RenewableUK CYMRU

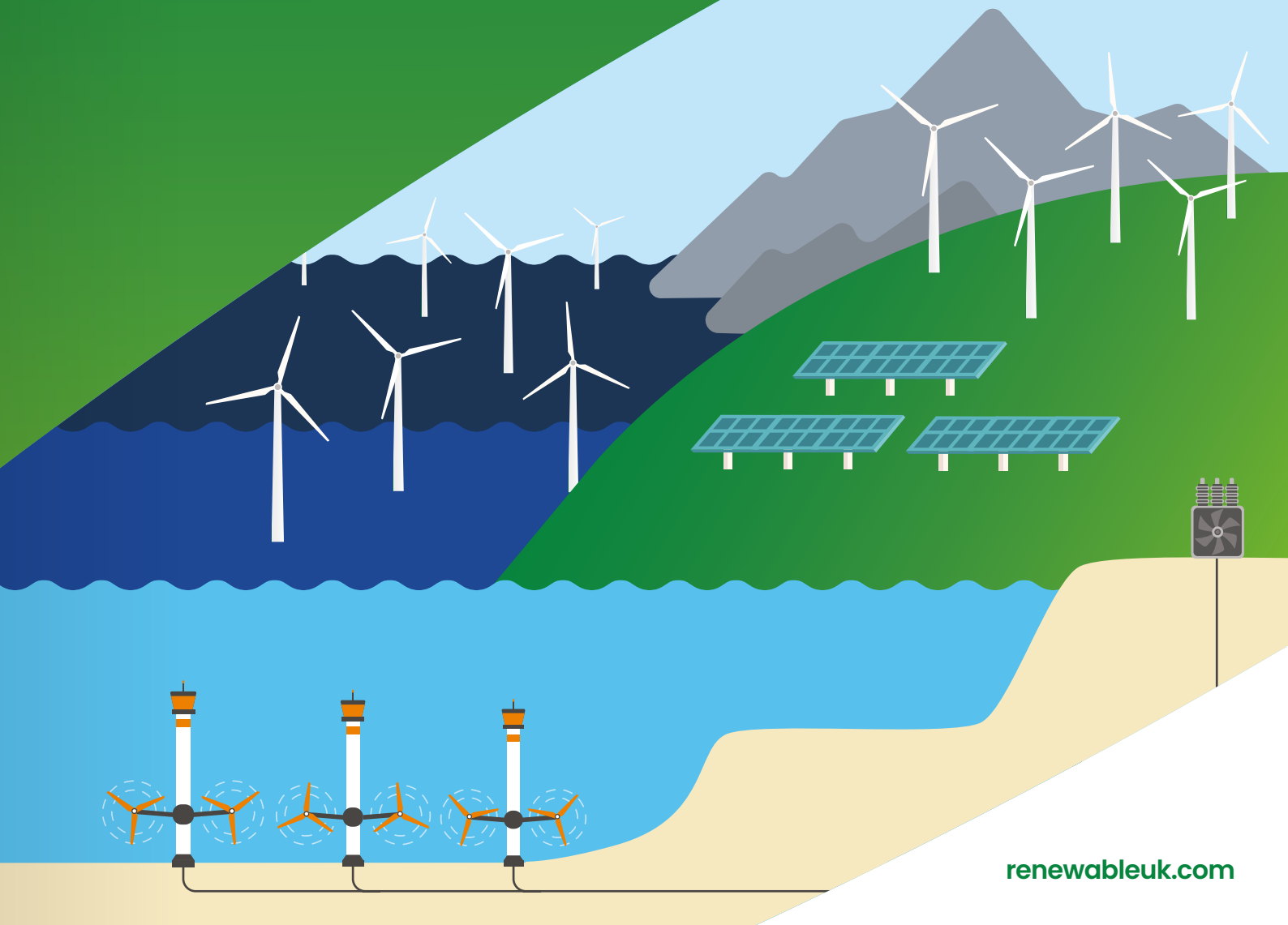
MARINE ENERGY WALES
YNNI MOROL CYMRU

Solar Energy UK

2025–2035

Wind, Solar and Tidal Stream:

Unleashing the Full Value of Welsh Renewables



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1. Executive summary

Large-scale renewable energy is one of the clearest and most immediate opportunities to deliver lasting, transformative benefits for Wales, from creating high-quality jobs and economic growth to securing direct investment into communities and boosting energy security.

This report is the result of collaboration between RenewableUK Cymru, Solar Energy UK and Marine Energy Wales. For the first time, it provides a comprehensive picture of the economic and social value of Wales' renewable energy sector, drawing on data from wind, solar, and tidal stream. Framed through the lens of the Well-being of Future Generations Act, it shows how renewables are not just a route to clean energy — but a foundation for a resilient, fair, and future-focused economy.

The Welsh Government has set ambitious goals to meet 100% of electricity consumption from renewables by 2035 and reach net zero by 2050. With electricity demand set to rise sharply in the coming years, Wales will need to expand its renewable energy generation more than fourfold to meet future needs. At present, we are a long way off pace. In 2023 renewables met just 27% of projected 2035 demand, with progress lagging behind other UK nations. Wales only added 109MW of new renewable energy capacity in 2023, almost all from small-scale solar, and, for the first time since the 1990s, no new wind farms were commissioned. Crucially the Welsh Government generation targets themselves could fall short of meeting future electricity demand. Failing to secure Wales' position as a net exporter of clean energy, and failing to maximise the broader economic and social opportunities the energy transition offers.

Expanding large-scale renewable energy deployment will be essential — not only to meet climate goals, but to revitalise Welsh industry, support community energy initiatives, and grow a resilient, well-being-focused economy. To realise these benefits, Welsh and UK policies must urgently support and accelerate the development of renewable energy infrastructure, onshore, offshore, and at both large and community scales.

This report sets out the actions needed to capture the full value of the Welsh renewables sector. BiGGAR Economics, Everoze and Lumen Energy & Environment analysis identifies three possible pathways for renewable deployment over the next decade — each offering different levels of economic and social benefits:

- **Maximising Renewables;**
- **Increased Ambition; and**
- **Current Targets.**

Maximising Renewables, the most ambitious scenario, is based on what the Welsh renewables sector believes is achievable under a supportive policy framework. Increased Ambition aligns with the Clean Power Action Plan 2030 targets and industry ambitions out to 2035. This scenario models a slower rate of deployment, which limits its ability to deliver the same level of social and economic value as "Maximising Renewables".

Finally, "Current Targets" is based on the Welsh Energy Targets Review, undertaken by Regen, to establish the Welsh Government's 2035 target. However, it lacks the necessary ambition to fully meet future demand or unlock the full economic and social potential of the energy transition.

Under Maximising Renewables, Wales could deliver more than 17GW of clean power by 2035, requiring a total investment of £46.7billion from across the sector. We estimate around 21% of that capital spend could be captured by Welsh businesses in the development, construction and servicing of the industry. With this level of investment, Wales would see:

- **£6.9 billion in GVA over the next decade;**
- **7, 980 jobs supported by wind, solar and tidal stream; and**
- **£1.9 billion in tax revenue.**

Scaling up renewables is not just about hitting climate targets, it is a major economic opportunity for Wales.

We have the natural resources, industrial capability, and talent to become a world leader in renewable energy, but to seize that opportunity, we must be bold. Unlocking our full renewable energy potential means powering a new era of green growth, skilled jobs, and shared prosperity in every part of Wales. This report makes clear the scale of the prize. With the right policies, investment, and political will, Wales can lead, and we intend to.

Eluned Morgan
First Minister for Wales

Distribution of average annual jobs supported by region

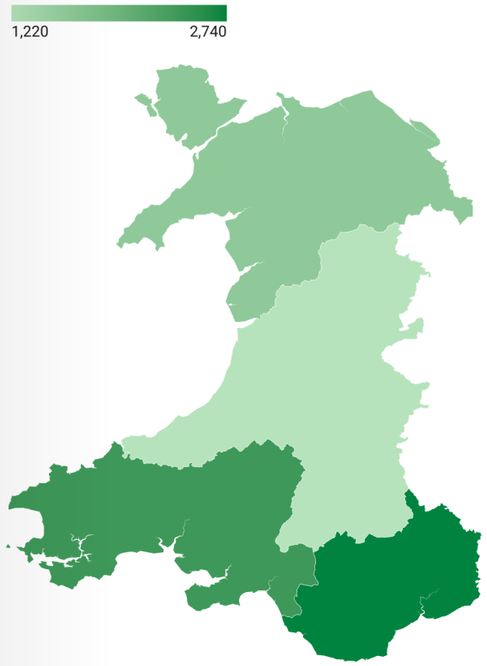


Photo credit: Llangwyryfon Windfarm - EDF Renewables

The renewable energy sector has the potential to deliver average GVA increases equivalent **to 68% of annual real growth** seen in the Welsh economy over the past decade. Every £1 invested in Welsh renewables is expected to generate an additional £0.32 of GVA through supply chain activity and wider economic impacts, demonstrating the strong multiplier effect renewables investment has across the Welsh economy.

The renewables industry will unequivocally deliver 'green jobs and growth' at an unprecedented scale in line with the current Welsh Government priorities. Jobs in this sector do not just contribute to the economy, they outperform it. The average GVA per job in renewable energy is 19% higher than the Welsh economy-wide average, while salaries exceed the national average by 26%, offering high-value employment for communities across Wales. Thanks to a diverse mix of technologies and the geographical spread of activity, crucially, the sector's economic impact is felt in every corner of the country. From rural communities to industrial hubs.

The growth of Wales' renewables sector and its local supply chain is central to cutting emissions, decarbonising heat and transport, and lowering the embodied carbon of infrastructure. Under the Maximising Renewables scenario, switching from gas to renewable electricity could save over 1.5 million tonnes of CO_2 by 2030, and more than **13 million tonnes by 2035** - the equivalent to taking almost 10 million cars off the road. While alternative fuels will play a role, the bulk of heat and transport decarbonisation will depend on clean, renewable electricity. Local, low-carbon supply chains further reduce embodied emissions, amplifying the sector's climate impact. Increasing deployment of renewables also leads to lower transport and consumer costs. The Climate Change Committee forecasts that, with successful **renewables deployment in the upcoming decades, households could save up to £1,000 in 2050 compared to 2025.**

Wales is making real progress towards becoming a clean energy nation – and there is so much more opportunity ahead.

Renewable energy can unlock private investment, create high-quality jobs, strengthen our energy security, and bring long-term benefits to communities across Wales. I'm focused on working with the industry to shape a Sector Deal that puts the right infrastructure, skills and policy environment in place – so we can turn ambition into delivery, and prosperity into a reality for the people of Wales.

Rebecca Evans
Welsh Government Cabinet Secretary for Economy, Energy and Planning

Photo credit: Bute Energy

Private and associated match funding from renewable projects in Wales also supports nature recovery, improving air and water quality, restoring peatlands, and creating new habitats. These nature-positive initiatives make the sector a key driver of both environmental and economic resilience.

Renewable energy is a cornerstone of Wales' well-being economy, delivering significant economic value through increased GVA and high-quality employment, while playing a vital role in achieving the Future Generations Framework goals. Renewables directly support 86% of national well-being indicators, making a meaningful contribution to all national goals and a strong contribution to: **a prosperous Wales, a resilient Wales, a healthier Wales** and a **globally responsible Wales.** By driving inclusive growth, supporting climate resilience, and reinvesting in local communities, Wales' renewables sector is laying the foundations for a more sustainable, fair, and thriving future.

Investing in renewable energy drives broader social benefits. Communities benefit directly, in a financial and well-being sense, from landowner payments and community benefit funds (CBF). Maximising Renewables would unlock **£183 million in CBF over the next ten years.** Onshore wind CBF alone could account for up to **£15 million a year** in funding for local economic development. By 2035, community benefit funding could deliver up to £937 million in wider well-being benefits, and £765 million in local economic value for Welsh communities. These funds empower communities by improving well-being and local decision-making, supporting the goal of a Wales of Cohesive Communities.

The renewables sector is a transformative opportunity for Wales, offering not only economic prosperity and job creation, but also broader benefits, including community resilience, rural development, emissions reduction, and environmental restoration. Under the most ambitious Maximising Renewables scenario, renewables have the potential to anchor an industry here in Wales, driving a long-term legacy of inclusive economic growth.

To realise this potential, Wales needs both a steady pipeline of consented projects, and targeted catalytic investment across critical areas: **port and grid infrastructure; skills development; supply chain capacity building; planning and policy;** and **stakeholder resourcing.**

This report makes one thing clear: only the most ambitious deployment scenario will unlock the full value of Wales' renewable energy potential. It is this pathway that delivers the highest returns in GVA, skilled jobs, tax revenue, CBF, local supply chain growth, and carbon savings. Crucially, it is also the only route capable of attracting the scale of investment needed to transform ports, infrastructure, skills, and planning into the backbone of a thriving Welsh economy. Anything less risks falling short of Wales' economic, environmental, and social ambitions.

If Wales is to lead in the clean energy transition, now is the moment to act boldly.

Realising this opportunity demands a **whole-government commitment to accelerating large-scale renewable energy deployment, scaling local capacity, and unlocking investment**. The reward is a resilient, inclusive well-being economy that delivers prosperity today and, safeguards the interests of future generations.

Crucial government interventions needed to Maximise Welsh Renewables:

Set minimum technology targets to provide industry and business certainty and support the delivery of the Maximising Renewables pathway;

Create a policy and regulatory framework that recognises and supports the strategic value of large-scale renewable energy in delivering shared prosperity for communities and a net benefit for biodiversity and ecosystem resilience; and

Accelerate progress through a Sector Deal underpinned by a dedicated Task & Finish group to drive delivery of targets and maximise socio-economic benefits.

Key:

- GWs installed
- GVA over next 10 years tax revenue
- Jobs
- Tonnes CO_2 saved
- Empowering Communities
- Wellbeing goals supported
- Improving Biodiversity/ Habitat management
- Idea
- Policy / recommendation

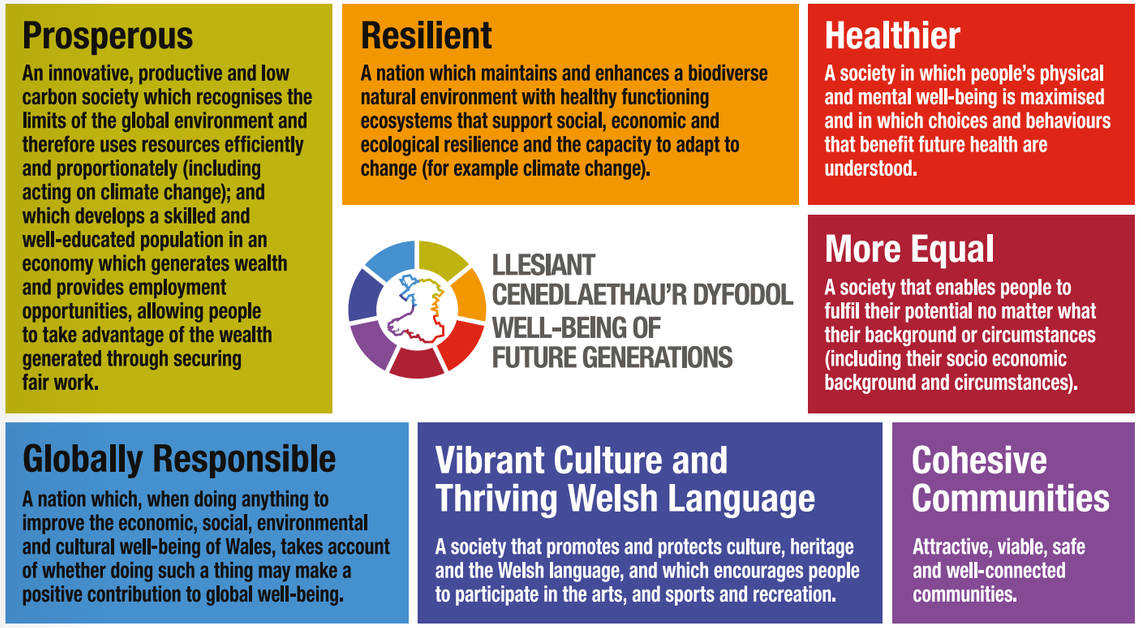
2. Introduction

2.1 Purpose

This study provides a socio-economic impact assessment of opportunities arising from the expansion of the Welsh renewables industry, considering renewable electricity contributions by 2035 from onshore and offshore wind, utility-scale solar and tidal stream[1].

2.2 Contents

Figure 2-1 Well-being of Wales goals



Source: Welsh Government, 2020, Well-being of Future Generations Visual Toolkit.

2.3 Context

While Wales has made progress in tapping into the renewable energy opportunity—setting targets, consenting projects, directing additional funding into Planning and Environmental Decisions Wales (PEDW) and Natural Resources Wales (NRW), and establishing an Offshore Wind Task and Finish Group to focus on the priority areas that will deliver the most benefit to people in Wales—further commitment is needed to unleash the full potential of investment in Welsh renewables.

Future Generations of Wales Act

In 2020 Wales announced official membership of the Well-being Economy Governments (WEGo), a key part of which was the commitment to the Well-being of Future Generations (Wales) Act 2015, enshrining the principle of sustainable development in Wales and requiring public bodies to act in accordance[2]. This includes setting well-being objectives for seven well-being goals. This assessment uses the framework to highlight long-term opportunities and the potential of renewables to support national well-being goals for both present and future generations.

The framework uses indicators, published by Welsh Ministers, that measure progress towards achieving the well-being goals. There are several relevant indicators relating to the four well-being goals of being **prosperous, resilient, healthier,** and **globally responsible,** that correspond with the renewable energy sector:

- **Capacity (in MW) of renewable energy equipment installed;**
- **Gross Value Added (GVA) per hour worked;**
- **The global footprint of Wales;**
- **Levels of nitrogen dioxide (NO2) pollution in the air; and**
- **Emissions of greenhouse gases within Wales[3]**

The Wellbeing of Future Generations Act should act as a guiding North Star, not a reason to delay bold action when competing priorities arise. It is a framework designed to help navigate tensions and make decisions that benefit both current and future generations. By aligning the renewable energy sector with the Act's well-being goals—particularly in terms of prosperity, resilience, health, and global responsibility—Wales can maximise its renewable energy potential. Drawing on its industrial heritage, skilled workforce, and abundant natural resources, Wales has the opportunity to produce clean, low-carbon energy, drive economic growth, and power its industries — transforming its industrial legacy into a future built on renewable exports. This will help retain and grow existing industrial hubs within Welsh clusters, driving a just transition that delivers real, lasting benefits for communities today and in the future.

[1] Grid, grid costs and the overall benefits from investment in grid infrastructure are not considered in the analysis.

[2] Formally the Well-being of Future Generations (Wales) Act 2015. See: Future Generations Commissioner for Wales

[3] Future Generations Commissioner for Wales. Future Generations Framework for Projects.

Photo credit: Pembrokeshire – Visit Wales

Welsh Renewable Energy Policy Context

Renewable energy projects can act as a driver of socio-economic and wider benefits. This is acknowledged by the Welsh Government, with the First Minister in September 2024 making green jobs and growth one of four key priority areas for progress[4].

To date, the Welsh Government has set targets for 100% of electricity consumption to be generated by renewable energy by 2035 and for net zero by 2050. By the end of 2023, Welsh renewable energy generation met 53% of the country's current electricity consumption (14.8 TWh) and 27% of its estimated 2035 demand (29 TWh). As electricity demand soars in the coming years, there is a real danger the current Welsh Government generation targets set in 2023 could fall short (as identified by National Grid ESO's Future Energy Scenarios at the time[5]) and renewable generation will need to more than quadruple by 2035[6] to keep pace.

Therefore, the electrification of the Welsh economy will require the construction and operation of more renewable energy developments. Currently, under the National Development Framework Future Wales: The National Plan 2040[7], proposals for renewable energy projects must contribute to meeting Welsh Government ambitions for low carbon energy generation. Within the Plan, Policies 17 and 18 include strategic spatial and detailed criteria-based policies providing a decision-making framework. Currently, projects between 10 and 350 MW are determined by Welsh Ministers through the Developments of National Significance (DNS) scheme. Otherwise, they are determined at a local level (sub 10 MW) or if offshore and greater than 350MW, through the UK NSIP regime.

Wales is simplifying its planning system, with new Infrastructure Consents set to replace the DNS regime in 2025 for projects between 50–350MW, while projects under 50MW will be determined by Local Planning Authorities.

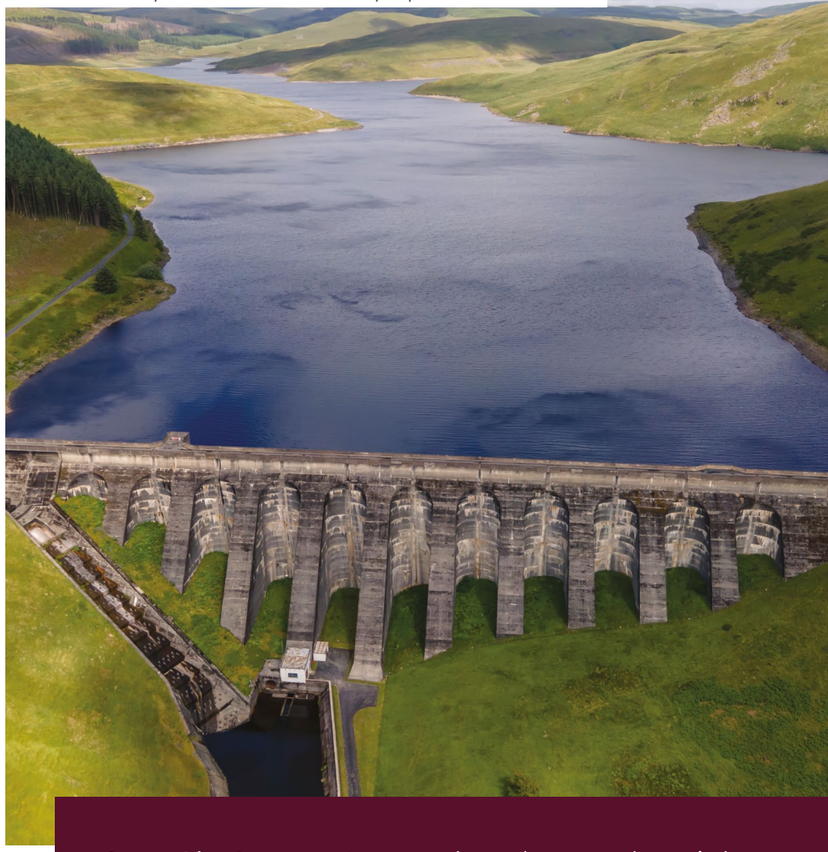
UK Strategic Policy Context

Renewable electricity generation is central to UK Government policy, as highlighted in the Clean Energy Superpower mission[8], and the Clean Power 2030 Action Plan[9]. These initiatives emphasise both the importance of renewables for energy security and the significant investment opportunities they offer across the UK, particularly in Wales.

The UK Government has committed £5.8bn of National Wealth Fund (NWF) investment into five strategic priorities, including green hydrogen, carbon capture, ports, gigafactories and green steel. A range of other government programmes, such as planning reform, industrial strategy and infrastructure strategy also support Clean Power 2030 and longer-term action on the energy transition. The Welsh Government welcomed the Clean Power Plan, describing it as necessary if Wales is to achieve its own ambitions for a prosperous low carbon future, also highlighting its own Future Energy Networks for Wales[10], and Trydan Gwyrdd Cymru[11], a new publicly owned energy company for Wales.

This policy work is being backed up by a range of industry and government initiatives, including the offshore wind industry's Industrial Growth Plan[12] (IGP); the Offshore Wind Industry Council (OWIC); the UK Government Clean Industry Bonus (CIB); the Onshore Wind Industry Taskforce[13]; and the Solar Taskforce[14]. These initiatives look to support their related sectors, unlocking barriers to deployment, and capturing benefits from cost reduction and UK supply chain growth. They also act as a catalyst for closer cross-border alignment on priority areas, such as grid and aviation, helping to drive progress across Great Britain.

Photo credit: Nant-y-Moch dam at the Rheidol Hydropower Scheme - Statkraft



Overarching Assessment

While energy policy is mainly the responsibility of the UK Government, the Welsh Government has a key role to play through its devolved powers; planning and consenting, education and skills. These respective responsibilities drive a need for coordinated action between the Welsh and UK Government to effectively enable renewable energy progress.

Over the past decade, the progress of the renewable energy industry in Wales has been slower than across other UK nations, including England, where a ban on onshore wind activity was in place. For the renewables sector to grow at the speed and scale required, and for Wales to retain the economic, social and environmental benefit, it is essential that **both** Welsh and UK policy is supportive and catalytic of the industry and associated investment. While there has been some progress in setting targets and consenting projects, more needs to be done at a policy level to accelerate deployment and maximise benefits from the opportunity the renewables industry presents for Wales.

[4] Welsh Government (2024). First Minister announces Welsh Government priorities.

[5] National Grid ESO (2022). Future Energy Scenarios, p. 158

[6] Welsh Government (2025). Energy Generation in Wales 2023

[7] Future Wales 2040

[8] Labour (2024). Make Britain a Clean energy Superpower.

[9] UK Government (2024). Clean Power 2030 Action Plan: A new era of clean electricity.

[10] Catapult (2023). Future Energy Grids for Wales.

[11] Welsh Government (2023). Ynni Cymru will unlock Wales' green energy potential.

[12] Offshore Wind Industry Council (2024). Offshore Wind Industrial Growth Plan.

[13] UK Government. Onshore Wind Taskforce.

[14] UK Government. Solar Taskforce.

3. Deployment scenarios

The deployment of renewable energy across Wales over the next ten years could generate a total investment of up to **£46.7 billion,** bringing total generating capacity to just over 17,700 MW and supporting a key indicator against four of the Well-Being goals in the Future Generations Framework.

Capacity (in MW) of renewable energy equipment installed is a key indicator in the Well-Being of Future Generations Framework, used to mark progress against four of the Overarching Well-Being Goals. An expanded renewables sector is therefore vital to ensure a prosperous, resilient, globally responsible Wales, with cohesive communities.

3.1 Charting potential trajectories for Welsh renewables

The potential deployment to 2035 of onshore wind, and offshore wind, solar, and tidal stream is considered under three scenarios:

- **Maximising Renewables:** Wales would position itself as a renewable powerhouse[15];
- **Increased Ambition:** while resting on the ambitious deployment aspirations of Maximising Renewables, clean power is produced at a slower rate[16]; and
- **Current Targets:** Welsh renewable energy generation meets the targets in the 2022 Welsh Energy Targets Review [17].

The three scenarios will result in the following levels of operational renewable energy capacity by 2035:

- **17,745 MW under Maximising Renewables**
- **11,806 MW under Increased Ambition[18]; and**
- **11,329 MW under Current Targets.**

For a breakdown of targets by technology see Table 3-1. The Maximising Renewables scenario involves a large deployment of offshore wind. As captured by reduced levels of offshore activity in the other scenarios, there is a degree of uncertainty in floating wind deployment, meaning more established renewable sources may need to be drawn upon in case of delays in project timescales.

[15] This scenario is based on what the Welsh renewable energy sector believes could be achievable under a supportive policy framework.

[16] This scenario accounts for targets in the Clean Power Action Plan 2030 and industry ambitions to 2035.

[17] Regen (2022). Welsh Energy Targets Review – Graphing Outputs. Tidal stream targets were not included in the original document and were formulated in consultation with Marine Energy Wales.

[18] Note that throughout this report the deployment of solar PV refers solely to utility scale projects. The deployment of residential and commercial solar to 2035 will result in additional investment, employment and GVA supported within the Welsh economy.

Table 3-1 Deployment targets by scenario and technology (MW)

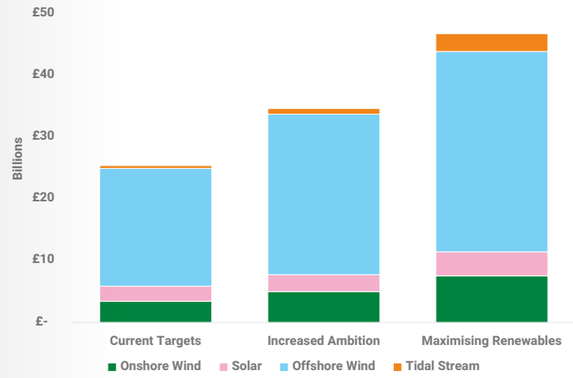
		2030	2035
Maximising Renewables	Onshore wind	3,428	4,948
	Solar PV	3,000	5,000
	Offshore wind	3,961	7,747[19]
	Tidal Stream	50	350
Increased Ambition	Onshore wind	2,355	3,509
	Solar PV	2,250	3,750
	Offshore wind	3,961	4,447
	Tidal stream	38	100
Current Targets	Onshore wind	1,900	2,706
	Solar PV	2,200	3,375
	Offshore wind	3,142	5,198
	Tidal stream	25	50

Figure 3-1 Deployment by scenario 2025-2035 (MW)

Source: BiGGAR Economics Analysis

Despite being based on the same portfolio of offshore wind projects as Maximising Renewables, Increased Ambition is expected to result in 4,447 MW by 2035, which is lower than the 5,198 MW expected under Current Targets. As a slower deployment scenario, this lower figure is due to an assumed delay in the delivery of 3 GW of Celtic Sea offshore wind projects. Under Increased Ambition, additional capacity is expected to come online shortly after 2035. This scenario highlights the risks that delays in offshore wind deployment pose to achieving Wales' 2035 targets.

Figure 3-2 Total investment up to 2035 by scenario



Source: BiGGAR Economics Analysis

Increased deployment as a driver of investment

With the scale of deployment, the costs associated with each project are a key driver of economic impact. Total investment includes spending across three phases: project development, construction, and operations and maintenance*. Based on evidence on the per MW costs of developing, constructing and maintaining different renewable energy projects, deployment under the three scenarios could generate total investment to 2035 of:

- **£46.7 billion under Maximising Renewables;**
- **£34.6 billion under Increased Ambition; and**
- **£25.4 billion under Current Targets.**

* O&M is limited to 2035 and will continue for the lifetime of the project

3.2 Summary

Under the Maximising Renewables scenario, in 2035 total operational capacity from solar, onshore wind, offshore wind, and tidal stream would reach 17,745 MW, significantly higher than the 11,329 MW projected under the Current Targets scenario. The difference extends to investment as well, with Maximising Renewables delivering £20 billion more in total investment.

While the Current Targets scenario based on Welsh Government's 2022 Energy Targets Review provides a useful baseline, it risks falling short in several important areas. Under National Grid's Future Energy Scenarios*, it may not be sufficient to meet projected electricity demand for 2035. It also fails to account for the need for Wales to move from being a net importer of fossil fuel-based energy to becoming a net exporter of clean energy. In addition, it does not fully capture the rising and uncertain demand for electricity as Wales decarbonises transport, heating, and industry. As a result, the Current Targets scenario risks under-delivering not just on energy security, but on the broader economic and social opportunities available through the clean energy transition.

[19] Maximising Renewables and Increased Ambition include North Hoyle, Rhyl Flats, Gwynt y Mor, Awel y Mor, Llyr 1&2, Erebus, Celtic Sea – Concrete (1,500 MW), Celtic Sea – Steel (3,000 MW), Mona and Morgan. This includes all activity to 2035 that could benefit Welsh suppliers

* To mirror the timelines of the Regen target setting work

4. Maximising investment in Wales

The overall economic impact from the renewable energy sector depends on the ability of Welsh businesses to secure contracts across the four technologies.

To achieve this, significant investment must be made in our infrastructure and supply chain, which will only be pursued if the right policy and economic conditions prevail. Fundamental to this is a reliable drumbeat of project pipeline, creating the foundations for the renewable energy industry to be built upon.

4.1 Current Welsh supply chain readiness

Evidence from EnergyPulse[20], socio-economic Environmental Impact Assessment (EIA) chapters, project evaluations and Everoze's assessment of individual offshore wind projects, informed assumptions on the ability of Welsh businesses to secure renewable energy contracts (Table 4-1).

Overall, Wales can capture spend across all project phases. For instance, Welsh businesses are relatively well-placed to capture activity from project development, thanks to companies offering planning services, legal support and wider project development support. Similarly, there are leading civil contractors able to deliver the onshore infrastructure required by renewable energy technologies. Local plant hire contractors, materials and electrical suppliers are also well placed to benefit from an expanded renewable energy sector.

Table 4-1 Welsh content assumptions by technology and phase (% of content)

	Project Development	Construction	Operations and Maintenance
Onshore wind	58%	30%	59%
Solar PV	50%	11%	60%
Offshore wind	25%	14%	20%
Tidal Stream	50%	36%	60%

Source: BiGGAR Economics and Everoze Analysis. Offshore wind analysis was based on the outputs of Everoze's analysis at a project level, considering locational aspects and timing of spend, so it is not an input assumption and would vary on a project-by-project basis

Operations and maintenance, which tends to be relatively more localised, results in wider opportunities, including from the long-term benefits of land leases. Aside from those businesses directly involved in renewable energy projects, there will be wider benefits to other sectors of the economy, including retail, accommodation and food services. Every £1 of direct spending in renewables in Welsh businesses is expected to result in £0.32 GVA across the renewable energy sector's supply chain and wider Welsh economy, demonstrating the strong multiplier effect of renewables investment. Menter Môn's approach to local impacts provides a good example of how renewable energy developers seek to establish a strong local footprint.

[20] RenewableUK (2025). EnergyPulse: Renewable energy data and news for faster, better decisions.

Case study

Morlais Tidal Energy

A pioneering community owned tidal test site.

Based in north-west Wales, Menter Môn is driving sustainable development through its leading community-led tidal energy project, Morlais. As the first social enterprise to secure an offshore lease, Morlais is developing the world's largest consented tidal stream energy zone, up to 240 MW by 2035.

Through a pioneering community-based model, Menter Môn secured planning permission in 2021 and began grid connection works in 2022. Distribution-level grid infrastructure is now complete, with transmission upgrades ongoing. The first turbine installation is expected in mid-2025, with developers deploying from 2026 under the UK Government's Contracts for Difference (CfDs) clean energy auction scheme.

At the heart of Morlais is long-term local benefit. Menter Môn and partners, including contractors like Jones Bros, are centred on community engagement, supporting local businesses, developing the supply chain, and offering growth opportunities. This commitment earned them the Institute of Civil Engineers (ICE) Cymru Community Engagement Award.

While challenges remain, such as funding for early-stage technology and port access, Morlais aims to deliver predictable, clean energy while setting a blueprint for inclusive renewable energy development. Menter Môn's approach demonstrates how community engagement can power both the energy transition and regional resilience.

Photo credit: Mhorwood - Statkraft

4.2 Maximising Welsh supply chain growth

While this economic analysis is based on existing capabilities, there is potential for the Welsh supply chain to secure more, if both government and industry play key roles.

The Welsh and UK governments can support industry in maximising local economic gains in several ways, including:

- **ensuring a steady and significant pipeline of consented renewable energy projects, underpinned by a stable policy & regulatory environment;**
- **mapping supply chain opportunities across technologies and focusing investment on areas of competitive advantage, such as those previously identified in the Industrial Growth Plan for offshore wind[21];**
- **helping to attract investment into Wales, particularly for anchor companies and large contracts where a single project alone may not be enough to influence a supplier's decision to invest;**
- **creating policy and pipeline certainty for investment in the renewable energy sector; and**
- **providing funding where there are market failures that cause supply chain constraints (e.g around port investment).**

Similarly, industry can continue to play an important role in maximising economic benefits by delivering further social value through its supply chain.

[21] 2024 Offshore Wind Industrial Growth Plan

Maximising local content

Best practitioners within industry have long looked for ways to maximise their local economic footprint, including through:

- **early engagement with potential suppliers: this allows businesses to prepare ahead of procurement, and for the developer to identify any potential barriers that may limit the ability of local businesses to bid for work;**
- **collaboration with local bodies such as chambers of commerce and local authorities: this provides developers with initial information and evidence about the business base of a given area;**
- **focusing on realistic opportunities: there may be a temptation to focus on large headline contracts of which a single developer may have limited control. Smaller opportunities, if consistently secured, can be as important towards realising local content;**
- **including in the procurement process a requirement for Tier 1 contractors to maximise local benefits and embed any commitments in contracts: adding a requirement to specify ways in which a contractor could secure local content will give the opportunity to Tier 1 contractors to develop innovative approaches toward maximising local content; and**
- **tracking local spending: this facilitates learning from project experience, and monitoring and evaluation of efforts to maximise local content.**


Photo credit: Port talbot Supplier Event – EDF Renewables

We need a joint commitment from industry and government to build capability and capacity in the Welsh supply chain to help maximise local economic opportunities and drive the growth of green jobs across Wales, supporting Welsh Government's aspirations.

5. Economic Impacts

Under Maximising Renewables, renewable energy projects in Wales could support **£6.9 billion GVA** over the next decade, supporting on average **7,980 jobs each year.** Generating economic activity and employment is key towards securing a Prosperous Wales.

One of the seven goals within the Well-being of Future Generations Framework is for a Prosperous Wales. By creating skilled job opportunities, increasing GVA, and supporting innovation, the renewable energy sector will make an important contribution to this goal.

5.1 Maximising Renewables

By 2035, this scenario would deliver 17,745 MW of renewable energy generating capacity in Wales, requiring a total investment of £46.7 billion*, of which Welsh businesses could secure £9.6 billion (21%).

5.1.1 Onshore Wind

By 2035, total investment on onshore wind projects in Wales could total £7.6 billion, of which Welsh businesses could secure £3.0 billion. The total economic impact in Wales could be:

- **£3.0 billion GVA up to 2035;**
- **an average annual GVA of £251 million; and**
- **an average annual employment of 3,250 jobs.**

The operation of onshore wind farms results in payments to landowners. It is estimated that **payments to landowners** in Wales from onshore wind technology could **total £458.7 million** to 2035, **averaging £38.2 million per year**.

The operation of onshore wind also results in **community benefit payments**, that is, funding given by developers to the local communities where onshore wind farms are located. On average, developers provide around £5,000 per MW per annum for the operational life of the wind farm[22], and funding is used to invest in local communities. Over the period to 2035, as more projects come online, it is estimated that community benefit payments could total **£183 million (averaging approximately £15 million per year but typically increasing year on year)**. Once all projects are operational in 2035, community benefit funding is expected to be around £24.7 million a year.

5.1.2 Solar

By 2035, investment in solar[23] projects in Wales could total £3.9 billion, of which Welsh businesses could secure £753 million in contracts. The total economic impact in Wales could be:

- **£623 million GVA up to 2035;**
- **an average annual GVA of £52 million; and**
- **an average annual employment of 660 jobs.**

Solar farms, like onshore wind farms, are based on long-term leases of land. **Payments to landowners** support local rural economic activity and provide additional income to farming businesses, facilitating diversification. Based on the total deployment of solar PV, it is estimated that payments to landowners in Wales could **total £147.1 million** to 2035, **averaging annual payments of £12.3 million**. Solar farms will also provide community benefits, though historically these have been less standardised and have therefore not been included in this report.

While the analysis focuses on utility scale projects, domestic and commercial installations will result in additional investment into Wales, and a higher GVA and employment contribution from solar. An example of the wider benefits associated with commercial and residential installations is provided by GB Sol.

* All cumulative figures in this section include some investment which took place in 2024

Case study

GB-Sol

An independent Welsh-based solar manufacturer, focused on local opportunities.

GB-Sol, a spin-out from Cardiff University's Solar Test Centre, is a specialist solar PV manufacturer based near Cardiff. With 12 employees, the company has grown since 1994, producing solar panels and mounting systems.

GB-Sol has evolved and expanded its offering to include innovative products, like solar slates and integrated roof designs, alongside a wide range of projects - from residential rooftops to complex commercial buildings and social housing retrofits.

Both the community and sustainability are at the heart of GB-Sol's operations. Panels are manufactured in-house using a local, ethical supply chain, and their site is powered entirely by green electricity. By prioritising local suppliers and Welsh labour, GB-Sol is strengthening regional manufacturing and supporting job creation across the renewables sector.

In the coming decades, GB-Sol is well positioned to benefit from growing demand for decentralised, rooftop solar systems. The company is collaborating with local battery storage installers to meet rising consumer interest for solar combined with battery installation.

Porth Wen Solar Farm – EDF Renewables

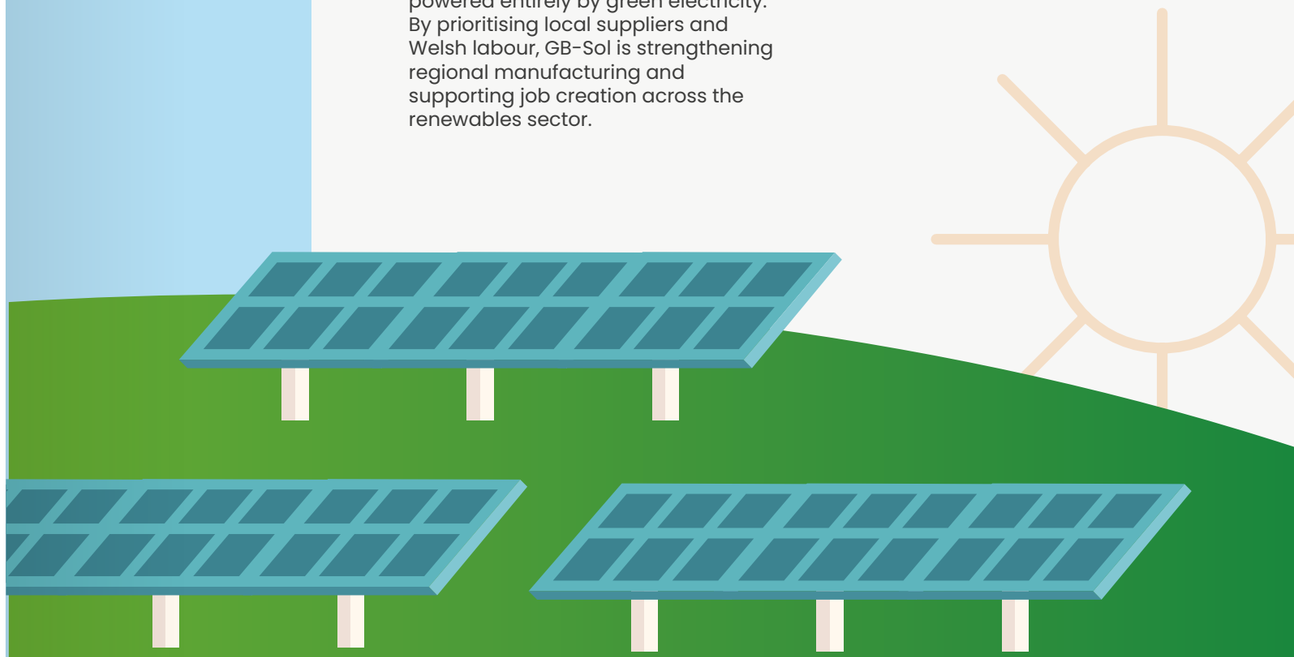


Photo credit: RWE

5.1.3 Offshore wind

By 2035, investment in offshore wind projects could total £32.4 billion, of which Welsh businesses could secure £4.8 billion. The total economic impact in Wales could be:

- **£2.6 billion GVA up to 2035;**
- **an average annual GVA of £213 million; and**
- **an average annual employment of 3,370 jobs.**

Photo credit: Marine Energy Wales

5.1.4 Tidal stream

By 2035, investment in tidal stream across Wales could total £2.9 billion, of which Welsh businesses could secure £1.1 billion. The total economic impact in Wales could be:

- **£696 million GVA up to 2035;**
- **an average annual GVA of £58 million; and**
- **an average annual employment of 700 jobs.**

5.1.5 Total economic impact

Adding together activity across the four technologies up to 2035, the total economic impact in Wales could be:

- **£6.9 billion GVA;**
- **an average annual GVA of £574 million; and**
- **an average annual employment of 7,980 jobs.**

A breakdown of the impact by technology can be found in Table 5 1.

Table 5-1 Maximising Renewables: total impact by technology

	Cumulative GVA (£m)	Average Annual GVA (£m)	Employment (Jobs)
Onshore wind	£3,013	£251	3,250
Solar PV	£623	£52	660
Offshore wind	£2,560	£213	3,370
Tidal Stream	£696	£58	700
Total	£6,891	£574	7,980

Source: BiGGAR Economics Analysis. *Note totals may not sum due to rounding.

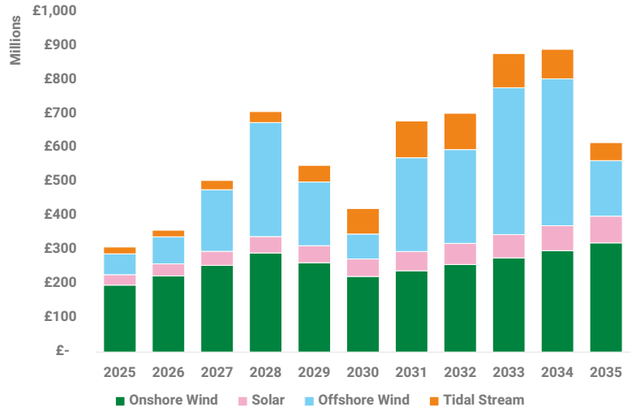
[22] Some developers offer up to £7,500 in community benefit funding.

[23] Note the analysis in this report focuses on utility scale projects. Commercial and residential solar will result in additional economic benefits.

Onshore wind is the most significant and rapidly achievable opportunity in the short to medium term, contributing an average of £251 million GVA annually to the Welsh economy and supporting over 3,000 jobs each year. The role of onshore wind as a precursor to the floating offshore wind opportunity should not be underestimated. It represents a vital opportunity for infrastructure (ports and grid), supply chain and skills to scale-up before the demands of offshore wind in the Celtic Sea become a reality. The development and growth of onshore wind in Wales would provide a strong foundation for securing local content from the larger opportunities offered by the Celtic Sea floating wind projects.

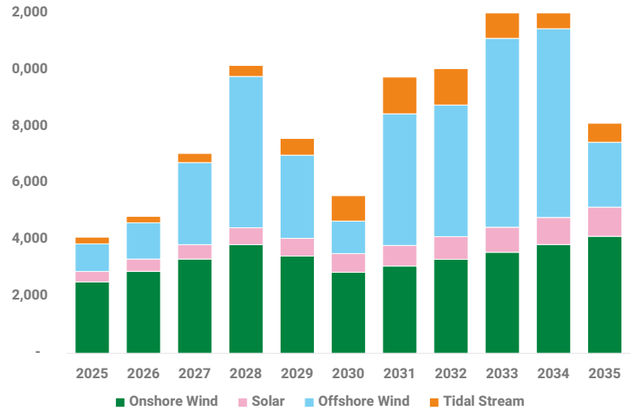
Annual activity will be influenced by the deployment trajectories of different technologies, particularly the construction phases, as these require a high level of activity within a short timeframe. Profiles are especially shaped by the transport and installation (T&I) of 3 GW of offshore wind projects in the Celtic Sea, assumed to be under construction in 2033 and 2034. As economic impacts are dependent on deployment trajectories, any delays in timescales would result in a lower impact over the period to 2035.

Figure 5-1 Maximising Renewables: total GVA per year (2025 - 2035)



Source: BiGGAR Economics Analysis

Figure 5-2 Maximising Renewables: total jobs supported per year (2025 - 2035)



Source: BiGGAR Economics Analysis

Around 15% of the jobs supported by renewables in Wales are expected to be in sectors relating to professional services. These are well-paid jobs underpinning services that are relatively easy to export.

As professional services jobs are mostly linked to the development phase, the share of employment accounted by them is higher in the years when there is more project development activity taking place.

Emerging opportunities in professional services across project development have led to new businesses entering the Welsh market, and existing businesses opening new offices in Wales.

Photo credit: EDF Renewables Cardiff Office

Case study

Supporting employment in professional services

LUC have recently moved into larger offices in Cardiff to respond to the growth of the renewables market in Wales.

Land Use Consultants (LUC) are an environmental consultancy employing around 330 people across the UK. In 2022, LUC opened a Cardiff office where they currently employ 11 people. The expansion into the Welsh market was driven by three factors: Welsh Government support for local supply chains; client proximity; and talent acquisition. Having a wider presence across the UK makes it easier for businesses like LUC to attract the best talent within each region. In addition, having a Welsh team that can meet the demands from LUC's work in Wales, including within the renewable energy industry, aligns with client preferences and procurement practices in Wales.

LUC's experience not only highlights the crucial role of professional services jobs in the renewable energy sector, but also demonstrates how the growth of renewable energy activity could attract existing UK businesses to Wales.

Photo credit: Trydan Gwyrdd Cymru

5.2 Total scale of impacts

Table 5-2 Comparison of average annual GVA by technology and scenario (£m)

	Maximising Renewables	Increased Ambition	Current Targets
Onshore Wind	£251	£169	£121
Solar	£52	£39	£35
Offshore Wind	£213	£170	£124
Tidal Stream	£58	£19	£9
Total	£574	£396	£289

Source: BiGGAR Economics Analysis. *Note totals may not sum due to rounding.

It is crucial to note that the benefits considered above do not capture the full lifetime activity from an expansion in operational capacity. This is due to the time constraint applied to align with the targets set for 2035. The employment from operational projects will constitute a long-term legacy from investment in renewables, extending well beyond 2035 as renewable energy assets have operational lifetimes of at least 30 years. This is also the case for the wider legacy impacts associated with community benefits. A comparison of Maximising Renewables with the other two scenarios is presented below.

5.2.1 Average Annual GVA Impact (2025 - 2035)

Over the next ten years, the average annual GVA impact that could be generated by renewable energy in Wales under each scenario is as follows:

£574M Maximising Renewables

£396M Increased Ambition

£289M Current Targets

A breakdown of total impact by technology and scenario is shown in Table 5-2.

Over the past ten years, the annual real growth in GDP in Wales was around £842 million. This means that the average GVA generated by the sector under Maximising Renewables would be **equivalent to 68% of the annual average growth achieved by the Welsh economy over the past decade.**

Similarly, recent research produced by CSconnected[24] indicated that the semiconductor cluster, an emerging sector based in South Wales, supported £255 million GVA across the Welsh economy in 2024. **Therefore, under each scenario, the Welsh renewables sector would support a greater annual economic impact than the semi-conductor sector has to date.**

5.2.2 Average Annual Jobs Supported (2025 – 2035)

Over the next decade, the average annual jobs that could be supported by renewable energy technologies in Wales under each scenario is as follows:

- **Maximising Renewables: 7,980;**
- **Increased Ambition: 5,620; and**
- **Current Targets: 4,090.**

A breakdown of the total impact by technology and scenario is shown in Table 5-3.

Table 5-3 Comparison of average annual jobs by technology and scenario

	Maximising Renewables	Increased Ambition	Current Targets
Onshore Wind	3,250	2,180	1,550
Solar	660	490	450
Offshore Wind	3,370	2,720	1,970
Tidal Stream	700	230	110
Total	7,980	5,620	4,090

Source: BiGGAR Economics Analysis. *Note totals may not sum due to rounding.

[24] CSconnected (2025), Annual Report: Compound Semiconductor Cluster in South Wales 2024

Photo credit: Nordsee Ost - RWE

> ***Every renewable energy project contributes to Local Authority funding through taxation.***
>
> **Jessica Hooper,**
> **Director, RenewableUK Cymru**

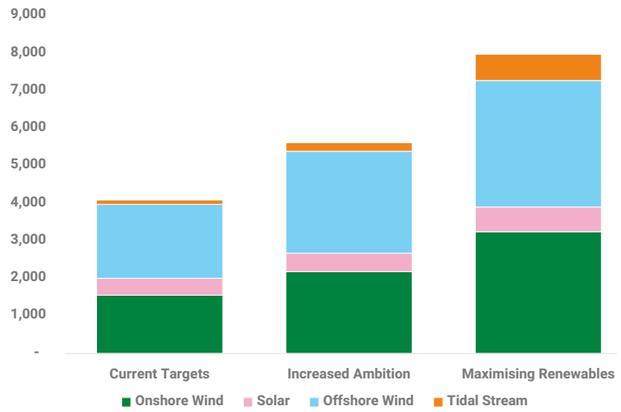
GVA per job is a marker of productivity because it measures how much economic value a job contributes to the wider economy.

In the renewable energy sector, each job generates £70,500 in GVA, which is 19% higher than the Welsh average of £59,300[25]. The renewables industry also has a GVA per job more than 2.5 times larger than the tourism sector (£26,000), a relatively important source of employment in the Welsh economy.

As productivity is the main factor in determining economic growth across advanced economies, it is important for the Welsh economy to support investment in relatively high value-added activity, such as that from the renewable energy sector. Sectoral productivity is generally linked with the salaries paid by a given sector. In addition to having higher productivity than the average sector of the Welsh economy, renewable energy jobs also pay higher than average wages. The sector was estimated to pay an average salary of £49,000, around 26% larger than the Welsh average (£38,900)[26] and around 29% larger than the average salary in the public sector, a key employer in the Welsh economy.

Creating job opportunities across renewables will reduce brain drain from Wales, by providing more well-paid, skilled employment opportunities across both rural and urban areas.

Figure 5-3 Comparison of average annual jobs supported



Source: BiGGAR Economics Analysis

Average annual jobs that could be supported by renewable energy technologies in Wales

7,980 Maximising Renewables

5,620 Increased Ambition

4,090 Current Targets

[25] Estimate based on data on total Welsh GVA for 2022 (latest available) from StatsWales - Gross Value Added by area and component - 2022 data. Data on employment from the Annual Population Survey and data on inflation from the Bank of England (see Inflation Calculator).

[26] Based on data from the Annual Survey of Hours and Earnings.

5.3 Tax revenue

By creating jobs and supporting economic activity, the deployment of renewable energy generates tax revenue that is then re-invested by the Welsh and UK Governments to the benefit of the Welsh people. This section considers the impacts from renewable energy activity in Wales across the following taxes: Income Tax, National Insurance, Corporation Tax and non-domestic rates.

5.4 Tax benefits under Maximising Renewables

Over the period to 2035 under Maximising Renewables, the renewable industry is expected to support at least £1.9 billion in tax revenue, including:

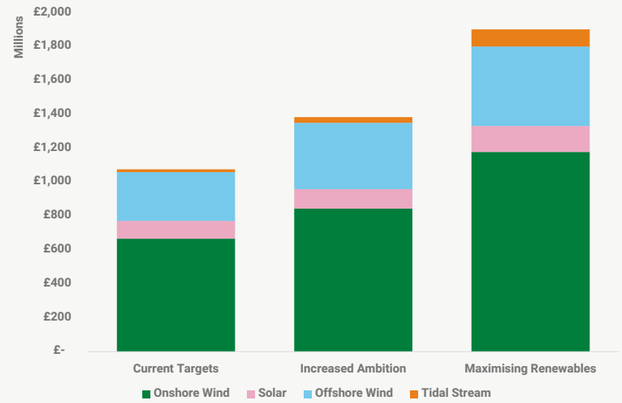
- **£243 million from Income Tax;**
- **£335 million from National Insurance;**
- **£409 million from Corporation Tax; and**
- **£915 million from non-domestic rates.**

Welsh renewables projects could result in **£159 million a year in tax revenue.** The contribution from onshore wind is larger than for the other renewable energy technologies because onshore wind developments pay higher non-domestic rates per MW of installed capacity, directly benefiting Welsh local authorities.

5.5 Summary of tax revenue

The deployment of renewable energy projects under the Maximising Renewables scenario generates around £508 million more in tax benefits than the Increased Ambition scenario, around £43 million more a year. The ambitious deployment of Welsh renewables will provide tax revenue to be re-invested into public services and non-domestic rate revenue, providing direct income for local authorities. To put this into perspective, the annual tax revenue from the Maximising Renewables scenario is 35% greater than the Welsh Government's annual expenditure on economic development.

Figure 5-4 Comparison of tax revenue supported



Source: BiGGAR Economics Analysis

> ***Renewable energy will have a crucial role for Wales, its people and its economy over the next decade and beyond.***
>
> *We must seize this opportunity and make the changes now to deliver lasting impact for Wales' society, economy, and wealth.*
>
> **Jessica Hooper,**
> **Director, RenewableUK Cymru**

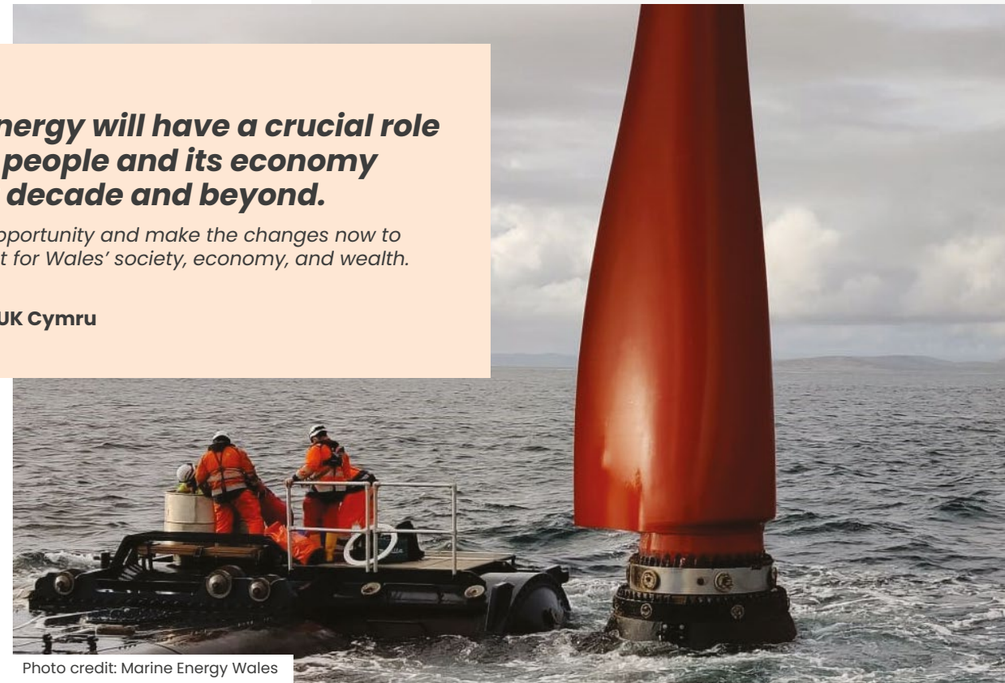


Photo credit: Marine Energy Wales

6. Wider benefits from investment in renewables

The case for investment in the sector is not just rooted in its ability to support GVA and jobs, but in how it comprehensively affects economic activity.

6.1 Driving economic activity across Wales

Different from other forms of economic activity, which may benefit from urban area knowledge clusters, renewable energy projects are developed where the natural resource is strongest. Through on and offshore wind, solar, and tidal stream, the renewables sector supports rural and coastal areas, as well as urban and industrial centres. This is particularly important for coastal communities, which often face less investment compared to cities, and rely heavily on seasonal industries like tourism.

By diversifying the local economy and creating sustainable, year-round employment, renewable energy provides a vital opportunity for these areas to flourish. Crucially, delivering more projects will require upgrading the electricity grid — improvements that not only cut emissions, but also strengthen infrastructure and economic resilience in these communities. Utility scale solar and onshore wind projects tend to be located within relatively rural areas. The construction of these projects creates demand for local business services, including companies involved in building the projects (e.g. civil engineering), those delivering building materials and necessities (e.g. concrete, steel), and ancillary services used by construction workers (e.g. accommodation).

Tidal stream activity and offshore wind projects see port locations as key epicentres of economic activity. These projects can also contribute to enabling investment in port infrastructure and support activity across marine economies. As discussed in section 5, project development supports employment across the professional services industry, which tends to be clustered around urban centres, including major cities in South East and South West Wales, particularly Cardiff.

Due to the different technologies involved and the geographical spread of activity, the renewables industry contributes to economic activity across the whole of Wales.

Under the Maximising Renewables scenario, the average annual impact is estimated to be up to:

- **£199 million GVA and 2,740 jobs in South East Wales;**
- **£162 million GVA and 2,400 jobs in South West Wales;**
- **£94 million GVA and 1,220 jobs in Mid Wales; and**
- **£119 million GVA and 1,620 jobs in North Wales.**

North Wales will benefit from tidal stream activity, with Mid Wales standing to gain from an expansion in onshore wind activity. Regions in the South of Wales are set to benefit from offshore wind, as well as professional services activity.

Figure 6-1 Regional economic impact - average annual employmentt

Source: BiGGAR Economics Analysis using Datawrapper

6.2 Supporting inward investment and exports

A clear commitment for investment in renewables, with a clear pipeline, ambitious targets and a resourced delivery plan, would support investment into domestic suppliers. This could lead to businesses moving part of their activities to Wales, supporting creation of new Welsh businesses or contributing to their expansion. A strong domestic business base creates export opportunities, enabling companies to build expertise through Welsh projects and expand across the UK and beyond. These opportunities are further strengthened by the UK Government's recent Clean Power 2030 Action Plan, which sets out a clear roadmap for investment in renewables to 2030 and beyond.

Exports are an opportunity in more established markets (onshore wind and solar), as well as in growing markets, such as tidal stream and offshore wind. These markets provide the opportunity of 'first-mover advantage' benefit where Wales could become a leader in the deployment of emerging technologies. This is especially true for floating offshore wind, with the Celtic Sea set to host one of the world's first commercial-scale leasing rounds. This, coupled with the Offshore Wind Industrial Growth Plan (IGP) recommendations, firmly highlights opportunities for Wales to take an early leadership position in this market.

6.3 Transferable skills

Diversifying renewable technologies is essential for energy security and to build a resilient, future-ready workforce and supply chain. As the renewable mix continues to evolve, the core skills needed, such as project management, planning, civil engineering, and environmental assessment, are highly transferable between technologies and from other related sectors e.g. fossil fuels. This allows companies and their workers that began with onshore renewables to pivot into emerging, offshore areas. It offers long-term growth for firms already embedded in the sector, and ensures that investments in people and expertise continue to deliver value as the industry expands.

Photo credit: RWE

Case study

Jones Bros Civil Engineering UK

Jones Bros is a major UK civil engineering contractor based in Wales, utilising their onshore wind experience to transition into the offshore renewables sector.

Founded in the 1950s, Jones Bros grew into a national civil engineering contractor, delivering large-scale infrastructure projects and has become a major force in the UK's renewable energy landscape. With over 30 years of experience in the sector and a portfolio of over 1,800MW of renewable projects, the company is a trusted partner in delivering clean energy infrastructure.

Their standout work on the 228 MW Pen y Cymoedd Wind Farm included 76 turbine foundations, 450km of cable, and significant economic impact to the local area, with over 70% of the workforce coming from within 35 miles of the site. The scheme claimed a Considerate Constructors Scheme national site gold in 2017, as well as civils project of the year at the 2018 Constructing Excellence National Awards.

Having completed more than 700 turbine foundations, the firm continues to lead in wind energy while expanding into new technologies. Recent projects include the world's largest offshore wind farm, Dogger Bank, and the Morlais tidal energy scheme in Wales—both award-winning for infrastructure delivery and community engagement. However, with 90% of their work now based in Scotland and England — and just 10% in Wales due to a lack of local projects — Jones Bros exemplifies how expanding the renewables sector in Wales could drive significant economic growth and create local jobs.

228MW Pen y Cymoedd Wind Farm

National Site Gold
Considerate Constructors Scheme, 2017

30+
years of experience

1,800MW+
of renewable projects

JONES BROS
CIVIL ENGINEERING UK

6.4 Diversifying economic activity

The renewables sector plays an important role in helping Welsh businesses diversify and strengthen their operations. The payments received by rural landowners for hosting renewable projects can be used to support core agricultural activity and enable other activities e.g. tourism. This is key at a time when traditional income streams are under pressure. Many professional services and civil engineering firms operate across multiple sectors. Work in renewables provides an additional, often stabilising, revenue stream particularly valuable during wider market downturns. For these businesses, the renewables sector expansion offers new opportunities and greater resilience in uncertain economic conditions.

6.5 Decarbonising economic activity and reducing household costs

As Wales moves towards 2050, electrification of the economy is expected to help reduce household bills. The 7th Carbon Budget, set out by the Climate Change Committee (CCC)[28], provides an overview of the costs and benefits of the net-zero transition, including distributional analysis of household effects. The CCC evidence is applicable to Wales, as it is linked to the GB energy market. The overview shows how the energy transition, including the electrification of transport through electric cars and heating through heat pump deployment, will increase demand for renewables, and reduce costs from home energy use and transport. **It is expected that renewables deployment could save households up to £1,000 per annum in 2050 compared to 2025.**

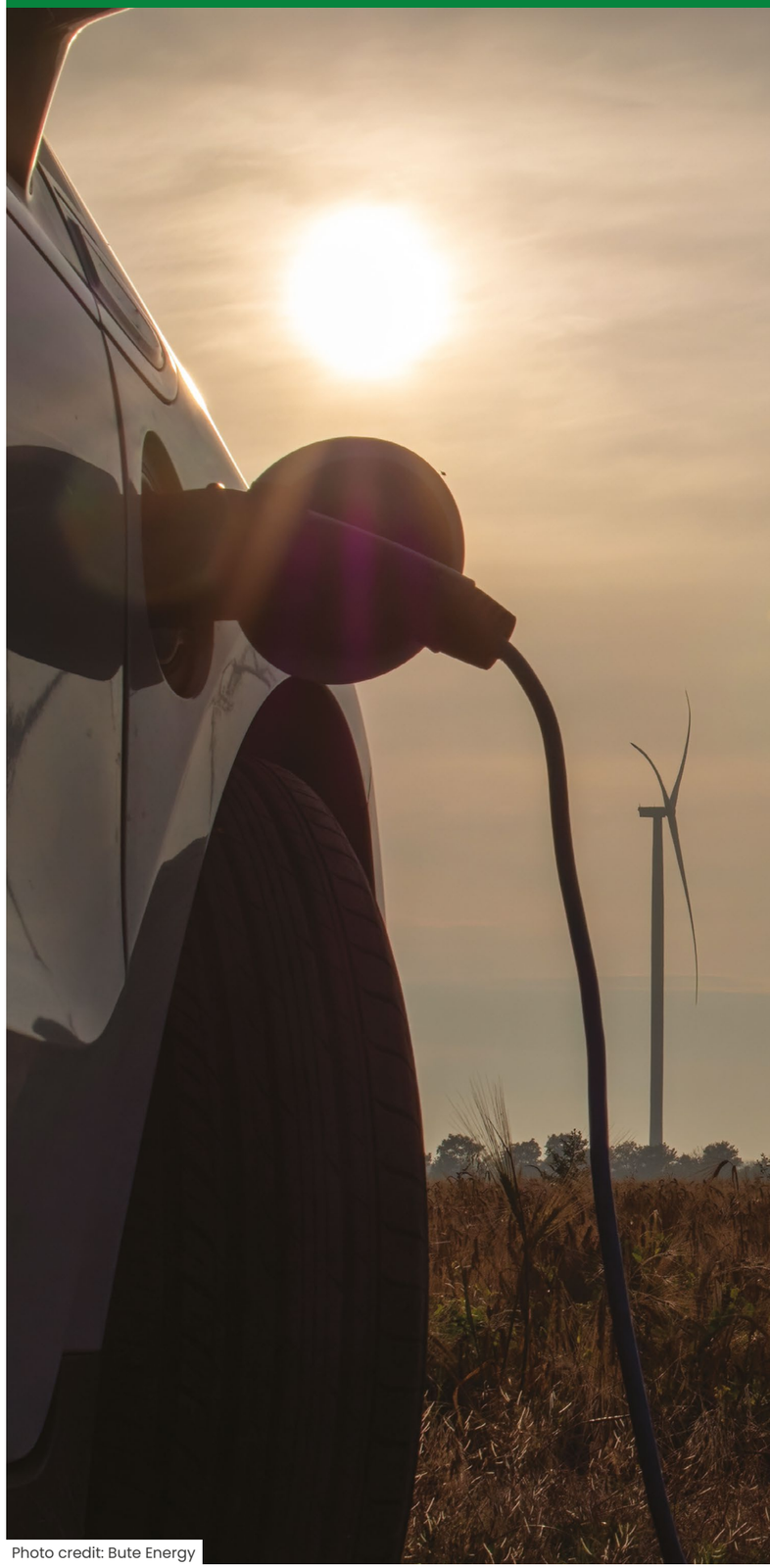


Photo credit: Bute Energy

[28] Climate Change Committee (2025), The Seventh Carbon Budget. Advice for the UK Government.

7. Reducing emissions

Deploying more renewable energy would enable a considerable reduction in Wales' carbon emissions. This extends beyond electricity generation itself, to include a reduction in emissions from transport and heating. By using more local suppliers and services, it also supports cleaner, greener supply chains.

Reducing emissions in Wales aligns with the Well-Being of Future Generations Framework. An expanded renewables sector will help Wales to reduce its global footprint, levels of nitrogen dioxide, and greenhouse gas emissions. With all three being important elements of the Well-Being of Future Generations Framework, progress across each of these areas will support goals for prosperity, resilience, being globally responsible, and having cohesive communities, as well as having a healthy population.

This section of the report addresses three key aspects of how renewable energy development in Wales affects carbon emissions:

- **Electricity grid emissions offset by the displacement of fossil-fuel generation;**
- **Heat and transport decarbonisation benefits enabled by increased clean electricity generation in Wales; and**
- **Embodied emissions and local content benefits arising through the development of local supply chains.**

7.1 Electricity grid emissions

Grid emission reductions depend on the rate of renewable energy development within Wales.

Under each scenario presented in this report, renewable energy production within Wales will increase significantly from its current level. Increasing deployment of renewables is essential if the Welsh Government is to meet its target of generating 70% of its annual electricity consumption from renewable sources by 2030, and 100% by 2035[29] – the basis of the Current Targets scenario. The higher deployment rates represented by the Increased Ambition and Maximising Renewables scenarios will mean Wales produces more renewable electricity than it consumes by 2035.

Predicted renewable generation under each scenario is presented below in Figure 7-1, alongside forecast electricity consumption and 2023 renewable generation figures[30] [31] for comparison. DESNZ average load factors specific to Wales[32] have been used to covert the deployment scenarios to energy generated.

Without further renewable energy development increasing demand will most likely be met by gas generation.

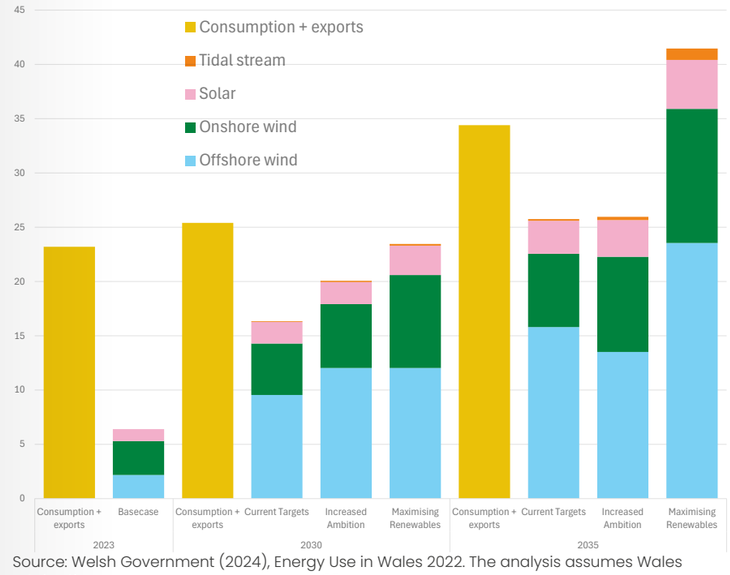
[29] Welsh Government (2024). Energy Use in Wales

[30] Regen (2022), Welsh Energy Targets Review.

[31] Welsh Government (2025), Energy Generation in Wales 2023.

[32] DESNZ (2024), Renewable electricity – standard load factors by region 2009-2023

Figure 7-1 Renewable energy generation by scenario



Source: Welsh Government (2024), Energy Use in Wales 2022. The analysis assumes Wales retains the same export capacity as in 2023.

Over 2023, in Wales total electricity generation was 23.2 TWh, with consumption of 14.8 TWh and the remaining 8.4 TWh exported to the rest of the UK, Ireland and the wider European electricity network. 15.4 TWh of electricity generated in Wales came from fossil fuels. Around 14.5 TWh of this total came from natural gas plants.

The existing role of Wales as a net exporter of electricity is currently driven by gas. As Wales transitions to net zero, there will remain the opportunity to benefit from its natural resources and export clean energy. This is what is achieved by the Maximising Renewables scenario, which, by increasing generation to 41.5 TWh, will both ensure domestic consumption is met and the role of Wales as a beneficiary from energy export is retained and expanded.

If no further renewable energy capacity is installed in Wales, the energy required to both meet consumption and remain a net exporter of energy will instead be provided by other technologies, most likely combined cycle gas turbines (CCGT). The shortfall between the current level of renewable generation (7.8 TWh across all technologies in 2023)[33] and the 2030 and 2035 scenarios (shown in the chart) could be as great as 15.7 TWh in 2030 and 33.7 TWh in 2035.

The carbon intensity of gas combustion in combined cycle gas turbines (CCGT) is 394g CO2 per kWh of electricity generated[34]. The equivalent figure for wind and solar generation is 0. The resultant carbon savings within Wales from producing this electricity with renewable sources rather than by burning gas could be as much as 6.2 million tonnes (Mt) of CO2 by 2030, and 13.4 Mt by 2035 (if the Maximising Renewables scenario is delivered).

Supporting Wales' electricity exports through renewables will not only reduce emissions, but also spread the socio-economic benefits more widely than would be the case with other forms of electricity generation.

Table 7-1 Renewable energy generation and emissions offset by scenario

Scenario	Renewable generation	Emissions offset
Base Case (2023)	**7.8 TWh**	**-**
Current Targets	**2030: 16.4 TWh** **2035: 25.8 TWh**	**2030: 3.4 Mt** **2035: 7.1 Mt**
Increased Ambition	**2030: 20.0 TWh** **2035: 26.0 TWh**	**2030: 4.9 Mt** **2035: 7.2 Mt**
Maximising Renewables	**2030: 23.5 TWh** **2035: 41.5 TWh**	**2030: 6.2 Mt** **2035: 13.4 Mt**

Photo credit: Rheidol Power Station - Statkraft

[33] Welsh Government (2025), Energy Generation in Wales 2023.

[34] NESO. Carbon intensity dashboard.

[32] Our World in Data (2025). Iceland: CO2 Country Profile.

[33] NESO (2024). Future Energy Scenarios 2024

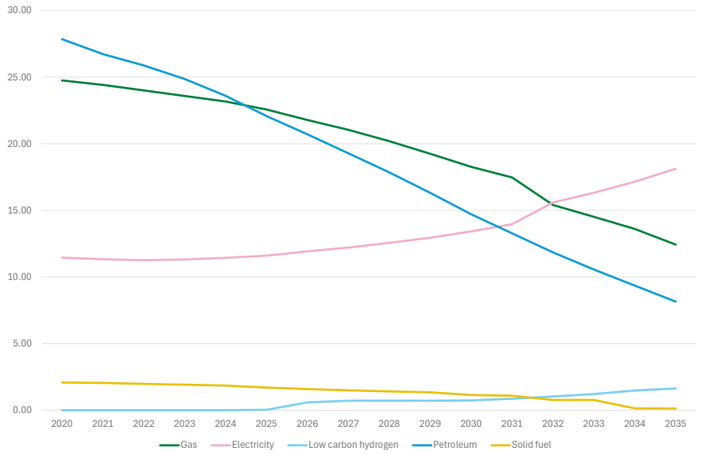
[34] Regen (2022). Welsh Energy Targets Review.

7.2 Heat and transport decarbonisation

Reaching net zero in Wales will depend heavily on switching heat and transport systems away from fossil fuels and towards cleaner, renewable electricity.

Currently, heating and road and rail transport across Wales consume large amounts of energy, mostly from burning gas in homes and industry, and from petrol and diesel in vehicles[35]. Both national and regional net zero strategies[36 37] rely on replacing these with electric alternatives: heat pumps in homes, electric-powered district heating networks, and the electrification of industrial heating processes[38].

Figure 7-2 Electricity in the heat and transport sector



Source: CCC 6th Carbon Budget, Balanced Net Zero Pathway

Photo credit: Bute Energy

On the transport side, the Welsh Government aims to deliver up to 55,000 fast electric vehicle (EV) chargers by 2030[39] and expand electric bus and rail services. While alternative fuels like green hydrogen will play a role, most of this transition will depend on electricity. Therefore it is critical that this comes from low carbon sources.

The potential carbon savings are significant. According to the Climate Change Committee's Sixth Carbon Budget, electrifying heat and transport could cut emissions in Wales by 4.5 Mt of CO_2 by 2030, rising to 10.4 Mt by 2035. These figures are measured against a scenario in which no additional action is taken beyond what was already in place as of 2020[40].

> **Electrification requires significant growth in renewable generation capacity.**
>
> **Gemma Grimes,**
> **Director of Policy and Delivery, Solar Energy UK**

Photo credit: Marine Energy Wales

7.3 Embodied emissions and local content

Manufacturing and construction are the next frontier for renewable energy sustainability. Like all large-scale infrastructure, renewable energy developments require huge quantities of materials and can be difficult and costly to build. Because renewables do not directly produce any carbon emissions during operations, manufacturing and construction are the most emissions-intensive phases. As a result, improving sustainability in renewables focuses on these stages.

Wales' ambitious targets will require huge quantities of raw materials. To meet the nation's renewable generation targets, hundreds of wind turbines and millions of PV modules will be needed to be manufactured, transported to site and installed. With typical offshore wind turbine foundations containing upwards of 1,000 tonnes of steel[41], the associated embodied emissions are significant. Primary sources of emissions include steel and concrete in foundations, glass in PV modules, and rare earth metals in electrical components.

Even with current supply chains, 'carbon pay off' is surprisingly short. Modern wind turbines have been shown to offset the carbon emissions of their entire lifetime in less than two years[42]. The period is similar for solar projects[43], meaning renewables will save far more carbon than they produce over their 30-year plus operational lives. As supply chain sustainability improves, this payback period will only shrink.

Wales is uniquely positioned to benefit from the growing focus on sustainable renewable energy development. Sustainable supply chains are typically more localised and rely on low-carbon methods. For Wales' renewable energy industry, this means developing advanced supply chains near project sites. The environmental benefits of this are clear: by reducing the need for long-distance transportation of materials, Wales can avoid emissions associated with global shipping. Additionally, by using low-carbon techniques to produce these materials, the supply chain can become even more sustainable. Wales stands to gain significantly from the shift towards sustainable supply chains in both new and existing projects.

Examples include:

- **The construction of an Electric Arc Furnace at Port Talbot, estimated to produce up to 3.2 million tonnes of steel per annum and have an annual electricity requirement of up to 1,800 GWh when operational.**
- **The 'Future Port Talbot' floating offshore wind hub development**
- **Local manufacturers such as GB-Sol** (see case study in Section 5)**.**

[35] Welsh Government (2024), Heat Strategy for Wales.
[36] Welsh Government (2022), Net Zero Strategic Plan.
[37] HM Government (2021), Net Zero Strategy: Build Back Greener.
[38] Welsh Government (2024), Heat Strategy for Wales.
[39] Welsh Government. Electric Vehicle Charging Strategy for Wales.
[40] CCC 6th Carbon Budget, Balanced Net Zero Pathway.
[41] Dillinger (2023). Steel is the Vital Ingredient. Solutions in Steel for Offshore Wind Energy Installations.
[42] Taylor & Francis (2024). Wind Farms can Offset their Emissions within Two Years, New Study Shows.
[43] National Grid. Solar power: your questions answered.

8. Habitat management and restoration

Supporting habitats and biodiversity features within the Well-being of Future Generations Framework.

Photo credit: Trydan

Protecting ecosystems are an essential part of the Well-being of Future Generations Framework. There are at least 6 key indicators that all contribute to both **A Resilient Wales** and **A Globally Responsible Wales**. Indicators include:

- **Concentration of carbon and organic matter in soil;**
- **Amount of waste generated that is not recycled, per person;**
- **Percentage of designated historic environment assets that are in stable or improved conditions;**
- **Areas of healthy ecosystems in Wales;**
- **Status of biological diversity in Wales; and**
- **Percentage of surface water bodies, and groundwater bodies, achieving good or high overall status.**

Renewable energy projects contribute to protect ecosystems by reducing fossil fuel use, leading to cleaner air and water; and implementing biodiversity-positive strategies.

8.1.1 Overview

The Welsh Government's 2019[44] guidance and the Planning Policy Wales (Edition 12)[45] mandate a net benefit for biodiversity in new developments, reinforcing the importance of sustainable practices in renewable energy development. Renewables in Wales have the potential to deliver significant positive impacts on natural habitats and biodiversity, driven by two key mechanisms:

- **The reduction in fossil fuel use, leading to cleaner air and water; and**
- **The implementation of nature-positive renewable projects that enhance biodiversity.**

8.1.2 Fossil fuel reduction

The reduction in fossil fuel usage benefits habitats and biodiversity in Wales by reducing the following negative impacts:

- **Poor Air Quality**
  Air pollution can be toxic to sensitive plants, trees and animals. The dry deposition of nitrogen oxides and sulphur dioxide from polluted air can harm biodiversity, degrade habitats and alter ecological processes;
- **Acidification**
  Pollutants like nitrogen oxides and sulphur can alter soil pH, affecting nutrient availability and plant growth. This can degrade habitat and have cascading effects for the animals that rely on these plants;
- **Eutrophication**
  The atmospheric deposition of nitrogen due to the burning of fossil fuels causes nutrient-over enrichment of freshwater or coastal ecosystems. This depletes oxygen in the water and promotes harmful algal blooms killing aquatic life;
- **Climate Change**
  Greenhouse Gas Emissions (GHG) from the use of fossil fuels are driving climate change. A rapidly changing climate exerts temperature stress on natural habitats, causing them to degrade;
- **Water Pollution**
  When air pollution dissolves in rainfall it damages habitats by wet deposition of acid, toxins or excess nutrients. Water bodies are susceptible to this type of harm, and it can occur at long distances away from the pollution;
- **Heavy Metals and Toxins**
  The accumulation of heavy metals and toxins in flora and fauna can alter the food web and nutrient cycling, leading to ecosystem changes.

[44] Welsh Government (2019). Biodiversity enhancements: guidance for heads of planning.

[45] Welsh Government (2024). Planning Policy Wales, Edition 12.

8.1.3 Nature positive renewables

Renewable energy projects can be located, designed and implemented in ways that actively support habitat protection, restoration and biodiversity enhancement;

- **Protect**

Landowners receive annual payments for hosting renewable energy on their land. This reduces the pressure to seek revenue from destructive land use activities, such as peat extraction, intensive grazing or commercial forestry. Similarly, through landowner agreements, renewable energy companies can control how an area is farmed. For example, solar farms result in land no longer being intensively managed;

- **Restore & enhance**

Well-designed and managed renewable energy projects can bring private investment to restore (e.g. peatland) and enhance habitats and address biodiversity loss. The consent process has locked in requirements for habitat protection and enhancement that are legally enforceable. For example, the creation of new fish nurseries around offshore wind farms; and

- **Reconnect**

If supported by an appropriate regional or national development plan, renewable energy can facilitate protection and restoration of habitats on a large scale to reconnect fragmented habitats, create wildlife corridors and maintain ecological connectivity. Wales' largest onshore wind farm, Pen y Cymoedd, is a strong example of best practice in a Welsh context, particularly through its peatland restoration work. The restored peatland will create vital habitat for returning wildlife, including endangered water voles, and act as a carbon sink to absorb and store CO2 from the atmosphere.

Solar:

There are many different ecological enhancements that can be delivered within a solar farm:

- **Meadows between rows of solar modules for wildflowers and wild bird seed mixes;**
- **Enhancing hedgerows by infill with native species and better hedgerow management;**
- **Pond and wetland features, such as scrapes and swales; and**
- **Animal and habitat creation, such as hibernacula, beetle banks, bee hives, wood piles, bat boxes.**

Well designed and managed solar farms benefit habitats and biodiversity by:

- **Creating and enhancing ecological habitats;**
- **Providing increased habitat connectivity through planting or infilling;**
- **Reducing or eliminating the use of pesticides, herbicides and fertilisers;**
- **Stopping intensive farming practices leading to lower pollution and better soil and water quality;**
- **Improving soil regeneration and carbon sequestration; and**
- **Increasing pollinator densities.**

Parc Worlton Solar Farm is located near Barry, Vale of Glamorgan. This recently consented project will involve a 55% biodiversity net gain.

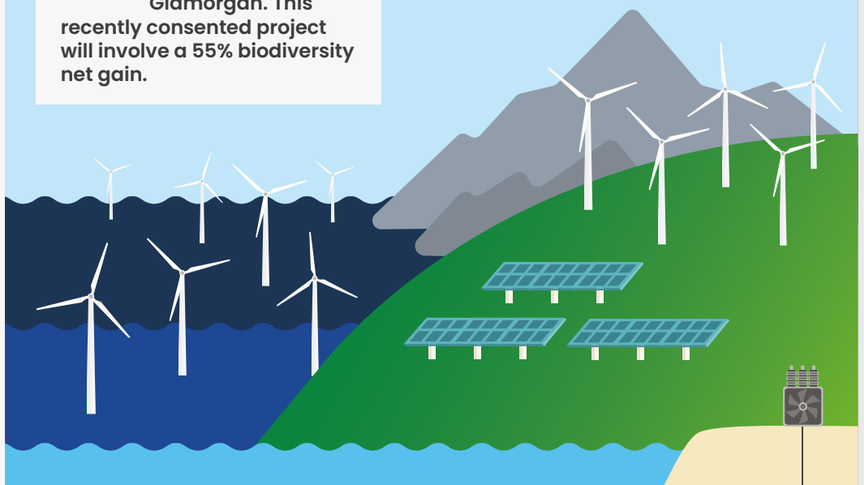
Onshore Wind:

Locations where the windspeed supports onshore wind power often coincide with mountains, moorland and heath (MMH) habitats. These upland ecosystems make up 19.3% of Wales' land area. The small physical footprint of wind farms within the larger landholding unlocks opportunities for:

- **Conservation work;**
- **Peatland or bog restoration;**
- **Regeneration of native woodland between turbines, enhancing woodland cover;**
- **Re-establishment of native hedgerows and heathland where appropriate; and**
- **Creating new habitat to improve ecological connectivity.**

Vale of Leven 70MW wind farm, West Dunbartonshire, Scotland. The project is looking to enhance peatland; restore grassland; create 111 ha of new native woodland, all within the same ownership of the windfarm.

The Brechfa Forest 57.4 MW windfarm. This project actively manages habitat by initiatives such as the partnership with the Bumblebee Conservation Trust which plants wildflowers and aims to bolster pollinator populations.



Improving biodiversity

Pen y Cymoedd, a 228MW onshore wind farm in South Wales, has operated since 2017. Built on former peatland damaged by Sitka spruce forestry, it includes a 25-year, £3 million Habitat Management Plan (HMP) focused on biodiversity restoration. Covering 1,500 hectares, the HMP began in 2019 and includes felling trees, blocking drainage ditches, and flipping stumps to rewet the bog. So far, through the HMP, 200 hectares have been successfully rewetted, with groundwater levels improving. Sphagnum mosses and other appropriate plant species are returning, alongside threatened species like water voles and otters in the River Cynon. Ongoing flora and fauna monitoring is in place. Currently 75 hectares is being restored with another 150 hectares in planning over the next two years. By 2035, the ecosystem is expected to resemble its natural pre-forestry state, with further biodiversity gains anticipated. Hardy cattle are expected to be introduced to the site to manage vegetation and promote the long-term growth of plant communities.

Alongside activity from the HMP, land is being restored as part of the Lost Peatlands of South Wales Project, funded by the Heritage Lottery, with the aim to recover the area's upland landscape. A first phase has been completed. Planning is underway for a second phase, with Pen y Cymoedd as a key partner in further restoration work.

Offshore wind and tidal stream:

Offshore wind farms can also have a nature positive impact. The foundations of the turbines can act as artificial reefs and attract fish (stimulating population growth), which in turn draws other species to the area. This increase in biodiversity can be further enhanced with active use of nature inclusive solutions, such as specific scour protection or cable protection that boost reef development. The environmental impact of tidal stream energy can be mitigated by thoughtful project design to minimise risks to the ecosystem. Environmental monitoring to date has shown no evidence of collisions, with marine life such as seals demonstrating avoidance behaviour during peak flows.

8.1.4 Further benefits

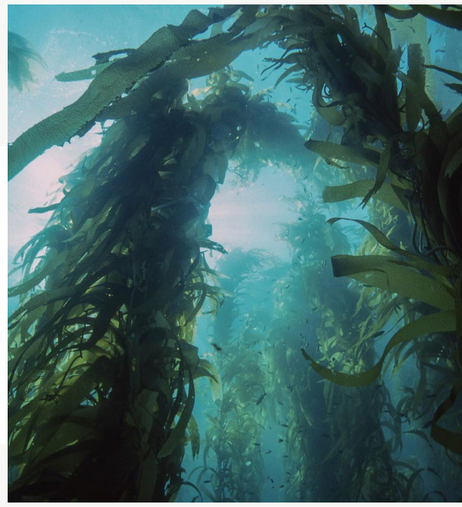
Renewables nature positive approach brings further potential benefits:

- **Research and education opportunities.**

Clocaenog Forest Wind Farm's HMP, which funded a PhD in dormouse behaviour in upland commercial forestry;

- **Species and habitat monitoring;**
- **The funding provided by renewable energy developers can be used as match funding for further habitat and biodiversity projects by other groups/charities.**

Pen y Cymoedd's £3 million Lost Peatland project leveraged £5 million match funding from local authorities and Natural Resources Wales.



- **Community health and wellbeing.**

9. Empowering communities

An expanded renewable energy sector could deliver large scale societal benefits by ensuring that wealth generated from renewables empowers local communities to better meet their needs. Wales has a strong track record of involving local communities in renewable projects and sharing the wealth generated. This approach has proven successful in transforming and empowering communities, demonstrating that the sector has a profound and positive impact on the well-being of Wales.

9.1 Approaches to sharing wealth

When focusing on economic development and inclusive growth, it is essential to consider the distribution of financial benefits and benefit-in-kind. In the renewables sector, established practices, such as community benefit funds (CBF), local electricity discount schemes (LEDS), and local and shared ownership schemes, play a key role in distributing wealth equitably, enabling communities to invest in initiatives that address their specific needs.

9.1.1 Community benefit funding (CBF)

CBF is a direct financial transfer from renewable energy developers to the local community hosting infrastructure. The funds are paid over the lifecycle of the project, and used to support a variety of different community initiatives within a specified radius of the development. This might include supporting local community groups, building new or renovating existing community buildings, supporting the development of community energy projects, supporting local skills development, setting up conservation projects, and providing business support, among many other possibilities. It has become good practice to offer a CBF associated with renewable energy projects across the UK. A voluntary approach to CBF is important to enabling the formation of mature, collaborative relationships between communities and developers, and is just one aspect of community engagement. Current expectations in Wales are that developers offer £5,000 per MW per year for the operational life of an onshore windfarm; this is aligned with the rest of the UK, although sometimes developers offer more. In a 2023 report, RenewableUK Cymru found that onshore wind projects were already contributing more than £6.5 million a year to Welsh communities from 1.3 GW of installed capacity, predicting that they could grow to £20 million a year if capacity were increased from 1.3 GW to 3.5 GW . As shown earlier, the current report estimates that, based on £5,000 per MW, in the most ambitious scenario **community benefit funding could total up to £183 million in the period to 2035.** This averages at £15 million each year, but once all projects are operational in 2035, it could be up to £24.7 million each year.

As discussed in Section 9.2, CBF has the potential to generate far greater benefits. A recent study used the Wellbeing-Adjusted Life Years (WELLBY)[46] approach to quantify wider wellbeing impacts of two wind farms in Scotland, which awarded £2.8 million in community benefit grants. This level of CBF generated between £10-£14.5 million in wellbeing benefits, in addition to £11.8 million in local economic value. Applying these ratios to the estimated CBF in the ambitious scenario, £183 million could potentially result in between £651- £937 million in wellbeing benefits, along with £765 million in local economic value. While caution is needed when drawing conclusions from a single study, this example illustrates the significant potential for transformative community benefits in Wales. In the case of solar energy, where yields are generally lower, expectations for CBF are not as clearly established, but there can still be substantial positive impacts on communities[47].

Photo credit: Bute Energy

9.1.2 Local and shared ownership

Another way in which wealth from renewable energy can be shared is through exploring opportunities for local and shared ownership. This approach not only enables others to share in wealth creation by having a direct stake, but also increases the chances that the economic value stays within the local area, creating broader, long-term benefits for the community.

Whereas local ownership of renewable energy requires that the individual or business is principally based locally (in Wales), shared ownership is where there is some form of investment. This could be a direct equity stake, revenue sharing, or direct ownership in a project by more than one legal entity, such as a developer and a community group, individuals, landowners, or a public sector organisation. The investment in renewables by Wales Pension Partnership is an example of this. As of 2020, the Welsh Government expects all new renewable energy projects to include an element of 'local ownership', which can be achieved by offering local bodies the opportunity to invest. Whilst there is no legislative requirement around local and shared ownership, most renewable energy companies give communities the opportunity to invest. However, there are often practical limitations within communities around realising these opportunities, including limited access to funding and the need for communities to take on additional financial risk, challenges in building community consensus, and a lack of expertise in managing a project risk.

9.2 Community impacts

Whether through community benefit funding or the proceeds of local or shared ownership, the redistribution of wealth within the renewables sector has already delivered meaningful and lasting impacts in communities across Wales. One of the key benefits of shared wealth from the renewable sector is that it empowers communities to set their own priorities and invest in what matters most to them. But the benefits go even further: fostering social cohesion, creating local jobs and skills pathways, strengthening a sense of place, supporting healthier, more active lifestyles, among many others.

[46] 'Onshore wind in Wales: how our sector works with communities', RenewableUK Cymru, November 2023

[47] WELLBYs (well-being Adjusted Life Years) are a tool for assessing well-being impacts recommended by HM Treasury. 'Wellbeing Guidance for Appraisal: Supplementary Green Book Guidance', HM Treasury, July 2021

[48] 'Impact Assessment of SSE Renewables Achany and RWE Rosehall Wind Farms Community Benefit Funds', BiGGAR Economics, February 2025

Photo credit: Porth Wen Community Fund – EDF Renewables

Having agency over our lives is a vital source of well-being, and community benefit funds **empower communities**. A key indicator in the Well-Being of Future Generations Framework is the percentage of people who feel able to influence decisions affecting their local area. This indicator helps to gauge performance on 6 of the 7 well-being goals in Wales.

Projects that **foster social cohesion** are expected to have strong impacts on at least four of Wales' national indicators of well-being, such as the ability for people to influence local decisions, the percentage of people who are lonely, and a person's sense of belonging and respect. Projects that **create local jobs and skills pathways** impact on several of the national indicators of well-being, such as rates of employment or training and inequality in educational outcomes. Progress on these indicators count toward A More Prosperous and A More Equal Wales. Projects that **strengthen a sense of place** play a key role in making Wales both A Nation of Cohesive Communities and a Wales of Vibrant Culture and Language. Such projects have the potential to significantly influence a number of national well-being indicators, such as satisfaction with local area, participation in arts, culture, or heritage activities, and the number of people speaking Welsh. Projects that **support healthier, more active lifestyles** help ensure A Healthier Wales and have direct impacts on several national indicators of well-being, including the percentage of people with healthy lifestyle behaviours and journeys made by active transport.

Some excellent examples of how community benefits can empower communities are provided by Vattenfall and RWEs' projects in Wales.

Case study

Community funds from Rhyl Flats and Gwynt y Môr wind farms have contributed to address local social challenges.

The community funds from Rhyl Flats and Gwynt y Môr wind farms have allowed us to enhance our facilities and expand our reach, proving that with the right support, community projects can thrive and adapt to ever-changing local needs.

Abergele Community Action

RWE and Abergele Community Action

Community Benefit Funding has been essential for groups like Abergele Community Action, enabling them to deliver activities that address social challenges and unite the community.

With a community hub that supports digital skills and employability, as well as a food bank, money advice, and fuel poverty service, the community benefit funding has helped to reduce social isolation and combat poverty. Each week, the hub welcomes around 175 users, supports 225 young people, and sees 90 regular visitors to the community shop. If 5% of these people experienced reduced social isolation, the well-being benefits could be worth £0.3 million. Additionally, 180 people used money advice services, and if half saw reduced financial strain, the well-being benefits would be £0.4 million. With 9 staff and 30 volunteers, there are further benefits worth £0.1 million. **Overall, Abergele Community Action generates well-being impacts of at least £0.8 million per year,** from a total 2024/25 funding of £256,239, including £19,999 from wind farms.

Case studies

Vattenfall's Pen y Cymoedd (PyC)

In 2024, Pen y Cymoedd generated £2.4 million for the upper Rhondda, Cynon, Neath, and Afan valleys, directly supporting the community's vision.

The onshore wind farm will continue to provide community benefit funding for 25 years, driving long-term change and making the valleys a better place to live, work, and enjoy.

Community Vision: Co-designed over two years by 4,000+ residents, the fund is shaped around local needs—from jobs and health to transport and culture.

Funding Priorities: The fund backs bold, early-stage ideas; supporting schools, skills, wellbeing, and local infrastructure.

Independent and Community-Led: Independent from the developer, the fund invites applications from all. A local board decides what to fund based on alignment with the community's vision.

The provision of funding to Afan Valley Swimming Pool by Pen y Cymoedd shows how community benefits can support healthier, more active lifestyles.

Pen y Cymoedd and Afan Valley Swimming Pool

Afan Valley Swimming Pool has become a vital community hub after being awarded £300,000 across 5 years, which helped keep the pool open and supported swim groups, a youth club, a Police Community Support Officer, and family services.

Photo credit: Vattenfall

The pool sees 36,000 visits annually—around 1,490 local users. The well-being value of this engagement is estimated at £1.1 million per year. With 13 staff and 8 volunteers, it adds another £0.1 million in well-being benefits annually. Over five years, this totals more than £6 million in value to the community. While not all benefits can be directly attributed to Pen y Cymoedd, they likely would not exist without the fund's crucial early support.

Similarly, interventions such as Building Resilience in Communities can help create local jobs and skills.

Photo credit: Vattenfall

Pen y Cymoedd and BRiC

Building Resilience in Communities (BRiC) received £276,265 to deliver an innovative model of socio-economic change that supports health and skill development, whilst addressing a local regeneration issue.

The Pen y Cymoedd area faces challenges like industrial decline, unemployment, skills gaps, depopulation, and housing issues. The Building Resilience in Communities (BRiC) project tackles these by helping 100–130 marginalised individuals build confidence and skills through renovating empty homes. Each participant follows a tailored learning plan to overcome personal barriers and develop both soft and practical skills. The project offers lasting economic and well-being benefits, while also increasing access to suitable housing.

10. Welsh well-being support

The development of renewables in Wales will not only ensure economic prosperity, but also contribute to the achievement of other well-being goals.

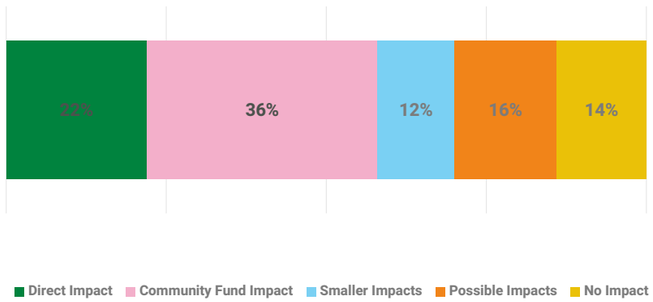
Wales has set out its ambitions as a well-being economy in the Well-being of Future Generations Act 2015. The Act centres around the achievement of seven well-being goals. To gauge national progress towards these goals the Senedd has outlined 50 indicators. The contribution of the renewable energy sector to these well-being goals is assessed based on the likely impact of its activities on these indicators.

10.1 Impact on the national indicators

The national indicators are diverse, with 86% (43 out of 50) identified as relevant to renewable energy. Of these, 11 indicators are strongly impacted by the industry's core activities, while 20 indicators are influenced through community benefit funding (with 2 overlapping with direct impacts). Another 6 indicators are impacted indirectly or to a smaller extent. Additionally, 8 indicators have the potential to be influenced, while 7 are unaffected. This is summarised in Figure 10 1.

To **maximise the contribution of renewable energy to Wales' well-being goals,** it is essential that Wales pursues the most ambitious deployment scenario. The scale of impact across the national indicators — and the speed at which well-being outcomes are delivered — will depend on the level of renewable energy development achieved. **An ambitious approach would unlock the full potential of the sector to drive economic, environmental, and social prosperity for future generations.**

Figure 10-1 Contribution to well-being indicators by source



Source: BiGGAR Economics Analysis

Photo credit: Bute Energy

10.1.1 Direct impacts

This report illustrates that there will be strong national impacts across:

Value Added (GVA) per hour worked: the sector could support average annual GVA to 2035 of £525 million.

Percentage of people in employment: the sector will support average annual employment to 2035 of up to 7,130 jobs.

Capacity (in MW) of renewable energy equipment installed: up to 17,745 MW of operational capacity by 2035.

Although not estimated in the report, strong national impacts are expected on at least five additional indicators, including high-level environmental measures like nitrogen dioxide levels, Wales' global footprint, and greenhouse gas emissions, as well as two employment-related indicators. Additionally, three more indicators are likely to be moderately positively influenced at the national level, including:

- **Gross Disposable Household Income per head;**
- **Percentage of adults with qualifications at the different levels of the National Qualifications Framework; and**
- **Percentage of businesses which are innovation-active.**

10.1.2 Direct impacts via CBF and local and shared ownership

Renewable energy is already having substantial impacts across communities throughout Wales. Impacts to date have primarily been through CBF, but also local and shared ownership options. Either way, these bring substantial impacts to a community that are many multiples the value of the funds themselves. With the continued expansion of the renewable energy sector, these effects will only intensify.

It is estimated that there is the potential for direct community impacts on 20 indicators through empowering communities and bringing them together, providing employment opportunities and skills development, creating a sense of place, supporting healthier lifestyles and cultural development, among many others. Most of these impacts will be substantial at the local level and include:

- **Percentage of people who feel able to influence decisions affecting their local area.**
- **Percentage of people satisfied with their ability to get to/ access the facilities and services they need;**
- **Percentage of people who volunteer;**
- **Percentage of people satisfied with local area as a place to live;**
- **Percentage of people who are lonely; and**
- **Percentage of people participating in sporting activities three or more times a week.**

10.1.3 Smaller indirect impacts

There are a further 6 indicators linked to health and poverty that are likely to be influenced in some small but indirect way. The limited influence arises because the indicators are distantly related to renewable energy, but nevertheless the clear environmental, economic, and community benefits that this report highlights will likely feed into their improvement.

10.1.4 Potential positive impacts

Whilst there are 7 indicators unlikely to be affected in any way, for example relating to confidence in the justice system, there are a further 8 indicators where there is strong potential for a positive impact or status of digital inclusion. However, the strength of this positive impact depends on how businesses operate, and the extent to which they intentionally address these areas. For example, some indicators relate to employment conditions, such as pay disparities by gender, disability, and ethnicity, or whether wages are set through collective bargaining. Others focus on the local environment, including the extent of healthy ecosystems and biodiversity, where renewable energy developments are playing an increasingly important role.

Photo credit: Alltwalis Wind Farm - Statkraft

10.2.1 Direct Impacts

Renewable energy is now a cornerstone of Wales' well-being ambitions.

A Prosperous Wales

Prosperity in Wales is not just about rising incomes; it is about laying the foundations for future success. Renewables play a critical role, with direct impacts on 11 of the national well-being indicators (37%). When including the wider benefits of community funding and shared ownership, this rises to 16 indicators; over half (53%) of those relevant to this goal. A further 4 indicators may be positively influenced in smaller ways, meaning the sector has the potential to impact 87% of the national indicators tied to a prosperous Wales.

A Resilient Wales

This goal is measured using 24 national indicators, many of which overlap with other well-being areas. Renewable energy directly supports 5 of these (21%). When broader community benefits are factored in, the total number of influenced indicators rises to 13 (54%). Smaller impacts are expected across 2 more indicators, giving the sector a potential positive influence on 88% of relevant indicators for a resilient Wales.

A Healthier Wales

Health is monitored through 34 national indicators. Renewable energy directly supports 7 of these (21%). Including community benefits, such as funding for local health and lifestyle initiatives, increases this to 22 indicators (65%). An additional 5 indicators could be moderately influenced, meaning the sector may contribute to 88% of all health-related indicators.

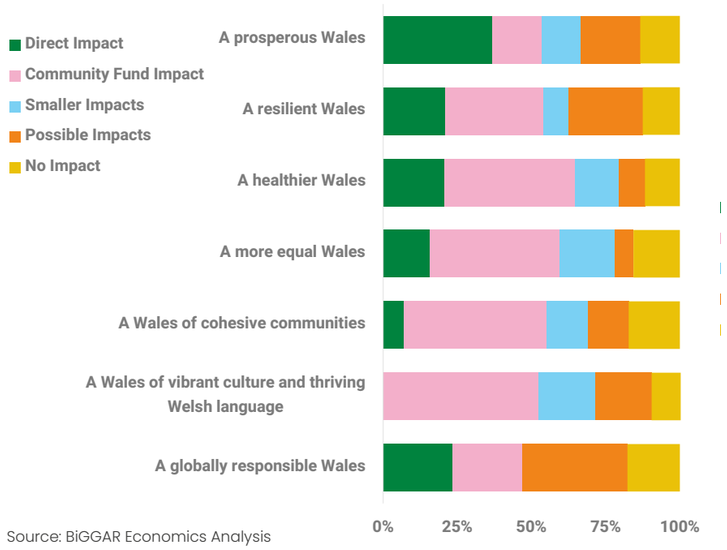
A Globally Responsible Wales

This goal uses 17 national indicators. Renewable energy has a direct influence on 4 (24%), with an additional 4 impacted through community-level action, bringing the total to 47%. Smaller or indirect effects are expected across another 6 indicators, meaning the sector has the potential to support up to 82% of the indicators used to track progress towards a globally responsible Wales.

10.2 Contribution to Welsh well-being goals

Renewable energy's contribution to the seven well-being goals is measured by the number of national indicators it directly or indirectly impacts. Overall, the renewable energy sector has strong direct impacts on at least 4 of the 7 goals: a prosperous Wales, a resilient Wales, a healthier Wales, and globally responsible Wales (see Figure 10 311 2). Including the impact of community benefit funds and other forms of wealth sharing, like local and shared ownership, the renewable energy sector contributes meaningfully to all seven well-being goals.

Figure 10-2 Contribution to Well-Being Indicators by Source and Goal



Source: BiGGAR Economics Analysis

10.2.2 A more equal Wales, with cohesive communities, and a vibrant culture and language

While the remaining three well-being goals are less directly shaped by renewable energy, the sector's wider community benefits still play a major role, contributing to at least 40% of the relevant indicators for each. Indirect impacts add further value. The renewable sector has had substantial impact on all of Wales' seven well-being goals, and its continued growth will only strengthen this, sealing Wales' position as a global leader in building a well-being economy.

Photo credit: Bute Energy

11. Capitalising on opportunities

As this report has shown, the renewables industry is a **transformational socio-economic growth opportunity** for Wales. Under the most ambitious renewable deployment scenario, there is significant potential for Wales in terms of economic prosperity and growth, societal well-being, tax revenue, wider benefits of resilience through diversification and decentralisation, rural development and community support, as well as emissions reduction, and habitat restoration. To capitalise on opportunities and associated benefits, **catalytic investment** is required in key areas by a range of industry actors and stakeholders.

Infrastructure

One of the principal centres of economic activity in the growth of the renewables industry is ports. While Wales has several ports, most are not yet equipped to fully capitalise on opportunities in offshore wind construction, operations, and decommissioning, as well as onshore wind and tidal stream energy.

Considerable investment into port infrastructure, facilities and available space is required to facilitate activity and encourage inward investment. Ports tend to be regional economic activity anchors and, under the right conditions, act as a draw for local and foreign businesses, creating clusters. A clear pipeline of projects, coupled with private sector funding and further support from both the UK and Welsh governments is essential to prepare Wales's ports for the upcoming renewables boom.

Continued development of and investment in the **national grid network**, with new and upgraded grid connections and substations throughout Wales, will be crucial to allow the export of clean power from generation locations to demand centres in Wales and the rest of the UK. However, it goes further than this. Businesses, residences and infrastructure in some areas of Wales are currently curtailed in their activities, due to a lack of grid connectivity. This not only affects the opportunity of economic growth and prosperity in the rural heartlands of Wales, but also represents a significant hurdle in their ability to decarbonise. Not only will a lack of investment in the grid lead to delays in deployment of renewable energy projects and stranded assets, it also increases uncertainty in the market, erodes investor confidence, and reduces the likelihood of achieving Welsh Government targets.

By contrast, delivering NESO's Clean Power 2030 strategic investment plan will drive additional economic activity beyond the direct benefits of renewable energy expansion. It will stimulate development, construction, and operation of new grid infrastructure, creating new jobs and business opportunities.

Crucially, it will enable businesses in rural areas — such as manufacturing firms — to expand, where they were previously held back by limited or non-existent grid connections and high energy demands. It will also ensure that both current and future businesses can be powered by clean, decarbonised electricity rather than relying on fossil fuels.

Skills

The expansion of renewables in Wales will require a **considerable, skilled workforce, both now and in the future.** To meet this need, targeted public, private, and educational sector investment is crucial. To expand the skills pool, investment should focus on upskilling and cross-skilling existing workers, including ex-military personnel and those from other industries, as well as supporting training programmes for school-leavers and recent college and university graduates.

For the industry's future success, skills pipeline investment is required. This entails support for STEM subjects and programmes within education institutions and industry-specific courses. It is critical that efforts are made to tackle inclusivity and diversity within the sector. Actively attracting and supporting under-represented groups ensures a more equitable workforce, driving innovation and sustainability. Inspiring and nurturing the next generation of professionals is vital for long-term growth.

Photo credit: Marine Energy Wales

Case study

RWE Coleg Llandrillo

For the renewables industry to grow at pace, the right number of people with the right skills is essential. Partnerships between industry and training institutions lead the way in developing this vital skills base, such as the one between RWE and Coleg Llandrillo Menai.

RWE has a strong record for developing skills and collaborating with local education institutions globally.

The company's award winning, UK-wide turbine apprenticeship hub is based in North Wales and has so far trained over 100 apprentices (from all over the UK, including Wales) to support the future of the wind industry.

Partnering with Coleg Llandrillo Menai, a Welsh, further education institution, RWE has established both engineering courses and an apprenticeship programme.

The Coleg recently opened a new, £14 million Engineering Centre in Rhyl, in which RWE's purpose-built training workshop is located.

This investment underlines RWE's continued commitment to developing a local skilled workforce, with many of the techniciansand engineers passing through the programme and joining RWE to further their careers.

Photo credit: RWE

Supply chain

Targeted domestic supply chain investment means government and industry can secure greater investment for local businesses, retaining economic benefit within Wales. Based on levels of content achieved across other areas of the UK experiencing sustained investment in onshore and offshore wind[49], it is estimated that with higher local content, the Welsh renewables sector could support an average annual GVA of £721 million and annual employment of 10,100 jobs over the period to 2035, under the Maximising Renewables deployment scenario.

National and regional business environment support programs help grow the local supply chain. These include investment in premises and facilities, skills, tax advantages, export support, and networking. Additionally, innovation support advances technology readiness and enables domestic technologies, such as floating foundations, to lead industry expansion. Industry-wide market intelligence sharing on renewable projects, pipelines, and opportunities will help inform and inspire local businesses to invest.

Renewable developers can hold supply chain events to share information about upcoming projects and procurement opportunities. Developers can also develop web portals to allow local businesses to register their interest. For example, there is significant interest in the opportunities available from The Crown Estate's (TCE) Celtic Sea leasing round and broader regional pipeline. This highlights the scale of opportunity, and the fact that the supply chain is still developing, creating potential for Welsh suppliers (or those investing in Wales) to enter the market.

Public and private sector support is crucial to positioning Wales as a leading inward investment destination. By attracting investors to establish or expand operations and create anchor institutions, Wales can maximise local benefits.

Photo credit: Marine Energy Wales

Policy and Planning Regime

With renewable energy project development timelines currently stretching from 5 to 10 years, simplifying and streamlining the planning system is critical to ensuring more projects are delivered and deployed. By **ensuring supportive and clear planning policies with statements and guidance to inform decision-making**, the UK and Welsh Governments will accelerate renewable development in Wales, and unlock economic, environmental, and social benefits.

Stakeholder resourcing

For renewables projects to progress through development and construction at the scale and pace required under this report's deployment scenarios, **sufficient resources within statutory consultees** will be required to ensure a streamlined planning process. This includes sufficient budget and staff allocation within government departments, local planning authorities, statutory consultees, and other planning bodies involved in the planning system.

There are strong examples of Welsh companies within and outside the renewables sector that have invested, or plan to invest, in expanding their facilities, workforce, products, services, and market reach to capitalise on the opportunities presented. One of these is Associated British Ports' (ABP) plans to develop Port Talbot.

[49] The analysis assumed 50% lifetime content from onshore wind projects and 20% across offshore wind projects. This drew on the following studies: BiGGAR Economics (2020). Economic Impact Assessment of SSE Projects in the Great Glen. BVG Associates (2021). UK and Scottish content baseline and roadmap. The evidence from those studies was balanced against the spending profile of projects to 2035, which is more focussed around construction activity.

Case study

A New Vision for Port Talbot

£760M
of trade handled annually by Port Talbot

Port Talbot could benefit from transformatory opportunities in low carbon steel, renewables and the wider energy transition.

ABP's Port Talbot is a long-established port on Wales' south coast. The port handles c.6.6 million tonnes of cargo and over £760 million of trade annually. Over 68 ha of development land is currently on offer at the port. Traditionally, Port Talbot focused on steel production, importing raw materials for the Tata Steelworks blast furnace and rolling steel mill, consistently supported by a significant local supply chain. Currently major changes are underway at the port and wider region with the upcoming Celtic Sea leasing round and Tata Steel's blast furnace 2024 closure. ABP, Neath Port Talbot Council and Tata Steel are collaborating on wider economic opportunities around the port to ensure its continued economic driver status in Wales. These opportunities include:

Low Carbon Steel:

- **Continuing steel production with the Tata Steel operational rolling steel mill;**
- **The planned Electric Arc Furnace.**

Renewables:

- **Planned investment of over £500m to support floating wind and other renewable technologies;**
- **The Port has been shortlisted as part of FLOWMIS UK Government support scheme;**
- **Port Talbot is part of the Celtic Freeport, with £26 million of UK Government support;**
- **Steel for the structures used to mount panels in the solar sector;**
- **Port Talbot has an active collaboration with the offshore wind supply chain; and**
- **Working in parallel with the nearby port of Swansea.**

Broader sustainable energy:

- **A Sustainable Aviation Fuel facility has already been granted planning permission**

ABP plans to turn Port Talbot into a major hub for floating wind and green energy development. This vision has significant potential for creating local jobs and retaining investment in Wales. For this to happen, long term visibility and certainty of the Celtic Sea pipeline is required to support floating wind as an enabler of Welsh decarbonisation.

Crucial government interventions needed to maximise Welsh renewables

This report shows that only by enabling the most ambitious deployment scenario will unlock the full value of Wales' renewable energy potential.

It is this pathway that delivers the highest returns in GVA, skilled jobs, tax revenue, community benefit funding, local supply chain growth, and carbon savings. Crucially, it is also the only route capable of attracting the scale of investment needed to transform ports, grid infrastructure, skills, and planning into the backbone of a thriving Welsh economy. Anything less risks falling short of Wales' economic, environmental, and social ambitions.

If Wales is to lead in the clean energy transition, now is the moment to act boldly.

Realising this opportunity will take more than meeting targets. It demands a whole-government commitment to fast-tracking large-scale deployment, scaling local capacity, and unlocking investment.

The reward is a resilient, inclusive well-being economy delivering prosperity today and safeguarding the interests of future generations.

To enable this, the Welsh renewables industry asks that the Welsh Government:

1. **Set minimum technology targets to provide industry and business certainty and support the delivery of the Maximising Renewables pathway;**
2. **Create a policy and regulatory framework that recognises and supports the strategic value of large-scale renewable energy in delivering shared prosperity for communities and a net benefit for biodiversity and ecosystem resilience; and**
3. **Accelerate progress through a Sector Deal underpinned by a dedicated Task & Finish group to drive delivery of targets and maximise socio-economic benefits.**

To maximise the socio-economic benefits, a series of specific actions will be required, which will be the starting point for a Sector Deal.:

- **Grid infrastructure**
  Develop a robust, supportive position on the need for transmission and distribution infrastructure.
- **Planning**
  Develop Infrastructure Policy Statements to provide policy alignment and clarity for decision-makers.
- **Stakeholder resourcing**
  Establish a central pool of resources to be used across regulatory and policy bodies.
- **Port investment**
  Put pressure on UK government and The Crown Estate to provide clarity and certainty on future offshore wind leasing as soon as Leasing Round 5 winners are announced.
- **Supply chain**
  Using the Industrial Growth Plan as the basis, focus investment in supply chain areas where current capabilities can be leveraged to maximise local content through both onshore and offshore development.
- **Skills**
  Create and fund a central net zero skills body to align all the activity across Wales.

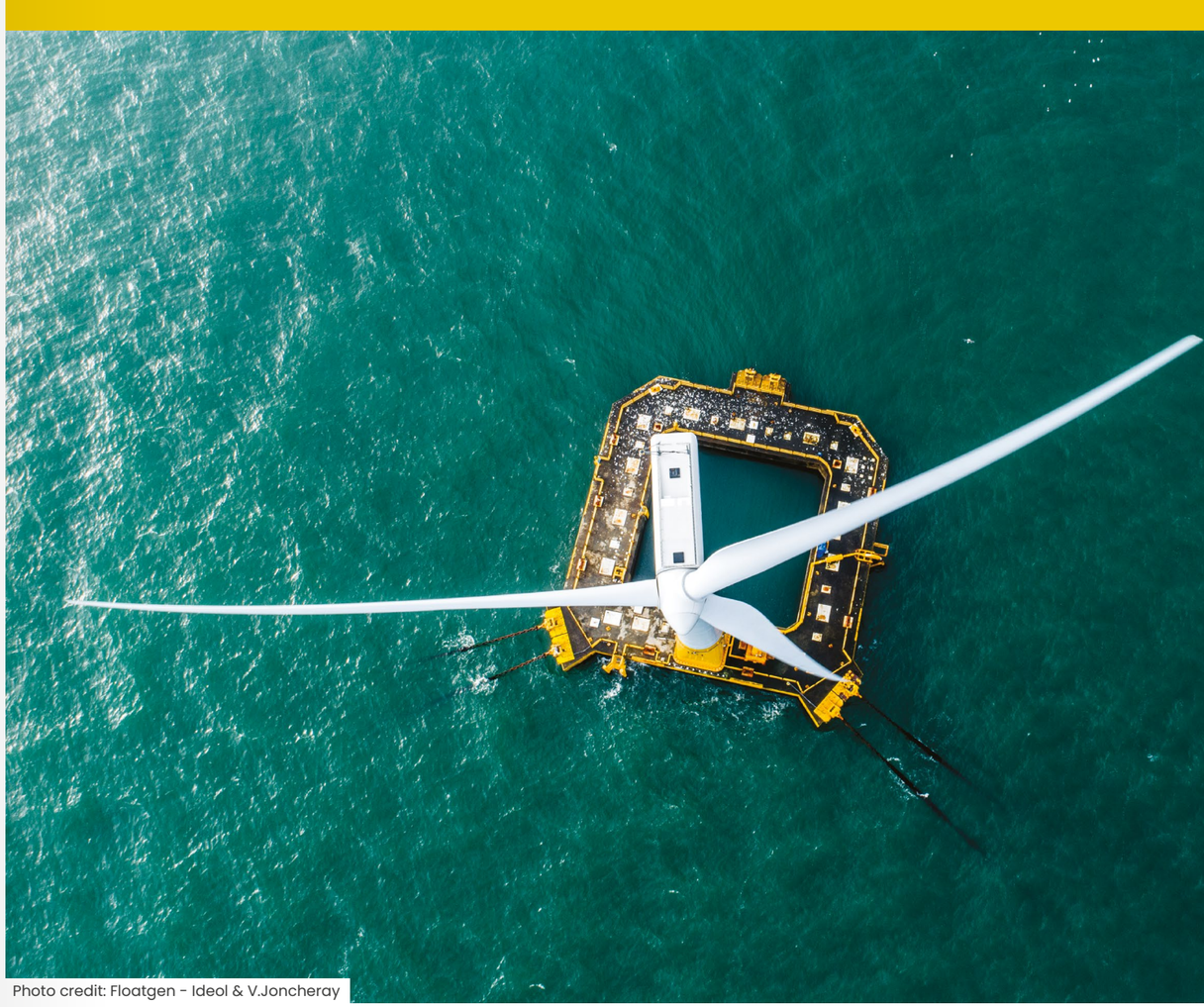


Photo credit: Floatgen - Ideol & V.Joncheray

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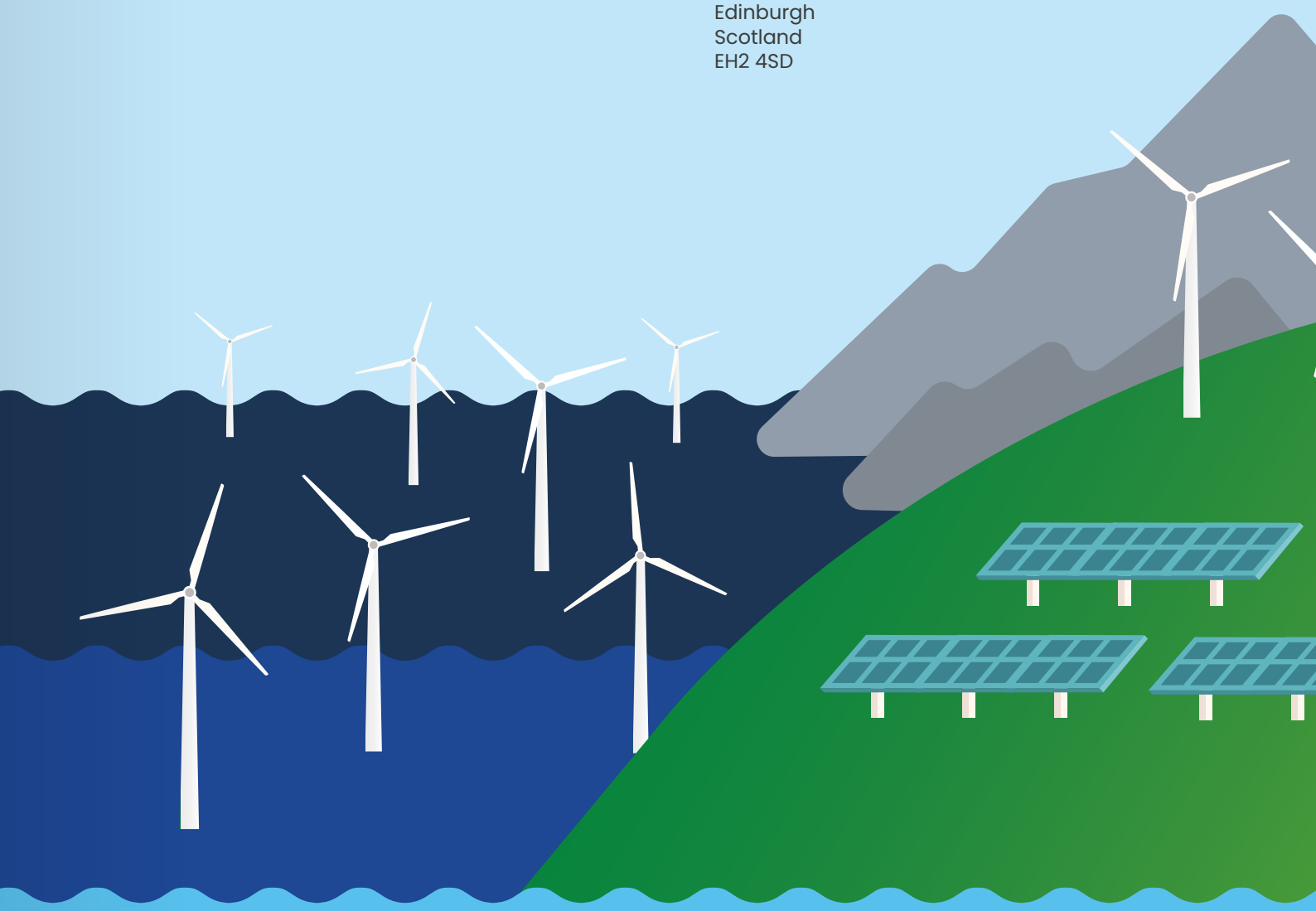

RenewableUK CYMRU

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