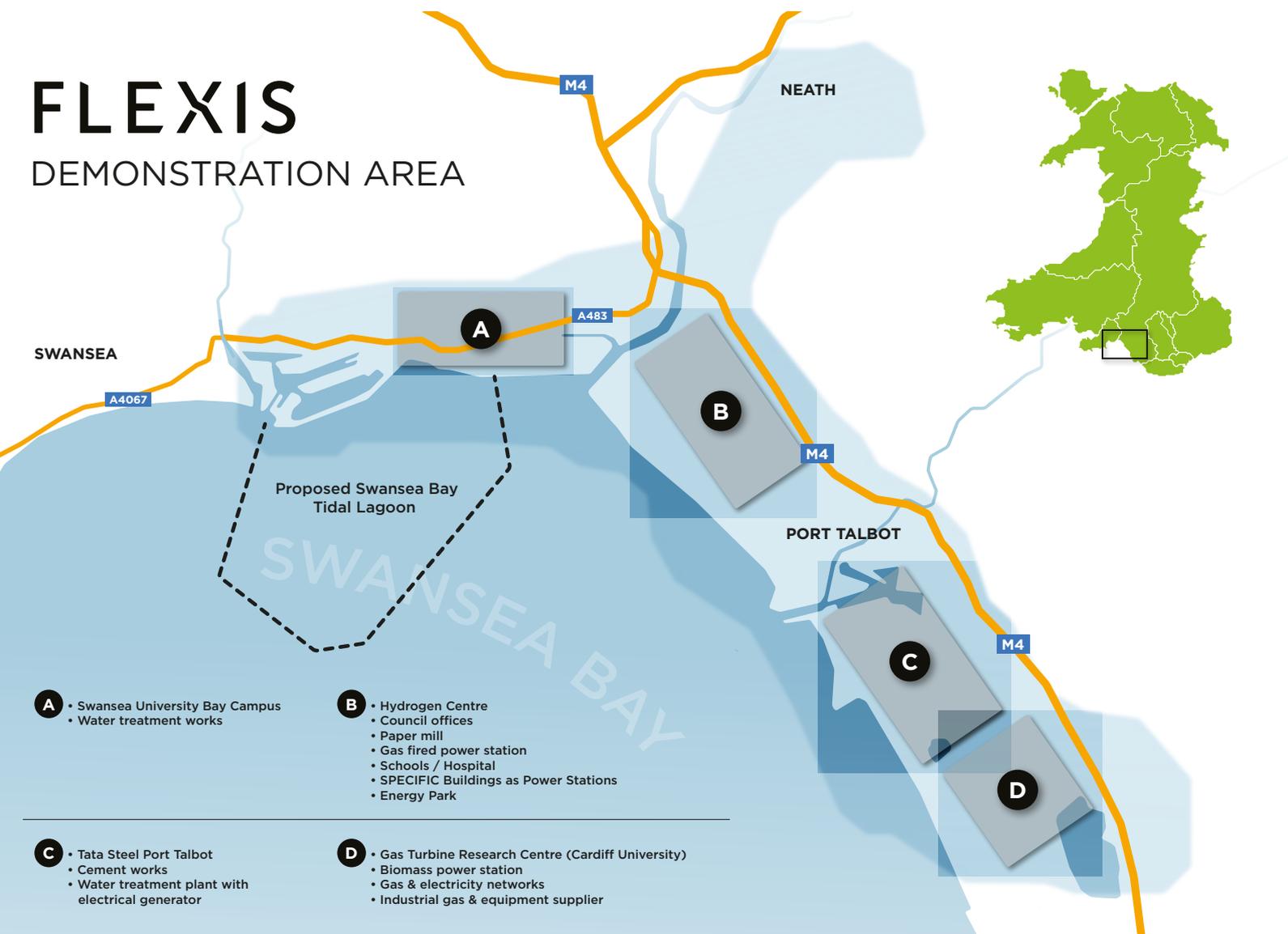


FLEXIS

SMART ENERGY FOR OUR FUTURE
YNNI CALL AR GYFER EI'N DYFODOL

DEMONSTRATION AREA TRACTION PROJECTS

FLEXIS DEMONSTRATION AREA



The FLEXIS Demonstration Area resides in the geographic centre of South Wales and covers an area of more than 50 square kilometers. Created in strategic partnership with Neath Port Talbot Council, the demo area features a unique set of qualities that create the perfect stage for decarbonising energy systems. Its goal is to de-risk decarbonisation solutions by running commercial scale demonstrations and in doing so create a national centre of excellence in the delivery of low carbon technology.

The joint traction projects between Neath Port Talbot Council and FLEXIS will support the demonstration area vision of creating a national centre of excellent in delivering low carbon technology, smart programmes and new applications that provide a multitude of benefits that meet the needs of businesses and residents of Neath Port Talbot. Each of these projects are positioned to have an immediate input contribution to public health and wellbeing, decarbonisation and to stimulate the local economy.

Driven by a Smart Low Carbon Vision

Neath Port Talbot is adopting a smart low carbon approach to address the Energy Trilemma and the Climate Emergency that is driving the world to decarbonise the production and use of energy. The following traction projects will help to identify the necessary steps that can progress Neath Port Talbot toward achieving smart low carbon status.

Core drivers of the traction projects therefore includes decarbonisation but also alleviation of fuel poverty, a focus on localised solutions, creation of a smart energy centre of excellence, generating inward investment and job creation, and to assist the council to become exemplar demonstrators of the Wellbeing of Future Generations Act and Environment Act.

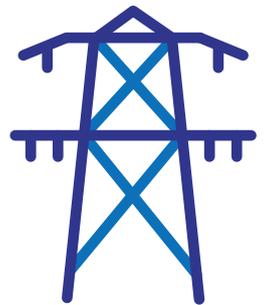
Smart Town Port Talbot



Port Talbot has all the right ingredients to become a national centre of excellence for decarbonisation. This project will identify the steps and programmes needed to be taken by the Council to implement smart local energy systems that will enable Port Talbot to become a Smart Low Carbon Town. The project aims to make use of pioneering digital technologies, including real time sensors and monitoring, the internet of things (IoT) and artificial intelligence. Work will be directed along four key themes: Data and Digitalisation, Decarbonisation, Health and Well-Being, and Commercialisation and Awareness.

Electrical Grid Constraints

Neath Port Talbot County contains the most renewable electricity generation of any county in Wales. It is important to consider how renewable energy generation interfaces with the grid and how to supply that energy to future applications such as electric vehicle charging, energy positive buildings and decarbonised industrial processes. This project will model the electrical grid within the demonstration area and bring together stakeholders from the Council and Network Operators to identify major infrastructure projects that can pave the way for the grid infrastructure of a decarbonised future.



Green Hydrogen for Transport



The Swansea Bay Technology Centre, under construction in the demonstration area, is an energy-positive building – meaning it produces more renewable energy on average than it requires for its own services. This project aims to transport the surplus energy as electricity to the adjacent University of South Wales Hydrogen Centre where it will be used to create green hydrogen fuel. The fuel will supply a fleet of 20 hydrogen vans owned by NPT Council, replacing diesel vehicles. This project will demonstrate the capability for energy positive buildings to power commercial vehicles, unlocking new ways for businesses to decarbonise their fleets.

Electric Vehicle Charging Strategy



Electric Vehicle technology, adoption and business models are rapidly evolving. An informed strategy is required to ensure that investments made today are ready to integrate with the EV landscape of tomorrow. This project will deliver an EV charging strategy that considers the current and future state of renewables, grid infrastructure and vehicle use both public and commercial. The project will focus on the unique landscape within Neath Port Talbot including heavy industry, return to home fleets, residential areas, M4 motorway corridor and significant local power generation capabilities with the potential to trial physical charging sites.

Mine Water Heat Recovery

Neath Port Talbot has centuries of mining heritage and today is the home to many historical coal mines. Some of these mines have potential to provide a source of zero-carbon geothermal energy. Activity will culminate around the opportunity to create a zero-carbon visitor centre at the Cefn Coed Colliery Museum, recently designated a Discovery Gateway by the Welsh Government, that will seek to maximise the application of energy and renewable technologies throughout the operation of the site. Mine water heat recovery at Cefn Coed will build upon the existing pilot scheme located in close vicinity at neighbouring Crynant.



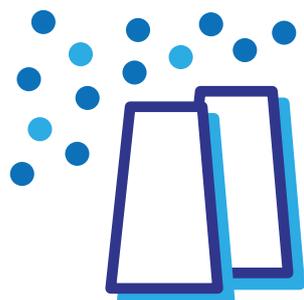
Real Time Energy Monitoring



The Council operate a portfolio of large buildings within the demonstration area. The aim of this project is to utilise cloud-connected monitoring and analysis to make effective and efficient changes to reduce the energy demand of the top 20% of the building portfolio. Interfacing with automatic metering and building management systems (BMS) will allow the aggregation of 'day plus one' data so that procedures and protocols can be put into place for an immediate decarbonisation as well as a long term understanding of how certain protocols influence energy demand.

Air Quality Monitoring

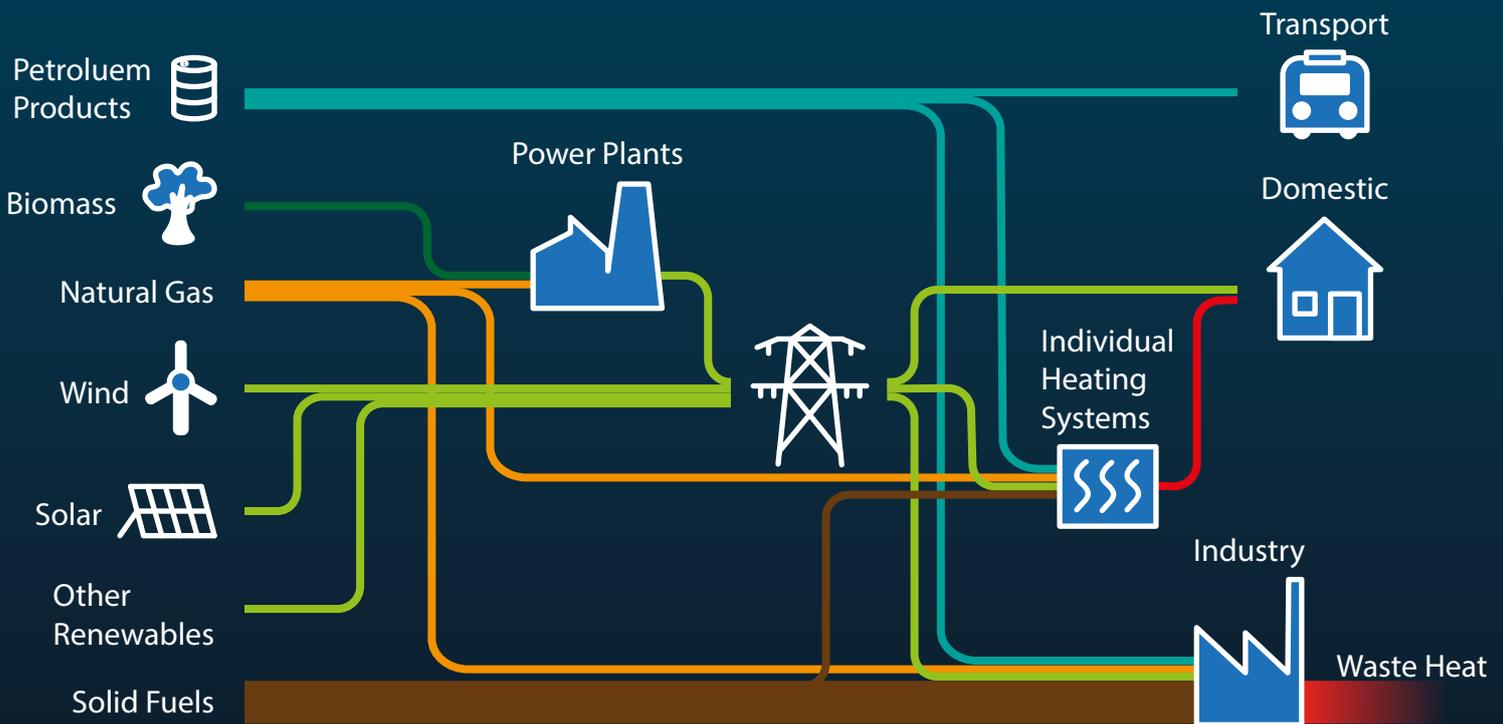
Air quality and decarbonisation are intrinsically linked as the combustion of traditional fuels to provide energy is a major cause of air pollution. Transportation, industrial processes, and the generation of heat and electricity all play a role in reducing air quality. This project will leverage the latest developments in the Internet of Things to deploy an area-wide monitoring scheme built from a mesh of approximately 100 wireless connected air quality sensors with an aim to better inform air quality strategy and provide detailed insight into the effectiveness of different intervention techniques.



Modelling Energy Flows Using a Multi Vector Approach

The traction projects act as a pathfinder for achieving a decarbonised society and way of life. As well as contributing to zero-2050 targets, they also provide a perfect opportunity to measure and understand how smart low carbon technologies impact local energy systems. By leveraging data from the traction projects and further sources, the demonstration area becomes a powerful living laboratory for research and innovation.

Understanding how energy flows and characterising where and when it is produced and consumed is vital to developing a smart low carbon approach - data is key to that understanding.



Using Data to Drive Decisions

FLEXIS will build a multi vector energy model of the Demonstration Area, sometimes referred to as a 'Digital Twin', providing unprecedented insight into how low carbon energy systems perform and integrate with the real world. This will provide an exciting opportunity to improve resource efficiencies, increase the flexibility of energy networks, reduce CO2 emissions, and support regional development by attracting new research and innovation funding to Wales.

