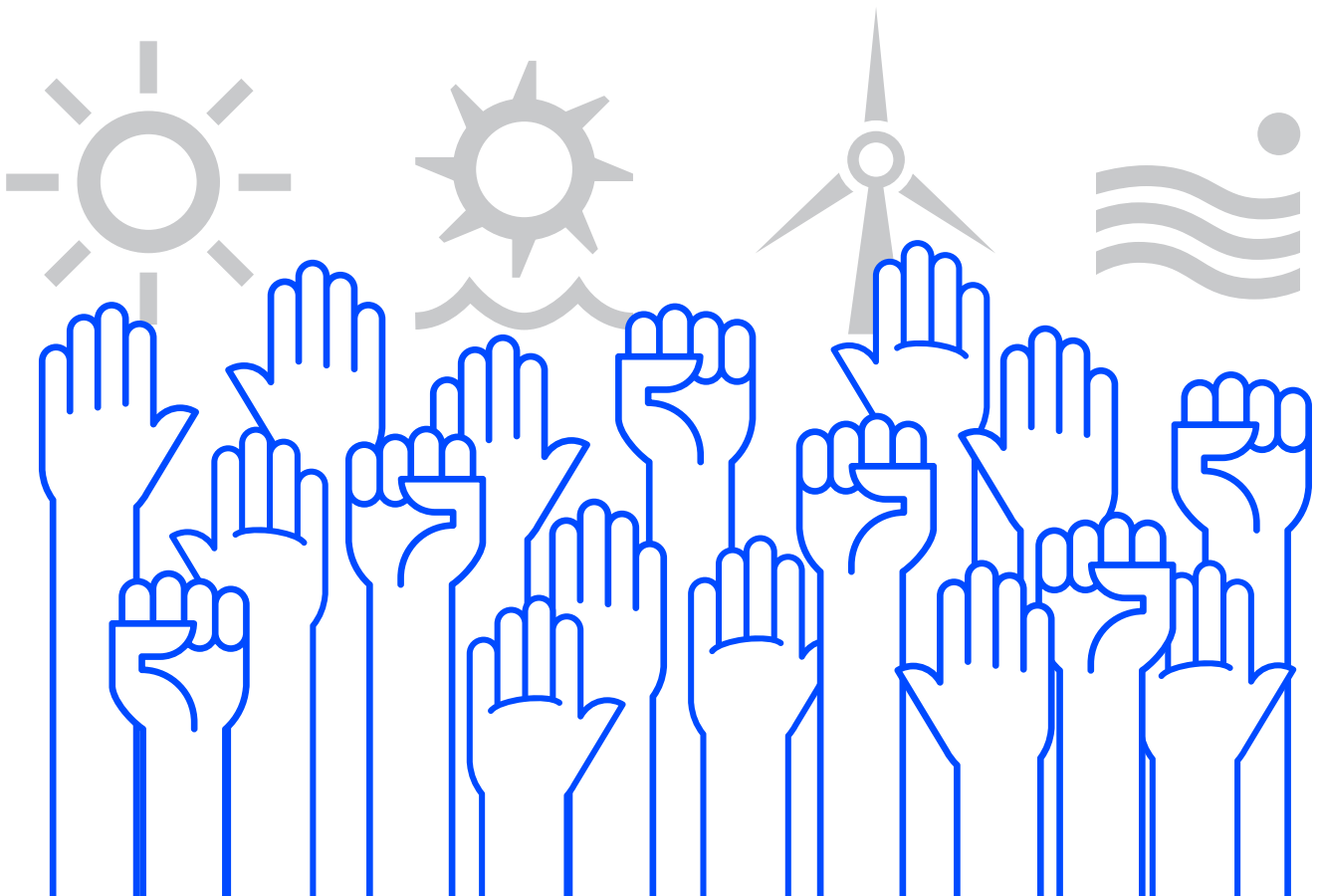




Re-energising Wales

Factors influencing local and community engagement in renewable energy in Wales

Report and analysis produced by Professor Judith Marquand, Kate O' Sullivan and Dr Sioned Pearce at The Wales Institute of Social and Economic Research, Data and Methods for the Institute of Welsh Affairs.



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About *Re-energising Wales*

The Institute of Welsh Affairs' *Re-energising Wales* project is a three year project (April 2016 - April 2019) that will deliver a plan to enable Wales to meet its projected energy demands entirely from renewable sources by 2035

The six core workstreams of *Re-energising Wales* are:

1 Energy Demand

We established a framework to collect and report on operational energy demand data, in order to help collate temporal and geographical data and better understand what drives energy demand.

2 Developing a future energy systems vision

We used the Swansea Bay City Region (SBCR) as a case study exemplar, showcasing how the SBCR can maximise the size and location of its renewable energy resources in order to meet its projected energy demands by 2035. Lessons from this will be applied across Wales.

3 Setting the economic parameters

Building on the above Swansea Bay City Region report, we outlined the economic opportunity that arises with a truly transformative approach to energy generation and domestic refurbishment in the Swansea Bay City Region. We also assessed the economic costs and benefits of renewable energy transition in Wales.

4 Social and Community Issues

This workstream is split into two reports. **Within this current report we have undertaken interviews with local and community organisations across Wales to capture their experiences of developing renewable energy projects in Wales.** Part 2 of this workstream outlines recommendations for how to protect, promote and achieve scale in community and local ownership of renewable energy in Wales.

5 Regulatory and political challenges

We assessed what political and regulatory powers are required for a new renewable energy regime to be implemented well in Wales.

6 A delivery plan

We have created a detailed, timed, and costed action plan for developing a credible renewable energy programme for Wales which brings together findings from the project.

There have also been two policy papers: *Funding Renewable Energy Projects in Wales* and *Decarbonising Transport in Wales*.

The IWA Re-energising Wales project is kindly supported by the Hodge Foundation, the Friends Provident Charitable Foundation and the Polden-Puckham Charitable Foundation.



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Foreword

We are at a crucial point in time in trying to ensure that our energy system is fit for purpose for future generations. We believe that ensuring that the economic, social and environmental value derived from renewable energy schemes is retained locally should be central to the development of the renewable energy sector in Wales.

As part of the research for this report, we wanted to capture the experiences of local and community organisations across Wales in developing renewable energy projects. We wanted to understand their motivations for developing renewable energy schemes as well as the barriers that have prohibited them from developing schemes and to set these out clearly. To produce this report, we have used the IWA's convening power to bring together diverse opinions and expertise to develop an informed perspective on how the energy sector in Wales can be improved for future generations.

The Welsh Government and UK Government are currently developing a number of energy policy updates, and we hope this report will contribute to their consideration of these issues and to their plans for renewed action. We also hope this report will contribute to shaping the plans of a number of other key actors, including local authorities, registered social landlords and community groups in particular. This report sets out a number of clear opportunities that, if taken up, could significantly and positively impact Wales' energy sector.

We would like to thank the authors for conducting this research and for preparing a thorough, compelling, evidence-based report. We would also like to extend our thanks to all those individuals and organisations who have participated in interviews that have contributed to the debate.

Shea Buckland-Jones

Re-energising Wales Project Coordinator

Executive Summary

This report explores what influences individuals and communities to engage and participate in local renewable energy generation and energy-saving in Wales, as well as the current barriers to local renewable energy generation for the benefit of local communities. It includes local authority projects and Registered Social Landlord (RSL) projects, as well as community-led projects.

Welsh Government has a target of 1GW of renewable energy to be locally owned by 2030. This report explores the barriers to be overcome and opportunities to be seized for Wales to meet, or potentially exceed this target.

The research for this report began with a number of initial interviews with relevant organisations and experts. It took place in six local authority areas in Wales, selected according to a range of geographical and socio-demographic factors. We held semi-structured interviews with the local authority in each area, and with a range of RSLs and community-led projects.

In the material gathered, we found an enormous variation between local authorities. These differences, apart from the effects of differing rurality, lay within the authorities themselves. Product champions, whether individuals or small groups, were essential to rapid progress. There was often a need to overcome staff conservatism and a need for education among their clientele, for adults as much as for school-children. Staff shortages in local authorities, including the lack of dedicated staff to develop renewable energy projects, are a clear barrier. The same differences and needs were found in RSLs. Community-led projects faced the same need for product champions. In addition, they needed to be able to draw on a wide range of expertise, with extra problems imposed by the long timescale needed to develop projects.

The launch of the revamped Welsh Government Energy Service, which occurred after the research for this report, obviated the need to make what would have been important recommendations to strengthen the expert and financial support available to community projects, particularly in the earlier stages of their development. In addition, the effects of the new Planning Policy Wales (Edition 10) (2018) will need to be observed before any further suggestions relating to planning are made.

However, there remain the needs to improve the understanding and hence the acceptability of renewable energy and to assure an adequate supply of skills, both practical skills and managerial skills, including those associated with entrepreneurship. There remains a general lack of knowledge and expertise within local communities to deliver renewable energy projects.

We identified a range of barriers and some related opportunities for developing these skills for individuals, communities and local authorities and RSLs respectively.

It became apparent that there is a pivotal role for local – or regional – authorities in any major expansion of locally- and community-led schemes. Particular attention needs to be paid to measures which help them, given the continuing conditions of financial stringency. As well as measures to raise the profile, understanding and acceptability of renewable energy and energy-

saving schemes for them, they need to take full account in their decision-making procedures of the benefits which renewable energy and energy-saving schemes can bring them, both financial benefits and help in reaching their carbon emission targets.

There are also requirements to take action associated with the Well-being of Future Generations Act (2015). Not only do many Public Service Boards (PSBs) need to raise the profile of renewable energy and energy-saving in their annual reports; there is also a need to ensure that the relevance of these reports is fully appreciated throughout their local authorities. These are steps which can be undertaken immediately. There is also a need to have a longer time horizon, to develop simple, robust ways to help local authorities to take account of social benefits in making their renewable energy and energy-saving decisions.

Introduction

Introduction

This study is a part of the IWA's *Re-energising Wales* project. *Re-energising Wales* has brought together representatives from industry, regional stakeholders and academia with an interest in the future development and transformation of energy in Wales.

The 3-year project, running from April 2016 until April 2019, has delivered a plan to enable Wales to meet its projected energy demands entirely from renewable sources by 2035, whilst delivering co-benefits in the areas of economic and community resilience, the widening of energy ownership models, and in energy demand management and efficiency. *Re-energising Wales* aims to provide the evidence to convince policy makers in Wales to adopt a new and ambitious programme to transform Welsh energy and set an example within the UK and internationally.

This report aims to explore the values that influence community engagement in energy saving and generation in Wales, identify the barriers to increasing local ownership of renewable energy projects and identify the opportunities that are needed to support growth in this area.

Renewable energy and energy saving in Wales

The Welsh Government has a target to generate 70% of its electricity consumption from renewable sources by 2030, with 1 gigawatt (GW) of that to be locally owned. All new renewable energy projects are also required to have an element of local ownership by 2020¹.

The Welsh Government report *Energy Generation in Wales* in 2017² showed that Wales generates the equivalent of 48% of the power it uses from renewables. Electricity generation from renewables doubled in the period from 2011 to 2016. Almost 70% of this came from wind, split almost equally between offshore and onshore wind.

In 2018 the Welsh Government released a call for evidence on 'Locally owned renewable energy'³. Furthermore, the revamped Welsh Government Energy Service was launched on 11 October 2018⁴. This service brings together the Green Growth Wales and the Local Energy Service support programmes. It is important to note the research and stakeholder interviews for this report were carried out before the new Welsh Government energy service was launched.

The *Re-energising Wales* report '*Swansea Bay City Region: A Renewable Energy Future*'⁵ has already shown that heroic acceleration of the rate of adoption of renewable energy will be needed if the *Re-energising Wales* 100% target is to be met. This report examines what changes are likely to help local and community energy projects to play a part in and benefit from growth in renewable energy.

- 1 Welsh Government, [Lesley Griffiths high on ambition for clean energy](#), September 2017
- 2 Welsh Government, [Energy Generation in Wales](#), December 2018
- 3 Welsh Government, [Locally owned renewable energy - A call for evidence](#), December 2018
- 4 Welsh Government, [Written Statement - Launch of the Welsh Government Energy Service](#), accessed January 2019

Locally-owned renewable energy

The Welsh Government report definition for 'locally-owned' projects covers projects owned by households, communities, local authorities, housing associations, other public sector bodies, charities (including faith organisations), further education establishments, local businesses (registered in Wales) and Welsh farms and estate.

Through our study we found that community-owned projects take many different forms. Some are community-led projects and others are undertaken with the well-being of the community in mind. There are projects that have been set up by third sector organisations like the National Trust and public statutory bodies like Natural Resources Wales (NRW) and the National Park Authorities. Some projects involve social housing and are normally set up by Registered Social Landlords (RSLs) or by local authorities. We also found projects that were set up by or for NHS Boards, local education authorities and local authorities. These projects were set up primarily to increase the energy-efficiency of local authority properties or to raise revenue, but all such projects do include an element of community benefit.

In 2017, 751 MW of installed renewable capacity was locally owned in Wales. This was made up of 529 MW of locally owned renewable electricity and 221 MW of renewable heat capacity⁶. These projects comprise just 20% of all renewable energy capacity in Wales, but they make up 94% of all renewable energy projects.

The role of local authorities in community-owned renewable energy projects

Renewable energy projects, private and community-owned, must be approved by the local authority through the planning process. Sometimes local authorities are also the owners of the land or assets needed for the project, and getting the right permissions for these can add to the difficulty of the process.

Partnership with a local authority is one option for community projects. Other options include the project being completely owned by members of a community, or by individuals from a wider area with an interest in renewable energy projects, or by a partnership between the community and a private developer.

5 Regen for Institute of Welsh Affairs, *Swansea Bay City Region: A Renewable Energy Future*, May 2018

6 Welsh Government, *Energy Generation in Wales*, December 2018

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

Some of the main reasons for installing renewable energy projects are to reduce carbon emissions and their impact on our health and climate change. Both of these are concerns of the Well-being of Future Generations (Wales) Act 2015. Although 'renewable energy' and 'energy-saving' are not mentioned explicitly in the seven well-being goals under the Act, they do feature in the national indicators. Of these 46 indicators, the most relevant here are:

- capacity (in MW) of renewable energy equipment installed
- levels of nitrogen dioxide (NO₂) pollution in the air
- percentage of dwellings with adequate energy performance
- emissions of greenhouse gases within Wales
- emissions of greenhouse gases attributed to the consumption of global goods and services in Wales.

Despite these indicators, energy does not currently feature in some of the Local Well-being Plans developed by Public Service Boards as required by the Act.

Public good recurred as a theme in several of our interviews, although it did not appear that benefit was measured other than in terms of financial benefit over a long period. There was considerable interest in the concepts of public good and social benefit; the problem was that our informants were not aware of any clear guidance on how to estimate them or how to use the resulting estimates. This is a clear area for action.

Chapter 1: Methods

Chapter 1: Methods

We took a case study approach to the study and looked at a range of projects with different types of ownership from different areas in Wales. All of the projects that we looked at had an element of community benefit. We chose this approach based on the findings from our initial meetings with key organisations and individuals. It was clear from the conversations we had that exploring real examples was the best way to get a full understanding of the variety of experiences individuals and communities have had with locally owned renewable energy projects

We began the study with a mix of desk based research, looking at articles, reports, web pages and so on. Meetings were held with the Future Generations Commissioner for Wales' Office, NRW, a Welsh Government advisor and individuals who have been involved with community-owned renewable energy projects.

We used the findings from these meetings to form hypotheses and to structure the next stages of our work.

We looked at six local authority areas with different characteristics and then in detail at a sample of projects from each area. The six local authority areas are Blaenau Gwent, Flintshire, Newport, Pembrokeshire, Powys and Swansea.

In each area, we carried out semi-structured interviews with local authority officers responsible for renewable energy and energy-saving, a selection of RSLs and individuals/groups with responsibilities for community projects. A list of organisations interviewed can be seen in Appendix 1. Appendix 2 gives a fuller account of our report methodology.

1.1 Selection of areas for detailed study

In order to select a sample of local authority areas with different characteristics, we looked at characteristics we thought might be relevant to the rate of growth in community or other local renewable energy or energy-saving projects. These characteristics were:

- geographical and physical factors such as the extent to which an area is urban or rural. This may affect the type and size of renewable energy or energy-saving projects that can be developed
- socio-demographic factors that might influence 'community capacity'
- the number of existing 'community' renewable energy developments

- the extent of available grid capacity at the local level and of gas supply
- local governance and housing factors that might influence the type, number and size of renewable energy or energy-saving projects that local authorities and RSLs were able to develop.

1.2 Urban and Rural

Welsh local authority areas classified by the 2011 Population Census as ‘rural’ are: Powys, Carmarthenshire, Ceredigion, Gwynedd, Pembrokeshire and Isle of Anglesey. All the rest are classified as ‘urban’. It is also possible to differentiate between ‘sparsely’ and ‘less sparsely’ populated urban and rural areas. The distribution of urban and rural areas is shown in Figure 1 and Table 1. Table 1 also shows their population densities in 2016.

Figure 1: Population density and urban or rural classification per local authority

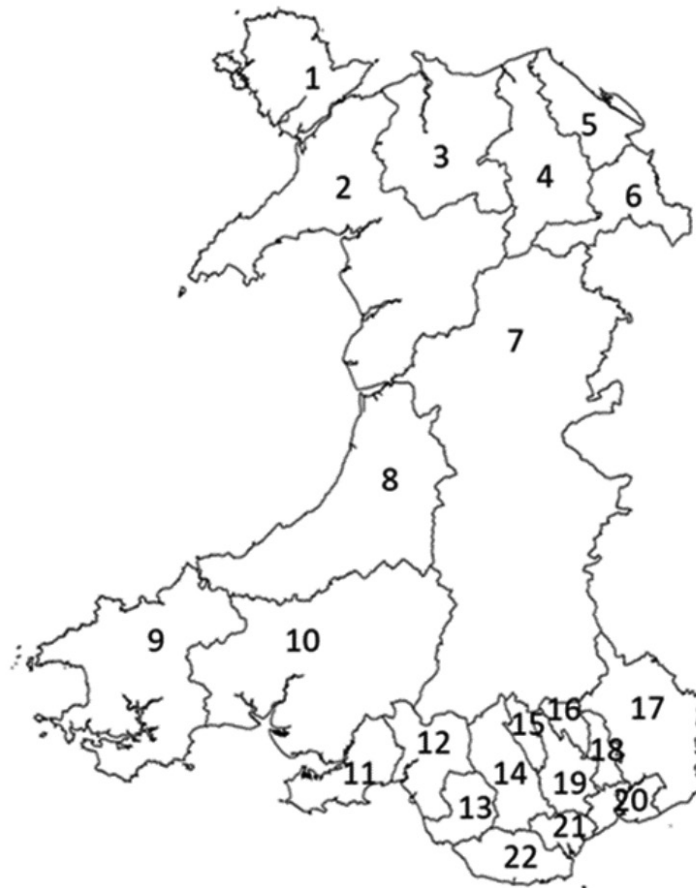


Table 1: Population density per local authority

Map No.	Local Authority	Population Density (per km ²)	Urban / Rural
1	Isle of Anglesey	98.02	Rural
2	Gwynedd	48.77	Rural
3	Conwy	103.51	Urban
4	Denbighshire	113.3	Urban
5	Flintshire	352.97	Urban
6	Wrexham	271.37	Urban
7	Powys	25.51	Rural
8	Ceredigion	41.52	Rural
9	Pembrokeshire	76.58	Rural
10	Carmarthenshire	78.31	Rural
11	Swansea	643.95	Urban
12	Neath Port Talbot	320.84	Urban
13	Bridgend	571.04	Urban
14	Rhondda Cynon Taf	561.84	Urban
15	Merthyr Tydfil	536.67	Urban
16	Blaenau Gwent	640.39	Urban
17	Monmouthshire	109.34	Urban
18	Torfaen	732.32	Urban
19	Caerphilly	650.58	Urban
20	Newport	782.83	Urban
21	Cardiff	2565.46	Urban
22	The Vale of Glamorgan	388.01	Urban

Source: Table adapted from *Statistics Wales (2018)*⁷, *Consumer Data Research Centre (2016)*⁸ and *Department for Environment, Food and Rural Affairs (2016)*⁹.

7 Statistics Wales, *Population density (persons per square kilometre) by local authority and year*, June 2018

8 Consumer Data Research Centre, *Population Density and Urban/Rural Classification*, <https://data.cdrc.ac.uk/dataset/population-density-and-urban-rural-classification>, accessed June 2018

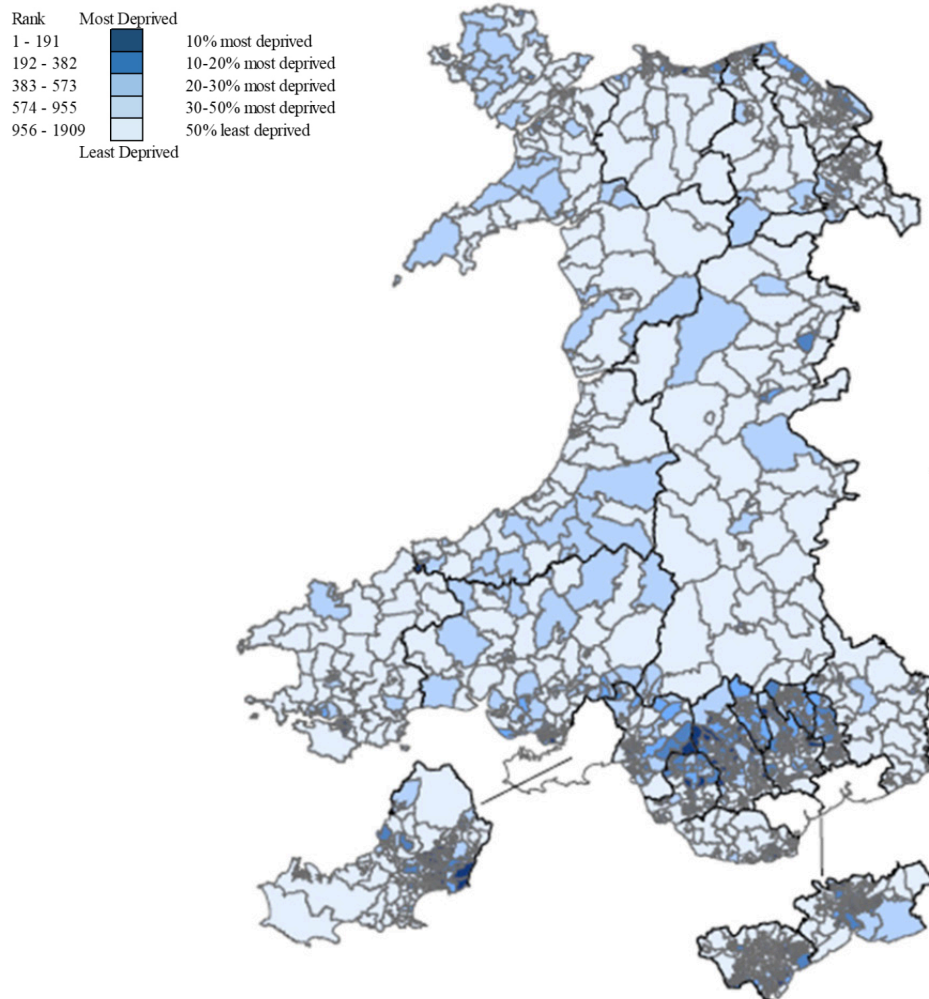
9 Department for Environment, Food and Rural Affairs. *Guide to Applying the Rural Urban Classification to Data*, July 2016

1.3 Socio-demographic factors: Deprivation

Levels of deprivation sourced from the Welsh Index of Multiple Deprivation (WIMD)¹⁰ are shown in Figure 2. The WIMD uses an index system to rank areas by the level of deprivation. It uses eight domains to inform this ranking, they are: health, access to services, housing, community safety, income, access to employment, education and physical environment (Welsh Government, 2015).

The WIMD shows that the highest levels of deprivation are seen in the areas often called 'the Valleys'. They are: Blaenau Gwent, Caerphilly, Merthyr Tydfil, Rhondda Cynon Taf, and Torfaen. After Cardiff, Newport and Swansea, these Valleys areas include all the most densely populated local authority areas. There is a smaller cluster of deprivation around Port Talbot.

Figure 2: Welsh deprivation scores assigned to Lower Super Output Area



Local authority boundaries are depicted in bold¹¹.

¹⁰ Welsh Index of Multiple Deprivation, [Welsh Index of Multiple Deprivation](#), accessed June 2018

¹¹ Welsh Government, [Welsh Index of Multiple Deprivation - Annual indicator data: 2015](#), accessed May 2018

1.4 Community-owned energy projects

Our selection of areas had to be made before Welsh Government published the information in Table 2 below. We had to estimate the numbers of community projects in each area from data held by Community Energy Wales and Energy Savings Trust. We did this by dividing the full list of community projects obtained from Community Energy and the Energy Saving Trust by the population in each area. The rankings are shown in Table 3 (note that the Welsh Government data in Table 2 appears to show broadly similar rankings).

The number of community-owned projects per head of population shown in Table 3 shows how likely communities within the local authority area are to set-up projects.

Table 2: Number of Community, RSL, Local Authority and Other Public Sector & Charity renewable energy projects per Local Authority area

Area	Community	Registered Social Landlord	Local Authority	Other Public Sector and Charity	Totals
Blaenau Gwent	0	475	2	3	480
Bridgend	2	370	0	9	381
Caerphilly	3	981	17	25	1026
Cardiff	5	485	3	19	512
Carmarthenshire	16	19	4	32	71
Ceredigion	3	165	1	23	192
Conwy	1	102	0	11	114
Denbighshire	3	116	4	7	130
Flintshire	8	158	45	20	231
Gwynedd	15	344	19	27	405
Isle of Anglesey	2	66	77	3	148
Merthyr Tydfil	2	96	0	3	101
Monmouthshire	17	30	10	22	79
Neath Port Talbot	5	13	2	10	30
Newport	6	129	1	9	145
Pembrokeshire	2	159	12	40	213
Powys	18	190	1	34	243
Rhondda Cynon Taff	7	783	7	27	824
Swansea	13	81	38	24	156
Torfaen	3	682	7	19	711
Vale of Glamorgan	2	131	7	4	144
Wrexham	5	78	40	13	136
Grand Total	138	5653	297	384	6472

Source: Welsh Government (2017)¹²

¹² Welsh Government, *Energy Generation in Wales 2016*, December 2017

Table 3: Community projects in Wales per head

Local Authority	Population (mid 2016)	Energy Projects	Community Projects (per head x100,000)	Rank
Blaenau Gwent	69,628	0	0	19=
Bridgend	143,177	1	0.698	16
Caerphilly	180,462	1	0.554	17
Cardiff	361,468	2	0.553	18
Carmarthenshire	185,610	4	2.155	10
Ceredigion	74,146	3	4.046	7
Conwy	116,538	1	0.858	14
Denbighshire	94,805	4	4.219	6
Flintshire	154,419	0	0	19=
Gwynedd	123,627	12	9.707	1
Isle of Anglesey	69,723	6	8.605	2
Merthyr Tydfil	59,810	0	0	19=
Monmouthshire	92,843	5	5.385	5
Neath Port Talbot	141,588	2	1.413	12
Newport	149,148	0	0	19=
Pembrokeshire	123,954	7	5.647	4
Powys	132,160	11	8.323	3
Rhondda Cynon Taf	238,306	4	1.679	11
Swansea	244,513	7	2.863	8
Torfaen	92,052	1	1.086	13
Vale of Glamorgan	128,463	1	0.778	15
Wrexham	136,710	3	2.194	9
TOTAL	3,113,150	75		

Data sourced from *Community Energy Wales* (2017) and *Welsh Government* (2017-18)
(with some data missing for 'ongoing capacity')

The geographic spread of community-owned energy projects in 2017 is shown in Figure 3 below, based on data from Table 3. The figure shows existing projects, discontinued projects and projects whose status was unknown. The number of projects in each area shows where it may be harder or easier to complete a community energy development and where there may be more or less barriers in place.

Figure 3: Community-owned energy projects Wales 2017, categorised as 'existing', 'discontinued' and 'unknown'



Map No.	Local Authority
1	Isle of Anglesey
2	Gwynedd
3	Conwy
4	Denbighshire
5	Flintshire
6	Wrexham
7	Powys
8	Ceredigion
9	Pembrokeshire
10	Carmarthenshire
11	Swansea
12	Neath Port Talbot
13	Bridgend
14	Rhondda Cynon Taf
15	Merthyr Tydfil
16	Blaenau Gwent
17	Monmouthshire
18	Torfaen
19	Caerphilly
20	Newport
21	Cardiff
22	Vale of Glamorgan

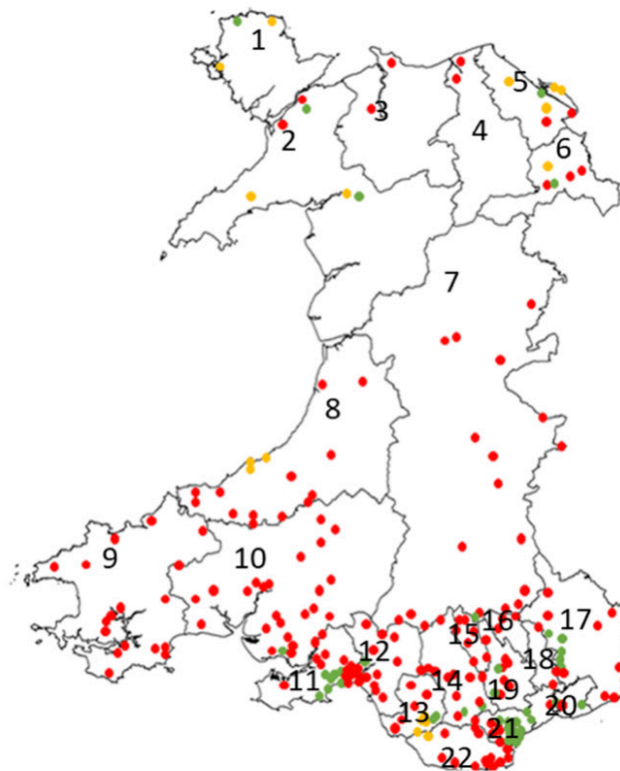
Projects grouped and mapped at postcode level¹³

13 Welsh Government, data anonymised and sourced from *Welsh Index of Multiple Deprivation - Annual indicator data*, August 2018. Originally mapped using WISERD Data Portal, using Community Energy and Energy Savings Trust data

1.5 Electricity network capacity

Our initial meetings highlighted that electricity distribution grid capacity has an influence over whether a renewable energy project can go ahead or not. We heard about some projects which did not go ahead because there was not enough capacity on the electricity grid for them to connect. Figure 4 shows which areas may have more or less access to the distribution grid, and the capacity that was available.

Figure 4: Electricity network capacity Wales



Red
Low network capacity;
Orange
Moderate network capacity
Green
High network capacity

Map No.	Local Authority
1	Isle of Anglesey
2	Gwynedd
3	Conwy
4	Denbighshire
5	Flintshire
6	Wrexham
7	Powys
8	Ceredigion
9	Pembrokeshire
10	Carmarthenshire
11	Swansea
12	Neath Port Talbot
13	Bridgend
14	Rhondda Cynon Taf
15	Merthyr Tydfil
16	Blaenau Gwent
17	Monmouthshire
18	Torfaen
19	Caerphilly
20	Newport
21	Cardiff
22	Vale of Glamorgan

Adapted from: Western Power Distribution (2017)¹⁴ and Scottish Power Energy Networks (2017)¹⁵

¹⁴ Western Power Distribution, *Network Capacity Map*, accessed November 2017

¹⁵ Scottish Power Energy Networks, *Distributed Generation SP Manweb*, accessed November 2017

1.6 Local government and housing factors

We examined local authority and RSL housing stock relative to population levels. Table 4 shows these measures for each local authority area. Thus it shows social housing per head in each area.

Table 4: Breakdown of RSL and local authority housing stock by local authority area, ranked from the highest level to lowest level

Local Authority Area	Population (2016 mid year)	RSL Housing Stock	RSL Housing stock per head	LA Housing Stock	LA Housing Stock per head	Total Social Housing Stock per head
Blaenau Gwent	69,628	7,945.33	0.11	0.00	0.00	0.11
The Vale of Glamorgan	128,463	9,882.67	0.08	3,897.33	0.03	0.11
Merthyr Tydfil	59,810	5,857.00	0.10	0.00	0.00	0.10
Wrexham	136,710	1,970.00	0.01	11226.00	0.08	0.10
Newport	149,148	12,960.00	0.09	0.00	0.00	0.09
Neath Port Talbot	141,588	12,260.67	0.09	0.00	0.00	0.09
Swansea	244,513	7,185.33	0.03	13,493.00	0.06	0.08
Caerphilly	180,462	3,822.67	0.02	10,852.00	0.06	0.08
Gwynedd	123,627	8,597.33	0.07	0.00	0.00	0.07
Cardiff	361,468	11,379.67	0.03	13,468.33	0.04	0.07
Isle of Anglesey	69,723	865.33	0.01	3,780.00	0.05	0.07
Pembrokeshire	123,954	2,461.67	0.02	5,668.33	0.05	0.07
Carmarthenshire	185,610	3,099.00	0.02	9,003.00	0.05	0.07
Rhondda Cynon Taff	238,306	15,206.00	0.06	0.00	0.00	0.06
Flintshire	154,419	2,529.67	0.02	7,176.00	0.05	0.06
Powys	132,160	2,856.67	0.02	5,348.00	0.04	0.06
Bridgend	143,177	8,586.67	0.06	0.00	0.00	0.06
Denbighshire	94,805	2,194.33	0.02	3,411.00	0.04	0.06
Monmouthshire	92,843	5,352.00	0.06	0.00	0.00	0.06
Conwy	116,538	6,134.67	0.05	0.00	0.00	0.05
Ceredigion	74,146	3,274.67	0.04	0.00	0.00	0.04
Torfaen	92,052	2,690.00	0.03	0.00	0.00	0.03
Total	3,113,150	137,111.33		87,323.00		0.07

Source: Data is ranked from the highest social housing stock level to lowest.
Data adapted from Statistics Wales 2016¹⁶ and 2017¹⁷

¹⁶ Statistics Wales, *Population projections by local authority and year*, accessed June 2018

¹⁷ Statistics Wales, *Total social housing stock by local authority area and provider type*, accessed June 2018

Chapter 2: The interview areas selected

Chapter 2: **The interview areas selected**

Our selected areas are Blaenau Gwent, Flintshire, Newport, Pembrokeshire, Powys and Swansea

We selected a diverse sample of local authority areas taking into account the characteristics listed above and representing the different parts of Wales (north, south, west, mid).

When carrying out a limited ethnographic survey it is important to select examples which appear, in advance of the survey work, to be as different as possible. This is why we have selected three urban areas, two rural areas and one area from the Valleys.

Using the information in Table 3, we selected three areas from the lowest ranked areas in terms of community projects per head and three from the top half. Swansea was the highest-ranking conurbation.

The capacity of the electricity distribution grid network to be able to connect electricity generation is low in much of Wales, but in two of our six areas, Flintshire and Swansea, it is moderate or high.

The amount of social housing per head ranges from very low in Powys and Flintshire to moderately high in Swansea and Pembroke, fairly high in Newport and very high in Blaenau Gwent.

There is more information about the chosen local authority areas in Table 5.

Table 5: The 6 Selected Local Authority Areas

Area	Urban/Rural/Valleys*	Community projects per head Rank	Network Capacity	Social housing per head	Social Housing Rank
Blaenau Gwent	Urban/Valleys	19=	low	0.11	1=
Flintshire	Urban	19=	moderate	0.06	14=
Newport	Urban	19=	low	0.09	5=
Pembrokeshire	Rural	4	low	0.07	8=
Powys	Rural	3	low	0.06	14=
Swansea	Urban	8	high	0.08	7=

Source: Data adapted from Statistics Wales (2016)¹⁸ & (2017)¹⁹

2.1 The initial interviews

We carried out initial interviews with the Future Generations Commissioner for Wales' Office, NRW, a Welsh Government advisor and individuals who have been involved with community-owned renewable energy projects. The findings from these meetings provided a framework for our detailed fieldwork. Below are the key themes that emerged from these initial interviews.

2.2 Opportunities identified

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

The Well-being of Future Generations (Wales) Act 2015 has great potential to encourage the implementation of renewable energy within local authorities. Renewable energy projects arguably contribute towards all seven of the well-being goals. The Act also makes it possible for projects to be assessed for their social return as well as their financial return, however as yet there is no agreed framework to support measurement of social return. The system of reporting against this legislation is in its early days; currently there is no specific duty on Public Service Boards to report on the progress of renewable energy schemes. However, Public Bodies and Public Service Boards do have a duty to improve the economic, social, environmental and cultural well-being of Wales through setting well-being objectives that maximise contribution to the seven national well-being goals and to report on progress. We believe that renewable energy and energy efficiency should be an explicit element of improving well-being in Wales

2.2.2 'Renewable Energy and Resource Efficiency' is one of NRW's three main drivers

'Renewable Energy and Resource Efficiency' is one of NRW's three main drivers and they are developing area statements for six broad areas which cover all land in Wales, and also one for marine resources. These area statements will provide an evidence base needed to manage natural resources sustainably at a local level and will include the development of renewable energy projects where necessary. The statements have to be completed by the end of 2019 and it is hoped that they will be seen as mission statements for anyone looking to develop in each area. They will be adopted by local authorities and their Public Service Boards.

¹⁸ Statistics Wales, [Population projections by local authority and year](#), accessed June 2018

¹⁹ Statistics Wales, [Total social housing stock by local authority area and provider type](#), accessed June 2018

2.2.3 Profitable case studies to influence others

NRW has an Energy Delivery Programme for its own estate. Its Carbon Positive Project has managed to make its activities not just carbon neutral, but carbon positive. This is a first for the public sector and makes a strong case for other public bodies to set up their own projects (by 2030).

2.2.4 Local authority funding

Local authorities are able to spend their own money on the risky earlier stages of projects and they can borrow. They can get repayable, interest-free loans from the SALIX scheme²⁰, financed by Welsh Government. Local authorities may also receive advice and support from the Welsh Government's Energy Service.

2.3 Barriers suggested in the initial interviews

The initial interviews provided a frame for our detailed fieldwork. Some of the emerging barriers from these interviews included the following:

2.3.1 Obtaining consents

It was mentioned that the culture of some local authorities made it difficult to obtain agreement on things such as the use of land for renewable energy projects. We were also told that NRW is often perceived as providing obstacles to planning consent, but NRW explained to us that if a second study of a rejected application does not show improved mitigation they have to reject it by law. For private developers, the local authority is the planning authority and NRW advises the local authority. Both have to say 'yes' before a development can go ahead.

2.3.2 Technical and managerial expertise

A strong conclusion from the interview data was that the need for relevant expertise was critically important and that it was not always readily available.

2.3.4 The length of time a project takes and problems of continuity

The length of time needed to develop a scheme was suggested as usually eight or nine years, with six or seven years as a minimum. Many projects took longer. This caused problems of continuity in the direction and management of schemes. Suitable expert advice was needed to deliver projects. Internal expertise for those developing the project as well as external expertise was needed. The issue of obtaining continuity of support was raised.

2.3.5 Financial risk

The interviews sometimes mentioned concerns about financial risk and (often) about finding initial capital for projects.

2.3.6 Distribution of powers

The retention of some powers by the UK Government over energy in Wales has affected the delivery of renewable energy projects in Wales; it remains to be seen how far the increase in Welsh powers through the Wales Act 2017 will change this. Many people mentioned the greater ease of developing local and community projects in various other European countries, including Denmark, Germany, Ireland and Portugal (and in the United Kingdom more than a century ago, when municipalisation of public services was prevalent). This hints, to some extent, at the broad question of the effect of regulation on the energy system.

20 Salix, [The Wales Funding Programme](#), accessed November 2018

2.4 Six stages of a community project

From a meeting with The Green Valleys we were able to develop the following six stages of a community project. We used these stages to guide and structure our fieldwork interviews.

- First, there has to be an initial idea. Here, knowledge, ideas, community confidence, skills and leadership are needed.
- Second, the feasibility of the idea has to be tested. At this stage, costs start to be incurred. Expertise and some finance are needed.
- Third, permissions have to be obtained from relevant parties. A business case has to be developed. Almost all projects have to receive local authority planning approval before they can proceed. More finance is needed.
- Fourth, finance has to be obtained for construction. Commercial finance organisations, public financing, and share issues are all possibilities.
- Fifth, the project needs to be built. There are few risks at this stage. Arrangements have to be made for the continuing management and maintenance of the project.
- Finally, the finished project starts to generate both energy, and a return on expenditure.

The people we spoke to mentioned a range of funding options for the early stages of a project. Once a development plan had been agreed, we found that issuing shares was seen to be one of the best ways of getting reliable financial support.

Chapter 3: Outcomes of the fieldwork

Chapter 3: **Outcomes of the fieldwork**

3.1 Local authorities

Before visiting each local authority in our sample we read the relevant sections of their Local Development Plans, including any renewable energy section or document. We also read the relevant sections of Well-being Assessments and the responses from the Future Generations Commissioner for Wales. We combined this with the information about the local authority area in Table 1 and the section on 'selection of areas' above to draft semi-structured interviews. As part of each interview, we asked for suggestions of people and organisations to interview in their area.

There was wide variation in the activities and approach of the different local authorities. A more detailed account of what we found interviewing each of the local authorities is in Appendix 3 which provides the basis for much of the analysis section below, from which we have pulled out some points.

3.1.1 Types of renewable energy and energy saving projects across the six local authorities

The most widely-used technologies for all the local authorities we interviewed appeared to be solar photovoltaics. Some authorities were also using air source heat pumps, some were using biomass. A couple of the local authorities were looking at hydrogen storage and anaerobic digestion. Gwynedd (not one of our 6 local authorities) is exceptional among Welsh local authorities for its large number of community-led hydroelectric projects.

Many were looking for opportunities to save energy, including switching off non-essential street lighting at appropriate times. At least one local authority wished to switch to LED street lights, if it could afford the short-term costs in doing so.

3.1.2 Local authority housing stock

Each of the local authorities that owned community housing was taking action to make these homes energy efficient, but staffing constraints were mentioned more than once as the main obstacle to this work. It was particularly challenging to deliver in rural areas where the types of housing were all different, so that it was not possible to use just one set of methods for all the housing concerned. Key lever levers for local authorities to increase energy efficiency and renewable energy generation are both the ARBED and Welsh Housing Quality Standard schemes.

3.1.3 Funding

Each local authority mentioned funding constraints as a barrier to its activities. These complemented their (financially imposed) constraints on their own staffing. These had an impact on, for example, the number of expert staff they were able to hire and the number of projects they were able to start exploring. The costs of transmission charges and taxes, such as business rates, on local renewable projects were also seen as a potential barrier.

In the local authorities where more resources had been allocated to developing renewable energy proposals, there was a noticeable improvement in planning for renewable energy and energy saving. In the livelier authorities, there appeared to be good team-working and at least one 'product champion', with impressive determination and energy.

Some local authorities seemed to have a better understanding of the funding opportunities available for them than others. Sources of funding mentioned included the Robert Owen Community Bank, Green Growth Wales, Re-Fit and the Invest to Save Fund.

3.1.4 Staff shortages

Each local authority mentioned staff shortages as barriers. Often, only one or two members of staff were available to work on renewable energy and energy-saving projects. One local authority mentioned that there had been staff cuts in their training department so there was less capacity across the authority to deliver training for its employees. Funding constraints were also causing staff to have a short-term outlook.

The CLAW Energy Group (Consortium of Local Authorities in Wales) was seen as providing a forum where mutual learning could take place and local authorities were well-informed about what was happening among their peers. But it was suggested that there was not enough time at CLAW Energy Group meetings for strategic discussions.

3.1.5 Gaps in knowledge, skills and understanding

Gaps in knowledge, skills and understanding were mentioned as a problem both internally within local authorities and externally in communities. For example, it was reported that applications for wind turbines by community groups were being rejected because they had not been properly thought through. One local authority mentioned its success in visiting people in their homes and giving presentations on energy saving and renewable energy, but that it was limited in this by the availability of suitable staff.

3.1.6 Grid availability

Access to the electricity distribution grid was sometimes a problem, especially in rural areas. There was limited availability and it was expensive to fund extensions and reinforcements.

3.1.7 Objections to schemes

Some authorities faced barriers to renewable energy projects from their planning departments and council members. Public opposition to wind energy seemed now to be less of an issue than previously. The anti-wind turbine campaigns of a few years ago appeared to have died down. Many developments had come to a compromise solution, such as only allowing permission for smaller windmills where sites were sensitive.

3.2 Registered social landlords

RSLs are found in every local authority area and usually there are several in one area, with many also found in more than one area such as Hafan Cymru, Pobl Group, and Wales & West Housing.

We interviewed representatives of four RSLs. One of these had properties in many areas and more than 200 renewable energy schemes. We have pulled out below the key themes that came from the interviews.

3.2.1 Level of interest and commitment to saving energy and renewable energy

The main levers for RSLs to increase energy efficiency and renewable energy generation are the Welsh Housing Quality Standards and building regulations. The interest that they have in this area varies from one RSL to another. In the RSLs with more interest, there are normally one or two committed individuals within the RSL itself or they may have taken over local authority housing stock where the local authority still has influence.

Each of the RSLs that we spoke to showed a willingness to try new methods and to reach high standards in sustainability. The need to alleviate fuel poverty and the availability of financial incentives were mentioned as the key drivers for developing projects.

3.2.2 Types of projects in place

One of the RSLs that we interviewed had more than 200 renewable energy schemes. It had installed solar thermal, solar PV cells, air source heat pumps, or ground source heat pumps in many of the buildings which it managed, its housing properties and some of its own offices. Some of the properties were communal or community properties. Many RSLs reported good insulation standards.

3.2.3 Lack of understanding within RSLs and by tenants

Although there was a small number of committed individuals in each of the RSLs we interviewed, there remained other colleagues in their organisations who were less supportive. Colleagues with less of an understanding were reported as thinking that renewable energy was risky and this often caused delays in getting projects approved.

Like the local authorities, the RSLs with projects in place found that it was sometimes difficult to get tenants to understand and use the new systems. One member of an RSL explained that education was her main activity. She had designed educational programmes and materials for tenants, schools and the public. She pointed out that advice needed to be simple to be effective.

3.2.4 Funding opportunities

The main funding opportunities that were mentioned were Welsh Government grants, joint working with utility companies, or using income as capital. One RSL stated that past discussions with councillors on the possibility of joint projects had not been fruitful and they had decided that it was better to initiate schemes themselves.

One RSL talked about the need for any project to be financially viable. He regretted that there was no way for social benefit to be considered alongside the financial value.

Although our sample size for RSLs was small, many of the themes and understandings that came out of our interviews were similar to our findings from the local authorities. The commonalities include the critical importance of having product champions, the need to overcome staff conservatism and the need for education both among staff and in the community.

3.3 Community projects

We found that community-owned projects take many different forms; the concept of a 'community project' was not clearly defined. We found projects that were purely locally-driven and owned, and projects with a strong local core but with finance from a wider area. The beneficiaries for these projects often included local businesses as well as households and communal facilities. We found projects which had been initiated by a local authority or other public authority for the benefit of a local community. These had varying amounts of commitment from the local community itself.

Table 6 shows the number of interviews we carried out and the location of the projects that we spoke to. Some of the projects have already been commissioned and others are at various points in the preparatory stages (the two right hand columns show the numbers of projects recorded by the Welsh Government in 2016²¹, as in Table 2). Below are the key themes and learning that came out of our interviews.

Table 6: Number of project interviews

Local authority	No. of interviews (17 in all)	Community projects	Other public sector and charity projects
Blaenau Gwent	1	0	3
Flintshire	3 (LA projects)	8	20
Newport	1	6	9
Pembrokeshire	5	2	40
Powys	3 interviews; many projects	18	34
Swansea	5	13	24

3.3.1 Urban and rural

The extent to which an area was rural appeared to be an important factor that led to variation in the number of community-owned renewable energy projects. From our interviews it was clear that there were more drivers and opportunities in place for developing community-owned renewable energy projects in rural areas. These included both the lack of a gas grid or weaknesses of the electricity grid, which drove innovative solutions and that the stronger communities in rural areas were better equipped to deliver community projects. Where the community was cohesive it was easier to find a 'product champion' to lead the project. It was also mentioned that there were more retired professionals in rural areas and they were able to devote more time and energy to a project.

3.3.2 **Sharing knowledge and expertise**

Many of the projects that we interviewed depended on people who were not part of the community but had relevant experience in developing renewable energy projects. Some of them had gained this experience through developing a particular project elsewhere and were now supporting other communities and projects. This suggests that networks are beginning to form in areas with multiple renewable energy projects, where there are experienced and knowledgeable individuals able to support new projects.

Indeed, once we started to visit the projects themselves, we were struck by the extent to which their successful development depended on a small circle of dedicated people (amongst whom it was essential that there be a product champion). Some of the people to whom we talked had gained their expertise over a long period of struggle to develop a particular project; others worked for bodies like the Energy Saving Trust, or Local Partnerships. We were also struck by the importance of public sector or third sector stimulation, whether from local authorities or other public bodies like the Brecon Beacons National Park. Attempts to draw a representative sample appeared inappropriate for mapping what was happening; network analysis would probably be more rewarding.

3.3.3 **The need for expertise and barriers**

In each interview we considered the need for expertise and the barriers that were faced by looking in detail at the stages²² of development that all projects have to go through. We found that some of the needs and barriers were consistent throughout and others were unique to the particular stage.

Project management is needed right through the project. It needs skill and time, and is usually unpaid. Retired people are a valuable resource at any rate for the early stages. But some communities have more committed retired people with the necessary determination and skills than others.

The community is always the client, and has to carry through the tendering process and the later stages. They usually require support from experienced managers of renewable projects. A Welsh Government funding programme, Resource Efficient Wales, used to do some of this, but it closed in September 2017. It was noted that, sometimes, Energy Savings Trust (Ynni Lleol) officers can help as they know what to do and can be regarded as project managers. Renew Wales and Community Energy Wales provide mentors. Sometimes there may be a paid community officer from NRW or elsewhere. Sometimes there is a council or a project post from a grant funder. Note that the new Welsh Government Energy Service was launched in October 2018, after the research for this report was carried out.

22 See Section 2.4 above

The initial idea

Many projects went through the process of having their initial ideas rejected before developing one that was accepted. The reasons that ideas were rejected included planning problems, community opposition, technical difficulties, or a change in funding regimes such as the reduction in the Feed-in-Tariff.

To progress beyond the initial idea a project needed community support, knowledge of the technical and institutional possibilities and hurdles, and leadership from one or a few people. Continuity in the leadership group was considered crucial as projects typically take eight or nine years from initial idea to successful operation. Several of the people we interviewed emphasised the need for every project to have its 'product champion'. As one of them said, 'communities can bring innovation, bloody-mindedness, passion and obstinacy to local energy projects'.

It was suggested to us that action plans were often developed, but that only about 5% of projects with an initial idea are carried through to fruition. What the community group needs is the expertise to ask questions; many other necessary skills such as financial expertise and support can be brought in from elsewhere.

Feasibility

Once the initial idea has been accepted, its feasibility needs to be examined in depth and a business case needs to be developed. At this stage there is a need for planning experts, technical experts and sometimes legal experts. This expertise has typically come from consultants from the renewable energy industry and consultants from Welsh Government schemes (Ynni'r Fro, with the European Regional Development Fund (ERDF), from 2010-2015; since then Ynni Lleol (the Energy Saving Trust)). The Energy Savings Trust has five or six officers who can help with administration at this stage.

Negotiating skills are needed to get permissions from landlords and participation from local businesses. We encountered several cases where landlords did not want to be involved with community projects as they believed that the decision-making processes were too cumbersome and inefficient. The use of publicly-owned land can be difficult, and it is often easier for public authorities to deal with big developers. The negotiation of grid access – both its availability and its (sometimes apparently arbitrary) cost – was mentioned as the source of many problems.

Usually, much of the needed expertise for this stage has to be bought in so access to funding is necessary. Funding at this stage is difficult, because the risk that the project will not proceed is high. A few sources of funding were mentioned to us, such as the Robert Owen Community Bank and credit unions. Charities may be helpful at this stage, or the National Lottery Fund.

One issue raised was that even if funding for the feasibility has been secured, forward projections of revenue are vulnerable to changes in UK funding (such as changes in the Feed-in-Tariff) or Welsh Government funding policy. Another source of vulnerability is changes in regulation, such as changes affecting the grid.

Obtaining permissions and licences

Once a project is considered to be feasible, permissions and licences need to be obtained and the business case finalised. This stage can be costly as various impact assessments are needed.

At this stage the project needs to secure support from the public, from the planners and finally from local authority council members.

We were told that five years ago this stage was difficult, especially for onshore wind and for hydro. It appears that attitudes, especially to wind, have now largely changed among the general public. Some obstructive planners have been replaced or overruled. Many of the people we interviewed mentioned that local authorities were introducing more supportive staff or dedicated renewable energy managers as part of their renewable energy policy, but it was still proving difficult to get support and approval from some council members.

The main sources of funds mentioned to us for this rather expensive stage were the Ynni Lleol programme, or the Robert Owen Community Bank for soft loans which could be written off if the project failed to go ahead. Other sources mentioned were NESTA (the Innovation Fund) and the ERDF (where the low-carbon economy is one of its priority areas). These sources relate to earlier stages as well as to this one.

Getting funding for construction

Funding for the construction stage was considered to be relatively straightforward once a business case and the necessary permissions and licences were in place.

Finance for this stage can come from share issues or from commercial finance organisations like Triodos. Finance Wales (from the Welsh Government) has provided support for big projects in the past.

Construction

The only difficulties at this stage that were mentioned to us were problems with finding trustworthy and reliable contractors and problems in managing subcontractors.

Operating the completed project

We were not told about many projects that had reached this stage so our interviews did not identify any of the problems that might be faced.

Chapter 4: Analysis

Chapter 4: Analysis

4.1 Recent developments

The work for this report was completed before the Welsh Government announced its new Welsh Government Energy Service on 11 October 2018²³. The new service brings together and expands Green Growth Wales and the Local Energy Service.

The now Minister for Environment, Energy and Rural Affairs has also strengthened Planning Policy Wales (Edition 10)²⁴ to align it with Welsh Government's energy ambitions and establish an energy hierarchy. Welsh Government are encouraging local planning authorities to see renewable resources as valuable assets supporting prosperity. The Minister has also introduced new requirements for local authorities to set local targets for renewable energy in their local plans. The Welsh Government Energy Service will support greater regional energy planning whilst providing the opportunity to secure the benefits of renewable energy generation, through increased local ownership within Wales. A list of Welsh Government policies since 2000 is given in Appendix 4.

Also, there will be an increase in the loans available for the difficult second and third stages of projects, where feasibility is tested, permissions are obtained and a business case is developed. In December 2018, the Welsh Government published accounts of the consultation and workshops²⁵ which underlay the change in policy. We had already seen, in confidence, some of its survey evidence.

The announcement and evidence all reinforce the main conclusions from our fieldwork – that the advisory, support (and loans) services for community renewable energy projects needed to be strengthened if the development of community energy projects is to be expanded and accelerated to any significant extent. However, these welcome developments do not deal with all the problems that we uncovered during our fieldwork.

The outstanding issues are typical problems of the early stages of technological revolutions:

- public understanding and acceptability need to be nurtured
- adequate supplies of capital and land are needed
- the supply of skills of all relevant kinds needs to be assured
- institutional barriers have to be removed and suitable institutional frameworks have to be developed.

23 Welsh Government, [Written Statement - Launch of the Welsh Government Energy Service](#), accessed 13 October 2018

24 Welsh Government, [Planning Policy Wales edition 10](#), December 2018

25 Welsh Government, [Locally owned renewable energy - A call for evidence](#), accessed January 2019

4.2 Understanding and acceptability of renewable energy in Wales

In our fieldwork, we were told of widespread weaknesses in the understanding and hence in the acceptability of renewable energy.

4.2.1 Barriers

A significant cultural shift is needed if rapid, widespread change is to be achieved, but we found that the lack of understanding of renewable energy and energy-saving was a problem in many quarters, in particular:

- The lack of understanding by social housing tenants of how to use their newly-installed systems was frequently mentioned.
- A lack of understanding by the general public makes it more difficult or slower to develop new community initiatives.
- A lack of understanding by some council members and senior council managers was sometimes given as a reason for delays in design, or in approval of plans.

4.2.2 Opportunities

There is already much renewable energy educational material available in Wales to support projects; the key challenge to overcome is wider dissemination and awareness of the materials. We found that a variety of educational programmes, both for schoolchildren and for the wider community, had been developed, both by some RSLs and by some local authorities. Many of the materials are already there to allow an active programme of dissemination to be rolled out, particularly through local education authorities and through the use of social media. Schools, community groups, public bodies and small businesses all stand to benefit from such a programme, which should be undertaken by all schools, local authorities and RSLs.

We found that insufficient allocation of human resources was curtailing the effort that RSLs and those local authorities which had social housing were able to devote to educating tenants with newly-installed systems. Local authority and RSL monitoring of the quantitative effects of such work could reveal whether renewable energy schemes yield profits – or save money – which can be used to support the development of further schemes, and so judge if it would be a cost-effective use of scarce resources to allocate more people to delivering it.

4.3 Capital - the need for funding

4.3.1 Barriers

The biggest barrier is the difficulty of finding funding for the early, riskier stages of development. There is also a lack of knowledge of what funding options are available.

Although funding has been an area of major policy interest and an area of concern for community projects, our study found that other areas are just as important. In our interviews we were told of many projects that had failed and there were many reasons for this, not just a lack of funding. Some failed for physical or technical reasons and others because of a lack of staff capacity to deliver projects.

4.3.2 Opportunities

At present, local authorities may have access to SALIX support in the early stages of projects, but for community schemes without local authority participation, funding can be more of a challenge.

Increasingly, community projects are choosing to issue share offers once all the necessary permissions have been achieved. It was also suggested that there are more funding options that might be possible to use such as the resources of pension funds.

The Robert Owen Community Bank (ROCB) has found what seems to be a good option for funding. The ROCB was set up to support community renewable energy projects with a particular focus on the planning and permissions stages. They agreed an innovative arrangement with the National Lottery Fund whereby the Bank agrees to repay the Lottery Fund, but retains any profits. This allows the ROCB to purchase licences and permissions on behalf of community groups who then repay the ROCB out of the earnings of their project. It is a high risk activity, but the risk for ROCB is spread by making a number of small loans. It is important for them to turn the loans around quickly. Their relationship with their community clients is that of a critical friend, working in partnership with them. The reductions in the Feed-in-Tariff created problems for ROCB as many projects in the pipeline were no longer viable. The impacts of this can mean that they work less with communities and instead work more with the private sector and local authorities. The local authorities can borrow from the Welsh Government and lend it to ROCB to manage loans to householders.

The recently revamped Welsh Government Energy Service is well placed to help those involved in community energy schemes to explore new opportunities for funding. To ensure the right information reaches communities it should publicise the available funding options in a clear and accessible way. All stakeholders who play a role in the development of community-owned energy schemes need to have an understanding of these options and to communicate them to the communities with whom they engage. The other main route for funding is through outright grants from governmental bodies or charities. Appendix 3 lists the various Welsh Government schemes which have been, or still are, available.

4.4 Land

4.4.1 Barriers

Problems in obtaining suitable sites for renewable energy projects were mentioned in many of our interviews. On the one hand there are physical limitations, which simply have to be accepted. Possible sites for hydro-electricity, wind power and photovoltaic cells are all constrained by geographical factors.

On the other hand, there are limits on the siting and nature of projects arising from institutional arrangements. Those which we came across in our interviews included:

- the reluctance of some landowners – both private and local authority – to make land available for community projects
- the lack of understanding by some applicants of the legal constraints on what NRW was able to approve
- planning constraints, both those within land use plans, and the interpretation of constraints (or indeed simple obstruction) by some planning authorities.

4.4.2 Opportunities

The impact of Planning Policy Wales (Edition 10) on new local energy projects could be significant, and should be monitored and evaluated in the coming years to ensure the regulations drive a positive planning environment. The Welsh Government should monitor and evaluate the effects of the revisions in planning regulations. In the meantime, the continued use of compromise solutions to individual problems, such as restrictions on the size of windmills in particular locations, can alleviate some of the difficulties.

4.5 Skills requirements

4.5.1 Barriers

Whilst everybody needs a basic understanding of what renewable energy and energy-saving measures are and how they work, those involved in its design, construction and operation need far more than this. A key question for this research has therefore been to what extent are there sufficient people available with the necessary knowledge, skills and understanding to allow expansion of renewable energy and energy-saving schemes on the scale required by 2035? Our study found that in many cases a lack of knowledge and expertise were causing a project to fail. This was true for local authorities and RSLs as well as in communities.

Technical competence of all kinds, from semi-skilled to professional levels, is certainly needed. In the earlier stages of a project, it is mostly professional technical skills which are important, but as projects reach the construction and operational stages the practical skills become more important.

It is widely recognised that there is a need throughout the UK to increase the supply of such skills in many fields. In new areas, such as renewable energy, there is a need not only for initial training, but also for continuing training opportunities, so that trained construction workers, for example, can readily add the new skills to their existing portfolio.

Qualifications Wales issued a detailed report in February 2018²⁶ which recognised that working with renewables was one of the key aspects of trades required by many employers, but which is at present omitted from qualifications. In general, improvement was needed in qualifications structures, in providing up-to-date equipment to use in training learners, and in the training of trainers.

We did not attempt to identify how far renewable energy gives rise to new skills and consequent training needs in areas of professional and managerial competence, such as training for architects and planners.

4.5.2 Opportunities

Work is already in hand to identify the new skills needs arising from renewable energy and to design new qualifications for apprenticeships for use both in industry and at Further Education colleges. There will be an increased emphasis on improving the underlying knowledge base. The new qualifications should greatly strengthen competence in analysing what is required, in particular new installations and in installing technologies. There is also ongoing work by the Welsh Government to look at training for trainers for high level skills for engineering and construction.

²⁶ Qualifications Wales, BUILDING THE FUTURE: Sector Review of Qualifications and the Qualification System in Construction and the Built Environment, February 2018

4.6 Communities and skills

4.6.1 Barriers

A remaining area of concern is the reluctance of older people and people, particularly those in deprived communities, to take up the training opportunities which are available. This is critical because our research found that retired people are often those with the time and inclination to drive local renewable energy projects. Moreover, the Office of National Statistics has found²⁷ that adults with the lowest levels of educational attainment were those most likely to report that they faced barriers to learning or training. Lack of confidence was cited by 40% of those surveyed as a main reason for their low uptake. Cost obstacles were cited by 34% of this group.

Thus there is a need to provide particular support for people in such communities to find their way into the training which they need. Here, organisations like Dove Workshop (Dulais Valley Opportunity Voluntary Workshop) help to fill the gap. They work with local organisations, like a rugby club, to raise awareness of opportunities. They are part of the Neath Port Talbot community learning partnership, working with Swansea University, Neath Port Talbot College and the Open University in Wales. For renewable energy, they work with experts from Aman Awel Tawe. They identify potential learners and support their access.

4.6.2 Opportunities

There are only a few similar organisations like Dove Workshop elsewhere in the Valleys; there is room for more, both there and elsewhere. Community organisations, education and training organisations and public and private sector employers can play an important role in helping people to find their way into training, including training related to renewable energy and energy-saving. The Welsh Government should give active consideration to measures ensuring that training is widely accessible, particularly for older people and in deprived communities.

27 Office for National Statistics, [Least qualified adults miss out on job-boosting training and education](#), accessed January 2019

4.7 Communities' Managerial Skills

4.7.1 Barriers

Communities often have a need for management training. Decision-making skills are particularly necessary. Even where there is a project champion, there is a need for competent decision-making by others from the community. During our fieldwork, we found that when talking with private sector developers, they said that they would not consider working with communities because their decision-making procedures were so slow and cumbersome. Whilst this is a small sample, it does suggest that there is need for basic, accessible and acceptable management training for community groups.

There is a need for a wide range of managerial competences at each stage of the development of a project, including an understanding of the role of organisational cultures.

4.7.2 Opportunities

There are several ways to enhance communities' skills. Firstly, there are demonstrations by some of their peer groups and discussion with them. This is already happening. Second, they can work in partnership with the private sector (either with or without local authorities). Third, they can be supported by expert advisers, often from the Energy Savings Trust or other organisations within Welsh Government's Energy Service. We came across several examples of this. Or fourth, they can seek relevant training from training providers.

Relevant training is provided by Adult Learning Wales, by the Welsh Council for Voluntary Action, and by the Open University of Wales, sometimes working in partnership with Future Learning. Further information about these is given in Appendix 5.

In general, there is a need for more support in communities to access what is available, especially for groups or individuals at the very early stages of thinking about a renewable energy project. The Welsh Government's Energy Service can play an important role by providing advice about relevant education and training possibilities among the services which it offers. The Welsh Government should consider what special support it can give to enable the least advantaged to take part in training. It should also consider whether funding for adult education more generally can be enhanced.

4.8 Decision-making skills in local authorities and RSLs

For local authorities and RSLs, the problems are rather different.

4.8.1 Barriers

The lack of understanding, expertise and support for renewable energy in local authorities and RSLs can lead to their decision-making processes becoming a barrier to projects.

4.8.2 Opportunities

We found that Welsh local authorities have the same problems, capacities and needs as the rest of the UK. We can use the conclusions from the UKERC study published in November 2017²⁸ to inform our work. The UKERC study suggests five solutions to the lack of core funding for local authority energy teams:

- making energy prominent in local strategy, future vision and investment
- making energy a responsibility of the Chief Executive's Office and Council Executive
- securing political leadership and cross-party support
- pragmatic starting points and 'easy wins'
- building local authority capacity and expertise from the public sector network.

Most of the local authority teams we spoke to were well aware of most of these suggested solutions but the problems came in delivering them. The UKERC report goes on to suggest key actions for local authorities:

1. Articulate a local authority clean energy plan geared to ensuring internal support from senior management and cross-party commitment.
2. Create a management structure to scale up delivery of local authority clean energy plans.
3. Build a business case and assess financing options for energy projects.
4. Collaborate with other local authorities and intermediary agencies to build capacity and technical expertise in the sector.
5. Use planning powers systematically to support development of clean energy and low energy buildings across the local authority area.
6. Aim to facilitate and enable local and regional cross-sector action on clean energy.

Again, the problems lie in execution rather than awareness. Some of the training opportunities suggested for communities may be useful for local authorities and RSLs, and also higher levels of management training. As well as training, there is a need to raise the awareness of renewable energy and energy-saving opportunities among senior management, among councillors, and in planning departments. A specific suggestion made during the fieldwork was that the Consortium of Local Authorities in Wales (CLAW) should arrange its meetings so as to allow time for more fundamental and forward-looking discussion of local renewable energy possibilities, leading to shared learning.

28 UKERC: Janette Webb, Margaret Tingey and David Hawkey, What We Know about Local Authority Engagement in UK Energy Systems, November 2017

4.9 Models for shared ownership

The factors necessary for rapid adoption of new technologies have been noted above. A key point made was that institutional barriers have to be removed and suitable institutional frameworks have to be developed.

It appears unlikely that current targets for community energy can be met with the current model. Other models of delivery that bring in more partners to work with communities are worth exploring.

The possible options include:

1. joint private developer and community schemes
2. joint local authority and community schemes
3. joint local authority, private developer and community schemes
4. joint local authority and private developer schemes, designed to give a profit to the local authority to be used for public benefit.

For the purposes of this discussion, RSLs may be considered as alternatives or complements to local authorities. Note that options 1, 2 and 3 all place heavy demands on community competence. Options 2, 3 and 4 all depend on local authority (or sometimes, RSL) participation.

Option 1

Based on the very small sample of private developers that we spoke to during our fieldwork we believe option 1 could face significant obstacles in the near future.

Scotland already has a Shared Ownership scheme. A consortium of Government-supported agencies supports communities which are exploring shared ownership. They define shared ownership as 'a community group that invests in a commercially-owned renewable energy project.' The Local Energy Scotland website²⁹, which is a model of clarity, goes on to explain the benefits of shared ownership stating 'Communities get the chance to share in the wealth generated by the renewable resource in their area and create a sustainable income stream that they have control over. Developers get the chance to increase community engagement, access incentives such as rates relief and possibly add value to their planning application'.

When a scheme is successful, it can be used to support all the factors leading to community economic development. But an experienced private developer pointed out that this is not necessarily an easy path to follow; communities without previous experience of projects find it difficult, as shared ownership schemes require certain skills from the community or local organisation to deliver the scheme in partnership.

The Scottish experience suggests that private and community shared ownership is only likely to provide a part of the growth that is needed in locally-owned renewable energy and energy-saving projects.

Options 2-4

Options 2-4 all involve the local authority. It is worth noting that they all place extra demands on already over-stretched local authority resources.

29 Local Energy Scotland, [Local Energy Scotland](#), accessed January 2019

4.9.1 Opportunities

During the fieldwork we noticed that the local authorities with an individual or a small group with specific responsibility for developing a renewable energy and energy-saving programme had more extensive and ambitious plans.

Financially viable renewable energy projects can provide a new funding source for local authorities – and a potential reduction in costs – and it should be possible for them to use some of the profit to employ additional staff. A well-thought out and well-managed programme should provide the local authority with the funding it needs to cover the cost of the additional manpower. Further opportunities on shared ownership are highlighted within the *Re-energising Wales* '[How to protect, promote and achieve scale in community and local ownership of renewable energy in Wales](#)' report.³⁰

30 Institute of Welsh Affairs, [How to protect, promote and achieve scale in community and local ownership of renewable energy in Wales](#), March 2019

4.10 Wider institutional factors

In this report, we have not considered the widely mentioned problems concerning the policies of grid operators and Ofgem, because these belong in a wider context than local and community projects alone. These are considered further within the IWA *Re-energising Wales* reports '[How to protect, promote and achieve scale in community and local ownership of renewable energy in Wales](#)'³¹ and '[A Framework for Action: Next steps for Regulatory and Policy Powers over Energy in Wales](#)'³².

Nor have we considered the way in which other policies developed at a UK level may cause problems as they do not fully address the needs of Wales. The transfer of some powers over energy in the Wales Act 2017 might change this but it is too early to tell what impact this might have on the locally-owned renewable energy sector.

However, discussion of three other major policy areas does arise directly from our fieldwork.

4.10.1 City and growth deals

The introduction of city and growth deals is a promising innovation in Welsh local governance. We did not conduct any detailed study of the impact of the Swansea Bay City Region (SBCR) on decisions about local and community energy there, but it was noticeable how often people in the areas covered, especially in the local authorities, drew examples from other parts of the City Region, and how often the pioneering Swansea Community Energy & Enterprise Scheme (SCEES) project³³ – an outstanding example of a community project in collaboration with local authorities – was mentioned.

Whilst the SBCR has made renewable energy one of its flagship policies, this is not the case in the Cardiff City Region, nor in the Mid-Wales Region, nor in the North Wales Growth Deal. There is a strong *prima facie* case for urging these areas to develop regional strategies for renewable energy.

Research which considers the potential of major changes in the ownership, structure and functions of renewable energy generation in the context of city regions would be useful. This should include consideration of what lessons Wales can draw from continental examples, for example in Leuven (Belgium), in Germany and in Denmark.

4.10.2 Future Generations and the public good

Wales is a world leader in that its Well-being of Future Generations (Wales) Act 2015 requires public sector bodies to take account of the needs of future generations in their decisions. Each public body listed in the Act must work to improve the economic, social, environmental and cultural well-being of Wales. Each local authority area has its own Public Services Board, which prepares a report annually for the Future Generations Office about its plans to pursue the seven well-being goals set out in the Act and its progress so far. Moreover, the Welsh Government has to report annually on progress towards a set of national indicators³⁴.

The system is in its very early days, so it is not surprising that the standard of reporting is still very uneven. However, the Act does provide an opportunity to improve decision-taking about

31 Institute of Welsh Affairs, [How to protect, promote and achieve scale in community and local ownership of renewable energy in Wales](#), March 2019

32 Institute of Welsh Affairs, [A Framework for Action: Next steps for Regulatory and Policy Powers over Energy in Wales](#), November 2018

33 Swansea Community Energy & Enterprise Scheme (SCEES) project, [Swansea Community Energy](#), accessed June 2018

34 Welsh Government, [National indicators](#), accessed June 2018

local renewable energy and energy-saving schemes (note that it is important to incorporate energy-saving into the same policy discussion as renewable energy; policies concerning retrofitting or new build often include both.)

Among the most important reasons for investment in renewable energy and energy-saving are not just the need to secure a sufficient supply of energy but also the overwhelming need to reduce carbon emissions, because of their impact on climate change and because of their impact on health. Both of these are concerns of the Well-being of Future Generations (Wales) Act 2015. Although capacity (in MW) of renewable energy equipment installed is one of the national indicators under the Future Generations Act, and although renewable energy and energy-saving contribute to some extent to all of the seven well-being goals, the extent to which Public Services Boards have taken note of this seems to be patchy.

Renewable energy and energy-saving were not discussed at all in some of the local well-being plans which we read, and were rarely treated at any length. Some of the local authority energy officers with whom we talked were only minimally aware of the relevance of the Well-being of Future Generations (Wales) Act 2015 to their activities. As the Act becomes embedded into strategic plans, the Future Generations Commissioner for Wales may wish to remind Public Service Boards to consider explicitly the role of renewable energy and energy-saving in achieving their well-being goals, alongside other national priorities. Public Bodies and Public Service Boards do have a duty to improve the economic, social, environmental and cultural well-being of Wales (through setting well-being objectives that maximise contribution to the seven national well-being goals) and report on progress, and we believe that renewable energy and energy efficiency should be an explicit element of improving well-being in Wales

The pursuit of the public good underlies all Future Generations work. Two policies which are apparently similar in financial terms may differ widely in their social benefits; these, as well as financial constraints, must be taken into account if optimal decisions are to be made.

We did find that public good recurred as a theme in several of our interviews. Usually, it arose in the context of estimating the social benefit from retrofitting housing, or from making new build more energy-efficient than the buildings regulations required. Whilst the motivation was often to reduce fuel poverty, it was hard to measure the benefit other than in terms of the financial benefit over a long period. Despite the considerable interest in concepts of public good and social benefit, no systematic attempt was being made to estimate the benefits from, for example, consequent improvements in health. The problem was that there was no clear guidance on how to estimate social benefits and use them in the renewable energy and energy-saving contexts.

Many of those whom we interviewed were well aware that social benefit was important, but no one seemed to know of any substantial work to measure the benefit from renewable energy and energy-saving policies, with the one exception of a (Welsh Government supported) doctorate (PhD) work in progress at Bangor University based on four case studies of the social impact of community renewable energy.

Thus, despite the considerable interest in concepts of public good and social benefit, the lack of clear guidance on how to estimate and use them in the renewable energy and energy-saving context was a problem.

4.10.3 Measuring social benefit opportunities

Any measure of social benefit involves heroic assumptions, some of which are genuinely contestable. However, the same is true of many statistical constructs, from GDP to PISA to attempts to measure well-being. Provided that their limitations are recognised, these all provide valuable support for policy decisions.

If each local authority were to make estimates of social benefit from renewable energy and energy-saving decisions independently, it would require the commitment of more research resource than is available to them. However, if a framework were available into which they could readily slot their own data, this could provide a useful aid to their decision-making. Such a ready reckoner would of course need to be revised regularly as new information becomes available.

There are already organisations that are working on the best ways of estimating and measuring social benefit. For example:

- The research at Bangor University that has already been mentioned.
- The New Economics Foundation is exploring ways of incorporating social benefit into public policy decisions.
- The Manchester New Economy Unit has worked with the Public Sector Transformation Network, endorsed by HM Treasury, to modify the Treasury Green Book to take account of social benefits.³⁵ However, this deals only with the question of how to make use of the resulting social benefit once it has been measured.

The development of a social benefit ready reckoner is thus a major task, but this is not a good reason to avoid it. A shared project between the Welsh Government, the Future Generations Commissioner, local authorities, Public Service Boards and qualified research bodies, to produce a framework for readily-usable estimates of the social benefits resulting from renewable energy and energy-saving decisions would be of real practical value.

35 UK Government, [Supporting public service transformation: cost benefit analysis guidance for local partnerships](#), April 2014

Chapter 5: Conclusions

Chapter 5: Conclusions

For local and community energy to gain momentum we need to facilitate a shift towards bottom-up decision-making. For this shift to happen we need to increase capacity and educate and empower people in their communities and their local representatives.

We found that the capacity and motivation of individuals and communities were as much of a barrier as the institutional and technological issues. The most immediate barrier seemed to be the lack of understanding by people, communities and their representatives about the potential of renewable energy and how it could be used in their community.

We recommend further studies to understand the barriers that arise from the rules and regulations that influence decision-making in the different institutions involved in the development process. Such institutions include grid operators, Ofgem and various financial bodies. We also suggest further study into the impact that changing the distribution of powers between the UK and Welsh governments could have on energy.

Like all renewable energy projects, local and community projects need to be able to at least break even or make a profit if they are to be worth developing. It is worth noting that such profits could be used, in part, to relax some of the constraints on the manpower and consultancy capacity used by local authorities and RSLs to develop renewable energy and energy-saving projects.

Moreover, especially given the framework provided by the Well-Being of Future Generations Act, for projects that provide an element of public good there needs to be consideration given to social costs and the value of social benefit. We found that increased salience needs to be given to renewable energy and energy-saving in the Well-Being Assessments produced by Public Sector Bodies and that increased salience needs to be given to these assessments by officers in the local authorities themselves.

However, there is at present no straightforward way for local authorities to take account of social benefits in their renewable energy and energy-saving decisions. We recommend that research be undertaken to provide guidance as to how they might proceed, ideally leading to a social benefits framework into which they could readily slot their own data.

By providing an overview of the experiences of local and community organisations in developing renewable energy and energy-saving schemes, this report will prove useful in helping to understand barriers and motivations, as well as some of the next steps needed to increase local and community ownership of renewable energy and energy efficiency schemes in Wales.

Appendices

Appendix 1: List of Organisations interviewed

Adult Learning Wales*	Melin Homes
Allied Hydropower*	Natural Resources Wales
Awel Aman Tawe	Neath Port Talbot Local Authority
Blaenau Gwent Local Authority	Newport Local Authority
Brecon Beacons National Park	The Open University Wales*
Cadwyn Clwyd	Pembrokeshire Local Authority
Coastal Housing	Powys Local Authority
Community Energy Pembroke	Robert Owen Community Bank
Community Energy (Wales)	Swansea Community Energy & Enterprise Scheme, SCEES
Cwmharry Land Trust	Severn Wye Energy
Datblygu Egni Gwledig	Social Investment Cymru
Dove Workshop*	Swansea City and County Local Authority
Ebenezer Church, Blaenau Gwent	Transition Bro Gwaun
Energy Savings Trust	Tai Wales & West Housing
Flintshire Local Authority	Wales Renewable Energy Skills Advisory Group*
Well-being of Future Generations Office	WCVA*
Gower Power	Welsh Government (Skills)
Gower Regeneration	Ynni Anafon
Green Valleys	Ynni Ogwen
Grŵp Cynefin	
Gwent Energy CIC	
Llanwern Community Energy*	An asterisk (*) indicates that the interview was by telephone.
Local Partnerships	

Appendix 2: Report methodology

The research aim was to assess the values, factors and barriers influencing local and community engagement and ownership in renewable energy generation and energy saving in Wales. To understand ‘community engagement’ in this context, we needed to examine a range of projects for community benefit but with different types of ownership from different areas in Wales.

We started by consulting a body of articles, reports, official documents and web pages relevant to local and community engagement in renewable energy and energy-saving in Wales. Whilst this body of text is substantial, that part which we consulted is listed in Appendix 6.

At the same time, we held a handful of meetings with organisations and with a small number of particular individuals with relevant experience. Appendix 1 lists which organisations and which individuals we held meetings with. The purpose of the meetings with organisations was to understand what their role was. The meetings with individuals helped us to form initial hypotheses and to structure the next stages of our work.

During these initial steps, it became clear that a collective case study approach would allow us to gain the fullest understanding of the variegated experiences of community engagement in renewable energy projects. It would allow us to explore different locations and stakeholders using a variety of methods such as interviews, observation and document analysis. We might be able to increase the robustness of the research through triangulation. The research would have elements of ethnography and phenomenology embedded in the design.

The next stage was to select areas for study in more depth and to select organisations within each for interview. A ‘maximum variation’ approach was taken, whereby we aimed to determine in advance as much as possible some criteria that differentiated the stakeholder. From this, stakeholders could be identified and selected according to the criteria. This approach allowed us to gain as wide a perspective as possible, exploring cases where projects had been successful as well as unsuccessful, which we believed to be key in determining barriers to community engagement. It also allowed us to take into account wider factors that may influence the initiation of community projects such as physical proximity and access to existing electricity and gas networks and the types and availability of local assets.

Given our limited time and resources, we decided that six out of the 22 local authority areas and a sample of the projects within them was as much as we could cover. Within each area, we interviewed relevant members of the local authority staff, and, to the extent that it was possible to identify them and obtain their consent to be interviewed, individuals concerned with particular community renewable energy or energy-saving projects and representatives of social housing. There were also some interviews with representatives of agencies supporting any of these. The interviews followed loose semi-structured formats, for local authorities, RSLs and community projects respectively.

Appendix 3: Account of meetings with local authorities

Blaenau Gwent

Blaenau Gwent is the most deprived local authority area in Wales, according to the Welsh Index of Multiple Deprivation (2014). The Welsh Government and Community Energy have not recorded any community energy projects there.

However, their Well-Being Assessment was favourably assessed by the Future Generations Commissioner for Wales and included a section on renewable energy as well as a section on their carbon and ecological footprint. Their recent Renewable and Low Carbon Energy Background Paper (September 2017) for a revised Local Development Plan (LDP) was full of commendable aspirations. But there was no-one from the Well-being Assessment team at our meeting, and none of those present had looked at the LDP.

We met Blaenau Gwent's Senior Energy Officer and its Regeneration Team. The Senior Energy Officer was largely concerned with persuading schools to be more energy-efficient and with the installation of new energy-auditing software. There was a Council district heating scheme, where the Council sold energy from its gas CHP plant to several public buildings. The Regeneration Team was actively seeking opportunities to create renewable energy through a 'Blaenau Gwent Energy' company, possibly through wind turbines and through district heating. They were working with Cardiff University to explore 'power-to-gas' technologies and to explore ways of reducing demand by reducing unnecessary use in buildings and by encouraging behaviour change. They planned to generate energy savings, using the Re:Fit scheme, where they expected a contract with Matrix Control Solutions to be signed within 12-18 months.

Blaenau Gwent has no housing stock of its own; it is all managed by RSLs. Tai Calon has taken over all the Council's previous housing stock. Other RSLs are also present in the LA area.

They did not know of any community energy projects in Blaenau Gwent.

They gave examples of several barriers to what they were trying to do:

- the LA had no funds to change street lighting, which it was estimated would bring significant savings. Instead, some street lights were being turned off early;
- testing the feasibility of changes to an existing hydro scheme was felt to be too expensive, so the project was abandoned;
- there had been rejections of proposed wind turbines because these did not look thought through;
- an application for solar panels on a school had been rejected (but not by Blaenau Gwent Borough Council) on the grounds that it was visible from a nearby heritage site, although several houses close by had been allowed to fit solar panels;
- there was a lack of understanding of appropriate technologies by installers and by householder users of new technologies.

Flintshire

Flintshire was another authority where Community Energy Wales did not know of any community energy projects, although the Welsh Government³⁶ suggested that there were eight. But in any case, Flintshire LA was very active where other aspects of renewable energy were concerned. Admittedly its Well-Being Assessment was lacking in clarity and relevance to Flintshire; it did not make clear how its 35 topics impacted on well-being and did not discuss renewable energy at all. But its Unitary Development Plan for 2000-2015 (only adopted in 2011) did consider that energy conservation and the development of renewable energy were important strategic aims. A new Local Development Plan, to run from 2020, was in preparation and will include renewable energy. However, a 'Renewable Energy 10 year Action Plan for 2015-25' had been agreed by the Flintshire Cabinet in March 2015. It contrasted very favourably with the earlier documents.

We met the two current Energy Managers, one of whom was responsible for implementing the plan, and the previous Energy Manager, now retired and working as an energy consultant, who wrote the 2015 Action Plan. They have now carried out high level mapping and identified potential sites for renewable energy, mostly solar. They were now, together with planning consultants, developing the business case for solar energy on two brownfield sites. They would use battery storage.

On a landfill site with solar potential, they were hoping to use a virtual private network, to cut out some of the charges they would otherwise have to pay for. They commented adversely on the impact of network charges, for example transmission charges and green taxes, on local renewable projects such as this.

On their own property, they had installed solar renewable energy at two leisure centres and on some 30 schools. They managed their extensive housing stock in-house and had installed solar panels on about 700 houses (about 10% of the stock). About 60 homes had air-source heating and they had just finished a pilot scheme with EDF for air-source heating, combined with solar and batteries. Major obstacles to installing renewable energy on their own property were the failure to use controls for heating and lighting properly. They only had two staff to deal with training; there had been five a few years ago.

Much of their energy policy for their housing stock was not designed primarily to bring profit to the LA. They were working with Wales & West Utilities to extend the gas network. They have managed to borrow money for this from Robert Owen Community Bank and know that they will save on their own stock, but the private sector has not been following their example, despite their help to the private sector to take out loans. Using the Feed-in-Tariff, they had fitted solar panels to much of the LA stock. They were now putting in air source heat pumps to replace solid fuel and considering ground source pumps too. But they had no district heating schemes.

They were putting together a package of measures to help households, not just their own stock. They give presentations about this, but rely mostly on direct promotion when they visit households. They won a Wales Government Energy Award in 2017 for this work.

Their two main problems were lack of staff, and the need for change in the legislation surrounding virtual private networks.

Newport

Newport was the third of our sample of local authorities where Community Energy did not list any community energy projects (although the later Welsh Government data shows six). The Sustainability Manager's post was a new one, created only in May 2017. The Well-Being Assessment did not discuss renewable energy or energy-saving. The relevant member of the Newport Public Service Board secretariat which drafted the Well-Being Assessment was at our meeting. The Sustainability Manager's appointment had filled a huge gap. They said that the decision to appoint someone was due to the opportunity offered by Welsh Government schemes such as Green Growth Wales (currently delivered by Local Partnerships Wales) and Re:Fit.

There were several photovoltaic (PV) sites for potential development; screening reports were awaited. Local Partnerships would then help with scoping reports and the preparation of a business case. Attempts would be made to forge links with the Cardiff Capital Region City Deal.

The Sustainability Manager was aware of the possibility of technical support from Green Growth Wales and Resource Efficient Wales.

He planned to start his work with Newport Council's own emissions. The first emphasis was to be on street lighting, and on using the Re:Fit programme to increase energy efficiency of council-owned buildings. (The Council's former housing stock is now managed entirely by RSLs.)

He had started a site assessment for buildings suitable for hosting renewable technology. He expected shortly to have 18 sites for which to develop a business case. The projects would include energy saving, and generation and export.

Pembrokeshire

We met the Sustainable Development and Energy Manager and the Partnership and Scrutiny Officer. The Sustainable Development and Energy Manager was also the chair of CLAW (Consortium of Local Authorities in Wales Energy Group). He was therefore well-informed about other LAs and their challenges, as well as about Pembrokeshire.

Pembrokeshire County Council sits on the Public Service Board (PSB) and the Well-Being Assessment work takes cognisance of energy questions. Most of the PSB is concerned with energy efficiency, but the Water Authority goes further. It is highly innovative, with a PV farm, PV rooftops and a smart energy network. It is looking at hydrogen storage and at an anaerobic digester for its turkey farm.

Pembrokeshire LA itself has installed rooftop solar PV on multiple public buildings. It has the second largest 21st Century Schools school building programme in Wales, which will all utilise further solar PV and heat pumps.

It has reached the stage of working on the business case for solar farms, utilising Welsh Government funded specialist renewable energy consultants on local authority land. A problem with this is the need to expand the capacity of the electricity grid.

It is also working on a large project to improve the energy efficiency of buildings within the county, drawing on the Re:Fit programme and the Welsh Government Invest to Save Fund. The programme includes such buildings as schools, offices, residential homes and leisure centres.

The scheme will see the installation of 65 separate energy conservation measures across 25 sites including LED lighting, solar PV, Combined Heating and Power (CHP), fuel cell CHP, a water borehole, and controls upgrades.

The council has a policy of switching off non-essential street lighting between midnight and 5am. For essential lighting that must remain on (safe routes, etc) the council is expecting to complete a programme to install LED street lighting in the near future. This incurs relatively low up-front expenditure and has a rapid payback.

Pembrokeshire has a social housing stock of more than 5,000 homes. It has been retrofitting them with insulation and improved heating systems. In a few very isolated cases, there has been some tenant resistance to central heating where it would be installed to replace traditional coal fireplaces, even though it is being fitted at the Council's expense.

Pembrokeshire is part of the Swansea Bay City Region (SBCR) and is involved in its work on 'Homes as Power Stations (HAPS)' and Pembroke Dock Marine Energy. In terms of HAPS, it has land on which it can build to align with the HAPS principle and also could elect to use the levers of planning control and/or building regulations to influence private developers.

Also located in Pembrokeshire is Milford Haven Port Authority, which is a trust port, created by statute. It is not owned by anybody and neither pays out dividends to any third party, nor receives any budgetary support from Government. It is active in developing the use of marine energy, within the framework of the plans for the Swansea Bay City Region. The Port Authority is highly innovative, with a PV farm, PV rooftops and a smart energy network. It is looking at hydrogen storage and an anaerobic digester in tandem with Community Energy Pembrokeshire.

Pembrokeshire has circa 23% of the PV capacity in Wales, which is largely in private ownership, and with few objections made about it. There has historically been a lot of opposition to wind energy, but opposition is significantly less now, apart from sensitive locations of outstanding natural beauty or the Pembrokeshire Coast National Park.

The interviewees did however point to some constraints on their renewable energy work. The local authority had limited staff resources and limited funding of its own. Grid access was a major problem, with limited availability and prohibitive costs for extensions and reinforcements. They were waiting for some technological developments, such as improvements in battery storage.

Powys

Powys is a large, sparsely populated rural local authority. Much of it has no gas supply, and spare electricity capacity is very limited over much of it. Thus its problems differ from those of much of the rest of Wales and we should not be surprised to find different solutions. When we talked with the Local Authority Energy Officer and the Rural Development Programme Officer (responsible for the EU LEADER funded projects), we found that that was indeed the case. (Powys is the only LA in Wales eligible for the LEADER programme, where funding has been guaranteed until 2021.)

The Powys Well-Being Assessment had been favourably received by the Future Generations Office and appeared to be well integrated into the approach of the Local Authority, including the energy section.

A Local Action Group (LAG) with about 10 members from each of the private, public and voluntary sectors oversees the funding for projects including local renewable energy. It oversees the three LEADER projects and deals with other funders including the Robert Owen Community Bank and Transition Towns.

We were told about Powys' large number of community-driven projects compared to other Welsh LAs. Our informants attributed this to the nature of the communities themselves and to the rurality of Powys. Leadership of each project by a couple of determined individuals was crucial. Powys has a large number of retired people who have the time to drive the projects.

Invest to Save funding makes it possible for the LA to make loans to schools. These are largely used for energy-saving PV cells.

For publicly-owned buildings off the gas grid, there were some biomass systems. These were expensive to run without Government Renewable Incentive support. The higher the price of oil, the better the value from replacing it.

They had a contractor currently assessing four or five of their buildings to see whether renewables, mainly solar PV, will be viable. Battery storage will help, but there are problems for buildings like schools which only use heat for part of the year. Private wire export of electricity according to demand is possible, but demand from companies is needed to complement the schools. Exporting to the grid is not possible in south and mid-Powys because the Western Power Distribution grid is full (except for exports of less than 12 kw.) On the other hand, SP Energy Networks in north Powys allow local export because their grid is stronger.

Powys has an LA-owned housing stock of more than 5,000 houses and is the largest housing provider in the county. A large number of properties are off gas, the highest in Wales followed by Ceredigion and Gwynedd. Off gas is less energy efficient and more carbon-intensive, including oils coal, heating measures like bottled liquefied petroleum gas, tanked liquefied petroleum gas, oil, night-time storage heaters and electric storage systems. Fuel poverty is also more of an issue in off gas areas because electric heater properties can be three times the cost and three times the carbon footprint. In addition, because of the rurality, Powys does not have repetition of property types which makes it difficult to roll out one scheme. There are also barriers due to lack of data, eg Welsh Housing Quality Standards scores for many properties are unknown.

A significant portion of Powys is within the Brecon Beacons National Park. The National Park Authority has two functions: conservation and awareness of nature on the one hand, and a duty to look after the economic and social well-being of the community within the park. In this second capacity, they have been involved with renewable energy for more than 12 years. They worked with their community in the first instance to gain acceptance of solar energy (the Park has few sites suitable for wind, and then on only a small scale.) They try to be an enabling authority, to demonstrate best practice and then to encourage people to follow it. They used the Welsh Government Renewable Energy Advice Programme (REAP). More recently they worked with NESTA's Big Green Challenge and won a prize worth one third of a million pounds. They had worked with Green Valleys, looking at potential hydro schemes. They work with the local authorities, acting as the planning authority within the National Park area. They are represented on the Local Action Group and work closely with Powys Local Authority; also with Monmouth Local Authority and the Vale of Usk Local Action Group. Altogether they are pro-active, focussing on projects where they can make a difference, both for renewable energy and energy efficiency.

Swansea City and County

Swansea is the only one of the three major Welsh cities to have an above average rank of community projects per head³⁷ and an above average number of community and public sector projects³⁸. How has it managed to achieve this good performance? Part of the answer may lie in the interest of the Swansea Bay City Region in renewable energy and energy-saving, and in the role of Swansea University in this.

Its Well-being Assessment contains rather few specifics, but Swansea has a remarkably impressive Energy Statement, where the draft is dated April 2016 and where the links to the Well-being Assessment are indicated. The initiatives which are described are structured according to the energy hierarchy: energy-saving, energy efficiency, renewables, low emissions, and at the bottom, conventional energy generation and use. It describes the measures already implemented, those currently under consideration and those which the LA intends to explore. It then emphasises the alignment of the LA strategy with the City Region bid, and briefly outlines the Swansea Community Energy and Enterprise Scheme (SCEES), which is 'a scheme exploring how local people in some of Swansea's most economically deprived areas can benefit from community renewable projects'³⁹. It discusses commercial opportunities for local authority renewable energy schemes. It points to various other carbon reduction opportunities which Swansea is exploiting, including introducing electric vehicles to its fleet, using anaerobic digestion of waste to produce energy, and changing to LED street lighting. Finally, it describes external funding opportunities and relevant partnerships.

The reason for describing the draft Energy Statement at such length is that, when we talked with an officer from the Corporate Building and Property Services Department, she explained that it was she who had written the energy statement. She had been the only member of the Sustainability Team; there was now no one employed there. She had come into her present post just in time to write the statement, and was working with only one other member in her team. She thought she did not have much to add to what was written there, although she was able to update us on what had happened since it was written. The strategy includes some of Swansea Council's long-term aspirations as well as an account of what had already been done. Implementation of the various measures was proceeding according to plan. It had recently been reviewed by APSE, an external agency, and will be reviewed every 18 months in future.

Work on land appraisals for wind energy and biomass had been completed with the help of Re:fit Cymru (SALIX) and Local Partnerships. An assessment of council buildings for district heating had been carried out; eight buildings had been identified as good options for the scheme. They had been trialling the uses of electric vehicles, with nine charging points installed on council property. They had been involved with the development of homes to Passive House standard and were particularly interested in homes which were off the gas grid. They were about to start planning an ambitious Local Authority Energy Company, which could provide social benefits and alleviate fuel poverty. Nottingham Council's project was a possible exemplar.

The Local Authority was now adopting an approach whereby it was assessing its assets and planning what it would like to do, if and when funding opportunities became available. There was support from the local authority's Cabinet and senior staff to carry renewable energy forward. It was not lack of support that appeared to be a barrier, it was rather the limitations of staff resource, knowledge and skills.

37 See Table 3

38 See Table 2

39 See p.31 of the City & County of Swansea's Energy Strategy, City & County of Swansea's Energy Strategy, April 2016

Appendix 4: Welsh Government policies since 2000

Date	● Policy	● Scheme	● Strategy	● Legislation	● Research	
2000	●					HEES (Heating and insulation for low-income houses)
2002			●			A Fuel Poverty Commitment for Wales
2006				●		(UK) Government of Wales Act devolved some elements of energy policy
2008			●			Fuel Poverty Report
2008			●			Welsh Quality Housing Standard required all social landlords to improve their housing stock to level EPC D by Dec. 2020
2009			●			Welsh Government Warm Homes Programme (umbrella programme for Arbed and Nest)
2009		●				Arbed works with LAs & RSLs to support improvement of energy efficiency within set areas
2010					●	Living in Wales 2008: Fuel Poverty
2010			●			A Fuel Poverty Strategy for Wales - NEST and Arbed schemes
2010	●					NEST Means tested benefit for rented and private households with energy efficiency rating F or G
2010-12		●				Low Carbon Community Challenge provided funding & advice for 22 area-based schemes
2010-15		●				Ynnir'Fro administered by BRW and Energy Saving Trust, gave financial support and advice for Community Energy projects
2010			●			A Climate Change Strategy for Wales
2010			●			Climate Change Strategy for Wales Delivery Plan for Emission Reduction
2011					●	Fuel Policy Quick Guide outlines UK and Wales Policy history on fuel poverty up to 2011
2011					●	Arbed Phase 1 and Phase 2 Review
2012			●			Energy Wales: A Low Carbon Transition

Date	● Policy	● Scheme	● Strategy	● Legislation	● Research
2013					● Fuel Poverty Projection Tool and final report, based on 2011-12 data
2014					● Low Carbon Energy Generation in Wales: baseline projections of low-carbon energy generation in Wales
2014			●		Energy Wales: A Low Carbon Transition Delivery Plan
2015				●	Well-being of Future Generations Act
2015				●	(UK) Planning (Wales) Act devolved all planning powers except for nuclear energy
2015			●		Green Growth Wales: Local Energy maps how the energy system may look in future: 'By using our natural resource in the most effective and sustainable ways, we will: create the local energy systems that Wales needs, tackle poverty for the long term, put Wales at the forefront of carbon reduction'
2015					● Updated: Low Carbon Survey set out 'vision to see all communities and businesses generating both electricity and heat locally, to supply local demand and to minimise our dependence on central generation'
2015					● NEST review
2016					● Update of Low Carbon Survey added a section on 'ownership'
2016		●			Ynni'r Lleol Advice and financial support for Community Energy projects
2016			●		A Smarter Energy Future for Wales outlines what is needed for transition
2016				●	Environment (Wales) Act. Wales to become a major exporter of energy efficiency technology. Target set of at least 80% reduction from baseline of net emissions by 2050. Also interim targets and carbon budgets
2016					● 'Legislation for sustainable development to secure the long-term well-being of Wales' lays out the links between the three major Welsh Acts
2016					● Final evaluation of Ynni'r Fro
2017					● Nest Annual Review 2016/7

Date	● Policy	● Scheme	● Strategy	● Legislation	● Research
2017	●		Natural Resource Policy		
2017	●		New targets for energy generation in Wales: 70% of energy consumption from renewable sources by 2031; 1 GW of renewable energy capacity to be locally owned; new renewable energy developments to have an element of local ownership by 2020		
2017			● (UK) Wales Act required the Secretary of State to consult Welsh ministers before establishing or amending a renewable energy scheme that applies in Wales. Also gave Wales increased powers over smaller electricity-generating stations (up to 350 MW)		
2018	●		Launch of Welsh Government Energy Service, including strengthening of renewable energy policy, with particular emphasis on local government and local ownership		

Appendix 5: Training opportunities for community groups

Adult Learning Wales

Adult Learning Wales works throughout Wales. It is working with the Co-operatives and Mutuals Alliance to develop curricula with communities, designed to produce self-sufficiency in decision-making processes and so to further democratic engagement. This is a new initiative; a basic package, building on the co-operative model, would be developed first. It was expected that something would be in place in September 2018.

They are working especially with poorer communities, disadvantaged educationally and in other ways. They are developing a curriculum framework which covers:

- negotiation
- communication
- research – how to find relevant information
- how to put a project together
- how to find funding
- how to find experts to help.

If a community wants renewable energy skills, Adult Learning Wales will bring renewables experts in.

Their work sits within the Well-being of Future Generations framework. They are interested in producing social benefits of all kinds, such as reductions in criminality. On the whole, people do not come to them; they go out and find suitable groups.

A major problem is that the Welsh Government's Adult Learning budget has been significantly cut recently. Adult Learning Wales now receives only £500k per annum.

The Wales Council for Voluntary Action (WCVA)

The Wales Council for Voluntary Action (WCVA) works with the Energy Savings Trust. Using Environet Cymru, a Welsh Government programme, it provides basic support and training for community groups and third sector organisations to start or develop environmental programmes of any kind. For renewable energy and energy-saving programmes in particular, WCVA finds its trainers by working through the Energy Savings Trust, who have workbooks from the earliest stages of projects.

The Open University in Wales

The Open University in Wales has a range of options which may be relevant to the needs of interested individuals, of communities, and indeed of local authorities. Most of these are to be found on the Open Learning website⁴⁰, with courses available in Welsh as well as in English, or the Future Learning website.⁴¹ The OU is a part-owner of Future Learning. These offer elementary management or 'Management and Leadership' in modular form. The online courses are free to use, unless learners decide at the end that they want a certificate. The main OU courses at certificate level include a course in 'Leadership and Management Development'. For renewable energy in particular, there is a Future Learning course on 'Go Solar'. Open Learning has a Level 1 Science and Technology course which includes something about renewable energy. Moreover, the OU is open to discussion on what might be needed on renewable energy and management. They will set up a new or special course if there is sufficient demand.

40 Open Learning, [Open Learning](#), accessed November 2018

41 Future Learn, [Future Learn](#), accessed November 2018

Appendix 6: List of documents consulted⁴²

Armstrong, David (2017) *'Psychoanalytic Study' and the Ethical Imagination, Organisational and Social Dynamics*
<http://tihr-archive.tavinstitute.org/podcast-psychoanalytic-study-ethical-imagination-making-finding-losing-tradition/>

Blaenau Gwent County Borough Council (2017) *Renewable Energy: Local Development Plan Review*
<https://www.blaenau-gwent.gov.uk/>

Brummer, Vasco (2018) *Community Energy - benefits and barriers: A comparative literature review of Community Energy in the UK, Germany and the USA, the benefits it provides for society and the barriers it faces*. *Renewable and Sustainable Energy Reviews* 94 (2018) pp. 187-196
www.sciencedirect.com/journal/renewable-and-sustainable-energy-reviews

Butler, C., Demski, Christina, Parkhill, K., Pidgeon, Nicholas Frank, Spence, A (2015) *Public Values for energy futures: Framing, indeterminacy and policy-making*. *Energy Policy* 87, pp.665-672
<http://dx.doi.org/10.1016/j.enpol.2015.01.035>

Community Energy State of the Sector Report (2017)
<https://communityenergyengland.org/pages/state-of-the-sector-report-2017>
Community Energy State of the Sector Report (2018)
<https://communityenergyengland.org/pages/state-of-the-sector-report-2018/>

Consumer Data Research Centre (2016), *Population Density and Urban/Rural Classification*
<https://data.cdrc.ac.uk/dataset/population-density-and-urban-rural-classification>

Creswell, John W (2013), *Qualitative Inquiry and Research Design Choosing Among Five Approaches, third edition*. London: SAGE Publications Ltd

Demski, Christina, Butler, C., Parkhill, K., Spence, A., Pidgeon, Nicholas Frank (2015), *Public values for energy system change*, *Global Environmental Change* 34 ; 59-69
<https://www.sciencedirect.com/science/article/pii/S0959378015000953>

Department for Environment, Food and Rural Affairs (2016) *Guide to Applying the Rural Urban Classification to Data*
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/539241/Guide_to_applying_the_rural_urban_classification_to_data.pdf

ECCO (accessed June 2018), *Creating new local Energy Community Co-operatives*
www.nweurope.eu/projects/project-search/ecco-creating-community-co-operatives

42 This list excludes documents shown to us in confidence

Empower (2008), *Powering Up Communities First (PUCF). Final Evaluation Report*
<http://gov.wales/docs/caecd/research/090209-communities-one-final-en.pdf>

Flintshire County Council (2011), *Unitary Development Plan 2000-2015*, Chapter 19
<http://www.cartogold.co.uk/flintshire/text/English/19.htm>

Flintshire County Council (accessed November 2018), *Renewable Energy 10 year Action Plan*
<https://www.flintshire.gov.uk/en/PDFFiles/Energy/Renewable-Energy-10-year-Action-Plan.pdf>

Gardner, Ian W (2014), *Nimby, Network or Social Movement? Individual and Collective Opposition to Windfarms*
<http://e.bangor.ac.uk/6554/2/Gardner%20Thesis%202014%20Revised%20after%20viva.pdf>

Henwood, K., Pidgeon, N., Groves, C., Shirani, F., Butler, C., Parkhill, K., (2015) *Energy Biographies Research Report*
<http://energybiographies.org>

Institute of Welsh Affairs (2017) *Re-energising Wales: Funding renewable energy projects in Wales*
https://www.iwa.wales/wp-content/uploads/2017/04/IWA_ReEnergisingWales-9.pdf

Institute of Welsh Affairs (2019), *Re-energising Wales: How to protect, promote and achieve scale in community and local ownership of renewable energy in Wales*
https://www.iwa.wales/wp-content/uploads/2018/11/IWA_Energy_WP4.1-1-1-1.pdf

Institute of Welsh Affairs (2018) *Re-energising Wales: Swansea Bay City Region: A Renewable Energy Future*
www.iwa.wales/wp-content/uploads/2018/04/Regen-SBCR-A-Renewable-Future-FINAL.pdf

Kerr, Sandy; Johnson, Kate; Weir, Stephanie (2017), *Understanding community benefits from renewable energy development*, Energy Policy 105 , pp.202-211
<https://www.sciencedirect.com/science/article/pii/S030142151730109X>

Llewellyn, David H., Rohse, Melanie; Day, Rosie; Fyfe, Hamish (2017), *Evolving energy landscapes in the south Wales valleys: Exploring community perception and participation*, Energy Policy 108, pp.818-828
<https://www.sciencedirect.com/science/article/pii/S0301421517302537>

UK Government (2014), *Supporting public service transformation: cost benefit analysis guidance for local partnerships*
<https://www.gov.uk/government/publications/supporting-public-service-transformation-cost-benefit-analysis-guidance-for-local-partnerships>

Office for National Statistics (accessed June 2018), *Least qualified adults miss out on job-boosting training and education*

<https://www.ons.gov.uk/releases/leastqualifiedadultsmisoutonjobboostingtrainingandeducation>

One Newport Public Services Board (2017) *One Newport Wellbeing Plan, 2018-23*

<http://onenewportlsb.newport.gov.uk/documents/One-Newport/One-Newport-Well-being-Plan-2018-23-Consultation-Draft-Final-EN.pdf>

Parkhill, K.A., Demski, C., Butler, C., Spence, A., Pidgeon, N. (2013) *Transforming the UK Energy System: Public Values, Attitudes and Acceptability - Synthesis Report* (UKERC, London)

<http://www.ukerc.ac.uk/publications/transforming-the-uk-energy-system-public-values-attitudes-and-acceptability.html>

Pembrokeshire County Council (2017) *LDP Renewable Energy Assessment*

<https://www.pembrokeshire.gov.uk/local-development-plan-review/ldp2-evidence-base>

Pembrokeshire County Council Public Services Board (2017) *Well-Being Assessment*

<https://www.pembrokeshire.gov.uk/public-services-board/well-being-assessment>

Powys Public Service Board (2017), *Well-being Plan. The Powys We Want*

<https://en.powys.gov.uk/>

Regen and Energy Networks Association (accessed June 2018) *Rough Guide to Engaging Communities in Energy Network Innovation*

<https://www.regen.co.uk/publications/rough-guide-to-engaging-communities-in-energy-network-innovation/>

Regen (2017) *Energy Storage: the Next Wave*

<https://www.regen.co.uk/publications/energy-storage-the-next-wave/>

Regen for Institute of Welsh Affairs (2018), *Swansea Bay City Region: A Renewable Energy Future*

<https://www.iwa.wales/wp-content/uploads/2018/04/Regen-SBCR-A-Renewable-Future-FINAL.pdf>

Regen and Western Power Distribution (2016) *Connecting Community Energy: a Guide to getting a Network Connection*

http://www.energynetworks.org/assets/files/news/publications/1500108_ENA_WPD_guide_AW_110416.pdf

Scottish Power Energy Networks (2017), *Distributed Generation SP Manweb*.

https://www.spenergynetworks.co.uk/pages/dg_spm_heat_maps_terms.aspx

Severn Wye Energy Agency, accessed November 2018, *Our Future's People. Information Pack for Schools*

<http://www.ourfuturespeople.org.uk/about.html>

Stats Wales (2017), *Total social housing stock by local authority area and provider type*
<https://statswales.gov.wales/Catalogue/Housing/Social-Housing-Stock-and-Rents/totalsocialhousingstock-by-area-providertype>.

Stats Wales (2016), *Population projections by local authority and year*
<https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Projections/Local-Authority/2014-based/populationprojections-by-localauthority-year>

Stats Wales (2017), *Total social housing stock by local authority area and provider type*
<https://statswales.gov.wales/Catalogue/Housing/Social-Housing-Stock-and-Rents/totalsocialhousingstock-by-area-providertype>

Stats Wales (2016), *Population projections by local authority and year*
<https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Projections/Local-Authority/2014-based/populationprojections-by-localauthority-year>

Stats Wales (2018), *Population density (persons per square kilometre) by local authority and year*
<https://statswales.gov.wales/Catalogue/Population-and-Migration/Population/Density/populationdensity-by-localauthority-year>

Swansea Council (April 2016), *City & County of Swansea's Energy Strategy*
<http://democracy.swansea.gov.uk/documents/s29144/14%20of%20%20-%20Appendix%20A.pdf>

Swansea Community Energy and Enterprise Scheme (accessed June 2018), *About SCEES. Creating a better future for everyone*

<https://www.swanseacommunityenergy.org.uk/>

Welsh Government (2017), *Energy Generation in Wales 2016*
<https://gov.wales/topics/.../energy/renewable/energy-generation-in-Wales/?lang=en>

Welsh Government (accessed September 2017), *Lesley Griffiths high on ambition for clean energy*
<https://gov.wales/newsroom/environmentandcountryside/2017/170928-lesley-griffiths-high-on-ambition-for-clean-energy/?lang=en>

Welsh Government (2019), *Locally owned renewable energy - A call for evidence*,
<https://gov.wales/topics/environmentcountryside/energy/renewable/local-renewable-energy-generation/call-for-evidence/?lang=en>

Welsh Government (2016), *National Indicators for Wales*

<https://gov.wales/docs/desh/publications/160316-national-indicators-to-be-laid-before-nafw-en.pdf>

Welsh Government (2018), *Planning Policy Wales (Edition 10)*

<https://beta.gov.wales/sites/default/files/publications/2018-12/planning-policy-wales-edition-10.pdf>

Welsh Government (2015), *Well-being of Future Generations (Wales) Act 2015: The Essentials*

<https://gov.wales/topics/people-and-communities/people/future-generations-act/?lang=en>

Welsh Government (2015), *Welsh Index of Multiple Deprivation - Annual indicator data*

<http://gov.wales/statistics-and-research/welsh-index-multiple-deprivation-indicator-data/?lang=en>

Western Power Distribution (accessed November 2017), *Network Capacity Map*

<http://www.westernpower.co.uk/connections/generation/network-capacity-map.aspx>

UKERC: Janette Webb, Margaret Tingey and David Hawkey (2017), *What We Know about Local Authority Engagement in UK Energy Systems*

www.ukerc.ac.uk/publications/what-we-know-about-local-authority-engagement-in-uk-energy-systems.html



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