Community Renewable Electricity Generation: Potential Sector Growth to 2020

Methodology, Detailed Assumptions and Summary of Results

FINAL REPORT

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Submitted by Peter Capener

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1 Executive summary

Introduction: This modeling exercise sought to generate a sense of the potential for growth within the community renewable electricity sector by 2020. The results are intended to offer a sense of what might be achievable given a range of different contexts, rather than provide something that purports to be a precise forecast of what will happen.

Scope: The modeling focuses on the development of onshore wind, solar PV and hydro technologies, where there is a proven track record and an approach to delivery that has been replicated and so growth can be more realistically modeled. While other forms of generation, such as anaerobic digestion, have an important part to play, the scale of their current deployment within the community sector means that the modeling approach described in this document is not applicable to these technologies.

Methodology: The methodology is based around testing the financial viability of community energy organisations' ability to deliver varying proportions of the existing DECC forecasts for these three technologies to 2020. The figures produced are then reviewed in the light of additional factors like community capacity and other existing data sets for comparison and reality checking.

The modeling uses a scenario-based approach built around differing sets of assumptions within three scenarios as follows:

- High (strong & sustained) scenario **–** assumes significantly increased rates of growth to 2020. It is characterised by:
  - An accessible, strong and stable policy and regulatory framework with respect to community entrants and their potential partners;
  - Strong messages from all levels that community energy will be a significant contributor to the UK's response to climate change and energy security;
  - A flourishing market for personal investment and debt finance for community energy projects;
  - Proactive support and guidance for community energy action that enables communities to learn and grow effectively and efficiently;
  - A market that brings forward split or shared ownership schemes between commercial developers and communities as the norm for onshore renewable energy projects; and
  - Growing enthusiasm, ambition and commitment to engage on community energy from within the community and voluntary sector
- Medium (stop-start) scenario – assumes variable rates of growth to 2020. It is characterised by intermittent support for community energy action and an unstable policy and regulatory framework. Instability has a significant impact on community and investor confidence undermining the rate of sector growth, as well as funds raised and projects installed as a result.
- Low (constrained) scenario – assumes that the rates of sector growth remain fairly constant to 2020 with the exception of the growth in share offer size, which is a lot lower than current growth rates. Little additional support for community groups, coupled with existing barriers and difficulties accessing finance mean that overall growth is heavily constrained and limits community ambition as a result.

More details can be found in section 4.2.

Assumptions set to reflect diversity and increase confidence: This analysis takes a conservative view of a range of assumptions, for example assuming that even in the strongest scenario, the average growth in share offer size is less than the current trend and the average investment per member is substantially lower by 2020 than that achieved currently by the most successful share offers.

Community energy projects are likely to grow in differing directions, reaching out into smaller and less well off communities as well as elsewhere generating scale and size. So assumptions have not been pushed to their limit in order to reflect this diversity in likely development paths.

Elsewhere there is a built in conservatism around modeling scope (non domestic focus and only three technologies considered), current fund raising activity (no data available on CIC fund raising) and alternative sources of funds to match debt (only modeled local share offers), which lend greater confidence to the figures that have been generated.

Headline results – Existing sector: The current sector for community scale renewables electricity projects involves at least 600 community groups with a strong interest in renewables. Over 50% of these groups are constituted as charities or some other form of voluntary group, with a high proportion of these in Scotland. However the number of Industrial & Provident Societies is very rapidly growing.

Between a quarter and a half of the 600 groups have delivered or are actively delivering projects. The rest of the groups will be in various stages of pre development from just having established to working out what they are going to focus on. No doubt some will also have been unsuccessful in moving to project development and may have moved on to other areas of interest.

There is around 66MW of community renewable electricity capacity installed. primarily funded through debt and grant, with over 200MW in development.

A rapidly increasing number of projects are being funded or part funded by local share offers, with to date over 40 share offers issued on community renewables projects, raising around £17 million from approximately 10,000 community member investors.

Headline results – Capacity & generation: The analysis suggests that within the 'high' scenario, the community energy sector could deliver 3GW of solar PV, onshore wind and hydro projects by 2020, representing 14% of the total capacity of these technologies and 1.4% of total electricity consumption by the end of this decade, assuming typical load factors. This represents rapid growth over 6-7 years and lays the foundation for even more substantial growth to 2030 and beyond.

Interpreting figures: The importance of these figures is less in the specific numbers but more in the sense of scale they imply. So, whether it is 2.5GW or 3.5GW is less important than acknowledging the figure is substantive and has the potential to grow significantly to 2030 and beyond.

Headline results – Community outreach: The resulting community outreach from the projects installed within the 'high' scenario is significant, with 2,300 community energy organisations (a four fold increase in current levels) focusing on developing community electricity projects, with 500,000 members with a direct interest in the projects and up to about 10% of UK households having direct contact with the community organisations on a regular basis (depending on overlap in outreach between projects).

Headline results – Community benefits: The community projects installed will offer between 12-13 times as much community value re-invested back into local areas as would be achieved through 100% commercial models. The estimate is based purely on an assessment of economic value, when full social and wider environmental returns are factored in the benefits will be substantially higher. However a full Social Return on Investment (SROI) analysis has not been possible within this exercise.

The re-investment back into communities via community funds could be as much as £1.3 billion over the project life of the 3GW established under the 'high' scenario.

Success Factors: There are a range of issues already recognised as being central to community energy success, like financing and the 'investment readiness' of community energy groups and projects, the need to develop community capacity, the accessibility of the regulatory framework etc. These issues have been factored into this analysis.

This modeling suggests four additional factors that would support community energy success in the future. These include:

1. The need to nurture financially viable community energy organisations able to deliver multiple projects, rather than assume that each organisation will deliver only one project. This doesn't mean that all communities will follow this path, but in the 'high' scenario over a third of the 3GW capacity will be delivered by successful community energy organisations delivering multiple projects as part of a growing social enterprise sector.

   The learning curve is significant in this sector and learning may be best utilised once secured with repeat action, rather than being lost. This has implications for how community energy organisations develop and the support infrastructure required to enable it. However the underlying strength of the sector will continue to depend on increasing numbers of non-energy community organisations integrating renewable energy into their activities.

2. Community partnership with commercial developers will be a vital element of the sector's success. In the 'high' scenario, split ownership schemes where communities buy in to commercially developed schemes will deliver over 50% of the 3GW capacity.

Such partnerships offer significant value to both sides but are constrained by cultural and operational differences. To establish this approach as the norm, there will need to be a focus on developing the support framework for community energy as well as dialogue between industry and community sectors.

3. Current assumptions about capacity development within the non-domestic bands of the FIT may underestimate the ability of community projects to take forward scales of development that might be considered too small for commercial developers.

   If this is the case, the consequential impacts on tariff degression may limit the growth of the sector and under-utilise the potential that might otherwise be realised.

4. The modeling emphasises the importance of a stable support framework for maximising the success of the community energy sector. The 'Medium (stop-start)' scenario brings forward even fewer community energy organisations focusing on renewable energy development than the 'Low' (constrained) scenario.

   A lack of stability has a disproportionate effect on this sector, as confidence is central to both community action and minimising risk for either equity or debt investors. Whilst this is true for all sectors to some extent, when drawing new entrants into a market where the barriers to entry and/or the up-front investment in learning or setting up systems are significant, it is even more important to create a stable environment to help justify the initial effort.

2 Methodology

2.1 Purpose & Scope

This modeling exercise sought to generate a sense of the potential for growth within the community renewable electricity sector by 2020. The results are intended to offer a sense of what might be achievable given a range of different contexts, rather than provide something that purports to be an accurate forecast of what will happen.

The modeling considers community renewable wind, solar PV and hydro projects only. It doesn't consider other renewable electricity technologies such as anaerobic digestion or other renewable heat technologies.

This is because it is currently only wind, solar and hydro where there is sufficient prior community experience to be able to establish a core delivery model that has been replicated to a degree to which trends can be identified and modeling of key variables carried out.

In terms of community energy delivery models, this analysis assumes that community energy groups raise finance from various sources to invest and as a result wholly-own or part-own renewable electricity projects.

The modeling focuses on ownership as the principal factor. As a result it doesn't take into account community initiatives around bulk purchasing or community benefits initiatives where commercial developers award communities a sum of money per MW installed. The assumptions needed to model such approaches would need to be fundamentally different.

However these types of project have an important role to play, and although they are not modeled in this paper, this is because of a lack of data and a need to adopt a different methodology, not a lack of importance. The section on community benefits does compare the level of community benefits attributable to a community model, to that generated through a 100% commercial approach.

The modeling focuses on non-domestic installations. Community renewables initiatives do work within the domestic sector, primarily on bulk purchasing type schemes where the ownership of the technology rests with the homeowner. There are one or two examples of community run domestic 'rent a roof' schemes within the community sector, but experience is limited with no replicable models demonstrated. So with limited experience or trends to build modeling assumptions around, it was considered appropriate to leave this scale of development out of this modeling exercise.

Community energy groups considered in this analysis are both organisations set up for the purpose of delivering renewable energy projects as well as existing community groups adapting their focus to include renewable energy installation across their community.

It doesn't include the wide range of community organisations like schools, village halls etc., that have installed micro renewable energy systems only on their own buildings or site. Historically these projects have tended to be funded through a mixture of public and private sector grant and organisational resources.

With the shift away from capital grants and the introduction of the FIT/RHI as the principal financial support mechanism for renewable energy below 5MW, these types of micro scale projects will need to develop alternative funding mechanisms. For example individual schools might run share or possibly debenture offers across their own school community. Though, given the extra complexity and financial impact of alternative funding mechanisms, it seems likely that their adoption within this sector will be less widespread and may anyway need the intervention and/or support of an intermediary or a community energy group as described above.

However, because of the incompatibility between public sector grant and the receipt of FIT, traditional grant funding to cover the capital costs of individual projects is not a mechanism that is modeled within this analysis.

2.2 Overview

The approach adopted by this modeling involves building three different scenarios for community renewable electricity growth rates using as a basis pre-existing modeling already carried out as part of the FIT impact assessment and the UK Renewable Energy Roadmap.

The modeling starts with a simple estimate of the proportion of existing UK renewable electricity forecasts for wind, solar PV and hydro that might be delivered via a community ownership model. Estimates are done for each FIT band and also for installations greater than 5MW.

These simple estimates act as a straw man that is then tested against a range of factors that will influence the growth of community energy, including the availability of finance, community capacity and the policy and regulatory framework.

The relative proportions of community energy contributions across the three technologies and a range of scales is fixed by this straw man estimate. The results of the second level of analysis, for example the availability of finance under three different scenarios, are used to either increase or decrease the initial estimate on a year on year basis.

The straw man estimate therefore provides a simple method of calibrating and then varying, in the light of changing contexts, the community energy contribution across multiple technologies and scales. It provides a link between this community model and the wider modeling undertaken to underpin the UK Renewable Energy Roadmap and the FIT Impact Assessment. As such this modeling draws on analysis that has already taken into account wider issues such as grid capacity and overall planning success rates.

A more detailed breakdown of the modeling methodology is outlined in figure 1.

2.3 Limitations to modeling approach

Current trends data: Current trends data in terms of growth in community energy organisations and the delivery of share offers (figure 3) is based on information on Industrial and Provident Society (IPS) figures only. Comparable historical data on Community Interest Companies (CICs) and other legal forms have not been possible to source.

As a result, whilst it has been possible to estimate the current number of community energy organisations, including all legal forms, taking action on renewable electricity projects (Figure 2), it has not been possible to apply this data to the historical growth rates shown in Figure 3.

Share offer data has been supplied by the Community Shares Unit (CSU)[1] as part of its activities to develop and maintain market intelligence of the overall community shares sector, of which renewable energy is a significant part. The CSU doesn't keep a record of CIC share offers, though sector knowledge suggests that CIC share offers on renewable energy projects are by far the minority when compared to IPS share offers. However this gap represents a built in conservatism to the data and the assumptions.

Funds raised to match debt: At the core of the scenarios are estimates of the funds that could be raised via local share offers to match debt raised at different debt/equity ratios.

The estimates of funds raised via share offer don't take into account other sources of funds that could be used to balance debt, including grant, venture capital, bonds etc. New valuable sources of funds like the debentures facilitated by intermediaries such as Abundance are also not directly modeled.

As a result the total funds available could be underestimated. Its impossible however to estimate what proportion of these additional sources of funds would be additional to, as opposed to substituting for, the estimates put forward in this modeling. However the knowledge of these additional sources of funds strengthens the confidence in the forecasts proposed.

Debt refers to debt finance from traditional sources like banks as well as other commercial lenders and Local Authorities.

Modeling scope: As outlined in section 2.1 above, this modeling defines the type of capacity to be modeled tightly in order to generate a deliverable modeling methodology. Different definitions of community renewable electricity capacity would increase the potential capacity, though it is impossible to say by how much.

Core renewable energy forecasts: The community energy sector forecasts outlined here draw on core renewable energy modeling undertaken by DECC as part of the FIT impact assessment[2] and analysis supporting 'Core Scenario 32%' of the EMR Draft Delivery Plan (for over 5MW project build rate data)[3]. The data obtained for under 5MW projects is from the low (solar) and central (wind) scenarios of the FIT impact assessment. This provides relatively low forecasts for non-domestic renewables, particularly for solar PV. See Table 2 for all the data used.

As a result, these figures represent an underestimate of the potential contribution from community renewable energy projects by constraining growth in the scale of technologies well suited to community energy development. Further analysis of this model drawing on other scenarios from the FIT impact assessment and the latest UK Renewable Energy Roadmap (RER) modeling (2013) would deepen the evidence base for this modeling work.

Modeling community benefits: The modeling of community benefits in this exercise has only been partial, focusing on direct economic benefits derived locally from a stronger community model.

A full analysis of the added value of community action would need to take into account social and wider environmental benefits derived from an analysis of Social Return on Investment (SROI). This has not been possible within this brief modeling exercise.

Community benefits are however central to the IPS form and the Community Shares Unit are looking to develop a framework for understanding and capturing community benefit and other non-financial impacts, as are other bodies like the New Economics Foundation.

Taking into account changes in the FIT threshold: The modeling has not been able to take into account the proposed raising of the FIT threshold to 10MW for community energy projects. Depending on how this is implemented it could significantly boost the sector. However policy in this area is still in development and the data that detailed modeling of the 5-10MW range would require is not yet available.

Figure 1: Methodology

Building 'Straw Man'

Step 1: 1st order estimate of proportion of current FIT/UK RER forecasts could be delivered via community energy projects, by technology and scale

Step 2: Estimate how much this would cost to implement per year. Propose debt/equity ratios by technology and scale to identify need for equity.

Scenario analysis

Step 3: Establish current trends in sector growth and equity funds raised via share offers.

Step 4: Identify key variables affecting fund raising potential and how these will vary over time within three scenarios. Suggest how debt/equity ratios might vary by scenario.

Step 5: Adjust 1st order estimate of community energy capacity either up or down depending on potential funds raised in each of the three scenarios

Testing results and calculating benefits

Step 6: Triangulate results against a range of factors in order to reality check findings, including:

- Other modeling, such as the Respublica/SCENE analysis
- Ask if the increased capacity building demands, installation rates per community and community interest of implied sector growth feel reasonable when compared with existing rates and potential policy intervention?
- Ask if the level of equity funds raised feel reasonable when compared to wider market norms?

Step 7: Calculate associated benefits that may be derived from the forecast growth in the community energy sector including:

- Local economic benefits
- Community re-investment
- Outreach and community engagement.

3 Detailed Assumptions

3.1 Scenarios

The modeling assumes that:

- Not all Community Energy Organisations that register will successfully raise finance. The ratio ranges from 1 in 3 (current trend) to 3 in 4 (by 2020 for the 'high' scenario)
- Based on analysis of existing data, community energy organisations that do run a share offer, on average do so a year after registration or start up.
- The annual growth rate in Community Energy Organisation registration will double from an extra 30/yr to 60/yr by 2020 in the 'high' scenario. This represents the additional increase year on year.
- Other variables such as members per share offer and average investment per member will also increase as Community Energy Organisations become more effective in running share offers and this type of investment becomes more recognised and established.
- The 'high' scenario assumes that 20% of Community Energy Organisations set up early enough will go on to run 5 share offers by 2020. (This assumes a share offer run every other year, so it is not the same as 20% of all organisations) and 90% will run two share offers by 2020.
- The availability of equity funds will grow faster than the forecast growth of the social investment sector due to availability of fair financial as well as social/environmental returns
- Community projects achieve a debt/equity ratio of 60/40 generally. For >5MW, assume 90/10 (for wind) and 80/20 (for solar/hydro).
- No debt is available for <1500kW wind & <5000kW solar in 'medium' and 'low' scenarios.
- No debt is available for <150kW Solar & <100kW wind in 'high' scenario.
- For 150kW-5000kW solar and 100kW-1500kW wind in 'high' scenario assume a debt/equity ratio of 60/40 growing to 70/30 in 2015 as the confidence in the market strengthens.

Current trends on share offer success are based on Industrial & Provident Society (IPS) data only. Whilst current trends suggest that less than a third of new community energy organisations go on to run a share offer, the information on share offers does not go back beyond 2007, though the data on IPS registrations does. It is also not a comprehensive list of share offers and no doubt misses some, those run by CICs for example. It is assumed therefore, for the sake of this exercise, that a third of new community energy organisations will go on to deliver one share offer (rather than multiple share offers) before 2020.

A conservative approach to forecasting assumes that the registration rate in 2013 and the share offers in 2014 are significantly higher that the previous year due to suppressed demand in the previous year. So rather than assuming the following year (2014/2015) kicks on from there, the forecast assumes demand falls back a bit to allow underlying demand to catch up.

Table 1: (a) Key scenario variables by 2020 & (b) % of successful CEOs that deliver follow on share offers

(a) Key Scenario Variables - outcomes by 2020	Current trends	High (strong and sustained)	Medium (stop-start)	Low (constrained)
Ratio of share offer to CEO start ups	0.33	0.66	0.50	0.46
Additional increase in CEO start ups/yr	30	60	40	30
Av. no. members per share offer	222	531	350	313
Av. investment per member	£1,814	£2,900	£2,200	£1,814

(b) % of follow on share offers	2nd	3rd	4th	5th
High (strong and sustained)	90%	60%	40%	20%
Medium (stop-start)	80%	30%	10%	0%
Low (constrained)	10%	0%	0%	0%

Data Sources: Extrapolation based on current trends as tracked by the Community Shares Unit[4] and estimate of potential scale with reference to existing benchmarks where possible. E.g. even in highest scenario assume no more than current rate of growth in members/share offer (10%/yr) and comparison with market investment in similar but more mature market like Triodos investment @ £3,400/investor[5] and top range of current community investment @ £3,500/investor.

Table 2: DECC Renewable Electricity Forecasts by Technology and Scale to 2020 for Capacity (MW) and Capital Cost (£/kW)

Wind	1.5-15kW		15-50kW		50-100kW		100-500kW		500-1500kW		1500-5000kW		>5000kW	
	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW
2013	1.8	£5,250	2.0	£4,200	1.1	£4,500	11.0	£3,000	4.0	£2,200	10.5	£2,000	1,800	£1,600
2014	1.7	£5,250	1.8	£4,200	0.9	£4,500	9.5	£3,000	7.5	£2,200	11.0	£2,000	500	£1,600
2015	1.4	£5,250	1.6	£4,200	0.8	£4,500	8.0	£3,000	4.5	£2,200	11.6	£2,000	600	£1,600
2016	1.2	£5,250	1.5	£4,200	0.6	£4,500	7.4	£3,000	4.5	£2,200	12.1	£2,000	700	£1,600
2017	1.1	£5,250	1.4	£4,200	0.4	£4,500	6.6	£3,000	4.0	£2,200	12.7	£2,000	400	£1,600
2018	1.0	£5,250	1.3	£4,200	0.4	£4,500	5.8	£3,000	4.0	£2,200	13.1	£2,000	400	£1,600
2019	0.9	£5,250	1.2	£4,200	0.3	£4,500	5.1	£3,000	3.0	£2,200	13.6	£2,000	500	£1,600
2020	0.8	£5,250	1.0	£4,200	0.2	£4,500	4.4	£3,000	2.0	£2,200	14.2	£2,000	500	£1,600

Solar	4-10kW		10-50kW		50-150kW		150-250kW		250-5000kW		>5000kW	
	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW
2013	61	£1,571	74	£1,629	7.1	£1,527	34	£1,381	58	£1,053	240	£1,140
2014	57	£1,414	74	£1,558	8.1	£1,460	41	£1,321	75	£1,007	149	£1,071
2015	43	£1,272	55	£1,491	7.2	£1,398	38	£1,264	78	£964	163	£1,020
2016	40	£1,171	50	£1,430	6.5	£1,340	39	£1,212	85	£924	300	£970
2017	39	£1,077	47	£1,373	6.0	£1,287	36	£1,164	91	£888	300	£925
2018	36	£991	43	£1,322	5.3	£1,239	33	£1,121	92	£855	250	£886
2019	38	£912	45	£1,276	5.4	£1,196	34	£1,082	105	£825	250	£852
2020	41	£839	48	£1,234	5.8	£1,156	37	£1,046	127	£798	450	£818

Hydro	<15kW		15-50kW		50-100kW		100-1000kW		1000-2000kW		2000-5000kW		>5000kW	
	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW	MW/yr	Capex/kW
2013	0.2	9500	0.023	7026	0.10	6650	8.1	4500	8.2	3,300	0.5	2,700	0	1,500
2014	0.2	9500	0.003	7026	0.04	6650	7.1	4500	9.0	3,300	0.5	2,700	0	1,500
2015	0.1	9500	0.002	7026	0.00	6650	5.8	4500	9.7	3,300	0.5	2,700	10	1,500
2016	0.1	9500	0.002	7026	0.00	6650	4.4	4500	10.5	3,300	0.5	2,700	10	1,500
2017	0.1	9500	0.002	7026	0.00	6650	2.9	4500	11.3	3,300	0.5	2,700	10	1,500
2018	0.1	9500	0.001	7026	0.00	6650	1.3	4500	12.1	3,300	0.6	2,700	10	1,500
2019	0.1	9500	0.001	7026	0.00	6650	0.0	4500	12.9	3,300	0.6	2,700	10	1,500
2020	0.1	9500	0.001	7026	0.00	6650	0.0	4500	13.3	3,300	0.6	2,700	10	1,500

Data Sources: Comprehensive FIT review low scenario (solar) & central scenario (wind & hydro)[6]. Analysis supporting Core Scenario 32% of the EMR Draft Delivery Plan (for >5MW build rate data)[7]. Parsons Brinkerhoff Solar PV Cost Update May 2012 (central scenario, medium cost reduction)[8] & Non PV Cost Data July 2012[9]

3.2 Technology

The modeling assumes that:

- Community energy will rapidly grow as a proportion of the current DECC forecast for non-domestic FIT and less rapidly as a proportion of the forecast non FIT capacity. The base DECC forecasts, percentages of which are assumed will be delivered by community energy projects within the modeling, are outlined above in table 2.
- These FIT/UK RER forecasts take into account non community issues like grid capacity, overall planning success rates etc., so this modeling doesn't need to
- Capital costs for solar will fall and remain constant for other technologies as per the DECC forecasts outlined in table 2.
- Load factors are as adopted within DECC modeling and vary by technology and scale of development, see table 3.
- Community energy projects delivered via FIT are assumed to be primarily 100% community owned, whereas non FIT projects are assumed primarily to be split or shared ownership schemes. Community contributions to split ownership schemes are assumed to be on average 2MW, representing a scale that one community could potentially finance via equity and debt. Though for larger projects its assumed that there could be more than one community involved.
- Split or shared ownership schemes include joint ventures where a single entity owns the whole project with both community and commercial shareholders, as well as projects where the community sets up a wholly owned subsidiary that then 100% owns a clearly defined and separately metered portion of the scheme. There are important governance and tax relief implications for each option.

Table 3: Technology Load Factors

Load factors	Range	
	Low	High
Solar	9.7%	11.1%
Wind	21%	28%
Hydro	35%	

Data Sources: Parsons Brinkerhoff Solar PV Cost Update May 2012[10] & Non PV Cost Data July 2012[11]. For wind assumes central case @ 6.5m/s

3.3 Benefits

The modeling assumes that:

- Each project contributes between 0.5-2% of capex per year into a community fund. The upper end of the range is based on existing experience and the lower end to take into account poor project performance. The actual payments may vary, with less in early years and more in later years. 2% represents what is viable within solar PV projects assuming a 7% return to members. The contribution could be higher for wind and hydro projects or if the return to members was lower.

Table 4: Modeling Assumptions for Community Benefits, Assuming Community Model

	High	Low	
Return to members	7%	2%	**of member investment/yr**
Average community fund re-investment	2%	0.5%	**of capex/yr**
Development costs of Community Energy Org	5%	2%	**of capex (one off cost)**
Admin overhead for Community Energy Org	1%	1%	**of capex/yr**
Local membership	75%		**Geographic or interest group**

Data Sources: Assumptions based on judgments drawn from current practice, see text for further discussion

- This balance between wider community benefit (of which the community fund is one part) and member return is a central consideration for community enterprises set up as an IPS, and in particular for Community Benefit Societies and is a particular area of interest for the FCA, the registering body for IPSs.
- The modeling assumptions outlined here generate a roughly 40%-60% fund to member return split. This is higher than might be implied by the figures in Table 4 because the member investment is only a proportion of total capex, with the balance made up by debt brought in to support the larger community projects.
- The range of annual returns to members modeled is based on current practice. The model assumes returns are paid in the year after investment is made.
- Development costs incurred by community energy organisations represent a conservative estimate of the proportion of development work that is done by local contractors, either the community energy enterprise itself or local consultants. More generally development costs can rise to up to 10% of capex.
- The modeling assumes that whilst tariffs may reduce, they will do so at a rate that keeps pace with reductions in capex, therefore retaining similar project returns.
- The proportion of members that are considered 'local' include those in the local area (as defined by the community energy organisation) and/or those that are part of any relevant community of interest.

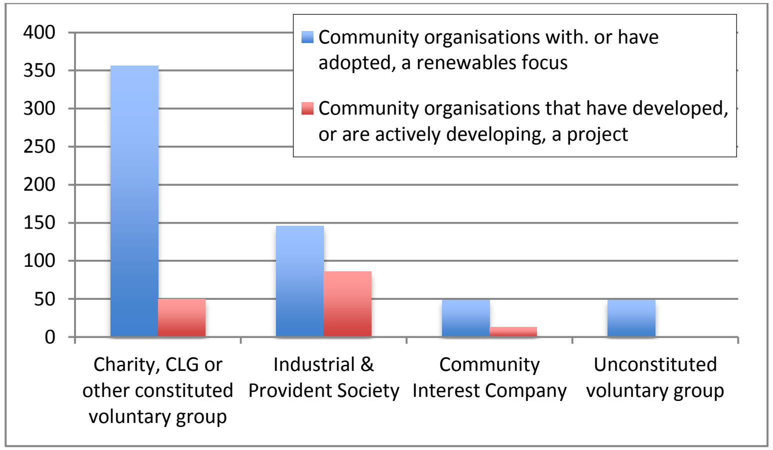
4 Summary of Results

4.1 Current Sector Growth

The current community renewables sector is still relatively undeveloped, though it is rapidly growing. There are around 600 community groups that have adopted a focus on renewable energy. Around a quarter of these have either developed or are in the process of developing a project. This proportion of the 600 or so groups that are actually working on a project is almost certainly a lot higher. The figure shown here is based only on those that have been identified during this analysis.

Figure 2 shows that there are a higher number of IPS based community energy organisations developing projects than any other form. However on average IPSs have developed or are developing smaller projects (800kW per organisation) than organisations in the other types of constituted voluntary group category, (1.4MW per organisation). The majority of the larger projects are in Scotland and the majority of the IPSs are in England.

Figure 2: Estimated Breakdown of Community Renewables Groups by Legal Form

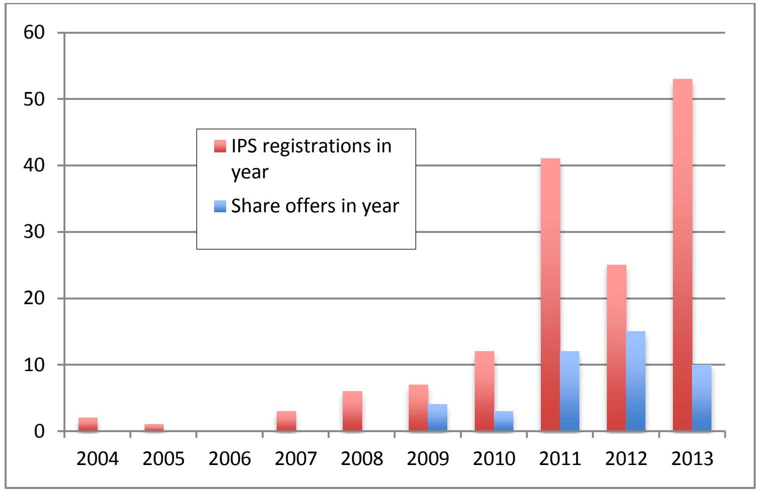


Data Source: IPS data from FCA's Mutuals Register[12], Community Shares Unit[13] & Coops UK[14]. Constituted and unconstituted voluntary group and CIC data scaled up using relative proportions obtained from LCCN's 2012 member survey[15] (subset focusing on community scale renewables)

It is clear from other sector surveys (CISE 2012[16], Databuild 2013[17], LCCN member surveys 2011/12[18]) that the level of grant funding is decreasing and the level of debt and share offer funding is increasing. Linked to this is an increase in the number of dedicated renewables focused community enterprises, often IPS in form, sometimes CICs. (Although CICs are more heavily constrained when it comes to running share offers for example than are IPSs) This trend is likely to continue as a range of different forms of constituted community group look for legal forms that are more able to raise non grant finance such as via local share offers. To date this is a trend that has been particularly strong in England and to a lesser extent Wales.

Figure 3 shows this strong growth in both registrations of IPSs and share offer delivery. This data is drawn from the mutual register and the Community Shares Unit. Registration data on community energy organisations formed as charities or CICs is not so easily obtainable.

Figure 3: Annual IPS Registrations and Share Offer Delivery



Data source: Community Shares Unit[19], FCA Mutuals Register[20] & Coops UK[21]

The fall in registrations in 2012 reflects the cuts in the Feed in Tariff (FIT) proposed at the end of 2011 and implemented in 2012. Total figures for 2013 have been scaled up from the actual data covering 1st January to 9th August 2013. Since the data suggests share offers are on average undertaken a year after registration, the fall in share offers in 2013 could be the delayed response to the fall in registrations in 2012. As of August 2013 there had been over 40 share offers raising £17 million from nearly 10,000 investors.

The growth in community energy organisations more widely could be substantially higher if data was available on CIC start up dates and on when the significant number of existing community organisations started turning their attentions to renewable energy.

Future growth in this sector could be both in the form of new stand alone community energy organisations setting up, as well as existing non energy community groups incorporating a focus on renewables into their existing activities (majority of the approx. 350 groups in the first bar of figure 2) or setting up their own IPS or CICs to progress renewable energy projects.

The ongoing strength of the community renewables sector will depend on increasing numbers of non-energy community groups starting to look at renewable energy in their community for the first time.

So to summarise, community energy organisations as defined in this paper include both community organisations set up for the purpose of delivering renewable energy projects and existing non energy community groups adapting their focus to include renewable energy installation across their community. Where this report refers to start ups, it should be taken to mean both these approaches to adopting a focus on renewable energy.

This definition doesn't include the wide range of community organisations like schools, village halls etc that have installed micro renewable energy systems only on their own buildings or site. See section 2.1 for an explanation and commentary on this.

Current estimated community renewable electricity capacity figures are outlined in figures 4 & 5. Data is provided only for the main renewable electricity technologies, wind, solar and hydro. Like figure 2, this data does not include the multitude of micro renewables, primarily solar PV installed by schools, village halls etc on their own buildings. Using data from the FITs register, and allowing for the FIT projects already included in Figure 4, these micro projects represent an additional 17MW of capacity taking the total to 83MW.

Figure 4: Current Community Renewable Capacity

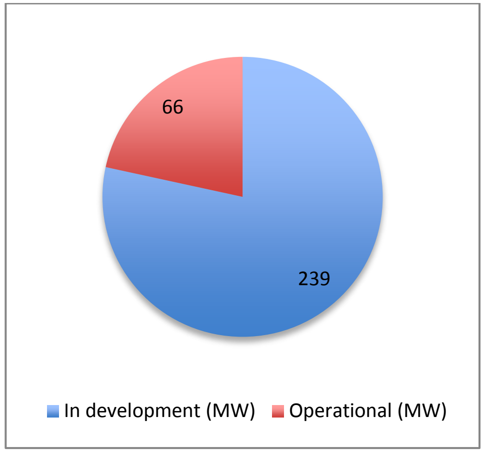
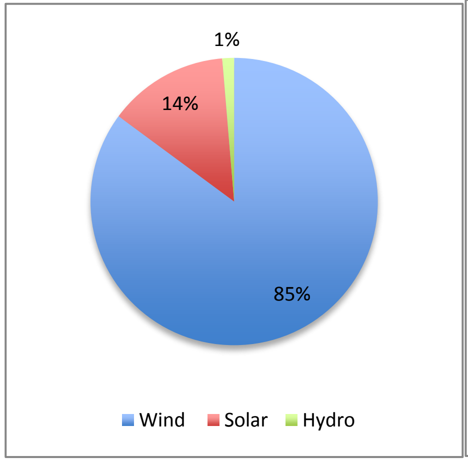
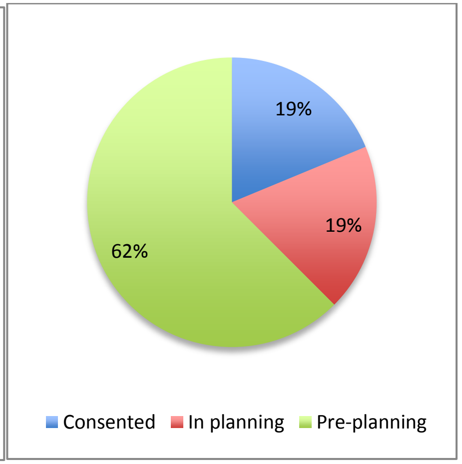


Figure 5: Current Operational Community Renewable Electricity Capacity & Capacity under Development





Data Source Figures 4&5: Coops UK[22], Community Energy Scotland[23] & Community Energy Wales[24]

4.2 Scenario Analysis

As previously mentioned, the modeling adopts a scenario-based approach. These scenarios illustrate what might happen under different sets of assumptions and so are not intended to be a prediction of the future.

The scenario analysis covers the next 6-7 years to the end of this decade only. None of the figures outlined represent a total 'potential' for the sector or limit the future growth of the sector to 2030 and beyond.

The 'Low (constrained)' scenario assumes that the rates of sector growth remain fairly constant to 2020 and that the growth in average share offer size is only 5%. Like all scenarios the 'low' scenario is underpinned by the FIT and RO and characterised by increasing levels of enthusiasm and interest at a community level. However the conversion to practical action continues to be constrained by significant barriers.

The 'low' scenario assumes little or no additional support for community action and a continuation of the challenging regulatory environment for communities. So whilst new start ups continue to grow, only the most tenacious community groups get through the hurdles in the way of installation, with only a small minority of community groups going on to run more than one share offer.

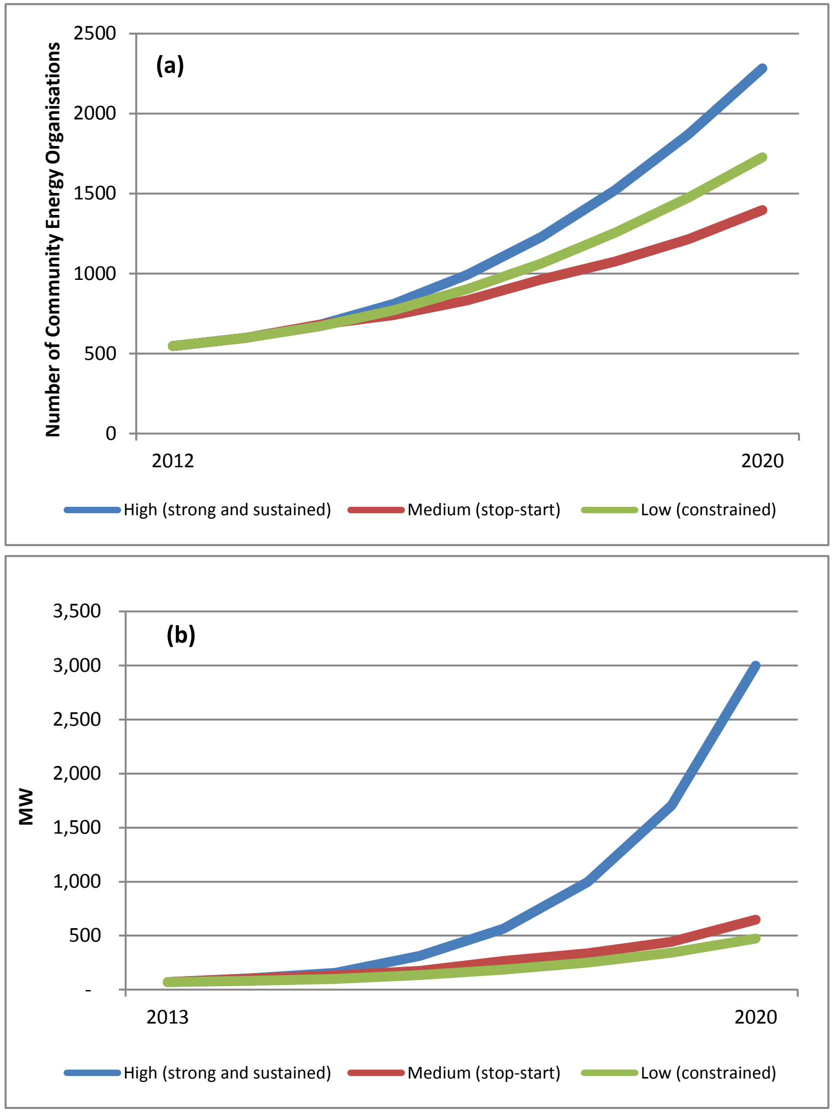
Debt finance continues to be difficult to get at the smaller scale and split ownership schemes do not flourish due the struggle communities have in raising significant enough finance to underwrite their part of the project.

Within the 'Low (constrained)' scenario, by 2020 there could be 1700 community energy organisations focused on renewable electricity, with over 430 of them having delivered around 460 share offers, which have raised over £230 million from just under 130,000 members. Together with around £300 million raised in debt finance community energy organisations could go on to install around 470MW of wind, solar and hydro capacity. This in turn represents 2.2% of the total capacity for these technologies by 2020 and could generate 0.3% of total UK electricity consumption.

The 'High (strong & sustained)' scenario assumes significantly increased rates of growth to 2020. The 'high' scenario is characterised by:

- An accessible, enabling and stable policy and regulatory framework with respect to community entrants and their potential partners;

Figure 6: Forecast (a) Community Energy Organisation (b) RE Capacity Growth



- Strong messages from all levels that community energy will be a significant contributor to the UK's response to climate change and energy security;
- A flourishing market for personal investment and debt finance for community energy projects;
- Proactive support and guidance for community energy action that enables communities to learn and grow effectively and efficiently;
- A market that brings forward projects that split ownership between commercial developers and communities as the norm for commercially led onshore renewable energy projects;
- Growing enthusiasm, ambition and commitment to engage on community energy from within the community and voluntary sector.

As communities build confidence in their ability to affect change and learn from each other and others, the conversion rate between start up and share offer delivery increases substantially from 1 in 3 to 2 in 3 by 2020. Community energy organisations also begin to deliver multiple share offers, up to five offers by 2020 for a small proportion of early entrants.

Share offers become more successful in terms of reach and funds raised, as communities learn what works and what doesn't and as the profile of this social investment sector grows and is strengthened through policy and a rigorous approach to implementing best practice. The average size of share offers grows at 20% per year, less than the current share offer growth rate of 25%, recognising that even within a strong scenario current growth rates cannot be sustained due to the very low baseline.

Average growth rates are also constrained by a growth in projects at different scales and within communities with differing demographics and representing all parts of society.

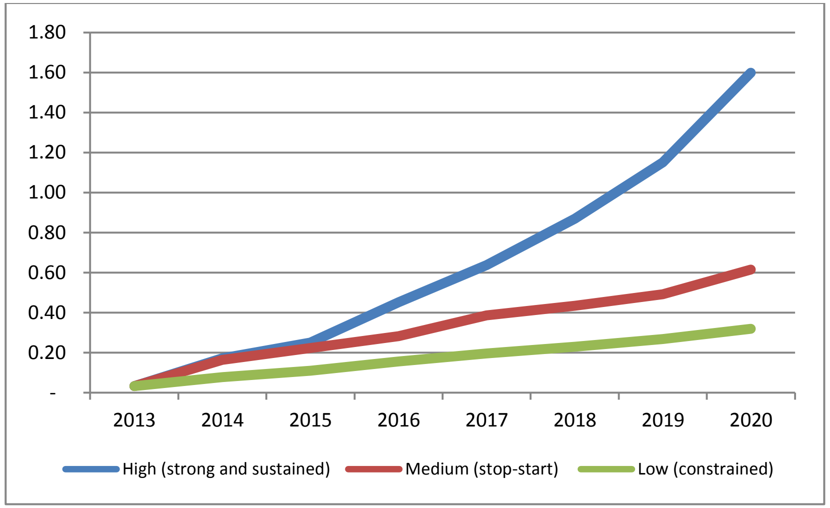
Access through the regulatory framework is simplified for communities, increasing substantially the success rate between start up and project success. A flourishing community energy enterprise sector grows, able to build community capacity and re-invest locally, generating substantial community benefits and raising profile & awareness of and support for renewable energy and related issues.

Over a third of new community renewable electricity capacity is made possible by communities delivering multiple share offers and over half of the capacity is generated through projects that split ownership between community and commercial developer and possibly Local Authorities. These partnerships successfully structure themselves in such a way that the community element of the funding retains eligibility for Enterprise Investment Scheme or other relevant tax relief for member investors as might become available.

Average installation rates per active community energy organisation (figure 7) grow from 30kW/yr to over 1.6MW/yr as many (though clearly not all) develop the capacity to deliver multiple projects and work with commercial developers on larger projects.

Within the <u>'High (strong & sustained)' scenario</u>, by 2020 there could be 2300 community energy organisations focused on renewable electricity, of which 780 of them have delivered 1200 share offers, which have raised £1.5 billion from over 550,000 members. Together with over £2 billion raised in debt finance community energy organisations could go on to install nearly 3GW of wind, solar and hydro capacity. This in turn represents 14% of the total capacity for these technologies by 2020 and could generate 1.4% of total UK electricity consumption.

Figure 7: Average Annual Installation Rate per Community Energy Organisation (MW/yr)



The 'Medium (stop-start)' scenario assumes variable rates of growth to 2020. This scenario is characterised by intermittent political and capacity building support for community energy action and an unstable policy and regulatory framework. The scenario assumes two additional hiatuses in (say) 2015 and 2018 that dent market confidence. The scale of the negative impact can't be assessed accurately without defining the hiatus in far more detail, so the impact is assumed to be relative in scale to the impact of the hiatus in confidence in the FIT in 2012.

This instability has a significant impact on community and investor confidence. The increase in community energy organisation start ups is severely undermined as a result, generating fewer registrations by 2020 than under the 'low' scenario. This has a knock on impact on the numbers of share offers run and the level of funds raised. The knock on impact is offset a year for number of share offers run, due to lead in times, but the impact in terms of share offer effectiveness and numbers of IPS registrations is in the year of the hiatus as the undermining of investor and community confidence will be immediate.

Some proactive support for community action enables some learning at community level. Learning and experience shared across community energy groups provides for an increase in share offer effectiveness over time, with communities also delivering multiple share offers (though fewer than within the 'high' scenario). So even though there are fewer community energy organisation start-ups, there are more share offers and funds raised than under the 'low' scenario. Increasing share offer success is however undermined by the uncertainty generated amongst potential investors.

Within the 'Medium (stop-start)' scenario, by 2020 there could be nearly 1400 community energy organisations focused on renewable electricity, with 330 of them having delivered nearly 530 share offers, which have raised £320 million from nearly 150,000 members. Together with just over £430 million raised in debt finance community energy organisations could go on to install nearly 650MW of wind, solar and hydro capacity. This in turn represents 3% of the total capacity for these technologies by 2020 and could generate 0.3% of total UK electricity consumption.

Please Note: The figures outlined in tables 5, 6 & 7 represent model outputs and as such show a level of accuracy that goes beyond the margins of error inherent in the modeling process. If quoted, figures should be rounded up or down to the nearest 100 or 50.

Table 5: Summary of Modeled Outcomes by 2020 – Capacity (MW)

By 2020	Capacity Installed (MW)	Wind (MW)	Solar (MW)	Hydro (MW)	% of solar, wind & hydro capacity	% Total Renewable capacity	% Total electricity capacity
High (strong and sustained)	2,998	1,000	1,914	83	14%	8%	2.9%
Medium (stop-start)	649	248	384	17	3.0%	1.8%	0.6%
Low (constrained)	475	190	272	12	2.2%	1.3%	0.5%

Table 6: Summary of Modeled Outcomes by 2020 - Funds Raised

By 2020	Total Equity Raised (£ million)	Total Capex (£ million)
High (strong and sustained)	1,513	3,668
Medium (stop-start)	311	744
Low (constrained)	218	520

Table 7: Summary of Modeled Scenario Outcomes by 2020 – Electricity Generated

By 2020	Electricity generated (GWh)	% of solar, wind & hydro generation	% Total Renewable generation	% Total electricity consumption
High (strong and sustained)	4,242	11%	4%	1.4%
Medium (stop-start)	1,030	2.6%	1.0%	0.3%
Low (constrained)	791	2.0%	0.8%	0.3%

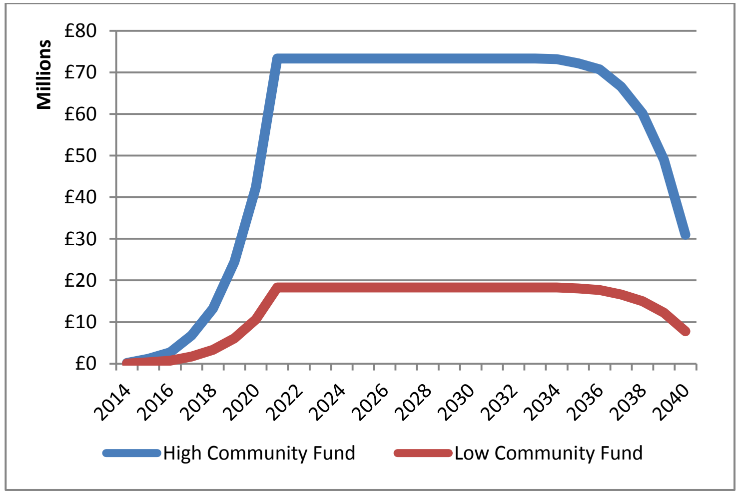
Data Sources Tables 5-7: As per ref 7 for Table 2 and from Annex C, DECC Updated Energy Projection 2013[25]

4.3 Relationship with Other Estimates of Potential Sector Growth

The total figure of 3GW by 2020 in the 'High (strong & sustained)' scenario is less than the 5.2GW suggested within the recent ResPublica/SCENE report[26]. The ResPublica/SCENE analysis builds on the estimate of 3.5GW in a report to the Cooperative Group by Camco & Baker Tilly[27]. The Camco/Baker Tilly report used a survey of community activity in one part of England and scaled it up to the UK as a way of testing whether a figure of 10% of total renewables capacity was viable. The ResPublica/SCENE survey makes the assumption that the Camco/Baker Tilly estimate didn't include the potential for split ownership or Joint Venture schemes and scales up the potential estimate of the proportion of renewables capacity that could be delivered from community energy accordingly.

The modeling in this report considers in detail the deliverability of the community renewables capacity, in particular from a financial perspective. Both the reports referred to above provide valuable insight and guidance around the issues facing a growing community energy sector. However it was not possible to gauge the degree to which either report considered the potential from a bottom up analysis of potential constraints, as adopted within this analysis. As a result it has not been possible to judge whether the difference in potential outcome is down to more conservative assumptions or just to a different, less detailed, approach to generating the results.

Figure 8: Annual Community Fund Contributions: 'High (Strong & Sustained)' Scenario



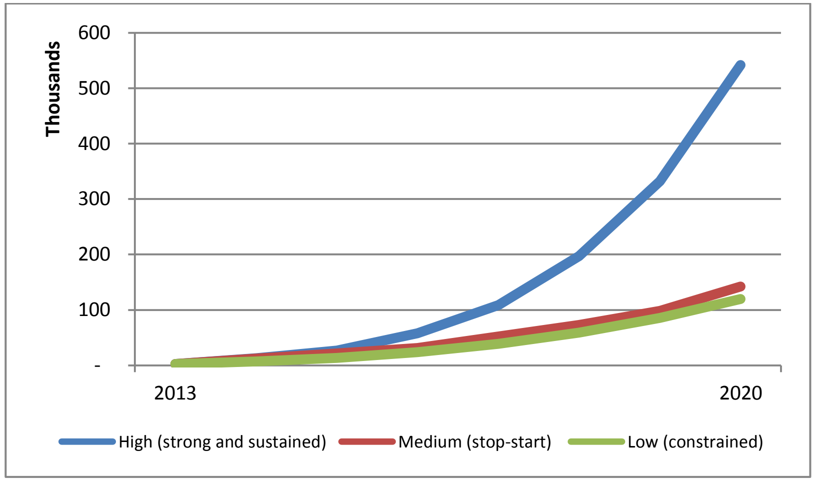
4.4 Community Benefits

On this analysis the community energy projects installed by 2020 could have generated up to £1.3 billion by 2040, to be re-invested back into communities via local Community Funds (Figure 8).

This can be regarded as a 'community dividend', representing a conscious decision by community enterprises to re-cycle a share of what would otherwise filter back into the higher returns made by shareholders within a commercial model. These funds can generate a double benefit in terms of carbon reduction if they are invested back into energy efficiency or other low carbon initiatives as many communities do.

Community outreach generated through community renewables projects is significant with up to 550,000 people investing in their local community energy company (Figure 9).

Figure 9: Cumulative Growth in Community Energy Organisation Membership



However, discussions with community energy organisations suggest that their direct newsletter distribution lists are between 3-5 times their membership. This in turn suggests that by 2020, community energy projects could be directly communicating with and potentially influencing up to 2.5 million people or 10% of the households within the UK (assuming no overlap between projects).

This ignores the even wider profile individual projects will have at a community level, through individual community networks linked to projects, schools, places of worship, village halls etc and the numbers of people that will be involved and benefit from initiatives supported by community funds.

For example, as part of IPPR's evaluation[28] of the British Gas Green Streets Community Energy Challenge, a survey of 1,300 people within 1.25km of community buildings that took part in the project found that 46% of people had been inspired to take some action in their own homes, with 50% of these taking action to improve insulation levels.

The community benefit figures outlined in this section are also only based on completed renewable energy projects, so not taking into account the outreach and impact that might be achieved through projects that are still in development. The impact and outreach of community energy projects could therefore be even greater at a local level.

In this analysis, the local economic value derived from the installation of a community energy project is considered comparable with commercial projects. Whilst a high priority is often placed on ensuring local contractors and suppliers within community projects, this could be replicated within commercial projects.

However in considering how project income is distributed, there is a fundamental difference between community and commercial projects, with community projects retaining a higher proportion within the local area through community funds, member return on investment and re-investment within the community enterprise itself.

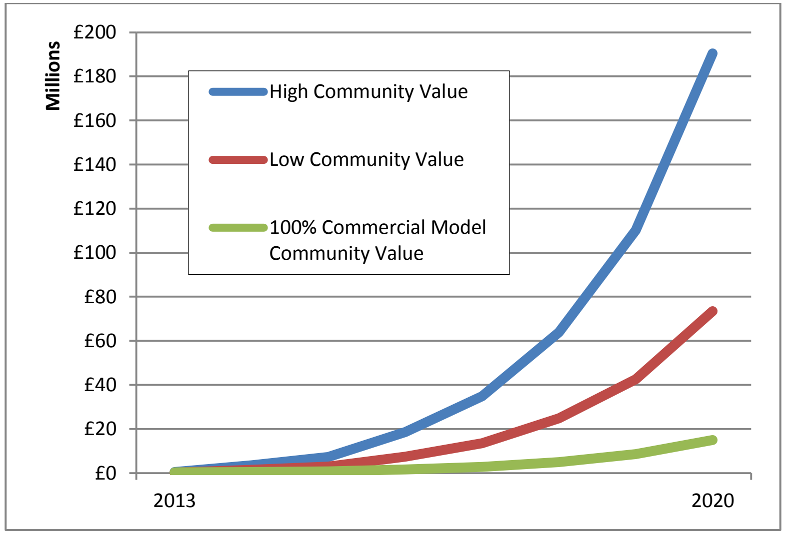
This modeling assumes that the community value that can be retained locally is the sum of the community fund income, 75% of member returns (allowing for not all members being local, as defined by the community group) and funds re-invested in the growth of the community energy group. See assumptions for detail. When comparing with 100% commercial delivery the modeling assumes that all commercial development adopts the new industry standard of £5,000/MW awarded to local communities.

Based on the modeling assumptions outlined in this paper, the split between the surplus distributed via the community fund as opposed to that returned to members is roughly 40% fund, 60% member returns. Community funds are the easiest community benefit to quantify, but evidence suggests (for example[29]) a range of other benefits including enhanced community resilience, confidence, and social cohesion and capacity. Successful community energy projects can build confidence and encourage communities to support other projects, such as community shops and pubs. This can be seen for example in Bath and Ashton Hayes to name just two examples.

Quantifying these benefits is however complex. It is beyond the scope of this modeling to account for the full social and environmental benefits of increased community ownership of renewable energy projects through, for example, an analysis of the Social Return on Investment (SROI).

The results of the analysis in this paper do suggest however that the community model, combined with a high proportion of community/commercial split ownership schemes, could retain around 12 times greater economic value at a local level than delivery via a 100% commercial model, if all commercial schemes meet the current industry standard of £5,000/MW for community awards. This ratio could be higher as this standard has been set by the wind energy industry rather than the whole renewable energy sector.

Figure 10: Annual Project Income Retained Locally: 'High (Strong & Sustained)' Scenario



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