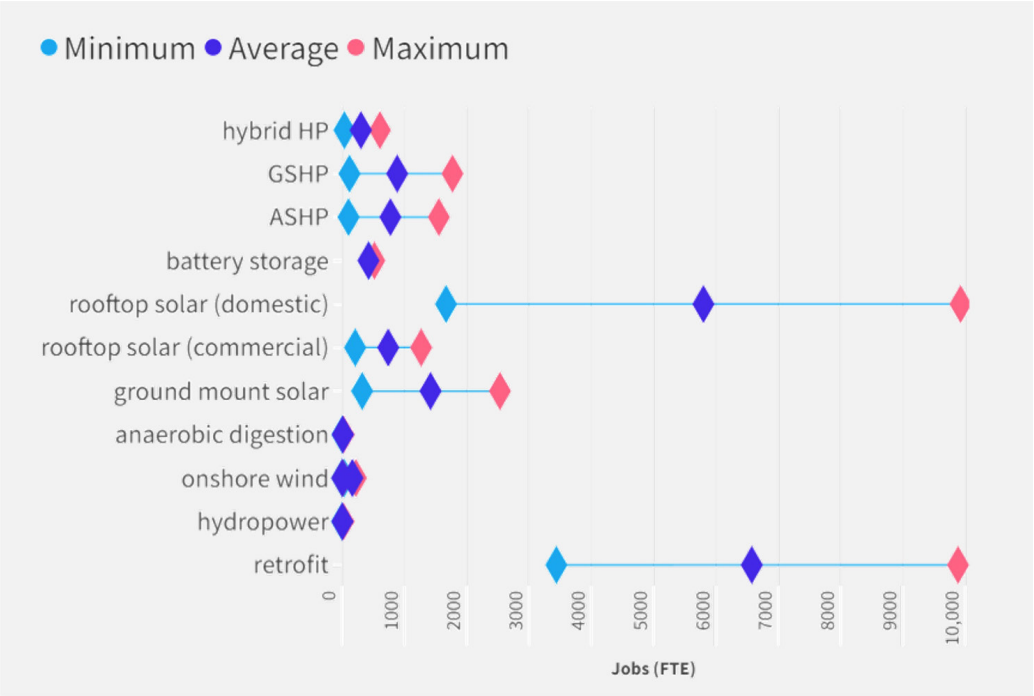
Estimated number of job (FTE) years from implementing Somerset's Net Zero Pathway

When estimating figures like FTE, there is always a range of uncertainty due to different methodologies and economies from which multipliers are calculated. The economic analysis and figures presented in this report present the average.

The graph here is included to display the range of uncertainty involved in using jobs multipliers. For example, rooftop solar and retrofit have large ranges among the multipliers found. Despite this, even the minimum in these two categories remains higher than any other low carbon development measure as part of the Net Zero Pathway. Therefore, regardless of the uncertainty of the degree of employment, these sectors are still likely to be the main sources of new jobs and skills in the county.



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