

Energised Welsh Communities

How community renewable
energy projects deliver and relate to
the Future Generations Act (2015)



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Executive Summary

The report highlights key policy issues emerging from a PhD study 'Energised Welsh communities' (Williams, 2022) focused on understanding how Community Renewable Energy (CRE) projects generated social impacts, alongside renewable energy to create 'energised' local communities.

The study centred on Ynni Padarn Peris (YPP), Ynni Ogwen (YO), Awel Co-op (AC) and Gower Regeneration (GR) CRE projects in North and South Wales as well as Cyd Ynni (CY). Although they represented a broad range of technologies, ranging from hydro, solar and wind, a common factor was that they were community-led and owned, centred on a Community Benefit Society model. **The role of communities has increasingly been recognised within a low-carbon transition and tackling climate change as well as supporting local decision making, ownership and income.** The findings from the PhD study highlight how the activities of CRE projects resonate with the overarching objectives of the Welsh Future Generations Act (2015) (WFG). The WFG Act (2015) is focused on a holistic perspective within that emphasise the integral value and interconnectedness of all the Wellbeing Goals and Ways of Working, fostering sustainable communities and policy development.

CRE projects focused on schools and colleges to increase awareness of RE and a low carbon transition. This centred on highlighting how local CRE projects could represent a way to create '*A more globally responsible Wales*', through practical and visible initiatives. These built on community action within their Welsh communities, which were presented as locally relevant but also opened a dialogue around global environmental challenges. Further, in terms of a '*Prosperous Wales*' there was long-term income that was accumulated over time and retained locally as a particular aspect of CRE, centred on sustainability. In relation to Ways of Working collaboration was a key feature that underpinned CRE projects across cases, both within and outside communities. Indeed, CEW (2021) emphasise the validity of the WFG Act (2015) as a clear vision, mirrored in the added value of CRE, aiming to deliver socio-economic, environmental, and cultural well-being in Welsh communities.



1. Introduction and background: sustainable communities and policy



1.1 Wales policy context:

Well-being of Future Generations (Wales) Act (2015)



***What Wales is doing today,
the world will do tomorrow.***

*(Nikhil Seth, UN Assistant Secretary General,
cited in Davidson, 2020)*

The WFG Act (2015) is focused on addressing ongoing challenges by Wales across climate change, health issues, including coronavirus, as well as tackling socio-economic concerns, such as employment.

At its core, the Act seeks to support a high quality of life for the present and future generations in Wales based on a consideration of long-term decision-making processes (Welsh Government, 2021b). Overall, the development of the WFG Act (2015) reflects a recognition that the availability of substantive natural resources in Wales provides a platform for generating sustainability. This was signalled by the First Minister's foreword in the 'Energy Wales: A Low Carbon Transition (Welsh Government, 2012).



***As a nation, we are rich in
energy resources, and this
provides a tremendous
opportunity to fuel our
drive for a fairer and more
prosperous Wales and to
achieve a better quality of
life for our own and future
generations. (P8)***

In this context, the WFG Act (2015) is centred on improving the social, economic, environmental, and cultural well-being of Wales underpinned by the 'Sustainable Development Principle'. It "seeks to ensure that the needs of the present are met without comprising the ability of future generations to meet their own needs" (2:5:1). In this way, within the Act, 'sustainable development' is viewed as a mechanism and a process for enhancing the well-being of Welsh citizens across economic, social, environmental, and cultural contexts.

The Act requires Public Bodies to consider how current decision-making may impact on future generations and apply a set of 'Ways of working' to deliver collaborative action to address long-term issues. In this way, the Act prompts the public bodies named in the Act to think more about the long term, with a more joined-up approach and look to prevent problems. In this context, WCVA (2020) indicate how the WFG Act (2015) was not only a unique exemplar of national legislation but also closely aligned with the UN Sustainable Development Goals and the UN's 2030 Agenda.



The 'Sustainable principle' aims to achieve the 'Well-being Goals' (Figure 1) as a requirement for Public Bodies. In this way, for Wales to be sustainable, it is important that all four aspects of well-being are taken into account. In this context, the Well-being Goals provide the scaffolding for moving forward with the 'Sustainable principle' in practice. These key areas are envisioned as a future framing for Wales as a country, built on sustainability and a collective vision by Public Bodies, to be enacted as a whole not selectively.

The enacting of the 'Ways of working' focuses on Public Bodies engaging with five components, ranging across the key areas of: *Long term, Prevention, Integration, Collaboration and Involvement* (Table 1).

Furthermore, the seven Well-being Goals centre on *A Prosperous Wales, A Resilient Wales, A Healthier Wales, A More Equal Wales, A Wales of Cohesive Communities, A Wales of Vibrant culture and thriving Welsh language, and A globally responsible Wales*. These goals represent the vision for Wales detailed in the Act (Table 2).

The Act provides a legal framework to address socio-economic, environmental, and cultural priorities in Wales through shared working on seven Wellbeing Goals.

This includes requiring public bodies, such as national and local government, local health boards and a range of public organisations to generate and publish Wellbeing Objectives. These state how public bodies envision addressing the Wellbeing Goals (Welsh Government 2021). In a similar way, Public Service Boards (PSBs) have been established by the Act, focused on each local authority area, representing a diverse constituency including local authorities, local health boards, natural resources organisations and emergency services. As such, PSBs produce an annual report to highlight progress in meeting the objectives of the Wellbeing Goals (Welsh Government 2021).

Figure 1: The Well-being of Future Generations (Wales) Act (2015) 'Well-being Goals'

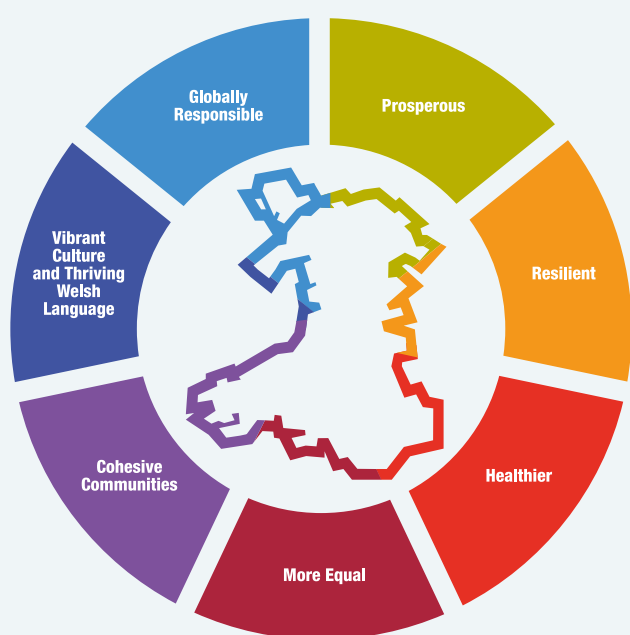


Table 1: Overview of the ways of working in the WFG Act (2015)

Way of working	Key features
Long term	It requires Public Bodies to balance the imperatives of any short-term priorities whilst securing longer-term aims and objectives.
Prevention	The emphasis is on ensuring a proactive approach and actions to tackle problems are taken to support objectives
Integration	It considers how the wellbeing objectives and goals relate to each other, as well as the priorities of other public organisations.
Collaboration	The Act envisages a collaborative approach with other constituencies or organisations to address the objectives
Involvement	It centres on the core value of engaging people interested in supporting the wellbeing goals.

Table 2: Overview of Well-being Goals in the WFG Act (2015)

Well-being Goals	Goal descriptor
A Prosperous Wales	It focuses on moving towards a low-carbon transition which uses innovation and productivity within the boundaries of available resources. It includes attentiveness to climate change and the development of a population equipped with appropriate skills and education, with sufficient prosperity to support employment opportunities.
A Resilient Wales	It emphasises the maintenance and facilitation of biodiversity and ecosystems to underpin economic, social and environmental resilience to create adaptability to changing circumstances, such as climate change.
A Healthier Wales	It relates to optimising the generation of wellbeing across the population, including both physical and mental health. This includes people being aware of the implications of factors that may influence future wellbeing
A More Equal Wales	It underscores the importance of equity of opportunity irrespective of background for the population, including socio-economic position
A Wales of Cohesive Communities	It identifies the centrality of social connectedness within communities, which has viability and safety as key characteristics.
A Wales of Vibrant culture and thriving Welsh language	It recognises that cultural and recreational contexts are important, based on access and opportunities to engage with culture and heritage, as well as a vibrant Welsh language, arts and activities.
A globally responsible Wales	It tackles global environmental issues and emphasises the interconnection between local and global wellbeing. As such, engages in positive actions that address both these contexts, focused on social, economic and environmental areas.

As part of the WFG Act (2015) a number of the national indicators are particularly relevant to CRE, particularly focused on the capacity measured in MW of RE technology that is installed as well as the number of households operating within the boundaries of appropriate energy performance. In addition, another indicator centred on the degree of greenhouse emissions in Wales. In this context, CRE provides an example of the connections that can be made between community energy and the 'Well-being Goals'. For instance, striking a balance between the delivery of a globally responsible and prosperous Wales as part of sustainability. In this way, it contributes towards carbon reduction targets whilst at the same time, bringing local benefits to communities, such as the retention of income locally.

Overall, community owned energy plays an important role as part of the energy mix within Wales having an important potential impact in delivering the objectives of the WFG Act (2015), harnessing local resources for local benefit within Welsh communities (Community Energy Wales, 2017). In this context, an emphasis on community-owned or led are seen as the preferred models for delivering such impacts (Community Energy Wales, 2017). The findings explored the societal implications of local CRE projects focusing on how sustainability was enacted and experienced at a range of levels. In this way, the WFG Act (2015) represents a key scaffolding to understand these interactions between grassroots organisations and governments, in implementing sustainable development policy.



1.2 Case profiles of the CRE Projects

Within the PhD study (Williams, 2022) a range of four case studies and a consortium in North and South Wales, UK were utilised. These centred on *Ynni Padarn Peris*, *Ynni Ogwen*, *Awel Co-op* and *Gower Regeneration CRE* projects as well as *Cyd Ynni* (Figure 2).



The key aim of all the CRE projects were to harness the natural resources for generating energy and income. This is based on a Community Benefit Society model, enabling the benefits from the CRE schemes to be re-invested back into the local community. Alongside this, some of the CRE projects were at an early stage of local innovation by developing local supply, storage, and demand management schemes (REGEN, 2021b).

The CRE projects represented distinct features, ranging from different locations, scales, and technologies but also with shared aspects such as the ownership models (Table 3).

In terms of a variety of scales and technologies, in North Wales micro hydros the YPP project involved a 55KW hydro and YO 100KW hydro. In contrast, in South Wales, larger scale projects included AC focused on a 2.35MW wind turbine and GR involved a 1 MW solar farm. In this way, the scale of technologies in each CRE project results in different scales of income being generated by schemes, then being available to Welsh communities to deliver social impacts.

Table 3: Overview of CRE projects

Name	Location	Technology	Energised	Ownership Model	Number of Stakeholders	Surplus Income
Ynni Padarn Peris	Peris Valley, Gwynedd	55 kW hydro-electric turbine	June 2017	Community Benefit Society	206	Target: £200,000 surplus over the lifetime of the period
Ynni Ogwen	Ogwen Valley, Gwynedd	100 kW hydro scheme	June 2017	Community Benefit Society	313	Target: £450,000 to the community over 20 years
Awel Co-op	Mynydd y Gwrhyd, Neath Port Talbot	Two 2.35 MW Enercon wind turbines	January 2017	Community Benefit Society	1000 (with over 40 local groups)	Target: £3million over the lifetime of the project
Gower Regeneration	Dunvant, Swansea	Solar 1 MW	March 2017	Community Benefit Society	435	Target: £500,000 over the lifetime of the project



2. Findings and Policy Implications: The Well-being of Future Generations (Wales) Act (2015)



The report considers the policy implications from the findings in relation to the WFG Act (2015), as part of a Welsh policy discourse of sustainability.

The findings detailed the applied context of CRE, centred on the experiences of communities in relation to projects and their perceived social impacts. It also identified how local CRE initiatives, and their added social value could be seen as translating a wider policy landscape in practice, through the lens of the WFG Act (2015).

The findings highlight that although the Act is not a driver for the development of CRE projects, it is nonetheless important. As such, it captures the social impacts that resonate with people within Welsh communities as well as policy makers.

As part of a synthesis of the findings, the researcher reviewed how the case study CRE projects related to the WFG Act (2015) policy. As such, the findings highlighted how, and in what way, the principles of the Act were being delivered by the CRE projects in practice. In this way, the study highlights the relevance of the WFG Act (2015) within the context of CRE, as well as the importance of CRE in enacting the principles of the Act in Welsh communities. As such, the findings indicate how the processes involved in CRE aligned with the 'Ways of Working' within the Act, as well as outcomes in the context of 'Well-being Goals'. Consequently, the report identifies how CRE projects connected social, economic, environmental and cultural well-being and addressed key aspects of the WFG Act (2015). As a result, the researcher argues that the WFG Act (2015) provides a significant policy framework for understanding the contribution of CRE projects to energized Welsh communities. The findings resonate with the conclusion of CEW (2021), which identified how the application of the sustainability principle framing the WFG Act (2015) and evident in CRE, seek to engage and benefit communities as part of the radical shifts globally towards a low-carbon society.



2.1 Connecting CRE to the 'Ways of working': Process

Within the WFG Act (2015), the 'Five Ways of Working' are designed to be implemented during the lifespan of a project from its inception to evaluation (WCVA, 2020).

The 'Ways of Working' focus on a series of key process areas underpinning the delivery of the Act's goals building on the sustainable principle and consisting of *Collaboration, Prevention, Integration, Involvement* and *Long term*.

These Ways of Working were evidenced in the findings from the study and indicated how CRE projects operated across these discrete components of the WFG Act (2015) in achieving well-being goals. This is summarised in Figure 2, prior to further consideration.

Figure 2: Ways of working and CRE projects: Summary



Collaboration

Focused on bridging social capital, supporting the community projects, shared learning and tackling barriers. Also linking social capital focused on collaboration with policy and accessing financial resources.



Prevention

Focused on engaging in preventative approach within CRE, such as climate and fuel poverty challenges. Also tackling volunteer burnout.



Integration

Focused on projects generating RE but also socio-economic and cultural impacts.

Alignment with:

- Well-being Goals and National Indicators
- Targets by Welsh Government for energy policy
- UN National Sustainable Goals (SDGs)



Involvement

Focused on the engagement of stakeholder, shareholders and broader community with CRE projects. This included mechanisms for involvement such as AGMs for shareholders and the 'one-member 'one vote' principle. Furthermore, wider community involvement was facilitated by a Community Benefit Society.



Long term

Focused on the generation of a longitudinal income stream for communities from projects, enabling benefits to be accrued for communities. Further, projects contributed towards longer-term aims of addressing climate and environmental challenges through local action.

2.2 Relationship between CRE projects and Ways of Working



Collaboration

A key finding was collaboration that highlighted how CRE projects engaged in partnership working and shared learning with other CRE schemes, building bridging social capital. This centred on formal and informal networks as 'Ways of working' which were important in developing local projects and overcoming key barriers. For instance, the CY consortium focused on regional collaboration coming together to share resources within Gwynedd, North Wales. Furthermore, the more established CRE projects within the consortium assisted newer CRE projects to develop, including setting up charities. In addition, the AC and GR CRE projects collaborated and developed an informal network within the South Wales region with other schemes, based on sharing expertise and knowledge. Indeed, all the case studies collaborated not only within their regions but also with other wider CRE projects, such as AC involved with Scottish CRE schemes during their early development. This was linked to the established nature of the CRE sector in Scotland which facilitated sharing knowledge and information.

Furthermore, CRE projects engaged in activities that represented linking social capital, including a focus on accessing strategic actors to influence policy context and provide gateways to financial resources. This centred on a relationship between CRE projects and policy makers. For instance, the development of GR and AC required significant funding resources, due to the scale of the schemes. As such, both CRE projects required support from the Welsh Government through the provision of initial financial loans. This collaboration highlighted the importance of linking social capital in supporting CRE developments. Furthermore, the CY consortium lobbied the Welsh Government and Central Government around support for CRE projects. This centred on the negative impacts of increasing business rates for CRE hydro schemes.



Prevention

The findings identified how the CRE projects supported a range of preventative strategies. In particular, the CRE projects sought to reduce the impact of climate change by engaging people in environmental issues and transition towards a low-carbon future. As such, the CRE projects attempted to address long-term social-environmental challenges facing Welsh communities. In this context, there was an attempt not only to tackle climate change but also local fuel poverty. For instance, across all the case studies there was an emphasis on engaging and increasing awareness by shareholders and communities on climate change issues. This centred on developing an understanding of environmental issues and facilitating a sense of control of what seemed insurmountable global challenges, through local community led CRE initiatives. Indeed, YO and AC exemplified how CRE projects sought to address high energy costs for local communities. This included developing community engagement around an Energy Local club, as well as energy efficiency and energy saving advice initiatives to reduce local fuel poverty.

The CRE projects attempted to prevent long-term strain on volunteers due to the demands of both time and commitment. This focused on developing a number of paid positions to support further development of CRE projects in localities. For instance, CY provided support for CRE projects by providing two employed posts to facilitate building capacity and capability and overcome problems of succession and burnout of volunteers. Equally, AC and GR CRE projects developed several paid posts to support the sustainability agenda within the schemes and building on the CRE schemes. A particular issue with such projects were the scale of schemes which accentuated the demands on volunteers.

Integration

The findings highlight how the case studies demonstrate a close alignment between the respective objectives of the CRE projects and address the WFG Act (2015) 'Wellbeing Goals'. Critically, CRE projects were not only focused on generating renewable energy but also developed social, economic and cultural impacts. In this way, the CRE projects represented an integrated approach to the 'Wellbeing goals'. In this context, CRE projects were driven by both local and global drivers, generated long-term income as well as supporting Welsh identity and heritage of using local natural resources. Alongside environmental benefits of increased renewable energy generation, CRE projects engaged people in a discourse about tackling climate change through community action. Further, CRE projects enhanced the cohesiveness of communities through local people coming together to develop and invest in the schemes.

In addition, CRE projects supported equal communities with its focus on energy transitions that emphasized a decentralized model and promoted a healthier Wales through volunteering and tackling fuel poverty.

Alongside the WFG Act (2015) the Welsh Government (2016) developed a set of National Indicators. These provided a metric to evaluate progress in the delivery of the Well-being goals. In this context, the CRE projects addressed two key indicators centred on (12) 'Capacity (in MW) of renewable energy equipment installed' and (23) 'Percentage who feel able to influence decisions affecting their local area'. In terms of increasing RE capacity, the CRE projects represented developments in installations through different technologies (solar hydro and wind), including the generation of further schemes based on the success of the initial project.



Furthermore, there was civic engagement with local decision-making and sense of ownership through CRE projects and having an impact on local communities.

In addition, the activities of the CRE projects connect with the Public Service Boards Wellbeing plans. In this context, Public Service Boards (PSBs) have been established across local authorities in Wales and are tasked with developing a set of objectives and stages for addressing the goals embedded in the WFG Act (2015), defined as Local Wellbeing Plans (LWP). In the case of Neath Port Talbot PSB, the Local Wellbeing Plans included an Objective centred on 'Put more life into our later years' that engaged in addressing a range of priorities. This included greater opportunities for volunteering and reducing fuel poverty through local partnership working, identifying vulnerable groups and increase awareness (Well-being Plan 2018 – 2023). In relation to the CRE project, through AC the Aman Tawe charity attempted to address fuel poverty through civic engagement and energy efficiency measures.

Further, the Swansea PSB developed Local Wellbeing Plans which included 'Working with Nature'. In this way, it sought to increase the amount of RE generation and support a low-carbon transition.



In relation to the CRE project, GR focused on the community-owned solar farm as increasing local RE capacity and aimed to support other sustainability initiatives through the Community Benefit Fund. In the Gwynedd PSB, Local Wellbeing Plans included 'Protecting and promoting the Welsh Language' centred on supporting local cultural identities and bilingual communities. In addition, 'The need to maintain a healthy community spirit' focused on developing sustainable communities across Gwynedd and Anglesey to address future challenges. In relation to the CRE project, YO and YPP brought people together in civic activities and integrated wider community groups, through solar panels on community buildings and educational activities. The CRE projects also supported the maintenance of the Welsh language as part of local cultural life, through community activities.

Furthermore, the CRE projects linked to the overarching Welsh Government energy policy targets centred on developing the generation of 1GW renewable electricity by locally owned projects by 2030, with every new RE scheme to include a degree of local ownership by 2020. The State of the Sector Report (2021) indicated that there was currently 22.6 MW of CRE electricity generated within Wales.

Overall, it highlights the important role of CRE not only within the WFG Act (2015) but also within the energy and the wider policy context (Regen, 2021b). In addition, the CRE projects represent local exemplars of addressing the wider global sustainable goals. The United Nations Sustainable Goals (SDGs) provide the framework for building sustainability into the relationship between global population, the earth's resources and developing prosperous communities (Welsh Government, 2019a). Of particular relevance for CRE projects were SDG 7 'Affordable and clean energy', SDG 11 'Sustainable cities' and SDG 13 'Climate action communities'.

The findings indicated that the CRE projects were not only engaged in increasing RE generation in Welsh communities but were also moving towards reducing energy consumption.



Involvement

The findings identified how the CRE projects involved a range of stakeholders, shareholders and the wider community. In this context, the stakeholders were key actors embedded in their communities who were active in shaping and managing schemes. Further, shareholders represented a broader constituency who actively supported projects through investment and the wider community as beneficiaries. In this way, in the YO and YPP projects had a high degree of local shareholders in the scheme, whilst AC and GR included a broader set of shareholders outside the local area. However, within GR there was a lower threshold for local investment and AC issued community shares to local community groups and schools. In this context, shareholders were able to have a say in the management of CRE projects through the AGM and the use of a 'one-member-one vote' approach. Furthermore, in terms of social impacts CRE projects utilized a BenComs model to deliver community benefits, based on addressing local priorities and being driven by community needs across social and environmental objectives.



Long term

Overall, there was a balance between short-term and long-term impacts from CRE projects. For instance, shareholders received annual interest but the income from schemes fed into the long-term Community Benefit Fund. An important finding identified how the CRE projects contributed to generating income for local communities over the long term that would be retained within Welsh communities. Further, there was a contribution towards long-term environmental objectives and energy targets, through increasing RE and tackling climate change. For instance, this included the increase in locally owned RE schemes by 1GW renewable electricity, including CRE projects, by 2030 in a Welsh context. CRE projects were seen as having a role in a low-carbon transition currently, but also in the future.

Further, the success of the CRE projects provided a platform for other, future RE initiatives in the locality and the Community Benefit Fund provided funding for further environmental projects around local transport, energy and food projects. In this way, CRE projects acted as catalyst for more long-term innovation and local sustainability initiatives. A crucial area in the findings focused on renewable education and how the CRE projects engaged with young people and schools. As such, projects engaged with school children from a young age to develop an understanding of RE and environmental issues providing initial social impacts and shaping a sustainable future.





3. Connecting community energy to the ‘Well-being Goals’: Outcomes

In the study, the findings indicate that community energy through community ownership addresses the principles of the WFG Act (2015), with schemes providing environmental but also added social, cultural and economic value for local communities.

As a result, the WFG Act (2015) through the seven 'Well-being Goals' develop locally sustainable Welsh communities, as summarized in Figure 3. For example, CRE projects represent a tool for delivering RE education and highlighting the relevance of broader environmental issues. Furthermore, CRE projects provided economic support to the community through local investment, based on surplus income from RE generation.

In addition, there was the generation of enhanced community confidence and skills by community group members through the development of local CRE projects. Although the goals are geared towards public bodies, third sector organisations, community groups and individuals can also highlight how they are delivering the goals (WCVA, 2020).

Figure 3: The impacts of CRE projects mapped to the Seven Wellbeing Goals of the Well-being of Future Generations (Wales) Act (2015)

A globally responsible Wales

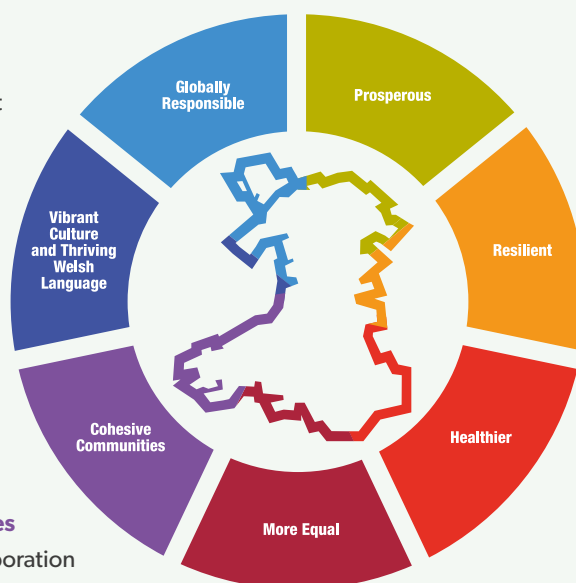
- Feeling empowered and tackling climate change
- More renewable energy and environmental projects
- Renewable energy engagement and education

A Wales of vibrant culture and thriving Welsh language

- Welsh language and bilingualism
- Post-industrial landscape and communities

A Wales of cohesive communities

- Building connections and collaboration within and between CRE groups
- Interconnections between CRE and community hubs
- Communities of place and interest



A Prosperous Wales

- Long-term and local income
- Training and employment opportunities
- Reduced energy consumption and cost

A Resilient Wales

- Economic and environmental resilience
- Adapting to barriers and local innovation

A Healthier Wales

- Alleviating fuel poverty and empowerment
- Volunteering and wellbeing

A More Equal Wales

- Local decision-making and ownership
- Local social impacts

3.1 A Prosperous Wales

The findings from the study indicated how CRE developed 'A Prosperous Wales' provide opportunities for training and employment, although at a small scale.

Furthermore, the case studies identified how the CRE projects focused primarily on generating RE and income that could be used by communities over a prolonged period of time. Alongside these activities, CRE projects were increasingly attempting to reduce energy consumption and costs for local communities through innovative models and energy efficiency measures. In this context, the Future Generations Report (2020) identify the role of CRE in facilitating a low carbon transition within organisations and by communities, centred on reducing carbon and utilising RE. Indeed, WCVA (2020) highlight how the CRE sector demonstrates the impacts from a low-carbon economy.

Long-term and local income

The CRE schemes had an element of long-term income providing a 20- year return for the local community. generated through the FITs. The long-term income being generated was seen as crucial in paying shareholders interest and the surplus directed towards the Community Benefit Fund, to provide direct benefits to the wider community. In this way, CRE projects contributed towards a sense of autonomy and empowerment within communities focused on securing a long-term source of income, supporting local sustainability.

In addition, this provided an ability to make decisions about how the surplus revenue could be distributed locally.

After a 12-month period of successful generation of electricity the project was able to pay the 3-5% interest due to shareholders investment. Further, in YO and YPP, 85% of the shareholders were drawn from the local community enabling the retention of economic benefits within the locality. In AC in excess of 40 groups had a stake in the scheme, acting as members with an investment of a £100k of shares. As such, this promoted local ownership from a wider range of local organizations including the local rugby and football clubs having a stake in the scheme.

Overall, the surplus income from CRE projects was reinvested into the community over a long period of time. For example, the AC scheme supports the social and environmental objectives of the Awel Aman Tawe charity during a 20-year period. However, this varied according to the scale of the scheme and the surplus income was designated as 'targets' by CRE projects, due to the fluctuating amount of energy generated linked to the constraints of being hydros, wind or solar renewables (Table 4). The surplus income from schemes tends to increase in later years, as in the earlier period there may be construction costs and repayment of loans (Community Energy Wales, 2017). Therefore, impacts from CRE projects, is seen as occurring over a medium-and-longer term period arising from this local revenue.

Table 4: Surplus Income for community benefit

Case studies: CRE Projects	Surplus income available for community benefit
Ynni Padarn Peris	Target: £200, 000 surplus over the lifetime of project
Ynni Ogwen	Target: £450, 000 to the community over 20 years
Awel Co-op	Target: £3 million over the lifetime of project
Gower Regeneration	Target: £500, 000 over the lifetime of project

Across the case studies, CRE projects developed a sense of autonomy and control with community energy providing a long-term and local retention of income, moving away from a dependency on external and short-term grants. In terms of civil society, dependency on grant-based income represented uncertainty, whilst long-term income from CRE projects even though on a small scale, was seen as providing sustainability for building prosperous communities in Wales.

Overall, CRE projects focused on long term social impact emerging from the income generated by the schemes, creating sustainability in terms of income generation. For instance, a participant from YPP indicated that although small-scale, the CRE project was important to the local community due to its long-term income, and sustainable impact extending over time.



Only a small scheme so not a lot of money but difference being that is long term income. And impact is going to be when us seven aren't here! (YPPKS3)

Further, participant in YO and YPP (YPPKS1) citing how a movement away from grants generated a sense of empowerment and a locus of control for communities as well as generating energy.



What they're doing is creating pot of money that isn't dependent on grants. But provides a communal sense of power. YO is a lot more than just generating green energy. (YOKS1)

Moreover, the income generated from CRE projects such as AC and YO created a sense of being self-sustaining schemes through the development of long-term income (ACKS3; YOS2). A participant identified the potential future impact of the AC project in providing the platform for further community projects, building sustainability.



Well, I hope it will be a positive impact if we can use the income generated by the turbine to help kick off community projects and develop things that are self-sustaining, that impact, it can be stronger. (ACKS3)

Training and employment opportunities

The cases of YO and AC exemplified how as part of the initial construction and maintenance the CRE project, the scheme utilised local contractors. In this context, there was support for the local supply chains and employment and economy. Community Energy Wales (2017) highlight that CRE projects provide a mechanism for retaining a high percentage of income within communities, based on community charities, local shareholder investing in schemes and utilising local suppliers. There were small-scale employment opportunities arising from CRE projects, for instance this was seen in the case of the CY consortium. In order to support the five CRE projects, including YPP and YO, the consortium appointed two posts to support current and develop RE and Energy Local clubs. In addition, the AC scheme was an exemplar of how a CRE project created training opportunities, focused on survey work as part of an energy efficiency initiative in the local community.



Reduced energy consumption and cost

The findings highlighted how CRE projects were developing initiatives to promote energy efficiency and developing an Energy Local Club within local communities. These sought to reduce electricity costs and tackle fuel poverty, even though this was at an early stage. In this way, the findings identified enhanced benefits from RE schemes as local communities, aiming to achieve more direct benefits from local projects through reducing energy consumption and costs.

A particular exemplar was the Bethesda Energy Local in the Ogwen valley, representing an initiative to match local supply and demand. In this context, the scheme attempted to encourage scheme members to closely align the pattern of energy usage with energy generation. This involved a reduction in energy costs of around 30%. In a similar way, the GR CRE project provided an example of a solar-based battery supply and storage initiative, aiming to meet the needs of households as well as businesses. Equally, within AC energy efficiency was targeted to enhance benefits for local communities. This focused on providing loft and cavity insulation to promote energy efficiency and reduce costs for households. In this way, the activities of the CRE projects were aligned to and contributed towards the goal of achieving 'A Prosperous Wales'.



3.2 A Resilient Wales

The findings from the study highlight how the CRE projects relate to ‘A Resilient Wales’, with schemes addressing economic alongside environmental resilience within localities.

It included CRE projects using natural resources in a different way from past heavy industries and moving towards activities generating RE and benefits for local communities. This involved a process of adaption within a challenging policy context and overcoming barriers through locally focused innovation. This included increasingly moving towards diverse forms of RE activities over and beyond energy generation, such as Energy Local Clubs, EV transport and energy efficiency.

Economic and environmental resilience

Across all the case studies, the natural environment had been the backbone of past industrial growth prior to a period of decline, focused respectively on the coal and slate industries. The decline of these established industries presented a challenge to the economic resilience of local communities. However, the findings indicated how through the development of CRE projects the local landscape was seen by communities as representing a key opportunity for the re-development of the locality. It included using natural resources for local benefit, with RE supporting local economic resilience although on a smaller scale.

For instance, AC exemplifies how using the local environment has changed over time, involving a difference between past and present usage of local resources, with a shift from coal to wind energy. In this way, economic and environmental resilience was built on a ‘greening’ of the South Wales valleys and a transition from heavy industry towards RE, whilst retaining a close relationship between communities and their local natural resources. In this context, participants in the case studies highlighted that

community projects were focused on more than generating green energy and were underpinned by a parallel motivation to generate a social and economic impact in their local communities. This centred on striking a balance between seeking environmental resilience by changing resource use away from fossil fuels, but also building resilience in enhancing the economic return to communities.

Within the findings, the case studies balanced both social and environmental impacts, viewing CRE projects as vehicles for developing the local community and its economy as well as supporting a low carbon transition. For instance, YPP sought to address environmental priorities centred on clean energy, as well as taking social action. These included a broad range of aims in the charity focused on financially supporting local action through grants to improve sustainable projects and community groups. As such, CRE projects facilitate a close relationship between communities, the local natural environment, and its resources, as well as increasing the strength of social networks within communities.

A participant from AC highlighted how social and environmental objectives underpinned the scheme as a “*double benefit*”. The participant viewed them as mutually supportive in terms of local regeneration and global CO₂ reduction, with outcomes operating at different scales.



I suppose to improve the lot of the area, but also doing it in a way that has global benefits, albeit a small reduction of CO₂ emissions. It’s a double benefit really, isn’t it? (ACKS3)

Further, a participant from a tourism-based community hub in the Peris valley identified the importance of CRE income being retained locally but based on a local decision-making process. This focused on decisions about distributing benefits being positioned within the community, therefore seen as driven by the community, for the community. An additional benefit of CRE projects was seen as its contribution to an overall benefit as an environmental project, with a “*low carbon footprint*”. In this way local benefits also extended towards global impacts.



And then when profit comes back to these local projects, I want local people then to have opportunities to decide where the profit is spent in their locally and also decide what should be the local benefits. And of course, because they are environmental projects, they have a low carbon footprint. (YPPCH2)

Furthermore, community hubs highlighted the development of economic and environmental resilience as part of wider community engagement. In this context, YO and AC focused on working with other community groups to support the development of rooftop solar installations on local buildings. For instance, the successful YO project created the foundation for ‘Ynni Heuldro’, installing solar PV on community buildings, including the Hwb Gwyrdd office, library, community centre and the rugby club.

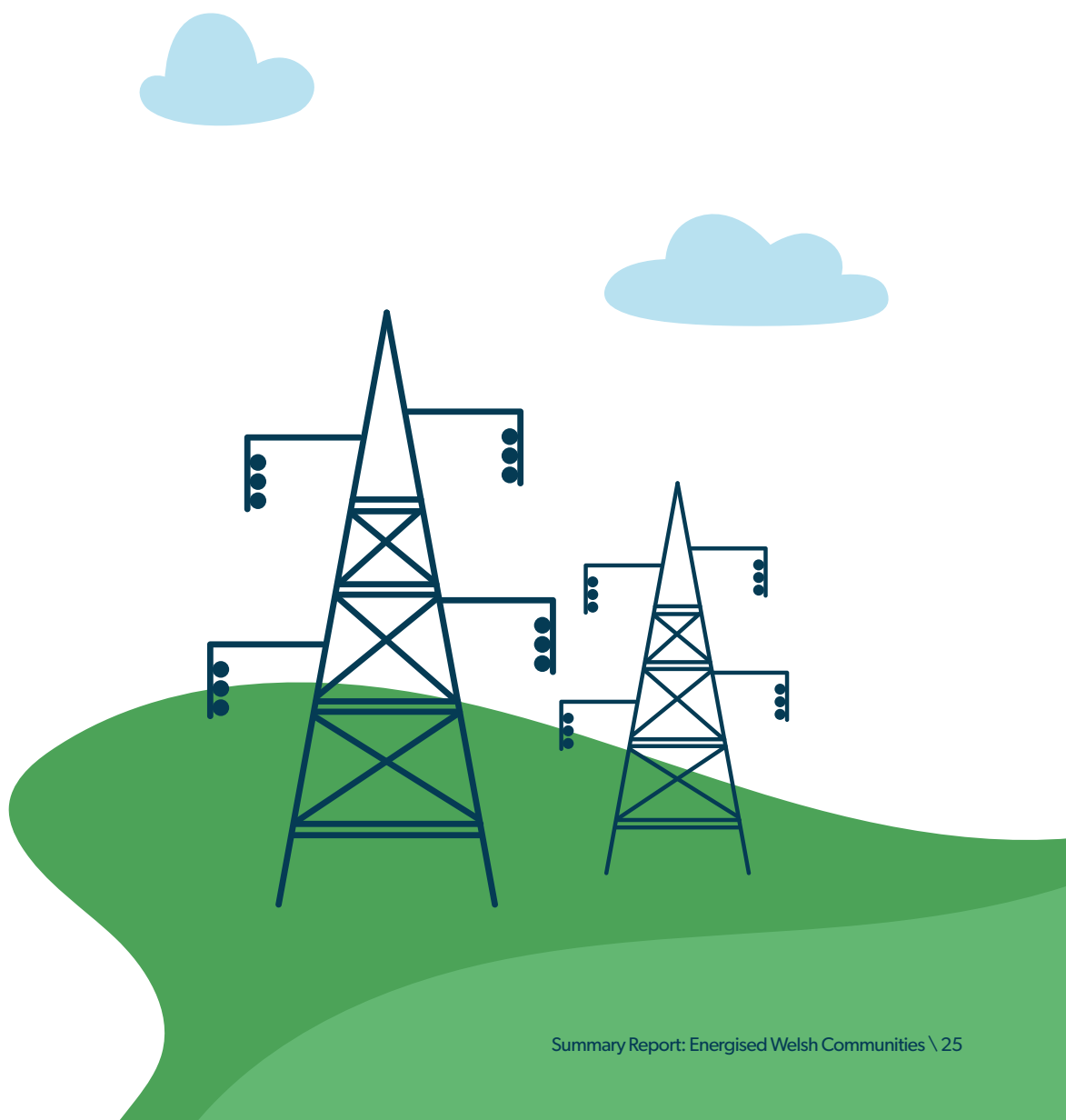
In a similar way, Egni Co-op, which was linked to Awel Aman Tawe charity, provided solar panels across Wales, as well as the local Amman and Swansea valleys targeting 250 sites. The panels reduced carbon but also enabled community groups to reduce their energy costs for sites but also carbon reduction as part of tackling climate change. Overall, CRE projects sought to develop wider engagement to promote economic and environmental local resilience, as well as more sustainable and connected communities.

The findings highlighted how environmental resilience was important, centred on an interrelationship between communities, place and natural resources. In this context, there was a sense of CRE projects utilising the readily available natural resources of the local area in an appropriate way. As such, the local topography was being utilised by CRE projects to deliver local benefit. For instance, the description in share documents of how projects were ‘harnessing’ local resources such as the winds in the case of AC (AC, 2017). Further, terms such as ‘ynni’ (energy) and ‘awel’ (breeze) were embedded as part of local Welsh and place identity in YPP, YO and AC. In a similar way, WCVA (2020) identify how the third sector provides an exemplar of the benefits of using a sustainable approach with harnessing of the natural environment. This includes work in the area of CRE, demonstrating the potential for a resilient Wales alongside other environmental projects, such as community farms.

Adapting to barriers and local innovation

The findings indicate the relevance of CRE projects as part of the WFG Act (2015), particularly generating resilience through adaptation to challenging circumstances and creating local innovation. In this context, the findings resonate with the observations of the State of the Sector (2021) report on CRE which identified the policy challenges facing CRE based on the removal of FITs and funding assistance. However, RE had demonstrated innovation and adaptability by moving from an exclusive focus on generation to adopting a whole-system strategy. Furthermore, the findings indicate how CRE projects have modified to a challenging political environment by operating across a wide range of projects, with an increasing focus on energy efficiency, low carbon transport and demand management as well as storage.

In the findings, this was exemplified by the CRE projects developing their programme through diverse initiatives. For instance, within YO there were additional developments aligned to the scheme, with the 'Green valley' initiative, energy efficiency measures and local EV transport. Further, building on the trial for Energy Local Club, the YOCRE project aimed to facilitate a closer relationship with local generation. Similarly, GR and AC are developing battery storage projects.



3.3 A Healthier Wales

Although less prominent in the findings from the PhD study, there were a number of areas that related to 'A Healthier Wales'. As such, CRE projects contributed to improved wellbeing through its aims to develop initiatives to alleviate fuel poverty and generate greater community empowerment, as well as the importance of volunteering in the maintenance of schemes.

Alleviating fuel poverty and empowerment

The findings highlighted how alongside generation, CRE projects aimed to reduce energy costs and consumption in Welsh communities. The work of CEW (2017) identified the relevance of CRE projects in addressing local fuel poverty such as through Energy Local schemes. For instance, in the findings the AC scheme contributed towards tackling fuel poverty through Awel Aman Tawe. In this way, energy efficiency initiatives sought to develop greater wellbeing for communities focused on colder houses exacerbating health problems. In a similar way, there were energy saving advice initiatives by the CY consortium aimed to improve the wellbeing of local communities.

Further, a participant from AC (ACS1) highlighted the importance of benefits carrying out loft and cavity wall insulation as part of energy efficiency. These provided both carbon reduction but also the reduction of cost on a household level. Energy efficiency was a part of the mandate of Awel Aman Tawe focused on both of households and community buildings taking part in large energy efficiency initiatives.



They were a lot of people to get grants for loft and cavity wall insulation. So they were kind of, huge kind of carbon savings from that and cost benefits to those households and we do energy efficiency reports on community buildings. (ACS1)

Volunteering and wellbeing

The area of volunteering within the CRE sector has been recognized as supporting wellbeing and also generating enhanced social ties (James, 2018). In the findings, this related to volunteers having active role in maintaining the CRE project on a number of levels, such as stakeholders acting as Directors but also volunteers engaging in practical maintenance work with schemes. For instance, in YO and YPP there was significant involvement of volunteers in the maintenance of the hydro's. Furthermore, in the Ogwen valley there was an expansion of volunteering building on the success of YO, centred on the 'Dyffryn Gwyrdd' sustainability scheme. As part of this initiative, there was a planned growth in volunteering focused on tackling fuel and transport poverty. In this context, WCVA (2020) indicate the value of volunteering for health and wellbeing, including for the wider community as well as individual volunteers.

3.4 A More Equal Wales

In terms of ‘A more equal Wales’, resonated strongly with the findings with members of the community developing an active role within the energy sector.

This was based on community-owned and led projects that resulted from civic action and moved the position of local community members from consumers to citizens (CEW, 2017). This was in contrast to large scale commercial schemes which underpinned the energy system with little opportunity for community involvement. Significant aspects of the findings highlight the importance of local decision-making processes and community ownership in CRE projects, as well as local retention of benefits. In this way, the case studies identify how CRE projects address key components of ‘A more equal Wales’, based on community-owned and led initiatives.

Local decision-making and ownership

The findings highlight how ‘An Equal Wales’ was facilitated by CRE projects by the development of a sense of ownership by communities in schemes. Furthermore, this led to greater empowerment through the success of CRE projects, with a sense of local control over local natural resources. For instance, the development of YPP signalled a shift from the external exploitation of the past slate industry, with the focus on local decision making and a locus of control.

Furthermore, in YO participants identified how it was important to use natural resources for local benefit, framed as using the water to our own watermills:

“

There’s a Welsh saying ‘turn the watermill to your benefit’ {“troi dwr i felin ein hunain”} and what community energy is to me is that you use, our natural resources for the benefit of our communities. In English they use the word ‘harnessing’. (YOKS1)

In addition, other participants in AC described a sense of ownership in the scheme, with people monitoring how much the renewable energy scheme generated, detailed as:

“

It’s the number of people who say, our turbines are turning, their doing well. (ACS5)



Further, equity was evidenced by participants from the AC CRE project focused on how local organisations were able to secure shares in the scheme and thereby had a stake in the scheme.

Furthermore, a key stakeholder in GR identified the importance of the community within CRE, focused on the shared interests leading to collective action around environmental issues. In this way, community energy represented an amalgam of individual and collective efforts, taken forward through the practical mechanism of a share scheme that built on this shared vision.



It's the community bit of it, coming together and collective action. People generally got an interest in the environment, who want to take action individually and collectively. So, lot of community energy of the Gower Regen, we've raised funding through a share scheme...so that's of individual commitment, but it's done collectively. (GRKS3)

In the context of local ownership there was also a process of active community involvement with CRE projects, leading to a sense of empowerment. For instance, at the outset of the project, GR sought to involve the local community by ensuring the threshold for having shares was lowered to encourage local participation. As such, those in the local area were able to secure a minimum £100 shares, compared to £300 to those outside the locality (Gower Regeneration, 2017). In a similar way, within AC at the consultative stage in its development the project organised a referendum with a significant part of the community engaging, having a say and supporting the project. Community involvement centred on both local key stakeholders and shareholders engaging in the development and investment in CRE projects.

In many respects, equity underpinned all the CRE projects in the study as they were established as CBS. As a Registered Society, in terms of governance there was an elected management board and an AGM enabling involvement by the community through shareholders and access to the process of decision making. Across the case studies, shareholders were able to have a say throughout the process, centred on how projects were set up and run. Also, the case studies highlighted the importance of the overarching structure as registered societies, based on the one member, one vote principle – irrespective of the number of shares owned, with all the shareholders having an equal say. For instance, a participant from YO highlighted how shareholders engaged in the overarching management of the CRE project.



We collaborate closely with our shareholders, we call them members. They have an input and a voice as say in a way that we run the organisation. (ACS5)



Local social impacts

There was the delivery of local social impacts from CRE projects through the CBS model, allowing the distribution of surplus income and providing community benefit. For instance, although CRE projects had different aims and objectives they all focused on the key areas of alleviating fuel poverty, further CRE projects, education and environmental awareness initiatives. Importantly, across the case studies, the social impacts were seen as being flexible and tailored to each community and their local needs. As such, the process was 'bottom up' and community-driven, involving CRE projects in a broad range of meaningful impacts on a community level. Across all case studies, CRE projects aimed to provide community investment over a period of time, focused on tangible social impacts. This centred on addressing the needs of vulnerable groups within communities and ensuring equity and local distribution of impacts.

The findings indicated how local drivers were important as motivational factors for involvement in schemes. In this way, stakeholders and shareholders across case studies highlighted how the CRE projects were viewed as enabling a step towards moving away from a centralized model of energy and creating community benefits. Such a shift in how energy could be delivered through a focus on the local, was viewed as unlocking the potential to empower communities. For instance, AC identified the role of the CRE project in advancing greater equity in the role of communities in a low carbon transition, contrasting with the dominance of substantive commercial enterprises. A particular impact was CRE projects delivering local control over the distribution of income to facilitate community-based priorities. Indeed, WCVA (2020) highlights the way in which third sector organisations are embedded in communities, contributing to an Equal Wales as well as the WFG Act (2015) more broadly, as well as addressing a local context.

Significantly, shareholders identified how a key community benefit was long term income being retained within the local community. This was imagining future projects that could be supported through a constant income stream in the locality.



So hopefully the benefit will be a steady stream of money into small community projects I think in the village like the 'Cylch Nursery', just improving the area like tree planting. (PS2)

In this context, CEW (2017) highlight how CRE projects facilitate a wider distribution of benefits, initially through generating revenue but also over time using Local Energy models. In particular, the Energy Local projects enable even greater engagement between local communities and energy projects. For instance, in GR there was an attempt to bridge local supply and demand as part of the solar project. Equally, in YO the development of an Energy Local pilot scheme sought to connect the community to a different pattern of energy use, linked to local hydro generation.

This was echoed by a participant from YO, highlighting how this notion of sustainability built on social and environmental benefits, could be enacted at a community level through the CRE project. As such, it could deliver a broad range of impacts based on the income from the scheme, addressing renewable objectives and seeking to develop ways of using the energy locally.



The aims been for community development and green energy. So the benefit will, come through the money that we generate, and environmental benefits through generating renewable energy and third being trying to use that energy in our community. (YOKSI)

Within AC a shareholder mapped the centrality of viewing community energy as part of community, affirming on a clear definition. This primarily focused on local community benefit but also included the local generation of energy.



I would think there is only one definition, that is, benefit to the community... well its energy for the community being generated within a community, then that energy either goes back to the grid or benefits us in some way. (PS2)

3.5 A Wales of cohesive communities

The findings from the study indicate the importance of CRE projects as part of building ‘A Wales of cohesive communities’, generating CRE projects through mobilising bonding and bridging social capital.

As such, the findings highlight how CRE projects developed a shared vision of sustainable future communities and brought local people together through collective action. There were also exemplars of co-working and collaboration in driving forward CRE projects across different projects and community areas. This centred on the development of shared learning and experience, as evidenced in the CY consortium. There was also cross sector and partnership working within a wider CRE network. Further, a significant finding was how cohesive communities consisted of interconnectivity, as seen in community hubs and their degree of awareness and involvement with local CRE projects. Overall, communities of place were predominantly important in shaping a sense of community as part of engagement with CRE projects, although shared interest was also relevant in some instances.

Building connections and collaboration within and between CRE groups

In the context of bonding social capital, the findings identified how within CRE groups there were internal social networks. The core group of people who came together to drive forward CRE projects, built on pre-existing personal networks and represented bonding social capital. For instance, in YPP, personal networks were based on close social ties and existing positions within the local community. However, in AC, YO and GR the personal connections originated from past social initiatives within communities. In this context, the projects reflected strong interpersonal connections but also developed these further as part of the collective action within projects.

As such, within CRE projects the shareholders indicated confidence and trust in the key stakeholders as Directors, driving forward schemes. They were trusted due to their local embeddedness within communities and their commitment of time, skills and energy in projects. Furthermore, the projects brought people together, engaging communities as shareholders in projects with a clear sense of local identity centred on community ownership.

In terms of bridging social capital, there were external social networks centred on between CRE groups connections. As part of co-working, CRE projects shared their experiences and knowledge. This included how best to address shared barriers and challenges to CRE development. For example, YO and YPP as two CRE projects at an early stage of development and facing the same challenges around raising finance, came together to support each other. In this context, these CRE projects acted in partnership to establish a joint community share offer to finance their respective schemes.

A key set of outcomes resulted from the formation of the CY consortium, focused on both shared resources and understanding, developing bridging social capital. In this way, the consortium provided a platform for discussion and space for knowledge exchange and learning in terms of setting up and taking forward community energy projects. For instance, this was exemplified by a participant, focused on:



Sharing knowledge, sharing resources. (CYSK2)

Joint share offer

A participant highlighted the benefits of partnership working, focused on how CRE projects were able to gain from the experience of the pioneering Aber community-led hydro project. Also, YO and YPP projects were at the same stage in their development, aiming to raise finance, which allowed them to engage in collaboration. This enabled the two projects to come together to secure funding to support the development of a joint share offer. Consequently, they shared resources to develop the share offer, such as *marketing materials*.

In addition, the consortium reduced the difficulties encountered by projects, facing the “*same hurdles*”, focused on similar barriers and obstacles. The participant highlighted the importance of the direct input and assistance provided by more established CRE groups within the consortium. For instance, in relation to shared learning from previously having set up a charity.



You can share ideas and knowledge. Because we all must come up with same hurdles, like this charity set up and then in they've already done this. So, they can hopefully share some of the findings with us to make our journey a little bit pain free but then we can give our knowledge to some of the other members. (CYSK2)

Interconnections between CRE and community hubs

The findings highlight how community hubs were interconnected to CRE projects within their local communities. This was characterised as having different degrees of awareness and involvement, representing bridging social capital. These community hubs represented diverse parts of civic society within local communities, from churches, litter picking groups, outdoor centres to Women's Institute. Overall, most hubs described largely a high degree of awareness of CRE projects, with only some exemplars of a low level. For instance, participants highlighted an awareness of YPP linked to an increasing number of micro-hydros within the locality.

This was in contrast to involvement by community hubs in CRE projects, which was generally low, with only some hubs reporting involvement. For example, solar panels were being installed on community buildings in the Ogwen valley as well as the Swansea and Amman valleys, aligned to the respective CRE projects. Equally in South Wales, an environmental centre hub was partially involved with CRE project by providing information about the new Egni Co-op community share offer.



Communities of place and interest

The findings indicated how participants embedded CRE projects represented a community of place, embedding cohesive communities. For example, the shareholders in YO and YPP were rooted in their communities, representing 90% of the overall shareholders. As part of share offers there was reference to the hydros being set within and benefiting the distinctive valleys of Ogwen and Peris. Further, the 'Awel Aman Tawe' charity directed benefits to the local area of the Upper Amman and Swansea Valley. Equally GR was framed as focused on local development, linked to Gower as a place. Furthermore, there was also evidence of a blending of community of place with community of interest in the larger CRE projects, focused on AC and Gower Regeneration.

In this context, the share offer included a broader regional focus and included a wider set of communities engaging with the CRE schemes. Although, such involvement still retained an identity of place, centred around the distinctiveness of the South Wales region.

Overall, communities reflect diverse groups, values and interests within a community, with cohesion positioned alongside division. In some communities, participants described how the CRE project provided a platform for connecting Welsh and English-speaking members of the community. This was illustrated in the case of the YO project which represented a blending of these two groups as part of the CRE scheme, with the AGM conducted bilingually.



3.6 A Wales of vibrant culture and thriving Welsh language

The findings from the study identify the importance of the interconnections between past and present nature of local communities in generating 'A Wales of vibrant culture and thriving Welsh language'.

As such, the CRE projects had a positive role in supporting the Welsh language in areas of North and South Wales, centred on a bilingual approach. Further, CRE projects built on the history of a post-industrial landscape and community life and presented a transition from past large-scale industries towards small-scale renewable schemes.

Welsh language and bilingualism

The work of CEW (2017) highlights how there is strong support for CRE projects in Welsh speaking communities, such as North West Wales and the Amman and Swansea Valley. In the findings, all the case studies reflected a culturally sensitive and bilingual approach. The CRE projects supported the use of bilingualism and the Welsh language through their initial campaigns and all the continuing communications, including social media and newsletters. In this context, the framing of the majority of CRE projects included cultural references. For instance, both the YP and AC projects were framed as 'Ynni' (energy) and 'Awel' (wind). In this context, WCVA (2020) indicate that a significant degree of community-based activity and regeneration projects are completed through the medium of the Welsh language.

Post-industrial landscape and communities

The findings identified how CRE projects were situated in a post-industrial landscape across all case studies, with a strong sense of heritage, linked to the slate and coal industry. For instance, YPP and YO built on the past heritage of hydro power in the local areas aligned to the slate industry in North Wales. Further, AC represented a transition from the history of the coal industry, to developing new technology based on wind power. Also, the GR project celebrated the industrial heritage of the locality with the Gower Heritage Centre focused on a past watermill. There was a sense of continuity by stakeholders and shareholders across the CRE projects focused on the past and present use of natural resources in their locality. In this way, there was a perceived transition that had occurred over a period of time which was rooted in a sense of local cultural and historical identity, moving from large-scale commercial industry to smaller-scale CRE schemes.

Within case studies shifts in the pattern of how natural resources were exploited had resulted in significant alterations to the landscape and the communities over time. For instance, in the AC case a shareholder identified the relevance of the "*greening of the Swansea valley*" in the post-industrial era in South Wales. As such, communities were part of a transition from heavy industrial past towards a greener future, focused on renewable energy and the closure of coal mines and the restoration of the site, signifying this change.

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I have seen the movement away from coal and the greening of the Swansea valley and the massive environmental improvements... And we're about to see that with the closure of East Pit. I think green power and means of, we don't have much other than the environment. So, tourism and renewable energy are two means of bringing resource in that can feed the community. (ACS5)





3.7 A Globally Responsible Wales

A key part of the findings highlighted the way in which CRE projects engaged in supporting ‘A globally responsible Wales’ through a range of activities. The projects enabled communities to have a sense of empowerment in not only addressing local priorities as part of a low-carbon transition but also to tackle the wider challenges of global climate change through community action.

Within the findings, prior to engaging with the CRE projects the key actors involved or investing in the scheme were already highly engaged in RE and environmental issues. However, the CRE projects sought to impact on the wider community and facilitate greater awareness and information about renewables and climate change. Furthermore, CRE projects were seen as a platform for generating new local sustainability and RE initiatives. Overall, the findings indicate the relevance of the CRE projects in addressing the WFG Act (2015) objectives as part of local action to achieve global change.

The Future Generations Report (2020) highlights the importance of developing CRE in relation to the WFG Act (2015), as exemplified in the ‘Journey to Globally Responsible Wales’ centred on ‘Topic 4: Efficient use of resources’. Indeed, WCVA (2020) emphasise that although the global agenda for tackling climate change is ambitious, it can be delivered through local community activities. In this way, the findings highlight the impactful nature of individual as well as community action in advancing a globally responsible Wales.

Feeling empowered and tackling climate change

The case studies highlighted how CRE projects represented local action and empowerment by communities to tackle wider global environmental challenges. As such, investment in CRE projects enabled shareholders to have a sense of making a positive contribution to global issues on a local level. In particular, increasing the adoption of RE in local communities, supporting a low-carbon transition and combating climate-change. In this way, engagement with CRE projects highlighted how collective action created a sense of an empowerment in communities to enact change. This was exemplified in Gower Regeneration, with shareholders identifying a positive outcome from investment, representing a practical and tangible impact at a community scale. This was identified as tackling what was often viewed as an insurmountable threat of global climate change. This was reiterated by participants in AC, highlighting the power of community action at a local level despite a perceived lack of governmental action. As such, there was a sense of empowerment being involved with the project as community energy was paving the way in terms of climate change action.

In terms of engagement in the CRE projects across case studies, the findings indicated the importance of global as well as local drivers. In this context, a shift towards a low-carbon society rather than dependency on fossil fuels was significant. For instance, participants in YO identified the value of the CRE project in increasing the amount of renewable energy generation in the locality. In the case of AC, addressing climate change was viewed as a key driver underpinning involvement in the scheme. Across the case studies, there was an emphasis on both tackling climate change and developing more CRE as motivational factors underpinning engagement in CRE. Engaging with the CRE project was viewed as positively supporting a shift to a low carbon future through practical steps.

A participant from GR indicated how from investing in the project, facilitating shareholders to have a sense of contributing in a practical way to tackling climate change on a local level. This was, despite its overwhelming scale as a global problem, being frequently framed in a distant and abstract terms.



It's tangible you see it and you meet some of the people, that idea that people are putting a lot of effort into this to make this happen, it really boils me up about climate change and, our government are not really doing anything about it.... It's like a little candle! You think things are gloomy and then you think hang on, somebody doing it. (ACS3)



The members that came to the AGM feel quite empowered by being able to put some money into a local project and make it happen to make difference, with climate change it seems so upsetting and demoralising, the scale of it, and you think what on earth can I do to make a difference? Well, you have, by investing in GR. (GRKS4)

More Renewable energy and environmental projects

The findings identified how the success of the CRE projects provided a platform for developing further renewable and sustainability initiatives. For instance, the GR CRE scheme developed a battery storage facility based on the original solar farm, selling energy to the Swansea area. In a similar way, AC generated Egni solar as a scheme that extended the use of PV installations in community facilities across Wales. On a local level, YO developed the 'Heuldro' project to install solar panels on community buildings as well as Green Valley initiative focused on transport, rural and reducing fuel poverty. The findings indicated that YPP had yet to set up additional projects but highlighted plans to create future CRE projects.

In a similar way, a stakeholder identified that YO now acted as a platform for an emphasis not only on cultural projects but also on environmental schemes focused on a local context, including community transport and community food. However, these initiatives had stemmed from the growth of capability and capability from the success of the community energy scheme so that "YO has been a catalyst" for further community action and local sustainability initiatives.



Talking about an area really, where the projects really have been rather cultural. So, any community green space, that we encourage people to grow their own vegetables. YO has been a catalyst, to think about more green projects. We are also looking at community transport in the valley and charging points. But the fact we have developed environmental project that have been so successful, that gives you confidence. (YOKS1)

Renewable energy engagement and education

The catalytic impact of CRE is highlighted by CEW (2021), focused on facilitating civic engagement and understanding of climate challenges and environmental issues. This was accomplished by connecting such issues in a local context and affirming their relevance to communities. A critical part of the findings was how the CRE projects not only generated renewable energy but also provided a source of information and awareness of energy issues. This included education on RE and provided a vehicle for promoting wider awareness and an understanding of climate change issues in the community. For instance, the consortium supported the CRE projects of YO and YP through a range of activities with local communities. For example, CY organised group visits by other CRE groups, schools and local people to the community hydro (Figure 5).

Figure 5: Wider education and awareness by Cyd Ynni (Datlbygiaud Egni Gweledig, 2021)



Figure 6: Ynni Ogwen community banner



In addition, CRE projects engaged with local schools, such as GR organising visits to the solar farm, YO and AC using site visits and film nights to promote awareness and education about RE and climate challenges. Interestingly, AC sought to relate to the local community through the use of arts, seeking to convey issues around climate change (Figure 6). In addition, there were arts-based activities used with the local primary school (Figure 7), as well as a community-based play at the Pontardawe Arts Centre focused on environmental change. Following on from AC, the additional funds generated by the Egni Co-op scheme, was going to be invested in scaling-up education work on climate issues and RE, centred on both schools and colleges.

Figure 7: Awel Co-op education project about climate change (AC, 2016)





Furthermore, aligned to YO there was engagement with local householders through Energy Local club that sought to establish a closer connection between energy usage and local generation. In addition, the CRE project had a visual display of how much energy generated by the hydro to heighten interest in the scheme. On a wider level, CY promoted energy awareness and attempted to impact on people's behaviour through a series of events and workshops, focused on reducing energy consumption and costs. This included energy saving advice which information provision on reducing household drafts, LED lights and energy tariffs to save both energy and money.

In addition, the shareholders in the CRE project provided a platform to provide further information through the membership of schemes to a wider audience, focused on global sustainability issues. For instance, in YP the newsletter produced about the CRE project highlighted its impact on reducing carbon emissions. As such local actions were linked to the potential role of communities in addressing global challenges. Indeed, in YO there was a similar strategy of disseminating information through its 300 members to engage in a discourse about wider sustainability issues, based on the initial impacts of the hydro. In a similar way, there were 1000 members as part of AC, representing an opportunity to engage with a significant constituency about environmental issues and RE. The CRE projects identified how the impacts of energy generation through renewables could be demonstrated in a tangible way and communicated to shareholders. For instance, in GR there were visual tools such as charts used to highlight the kilowatts of energy produced and the value of solar installations.

Furthermore, the CRE projects developed initiatives as catalysts for change that sought to link addressing local priorities also contributing to tackling broader global environmental challenges. For instance, the success of YO resulted in the development of more green projects in their local communities with the CRE projects perceived as having a ripple effect.

In this way, the scope was broadened to include not only cultural projects but also other small scale sustainability initiatives. As such, key stakeholders were focusing on developing community transport and local food growing. Further, building on their experience of AC, the stakeholders were expanding Egni Co-op, with a focus on a rooftop solar panel rollout for over 250 sites in Wales. In this way, local action was seen as impacting on global issues through a series of sustainability projects.

Equally, a participant in AC highlighted how the successful completion of the wind farm had major repercussions for community engagement. Consequently, the participant highlighted there was a visible impact which could be used to foster engagement. With large number of people quoted seeing the turbines first-hand.



I think having two massive great wind turbines. Oh God, those things are actually up. I think a lot of people, about 600 people, have been to see them. (ACKS1)

In particular, site visits were viewed as an educational tool with school children and provided reinforcement of learning about the hydro and renewable energy. This was seen as potentially influencing families as part of promoting awareness within the wider community.



Schools are another big influencer, primary schools talking to children when they go out into to see the hydro and their eyes light up, if they're learning these things at a really early age. (YOS2)

4. Recommendations: Impacts and policy

The findings highlighted the need to develop a clearer account of social impacts within a policy context that extends beyond quantifiable metrics, identifying areas of community benefit.

In this way, the findings highlight the need to capture the multifaceted nature of added value emerging from CRE projects as part of a policy environment, focused not only on generating RE but also discrete social impacts. This includes areas such as CRE generating income which supports a community sense of autonomy over the long term, underpinning further community developments and contributing to impacts around energy efficiency and healthier communities.

Further, CRE social impacts are linked to building and extending social networks, contributing to the policy focus on cohesive and well-connected communities. In addition, aligned with CRE projects there was a sense of empowerment as an impact focused on actions on a local and global level. This centred on generating RE and tackling climate change, but also delivering community benefit and bringing people together for collective action, important in developing sustainable communities.

A key recommendation is the need for a greater emphasis on the value of social impacts from CRE projects, as well as developing a more nuanced approach to integrating social impact as experienced and perceived by communities within a policy context.

Significantly, the FGA (2015) in Wales presents an opportunity for developing such an approach in the context of the CRE sector, providing a framework for linking impacts within a clear policy infrastructure that acknowledges a range of impacts cutting across social, economic, environmental, and cultural well-being. Therefore, it provides a good framework for capturing social impacts, although the FGA (2015) is at an early stage of implementation.

The study echoes the conclusions of the IWA (2019) highlighting the relevance of building RE and energy efficiency as a key part of addressing the Well-being goals. However, there is a need for a greater emphasis on including an account of the progress of RE schemes and energy saving and efficiency initiatives by Public Bodies and Public Service Boards. Furthermore, a recommendation centres on signalling the importance of the FGA (2015) as a template in the national UK policy context. It could provide the infrastructure for a more unified approach to representing complex impacts across multiple areas arising from CRE projects, represented by the Well-being goals as well as linking to processes represented by the Ways of working.

5. Concluding Remarks

To conclude, the study detailed an account by identifying impacts ranged across different goals, for instance building economic and environmental resilience, a more equal Wales as well as having more local ownership and decision making by communities within the energy system.

Further, the study detailed how CRE projects addressed the 'Ways of working' in the WFG Act (2015). In this way, the study highlighted *how* there was collaboration by CRE projects through building connections within and between CRE groups but also extended towards policy makers. The study also detailed how people on a local level were part of involvement in collective action through the vehicle of CRE projects.

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