Neath Port Talbot
Local Area Energy Plan
2024

CITY SCIENCE
delivering decarbonisation

INTRODUCTION TO THE DOCUMENT

This the primary report for the Neath Port Talbot Local Area Energy Plan (LAEP), prepared by City Science for Neath Port Talbot Council.

This LAEP was crafted through significant stakeholder engagement. It adheres to both the Energy Systems Catapult and Ofgem guidance. Earlier chapters summarise the findings from the LAEP process, providing a comprehensive overview of the current energy system in Neath Port Talbot. Later chapters consider multiple prospective future energy scenarios and the nature of the potential energy system changes required, ultimately providing potential actionable steps, with the primary goal of achieving net zero by 2050.

The intention of this report is to serve as a dynamic resource, delivering technical insight in a format that is easily digestible. This document has been produced alongside detailed technical reporting that provides the Council with further details.

Local Context and Energy System

Provides an overview of the local context (such as demographic and socio-economic factors), and the current energy system. The information provides a benchmark against which net zero progress can be measured.

The Vision

Presents a comprehensive vision for Neath Port Talbot's future energy system, outlining the Net Zero Pathway, which was used to inform and support the interventions and the detailed Action Plan.

Interventions

Provides the potential interventions that can be applied across the energy system to reach net zero. It also identifies Focus Zones which are areas where an intervention is suitable on a large scale or could be prioritised.

Action Plan

The Action Plan provides clear direction, channelling the broader focus on decarbonisation into a set of collective actions to guide and progress Neath Port Talbot toward the targets in the Net Zero Pathway.

Mae'r adroddiad hwn ar gael yn y Gymraeg.

This report is available in Welsh Language.

CONTENTS & GLOSSARY

Acronym	Definition
ASHP	Air Source Heat Pump
BUS	Boiler Upgrade Scheme
CAPEX	Capital Expenditure
CO_2	Carbon Dioxide
DSR	Demand Side Response
EPC	Energy Performance Certificate
EV	Electric Vehicle
FES	Future Energy Scenarios
HGV	Heavy Goods Vehicle
KPI	Key Performance Indicator
LAEP	Local Area Energy Plan
LGV	Light Goods Vehicle
LSOA	Lower Layer Super Output Area
LULUCF	Land Use, Land Use Change And Forestry
NGED	National Grid Electricity Distribution
NGET	National Grid Electricity Transmission
NZIW	Net Zero Industry Wales
OS	Ordnance Survey
PV	Photovoltaics
RLCEA	Renewable And Low Carbon Energy Assessment
SWIC	South Wales Industrial Cluster
WIMD	Welsh Index Of Multiple Deprivation
WWU	Wales And West Utilities
ZEVIS	Zero Emission Vehicle Infrastructure Strategy

1. EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Neath Port Talbot's Local Area Energy Plan (LAEP) presents a comprehensive vision for Neath Port Talbot's future energy system, delineating the essential characteristics it will need to achieve a net zero energy system by 2050. The objectives of the plan include:

- Promote cost-effective solutions for energy generation, distribution, and consumption whilst reducing carbon emissions
- Enhance the efficiency, security and resilience of the local energy system via sector-based interventions
- Enable the planning of energy infrastructure that aligns with the current and future needs of the community
- Stimulate economic development and job creation through the growth of local clean/green energy industries
- Address equity and social inclusion in the energy system to maximise well-being and other wider community benefits

What is a Local Area Energy Plan?

A LAEP is an evidenced, spatial plan that identifies the changes required to the local energy system and built environment to achieve a net zero energy system by 2050. The resulting Net Zero Pathway and Action Plan in the LAEP can be used to guide the area's long term strategic thinking, planning and investment but requires subsequent detailed design work to deliver the suggested actions and projects.

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.

In 2021, the Welsh Government pledged to achieve net zero carbon emissions by 2050 and produced the Net Zero Wales Plan[1]. This ambition is undeniably challenging yet is achievable with significant action and engagement from the regional local authorities, local communities and individual citizens. Despite the challenges, a net zero energy system can also offer immense economic opportunity and multiple co-benefits for the area, which are explored and illustrated through this LAEP.

Stakeholder Engagement

A comprehensive stakeholder engagement programme was embedded throughout each stage of the LAEP development. Local and regional sessions were held including interviews, technical validation meetings, workshops and focus groups to ensure the final outputs reflect the needs and ambition of local stakeholders.

Key Project Stakeholders

- Neath Port Talbot Council
- Welsh Government Energy Service
- National Grid Electricity Distribution
- Wales and West Utilities
- Energy Systems Catapult

Wider Stakeholders

- Key industry segments
- Active influencers
- Subject experts
- High energy users

Local Context

Neath Port Talbot County Borough is in the South West region of Wales and covers 2% of the total land in Wales. It has a high population density, double that of the Welsh average, which is partly due to its very active industrial sector. The area stretches from the coast to the border of the Brecon Beacons National Park. This is split into the Coastal Corridor, which extends around Swansea Bay and houses the M4 corridor and Port Talbot industrial area, and the Valleys, rural areas characterised by the river valleys, upland plateaus and mountains.

EXECUTIVE SUMMARY

Policy Drivers

Neath Port Talbot Council declared a climate emergency in 2022, committing to develop a net zero carbon approach as soon as practically possible[2]. A variety of policies drive the need for a net zero energy system.

Net Zero Wales Carbon Budget[3]
Outlines national ambitions to be net zero by 2050., including a 37% reduction in emissions by 2025.

Llwybr Newydd -The Wales Transport Strategy[4]
The Wales Transport Strategy aims to create an accessible, sustainable and efficient transport system

South West Regional Energy Strategy[5]
A regional strategy that outlines six priorities to deliver a 55% reduction in energy system emissions by 2035 to meet national and regional ambitions.

Zero Emissions Fleet Transition Plan[6] & Infrastructure Strategy[7]
Identifies the Council's aspirations to transition 266 fleet vehicles to zero emission by 2030 and vision to accelerate zero emission uptake.

Local Development Plan[8]
Sets targets for the renewable energy generation and encourages new development to incorporate renewables and energy efficiency measures.

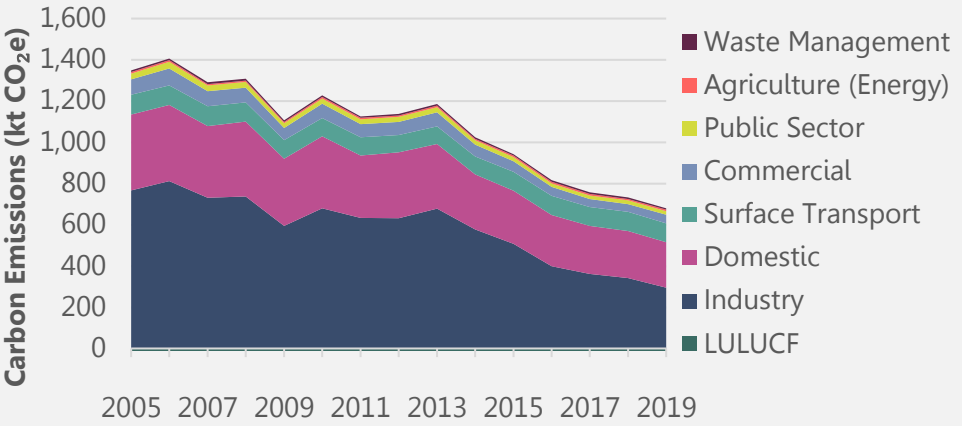
Decarbonisation & Renewable Energy Strategy[9]
Approach for achieving net zero carbon emissions, highlighting the area's potential for renewable energy generation.

Baseline Energy System

The current energy system was analysed across sectors to understand emissions trajectories, key challenges and opportunities and to serve as a benchmark against which progress can be measured. The base year was chosen as 2019, as the latest available data unaffected by COVID-19.

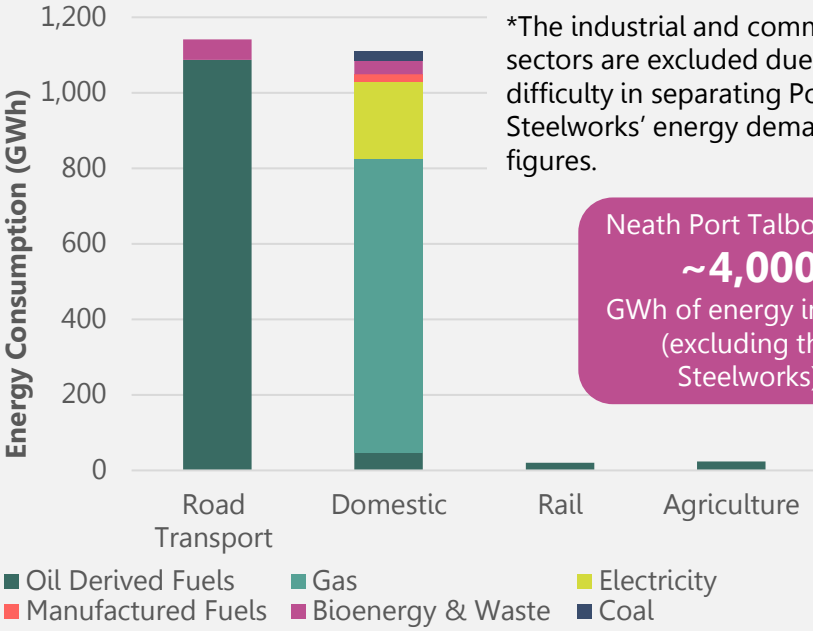
Industry is pivotal to Neath Port Talbot, both from the Port Talbot Steelworks but also the general industrial areas across the Swansea Bay region. Due to the scale of energy demand and emissions from the Steelworks, it has been separated in the analysis to enable a more detailed view of Neath Port Talbot's other sectors and industrial operations.

Carbon Emissions (2005-2019)[10]



Historic carbon emissions have fallen, mainly due to the decarbonisation of the electricity grid since 2013. However, fossil fuels still make up the majority of energy consumption. After industry, road transport and domestic housing are the two most energy intensive and polluting sectors.

Energy Consumption in 2019[11]*



*The industrial and commercial sectors are excluded due to the difficulty in separating Port Talbot Steelworks' energy demand figures.

Neath Port Talbot used
~4,000
GWh of energy in 2019 (excluding the Steelworks)

EXECUTIVE SUMMARY

Assessing Options for the Future

The potential 2050 energy system was modelled under a variety of technology and policy scenarios to understand the capacities of technologies required to reach net zero. This was extrapolated to a pathway, presenting a vision for how Neath Port Talbot could progress to achieve decarbonisation. Two main narratives were tested and compared.

WIDESPREAD ENGAGEMENT

- Incorporates a widespread uptake of heat pumps, increase in public transport and high EV adoption across all vehicles
- Industry relies on a mix of electrification and hydrogen
- Some technologies require consumers to embrace initial changes to behaviour

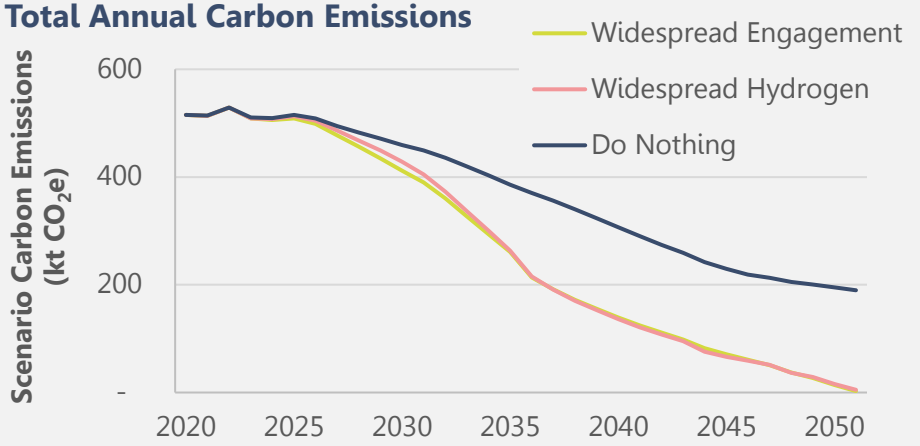
WIDESPREAD HYDROGEN

- Change is driven from a top-down, system-wide approach with hydrogen infrastructure as a key driver for heating
- Hydrogen is the main fuel for industry and a key fuel for heavy vehicles
- Private transport is electrified and use of public transport increases

A 'Do Nothing' scenario was also used as a counterfactual, which assumes that nationally and locally, no further policies or action is taken. Analysis was carried out across multiple factors to determine a preferred pathway which balances the need to deliver carbon reductions with economic opportunity and improved quality of life for local people.

Major differences include a **9%** lower total system cost for Widespread Engagement and close to **50% savings** on consumer bills from using heat pumps rather than hydrogen boilers.

Total Annual Carbon Emissions



A Red Amber Green (RAG) analysis was carried out to demonstrate the impacts of each scenario. It was found that Widespread Engagement offers faster decarbonisation, at a lower overall cost, and with a reduced impact on consumer bills.

Pathways	Carbon	System Cost	Consumer Bills	Job Creation	Health
Widespread Engagement	Positive	Neutral	Neutral	Positive	Positive
Widespread Hydrogen	Neutral	Negative	Negative	Positive	Positive
Do Nothing	Negative	Positive	Positive	Neutral	Negative

Key: Negative Impact; Neutral Impact; Positive Impact

EXECUTIVE SUMMARY

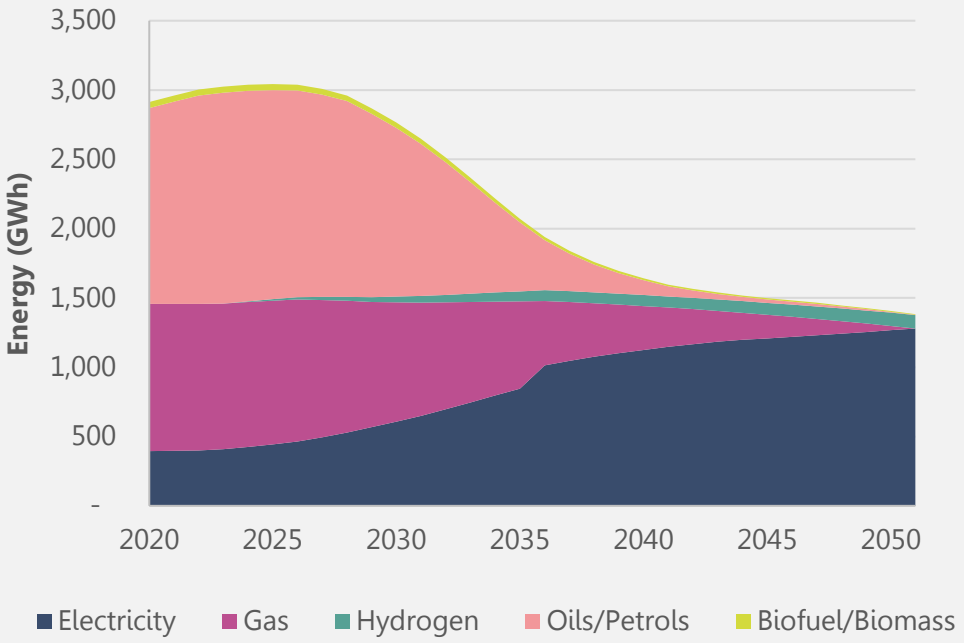
The Preferred Pathway

Overall, Widespread Engagement was selected by stakeholders as the preferred scenario. This is due to the cost savings, lower impact on consumer bills and generally lower risk associated with the electrification of heat versus widespread dependency on hydrogen. Both net zero scenarios, however, offered significant carbon emissions savings compared to the Do Nothing scenario.

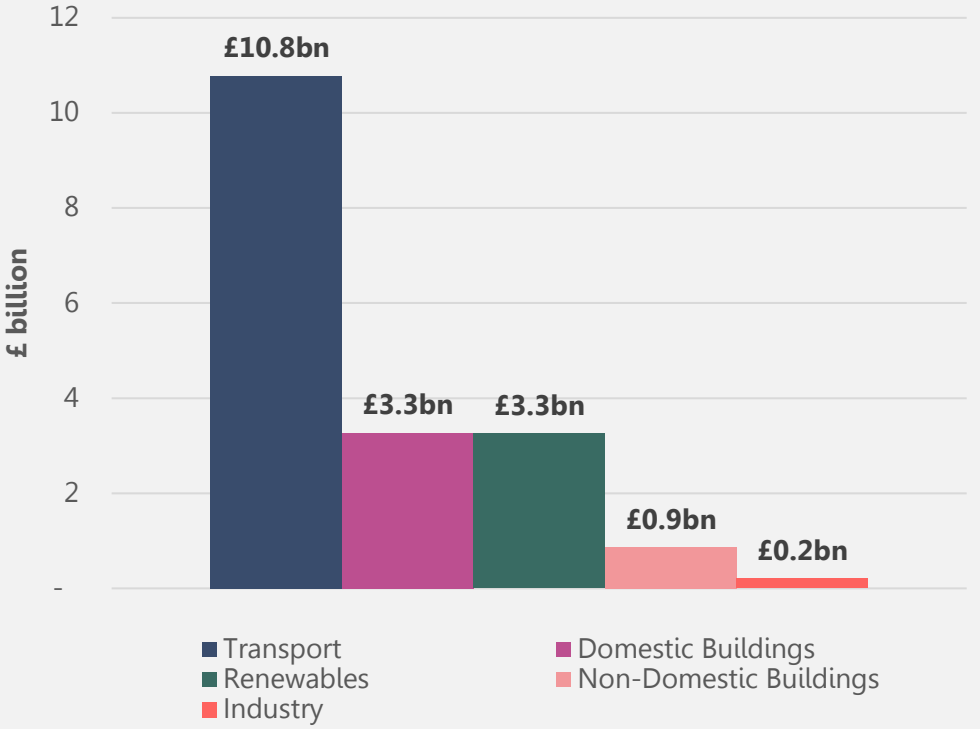
The Widespread Engagement scenario transitions primarily to electricity, by increasing the rollout of heat pumps for both domestic and non-domestic buildings, and the adoption rate of electric vehicles EVs across all vehicle types. The overall energy consumption decreases as heat pumps and EVs are significantly more energy efficient than gas boilers and internal combustion engines. Hydrogen is still required in this scenario, which is used for a small number of heavy vehicles such as buses and Heavy Goods Vehicles (HGVs) and could be used for industrial processes.

The total system cost was estimated, which includes both fossil fuel and low carbon costs, between now and 2050 across both the private and public sectors. Overall, the Widespread Engagement scenario is estimated to cost an additional 18% relative to Do Nothing, to achieve the desired level of decarbonisation by 2050. This is equivalent to £2.7bn. In all scenarios, the transport sector has the highest cost due to the volume of new vehicles.

Widespread Engagement: Total Energy Consumption



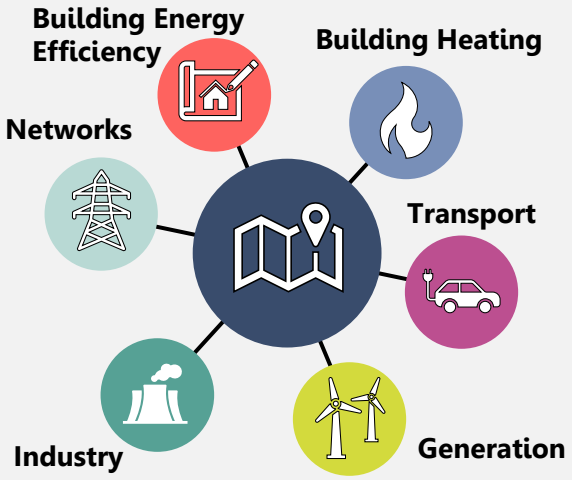
Widespread Engagement: Total Sector Cost



EXECUTIVE SUMMARY

Intervention Areas

Specific interventions required to achieve a net zero energy system under the Widespread Engagement Scenario were assessed across all sectors within the LAEP. These are presented in detail, including a spatial analysis of where they would be needed, which will support implementation programmes and identification of potential synergies from different actions.



The analysis from these intervention areas was combined with extensive stakeholder engagement to develop the final Action Plan.

Interventions were assessed across key factors for each sector, such as carbon emission savings, cost and energy reduction. This supports in determining the priority order of intervention but also informs the local authority of the scale of cost required and the associated benefit.

Focus Zones were determined for areas where a given intervention is considered to be 'low regrets', i.e. it is recommended across all modelled scenarios. A summary of these Focus Zones is given on the following page, shown by the Plan on a Page.

Interventions were chosen through engagement with stakeholders to determine the decarbonisation solutions that aligned with local policy and plans as well as supporting wider factors, such as alleviating fuel poverty. Some key findings across the intervention sectors are shown below.

Applying shallow (80%) and deep (20%) retrofitting can offer an 8% energy saving across all buildings.

The area will require 4,330 heat pumps by 2030.

Buses will make up 30% of the 2050 transport electricity demand, requiring strategic charging locations.

Rooftop photovoltaics (PV) has the potential to increase 20-fold, and total generation in the area could exceed demand.

Port Talbot could be a major future opportunity, with the combination of the Clean Growth Hub and the Freeport.

The 2050 electricity demand is 3.2x the baseline, requiring network investment in the major urban areas.

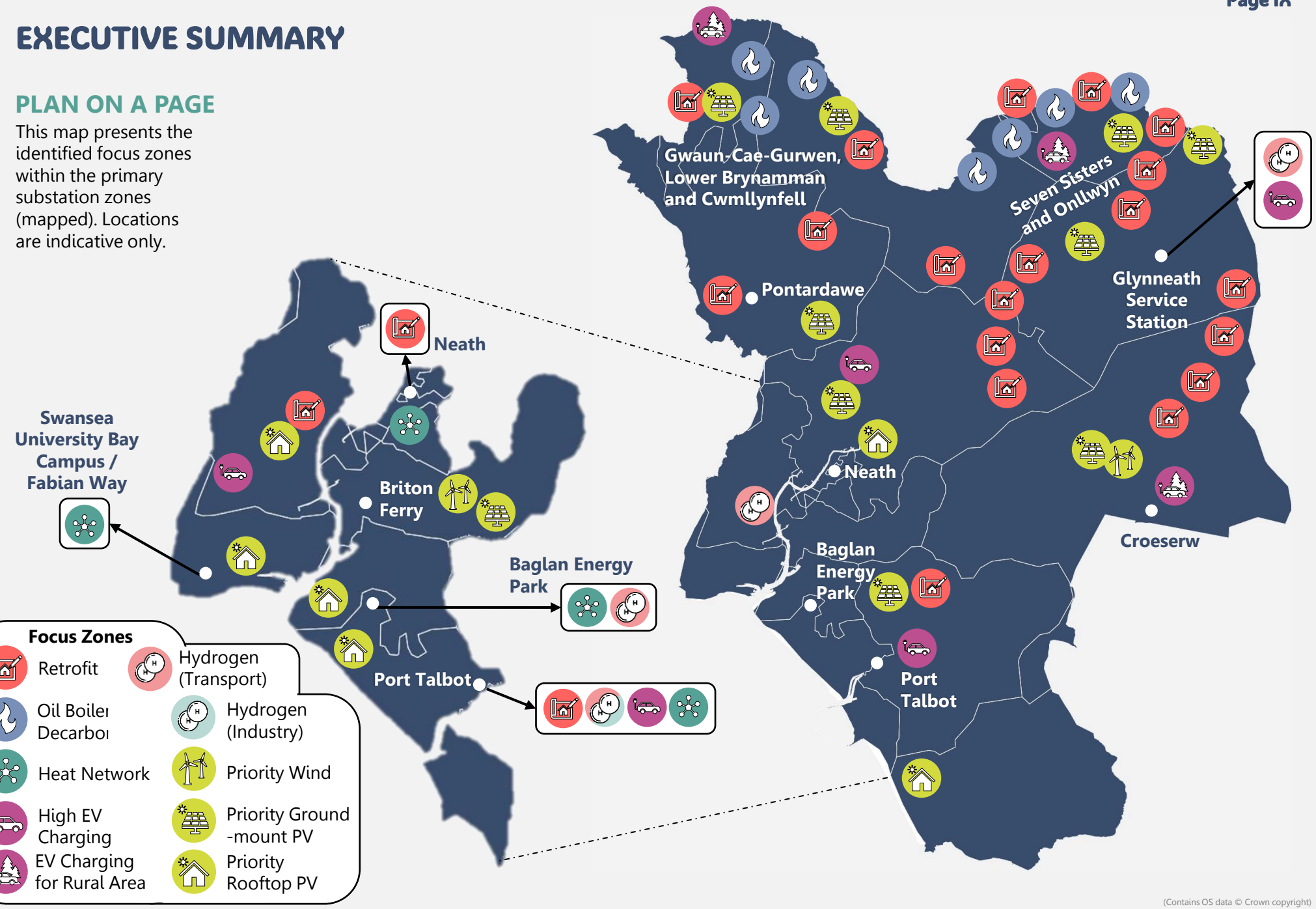
The Electrification Challenge

Net zero demands significant electrification, which will require increased capacity for both demand and generation on the electricity grid. The cost to increase capacity is substantial, with estimates in the region of £10 – 20mn and £200 – 300mn for demand and generation respectively. Measures which reduce capacity needs, such as large energy storage and demand flexibility should be prioritised. A key focus after this LAEP will be to collaborate with National Grid Electricity Distribution (NGED) to forecast and plan for future demand and generation to enable efficient and timely grid upgrades.

EXECUTIVE SUMMARY

PLAN ON A PAGE

This map presents the identified focus zones within the primary substation zones (mapped). Locations are indicative only.



EXECUTIVE SUMMARY

Action Plan & Next Steps

The Action Plan provides the detail of 15 priority actions (outlined below) to achieve the milestone targets set out in the Net Zero Pathway, and support Neath Port Talbot's journey to a net zero energy system. It acts as a catalyst for future initiatives, with an intention to inform upcoming projects, policies, and strategies. It provides clear, but intentionally flexible direction, channelling the broader decarbonisation focus into a set of collective actions. It is noted that the selection of priority actions does not preclude support for initiatives beyond this list or those featured in other Councils' plans.

CROSSCUTTING ENABLING ACTIONS

1: Establish a Regional LAEP Steering Group
2: Support a Long-Term Green Skills Programme
3: Embed LAEP Learnings into Wider Council Processes & Communications

BUILDING EFFICIENCY, RETROFIT & HEAT ACTIONS

4: Create a Retrofit & Low Carbon Heating Behaviour Change Campaign
5: Develop a Fuel Poverty Programme
6: Develop a Programme to Electrify Public Sector Owned Non-gas Properties

TRANSPORT ACTIONS

7: Develop Holistic Community Transport Provision in Valley Areas
8: Low & Zero Carbon Vehicle Public Fleet Uptake
9: Enhance Active Travel & Public Transport

GENERATION & NETWORKS ACTIONS

10: Continue Collaboration with Electricity & Gas Network Operators
11: Address Future Needs of Hydrogen-Fuelled Vehicles
12: Develop a Support Programme for Community Energy Microgrid Projects
13: Develop a Storage and Flexibility Financial Incentives Programme

INDUSTRY ACTIONS

14: Establish an Industry Engagement Forum
15: Encourage the Uptake of Industry Decarbonisation Support

Next Steps

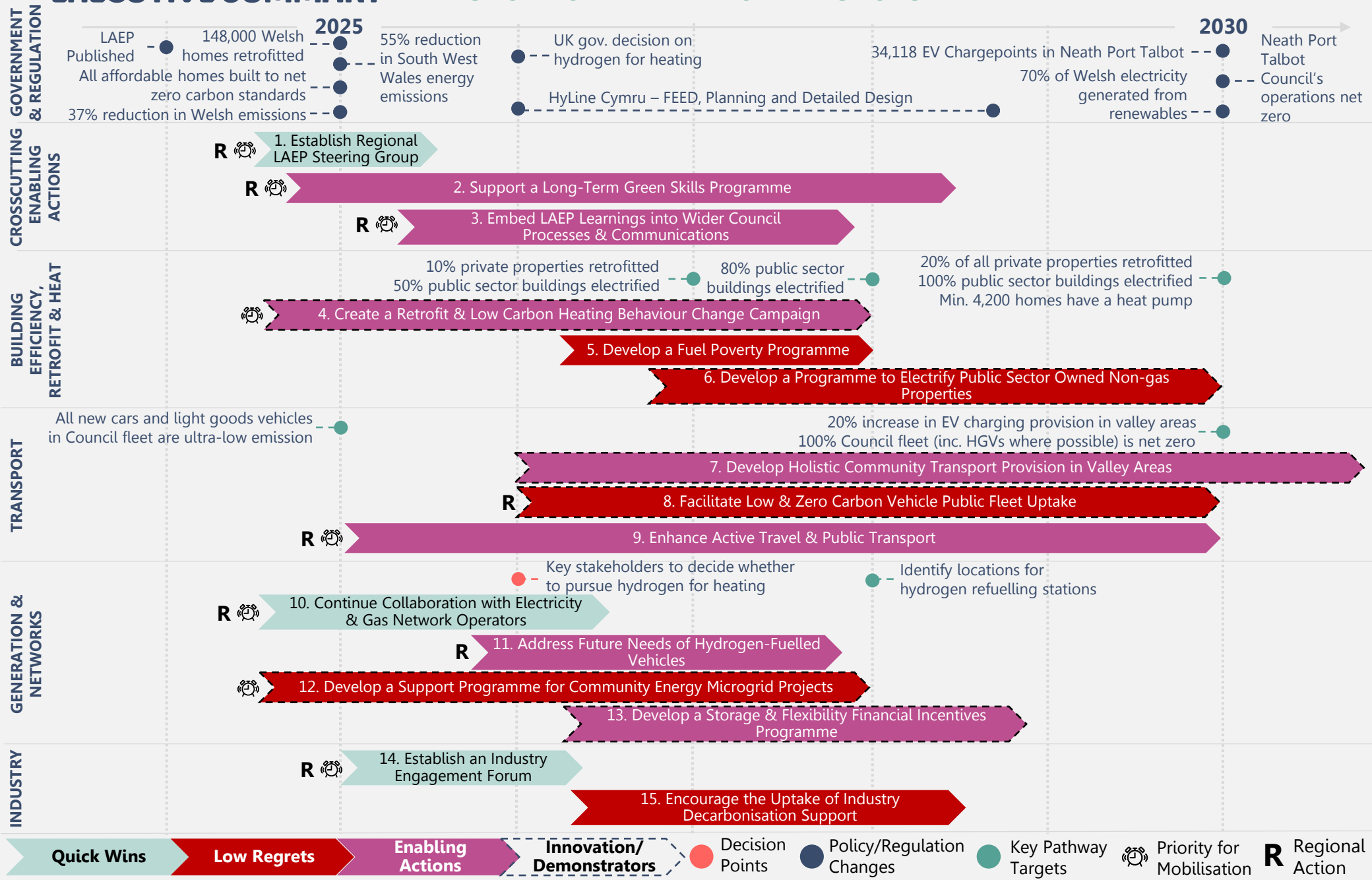
To mobilise the actions, the following key next steps have been identified.

1. **Regional Review:** A collaborative and thorough assessment of all four LAEPs in the region, leading to the identification of actions to be collectively advanced through a regional approach.
2. **Prioritisation:** Mobilise the establishment of a Regional LAEP Steering Group who will assess and develop a phased delivery plan to optimise impact and foster a holistic approach.
3. **Collaboration:** The Regional LAEP Steering Group may take ownership of certain actions, however, not all actions will fall under its purview. Instead, it will delegate ownership to appropriate parties, via engagement with key stakeholders.
4. **Funding & Resource:** Once ownership has been identified, the next step is to assess the funding and resource required and develop a plan for each action.

The next page features an Action Roadmap which provides an overview of the sequential implementation of the priority actions

EXECUTIVE SUMMARY

ACTION ROADMAP – PRIORITY ACTIONS



2. INTRODUCTION

WHAT IS LOCAL AREA ENERGY PLANNING?

LOCAL AREA ENERGY PLAN (LAEP)

Sets out the changes required to transition an area's energy system to net zero carbon emissions, against a specified timeframe.

This is achieved by exploring a range of technologies and scenarios through whole energy system modelling and analysis. By identifying the most cost-effective preferred pathway to net zero, additional benefits for the local area can be realised[1,2].

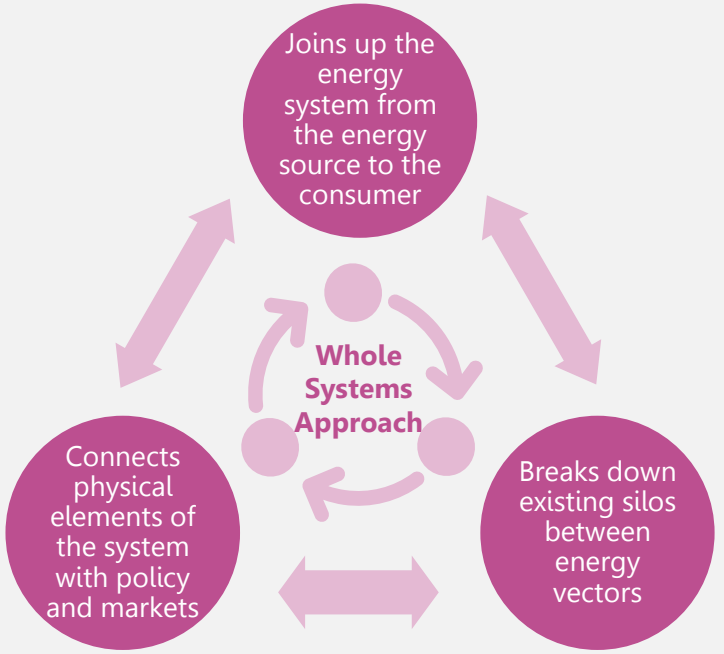
A LAEP results in an indicative costed spatial plan that identifies the change needed to the local energy system and built environment, detailing what changes are required, where, when and by whom. The level of detail for an area is equivalent to an outline design or master plan. Therefore, additional detailed design work is required for identified specific actions, projects, and programmes to progress to implementation. Rather than a detailed schematic, a LAEP proposes a sector-specific action plan that sets out how each part of the area will be designed and built.

For example, a LAEP may identify a zone that is best suited to a district heat network by assessing the types of buildings in the zone, their characteristics, and density. However, a full feasibility assessment by an appropriately qualified installation or design company, along with assessment of commercial viability and delivery mechanisms would be required.

VISION

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.

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.



KEY BENEFITS OF THE WHOLE SYSTEMS APPROACH

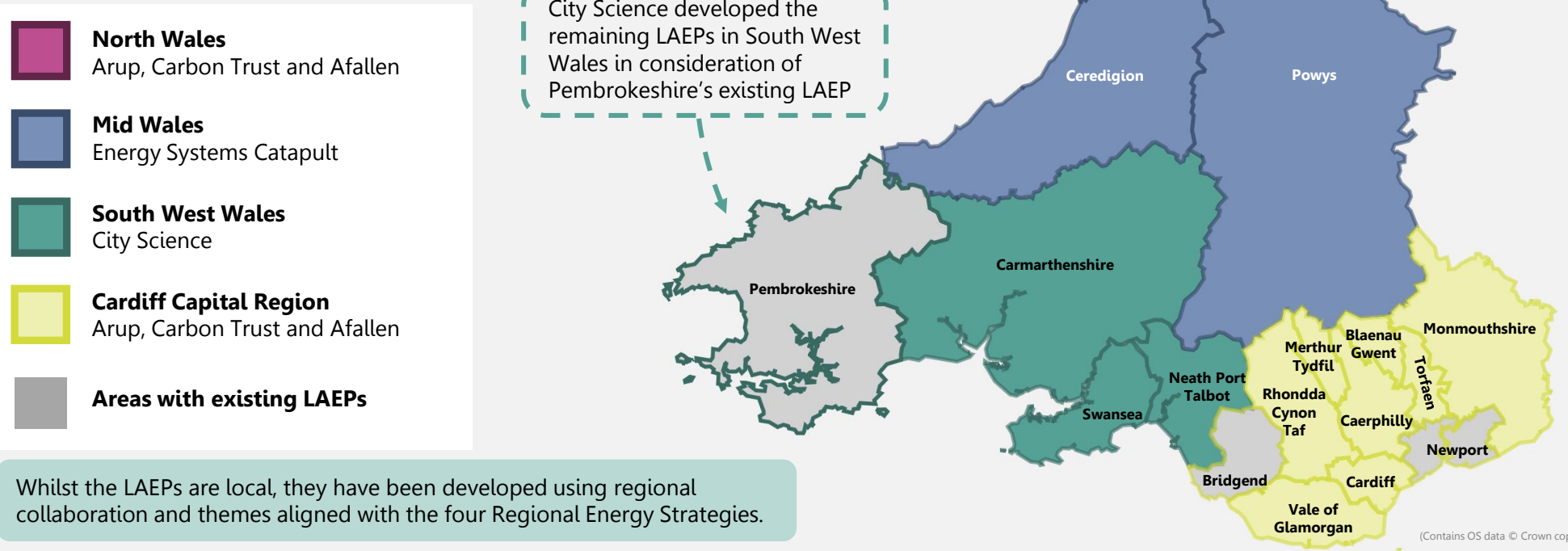
Provides consideration of the most cost-effective solutions to the future energy system (e.g. deploying different heat decarbonisation technologies to avoid a high-cost upgrade of the electricity network).

By working closely with local stakeholders, incorporating their data, knowledge and future plans, a LAEP is built on a common evidence base. The outputs can then be used reliably by all stakeholders knowing they are working towards a common goal built on strong foundations.

THE ENERGY TRANSITION ACROSS WALES

The Welsh Government's "Net Zero Wales" plan establishes an increased level of ambition on decarbonisation, with a legally-binding target to reach net zero emissions by 2050[3]. It is the first national government to fund the roll-out of Local Area Energy Planning to all its local authorities. While four regions in Wales had earlier developed LAEPs, the present programme has extended LAEPs to all remaining areas through a coordinated regional approach. A number of suppliers have been selected to produce the LAEPs for each region, as detailed in the map.

The LAEPs will form the basis of the 'National Energy Plan' that Welsh Government have committed to produce in 2024. Upon completion of the LAEP programme, Energy Systems Catapult, 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. Energy Systems Catapult is also providing technical advisory support to the Welsh Government throughout the programme.



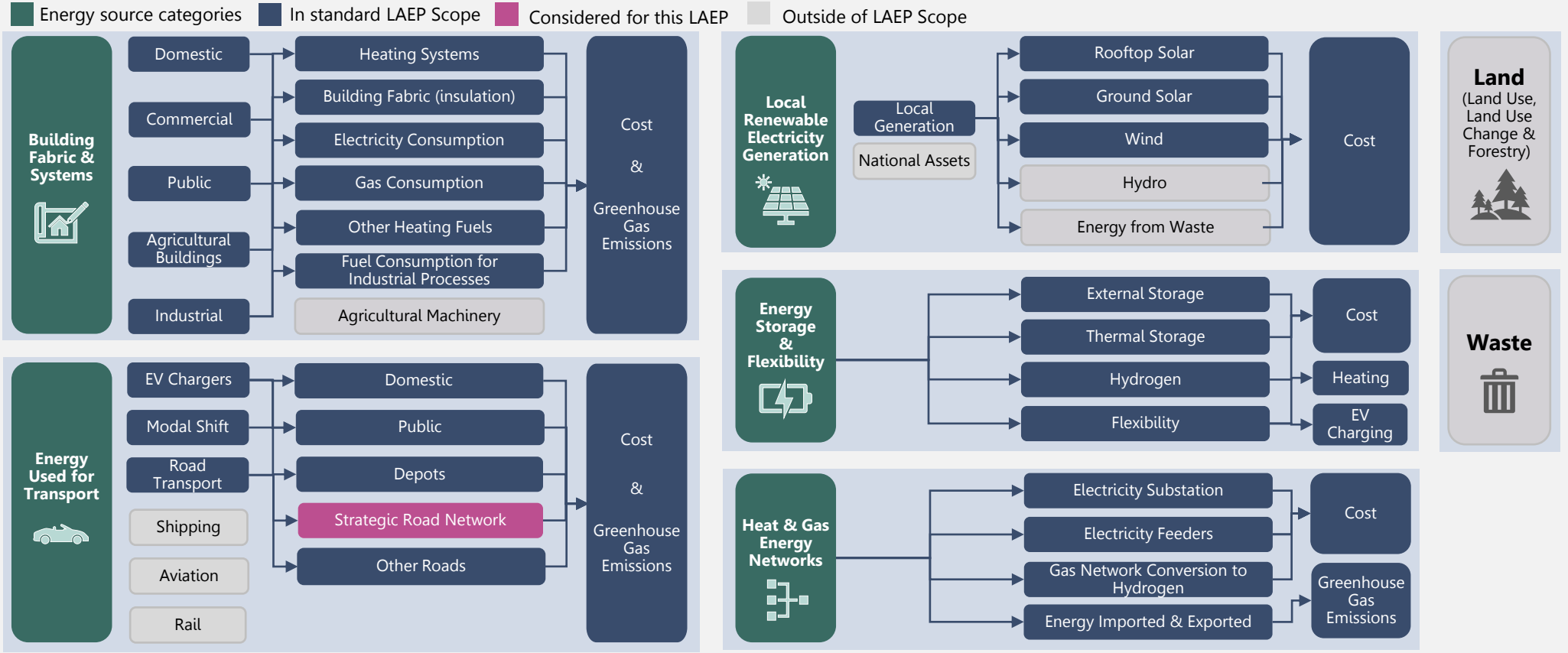
Whilst the LAEPs are local, they have been developed using regional collaboration and themes aligned with the four Regional Energy Strategies.

SCOPE

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"[4]. The scope of the LAEP covers current energy consumption and associated greenhouse gas emissions, and projected consumption in a defined area to 2050[2], based on the expected changes required to achieve a net zero energy system. Site-specific data is used where available, with remaining elements covered by national datasets.

LAEPs do not normally consider non-energy sources of greenhouse gas emissions, or aspects of the energy system that are expected to be overseen by central government (such as shipping, aviation, rail, the strategic road network, and large electricity generators connected to the transmission network).

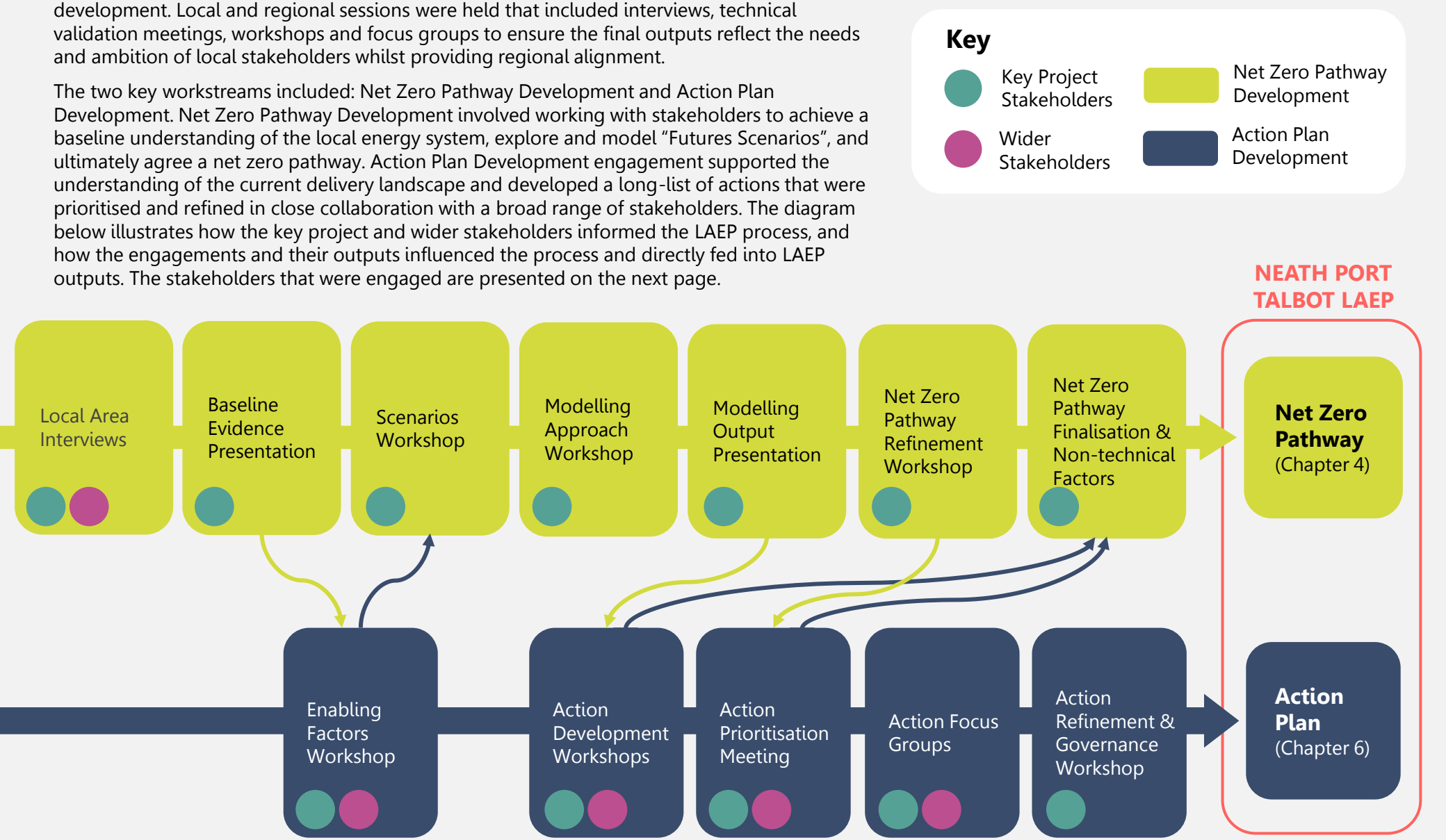
Port Talbot Steelworks is also considered a national asset and is omitted from all calculations and addressed separately, with further detail given on page 15. Furthermore, as per the scope, the strategic road network has not been icluded in emissions calculations; however, has been included for future energy demand forecasting. This is to inform the energy network and infrastructure investment required to support it.



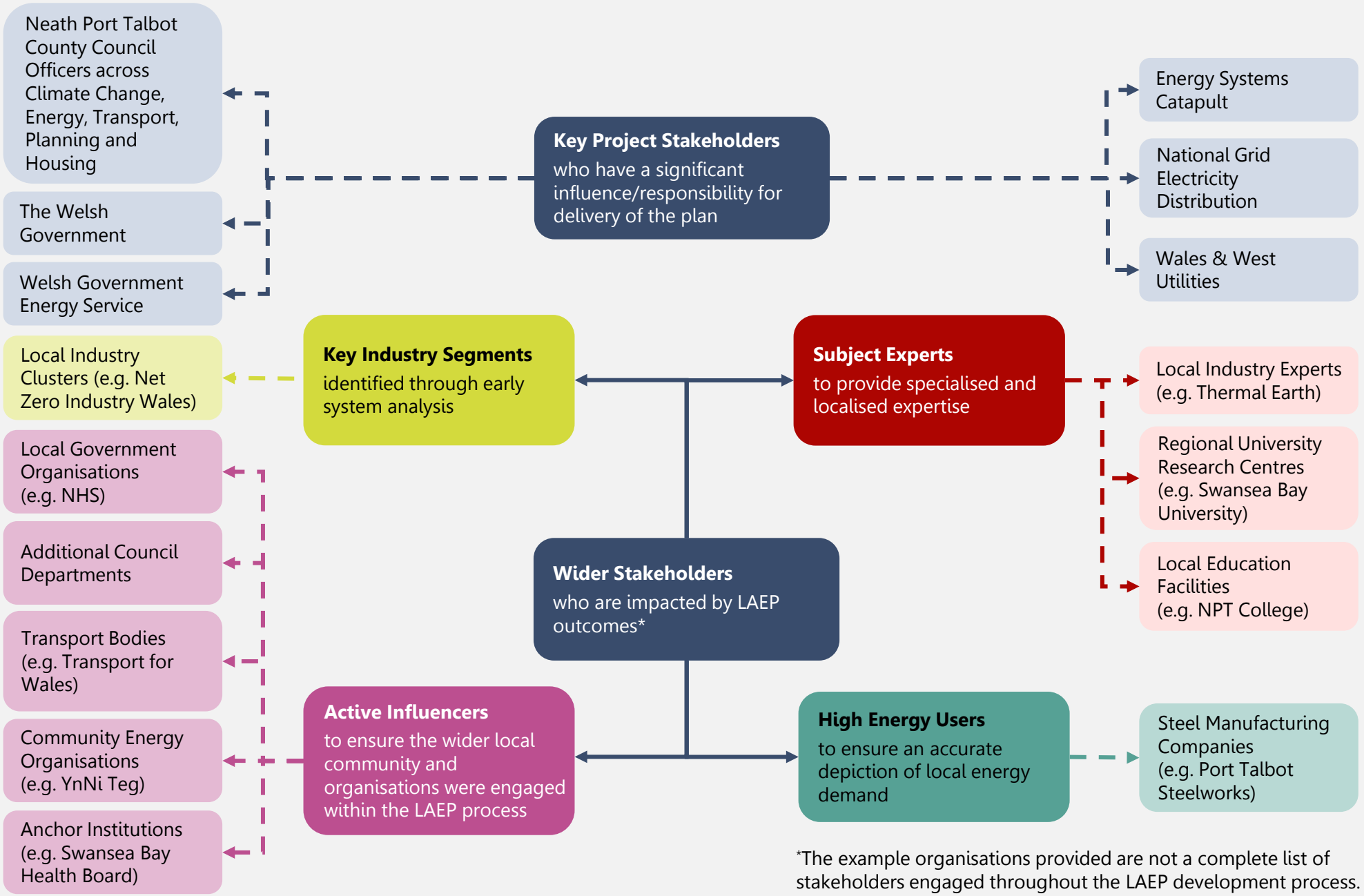
STAKEHOLDERS

A stakeholder engagement programme was embedded throughout each stage of the LAEP's development. Local and regional sessions were held that included interviews, technical validation meetings, workshops and focus groups to ensure the final outputs reflect the needs and ambition of local stakeholders whilst providing regional alignment.

The two key workstreams included: Net Zero Pathway Development and Action Plan Development. Net Zero Pathway Development involved working with stakeholders to achieve a baseline understanding of the local energy system, explore and model "Futures Scenarios", and ultimately agree a net zero pathway. Action Plan Development engagement supported the understanding of the current delivery landscape and developed a long-list of actions that were prioritised and refined in close collaboration with a broad range of stakeholders. The diagram below illustrates how the key project and wider stakeholders informed the LAEP process, and how the engagements and their outputs influenced the process and directly fed into LAEP outputs. The stakeholders that were engaged are presented on the next page.



STAKEHOLDERS



*The example organisations provided are not a complete list of stakeholders engaged throughout the LAEP development process.

3. LOCAL CONTEXT & ENERGY SYSTEM

LOCAL CONTEXT & CHARACTERISTICS

313 people per km²[2]

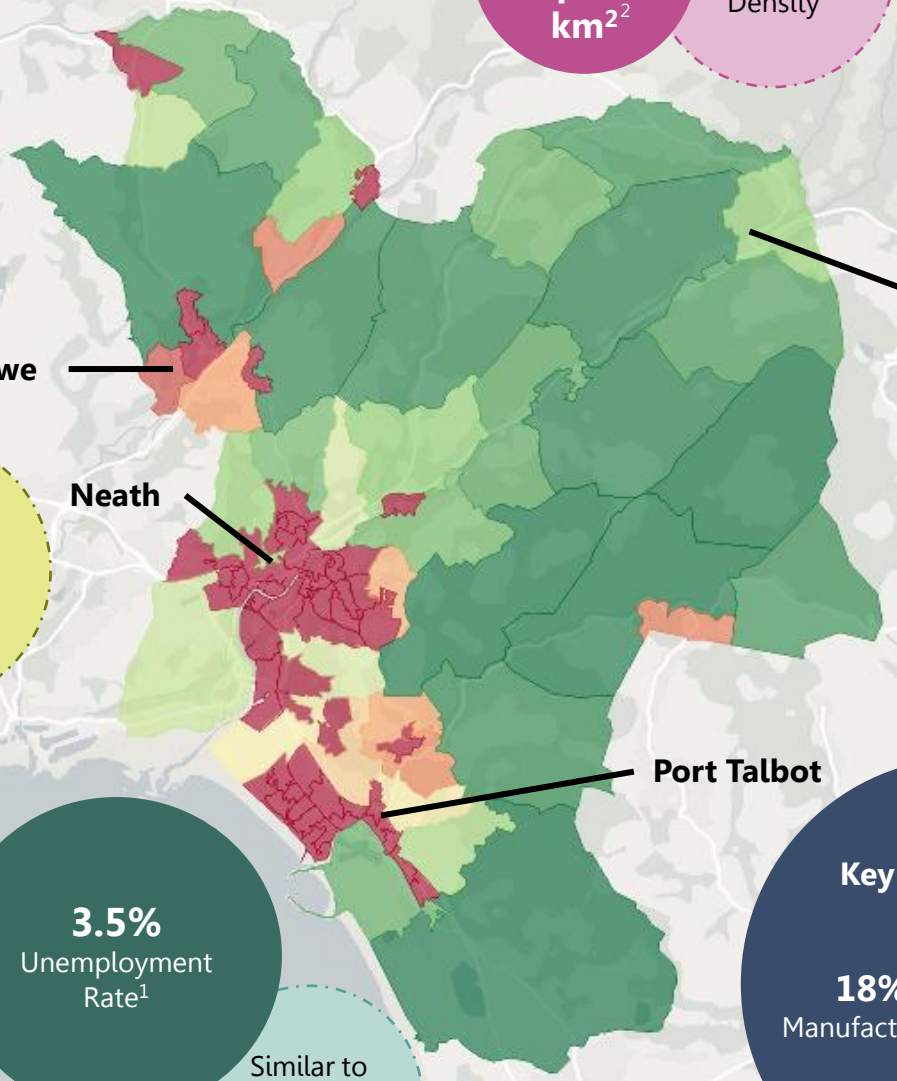
High Population Density

141,900
Population[4]

4.6%
Welsh Population[4]

452 km²
land area[1]

2%
total land area in Wales[1]



Main Housing & Economic Development Areas in Local Development Plan[3]

Port Talbot
Neath
Baglan
Llandarcy

4,600
new homes by 2038[3]

In 2022, up to **45%** Welsh households were in Fuel Poverty[5]

3.5%
Unemployment Rate[1]

Similar to Welsh Average[1]

Key Employment Sectors[1]

18% Manufacturing

12% Health

15% Wholesale and Retail Trade

5 km

Population Density (2020)
per km²
0 200 400 600 800

Neath Port Talbot Population Density (Contains OS data © Crown copyright)

POLICY AMBITIONS

NATIONAL

2050 The Welsh[6] and UK[7] governments have a legally-binding target to reach net zero by 2050. Additional net zero targets include:

37% reduction in Welsh emissions by **2025**[6]

148,000 Welsh homes to be retrofitted by **2025**[6]

100% of Wales' electricity produced from renewables by **2035**[8]

Llwybr Newydd -The Wales Transport Strategy aims to create an accessible, sustainable and efficient transport system[9]

The Well-being of Future Generations (Wales) Act (2015) outlines seven goals to increase the well-being in Wales[10]

REGIONAL

55% reduction in South West Wales' energy emissions by **2035**[11]

South West Wales Energy Strategy (2022)[11] outlines six priorities to achieve this:

- ENERGY EFFICIENCY
- DECARBONISE TRANSPORT
- DECARBONISE HEAT
- REGIONAL COORDINATION
- SMART & FLEXIBLE SYSTEMS
- ELECTRICITY GENERATION

Ambitions to be a UK leader in renewable energy and the net zero economy[12]

A dedicated hydrogen distribution pipeline is being explored, HyLine Cymru[13]. This could unlock the opportunity for fuel switching across Neath Port Talbot.

LOCAL

2022 Climate emergency declared[14]

2030 Emerging Net Zero Action Plan[15]

Generated the most renewable energy of all Welsh local authorities in **2017**[16]

Plans to increase the region's renewable generation legacy to make the area an exemplar for clean energy in 20 years[17]

DARE

The Decarbonisation and Renewable Energy Strategy aims to maximise decarbonisation benefits through renewable energy[15]

The emerging Local Development Plan has a strong net zero focus and will be supported by a Renewable and Low Carbon Energy Assessment[3]

266 fleet vehicles zero emission by **2030**[18]

EXISTING PROGRAMMES

Swansea Bay City Deal

- The Swansea Bay City Deal is an investment of up to £1.3bn in nine major programmes and projects across the Swansea Bay City Region (Neath Port Talbot, Carmarthenshire, Swansea and Pembrokeshire)[19].
- The programme aims to boost the regional economy by at least £1.8bn whilst generating significant job opportunities. Net zero and energy system decarbonisation are key themes across the projects. The LAEP will seek to integrate and build on these initiatives to maximise impact and avoid duplication.

Homes as Power Stations

- Homes as Power Stations is part of the portfolio of projects set out within the Swansea Bay City Deal and aims to integrate energy efficiency design and renewable technologies into the development of new build homes alongside promoting public and private sector retrofit programmes[20].
- A key ambition is to facilitate the uptake of renewable technologies in at least 10,300 properties (68% retrofit and 32% new build) within five years[20].

Supporting Innovation & Low Carbon Growth

- Supporting Innovation and Low Carbon Growth £64mn programme, part of the Swansea Bay City Deal portfolio, is made up of eight interlinked projects with a central aim to support the creation of a decarbonised and innovative economy[21].
- With a targeted focus on the Port Talbot Waterfront Harbourside area, this programme, led by Neath Port Talbot Council, is projected to be worth £6.2mn per year to the local economy[21].

Celtic Freeport

- Celtic Freeport in Port Talbot has been chosen as one of Wales' first freeports[22].
- The freeport aims to attract significant inward investment, including £3.5bn in the hydrogen industry, the creation of 16,000 jobs, generating £1.3bn in Gross Value Added by 2050 and unlocking up to 24 GW of floating offshore wind, which is roughly the same capacity as the UK's entire offshore wind output potential[22].

Steelworks Decarbonisation

- The UK Government has agreed to invest up to £500mn to help Port Talbot Steelworks decarbonise, with Tata Steel investing £700mn to support the process[23].
- Key elements of the strategy include switching from using blast furnaces to electric arc furnaces, which can be powered using renewable energy and can produce recycled steel rather than virgin.

HyLine Cymru

- South Wales Industrial Cluster (SWIC) is the second largest emitting industrial cluster in the UK. As a result of the heavy industry presence, there is a significant amount of activity exploring the production, distribution and usage of hydrogen.
- Wales & West Utilities (WWU) is exploring the feasibility of a dedicated hydrogen distribution pipeline, HyLine Cymru, which would run from Milford Haven, through Carmarthenshire, over to Port Talbot[13].

GREENHOUSE GAS EMISSIONS

- Most of Neath Port Talbot's energy use emissions in 2019 (excluding the Port Talbot Steelworks) were produced by the industrial sector at 39%. This was followed by the domestic sector at 29% of total emissions.
- Surface transport only makes up 12% of Neath Port Talbot's total emissions. This is largely due to most transport emissions being from the Strategic Road Network (which includes trunk roads and motorways), which are not included in the LAEP's scope.
- 3% of annual emissions are offset through Neath Port Talbot's Land Use, Land Use Change and Forestry (LULUCF) activities.

Neath Port Talbot's greenhouse gas emissions have reduced by **50%** (2005 ↓ 2019) largely due to electricity grid decarbonisation

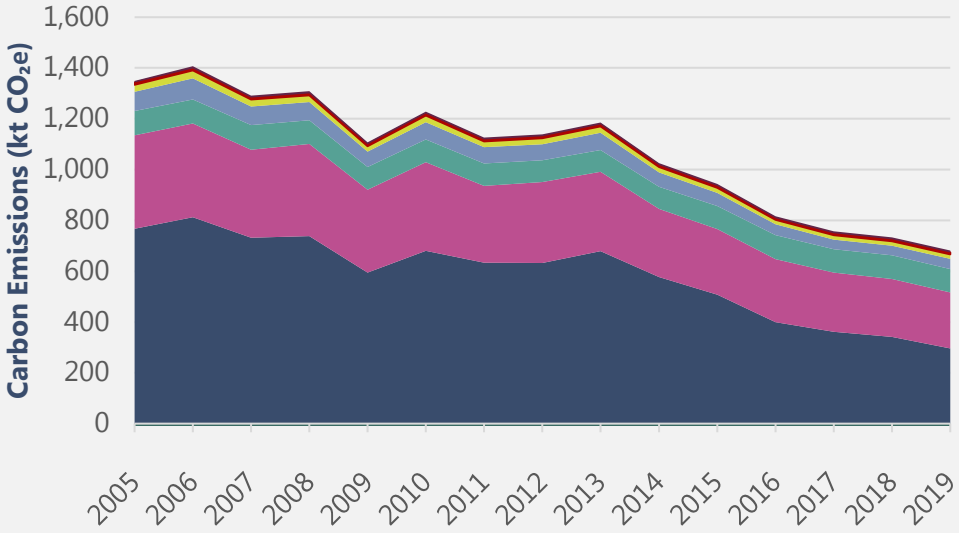
744 kt CO_2e emissions remain (2019)

2019 has been used as the base year as this was the last year the available data was unaffected by COVID-19.

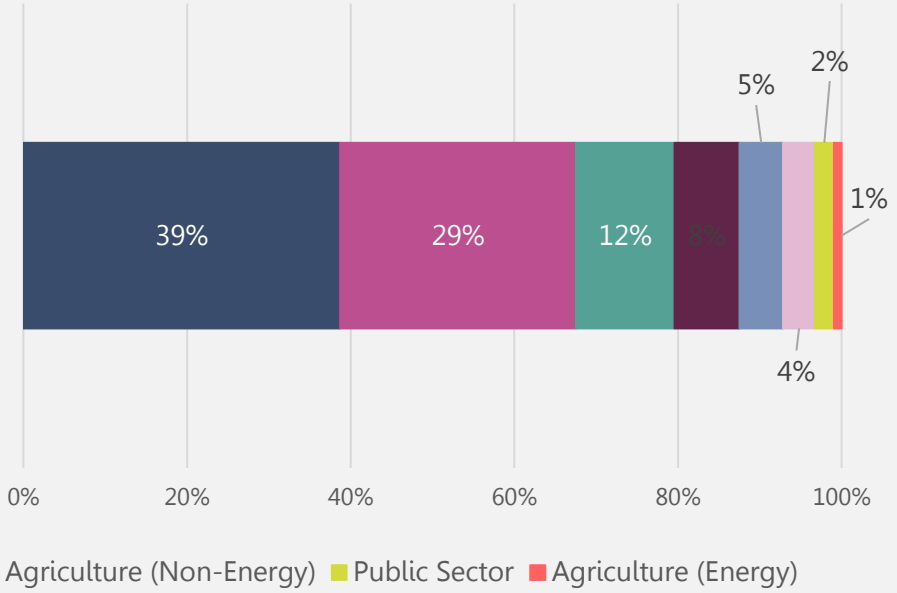
91% of emissions are from energy use (excludes waste, agricultural livestock and soils and LULUCF)

681 kt CO_2e energy emissions in 2019

Carbon Emissions (2005 – 2019)[24]



Emissions Breakdown (2019)[24]



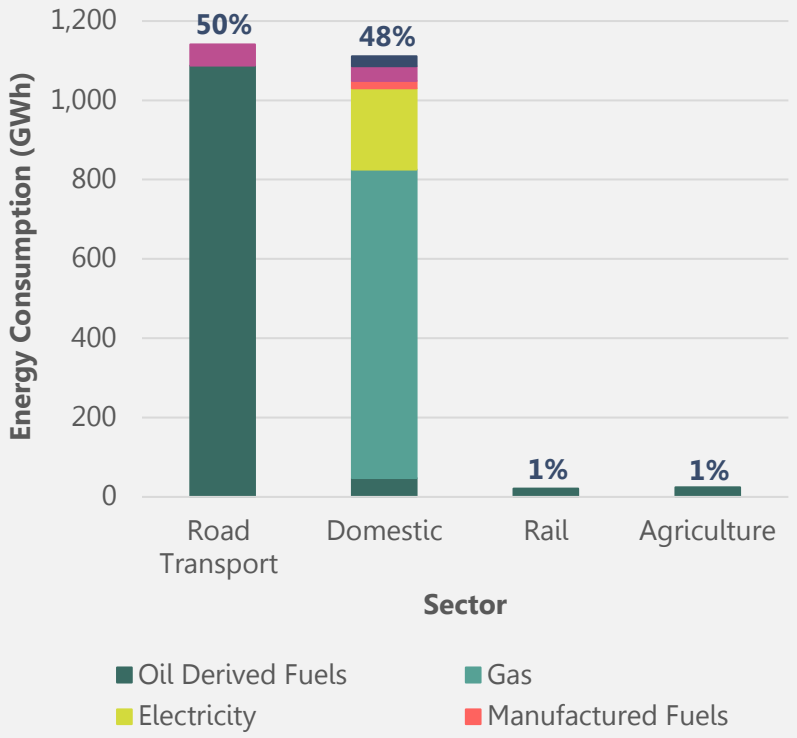
ENERGY DEMAND

Neath Port Talbot used **~4,000**[25] GWh of energy in 2019 (excluding the Steelworks)

Around the Welsh local authority average of **4,196**[25] GWh

Energy Use (2019)[25]

(Excluding Industrial and Commercial Sectors)



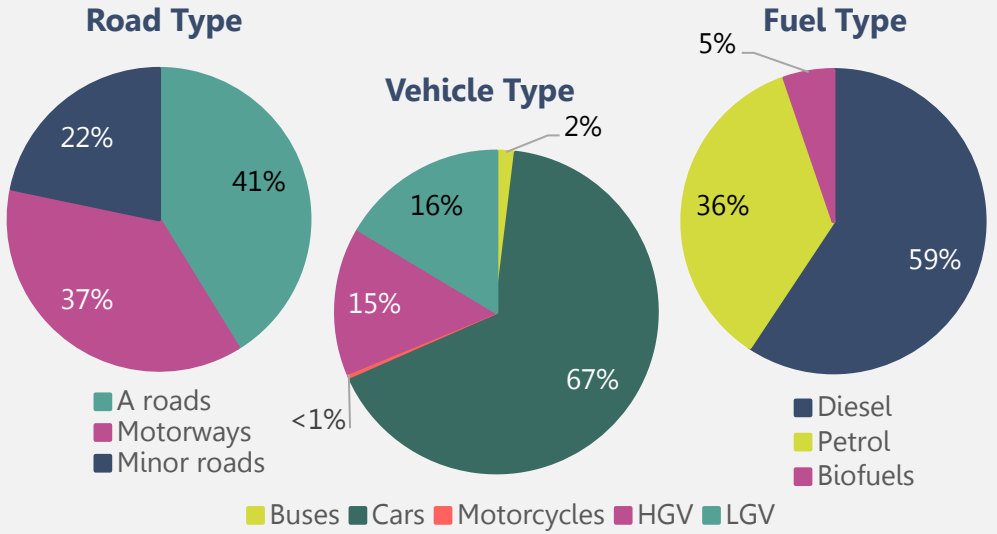
Industrial Sector

The industrial sector has been excluded from this analysis as it is difficult to breakdown the energy consumption in the sector due to the large and unique Steelworks. The BEIS subnational data does not appear to account for this correctly[25].

Based on the steelwork's annual sustainability report, its typical energy consumption is estimated to be **21,000 GWh**, which is mostly coal and some natural gas. Including for other industrial buildings would yield a total industrial demand which is at least greater than the Steelworks alone.

Transport

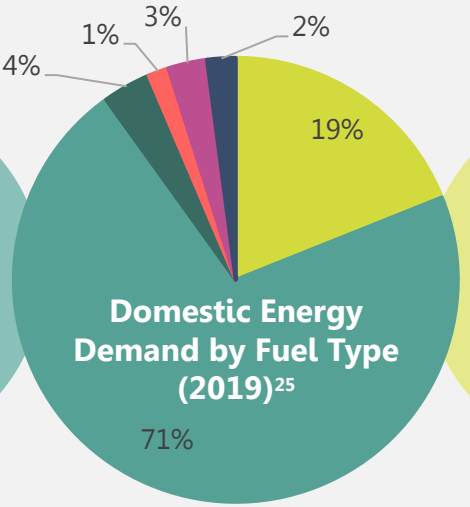
In 2019, fuel consumption by all vehicles totalled **1,140** GWh, at **28%** of total energy use. 37% of fuel consumption occurred on motorways which is much higher than the Welsh average of 12%[26]. Over half of energy demand was diesel at 59%, however it should be noted that this data does not include electricity use by transport and there were 107 licensed plug-in vehicles in Neath Port Talbot in 2019[27].



DOMESTIC ENERGY DEMAND

7%
of homes are not connected to the gas network[28]

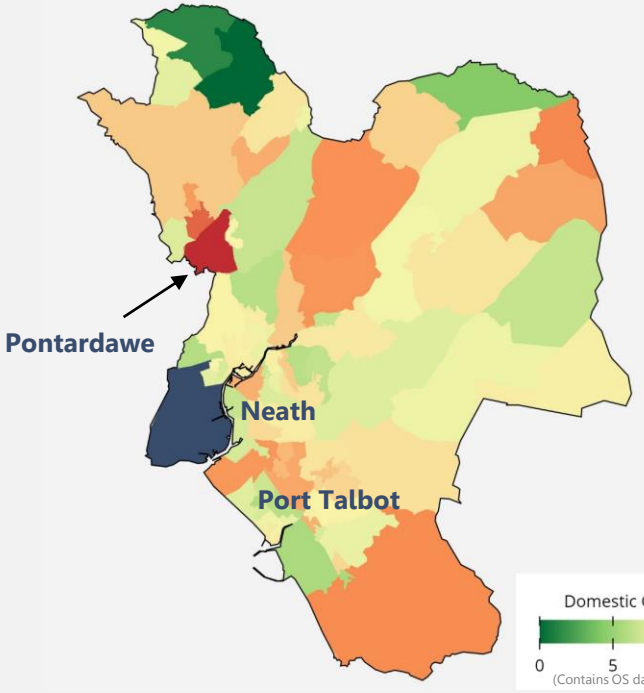
Domestic **gas** demand totalled
780
GWh in 2019[29]



Domestic **electricity** demand totalled
210
GWh in 2019[30]

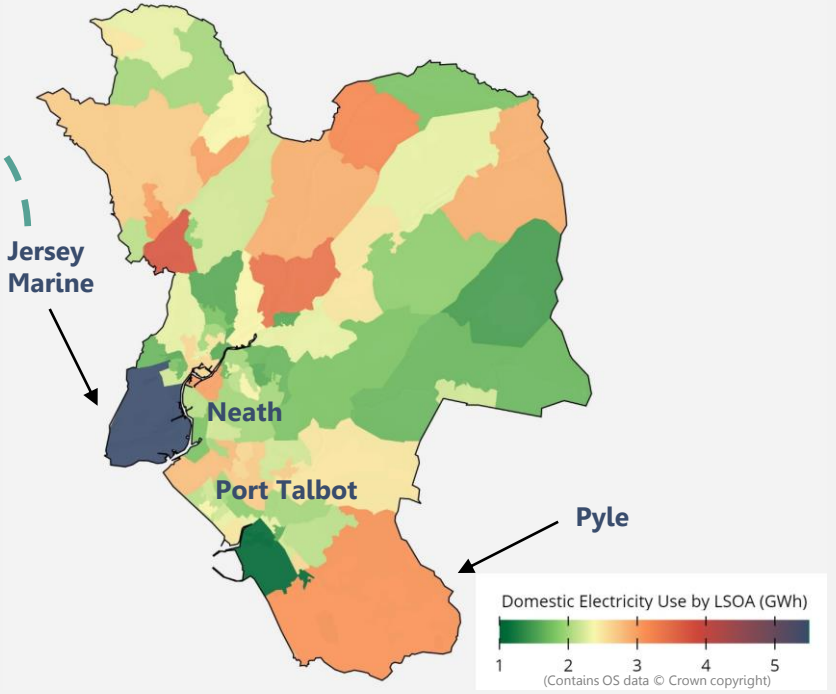
Rural areas have higher electricity consumption, likely due to off-gas grid heating.

Gas Demand (2019)[31]



This Lower Layer Super Output Area (LSOA) has the highest number of electricity (1,176) and gas (1,126) meters in Neath Port Talbot compared to the average across Wales of 736 and 685 respectively resulting in a proportionally higher total energy consumption. Thus, the limitations of this data should be noted.

Electricity Demand (2019)[32]



INDUSTRIAL & COMMERCIAL ENERGY DEMAND

The industrial & commercial sectors combined account for a large share of energy demand in Neath Port Talbot

Commercial

Commercial energy demand in Neath Port Talbot is ~**200** GWh/year. The energy demand is approximately 50% electricity and 50% gas.

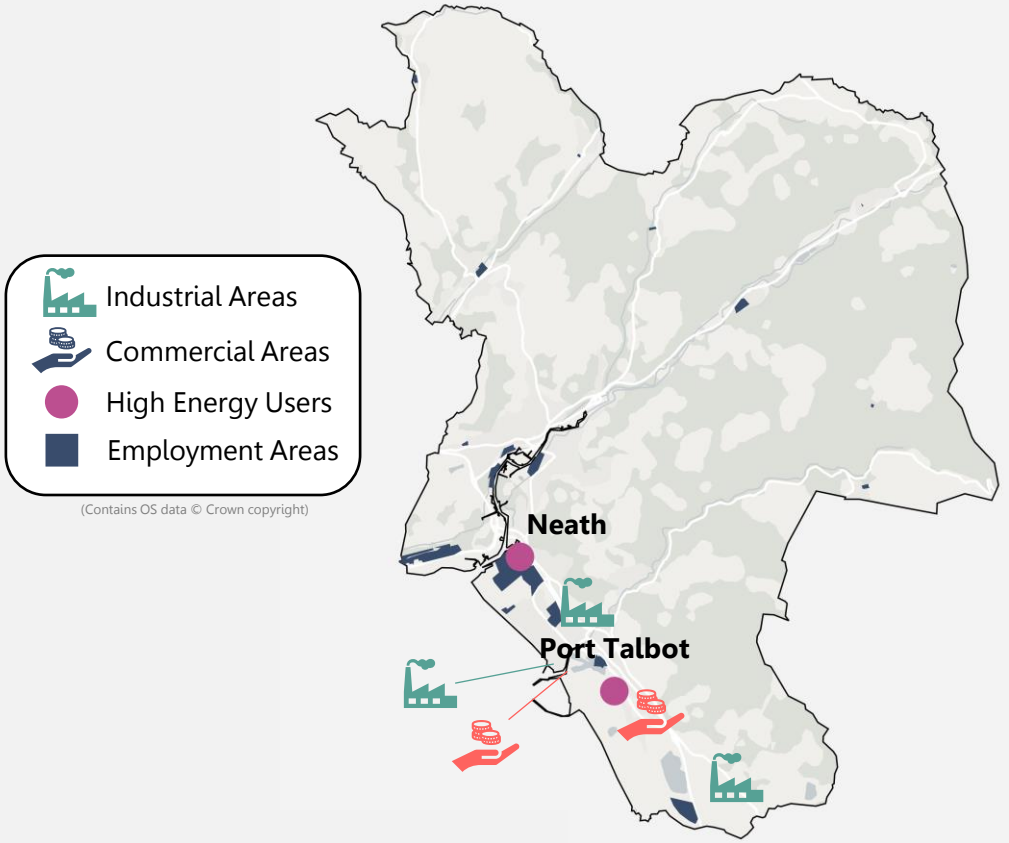
- Non-domestic electricity demand totalled 47 GWh in 2019, with Council owned properties accounting for ~20 GWh which is around 5% of total consumption in the local authority area[28].
- Non-domestic gas demand totalled 262 GWh with 32 GWh of this demand being from Council owned assets[29].

Industry

- Neath Port Talbot is a large industrial hub, with ten urban estates and significant steel production.
- The main large consumers come from multiple buildings in the Port Talbot Steelworks production site with another being the Sofidel paper and printworks[33].

Port Talbot Steelworks **~21,000** GWh

The industrial area in Neath Port Talbot could offer a source of waste heat for future heat networks



PORT TALBOT STEELWORKS

Port Talbot Steelworks is the **UK's largest steel producing site** and consequently is one of the country's largest sources of CO_2e emissions.

Due to the scale of energy demand and emissions from the site, the Steelworks has been omitted from the collective modelling and outputs for the LAEP and its decarbonisation is addressed separately.

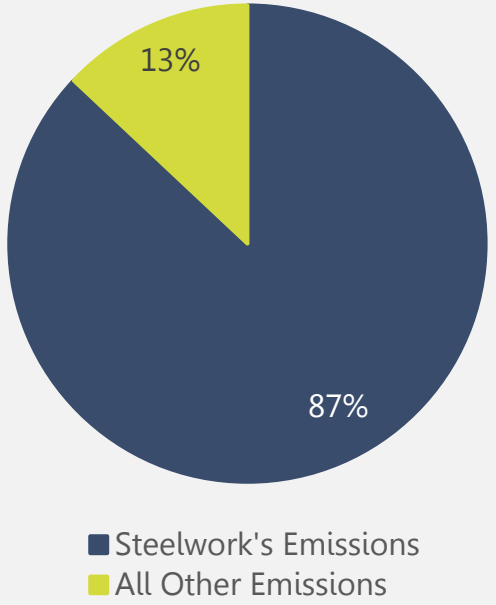
Typical annual steel output:
3.1 – 3.5
million tonnes crude steel

Typical annual energy consumption:
~21,000
GWh (mostly coal)

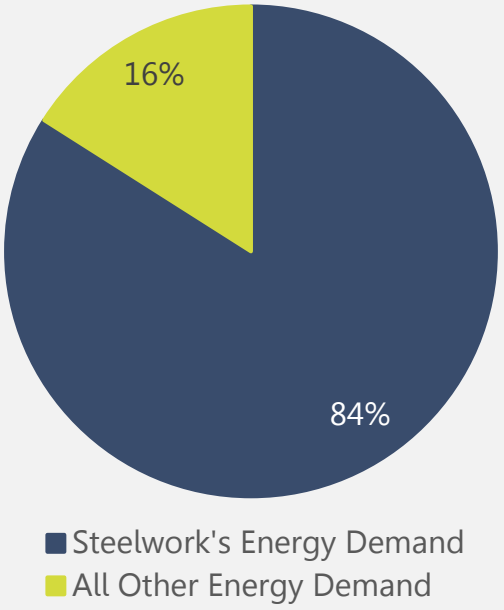
Typical annual emissions:
6 – 6.5
million tonnes CO_2e

- In 2021, Tata Steel outlined intentions to "make a substantial contribution to the UK's goal of achieving carbon neutrality by 2050"[34].
- The UK Government has agreed to invest up to £500mn to Port Talbot Steelworks to decarbonise, with Tata Steel investing £750mn to support the process[35].
- Key elements of the plan include switching from using blast furnaces to electric arc furnaces which can be powered using renewable energy and producing recycled rather than virgin steel.

Steelworks Emissions as a Proportion of Neath Port Talbot's Total Carbon Emissions[24]



Steelworks Energy Demand as a Proportion of Neath Port Talbot's Total Energy Demand[25]



TRANSPORT

Neath Port Talbot has a total of **971**[27] plug-in vehicles

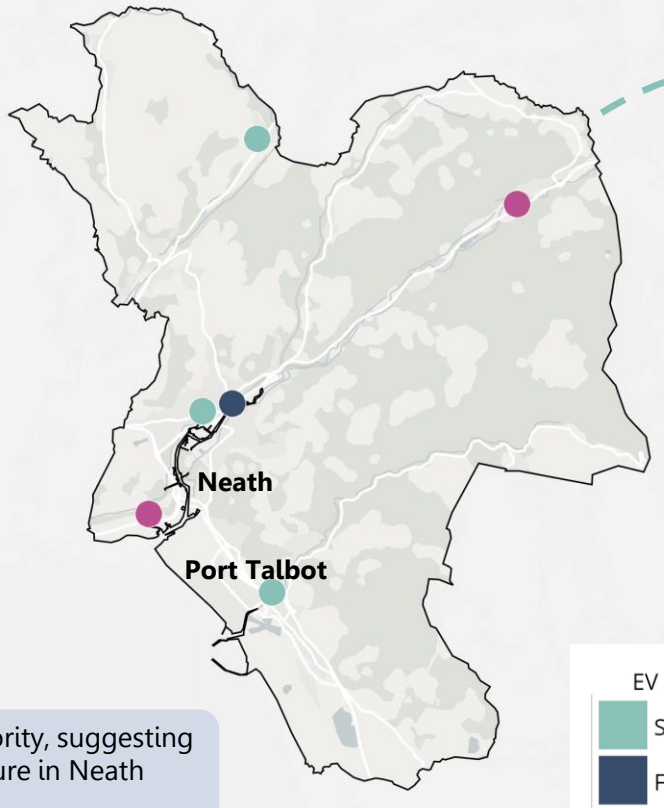
2023

Total number of registered plug-in cars: **920**

Number of registered EVs:	Number of registered range extended EVs:	Number of registered hybrid vehicles:
629	**3**	**288**

2023

Total plug-in buses/coaches:	**4**
Total plug-in HGVs:	**1**
Total plug-in Light Goods Vehicles (LGV's):	**35**
Total plug-in motorcycles:	**11**
Total 'Other Vehicles':	**0**



This map shows the National Chargepoint Registry spatial data, last updated in 2020[38].

Chargepoints

2023

As of July 2023, Neath Port Talbot has **22** chargepoints[36].

15 of these are rapid or above chargepoints.

The Welsh average for number of chargepoints is 86 per local authority, suggesting that there is significant scope for increasing EV charging infrastructure in Neath Port Talbot.

The Council has also approved a Net Zero EV Infrastructure Strategy and is currently formulating an action plan and fast track programme to address this issue.

EV Chargepoints by Charging Type

- Slow (<7 kW)
- Fast (7-22 kW)
- Rapid (22-100 kW)

RENEWABLE ENERGY INSTALLATIONS

Neath Port Talbot's renewable energy capacity (2020) is **401 MW** (excluding offshore wind)[38]

The largest renewable energy capacity in Wales

Key operational installation[38]:

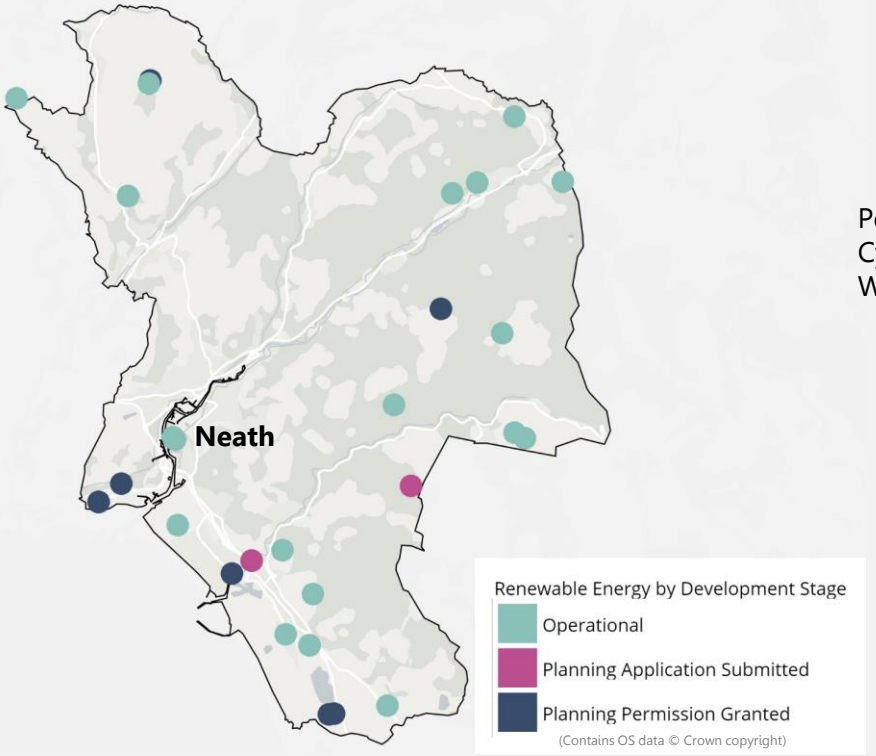
Pen y Cymoedd Wind Farm

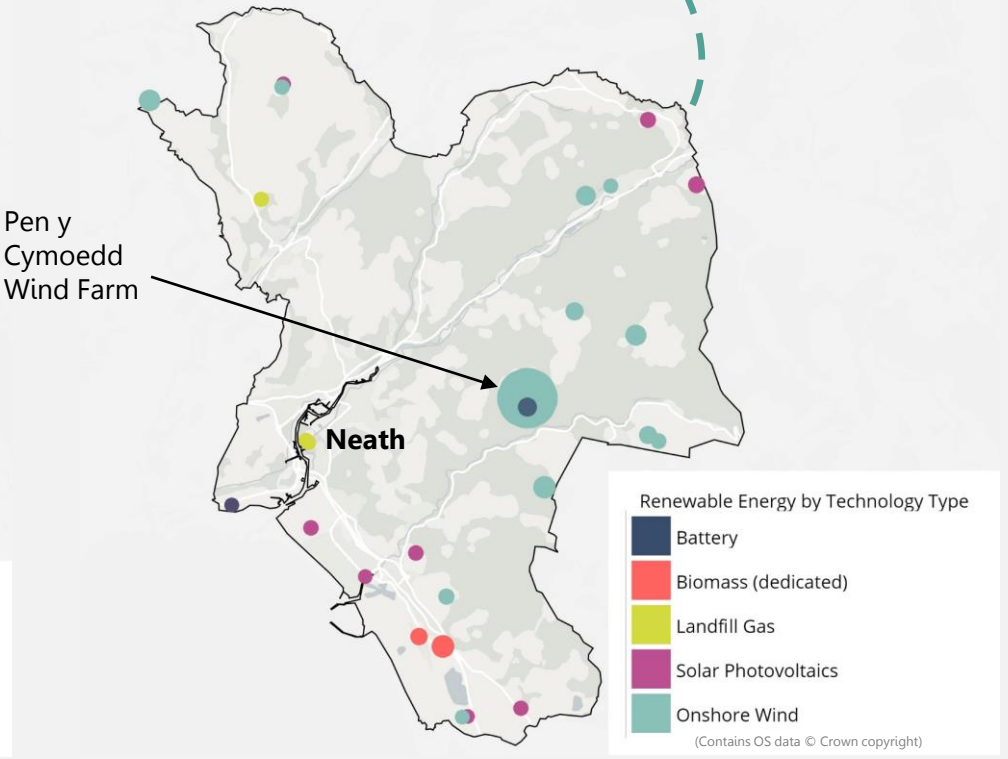
228 MW

Onshore Wind Capacity (2020)[39]: **361 MW**

Solar PV Capacity (2020)[39]: **44 MW**

This map includes installations that are operational, under construction or with planning permission granted or submitted. The size of the points are proportional to the installed capacity.





4. THE VISION

THE VISION

The LAEP presents a comprehensive vision for Neath Port Talbot's future energy system, delineating the essential characteristics it will need to achieve a net zero energy system by 2050. It outlines a potential pathway towards this goal, which is used to develop and support a detailed Action Plan. The objectives of the plan include:

- Promote cost-effective solutions for energy generation, distribution, and consumption whilst reducing carbon emissions
- Enhance the efficiency, security and resilience of the local energy system via sector-based interventions
- Enable the planning of energy infrastructure that aligns with the current and future needs of the community
- Stimulate economic development and job creation through the growth of local clean/green energy industries
- Address equity and social inclusion in the energy system to maximise well-being and other wider community benefits

A three-staged approach was adopted to develop these key actions and decarbonise Neath Port Talbot energy system.

The synergy between

2050 ENERGY SYSTEM **NET ZERO PATHWAY DEVELOPMENT** **ACTION PLAN**

creates a roadmap for success, guiding Neath Port Talbot towards a resilient, sustainable, and decarbonised local energy system, that ultimately benefits the local community through cost-effective and reliable energy.

2050 Energy System

The future energy system was modelled in the net zero year under different policy and technological scenarios. It explored the changes required to decarbonise under the area's major uncertainties, including capacity of technologies needed and total cost.

Net Zero Pathways

A Net Zero Pathway was developed for each scenario, depicting the potential routes to achieving net zero. The Net Zero Pathways informed the development of a series of interim targets and milestones to drive decarbonisation progress.

Action Plan

A delivery pipeline of key actions to achieve the milestone targets set in the Net Zero Pathway. This plan functions as a living document, providing a detailed blueprint that orchestrates the sequential implementation of key initiatives and measures.

SCENARIOS – BASELINE AND NET ZERO PATHWAYS

Three distinct primary scenarios were employed to explore the different pathways to meet net zero. The first scenario, "Do Nothing", served as a baseline, projecting the future energy system's trajectory without additional actions toward net zero beyond existing committed initiatives. Two alternative scenarios were also developed and modelled, delineating the potential routes and strategies needed to ensure Neath Port Talbot achieves net zero. The National Grid Future Energy Scenarios (FES)[1] were a basis for modelling the trajectories.

In the Widespread Engagement scenario, a consumer-led, bottom-up transformation towards electrification was modelled, while the Widespread Hydrogen scenario envisioned a top-down transformation towards hydrogen.

These scenarios were subsequently translated into Net Zero Pathways which identified the pace of change required, offering measurable steps and assessing the cost and wider infrastructure required to strategically deliver decarbonisation.

Throughout the process of developing the scenarios and pathways, a regional approach was applied across South West Wales. This ensured alignment and consistency between the three LAEPs being conducted in terms of narrative and assumptions, while also aligning with the scenarios previously modelled in Pembrokeshire's LAEP.

1 DO NOTHING

This scenario serves as a baseline counterfactual, presenting the future energy system with only existing decarbonisation pledges (such as the ban on gas boilers from 2035).

It excludes policies which aren't tangible and, as such, does not guarantee the achievement of net zero.

2 WIDESPREAD ENGAGEMENT

- Incorporates a widespread uptake of heat pumps, increase in public transport and high EV adoption across all vehicles
- Industry relies on a mix of electrification and hydrogen
- Some technologies require consumers to embrace initial changes to behaviour

Similar to the FES Consumer Transformation scenario[1].

NET ZERO 2050

3 WIDESPREAD HYDROGEN

- Change is driven from a top-down, system-wide approach with hydrogen infrastructure forming a key driver for heating
- Hydrogen is the main fuel for industry and a key fuel for heavy vehicles
- Private transport is electrified and use of public transport increases

Similar to the FES System Transformation scenario[1].

SCENARIOS – SENSITIVITY ANALYSIS

In addition to the primary scenarios focused on achieving net zero emissions, a secondary scenario set was modelled to assess the sensitivity of the grid to electricity demand peaks. These scenarios serve as a vital tool for stress testing the electricity grid, exploring the potential maximum and minimum demand scenarios that may emerge in 2050. The intention behind this modelling is not to predict a likely pathway to net zero but to provide a comprehensive understanding of the potential range of future electricity demand.

Given the inevitable uptake of electrification, reinforcing the electricity network will be a critical enabler for a successful net zero transition. The scenarios, by delineating the upper and lower bounds of electricity demand, allow for a robust evaluation of the system's resilience. This stress testing feeds into reinforcement required for the electricity network to withstand a spectrum of future uncertainties, thereby enhancing its adaptability and reliability.

Ultimately, these scenarios do not represent the likely pathway to net zero; instead, they function as a tool for risk mitigation and contribute to the development of a robust energy system.

NET ZERO PATHWAYS – METHODOLOGY

To inform the development of a pipeline of priority projects, a Net Zero Pathway analysis and techno-economic model were developed to determine the preferred pathway for Neath Port Talbot. The themes below were evaluated.

Carbon Emissions: The annual carbon emissions were projected to 2050 to compare the carbon savings.

System Cost: The overall cost of transforming and decarbonising the energy system was modelled to identify the most cost-effective scenario.

Health: The effect on air quality was modelled to evaluate the impact on health and well-being.

Job Creation: The net number of temporary and permanent jobs was modelled to highlight potential opportunities for employment.

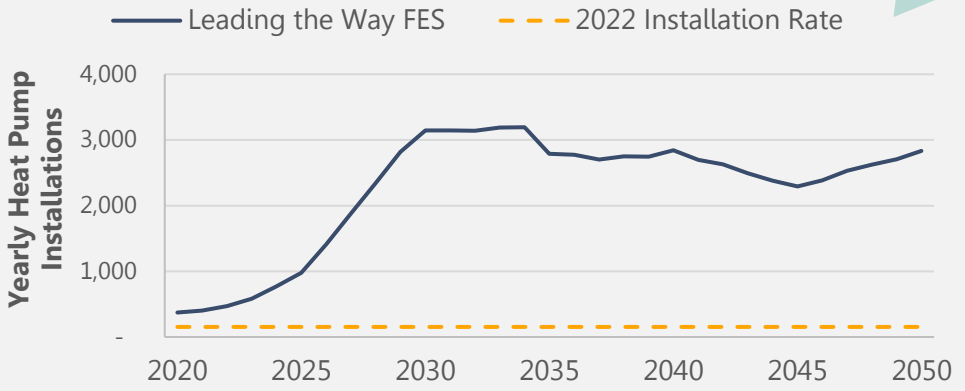
Consumer Bills: Energy bills and upfront costs were modelled. This relates the wider system changes to the impact on an individual's finances and fuel poverty risk.

The Net Zero Pathways were modelled on an annual basis until 2050

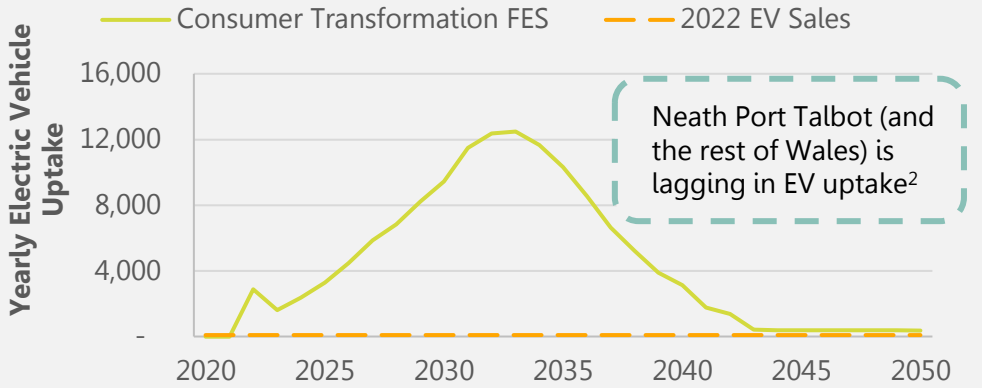
Uptake projections were estimated using the National Grid's FES 2023 Data workbook[1]

The FES estimates for various technologies were scaled down to the county

Annual Heat Pump Uptake



Electric Vehicles Uptake



Current heat pump and EV uptake is low (dashed lines) and will need to increase to meet the pathway. The rate of change required to meet net zero is very ambitious and will require extensive planning by local authorities, as well as governmental support to be achievable.

NET ZERO PATHWAYS – ENERGY MIX

Reminder:
Port Talbot Steelworks is omitted from all modelling for Neath Port Talbot

HIGHLIGHTS

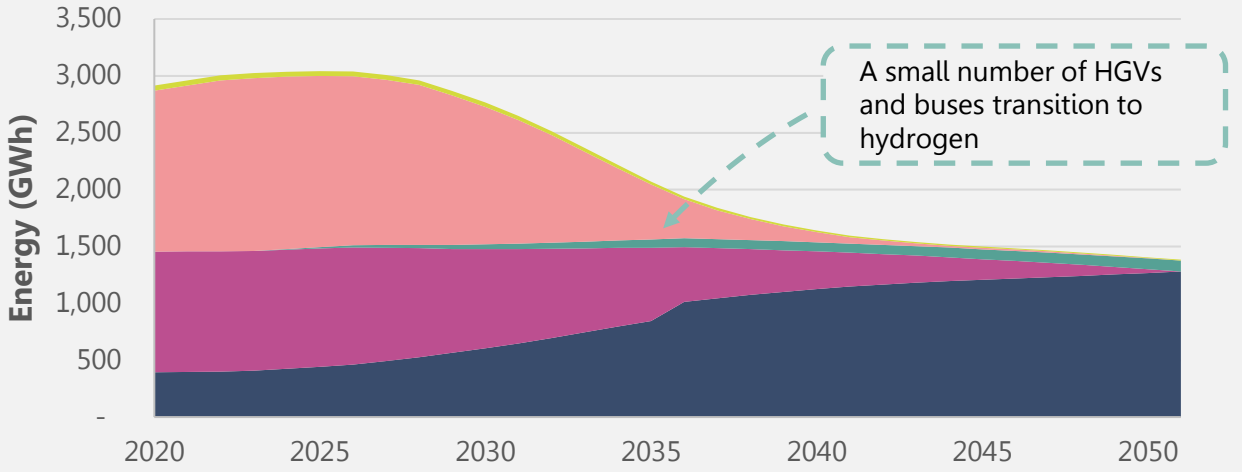
Heat pumps & heat networks are the most prevalent technologies for heating in Widespread Engagement, replacing gas boilers and leading to high levels of electrification.

The high energy efficiency of heat pumps significantly reduces the overall energy demand of the system.

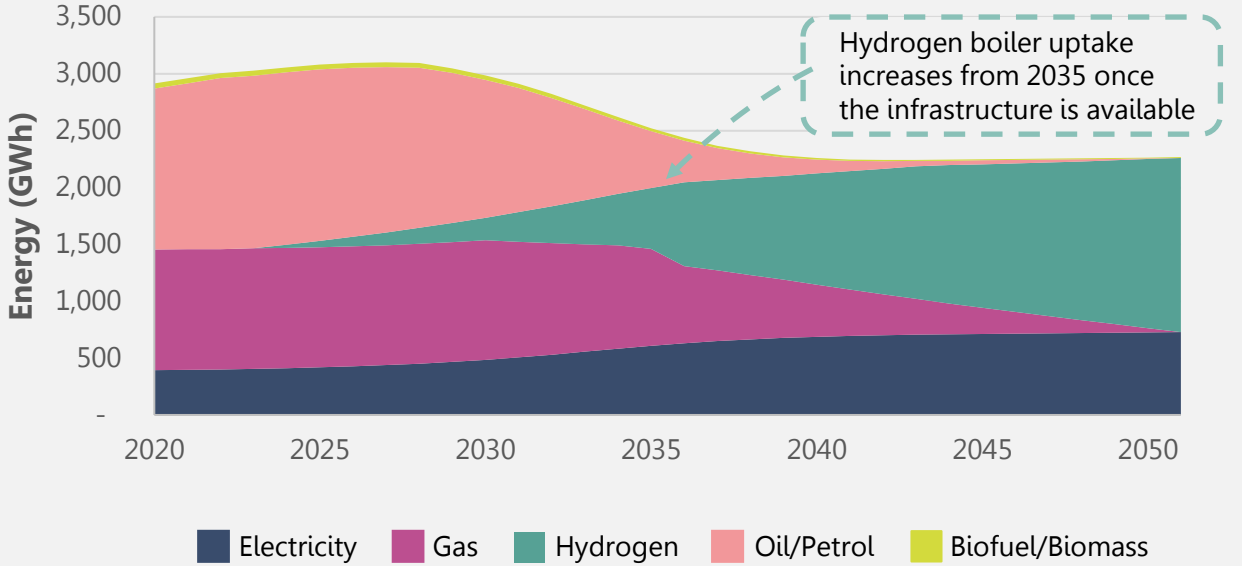
Hydrogen boilers are the most prevalent technology for heating in Widespread Hydrogen, with heat pumps and heat networks still forming a part of the mix.

Some hydrogen will form part of the energy mix in both scenarios for HGV and bus transport.

Widespread Engagement – Total Energy Consumption



Widespread Hydrogen – Total Energy Consumption



NET ZERO PATHWAYS – CARBON ANALYSIS

HIGHLIGHTS

Net Zero is not met under the 'Do Nothing' Scenario.

Decarbonisation occurs slower under the Widespread Hydrogen scenario, as hydrogen technologies are not yet commercially available.

kt CO_2e

Compared to 'Do Nothing':

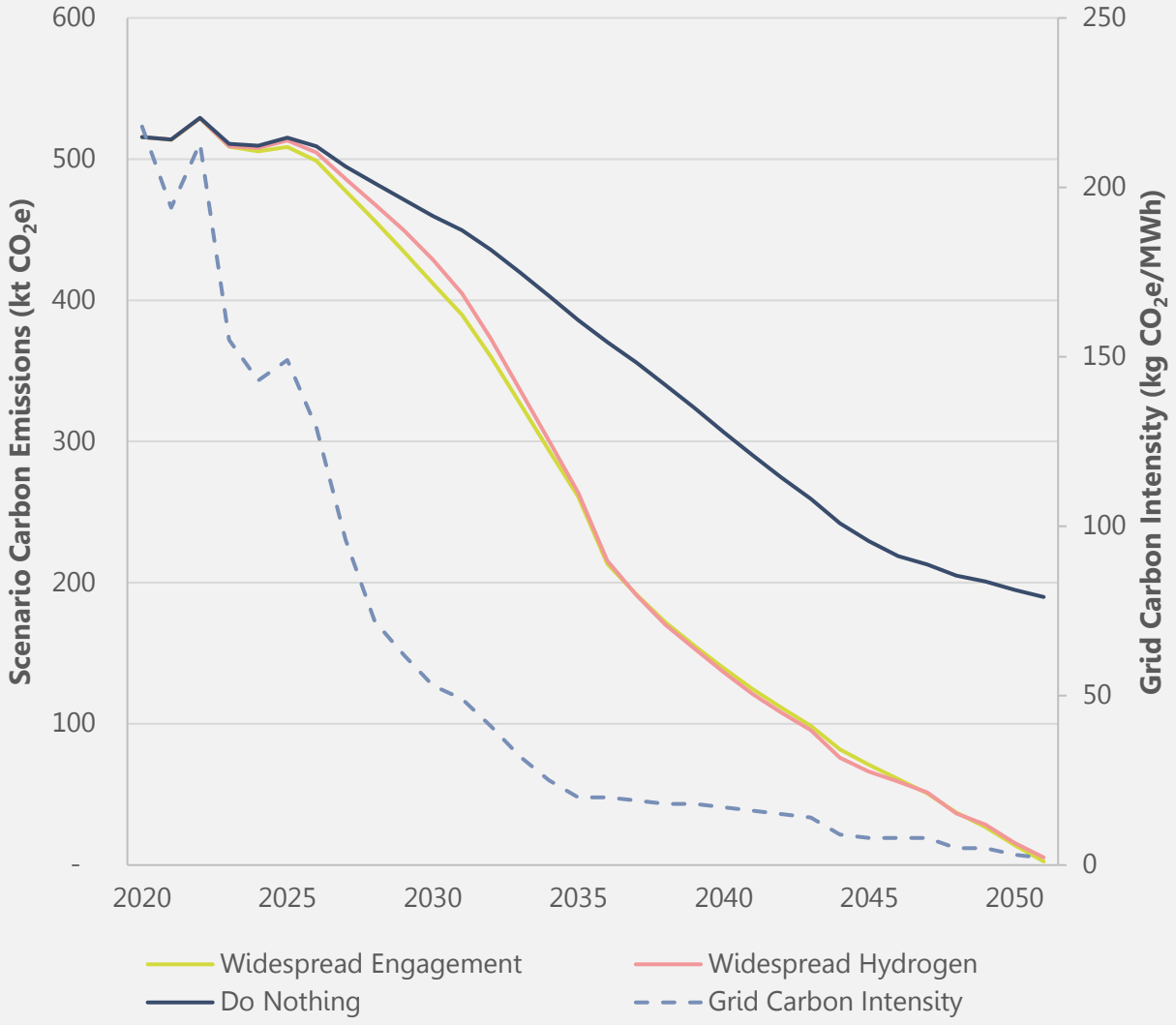
3,300 kt CO_2e is avoided under Widespread Engagement.

3,200 kt CO_2e is avoided under Widespread Hydrogen.

Decarbonisation is dependent on the grid carbon intensity, which decreases as fossil fuel power plants are superseded by renewable energy.

Widespread Hydrogen assumes green hydrogen is readily available and produced via electrolysis from grid electricity.

Total Annual Carbon Emissions



NET ZERO PATHWAYS – COST ANALYSIS

HIGHLIGHTS

Transport is the most significant expense, due to the large cost associated with purchasing new vehicles.

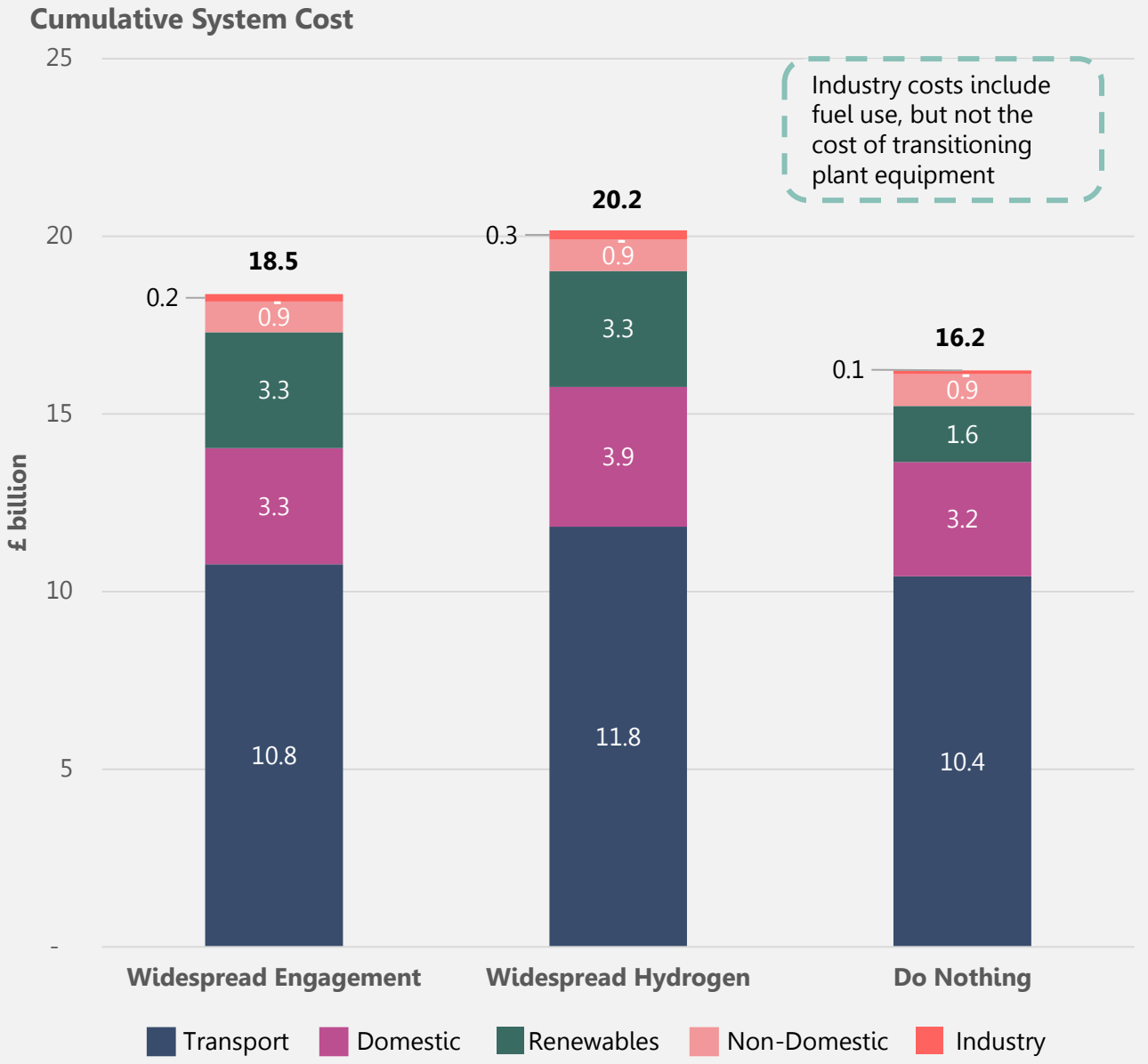
"Do Nothing" still has high transport cost as the transition to EVs is largely consumer-driven.

Secondary markets for EVs would significantly decrease this cost over time.

The 'Do Nothing' scenario has fewer costs as new technologies are currently more expensive than existing ones.

Widespread Hydrogen is more expensive than Widespread Engagement, as electricity is used to produce hydrogen with additional inefficiencies.

Widespread Engagement and Hydrogen scenarios are similar in overall system cost (this does not include cost for upgrading electrical grid or decommissioning gas network).



NET ZERO PATHWAYS – HEALTH ANALYSIS

HIGHLIGHTS

The costs represent the damages on human health, productivity, well-being, and the environment caused by burning fuels.

The domestic sector has the largest impact due to the large number of fossil-fuel boilers already in use in Neath Port Talbot.

All scenarios transition away from petrol and diesel vehicles as this transition is being consumer-led.

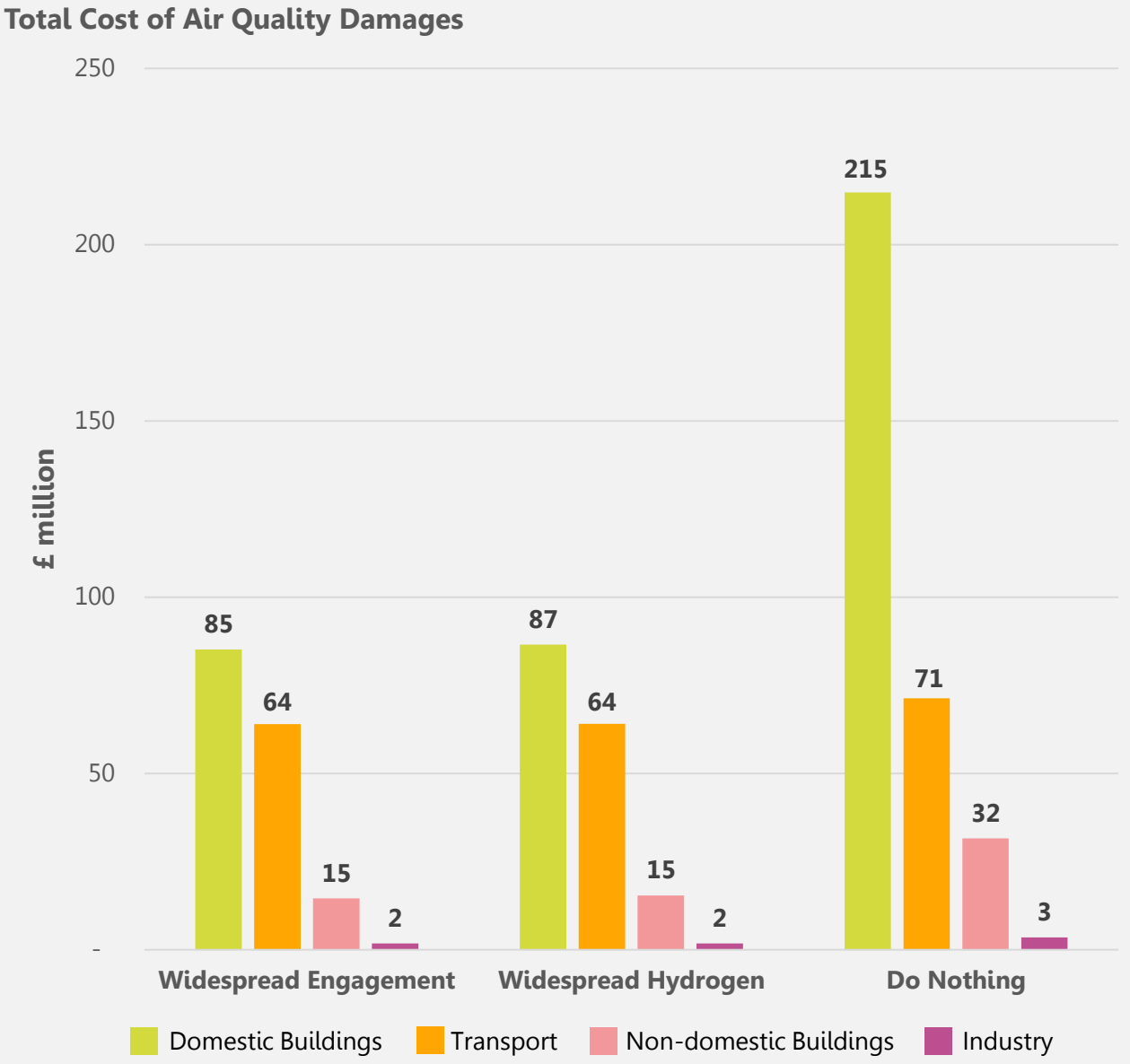
The transition away from fossil fuel heating towards heat pumps or hydrogen boilers causes a substantial increase in air quality over time.

Under 'Do Nothing', the lower uptake of low-carbon heating systems results in higher levels of air pollution.

Under Widespread Engagement, air quality damages are:

48% lower

than "Do Nothing" (~£150 million).



NET ZERO PATHWAYS – JOB CREATION ANALYSIS

HIGHLIGHTS

Installations of heating technologies are the largest temporary job creator, followed by retrofit installations.

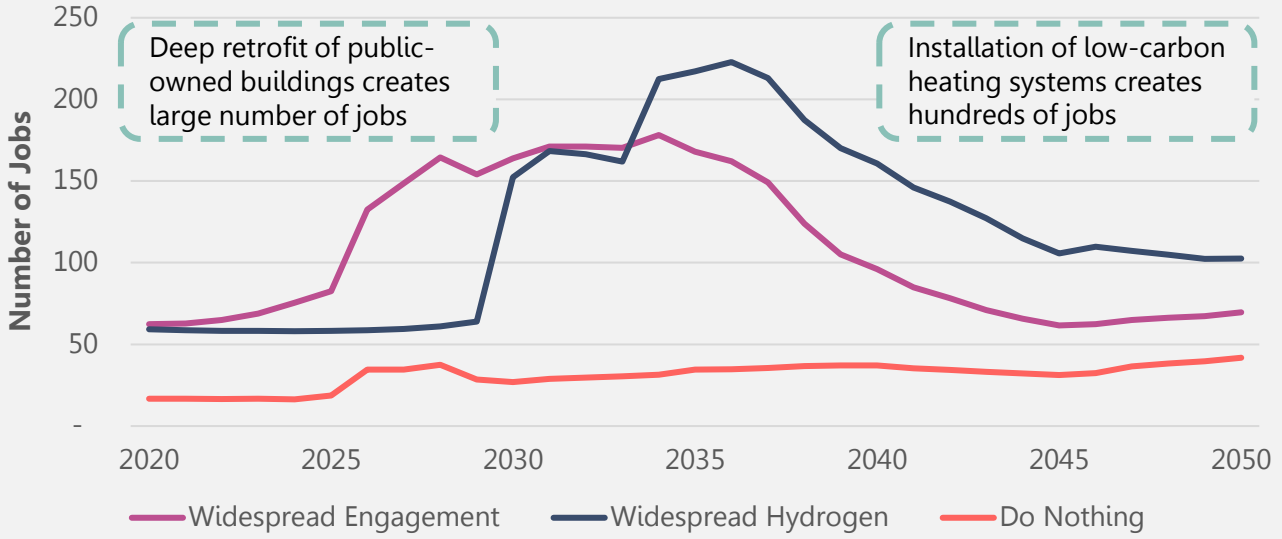
The large initial number of temporary jobs in Widespread Engagement is due to the deep retrofit of council-owned buildings, which finishes around 2030.

Hydrogen retrofit and installations are only expected to begin from 2030.

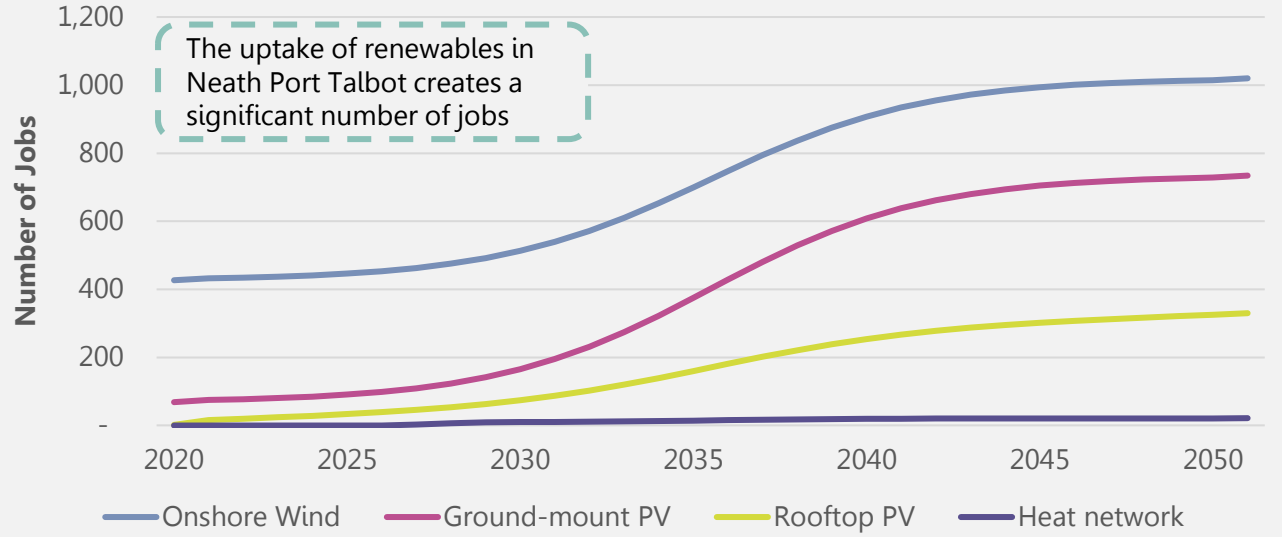
Renewable projects create a significant number of jobs; the large uptake of ground-mount PV and onshore wind in Neath Port Talbot is a significant employment opportunity.

The increase in skilled workers needed in the retrofit and renewable sectors would benefit from training at colleges and investment into apprenticeships.

Temporary Jobs (Installation)



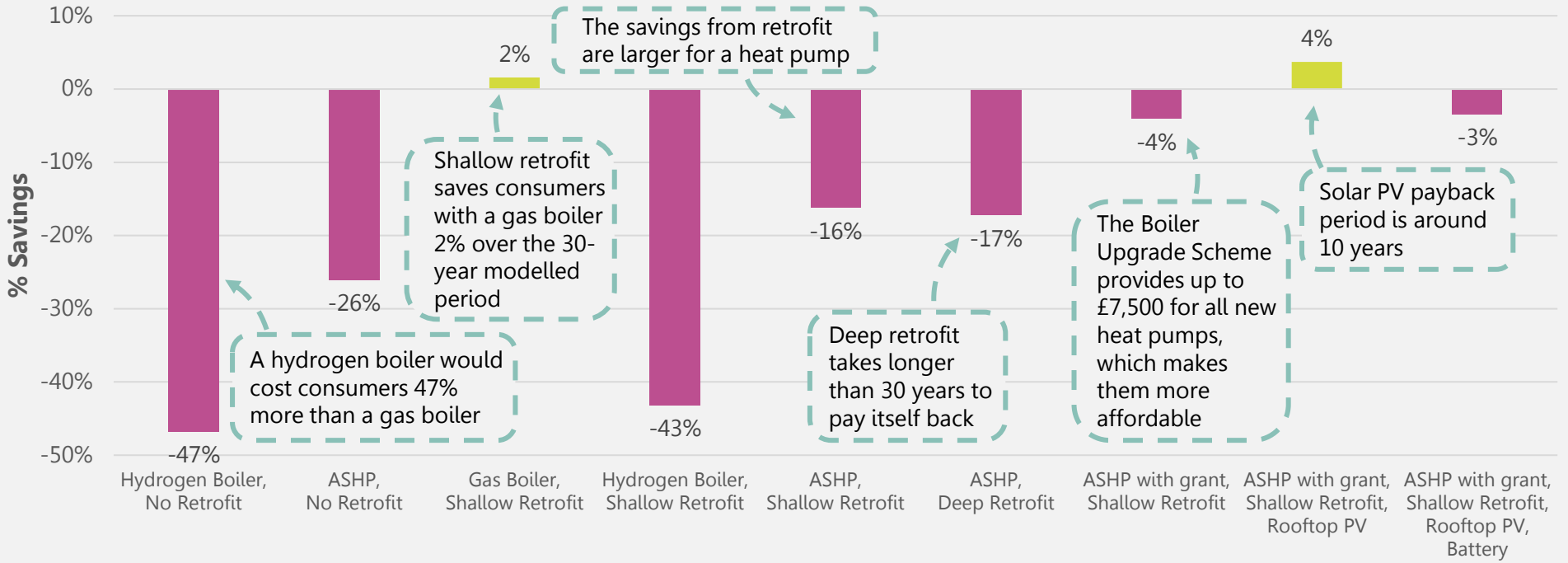
Permanent Jobs (Maintenance) - All Net Zero Scenarios



NET ZERO PATHWAYS – CONSUMER BILLS ANALYSIS

% Cumulative Savings to Consumers vs Baseline

Includes initial investment cost for each technology, and the savings they generate up to 2050
Baseline is the purchase of a new gas boiler with no retrofit



HIGHLIGHTS

Shallow retrofit includes measures such as loft and cavity wall insulation. The payback is greater for heat pumps (due to higher fuel cost relative to gas boilers), showing the synergy between heat pumps and retrofit.

Hydrogen boilers increase expenses over 40% compared to Air Source Heat Pumps (ASHPs), due to the high running cost of hydrogen and initial installation.

Over a 30-year period, consumers who invest in an ASHP, rooftop PV, and shallow retrofit will save more money than those who only have a gas boiler.

ASHPs and batteries have potential to reduce energy bills, although as relatively new technologies they have a high capital expenditure (CAPEX). As production increases, these costs are anticipated to fall.

NET ZERO PATHWAYS – SUMMARY

The Widespread Engagement pathway has significant advantages over Widespread Hydrogen, including:

- Over 100 kt CO_2e additional carbon savings
- 9% lower system cost
- £2mn savings in air quality damages
- Considerable consumer bill savings using heat pumps instead of hydrogen boilers

The key difference between the two scenarios is the use of hydrogen for heating, with some smaller differences in hydrogen's use for transport and in industry.

The interventions (in the next section) have therefore been predominately based on the Widespread Engagement scenario. However, hydrogen's future role in heating is uncertain and will be a governmental decision. This has been considered and accounted for during the development of interventions and the Action Plan.

Pathways	Carbon	System Cost	Consumer Bills	Job Creation	Health
Widespread Engagement	Positive	Neutral	Neutral	Positive	Positive
Widespread Hydrogen	Neutral	Negative	Negative	Positive	Positive
Do Nothing	Negative	Positive	Positive	Neutral	Negative

Key: Negative Impact; Neutral Impact; Positive Impact

Electrification of heating is the main recommendation, however developments around the government guidance for hydrogen should be monitored.

Electrification also has significant uncertainties and challenges concerning electricity grid capacity, connection delays and the costs of gas grid decommissioning.

WIDESPREAD ENGAGEMENT

NET ZERO 2050

WIDESPREAD HYDROGEN

Hydrogen has high uncertainty around future cost, availability, and carbon emissions, making it difficult to justify as the key energy vector for buildings and transport.

However, hydrogen will have an important role where electrification is less suitable, such as high temperature industry. The LAEP's Action Plan reflects this.

5. INTERVENTIONS

INTERVENTIONS & FOCUS ZONES

This section provides technical detail for each intervention area that has been covered in this LAEP, under the Widespread Engagement scenario. This includes exploring key assessment factors on these recommended interventions areas. Clusters of interventions within the same area, were grouped and identified as "Focus Zones", which are priority areas for intervention. The results of this analysis has directly informed the development of some of the final actions within the Action Plan.

INTERVENTION AREAS

- BUILDING EFFICIENCY & RETROFIT
- INDUSTRY
- BUILDING HEATING
- RENEWABLE GENERATION
- TRANSPORT
- ENERGY NETWORK IMPACTS

ASSESSMENT FACTORS

- CARBON EMISSIONS
- INDICATIVE COST
- ENERGY REDUCTION

Throughout this section, mapped intervention requirements have been presented for the described primary substation zones. Where relevant, this has been supplemented with further spatial information to provide insight to each zone.

FOCUS ZONE

An intervention that is highly recommended within a particular area. This identifies a key location to target delivery and therefore maximise impact.

The intervention findings have then been further developed to suggest potential Focus Zones (areas where a particular intervention is highly recommended or consider 'low regrets'), based on the detailed analysis. The Focus Zones have been purposefully selected to be applicable for either scenario to ensure they are 'low regret' regardless of additional external factors. Whilst specific areas are suggested, wider considerations will be needed before the Council finalises any zone for prioritisation. Depending on data suitability and type of zone, Focus Zones have either been represented on an LSOA level (for ease of spatial referencing) or as indicative point locations.

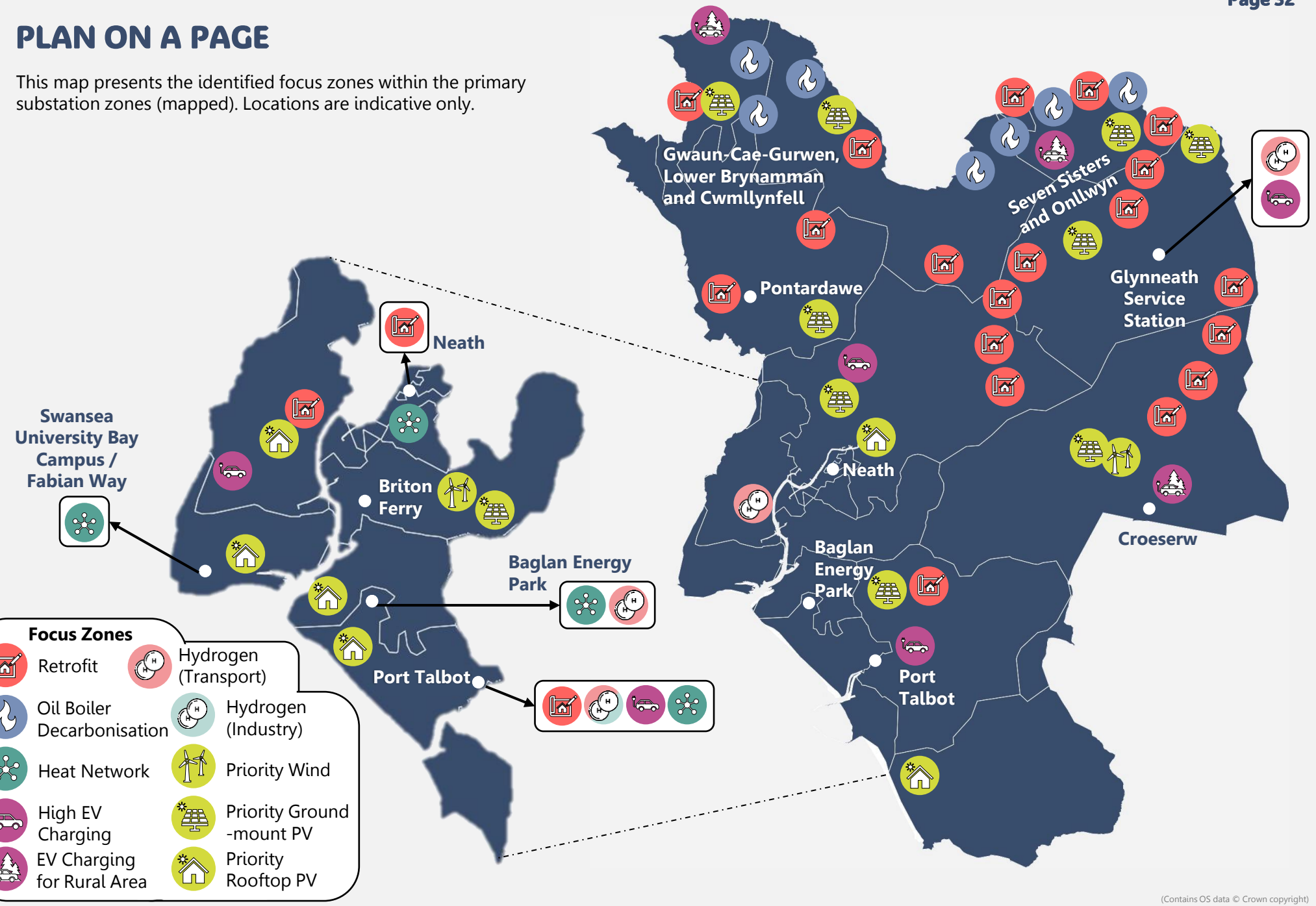
Wider factors to be included in the selection of a Focus Zone are:

- Extent of fuel poverty or socio-economic vulnerability
- Alignment with existing or proposed programmes of work across the public sector
- Eligibility for funding which should be capitalised
- Opportunity for strategic roll out due to specific characteristics such as types of building
- Support from wider stakeholders such as areas which could be impacted by HyLine Cymru

The following page presents the Plan on a Page. This is a combination of all Focus Zones across Neath Port Talbot, across all sectors. This gives a spatial representation of some of the priority actions which need to occur and how they interconnect.

PLAN ON A PAGE

This map presents the identified focus zones within the primary substation zones (mapped). Locations are indicative only.



ENERGY EFFICIENCY IN DOMESTIC BUILDINGS – OVERVIEW

Fabric retrofit has several benefits for domestic properties such as lower energy bills, reducing carbon and demand on the grid, and improving comfort, health and well-being.

For the purposes of the LAEP, retrofit has been split into two categories across domestic buildings:

FABRIC RETROFIT

the process of improving building insulation to increase thermal efficiency

Shallow:
Measures which payback within 10 years.
(e.g. loft insulation and cavity wall insulation)

Recommended as a minimum for all of Neath Port Talbot's domestic building stock, where suitable.

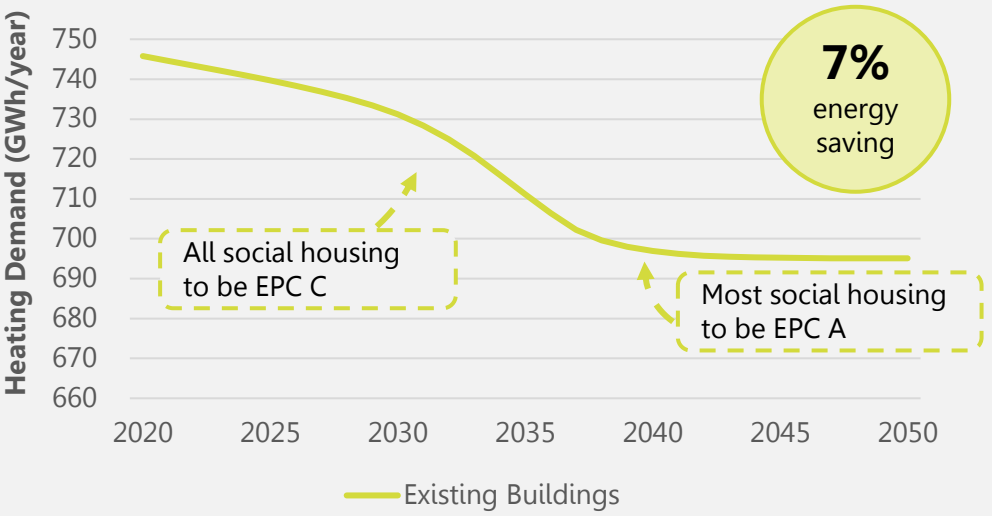
Deep:
Longer payback, higher upfront investment.
(e.g. internal/external wall insulation, double/triple glazing, underfloor insulation)

Recommended for 20% of domestic buildings: All social housing and some privately owned properties, where suitable.

Deep retrofit can require significant investment and isn't always required. Technological developments mean newer ASHPs can operate effectively in some buildings without extensive retrofit[1]. Additional insulation can improve a heat pump's efficiency, depending on factors such as the age, type of building and if it has underfloor heating. This investment to bill saving ratio should be considered.

Assessment for a shallow, more financially accessible retrofit is recommended for all buildings, while a deeper retrofit is recommended for specific cases, such as those who are most vulnerable. Retrofit suitability should be assessed on an individual building basis as standard measures are not appropriate for all build types and ages. Correct assessment is needed to avoid issues such as damp and poor ventilation.

Impact of Retrofitting Domestic Properties



TOTAL COST | **Shallow: £7.6mn** | **Deep: £40.1mn**

Challenges	Opportunities	Outcome
Lack of necessary skills and reliance on supply chain to deliver at pace and scale.	Boosting the local economy and stimulating growth across the region.	Creating a long-term skills programme.
High upfront costs including significant funding gap for council and social housing.	Funding schemes can support local authorities and social housing landlords with delivery.	Signposting funding and innovative financing mechanisms and ensuring consumers are well educated on the options available.

ENERGY EFFICIENCY IN NON-DOMESTIC BUILDINGS – OVERVIEW

Fabric retrofit for non-domestic buildings can be slightly more complex due to the more varied nature of their construction types. For the purposes of this analysis, the type of retrofit, the cost and the efficiency improvement has been defined based on the building use type, such as offices, industrial, and community, arts and leisure.
The LAEP has split the types of measures into shallow and deep, as described below.

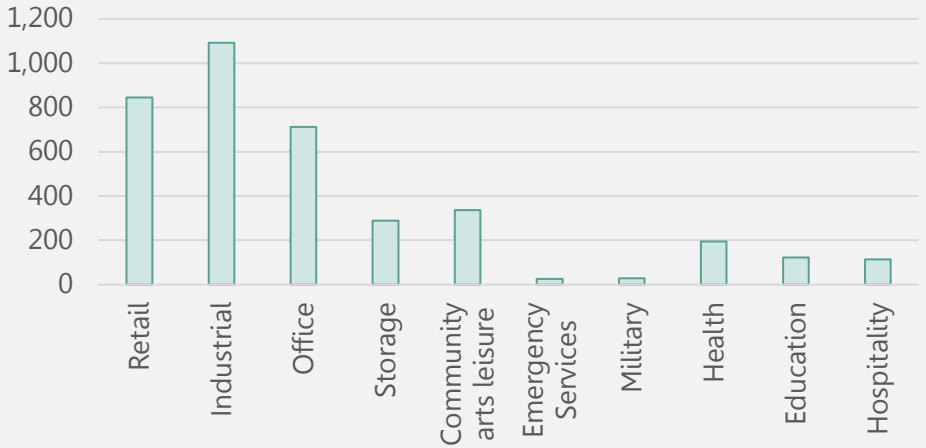
Shallow:
Measures which payback within three years.
(e.g. carbon and energy management systems, lighting improvements, upgrading of small appliances)

Recommended as a minimum for all of Neath Port Talbot's non-domestic building stock, where suitable.

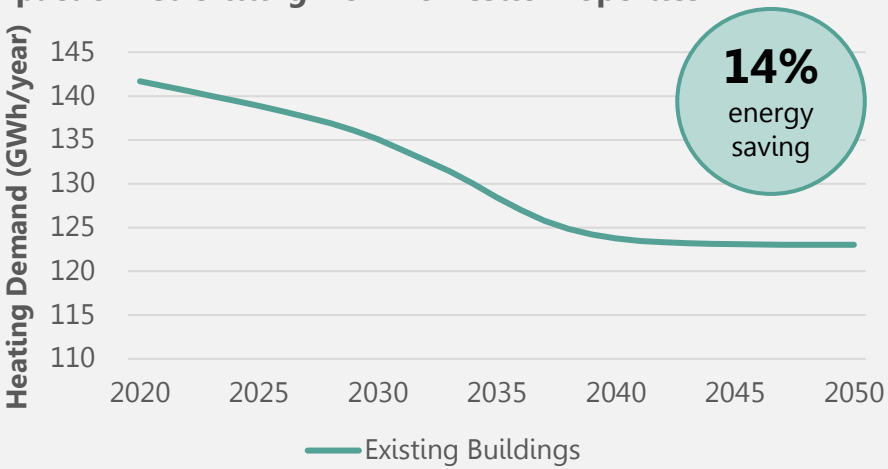
Deep:
Longer payback, higher upfront investment.
(e.g. upgrading building fabric or air conditioning, improving ventilation)

Recommended for 20% of non-domestic buildings: All public sector and some privately owned properties.

Number of Non-Domestic Buildings by Type



Impact of Retrofitting Non-Domestic Properties



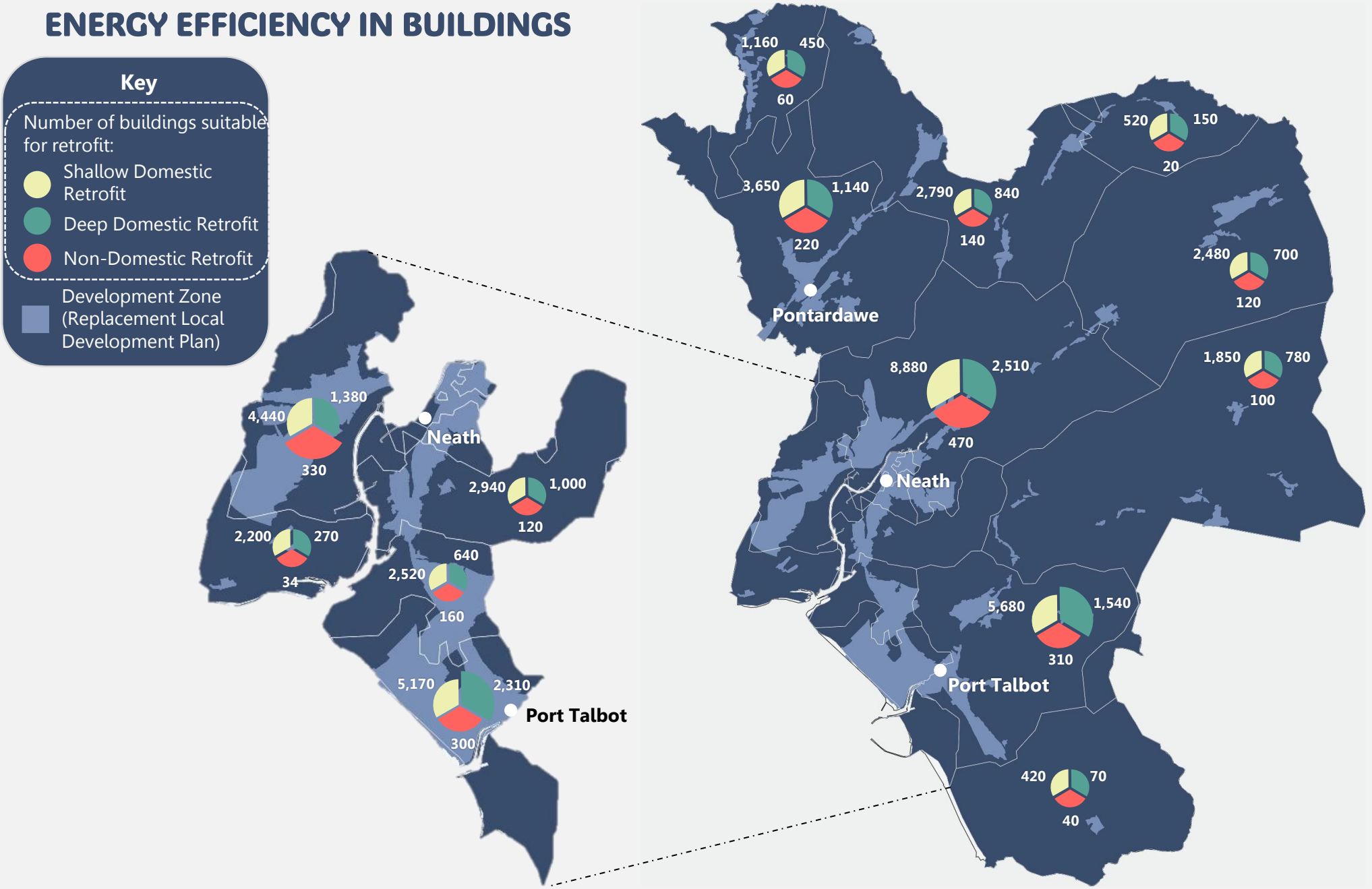
TOTAL COST | **Shallow: £48.3mn** | **Deep: £43.1mn**

Non-domestic retrofit measures tend to cover efficiency improvements to electricity use and cooling as well as heating.

Building design is very varied, with properties having complex systems and functionalities tailored to their specific purpose. Measures may need to be more bespoke due to specialised ventilation or cooling set-ups which require higher expertise to upgrade without disrupting ongoing operations. The scale of changes tends to be bigger due to the size of buildings, causing higher investment costs and requiring more extensive planning.

Data on building fabric of existing non-domestic buildings tends to be poor and estimated in most cases. The recommended measures are approximate and more representative of the building stock as a whole but has less accuracy when broken down to individual buildings. Therefore all results for non-domestic buildings are aggregated and indicative and specific Focus zones have not been created.

ENERGY EFFICIENCY IN BUILDINGS



Values presented are totals of the respective primary substation zones.

ENERGY EFFICIENCY IN DOMESTIC BUILDINGS – FOCUS ZONES

Focus Zones for building energy efficiency are selected around areas with 'no regrets' or a priority need for action. For domestic buildings this could be identified by areas with a high risk of fuel poverty, housing with particularly low EPC scores or areas with a high density need for retrofit which could benefit from a mass roll-out scheme.

Further analysis was carried out to determine potential Focus Zones. Data used included the Welsh Index of Multiple Deprivation (WIMD) ranking of areas, the density of homes with the lowest EPC (F or G) and areas with a high density of social housing[2]. The Focus Zones have been presented on an LSOA level for reference but the area of impact may be smaller and should be reviewed on an individual zonal level.

This combination of data suggests areas where poor energy efficiency could be impacting deprivation, particularly through fuel poverty. Intervention in these areas could benefit from mass planning, including spatially strategic roll-out of implementation to reduce cost from economies of scale, or bulk purchasing of materials to provide efficient and effective impact.

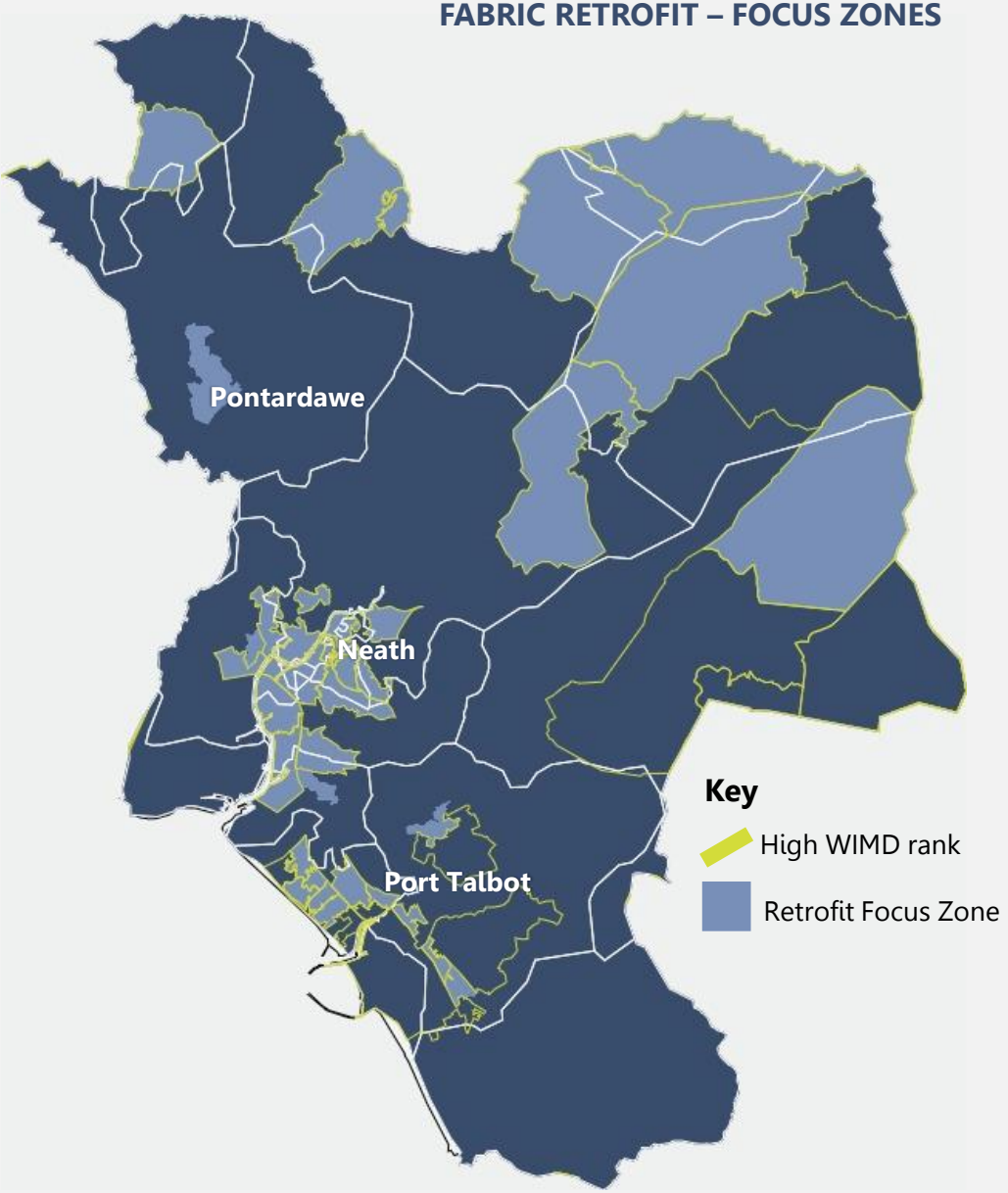
PRIORITY ACTIONS

4 Create a Behaviour Change Campaign to Increase Uptake of Retrofit and Low Carbon Heating

5 Develop a Fuel Poverty Programme to Support a Just Transition to Net Zero

6 Develop a Programme for the Electrification of Public Sector Owned Non-Gas, Fossil Fuelled Buildings to Increase Uptake of Low Carbon Heating

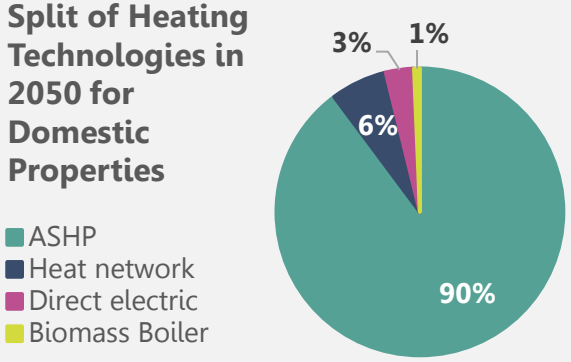
FABRIC RETROFIT – FOCUS ZONES



DOMESTIC HEATING – OVERVIEW

Neath Port Talbot will require the mass replacement of current heating technologies (mainly gas and oil boilers) with decarbonised alternatives to reach net zero. Four main heating options were considered for domestic buildings and the final split in 2050 is shown below.

Split of Heating Technologies in 2050 for Domestic Properties

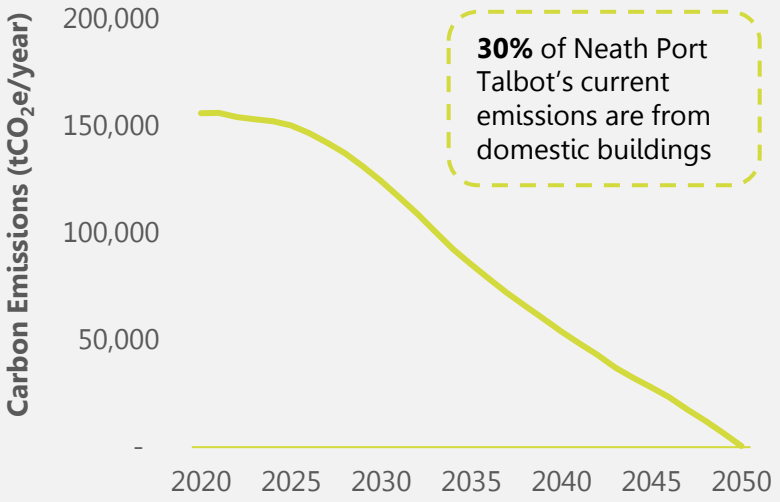


Total Cost including the cost of retrofit

£511mn

Up to £180mn available through the Boiler Upgrade Scheme (BUS) grant

Carbon Emissions from Domestic Heating



30% of Neath Port Talbot's current emissions are from domestic buildings

Air Source Heat Pump

This is the most suitable and lowest cost solution across most buildings. Heat pumps are proven to work in many building types with only moderate retrofitting[3].

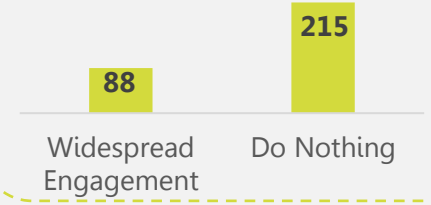
Although one the cheapest low carbon options, heat pumps are likely to be more expensive than gas boilers to run and have a higher initial CAPEX. Future reforms of energy pricing may reduce this gap, but price is currently driving concerns around uptake and the potential impact on fuel poverty. Heat pump efficiency increases with building energy efficiency, reducing bills. Therefore, retrofit and heat pump roll-out should be targeted simultaneously.

ASHPs, the most widely suitable heat pump, are not the only recommendation. Building suitability will need to be considered on a case-by-case basis for other options such as ground source or water source heat pumps.

Biomass Boiler

Buildings which currently have biomass boilers are assumed to mostly retain them as these are already considered to be low carbon. However, the high impact on local air quality should be considered.

Heating Air Quality Cost (£ millions)



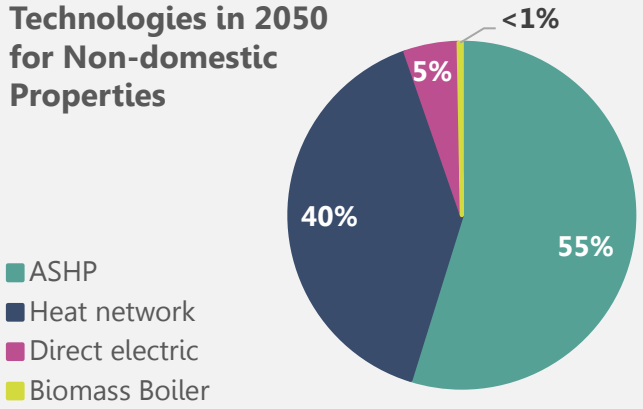
Direct Electric

Direct electric heating can be appropriate for properties which have limited space for an air source heat pump or retrofitting is challenging. However, it can be expensive due to the relatively lower efficiency than heat pumps and higher cost of electricity compared to gas. Therefore, it is recommended in only certain cases.

NON-DOMESTIC HEATING – OVERVIEW

As with domestic properties, a mass replacement of current heating technologies with decarbonised alternatives is required for non-domestic buildings in order to reach net zero. The final split of heating technologies in 2050 for non-domestic buildings is shown below:

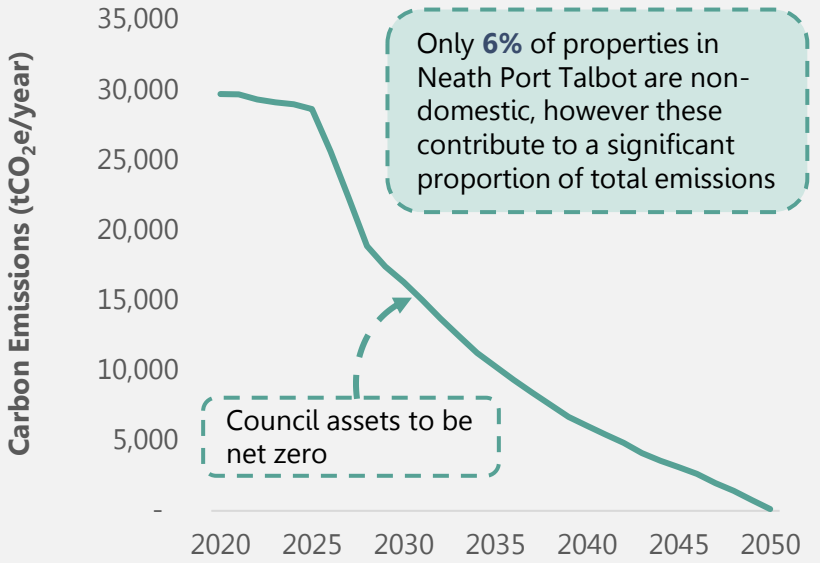
Split of Heating Technologies in 2050 for Non-domestic Properties



Total Cost

£138mn including the cost of retrofit

Carbon Emissions from Non-Domestic Heating



Heat Network

Heat networks are best in areas of high heat density and therefore are recommended for some of Neath Port Talbot's urban and industrial areas and are most suitable for non-domestic properties. The main potential opportunities exist around Neath, Port Talbot and Swansea University Bay Campus, with some smaller town community schemes.

Heat networks have a very high upfront cost due to the infrastructure required and therefore ensuring financial viability is key.

Specific heat sources for heat networks have not been modelled in this LAEP and further feasibility studies would be needed.

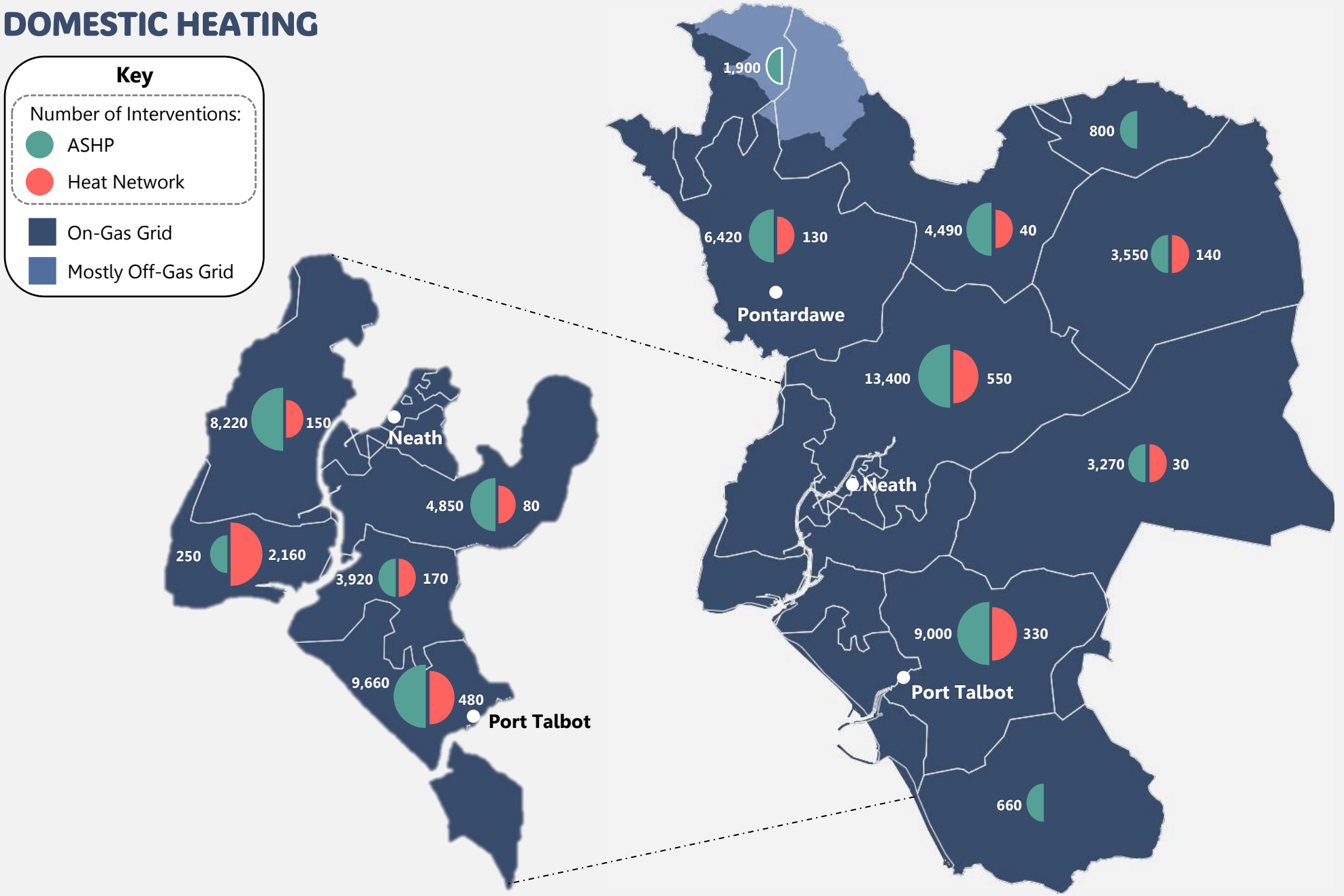
ASHP

ASHPs can be highly suitable for non-domestic properties due to the ability of some models to provide both heating and cooling. They can have similar or reduced spatial needs compared to conventional heating and are easily scalable and easy to integrate with solar panels or thermal storage.

Direct Electric

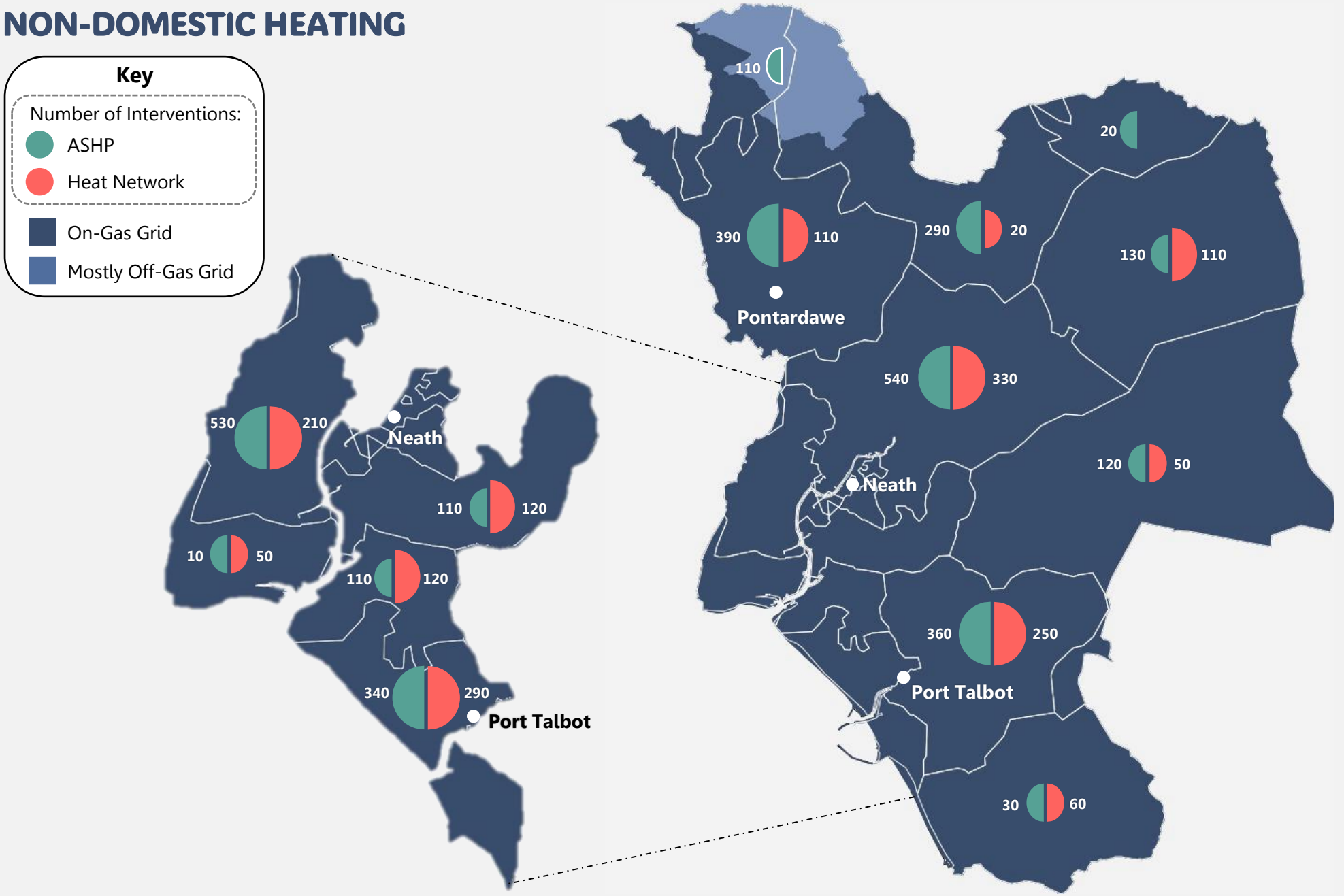
Direct heating can be suitable in non-domestic buildings which have low, or irregular heating demand where a simple and flexible system is required without extensive infrastructure or complex control systems. They can also provide precise control of temperatures across different parts of the building.

DOMESTIC HEATING



Values presented are totals of the respective primary substation zones.

NON-DOMESTIC HEATING



Values presented are totals of the respective primary substation zones.

DOMESTIC HEATING – FOCUS ZONES

Various factors impact the suitability of a low carbon heat technology and the deployment strategy in a given area. Considering these different factors can enable the development of Focus Zones. For example, technologies such as heat networks or biomass boilers are restricted to specific areas, whereas others such as air source heat pumps can benefit from mass roll-out.

Air source heat pumps are suitable in any location and for almost all building types. Due to the higher carbon impact and typically higher cost, it can make sense to prioritise homes with oil boilers for initial targeting. Suitable Focus Zones show LSOAs with a high density of oil boilers are shown on the above map.

The area and surrounding villages around Gwaun-Cae-Gurwen, as well as , along the Dulais Valley, have a large numbers of recommended heat pumps in areas with a high number of oil boilers. These rural and valley areas could be prioritised for early engagement programmes with building owners to understand the benefits and funding opportunities for heat pumps

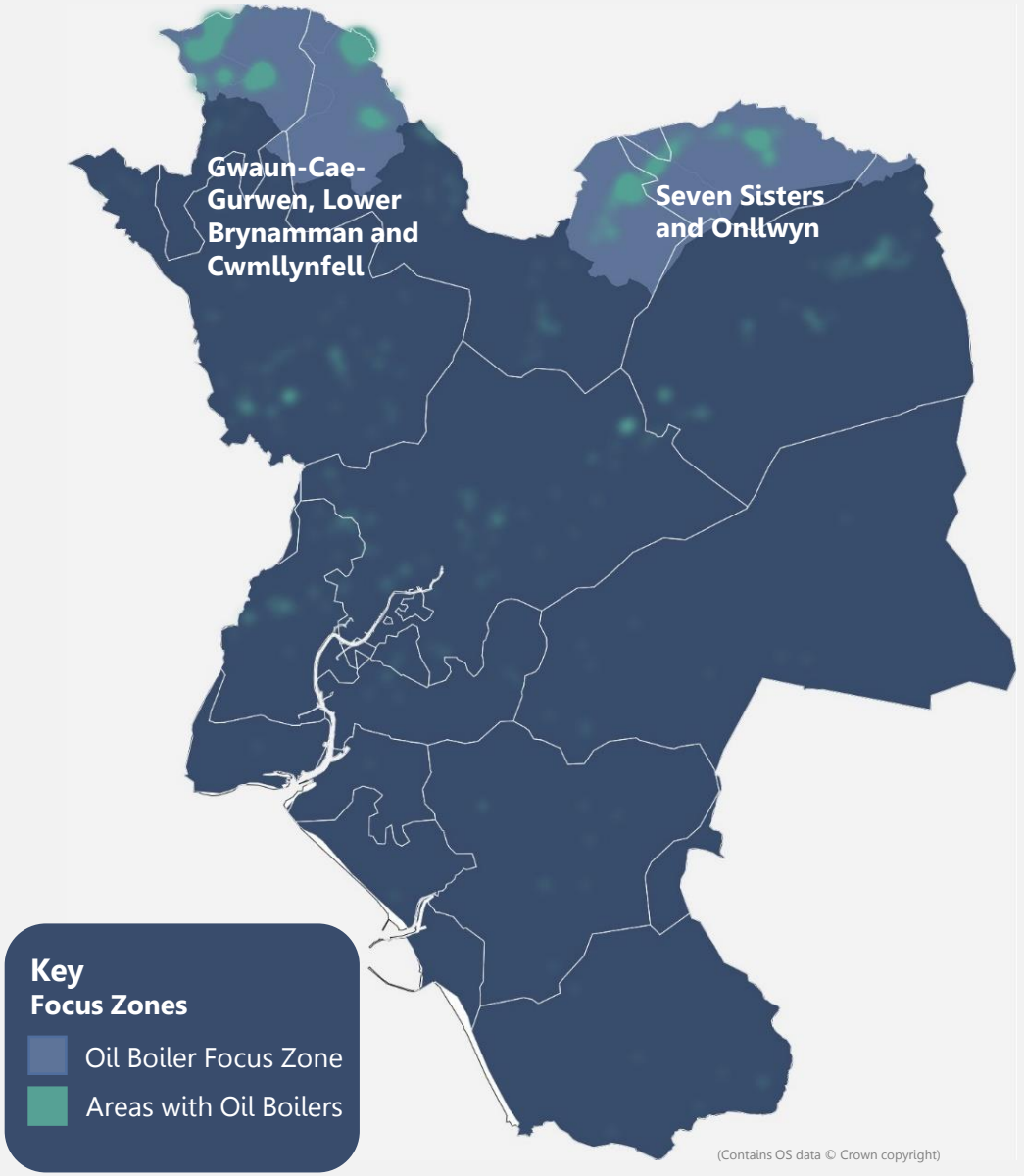
PRIORITY ACTIONS

4 Create a Behaviour Change Campaign to Increase Uptake of Retrofit and Low Carbon Heating

5 Develop a Fuel Poverty Programme to Support a Just Transition to Net Zero

6 Develop a Programme for the Electrification of Public Sector Owned Non-Gas, Fossil Fuelled Buildings to Increase Uptake of Low Carbon Heating

Decarbonisation of oil boilers - Focus Zones



NON-DOMESTIC HEATING – FOCUS ZONES

For non-domestic properties in particular, heat networks could be a key factor in heating decarbonisation in Wales and by design are suitable for only certain areas where buildings have sufficiently high density and heat demand. This has been found around the main urban areas such as Neath and Pontardawe. There is also potential for an industry-based network around Port Talbot, and a campus network for Swansea University Bay Campus, which could extend to other commercial neighbouring buildings. Other areas show some potential for heat networks, although these would be small networks with just a few buildings.

Following identification of high heat demand density, low carbon heat sources must be located. This could be from waste heat sources (such as industrial sites or incinerators) or from low carbon heat sources. Typical sources include bodies of water, rivers, sewer networks or geothermal heat. Low temperature heat sources would be increased using heat pumps, supplying buildings with space heating and hot water at high efficiencies.

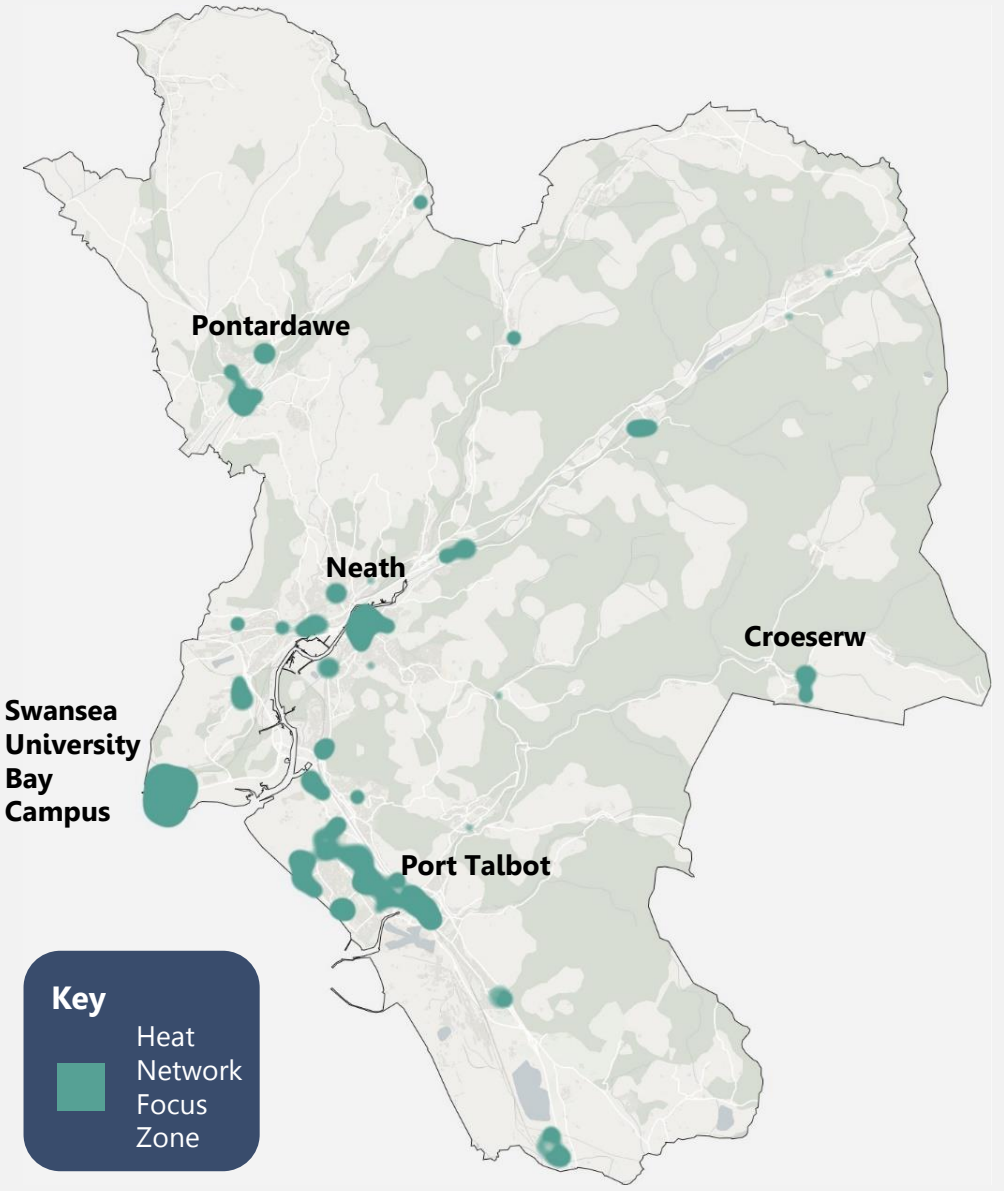
Heat networks have a high upfront cost due to the scale of infrastructure development required and therefore most networks are reliant on 'anchor loads' to have a sufficiently high heat demand to payback the high costs at a suitable rate for investors. These are typically buildings with a large heat demand and preferably are public sector buildings; this provides a more reliable stakeholder and gives confidence in future connection, although private sector connections can be equally suitable.

For all clusters identified it is recommended to carry out a further review of any which show adequate potential to be developed further through a feasibility study. This will be included in the upcoming Renewable and Low Carbon Energy Assessment (RLCEA).

PRIORITY ACTIONS

4 Create a Behaviour Change Campaign to Increase Uptake of Retrofit and Low Carbon Heating

Heat Network - Focus Zones

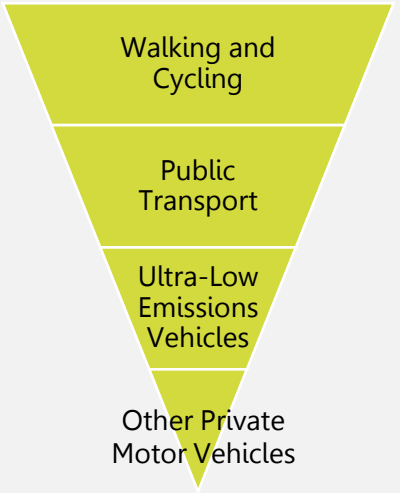


ROAD TRANSPORT – OVERVIEW

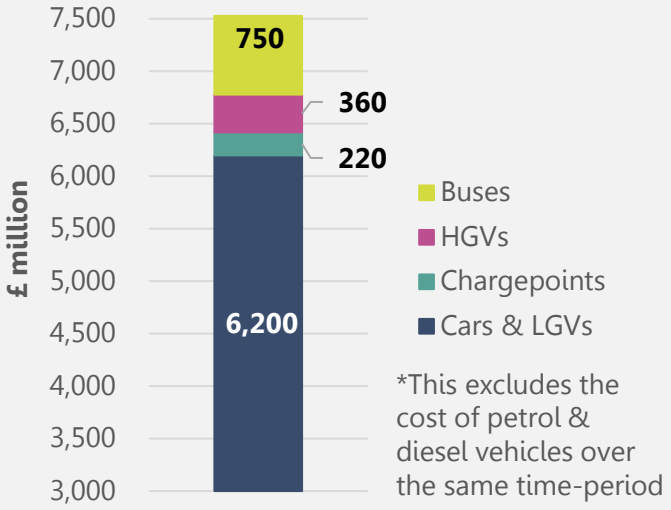
The continuing policy priority under any future pathway will be to reduce the need to travel, above encouraging walking, cycling and public transport. Low carbon vehicles, whilst important, will sit below an emphasis on "mode shift" within the sustainable transport hierarchy (right)[5].

Support to improve public transport will reduce the number of cars and improve congestion in major urban areas. However private vehicle use will still be significant. Adequate electric chargepoint infrastructure will still be crucial to support and continue the rapid growth, with owners requiring confidence in both battery range and accessibility of charging everywhere they travel.

Sustainable Transport Hierarchy[4]



Total Cost of Low Carbon Transport 2020-2050*



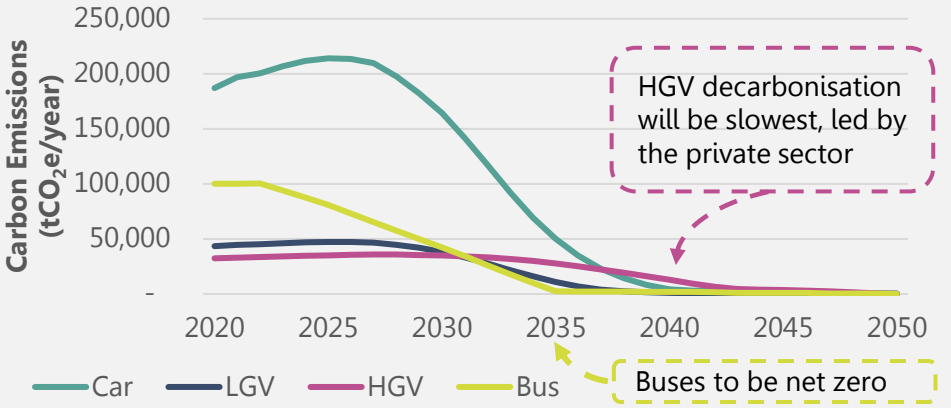
*This excludes the cost of petrol & diesel vehicles over the same time-period

100% of homes will need access to an EV charger

Neath Port Talbot will require 34,410 EV chargers by 2030[5]

45% of journeys to be made by walking, cycling or public transport by 2045[4]

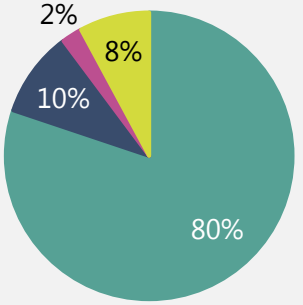
Carbon Emissions from Transport



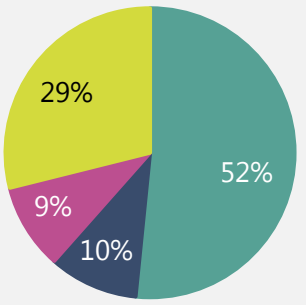
While cars, vans and motorbikes are expected to move to 100% electric, hydrogen could be an alternative for heavier vehicles such as buses and HGVs.

Neath Port Talbot Council is actively engaged with exploring the potential for hydrogen-fuelled vehicles and have successfully conducted a 2-week hydrogen bus trial as part of the Swansea University Park and Ride service. The service uses low carbon hydrogen, produced locally at the Baglan Energy Park. There are also ambitions to expand the trial to add an additional route from Neath to Pontardawe.

Vehicle Mileage in 2050

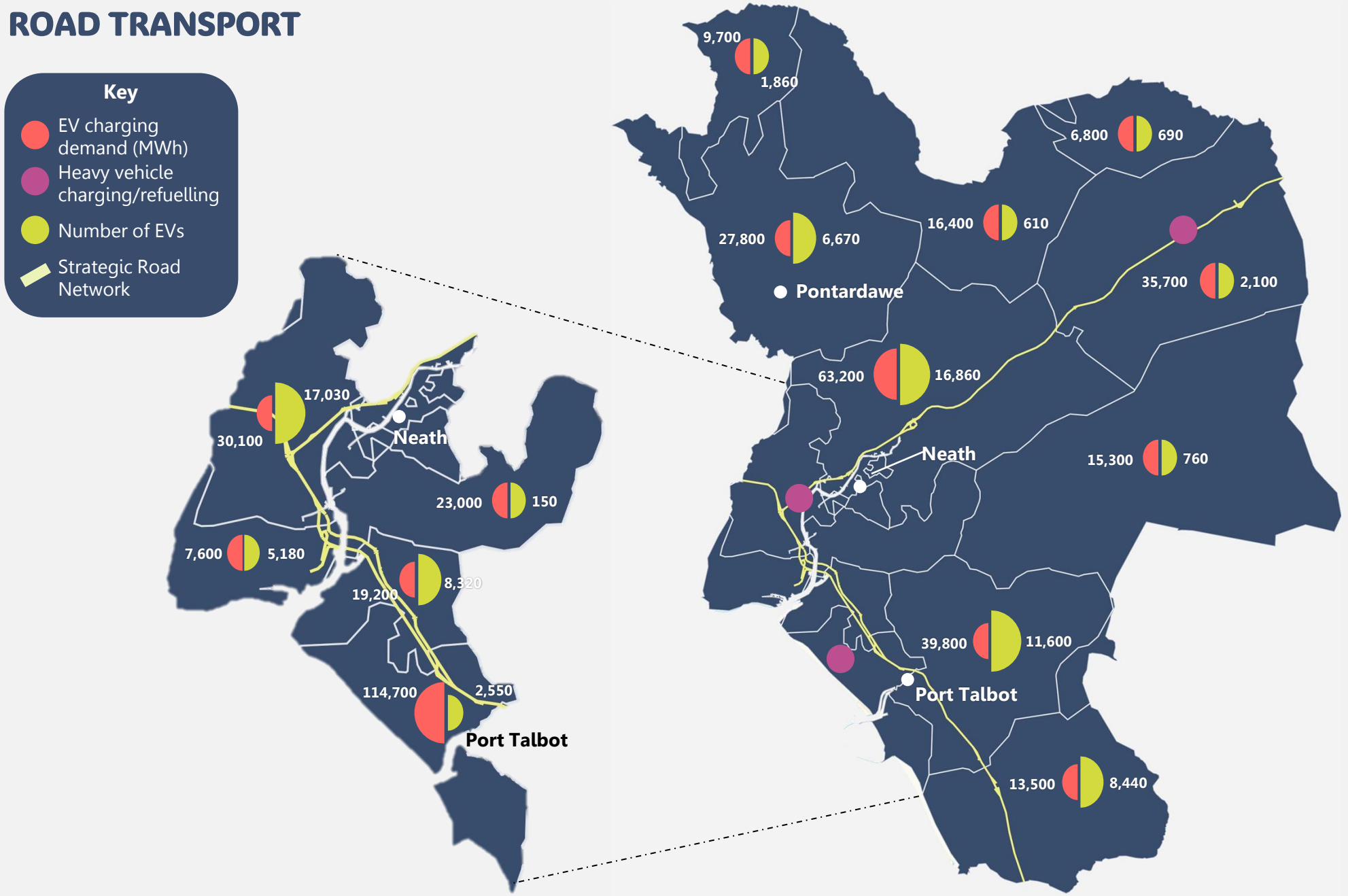


Electricity Demand in 2050



423 GWh
33% of Neath Port Talbot's 2050 electricity demand

ROAD TRANSPORT



Values presented are totals of the respective primary substation zones.

ROAD TRANSPORT – FOCUS ZONES

To boost the uptake of EVs sufficiently to achieve 100% market penetration by 2050, the main barriers to adoption need to be addressed. EV technology is developing rapidly to become competitive with internal combustion engine vehicles. EVs will become increasingly more affordable as the cost of new products fall and the second-hand market establishes itself.

Non-domestic charging infrastructure needs to be planned strategically for high-traffic areas. This includes 'destination' locations such as town centres, where public chargepoints should be integrated with car parking, and through-traffic hotspots - key points along the Strategic Road Network such as service stations. These have been indicated with High Electric Charging Demand Focus Zones.

It is also important to ensure access for rural communities by installing chargers in key public areas and car parks. Public awareness and engagement campaigns will support the installation of domestic charging where off-street parking is available, particularly in areas with fewer public or workplace chargers. Potential priority areas have been indicated through Priority Engagement Focus Zones.

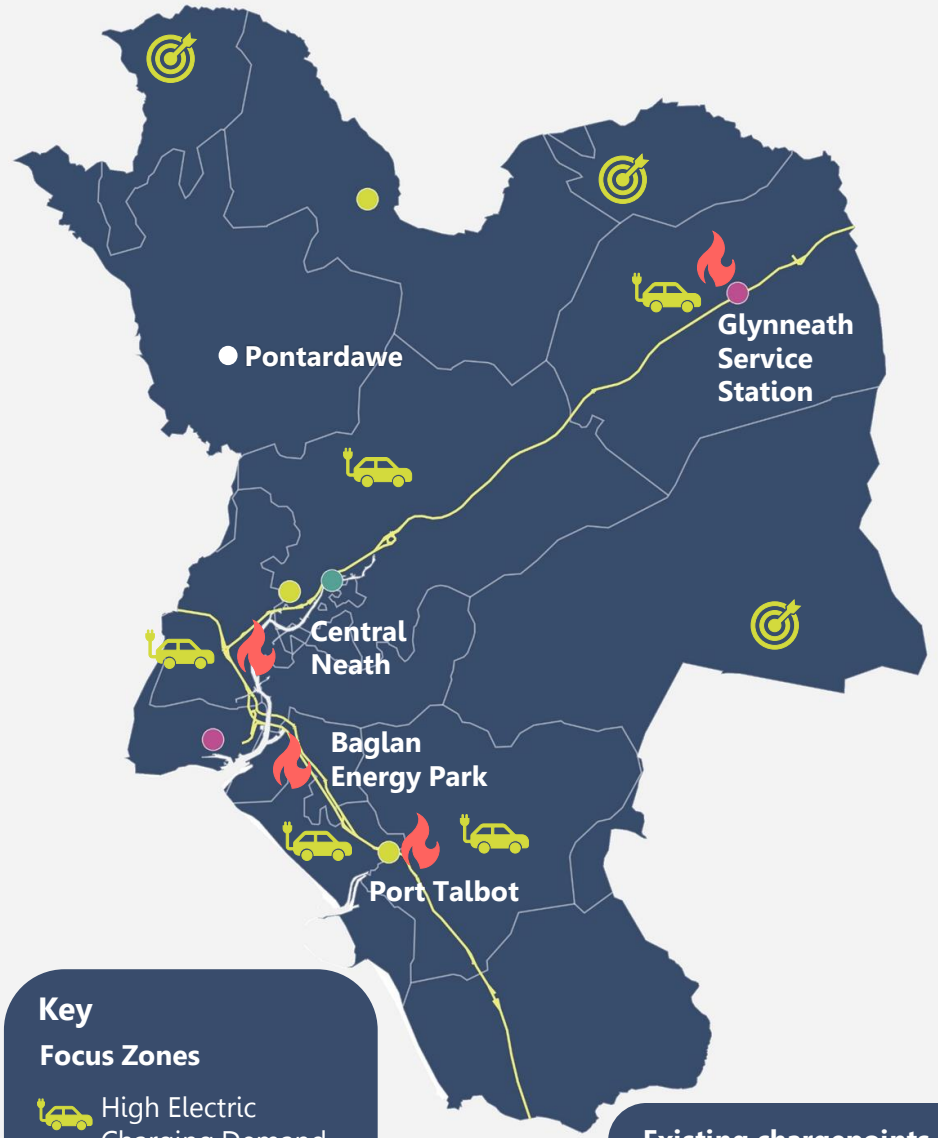
The industrial area around Baglan Energy Park could be key to low carbon transport infrastructure. Potential future use or generation of hydrogen around the industrial sites could align with refuelling locations, as shown by the current Hydrogen Bus Trials station. It is also home to bus depots which will need considerable electricity demand. Network upgrade requests for the industrial site should incorporate future transport needs.

PRIORITY ACTIONS

7 Develop Holistic Community Transport Provision in Valley Areas to Enable Sustainable Rural Travel

8 Facilitate Low and Zero Carbon Vehicle Uptake to Decarbonise Public Fleets

9 Enhance Active Travel and Public Transport to Reduce Reliance on Personal Motorised Vehicles



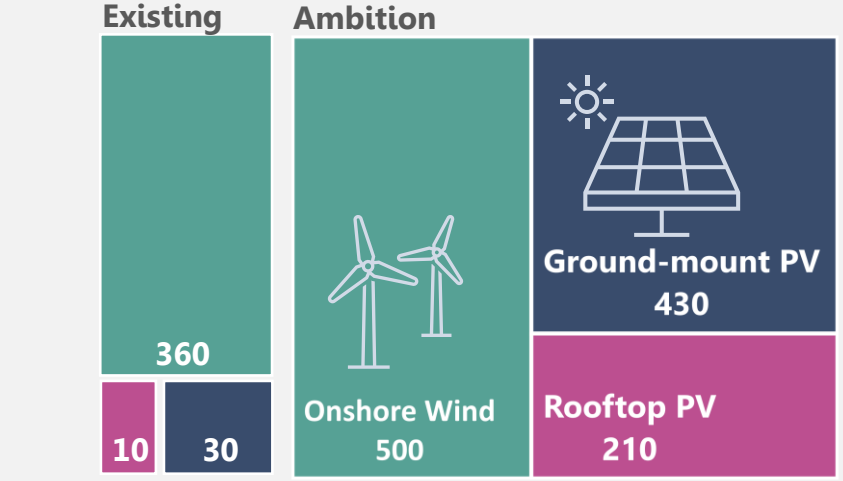
GENERATION – OVERVIEW

Neath Port Talbot currently has the largest renewable energy capacity in Wales, with a large onshore wind resource[6]. Through this LAEP, the Council has set 2050 ambitions for 1,140 MW additional capacity, with large growth in ground-mount and rooftop PV. This potential (1,700 MWh) outweighs the future energy demand (1,300 MWh), even despite the large demand from electrification, yielding potential to be a net exporter.

The largest potential growth is for ground-mount PV. This is 15% of the total theoretical potential and is highly dependent on suitability of current land use and ensuring that any renewable installation is of benefit to the local area. It is possible for solar farms to co-exist with rural areas but careful planning and engagement with the local community is key.

Rooftop PV also has high potential for expansion, and can utilise currently unused roof space to the benefit of the building owner.

Total Renewables Capacity (MW)



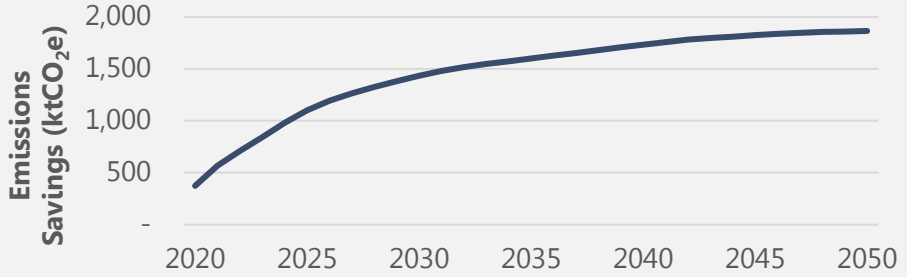
Total investment cost
£565mn

Neath Port Talbot's renewable energy ambition is
1,140 MW

These figures are ambitious; there will likely be impeding factors such as grid constraints which may make them more challenging to achieve.

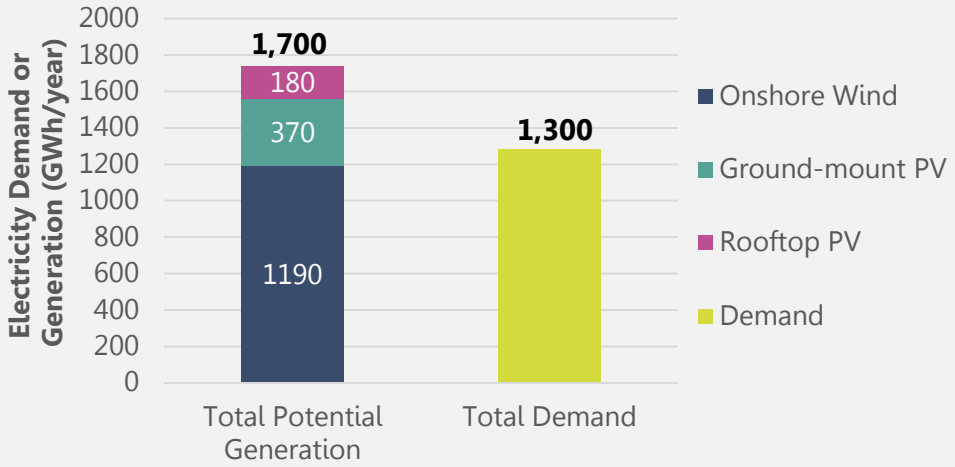
Although not a necessity for decarbonisation, localised energy generation could offer a faster pathway to net zero, additional energy security and a major source of income for local supply chain, developers, building and landowners.

Emissions Savings from Local Renewables

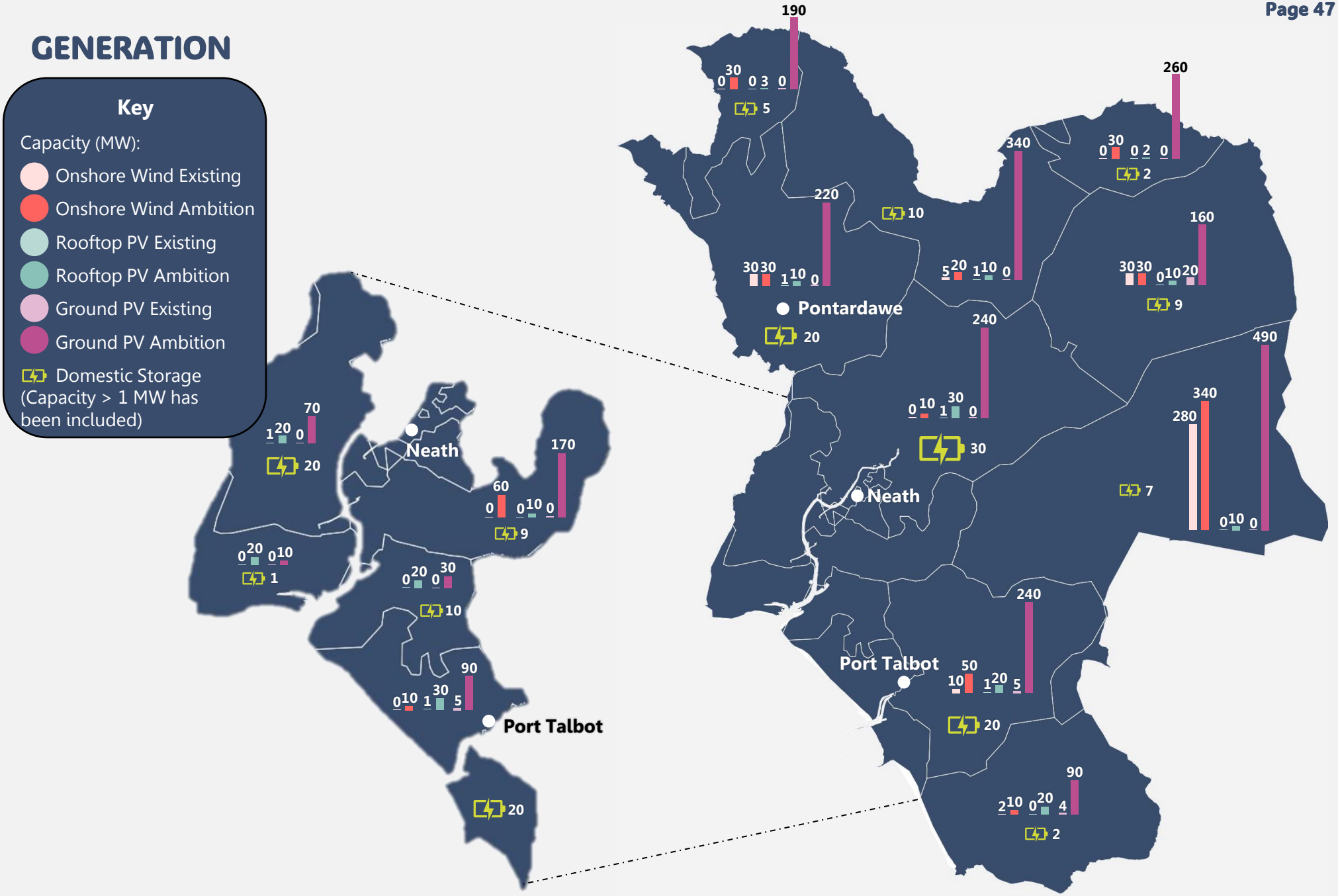


Rooftop PV has multiple co-benefits for the building owner. As shown through the Consumer Bills insights, a PV installation on a building could offer significant savings, offsetting the cost of electricity but also providing revenue from selling back to the grid through incentives such as the Smart Export Guarantee.

Ambition for Generation vs Demand in 2050



GENERATION



Values presented are totals of the respective primary substation zones.

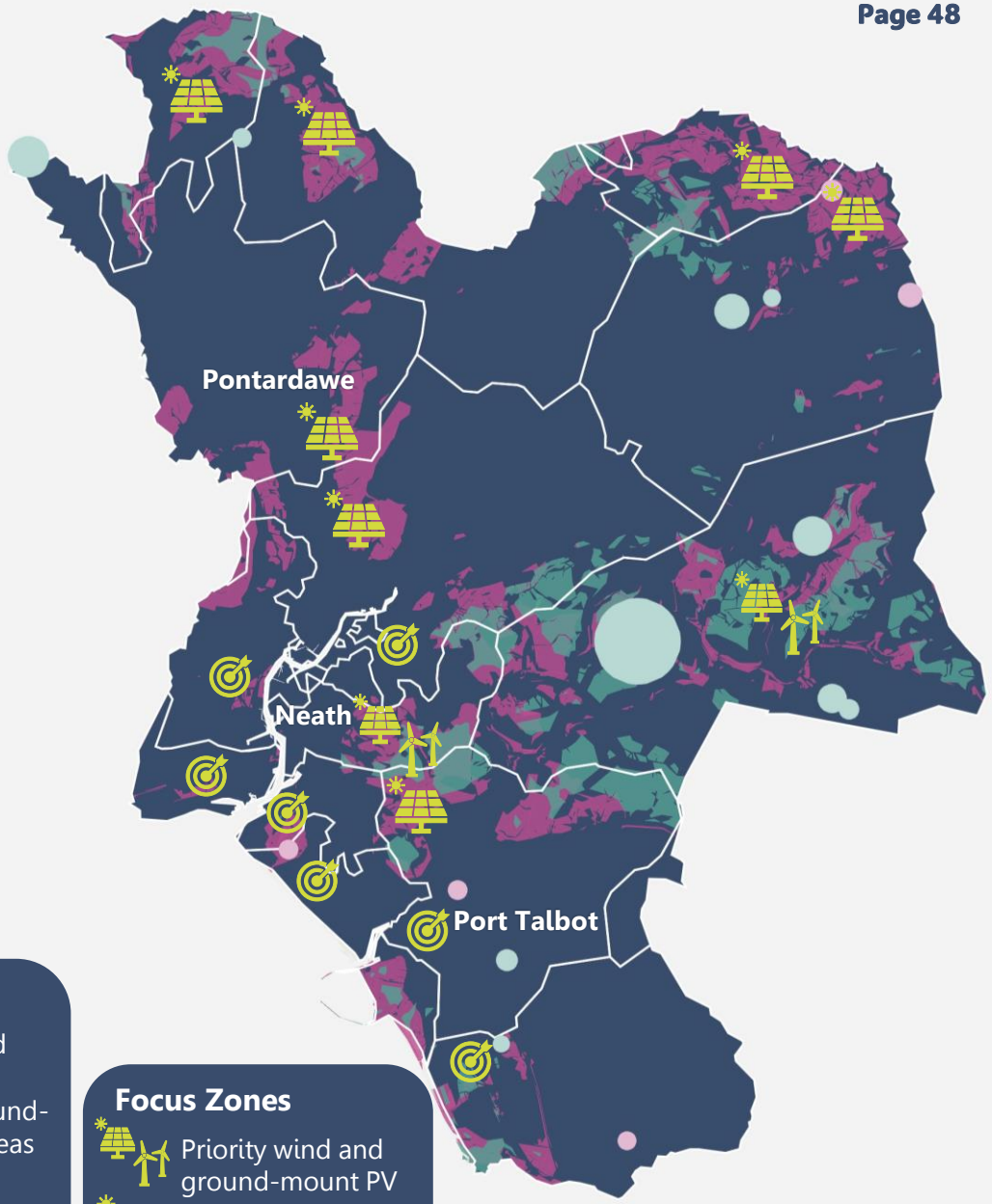
GENERATION – FOCUS ZONES

Evaluation of Focus Zones for renewable generation has been based on the LAEP renewable potential analysis. These Focus Zones are not simply areas where renewable development should be pushed forwards, they are areas where engagement with the local community and landowners should be sought to understand the shared benefits and opportunities that renewables can offer. When done correctly, installation of solar and wind farms can work side-by-side with agricultural and rural land, but it is imperative that this is understood by the local community and the opportunity harnessed by them.

Grid connection delays will be a major factor in the overall renewable development by 2050. This is a UK-wide challenge and continued engagement with NGED to understand solutions will be key.

Rooftop PV is assumed to be viable on 25% of properties, utilising space which is currently an unused, valuable asset. Engagement with building owners, both domestic and non-domestic, in areas with high PV potential should be prioritised. This includes informing people of how to access surveys, funding and support as well as the potential benefits of infrastructure.

The Welsh Government aims to accelerate community-owned renewable energy projects. Such projects are currently being progressed by community energy organisations (with support from Community Energy Wales) and could have a significant contribution to increasing generation within the county.



PRIORITY ACTIONS

10 Continue Collaboration with Electricity and Gas Network Operators to Foster a Robust Future Energy System

12 Develop a Support Programme for Community Energy Microgrid Projects to Increase Energy System Resilience and Efficiency

13 Develop a Storage and Flexibility Financial Incentives Programme to Increase Energy System Resilience

INDUSTRY - OVERVIEW

The decarbonisation of heavy industry is challenging, both technically and economically. Alternative low carbon technologies (particularly for high temperature processes) are expensive, and supply chains are less well developed than other sectors. The cost and timelines of grid connections can also impede electrification.

Two large industrial sites were identified based on the National Atmospheric Emissions Inventory: the Sofidel Paper Mill in Baglan Energy Park, and the Port Talbot Steelworks. Paper mills typically do not require very high temperature processes meaning that electrification could be feasible. There are several routes to the decarbonisation of heavy industry, including improving process and material efficiencies. Electrification and hydrogen are key options:

1

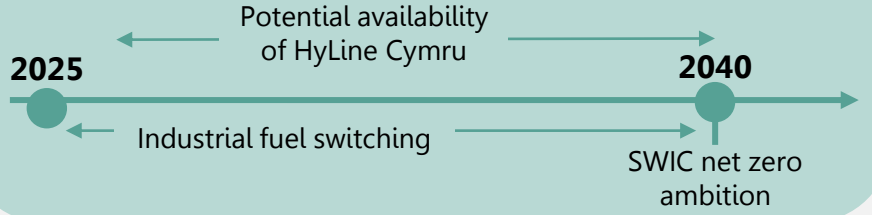
Industrial Electrification
As the grid decarbonises, the electrification of industrial processes opens up an avenue for decarbonisation.
Electrification is seen as challenging, as the supply chain of technologies is less well developed than incumbents, and the costs of the technologies, the grid connection and electricity itself is high.
However, electrification could offer energy efficiency benefits, particularly with the development of high temperature heat pumps.

2

Hydrogen for Industry
Due to the challenges of electrification, particularly for high temperature processes, hydrogen is seen as a key enabler for industrial decarbonisation. However, the cost and availability of hydrogen needs to be considered.
The HyLine Cymru project being investigated by WWU could unlock hydrogen for the Port Talbot industrial area by transporting it from Milford Haven where large-scale hydrogen production has been proposed.

Key bodies represent industry in the South of Wales including Net Zero Industry Wales (NZIW) and the South Wales Industrial Cluster (SWIC). They will be essential support services to assist in the industrial transition. Wales also sits in the Western Gateway region and therefore can lean on this wider area which encompasses Western England and South Wales.

The transition to decarbonise heavy industry is predicted to be slower than other sectors due to the lack of formal targets and anticipation of unique challenges across the sector. The fuel switching of heavy industry (electrification or hydrogen) could occur from the late 2020s. The availability of grid connection and hydrogen will be key considerations.



The future of heavy industry in Neath Port Talbot is uncertain, so the future energy demands, and the cost of the transition has not been included in the analysis of this LAEP. However, the opportunities from the industrial transition should not be overlooked, these are outlined in the following two pages.

The Decarbonisation of Steel

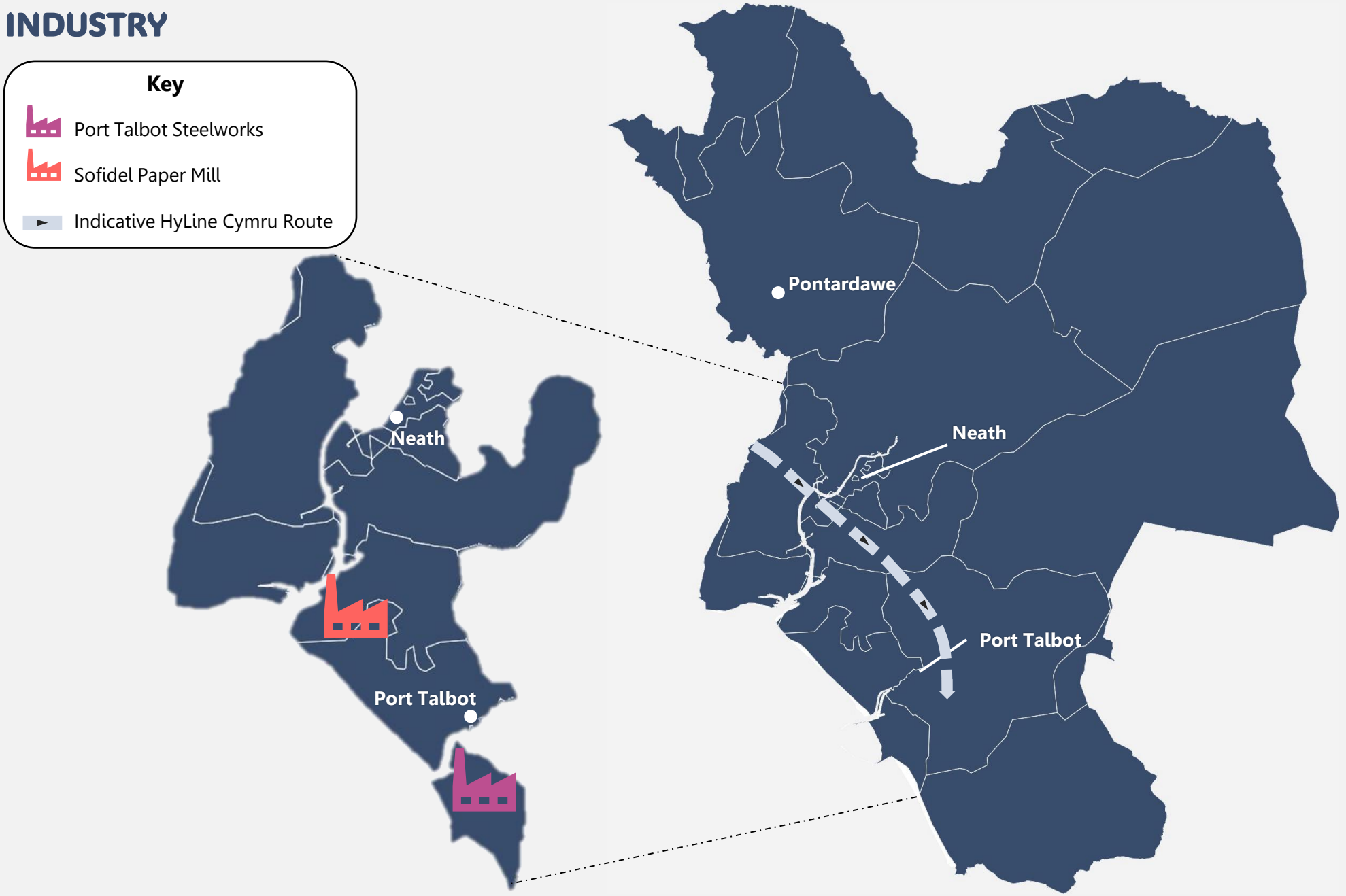
The current method of steel production at the Port Talbot Steelworks is the Blast Furnace – Basic Oxygen Furnace method which requires coal in the blast furnace to remove the oxygen from iron ore.

Steel production can be decarbonised in several ways including:

- Applying carbon capture and storage on existing blast furnace plants
- Using hydrogen to remove oxygen from the iron ore in a Direct Reduction Ironmaking process
- Switching to a recycled steel plant using electric arc furnaces

Recent announcements on the Steelworks confirm that it is moving away from its current production route to recycled steel electric arc furnaces[7].

INDUSTRY



INDUSTRY – FOCUS ZONES

Costs and energy demand for industrial decarbonisation are highly uncertain and therefore have not been quantified in this LAEP. However, as Port Talbot is one of the UK's major industrial areas and a key part of the local authority's identity, it is undeniably a Focus Zone of the future (represented by the LSOAs it is contained within for spatial reference).

There is opportunity for a virtuous exchange of goods and materials within industrial clusters such as South Wales. Port Talbot was identified as a 'Clean Growth Hub' in SWIC's 2023 cluster plan[8] due to the presence of the Steelworks, its deep-water port, plans for Floating Offshore Wind (FLOW) turbine assembly, and the recent planning application from Lanzatech for a sustainable aviation fuel plant[9]. These industrial activities can complement each other by a circular exchange of materials and a shared energy infrastructure.

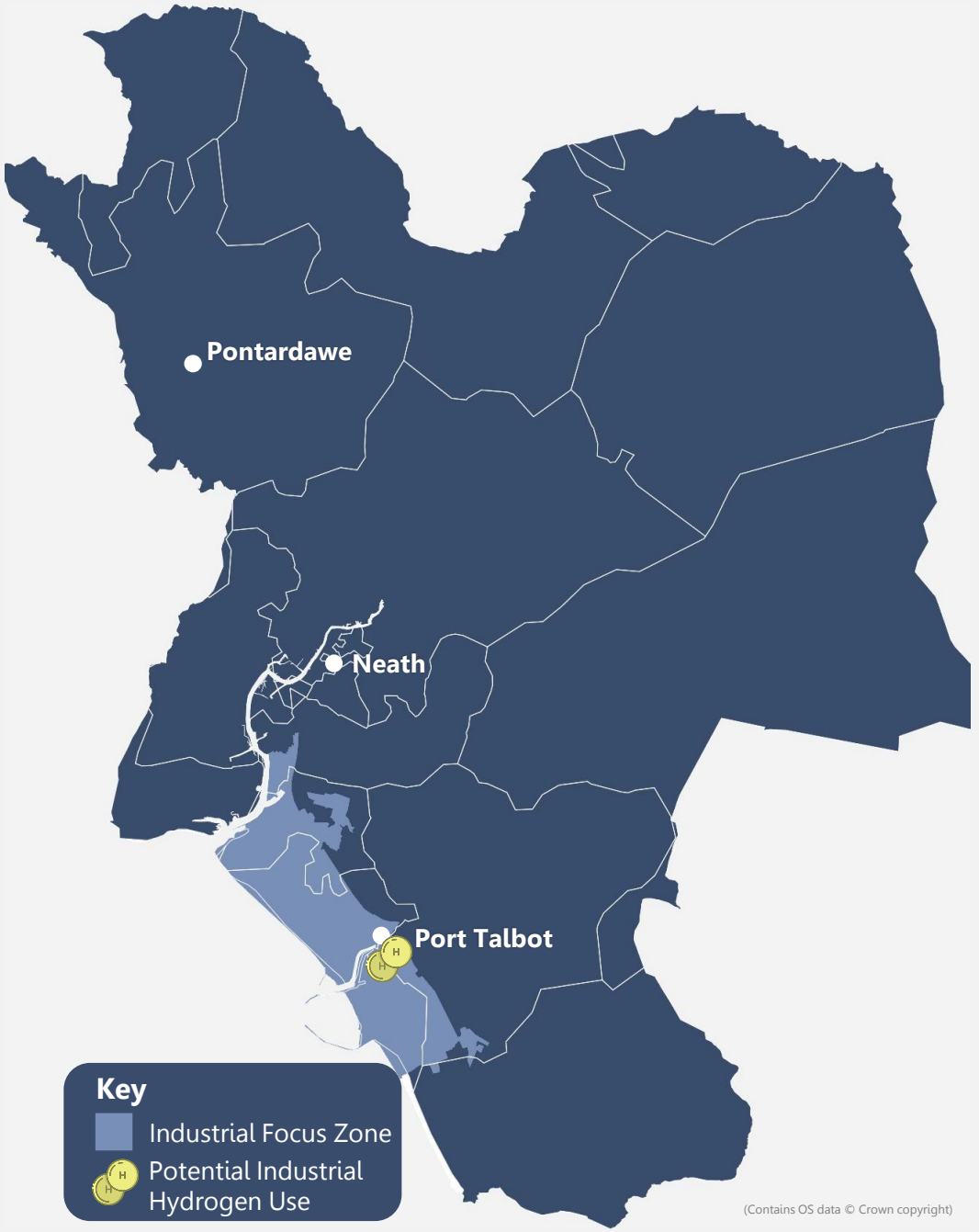
In 2023, Port Talbot received official status as a freeport, which is a considerable achievement for the area and is likely to attract significant investment and jobs. The port has also been identified as a potential carbon capture and storage hub, by using the port for CO_2 shipping. This could unlock wider decarbonisation opportunities in the area.

Although current plans centre around the electrification of the steelworks, hydrogen could still play a major role in Port Talbot, with opportunities from HyLine Cymru, and for production, use in other industry, and distribution through the freeport.

PRIORITY ACTIONS

14 Establish an Industry Engagement Forum to Identify and Progress Energy-Related Opportunities

15 Encourage the Uptake of Decarbonisation Support Programmes to Facilitate the Decarbonisation of Light, Medium and Heavy Industry



NETWORKS – FOCUS ZONES – DEMAND CAPACITY

The resiliency of the electricity grid will be paramount to decarbonisation, to be able to support the considerable increase in electricity demand as many sectors electrify. In some areas, the future demand will exceed the current grid capacity and upgrades will be required.

Distribution Network Operators manage the delivery of electricity to end-users through the low and medium voltage portions of the network, which deliver from primary substations down to building level customers. Therefore. they are responsible for upgrades, maintenance and expansion of the distribution networks within the modelled zones.

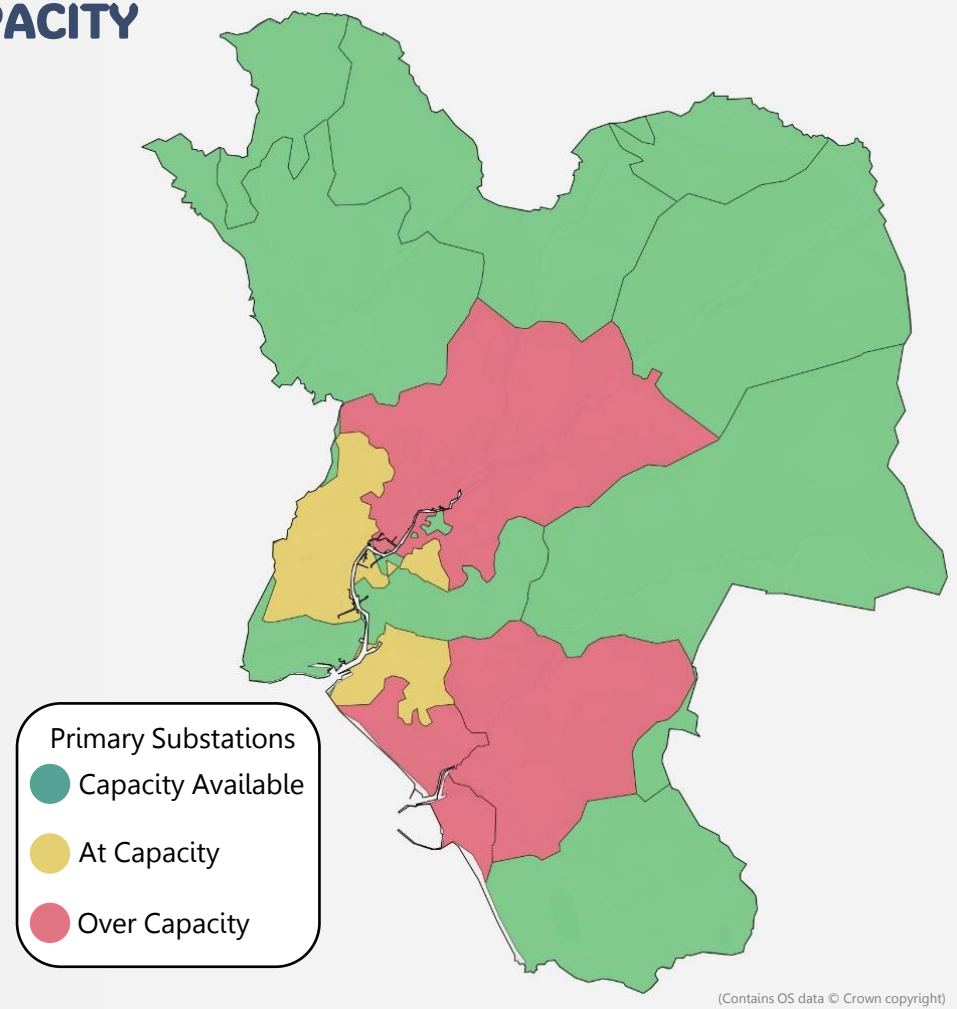
Advanced planning of upgrades across multiple projects and sectors will reduce delays and can help to reduce and spread costs by considering the demand holistically, instead of for individual applications.

The **2050** electricity demand is **3.2x current demand**

The modelled hourly electricity consumption for each sector was analysed to estimate the overall peak electricity demand in 2050 for each primary substation area. The peaks were compared to the current estimated capacity of each primary substation, as per NGED's data. This gave an indication of where future demand may exceed current capacity.

This modelling is highly indicative and uncertain as the reality of network modelling and connections is highly complex. Therefore, this analysis was performed as a Red Amber Green (RAG) assessment to identify areas with a high (red), moderate (amber) or low (green) risk of needing an upgrade.

Areas denoted as high risk have been selected as network Focus Zones– areas which will require planning and engagement with stakeholders to support development and decarbonisation. Three primary substations were identified to have significant demand capacity restrictions, with estimates of network upgrades required costing in the range of £10 – 20mn.



The peak demand data accounts for demand reduction measures such as flexibility services, retrofitting of buildings and distributed energy resources. However further alternative solutions could be cheaper than grid upgrades, such as aggregation of flexibility and peak shaving services; smart grid technologies; and grid level storage. Although grid upgrades will be unavoidable in some areas, demand reduction and energy efficiency measures should be maximised to reduce the peak as much as possible.

NETWORKS – FOCUS ZONES – GENERATION CAPACITY

Renewable generation connection currently faces challenges due to long wait times for projects to be connected into the grid. This is also due to planning around capacity limits, and considerable work is being done by National Grid Electricity Transmission (NGET) and Distribution Network Operators to address the issues with the current system and find a feasible solution. Forward planning of renewables holistically will also help this.

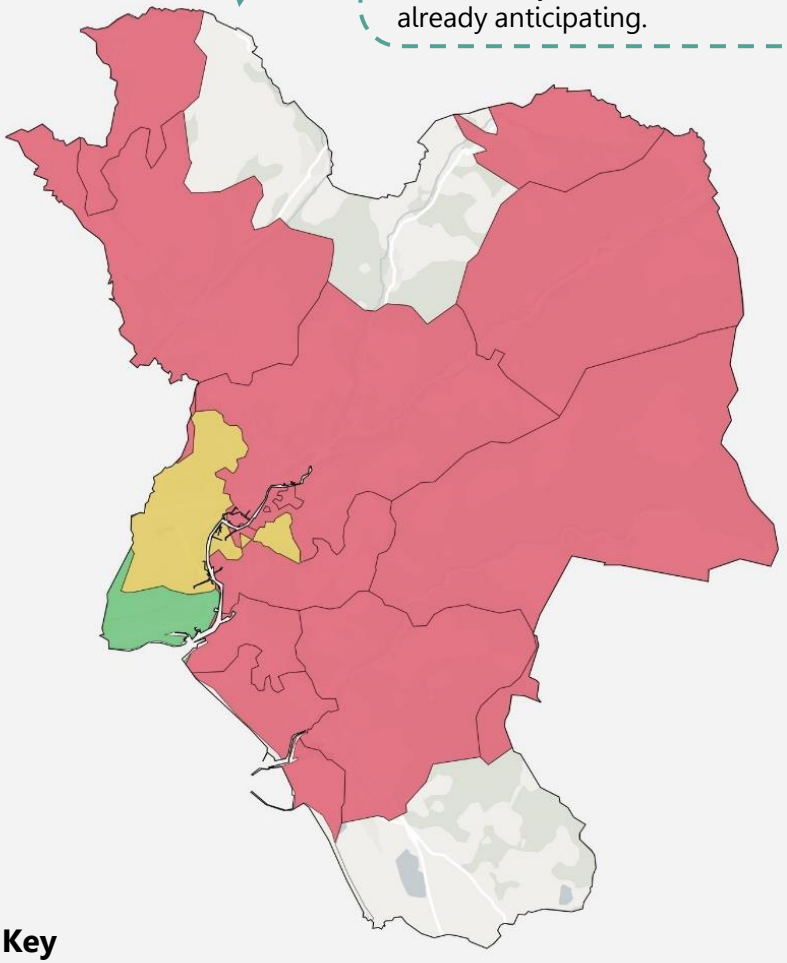
Diversifying renewable generation can allow better utilisation of intermittent energy sources and reduce the need for large grid reinforcements. Distributed generation which is consumed locally can also provide opportunity for community-led, decentralised projects and can be supported by Power Purchase Agreements or Peer-to-Peer networks, these also avoid the need for large grid upgrades.

For each primary substation area, the hourly intersection of renewable generation was analysed to determine the peak generation. This was compared against the existing network capacity and additional capacity requirements were reviewed. As with the demand capacity data, this is high level and therefore has been provided as a RAG assessment. For some zones, the generation capacity data was unavailable and therefore this assessment has not been completed.

12 of the primary substations could have generation capacity constraints depending on final build out of renewable potential. This is estimated to require an investment in the region of £200 – 300mn for network upgrades by 2050 to accommodate the additional power.

Distribution Networks Operators are actively using Load Management Schemes to more actively manage network loading across the electricity system. This allows greater amounts of generation to be connected without triggering all of the reinforcement, which may further reduce this figure. It should also be noted that some of the total costs will be covered through private investment for the network, and therefore not all of the cost will be borne by bill payers. Additionally, a large amount of initial cost for generation sites will be 'sole use assets' – connecting the site to the closest point on the network. This cost is also funded by the connecting customer.

NGED is continuously planning and developing the network to accommodate for predicted constraints and therefore this LAEP will support in assessing demand beyond the amount NGED is already anticipating.



NETWORKS – FOCUS ZONES

Despite the current plans to electrify the Steelworks, hydrogen could still play a key role in the area if used within the wider industry hub or for heavy vehicles. The potential use of hydrogen could be planned strategically to enhance the associated potential economic opportunities and reduce the distribution and infrastructure costs. This includes the possibility to tap into the existing gas grid at desired locations, as a hydrogen distribution network, should the grid be repurposed.

The opportunity around the development of HyLine Cymru plus the freeport status, could provide a valuable source of hydrogen and distribution to Neath Port Talbot. Baglan power station could be considered for repurposing such as for hydrogen generation. Proposed off-shore wind development in the Celtic sea could connect into Port Talbot, providing green hydrogen. Plans around HyLine and further developments of the potential for hydrogen's use across industry and transport should be drawn together to understand how shared infrastructure could be developed.

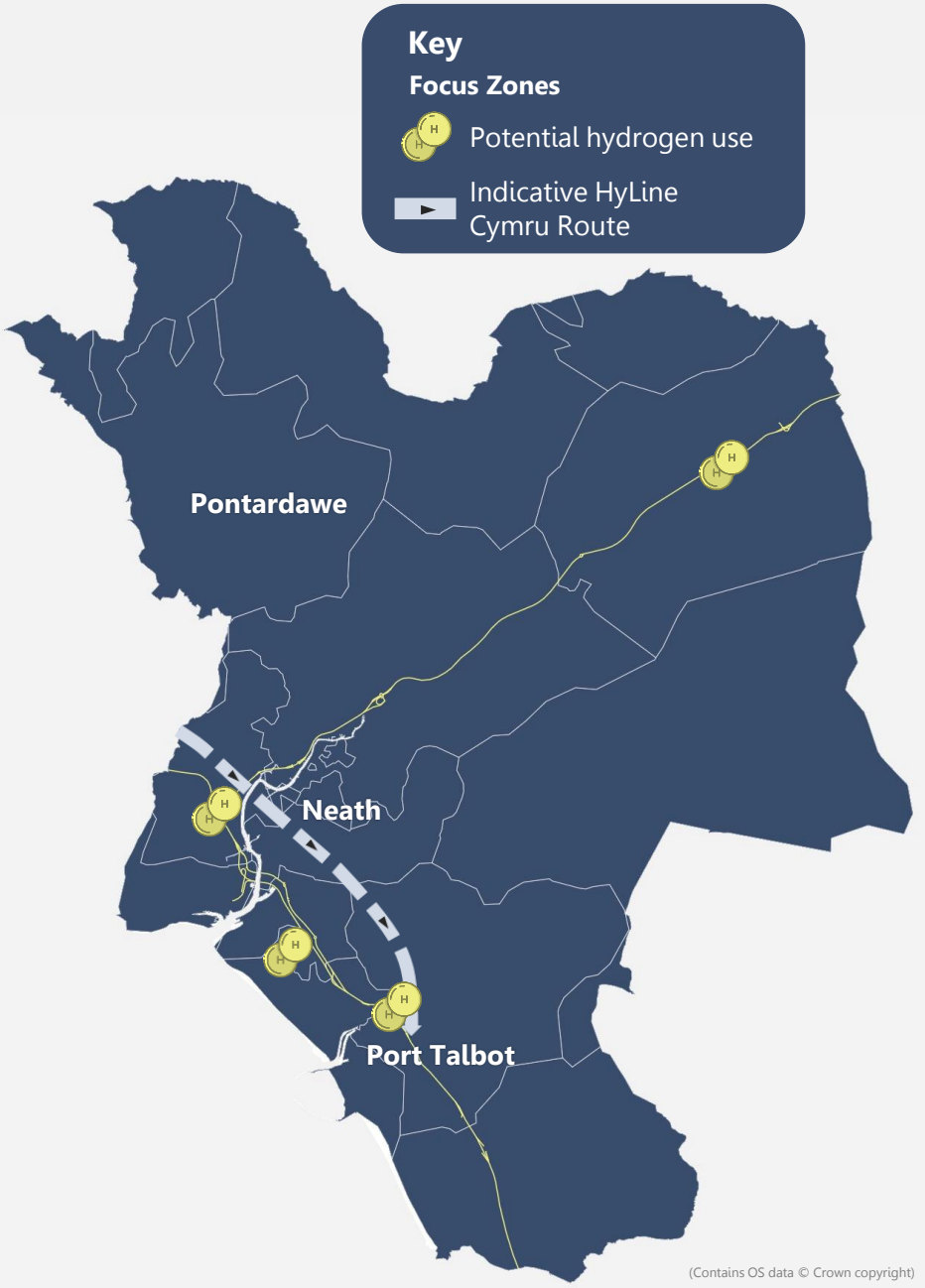
Focus Zones present areas where hydrogen could be needed across the different sectors and strategic, spatial planning would be effective. This includes key hydrogen vehicle refuelling points, areas which could host hydrogen bus depots, hotspots for industry and the freeport. These areas and any corresponding programmes or opportunities should be discussed through engagement with WWU and industry bodies such as SWIC.

PRIORITY ACTIONS

10 Continue Collaboration with Electricity and Gas Network Operators

11 Address Future Needs of Hydrogen-Fuelled Vehicles

15 Encourage the Uptake of Decarbonisation Support Programmes to Facilitate the Decarbonisation of Light, Medium and Heavy Industry



6. ACTION PLAN

ACTION PLAN OVERVIEW

This section discusses the Action Plan. The Action Plan provides the detail of priority actions to achieve the milestone targets set out in the Net Zero Pathway, and support Neath Port Talbot's journey to a net zero energy system. Each action has been allotted a time frame for successful implementation/completion as follows:

Short-Term: Implementation over two years.

Medium-Term: Implementation over two to five years.

Long-Term: Implementation over five years or more

The Action Plan acts as a catalyst for future initiatives, informing upcoming projects, policies, and strategies. It provides clear, but intentionally flexible direction, channelling the broader focus on decarbonisation into a set of collective actions. Whilst many of the levers are local, a large number are regional and the LAEP has considered existing regional governance structures.

Its purpose is not to prescribe an exact process or steps to reach net zero, but rather to recommend directions that guide the correct trajectory and ensure the involvement of relevant stakeholders in future projects and decisions. Moreover, the time period will be subject to significant changes and uncertainties across technology, policy, and markets that cannot currently be predicted. Therefore, the Action Plan and its actions will require regular updates (every three to five years) to adapt to the evolving environment.

ACTION PLAN PURPOSE

- Acts as a catalyst for future initiatives
- Guides the correct trajectory with example key steps
- Intentionally flexible
- Identifies 'no regret' decisions
- Complements and supports existing work

- Does not provide an exact process
- Is not set in stone, therefore the details may evolve or change
- Does not replace existing strategies, workplans or documents

The remainder of this section includes:

Action Roadmap: Provides an overview of the sequential implementation of the 15 priority actions. However, this selection of actions does not preclude support for initiatives beyond this list or those featured in other Councils' plans.

Priority Actions by Sector: Includes an overview of each action by sector, including example key steps, Key Performance Indicators (KPIs), location, and additional benefits. Further details (such as key stakeholders, costs, and risks) have been provided to the Council.

Next Steps: Immediate next steps to mobilise the recommendations from the LAEP.

Stakeholder Engagement Process

Enabling Factors Workshop → Action Development Workshops → Action Prioritisation Meeting → Action Focus Groups → Action Refinement & Governance Workshop → **Action Plan**

ACTION PLAN OVERVIEW

CROSSCUTTING ENABLING ACTIONS

Actions that foster a supportive environment and promote a holistic approach to addressing complex challenges. The actions enable Neath Port Talbot to navigate energy transition challenges and embrace a low carbon future.

- **Action 1: Establish a Regional LAEP Steering Group**
- **Action 2: Support Long-Term Green Skills Programme**
- **Action 3: Embed LAEP Learnings into Wider Council Processes & Communications**

BUILDING EFFICIENCY, RETROFIT & HEAT ACTIONS

Actions that enable the delivery of building efficiency, retrofit and heating interventions. The actions address the decarbonisation of the building stock and position Neath Port Talbot to facilitate decarbonisation benefits for residents.

- **Action 4: Create a Retrofit & Low Carbon Heating Behaviour Change Campaign**
- **Action 5: Develop a Fuel Poverty Programme**
- **Action 6: Develop a Programme to Electrify Public Sector Owned Non-gas Properties**

TRANSPORT ACTIONS

Actions that support transport decarbonisation and the Sustainable Transport Hierarchy. The actions encourage the reduction dependence on personal motorised vehicles, fostering a greener and more accessible transportation landscape.

- **Action 7: Develop Holistic Community Transport Provision in Valley Areas**
- **Action 8: Facilitate Low & Zero Carbon Vehicle Public Fleet Uptake**
- **Action 9: Enhance Active Travel & Public Transport**

GENERATION & NETWORKS ACTIONS

Actions that underscore a commitment to a future-proofed energy system. The county aims to leverage expertise and resources to fortify infrastructure, reduce peak demand and plan for a hydrogen future.

- **Action 10: Continue Collaboration with Electricity & Gas Network Operators**
- **Action 11: Address Future Needs of Hydrogen-Fuelled Vehicles**
- **Action 12: Develop a Support Programme for Community Energy Microgrid Projects**
- **Action 13: Develop a Storage and Flexibility Financial Incentives Programme**

INDUSTRY ACTIONS

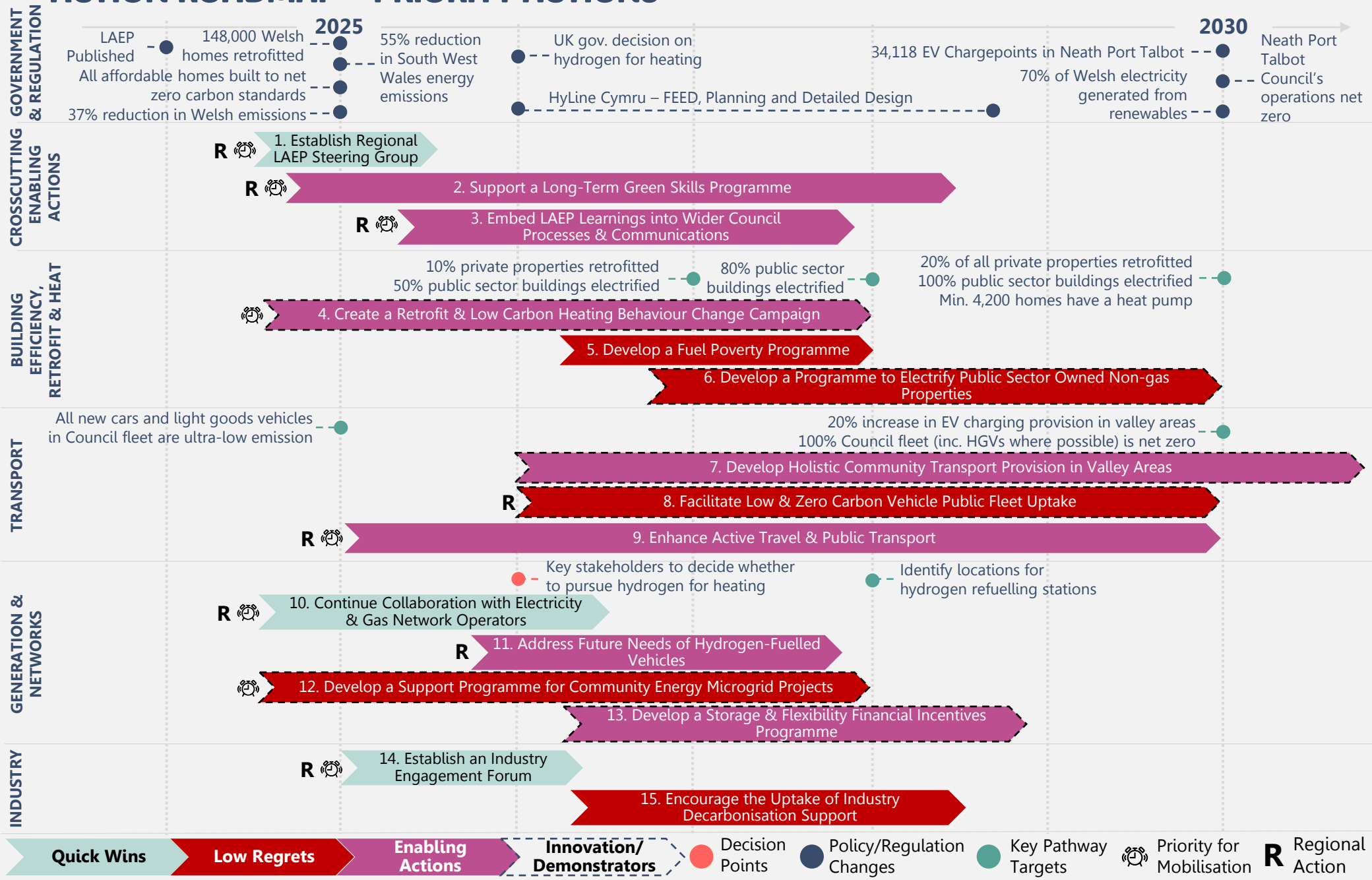
Actions that support the decarbonisation of industry. Neath Port Talbot aims to advance energy-related opportunities, drive innovation, nurture growth, and accelerate the transition to a decarbonised industrial landscape.

- **Action 14: Establish an Industry Engagement Forum**
- **Action 15: Encourage the Uptake of Industry Decarbonisation Support**

Actions intended for regional implementation

Priority for mobilisation

ACTION ROADMAP – PRIORITY ACTIONS



PRIORITY ACTIONS – CROSSCUTTING ENABLING ACTIONS

Action 1: Establish a Regional LAEP Steering Group to Enable the Delivery of LAEP Outcomes

Establish a Regional LAEP Steering Group for effective LAEP action implementation. The group will align actions from the four LAEPs, mobilise and oversee the actions at a programme level, delegate ownership, provide funding support (which is to be aligned with the Regional Directors' Group) and monitoring. Operational support will come from the new regional project management team and the dedicated Regional Energy Team, reporting directly to the influential South West Wales Energy Core Group.

- Establish a regional project management team
- South West Wales-wide
- Develop aim, Terms of Reference, structure and scope
- High Priority
- Align with Regional Directors' Group and Regional Energy Strategy
- Regional Action
- Define roles and responsibilities

Co-benefits

- Promotes synergy, efficiency, and informed decision-making in LAEP implementation
- Fosters collaboration and knowledge exchange

KPIs

- Regional LAEP Steering Group is operational by Q4 2024
- Review of actions conducted by Q1 2025

Short Delivery Timeframe

Action 2: Support Long-Term Green Skills Programme to Enable the Delivery of Decarbonisation Measures

Continue advancing existing skills programmes in Neath Port Talbot, such as the Swansea Bay City Deal's Supporting Innovation and Low Carbon Growth Programme (which Neath Port Talbot Council leads and is actively pursuing funding for a Net Zero Centre of Excellence Skills Academy). The aim is to proactively increase the availability of regional local and in-house expertise for the effective delivery of net zero, from a low carbon and renewable technology perspective.

- Conduct green skills mapping exercise
- South West Wales-wide
- Develop collaborations and partnerships
- High Priority
- Create a prioritised action plan for green skills
- Regional Action
- Expand the Supporting Innovation and Low Carbon Growth Programme

Co-benefits

- Strengthened supply chain
- Local employment opportunities
- Fosters community involvement

KPIs

- Gap analysis complete by Q3 2025
- Action plan by Q3 2026
- First new courses available by academic year 2027/2028

Medium Delivery Timeframe

PRIORITY ACTIONS – CROSSCUTTING ENABLING ACTIONS

Action 3: Embed LAEP Learnings into Wider Council Processes and Communications to Enable the Delivery of LAEP Outcomes

Embed the principles of net zero and LAEP outcomes into Council processes and public communications. This action aims to create a culture of awareness and understanding within the Council, aligning with net zero and LAEP goals. By integrating these outcomes into decision-making processes and public communications, the objective is to drive behaviour change and encourage wider organisations and the community to engage in sustainable practices.

Embedding Within Council Planning

- Create updated climate awareness training
- Establish framework for quantifying carbon impact of decisions and review procurement practices
- Expand support for wider organisations

Embedding Within Public Communications

- Develop a regional climate change communications plan
- Identify prevalent myths and misconceptions related to climate change and net zero (e.g. EVs and heat pumps)
- Develop a myth-busting document

South West Wales-wide

High Priority

Regional Action

Co-benefits

- Reinforces sustainability commitments
- Fosters innovation and leadership
- Encourages support for LAEP outcomes

KPIs

- Awareness training by Q1 2026
- Myth busting document by Q1 2026
- Framework to quantify climate impact implemented by Q3 2026

Short Delivery Timeframe

PRIORITY ACTIONS – BUILDING EFFICIENCY, RETROFIT AND HEAT

Action 4: Create a Behaviour Change Campaign to Increase Uptake of Retrofit and Low Carbon Heating

Develop behaviour change initiatives for residential and commercial properties. The dynamic campaign should be designed to inform, educate and cultivate transformative shifts in behaviour concerning energy efficiency, retrofit practices, and the adoption of low carbon technologies. The initiative should aim to instigate a positive and lasting transformation in behaviour, contributing to a more energy-efficient and environmentally conscious community.

- Prioritise non-gas properties that do not use gas and instead use other polluting fossil fuels
- Collaborate with the Homes as Power Stations project
- Develop targeted communications campaigns
- Move onto on gas properties

Countywide

High Priority

Co-benefits

- Cost savings for consumers
- Health benefits from thermal comfort
- Stimulates the local economy

KPIs

- Campaign developed for non-gas properties by Q3 2025
- Min. 50% non-gas properties informed by Q1 2026
- 10% properties retrofitted by Q1 2028

Medium Delivery Timeframe

Action 5: Develop a Fuel Poverty Programme to Support a Just Transition to Net Zero

Develop a fuel poverty programme that undertakes a fresh review of fuel poverty and affordable warmth levels within Neath Port Talbot. Through this action, Neath Port Talbot aims to build a resilient and inclusive strategy that not only alleviates fuel poverty but also ensures that the net zero transition benefits all members of the community, fostering a sustainable and equitable future.

- Conduct a review of fuel poverty and affordable warmth
- Evaluate the impact of energy markets and the transition to EVs
- Engage with local communities
- Develop programme to ensure vulnerable populations benefit

'At risk' areas in Neath Port Talbot

Co-benefits

- Positive health impacts
- Facilitates a just transition
- Encourages an equal distribution of benefits

KPIs

- Identify specific areas to target by Q4 2026
- Develop programme by Q3 2027
- 100% targeted properties informed by Q4 2027

Short Delivery Timeframe

PRIORITY ACTIONS – BUILDING EFFICIENCY AND HEAT

Action 6: Develop a Programme for the Electrification of Public Sector Owned Non-Gas, Fossil Fuelled Buildings to Increase Uptake of Low Carbon Heating

Develop a funded programme which focuses on the early transition to electrification for non-gas, fossil fuelled buildings that are within a sphere of influence of the council (such as social housing, council owned and other public sector buildings). Through the programme, the council aims to instigate an inclusive electrification strategy that addresses immediate needs and lays the foundation for a sustainable, low-carbon future in the broader community.

- Explore grant opportunities
- Identify priority non-gas, fossil fuelled buildings
- Conduct Energy Audits and evaluate technology suitability
- Develop the programme
- Incorporate a pilot to showcase exemplary electrification

Countywide

Co-benefits

- Improved indoor air quality and health outcomes
- Increased employment opportunities
- Enhanced awareness of environmental responsibility

KPIs

- 100% of energy audits complete by Q3 2027
- 50% buildings electrified by Q1 2027
- Social housing compliance increased to EPC C by Q1 2030

Medium Delivery Timeframe

PRIORITY ACTIONS – TRANSPORT

Action 7: Develop Holistic Community Transport Provision in Valley Areas to Enable Sustainable Rural Travel

Develop plans and projects to initiate holistic community transport provision in rural, valley areas. The aim of this action is to comprehensively address the community's transport needs, therefore fostering a holistic and well-rounded transport provision that enhances accessibility, inclusivity, connectivity, overall community well-being.

Valley areas: (Vale of Neath, Dulais Valley, Afan Valley, Swansea Valley and Upper Amman Valley)

- Engage with the local community to identify needs
- Assess sustainable transport options (minibus, active travel, charger sharing, car schemes)
- Explore synergies with the community energy schemes
- Prepare a plan for enhancing sustainable transport in valley areas

Valley areas

Co-benefits

- Fosters an inclusive transition
- Increased social connectivity
- Less congestion
- Economic benefits for local businesses

KPIs

- Plans produced by Q1 2027
- 20% increase in EV charging provision by Q1 2030
- ≥25% reduction in personal vehicle travel by Q1 2033

Long Delivery Timeframe

Action 8: Facilitate Low and Zero Carbon Vehicle Uptake to Decarbonise Public Fleets

Continue to facilitate the transition to low and zero carbon buses and HGVs in the fleets of Neath Port Talbot Council and other public bodies through a structured programme for fleet transition. This programme should establish a clear roadmap for transitioning public transport fleets, and incorporating strategic milestones, funding exploration, technology testing, collaborative efforts, and community education to ensure an impactful shift towards low and zero carbon options.

- Develop structured programme with clear milestones
- Explore identified funding sources
- Establish pilot schemes
- Enhance collaboration

Countywide

Regional Action

Co-benefits

- Improved air quality
- Drives innovation
- Increased support of public transport

KPIs

- All new cars and LGVs ultra-low emission by Q1 2025
- Structured programme developed by Q3 2025
- Council fleet net zero by Q1 2030

Medium Delivery Timeframe

PRIORITY ACTIONS – TRANSPORT

Action 9: Enhance Active Travel and Public Transport to Reduce Reliance on Personal Motorised Vehicles

Enable active travel initiatives and funding, and enhance public transport to foster a greener and more efficient transportation landscape with reduced reliance on motorised vehicles. The action aims to encompass strategising, advocating, and implementing measures to create a more sustainable and efficient transportation ecosystem.

Enabling Active Travel Initiatives And Funding

- Review the emerging Regional Transport Plan (2025 – 2030) and Active Travel Network Map recommendations
- Develop a funding and resource plan for priority projects
- Facilitate access to national funding in non-urban areas by advocating for:
  - Extension of Active Travel Act to include rural areas, leisure and recreational activities

Countywide

High Priority

Regional Action

Support and Enhance Public Transport

- Review the Regional Transport Plan and develop funding and resource plans for public transport initiatives
- Support the South Wales Metro Project
- Collaborate with local transport providers
- Launch public awareness campaigns

Co-benefits

- Public health benefits due to shift to active travel modes
- Reduced traffic and congestion
- Improved air quality

KPIs

- Extension of Active Travel Guidance requested by Q1 2026
- Campaign launched by Q3 2026
- Census reports ≥25% reduction in personal vehicle travel (for journeys less than 5km) by Q1 2033

Long Delivery Timeframe

PRIORITY ACTIONS – GENERATION AND NETWORKS

Action 10: Collaborate with Electricity and Gas Network Operators to Foster a Robust Future Energy System

Deepen collaboration with NGET, NGED and WWU to catalyse the development of new and reinforced electricity grid infrastructure, and enable planning for gas network reinforcement or removal as early as possible. This entails building on the existing relationship with enhanced ongoing dialogue, improved connections, and streamlined planning processes.

- Appoint permanent dedicated points of contact for all parties
- South West Wales-wide
- Establish a regular forum/working group
- Work collaboratively to mitigate planning and connections bottlenecks
- Establish gas network demand requirements

High Priority

Regional Action

Co-benefits

- Grid resilience (e.g. fewer power cuts and disruptions)
- Improved process for renewables deployment
- Strengthened relationships

KPIs

- Contacts appointed by Q3 2024
- Forum/working group operational by Q1 2025
- Bottlenecks known by Q3 2025

Short Delivery Timeframe

Action 11: Support the Zero Emission Vehicle Infrastructure Strategy to Address Future Needs of Hydrogen-Fuelled Vehicles in the Region

Support the Swansea Bay City Deal project's Zero Emission Vehicle Infrastructure Strategy (ZEVIS), emphasising preparing for the potential adoption of hydrogen-fuelled vehicles. Neath Port Talbot Council is actively engaged with exploring the potential for hydrogen-fuelled vehicles and is adaptable to local, regional and national hydrogen infrastructure demands, to ensure resilience amid hydrogen's evolving landscape.

- Understand support and resource requirements
- HGV suitable locations on the Strategic Road Network
- Explore possible future scenarios
- Develop hydrogen recommendations in collaboration with WWU
- Identify potential target locations for hydrogen refuelling

Regional Action

Co-benefits

- Adaptability to changing technologies and demands
- Economic resilience
- Development of local job opportunities

KPIs

- Requirements understood by Q1 2026
- Station locations identified, weaving in recommendations by WWU by Q1 2027

Short Delivery Timeframe

PRIORITY ACTIONS – GENERATION AND NETWORKS

Action 12: Develop a Support Programme for Community Energy Microgrid Projects to Increase Energy System Resilience & Efficiency

Increase community energy projects by developing a support programme focused on smart, low carbon community energy projects such as rural community microgrid zones. The programme includes setting up and funding a working group to deeply ingrain collaboration with the area's community energy groups. The objective is to cultivate a robust, inclusive, and collective approach tailored to address current and future energy system challenges.

- Set up a working group with community energy groups and organisations
- Explore and secure funding to support the community energy projects
- Identify suitable rural zones for microgrids
- Develop a comprehensive support programme

Countywide

High Priority

Co-benefits

- Local job opportunities
- Reduced cost of energy
- Reduced impact on the electricity grid
- Empowers local communities

KPIs

- Working group set up by Q1 2025
- Zones identified by Q1 2026
- 50% of target microgrid projects complete by Q3 2028

Medium Delivery Timeframe

Action 13: Develop a Storage and Flexibility Financial Incentives Programme to Increase Energy System Resilience

Ascertain funding to develop a Storage and Flexibility Financial Incentives Programme. The programme should be aimed at businesses and residents to encourage the uptake of consumer energy storage systems (e.g., thermal or battery systems) and participation in Demand Side Response to promote flexible energy use. Furthermore, the initiative should be strategically integrated with community energy opportunities to maximise impact.

- Evaluate potential funding sources (such as grants and rebates)
- Design a programme that encourages businesses and residents to invest in storage systems and demand side response (DSR)
- Explore synergies with community energy projects
- Develop outreach initiatives to educate on the benefits of storage systems and DSR

Countywide

Co-benefits

- Enhanced energy resilience
- Increased adoption of low carbon technologies
- Reduction in peak demand, reducing impact on the grid

KPIs

- Programme created by Q4 2026
- Reporting of avoided energy demand or storage by Q3 2027
- 50% of target participation by Q1 2028

Medium Delivery Timeframe

PRIORITY ACTIONS – INDUSTRY

Action 14: Establish an Industry Engagement Forum to Identify and Progress Energy-Related Opportunities

Set up an industry engagement forum group that focuses on electrical and gas network/hydrogen opportunities and challenges from an industrial perspective. The group will aim to integrate with and support existing groups, projects, and decarbonisation plans. Additionally, it will actively identify opportunities for collaboration, innovation, and sustainable growth within the industrial sector, fostering a dynamic and cooperative ecosystem.

- Agree target member organisations
- Define the scope, structure and the Terms of Reference
- Identify opportunities, for integration and alignment
- Identify sources of funding support

Countywide

High Priority

Regional Action

Co-benefits

- Promotes knowledge sharing
- Strengthens strategic alignment
- Future-proofs the industrial sector

KPIs

- Forum operational by Q3 2025
- Opportunities identified by Q1 2026
- Communications mechanism set up by Q3 2026

Short Delivery Timeframe

Action 15: Encourage the Uptake of Decarbonisation Support Programmes to Facilitate the Decarbonisation of Industry

Continue championing the decarbonisation efforts across all sectors of Neath Port Talbot's industries (Light, Medium & Heavy). Propel this initiative through the strategic identification and execution of targeted decarbonisation support (such as the Manufacturing Energy Toolkit and the Supporting Innovation and Low Carbon Growth programme). The aim is to empower diverse industries in their journey towards sustainable manufacturing and decarbonisation.

- Set up a working group to champion industry decarbonisation efforts
- Research existing initiatives and evaluate against industry's needs
- Influence emerging initiatives and programmes
- Collaborate with local stakeholders to encourage adoption of initiatives

Countywide

Co-benefits

- Stimulates investment and economic growth
- Fortifies against future regulations and market shifts
- Enhances reputation

KPIs

- Working group set up Q3 2026
- Communications materials developed by Q3 2027
- 100% of with relevant SIC codes contacted by Q1 2028

Short Delivery Timeframe

NEXT STEPS

This LAEP has set out the transformative steps required to transition Neath Port Talbot's energy system towards achieving net zero carbon emissions by 2050. This was achieved through exploration of various technologies and scenarios employing whole energy systems modelling and analysis. Chapter 4 strategically pinpointed the most cost-effective, preferred pathway to net zero, optimised for maximum local benefits. Chapter 5 articulated the required interventions and necessary pace of change to align with the Net Zero Pathway. Finally, Chapter 6 detailed 15 priority actions that are recommended for near-term mobilisation.

To mobilise the actions, the following key next steps have been identified.

1. Regional Review

Neath Port Talbot, Carmarthenshire, Swansea, and Pembrokeshire Councils intend to collaboratively conduct a comprehensive regional review of the four LAEPs. This involves examining individual actions, identifying opportunities for integration, and determining actionable items that can be effectively mobilised at a regional level.

The actions intended for regional level implementation are shown on the right.

Action 1: Establish a Regional LAEP Steering Group
Action 2: Support a Long-Term Green Skills Programme
Action 3: Embed LAEP Learnings into Wider Council Processes & Communications

Action 8: Low/Zero Carbon Vehicle Public Fleet Uptake
Action 9: Enhance Active Travel & Public Transport

Action 10: Collaborate with Electricity & Gas Network Operators
Action 11: Address Future Needs of Hydrogen-Fuelled Vehicles

Action 14: Establish an Industry Engagement Forum

2. Prioritisation

The next step to mobilise is the establishment of a Regional LAEP Steering Group, a pivotal step that will enable the implementation of all other actions and associated projects.

Using the Actions Roadmap as a base, the group will assess and develop a phased delivery plan to optimise impact and foster a holistic approach. Actions that are recommended for priority mobilisation are shown on the right.

Action 1: Establish a Regional LAEP Steering Group
Action 2: Support a Long-Term Green Skills Programme
Action 3: Embed LAEP Learnings into Wider Council Processes & Comms

Action 4: Create a Retrofit & Low Carbon Heating Campaign

Action 9: Enhance Active Travel & Public Transport

Action 10: Collaborate with Electricity & Gas Network Operators
Action 12: Support Programme for Community Energy Microgrid Projects

Action 14: Establish an Industry Engagement Forum

3. Collaboration

The Regional LAEP Steering Group will operate at a portfolio level, strategically overseeing actions. While the group may take ownership of certain actions, not all actions will fall under its purview. Instead, it will delegate ownership to appropriate parties. To initiate this, engagements with key stakeholders for each action (see Technical Annex) are essential. The collaborative determination of action owners is integral to this process.

4. Funding & Resource

Although the Council is best placed to facilitate the implementation of the LAEP, support is needed from Welsh Government, public and private sector organisations, academia and the public to successfully deliver on the identified actions. Once ownership is identified the next step is to develop funding and resource plans for each action and to align political aims to reach net zero by 2050 across all sectors.

7. REFERENCES

REFERENCES

Chapter 1: Executive Summary

1. Welsh Government, 2021. *Net Zero Wales.* [Online] Available at: https://gov.wales/net-zero-wales
2. Neath Port Talbot Council, 2023. *Strategic Change Programme: Working in Partnership for Our People, Our Places and Our Planet*. [Online] Available at: https://www.npt.gov.uk/media/18727/strategic-change-programme-2023-2024-final-accessible.pdf?v=20230714164740
3. Welsh Government, 2021. *Net Zero Wales Carbon Budget 2 (2021-25).* [Online] Available at: https://www.gov.wales/net-zero-wales-carbon-budget-2-2021-2025
4. Welsh Government, 2021. *Llwybr Newydd The Wales Transport Strategy 2021* [Online] Available at: https://www.gov.wales/sites/default/files/publications/2021-03/llwybr-newydd-wales-transport-strategy-2021-full-strategy_0.pdf
5. Welsh Government, 2022. *Regional energy strategy: South West Wales*. [Online] Available at: https://www.gov.wales/sites/default/files/publications/2022-04/regional-energy-strategy-south-west-wales.pdf
6. Neath Port Talbot Council, 2020. *Zero Emissions Fleet Transition Plan.* [Online] Available at: https://democracy.npt.gov.uk/documents/s72502/DWG%20APPENDIX%20A%20-%20Fleet%20Transition%20Plan.pdf
7. Neath Port Talbot Council, 2023. *Zero Emissions Vehicle and Infrastructure Strategy Fleet* [Online] Available at: https://democracy.npt.gov.uk/documents/s93595/SB%20NPT%20ZEVIS%20Doc%201023.pdf
8. Neath Port Talbot Council, 2023. *Replacement Local Development Plan (RLDP) 2023-2038.* [Online] Available at: https://beta.npt.gov.uk/planning-and-building-control/planning-policy/replacement-local-development-plan-rldp-2023-2038/

Chapter 1: Executive Summary

9. Neath Port Talbot Council, 2020. *The Neath Port Talbot Decarbonisation and Renewable Energy Strategy*. [Online] Available at: https://www.npt.gov.uk/media/16358/dare-the-neath-port-talbot-decarbonisation-and-renewable-energy-strategy.pdf?v=20211207133732
10. Department for Business, Energy & Industrial Strategy. 2022. UK Local Authority and Regional Greenhouse Gas Emissions National Statistics, 2005 to 2020: 2005 to 2020 UK local and regional greenhouse gas emissions – data tables (Excel). [Online] Available at: https://www.gov.uk/government/ statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2020
11. Department for Business, Energy & Industrial Strategy. 2022. *Total Final Energy Consumption at Regional and Local Authority Level: 2005 to 2020: Subnational total final energy consumption statistics: 2005 to 2020.* [Online] Available at: https://www.gov.uk/ government/statistics/total-final-energy-consumption-at-regional-and-local-authority-level-2005-to-2020

Chapter 2: Introduction

1. Energy Systems Catapult, 2021. *The future of local area energy planning in the UK.* [Online] Available at: https://es.catapult.org.uk/report/the-future-of-local-area-energy-planning-in-the-uk/
2. Energy Systems Catapult. 2022. *Guidance on creating a Local Area Energy Plan*. [Online] Available at: https://es.catapult.org.uk/guide/guidance-on-creating-a-local-area-energy-plan/
3. Welsh Government, 2021. *Net Zero Wales Carbon Budget 2 (2021-25).* [Online] Available at: https://www.gov.wales/net-zero-wales-carbon-budget-2-2021-2025
4. HM Government, 2021. *Net Zero Strategy: Build Back Greener.* [Online] Available at: https://www.gov.uk/government/publications/net-zero-strategy

REFERENCES

Chapter 3: Local Context and Energy System

1. Office for National Statistics, 2021. *Counties (May 2021) EN BFC.* [Online] Available at: https://geoportal.statistics.gov.uk/datasets/counties-may-2021-en-bfc-1/explore
2. Varbes, 2023. *Population of Neath Port Talbot.* [Online] Available at: https://www.varbes.com/population/neath-port-talbot-population
3. Neath Port Talbot Council, 2023. *Replacement Local Development Plan (RLDP) 2023-2038.* [Online] Available at: https://beta.npt.gov.uk/planning-and-building-control/planning-policy/replacement-local-development-plan-rldp-2023-2038/
4. Office for National Statistics, 2021. *Labour Market Profile - Neath Port Talbot.* [Online] Available at: https://www.nomisweb.co.uk/reports/lmp/la/1946157394/report.aspx#tabrespop
5. Welsh Government, 2021. *Fuel poverty modelled estimates for Wales (headline results): as at October 2021.* [Online] Available at: https://www.gov.wales/sites/default/files/pdf-versions/2022/6/3/1656514056/fuel-poverty-modelled-estimates-wales-headline-results-october-2021.pdf.
6. Welsh Government, 2021. *Net Zero Wales Carbon Budget 2 (2021-25).* [Online] Available at: https://www.gov.wales/net-zero-wales-carbon-budget-2-2021-2025
7. HM Government, 2021. *Net Zero Strategy: Build Back Greener.* [Online] Available at: https://www.gov.uk/government/publications/net-zero-strategy
8. Welsh Government, 2023. *Wales aims to meet 100% of its electricity needs from renewable sources by 2035.* [Online] Available at: https://www.gov.wales/wales-aims-meet-100-its-electricity-needs-renewable-sources-2035.

Chapter 3: Local Context and Energy System

9. Welsh Government, 2021. *Llwybr Newydd The Wales Transport Strategy 2021* [Online] Available at: https://www.gov.wales/sites/default/files/publications/2021-03/llwybr-newydd-wales-transport-strategy-2021-full-strategy_0.pdf
10. Welsh Government, 2015. *Well-being of Future Generations (Wales) Act 2015: the essentials.* [Online] Available at: https://www.gov.wales/well-being-future-generations-act-essentials
11. Welsh Government, 2022. *Regional energy strategy: South West Wales.* [Online] Available at: https://www.gov.wales/sites/default/files/publications/2022-04/regional-energy-strategy-south-west-wales.pdf
12. Swansea Council, 2022. *South West Wales Regional Economic Delivery Plan.* [Online] Available at: https://swansea.gov.uk/regionaleconomicdeliveryplan
13. Wales and West Utilities , 2022. *Major hydrogen pipeline planned to decarbonise Welsh industry.* [Online] Available at: https://www.wwutilities. co.uk/news-and-blog/major-hydrogen-pipeline-planned-to-decarbonise-welsh-industry/
14. Neath Port Talbot Council. Strategic Change Programme: Working in Partnership for Our People, Our Places and Our Planet . [Online] 2023. https://www.npt.gov.uk/media/18727/strategic-change-programme-2023-2024-final-accessible.pdf?v=20230714164740.
15. Neath Port Talbot Council. May 2020. *Decarbonisation and Renewable Energy Strategy.* [Online] Available at: https://www.npt.gov.uk/media/13541/dare-strategy-may-20.pdf?v=20200522162830.
16. Welsh Government, 2018. *Energy Generation in Wales 2017 in 5 minutes.* [Online] Available at: energy-generation-2017-graphical-summary.pdf (gov.wales)

REFERENCES

Chapter 3: Local Context and Energy System

17. Neath Port Talbot Council, 2022. Recover, Reset, Renew Corporate Plan 2022-2027. Available at: https://www.npt.gov.uk/media/17199/corporate-plan-2022-27-recover-reset-renew.pdf?v=20220422124059.

18. Neath Port Talbot Council, 2020. *Zero Emissions Fleet Transition Plan.* [Online] Available at: https://democracy.npt.gov.uk/documents/s72502/DWG%20APPENDIX%20A%20-%20Fleet%20Transition%20Plan.pdf.

19. Swansea Bay City Deal, n.d. *About.* [Online] Available at: https://www.swanseabaycitydeal.wales/about/

20. Swansea Bay City Deal, n.d. *Homes as Power Stations.* [Online] Available at: https://www.swanseabaycitydeal.wales/projects/homes-as-power-stations/

21. Swansea Bay City Deal, n.d. *Supporting Innovation and Low Carbon Growth.* [Online] Available at: https://www.swanseabaycitydeal.wales/projects/supporting-innovation-and-low-carbon-growth/

22. Welsh Government, 2023. *Wales' new freeports unveiled.* [Online] Available at: https://www.gov.wales/wales-new-freeports-unveiled

23. GOV.UK 2023. *Welsh steel's future secured as UK Government and Tata Steel announce Port Talbot green transition proposal.* [Online] Available at: https://www.gov.uk/government/news/welsh-steels-future-secured-as-uk-government-and-tata-steel-announce-port-talbot-green-transition-proposal

24. Department for Business, Energy & Industrial Strategy. 2022. *UK Local Authority and Regional Greenhouse Gas Emissions National Statistics, 2005 to 2020: 2005 to 2020 UK local and regional greenhouse gas emissions – data tables (Excel).* [Online] Available at: https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2020

Chapter 3: Local Context and Energy System

25. Department for Business, Energy & Industrial Strategy. 2022. *Total Final Energy Consumption at Regional and Local Authority Level: 2005 to 2020: Subnational total final energy consumption statistics: 2005 to 2020.* [Online] Available at: https://www.gov.uk/ government/statistics/total-final-energy-consumption-at-regional-and-local-authority-level-2005-to-2020

26. Department for Business, Energy & Industrial Strategy. 2022. *UK road transport energy consumption at regional and local authority level, 2005 to 2020: Sub-national road transport fuel consumption statistics, 2005-2020 (Excel).* [Online] Available at: https://www.gov.uk/government/statistics/uk-road-transport-energy-consumption-at-regional-and-local-authority-level-2005-to-2020

27. Department for Transport. 2023. *Vehicle Licensing Statistics Data Tables: VEH0142: Licensed plug-in vehicles (PiVs) at the end of the quarter by body type, fuel type, keepership (private and company) and upper and lower tier local authority: United Kingdom* [Online] Available at: https://www.gov.uk/government/statistical-data-sets/vehicle-licensing-statistics-data-tables

28. Department for Business, Energy & Industrial Strategy. 2022. *LSOA Estimates of Properties not Connected to the Gas Network: LSOA estimates of properties not connected to the gas network 2015 to 2021.* [Online] Available at: https://www.gov.uk/government/statistics/lsoa-estimates-of-households-not-connected-to-the-gas-network

29. Department for Business, Energy & Industrial Strategy. 2023. *Regional and Local Authority Electricity Consumption Statistics: Sub-national electricity consumption statistics 2005 to 2021..* [Online] Available at: https://www .gov.uk/government/statistics/regional-and-local-authority-electricity-consumption-statistics

REFERENCES

Chapter 3: Local Context and Energy System

30. Department for Business, Energy & Industrial Strategy. 2023. *Regional and Local Authority Gas Consumption Statistics: Sub-national gas consumption statistics 2005 to 2021.* [Online] Available at: https://www.gov.uk/government/statistics/regional-and-local-authority-gas-consumption-statistics

31. Department for Business, Energy & Industrial Strategy. 2022. *Lower and Middle Super Output Areas gas consumption: domestic electricity 2010 to 2021.* [Online] Available at: https://www.gov.uk/government/statistics/lower-and-middle-super-output-areas-gas-consumption

32. Department for Business, Energy & Industrial Strategy. 2022. *Lower and Middle Super Output Areas electricity consumption: LSOA domestic electricity 2010 to 2021.* [Online] Available at: https://www.gov.uk/government/statistics/lower-and-middle-super-output-areas-electricity-consumption

33. NAEI. 2022. *National Atmospheric Emissions Inventory Data: Emissions from NAEI large point sources (2021).* [Online] Available at: https://naei.beis.gov.uk/data/map-large-source

34. Tata Steel, 2021. *Written Evidence Submitted by Tata Steel Europe (HNZ0096).* [Online] Available at: https://committees.parliament.uk/writtenevidence/36262/pdf/

35. Department for Business & Trade. 2023. *Welsh steel's future secured as UK Government and Tata Steel announce Port Talbot green transition proposal. Press release.* [Online] Available at: https://www.gov.uk/government/news/welsh-steels-future-secured-as-uk-government-and-tata-steel-announce-port-talbot-green-transition-proposal

36. Department for Business, Energy & Industrial Strategy. 2022. *Total Final Energy Consumption at Regional and Local Authority Level: 2005 to 2020: Subnational total final energy consumption statistics: 2005 to 2020.* [Online] Available at: https://www.gov.uk/ government/statistics/total-final-energy-consumption-at-regional-and-local-authority-level-2005-to-2020

Chapter 3: Local Context and Energy System

37. Department for Business, Energy & Industrial Strategy. 2022. UK Local Authority and Regional Greenhouse Gas Emissions National Statistics, 2005 to 2020: 2005 to 2020 UK local and regional greenhouse gas emissions – data tables (Excel). [Online] Available at: https://www.gov.uk/government/ statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics-2005-to-2020

38. Department for Energy Security and Net Zero. 2023. *Renewable Energy Planning Database: quarterly extract: Renewable Energy Planning Database (REPD): July 2023.* [Online] Available at: https://www.gov.uk/government/publications/renewable-energy-planning-database-monthly-extract

39. Neath Port Talbot Council. (Forthcoming). *Renewable and Low Carbon Energy Assessment (RLCEA).*

Chapter 4: The Vision

1. National Grid Electricity System Operator, 2023. *Future Energy Scenarios.* [Online] Available at: https://www.nationalgrideso.com/document/283101/ download

2. Senedd Cymru, 2023. *Is the Welsh Government delivering on EV Charging Infrastructure?.* [Online] Available at: https://research.senedd.wales/ research -articles/is-the-welsh-government-delivering-on-ev-charging-infrastructure/

REFERENCES

Chapter 5: Interventions

1. Eyre et al., 2023. *Fabric first: is it still the right approach? Buildings and Cities,* 4(1), p.965 – 972. [Online] Available at: https://doi.org/10.5334/bc.388
2. Stats Wales, 2019. *Welsh Index of Multiple Deprivation*. [Online] Available at: https://statswales.gov.wales/Catalogue/Community-Safety-and-Social-Inclusion/Welsh-Index-of-Multiple-Deprivation
3. Energy Systems Catapult, 2022. *All housing types are suitable for heat pumps, finds Electrification of Heat project.* [Online] Available at: https://es.catapult.org.uk/news/electrification-of-heat-trial-finds-heat-pumps-suitable-for-all-housing-types/
4. Welsh Government, 2021. *The Wales Transport Strategy.* [Online] Available at: https://www.gov.wales/sites/default/files/publications/2021-03/llwybr-newydd-wales-transport-strategy-2021-full-strategy_0.pdf
5. Welsh Government, 2021. *The Electric Vehicle Charging Strategy for Wales.* [Online] Available at: https://www.gov.wales/sites/default/files/publications/2021-03/electric-vehicle-charging-strategy-wales.pdf
6. Neath Port Talbot Council (Forthcoming). *Renewable and Low Carbon Energy Assessment (RLCEA).*
7. Tata Steel, 2024. *Tata Steel's plan for Port Talbot Steelworks*. [Online] Available at: https://www.tatasteeleurope.com/sustainability/green-steel-future-uk
8. SWIC, 2023. *Cluster Plan Report.* [Online] Available at: https://www.swic.cymru/clusterplan-reports
9. Lanzatech, 2023. *Project Dragon*. [Online] Available at: https://www.lanzadragon.wales/

www.cityscience.com

CYNGOR CASTELL-NEDD PORT TALBOT
NEATH PORT TALBOT COUNCIL

CITY SCIENCE
delivering decarbonisation