Smart strategies for the transition in coal intensive regions

Project No: 836819

Factsheet:

Closed mine vs. Landscape with wind farms, Wales, UK

SEPTEMBER 2019

Description

Until the mid-19th century, the valleys of South Wales were less inhabited. The industrialization of the valleys occurred in two phases. From 1850 until the outbreak of World War I, South Wales Coalfield was developed to provide coal for steam and anthracite. Extracted coal was transported south by rail and canal to Cardiff, Newport and Swansea. Cardiff immediately became one of the most important coal ports in the world. The transformation of valleys into mining sites, with underground and up-to-date mining, but also tailings dumps, has contributed to the creation of an industrial landscape on all the valleys of South Wales that can still be seen today. After the closure of the mining activity in the southern part of Wales, it had to adapt to the conditions and restructure its profile to adapt to the situation in the energy sector. The energy transition strategy of Wales had several stages:

- mine closure (the 1980 decline, which began with the 1984 mining strike, which will be progressively closed from 1988 until now);

- former abandoned sites, have been redesigned and redesigned for new housing, industry and commerce, tourism;

- the lands affected by the mining have been cleaned, on some there have been installed resin forests, others have been transformed into pastures, sometimes the contrast between the urban valleys, the ex-industrial ones and those in the process of transition is still observed;

- houses with terraces and old waste dumps have been preserved in the middle of the landscape, which are now part of the world heritage;

- from 2015 on the plateau of the mountain landscape, otherwise devoid of development, pillars and wind turbines began to appear;

- large-scale generation of offshore energy (projects of 350 MW or less in Welsh territorial waters) and onshore type - planning of local authorities (projects for generating sub-stations up to 350 MW and distribution networks up to 132 kV).

Achievements

1. Location: Wales, UK.

2. Type of action: conversion of a mining site into a wind farm (Onshore wind farm) that develops and services new energy systems (for the supply of heat and electricity) and to build intelligent systems in Wales.

3. Actors: Vattenfall

4. Financing conditions: Public investments, state subsidies, electricity and thermal power tariffs

5. Fund(s): The community fund was set up by the Vattenfall energy company for the benefit of the communities that host the wind farm in and along the Neath, Afan, Rhondda and Cynon valleys.

The fund has an annual budget of 1.8 million pounds by 2043 and provides an amazing opportunity for locals to invest in themselves and their ideas - based on what is best in their communities. An independent, non-profit, community-based company with a local purpose manages the fund.

The valleys in South Wales are home to about 30% of the Welsh population, although this is slowly declining due to emigration, especially from the upper valleys. The area is less diverse than the rest of the country, with a relatively large proportion of residents (over 90% of Blaenau Gwent and Merthyr Tydfil) born in Wales. The valleys suffer from a number of socio-economic problems. The educational level in the valleys is low, with a large proportion of people having few or no qualifications. A large proportion of people report a limited long-term

health problem, especially in the Upper Valley. In 2006, only 64% of the working age population in Heads of Valleys was employed, compared to 69% in the Lower Valley and 71% in the whole of Wales.

A relatively large number of locals are engaged in production, health and social services. Less work in managerial or professional occupations and more in elementary occupations, compared to the rest of the country. A large number of people commute to Cardiff, especially in Caerphilly, Torfaen and Rhondda Cynon Taf. Although Cardiff's rail network is extensive, train times and frequencies beyond Caerphilly and Pontypridd hinder the development of a significant transport market to downtown jobs. However, the area benefits from a local landscape described as „*amazing*", improving road connections such as the modernized A465 and public investments in regeneration initiatives.

Pen y Cymoedd Wind Park is a land-based one in Neath Port Talbot and Rhondda Cynon Taf, South Wales, UK. With an installed capacity of 228 MW, it is the largest onshore wind farm in England and Wales.

Pen y Cymoedd is the leading wind farm in South Wales. Its 76 turbines can produce enough electricity to power 15% of Welsh homes annually. In addition to fossil-free electricity production, a 22 MW battery is co-located at the wind farm. The battery is capable of responding to the needs of the grid system in less than a second - supporting a stable supply of electricity for UK homes. Electric vehicle charging stations are also installed in the wind farm, being prepared to power the entire fleet of electric vehicles in the next four years.

The construction of the project started in February 2014, and was completed in the second quarter of 2017. The construction phase involved the creation of new jobs and over 1,000 workers were employed. The wind farm was officially inaugurated on September 28, 2017 and began producing electricity for the first time in the fall of 2018. The plant has an operational life of 25 years and generates enough electricity to power 1,88,000 homes per year.

Energy Minister Charles Hendry advanced the Pen Y Cymoedd wind project, made up of 76 turbines. The wind farm built between Neath and Aberdare has the highest generation capacity of any wind power plant in England and Wales. Vattenfall, the developer behind the project, claims it will generate enough electricity to power the equivalent of up to 206,000 homes a year.

The transmission infrastructure of the wind farm included two new stations connected with 9.2 km of underground cables. The electricity produced by the turbines in the hill is increased from 33kV to 132kV by the Pen y Cymoedd station. The second sub-station at Rhigos further increases the voltage up to 400kV for introduction into the new National Grid station via the airlines. At the hill, station on the Pen Y Cymoedd hill 132kV compact hybrids switch and switch device (PASS) was installed. The station is also equipped with voltage sources, converter-based reactive power compensation units, called PCS 6000 STATCOM, to support network voltage stability using variable reactive power during voltage fluctuations. Both stations were supplied with automatic equipment that complies with the international standard IEC 61850 for communications in stations for the protection, control and efficient monitoring of the electricity flow.

A Jones Bros and Balfour Beatty Joint Undertaking (50:50) received a civil and electrical infrastructure supply contract for the wind farm in October 2013. Siemens was selected to supply and install direct drive turbines for the wind farm. Siemens provides services and maintains the wind farm in the operational phase, based on a five-year service agreement. ABB was responsible for providing the network connection and the provision of the related transmission infrastructure.

Onshore wind plays an important role in improving energy security in Wales. It is the cheapest form of renewable energy and reduces the dependency of Welsh on foreign fuel. This project in South Wales will generate large amounts of renewable electricity and will provide a significant benefit package for the local community.

Challenges

Pen-y-Cymoedd will increase Wales' momentum for carbon reduction, accelerate Vattenfall's move towards renewable wind energy to avoid using fossil fuels and which will help the Welsh economy to grow and become sustainable. The developer has also committed to a community benefit package worth over £ 55 million over the lifetime of the development, including £ 3 million for habitat management and £ 6,000 per megawatt at Community Trust Fund.The Welsh government wants 70% of electricity to come from renewable sources by 2030, up from the current rate of 32%. Locals in South Wales know that they must stop using fossil fuels. It must analyze all the technologies that appear on the market to ensure that it is part of the decarbonisation process. The Pen-y-Cymoedd wind farm was created in response to the potential effects of mining on the environment in order to protect the future extraction of coal.

Wind power creates jobs in local communities. One such example is the Pen y Cymoedd wind power project in southern Wales. Just one year after the project started, Vattenfall, with strong support from Welsh businesses, has signed contracts with local community businesses of over 45 million pounds, providing 600 jobs and supporting over 50 companies. With a life expectancy of twenty-five years, the project is expected to inject up to £ 1 billion to the Welsh economy. In addition to the economic impetus of the supply chain, the Pen y Cymoedd project will also benefit local communities of around 1.8 million pounds a year through a community fund. A recent campaign from Vattenfall known as „Power in the valleys" asked local people how the fund can make a major difference in the area. In addition, Vattenfall has funded the construction of a 350,000pound mountain bike trail through the Afan Forces Park and has pledged to fund its maintenance for the next decade. Louise Davies, manager at Afan Lodge, says, „the tourism industry in the Afan Valley is very young, and this investment and the publicity we get from it will be invaluable". Jobs created in a sustainable local economy can be found in supplies, logistics, and facilities such as schools, local retail and tourism. Offshore wind energy also stimulates local economies in coastal areas of Europe, where numerous jobs in service and maintenance have been created (EWEA).

Within the National Museum Wales is one of the most outstanding museums: the Big Pit National Coal Museum. There, surface and underground tours are organized, visiting the objectives of the Mining Galleries, the Pithead Baths and other historical buildings. Mining Galleries Pithead Baths Historic colliery buildings. Through the experience offered, the slogan displayed on the site is fully deserved: „King Coal: The Mining Experience at Big Pit".

Another adventure offered by the famous Zip World Slate Caverns is Bounce Under, „undoubtedly one of the truly distinct and unique activities that have put North Wales on the world map." The gigantic underground caves, the defunct Llechwedd slate mines are filled with six levels of trampolines, slides and nets. It is an impressive underground experience, due to the wild and diverse landscape. A Victorian slate mine near the town of Blaenau Ffestiniog in Snowdonia National Park is the first underground trampoline in the world.

The third adventure on offer at Zip World Slate Caverns is Bounce Below, undoubtedly one of the truly distinct and unique activities that have put North Wales on the world map. Gigantic underground caves, the disused Llechwedd Slate Mines are filled with six levels of trampolines, slides and nets. You will head deeper and deeper underground for a truly mind-blowing experience-something that is possible because of North Wales's phenomenally diverse and wild landscape.

A Victorian slate mine close to the town of Blaenau Ffestiniog was once where miners wielded hammers and chisels to eke out a hard living from the rock. Today, it is home to the world's first subterranean trampoline.


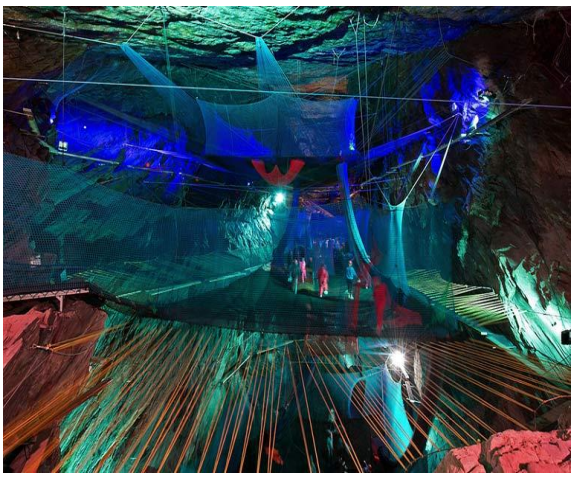

Figure 1: Bounce Below, Zip World Slate Caverns, North Wales, UK

(source: http://blog.theroyalvictoria.co.uk/things-to-do/north-wales-in-a-weekend-adventure/)

- 10,000 FTE jobs per annum supported across Wales during a notional 15-year implementation period;

- the creation of around £2.2bn in Welsh GVA;

- savings to householders of at least £350 on their annual combined energy bill;

By 2035, Wales aims to achieve its goals (IWA, 2019, p.12):

- 100% renewable electricity, i.e. 11,085 MW of renewable energy + energy efficiency measures to 870,000 homes;

- 20,150 jobs annually across Wales during a 15-year investment period (2020-2035);

- + £ 7.4 be in total Welsh GVA created.

Enabling conditions

The availability of funding proved to be the key to the success of the activities in South Wales.

1. The potential value of the marine portfolio in Wales should be seen as an asset to the UK system, with investments from the public to facilitate its development. In addition, Wales needs to develop its marine licenses to allow proportionate and timely consent for „*implementation and monitoring*" in support of renewable pilots.

Our Re-energising Wales evidence estimated a potential of at least 4,000 MW of renewable electricity from the tidal range, tidal stream, wave and floating wind sectors alone in Wales up to 2035.

Based on this 4,000MW figure Wales could see:

- investment of nearly £6bn in Wales in the tidal range, tidal stream and wave sectors alone over a notional 'construction plus 15 years operation' period up to 2035;

- at least 5,200 annual full-time equivalent (FTE) jobs in Wales in the tidal range, tidal stream and wave sectors alone up to 2035;

- nearly £3bn of gross value added in Wales across the development and operational period in the tidal range, tidal stream and wave sectors alone up to 2035;

- a first commercial 100MW floating wind array in Pembrokeshire, leading to further „multi-GW" roll out. (IWA, 2019, p. 39)

The potential value of the marine portfolio in Wales should therefore be viewed as a UK system-wide asset with investment from the public to facilitate its development. Wales also needs to develop its marine licensing to allow proportionate and timely consent to 'deploy and monitor' in support of renewable pilots.

2. Welsh Government policy should require local authorities to offer 50% business rate relief on the community percentage of shared ownership projects, and a sliding scale of business rate relief for the developer proportionate to the community share. For example, if the community share were 15% then the developer would get 15% business rate relief. Non-domestic (business) rates are normally assessed every five years, and the next revaluation is due in 2022. To achieve the required increase in shared ownership, this rate relief should be in place before 2020 and guaranteed for at least 10 years to provide certainty in financial modelling. To achieve this, Welsh Government should undertake an extra-ordinary business rates review during 2019 to mitigate the loss of subsidy for renewable projects.

3. The planning system plays a key role in the decarbonisation of our energy system and the ability of communities to develop projects and own generation assets in their area. Planning Policy Wales Edition 10 now gives material weight to social, environmental and economic benefits associated with renewable energy developments in Wales and supports shared ownership, a very positive development.

4. Increasing partnership projects and preserving benefits in Wales by owning community and local property.

References and further links

Amgueddfa Cymru – National Museum Wales in 2017. available www.museum.wales

Big Pit National Coal Museum, https://museum.wales/museumcare/bigpit/

Institute of Welsh Affairs (IWA), Re-energising Wales: A plan for Wales' renewable energy future, https://www.iwa.wales/wp-content/uploads/2019/03/IWA_Energy_WP6_Digital-2.pdf

Mills, R., A giant underground trampoline has opened in a cave in Wales, https://www.roughguides.com/article/a-giant-underground-trampoline-has-opened-in-a-cave-in-wales/

The European Wind Energy Association (EWEA), www.ewea.org

https://www.power-technology.com/projects/pen-y-cymoedd-wind-farm-south-wales/

http://www.climateaction.org/news/uk_gives_green_light_to_299_mw_welsh_wind_farm

https://www.sciencedirect.com/science/article/pii/S0301421517302537

http://www.towerregeneration.co.uk/history/

https://www.researchgate.net/figure/Past-Energy-Landscapes-The-Upper-Rhondda-Fawr-valley-looking-south-towards-Treherbert_fig2_316374062

https://storieseverydaylives.wordpress.com/2016/05/24/community-futures-and-utopia-three-days-in-ynysybwl/

http://www.assembly.wales/laid%20documents/cr-ld10610/cr-ld10610-e.pdf

https://naturalresources.wales/media/682625/nlca37-south-wales-valleys-description-1.pdf

https://penycymoeddcic.cymru/home/

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 836819. The sole responsibility for the content of this report lies with the authors.