RICARDO-AEA ecologic PEMBINA institute

# Cost and financing aspects of community renewable energy projects

## Volume II: Case Studies - UK

IEA-RETD
Renewable Energy Technology Deployment

Data contributions from: SCENE Community Energy Specialists; The James Hutton Institute

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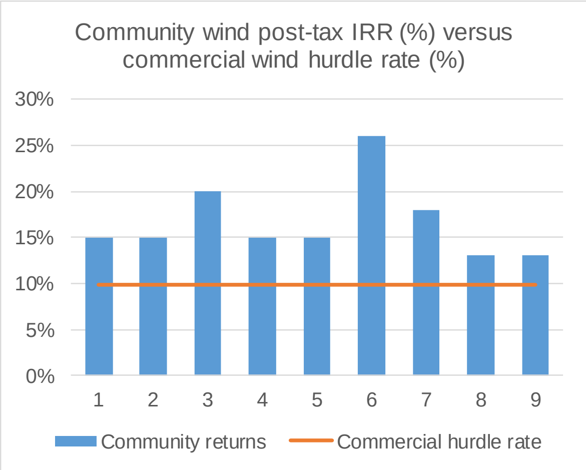
# Executive summary

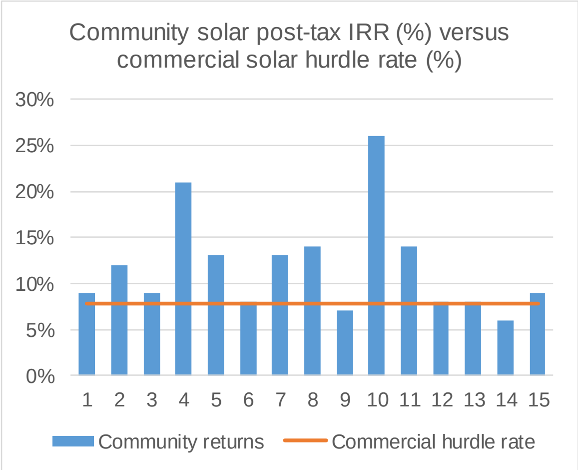
This Case Study report presents the results of data collection and analysis on community and commercial wind and solar PV installations in the UK. It has been based on information available as at the end of June 2015 and does not refer to any policy changes that may occur after this date.

## Cost Data Comparison

The objective is to compare the costs and other factors that differentiate these different types of renewable energy project – drawing out key issues for policy makers.

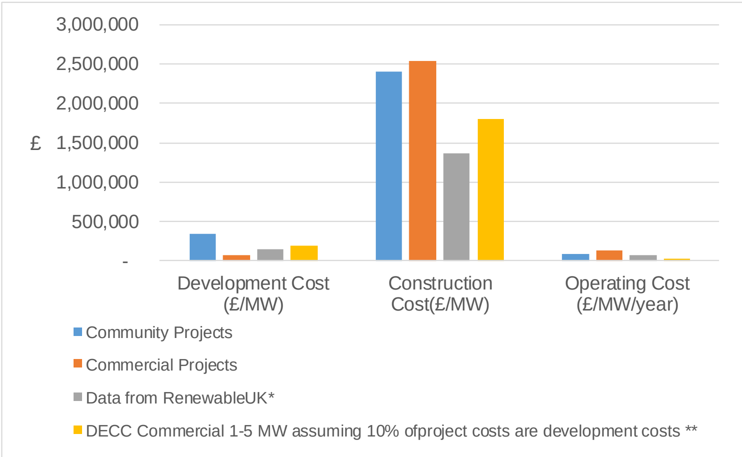
Through direct interviews and obtaining data[1] from recent projects we have data for 26 community projects, 11 wind (two being shared ownership deals between communities and a commercial developer) and 15 solar PV plus 11 commercial wind projects. We chose to collect data on completed projects – so that the cost data represented actual, rather than predicted, costs. Using the data on costs and income we have calculated the pre-tax pre-financing Internal Rate of Return (IRR) for each of the 24 wholly community owned projects cognisant that as all the community projects were structured to have no corporation taxes the pre- and post-tax pre-financing IRRs will be the same, shown below:




This shows that for wind and solar – communities are selecting projects that meet expected hurdle rates. Though there is a pattern of lower IRR for some of the solar projects.

Comparing the 11 small to medium commercial wind projects with the community projects provides evidence that development costs, even excluding the 'free' professional time, will often be lower for commercial projects than community projects, but then backs up the hypothesis that community and commercial projects will have similar construction costs and similar operating costs:




Sources: * RenewableUK. *Onshore Wind Cost Reduction Taskforce Report.* 2015
** DECC. *Electricity Generation Costs 2013*. July 2013. p.66.

[1] Provided by Scene Consulting and the James Hutton Institute

In conclusion, drawing together the data we collected, data from CimateXChange, data we obtained from the DECC review of Feed in Tariffs and other DECC data, the main message is that development costs are higher for community projects than commercial projects, but operating and construction costs are not significantly different. This message is nuanced like it is because the data we gathered for community projects spanned five years, and had a small sample size.

From the 24 wholly owned community projects that data was obtained for five would not have passed the hurdle rates required by commercial investors. As the range of returns commercial developers make above their target hurdle rates are unknown it is not possible to definitively say that community projects have less financial headroom (e.g. if generation income is lower than expected or operational costs increase then rates of return will fall below hurdle rates) than commercial projects, but an argument could be made that this is the case, especially for small sub 50kW solar projects.

### Qualitative comparison

The main messages from the qualitative research questions are:

- Communities are often constrained in where they can develop their project, so will normally be developing renewable projects in sub optimal situations with lower wind speeds or less solar insolation which to be profitable require grants, free time given by local community members, attractive loans, or to find other innovative ways to support the project, like selling the electricity at retail as opposed to wholesale prices to local consumers;
- Development costs (even excluding 'free' volunteer time) tend to be higher for community projects.
- Some community developers have done more than one project, and have been able to do the second project more quickly, although not necessarily reducing the development costs. This is significant because the quicker projects can be commissioned, the higher the FITs that can be secured, and therefore the more financially attractive community projects can be;
- Communities tend to be very risk averse, and are reluctant to invest community monies until there is certainty that the project will go ahead. This makes the raising of finance to get to the point of certainty very challenging, which is where development grants and attractive loans have been very effective;
- Evidence of higher construction or operating costs is not definitive.

Whilst there is evidence of higher development costs which is supported by other research there are some costs that are lower, notably:

- All the community projects interviewed were able to structure their projects to be corporate tax free, therefore avoiding this cost;
- Many community projects interviewed raised some of their money from a community share offer. The effective interest rates on community share offers was between 4% and 5%, much lower than the hurdle returns required by commercial developers. The preferential tax treatment offered to taxpayers through EIS, SEIS and CITR may be a key driver for the availability of funds at this low interest rate. However, even though the cost of equity may be lower communities reported that commercial banks may sometimes charge higher interest rates or offer lower debt: equity ratios compared to commercial developers. This means that the post-tax Weighted Average Cost of Capital is not that different for a community relying on a part debt/ part equity finance solution, compared to a commercial developer with a similar structure;
- There is also anecdotal evidence that on those projects that are part financed by a commercial bank and part financed by a Government supported bank (e.g. the Scottish Government backed Renewable Energy Investment Fund) that commercial lenders will offer terms that may be lower than those that would be offered to a commercial lender, although this may be because the Government supported bank is acting as a junior lender, in effect significantly reducing the exposure of the commercial bank;
- Although the evidence is that community development costs are higher than those faced by a commercial developer the costs would have been even higher had volunteer time been charged for. Five communities said that without the volunteer time many projects would not have progressed. Two of the projects interviewed also benefited from a Government funded development officer that avoided some additional project management costs;

- Some communities will own the land they develop the project on, but if they do not there is anecdotal evidence that communities often end up paying more to rent the land than a commercial developer could negotiate as a commercial developer will often be negotiating with a number of land owners in different locations to secure the best deal.

## Conclusions

It is clear that community projects have much higher development costs – which may in part be balanced by lower costs of finance and lower operating costs. It is also clear that the community projects in the sample make acceptable investment returns – though this is a sample that is was chosen to show real projects, and hence only shows successful projects.

From a policy perspective:

- The key support to assist projects develop (from CARES, RCEF, UCEF etc.) is targeting a key barrier and key difference for community projects;
- Part of the higher cost of development is the longer timeframe – reflected in current policy that offers community projects a longer construction period following preliminary accreditation for the FiT;
- FiT pre-accreditation is seen as essential for communities developing projects where they need to pay deposits (e.g. for grid connections or wind turbine deposits) before financial close, for communities tend to have few (if any) cash reserves. Without FiT pre-accreditation they will not be able to secure finance nor meaningfully engage with solar and wind turbine manufacturers;
- Although not so much a cost, but rather a revenue driver, there is anecdotal evidence that the costs for communities to be able to sell electricity directly to local consumers through a Licence Lite route often outway the higher electricity sale prices. Thought could be given to further reducing the costs for direct sale to consumers;
- That tax incentives for investors enable community projects to access lower cost finance – which is key to rate of return, although it is questioned how effective community share offers would be without income tax breaks;
- However in terms of increasing wider community benefits, other policy options could be better placed to deliver – as income tax incentives for investors will not target local or social issues;
- At a wider level, shared ownership could be a more efficient means of delivery of renewable energy and local economic benefits. Though the investors would need to be local to ensure that local benefits are realised.

# Table of contents

# 1 Introduction

This United Kingdom (UK) case study is structured into four main areas:

- Firstly a short overview of the UK renewable energy sources (RES) market is given focusing on community based RES activities. To do this a definition of community led RES projects is proposed.
- Secondly the costs faced by community based and commercial RES projects are described and analysed. The information on costs for community projects was collected via interviews with RES communities, and the information on commercial projects has relied on a literature review. The cost data were then transferred into a financial model that shows how 'profitable' different projects are. This enables a comparison on the profitability of community versus commercial projects.
- Thirdly the responses to the seven research questions are provided that draw on the outcomes from the interviews with communities and RES sector specialists, and from wider literature research.
- The Case Study then provides overall conclusions targeted at policy makers.

**This Case Study has been based on information available as at the end of June 2015 and does not refer to any policy changes that may occur after this date.**

# 2 Background: The UK RES market

## 2.1 Definition of community led projects

In different countries there are different definitions of community ownership. For the UK we use the Department of Energy and Climate Change (DECC) definition, namely a:

> *"community interest company; or a community benefit society or co-operative society, or a registered charity or a wholly owned trading subsidiary of a registered charity, other than such a company or society with more than 50 employees."*[2]

This definition is wider than the previous definition of community that excluded registered charities and wholly owned subsidiaries of such organisations. In order to be a charity such organisations must have exclusively charitable objectives for the public benefit[3].

## 2.2 Possible legal forms for RES community led projects

There are various legal structures available for RES community led organisations, summarised in Table 1. There is also encouragement for communities to enter into shared ownership partnerships with commercial developers. The main types of shared ownership models are:

- Shared revenue projects, where the community invests money and in return gets a share of the revenues or net cashflows;
- Joint ventures, where the community invests money in a Special Purpose Vehicle company owned partly by the community and partly by the commercial developer, with each shareholder owning a proportion of the renewable energy assets;
- Split ownership – where a community owns outright part of a renewable energy asset and a commercial developer owns outright the other part of the asset.

[2] Department of Energy and Climate Change. *Guidance on community ownership models under the Feed-in Tariffs scheme*. March 2015, p.23. Retrieved from: https://www.gov.uk/government/publications/guidance-on-community-ownership-models-under-the-feed-in-tariffs-scheme
[3] Department of Energy and Climate Change. Government responses to the consultation on support for community energy proposals under the Feed-in-Tariff Scheme. November 2014. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/374540/Govt_Response_to_community_FITs_consultation_-_FINAL.pdf

The legal structure for a community's investment into any of these three shared ownership solutions will be similar to one of those specified in Table 1 for wholly owned community projects.

**Table 1: Different legal structures for community led RES projects**

| Legal Structures | Description | Corporation Tax Obligation |
|---|---|---|
| **Registered Society: Community Benefit Society (BenCom)** | A group of more than three members registered under the Financial Conduct Authority (FCA) that operate for non-profit, and trade to benefit the boarder community, governed by charity law[4]. | Y |
| **Registered Society: Cooperative** | A group of more than three members registered under FCA that operate for non-profit, and run for the mutual benefit of their members that use its services[5]. | Y |
| **Community Interest Company (CICs)** | A form of limited company that is governed by the Companies Act 2004 and is designed for social enterprises. | Y[6] |
| **Private Company Limited by shares (CLSs) if wholly owned by registered charity** | Private limited company, where shareholders' liability is limited to the capital originally invested, with shares not listed on a stock exchange[7]. | Y |
| **Private Company Limited by guarantee (CLGs) if wholly owned by registered charity** | A limited company registered with Companies House and governed by Company Law, with a limited liability status with shareholders guaranteeing to pay £1 - £10 if insolvency occurs[8]. | Y |
| **Charitable Trust** | An irrevocable trust established for charitable purposes. | N[9] |
| **Charitable incorporated organisation (CIO)** | An organisation with charitable aims that meets the public benefit test, is incorporated without being a company, and is registered with the Charity Commission.[10] | N |

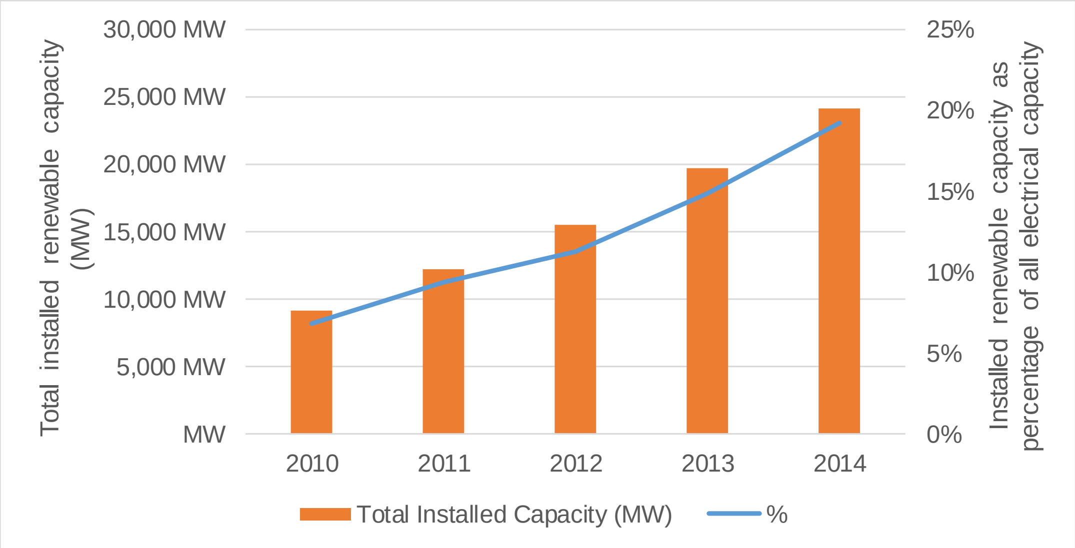
Whichever legal structure the community decides to use, normally the community is able to avoid corporate tax, either by using a corporate tax exempt legal structure, or by simply gifting all pre-tax profits to a tax-free charity that will seek to deliver the communities' mandate.

## 2.3 RES development in the UK

The UK has a rapidly expanding renewable energy market (Figure 1) with renewable electricity now representing 19.2% of electricity generation capacity with approximately 24,226MW[11] installed.

[4] Community Action Southwark. *Registered Society: Co-operative and Community Benefit Society*. Jan 2015. Retrieved from: http://casouthwark.org.uk/sites/default/files/images/Industrial%20and%20Provident%20Society%20%28IPS%29.pdf
[5] Community Action Southwark. *Registered Society: Co-operative and Community Benefit Society*. Jan 2015. Retrieved from: http://casouthwark.org.uk/sites/default/files/images/Industrial%20and%20Provident%20Society%20%28IPS%29.pdf
[6] Community Action Southwark. *Registered Society: Co-operative and Community Benefit Society*. Jan 2015. Retrieved from: http://casouthwark.org.uk/sites/default/files/images/Industrial%20and%20Provident%20Society%20%28IPS%29.pdf
[7] Wikipedia. *Private Company Limited by Shares.* Retrieved from: http://en.wikipedia.org/wiki/Private_company_limited_by_shares
[8] Community Action Southwark. *Registered Society: Co-operative and Community Benefit Society*. Jan 2015. Retrieved from: http://casouthwark.org.uk/sites/default/files/images/Industrial%20and%20Provident%20Society%20%28IPS%29.pdf
[9] Wikipedia. *Charitable Trust.* Retrieved from: http://en.wikipedia.org/wiki/Charitable_trust
[10] Community Action Southwark. *Registered Society: Co-operative and Community Benefit Society*. Jan 2015. Retrieved from: http://casouthwark.org.uk/sites/default/files/images/Industrial%20and%20Provident%20Society%20%28IPS%29.pdf
[11] DECC. Renewable Statistics. April 2015. Energy Trends Section 6: Renewables. Renewable Electricity Capacity and Generation ET6.1. https://www.gov.uk/government/statistics/energy-trends-section-6-renewables

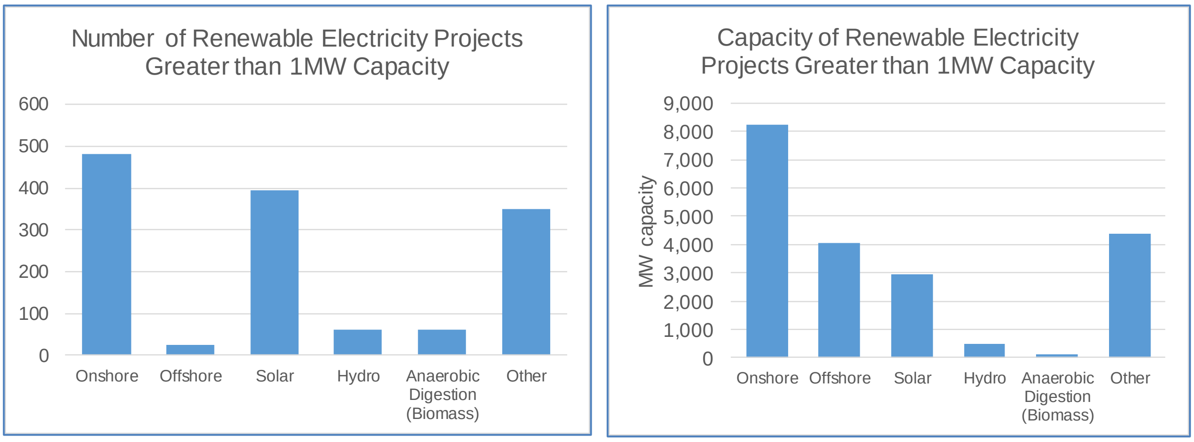
**Figure 1: DECC Renewable Electricity Generation 2010-2014**




Sources: DECC Renewable Energy in 2013[12] & DECC Energy Trends section 6: Renewables

As shown in Figure 2 the UK has significant onshore wind, offshore wind and solar assets, and growth is projected to continue, especially in the offshore wind sector.

**Figure 2: DECC Renewable Electricity Generation by Technology Type**




Source: DECC Renewable Energy Planning Database Monthly Extract (March 2015)

### 2.3.1 Commercial developers

Of the 24,226MW of installed capacity, 18,264MW (75%) is from generators with a capacity greater than 5MW.

As there are very few community projects (and no household solar or micro-wind projects) in excess of 5MW, the 5MW+ market is dominated by commercial developers[13]. These developers have historically relied on the Renewables Obligation (RO) support mechanism which creates an obligation on electricity suppliers to buy and then sell a proportion of renewable electricity.

[12] DECC. Renewable Statistics. June 2014. Energy Trends: June 2014, special feature articles – Renewable Energy 2013. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/323429/Renewable_energy_in_2013.pdf
[13] DECC. Renewable Energy Planning Data. March 2015. https://www.gov.uk/government/statistics/renewable-energy-planning-database-monthly-extract

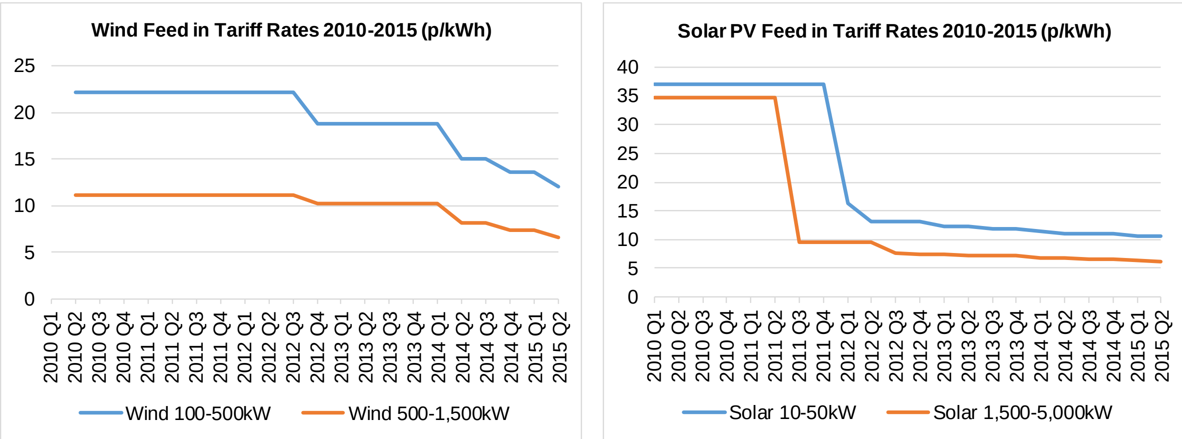
However, from 2017, the Electricity Market Reform programme will replace the RO for projects over 5MW with the new Contract for Difference (CfD) mechanism. CfD is a contract between the generator and the Government with a guaranteed price floor (strike price), reducing the risk faced by a generator through the project life. In many ways it is similar to FiTs (discussed below), although contract allocation and prices are determined through auctions, rather than being set by the Government.

This new CfD mechanism has already led to 15 onshore wind farms, two offshore wind farms and three solar farms being set to receive financial backing through this renewable energy incentive scheme[14]. This scheme is expected to amount to more than £315 million in total, accumulating to over 2 GW of new renewable generation capacity.

### 2.3.2 Community developers

As stated, so far there have only been a handful of community energy projects greater than 5MW (e.g. Westmill Solar Park), with most community projects being less than 5MW. For renewable electricity projects up to 5MW the main Government support mechanism has been the Feed in Tariff (FiT). Once accredited, the FiT gives generators a fixed price (£/MWh) which increases by inflation every year for the duration of the feed in tariff agreement. Since its introduction in 2010 the FiTs for newly accredited projects have fallen in most years (degression), shown in Figure 3. As can be seen in 2011 and 2012 there was a very large reduction in FIT support to solar PV projects as a result of the rapidly declining cost of PV units.

**Figure 3: Feed in Tariff rates (p/kWh) for Wind 100-500kW, Wind 500-1,500kW, Solar roof mounted 10-50kW, Solar ground mounted 1,500-5,000kW**

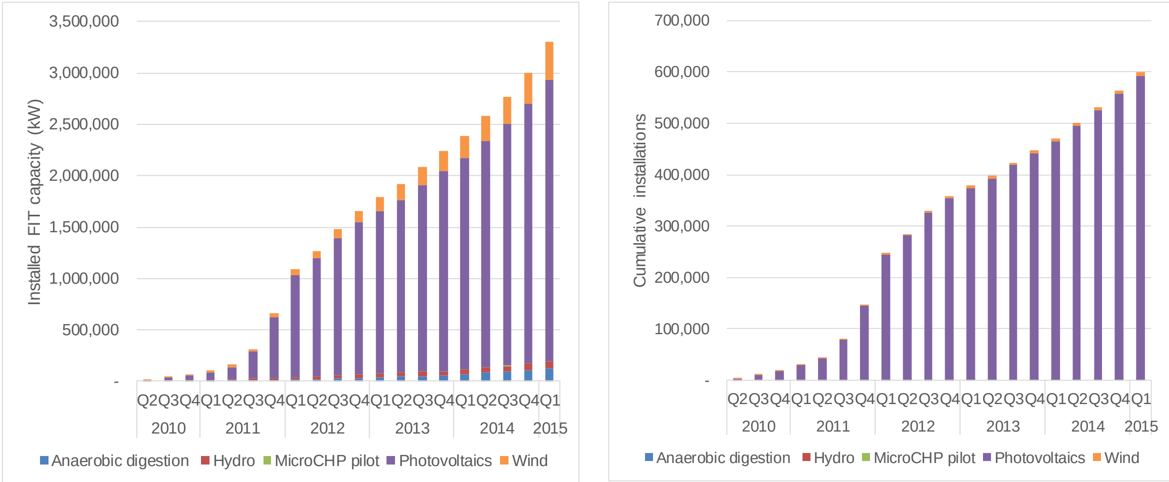



Of the 5,962MW of capacity under 5MW, the FiTs support 3,307MW[15]. It is assumed that the remaining 2,655MW did not go through the FiT scheme, but may have used the Renewable Obligation Certificates.

As shown in Figure 4, the FiT scheme has made a significant impact to the UK renewable energy, accumulating just under 600,000 installations by March 2015[16].

[14] http://www.renewableenergyfocus.com/view/41523/decc-releases-results-of-uk-s-first-auction-for-contracts-for-difference/
[15] DECC. Feed-in Tariff Statistics. April 2015. Monthly Central Feed-in Tariff Register Statistics. https://www.gov.uk/government/statistical-data-sets/monthly-central-feed-in-tariff-register-statistics
[16] DECC. Feed-in Tariff Statistics. April 2015. Monthly Central Feed-in Tariff Register Statistics. https://www.gov.uk/government/statistical-data-sets/monthly-central-feed-in-tariff-register-statistics

**Figure 4: Cumulative installed FiT capacity and number of installations receiving FiTs (quarterly)**




Source: DECC Monthly Central Feed-in Tariff Register Statistics (April 2015)

As well as FiTs, the Renewable Heat Incentive[17] (RHI) is a similar support programme for renewable heat.

Obtaining accurate information on the numbers of community renewable energy projects is difficult, as specific data is not collected by the Government. For example, one 2014 DECC report states that 49MW of community renewable assets have been installed, with another 384MW under development[18]. Another 2014 report to DECC states that there is *"around 66MW of community renewable electricity capacity installed, primarily funded through debt and grant, with over 200MW in development*."[19] DECC's Community Energy Strategy says they have found 5,000 community energy groups active in the UK since 2008 and there is at least 60MW of community-owned renewable electricity generation[20]. A map of the country then shows at least 220 community energy groups being involved in renewable energy projects. As at June 2013 communities in Scotland own 43MW of renewable energy generation[21].

Community renewable energy represents about ¼% of UK renewable electricity generation.

We have collected data for 24 wholly community owned projects, summing to 15.2MW of wind and 5.3MW of solar. Ricardo-AEA collected data for 17 projects where we conducted interviews, using the template provided in **Appendix 1 to the Main report**. We obtained data for seven Scottish community projects that was gathered by the James Hutton Institute and Scene Consulting. This data was part of a ClimateXChange project entitled *'The Comparative Costs of Community and Commercial Renewable Energy Projects in Scotland'* funded by the Scottish Government. The ClimateXChange project also relied on interviews and survey questionnaires, focusing on the construction, development and operating costs. This meant we were able to use their dataset, and queried the ClimateXChange team where there were questions. In addition to the 24 wholly community owned projects we were able to interview two shared ownership projects.

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[17] DECC. 2010 to 2015 government policy: low carbon technologies. May 2015. Appendix 7: Renewable Heat Incentive (RHI). https://www.gov.uk/government/publications/2010-to-2015-government-policy-low-carbon-technologies/2010-to-2015-government-policy-low-carbon-technologies#appendix-6-renewable-heat-incentive-rhi

[18] DECC. Greenhouse Gas Emissions and Household Energy. Community Energy in the UK Part 2. January 2014. Retrieved from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/274571/Community_Energy_in_the_UK_part_2_.pdf

[19] Capener, P. Community Renewable Electricity Generation: Potential Sector Growth to 2020. Methodology, Detailed Assumptions and Summary Results. Final Report to Department of Energy and Climate Change. January 2014, p.2. Accessed https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/274746/20140108_Community_Energy_Modelling_FinalReportJan.pdf

[20] Department of Energy and Climate Change. Community Energy Strategy: Full Report. January 2014, p. 21. Retrieved from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/275163/20140126Community_Energy_Strategy.pdf

[21] Energy Saving Trust. Community and locally owned renewable energy in Scotland at June 2013. April 2014. Retrieved from: http://www.energysavingtrust.org.uk/organisations/sites/default/files/Community%2Band%2Blocally%2Bowned%2Benergy%2B2014.pdf The report states there is 285MW of installed capacity by community organisations and local owned organisations. The report states that 43 MW is owned by community organisations, 24MW by other public sector and charities, with local businesses, local authorities, housing associations, other public sector, and farmers owning the remainder. Therefore, the 43MW could be higher if the ownership by charities is significant.

Whilst sometimes people and companies responding to surveys may not state correct values if they perceive benefits to understating or overstating results (e.g. to overstate costs to portray a worse financial position than the reality) the respondents were very open and we believe very honest in the information they provided.

Our review of community projects in existence was thorough, so it is possible that there are only about 100 community projects currently operational in the UK. Whilst many of the 220+ community energy groups will only have one project built, or one project under development, some of the groups will have a few projects. From this it can be determined that there are maybe 50-60 community groups with operational community projects, with the other 160-170 community groups having projects under development, but not yet commissioned.

One reason for the ambiguities, e.g. 49MW or 60MW, could be because some of the other MW of installed capacity comes from shared ownership models, even though the number of commissioned shared ownership schemes is very small.

For example, there is the 28.3% community stake in a 12MW £15.6 million wind farm completed in 2013, a £1.04 million stake by Kirbraur Wind Energy Cooperative in the 67MW Kilbraur wind farm that was built in 2008, and a 25% stake by Fens Cooperative in a 16MW wind farm in Lincolnshire that was also built around 2008[22]. Ardrishaig Community Trust receives 1/12th of the revenue from the 10.2MW Allt Dearg project[23].

## 2.4 Policy support schemes for RES

### 2.4.1 RES support for commercial projects

As stated in Section 2.4.1 (page 6) the main RES support for commercial projects is the RO which is being replaced by CfD.

### 2.4.2 RES support for community energy projects

DECC published the first UK Community Energy Strategy in 2014[24], setting out the rationale and support for community energy.

> *"Community-led action can produce energy, reduce energy use, manage energy demand and purchase energy. It can often tackle challenges more effectively than government alone, developing solutions to meet local needs, and involving local people. Putting communities in control of the energy they use can have wider benefits such as building stronger communities, creating local jobs, improving health and supporting local economic growth.*
>
> *Community energy can unlock opportunities for lower energy bills and carbon emissions saving that would otherwise be missed. A community role in electricity generation, whether in shared or full ownership or as part of a community benefits package, can help encourage investment."*
>
> Source: DECC. *Community Energy Strategy.* January 2014, p. 7.

The actions set out in the strategy include:

- Consultation on further changes to the FIT for community projects;
- Establishing a Community Benefits register for onshore wind projects in England;
- Setting up a DECC Community Energy Unit;
- A One Stop Shop information resource;
- A peer mentoring scheme to pass on lessons learnt;
- Adding community energy to the Green Investment Bank's scope of operation;
- Work to enable communities to supply electricity.

[22] Department of Energy and Climate Change. *Guidance on community ownership models under the Feed-in Tariffs scheme*. March 2015. Retrieved from: https://www.gov.uk/government/publications/guidance-on-community-ownership-models-under-the-feed-in-tariffs-scheme
http://neilstonwindfarm.org/ourwindfarm.html
http://www.kilbraur.coop/
http://www.fens.coop/fenland_aboutus.asp
[23] http://lochfynewindfarms.com/AlltDearg/AlltDeargBackground.aspx
[24] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/275163/20140126Community_Energy_Strategy.pdf

In addition to the UK policy and support mechanisms there are regional programmes:

- In England the Rural Community Energy Fund (RCEF) (£15million) and Urban Community Energy Fund (UCEF) (£10million) provide development support, grants and attractive loans to community developers;
- In Scotland a target has been set for 500 MW of locally renewable energy by 2020. This is supported by the Community and Renewable Energy Scheme (CARES), which provides free expertise as well as grants, attractive loans and support to access other grants and local funding;
- In Wales the Ynni'r Fro programme offers social enterprises grant aid, loans and free, independent, hands-on advice and information to help develop their own community-scale renewable energy schemes.

As stated, there is also government support for partnerships with commercial developers. Much progress has been made in this area, as highlighted by the Government's Shared Ownership Taskforce Report[25] and in Scotland by a Good Practice Principles guide for partnerships[26]. There is an expectation there will be more collaboration between community and commercial developers in renewable energy.

Prior to May 2015 planning permission for projects up to 50MW was left to local authorities to decide. This is proposed to change, so that local authorities get to have the final decision on all sizes of projects. The process of applying for planning permission for many renewable energy projects (especially wind energy projects) is expensive, and approvals can be difficult to secure because of objections for households living near renewable energy projects.

If planning permission is not secured then the development costs spent (e.g. for feasibility studies, wind surveys, project management, advisory fees) are essentially lost. For this reason, having partnerships between communities and commercial developers is seen by commercial developers as significantly increasing the chance of securing a successful planning permission decision.

Figure 5 summarises the main five types of government support for community RES projects.

[25] DECC. UK Energy Security. February 2015. Government Response to the Shared Ownership Taskforce. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/408440/Government_Response_to_Shared_Ownership_Taskforce.pdf

[26] Scottish Government. *Good Practice Principles for Shared Ownership of Onshore Renewable Energy Developments*. 2015. Retrieved from: http://www.gov.scot/Resource/0047/00473165.pdf

**Figure 5: Summary of policy support for community energy projects**

| Fiscal incentives | Legal structures | Grid connection | Planning | Other |
|---|---|---|---|---|
| Like commercial projects FiTs for projects less than 5MW and CfD for 5MW+ projects | Different legal structures in Table 1, many of which enable dividends to be passed tax-free for community benefit | DECC Grid Connection Working Group | Varies by each Local Authority | Encouragement for shared ownership, with differences between England and Wales and Scotland |
| Pre-accreditation for FiTs six months longer for communities (e.g. 12 months for solar and 18 months for wind) | | | DECC Planning Working Group | DECC Shared Ownership Working Group |
| Ability for a community project up to 5MW and another project up to 5MW to share a grid connection and both receive FiTs | | | | Licence Lite route to sell electricity to households |
| Tax incentives for investors, e.g. EIS and SITR | | | | DECC Hydro Working Group |
| Grants, e.g. £20k pre-planning grants from UCEF, RCEF, Ynni'r Fro and CARES | | | | |
| Attractive loans, e.g. from the Green Investment Bank or Renewable Energy Investment Fund | | | | |

Some of the support components shown in Figure 5 have already been discussed. More detail is provided below about some of the other components.

- Accredited community groups can access the Government's Enterprise Investment Scheme, the Seed Enterprise Investment Scheme (SEIS) and the Venture Capital Trust Scheme (VCTS). However, these schemes are now being overhauled with the Social Investment Tax Relief (SITR) scheme, which will offer 30% tax relief, the same as the EIS and VCTS.[27] Once SITR receives EU State Aid approval the intention is the EIS, the SEIS (with a 50% tax relief) and the VCTS will no longer be available for community organisations after a six month transition period[28]. There are different limits around how much can be invested by investors into a community project of £100,000 for SEIS, £1 million for EIS, £200,000 for VCTS and approximately £280,000 for SITR. The tax relief is available for all tax payers, but will particularly benefit richer individuals who have a greater income tax liability they can defray. Table 2 summarises how much a £10,000 investment into an EIS of SITR can benefit taxpayers. In effect, if a project is 50% financed by a community share offer this amounts to a Government incentive to shareholders equal to 15% of the project's capital cost.

[27] HM Revenue and Customs. Social Investment Tax Relief. Available at https://www.gov.uk/government/publications/social-investment-tax-relief-factsheet/social-investment-tax-relief

[28] Department of Energy and Climate Change. *Community Energy Strategy Update: Creating the conditions for long term growth*. March 2015. Retrieved from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/414446/CESU_FINAL.pdf

**Table 2: Example of how EIS and SITR tax relief works**

Under EIS and SITR tax payers can benefit from the following tax reliefs if they invest £10,000 in an eligible community project, with the shares being repaid after three years:

- In the year of investment the individual will be able to reclaim £3,000 of tax relief against their other taxable income.
- Then for the following three years a community payment of 5% may arise, i.e. £1,000 of community payment in years 1, 2 and 3, on which the individual will pay 40% tax (if they are a higher rate tax payer) or 20% (if they are a lower rate tax payer).
- The shares after three years are repaid (or the investor sells the shares) for £10,000.

The net cash flow for the individual is shown below, which equates to a post-income tax return of 16%.

| | Year 0 | Year 1 | Year 2 | Year 3 |
|---|---|---|---|---|
| Initial injection | -10,000 | | | |
| Tax SEIS relief at 30% | 3,000 | | | |
| Shares repaid | | | | 10,000 |
| Community payment | | 500 | 500 | 500 |
| Minus higher rate income tax (40%) | | -200 | -200 | -200 |
| | | | | |
| Net cash flow if 4 | -7,000 | 300 | 300 | 10,300 |

- Under the actions from the Community Energy Strategy a range of Working Groups to address key issues have been established, which are explained in more detail in Table 3;
- The costs of compliance to obtain a supply licence to sell directly to consumers (therefore receiving a higher electricity price than the price they could sell the electricity to an electricity supplier) are significant. Licence Lite was introduced to open the electricity supply market to new, often small scale suppliers such as communities. It lets a new supplier sell electricity directly to individual consumers and companies by partnering with an existing supplier that is responsible for some of the more costly and technically challenging parts of a supply licence.

**Table 3: Department of Energy and Climate Change Community Energy Strategy Initial Outcomes**

DECC launched the UK's first Community Energy Strategy in 2014. This led to the formation of three working groups specifically tasked with understanding the challenges of developing community energy projects in grid connections, planning and hydro-power. In addition a Shared Ownership taskforce was set up.

The working groups included representatives from industry and community energy support organisations with key roles to play in these areas. The working groups have now completed their work for DECC. The following is a summary of their conclusions:

**Grid connection working group**

An outcome of the grid connection working group included actions which have been implemented to:

- Improve engagement by Distribution Network Operators (DNOs) with community groups,
- Encourage DNOs and community groups to explore opportunities to work together in future smart grid trials under the Low Carbon Network Fund and Network Innovation Competition,
- Allow for shared grid connections and improve transparency of costs and connection offer terms.

Recommendations were made to DECC for the costs of grid strengthening to be borne by every electricity consumer or by DNOs (as opposed to the community projects), and/ or the DNO not to charge communities for grid connections until community schemes are commissioned.

**Planning and permitting working group**

The planning and permitting working group identified three related areas that were central to the delivery of a successful planning application, notably:

- The skills and knowledge within the community group;
- The local planning process;
- The National Planning Policy Framework.

The outcome of this included a number of actions on relevant planning organisations aimed at supporting community groups through the planning process. Amongst others this included DECC providing a one day training event in Summer 2015.

**Hydro working group**

The hydro working group identified finance, issues with landowners, and long approval and organisational timelines compared to commercial projects as barriers to community hydro projects being developed. They also proposed a number of solutions to overcome them including an extension to the preliminary accreditation timeline for community renewable projects, which has since been implemented.

**In addition to the three working groups and Shared Ownership taskforce was set up.**

The conclusions of the taskforce was that commercial project developers seeking to develop significant renewable energy projects (i.e. above £2.5m in project costs) for the primary purpose of exporting energy onto a public network should offer interested communities shared ownership. This is a voluntary initiative.

The Scottish Government has gone further than this and has an expectation that all renewable energy developers offer shared will offer shared ownership to local communities. The £10 million Local Energy Investment Fund was set up to support this by completing the initial investment on behalf of the community, providing the community with additional time to determine whether the investment opportunity is right for them.

Sources: Grid working group: https://www.ofgem.gov.uk/ofgem-publications/91692/gridconnections011214.pdf

Hydro working group: http://www.lowcarbonhub.org/wp-content/uploads/2014/10/DECC-Hydro-Working-Group-reportFINAL.pdf

Planning and Permitting Working Group: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/414446/CESU_FINAL.pdf

Shared Ownership: http://www.renewableuk.com/download.cfm/docid/CB5A9C2C-FA70-46CE-83757D293D992E3E

# 3 Costs faced by renewable energy developers

The costs faced by RES projects were collected on the basis of the interviews (for community led projects) and by using publicly available data bases (for commercial projects).

## 3.1 Commercial RES projects

Data on commercial projects is already available from a range of sources, covered in the **Methodology Chapter of the main report** and replicated in below in Figure 6 and Figure 7.

**Figure 6: Commercial UK data: Wind**

| | International UK data ($) | International UK data (£) at £1 = US$1.55 exchange rate | Additional UK data (£) |
|---|---|---|---|
| Development costs (Currency/ MW) | $187,000 ˘ | £120,650 ˘ | £149,598 * |
| Construction costs (Currency /MW) | $1,687,000 ˘ | £1,088,400 ˘ | £1,360,053 * |
| Operational costs (Currency/ MW/ year) | Not available | Not available | £68,557 * |
| Typical debt: equity ratio | Not available | Not available | 70% ≈ |
| Cost of debt (%) | Not available | Not available | 6.5% ≈ |
| Length of loan (years) | Not available | Not available | 15 ≈ |
| Cost of equity (%) | Not available | Not available | 15.5% ª |
| Tax rates (2015) | 20.0% ° | 20.0% ° | 20.0% ° |

Sources:

˘ IRENA. *Renewable Power Generation Costs in 2014*. January 2015. Table 4.3 which has total installed costs ($/MW) for the UK. Further, Figure 4.1 shows that development costs are typically 9%-13% of total project cost. An assumption of 10% is made.

° 2015 corporate tax rates are sourced from KPMG's Corporate Tax Rate Tables available at http://www.kpmg.com/Global/en/services/Tax/tax-tools-and-resources/Pages/corporate-tax-rates-table.aspx

* Renewable UK. *Onshore Wind: Economic Impacts in 2014.* April 2015. Tables 1, 4 and 8. The total development and construction cost £1,509,651 is close to the central point £1,600,000 estimate for 5MW+ windfarms in Department of Energy and Climate Change. *Electricity Generation Costs: 2013.* July 2013, p. 60. The Renewable UK report relied on analysis by the consultancy Biggar Economics. However, the operations costs in the DECC report at £44,610 is lower than the Renewable UK report.

ª Department of Energy and Climate Change. Electricity Generation Costs: 2013. July 2013, p. 50 reports a pre-tax real weighted average cost of capital of 8.3% for projects commissioned with Renewable Obligation Certificates. Assuming inflation is 2% that equates to 10.5% pre-tax weighted average cost of capital. To convert to a post-tax number there is a need to multiply by the technology specific Effective Tax Rate (ETR) which for onshore wind is 12% (Department of Energy and Climate Change. *Electricity Market Electricity Market Reform. Review of effective tax rates for renewable technologies.* July 2013. p.29) to give a post-tax weighted average cost of capital of 9.2%. As the debt equity ratio is 70:30 and debt costs 6.5% this equates to a cost of equity of approximately 15.5%.

≈ Department of Energy and Climate Change. *Electricity Market Electricity Market Reform. Review of effective tax rates for renewable technologies.* July 2013. p.39.

**Figure 7: Commercial UK data: Solar**

| | International UK data ($) | International UK data (£) at £1 = US$1.55 exchange rate | Additional UK data (£) |
|---|---|---|---|
| Development costs (Currency/ MW) | $120,000 [ˇ a] | £77,400 [ˇ a] | £1,000,000 for development + construction combined [!] |
| Construction costs (Currency /MW) | $2,280,000 [ˇ a] | £1,471,000 [ˇ a] | See above |
| Operational costs (Currency/ MW/ year) | $48,000 [ˇ *] | £31,000 [ˇ *] | £22,600 [!] |
| Typical debt: equity ratio | Not available | Not available | 70% [≈] |
| Cost of debt (%) | Not available | Not available | 6.5% [≈] |
| Length of loan (years) | Not available | Not available | 15 [≈] |
| Cost of equity (%) | Not available | Not available | 9.3% [═] |
| Tax rates (2015) | 20.0% [°] | 20.0% [°] | 20.0% [°] |

Sources:

ˇ IEA. *Technology Roadmap. Solar Photovoltaic Energy.* 2014 edition.

a Based on Ricardo-AEA studies, development costs make up approximately 5% of total cost of installation. This covers feasibility work, planning permission and other related development costs.

* The international operating costs were sourced from a UK report by DECC. *Electricity Generation Costs 2013*. July 2013, p. 66. The DECC report states operation and maintenance costs are approximately 2% (per year) of total cost of installation for large scale solar PV installations. Operation and maintenance costs include inverter replacements (approximately every 7-10 years), ongoing installation project management, insurance, cleaning and basic repairs.

! DECC. *Electricity Generation Costs 2013.* July 2013. p.66. The £ actual numbers for combined UK solar development and construction costs are given, as are the actual number for operations costs.

≈ Department of Energy and Climate Change. *Electricity Market Electricity Market Reform. Review of effective tax rates for renewable technologies.* July 2013. p.39. gives a typical debt equity ratio for onshore wind as 70:30 and 15 year loans at 6.5% interest rate. Similar values are assumed for solar.

═ Department of Energy and Climate Change. *Electricity Generation Costs: 2013*. July 2013, p. 45 reports a pre-tax real weighted average cost of capital for large scale (5MW+) solar projects that rely on Renewables Obligation Certificates of 6.2%. Assuming inflation is 2% that equates to 8.3% pre-tax weighted average cost of capital. To convert to a post-tax number there is a need to multiply by the technology specific Effective Tax Rate (ETR) which for solar is 12% (Department of Energy and Climate Change. *Electricity Market Electricity Market Reform. Review of effective tax rates for renewable technologies.* July 2013. p.31) to give a post-tax weighted average cost of capital of 7.3%. As the debt equity ratio is 70:30 and debt costs 6.5% this equates to a cost of equity of approximately 9.3%.

° 2015 corporate tax rates are sourced from KPMG's Corporate Tax Rate Tables available at http://www.kpmg.com/Global/en/services/Tax/tax-tools-and-resources/Pages/corporate-tax-rates-table.aspx

The IRENA UK wind data, and IEA solar (<1MW) data is presented (converted into £s), along with the data that is used in this analysis which for:

- Wind cost data is drawn primarily from a publication by Renewable UK and DECC reports on the costs of finance. The Renewable UK data comes from a database held by Biggar Economics;
- Solar cost data is drawn primarily from different DECC publications for 5MW+ solar ground mounted projects.

It is noticeable that the Renewable UK wind costs are higher than the IRENA data, but the IEA solar costs are much higher than the DECC data. Interestingly, the IEA solar report also presented combined construction and development costs for utility scale (1MW+) solar projects at $1,900,000/MW[29], which equates to a cost per MW of £1,225,000/MW still higher than the DECC cost of £1,000,000/MW. This could be because the IEA report presents 2013 data, and the DECC report 2014 data and the costs of PV units have continued to fall.

## 3.2 Community led RES projects

As explained in the **Methodology Chapter of the Main Report**, the cost data for community led RES projects was gathered via stakeholder interviews.

### 3.2.1 Interview process and initial results

A number of sector level organisations were initially contacted to obtain a list of community leads as this was considered the approach that may result in the most accurate cost data being obtained in the short time available. These were Waste Resource Action Programme (WRAP), DECC, Centre for Sustainable Energy, Energy 4 All, Countryside and Community Research Institute, Co-operative and Mutual Solutions and Community Energy England.

The majority of the community group contact details provided by these organisations were for projects at the development stage or were for hydropower projects. Any projects at the developmental stage were excluded as final actual construction costs are not available. Therefore, the focus was on already commissioned projects, or community projects that were already being built and are anticipating commissioning in the next few months.

We also excluded hydro projects as cost data is very site dependent. Therefore, we focused on contacting the community organisations with wind and solar projects that were operational or in construction.

We were successful in speaking directly to seven English and Welsh community organisations that have built wholly owned community projects, some of which have developed a number of different projects, giving 17 projects. The interviews were held with each of the community groups after they had received the questionnaire to ensure consistency across the data provided.

Scottish data on 6 community projects and one English wind project was gathered from ClimateXChange. This gave 24 projects in total, summarised in Figure 8. In addition to the 24 projects we were able to obtain data for two shared ownership projects, both wind projects with in total 4.4MW under community ownership.

**Figure 8: Summary kW capacity of the 24 community projects**

| | Project Scale (kW) | Number of projects |
|---|---|---|
| Wind - 9 | <100 | 1 |
| | 100-500 | 3 |
| | 500-1,500 | 3 |
| | 1,500 – 5,000 | 1 |
| | >5,000 | 1 |
| Solar Roof – 14 | <50 | 12 |
| | 50 – 500 | 2 |
| Solar Ground – 1 | 1,500 – 5,000 | 1 |

The projects were commissioned at different points in time, with the split of the 24 projects being shown in Figure 9.

[29] IEA. *Technology Roadmap. Solar Photovoltaic Energy.* 2014 edition, p.15

**Figure 9: Commissioning dates of wind and solar projects**

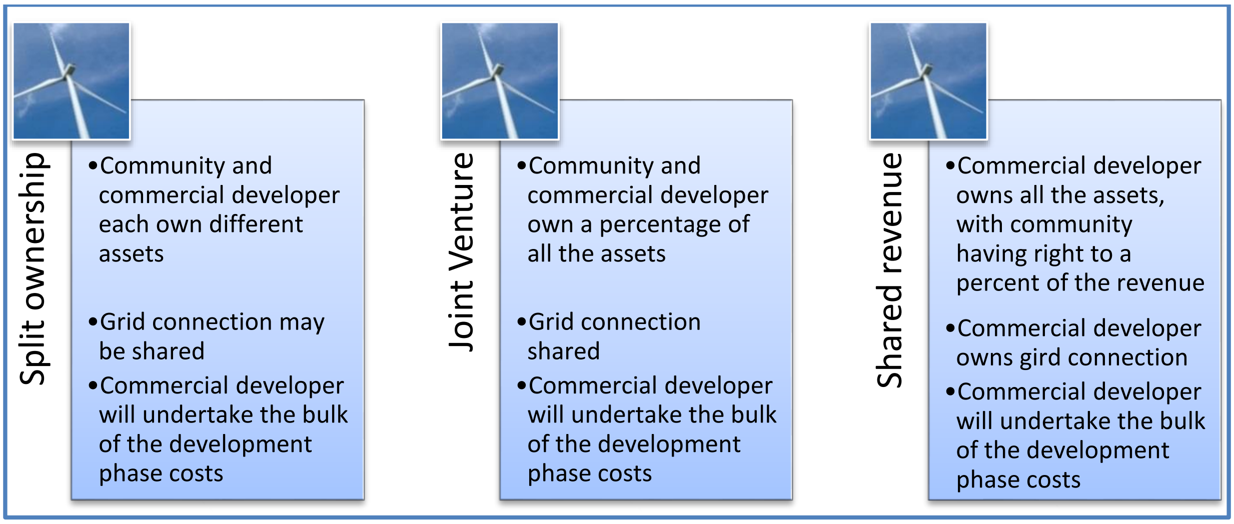
| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|
| Wind | 1 | 1 | 0 | 2 | 3 | 2 |
| Solar | 0 | 1 | 3 | 3 | 2 | 6 |

The geographic split was 8 of the 9 wind projects were in Scotland and all the solar projects were in England, with 14 in the south of England and one in the north of England. This matches the fact that Scotland has the highest number of wind projects, given its high wind resource, whereas the south of England has the best levels of solar insolation.

## 3.3 Shared ownership solutions

In the UK we were able to collect data from projects using two different shared ownership models. The three models are summarised in Table 4 and explained in further detail below:

**Table 4: Three different shared ownership models**



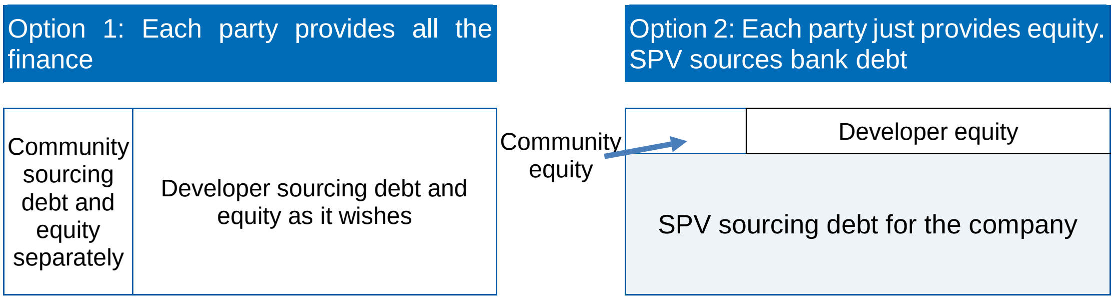

i. **Shared revenue.** Here the commercial developer owns all the assets, with the community having a right to a percentage of revenues or net revenues (i.e. revenue less operating costs but before any interest payments and dividend payments). The community has no shares and therefore cannot vote on issues, although the commercial developer may well involve them in discussions. The community will have to raise all the finance for their share of the revenues they are purchasing.

ii. **Split ownership.** At the opposite end of the spectrum is split ownership. Here a commercial developer may approach a community and ask if they want to buy some of the assets, so that the community and commercial developer each own different assets. For example, the community may own 20 solar panels and the commercial developer 80 solar panels. There is likely to be an interparty agreement on sharing the grid connection and sharing the operating costs (e.g. maintenance), but for all other intents and purposes the assets are separately owned. Like the shared revenue model the community will have to raise all the finance for the assets they are buying from the commercial developer. Another scenario could be that a community decides to build a solar farm, and asks a commercial developer if it wishes to buy some of the solar farm from it. Either way, it is likely that one party will pay for the bulk of the development costs, will negotiate the purchase of assets and act as the project manager.

The split ownership route is becoming more and more common where communities and a commercial developer build two 5MW solar projects adjacent to each other to benefit from the 5MW + 5MW shared grid connection arrangements.

iii. **Joint Venture.** Lying in between shared revenue and split ownership is the joint venture. Here each party owns a percentage of the assets, with the company set up as a Special Purpose Vehicle (SPV). There are two structures, one where each party sources all the debt and equity for its share of the assets (Option 1 in Table 5) and the other (Option 2 in Table 5) where the SPV secures the debt for the project (e.g. for 75% of the costs) and the community and developer then inject a smaller equity amount.

**Table 5: Different joint venture structures**




The community will have voting rights, and there may be addition shareholder protection for any minority interests. Whereas in the split ownership model the community own identified assets (e.g. 20 solar panels or one wind turbine), in a joint venture all the profits are shared. This means that rather than the risk of specific assets failing (e.g. the 20 solar panels in the above example) is reduced.

Each of the three options has its own particular challenges for communities to finance, notably:

- **Shared revenue.** As the community does not '*own*' any assets commercial banks are extremely unlikely to lend money to the community as the bank will have no step in rights. Further the bank would need to undertake due diligence not only on the project (e.g. the manufacturer of the renewable assets and the installer, the maintenance company and warranties on the assets), but also on the financial strength of the other party. The community will therefore need to rely on grants, community share offers and debt from other lenders (e.g. Government supported banks or social enterprise funds) who may act as subordinated debt, or mezzanine debt financiers[30].
- **Split ownership.** As the community owns outright specific assets commercial bank financing is possible, although there may sometimes be issues over sharing grid connections, the transfer of warranties and sharing maintenance costs. The other challenge with split ownership is the community will own defined assets, e.g. one wind turbine, and there is a risk that the turbine could be defective. This is no different to a community just building one wind turbine itself, but community investors may feel aggrieved if their wind turbine breaks down more often that the other turbines on the site, or their turbine does not create as much power as better sited turbines in the windfarm.
- **Joint venture.** Like Shared Revenue, under Option 1 (each party provides all their finance) the community will need to rely on grants, community share offerings and other subordinated debt or mezzanine debt lenders (e.g. Government supported banks) rather than on commercial bank lending. There will be many inter-creditor issues if different banks are involved, especially around which lender will have the first right to the security in the event of default. Using subordinated debt/ mezzanine debt for a joint venture was achieved on the Neilston Community Wind project, explained in in Case Study 1.

  Inter-creditor issues can be resolved if the lender to the community and the lender to the developer are the same, and both seek similar debt/ equity gearing ratios, as that in effect is the Option 2.

[30] In the event of a project default subordinated debt holders get paid back their debt only once the senior bank loan has been repaid. In that sense they are subordinated, and will therefore commonly demand a higher interest rate than senior bank loans. Subordinated debt is sometimes also called mezzanine debt.

**Case Study 1: Neilston wind**

Carbon Free Developments Ltd formed a joint venture with Neilston Development Trust Trading Ltd (the trading subsidiary of the Neilston Development Trust) to develop a four turbine 10MW wind farm. The project was structured as an Option 2 Joint Venture, with the Cooperative Bank providing debt finance for more than 75% of the project costs.

Neilston Development Trust Trading Ltd purchased 28.3% of the shares in the Joint Venture and, rather than undertaking a community share offer was able to secure £950k of loans from Social Investment Scotland (a social enterprise founded by the Scottish Government and five commercial banks), Charities Aid Foundation, Big Issue Invest and West Scotland Loan Fund who were comfortable with the higher risk of being subordinated lenders to Cooperative Bank.

The structure was designed to ensure that the Neilston community could subscribe on identical terms to Carbon Free.

Carbon Free Developments funded the technical, development, planning and construction aspects of the project, and NDT contributed community consultation and press relations. Governance of the development is shared jointly.

**Sources**: http://www.neilstonwindfarm.org/ourwindfarm.html

Department of Energy and Climate Change. *Guidance on community ownership models under the Feed-in Tariffs scheme.* March 2015.

Therefore in summary for communities there are three main shared ownership issues to consider:

- How much can the community raise itself? With the shared revenue and joint venture structures communities will tend to be reliant on grants, community share offers and subordinated debt (may be from social lenders). To date the largest community share offer is believed to have been the £3.75m Westmill Community Share offer in Oxfordshire for their £7.6 million wind farm.[31] That puts a cap on the equity investment injection, although if communities can find subordinated/ mezzanine debt lenders, this will increase the amount that can be invested. One respondent stated that in today's market achieving a community share offer of £1 million is comparatively easy, £2 million is harder unless the area is affluent and above £2 million requires a very dedicated community.
- Which legal structure is best for the community, which will also involve a consideration of which is the cheapest to structure? The cheapest to structure is the shared revenue, as the community is just buying a share of the revenue. As explained above, the due diligence costs and inter-creditor agreement costs for commercial banks for joint venture projects are likely to be prohibitive, making split ownership more attractive for larger deals that cannot secure sufficient community shares and subordinated loans.
- Some developers are very open in sharing their financial models (and from the outset agree to the principle that the community should be able to get a return very similar to the return it will make), but other developers ask communities to quote a price for purchasing the defined assets (split ownership), a certain percentage of the project (Joint Venture), or the right to a certain percentage of the revenue. In these latter cases the community needs to determine how much it thinks the commercial developer will have spent for the whole project (both on the development phase and the construction phase), project future revenue and cost streams and offer a price. This will require an understanding of valuing assets, and skills in negotiating an acceptable price.

[31] http://www.westmill.coop/westmill_windfarm.asp?ID=WST0 and http://www.westmill.coop/westmill_newsdetails.asp?newsID=21

## 3.4 Results from financial modelling

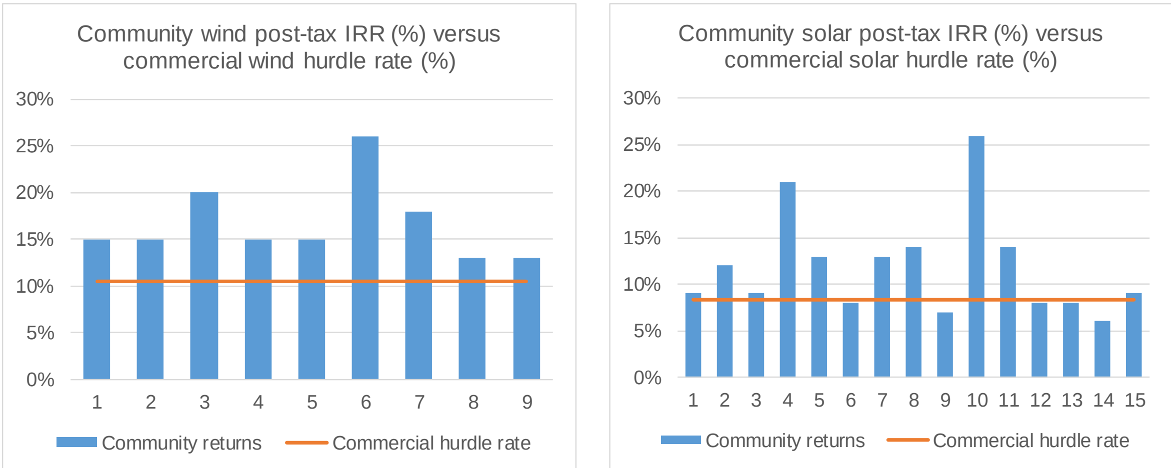
As explained in the **Methodology Chapter of the Main Report** the numerical values from the interviews were entered into the bespoke financial model to estimate the profitability of community projects. The profitability of community projects was then compared to the equivalent profitability of commercial projects. Because community projects are structured differently from commercial projects the definition of 'profitability' may seem incongruous. For example, most UK community energy projects are part financed with loans and part financed with a community share offer. After paying off the operating costs, the loans and the community shareholders the remaining 'profit' is gifted tax-free for community benefit activities. However, commercial projects will normally be part financed by loans and part financed by equity, with the profits after operating costs, taxes and loans have been repaid being paid to the equity holders. For this reason, the most appropriate comparison metric is the pre-tax pre-finance Internal Rate of Return (IRR) - essentially the profits available to repay the various financiers (whether that be banks, community shareholders, equity investors or money for community benefit).

As a comparison, the DECC report on electricity generation costs in 2013 gives commercial wind pre-tax Internal Rates of Return of 10.5%[32]. The equivalent pre-tax Internal Rate of Return for large scale (5MW+) solar is 8.3%[33].

### 3.4.1 Community results

The results from the modelling of the wholly owned community projects are shown in Figure 21 and Figure 22 in Appendix 2, with the post-tax Internal Rates of Return (IRRs) for each of the 24 projects shown in Figure 10. The community projects we gathered data for were all structured to be exempt from corporation tax, some organisations achieving this by gifting their 'profits' to a community benefit charity. Therefore, the pre- and post-tax pre-finance IRRs are identical for the community projects surveyed.

**Figure 10: Community wind and solar post-tax pre-finance IRRs versus commercial pre-tax hurdle rates**




It is noticeable that the post-tax IRRs for all nine wind projects (highlighted in light blue in Figure 21 in Appendix 2) pass the commercial hurdle return of 10.5% hurdle, meaning they would be financially attractive to commercial developers.

Likewise, 10 of the 15 solar projects pass the commercial hurdle rate of 8.3% (highlighted in light blue in Figure 22 in Appendix 2) would be attractive to commercial developers. What is noticeable is that only seven of the 15 projects comfortably pass the commercial hurdle rate, meaning a commercial developer may drop them in the development phase if concerned about future FiT rates falling, or being offered with other more attractive projects.

[32] See Figure 6 with the explanation of the pre-tax IRR from the DECC report. Electricity Generation Costs 2013. July 2013.
[33] See Figure 7 with the explanation of the pre-tax IRR from the DECC report. Electricity Generation Costs 2013. July 2013.

The fact that 19 of the 24 community projects pass the commercial hurdle rate is evidence that the sample of community projects is self-selecting, i.e. the sample of community projects we obtained data for are likely to be successful and offer community benefits, and conversely weaker projects have not progressed. As stated in Section 3.2.1, this is evidenced by the fact that most of the community wind projects we secured data for were based in Scotland with its high wind resource, and 14 of the 15 community solar interviewees were from the South of England. However, even though from a returns perspective they would be attractive to commercial perspective, this is not to say a commercial developer would have invested in the project. This is for two main reasons:

- Commercial developers will have a choice of projects, so dropping marginal projects will be common;
- Commercial developers will want to focus on projects that give both a good return in IRR terms, but also in absolute £ sterling terms. Hence, small 250kW wind turbines, or a small 50kW solar installation are likely to be of less interest given the risk verusi reward pay off.

This therefore means that in some cases without the community engagement the project, or a similar project near that location, would not have gone ahead. This is especially true for the projects with a lower IRR, as they have a lower safety margin.

Due to the size of the sample it was also possible to compare the post-tax pre-finance project IRRs over the years the project was commissioned in. The results in Figure 11 do not show any clear picture, for example of post-tax pre-finance IRRs falling or rising over time. The Government's believed intention is that as the market matures the returns investors will be prepared to accept should be falling, but the results shown here indicate that they are not, but neither are they rising. For the solar projects all bar one of the fifteen projects were small (< 60kW), so a change in costs of a few thousand pounds could tip the returns significantly, so this conclusion has to be treated with caution.

**Figure 11: Post-tax pre-finance project IRRs for the 24 wholly community owned projects**

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | |
|---|---|---|---|---|---|---|---|
| Wind | 26% | 18% | 0 | 20%<br>13% | 16%<br>14%<br>15% | 15%<br>13% | |
| Solar | 0 | 6% | 21%<br>26%<br>9% | 9%<br>8%<br>8% | 13%<br>14% | 12%<br>9%<br>8% | 13%<br>14%<br>9% |

## 3.4.2 Shared ownership results

We were only able to obtain data from two shared ownership projects, one was a shared revenue model and another was a joint venture. Being a shared revenue or joint venture model it is not possible to determine what the project pre- or post-tax pre-finance IRRs would be as that would require access to the developer's financial model.

However, the effective equity returns on the shared revenue project are projected to be about 10%, whilst the effective equity return on the joint venture model is projected to be circa 24% (partly because the underlying project had a very high debt: equity ratio). Therefore the results are not directly comparable to the results for 100% community owned examples, and are highly dependent on the gearing. Given the small sample (2) limited conclusions can be drawn.

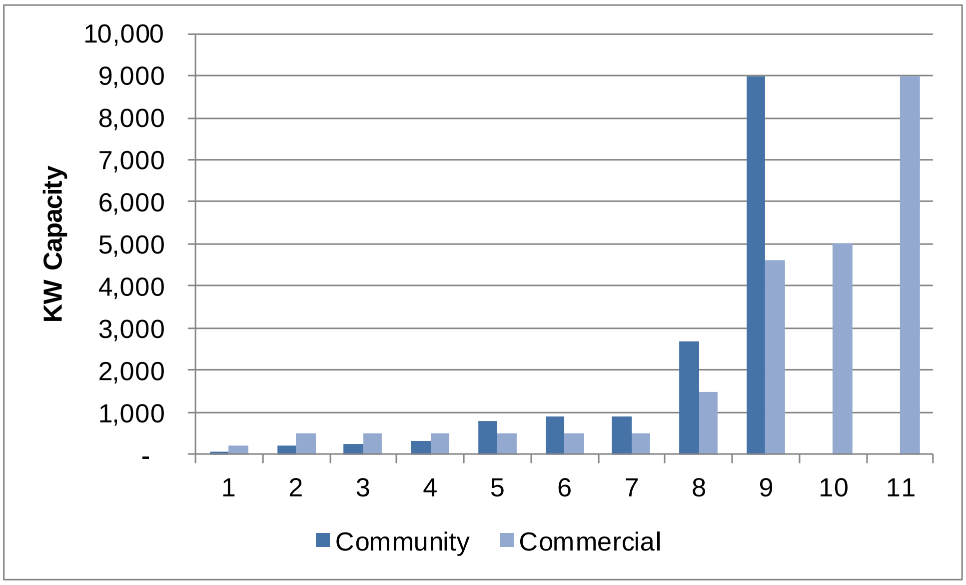
In the UK most shared ownership projects are developer led, i.e. a commercial developer undertakes the site investigations, secures planning permission and arranges grid connections, etc. Communities are often approached during the planning phase and asked if they wish to invest in the project, meaning that apart from the costs of raising finance (e.g. due diligence and arranging share offers) they do not need to spend money on the risky development phase. As stated in Section 3.3, communities are asked to either pay an amount for their investment, or are asked to offer a price for the investment, which will have to incorporate some of the development and construction costs.

As explained in Section 3.4.1, developers are able to conduct a wide search for sites so they will tend to select sites that are most attractive, whether that is because the site is attractive for reasons related to the energy resources (south facing and sunny or windy), are easily accessible, or near grid connections. Therefore, a presumption is made that commercial led investments will tend to make a higher return (which will be at least their own internal hurdle rate), when compared to 100% community owned ones, unless communities are able to finance their projects more cheaply or also locate their projects in attractive locations. Nevertheless, as shown in Figure 11 there will always be some community projects which will secure high IRRs, and the projected IRRs do not mean the developer or community will make those returns if development, construction or operating costs end up higher than anticipated or the electricity yield is less than assumed.

### 3.4.3 Commercial results

Through interviews the ClimateXChange project gathered data from a further 11 small to medium scale commercial wind projects, with a comparison of sizes of the nine community wind projects and the 11 commercial projects shown in Figure 12. As can be seen the projects are of a similar size and scale to the wholly owned community wind projects, making differences comparable. Being comparatively small scale quite a few of the commercial projects will have been developed by farmers.

**Figure 12: Comparison of kW capacity of community wind and commercial wind datasets**



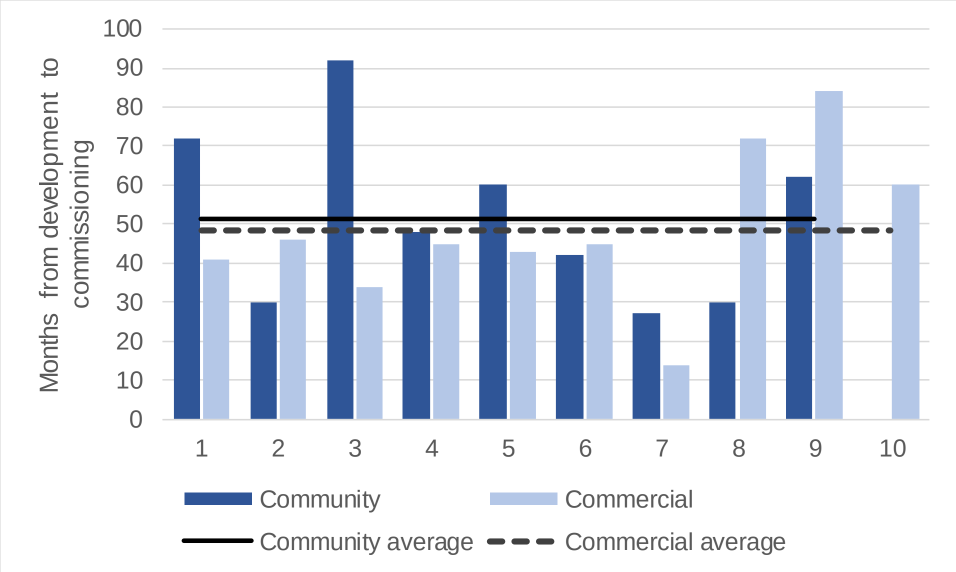

Source: ClimateXChange. *Comparative Costs of Renewable Development: Community vs Commercial Projects*. July 2015.

The authors state that for commercial costs in addition to interviews they obtained data from 'grey literature', including:

- BVG Associates. *Future Renewable Energy Costs: Onshore Wind.* 2014,
- Renewable UK. *Wind Energy in the UK: State of the Industry Report 2014*. 2014,
- Garrad Hassan. *UK Onshore Wind - the true cost now & in the future*. 2010, and
- Department of Energy and Climate Change. *Review of the generation costs and deployment potential of renewable electricity technologies in the UK*. 2011.

As many of the commercial projects will have been built by farmers it would be anticipated that they would face similar challenges to community wind projects, explaining why the time from the spending the initial money on feasibility studies all the way to commissioning is quite similar (51 months for nine community projects versus 48 months for commercial projects), as shown in Figure 13.

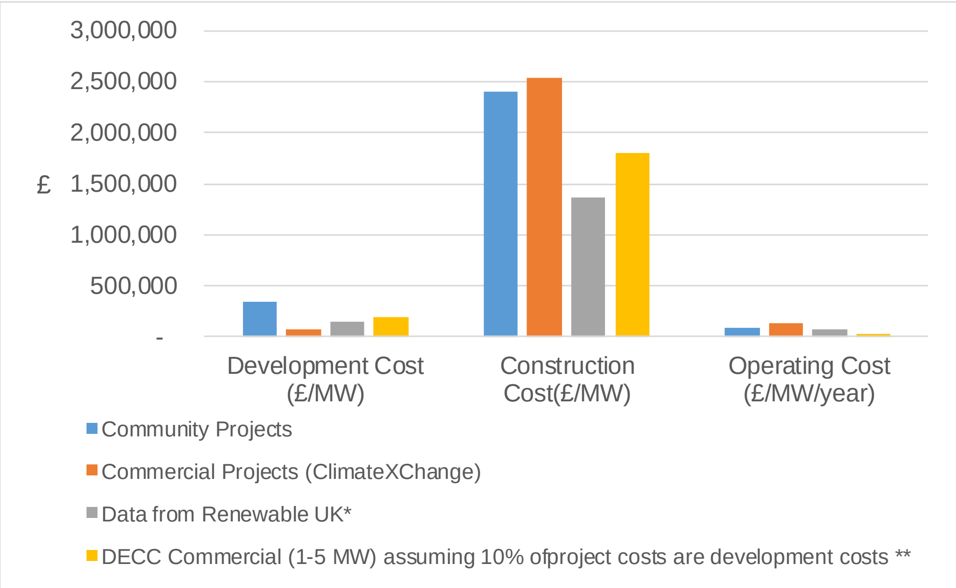
**Figure 13: Comparison of the time from project planning to commissioning for community v commercial wind projects**




Source: ClimateXChange. *Comparative Costs of Renewable Development: Community vs Commercial Projects*. July 2015.

To create some conformity the development, construction and operating costs were calculated as a cost per MW of installed capacity, and the results are shown in Figure 14. In this chart are also shown the commercial costs for wind projects (£/MW) from Figure 6 and the data from DECC's Electricity Generation Costs 2013 report showing the costs for commercial wind renewable energy projects of 1 – 5 MW.

**Figure 14: Average cost £/MW for 9 community wind projects and 11 commercial projects**




Sources: * Figure 6 ** DECC. *Electricity Generation Costs 2013*. July 2013. p.66.

Comparing the 11 small to medium commercial wind projects with the wholly owned community projects provides evidence that development costs, even excluding the 'free' professional time, will often be lower for commercial projects than community projects, but then backs up the hypothesis that community and commercial projects will have similar construction costs. This conclusion is validated by the ClimateXChange report that includes three pairwise comparisons of similar sized wind projects – see Figure 15.

**Figure 15: Results of comparing similar commercial and community wind projects**

| | Small single turbine project | | Medium single turbine project | | Large single turbine project | |
|---|---|---|---|---|---|---|
| Size | 225kW Commercial | 250kW Community | 500kW | 800kW | 1,500kW | 1,500kW |
| Ownership | Commercial | Community | Commercial | Community | Commercial | Community |
| Development costs (ex. 'free time') | £12,000 | £45,000 | £30,000 | £52,100 | £56,000 | £100,000 |

Source: ClimateXChange. *Comparative Costs of Renewable Development: Community vs Commercial Projects*. July 2015. Appendix C.

From Figure 14 it is noticeable that the 11 small to medium commercial projects had a much higher total project cost compared to the large scale commercial onshore wind projects and the commercial 1 – 5 MW wind projects. This is probably because 7 of the 11 commercial projects were less than 1MW.

**Other data analysis**

We were also able to review construction cost and operating cost data collected by DECC as part of its 2015 review of the Feed in Tariffs. This data breaks numbers down wind into projects of different capacities (<50kW, 50-100kW, 100-500kW, 500-1,500kW and 1,500-5,000kW). Whilst the details were confidential key observations on the data for wind projects are:

- Construction costs £/ MW collected as part of this study are not materially different from the construction costs £/ MW collected by DECC's review of the Feed in Tariffs; and
- Operational costs / MW appear slightly higher than DECC's data, but this could be because the ClimateXChange dataset was focused on collecting development and construction costs.

Against various capacity bandings (<4kW, 4-10kW, 10-50kW, 50-150kW, 150-250kW and 250-5,000kW) key observations on the data for solar projects are:

- Construction costs £/MW for solar projects are higher than DECC's Feed in Tariff review values, but can be explained by the fact that the costs £/MW for our data are at the lower end of each of their capacity bandings.
- Some of the solar projects we gathered data for were commissioned in 2011 and 2012, and solar panel prices have fallen significantly since then.

As the evidence of higher costs is mixed Question 20 of the questionnaire that was sent to the community organisations that have built wholly owned (i.e. not shared ownership) projects asked respondents to estimate how different the costs would have been for a commercial project of exactly the same kW capacity and exactly the same load factor (i.e. generating exactly the same MWh of electricity). The results from the six communities who responded to this question are presented in Figure 16. The number of responses for each option is shown in red.

**Figure 16: Community views of comparable costs for commercial projects**

| | | | | No answer | Overall |
|---|---|---|---|---|---|
| The time from concept to commissioning would have been | Quicker 1 | Similar 3 | Slower 2 | | Similar |
| Developmental costs would have been | Higher 5 | Similar | Less 1 | | Higher |
| Capital costs would have been | Higher 1 | Similar 5 | Less | | Similar |
| Installation/ construction costs would have been | Higher | Similar 5 | Less | 1 | Similar |
| Substation/ BoP costs would have been | Higher | Similar 5 | Less | 1 | Similar |
| Grid connection costs would have been | Higher 1 | Similar 4 | Less | 1 | Similar |
| Loans would have been | Cheaper 1 | Similar 1 | Dearer 1 | 3 | Uncertain |
| Equity finance would have been | Cheaper 3 | Similar 1 | Dearer 2 | | Cheaper |
| The amount of the loan would have be | More 1 | Similar 1 | Less | 4 | Uncertain |

The main messages from the community respondents are:

- Communities thought that development time would be similar to commercial scale projects. This goes against the evidence presented by ClimateXChange[34] and the values presented above. This could be because 12 of the 24 projects were small sub-50kW solar installations, which have fewer constraints to financing (because of their comparatively low cost) and less complex requirements to obtain planning permission and grid connection;
- Development costs would have been higher, which again goes against the information presented by ClimateXChange and the values presented below. The reason we believe development costs are higher is that communities may not appreciate how much quicker commercial entities can develop projects, and even though they won't benefit from people giving their time freely, they will still be able to develop projects quicker.

  Importantly, communities welcomed the longer pre-accreditation periods for two reasons:
  - As evidenced, community projects often take longer to develop and get commissioned than commercial developers, and
  - More importantly, communities have no or few financial resources to be able to pay for early grid payments, wind turbine deposits, and then the construction costs. Without FiT pre-accreditation, commercial banks and other subordinated debt/ mezzanine lenders are particularly reluctant to lend any money for specific post-planning pre-financial close costs that often are required for bigger (50kW+) projects such as deposits for long lead items (e.g. wind turbines) or grid connections. Commercial organisations on the other hand, may be able to use their own monies to pay for these post-planning pre-financial close costs. As well as lenders being reluctant to engage, there is also evidence that wind turbine and solar panel manufacturers are reluctant to enter into discussions over ordering equipment and getting deposits until they have confidence that the equipment will definitely be required.

  Regarding free time given to community projects, as well as communities having meetings which people attend in their own time, community projects often benefit from professionals who give their time freely to help develop the projects. A number of communities, particularly those in Scotland and Wales (but not in England), benefited from having a paid development officer who helped take forward the project. This is at no cost to the project, but a cost to the taxpayer.

[34] ClimateXChange. *Comparative Costs of Renewable Development: Community vs Commercial Projects*. July 2015.

In the questionnaire we sent to communities we explicitly asked communities to estimate how many days of professional time were given freely. To these numbers (which ranged from 10 days to 1,670 days) we applied appropriate daily rates, which we valued at £120 a day, unless the community gave us other information. The results for solar and wind are shown in Figure 17, which illustrates that with simpler small scale solar projects free professional time is a very significant contribution in percentage terms, but for more complex wind projects the 'free' professional time is estimated to be worth about 25%. As shown in Figure 17 it is noticeable that one wind project had a very high value ascribed to free professional time (217%), but this is because this project took six years from development start to commissioning.

**Figure 17: Importance of 'free' professional time as a proportion of invoiced development costs**

The following tables show:

- The value of free time, given by members of the community group, development officers, helplines etc.
- The value invoiced development costs (e.g. for legal advisers, wind studies, project management, etc.).

**Solar**

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Capacity (kW) | 50 | 39 | 10 | 30 | 10 | 10 | 10 | 10 | 10 | 60 | 60 | 33 | 14 | 4 | 4,980 |
| Free time | 4,980 | 1,200 | 2,040 | 3,600 | 3,600 | 3,600 | 3,600 | 3,600 | 3,600 | 12,000 | 7,200 | 15,600 | 6,000 | 6,000 | 9,000 |
| Priced costs | - | - | - | 1,000 | 500 | 30 | 30 | 30 | 250 | 800 | - | 9,000 | 3,500 | 2,500 | 540,000 |
| Free as percent of priced | No priced cost | No priced cost | No priced cost | 360% | 720% | 12000% | 12000% | 12000% | 1440% | 1500% | No priced cost | 173% | 171% | 240% | 2% |

**Wind**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Capacity (kW) | 2,700 | 50 | 225 | 250 | 910 | 900 | 800 | 330 | 9,000 | 2,700 |
| Free time (£) | 157,200 | 4,500 | - | - | 158,338 | - | 105,000 | - | - | 157,200 |
| Priced costs (£) | 718,000 | 18,600 | 3,500 | - | 218,799 | 712,600 | 51,000 | 362,000 | 236,000 | 718,000 |
| Free as percent of priced | 22% | 24% | 0% | No priced cost | 72% | 0% | 206% | 0% | 0% | 22% |

- All the construction period costs (capital costs, costs of installing the assets and connecting to the grid) are believed to be similar.
- The messages for the involvement of loan finance (both the interest rates and the gearing ratio) are unclear, although oddly participants thought commercial entities may be able to secure equity more cheaply. This goes against the data presented by communities that they are often able to secure community shareholders at competitive rates from 4-6%, compared to the 15.5% (wind equity hurdle rate) and 9.3% (solar equity hurdle rate).

  However, two respondents said that in their experience commercial banks are prepared to lend to commercial organisations at higher debt: equity ratios (e.g. 70:30 versus 50:50) and also at interest rates 1% lower. These opposing forces of cheaper equity but more expensive debt creates a cost of finance that is actually quite similar for community versus commercial ventures, as shown in the following post-tax Weighted Average Cost of Capital (WACC)[35] calculations assuming community investment requires a 50% gearing at a 5.5% interest and a 5% community share offer, versus a commercial investment with a 70% gearing at a 4.5% interest rate and a 9.3% equity return.

[35] The WACC is ( gearing x interest rate ) + ((1-gearing) x required equity return)

| WACC for community project | | WACC for commercial project | |
|---|---|---|---|
| (50% x 5.5%) + (50% x 5.0%) = | 5.25% | (70% x 4.5%) + (30% x 9.3%) = | 5.94% |

In conclusion, drawing together the data we collected, the ClimateXChange data, the data we obtained from the DECC review of Feed in Tariffs and other DECC data, the main message is that development costs are higher for community projects than commercial projects, but operating and construction costs are not significantly different. This message is nuanced like it is, because the data we gathered for community projects spanned five years, and had a small sample size.

This message is consistent with the ClimateXChange project's findings.

*"Community renewable energy projects are a relatively young phenomenon in Scotland, and trend data suggests that average sectoral costs (in £/MW terms) have declined over the past two decades. However, other than the community project costs being distinctly more variable, we found no statistically significant differences between average total project costs across ownership models for any one given capacity band……….*

*Community organisations spend from 25% to 275% more at pre-planning stages, despite significant contribution of volunteer days. Pre-planning costs typically account for a minor proportion of total project costs, which is why we would not expect to see this inter-sectoral cost difference reflected in the aggregate cost data above. Nevertheless, policy support for pre-planning is crucial, as most projects require planning permission to proceed, and debt- and equity- finance are typically unavailable for this risky development stage."*

Source: ClimateXChange. *Comparative Costs of Renewable Development: Community vs Commercial Projects*. July 2015, pgs.4 and 20.

From the 24 wholly owned community projects that data was obtained for, five would not have passed the hurdle rates required by commercial investors and another three projects have returns very close to the commercial hurdle rates. As the range of returns commercial developers make above their target hurdle rates are unknown, it is not possible to definitively say that community projects have less financial headroom (e.g. if generation income is lower than expected or operational costs increase then rates of return will fall below hurdle rates) than commercial projects, but a case could be made that this is the case, especially for small sub 50kW solar projects.

# 4 Responses to research questions

The main messages from the qualitative research questions are:

- Communities are often constrained in where they can develop their project, so will normally be developing renewable projects in sub optimal situations which to be profitable require grants, free time given by local community members, attractive loans, or to find other innovative ways to support the project, like selling the electricity at retail as opposed to wholesale prices to local consumers;
- Some community developers have done more than one project, and have definitely been able to do the second project more quickly, although not necessarily reducing the development costs. This is significant because the quicker projects can be commissioned, the higher the FITs that can be secured, and therefore the more profitable community projects can be;
- Communities tend to be very risk averse, and are reluctant to invest community monies until there is certainty that the project will go ahead. This makes the raising of finance to get to the point of certainty very challenging, which is where the development cost grants and attractive loans have been very effective;
- Even with FiT pre-accreditation securing finance for post-planning pre-financial close costs on larger (50kW+) projects is difficult, e.g. to pay for grid or wind turbine deposits;
- Evidence of higher construction or operating costs is not definitive.

The detailed questions and a summary of the responses follow.

## 4.1 Cost components for different ownership options (community-led, shared ownership and fully commercial)

As shown in Figure 18, all models of ownership (community-led, shared ownership and fully commercial) will have similar costs to develop projects, with the exception that:

- Community organisations will often have considerable costs involved in community engagement, and if a community share offer is released, all the additional costs for launching the share issue. In comparison, depending on how commercial developers are financed, some may be able to finance projects on their own balance sheet (e.g. large utilities), others will use profits from previous projects whilst others will also need to raise equity;
- Community projects in the UK can normally be structured to be tax exempt, with all 'dividends' flowing to the community as a tax-free community benefit;
- The exact split between costs faced by communities and commercial developers in shared projects will depend on the actual project arrangements. However, indications are that with shared ownership options the community will often be brought in later into the project, so will not incur the initial feasibility costs and planning permission costs. It is also likely that the communities' project management and other advisory costs will be lower as their main cost will be around trying to secure the necessary finance.

**Figure 18: Different costs faced by different ownership models**

| | Community | Shared community involvement | Shared commercial involvement | Commercial |
|---|---|---|---|---|
| *Development costs* | | | | |
| • *Initial feasibility* | ✓ | × | ✓ | ✓ |
| • *Planning permission preparation* | ✓ | × | ✓ | ✓ |
| • *Project management costs* | ✓ | ✓ | ✓ | ✓ |
| • *Other advisory* | ✓ | ✓ | × | × |
| • *Community consultation* | | | | |
| *Construction costs* | ✓ | ✓ | ✓ | ✓ |
| *Operations costs* | ✓ | ✓ | ✓ | ✓ |
| *Taxation costs* | × | × | ✓ | ✓ |

Communities often benefit from 'free' volunteer time, so adding the actual costs had the 'free' volunteers' time been paid will significantly increase the total costs.

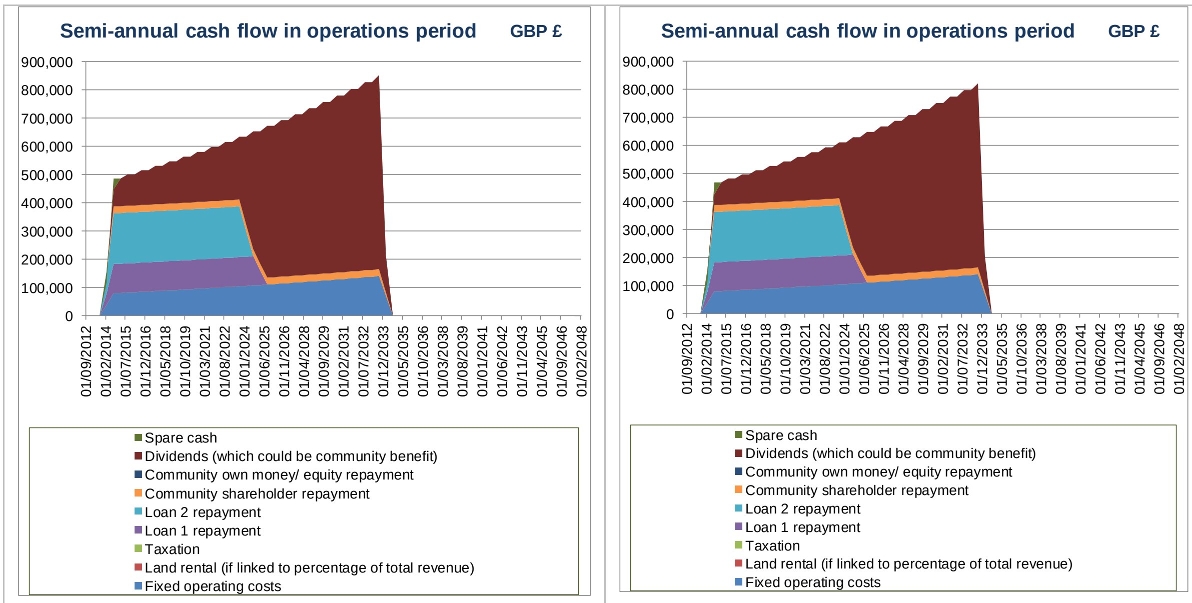
## 4.2 External factors that can affect the costs of community-led and shared ownership projects

The main policy factors that impact the costs of community-led renewable energy projects are mostly around grants/ attractive loans being available to assist with the development costs and the tax breaks that reduce the cost of finance. There are two specific incentives within the FiT structures encouraging community projects, namely the longer pre-accreditation periods and the ability to have another project of up to 5MW sharing the same grid connection (which is a particular incentive for split ownership projects). As FiTs are falling (degressing) all the communities interviewed said that projects that a few years ago at concept formation were going to be profitable, are now with lower FiT rates becoming more marginal. Alternatively previously projects may have been able to give the electricity generated for free to impacted communities, but now with degression these communities are having to be charged for the electricity generated. However, this declining profitability is no different for commercial developers.

Figure 19 is an example of how one of the community wind projects (which is actually the example given in **Table 5 in the Main Report**) would have been affected had there been two further FiT degressions of 3.5% followed by another 3.5%. As can be seen the post-tax pre-finance IRR will fall from 16.3% to 15.5% and dividends for community benefit will fall by nearly one million pounds. **Whilst this example still gives a seemingly acceptable post-tax pre finance return of 15.3%, even with this small fall in revenues it may not actually be financeable as the ratio of cash flow available for debt finance to the interest and principal repayments in the early years is low (about 1.30) which may not be acceptable to bank lenders[36].**

[36] The ratio of Cost Flow Available for Debt Service (CFADS) to debt repayments is commonly known as the Debt Service Cover Ratio.

**Figure 19: Example of the impact of six month longer project on returns**




| | |
|---|---|
| **Total dividends = £14.5 million** | **Total dividends = £13.6 million** |
| **Post-tax pre-finance IRR = 16.3%** | **Post-tax pre-finance IRR = 15.5%** |

## 4.2.1 Grants and attractive loans

There are many grants available for community projects (e.g. government grants and Big Lottery grants), especially grants to assist with finance for the development phase. This is in part due to the fact that public grants are not compatible with FIT support and also that the greatest challenge for communities is at the development phase, due to the risk that the project may not proceed.

There are also attractive loans to cover the development phase, for example the CARES scheme in Scotland offers loans of up to £150,000 at a 10% interest rate to cover the pre-planning phase, if the project doesn't proceed for valid reasons the Scottish Government will write off the loan. The UCEF and RCEF development phase attractive loans charge a one-off 45% interest charge.

Although grants and attractive loans are appreciated by communities, the process for applying for grants can be time consuming and the amount of the grants and loans is sometimes insufficient to do a proper job, meaning further studies are needed later on when it is realised the reports prepared are insufficient for banks to lend money on. Further, some grants will only allow monies to be spent on certain activities and the grant only released when the activities are done. This wastes valuable time as often other activities could be happening in parallel, but development is put on hold as there is insufficient money. This constraint was mentioned by three of the communities.

The CARES scheme has tried to partially overcome these impediments by:

- Having lists of legal, financial and project management professionals with knowledge of the community renewable energy market;
- Having 'how to' guides and handbooks explain to communities all the processes required to develop a successful project in a clear and sequential order whilst making it clear which processes can be progressed at the same time;
- Having an indicative project finance model to help communities understand the financial returns they may be able to make; and
- Having an Investment Ready Tool – a checklist of the common due diligence and evidence required by banks and other financiers in order to streamline the loan application process.

All these ultimately tools aim to reduce the time communities take to develop projects, and with that the costs of developing projects, as projections do not need to be continuously updated. Reducing the time communities take to develop projects also means that they can achieve commissioning quicker and with secure and higher FiT rates, given the regular degression of FiT rates (as shown in Figure 19).

With the success of the CARES programme some of these approaches are being adapted for the English and Welsh support programmes.

Another challenge sometimes faced with Government grants is compliance with EU State Aid rules, which could mean that communities that have already accessed some grants are unable to access other grants. One community wind developer raised this as an issue.

### 4.2.2 Access to post-planning, pre financial close monies

One of the biggest challenges for communities is if grid connections (or deposits) need to be paid for before financial close or if equipment with long lead times needs to be paid for before financial close. Even for a 1 or 2 MW scheme these costs could often be £200,000 or £300,000. As stated in Section 3.4.3, whilst commercial developers will have working capital to cover these costs, communities have real difficulty paying these costs before financial close (when all the loan agreements and construction contracts are signed). Big Lottery grants of up to £100,000 are available to pay towards up front grid connection costs, although applying for these grants can take time, potentially delaying the construction commencement and with that putting pressure to meet the FiT pre-accreditation timeline. In Scotland the Renewable Energy Investment Fund (REIF), a Scottish Government initiative, is also prepared to lend money for pre-payments for equipment and grid connections. In England and Wales it is unclear how communities can access pre financial close monies to pay deposits on wind turbines for example, although some subordinated debt financiers may be able to lend.

### 4.2.3 Policy incentives reducing the cost of finance

Most community projects are structured to be exempt from corporation tax. As corporation tax is 20% this is a large avoided cost meaning the money available for community benefit is much larger.

As explained in Section 2.4.2, many community investments are also supported through income tax breaks to taxpayers. For a project financed 50% by a community share offer and 50% by a bank loan the tax breaks to taxpayers amount to a 15% of the cost of the project. Community share offers commonly offer investors a 4% - 5% return, before the tax breaks. However, the continued uncertainty around SITR was a concern raised by one of the communities interviewed.

### 4.2.4 Policy incentives increasing costs

Despite attempts to simplify legal structures in order to be able to be recognised as a community organisation there remains uncertainty amongst communities about the exact structures allowed, and also how the Financial Conduct Authority regard cooperatives. This uncertainty is adding to communities legal costs.

### 4.2.5 Negotiating strength of parties in shared ownership projects

As most shared ownership projects tend to be developer led, developers are likely to target those sites that generate the highest electricity amounts (i.e. those sites which have the highest capacity factors, whether that is south facing roofs/ land in sunny areas, or windy sites), and will not invest in projects unless they anticipate they can at least meet their hurdle rates of return.

If the developer offers the community an opportunity to invest then the terms of the deal will be relevant for the community. Different developers have different approaches, some providing ‘open book' access to their own models, allowing communities to invest on the same terms (*pari passu*), whereas other developers are less open in providing their information. The less information the developer provides the more time and expense communities need to incur to value their investment and negotiate acceptable terms with the developer.

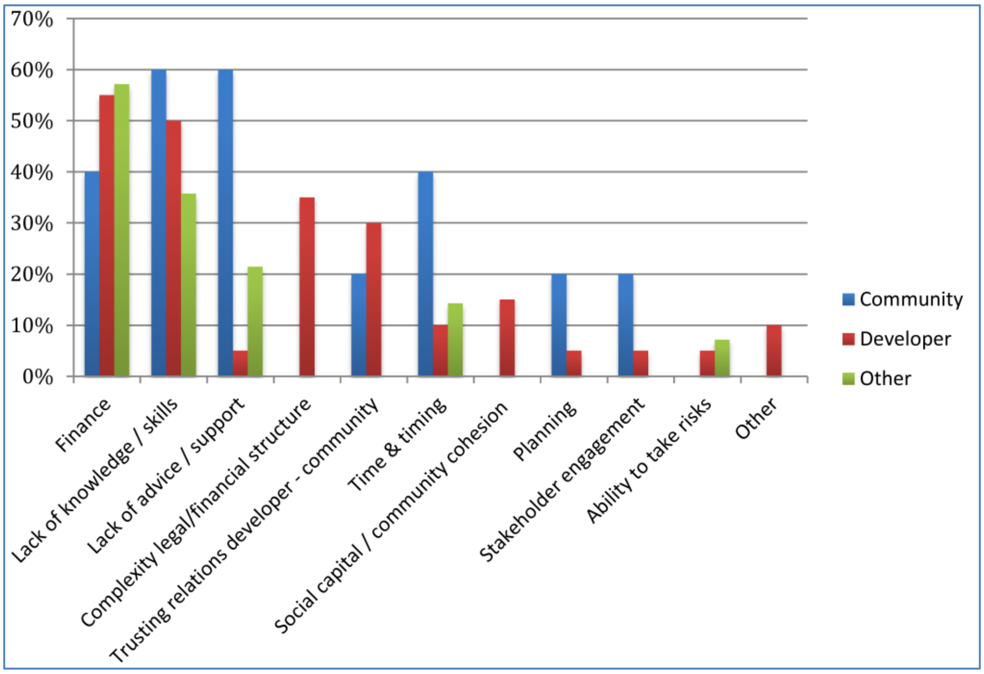
## 4.3 Constraints and related cost/ financing implications that only apply to community-led and/ or shared ownership projects

Yes, there are a number of specific constraints that will apply specifically to community-led and shared ownership projects, most notably the development costs namely:

- The lack of clear governance processes for community groups hinders decision making, as different people often hold different views or agendas for the project. Nevertheless, with an increasing number of community enterprises this is becoming less of an issue.

- Communities are risk averse, and will be reluctant to invest monies in a project until it is almost certain a project will go ahead. As stated, this means communities are reliant on grants which often take a long time to apply for, resulting in delays to projects, but also the grants are sometimes insufficient to finance development of all the information that banks and financiers require, resulting in further additional delays.
- Communities have very few financial resources. Therefore, there are times when commercial investors will be able to finance work streams (e.g. paying in advance of financial close a grid connection deposit, or paying for an environmental study) where communities do not have the money, which can delay project progression. This is why FiT pre-accreditation is seen as so important, as it can enable communities to secure bank loans from the likes of REIF in Scotland and engage with turbine and solar manufacturers.
- The perceived riskiness of community-led and shared ownership projects has deterred some financiers, such as banks. For example, one respondent stated that banks will lend at lower gearing ratios to communities rather than commercial developers as communities have little liquidity (e.g. 50% compared to 70%), although there are community deals with gearing ratios of 70% and more.
- Community groups are not able to raise finance quickly, which has hindered two of the communities interviewed from investing in other shared ownership projects, or from purchasing from commercial developers other projects that have already been commissioned. This is especially pertinent for shared ownership models, where the developer may need the community to invest say £5 million by a certain date as that is when the project is being built. This time pressure, and the difficulty in preparing community share prospectuses in time means that some shared ownership opportunities do not proceed. This difficulty is illustrated in a survey undertaken in Scotland on the difficulties in progressing shared ownership schemes – see Table 6.

**Table 6: Biggest hurdles in progressing shared ownership schemes**




Source: Haggett, C., Aitken, M., Rudolph, D., van Veelen, B., Harnmeijer, J. and Markantoni, M. *Supporting Community Investment in Commercial Renewable Energy Schemes: Final Report.* ClimateXChange. December 2014, p.25.

- From our research the average time from the development phase commencement to project commissioning was slightly longer (51 months versus 48 months for wind projects). However, larger scale commercial projects are likely to be able to develop projects even more quickly, meaning communities both have more development costs and are more likely to be adversely impacted by changes in Government rules and FiTs as exemplified in Figure 19.

- Developers are likely to have a number of projects under consideration, learning how to structure projects, whilst communities will often be developing only one project. A noticeable comment from those communities doing the second or third project is that they were able to develop their second and third projects much quicker.
- To undertake a renewable energy project of any size requires an understanding of many issues (e.g. planning permissions, securing finance and FITs, due diligence, project structuring, grid connections, finding the best turbine/ solar PV installation for the site), with communities until recently lacking guides on how to solve each challenge.
- With shared ownership models both parties have to come to an agreement, involving support from lawyers. Two communities interviewed said these legal fees can run to many £10,000's. If the project was just being undertaken by a commercial developer these costs would not apply.

## 4.4 Whether some of the cost components are invariably higher for community-led and/ or shared ownership projects

Yes, communities by their very definition are geographically located and will rarely be located in the best position to maximise wind yields or solar insolation levels. However, commercial developers, will often be able to widen their search to look for these optimum locations. So whilst the costs faced by commercial developers may be exactly the same, they may be able to site their projects in locations that can generate an extra 10% of electricity, and with that 10% more revenues. This is why community involvement (shared ownership) with developers can be attractive.

It is not only locations with high wind speeds or high levels of insolation that are appealing, it is also areas that are near electricity distribution and transmission grids and have no grid capacity constraints. However, many communities (especially in Scotland) are located in areas that are grid constrained. So they may progress with the project, even though a commercial developer would not want to get involved.

Using the Scottish ClimateXChange dataset for commercial wind projects, even though the commercial and community wind projects were of slightly different sizes (commercial being slightly bigger) the following messages come out (as shown in Figure 14 in Section 3.4.3):

- Development costs tend to be much higher for community projects, compared to commercial projects – about £340,000/MW compared to £70,000/MW for commercial (390% higher);
- Construction costs appear slightly lower for community projects than for commercial projects - £2,400,000/MW versus £2,550,000/MW (5% lower), though this is a small difference which may be due to the difference in samples;
- Operating costs are lower for community projects compared to commercial projects - £88,000/MW/yr versus £127,800/MW/yr (31%) lower. This could be because in some cases the community will own land, and so will not need to pay a land rental.

Even if there are slightly different methodologies in defining development costs, the message is still clear that communities have higher development costs compared to commercial developers.

It is noted that these costs are much higher than those for a large scale commercial wind farm quoted in the DECC report of £100,000MW for development costs, £1,500,000/ MW for construction costs and £44,610/MW/yr for operating costs.[37] The costs are also much higher than the DECC numbers quoted for 1MW-5MW commercial projects of £2,000,000/MW for construction and development costs combined and an operations cost of £29,600/MW/yr[38].

Another point that is partially relevant is that developers can get more profitable projects if they are able to sell the electricity generated directly to an end user, rather than to an energy supplier (e.g. EoN, Npower, SSE, etc.). So a commercial developer may find a way to sell 100% renewable electricity directly to a consumer, maybe receiving a price of 7 or 8p/kWh rather than the 5 – 5.5p/kWh from selling it to an energy supplier.

[37] DECC. *Electricity Generation Costs 2013*. July 2013. p.60
[38] Ibid. 66.

Deals such as these can be done through a third party netting arrangement or the Licence Lite route discussed in Section 2.4.2. It is a complicated market, so even though there is no hindrance to community developers trying to maximise their revenues, it may be a route that communities do not try to tap into. This complexity was mentioned by two of the communities interviewed, where the set-up costs for setting up such a solution outweighed the benefits. Whilst this would be the same for any smaller scale project a commercial developing building two or three small projects may be able to benefit from economies of scale.

## 4.5 Whether some of the cost components are invariably lower for community-led and/ or shared ownership projects

Yes, there are five main costs that are always, or often lower for community developers, notably:

- As stated, all the community projects interviewed were able to structure their projects to be corporate tax free, therefore avoiding this cost.
- Many community projects interviewed raised some of their money from a community share offer. For the reasons explained in Section 4.2.3 (page 27) the effective interest rates on community share offers tends to be between 4% and 5%, much lower than the hurdle returns required by commercial developers. For some retail investors these lower rates are only attractive because of the EIS, SEIS and CITR income tax incentives. Whilst some communities said that if the preferential tax treatment offered to taxpayers through EIS, SEIS and CITR was removed the viability of many of the projects would be called into question. However, this is debatable, as there have been a number of community share offers that have been oversubscribed very quickly.
- There is anecdotal evidence that on those projects that are part financed by a commercial bank ,and part financed by a Government supported bank (e.g. the Scottish Government backed Renewable Energy Investment Fund), that commercial lenders will offer terms that may be lower than those that would be offered to a commercial lender. This reduction may be partly real as there is anecdotal evidence that having a Government supported bank helps to resolve commercial issues, meaning again commercial banks are able to lend money at lower rates or become involved when they would normally not entertain small £1 million or £2 million loans. However the interest rate reduction may partly be just a change in the risk profile for the commercial lender because the Government backed bank will be acting as a junior lender or subordinated/ mezzanine lender, significantly reducing the commercial lender's exposure. As an example, a commercial bank may lend at 6% for a project with a 70:30 debt: equity ratio, but if a mezzanine debt lender was prepared to lend 20% of the money it may be prepared to lend at 5% for 50% of the project cost.
- Although the evidence is that community development costs are higher than those faced by a commercial developer the costs would have been even higher had volunteer time been charged for. Five communities said that without the volunteer time many projects would not have progressed. Two of the projects interviewed also benefited from a Government funded development officer that avoided some additional project management costs.
- As the project is a community led one often the community it may be able to rent land at much lower costs than a commercial developer could, in effect the landowner is giving the community extra profit by not charging a market rate.

## 4.6 Cost projections to 2020

The main cost for renewable energy projects are the construction phase costs. The IEA estimate that roof mounted solar projects' construction costs are forecast to decrease by 18.6% in real terms between 2015 and 2020[39].

There are no available data on operational expenditure costs, but they are likely to remain flat in real terms. Operational costs will include land rentals, insurance, cleaning and replacing inverters every 7-8 years. So whilst the costs of inverters will fall, it is likely that the other operating costs will remain similar, giving an overall similar cost profile.

For onshore wind projects, the IEA forecasts capital expenditure costs will drop at an annual nominal rate of 2.2%, due to a consistent reduction of wind turbine prices[40]. A report by KIC InnoEnergy estimates that operational costs are expected to fall by about 6% between 2014 and 2025. Therefore, an assumption is made that between 2015 and 2020 annual operational costs will only fall by 3% in total. This small reduction in costs is due to advances in maintaining wind turbines, although other operational costs (e.g. insurance, rentals, etc.) are likely to remain flat[41].

As a comparison, a UK report by RenewableUK estimates that the Levelised Cost of Energy (LCOE) for onshore wind will fall by about 4% a year between 2015 and 2020[42]. This LCOE will be made up of the total project cost (development plus construction costs), costs of financing and operating costs. Whilst Levelised Cost of Energy calculations can attribute costs of projects into the project costs, the financing costs, taxation costs and the operating costs they are normally underestimates of the price of electricity a generator can sell electricity at, as they do not consider the practicalities of financing projects, where debt financiers will often only lend for 10 years forcing the generator to sell electricity at a higher price to meet the early debt servicing obligations. Nevertheless, there is no reason not to say that the downward trend in prices for commercial projects will not be followed for community projects.

As with trends in construction costs, with the increasing maturity of the community renewable energy market, and the 'how to' guides now available, it is suggested that development costs should fall over time, but are unlikely to  get close of commercial developer's development costs due to economies of scale in progressing many projects at the same time.

## 4.7 Opportunities to reduce community-led and/ or shared ownership costs

Yes, there do appear to be opportunities for communities to reduce development costs (or secure higher revenue streams) in the future if they are able to develop a second or third project as:

- All interview respondents thought that they could develop the project quicker the second time round. Although this won't reduce costs, by developing projects quicker higher FiTs can be secured;
- Two of the eight respondents think they could develop a project more cheaply a second time, but the other six didn't think there would be many cost savings.

Whilst there are few examples of communities wanting to develop a second wind farm, there are plenty of examples of communities wanting to replicate small scale community projects.

[39] IEA. 2014. *Technology Roadmap – Solar Photovoltaic Energy.* 2014, p. 23 (Figure 11). Retrieved from: https://www.iea.org/publications/freepublications/publication/TechnologyRoadmapSolarPhotovoltaicEnergy_2014edition.pdf
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[41] KIC InnoEnergy. 2014. *Future Renewable Energy Costs: Onshore Wind*. Retrieved from: http://www.kic-innoenergy.com/wp-content/uploads/2014/09/KIC_IE_OnshoreWind_anticipated_innovations_impact.pdf
[42] RenewableUK. 2015. *Onshore Wind Cost Reduction Taskforce Report*. Retrieved from: http://www.renewableuk.com/en/publications/index.cfm/Onshore%20Wind%20Cost%20Reduction%20Taskforce%20Report

Even where communities only build one project the 'how to' guides and handbooks developed by CARES and Scotland and being replicated in England and Wales were seen as very useful documents to help reduce development costs. Three respondents also said that sharing good practice such as through forums such as Community Energy England and regular events such as the CARES conference are invaluable.

"*On the basis of field experience, we would point to several dominant policy and non-policy drivers that we think have exerted a downward pressure on the average cost of Scottish community renewables, through both 'Learning by Doing' and 'Learning by Research' effects. On the policy side, the delivery of support mechanisms for community renewables (e.g., SCHRI and CARES) has evolved dynamically in response to challenges facing the sector, driving costs down over time. Examples of policy innovations include improved due-diligence processes implemented during the assessment of CARES loan applications; the introduction of a £10k CARES 'Start-up Grant' scheme; and the introduction of a project management procurement framework. Non-policy drivers include the increasingly important role of intra-sectoral (that is, inter-community) learning as the number of Scottish community renewables projects has grown."*

Source: ClimateXChange. *Comparative Costs of Renewable Development: Community vs Commercial Projects*. July 2015, p.29.

Although not a cost, but rather a revenue driver affecting the price of electricity (£/MWh) received through a Purchasing Power Agreement (PPA), it has been noted that for small community projects the costs for setting up a third party netting and sleeving arrangement in order to be able to sell electricity directly to consumers often outway the benefits of a higher PPA price. The Government may want to consider ways to make the Licence Lite approach more cost effective, so as not to prejudice small community projects that want to sell electricity to local individuals.

In order to be able to take advantage of the EIS, SEIS and CITR communities can change their legal structures to comply with the requirements of these tax benefits. For example, one community developer stated it was going to change its legal structure to become compliant. Greater clarity on legal structures and approvals required by cooperatives to be approved by the Financial Conduct Authority would assist.

If the Government's priority is to encourage community renewables, then where projects are financed primarily with community share offers, there may be more merit in giving grants of 30% directly to the community rather than giving taxpayers a 30% tax break. It is acknowledged that grants can increase aid dependence, but the direct beneficiaries of a grant will be the community directly. Although tax breaks can encourage entrepreneurial activity, it is questioned whether or not community share offers would have been fully subscribed without the income tax breaks. There is anecdotal evidence that about one third of community share offers are subscribed by wealthy individuals injecting between £50,000 - £100,000, with the remainder injecting about £4,000 on average (although this will be made up of some £500 and smaller investments). There is therefore merit in the Government undertaking an analysis of how successful community share offers have been and how important the tax breaks have been in stimulating this investment. For example, some community share offers have been fully subscribed within a few days so a case could be made that tax breaks may not have needed to be as generous.

With shared ownership models (joint venture, split ownership and shared revenue) the community will often have to negotiate the terms it buys into the project at. This would be no different to a commercial developer approaching another commercial investor to invest in the project. However, it can be hypothesised that the commercial developer would be able to negotiate better terms than the community if it was already actively involved in the sector. There are cases where Social Investment Scotland (a social enterprise founded by the Scottish Government and five commercial banks) or Renewable Energy Investment Fund (part of the Scottish Government) has been able to encourage the commercial developer show the community its financial model, so that communities can invest on the same terms as the commercial developer. Therefore, the Government may want to consider any recommendations for encouraging commercial developers to adopt pen book accounting when discussing shared ownership options with communities.

# 5 Conclusions

Community energy currently represents about ¼% of the total installed renewable energy capacity in the UK. Whereas other countries offer little specific support for community energy projects (e.g. Germany) there are a number of specific support measures for UK community projects. From the evidence gathered the main messages are:

- Many community projects will be located in areas that would not be attractive to commercial developers, and rely on grants to cover some costs, or tax breaks to taxpayers, to encourage investment. A policy decision needs to be made around what the Government's priorities are. If the sole priority were to generate renewable electricity then there are more cost effective ways of doing this, e.g. relying on commercial and community developers to locate projects in '*good*' locations, whether that is areas with high wind speeds or high levels of solar insolation, and separately for the Government to give grants to community organisations across Britain. As DECC's Community Energy Strategy makes clear, there are a range of wider reasons for supporting community renewable energy, e.g. building stronger communities, creating local jobs, supporting local economic growth and unlock opportunities for lower energy bills.

  > *"Independent modelling of community led solar PV, onshore wind and hydro projects estimates they offer between 12-13 times as much community value re-invested back into local areas as would be achieved through 100% commercial models."*
  >
  > **Source:** DECC, '*Evidence Review of Feed-in-Tariff Scheme*', 2015.

  In Scotland there is a recommendation for commercial developers to give local communities £5,000 for each MW of installed capacity per year. Even if this was increased to £20,000 for each MW of installed capacity per year it may prove to be a more effective solution to give communities a sense of benefit in local commercial projects, than encouraging small scale community groups to develop small renewable energy assets, supporting this with tax breaks, grants, government support and advice, etc.

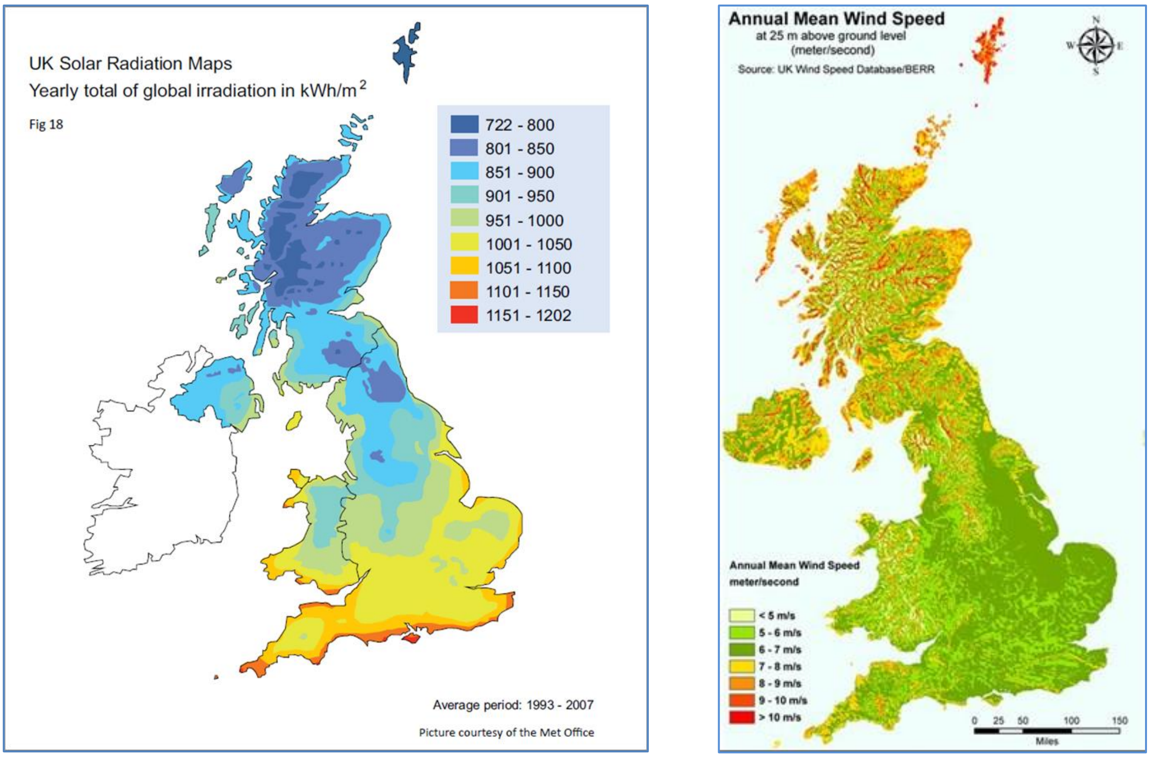
  Another solution is to encourage commercial developers in these '*good*' locations to offer to the community opportunities for shared ownership. This has the double benefit that much of the risky development phase costs are borne by the private developer (so communities only need to spend development phase money doing due diligence on the commercial offering and raising the money) and the project will be in a '*good*' location, meaning that in the strike prices developers will offer for CfDs will be lower than an equivalent large community project could offer. The challenge here is for communities to be able to rapidly access the finance required. In practice shared revenue or Joint Venture structures (see Section 2.2, page 1) can be very difficult (if not impossible) to finance with commercial debt due to issues around seniority of the lenders, security over assets and inter creditor issues. Nevertheless, grants, community share offers and finance from Government supported intermediaries can still be available for these two routes. With split ownership commercial banks are much more willing to invest, if issues around sharing grid connections and any maintenance contracts can be successfully resolved.

  One solution to raising money quickly for shared revenue projects is an intermediary buying into the project and then selling its shares to the community once necessary finance has been raised. The challenge with this is that the intermediary will expect to make a return on the transaction, possibly then making the proposition less attractive to the community concerned.

- Nevertheless, some communities are located at sites which are '*good*', i.e. sites with high insolation or wind speeds. This is shown in Figure 20, which illustrates the areas in the UK with high solar insolation, shaded dark orange ( ■ ), light orange ( ■ ) and a yellow/ green ( ■ ) – mostly in the South of England. Figure 20 also shows the areas in the UK with high wind speeds (>6.5m/s at 25 metres) shaded red ( ■ ) through to yellow ( ■ ) – mostly in the north and west of the UK. As wind speeds are influenced by many factors, e.g. height, obstacles in the way and whether the site is in the windier north and west, the map shown is indicative. However, by accessing the NOABL database wind speed data is available at a 1km$^2$ gradation, and can be zoomed in to find the indicative wind speed at various locations.

In these '*good*' locations, the evidence is that community projects can be successful and have similar cost structures to commercial developers, with the exception of development costs which are higher (due to the longer time it takes to commission projects and inefficiencies in developing projects for the first time) and also much harder to find finance for.

**Figure 20: UK solar radiation map (yearly total of irradiation in kWh/m$^2$) and wind speeds (m/s)**




Sources: Microgeneration Certification Scheme. *Guide to the Installation of Photovoltaic Systems*. 2012. Figure 18 retrieved from: http://www.microgenerationcertification.org/images/PV%20Book%20ELECTRONIC.pdf

Wind speeds from: BERR

- As the levels of government support for renewables fall (in terms of lower FiTs or lower CfD strike prices) marginal projects will only be attractive if the electricity generated can be used locally, displacing electricity that would otherwise be bought, as there is a wide difference between the wholesale price electricity can be sold to electricity companies at (about £50/MWh) and the price smaller companies or households pay (about £100/MWh to £150/MWh). Community projects may be located closer to buildings that are heavy users of electricity that can match when the renewable energy is generated, e.g. solar projects on top of community centres or health facilities that are users of electricity in the day time.
- Shared ownership options with developers can be attractive if communities can negotiate acceptance deals. There is evidence of different levels of engagement by developers, with some developers approaching communities and openly showing the project structure and financing, allowing the community to buy in if they can find sufficient finance.

**Recommendations**

It is recommended that community energy projects in 'good' locations (i.e. high wind speed or high levels of insolation) are encouraged, and to be successful the Government should continue its support to help communities deal with the supply side blockages, notably:

- find finance to cover the development phase (e.g. through the successful CARES, RCEF and UCEF loans);
- mindful of the slower development time, and the difficulty in raising finance, have longer time to pre-accredit for FiTs (which will also enable communities to engage with financiers to cover the costs of any post-planning pre-financial close costs such as grid or turbine deposits). Linked to this the Government may want to consider new finance sources or loans for the post-planning

pre-financial close costs as even with pre-accreditation communities can sometimes find it difficult to raise the £200,000 - £400,000 sometimes required for these deposits;

- preparing 'how to' guides to help communities avoid unnecessary costs and time being wasted during the development phase.

Other ideas to reduce development costs would include having standardised commercial agreements for shared ownership projects would also help communities and developers when discussing renewable propositions, and encourage commercial developers to be as open as possible when discussing shared ownership options.

The Government may also want to evaluate the possibility of making the Licence Lite solution even cheaper as small community projects have stated that the administrative costs of setting up a contract to sell electricity directly to local consumers often out way the higher electricity price achievable.

For community energy project in 'good' locations bring many benefits to society – bringing together communities, building community spirit, creating small decentralised electricity suppliers thereby increasing the energy security of the country, increasing public support for renewables and reducing carbon emissions.

# Appendices

# Appendix 1 – Glossary

| | |
|---|---|
| CfD | Contract for Difference |
| DECC | Department of Energy and Climate Change |
| FCA | Financial Conduct Authority |
| FiT | Feed in Tariff |
| IRR | Internal Rate of Return |
| PV | Photovoltaic |
| RHI | Renewables Heat Obligation |
| RO | Renewables Obligation |
| WRAP | Waste Resources Action Programme |

# Appendix 2: Results from financial modelling

The results from the modelling for the 100% community owned projects show that community dividends were expected in each case, shown in the purple areas ( ■ ) in the charts. The methodology section of the main report explains how to interpret the results. The graph for community wind project 1 is identical to the one presented in the methodology section of the main report.

**Figure 21: Anticipated post (and pre) tax pre-financing returns in the 9 community wind projects**

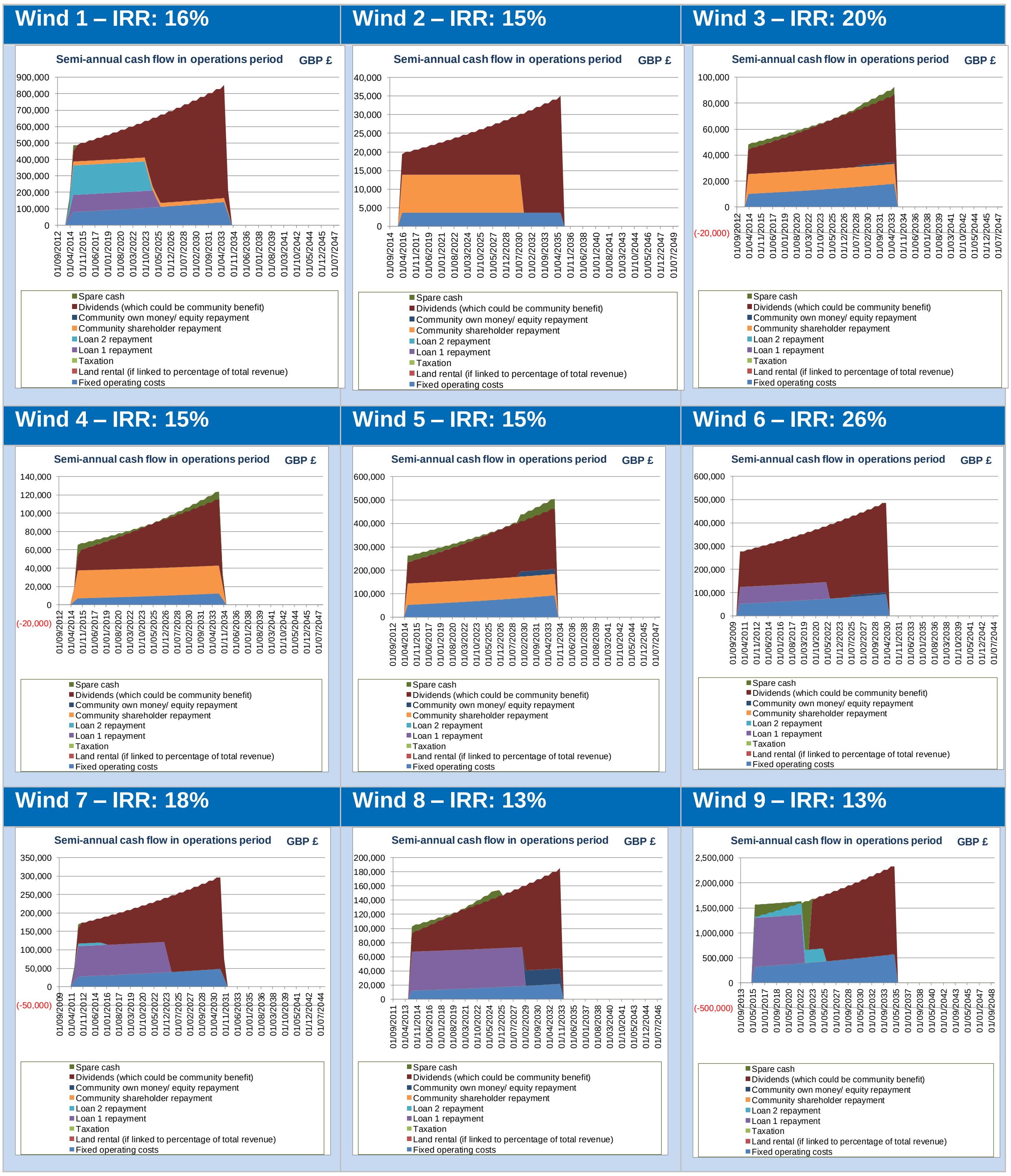
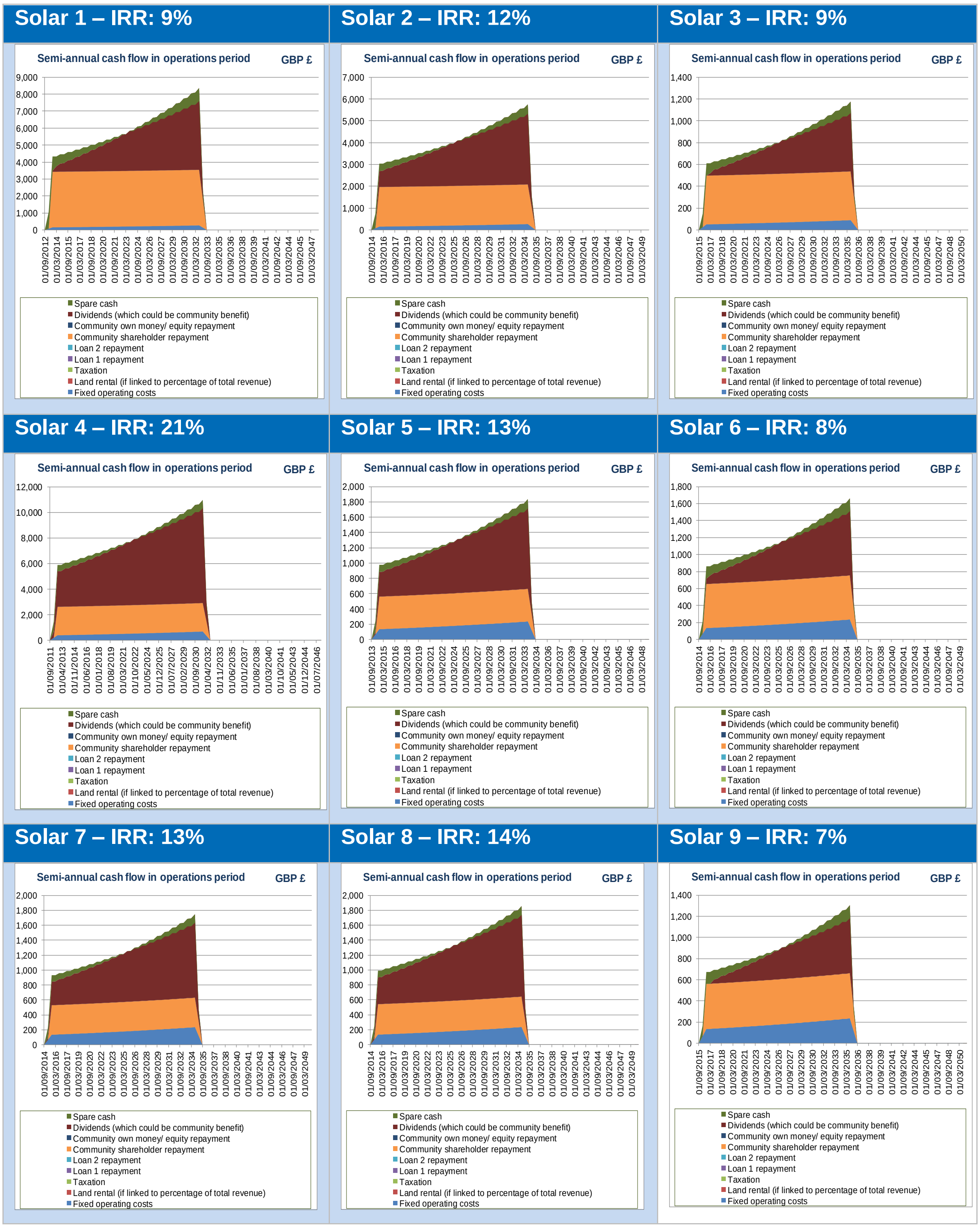
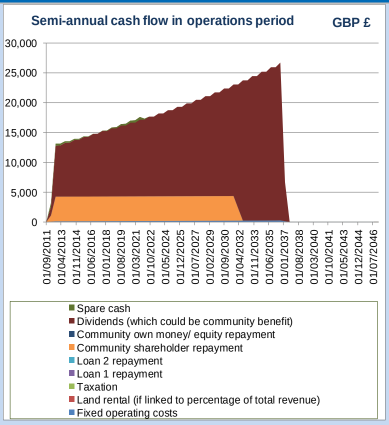


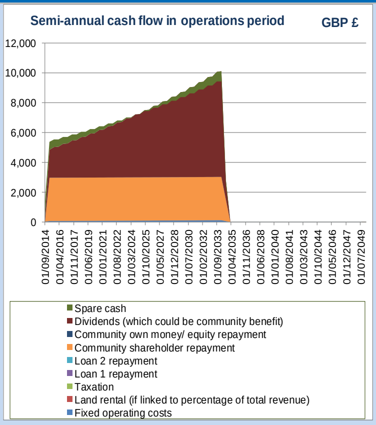
**Figure 22: Anticipated post (and pre) tax pre-financing returns (IRR) in the 15 community solar projects**



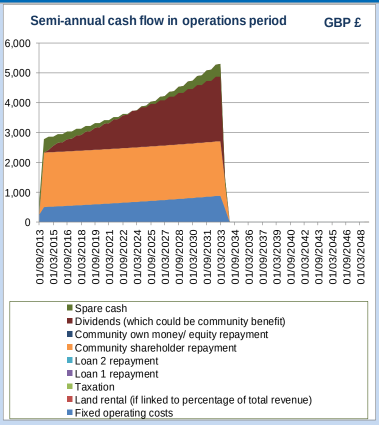
## Solar 10 – IRR: 26%



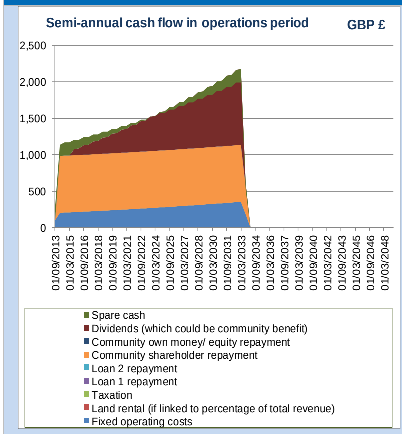

## Solar 11 – IRR: 14%



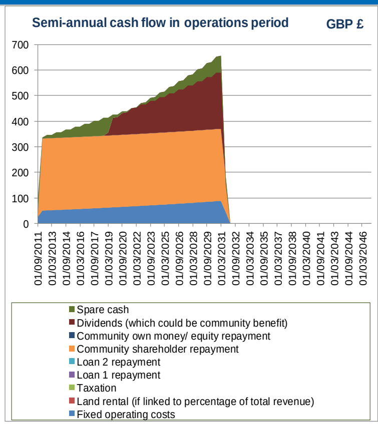

## Solar 12 – IRR: 8%



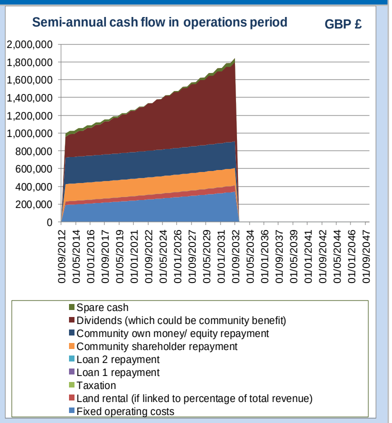

## Solar 13 – IRR: 8%




## Solar 14 – IRR: 6%




## Solar 15 – IRR: 9%



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