

# Local Area Energy Plan (LAEP)

Blaenau Gwent

Mae'r ddogfen hon ar gael yn Gymraeg /  
This document is also available in Welsh



# Abbreviations

Acronym	Definition or meaning	Acronym	Definition or meaning
CCGT	Combined Cycle Gas Turbine.	LDP	Local Development Plan.
CCR	Cardiff Capital Region.	LGV	Light Goods Vehicles.
DESNZ	Department for Energy Security and Net Zero.	LSOA	Lower super output area, a small area classification in the UK designed to have a comparable population.
DFES	Distribution Future Energy Scenarios.	LULUCF	Land Use, Land Use Change and Forestry.
DfT	Department for Transport.	MSOA	Middle super output area, a medium-sized area classification in the UK designed to have a comparable population.
ECOFLEX	Flexible Eligibility Energy Company Obligation.	NAEI	National Atmospheric Emissions Inventory.
EPC	Energy performance certificate.	NGED	National Grid Electricity Distribution.
ESC	Energy Systems Catapult.	REPD	Renewable Energy Planning Database.
EV	Electric Vehicle.	RFI	Request for Information.
FES	Future Energy Scenarios.	RIIO	Revenue = Incentives + Innovation + Outputs, a regulatory framework used by the UK energy regulator, Ofgem.
GHG	Greenhouse Gas.	RSP	Regional Skills Partnership.
HGV	Heavy Goods Vehicles.	RTP	Regional Transport Plan.
LAEP	Local area energy planning or Local area energy plan.	SMR	Steam Methane Reformation.

# Abbreviations

Acronym	Definition or meaning
SPEN	SP Energy Networks.
SWIC	South Wales Industrial Cluster.
TfW	Transport for Wales.
ULEV	Ultra Low Emission Vehicle.
WG	Welsh Government.
WGES	Welsh Government Energy Service.
WIMD	Welsh Index of Multiple Deprivation.
WWU	Wales and West Utilities.
ZEV	Zero Emission Vehicle.

# Contents

<a href="#">Abbreviations</a>	2
<a href="#">Foreword</a>	5
<a href="#">Local Area Energy Plan outline</a>	6
<a href="#">Executive summary</a>	7
1. <a href="#">Introduction</a>	13
2. <a href="#">The current energy system</a>	22
3. <a href="#">The future energy system</a>	34
4. <a href="#">Action planning</a>	49
5. <a href="#">Next Steps</a>	61
<a href="#">Glossary of terms</a>	66
<a href="#">Bibliography</a>	77

## Navigating this report

### Home icon

Clicking the Blaenau Gwent County Borough Council logo in the top right-hand corner of each page will return the reader to this contents page.

### Navigation to Sections

Readers can navigate to every section of the report by clicking on the desired section from this contents page.

### Navigation within the report

Throughout this document, clicking on underlined text will take the reader to the page referred to.

This Local Area Energy Plan was prepared by Arup, Carbon Trust and Afallen on behalf of Blaenau Gwent County Borough Council and co-ordinated across the region by the Cardiff Capital Region. Energy Systems Catapult is the Technical Advisor for the LAEP Programme in Wales.

The Plan's development was funded by the Welsh Government.

# Foreword

## A note from Councillor Helen Cunningham

This Local Area Energy Plan sets out the changes that need to happen if we are to achieve Net Zero in Blaenau Gwent. The crisis of climate change is pressing and urgent, and we are committed to taking action on both the climate and nature emergencies in collaboration with our partners. The actions and changes required to do this are significant. We are in no doubt that they will be challenging to achieve. However, the biggest crisis facing us demands that we rise to this challenge for the sake of future generations and the future of our planet.

This Local Energy Action Plan is a common frame of reference for taking forward responses to the climate crisis and planning for today and tomorrow. It does not contain complete solutions to the climate and nature emergencies, but it builds on the work done by the Climate Mitigation Steering Group and the Blaenau Gwent Climate Assembly. It is designed to be an evidence base for a roadmap to a Net Zero energy system.

The evidence in this plan underscores that just as local responses are essential, so are regional and national ones. Delivery of our commitment to reaching net zero is contingent upon wider changes at regional and national scales. It is not something we as council or Blaenau Gwent as an area can do alone. From increased harnessing of wind, water, sun and other renewable forms of energy, to energy grid reform and the accompanying energy infrastructure, it will take effort at every level to achieve a sustainable energy system.

Taking action on climate change and getting to Net Zero will affect all our lives in many ways. As part of a just transition, such action has the capacity to deliver benefits for improved health outcomes, better housing with lower energy costs and generation of local jobs. From heat pumps to electric vehicle charging infrastructure to ground source heat and increased use of

hydrogen and other emerging solutions, the transition to Net Zero offers exciting prospects. However, reaching a Net Zero energy system will require significant additional resources and support for our communities. Such a future energy system must also provide affordable energy and retain the benefits within our communities.

We look forward to working towards a Net Zero Blaenau Gwent in collaboration with our partners and communities.

*Councillor Helen Cullingham, Cabinet Member for Place and Environment & Deputy Leader*



# Local Area Energy Plan outline

This plan collates evidence to identify potential routes for Blaenau Gwent to reach a Net Zero Energy System

## Overview

As part of this project, three separate documents have been produced. This will ensure the content is accessible to a variety of audiences whilst also making it easier to find information relevant for the reader. These three documents are the:

- 1. Local Area Energy Plan** (*this document*) contains the overarching plan, focusing on the Blaenau Gwent's area-wide local energy plan and actions.
- 2. Technical Report** contains the graphs, charts, maps and supporting data for the results published in the Local Area Energy Plan. It also provides more detail about the approach to modelling and scenario analysis that we took. This report is available upon request.
- 3. Renewable Investment Prospectus** highlights short-term, regional and local renewable energy opportunities that have the greatest potential for delivery across the Cardiff Capital Region.

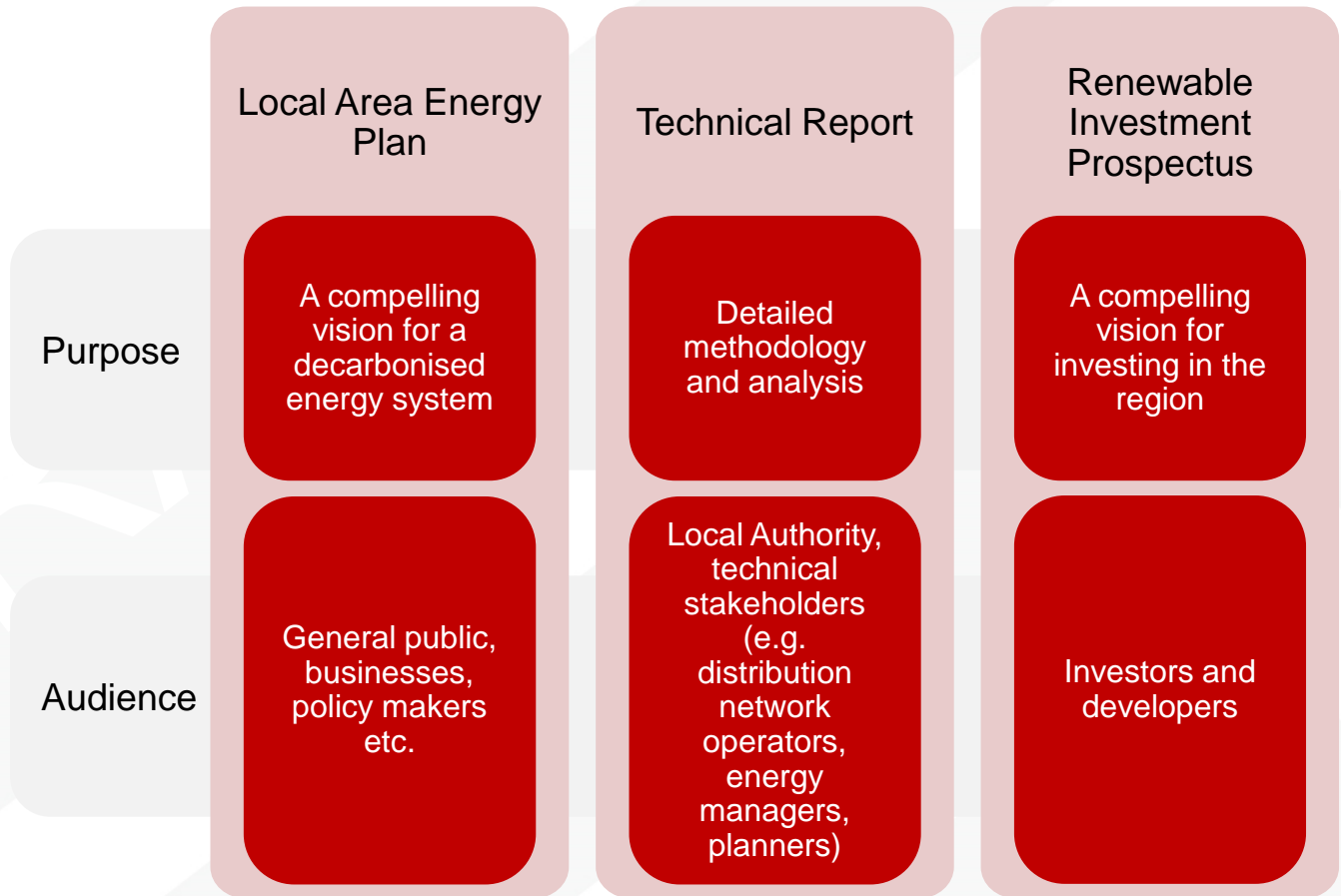


Figure 0.0.1: LAEP and support documents purpose and audience summary

# Executive summary

## Our vision for a Net Zero local energy system

### Overview

In 2020, Blaenau Gwent County Borough Council declared a climate emergency and committed to becoming a Net Zero council by 2030.

We also recognise the important role we have in providing local leadership, collaborating with other organisations, businesses, the community and residents, as we all try to realise our Net Zero ambitions. Our journey will contribute greatly to the council's 2030 target, the CCR Energy Strategy and Plan, in addition to the Welsh and United Kingdom targets to reach Net Zero by 2050.

This Local Area Energy Plan (LAEP) outlines a compelling vision for what a Net Zero carbon energy could look like in 2050 for Blaenau Gwent. Drawing on a robust evidence base developed during the LAEP's creation, an action plan has been produced to drive the transition of the local energy system towards Net Zero.

Net Zero when used in this LAEP is the energy Net Zero as it does not include all emissions, only energy emissions.

Our vision for Blaenau Gwent's future local energy system is to:

***“Develop a local Net Zero carbon energy system for Blaenau Gwent that supports the transition to a prosperous and attractive low carbon economy, achieving a better quality of life for all residents whilst protecting and enhancing the distinctive natural environment, culture and identity of the region.”***

By involving key local stakeholders throughout the LAEP development process, priority energy propositions were identified and local actions were proposed (Figure 0.2). These represent the areas where we need physical changes to the energy system. Delivery of the wider objectives of our plan will need to be supported by the right governance and engagement, policy environment and finance options.

It should be emphasised that continued support, and partnership working with a wide range of stakeholders will be required to deliver this plan and implement the change necessary to ensure Blaenau Gwent achieves Net Zero by 2050. This vision can only be realised with leadership and investment at a national level as well.



Figure 0.0.2: LAEP priority intervention areas for Blaenau Gwent

# Executive summary

## Overview of steps in developing a Local Area Energy Plan

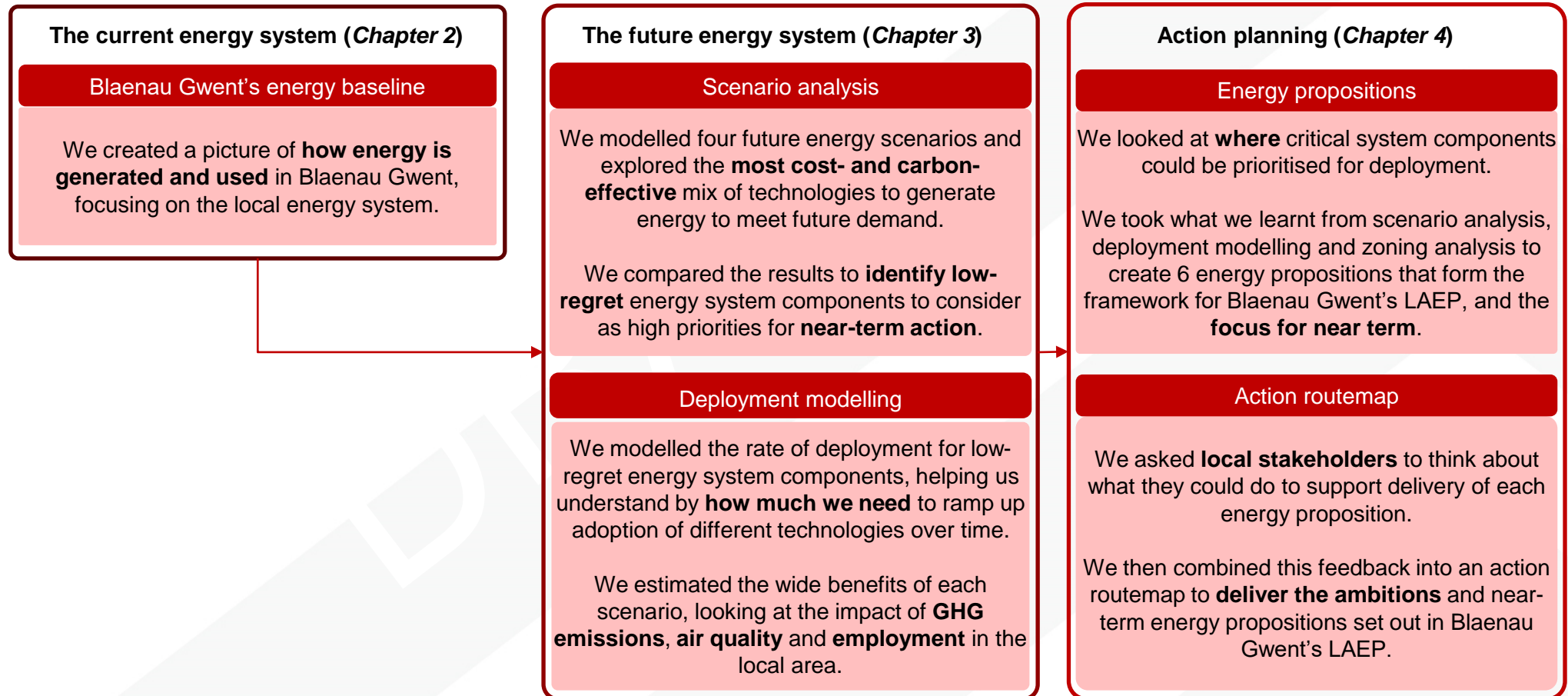


Figure 0.0.3: Summary of steps taken to produce the LAEP

# Executive summary

Blaenau Gwent's energy propositions in more detail

## Getting Our Buildings Future Ready

- Supporting and deploying energy efficiency measures across Blaenau Gwent to reduce energy demand and costs.
- Support residents retrofitting homes ready for low carbon heating.



## Low Carbon Travel

- Promoting active and sustainable travel.
- Enabling the rollout of electric vehicles across Blaenau Gwent and transition to an ultra-low emission public sector fleet.



## Green Energy

- Ensure resilient zero carbon energy supply for an environmentally friendly and sustainable retail and business environment.
- An energy transition that promotes learning and skills and delivers supply chain benefits in Blaenau Gwent.



## Green Economy

- Encouraging businesses to adopt low carbon measures and reduce energy costs.
- Create an attractive environment for sustainable businesses to make base in Blaenau Gwent.



## Research and Innovation

- Explore the potential of emerging technologies (e.g. hydrogen) to solve energy challenges in Blaenau Gwent.
- Host and participate in innovative zero carbon energy projects and trials.



## Energy Networks

- Grid reinforcement will be required to accommodate the shift towards electric vehicles and heating.
- Even in a low hydrogen scenario the gas grid will require repurposing for hydrogen within some applications.



Figure 0.0.4: Summary of energy propositions

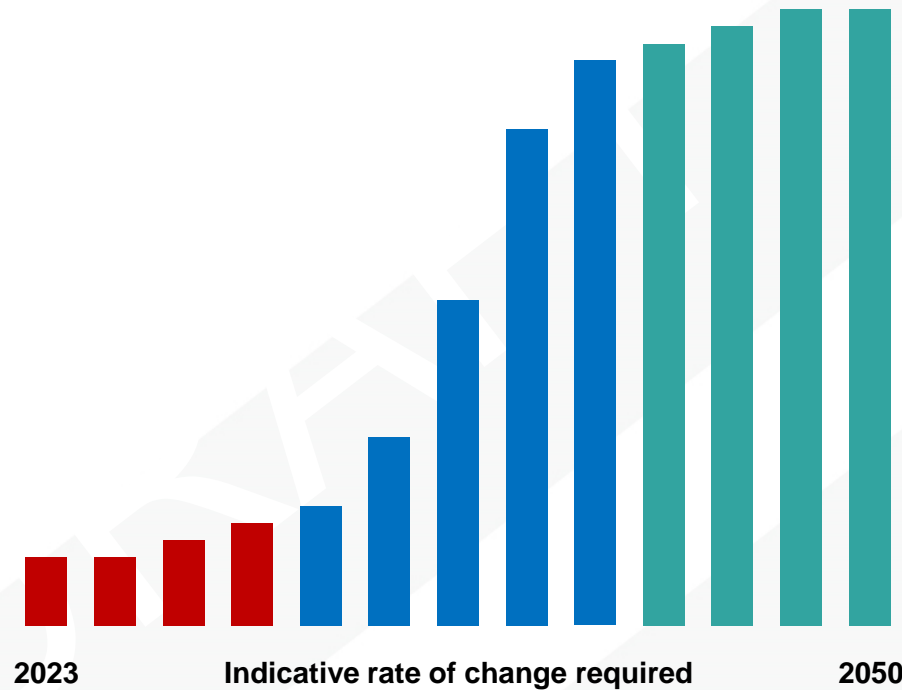


# Executive summary

Blaenau Gwent's local energy system will need to change significantly to achieve Net Zero by 2050

## Blaenau Gwent's local energy system today

- 7MW** installed capacity
- 180** public EV charge points
- 100** heat pumps installed
- 5,700** domestic properties EPC A-C
- 14MW** ground-mounted solar PV installed capacity
- 700** buildings with rooftop solar PV installed



## What Blaenau Gwent's Net Zero local energy system could look like in 2050

- 88MW** installed capacity
- 3,200 - 4,500** public EV charge points
- 14,200 - 29,100** heat pumps installed
- 24,300 - 37,200** domestic properties EPC A-C
- 265MW** ground-mounted solar PV installed capacity
- 25,900** buildings with rooftop solar PV capacity

**1** Between 2023 and 2030, we assume a slow but steady uptake of low carbon technologies due to factors such as limited awareness, higher capital costs, and the need for network reinforcement.

**2** From 2030 onwards, we assume that deployment accelerates as technologies become more commercially attractive, awareness increases, supply chains develop, and they become more affordable.

**3** From 2040 onwards, we assume that low carbon technologies are widely used and tend towards their maximum feasible adoption, which causes the deployment rate to stabilise.

# Executive summary

Achieving a net zero local energy system in 2050 aligns with the Well-being of Future Generations (Wales) Act 2015 and could lead to the following

## Direct impacts



### Emissions reductions

17 times less GHG emissions than in 2023



### Energy savings

Two times less energy used for heating buildings than in 2023

Two times less energy used for transport than in 2023

## Wider impacts

### Energy security and reliability

Diversified local energy supply improves energy security



### Air quality improvements

Reduced fossil fuel combustion from transport, heat and power improves air quality - up to £112m of cumulative savings by 2050



### Net job creation

Emerging net zero industries attract investment and create high quality local jobs – 3,500 jobs created cumulatively by 2050



### Affordability

Highly insulated homes reduce heat demand, improve affordability and reduce fuel poverty



## National well-being goals

Wales' Well-being of Future Generations (Wales) Act 2015, well-being goals










# Executive summary

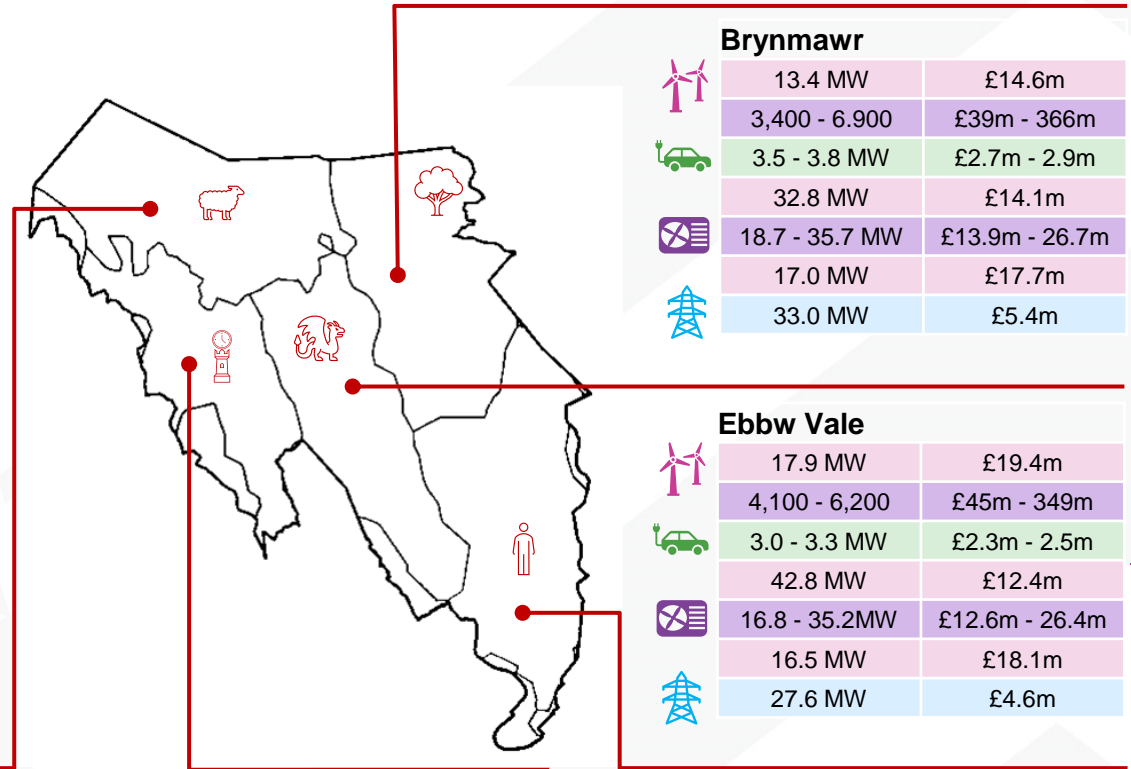
## Blaenau Gwent's locational breakdown for 2050

This graphic highlights the potential location, scale of rollout and cost of some key measures that are expected to be required within Blaenau Gwent's 2050 energy system. This system results from modelling to create the most cost and carbon optimal system. The range of values represent outputs from a Low and High Demand scenario, just two of five scenarios modelled. The scenarios produced are intended to provide models of a range of possible future Net Zero energy systems to help inform decision making, they are not intended as recommendations or targets for what should definitely happen.





\*Costs quoted using 2022 prices

**Key:**





	Onshore wind
	Insulation retrofits (# buildings)
	Public & private EV chargers
	Ground-mounted solar PV
	Heat pumps
	Rooftop solar PV
	Primary substation extra capacity required







**Brynmawr**

	13.4 MW	£14.6m
	3,400 - 6,900	£39m - 366m
	3.5 - 3.8 MW	£2.7m - 2.9m
	32.8 MW	£14.1m
	18.7 - 35.7 MW	£13.9m - 26.7m
	17.0 MW	£17.7m
	33.0 MW	£5.4m





**Ebbw Vale**

	17.9 MW	£19.4m
	4,100 - 6,200	£45m - 349m
	3.0 - 3.3 MW	£2.3m - 2.5m
	42.8 MW	£12.4m
	16.8 - 35.2 MW	£12.6m - 26.4m
	16.5 MW	£18.1m
	27.6 MW	£4.6m





**Rassau West**

	13.4 MW	£11.9m
	2,000 - 5,400	£24m - 285m
	5.2 - 5.4 MW	£4.1m - 4.3m
	50.8 MW	£21.9m
	19.3 - 37.4 MW	£14.5m - 28.0m
	33.4 MW	£36.1m
	25.2 MW	£4.2

**Tredegar**

	8.5 MW	£8.7m
	3,000 - 5,700	£22m - £279m
	2.0 - 2.1 MW	£1.6m - 1.7m
	26.2 MW	£11.3m
	15.1 - 26.5 MW	£11.2m - 19.7m
	17.9 MW	£19.2m
	18.7 MW	£3.1m

**Abertillery**

	21.9 MW	£23.3m
	5,300 - 6,200	£30m - 345m
	2.6 - 2.8 MW	£2.0m - 2.2m
	80.0 MW	£34.5m
	15.5 - 29.5 MW	£11.6m - 22.1m
	15.5 MW	£16.5m
	24.1 MW	£4.0m

# Executive summary

To deliver the LAEP, we have developed a series of actions and next steps that we'll need to take

## Action routemap

Although the exact form of the decarbonised energy system in 2050 is uncertain, there are actions we can take now with relative certainty that will help us maintain the ability to meet our 2050 Net Zero ambition and capitalise on the opportunities that this transition will bring.

Our action routemap takes each energy proposition and outlines critical, enabling actions that we will take collectively alongside our stakeholders in the coming decade, with a particular focus on what we can achieve in the next 5-7 years.

The sequencing of activities in the routemap is highly dependent on the political, regulatory and strategic context it has been created in. Therefore, we expect it to evolve over time and be regularly updated to make sure it stays relevant. Blaenau Gwent's routemap can be found in Chapter 4: Action planning.

## Next steps

**Progressing energy propositions:** For each prioritised proposition, we will undertake a series of development activities to progress towards delivery (such as feasibility studies, detailed technical and commercial development, business case, commercialisation and procurement).

**Governance:** Where possible, we will integrate oversight of LAEP delivery with existing governance structures. We will look to appoint a lead officer, to guide the delivery of the actions in this plan.

**Monitoring:** We will work with regional and national partners to develop a monitoring framework which builds on existing processes and helps us understand the progress Blaenau Gwent is making towards its committed actions and ambitions set out in this plan.

### Engagement & collaboration:

Many stakeholders with an interest and influence over the local energy system have come together to help shape this LAEP, and it is important that this collaboration continues as we deliver this plan. The development of this LAEP has brought those with interest and influence together.

Blaenau Gwent

# Chapter 1: Introduction



# 1. Introduction

## What is Local Area Energy Planning (LAEP)?

### Overview

#### Definition of a LAEP

A LAEP sets out the changes required to transition an area's energy system to Net Zero carbon emissions against a specified time. By exploring a range of technologies and scenarios through whole energy system modelling and analysis, the most cost-effective preferred pathway to Net Zero can be identified<sup>M01</sup>. The process follows standardised guidance defined by ESC.

Being data-driven and evidence-based, a LAEP uses a whole energy system approach that is led by local government and developed collaboratively with defined stakeholders. It sets out to identify the most effective route for the local area to meet its local Net Zero target, as well as contributing towards meeting the national Net Zero target<sup>M01</sup>.

A LAEP results in an indicative costed spatial plan that identifies the change needed to the local energy system and built environment, detailing what changes are required, where, when and by whom. The level of detail in a LAEP is equivalent to an outline design or masterplan and is intended to identify core areas that require focus over the next 25 years. It proposes future sector-specific action plan that sets out how each part of the area will be designed and built. Additional detailed design work will be required for identified specific actions, projects and programmes to

progress to implementation.

#### Vision of a LAEP

A LAEP defines a long-term vision for an area but should be updated approximately every 3–5 years (or when significant technological, policy or local changes occur) to ensure the long-term vision remains relevant.

#### Scope of a LAEP

The UK government's 2021 Net Zero Strategy estimates that **82% of the UK's emissions are "within the scope of influence of local authorities."**<sup>M02</sup>

The scope of a LAEP covers the current and projected future energy consumption and associated greenhouse gas (GHG) emissions, primarily focusing on an area's built environment (all categories of domestic, non-domestic, and industrial buildings), energy used for road transport (excl. energy used in rail, aviation, and shipping), local renewable generation and the energy networks needed to support this consumption.

Elements included in a LAEP are:

- Electricity, heat and gas networks
- The future potential for hydrogen
- The built environment (industrial, residential, and commercial), its fabric and systems,

- Flexibility (in terms of shifting when demand is placed on the grid), and the storage and generation of energy,
- Providing energy to decarbonised transport (i.e., the electricity required for electric vehicle charging infrastructure).

It identifies near-term actions and projects, providing stakeholders with a basis for taking forward activity and prioritising investments and action. Site-specific data is used where available, with remaining areas covered by nationally available dataset.

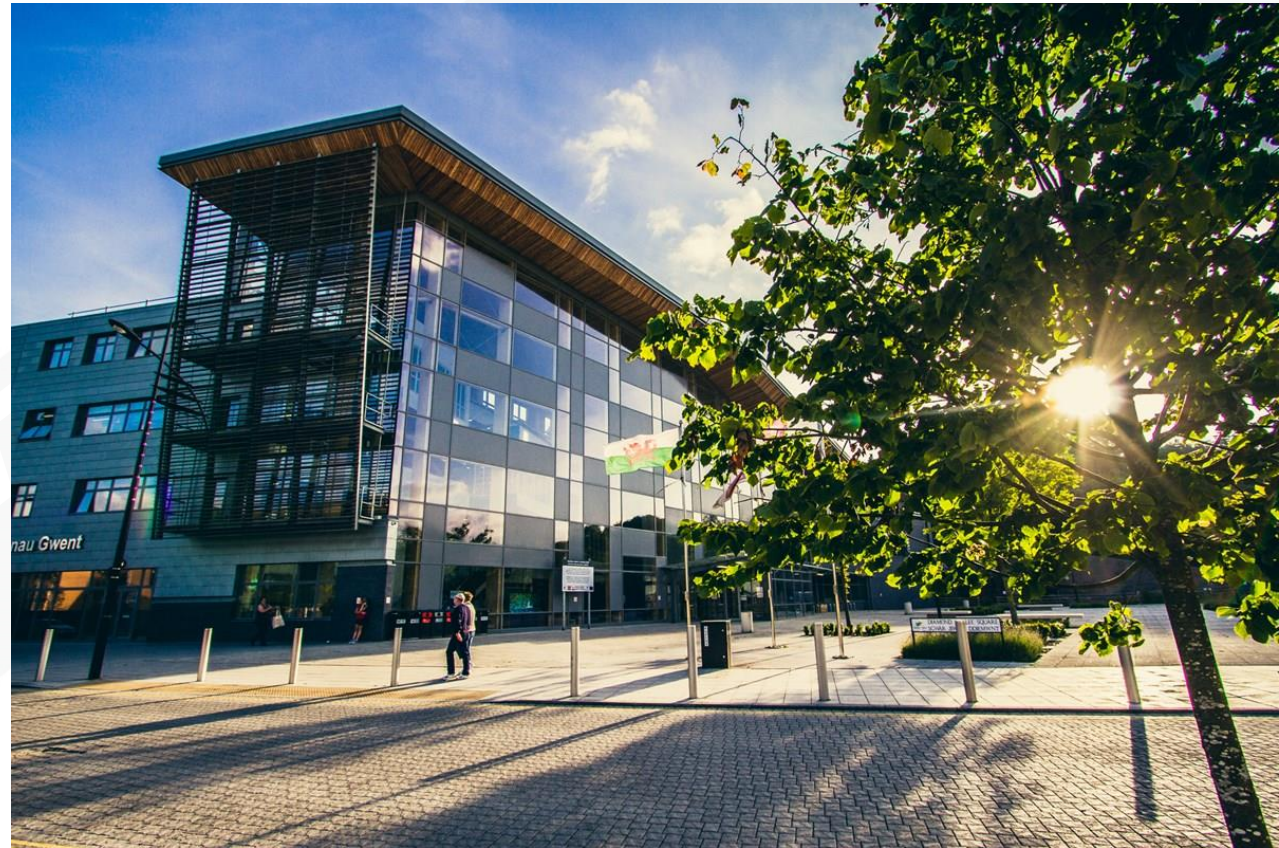
#### Benefits of a LAEP

A LAEP provides a long-term plan to deliver Net Zero. A benefit of LAEP is the 'whole systems approach', aligned to the Wellbeing of Future Generations Act "way of working" on integration. This provides consideration to the most cost-effective solutions to future energy system at the right time. For example, deploying different heat decarbonisation technologies to avoid a high-cost upgrade of the electricity network. By working closely with local stakeholders, incorporating their data, knowledge and plans, a LAEP is built on a common evidence base. The outputs can then be used reliably by stakeholders from Blaenau Gwent planners to network operators to community groups, knowing they are working towards a common goal built on strong foundations.

# 1. Introduction

## About this programme

The Welsh Government commissioned LAEPs for all Welsh local authority areas. The production of this plan was co-ordinated regionally by Cardiff Capital Region, including the appointment of the consultants Arup, Carbon Trust and Afallen who prepared this plan on behalf of Blaenau Gwent County Borough Council. The plan covers the energy system of Blaenau Gwent as a geographical area, so delivering it will require action by a wide range of partners (and the public). Local authorities are the lead organisation for LAEPs due to their place shaping role and ability to provide democratic accountability. The LAEP provides a 'roadmap' towards a Net Zero energy system in Blaenau Gwent for all partners. It also sets out local actions as the next steps of this transition, a transition that will also require significant change and investment at the national level.



# 1. Introduction

## Our vision for Blaenau Gwent's future local energy system

### Future energy system vision, objectives and principles

We have produced the following vision statement that underpins our ambition for the future Net Zero energy system in Blaenau Gwent:

In shaping the LAEP for Blaenau Gwent, we established the following objectives. These objectives served as foundation elements that were considered when formulating recommended actions:

#### Blaenau Gwent's vision

**Tackle the climate emergency by transitioning to a Net Zero carbon energy system which improves homes, transport and job opportunities in Blaenau Gwent, whilst protecting our distinctive natural environment, culture and identity.**

#### Energy objectives

1. A resilient energy system capable of meeting Blaenau Gwent's future energy needs.
2. The benefits of renewable energy development retained within Blaenau Gwent through local ownership and community participation.
3. An energy transition that supports jobs and supply chains in Blaenau Gwent.
4. Affordable zero carbon energy for residents and businesses.
5. An energy transition that improves the quality of homes and transport.

# 1. Introduction

## The energy transition across Wales

### Overview

The Welsh Government's "[Net Zero Wales](#)" plan<sup>M03</sup> establishes an increased level of ambition on decarbonisation, with a legally-binding target to reach Net Zero emissions by 2050. It is the first national government to fund the roll-out of LAEPs to all its local authorities. The programme is being coordinated through a regional approach, where LAEPs are being developed for local authorities in Mid Wales, South West Wales, North Wales and the Cardiff Capital Region. The rationale for taking this approach was because there are efficiencies on data collection and management, as well as reinforcing the links between the regional and local plans to maximise opportunities across LA areas and between regions.. Several suppliers have been selected to produce the LAEPs for each region, as detailed in the map.

To contribute to the Welsh Government's commitment of producing a "National Energy Plan" in 2024, upon completion of the LAEP programme Energy Systems Catapult<sup>M04</sup> will aggregate the LAEPs into a national view. To support this task, they are working with the Welsh Government to create and import standardised LAEP outputs for aggregation into the DataMapWales platform<sup>M05</sup>. The Catapult is also providing technical advisory support to the Welsh Government throughout the programme.

The LAEPs will also form the basis of the 'National Energy Plan' Welsh Government has committed to produce in 2024.

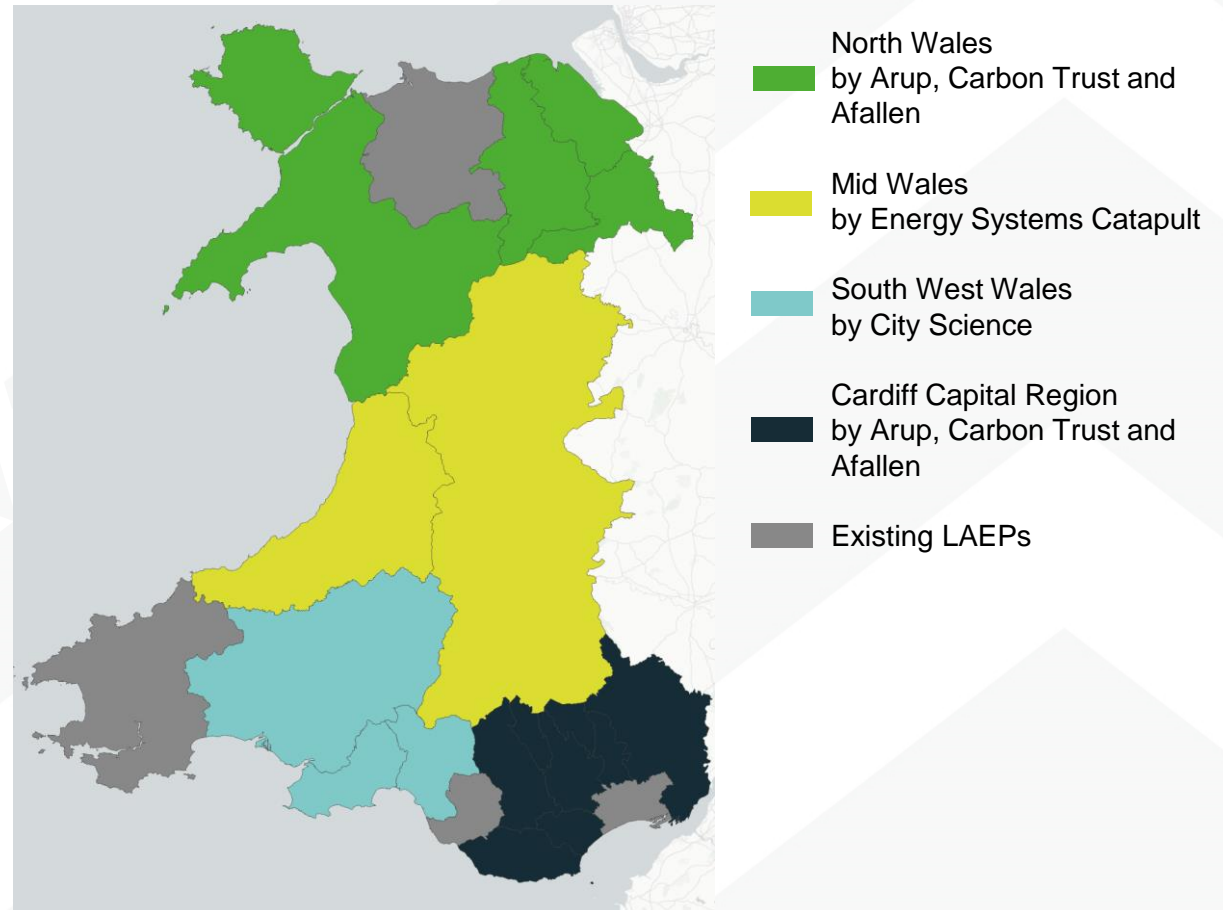


Figure 1.0.1: LAEP landscape across Wales

# 1. Introduction

## Boundary and scope

### Parts of the energy system analysed in a LAEP

A LAEP considers energy use, supply and generation within the Blaenau Gwent boundary.

There are three core parts to the local energy system:

- **Infrastructure** – The physical assets associated with the energy system such as electricity substations.
- **Supply** – Generation (renewable and non-renewable), storage and distribution of energy to local consumers for use in homes, businesses, industry and transport.
- **Demand** – The use of energy driven by human activity e.g. petrol/diesel used in vehicles, gas burned for heat in homes. required for the energy system to operate.

The whole energy system across all sectors is considered in the planning process to ensure that the interactions and dependencies between generation and use of different energy sources are fully considered. This identifies where different systems can work together to improve the overall resilience and flexibility of the energy system.

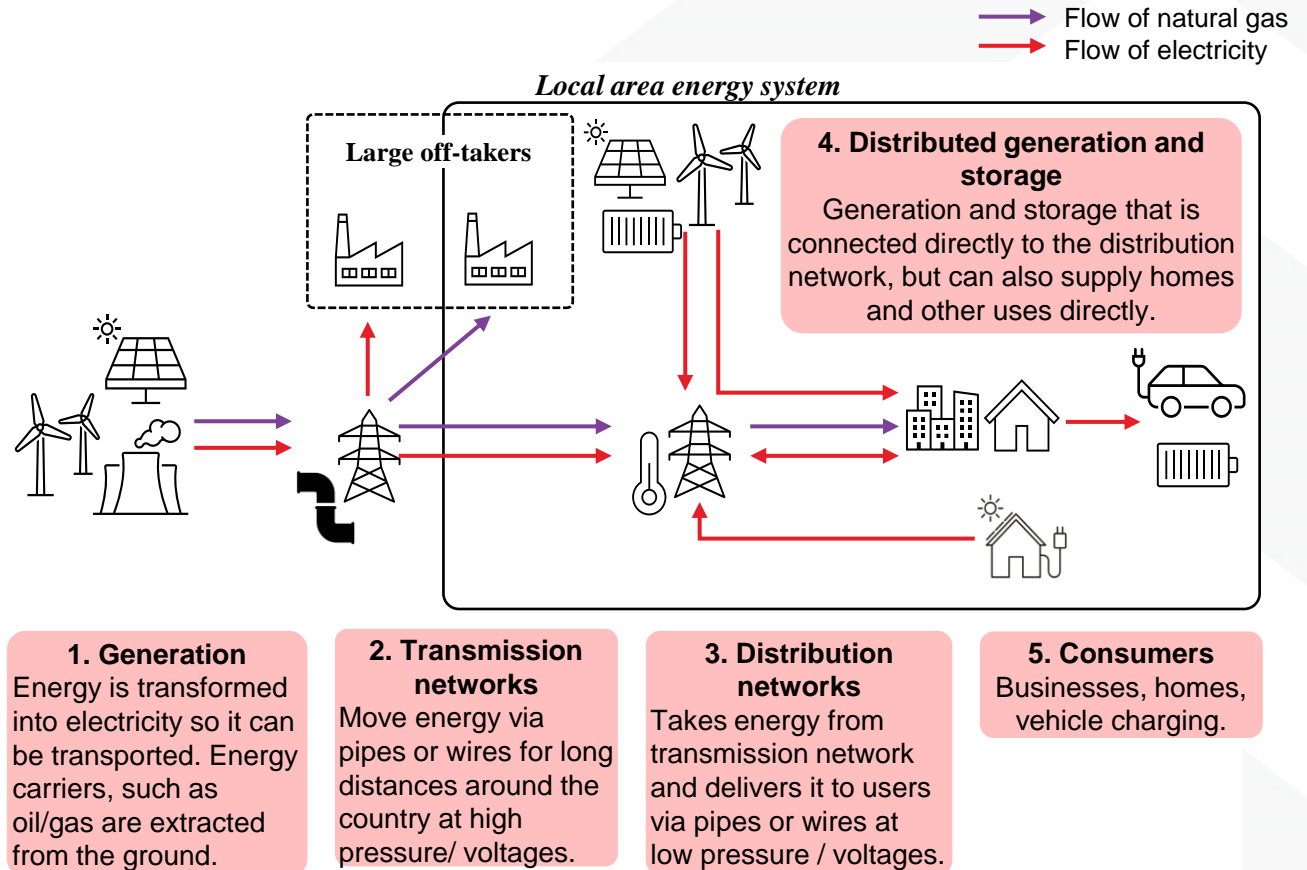


Figure 1.0.2: Schematic of electricity and gas transmission and distribution network and the system boundary for LAEP

# 1. Introduction

## Boundary and scope

### Definitions

#### Scope for the Welsh LAEPs

The diagram to the right indicate the parts of the local energy system which are in-scope for the LAEPs across Wales. This scope is defined by ESC's LAEP Guidance<sup>M01</sup>.

#### Geographic boundary

We used the geographic boundary for Blaenau Gwent to set the boundary for the LAEP, which meant that any energy generating assets, energy use and infrastructure in that boundary were considered for inclusion in the LAEP.

#### Exclusions from the LAEP

LAEP does not consider aspects of the energy system which are expected to be overseen by central government, or any non-energy sources of greenhouse gas (GHG) emissions occurring within the Local Authority's governing boundary (for example, emissions from industrial processes, agricultural land use and livestock are excluded. Energy used for shipping, aviation and rail are excluded on the basis that they are not local uses of energy. Large electricity generators connected to the transmission network are considered national assets and excluded. (such as offshore wind, grid scale batteries, hydrogen SMR) are considered national assets and excluded from the modelling, however these are likely to play an important role in Blaenau Gwent's decarbonisation journey.

■ In scope of LAEP  
 ■ Out of scope of LAEP

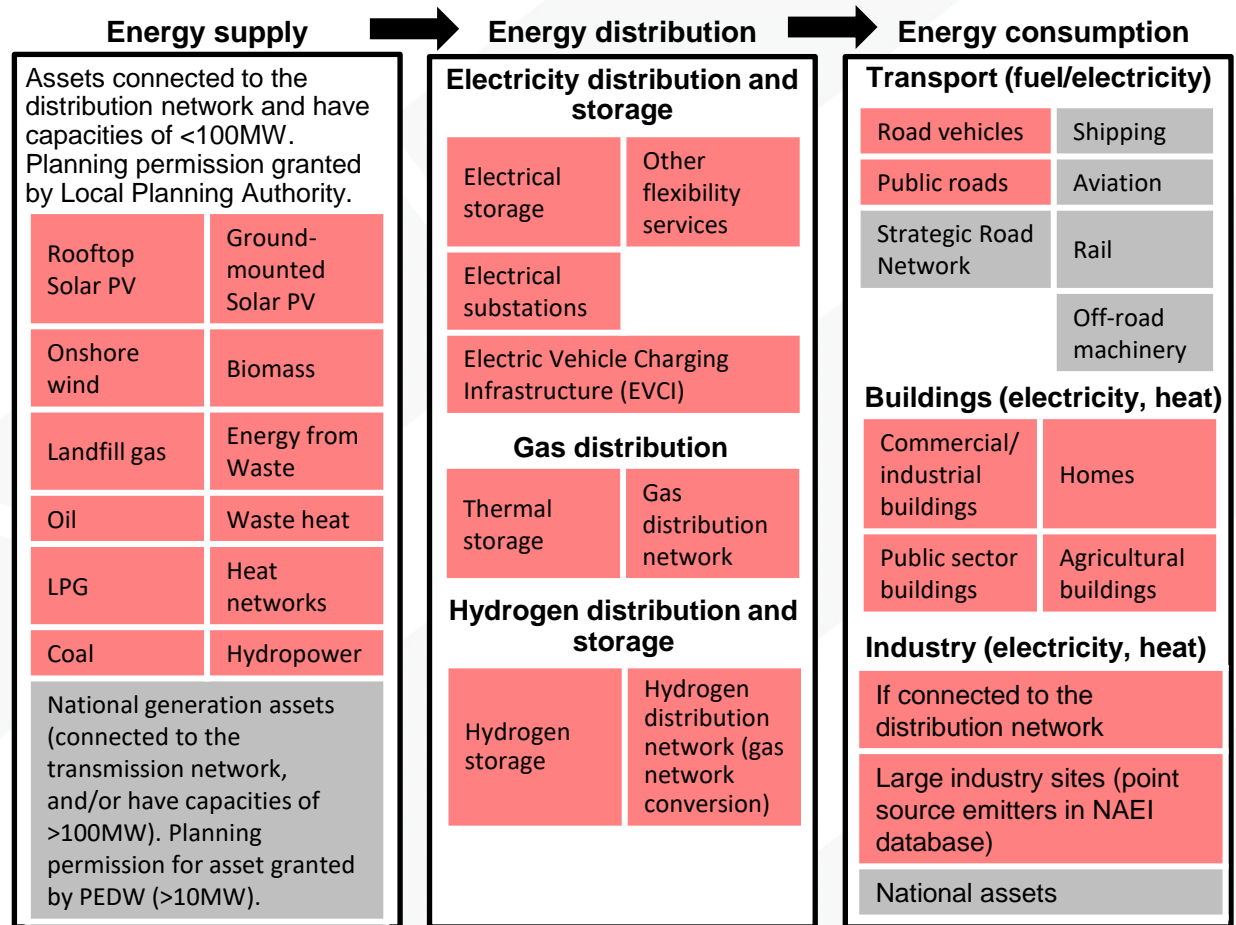


Figure 1.0.3: Schematic of the local system scope for LAEP

# 1. Introduction

## LAEP contents

This LAEP presents a vision for a Net Zero local energy system for the whole Blaenau Gwent area, with a route map to get there, including a set of recommended actions for the Blaenau Gwent, whilst recognising the role of other key actors in government, the energy sector and across the community.

## Plan structure

This plan is structured into four main topic areas:

1. **The current energy system** - description of Blaenau Gwent's existing energy system and relevant policies and objectives.
2. **The future energy system** - presentation of future scenarios for a Net Zero local energy system, including risks and "low regrets" measures, which are very likely to be part of the future energy system regardless of uncertainty around certain aspects of the future.
3. **Action planning** - a route map and action plan for us to use to drive the local energy system transition in Blaenau Gwent, including what needs to happen and what we will do.
4. **Next steps** – outlines immediate next steps and what is needed to create an enabling environment for the delivery of this plan, and a Net Zero local energy system.

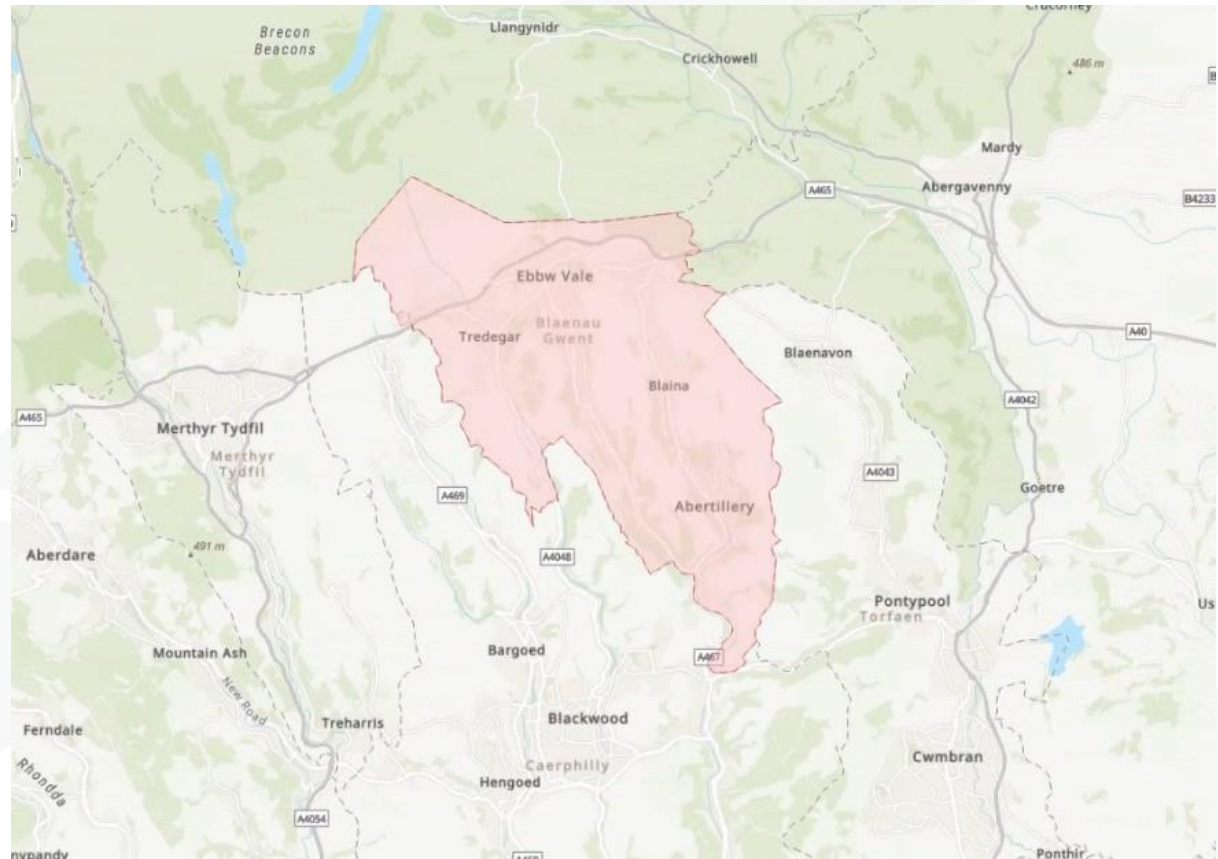


Figure 1.0.4: Geographic boundary for Blaenau Gwent's LAEP

# 1. Introduction

## Blaenau Gwent's transition

Through the development of Blaenau Gwent County Borough Council's other plans and strategies, we have developed sets of key principles, priorities and outcomes to be maintained within the LAEP; these align to the Council's core values:

- Respectful
- Inclusive
- Collaborative
- Accountable
- Supportive

### Corporate Plan

1. Maximise learning and skills for all to create a prosperous, thriving, resilient Blaenau Gwent.
2. Respond to the nature and climate crisis and enable connected communities.
3. An ambitious and innovative council delivering quality services at the right time and in the right place.
4. Empowering and supporting communities to be safe, independent and resilient.

### Blaenau Gwent County Borough Council Decarbonisation Plan

1. **Just transition:** Ensuring that the benefits of decarbonisation are fairly distributed and supporting those who may lose out. A just transition is not only desirable but may be the only way decarbonisation can be achieved.
2. **Co-Benefits:** Considering how decarbonisation can deliver other benefits. This includes identifying both potential cost savings and priorities for investment; protecting and enhancing biodiversity; and ensuring the needs of the present are met without compromising the ability of future generations to meet their own needs.

### Local Development Plan – Preferred Strategy

1. Create a network of sustainable vibrant valley communities.
2. Create well-connected, active and healthy communities.
3. Create opportunities for a prosperous low carbon economy and promote learning and skills.
4. Protect and enhance the distinctive natural and built environment.

Blaenau Gwent

## Chapter 2: The current energy system



# 2. The current energy system

## Policy and funding context

Net Zero Wales is the Welsh Government’s emissions reduction plan for the current carbon budget period between 2021-2025. This is a statutory document required by the Environment (Wales) Act, which sets out policies and proposals to help Wales meet its carbon budget and be on track to meet its legally binding Net Zero target for 2050. The Well-Being of Future Generations (Wales) Act is in place to ensure that this transition fosters greater equality and positive outcomes for all.

There are a range of strategies and policies at Welsh and UK level that will influence how Wales transitions to a Net Zero energy system in the next 25-30 years. Devolved powers vary across the different parts of the energy system.

Using our own statutory powers, we, as a Local Authority, have also established plans and policies relating to decarbonising energy use across our own operations, and have started to look further to how we influence changes in our local communities through our place-making role.

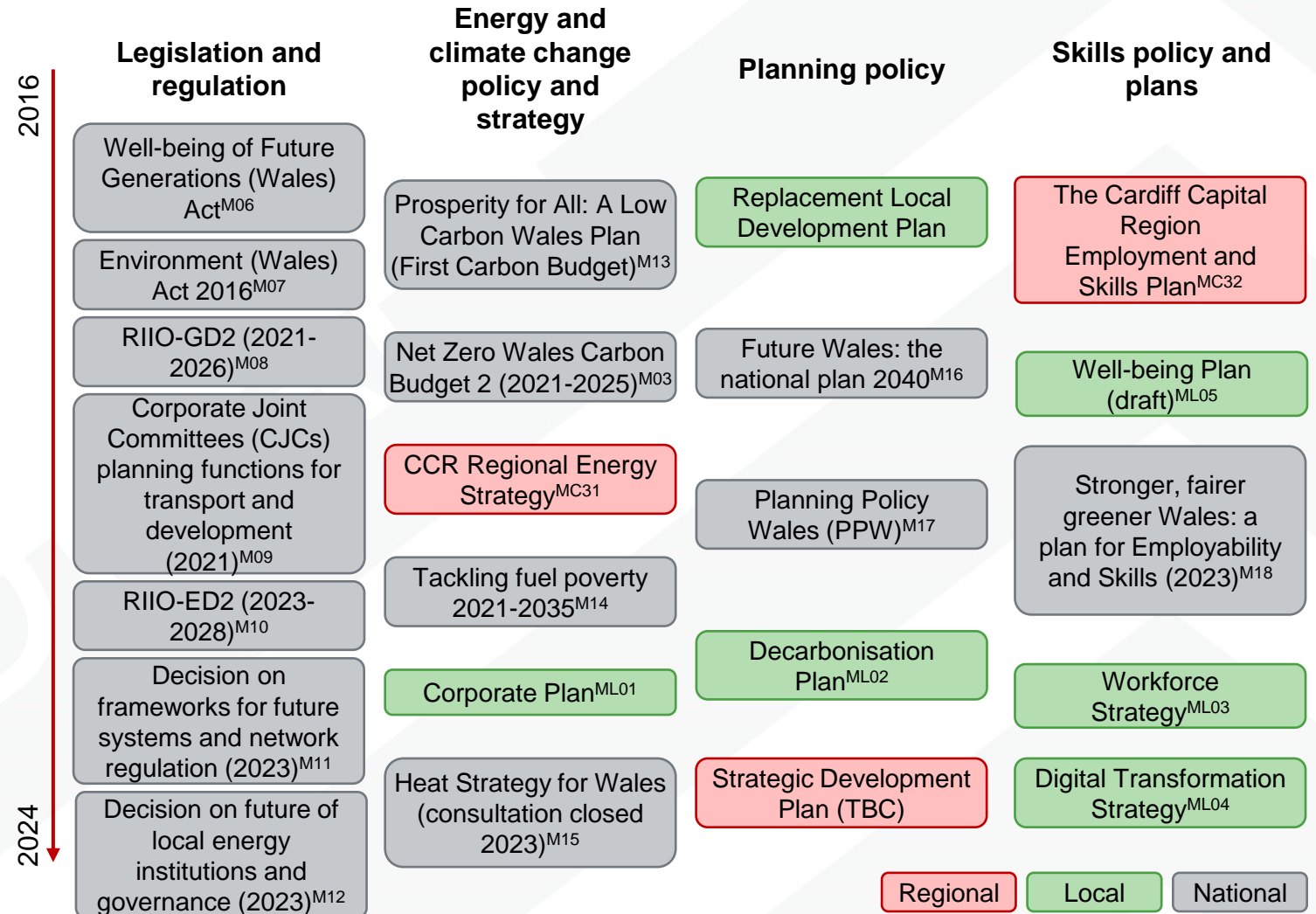


Figure 2.0.1: Summary of cross-cutting regulation / policies at local, regional and national level.

# 2. The current energy system

## Policy and funding context

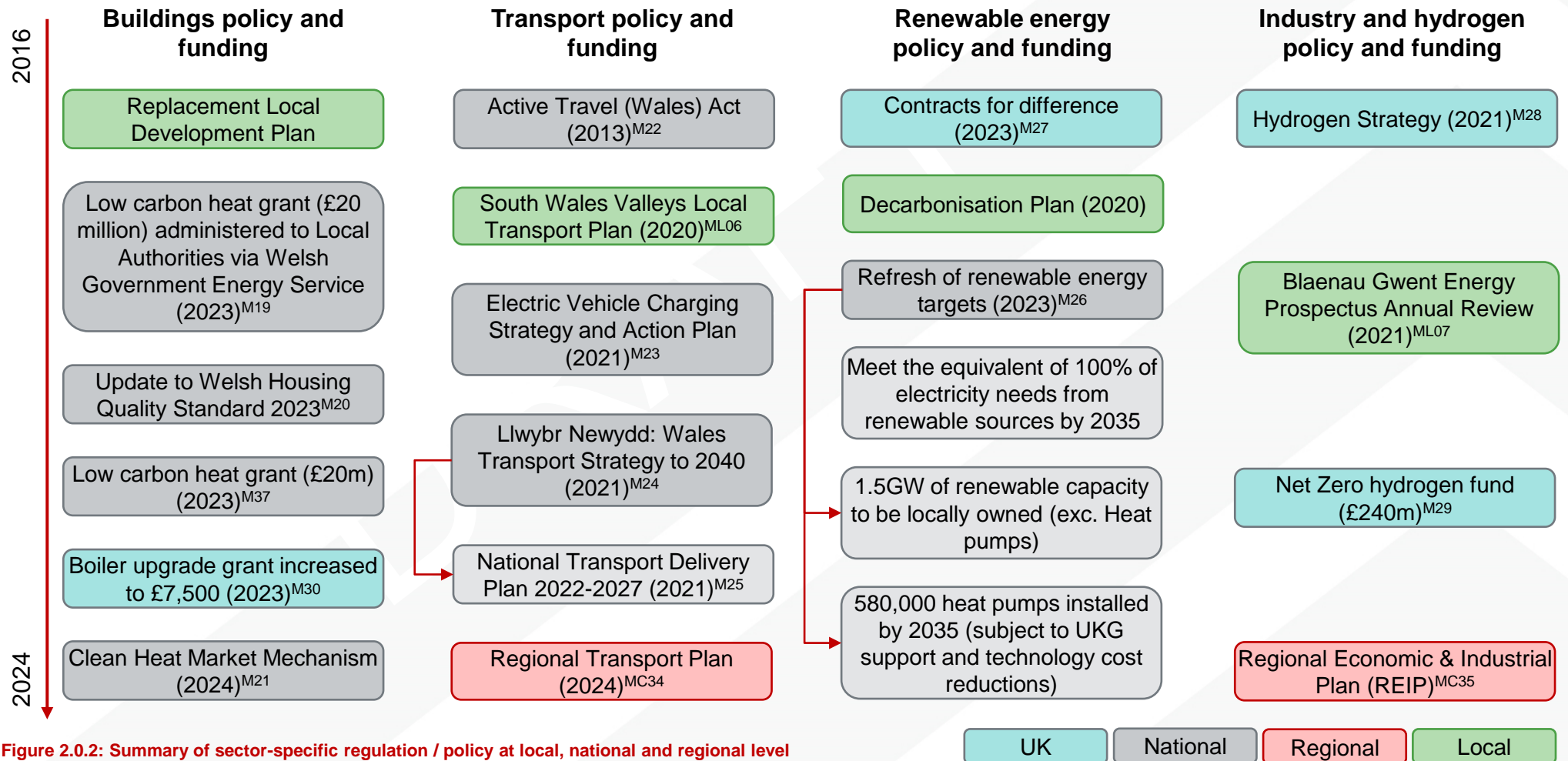


Figure 2.0.2: Summary of sector-specific regulation / policy at local, national and regional level

# 2. The current energy system

## Our collaborative approach to developing and delivering our LAEP

### Stakeholder engagement approach

Delivering our LAEP calls for a collective effort from all types of organisations in and beyond the local authority boundary. Local energy system extends beyond Blaenau Gwent’s influence which is why stakeholder engagement is the foundation for the development of our LAEP.

We prioritised stakeholders based on their level of local influence and / or knowledge of specific elements of the local energy system and their role in the development of the LAEP. The importance of recognising the involvement of regional stakeholders emerged early in the LAEP. They have a unique role, ensuring cohesion of action for specific element(s) of the energy system across neighbouring LAEPs in the same region and offering regional efficiencies where local objectives are aligned.

We engaged stakeholders at different stages of the development process to make sure stakeholders could help shape the plan and key development milestones. Regional steering groups were held for the Cardiff Capital Region, attended by the regional and local authority leads, as well as bi-weekly meetings with the local authority leads. Three workshops were held

regionally and involved primary stakeholders from across each local authority in the Cardiff Capital Region. These workshops were used at stages where it was important to agree a way forwards that was appropriate for the region, as well as each local authority.

As part of the overarching programme, a national forum brought together all suppliers, local authority leads, the regional leads, Welsh Government and the Technical Advisor to share learnings and maintain a consistent approach across Wales. The suppliers and regional leads also had regular catch-ups to share assumptions and challenges.

*This report is accompanied by a **Technical Report** which includes more detailed information on the analysis methodology and engagement of stakeholders throughout the plan’s development.*

Sector	Examples of stakeholders engaged
Buildings	Housing developers
Transport	Transport providers
Renewable energy generation	Energy project developers Community energy groups, landowners
Industry and private sector	Local businesses, larger industrial players
Community engagement	Social enterprises
Networks	Distribution Network Operators, gas distribution networks
Public sector	Public service providers, Welsh Government, educational institutions

**Figure 2.0.3: Summary of stakeholders**

Blaenau Gwent

## Chapter 2: The current energy system

Blaenau Gwent's energy baseline



# 2. The current energy system

## Blaenau Gwent's energy baseline

### How to read a Sankey diagram

This section provides a detailed overview of the local energy system baseline, and describes the methodology and assumptions used to understand current energy infrastructure, what types of energy are used, what technologies are used to convert it from one form to another (e.g. heat) and how much is consumed.

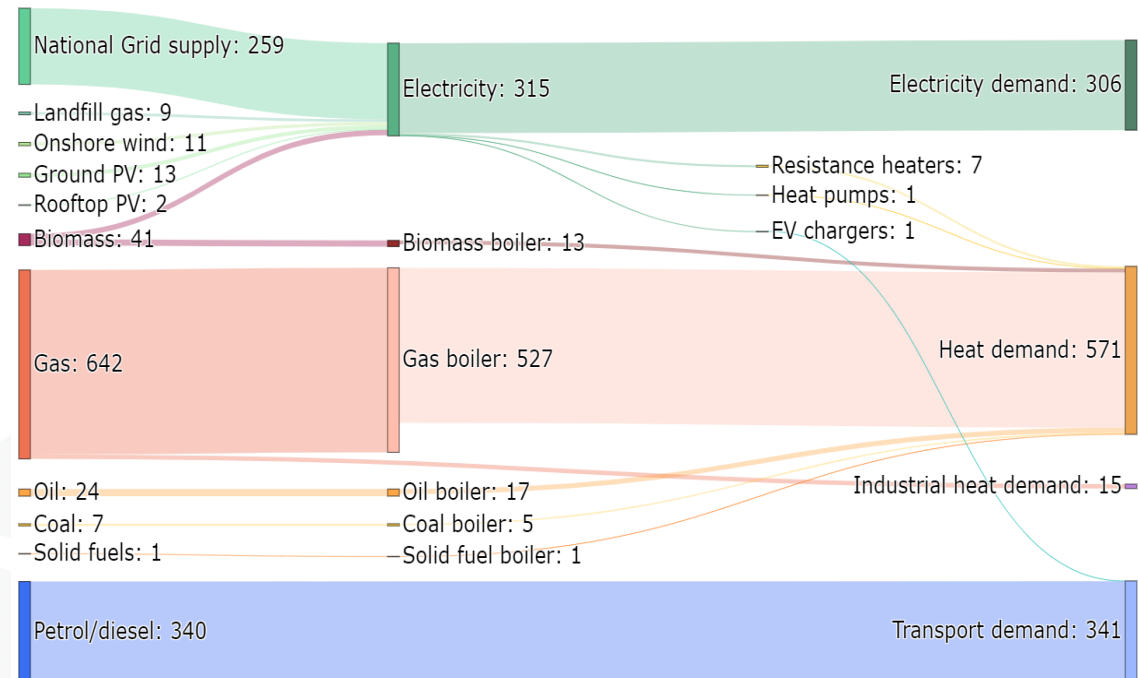
Results presented reflect the energy baseline in Blaenau Gwent in 2023, apart from the transport (2015 for CCR) and industry data (2019). Transport and industry datasets are the least likely to have changed in terms of electrification over the years 2019 to 2023, and transport is the most likely dataset to have changed due to COVID-19.

Sankey diagrams are a way of visualising energy transfer from energy sources to energy demands via energy vectors or conversion technologies.

They are read from left to right and show a snapshot of a scenario in time e.g., 2050

Energy transfers are drawn to scale and so are helpful to identify the size of each transfer and compare different scenarios.

The average Welsh home uses 3,300kWh/year of electricity, which is 0.003GWh for comparison with the scale on the Sankey. In terms of gas, a typical home uses 12,000kWh/year, which is 0.0012GWh for comparison with scale on the Sankey<sup>M40</sup>.



1. Where the energy comes from

This side represents the different **energy sources**, including generation technologies and imports from the national grid

2. How the energy is being converted

3. Where the energy is being used

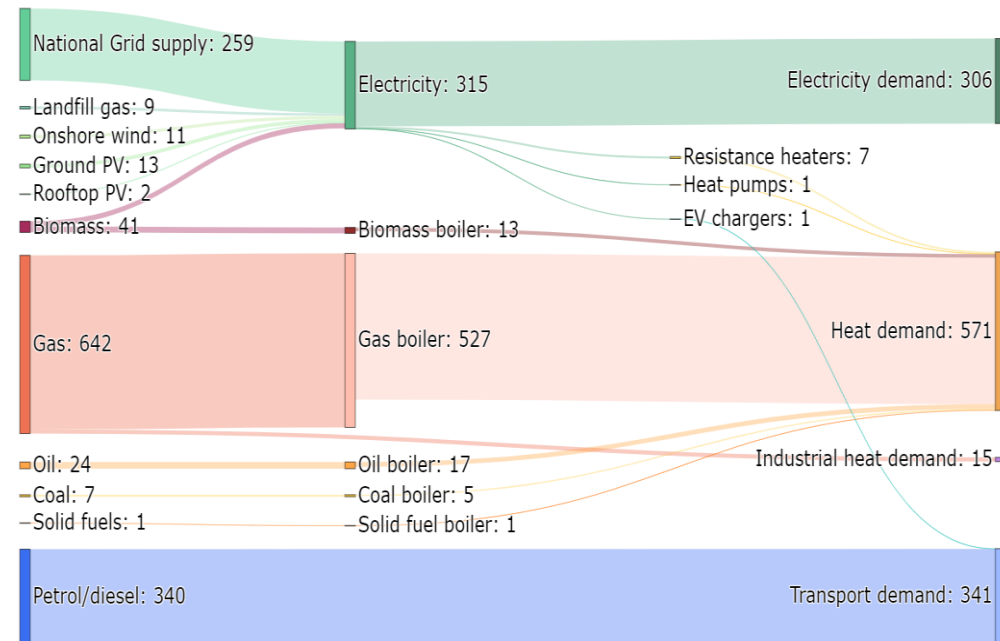
This side represents the **final demands** for each energy vector: heat demand, electricity, demand, transport demand.

Figure 2.0.4: How to read a Sankey diagram (units are GWh/year)

# 2. The current energy system

## Blaenau Gwent's energy baseline

### Energy demand



#### Industry

**41%** of natural gas is consumed by industrial; and commercial sources. This compares to 39% nationally.

Major industries include minor power production and electrical engineering.

#### Transport

**66%** of fuel consumed is diesel, with the remainder being petrol. The national split is 70% diesel.

**70%** of households own a car, compared to 76% nationally.

**73%** of energy used by personal transport (buses, cars and motorcycles), the remaining 27% of energy is used by freight transport.

**Less than 1%** of vehicles are electric or plug in hybrid, this compares to less than 2% across the UK.

#### Electricity

Majority of electricity supplied through National Grid – **82%**.

Local renewables supply **18%** of electricity.

**25%** of total energy demand is electricity, this compares to 16% nationally.

#### Heat

**46%** total energy demand used for heat, compared to 45% across the UK.

**97%** of heat demand from domestic and commercial sites, compared to 76% across the UK.

**34%** of properties achieve an A-C EPC rating.

Figure 2.0.5: Sankey diagram showing energy input, conversion and output in Blaenau Gwent in GWh/yr

# 2. The current energy system

## Blaenau Gwent's energy baseline

### Energy demand by sector

#### Transport

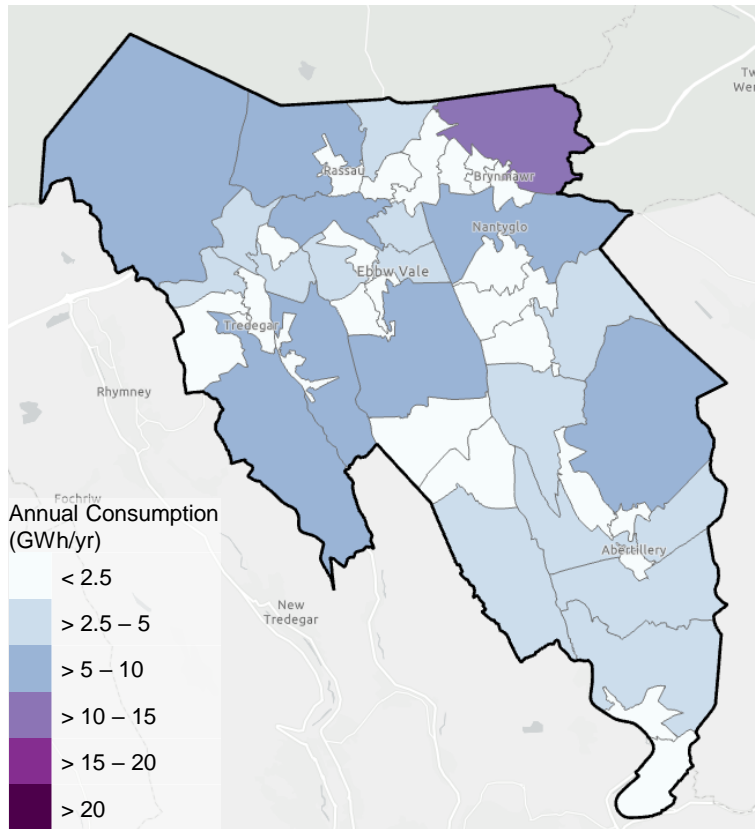


Figure 2.0.6: Transport energy consumption (combined total across cars, light goods vehicles (LGV) and heavy goods vehicles (HGV)) by LSOA, in 2015 as a baseline year

**Left:** Transport demand varies across the local authority. However, peak areas of consumption tend to align with the A465 and larger towns (Ebbw Vale, Abertillery, Tredegar).

**Right:** Heat consumption is greatest in the central Ebbw Valley, with the highest consumption in the Rassau area. This is expected given the location of larger towns and industrial estates there.

Major industrial point loads are situated in and around the Rassau industrial area, and include companies such as: Continental Teves, Yuasa Battery, and Ogmor Power.

#### Buildings & Industry

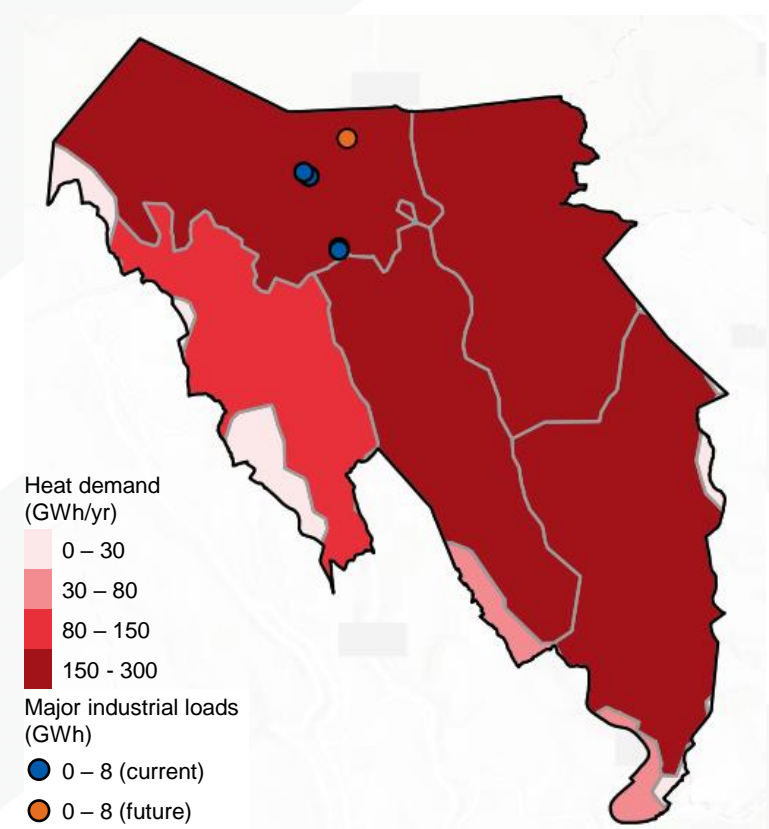
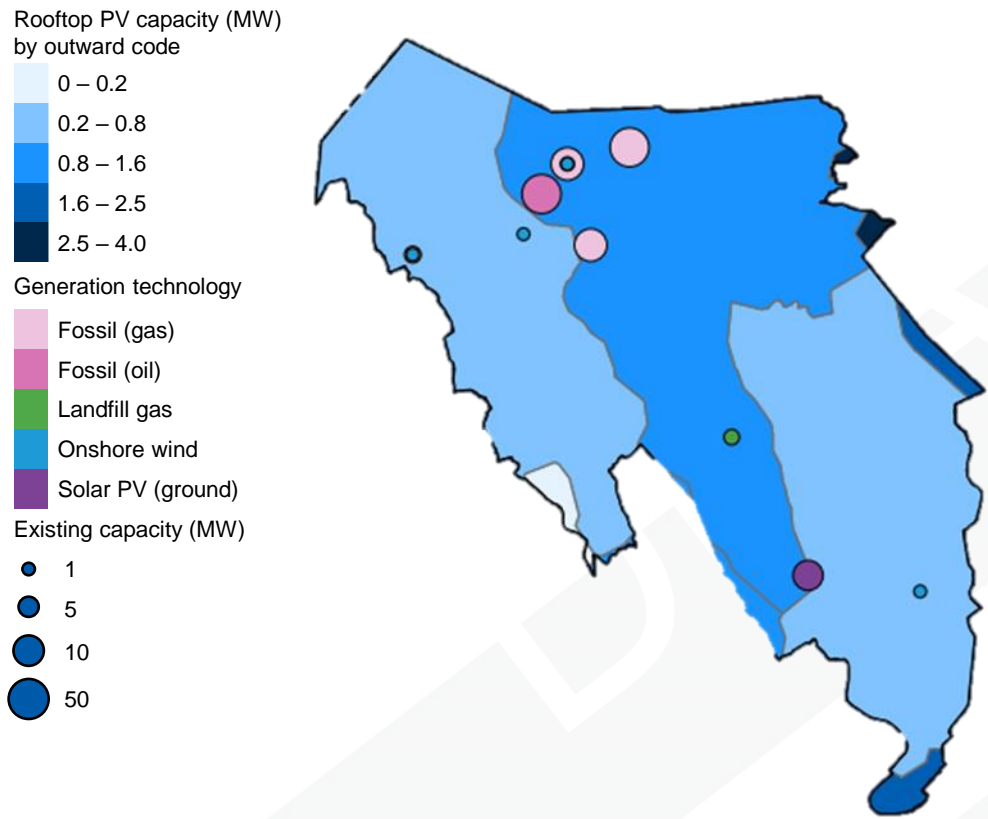


Figure 2.0.7: Major industrial loads (2019) and heat demand (2023) by substation zone across Blaenau Gwent

# 2. The current energy system

## Blaenau Gwent's energy baseline

### Energy generation



Electricity generation

**100MW** total electricity generation capacity from a range of different technologies

**74MW<sub>e</sub>** total fossil fuel powered generation capacity, from three gas power plants and one oil fuelled power plant:

- Ogmore 16MW<sub>e</sub>
- Brecon Power 21MW<sub>e</sub>
- Nevern Power 16MW<sub>e</sub>
- Clyne Power 16MW<sub>e</sub>

**3.5MW<sub>e</sub>** onshore wind generation capacity

**16MW<sub>e</sub>** solar photovoltaic capacity from ground-mounted and rooftop installations. The majority generated by Hafod-y-Dafal farm which has a capacity of 14MW<sub>e</sub>.

**2.7MW<sub>e</sub>** landfill gas at Silent Valley

Heat generation

Majority of heat is generated through gas boilers – **94%** of all heat within the local authority

One heat network currently exists at The Works powered through a combination of gas fired and biomass wood pellets CHP system. There is opportunity to connect more loads to the network as the Works business site expands.

Figure 2.0.8: Local energy generators and their respective capacities (MW) and domestic and non-domestic rooftop solar PV (MW) by outward code (2023)

# 2. The current energy system

## Blaenau Gwent's energy baseline

### Networks and infrastructure

Figures 2.9 and 2.10 display primary substation's generation and demand headroom across Blaenau Gwent. A primary substation is a unit within the local electricity network that provides power to a specific area (individual colour patches in the diagrams). Headroom is a measure of the amount of 'spare' electrical capacity available at a primary substation. Looking at the demand (using electricity) and generation (providing electricity) headroom provides an indication of where there may be constraints in the electricity network for the construction of future users or providers of electricity.

Generation and demand headroom are higher and tend to align in areas of lower population density, the southwest of Tredegar, the west of Abertillery, north of Cwmtillery, Trefil, and the area between Ebbw Vale and Waun-Lwyd. The low population density provides higher demand headroom, these areas also tend to have steeper topography making it difficult to install renewables – hence a higher generation headroom.

Although headroom offers valuable insights into the available 11kV network capacity, it is important to recognise that constraints can occur both upstream and downstream of primary substations. Figures 2.9 and 2.10 may not show the extent of networks constraints in Blaenau Gwent.

Generation headroom

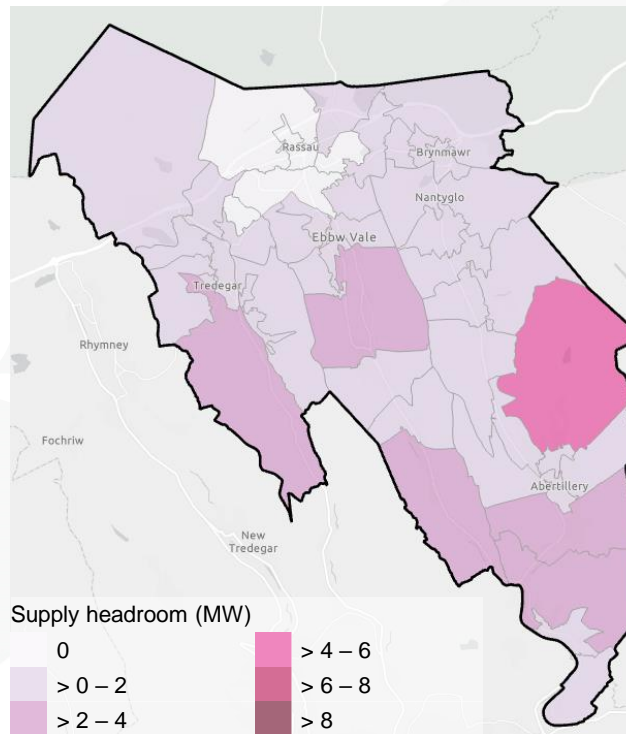


Figure 2.0.9: Electricity generation headroom

Demand headroom

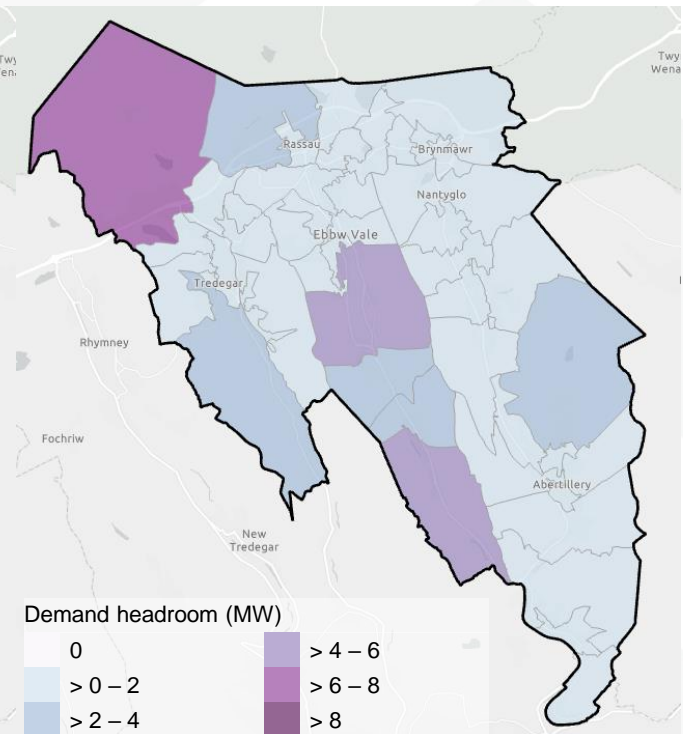


Figure 2.0.10: Electricity demand headroom

## 2. The current energy system

### Blaenau Gwent's energy baseline

#### Local environmental, social and economic factors that influence energy

#### Land

Total land area of 109km<sup>2</sup>.

Blaenau Gwent hosts the Ebbw Vale enterprise zone, consisting of 8 key sites over 40 acres of land.

Blaenau Gwent's land usage differs significantly from both the Wales and UK average, with very little used for farmland and larger portions built on or left natural. The combined area of commons, open spaces, and farmland equate to 77% of the land area in Blaenau Gwent.

#### Socio-economics

11% of households are regarded as being in fuel poverty, this compares to 12% for the Welsh national average.

92% of economically active residents are in employment.

32% of those in employment work within the 'Wholesale, retail, transport, hotels, food and communication' sector; other large employing sectors are 'Production' - 26% and 'Private sector health and education' - 14%.

Industries that contribute substantially to Gwent valleys GVA include electrical manufacturing (7.6%), real estate activities (12.1%), health and social work (10.4%), retail trade (6.9%).

#### Demographics

Blaenau Gwent has a population of 66,900 and a density of 615 pers/km<sup>2</sup>, the sixth most densely populated local authority in Wales.

The population has fallen by 4.2% between 2011 and 2021.

Blaenau Gwent has a median age of 43, the proportion of the population over 19 years of age has increased from 76.7% to 78.5% between 2011 and 2021.

In general Blaenau Gwent sees more people commute out (16,700) of the area for work than commuting in (4,900). 73% of workers in Blaenau Gwent also live there.

#### Emissions

In 2019, Blaenau Gwent had an emissions per capita of 4.2tCO<sub>2</sub> per person, this compares to a national average of 7.6tCO<sub>2</sub> per capita.

Emissions sources are relatively evenly distributed with domestic (37%), industry and commerce (32%) and transport (27%) the greatest three emitting sectors.

Emissions have steadily been decreasing with an average decrease of 2% per year since 2005, the domestic sector has seen the greatest absolute reduction in emissions over this timeframe.

# 2. The current energy system

## Blaenau Gwent's energy baseline

### Progress to date

Since declaring a climate emergency in 2020, Blaenau Gwent County Borough Council has worked to reduce its organisational carbon emissions, and to provide the means for the wider community to do the same, as we transition to a Net Zero energy system.

Blaenau Gwent County Borough Council has developed a decarbonisation plan<sup>ML02</sup> that supports its efforts to achieve Net Zero by 2030. The plan highlights transition themes, with progress against these monitored through annual Net Zero reports.

The Net Zero reports highlight actions for the Council to reduce its own direct and indirect emissions, with some of these therefore having implications on the wider local energy system, through its supply chain for example. The report also highlights Blaenau Gwent's territorial emissions. These are beginning to be addressed through a *Climate Group* that is developing a *Net Zero 2050 Framework*, the framework has been informed by themes developed through the *Blaenau Gwent Climate Assembly*. The framework will be supported by the outputs of this Local Area Energy Plan.

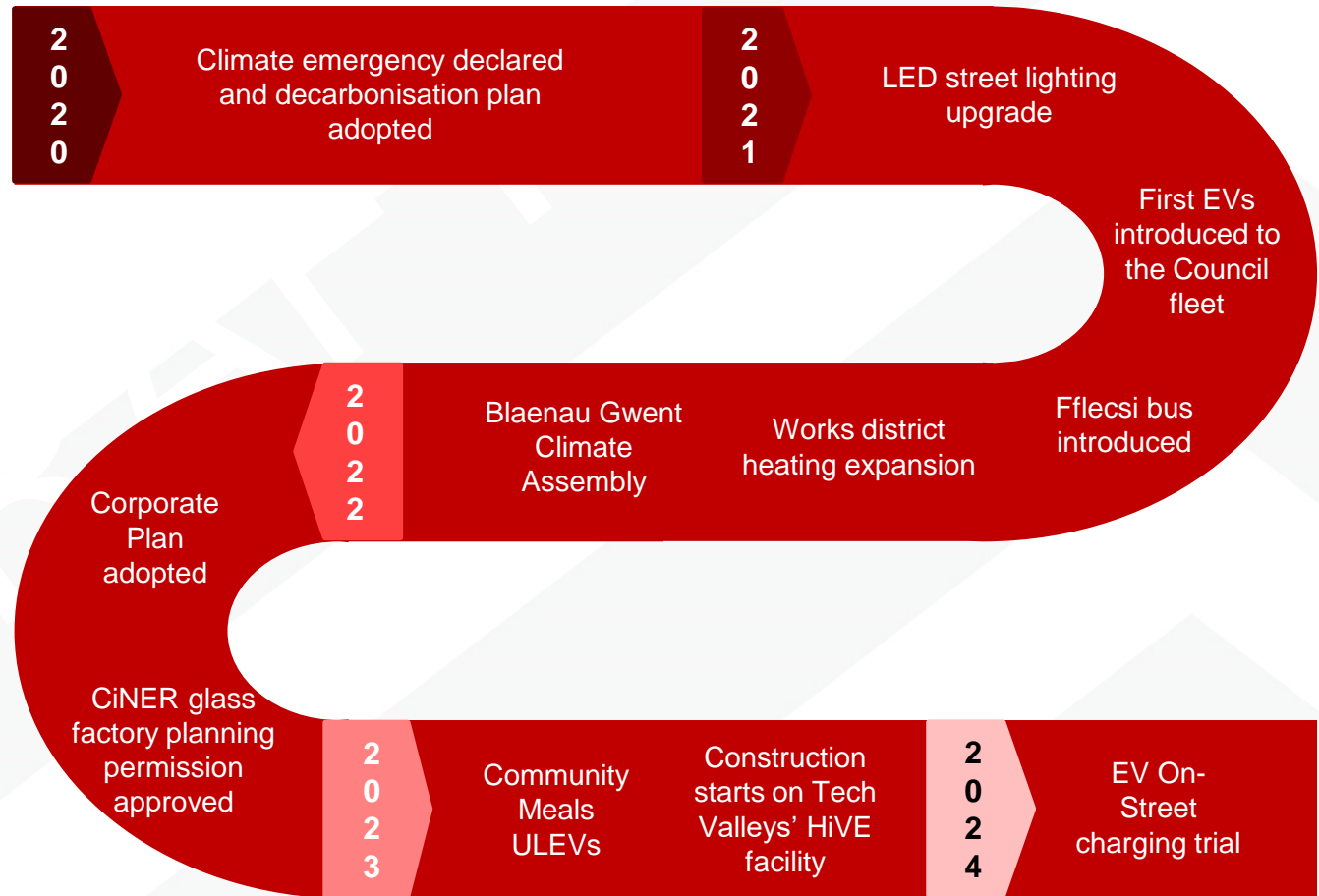


Figure 2.0.11: Summary of activities to date that have contributed to decarbonising the local energy system

Blaenau Gwent

## Chapter 3: The future energy system



# 3. The future energy system

## Overview

### Vision

Tackle the climate emergency by transitioning to a Net Zero carbon energy system which improves homes, transport and job opportunities in Blaenau Gwent, whilst protecting our distinctive natural environment, culture and identity.

### Objectives of the plan

- A resilient energy system capable of meeting Blaenau Gwent's future energy needs.
- The benefits of renewable energy development retained within Blaenau Gwent through local ownership and community participation.
- An energy transition that supports jobs and supply chains in Blaenau Gwent.
- Affordable zero carbon energy for residents and businesses.
- An energy transition that improves the quality of homes and transport.

As described in our technical report, we developed our vision and objectives with our stakeholders.

### Understanding the future energy system

We know that we need to transition our energy system in Blaenau Gwent to Net Zero by 2050.

However, we know that there are multiple plausible and attractive future energy systems for Blaenau Gwent, depending on a range of factors. This includes how the cost of technologies might change over time, as well as wider policy decisions that will be made by Welsh and UK Governments. These factors will influence the uptake of hydrogen, for example.

### Scenario analysis

To inform our plan, we used scenario analysis to explore what a net zero future energy system could look like under different future outcomes, including considering the potential for reduction measures and potential energy sources. We modelled four future energy scenarios and modelled the most cost- and carbon-effective way to meet demand in each one. Through doing this, we were able to identify technologies that played a significant role in all the future scenarios modelled. These technologies represent low- and no-regrets options (meaning that they are likely to be most cost-effective and provide relatively

large benefits) which are very likely to be important parts of the future energy system, regardless of the uncertainty of the future.

### Deployment modelling

We looked at how aspects of each energy proposition might be deployed between now and 2050, creating deployment pathways.

Deployment pathways indicate:

- the scale of change required over time,
- the sequencing of activity that needs to happen to achieve a net zero energy system.

Deployment pathways for different components were informed by broader plan objectives, local and regional strategic priorities, policies and national targets and using this context, helped us to define a suitable level of ambition, and bring all this evidence together into an action plan.

# 3. The future energy system

## Overview

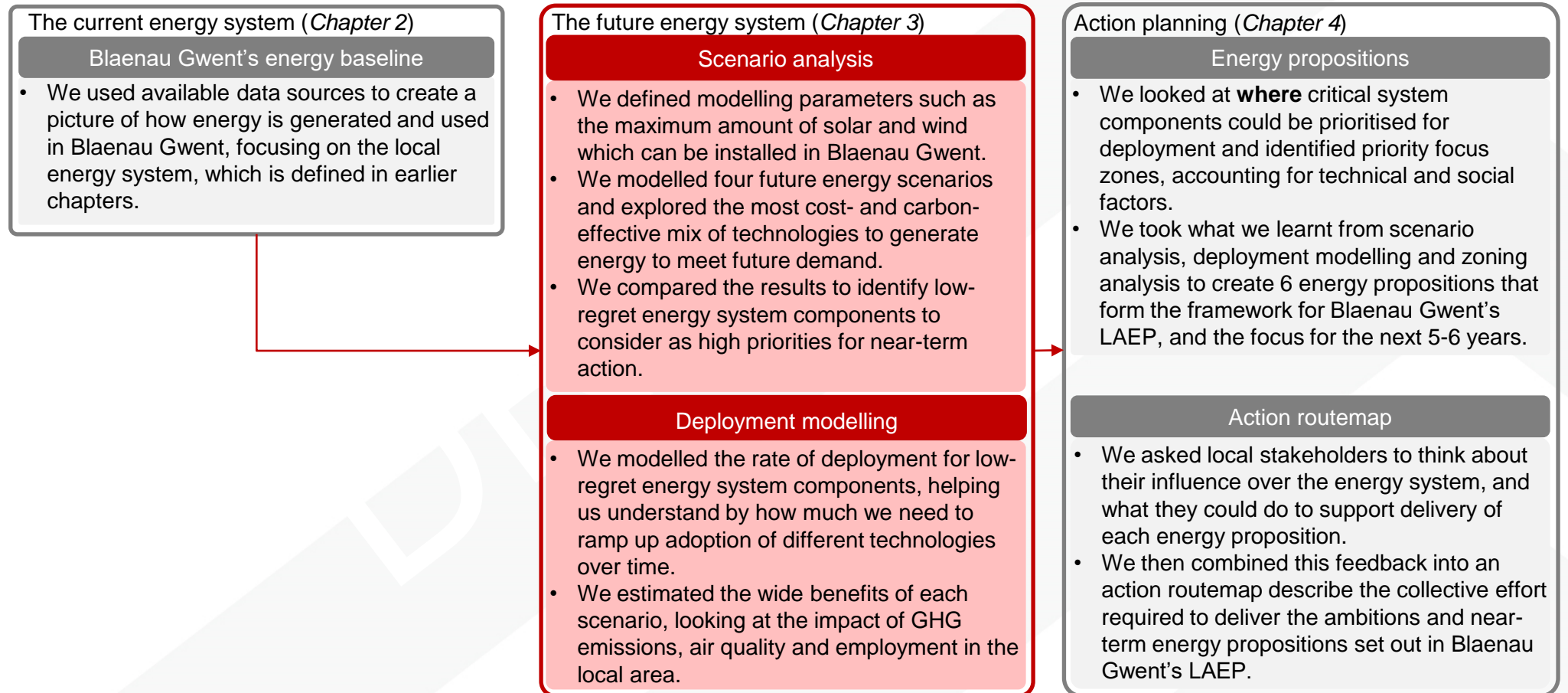


Figure 3.0.1: Summary of steps taken to produce the LAEP

# 3. The future energy system

## Plans for the future

### Plans in development

#### Renewable generation

Blaenau Gwent has recently seen planning applications submitted for a range of new renewable energy generation projects.

The majority of these are focussed on onshore wind. Blaenau Gwent's topography lends itself to favourable wind conditions on the higher ground between valleys. Several Developments of National Significance (DNS), with potential capacities of 10MW+ are currently at various stages of planning process. Reflecting that a significant proportion of Blaenau Gwent is part of 'Pre-Assessed Areas for Wind Energy' where, in principle, developments would be acceptable.

Beyond projects with planning applications, Blaenau Gwent recently became home to one of Wales's first multi technology local energy centres. Infinite Renewables, a developer, supported by Yuasa have developed a mixed technology battery, rooftop solar PV and wind turbine local energy centre. This energy centre is able to manage power across the GS Yuasa battery factory, reduce loads on the national grid and provide a framework for expansion to community scale.

#### Reducing energy demand

Blaenau Gwent County Borough Council is working with energy companies and Cardiff Capital Region to support households in poorly insulated homes - making those households more energy efficient and helping lessen the impact of rising energy bills.

Working with our partners, we aim to draw government funding, to reduce or eliminate the cost of these energy efficiency upgrades.

As part of the national ECO4 scheme, EDF and other energy companies will be investing in energy efficiency community schemes to support 'fuel poor' homes and those households that include individuals with health conditions exacerbated by living in a cold home.

# 3. The future energy system

## Plans for the future

### Plans in development

#### CiNER Glass Factory

Planning permission has been submitted for a substantial glass factory to be constructed to the Northeast of the current Rassau industrial estate in Ebbw Vale, with production expected to commence in 2026. Plans are at an advanced stage, and the project is expected to have a significant impact on the local economy, supporting numerous jobs and providing wider local benefits. The factory is also expected to have a large impact on Blaenau Gwent's future energy landscape. Environmental and energy due diligence has been completed as part of the application, and from these it is estimated the site will consume 438GWh of natural gas and 153GWh of electricity annually. Given its significant positive impact to the local economy, this project **has been included** within all scenarios of the energy modelling, with the assumption that heat demand will be supplied by hydrogen boilers by 2050. It has been assumed the hydrogen would be sourced from steam methane reformation (SMR) with carbon capture and storage (CCS), however this is by no means fixed or agreed and the hydrogen could be derived from a variety of sources. If indeed

hydrogen is the fuel source that the plant decides to use in 2050, which is far from being determined at this stage. Given that the plan is yet to be constructed, its significant potential energy use and the uncertainty around what form of energy it might be using in 2050 the energy flows related to CiNER has been highlighted separately where possible in the analysis.

#### Tech Valleys

The Tech Valleys programme is an ongoing significant investment of £100m over ten years from Welsh Government to grow the hi-tech industries and skills of the future, it is expected to support over 1,500 jobs locally in Blaenau Gwent. This programme has already started and is well underway with a handful of business parks and enterprises already supported. Capturing the ongoing and future energy system implications of the Tech Valleys, however, is difficult from a modelling perspective. As such, the modelling captures the programme indirectly through growth projections outlined within the Local Development Plan.

# 3. The future energy system

## Scenario Analysis

### Summary of future energy scenarios

<b>Do Nothing</b>	<ul style="list-style-type: none"><li>• A scenario for comparison which considers no change to activities</li><li>• This scenario provides a cost counterfactual.</li><li>• There is no decarbonisation target for this scenario, and we do not use it in optimisation modelling.</li></ul>
<b>National Net Zero</b>	<ul style="list-style-type: none"><li>• Uses the lowest cost and carbon combination of technologies to meet Wales' 2050 Net Zero target.</li><li>• Assumes a moderate level of energy demand reduction across the system.</li><li>• Model is allowed to import and export to the electricity grid, this assumes that the electricity grid is decarbonised and reinforced to allow for the demands, likely to be a combination of offshore wind, hydrogen CCGT, grid level battery storage, nuclear (these are considered as national assets and outside the scope of the LAEP).</li></ul>
<b>Low Demand</b>	<ul style="list-style-type: none"><li>• Considers the lowest future energy demand across different sectors.</li><li>• Explores the impact of energy-reducing initiatives (home fabric improvements) and uptake of active travel and public transport use.</li><li>• Model finds the lowest cost and carbon combination of technologies to meet predicted future energy demand.</li><li>• Import and export of electricity as National Net Zero</li></ul>
<b>High Demand</b>	<ul style="list-style-type: none"><li>• Considers the highest future energy demand across sectors.</li><li>• Model finds the lowest cost and carbon combination of technologies to meet predicted future energy demand.</li><li>• Import and export of electricity as National Net Zero</li></ul>
<b>High Hydrogen</b>	<ul style="list-style-type: none"><li>• Considers the highest plausible future energy demand across different sectors.</li><li>• Uses a cost- and carbon-optimal range of technologies to meet predicted future energy demand.</li><li>• Considers hydrogen for heavy goods vehicles and industry.</li></ul>

Figure 3.0.2: Summary of future energy scenarios

# 3. The future energy system

## Scenario Analysis

### National Net Zero scenario

Figure 3.3 shows a potential future energy system for Blaenau Gwent. This system results from modelling to create the most cost and carbon optimal system. We have run a number of scenarios to support us in making decisions. The optimisation modelling informs the deployment modelling and the actions that go into the plans, but the scenarios produced are intended to provide models of a range of possible future Net Zero energy systems to help inform decision making, they are not intended as recommendations or targets for what should definitely happen.

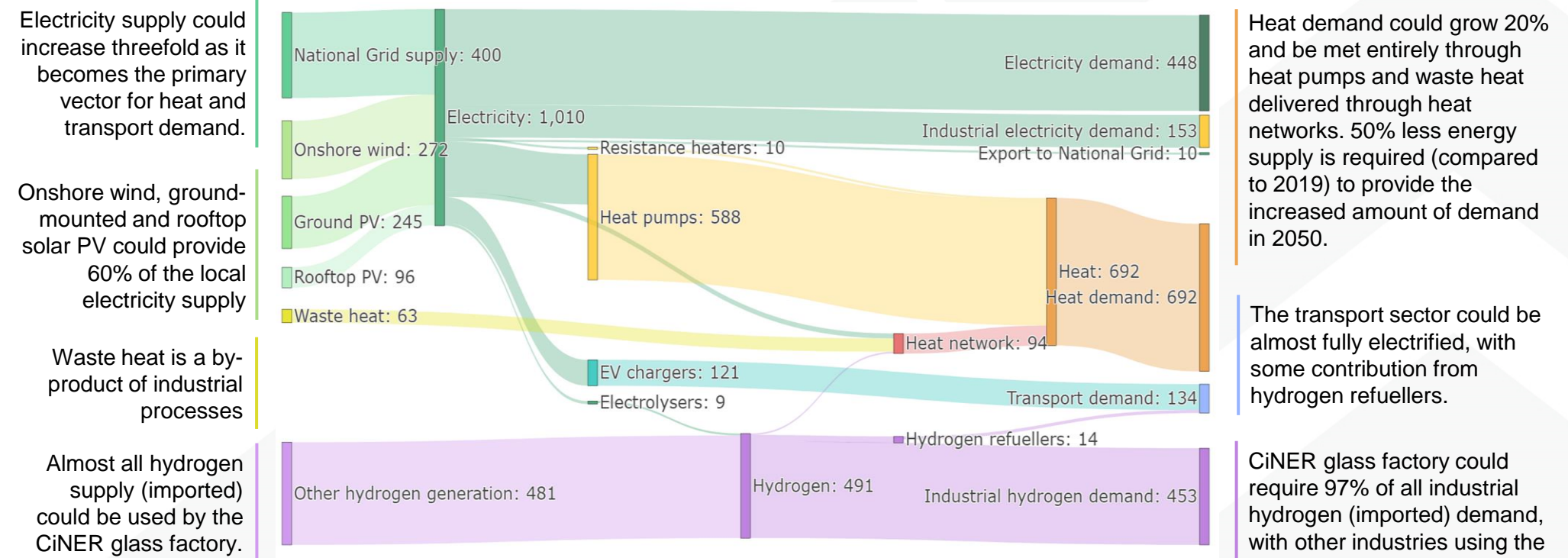


Figure 3.0.3: A Sankey diagram for a potential future 2050 energy system (energy flows in GWh)

# 3. The future energy system

## Scenario Analysis

### Energy system components

Figure 3.4 provides an overview of the variations in energy components observed in the optimisation modelling results across future energy scenarios, benchmarked against the baseline results.

Optimisation modelling prioritises the rollout of local renewables as an assumed low cost and carbon means of electricity generation. This results in onshore wind, ground-mounted, and rooftop solar being increased to their theoretical maximum limit across all scenarios to cater for increased electricity demand. Local generation is prioritised ahead of electricity imports which act to top up any demand beyond what can be supplied through local generation. In contrast, biomass generation sees a decline across all scenarios, likely due to a reduced dependency resulting from the enhanced output of solar and wind farms. Hydrogen is largely used in all scenarios for high industrial heat, which represents up to 100% of hydrogen demand in the High Hydrogen scenario.

Transport demand decarbonises, primarily due to the supply of electricity through EV charge points. Hydrogen also contributes to this demand, albeit to a lesser extent.

Heat demand is predominantly catered for by heat pumps and waste heat, a trend that is consistent across all scenarios. While heat networks and other technologies contribute to this demand, their usage is comparatively less.

Energy System Components	Baseline (GWh)	National Net Zero (GWh)	High Demand (GWh)	Low Demand (GWh)	High Hydrogen (GWh)
Ground-mounted PV	13		245 ↑		
Rooftop PV	2		96 ↑		
Onshore wind	11		272 ↑		
Waste heat	0		63 ↑		
Biomass	41		0 ↓		
Hydrogen import	0	481 ↑	481 ↑	433 ↑	651 ↑
Electrolyser	0	9 ↑	9 ↑	57 ↑	52 ↑
Import from Grid	259	400 ↑	407 ↑	139 ↓	281 ↑
EV chargers	1	121 ↑	128 ↑	121 ↑	92 ↑
Refuellers	0	14 ↑	13 ↑	14 ↑	40 ↑
Heat pumps	1	588 ↑	588 ↑	255 ↑	588 ↑
Heat networks	0		94 ↑		
Resistance heaters	7	10 ↑	10 ↑	3 ↓	10 ↑
Biomass boilers	13		0 ↓		

Table 3.0.1: Comparison across the scenarios

# 3. The future energy system

## Scenario Analysis

### Modelling results in context

Blaenau Gwent's future energy system has to reflect its unique location, geographical constraints, plans and ambitions. Efforts have been made to capture this wherever possible within the numerical modelling, however there are components and influences on a future energy system that can't be captured so easily. Below we discuss some of these components and how they have or haven't been captured within the modelling. This aims to provide the necessary context to the modelling, which, ultimately, can only show one potential outcome based on a finite set of inputs.

The energy model used within the development of this LAEP creates a future energy system that has been optimised to reduce system costs and carbon emissions. These have been determined as the key parameters for delivering a low cost, Net Zero energy system. Optimising based on these two parameters alone means that other local or technological factors may not be considered to the same degree.

This is evidenced by the model favouring ground-mounted solar PV as the primary supply of electricity (deemed cheapest and lowest carbon). This doesn't capture Blaenau Gwent's

topography, natural resources or constraints that mean onshore wind in reality is a preferable generation technology in the local area. Similarly, the model deems it cheaper to balance electricity supply and demand through the national grid than through electricity storage; this is therefore notably absent from the model. However, in reality it is likely that local electricity storage will need to be a part of the future energy system.

The LAEP aims to supplement the potential solutions from the modelling with local knowledge and understanding of the energy system.

### Limitations of the modelling

A significant limitation of the optimisation model is the extent to which it prioritises local renewable generation ahead of importing grid electricity. In reality, the proportion of local generation utilised is likely to be significantly more limited than this modelling suggests, due to the limits on the proportion of solar energy it is cost effective to include within the local energy system given the need to balance supply and demand over time. An energy system including this level of solar

generation would result in high levels of curtailment, where the level of electricity generated from local renewables has to be reduced during sunny periods to avoid oversupply, imposing significant cost inefficiencies. As a result, Blaenau Gwent's future energy system is very likely to require higher levels of imported grid energy than these scenarios suggest in order to balance supply and demand. Similarly, electricity storage is notably absent from the model, however, in reality it is very likely that local electricity storage will also be needed as part balancing supply and demand. The model is also not able to fully capture the limits placed on local renewable generation by the cumulative landscape impacts of each additional local renewable scheme.

# 3. The future energy system

## Deployment modelling Impact on energy demand

Deployment modelling sets out how quickly each energy component could be deployed in each optimisation scenario.

Figure 3.5 shows how the energy demand could change over time in the different sectors for the baseline, 2030 and 2050. The energy demand is then converted into carbon emissions, numbers of jobs and air quality as you can see on the following pages.

Industrial energy demand for the planned Ciner glass factory has been pulled out as a separate category so as not to skew the results.

The demand profiles remain fairly consistent across all scenarios, as the underlying assumptions are similar, except within the Low Demand scenario. In all scenarios, except Low Demand, we see a small increase in energy demand (ignoring Ciner) and a significant decrease in energy demand in a Low Demand scenario.

N.B. Electric vehicles are captured within 'Demand from road vehicles' as opposed to any of the other categories

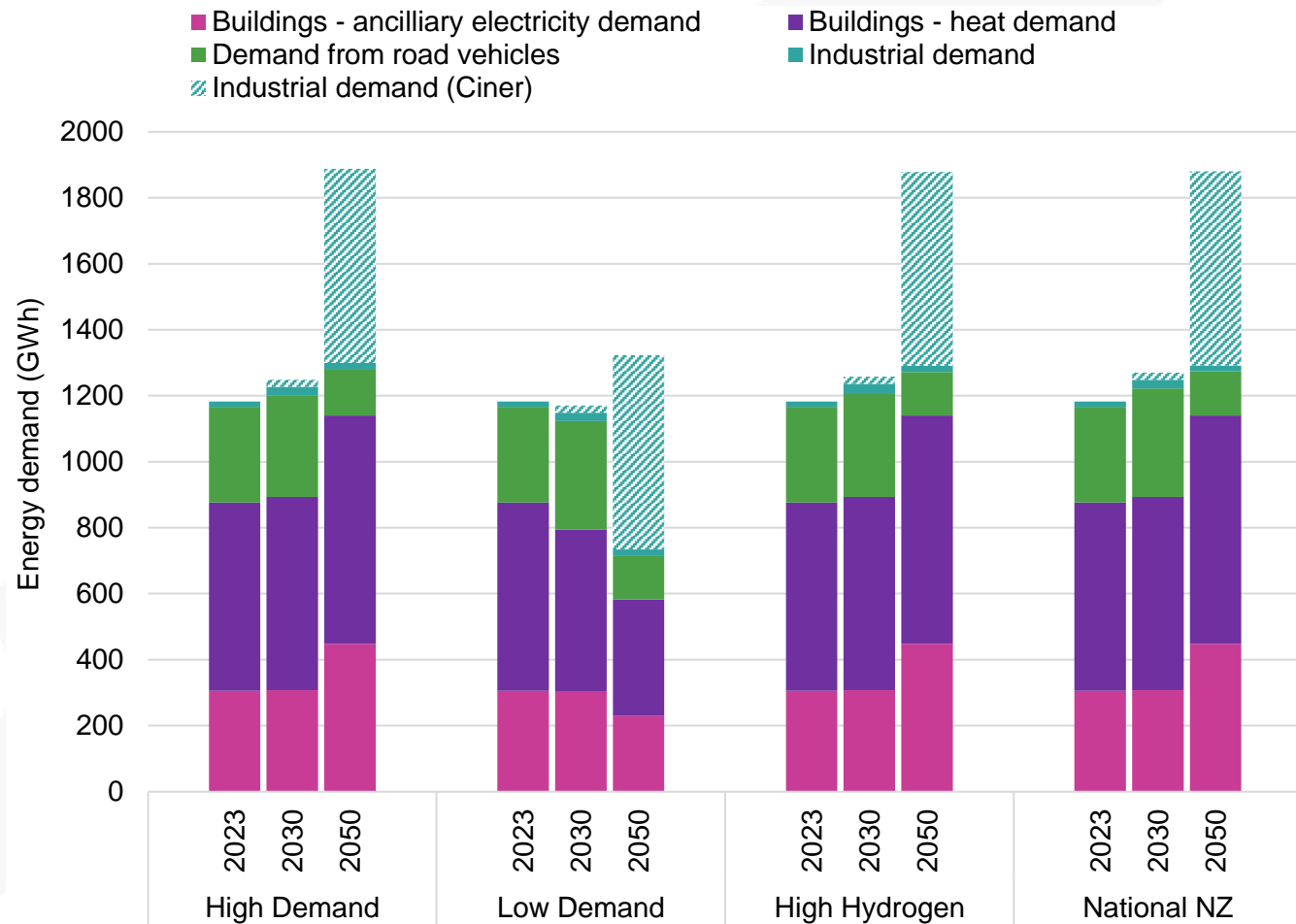


Figure 3.0.4: Energy demand over time for each scenario (GWh)

# 3. The future energy system

## Deployment modelling

### Impact on energy supply

On the previous slide we analysed the energy demand within Blaenau Gwent across the different scenarios. The energy demand is what is developed first from the optimisation model, and essentially reflects the right-hand side of a Sankey diagram. The second stage of the optimisation model is to determine how that energy demand will be met. Figure 3.6, right, shows the energy supply for Blaenau Gwent's energy system for the baseline year and for the optimised 2050 scenarios. These values relate to the left had side of a Sankey diagram.

Here the 'Electricity' category covers all forms of generation (solar, wind, etc.). Once again Ciner glass factory has been highlighted separately, when ignoring the energy supply required for Ciner, we see a significant drop in demand across all scenarios between 2023 and 2050.

The decrease in energy supply required for a larger 2050 energy demand represents efficiency gains in the energy system, this is primarily driven by heat pumps and electric cars which offer much greater 'energy out' from 'energy in' when compared to their fossil fuel equivalents. This is particularly true of heat pumps which extract heat from the environment, allowing levels of efficiency over 100%.

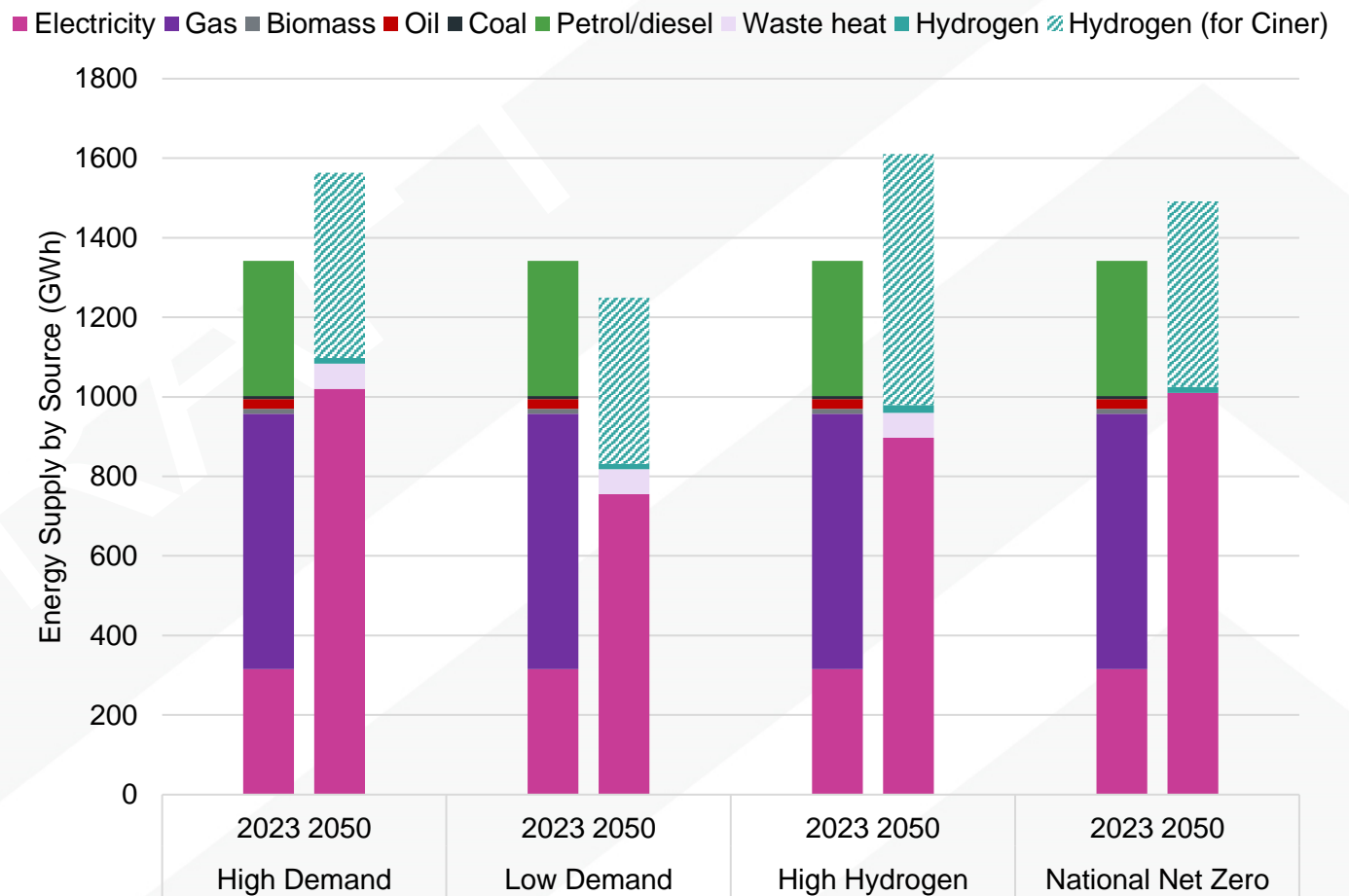


Figure 3.0.5: Energy demand over time for each scenario (GWh)

# 3. The future energy system

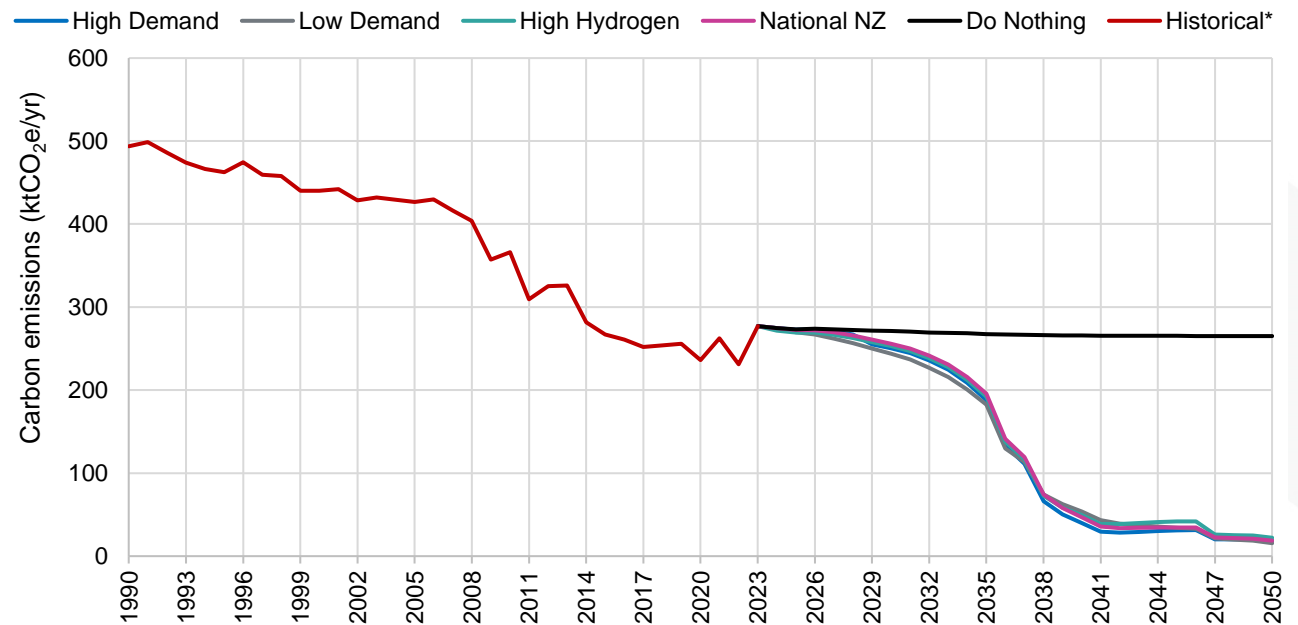
## Deployment modelling Impact on GHG emissions

Figure 3.6 shows the gap in the GHG emissions between the Do Nothing scenario and the optimised scenarios. Our deployment modelling provides additional evidence on the realism of delivering the changes suggested by the optimisation modelling. It helps us to determine the actions needed in the next five years to set us on the pathway to net zero in 2050. There are also bigger systemic changes that will be needed to achieve the scale of change set out in this plan.

The plan shows that the system doesn't meet net zero in 2050, this is because in all there are residual emissions associated with high industrial heat processes. Offsetting would be needed to reach net zero, however this is not in the scope of the LAEP.

The deployment modelling also shows how these pathways contribute to the Welsh Government emissions reduction targets. For Blaenau Gwent, we see that the 2023 baseline is a 44% reduction on the 1990 levels. 2050 is slightly missed, because there is residual electricity in the network, however the average reduction is 99% against the 1990 levels.

It should be noted that not all GHG emissions generated within Blaenau Gwent as an area are within scope of the LAEP, approximately 70% of Blaenau Gwent's GHG emissions are considered in the LAEP, the exact proportion may change from year to year.



**Figure 3.0.6: GHG emissions (ktCO<sub>2</sub>e) over time for each scenario compared to the Do Nothing scenario (bottom) % GHG emissions reduction for each scenario compared to the Welsh Government emissions reduction targets**  
 \* Historical data is a combination of DESNZ sub-national data and proportional estimates from DESNZ UK emissions

Scenario	2030	2040	2050
High Demand	-49%	-93%	-97%
Low Demand	-51%	-90%	-98%
High Hydrogen	-49%	-91%	-97%
National Net Zero	-48%	-92%	-97%
Do Nothing	-45%	-46%	-46%
<b>Welsh Government Targets</b>	<b>-63%</b>	<b>-89%</b>	<b>-100%</b>

# 3. The future energy system

## Deployment modelling

### Socio-economic impacts

Reducing the amount of energy we use and using renewable energy sources for power generation can have wider environmental, social and economic benefits so it is important that they are fully understood to support decisions that impact the future of the energy system. For example, for every £1 invested in energy efficiency measures, the NHS can save £0.42 (amounting to annual savings of £1.4 billion in England alone)<sup>M41</sup>.

### Employment impacts

Investments in local energy systems can be expected to have employment benefits by providing local, skilled jobs. These will include direct jobs from construction and operational phases of the development as well as associated supply chain and multiplier effects<sup>M42</sup>.

### Impact on air quality

It can also impact the quality of the air which in turn impacts: human health, productivity, wellbeing and the environment, which is why it is so important to understand when planning future policy or programmes of work. Activity costs presented in Figure 3.7 show estimates for the impact of air pollution per unit of fuel consumed in each future energy scenario and estimates for the employment impacts associated with each future energy scenario, compared to the Do Nothing scenario.

Metric	Do Nothing	National Net Zero	High Demand	Low Demand	High Hydrogen
<b>Energy change (GWh, relative to 2023)</b>	N/A	+569 (+48%)	+569 (+48%)	+12 (+1%)	+569 (+48%)
<b>Cumulative air quality activity costs between 2023-2050 (£m, 2022 prices)</b>	£230m	£124m	£116m	£123m	£123m
<b>Cumulative gross local jobs added between 2023-2050 (FTE)</b>	N/A	3,153	3,159	3,437	3,494

**Table 3.0.1: Summary of economic impacts for each scenario: employment impacts and air quality activity costs. Figures shown relate to the period 2023 – 2050. Air quality activity costs are presented using 2022 prices and are not discounted**

# 3. The future energy system

## Future energy scenarios and pathways

### Summary of deployment

Our deployment model helps us to think about where we are now and where we need to get to, providing a starting point to frame the challenge and for more detailed analysis. We have included theoretical pathways which have a high degree of uncertainty as there are many variable factors and unknowns. The deployment modelling can't take into account every factor, some of the things that will impact deployment include:

- 1) Technological advance and innovation
- 2) Supply chains and how they develop
- 3) Large scale activity to decarbonise infrastructure at other levels: regional, UK and beyond.

Ranges provided here are taken by looking at the minimum and maximum level of deployment from the four scenarios analysed.

\*According to the National Charge Point Registry as of May 2023. Refers to individual charge points, and assuming 4kWp per charge point

\*\*Assuming 4kWp per roof

\*\*\*Renewable generation capacity is shown for technologies where current installed capacity is >5MW







Measure	2023	By 2030	By 2050
 Additional homes with insulation measures (#)	-	7,700 - 13,000	18,600 - 31,500
 Buildings with heat pumps installed (#)	100	2,700 - 4,800	14,200 - 29,100
 EV public charge points (#)*	180	680 - 840	3,200 - 4,500
 Buildings with rooftop solar PV (#)**	700	7,400	25,900
 Ground-mounted solar PV capacity (MW)	14 MW	116 MW	265 MW
 Other renewable capacity (MW)***	7 MW	18 MW	88 MW

Table 3.0.2: Summary of deployment of various technologies between 2023, 2030 and 2050



# 3. The future energy system

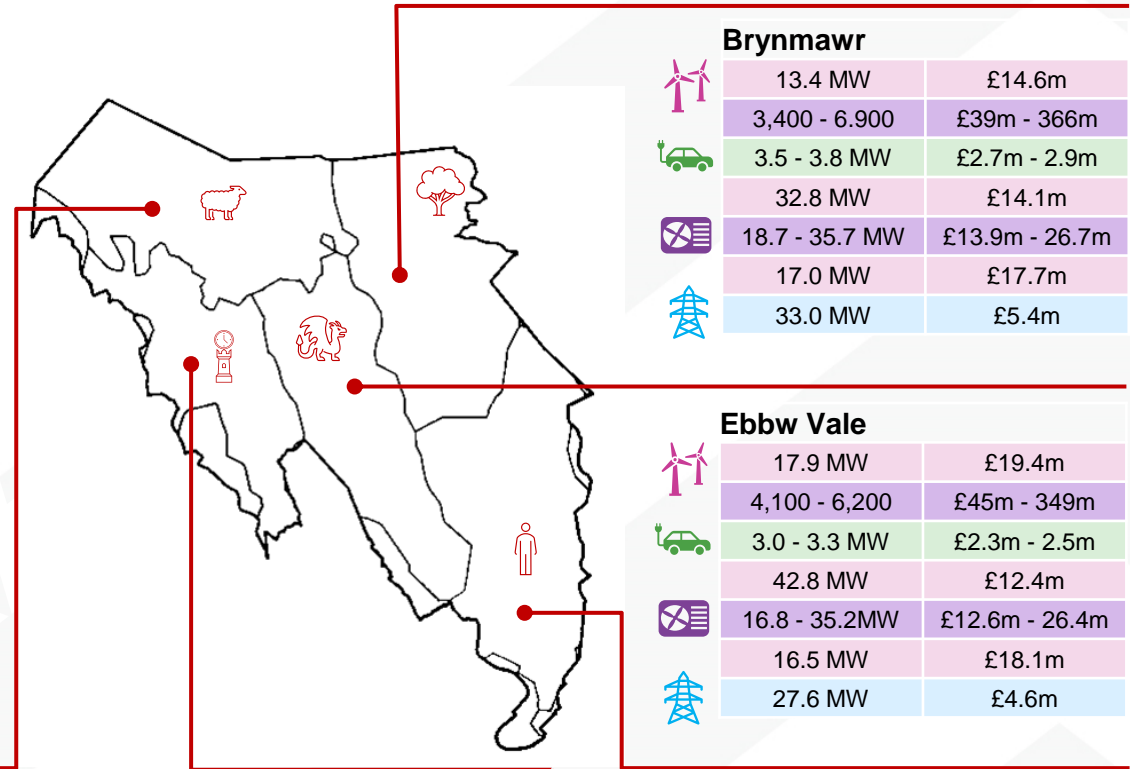
## Blaenau Gwent's locational breakdown for 2050

This graphic highlights the potential location, scale of rollout and cost of some key measures that are expected to be required within Blaenau Gwent's 2050 energy system. This system results from modelling to create the most cost and carbon optimal system. The range of values represent outputs from a Low and High Demand scenario, just two of five scenarios modelled. the scenarios produced are intended to provide models of a range of possible future Net Zero energy systems to help inform decision making, they are not intended as recommendations or targets for what should definitely happen.

\*Costs quoted using 2022 prices

**Key:**

- Onshore wind
- Insulation retrofits (# buildings)
- Public & private EV chargers
- Ground-mounted solar PV
- Heat pumps
- Rooftop solar PV
- Primary substation extra capacity required



**Rassau West**

	13.4 MW	£11.9m	
	2,000 - 5,400	£24m – 285m	
	5.2 - 5.4 MW	£4.1m – 4.3m	
	50.8 MW	£21.9m	
	19.3 - 37.4 MW	£14.5m – 28.0m	
	33.4 MW	£36.1m	
	25.2 MW	£4.2	

**Tredegar**

	8.5 MW	£8.7m	
	3,000 - 5,700	£22m - £279m	
	2.0 - 2.1 MW	£1.6m - 1.7m	
	26.2 MW	£11.3m	
	15.1 - 26.5 MW	£11.2m - 19.7m	
	17.9 MW	£19.2m	
	18.7 MW	£3.1m	

**Abertillery**

	21.9 MW	£23.3m	
	5,300 - 6,200	£30m - 345m	
	2.6 - 2.8 MW	£2.0m - 2.2m	
	80.0 MW	£34.5m	
	15.5 - 29.5 MW	£11.6m - 22.1m	
	15.5 MW	£16.5m	
	24.1 MW	£4.0m	

**Brynmawr**

	13.4 MW	£14.6m	
	3,400 - 6,900	£39m - 366m	
	3.5 - 3.8 MW	£2.7m - 2.9m	
	32.8 MW	£14.1m	
	18.7 - 35.7 MW	£13.9m - 26.7m	
	17.0 MW	£17.7m	
	33.0 MW	£5.4m	

**Ebbw Vale**

	17.9 MW	£19.4m	
	4,100 - 6,200	£45m - 349m	
	3.0 - 3.3 MW	£2.3m - 2.5m	
	42.8 MW	£12.4m	
	16.8 - 35.2MW	£12.6m - 26.4m	
	16.5 MW	£18.1m	
	27.6 MW	£4.6m	

Blaenau Gwent

## Chapter 4: Action planning



# 4. Action planning

## Energy propositions

We shared what we learnt from exploring different energy futures and deployment pathways with our stakeholders and discussed with them what key drivers will be critical for the transition to Net Zero. We then considered their feedback, our strategic vision and objectives and agreed energy propositions to act as the framework for Blaenau Gwent's LAEP. There are numerous interdependencies and interactions between these propositions, as shown here, and this highlights the importance of a whole system approach with a co-ordinated programme of delivery to meet the Net Zero target by 2050.

### Vision

Tackle the climate emergency by transitioning to a Net Zero carbon energy system which improves homes, transport and job opportunities in Blaenau Gwent, whilst protecting our distinctive natural environment, culture and identity.

Retrofit is key to ensure heat pumps can operate efficiently at low supply temperatures

If located appropriately, local renewables can reduce required network reinforcements, otherwise could require more reinforcements

Electrolysers require electricity, from suitable electricity network

Hydrogen supports industrial decarbonisation

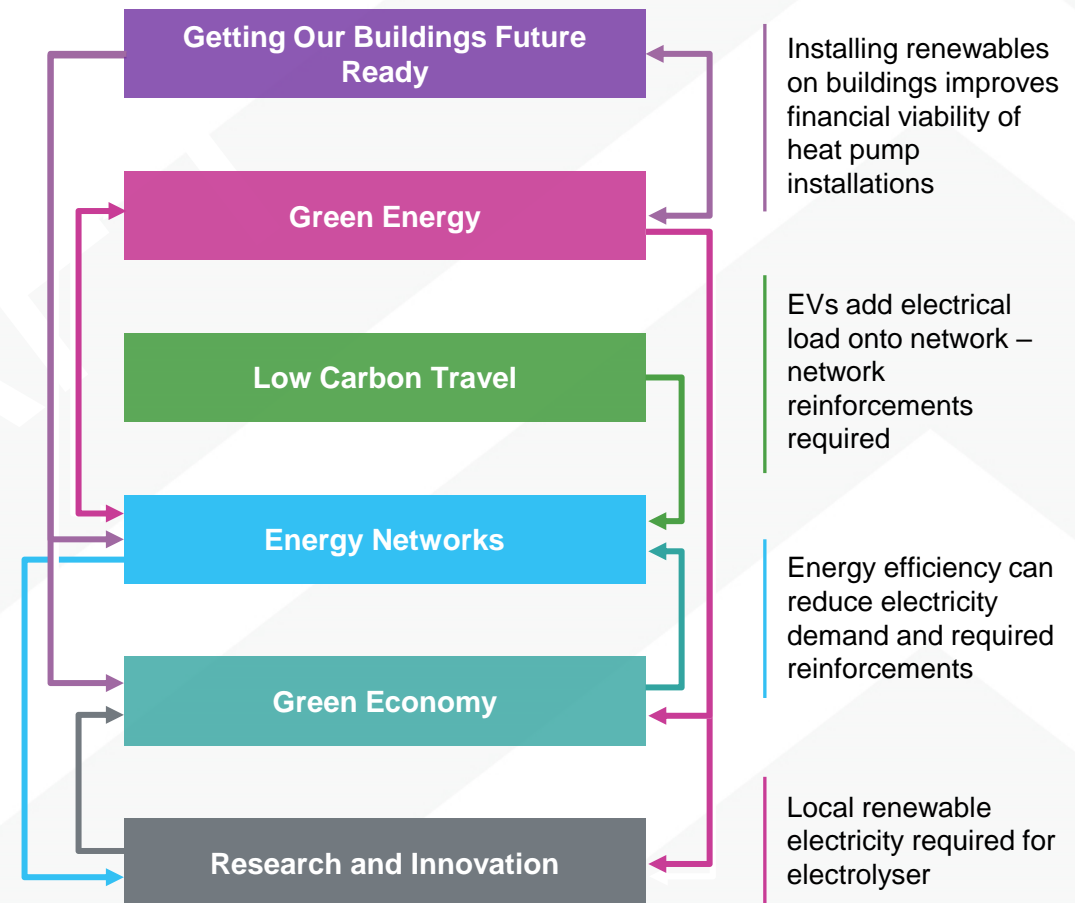


Figure 4.0.1: Summary of energy propositions and their inter-dependencies

# 4. Action planning

## Energy propositions

### Getting Our Buildings Future Ready

- Supporting and deploying energy efficiency measures across Blaenau Gwent to reduce energy demand and costs.
- Support residents retrofitting homes ready for low carbon heating.



### Low Carbon Travel

- Promoting active and sustainable travel.
- Enabling the rollout of electric vehicles across Blaenau Gwent and transition to an ultra-low emission public sector fleet.



### Green Energy

- Ensure resilient zero carbon energy supply for an environmentally friendly and sustainable retail and business environment.
- An energy transition that promotes learning and skills and delivers supply chain benefits in Blaenau Gwent.



### Green Economy

- Encouraging businesses to adopt low carbon measures and reduce energy costs.
- Create an attractive environment for sustainable businesses to make base in Blaenau Gwent.



### Research and Innovation

- Explore the potential of emerging technologies (e.g. hydrogen) to solve energy challenges in Blaenau Gwent.
- Host and participate in innovative zero carbon energy projects and trials.



### Energy Networks

- Grid reinforcement will be required to accommodate the shift towards electric vehicles and heating.
- Even in a low hydrogen scenario the gas grid will require repurposing for hydrogen within some applications.



# 4. Action planning

## Energy propositions

### Identifying priority focus zones and action routemap

Although the exact form of the decarbonised energy system in 2050 is uncertain, there are actions we can take now with relative certainty that will help us maintain the ability to meet our 2050 Net Zero ambition and capitalise on the opportunities that this transition will bring.

#### Action routemap

Our energy propositions describe where our priorities lie based on the evidence presented thus far. Our action routemap takes each energy proposition and outlines critical, enabling actions that we will take collectively alongside our stakeholders in the coming decade, with a particular focus on what we can achieve in the next 5 years. Our action routemap has been developed as a dynamic plan that recognises the influence that wider contextual changes at national and local level will have on the way we choose to transition to a net zero energy system, such as national regulation, policy and strategic plans. As a result, we expect to regularly review and update our routemap based on these dependencies.

Each action will require four key elements to be successful:

- Mobilising finance

- Strong and consistent policy frameworks
- Identifying delivery owners
- Community engagement

As Blaenau Gwent County Borough Council, our role in delivering each energy proposition will vary. Some actions call for council action in the material delivery of programmes, whilst others require the council to act as the facilitator for market-driven change.

Through the LAEP process, we also identified that some of the actions are best delivered collaboratively through the regional partnership. This is because there are economies of scale, and it would be more efficient to have joined up and focused public resources. The regional actions will require detailed design work, to create projects and programmes, to progress them to implementation stage - with an initial focus on the tried and tested. The council will take an active role in supporting the Cardiff Capital Region going forward.

Local ownership is a key focus throughout this plan, and where possible the action taken should leverage the progress made through the Welsh Government's recent Co-operation Agreement<sup>M63</sup> with Plaid Cymru, which includes key goals on

tackling climate change in a way that maximises local benefits.

The following section provides further detail on each of the actions that we will undertake under each energy proposition, as well as our key asks of others. Due to the relative uncertainty of longer-term actions, we have chosen not to focus on detailed scoping of these in this report and instead, focus on actions we intend to deliver in the short-term, subject to appropriate support. For more details on the action plan, please see our Technical Report for further details.

# 4. Action planning



## National Policies and Targets

Action	2024	2025	2026	2027	2028	2029	2030
Up to 1GW of electrolytic hydrogen secured (2025) [UK] <sup>M40</sup>							
Decision on hydrogen to heat buildings (2026) [UK] <sup>M41</sup>							
Up to 10GW hydrogen capacity (50% electrolytic) [UK] <sup>M40</sup>							Progressing towards 2030
Up to 50GW of offshore wind capacity including up to 5GW of innovative floating wind (2030) [UK] <sup>M40</sup>							Progressing towards 2030
Future Homes Standard consultation suggests all space heating and hot water demand be met through low carbon sources in new builds (2025) [UK] <sup>M42</sup>							
All new social homes built to Welsh Development Quality Requirements 2021 without fossil fuel heating (from 2025) <sup>M43</sup>							
All existing social homes to have a plan for minimizing environmental impact and improving energy performance (2027) [Wales] <sup>M44</sup>							
-37% GHG emissions by 2025 (rel. to 1990) [Wales] <sup>M45</sup>							
-63% GHG emissions by 2030 (rel. to 1990) [Wales] <sup>M45</sup>							Progressing towards 2030
Meet the equivalent of 100% of electricity needs from renewable sources by 2035 [Wales] <sup>M46</sup>							Progressing towards 2035
1.5GW of renewable capacity to be locally owned (exc. Heat pumps) (2035) [Wales] <sup>M46</sup>							
580,000 heat pumps to be installed in Wales by 2035, contingent on scaled up support from the UK Government and reductions in the cost of technology (2035) [Wales] <sup>M46</sup>							
Minimum EPC E to rent out any property (from 2023 onwards) and EPC C from 2030 [UK] <sup>M47</sup>							
1 public charge point for every 7 to 11 electric vehicles (2025) [Wales] <sup>M48</sup>							
Rapid charging available every 20 miles on the strategic trunk road (2025) [Wales] <sup>M48</sup>							
-10% car miles travelled/person (2030) [Wales] <sup>M03</sup>							Progressing towards 2030
80% new cars and 70% new vans sold to be 0 emissions (2030) (ZEV mandate) [UK] <sup>M48</sup>							Progressing towards 2030
100% new cars and vans sold to be 0 emissions (2035) (ZEV mandate) [UK] <sup>M48</sup>							Progressing towards 2035
Net Zero public sector by 2030 [Wales] <sup>M26</sup>							Progressing towards 2030

# 4. Action planning

## Action routemap



### 1. Getting Our Buildings Future Ready

#	Action	2024	2025	2026	2027	2028	2029	2030		
1.1	Develop an approach and delivery plan for tackling owner-occupied retrofit, including promoting EPCs for residents (B.1.2)								Review every 5 years	R+N
1.2	Develop a retrofit prioritisation plan (B.1.1)								Review annually	R
1.3	Work to identify skills and training priorities and opportunities, including Aspire apprenticeship scheme and partnering with bodies such as Learning Action Zone and local businesses									L
1.4	Work with WG and other key local partners for rollout of energy efficiency programmes									L
1.5	Review the current ECOFLEX programme (B.1.3)								Review annually	R
1.6	Agree energy and carbon targets for public sector new builds									L
1.7	Signpost to or develop a retrofit and energy efficiency information hub for consumers (B.2.1)									R+N
1.8	Engage with development industry to assess opportunities for higher sustainable building standards, including zero carbon, taking account of local development viability									L
1.9	Source private funding to support the delivery of retrofitting in residential social landlord homes									L
1.10	Consider mechanisms for encouraging greater uptake of retrofit (B.1.7)								Ongoing	N
1.11	Apply lessons learnt from ORP through the Welsh Zero Carbon Hwb (B.1.8)									N
1.12	Identify specific planning constraints limiting progress to Net Zero (B.5.1)								Ongoing	N
1.13	Consider tighter building regulations to support delivery of Net Zero ready buildings (B.5.2)									N

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# 4. Action planning

## Action routemap



### 2. Low Carbon Travel

#	Action	2024	2025	2026	2027	2028	2029	2030		
2.1	Develop EV charging strategy, explore on street charging trials and destination charging location options	[Green bar from 2024 to 2028]								L
2.2	Identify and access funding for the deployment of EV chargers across the region, explore commercial models for investment into EV charging (T.2.2)	[Green bar from 2024 to 2025]								R
2.3	Develop, agree and implement a plan to roll out EV chargers across the region ahead of need (to include on-street charging) (T.2.1)	[Green bar from 2024 to 2029]							Ongoing	R
2.4	Explore models and approach for ULEV car sharing scheme (car clubs) (T.2.3)	[Green bar from 2024 to 2025]								R
2.5	Continue to improve the existing Active Travel Network and create new active travel routes where needed	[Green bar from 2024 to 2025]								L
2.6	Expand Challenge Fund green hydrogen vehicle pilot (T.3.1)	[Green bar from 2024 to 2025]								R
2.7	Continue to contribute to improvement of local bus services including flecsi	[Green bar from 2024 to 2025]								L
2.8	Review the impacts of the Fflecsi bus scheme trials and undertake research to understand the impact of such a bus transport model on other areas within the local authority.	[Green bar from 2024 to 2025]								N
2.9	Prepare for potential extension of Metro to Abertillery and Ebbw Fawr Valley	[Green bar from 2024 to 2028]								L
2.10	Produce a Regional Transport Plan (RTP) (T.1.1)	[Green bar from 2024 to 2025]								R
2.11	Transition public sector fleet to ULEV	[Green bar from 2024 to 2030]								L
2.12	Develop a national procurement framework for EV infrastructure (T.2.4)	[Green bar from 2024 to 2025]								N

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# 4. Action planning

## Action routemap



### 3. Green Energy

#	Action	2024	2025	2026	2027	2028	2029	2030		
3.1	Maximise the retention of the benefits of renewable energy development in Blaenau Gwent	█							L	
3.2	Continue to support the development of wind energy schemes that can be accommodated within environmental and landscape capacity	█								
3.3	Local public sector bodies understand the potential for renewable energy generation on their estates	█							L	
3.4	Promoting onsite renewables for businesses			█					L	
3.5	Understand local potential and need for energy storage			█					L	
3.6	Understand potential heat provision from future industry			█					L	
3.7	Create a regional renewable energy investment prospectus (R.1.1)	█							R	
3.8	Attract investment in renewable energy (including community projects) (R.1.2)	█						Ongoing		R
3.9	Develop a renewable energy communication campaign (R.2.1)	█								R+N
3.10	Identify public sector land suitable for renewables (R.4.1)	█						Ongoing		N
3.11	Develop and deliver on a masterplan for renewables on the Aberthaw site (R.2.2)	█								R

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# 4. Action planning

## Action routemap



### 4. Green Economy

#	Action	2024	2025	2026	2027	2028	2029	2030	2030
4.1	Co-ordinate a network to support businesses to decarbonise (C.1.1)								R
4.2	Develop an industrial engagement programme to decarbonise industry (C.1.2)								R
4.3	Continue to engage with business enquiries to understand energy needs and green aspirations of business considering locating in Blaenau Gwent								L
4.4	Embed decarbonisation and sustainability into Tech Valleys governance and decision making								N
4.5	Understand heat and cooling as potential sources for future heat networks from local businesses								L
4.6	Creation of Net Zero Clusters (Partnerships) across the region in key Net Zero areas as identified in the LAEPs (I.1.2)								R

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# 4. Action planning

## Action routemap



### 5. Research and Innovation

#	Action	2024	2024	2025	2026	2027	2028	2029	2030	2030	
5.1	Understand potential future options for heat demand in industry										L
5.2	Identify opportunities for smart local energy systems (I.1.3)										L+R
5.3	Continue to participate in research and pilot projects around future energy technologies	Ongoing									L
5.4	Develop plans for viable and alternative energy technologies e.g. heat networks, mine water, energy storage and hydrogen (I.1.1)	Timescales TBC									R
5.5	Support further local investigation of potential use of mine water for heating	Timescales TBC									L

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# 4. Action planning

## Action routemap



### 6. Energy Networks

#	Action	2024	2025	2026	2027	2028	2029	2030	
6.1	Provide data for forecasting to NGED and WWU	Ongoing action and review annually							R
6.2	Hold regular engagement meetings between BGCBC and grid operators National Grid and Wales and West Utilities	Ongoing action and review quarterly							L
6.3	Consolidate project pipelines across electricity and gas networks								WWU; NG
6.4	Inform local authorities about available data resources	Ongoing action							NG
6.5	Respond to consultations in support of required investment	Ongoing action							L
6.6	Include new projects from the LAEP in strategic planning process								NG
6.7	Highlight gas infrastructure opportunities	Ongoing action							WWU
6.8	Include new projects from the LAEP in strategic planning process								WWU
6.9	Support RIIO-GD3 Planning for future of electricity and gas grids								L
6.10	Publish LAEP outputs onto datamap Wales								N
6.11	Make the network hydrogen ready	Ongoing action							WWU
6.12	Develop plans for a green hydrogen production facility	Ongoing action							R
6.13	Develop a trade association and co-ordinate a regional market for hydrogen	Ongoing action							R
6.14	Pilot projects for hydrogen, biomethane, flexibility and storage	Ongoing action							WWU
6.15	Investigate hydrogen transport demand								WWU
6.16	Adopt a low carbon hydrogen standard based on that of UK Gov to feed into hydrogen permitting								N

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# 4. Action planning

## Action routemap

7. Other and Enabling		2024	2025	2026	2027	2028	2029	2030		
7.1	Develop a governance structure and performance management framework (E.1.1)								R	
7.2	Facilitate monitoring of the LAEP across the Region (E.1.2)		Review annually						R	
7.3	Develop a business plan for delivery of the LAEPs across the region (E.1.3)								R	
7.4	Develop a regional Strategic Development Plan (SDP) (E.1.4)								R	
7.5	Develop a national energy plan (E.2.2)								N	
7.6	Map and identify skills and labour needs (E.3.1)			Review every 5 years						R+N
7.7	Review and develop educational programmes to meet skills needed (E.3.2)									R+N
7.8	Develop a communication strategy to promote jobs (E.3.3)		Ongoing						R+N	
7.9	Identify supply chain needs (E.3.4)			Review every 5 years						R
7.10	Investigate possible procurement and investment frameworks that could be considered for larger projects of scale (E.4.1)								R	
7.11	Share best practice for energy decarbonisation (E.4.2)		Ongoing						R	
7.12	Access funding for energy decarbonisation (E.4.3)		Ongoing						R	

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Blaenau Gwent

## Chapter 5: Next steps



# 5. Next steps

## Our LAEP in the context of programmes and projects

Our LAEP gives us a good understanding of the current state of our local energy system, and what it will take to decarbonise it. We have set out a plan of action for the next 5 years, and intend on delivering this subject to sufficient political, and financial support.

We have assessed each proposition against the diagram to the right in terms of which stage of the development journey it is at. To take each proposition to delivery, programmes and projects will need to go through the entire journey.

Figure 5.1 shows how projects move from context and vision setting, to procurement and project delivery.

**Stage 0 Context setting:** This stage involves understanding the context, key challenges, strategic objectives as well as our role to support delivery.

**Stage 1 Delivery option assessment:** This stage involves the initial options exploration with the defining of potential long list commercial options, an appropriate evaluation framework and initial market testing.

**Stage 2 Detailed project development (including market testing):** Following the initial long listing exercise, detailed development of a shortlist of

potential commercial options will be developed and tested with the market. This process will be iterative, as options will be refined based on feedback from the market as well as commercial and technical limitations.

**Stage 3 Procurement and project delivery:** Stage will include selection of the commercial delivery option which best delivers the objectives and is commercially deliverable. This will be taken forward to procurement (if required) and subsequent delivery.

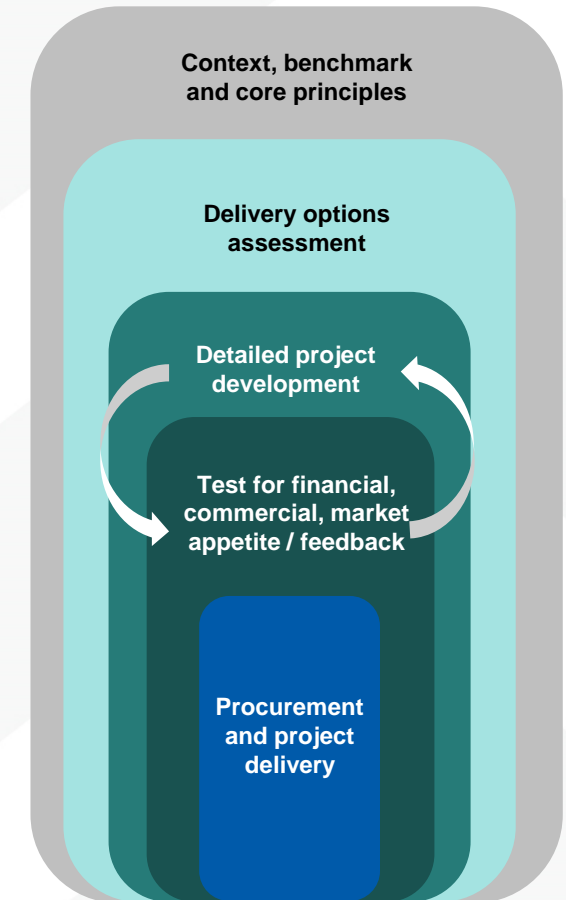


Figure 5.1: How programmes and projects develop

# 5. Next steps

## Our LAEP in the context of programmes and projects

During the LAEP process, we have developed the context and vision for propositions relating to buildings, transport, renewables, business, hydrogen and the grid. This means that, as well as continuing in delivering individual projects, we also take the first next step for each of our propositions in considering the delivery options.

### Getting our buildings future ready

We continue to invest in our buildings to improve their energy efficiency and subsequent carbon emissions. We have successfully secured Salix loans, Welsh Government grants and utilised internal funds to carry out works across our estate including industrial units and street lighting. There is more work to do to scale this up for all buildings across the County.

### Low carbon travel

Work is being carried out to develop the Council's ULEV Transition plan in line with the installation of EV charging points and the renewal of the Fleet contract. We have invested in EV charging infrastructure to support the public transition to electric vehicles through the EV infrastructure fund.

### Green economy

Through Welsh Government and Tech Valleys funding we have secured investment to explore

the development of net zero energy business parks, including live demonstrators; and rolling out other projects to decarbonise industrial estates (e.g. through the smart living programme R&D).

### Green energy

The Council has demonstrated leadership through exploring different mechanisms for rolling out renewable generation, including exploring community energy bonds, and harnessing public and private investment for developing feasibility studies and business cases for hydro and wind projects.

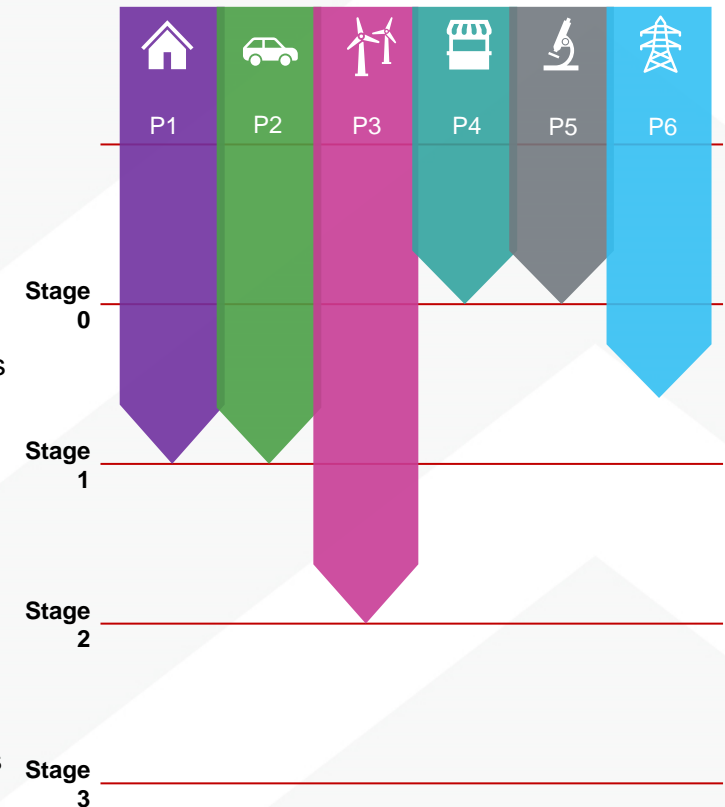
### Research and innovation

This is a nascent space and exploratory work needs to be undertaken to understand the challenges and opportunities for hydrogen in Blaenau Gwent.

### Energy Networks

As we transition towards a net zero energy system, it is essential energy infrastructure is upgraded to ensure reliable supply to consumers in Blaenau Gwent. NGED and WWU have actively participated in developing this LAEP and remain committed to supporting the energy transition across our region.

**Proposition area for Blaenau Gwent's LAEP**



**Figure 5.0.2: Where each proposition is in terms of development**

# 5. Next steps

## Enabling conditions for success

### Governance

Delivery of our LAEP will be overseen by Blaenau Gwent County Borough Council and the Cardiff Capital Region. Blaenau Gwent council will look to identify a lead officer with overall responsibility for the delivery of the actions for which we are the lead within the LAEP.

Recognising the number of different stakeholders who play an important role in delivering the change that will be required to meet the objectives and actions set out in this plan, we will work with the Cardiff Capital Region and partners across different sectors. The Cardiff Capital Region will lead on developing and setting up a regional governance structure that will enable wider input in the plan.

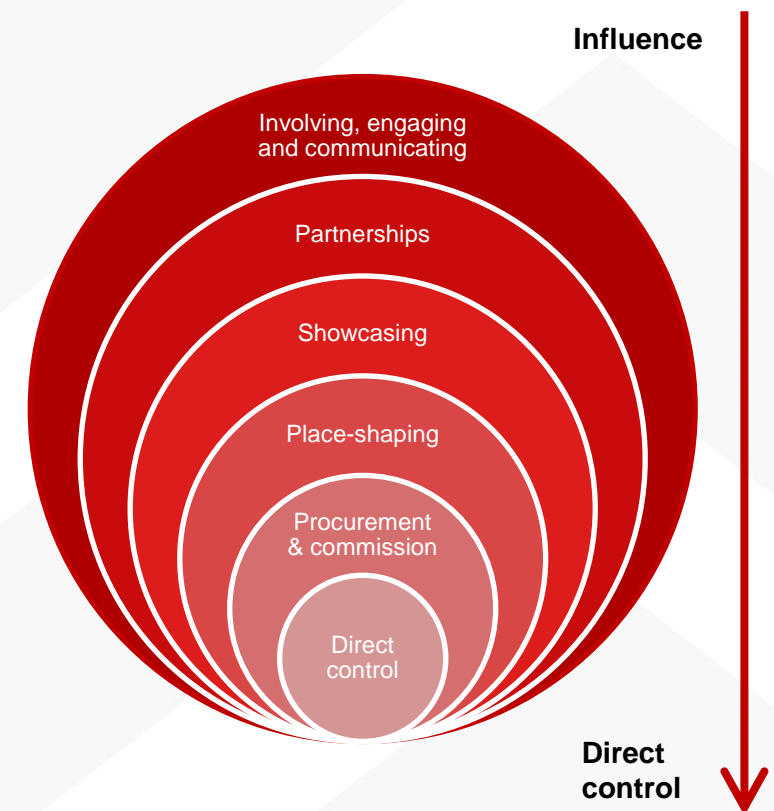
To deliver this, we (as Blaenau Gwent County Borough Council) will decarbonise assets within our direct control, such as council buildings and the council transport fleet. Further, we will drive and influence the decarbonisation of the wider area through showcasing, collaborating and engaging the community.

Our sphere of influence might include:

- Budget and finance
- Defining and helping to achieve the project outcomes
- Identifying the priorities
- Identifying potential risks and monitoring risks
- Monitoring timelines
- Monitoring the quality of the project as it develops

We are involved in a range of projects, initiatives and partnerships with different levels of control.

Across the CCR, we see synergies in terms of the propositions chosen. We believe there will be efficiencies in undertaking many of the programmes and projects forward regionally and/or nationally.



**Figure 5.0.3: Local Authority roles and level of influence**

# 5. Next steps

## Enabling conditions for success

### Monitoring and review

This plan sets out our key actions for the first five years that will set us on the right journey to achieve the ambitions in our longer-term routemap. The plan needs to be flexible to adapt to changes in the future.

Working across the region, the Cardiff Capital Region will develop a consistent performance management framework and facilitate monitoring and review of the LAEPs across the region. An annual monitoring report will be produced, building on the Welsh Government's Energy Generation in Wales reports, which will describe our progress against the actions set out in this plan and also against key output metrics as follows:

- Number of homes retrofitted
- Number of non-domestic buildings retrofitted
- Number of EV charging points installed
- Total installed capacity of renewables such as solar PV and onshore wind
- Heat pumps installed
- Hydrogen electrolyzers
- Battery installations

- Number of low carbon energy innovations.

To monitor these metrics, we will make use of publicly available datasets such as the DFES reports undertaken by NGED, Energy Performance Certificate Register, the Micro Generation Certification Scheme and the Renewable Energy Planning Database.

We will develop a baseline understanding of these metrics based on existing data and monitor changes annually.

GHG emission reduction for the area will be tracked as part of the annual reporting process which will be in addition to the Welsh Government public sector reporting that we undertake as a local authority. We recognise that available data will lag a few years behind.

The whole plan will be updated at least every five years to take account of key factors, including policy changes at a UK and Welsh Government level, changes in costs and the effectiveness of technologies.

# Table of figures

<b>Reference</b>	<b>Description</b>	<b>Page number</b>
Figure 0.0.1	LAEP and support documents purpose and audience summary	6
Figure 0.0.2	LAEP priority intervention areas for Blaenau Gwent	7
Figure 0.0.3	Summary of energy propositions	8
Figure 1.0.1	LAEP landscape across Wales	17
Figure 1.0.2	Schematic of electricity and gas transmission and distribution network and the system boundary for LAEP	18
Figure 1.0.3	Schematic of the local system scope for LAEP	19
Figure 1.0.4	Geographic boundary for Blaenau Gwent's LAEP	20
Figure 2.0.1	Summary of cross-cutting regulation / policies at local, regional and national level	23
Figure 2.0.2	Summary of sector-specific regulation / policy at local, national and regional level	24
Figure 2.0.3	Summary of stakeholders	25
Figure 2.0.4	How to read a Sankey diagram (units are GWh/year)	27
Figure 2.0.5	Sankey diagram showing energy input, conversion and output in Blaenau Gwent in GWh/yr	28
Figure 2.0.6	Transport energy consumption (combined total across cars, light goods vehicles (LGV) and heavy goods vehicles (HGV)) by LSOA, in 2015 as a baseline year	29

# Table of figures

Reference	Description	Page number
Figure 2.0.7	Major industrial loads (2019) and heat demand (2023) by substation zone across Blaenau Gwent	29
Figure 2.0.8	Local energy generators and their respective capacities (MW) and domestic and non-domestic rooftop solar PV (MW) by outward code (2023)	30
Figure 2.0.9	Electricity generation headroom	31
Figure 2.0.10	Electricity demand headroom	31
Figure 2.0.11	Summary of activities to date that have contributed to decarbonising the local energy system	33
Figure 3.0.1	Summary of steps taken to produce the LAEP	36
Figure 3.0.2	Summary of future energy scenarios	39
Figure 3.0.3	A Sankey diagram for a potential future 2050 energy system (energy flows in GWh)	40
Figure 3.0.4	Energy demand over time for each scenario (GWh)	43
Figure 3.0.5	Energy demand over time for each scenario (GWh)	44
Figure 3.0.6	GHG emissions (ktCO <sub>2</sub> e) over time for each scenario compared to the Do Nothing scenario (bottom) % GHG emissions reduction for each scenario compared to the Welsh Government emissions reduction targets	45
Figure 4.0.1	Summary of energy propositions and their inter-dependencies	50
Figure 5.0.1	How programmes and projects develop	62

# Table of figures

Reference	Description	Page number
Figure 5.0.2	Where each proposition is in terms of development	63
Figure 5.0.3	Local Authority roles and level of influence	64



Sponsors:



Delivery partners:



# Table of tables

Reference	Description	Page number
Table 3.0.1	Comparison across the scenarios	41
Table 3.0.2	Summary of economic impacts for each scenario: employment impacts and air quality activity costs	46
Table 3.0.3	Summary of deployment of various technologies between 2023, 2030 and 2050	57

Blaenau Gwent

# Appendices

Appendix A – Glossary of terms



# Glossary of terms

Term or acronym	Definition or meaning
Action	The process of doing something – a specific action assigned to a responsible person preferably with a date to be completed.
Anaerobic Digestion	Processes biomass (plant material) into biogas (methane) that can be used for heating and generating electricity.
Baseline	The baseline is the data showing the current energy system, containing the 2019 data sets provided by the LA and publicly available data.
Batteries	Devices that store electrical energy to be used at a later time.
Biomass boiler	A boiler which burns wood-based fuel (e.g. logs, pellets, chippings) to generate heat and electricity.
Carbon Capture and Storage (CCS)	The process of capturing and then storing carbon emissions before they enter the atmosphere.
Cardiff Capital Region	The Cardiff Capital Region, that covers the 10 local authority areas covering South East Wales -Blaenau Gwent; Bridgend; Caerphilly; Cardiff; Merthyr Tydfil; Monmouthshire; Newport; Rhondda Cynon Taf; Torfaen; and Vale of Glamorgan.
Certainties	A fact that is definitely true or an event that is definitely going to take place. In terms of a local energy system, certainties include funded projects, etc.
Demand	Local energy demand that the local energy system needs to meet.

# Glossary of terms

Term or acronym	Definition or meaning
Demand headroom	The difference between the electrical capacity of a substation, and the electricity demand at the substation at the time of peak demand.
Deployment modelling	A model investigating rates by which to deploy specific technologies between the baseline year and 2050 to achieve the end state developed by the optimisation model for each scenario. The model considers broader plan objectives and local, regional, and national strategic priorities, policies, and targets to help us to define a suitable level of ambition and inform an action plan.
Dispatchable energy generation	Energy generation that can turn on and off (i.e. isn't controlled by the weather) – this is likely to be gas turbines of some sort.
Distribution network	Takes energy from transmission network and delivers it to users via pipes or wires at low pressure / voltages.
Electricity network	Interconnected infrastructure which consists of power stations, electrical substations, distribution lines and transmission lines. The network delivers electricity from the producers to consumers.
Electrolyser	A piece of equipment that uses electricity to split water into hydrogen and oxygen.
Energy Proposition	A proposition is an energy component with a scale and a timescale. For instance, X MW of wind turbine to be built in 5 years, 10,000 buildings to retrofit with XX by 2030, or a pilot project such as hydrogen storage innovation. These are typically near term, low regrets energy components that are needed in future energy systems (it is likely that these appear in all scenarios).
Focus zone	A modelling zone which has been identified as an area in which to target near-term installation, upgrade, retrofit, or other activities related to a specific energy system component.
Generation	Local generation – size below 100MW.

# Glossary of terms

Term or acronym	Definition or meaning
Grid electricity	Electricity that is supplied by the electricity network.
Grid substation	The physical equipment comprising a substation with a 132kV-33kV transformer(s) connecting the grid-level, extra high voltage electricity lines to the primary-level, high voltage electricity lines. The grid substation facilitates connection with the national grid.
Heat network	A distribution system of insulated pipes that takes heat from a central source and delivers it to a number of domestic or non-domestic buildings.
Heat pump	A piece of equipment that uses a heat exchange system to take heat from air, ground or water and increases the temperature to heat buildings. By using ambient heat from the environment and concentrating it, rather than from an energy source (such as natural gas), heat pumps can achieve efficiencies over 100%.
Hydrogen	A flammable gas that can be burned, like natural gas, to generate heat or power vehicles. The by-product is water only, no carbon.
Infrastructure	Local energy distribution infrastructure, includes storage assets if these are at grid level.
Landfill gas	Gases such as methane that are produced by micro-organisms in a landfill site that can be used as a source of energy.
Lever	We use the term policy levers to refer to the 'governing instruments' (Kooiman, 2003) which the state has at its disposal to direct, manage and shape change in public services.
Local energy system	The distribution level energy system, excludes the transmission and national assets.
Longer-term options	The likely outcome of these is less certain and dependent upon actions and decisions being made that are not under our control, e.g. a national policy or the capability / availability of a technology.

# Glossary of terms

Term or acronym	Definition or meaning
Major industrial load	The power demand of industrial sites in the 2019 NAEI Point Sources data are large enough to be classified as major industrial loads. Sites that aren't included in this database are likely too small to have a significant impact on the energy system singlehandedly.
Methane reformation	Process of producing hydrogen by heating methane from natural gas and steam, usually with a catalyst. Produces carbon dioxide as a by product.
Modelling zone	A specified area in our modelling which is the smallest level of granularity for analysis. The zones are used through energy modelling, deployment modelling, and mapping. Zones were created by intersecting the Local Authority boundary with the primary substation service area boundary, as described in the "Methodology - electricity and gas network infrastructure" section of the Technical Report. <i>May also be called "zone" or "substation zone" in the reports.</i>
National asset	National infrastructure (can be supply or demand and the accompanying transmission / distribution infrastructure) – defined as over 100MW, unless it produces heat which can only be used locally this is generally excluded from LAEP particularly the modelling.
National Net Zero	The National Net Zero modelled in the LAEP. Details of assumptions are in the methodology section.
Net Zero	Net zero when used in this LAEP is the energy net zero as it does not include all emissions, only energy emissions.
No regrets/ low regrets	Options which are common to all scenarios, cost-effective, provide relatively large benefits, and are very likely to be important parts of the future energy system, regardless of future uncertainty.
Optimisation modelling	Modelling to create the most cost and carbon optimal system.

# Glossary of terms

Term or acronym	Definition or meaning
Outward code	The first part of a postcode i.e. BS1.
Pathway	A pathway is how we get from the current energy system, to the most likely net zero end point. The pathway will consider what is needed from across the scenarios, the supply chain, number of installers etc. The propositions will make up the more certain part of the pathway, whereas the longer-term energy components will need further definition in the future.
Power factor	The ratio between useful power (kW) and apparent power (kVA) consumed or transformed by electrical equipment.
Power Purchase Agreement (PPA)	A contract between two parties where one produces and sells electricity and the other purchases electricity.
Primary substation	The physical equipment comprising a substation with a 33kV-11kV transformer(s) connecting the primary-level, high voltage electricity lines to the consumer-level, low voltage electricity lines.
Primary substation service area	The area bounding the buildings or other electricity demands which are served by a primary substation
Programme	A series of projects, usually with a theme, that is run collectively.
Project	Strategic scale projects being implemented or planned for implementation in the local energy system that will significantly affect local demand or local supply.
Renewable Energy Guarantees of Origin (REGO) Agreement	A scheme that tells consumers what proportion of their electricity comes from renewable sources.
Resistance heating/ heater	Generate heat by passing electrical currents through wires.

# Glossary of terms

Term or acronym	Definition or meaning
Scenario	A scenario is a set of assumptions for a particular end point (usually 2050) which are modelled in our optimisation model. We modelled 5 different scenarios to see what was common across the scenarios and therefore is a “no regrets” measure, and what changed between the modelled scenarios.
Sensitivities	Sensitivities of a specific scenario can be tested – for instance to test the impact of increasing electricity/hydrogen prices on the scenario. Testing a sensitivity is when you change one thing multiple times to assess the impact on the cost/carbon.
Sewage gas	A mixture of gases generated in sewer systems, used in a reciprocating gas engine to produce heat and electricity.
Solar PV	Convert solar radiation into electricity using photovoltaic (PV) cells.
Strategic objective	Strategic objectives are purpose statements that help create an overall vision and set goals and measurable steps to achieve the desired outcome. A strategic objective is most effective when it is quantifiable either by statistical results or observable data. Strategic objectives further the vision, align goals and drive decisions that impact change.
Strategic options	Strategic options are longer-term changes to demand, generation and infrastructure that will lead onto decarbonisation of the local energy system - and the key variables that determine scenarios.
Substation upgrades	Interventions at an existing primary substation designed to increase the capacity of the substation, such as upgrading an existing primary substation or installing a new primary substation. <i>May also be called ‘substation interventions’ in the reports.</i>
Supply	Energy supply options – this is how energy is delivered from the point of source – so a supply option would be solar PV.

# Glossary of terms

Term or acronym	Definition or meaning
Supply/ generation headroom	The difference between the electrical capacity of a substation, and the power being supplied to the substation at a given time.
TfW zone	An area used by the Transport for Wales (TfW) as a point of origin or departure for vehicle trips. <i>May also be called "transport zone" within the reports.</i>
Transmission network	Move energy via pipes or wires for long distances around the country at high pressure/ voltages.
Uncertainties	Uncertainty results from lack of information or from disagreement about what is known or even knowable.
We	The range of people and organisations in Blaenau Gwent who will support the ambition and take action.
Wind power	Harnessing the kinetic energy of wind to turn a turbine to generate electricity.

Blaenau Gwent

# Appendices

Appendix B – Units of measure



# Units of measure

Unit	Definition or meaning
°C	Degree(s) Celsius – a unit of temperature on the Celsius scale.
GWh	Gigawatt hour(s) – a unit of energy representing 1 billion watt-hours.
kgCO <sub>2</sub> e	Kilogram(s) of carbon dioxide equivalents – a unit of measurement for greenhouse gas warming potential, expressing the equivalent weight of carbon dioxide with the same global warming potential.
ktCO <sub>2</sub> e	Kilotonne(s) of carbon dioxide equivalents - a unit of measurement for greenhouse gas warming potential, expressing the equivalent weight of carbon dioxide with the same global warming potential. Represents 1 million kgCO <sub>2</sub> e.
kV	Kilovolt(s) – a unit of potential energy of a unit charge in a point of a circuit relative to a reference (ground) representing 1000 volts.
kW	Kilowatt(s) – a metric unit of power measuring rate of energy consumption or production representing 1000 watts.
kWh	Kilowatt hour(s) - a unit of energy representing 1000 watt-hours.
kWp	Peak kilowatt(s) – the maximum power rating possible produced by an energy generation source (i.e., amount of power produced in ideal generation conditions).
MVA	Mega volt amp(s) – a metric unit of apparent power measuring rate of energy consumption or production and considering the efficiency by which electrical power is converted into useful output. It is related to MW by the power factor of the system or equipment.

# Units of measure

Unit	Definition or meaning
MW	Megawatt(s) – a metric unit of power measuring rate of energy consumption or production representing 1 million watts.
MWe	Megawatt(s) electric – a unit of electric power output from a generation source representing 1 million watts electric.
MWth	Megawatt(s) thermal – a unit of thermal power output from a generation source representing 1 million watts thermal.
MWh	Megawatt hour(s) - a unit of energy representing 1 million watt-hours.
tCO <sub>2</sub> per capita	Tonne(s) of carbon dioxide per capita – a unit of mass of carbon dioxide emitted per member of a population per year. Represents 1000 kgCO <sub>2</sub> per capita.