Ener-Vate Consultancy Limited

Common Scope ESCo Report

An Informative Review of How an ESCo Entity can be Formed and Structured

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Empowering Communities

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Contents

Document Approval

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01

Introduction

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1 Introduction

1.1 The Project

1.1.1 Ener-Vate Consultancy Ltd and SmartKlub Ltd have undertaken a research project to examine the options for establishing an Energy Services Company (ESCo) at new developments in each of four Local Authority (LA) areas.

1.1.2 The LAs involved in the project are:

- Eastleigh Borough Council,
- Isle of Wight Council,
- Bath and North East Somerset Council, and
- Cornwall Council.

1.1.3 Each of the four LAs listed above have particular development sites in mind and therefore have different specifications, requirements and nuances that require a commercial structure designed to meet the criteria of each site.

1.1.4 ESCo entities can help LAs to facilitate a low/zero carbon local energy system and, depending on the model chosen, can be formed to provide the LA with a source of income through the retailing of on-site (and in some cases, off-site) low carbon energy services including, heating, hot water, electricity and EV charging.

1.1.5 This report forms a wider 'toolkit' available to the four LAs to help them understand the business case for an ESCo model and the benefits it can provide to low carbon energy projects.

1.2 ESCo's and Commercial Structures

1.2.1 A business that sells an energy service adds value to the provision of energy as a commodity by meeting some additional aspect of the customer's needs.

1.2.2 In its most developed form, an ESCo provides a commitment to deliver the benefits of energy to a specified level of performance and reliability whilst providing the ESCo entity itself with long-term revenue streams.

1.2.3 This business model is of particular interest to LAs because an ESCo with a performance contract has a strong incentive to increase the energy efficiency with which it meets its contract, and thereby drive down carbon emissions.

1.2.4 ESCo's can be delivered in the form of many different commercial structures with each project having different specifications and requirements. There is no 'one size fits all' commercial structure that can be applied to every project, however this report will

provide a series of typical 'shell structures' that can then be tailored to the needs of each development as the respective projects progress.[1]

1.2.5 The 'shell structures' contained within this report are briefly explained below:

3rd Party ESCo	The Project Sponsor enters into an Energy Services Agreement (ESA) with a 3rd party that will deliver the low carbon energy scheme through an ESCo entity.
Concession	The Project Sponsor enters into a Concession Agreement (CA) with a 3rd party ESCo to deliver the low carbon energy scheme.
Joint Venture (JV) ESCo	The Project Sponsor jointly establishes an ESCo entity with a Joint Venture Partner to deliver the low carbon energy scheme.
Project Sponsor ESCo	The Project Sponsor establishes a wholly owned ESCo to deliver the low carbon energy scheme.
In-House Delivery	The Project Sponsor develops the low carbon energy scheme without establishing a stand-alone delivery vehicle (such as an ESCo).

1.2.6 Each commercial 'shell structure' will outline the following:

- Roles and responsibilities of each entity involved,
- Control, risk and reward,
- Exit strategies, and the
- Advantages and disadvantages to each ESCo structure.

1.2.7 Case Studies for commercial structures are provided as an Appendix.

[1] Financing Heat Networks in the UK, Grant Thornton, August 2018

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02

The Role of Community Involvement in ESCo's

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2 The Role of Community Involvement in ESCo's

2.1 Introduction

2.1.1 As energy systems become embedded in the built environment due to climate change needs and improved small-scale generation and storage technology, so the role of communities needs to be redefined. This has growing precedence in other industries like agriculture (local farm shops, community shops, animal welfare etc.). How will this play out for energy schemes and how can this assist LAs in their development?

2.2 Localism

2.2.1 Society is seeing a rise of "Localism" where the public consumer does not want to 'be done to' but would rather have an active role to ensure it is done properly. This usually involves a default position of what's local is best. While it can be argued that favouring the local cheese always as the best cheese suffers in its logic on taste grounds, it has merits on its sustainability grounds. Energy rarely suffers from taste comparisons and local usually is best. So, localism is something that LAs should support for energy. By doing so a council will immediately find allies amongst its citizens. And given those citizens are often retired people (with plenty of time and commitment) and the young (with plenty of passion and networking skills), they are good friends to have.

2.2.2 Localism is not just about nearby production using local resources. It is much more than that for energy. It means local companies and jobs who understand the area and its people. Local societies, clubs and faith groups getting involved. But most of all it's about its people who stay loyal to a locality. This loyalty means doing a good job first time and enhancing their reputation for follow on work. It's about being around to address snagging issues and wanting the maintenance work year after year. And being there to share the memory of why an energy scheme was done this way in the first place. This point becomes important as schemes will be bespoke designs and not a standard design, so expect quirks but ensure they're understood.

2.2.3 Research from case studies suggests that localism is beneficial to outcomes including climate change targets and so should be encourage. This is especially true where local authorities are involved because the public trust them to have their interests at heart, unlike the reputation of the incumbent "big six" type energy industry players (whether justified or not).

2.2.4 Therefore, it can be argued that LAs should adopt a strategy of "activating" their citizens to promote a bottom-up movement of dialogue, activities and viral marketing that demands more local energy schemes. Active citizens in community energy are not only more likely to accept planning decisions where sustainability is put ahead of more aesthetic considerations, but also be open to accept new technology. Further research shows that people who are involved in schemes are prepared to change their attitudes and energy behaviours.

2.3 Behaviour Change

2.3.1 Behaviour change will become extremely important in the medium term once the low hanging carbon fruit of top-down change has been made and technology swap outs performed. The next level of carbon savings will require behaviour changes in the way people run their lives, breaking ingrained habits. This is the most difficult personal change to make. Furthermore, once the low hanging fruit are done, central government will push carbon saving targets to LAs to take action. The LAs that have been engaging and inspired by their citizens are much more likely to succeed in promoting behaviour change e.g., allowing their appliances to be run at inconvenient times of the day or moving to use public transport or car share schemes.

2.3.2 Asset financiers also see a benefit in localism for community assets because the adopted behaviours enhance how they are looked after and so achieve better than average results and longer life. Furthermore, as schemes or technology evolve, engaged citizens are more likely to accept necessary changes to operations and usage. This will happen in most schemes as we adapt them to promote energy demand flexibility.

2.4 Community Involvement Opportunities

2.4.1 When it comes to a particular energy scheme, community involvement has a very wide range of possibilities and roles including consultation, formal governance, part or full ownership (including share options or other financing rights), surplus share based on carbon and financial performance, say in appointment of 3rd parties and expansion of schemes.

2.4.2 In considering each of those roles in turn and how they may relate to an ESCO providing services to a residential development, the following opportunities for involvement are possible:

- Consultation - Involving people in any planning decision is both necessary for certain planning matters and advisable for others, it has a special relevance to energy schemes. That's because increasingly, new developments and their supporting energy scheme, will not only affect the immediate site, but will be designed to help the flexibility of retrofit neighbourhoods too. New schemes are relatively easy to make low or zero carbon, while retrofitting is notoriously difficult being disruptive and expensive. Therefore, we predict that LAs will have a future role of using planning powers to strategically task new developments to enable retrofit in old ones. For example, oversizing some energy generation and storage assets to serve the new development as well as the adjacent old developments. This will probably be the most efficient way of the old development homes' grid being able to adopt heat pumps and electric vehicles, without the DNO curtailing their roll out. This will be far reaching and make Section 106 interventions common place and necessary. Perhaps best to have a strategy to help this than leave it to opportunism.

- Community building - New build schemes, have the disadvantage of not starting with a ready-made community. This takes a while to form as the neighbourhood gets to know each other and find common cause. The first cause is often a pooled interest in getting the developer to improve its performance on resolving snagging issues and finishing communal areas etc. An on-site energy scheme provides another focus and can provide a more constructive focus for building

community cohesion. The LA can stimulate this proactively and accelerate the community formation and joined up thinking and action.

- Governance - Local energy schemes have historically been administered to meet their financial goals while obeying minimum customer service and asset husbandry requirements. With localism and sustainability coming to the fore, ESCO scheme administration becomes more complex. Who has the passion and insights best to argue the customers and residents' case? Those affected of course, so why not allow them official roles or a board seat on the ESCO to ensure their involvement with real impact. While this does not need to be to the extent of Tenant Management Organisations, it has clear advantages for understanding and transparency when inevitably trade-off decisions have to be taken.

- Residents' committee - If a full board role on the ESCO is seen as too much governance and involvement, an operational relationship via a development's residents committee is another possibility. The ESCO can agree to share board decisions, present results and undertake consultations via the residents in this way. The advantage of working via a committee over direct connections to the residents themselves, is that the committee can claim to speak on behalf of the community, even if there's a difference of views amongst the residents.

- Shared ownership - part of localism for some is the ability to invest in their communities. For those able to do so, it has much more attraction than some anonymous unit trust, company or far away scheme that may have great sustainability credentials but no direct social or emotional connection. While LAs cannot expect locals to unquestioningly invest in schemes that appear innovative and unfamiliar (and hence risky), they can adopt a stepwise course of action that through transparency builds confidence in the LAs sponsored projects. At least after construction risk has been removed and a year's worth of results can be seen to create a yield. Such an approach could bring forward a LA revolving fund, where locals buy into established schemes while the LA moves forward to the construction phase of the next scheme.

- Community ownership - Community ownership of generation assets and schemes is well known (if still niche) and often founded on government incentives like the feed in tariff. However, for dynamic supply centred scheme like housing energy schemes they are less well known and will take time to evolve into something substantial. We believe that speculation on these now is futile as there is so much learning and development required for the next 10 years. However, neither should entity structures be established that preclude them entirely over the next 25 years, or at a point in time when a technology refresh is required after 20 years say.

2.5 Conclusion

2.5.1 In conclusion, community energy should be seen as a spectrum of people and activities. It does not matter where people start their particular journey on the spectrum, but it does matter that LAs encourage all such initiatives. Once on the journey, citizens tend to become more committed to sustainability hand in hand with localism and therefore more supportive of LA efforts in this direction.

2.5.2 For this reason, any scheme should have careful stakeholder analysis and planning. Traditionally (and despite the best intentions), formal stakeholder planning has often focused on key industry actors and diluted its community efforts. That can be a short-term compromise when it comes to community energy. Society needs to learn how to do this over the next 10 or so years.

2.5.3 Either way, by the time a scheme is operational, and residents are moving in, a very clear set of involvement opportunities should exist, even in draft format. After all the first LA proactivity might be to consult and agree a management approach for the first two years, before more long-term approaches are shaped, agreed and adopted.

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3rd Party ESCo

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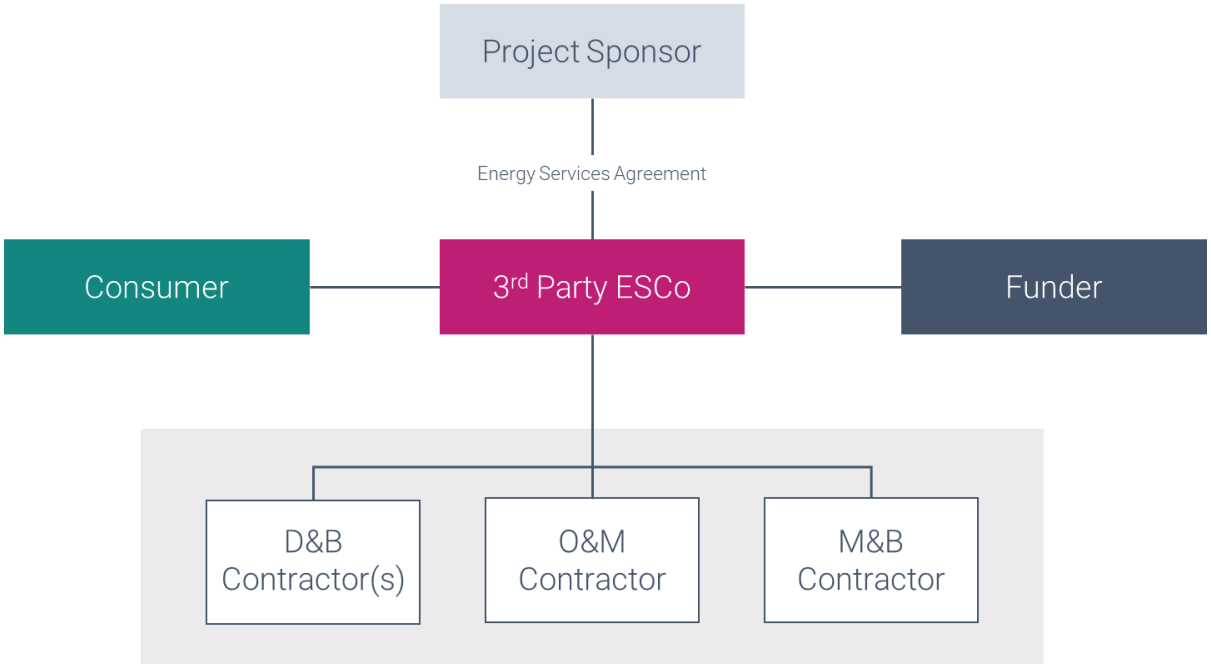
3 3rd Party ESCo



3.1 Roles and Responsibilities

3.1.1 The Project Sponsor will procure a 3rd party ESCo entity to exclusively deliver energy provisions to the site in question through an Energy Services Agreement.

3.1.2 The 3rd party ESCo will be responsible for funding all associated plant and infrastructure capital costs related to the low carbon energy scheme proposed and will therefore own the asset.

3.1.3 The 3rd party ESCo will also be responsible for procuring the following:

- A Design and Build (D&B) contractor to design and build the low carbon energy scheme infrastructure and plant,
- An Operation and Maintenance (O&M) contractor to operate and maintain the low carbon energy scheme throughout a specified concession period, and
- A Metering and Billing (M&B) contractor to meter the energy provisions provided to the site and subsequently bill the consumers for the amount of energy consumed.

3.1.4 The Consumers can be given some consultation rights as to the goals and performance of the ESCo, but this is likely to be limited as it will be seen to encroach on its financial performance during the critical early years. Once mature, a positive role can be found

for incremental expansion of the ESCo to additional services like electric vehicle charging.

3.2 Control, Risk and Reward

3.2.1 The Project Sponsor has no ongoing control over the 3rd party ESCo's contracted partners, future expansion of the low carbon energy scheme or heat and power tariffs. A tariff review mechanism will be embedded in the Energy Service Agreement.

3.2.2 The Project Sponsor will also see no direct financial reward from the success of the project other than costs avoided by procuring a 3rd party ESCo.

3.2.3 This does, however, mean that the Project Sponsor is sheltered from the risk of funding, constructing, operating and maintaining the low carbon energy scheme.

3.2.4 Once the ESA concession period ends, the service provision provided by the 3rd party ESCo to the Project Sponsor will cease. As the Project Sponsor does not own the asset, and the 3rd party ESCo will have no further obligations to the Project Sponsor, the 3rd party ESCo can choose to do as they wish with the asset(s).

3.3 Exit Strategies

3.3.1 As mentioned, at the end of the ESA concession period the service provision to the Project Sponsor will cease and therefore there will be no further obligations on the Project Sponsor itself.

3.3.2 At this point, the Project Sponsor would typically do one of the following:

- Enter into a new ESA with the 3rd party ESCo,
- Buy the asset at a fair value (if this has been stated within the original ESA), or
- Evaluate an option for a more formal role for the community including ownership or part-ownership. This evaluation could be attractive to residents because there is a track record of performance established.

3.3.3 If neither of these options are exercised, the 3rd party ESCo will be responsible for the disposal of the asset(s).

3.4 Advantages and Disadvantages of a 3rd Party ESCo

Advantages	• Allows all technical and performance risks to be passed on to a 3rd party. • Leverages 3rd party expertise and skills.

	• Secures external funding.
Disadvantages	• The Project Sponsor will have limited control over how the low carbon energy scheme is delivered, operated or maintained, potentially making it more challenging for the Project Sponsor to achieve its strategic objectives. • The scheme must meet the 3rd party's return on investment, which could result in higher heat and power tariffs. • Difficult to give communities a meaningful role at least initially.

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Concession

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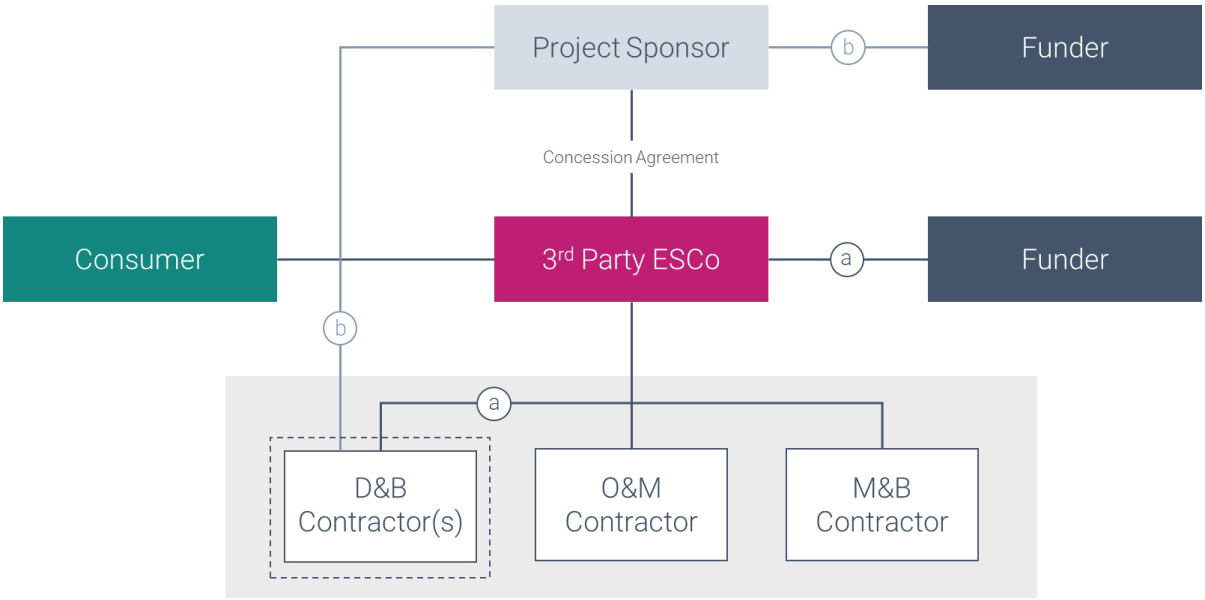
4 Concession



4.1 Roles and Responsibilities

4.1.1 The Project Sponsor will procure a 3rd party ESCo entity to exclusively deliver energy provisions to the site in question through a Concession Agreement.

4.1.2 This commercial structure differs to a '3rd party ESCo' in that the Project Sponsor will own the low carbon energy scheme asset(s), with the 3rd party ESCo operating them.

4.1.3 A Concession ESCo structure can be funded in one of two ways, as denoted in the line diagram:

a) Assets funded by the 3rd party ESCo

The 3rd Party ESCo is responsible for funding the project. The 3rd party ESCo then receives a pre-determined payment per connection from the Project Sponsor and/or consumer. This is often referred to as a 'connection model'.

b) 3rd party ESCo Adoption of Assets

The Project Sponsor is responsible for funding/securing funding for the low carbon energy scheme and builds the assets. The 3rd party ESCo then pays a contribution to the Project Sponsor in the form of a one-off lump sum or a series of long-term annual contributions.

4.1.4 The Project Sponsor's leadership role can include choosing various degrees of community involvement, according to the spectrum described above. However, at these early stages of community ESCO innovation, a cautious approach is advised. Learning rates and innovation potential can be improved by having short concession

periods to allow faster change than standard. This can also be arranged to improve future trust by having an open books approach.

4.2 Control, Risk and Reward

4.2.1 The Project Sponsor retains limited ongoing control over the 3rd party ESCo's contractors unless D&B contractor is directly appointed as per option b in above diagram, future expansion of the low carbon energy scheme or heat and power tariffs. Although the tariffs and a review mechanism will be embedded in the Energy Service Agreement.

4.2.2 As, for this commercial structure, the Project Sponsor will be the owner of the assets, it will want to retain some level of control regarding the Design and Build contractor(s) to ensure they are meeting its operating requirements.

4.2.3 The 3rd party ESCo may want to have some design input for the low carbon energy scheme to ensure optimal performance for the respective systems. The design input can include community consultation and even co-design to take the community with them and in particular accelerate behaviour change.

4.2.4 Using a Concession ESCo structure means the Project Sponsor is exposed to some level of funding and construction risk, however it is sheltered from the risk of operating the scheme and will not see any direct financial rewards from the success of the project other than through contributions paid by the 3rd party ESCo if an adoption structure is implemented.

4.3 Exit Strategies

4.3.1 At the end of the pre-determined concession period, the Project Sponsor will still own the low carbon energy scheme assets and therefore have the option to do one of the following:

- The Project Sponsor can become the operator,
- The Project Sponsor can enter into a new Concession Agreement with the existing 3rd party ESCo,
- The Project Sponsor can enter into a new Concession Agreement with a different 3rd party ESCo, or
- The Project Sponsor can sell the assets.

4.3.2 The end of the first concession period provides an opportunity to increase community involvement. All parties understand viability (especially if open books were adopted) and so increasing community involvement can be arranged to avoid unacceptable risk scenarios to both the community and concession owner.

4.4 Advantages and Disadvantages of a Concession

Advantages	• Allows all technical and performance risks to be passed on to a 3rd party. • Leverages 3rd party expertise and skills. • Secures some level of external funding. • The Project Sponsor is able to influence expansion of the services to specific users and community arrangements.
Disadvantages	• The Project Sponsor will have limited control[2] over how the low carbon energy scheme is delivered, operated or maintained, potentially making it more challenging for the Project Sponsor to achieve its strategic objectives. • The scheme must meet the 3rd party's return on investment, which could result in higher heat and power tariffs. • The Project Sponsor retains liability for the low carbon energy scheme assets. Depending on which route taken, the Sponsor will need to ensure they limit liability through their contracting structure on replacement costs etc, if this is to be flowed down to the ESCo then this will need to factor in consumer prices and recoup for the concession to the sponsor.

[2] The Concession Agreement will set out the rules on how the ESCo will operate at the outset based on an agreed design / approach. The Sponsor will retain control within this document on things like customer tariffs etc – but the ESCo will want / need freedom to operate and maintain the assets within the confines of meeting the agreed service level agreements and key performance indicators.

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Joint Venture ESCo

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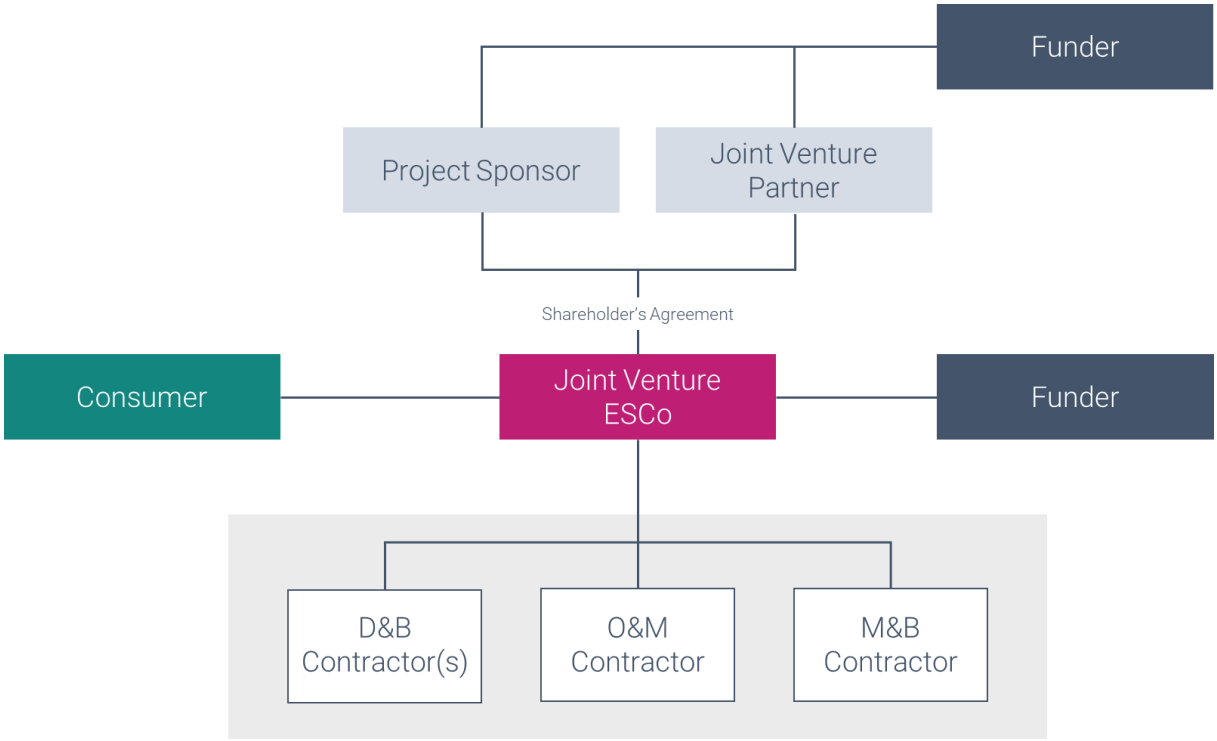
5 Joint Venture ESCo



5.1 Roles and Responsibilities

5.1.1 The Project Sponsor will jointly establish an ESCo entity with a Joint Venture Partner to deliver the low carbon energy scheme.

5.1.2 Both the Project Sponsor and Joint Venture Partner are responsible for securing funding for the project. The relationship between funding and equity distribution between the two parties does not necessarily have to be split equally and will be stated within a Shareholder's Agreement prior to the creation of the Joint Venture ESCo.

5.1.3 The Joint Venture ESCo will be responsible for procuring D&B, O&M and M&B contractors to deliver and operate the low carbon energy scheme, as well as retailing the energy provisions generated/required.

5.1.4 Therefore, the Project Sponsor and Joint Venture Partner will share control over the Joint Venture ESCo which will be both the asset owner and operator.

5.1.5 This option provides the best opportunity for community involvement in that they can jointly or severally play a role as JV ESCO part owner and Financier. This can be seen as a great advantage to Third Parties especially the Financier as the Consumers have 'skin in the game'. In addition, as localism rises, non-consumer local residents increasingly want to invest in their locality even if they are not energy participants. This for many is a preferable use of their savings than some anonymous unit trust.

5.2 Control, Risk and Reward

5.2.1 Both the Project Sponsor and Joint Venture Partner will share control over the Joint Venture ESCo's contractors, future expansion of the low carbon energy scheme and heat and power tariffs offered to consumers.

5.2.2 The Shareholder's Agreement will regulate the decision making in the Joint Venture ESCo. A key element of the agreement would be in relation to how cost overruns are handled.

5.2.3 Using a Joint Venture ESCo, depending on the distribution of equity between the shareholders, both the Project Sponsor and Joint Venture Partner will share the risk of funding, constructing and operating the project. In return, the Project Sponsor will share a direct financial reward from the success of the project.

5.3 Exit Strategies

5.3.1 Both the Project Sponsor and Joint Venture Partner have the ability to sell their shares in the Joint Venture ESCo.

5.3.2 Common exit strategies for Joint Venture ESCo are as below:

- One partner can buy the other partner outright,
- One partner can progressively buy out the other partner over a period of time, or
- A partner can sell their shares to a 3rd party.

5.3.3 It is advised that the Project Sponsor not sell their shares until all design and construction risks have passed and the Joint Venture ESCo is operational. After a track record of secured revenues, the Joint Venture ESCo may be attractive enough to a secondary market.

5.3.4 If the Project Sponsor has a pre-determined aim to sell their shares at some point during the concession period, it is advised that these be written into the Shareholder's Agreement at the start.

5.4 Advantages and Disadvantages of a Joint Venture ESCo

Advantages	• Project Sponsor has some strategic control of the project. • Project risks are spread between the partners. • The Joint Venture Partner may bring expertise, skills and a source of funding. • There are opportunities to exit the project through the sale of shares.

	• Best opportunity for community involvement. This need not happen at start up, but after a few years of proven operation and viability.
Disadvantages	• There are legal complexities in setting up and negotiating the risks for each partner. • The partners will need to agree the direction of the project and how this will be managed. • The project must meet the Joint Venture Partners' return on investment criteria, which could result in higher heat and power tariffs.

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06

Project Sponsor ESCo

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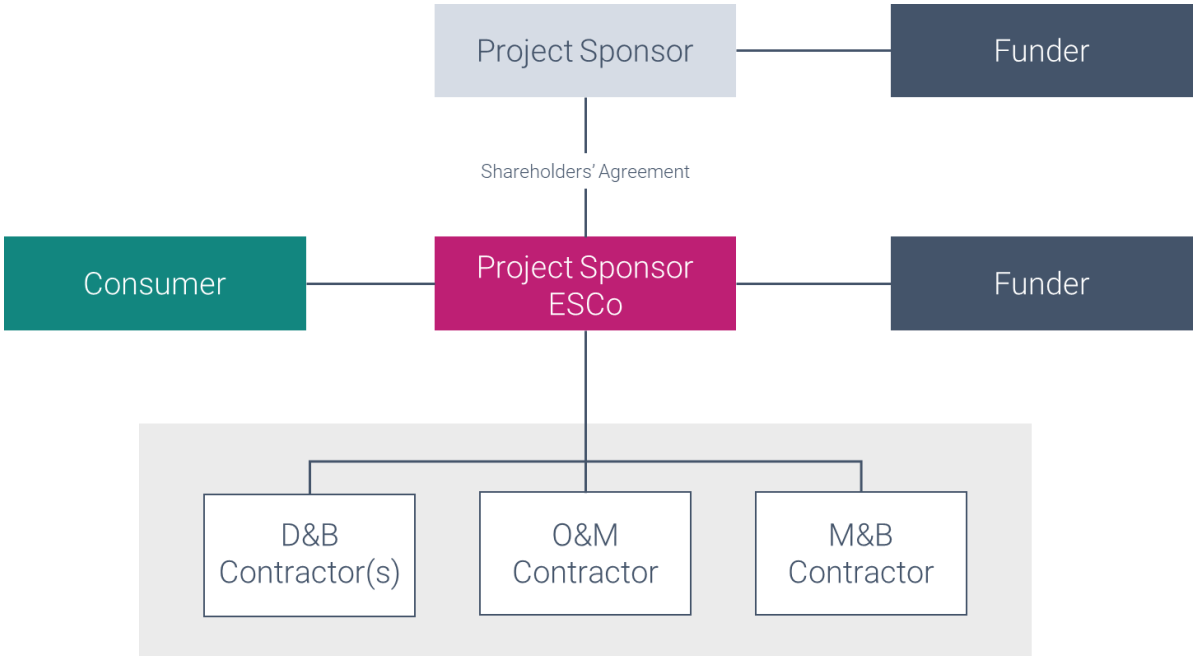
6 Project Sponsor ESCo



6.1 Roles and Responsibilities

6.1.1 The Project Sponsor establishes a wholly owned ESCo to deliver the low carbon energy scheme without a 3rd party.

6.1.2 The Project Sponsor will be the low carbon energy scheme asset owner and operator.

6.1.3 The Project Sponsor will be responsible for funding the low carbon energy scheme as well as the procurement of D&B, O&M and M&B contractors.

6.1.4 The opportunity for community involvement is similar to that of a Joint Venture ESCo, but without the investment options.

6.2 Control, Risk and Reward

6.2.1 The Project Sponsor will have control of the ESCo's contractors, future expansion and tariffs for the low carbon energy scheme therefore giving a lot of flexibility.

6.2.2 The Shareholders' Agreement will regulate the decision making in the ESCo, for example which decisions can be made by the ESCo itself, and which decisions can be made by the Project Sponsor as shareholder.

6.2.3 In return, the Project Sponsor will take on all funding, construction and operation risk. It will also benefit from all of the financial rewards from the success of the project.

6.3 Exit Strategies

6.3.1 The Project Sponsor has the ability to sell its shares in the ESCo or refinance any debt extended to the ESCo.

6.3.2 Similar to the JV ESCo, it is advised that, should the Project Sponsor wish to sell its shares, the low carbon energy scheme should be fully built and operational over a period of a few years to be attractive to a secondary market.

6.4 Advantages and Disadvantages of a Project Sponsor ESCo

Advantages	• Project Sponsor retains all strategic control over the project such as future expansion and setting heat and power tariffs. • Opportunities to exit the project through the sale of shares and/or refinancing of project debt.
Disadvantages	• Project Sponsor is exposed to all project risks (if not passed down to contractors). • Responsibility for funding/securing funding lies with the Project Sponsor. • The Project Sponsor will need to procure external expertise and skills. • While this structure offers all of the community energy involvement described for JV ESCOs, it comes with much higher risks as the LA will be seen as accountable for any adverse outcomes. However, this scheme could incorporate community involvement without direct financial involvement. For instance, a LA sponsored Housing Association scheme.

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07

In-House Delivery

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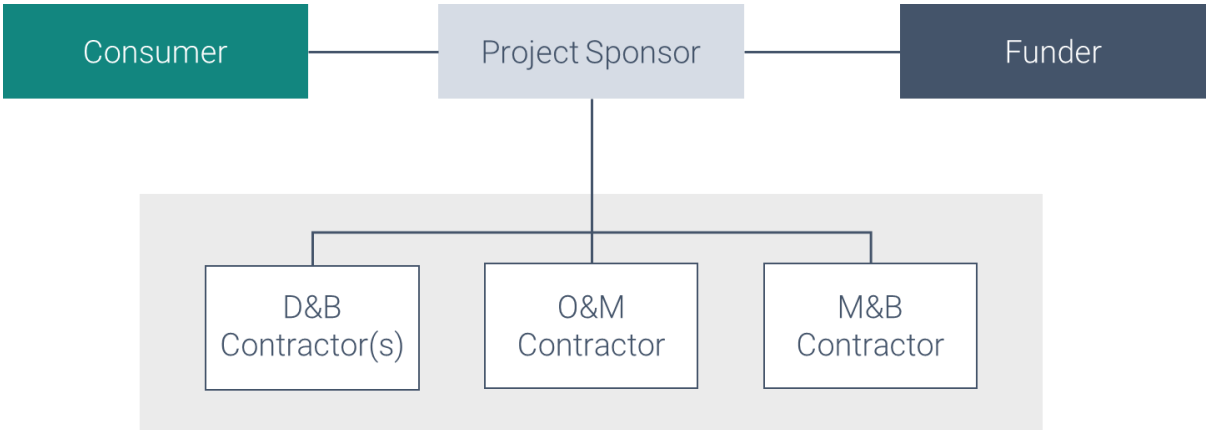
7 In-House Delivery



7.1 Roles and Responsibilities

7.1.1 The Project Sponsor delivers the low carbon energy scheme without establishing a standalone delivery vehicle.

7.1.2 The Project Sponsor will be the low carbon energy scheme asset owner and operator.

7.1.3 The Project Sponsor will be responsible for funding the low carbon energy scheme as well as the procurement of D&B, O&M and M&B contractors.

7.2 Control, Risk and Reward

7.2.1 The Project Sponsor will have full control of the delivery of the low carbon energy scheme including contractors, future expansion and tariffs.

7.2.2 In return, the Project Sponsor will take on all funding, construction and operation risk. It will also benefit from all of the financial rewards from the success of the project.

7.2.3 Community investment for In-House delivery is the same as that for a Project Sponsor ESCo.

7.3 Exit Strategies

7.3.1 Exit strategies are limited for In-House Delivery as there is no separate entity to sell shares in or refinance. The assets can be sold to a 3rd party.

7.3.2 Alternatively, an ESCo could be set up retrospectively and the trade transferred to this ESCo to enable divestment of the project.

7.4 Advantages and Disadvantages of In-House Delivery

Advantages	• Project Sponsor retains all strategic control over the project such as future expansion and setting heat and power tariffs. • Costs of establishing and running an ESCo are avoided.
Disadvantages	• Project Sponsor is exposed to all project risks (if not passed down to contractors), including limited commercial protection from the liability of the project if it fails. • Responsibility for funding/securing funding lies with the Project Sponsor. • The Project Sponsor will need to procure external expertise and skills. • Opportunities to exit the project are limited. • May result in irrecoverable VAT. • For public bodies, In-House Delivery can result in revenues from the project being taken and used elsewhere without consultation. This can be detrimental to a low carbon energy scheme if not handled properly. • While this structure offers all of the community energy involvement described for JV ESCOs, it comes with much higher risks as the LA will be seen as accountable for any adverse outcomes. However, this scheme could incorporate community involvement without direct financial involvement. For instance, a LA sponsored Housing Association scheme.

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08

Commercial Structure Conclusions

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8 Commercial Structure Conclusions

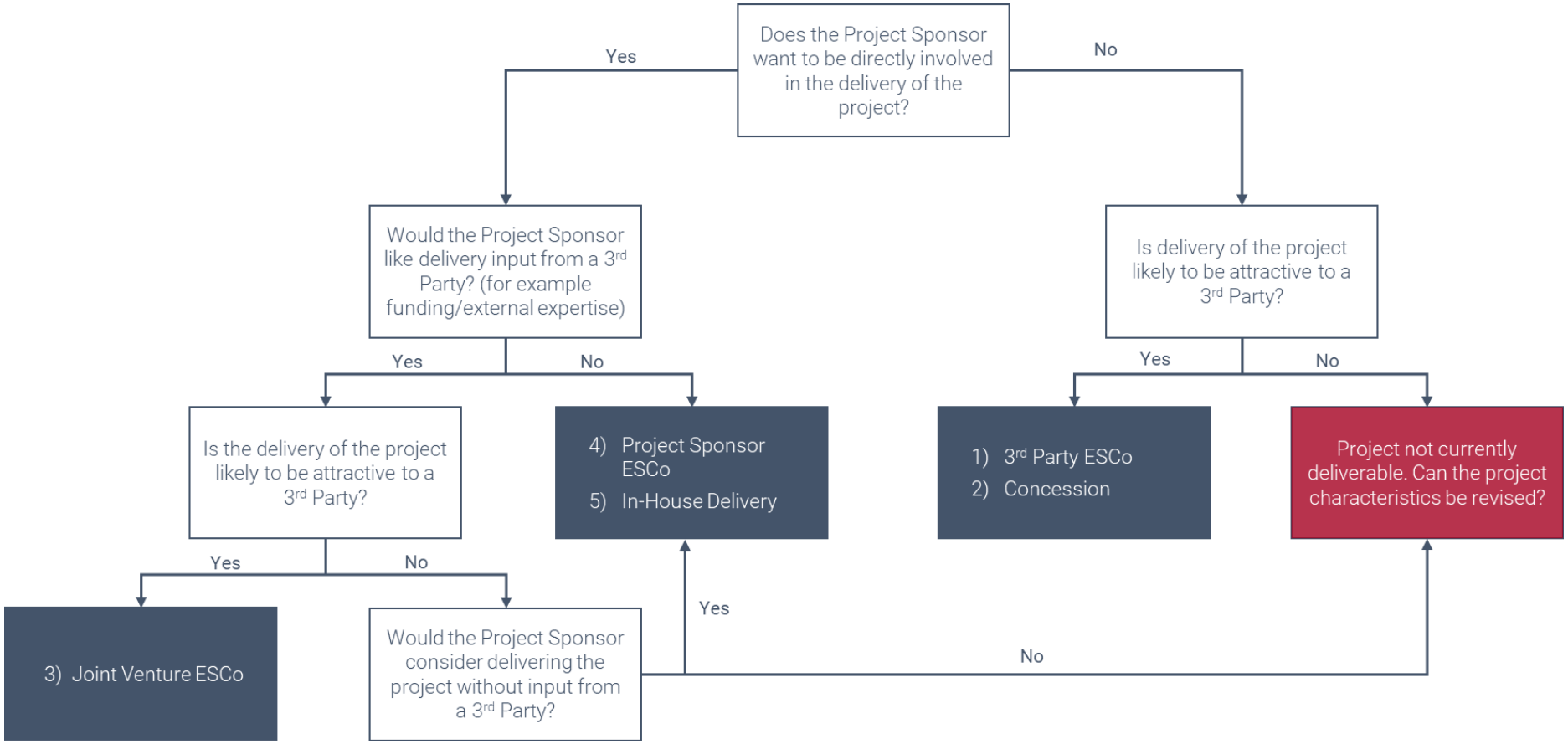
8.1 Control over Roles and Responsibilities for the Project

8.1.1 Below is a simple matrix summarising the control that the Project Sponsor will have over the roles and responsibilities associated with the project. The matrix has been given as a summary only and each council should also take into account the risks associated with each commercial structure before deciding the route they wish to take.

	3rd Party ESCo	Concession	Joint Venture ESCo	Project Sponsor ESCo	In-House Delivery
Control over Procurement of Contractors	None	Limited	Yes (shared with JV Partner)	Yes	Yes
Control over Construction & Delivery	None	Limited	Yes (shared with JV Partner)	Yes	Yes
Access to 3rd Party Skills	Yes	Yes	Yes	No	No
Funding Required	None	Some	Some (dependent on JV equity split)	Yes	Yes
Control over Heat and Power Tariffs	None	Limited	Yes (shared with JV Partner)	Yes	Yes
Financial Reward	None	Some	Yes (shared with JV Partner)	Yes	Yes
Control over O&M of System	None	None	Yes (shared with JV Partner)	Yes	Yes
Control over Future Expansion	None	Limited	Yes (shared with JV Partner)	Yes	Yes
Exit Strategy(s)	Moderately Good	Very Good	Good	Good	Bad

8.2 Delivery Tree

8.2.1 Below is a 'delivery tree' to support each council in their decision-making process. The following questions should be answered in relation to the intention of the Project Sponsor and attractiveness of the project to delivery by a 3rd party.



8.3 Risk Matrix

8.3.1 Below is a matrix outlining the common risks associated with low carbon energy schemes and applies to all commercial structures previously mentioned within this report. This is also available in Appendix 5 in full size.

Ref.	Risk	Potential Impact	Mitigation Action	Likelihood	Impact	Risk Score
Design Risk						
1	Power and heat demands are different to the assumptions and forecast	Plant and infrastructure may be under/over sized to meet the assumed demands	During system design, a technical consultant should be contracted to project power and heat loads	2	3	6
2	Plant and infrasatructure is not sized properly for the demand required	The system will be: Inefficient if the plant/infrastructure is over-sized; or Under-sized, therefore not providing enough energy to heat and/or power the development	Plant and infrastructure should be designed alongside projected heat demands provided by a technical consultant (above)	2	3	6
3	Capacity for future connections to the project not included at design stage	The project cannot be expanded without further significant capital costs	The Project Sponsor should be aware of any existing and future buildings/developments situated close to the project. The developers/landlords of said buildings/developments should be contacted prior to completion of the design stage to gauge their appetite to join the scheme. The ESCo should also remain cash positive in its own right without having to rely on future connections	2	2	4
Construction Risk						
4	Land owners do not give consent to easements / wayleaves for works associated with the projects	Delays to the build programme, Re-routing of infrastructure, Additional costs to the project.	Each council should have intial agreements set in place for parcels of land not under their control contained within their development(s) for any proposed works	2	4	8

5	Obstructions in the ground prohibiting utility works associated with the project	Delays to the build programme, Re-routing of infrastructure, Additional costs to the project.	Full surveys should be completed by the Contractor at each site	2	4	8
6	Delays to customer connections	Revenues will be lost due to customers connecting late. These cannot be recouped.	Updates to the masterplan and build-schedule should be shared throughout the whole team (Project Sponsor, ESCo, Contractors, Consultants/Advisors) to inform them of any changes as quickly as possible	2	4	8
Operation and Performance Risk						
7	Operational performance of the project not meeting the requirements set out	Poor operational performance can lead to financial, environmental and/or social impacts	Mitigation the same as No. 2. All plant and infrastructure for the project should be designed and implemented by a trusted partner to a given specification derived using technical consultants	2	4	8
8	Replacement of plant over the concession period	If replacement of plant is not taken into account at the beginning of the period, the ESCo or Project Sponsor (dependent on the commercial structure) will be responsible for paying the capital costs of replaced equipment	The Project Sponsor/ESCo should be aware of plant replacement costs and the year they will need to be replaced. The Project Sponsor/ESCo can accrue money annually so they are prepared for any plant overhaul	2	3	6
9	Do the Project Sponsor have the skills necessary to run a successful ESCo (if no 3rd Party skills are accessible)	The ESCo is not run correctly resulting in poor performance and/or financial reward	The Project Sponsor should ensure they have the necessary skills to run an ESCo entity if they do not contract with a 3rd party. There are entities that do not wish to have an equity stake in an ESCo but are willing to sit beside the Project Sponsor for a pre-determined fee to advise them on how to run an ESCo	2	3	6
Financial Risk						
10	Increase in capital cost figures for the scheme due to unforeseen circumstances	Commercial viability of the ESCo	Cost security is imperative. Design stage cost plans should contain contingency in case of unexpected costs. During the commercialisation process the designs will be developed and cost plans more secure. All cost plans should also be audited by a third party Quantity Surveyor.	2	5	10

11	Funding requirements and interest rate movements	Commercial viability of the ESCo	The Project Sponsor/ESCo should be aware of the funding terms they are contracted under, including but not limited to repayment amounts and dates, the rate of interest and any penalties applicable for defaulted payments	2	2	4
12	Tax Implications	Commercial viability of the ESCo	The Project Sponsor should employ an entity to calculate any compulsary tax payments as well as potential further tax payments dependent on the operation of the project	2	2	4
Regulatory Risk						
13	Incorrect license exemptions	Potential to incriminate the Project Sponsor/ESCo	The Project Sponsor/ESCo should be aware of the license(s) they may have to obtain, or if this is not applicable then they should be aware of the rules that prove them exempt from obtaining said license(s)	2	4	8
14	Government subsidy requirements not being met	Commercial viability of the ESCo	If the Project Sponsor applies for grant/loan funding, requirements and timescales would have to be met in order to receive it. The funds available can sometimes prove a project viable/unviable and so should be seriously considered	3	4	12

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09

ESCo Optimisation

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9 ESCo Optimisation

9.1.1 Every energy system must be operated within its design criteria to achieve its performance targets. Historically these targets used to be purely financial within the envelop of its governing contracts. However, within the world of climate change and rising energy prices, there are mutually exclusive targets that makes operation more complex. What is often called the energy trilemma, demonstrates this clearly when looking at Carbon and Cost in addition to the traditional Security of Supply. To flex one of these has an adverse effect on the other two. If you then add localism in the criteria it makes it more complex still. Therefore, when designing a scheme and its performance targets, it's essential to be clear on your trilemma hierarchy.

9.1.2 However, this can be offset somewhat by flexibility within the energy system that allows the system to be optimised throughout the day, season and energy value chain as it evolves. There are several factors when designing a system, that improves its optimisation potential. These essentially revolve around the system's diversity - the more diverse the larger the optimisation potential. Diversity can be increased by considering these factors:

- Energy generation components - a mix of PV, wind, solar thermal, CHP and various heat pump technologies each with strengths and weaknesses allow better generation performance over the day and seasons especially cross energy vector opportunities.
- Storage components - electrical and thermal storage provide the ability to disconnect demand from supply for periods of the day and so provide flexibility to optimise. Electric Vehicles are particularly attractive as they have the potential to act as loads and storage while being financed for transport needs alone.
- Customer mix - residential customers have morning and evening peaks of demand, while community facilities and commercial businesses usually have a working day demand peak. Including both in a scheme improves diversity.
- Ancillary services - By supporting the grid through various energy market mechanisms (Firm Frequency Response, Capacity Market, Triads, Balancing Mechanism, flexible Power Purchase Agreements), provide revenue earning potential in addition to supply of onsite renewables to the connected building.
- Network - while private wires via iDNOs offer cost effective solutions for 'islanded' systems, even with grid independence (for those that it is important to), it can also limit diversity. Society's grid run by the DNOs has the most diversity and may be the long-term option for optimisation.
- Smart system and Internet of Things (IoT) - by connecting loads within homes and businesses via increasing affordable and ubiquitous technology like IoT, both appliance savings as well as behaviour change can be included to add diversity.

9.1.3 All the above options can be managed by simple to sophisticated smart systems to optimise operations, carbon savings and revenue flows. This is achieved by both taking opportunities the grid and connected customers offer as well as arbitraging between the value signals to achieve the scheme's aims. Significant R&D is being invested to bring such services to market by large and small energy companies

alike. The market is currently being led by small suppliers and aggregators but this is changing rapidly.

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10

Procurement
Of a 3rd Party Partner

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10 Procurement of a 3rd Party Partner

10.1 Introduction

10.1.1 The procurement of a third party ESCo partner should be carefully considered in the way that this is approached. There are three critical advisory roles that will be needed to support a client on the journey of appointing an ESCo partner; Commercial, Technical and Legal. Depending on the desired commercial structure there could be a need for Project Management and Quantity Surveyor roles also, this is explored later in this document.

10.1.2 The process of appointing a third-party ESCo partner can be summarised across six key stages.

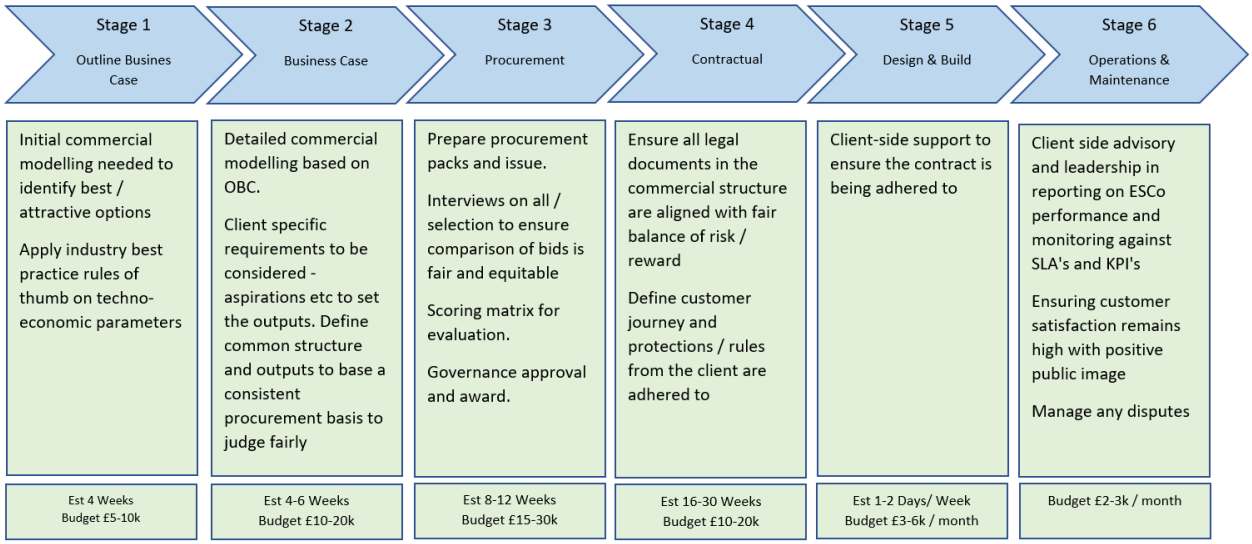
- Stage 1 Outline Business Case
- Stage 2 Business Case
- Stage 3 Procurement
- Stage 4 Contractual
- Stage 5 Design & Build
- Stage 6 Operations & Maintenance

10.1.3 A more detailed description of the six stages is contained in the report below.

10.1.4 Each of the three key advisory disciplines will be needed across the six key stages, however the timing when these disciplines are engaged will not be all concurrent. All too often the initial reaction is to engage a technical designer to develop the project concept. Whilst this is not necessarily the wrong thing to do, from our experience within the industry, this can sometimes lead to a high-engineered bells and whistle technical solution that is often unaffordable to deliver and ultimately gets simplified to suit the commercial budgets and return on investment criteria.

10.1.5 Managing the timing when the disciplines are engaged is also key to managing costs for developing a project. Whilst this is an up-front capital commitment to developing a project, these costs can be recovered from the commercialised project if this is engineered in the right way from the outset.

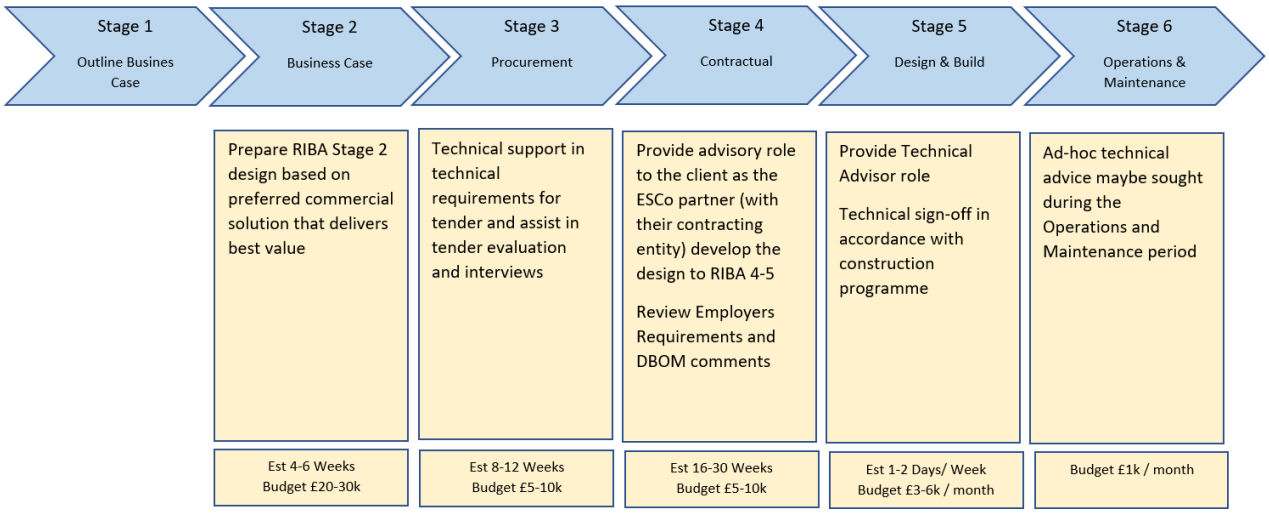
10.2 Commercial Advisory Role in ESCo Partner Appointment Capacity for a Client



10.2.1 The graphic above is a summary of the roles in which a Commercial Advisor will support a client in the journey across the six key stages. Below each of the stages in an estimation on the time and financial budget that should be considered for this service.

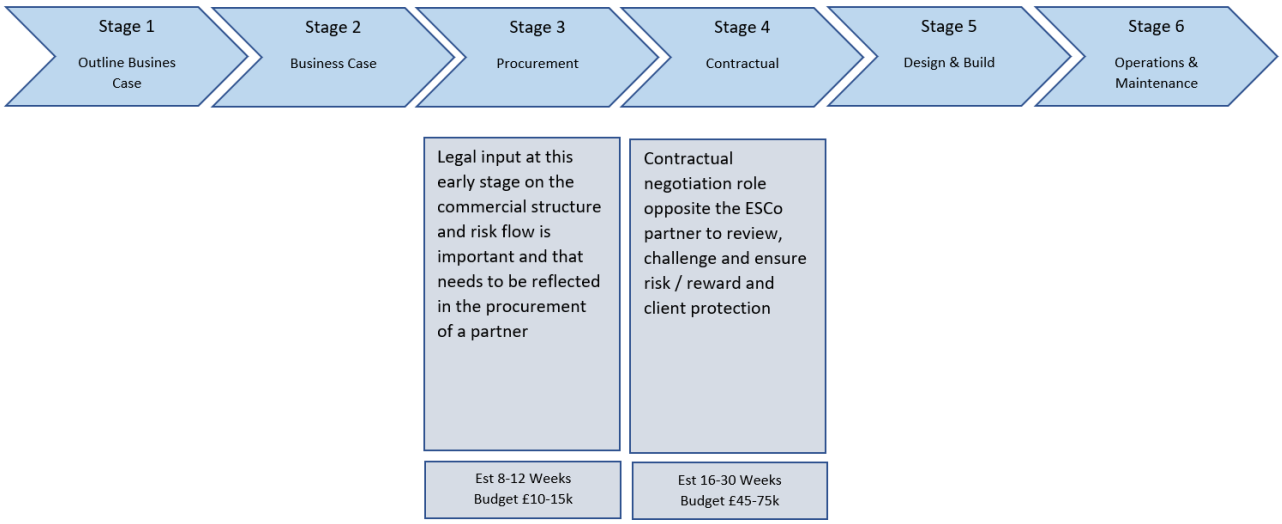
10.3 Technical Advisory Role in ESCo Partner Appointment Capacity for a Client

10.3.1 The key roles for a Technical Advisor in supporting a client across the six key stages is shown in the graphic below.



10.4 Legal Advisory Role in ESCo Partner Appointment Capacity for a Client

10.4.1 The key roles for a Legal Advisor in supporting a client across the six key stages is shown in the graphic below.



10.5 Stage 1 - Outline Business Case

10.5.1 Prior to embarking on a technical solution, appointing a Commercial advisor who has a strong technical background within the sector can help limit initial technical expertise and shape the project, within tolerances, that suit the investment budgets and the returns on investment that are acceptable within the market. During this initial process, the commercial structure is also developed that should be based on their previous working experiences and provide a foundation on which all parties' roles, responsibilities, risks and rewards are mapped accordingly.

10.5.2 This initial process we define as an Outline Business Case (OBC) This stage will take onboard any initial high-level feasibility studies that have been undertaken to date and, after interviewing all interested stakeholders allow the commercial advisor to shape a project and offer some scenarios to consider. The output of this process would result in a ranked preference of models, based on commercial returns, to progress to the next stage.

10.5.3 The methods of finance for the scheme should also be given some consideration at this stage. A high-level options appraisal can be provided based on the outputs of the Outline Business Case that reflects what is acceptable in the commercial markets as well as self-financing routes.

10.5.4 Depending on the scale and complexity of the scheme, the estimated time to conclude this process is approximately 4-weeks with an estimated budget range of £5-10k.

10.6 Stage 2 - Business Case

10.6.1 The next stage in the process is to take the Outline Business Case and further develop this into a more robust and tested model. To do this, at this stage a Technical Advisor should be sought to develop the concept design. Working collaboratively, both the

Technical and Commercial advisory team will be able to refine the commercial cost assumptions within the model with regards to Capital, Operational and Replacement costs (Capex, Opex and Repex) based upon a RIBA stage 2 design approach.

10.6.2 The commercial structure will then be refined based upon any key stakeholder requirements with clear benefits identified in taking this approach. The Business Case output will also include a market appraisal for the next step in the process, procurement.

10.6.3 The route to funding the scheme will at this stage also be better understood. The Commercial advisor will be able to provide scenarios and the options for funding and routes to where this can be sought, including the identification of any grants, loans or other funds that can be attracted to the scheme.

10.6.4 Depending on the scale and complexity of the scheme, the estimated time to conclude this process is approximately 4-6 weeks with an estimated budget range of £30-50k across the Commercial and Technical disciplines.

10.7 Stage 3 - Procurement

10.7.1 The procurement stage is the right time to consider introducing a client Legal advisor to the team. Collectively, as a client advisory team, a procurement strategy will be developed that ensures the market engagement pack / tender pack is aligned, robust, structured and above all provides a basis on which all respondents can be equally and fairly assessed.

10.7.2 By approaching the procurement process in this methodological manner, with the prior stages leading to this point, will ensure all respondents to the tender are on a level playing field on which to judge. Rushing into a market engagement process that doesn't have a defined scope and is wide in its requirements will lead to respondents offering different solutions making it difficult to judge best value properly and fairly.

10.7.3 Well defined scopes based on the Business Case, RIBA Stage 2 design and cost plan along with the preferred contractual / commercial structure will make it clear what respondents are being asked to provide. Variations to the tenders can be considered as added value which may allow respondents to put in an additional bid alongside their compliant tender.

10.7.4 A well-designed scoring matrix should be developed with an appropriate weighting mechanism that reflects the stakeholders' requirements. This should be transparently shown within the tender pack.

10.7.5 Respondent interviews should be undertaken to allow them to present their proposition and provide time for the client and the advisory team to question and seek clarifications on any responses. Depending on the number and quality of the respondents, a decision to score the tenders and produce a short-list prior to interviews should be considered.

10.7.6 At the end of the procurement exercise, a preferred bidder will be identified. At this stage, the outputs of the procurement process should be reflected in the commercial model to update the business case, which may now include for a base-case, low-case and upper-case scenario with some tolerances on any key sensitivities / inputs.

10.7.7 Time within the procurement process should be allowed for all internal governance to seek approvals to proceed – or not as the case may be.

10.7.8 Depending on the scale and complexity of the scheme, the estimated time to conclude this process is approximately 8-12 weeks with an estimated budget range of £30-55k across the Commercial, Technical and Legal disciplines.

10.8 Stage 4 - Contractual

10.8.1 If it is decided to continue with the project, the next stage is to officially appoint an ESCo partner and enter into the Contractual phase. This is often an intense collaborative process, which can be protracted depending on the scale and complexity of the commercial structure.

10.8.2 The ESCo partner will now be responsible for developing the commercial model, detailed design to construction level (RIBA 4-5) and the legal suite of documents to enter into contract.

10.8.3 To support this process and to ensure the client is protected, it is important for both the Commercial and Technical advisors to remain on the team alongside the Legal partner to ensure the Business Case doesn't deviate radically from what has been approved and committed to. The detailed nature of ESCo's is finely balanced. A minor amendment on one level can have a significant impact on associated levels within the commercial / legal structures.

10.8.4 The retention of the Commercial and Technical advisors at this stage is important to challenge and flag impacts and test the ESCo's model by retaining the Business Case model in shadow.

10.8.5 Negotiating the contracts should not be underestimated. Depending on the complexities of the scheme, the layers of legal documents can be significant. The time taken at this stage can be protracted depending on the commercial sensitivities and end-user connection and supply agreements that need to be secured to a high degree.

10.8.6 Depending on the scale and complexity of the scheme, the estimated time to conclude this process is approximately 16-30 weeks with an estimated budget range of £60-105k across the Commercial, Technical and Legal disciplines. Clearly, at this stage, the Legal costs are by far the highest budget.

10.9 Stage 5 - Design & Build

10.9.1 Retaining both the Commercial and Technical advisory roles during the Design & Build stages is very important. From a commercial perspective, it is imperative the contract is adhered to and any changes or variations are managed with minimal commercial impact to the structure of the scheme and / or end users.

10.9.2 At this stage on the project, depending on the commercial and contractual structure, there may be a need for a Project Manager and Quantity Surveyor role. The D&B risk should clearly rest with the ESCo entity, however, in some circumstances, it can be the case that the client / developer is responsible for the D&B element and the ESCo adopts the built asset. Managing the contractor is challenging and risky with regards to managing programme delays and variations.

10.9.3 On the basis that the D&B element is wrapped with the ESCo partner and they manage the risks, depending on the scale and complexity of the scheme, the estimated time to conclude this process is approximately 1-2 days per weeks for each of the Commercial and Technical advisor roles with an estimated budget range of £6-12k per month.

10.10 Stage 6 - Operations & Maintenance

10.10.1 From our experience, maintaining client Commercial advisory throughout the Operations and Maintenance period is essential to ensure the ESCo partner is delivering and maintaining the agreed Service Level Agreements (SLAs) and Key Performance Indicators(KPI's). These agreed metrics within the Contractual period of the project are the regular dip-tests to measure customer satisfaction and over efficiency and performance and that all objectives and targets set out initially in the Business Case are being met across the stakeholders.

10.10.2 The Commercial advisor will have been intrinsically involved with the project from the concept stage. This continuous knowledge is priceless to a client. Whilst only a relatively light touch, the advisory role during this phase will pragmatically monitor the ESCo performance, challenge where necessary and ensure industry standards are being met with excellent customer servicing.

10.10.3 From time to time, during the Operations and Maintenance period there may be a need for ad-hoc Technical advisory services to challenge any discrepancies with the ESCo's approach / recommendations to planned preventative maintenance and reactive maintenance issues. It is advisable to retain a Technical advisor during this period.

10.10.4 The Commercial advisory role is only required on an average of 2-3 days per month. During this time, the agreed reporting templates for ESCo monitoring and reporting will be collected, reviewed, challenged, and tested. The outputs of the monthly reports will be summarised to the client with a summary on any commercial impacts of the project and returns on investment. Typically, a more detailed quarterly report will be developed for distribution with investors / governance boards.

10.10.5 A budget allowance for the Commercial Advisory role is £2-3k per month. Retaining a Technical Advisor is also recommended with a charge agreement on an ad-hoc basis and fixed day-rates.

10.11 Summary

10.11.1 The client advisory team are fundamental to the success of an ESCo partner procurement. Selecting your advisors should be carefully considered from the outset. They should have the capability, skills and demonstrable experience in taking a project from concept to operation and have the in-depth knowledge across the many disciplines.

10.11.2 Maintaining the advisory team is also important for consistency, which will deliver efficiencies in time and resource to effectively manage changes as the project evolves with the deep understanding of the impacts this can have across the contractual relationships and customers.

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11

Stakeholder Analysis

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11 Stakeholder Analysis

11.1 Introduction

11.1.1 The purpose of this section is to enable ESCO project initiators to undertake stakeholder analysis in order to create a stakeholder plan. The approach outlined in this ESCO toolkit follows the following 5 step process:

List specific stakeholders from a set of typical stakeholders

- For each stakeholder assess their:
- Available resources or “haves”.
- Desired outcomes or “wants”.
- Importance by prioritising them.
- Identify potential stakeholder dependencies by marrying up haves and wants across a stakeholder matrix.
- Use dependencies to describe possible treatments for each stakeholder in order that they achieved their wants or outcomes while making their haves or resources available to your project.
- Socialise, agree and track the treatment plan with stakeholders to achieve mutually beneficial project outcomes.

11.1.2 A spreadsheet template (see Appendix 5) has been created in order to manage the 5-step process. Make a copy of the spreadsheet and update as you undertake the steps.

11.2 Stakeholder Listing

11.2.1 Every project will have its own unique set of parties involved, each with a role to play. It is important to recognise who they are and what influence they can have on your project’s success. Some may be directly involved protagonists, while others may unknowingly be involved indirectly. List them all initially, you can always discard ones that prove less influential on your project after Step 2 below.

11.2.2 For a community based ESCO project the most likely stakeholders are below grouped as to their typical role. For each group, decide who are your specific named stakeholders. Apply 80/20 rule to ensure you capture the most important while preserving the bandwidth to manage the final number.

11.2.3 Citizen Groups

- Local citizens - people with an interest in a clean, robust and sustainable locality
- Residents affected - people who are directly affected by being supplied by the ESCO’s energy.

- NGOs - Established Sustainability Activists such as: Friends of the Earth, Greenpeace, Worldwide Fund for Nature, Extinction Rebellion
- Environmental campaigners - informal groups of citizens active in improving the area's sustainability.

11.2.4 Commercial:

- Developers - the private companies, housing associations that build homes and commercial property in the region.
- Landlords - the owners of the rented sector including council properties, Housing Associations and Registered Social Landlords.
- Local Enterprise Partnership - the local LEP tasked with developing jobs and the region's economy.
- Chambers of Commerce - and similar bodies that represents the interests of local business and national suppliers.
- Financiers/Investors - the providers of capital to viable schemes.

11.2.5 Local Authority:

- Planning Department - the local planning authority that approves development schemes.
- Inward Investment Group - local council department or quango that attracts inwards investment to the region.
- Sustainability or Environmental Officers - those tasked with setting and achieving local sustainability targets.
- Members - the elected councillors whose responsibility it is to achieve the manifesto pledges made.

11.2.6 Energy Industry:

- Distribution Network Operator - the DNO responsible for new connections and grid expansion, with growing remit for enabling renewables and community schemes.
- iDNO - independent private networks companies for private wire arrangements
- Licensed Suppliers/Generators/Aggregators - power market for supply and PPA as required.
- ESCo Operators - companies that help design/build/operate the energy system and customer service on behalf of the new power/heat ESCo.
- Heat providers - companies that design/build/operate heat systems on behalf of the new power/heat ESCo.

11.2.7 Govt./Regulators:

- UK Govt. - The owner and facilitator of the overall Climate Change policy targets
- BEIS - Department for Business, Energy and Industrial Strategy - The Govt department mostly responsible for Govt. strategy and policy interventions as well as some exemptions
- Ofgem - the regulator responsible for most market rules, exemptions and derogations

11.2.8 Local Media - all wanting stories of citizen action and controversies of non-compliance:

- Local BBC Radio/TV
- Commercial Radio
- Regional Newspaper
- Online channels.

11.2.9 Update the Assessment tab on the spreadsheet with your long list of stakeholders by using the examples to identify real parties you will interact with. Add Others too that may be unique to your scheme.

11.3 Stakeholder Assessment

11.3.1 Each stakeholder has resources and privileges ("haves") at their disposal that may be of use to you. Some of these may be regulated and some discretionary. In both cases, there is a right way and wrong way to interact with the stakeholder in order to obtain their attention and approval to access their resources. Sometimes it may take creative tactics in order to get the stakeholder to support your scheme. Such creativity usually concerns being able to provide the stakeholder with their "wants". This can happen in a roundabout way via a trusted third-party stakeholder to create a dependency. In order to maximise your chances of creating such dependencies, you first must identify their haves and wants.

11.3.2 Available resources or "haves" - these are resources that you wish to access from various stakeholders in order to implement your scheme.

11.3.3 Desired outcomes or "wants" - these are the resources that you or other stakeholders have that the resource holding stakeholders want.

11.3.4 For example, a community group that wants planning approval for a scheme, may have to demonstrate widespread public support. This can be hard to show with limited people and money to conduct a survey. However, the local newspaper likes to run campaigns on public interest stories (it's want). Maybe they would run your story (you're have) to create the publicity to deliver your marketing reach while publishing an online survey link to get responses and then follow up with a story on the survey results?

11.3.5 Below are some typical haves and wants for the stakeholder groups above. Tailor these (on the Assessment tab on your spreadsheet) for your stakeholders for your scheme's situation by adding the haves and wants:

Stakeholder	Typical Haves	Typical Wants
Citizen groups:	Citizen groups:	Citizen groups:
Local citizens	People power with David v Goliath potential. Numbers to campaign for and against local schemes and register support or dissatisfaction	A better living environment with robust communities for their families with local jobs and affordable living
Residents affected	Ability to support or reject proposals. Real stories of hardship and being the underdog in a campaign	Homes and energy provision that support their sustainability beliefs at an affordable price
NGOs	Expertise in statutory planning/objection processes as well as ability to campaign effectively and tap into national campaigning resources. Links to sympathetic journalists	To make a difference towards a better world with recognition from policy makers and their donors
Environmental campaigners	Sufficient belief and indignation to put their heads above the parapet and be vocal when protesting for good causes or against bad ones	Purpose in their lives being seen to make a difference to the wider world
Commercial:	Commercial:	Commercial:
Developers	Land, access to capital and traditional expertise in planning and development approaches. Forward thinking ones have budgets to innovate and create more sustainable homes with energy generation	Need planning approvals to develop their land. Recognition that they are embracing sustainability. Happy homebuyers that believe they are getting value
Landlords	Balance sheets that support change to new methods of sustainable living	Happy tenants with affordable bills. Good total cost of ownership for their buildings and operating costs
Local Enterprise Partnership	Grant funding to help develop local economy. Influence on central govt policy making. Role in creating regional jobs strategy	Jobs and job creating businesses to inwardly invest
Chambers of		

Commerce	Business networks and supply chains for local traders. Understanding of business obstacles that require resolution to promote economic development	Happy and new members who see value in their services. New ideas for services such as easy sustainability actions for SMEs
Financiers/ Investors	Capital in search of the right asset classes that will make safe returns	Energy project-based asset class options where returns are stable and enduring
Local Authority: Planning Department	Local Authority: Ability to sanction or refuse planning applications and associated Section 106s etc.	Local Authority: Applications that meet council and national policy for development including sustainable schemes
Inward Investment Group	Budget to help and advance inward investment schemes that are in line with regional development policies	Reach to national businesses that want to locate to their region
Sustainability or Environmental Officers	Support and expertise for sustainable developments. Influence with Planning Authority and Members	Viable schemes and additional expertise from commercial and community partners
Members	Ability to authorise council resolutions and development applications into force	Achievement of election promises and targets. Good press coverage to show they are improving the local area for citizens and businesses
Energy Industry: Distribution Network Operator	Energy Industry: Regulated capital to extend the power network in line with their plan agreed with Ofgem. Additional capability to develop network outside this plan when funding provided by scheme sponsors	Energy Industry: Being seen to support housing and business developments and not stifle progress. Good news citizen led stories supporting sustainability in communities. New capabilities to become system operators

iDNO	Capability to build private networks outside the DNO scope	Schemes that want private wires
Licensed Suppliers/ Generators/ Aggregators	Capability to deliver and support local energy schemes	Access to embedded energy schemes and ESCOs to grow new business lines and show sustainability credentials
ESCO Operators and heat providers	Ability to help design, optimise and run ESCO operations on behalf of scheme owners and their customer	Access to viable schemes
Govt./Regulator	Govt./Regulators	Govt./Regulators
UK Govt.	Ability to change policy to favour viability of local energy schemes	To achieve 2050 CO2 targets at an affordable cost to citizens
BEIS	Funds and support for local energy schemes design and innovation trials	Business investment in their policy areas to demonstrate policy delivery. Innovation and policy ideas to make a step change in delivery
Ofgem	Ability to grant exemptions and policy derogations that advance viable sustainability	Collaborative industry consultation that that bridges new energy world with old world to deliver policy agendas while keeping the lights on
Local Media:	Local Media:	Local Media:
Local BBC Radio/TV Commercial Radio Regional Newspaper Online channels	Hours of available media space to fulfil their coverage and news obligations. Capability to support medium term local campaigns with consistent coverage	Regional interest stories particularly where locals are seen advancing the national agenda. Controversial David v Goliath victories

11.3.6 Prioritise the stakeholders (in the "Priority H/M/L" column on the spreadsheet) depending on the influence they have on your project's success. High are ones that

are mandatory to interact with; Medium may be discretionary but have things you or others want; Low are ones you can discard from the dependency analysis below.

11.4 Stakeholder Dependencies

11.4.1 The skill of stakeholder management is working out the best matching of haves and wants amongst your stakeholders. This is not just a question of matching bi-lateral arrangements but tri-lateral and beyond arrangements. E.g., take 3 stakeholders each with their respective haves and wants: S1 (h1 and w1), S2 (h2 and w2) and S3 (h3 and w3). You are S1 and want w3, but S3 does not want your h1, but they do need w2. However, S2 does need w1 and they have h3 that S2 wants! So, your Treatment is to agree to give S2 what they want as long as they give S3 their h2 in exchange for you getting h3. Creating these interdependencies is advanced stakeholder management.

11.4.2 For High and Medium stakeholders, enter their names on the Dependency tab matrix on the spreadsheet. Spot the interdependencies and record in the matrix intersections.

11.5 Stakeholder Treatments

11.5.1 Having identified the potential dependencies, you must now construct a method for getting the stakeholders to agree to the interdependencies for their mutual benefit. It may require more than just a phone call. Often third parties will agree in principle that your plan makes sense, but do not have the time or authority to make it happen. In these cases, you need to formulate a treatment in order to help them prioritise your thoughts. Usually, the best way is to discuss it with them as they may have perspectives and ideas you do not. Other treatments may require a softly-softly approach where a direct approach is not suitable. Either way, you need to record your proposed treatment plan.

11.5.2 Complete the Treatment tab on the spreadsheet and review with your internal colleagues.

11.6 Stakeholder Plan

11.6.1 Finally, once your team and you are happy with the treatments idea, it's time to socialise the plan (where appropriate) with the connected stakeholders, so that the plan can be put into action. Record the plan status as you do this like any other plan.

11.6.2 Regularly review the plan as the project progresses. Opportunities will arise that were not obvious at the outset so regular reviews are essential.

11.6.3 Update and track the Treatment tab on the spreadsheet on at least a monthly basis. Every quarter or so, it is worth undertaking a brief end to end review of the 5 steps and making changes as stakeholder relationships develop.

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12

Tenure Analysis

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12 Tenure Analysis

12.1.1 The provision of low carbon heating for new build residential properties can be delivered in a number of ways. The simplest way to do this is for the developer to provide a dedicated heat pump per property and potentially also include roof mounted solar PV generation to complement and support the running costs. This option is viable with careful selection of the heat pump type but will add cost compared to a gas boiler counterfactual option to the developer and ultimately the house price. That said, from 2025 gas boilers will not be allowed under Government guidance.

12.1.2 There are options for ESCo's to support the delivery of low-carbon heating solutions that can reduce the cost to the developer and the occupiers / tenants. There are many permutations of an ESCo's role in this space, but the advantages of employing an ESCo model adds improved efficiency and diversification when considering a development scale system as opposed to an individual property and also provides for smart system management when connecting mixed use non-domestic properties with load balancing. Where mixed use developments that require both heating and cooling simultaneously there are significant efficiency benefits that can be gained and distributed across the network.

12.1.3 ESCo's typically retail heat to customers with a tariff structure not too dissimilar to that of gas and electricity – a standing charge (usually charged monthly) and a volumetric tariff based on consumption on a p/kWh basis. Standing charges are typically equivalent to that of a daily gas or electricity availability rate, plus an element of fixed costs for the provision of maintenance and replacement that is similar to a no-excess maintenance package for a traditional system a homeowner may elect to purchase.

12.1.4 There are many options for ESCo design in relation to tenure types. By way of example, the following two scenarios demonstrate classic choice a scheme designer has.

Scenario 1 - Traditional

12.1.5 The table below shows an example of the charge structures of employing an ESCo across the residential tenures for a scheme that considers a centralised low carbon heating system that distributes heat via a series of dedicated buried insulated pipes. A central energy centre will house commercial scale heat pumps. Heat is delivered to individual properties and transferred into the domestic tertiary wet system for the provision of heating and hot water via a Heat Interface Unit (HIU). The HIU has an automated meter that accurately measures heat that has been delivered to each property on a kWh metric and is read monthly remotely to create accurate billing charges to the consumer.

12.1.6 A big advantage to an ESCo provision is the peace of mind to the consumer. The HIU is owned, maintained and replaced by the ESCo entity. Service level agreements are in place to provide consumers with comfort that breakdown and replacements are dealt with in a timely manner. A common perceived disadvantage to this approach is a monopolised position with no ability for the consumer to switch supplier. This is dealt with through clear transparent communications on price reviews and with impending regulation of the heat sector.

	Centralised Low Carbon District Heating - HIU's			
	Standing Charges	**Who Charges**	**Volumetric Charges**	**Who Charges**
Private Sale Freehold	Occupier	ESCo	Occupier	ESCo
Private Sale Leasehold	Occupier	ESCo	Occupier	ESCo
PRS Option 1	Landlord	ESCo	Tenant	ESCo
PRS Option 2	Tenant	ESCo	Tenant	ESCo
Social Housing Option 1	Landlord	ESCo	Tenant	ESCo
Social Housing Option 2	Tenant	ESCo	Tenant	ESCo

12.1.7 The table above shows how elements of the ESCo charge structures can be split depending on the tenure of the properties. In private and social renting scenarios, the landlord is typically responsible for repairs and maintenance and therefore accepts all / part of the ESCo standing charges and passed elements of this to the tenants via the rental agreement – as standard. The volumetric usages in all cases are met by the occupiers / tenants.

12.1.8 There is an array of metering solutions that ESCo providers offer to occupiers, landlords and tenants that mirror that of a regulated supply. This can range from pre-payment meters through to monthly direct debit accounts. There are equally a growing number of smart methods of managing billing and payments through modern technology.

12.1.9 Given the exclusive position an ESCo would have for the provision of heating and hot water supply over a given period, the ESCo entity can invest in the infrastructure and reduce the capital cost to the developer in return for long-term secured revenues streams. As is often the case, the developer will make a one-off contribution payment as a “connection fee” that is mutually agreed on a project specific basis that typically considers the counterfactual cost the developer would have ordinarily realised.

12.1.10 This approach doesn’t negate the developer adding solar PV on the roofs of the properties for the benefit of the occupant / tenants. Clearly, this comes at a cost which will vary depending on array size and whether battery storage is adopted. For apartment blocks, roof top arrays can be deployed, however, distributing the generated power to multi-tenants within the block is problematic. Depending on the ESCo ownership, it is not uncommon for the ESCo to invest in apartment rooftop solar arrays where generated energy can be used within the centralised energy centre for heat and hot water production. Whilst there are no absolute rules, it is common for an ESCo to pay roof rent for this benefit to the landlord / building owner.

Scenario 2 - Flexible

12.1.11 In contrast to the above solution, low carbon heating and hot water can be provided via an ESCo solution that offers greater freedom, flexibility and opportunities to switch supplier.

	District Heating - Ambient Loop Heat Pump per Property			
	Standing Charges	Who Charges	Volumetric Charges	Who Charges
Private Sale Freehold	Occupier	ESCo	Occupier	Elec Provider
Private Sale Leasehold	Occupier	ESCo	Occupier	Elec Provider
PRS Option 1	Landlord	ESCo	Tenant	Landlord / Elec Provider
PRS Option 2	Tenant	ESCo	Tenant	Landlord / Elec Provider
Social Housing Option 1	Landlord	ESCo	Tenant	Landlord / Elec Provider
Social Housing Option 2	Tenant	ESCo	Tenant	Landlord / Elec Provider

12.1.12 The solution above will see an ESCo entity invest in a series of technologies to create an ambient distribution network around the development. Typically, this ambient loop will transport water around the development at circa 8-13 degrees depending on the season, location and geology.

12.1.13 Individual heat pumps are then located within each property and connects to the ambient loop. The ESCo entity typically owns the heat pumps in the properties and performs the regular maintenance and replacement risk. The occupier / tenant will then be responsible for the electricity consumption the heat pump uses as part of their overall electrical connection and supply – leaving them free to change supplier as a regulated supply.

12.1.14 There are several innovations within this sector that are exploring ESCo's owning private wire infrastructure and renewable generation that will provide a dedicated secondary supply to the heat pumps which the ESCo will own, operate and maintain. The ESCo would then pay for the incoming power to the heat pumps and retail the heat output in the same way as described in the first scenario above. This is innovation and being tested with several Distribution Network Operators to test the dual supply to a property and how this can be isolated safely.

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13

Residential Supply

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13 Residential Supply

13.1 Introduction

13.1.1 The purpose of this section is to make Local Authorities aware of the possibilities of including residential supply as part of a sustainable ESCo scheme. It explains the basic regulations and exemptions with the associated risk. It outlines several concepts and trial schemes from various innovators with a desire to make residential supply viable.

13.2 Why New ESCO-Friendly Regulation Has to Happen

13.2.1 Transitioning from our fossil fuel based centralised energy system to a brave new world of renewables and decentralisation, is easier said than done. Primarily due to legacy issues and vested interests, not to mention the energy trilemma of competing goals (low carbon, affordability, security of supply) all pulling in opposite directions. A migration path from legacy to brave new world is fraught with complexity with a very real chance that foreseen and unforeseen dangers will embarrass policy makers.

It also outlines the need for such schemes to achieve climate change policy and the regulatory landscape reforms that are in a state of flux currently, albeit with well-intentioned Ofgem, BEIS and Govt. intent. Finally, it summarises the state of play in early 2021 and provides a large caveat as to why it is difficult for any consultancies to recommend an active path without material risks.

13.2.2 Nevertheless, the brave new world must be reached because the grid cannot support the move to electrification of transport and heating as the best ways to decarbonise those sectors, via electric vehicles (EVs) and heat pumps (HPs). Embedded “onsite” generation in the low voltage grid is required to achieve this with additional energy storage. Such onsite generation within new developments with local use of electricity is the best way to add additionality of renewable supply to the UK’s energy mix while also supporting the legacy grid to achieve the brave new world. This is a good solution for several non-competing considerations:

- The grid cannot support 2 to 3 times its capacity in its current form. “Rewiring Britain” is neither affordable nor practicable. The grid has to transition to a Smart Grid capable of balancing centralised supply with local supply and storage dynamically with local demand.

- The grid needs and can afford to pay for the flexibility new generating and storage assets provide. The secondary use of such assets for balancing purposes provides revenue to their owners to increase their affordability. The same is true for EVs deploying vehicle to grid technology (V2G).

- New developments that plan beyond their own boundaries provide diversity in mixed use and legacy grids so that their flexibility supports retrofitting of neighbourhoods with HPs and EVs.

- The local grid can increase its daily capacity by better balancing demand and supply across the day. Local use of generation reduces transmission losses

and more than compensates for round trip storage losses. It should be quite possible for centralised offshore wind plus carbon free baseload to combine with embedded generation to meet the electrification growth of 2 to 3 times.

- Policy and Use of System pricing must encourage local energy schemes integrated with the legacy grid in order to support legacy grids. Otherwise, islanded private wire iDNO grids may prevail. While these are feasible for eco developments, they are anti-social in their inability to add diversity and flexibility to the public realm. Hopefully, they are a pump priming stop-gap solution rather than a trend.

- Planning Authorities are well positioned to play a crucial role in establishing strategies in how new developments and urban renewal programmes can be geographically positioned and timed to support electrification and its rapid growth.

13.2.3 This Government and the energy industry understand both the need and the dangers involved but is finding it difficult to come up with integrated policies that all actors accept as feasible. Solutions must be found before market tipping points in EVs and HPs occur. Otherwise, the grid operators may have to impose curtailments to avoid overloads and keep the lights on. This is unlikely to be seen as helpful to those communities trying to go green.

13.3 Why It's Happening Very Slowly

13.3.1 The current electricity generation, distribution and supply regulations are based on the Central Electricity Generating model with some updates for the unbundling and privatisation of the industry started in the 1990s. While there have been some further minor updates since (including microgeneration, iDNOs and onsite exemptions), they have been done in the context of the dominant supplier model with domestic generation and onsite generation being niche activities, rather than a wholesale decentralisation. One example is that sharing embedded generation beyond the onsite boundary incurs Use of System charges much higher than is reasonable or justified. Government recognises this and Ofgem and the Networks Association have been tasked with modelling a "significant code review" for a fairer approach for small generators before an industry consultation. This has so far showed that there are no obvious remedies that keep legacy and new generators happy without society paying more. The study's consultation has been recently delayed (to 2021) due to its complexity.

13.3.2 Furthermore, the legacy of publicly owned regional suppliers having captive customers paying ever higher prices has left successive governments wary of local schemes allowing locked in customers. This leaves a situation where policy makers are concerned whatever part of the system is changed, it will adversely affect other parts, yet if they make wholesale compensating changes all at once - the lights may go out.

13.3.3 As a result, it is unlikely anything will change quickly. And when things do change gradually, there may be adverse costs and rules for existing energy schemes whether sustainable or not. To compensate via grandfathering rights leads to high costs to society when the money is required to spend on new assets and not protecting old ones. We are far from achieving the holy grail of Use of System charging structure where ESCOs can create a "virtual private wire" so both it and society get the best of both worlds (one system, one capital provider, yet Use of System revenue both traditional supply market and independent ESCO schemes).

"Virtual Private Wire" is yet to be delivered concept where physical private wires are not needed. Instead, the public grid is physically implemented as a single system but allows space to be leased on it by private developments in order to achieve it bespoke needs. Analogous to private networks being set up on the telephone wires.

13.4 Meanwhile, What is the Current Situation?

13.4.1 Today, a local authority (or other actor) wishing to supply their own renewable generation to a locality in order to meet sustainability policies, has a choice to make. It either:

- Path 1 maximises its market potential by going down the traditional route of becoming licensed to generate/distribute/supply its power under the Electricity Act 1989
- Path 2 minimises its costs and bureaucracy by supplying within the allowed Class Exemptions from various amendments to the 1989 act for onsite generation. Please note these Class Exemptions are now under a BEIS and Ofgem review. See 13.10 Policy Landscape for more details.
- Path 3 applies for Individual Exemptions from BEIS/Ofgem for particular schemes, that allow onsite licence exemptions.

13.4.2 Following path 1 is a major commitment and is beyond the scope of this study. The fixed costs of becoming and remaining fully licensed are considerable, and it is unfeasible for most to do this (a rule of thumb estimates 100,000 customers are required to meet the annual fixed costs of compliance alone). If 250,000 customers are obtained a further set of cost obligations are required to be met that can be onerous if margins are not sustained. Witness several apparently successful challenger supply companies that have not remained solvent. For local authorities, the case of Robin Hood Energy being the most obvious warning. While there are some cut down variations like License Lite, the obligations are reduced but still onerous and costly.

13.4.3 Path 3 requires specific regulatory and legal expertise to explore and is both beyond the scope of this report and the expertise of the consultants as clarified during the tender process. The raw documented advice of BEIS is as the following bullets state. This has been verbally corroborated when talking to BEIS and Ofgem officials in that they approve generation exemptions generally with very few distribution and supply being given in practice. They have no examples of combined exemptions, e.g. generation with a corresponding uplift in distribution and/or supply, apart from that already allowed under Path 2:

- Individual exemption: The Secretary of State may also consider applications for exemption for individual generation, distribution or supply undertakings that do not fall under class exemption.
- Generation: With regard to generation activities, the Department's policy has broadly been to only consider applications for generating stations of less than 100 MWs capacity. This is because such plants will generally have a low impact on the total electricity system and it is considered appropriate therefore that, subject to consultation, such stations be exempted from the same degree of system regulation (and costs) as imposed by standard licensing conditions.

- Distribution and Supply: The Department considers that in most cases it is not appropriate to grant exemption from the requirements of supply or distribution licence. This is because it is rarely considered appropriate for these activities not to be subject to the full terms of licensing regime. Applications for exemption where exceptional circumstances apply may still be possible. We suggest you contact the Department in the first instance.

13.4.4 The remainder of this section summarise path 2 options and its variants, for the purposes of this study. These options are based on experience and folklore surrounding the Energy Act 2001 (primary legislation). It is essential that any scheme or option, whether derived from this study or elsewhere, must be examined by regulatory and legal experts prior to investment business case decisions.

To emphasise the risks involved, I quote a legal expert and his opinion of the primary legislation thus “this is a bad piece of legislation, in both the letter and the spirit of the law. The letter of the law is so badly written as to impose risks on interpretation. The spirit is even worse in that no introductory prose is included to indicate what the legislation is trying to achieve.” Furthermore, when challenging BEIS and Ofgem on case law and examples of good practice their answers can be summarized as “we know of no cases ever coming to court to establish what the law means and there is no register of schemes from which acceptable practice can be learned.” When asked for instance, what the definition of a Site is (a term quoted many times in the legislation but not defined in the act), answer is there none.

In addition, there are many complex conditions within the act that render simple yes/no guidance as inappropriate. As a further incentive to seek guidance, please be aware that breaking this law is deemed a criminal offence. The raw guidance under The Electricity Act (Class Exemptions from the Requirement for a Licence) Order 2001 for Generation, Distribution and Supply, is:

- Class exemption: Class exemptions will apply automatically to those persons falling within the terms of a relevant class exemption.

- The Electricity (Class Exemption from the Requirement for a Licence) Order 2001 (“the Class Order”) created a number of class exemptions applicable to discrete categories of generation, distribution and supply activities.

- In the case of generation for example, there is a class exemption for small scale generators producing no more than 10 MWs of electrical power from any one generating station or 50 MWs in the case of a generating station with a declared net capacity of less than 100 MWs (see article 3(1)(a) and Schedule 2 to the Class Order).

13.4.5 The full Class Exemptions are provided in Appendix 1. The parts thought to be helpful to Local Authorities’ ambition for on-site electricity supplies to mixed use developments are extracted here for discussion.

13.4.6 Class A: Small generators

Persons (other than licensed generators) who do not at any time provide more electrical power from any one generating station than—

(1) 10 megawatts; or

Class A: Small distributors

Persons (other than licensed distributors) who do not at any time distribute more electrical power than 2.5 megawatts for the purpose of giving a supply to domestic consumers or enabling a supply to be so given with that electrical power.

Class B: On-site distribution

Persons (other than licensed distributors) who do not at any time distribute from any distribution system more electrical power than one megawatt for the purpose of giving a supply to domestic consumers or enabling a supply to be so given with that electrical power provided that each domestic consumer receives the electrical power, disregarding stand-by electrical power, from a generating station embedded in the same distribution system as himself.

Class C: Distribution to non-domestic consumers

Persons (other than licensed distributors) who do not at any time distribute electrical power for the purpose of giving a supply to domestic consumers or enabling a supply to be so given with that electrical power.

Class A: Small suppliers

Persons (other than licensed suppliers) who do not supply any electricity except electricity which they generate themselves and who do not at any time supply more electrical power than 5 megawatts of which not more than 2.5 megawatts is supplied to domestic consumers.

Class C: On-site supply

Persons (other than licensed suppliers) who—

(c) one or more consumers who—

(i) each occupy premises which are—

(aa) on the same site as the premises where the generating station is situated; or

(bb) not on the same site but which receive the electricity supply from that generating station over private wires; and

(ii) each of whom consumes all the electricity provided to him by the supplier in question at those premises other than any of that electricity supplied by that consumer in circumstances such that he falls within Class B in this Schedule;(each in this Class referred to as an “additional group consumer”)

(c) where the total maximum amount of electrical power supplied to those additional group consumers at any time is 100 megawatts of which not more than one megawatt is supplied to domestic consumers.

13.4.7 The above sections effectively means that there is scope for an ESCO to combine these exemptions for small scale generation, distribution and supply to the sites on which the generation is located and that the customers of the supply can be a mix of

residential and commercial. So for the projects considered, the ECSO can be exempt from licensing as one or more of the following:

- Class A small generator - of up to 10MW can be performed and then used on site
- Class A small distributor - with less than 2.5MW of electrical power for the purpose of giving (or enabling) supply to domestic customers, for the part sold directly to EV domestic consumers, or
- Class C distribution to non-domestic consumers – for any amount of distribution to commercial customers only. This covers all the non-domestic power sold, plus could include:
    - The sale of heat provided by a centralised heat pump system as the power for running the HPs would count against the commercial portion of the exemption and not the residential
    - Similarly, the sale of EV charging separate to domestic distribution/supply if done via a commercial entity like the ESCO or a car club
- Class A small suppliers – for those who supply electricity they generate themselves providing the amount is less than 5MW and no more than 2.5MW is to domestic consumers across a number of sites connected by private wire
- Class C On-site supply - for those that supply electricity they generate themselves to a single site providing the amount is less than 100MW (limited to 10MW by the small generator exemption) and no more than 1MW is to domestic consumers.

13.4.8 So a configuration of ESCO owned generation and distribution via a micro-grid (and/or iDNO solution) with mixed power supply to residential homes (with or without their own PV and HPs); plus commercial premises; plus centralised heat and EV charging points, it is possible to optimise the exemptions. However, onsite supply is not without some further considerations:

- The limits are not supposed to be artificially exceeded by chopping a site into sub-sites. The whole development will be considered a single site even if there are separate generating and distribution assets. However, this is a grey area. If a development of 2,500 homes was evolved over 10 separate planning applications of 250 homes each every 2 years or so, would that qualify?
- The power limits stated (e.g. 1MW) are exactly that. The maximum power that can be supplied at any time. They are not an average over the year for instance.
- If an additional legal entity is involved as part of the ESCO's supply chain from generation to supply, then a limit of 10% of the total generation is allowed to be supplied to residential customers.
- Residential customers still have rights to a choice of supplier. The practicality of this and the role of landlords in the equation, mean there are options to mitigate this eventuality - more on this below.

- Given the 1MW cap at one site, the typical size of housing development in the UK would equate to 500 homes maximum (assuming a diversification factor of 2kW with no individual heat pumps). The 2.5MW cap is correspondingly 2.5 times this number across a number of sites.

- With individual heat pumps (total diversification factor rises to 3.7kW) means 1MW of onsite supply indicates about 250 homes maximum. A centralised heat pump system would keep the diversification factor at 2kW and so allow larger developments.

- However, increasing household electricity loads (by gradual adoption of domestic charged EVs for instance), means limits on supply may be exceeded in the future. EVs charged via a non-domestic charging system would also get around this issue.

- Licensed supplies can be blended with onsite supplies to meet additional power needs although if this is done by the ESCO, it cannot profit from the imported power when billing the residential customers, although it can for the commercial ones.

- EV charging points that are separated from the residential supply (e.g. provided to a communal car park) can be charged at a higher rate when supplied from onsite supplies.

- If EV charge points are supplied from imported power and the car park is considered residential, then they will be subject to the same non-profit consideration. Mixed use car parks are seen as a commercial environment.

- Given the price caps imposed on licensed suppliers, will the government ever impose similar caps on unlicensed suppliers?

Diversification Factors are estimates of average power load across a community of users. They can be used to estimate the total power demand at a point in time for the community in question. This does not mean to say they are an unbreakable rule. It is possible to trip a domestic consumer unit by boiling multiple kettles while having the oven and the hair straighteners on at the same time. Similarly, a whole development can trip it's power load (half-time tea making during FA cup final etc).

13.5 Unlicensed ESCo Supplies Ready Reckoner

13.5.1 The attached spreadsheet tool can be used to estimate and maximise the direct residential supply; the indirect residential services from the ESCO; the available supplies to other commercial interests; and finally, the balance available for non-supply services like export and/or grid services/PPA. There are two versions for the single site and multi-site configurations. It should be noted that this tool is an estimator for staying within the Class Exemption regulations and not a definitive view. It is intended to be used to quickly select useful configurations for more in-depth financial modelling. The model assumes a single entity is involved as the exempt generator, distributor and supplier. Once a model looks promising it must be verified by a qualified legal expert before an investment case is put forward for sanction.

13.6 Metering and Billing

13.6.1 While metering is simple for an ESCO, billing on the other hand is complex and operationally hard for a new ESCO. Most ESCO's will outsource this to a specialist bureau (e.g. Switch2). Such providers have software and interface mediums to capture actual metered data and create the bills. There are the same methods of payment like a regulated supply – pre-pay etc.

13.6.2 If you wish to consider undertaking your own billing, consider the following points:

- Ofgem has metering, billing and payment standards that must be met. These require detailed study when deciding on an offer to customers. A new offer from an unlicensed supplier has the advantage of designing an offer that avoids legacy issues and their costs if possible. A few aspects to draw attention to are:
    - Use SMETS2 smart meters so regular timely readings are always possible and supplier changes are not an issue
    - Avoid prepayment meters and the complexity they can cause
    - Provide all information and service request online
    - The Ofgem guide is here
- In addition, Ofgem has a more general guide to provision of customer information that is covered here. However, there are some exemptions for unlicensed suppliers under Section 4 Schedule 2ZB, the Electricity and Gas (Internal Markets) 2011. As a flavour of information requirements consider provision of:
    - Unit rate, standing charge and tariff name requirements
    - Definition of Estimated Annual Costs
    - Supply contract details
    - Notification of domestic supply terms
    - Alternative and relevant cheapest tariffs
    - Fuel mix disclosures
    - More details contained here
- Bad debt has to be factored into any business plan and can vary from 1 to 3% depending on your demographic.
- Metering requires appointing a specialist fitter, data collector and data aggregator. This could be done all by one company or different companies. With the advent of smart metering, it is often economic to have one provider. Bureaus like Switch2 can handle the billing and metering as a one stop shop. Most bureaus will not take the risk of bad debt however.

13.7 Grid Considerations

13.7.1 When considering using onsite supplies via a private wire microgrid including a grid connection, a number of points must be considered:

- One or more iDNO/microgrid suppliers will need to be employed to design, build and operate the grid.

- The DNO will need to design the grid connection according to your needs and the grid conditions at the most suitable connection point for the development's location.

- When planning a substation in consultation with the DNO, it is important to discuss ownership considerations. There are rules on how many substations can be owned by an unlicensed distributor (usually one only). The setup of ESCOs as special purpose vehicles (SPVs) for each site is thought to be able to overcome this, but it must be planned with legal advice.

- As an unlicensed supplier supplying behind the meter, you will not be responsible for balancing generation and supply.

- If considering exporting to the grid, as a material source of income, many factors must be taken into account. Contracting to supply grid services may require additional capacity to be designed for, even if only having a PPA for excess onsite generation above the needed exempt supplies. To make grid services worthwhile as secondary purpose of the scheme, the idea is to ensure that for the smallest marginal uplift cost a larger value gain can be made. A detailed study should form part of the funding ready business case once an accurate view of the following is better known: engineering constraints; grid connection limits and costs; and available flexibility of scheme under normal operations. Some grid services may be supportable without any additional expenditure. A conversation with an aggregator must then occur to quantity flexibility and make a judgement call on additional capacity to be designed in. For instance, a larger inverter from a battery may double earning potential from flexibility, if the grid connection makes it affordable (both construction and operations).

- "Grid Services" is a general term for a range of power and energy supplies to support the national and local grids. These services can be won in auctions for various seasons, durations and times of day. They are subject to constant change and challenge by vested interests so must be used as supplementary income rather than fully dependent income at the current time.

- Both the National Grid and District Network Operator collect their operational revenues from Use of System (UoS) charges (Transmission aka TUoS and Distribution aka UoS respectively). These are priced based on a complex historic formula that assumes full national and local power transport but takes no account of the growing level of embedded generation that does not need such widespread access. This has resulted in complaints by local energy companies that local generation and supply is discriminated against resulting in an Ofgem review and consultation, trying to find a fair pricing mechanism.

  In turn, legacy energy companies believe private wire operators with a grid connection are not paying their fair share, resulting in another review and

consultation of exempt supplies. How this turns out is unknown, however, it is certain that embedded generation is required to allow the grid to support decarbonisation along with a new grid service ensuring local flexibility is incentivised to support the low voltage grid. ESCO operating private wire sound ensure their proposal is sufficiently carbon and price attractive that no-one seeks to be supplied by a licensed supplier.

- Costly grid connections, upgrades and new primaries, need careful planning in order to ensure the cost does not land on one party thus making a scheme unaffordable. Best is to ensure it is included in the DNO's regulated spend. Failing this, the cost can be funded by a local authority and a connection fee charges to each developer for each home connected. Various hybrids of this approach can be considered. See Bath and North East Somerset Council's options at their Riverside development.

- The role of a grid company will change over the next 20 years, in order that flexibility is effectively used to optimise the public grid. This change is described as the transition from DNO to DSO - Distribution Network Operator to Distribution System Operations. WPD are already consulting on this as part of their new strategy for 2023 price control submission to Ofgem. When taking part in one of their numerous consultations for this exercise, SmartKlub learnt the following:

    - WPD do not expect to be an exclusive supplier of DSO services in the new flexible distributed energy world

    - They are considering whether they should just be planners and developers of the new flexible network, or be the prime operator or even help market development of flexibility

    - They will start monitoring a minor part of the low voltage grid from 2023 that will help optimise embedded generation

    - They will extend their role in helping tackle fuel poverty by highlighting energy and costs savings

    - Their Flexible Power product is integrated to c25% of their substations to help defer grid reinforcement costs of £26.5m at a cost of just £550k indicating a healthy potential for flexibility

    - They want to consider extending this flexibility to embrace residential EVs, heat pumps and storage but are unclear on timing

    - They know they have to improve their support and transparency for major new connections such as housing developments

    - They understand they must play a bigger role to promote green developments especially involving communities. See: www.westernpower.co.uk/green-recovery and its call for evidence

In summary, this is further evidence that local generation and supply will receive further promotion and support over the coming years from BEIS pushing the DNOs and the DNOs responding to community pressure. DNOs understand they must be seen to be doing the right thing to protect their monopolistic position.

13.8 Residents Right to Switch

13.8.1 In a landlord tenant situation where the landlord is responsible for paying for supply to the premises and recharges the tenant (as part of a bundled rent and service charge), tenants are unlikely to have the right to switch as long as their arrangement stays in place. Although this does not prevent the tenant asking to switch. Similarly, this can apply for a lease (particularly short-term ones) where bundled services are more common.

13.8.2 However, private residents or tenants responsible for paying for their electricity supply, do have a right to switch. Licence exempt suppliers like an ESCO must provide the occupier with terms and conditions with end dates for their supply. Unreasonably long contracts can be deemed unfair under consumer protection legislation. Any price increases made by license exempt suppliers must give a timely notice and a right to termination of the agreement.

13.8.3 If a tenant/resident does exercise the right for an alternative supplier, the ESCO would have to engage with their chosen third-party supplier to discuss the granting of access to their network. This would involve technical (connection, capacity and metering arrangements) and commercial considerations. If the result is that a technical upgrade is required at significant expense, then access can be resisted. However, charges can be levied to the third-party supplier for reasonable costs. However, any Use of System charges must be made on the same basis as the existing users of the network and approved by Ofgem. Customers on private wire can request and pay for their own connection to the public network. This is unaffordable for residential customers but may be feasible for commercial customers near the public grid.

13.8.4 The above constraints make a strong case for ensuring any scheme is designed to allow sustained, favourable retail pricing below mainstream licensed suppliers, meaning happy customers that do not want to switch. In Sweden, where the gas network is very limited and local heat networks popular, heat pricing focuses on being cheaper than alternatives. This was achieved and so heat pricing was never regulated.

13.9 Ongoing Innovations

13.9.1 This section describes new innovations by start-ups to potentially improve the role of onsite renewables. Each of these companies and offers have been examined or interviewed for details of their innovation and the essence of it described below.

Octopus and Local Energy

13.9.2 Octopus has partnered with Energy Local (known for Bethesda hydro) with BEIS funding to trial new arrangements for sharing local energy where the onsite regulations considered above cannot apply. The hypothesis is that using the public wires to distribute local energy to local customers in the locality (both on the same DNO substation), should not be subject to the normal supply and distribution arrangement - especially DUoS charges. This is because DUoS charging levels are more or less the same whether the power is moving 500 meters or 500 miles. If successful, local generators could make bigger margins supplying directly to locals who would also save on normal supply prices, effectively cutting out the middlemen.

13.9.3 The technology is simple metering on a half hourly basis with the assumption that each customer takes an equal share of the available generation and then tops up their

demand with their licensed supplier. The Energy Local club then bills appropriately in the same way SmartKlub is creating combined billing at Trent Basin ESCO for their Behind the Meter project, that also mixes ESCO and licensed suppliers.

13.9.4 This scheme requires regulatory change to allow it to be used more widely assuming it is successful. Hopefully this will happen (potentially in Parliament via the Local Energy Bill using devices such as a 10-minute rule bill or a private members bill as these devices have proven successful in the past as a way of getting common sense changes that have all party support) but probably not in time for the current Use of System charging review. It may fit better with the Virtual Private Wire review that is still unscheduled by Ofgem but being pushed by many disrupters including SmartKlub. If changes are made it will mean that private/communal/local authority generators can partner with developments or ESCOs to easily share generation without considering onsite exemptions or private wires.

Sero Homes and Sero Energy

13.9.5 Sero homes is a concept of sustainable living in eco village style but done through a 100% leasing arrangement with the developer for all services. This “all-in cost” includes energy. We have not managed to speak to Sero yet, but they have recently established Sero Energy presumably to act as the energy provider/ESCO. From the information examined so far, it appears that their offer is a premium one that would be executed for small developments only (less than 250 homes), so always coming under the onsite exemptions. However, their tenants may include long term residents that could argue that they were bound into an unfair contract that included lack of choice of energy supplies. The niche nature of their offer may not be applicable to mass market developments that will make a difference at local authority scale.

Cepro

13.9.6 Cepro is a 10-year-old pioneer that leads a partnership of complementary capabilities looking to deploy micro grid-based developments centred on PV generation, battery storage and heat pumps. They link their network to the public grid so full resilience is not required. They made their name with their iconic Owen Square project in Bristol, but have several other schemes (Water Lilies, Lovedon Fields and Bridport) all based in the West Country. They will consider projects further afield although have a strong preference for only connecting to WPD networks as they understand WPD’s technical constraints and standards.

13.9.7 Their strategy is to do as much as possible within the onsite exemptions and keep away from the regulator due to the imposed costs and flexibility. They have concerns about increasing regulation on iDNOs especially the propensity for “gold plating” schemes and wires that would make them less competitive.

13.9.8 Cepro is very selective on the projects it undertakes as it does not believe the environment is yet right to expand as a business in a sustainable way. They believe it may take circa ten years before local energy schemes become viable and can be grown to become mainstream. This includes time for beneficial policy and regulatory changes.

Larkfleet Homes

13.9.9 Larkfleet Group of Companies (developers) are evaluating a Smart Homes concept as an innovative, domestic energy and low carbon housing arm, with the ultimate aim of

all Larkfleet Houses being built to this standard. The model is centred around a domestic energy service company (ESCO) type of model where Larkfleet or a third party funds the upfront capital expenditure or at least, the marginal cost of the low carbon and smart hardware installed on the home and recoups this capex through selling energy and energy services to the homeowner.

13.9.10 Low carbon and smart hardware would also be deployed across the wider housing development site, such as communal storage, shared EV, carports and solar street lighting. The site would then be able to access flexibility and similar ancillary services. The first step will be a pilot of 6 homes on a 24-home development.

13.9.11 Their target business model reflects what is necessary to manage the tension between needing longer term certainty around recouping capex while also maximising the energy assets and the need to meet OFGEM competition requirements for domestic energy supply. They have not yet gone public with their aspirations.

Emrgnt

13.9.12 Emrgnt are a new company offering design, fund, build and operate services to developers of new developments around smart grids. Their business model of mixing generation, supply and grid services seems very similar to SmartKlubs. We have not yet been able to speak to them.

SmartKlub

13.9.13 See separate case study on Trent Basin (to be incorporated in here before completion)

Switch2

13.9.14 See separate case study

13.10 Policy Landscape

13.10.1 As stated previously, BEIS and Ofgem know this is an area that requires reform. It is fully accepted that current regulations and particularly Use of System charging is out of date including its disproportionate over charging of small generators. In general it is not fit for purpose for a decentralised smart grid world that all actors agree is the best solution to decarbonisation. National Grid Electricity System Operator and Ofgem are currently working on Network Access SCR policy employing CEPA TNEI consultants (USA experts in this field) to come up with better charging models to be ready for consultation in 2020 (now delayed to 2021). The new charging models are supposed to be cost neutral overall, meaning the overly high costs of small generators have to be met from higher costs to incumbents and all the issues that will create for legacy operators and innocent users who created viable schemes at time of their investment.

Whatever the final proposals are, and the response the energy industry gives them during consultation, it is going to be a long and tortuous process before meaningful change occurs. In the meantime, there are some medium-term policy measures as “sticking plaster” that could make local energy schemes more viable and allow innovation and market confidence grow:

- Uplift of the class exemption thresholds. It can be argued that these thresholds should be tripled in order to account for the required uptake of EVs and HPs to meet UK's carbon goals. This would allow bigger schemes that can support both transport and heating needs of the same communities. Alternatively, more liberal interpretation of how a "site" is defined will help build scale too.

- Adoption of the Local Energy proposals. Although small in nature and very localised, these proposals if accepted would incentivise more embedded generation with supply to localities in mind. However, unlike existing class exemptions they do not have to be so tightly linked to the same site and therefore bring retrofit communities into play. A rich seam for local authority and housing associations in particular

- BEIS/Ofgem announcement of a consultation on Virtual Private Networks in the medium term would signal a resolution to the danger that a diversified single network is lost as private wires is the only solution. This may be linked to re-adoptions of private wire scheme subject to technical standards.

- BEIS/Ofgem confirmation that local low voltage flexibility will have value in meeting adoption of EVs and HPs to the grid in meeting the need to optimise our networks. Furthermore, housing schemes need the income from this to unlock viable CO2 free living and so are well placed to be part of this initiative. They should receive preferential rights to provide this flexibility, rather than it being met by purely commercial interests that double up on the infrastructure and so reduce value. A free-market approach is probably not the best way for society to allocate its resources.

- Local Authorities could develop strategic positions (say via bodies like policy UK100) to promote the above ideas (and others no doubt) with central government in order to breathe life into new energy schemes.

BEIS have also launched a review and consultation into the Electricity Class Exemptions referred to in section 13.4 of this report. The first stage of the consultation runs to 1 March 2021 where anyone can submit their views of what changes should be made to update the legislation. Online submissions can be made here: https://beisgovuk.citizenspace.com/energy-strategy-networks-markets/electricity-licence-exemptions-cfe/.

Having attended a meeting with BEIS and Ofgem concerning this review, it is clear that the large, vested interest in the electricity supply industry believe that small private wire energy companies are not paying their fair share of grid costs and will be arguing for fairness. However, BEIS are also aware that they need to encourage more embedded generation. At the very least, BEIS are likely to improve the legislation's clarity in order to encourage take up in a legal way. Proposals are likely to be forthcoming in summer 2021 but may suffer a protracted consultation within Whitehall before the industry responds. Changes may not happen until 2022. What the outcomes of the review is, is hard to predict. SmartKlub shall be making a submission along the following lines:

- Rewrite the legislation to make it clear and implementable including a definition of a site that represents the reality of development.

- At the very least Increase the power limits 3-fold to account for the electrification of transport and heat.

- Better change the limits from power-based ones to energy-based ones so that assets can be optimised and supplies more accurately managed across the seasons.

- Ensure that sites that utilise class exemptions are sized above their own needs in order that they "spill" their flexibility to the public grid in order to allow neighbourhoods to also transition to electric heat and transport.

13.11 Summary

13.11.1 The above sections describe the state of play for regulation relating to residential schemes. It can be concluded that as yet there is no sure-footed approach a local authority can adopt that does not have risks and limitations. However, residential schemes with lock-in of customers are unlikely to fall foul of customers and the regulator if they manage to deliver low carbon at price parity (or better) than the licensed suppliers. But this is where the risk is. Will future policies and financial incentives help or hinder such schemes? Investors are always wary of markets that are dependent on Whitehall's pen. Witness fall-out of FITs and RHI schemes.

13.11.2 New innovations provide hope that ideas with improvements in regulations can make ESCOs more viable, however, these too have dependencies on regulation. So for now these schemes are likely to be developed within the class exemption thresholds.

13.11.3 The onus is on central government to articulate a stable way ahead and quickly move to give assurances for the future so developers and innovators alike can have the confidence to invest within acceptable risk tolerances. Local authorities may wish to reflect on how best they can help push this agenda forward in order to meet the needs of their residents.

13.11.4 However, all of the above has a caveat in that with central government and Ofgem announcements on climate change policy and energy industry consultations respectively, this has the potential to be a fast-changing world. The horizon may look very different in 6 months' time.

Ener-Vate Consultancy Limited

14

Trent Basin Case Study

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14 Trent Basin Case Study

14.1 Introduction

14.1.1 The purpose of this section is to explain the theory and progress of a new type of ESCO being developed at Trent Basin Nottingham with the support of grant funding. The scheme's ambition is to create a financially viable ESCO model that gives confidence to developers and homebuyers to embed more renewables in housing developments as standard. However, while signs are encouraging, the scheme is not yet fully complete and is still in research and development for another 3 years or so. While it is too early to draw conclusions, it is possible to be aware of the scheme and consider it as a candidate for future schemes being readied for master planning.

14.2 Background

14.2.1 Energy Service Companies have a very mixed reputation. While this is understandable because many have not succeeded, it is not because they are a flawed concept. That's because an ESCO can be whatever you design them to be and they are all different. They are simply an arrangement of parties that offer energy services (of some kind) to one or more customers. While they are talked about as a generic thing, their ability to be shaped to the local need is a strength. Searching for a "silver bullet" model that works in all situations, is futile. Just as it is to expect a tailor to create a suit that fits all sizes and tastes.

14.2.2 However, it is clear that there are a number of limiting factors that makes them particularly vulnerable, that are worth inspection:

- Stakeholder Ambition - In general, ESCOs serve a small area using local resources with embedded renewables with a number of stakeholders involved. The stakeholders have sincere aspirations for what can be achieved and set high standards (environmental, pricing, localism, etc.). This often burdens the design phase with challenging (even unrealistic) aspirations that sets high hurdles to meet, in order to obtain consent by all parties.

- Scale - They are, by definition, small and so find economies of scale hard to accumulate. This materialises in high fixed costs, that swamp the business case and operation, however well the variable costs are managed, or additional customers are acquired over time.

- Quality - High ambitions and small scale have a negative effect on perceived success and drive impact decision making towards low-cost solutions. This inevitably results in low quality on parts of the service that are discretionary. This

inevitable means poor quality customer service while non-discretionary items such as safety are protected.

- Value Creation v Incentives and Subsidies - Schemes are planned with a set of financial assumptions that drive the business case. These include financial incentives such as Feed in Tariff, Renewable Heat Incentive, Renewal Obligation Certificates, threshold based Ancillary Services etc. Schemes tend to max out on the best of these that suit their design and viability, rather than creation of value. However, policy-based incentives (as opposed to value-based incentives) are subject to the whim of Whitehall rather than the real value of either the market or long term environmental goals. As such these incentives are withdrawn or changed, resulting in schemes struggling to keep up or grow using the same business model.

- Regulation - The energy industry is heavily regulated in favour of big energy. Since WW2, small energy generation was effectively regulated out of existence. Only centralised plant and national/regional distribution were allowed and/or viable. While this is being slowly unwound, the regulations are still tilted away from small schemes in many ways. For example, due to small threshold allowances limiting onsite renewables use. This is required to an extent to ensure the transition to a more decentralised system is orderly (the lights stay on) but is hampered by the vested interests of incumbent supply chains, lobbying policy makers with the persistent threat “it’s the politicians that get the blame if the lights go out, not the industry!”

- Supply Chain - Because of all the limitations above, the market is risky and immature, meaning that the generic suppliers to local schemes (not just licenced suppliers), is very immature and heavily biased towards big energy players that find it hard to innovate for the new local energy market. This compounds the high fixed cost problem and limits innovation the sector.

- Energy Strategy - While UK Govt. know things have got to change and both Whitehall and local govt. officers push for change, central Govt. finds it very hard to create a coherent strategy beyond a set of carbon targets. The UK is still in a position of stop start policy measures that creates uncertainty amongst investors as to what the future direction is for practical measures that will still be in force in 2050 when the targets are supposed to be achieved. Worse still, many investors now shun energy as a sector because they have had their fingers burned previously. There is no free market in energy, yet the Govt. won’t pass long lasting regulations that provide some certainty. This means the status quo remains dominant and evolution is slow for local energy schemes.

14.2.3 Despite the above issues, it is a certain fact that local schemes are required in order to meet the growth of electrification as heat and transport transition from their fossil fuel legacies. The UK’s current wires (NG and DNOs) do not have the capacity to meet the new demand. New fatter wires cannot be afforded or replaced in time. So even if 10 Downing Street’s recent announcement for a huge growth in offshore wind energy happens, this does not allow UK to power its heat pumps and cars. Only embedded renewable can achieve this.

14.3 Hypothesis

14.3.1 Given the above factors, the Trent Basin project (actually a number of projects with separate funding streams from ERA [Energy Research Accelerator], Innovate UK and Active Building Centre]) set out to create a local energy scheme model that is viable and can transition to a subsidy free world, such that new developments adopt them as standard. The main consortium project partners are: University of Nottingham (academic); Blueprint (developer 50% owned by Nottingham City Council); and SmartKlub (community energy business model innovator and service provider). Working together, they agreed some principles on scheme design in response to the above limiting factors:

- Stakeholder Ambition - Our conclusion was to be pragmatic. Recalling the phrase "The best is the enemy of the good", we abandoned beliefs that we had to be 100% renewable from the start or that we had to have grid independence 365 days of the year. The gird is decarbonising very well and makes for a far more robust system than lots of islanded grids that have invested in surplus capacity to cope with rare events.

- Scale - By having a pragmatic approach, we believe many more elements of the scheme can be standardised and exploiting local resources and variations becomes less important. By standardisation, economies of scale can accrue across many schemes in a given region or local authority. In addition, an ambition of the project is to derive a set of magic ratios for UK conditions. For instance what is the best number of homes in a scheme to balance scale and neighbourhood community factors? For a given pot of capital, how much should be spent on PV v electrical storage and heat system v heat storage?

- Quality - Fit for purpose requirements have to be understood and delivered. It is not necessary for customer service to suffer in today's world with the Internet of Things and the connected home can utilise cloud-based IT services. Therefore, we decided to create a universal customer service app that can cover all residential ESCOs everywhere both keeping service levels appropriate and costs to the ESCO low.

- Value Creation v Incentives and Subsidies - It is impossible to predict incentives without a strategic Govt. in power creating an energy strategy you trust. However, it is possible to speculate that the value of flexibility on the local grid will increase as the country transitions away from petrol and gas for their transport and heating, and towards growing electrification. Therefore, a business model that stays flexible on how it delivers value from its embedded generation and storage to the local grid is essential and surely has a long-term future as the various energy balancing mechanisms wax and wane in value. So we set out to shun any incentives and become an agent of the energy system supplying energy to its connected residents as well as grid services to the DNO/neighbourhood

- Regulation - By keeping our R&D scheme small we could come below the auto-exemptions for use of on-site renewables for generation, distribution and supply. Once we draw conclusions on the project and its magic ratios, we will make representations to Govt. on making these thresholds more appropriate for society to have a thriving local energy industry. Nevertheless, we have sought (and obtained) an Ofgem derogation on billing of customers when blending through and behind the metre supplies.

- Supply Chain - This remains a problem and will do so until the industry believes in a Govt. energy strategy. By having grant funding we can afford to overpay our suppliers compared to a mature market. We can only factor this into our models as to future viability as a cost curve develops.

- Energy Strategy - We have good relations with BEIS and hope our continued findings get the attention they deserve and so we can influence Govt. on the need and shape of a future strategy. However, we will never have sufficient resources to lobby as effectively as the incumbency suppliers. We must rely on the strength of our arguments and a developing group of like-minded projects and local authorities. We try and spread the word via academic papers and conference appearances.

14.4 Stakeholders

14.4.1 The outcomes of our mass market stakeholder analysis yielded the following considerations for scheme design. It should be noted that we are trying to establish approaches for non-greens too so that the majority of the market can benefit, not just those who can afford to pay extra for sustainability:

- Developer - Wants to be eco-friendly in the planning authority's mind while avoiding erecting barriers to home sales in the homebuyer's mind. So avoiding price increases and hassle with maintenance issues or lack of choice with supply agreement lock-in contracts

- Homebuyer - wants a hassle-free home to run that is as environmental as possible but not at a cost. Happy to do more towards sustainability especially with the neighbours. Doing things with the new development's community of homebuyers is attractive - making friends while saving the planet is a win-win. They called it "Community Building". However, may not want to take responsibility for too much technology as an individual. Having a say in their community's approach to sustainability is important while allowing different residents to progress at different speeds.

- Planning Authority - Wants developers to do more to make the area more sustainable and desirable and meet both central and regional CO2 targets. Wants developers and locals to participate in LA schemes.

- Local Residents - wants to see new developments done responsibly and not add to the problem of sustainability. If a new development can help their locality's sustainability credentials that's a bonus.

- DNO - Wants to improve its network, carbon and customer facing credentials, but is not used to change. Concerned the network will be an impediment to transport and heat electrification but not sure how to do it. Motivated by the fear of curtailing low carbon connections and being seen as the problem

- Licensed Suppliers - Caught between the status quo and the new world and recognises change is necessary but focused on suppliers remaining as the hub for the centralised electricity supply industry and its regulations. Recognises flexibility is good for the system but unsure what its future role is given demand profiles will become meaningless. Is it ready to move to Time of Use tariffing for domestic customers?

- Aggregator - Successfully growing its sector from large scale flexibility to smaller scales. The best innovating for smaller loads and pushing the regulations back, but met with industry resistance.

- Local Supply Chain - Still immature for local energy services favouring B2B projects of large scale rather than small projects where local know how counts.

14.5 Aim and Vision

14.5.1 Our aim is to evolve in R&D a community energy system that develops in line with stakeholder aspirations and appetites. When the R&D ends, we will decide which parts of the evolution process were just a matter of learning best practice (so not required in the resulting ESCO proposition) and which parts are essential to allow residents to develop confidence at their own pace and not commit as much as others (so required to keep for the resulting ESCO proposition).

14.5.2 The ultimate vision is to create and operate a Community ESCO with the following attributes:

The offer to residents is community based

"In exchange for lending us your estate we generate green power & heat while discounting your energy"

- Advantages: economies of scale, supplier attention
- Community say: target setting, scope steering, surplus share, investment option
- Journey extensible: EVs, Smart Homes, IoT…
- Customer service: via an best value app.

SmartKlub's role: Business model and service platform
Ensuring the ESCO's affordable and meets local needs

ESCO evolves with community aspirations

"Members steer its future, invest and expand its scope, while protecting investors and residents"

Each ESCO grows with residents only taking risks and responsibilities they want

Returns structure incentivise residential priorities:

- Residents Community – variable surplus share
- Local investors (inc. resident options) - fixed return
- Underwriting investor - fixed return

SmartKlub's role: encourage communities to become investors and even buy out the underwriting investor

14.5.3 The evolution of the scheme is planned as described in the table below with assumption.

<table>
<tr><th>R&D Approach</th><th>Assumed Final Proposition</th></tr>
<tr><td colspan="2">Phase 1 R&D: 70 homes - 30 with PV and 40 in-home controls heated by gas boilers- Completed

Aim: to install major foundation assets and win developer and residents trust without any compulsion to participate</td></tr>
<tr><td>Asset configuration:

● PV - solar farm and on roofs private wire to energy centre. PV integration with home covered under NHBC
● Store - communal battery connected to energy centre
● LV energy centre with ESCO and Aggregator controls
● Grid connection to energy centre
● SCADA system for energy centre
● In-home monitoring with database
● Homes supplied from grid</td><td>Asset configuration: as R&D but with all assets in all phases constructed in single step</td></tr>
<tr><td>Capital: provided by UoN via grant from Energy Research Accelerator</td><td>Capital: provided by foundation investor on fixed return</td></tr>
<tr><td colspan="2">Innovations: New type of solar roof lease acceptable to homebuyer and Council of Mortgage Lenders. ESCO acts as tenant on the roof or wall space with various landlord safeguards. ESCO developed 24x7 self-service app that provides affordable service levels with full transparency and audit trail to residents including project/scheme progress updates and service issues in forum or private mode as chosen by resident.</td></tr>
<tr><td>ESCO:

JV ESCO between UoN and SK to allow innovation decision making to be fast and flexible
All returns invested in further R&D
SK employed to manage ESCO operations with H&S framework and good husbandry O&M costs
Residents entitled to surplus share for allowing PV on roofs equivalent to c25% electricity saving
Residents benchmarking of their energy use and behaviour</td><td>ESCO: Project Sponsor ESCO owned by foundation investor but with evolution steps:

. Appoints SK to manage ESCO for the first 5 years. Allows residents surplus share once fixed returns met. Residents have consultation rights say in operating priorities with open books
. Allow Residents and locals to buy-in via equity stakes up to 49% (no control) and so access fixed returns also
. Allows Residents to make a take-over at a fixed cost to buy-out entire equity so foundation investor is free to sponsor another ESCO with their capital</td></tr>
</table>

Revenue ambition: Allow aggregator to maximise revenue from solar PPA plus ancillary services provided to grid (FFR, CM, Triad)	**Revenue ambition:** as R&D
Phase 2 R&D: 110 homes - 45 with PV and 45 in-home controls heated by gas boilers - Under Construction **Aim:** to avoid peak grid pricing for residents by providing on-site renewables behind the meter while demonstrating to resident savings and hassle-free billing solution	
Asset configuration: As above plus Private wires for behind the meter trial between energy centre and trial homes 15 further PV on roof installations	**Asset configuration:** as R&D but with all assets in all phases constructed in single step
Capital: provided by UoN via grant from Active Building Centre	**Capital**: provided by foundation investor on fixed return
Innovations: In place of standard grid supply, we're blending of on-site renewables provided behind the meter with traditional licenced supplies through the ESCOs boundary meter via private wire, all managed by the ESCO's algorithm. New billing arrangements with ESCO for all residents' supplies. Combined bill format for both through and behind meter supplies, showing CO2 and financial savings	
ESCO: As above for non-trial residents Trial residents achieve direct energy savings on their supplies with guarantee of no higher prices underwritten by ESCO meeting any increased costs Residents with previous year's benchmarking now set savings targets for them to meet through behaviour change	**ESCO**: As above
Revenue ambition: In addition to above make additional revenue from arbitraging electricity price between market Time of Use price and on-site behind the meter renewables. E.g. avoid import during peaks electricity prices and supply from our community battery that was charged using our own on-site generation from our PV arrays.	**Revenue ambition:** as R&D

<table>
<tr><td colspan="2">Phase 3 R&D - 150 homes - 45 with PV and 45 in-home controls plus 40 with PV, heat pumps and in-home controls. 450 pupil Primary School with roof mounted PV and heat supplied by ground source heat pumps - Under Planning

Aim: to save money and earn revenue by arbitraging heat and power between the energy vectors and time of day and between grid and on-site renewables, while providing below market price heat and power supplies. To show how Primary schools can act as foundation tenants to energy schemes and so allow more flexibility of their grid for neighbourhoods to adopt more electrical heat and transport</td></tr>
<tr><td>Asset configuration:

As above plus
Borehole ground source heat collectors
Heat pump plant room extension to energy centre
Heat exchangers to school and 10 homes from plant room
Flat roof mounted solar arrays for PV with private wire back to energy centre</td><td>Asset configuration: as R&D but with all assets in all phases constructed in single step</td></tr>
<tr><td>Capital: provided by UoN via grant from Active Building Centre</td><td>Capital: provided by foundation investor on fixed return</td></tr>
<tr><td colspan="2">Innovations: Optimisation algorithm on arbitraging different energy sources over time of day and between various markets to improve cost and carbon savings. Ability for developments to provide extra grid flexibility to surrounding neighbourhood to increase their scope for extra heat and transport electrical loads.</td></tr>
<tr><td>ESCO:

As above for Phase 1 and 2 residents
ESCO to supply school with heat and power at market price but without having paid for capital assets and no operation and maintenance responsibilities
10 new homes to bill at below market price for heat and power
Overall for ESCO to improve surplus to meet asset capital cost repayments</td><td>ESCO: As above</td></tr>
<tr><td>Revenue ambition: In addition to above make additional revenue from arbitraging between energy vectors</td><td>Revenue ambition: as R&D</td></tr>
<tr><td colspan="2">Phase 4 R&D - Transition R&D ESCO to Community ESCO - Planning in 2022

Aim: to have enough experience to conclude viable and sustainable technical, regulatory and business model to create new ESCO option for future developments in UK. To ensure Trent</td></tr>
</table>

<table>
<tr><td colspan="2">Basin has a long-term future</td></tr>
<tr><td>Asset configuration:

As above assuming viability
Potential fuller roll out to all homes
Possible removal of assets and make good if not viable</td><td>Asset configuration: Use of magic ratios to configure future developments</td></tr>
<tr><td>Capital: tbc for Trent Basin transition</td><td>Capital: provided by foundation investor on fixed return</td></tr>
<tr><td colspan="2">Innovations: Conclusion on magic ratios for optimised viable low carbon community ESCOs</td></tr>
<tr><td>ESCO: Trent Basin to transition to Community ESCO with ownership and ESCO management tbc</td><td>ESCO: As R&D with adjustments based on R&D conclusions</td></tr>
<tr><td colspan="2">Revenue ambition: Self-sustaining resilient to market movements and growing as flexibility becomes more valuable to accommodate heat and transport electrification</td></tr>
</table>

14.5.4 As Phases 2 and 3 further learnings will be applied and conclusions drawn. Depending on the size of the resulting magic ratios that emerge from the project, representations will be made to BEIS on necessary changes to regulations concerning the auto-exemption of supply, distribution and generation licences.

Ener-Vate Consultancy Limited

15

Paddington Village Case Study

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15 Paddington Village Case study

15.1 Introduction

15.1.1 Paddington Village is a major new development at a gateway location to Liverpool City Centre being developed by Liverpool City Council (LCC).

15.1.2 The Site will be developed in three phases: Paddington Central, Paddington South and Paddington North, with Phase 1 now underway. The first phase of the development; Paddington Central consists of residential units, major new offices, a hotel, medical research facilities and a multi-story car park. Paddington Village Central is made up of 7 individual plots.

15.1.3 LCC retains 100% ownership of the ESCo, as a single shareholder. This structure allows for LCC to maintain an arms-length relationship with the Design and Build (D&B) Operate and Maintain (O&M) service provider.

15.2 100% Wholly Owned ESCo objectives

15.2.1 The established ESCo structure at Paddington Village will pursue and achieve the following key objectives, aligning with those set out in Sustainable Energy Action Plan;

- Reduce carbon emissions;
- To provide a low carbon, low-cost source of energy to occupiers of the Site which aids to create a better place for people to live, work and create in a deprived area of Liverpool;
- To provide long term income and create value to LCC through the delivery of an ESCo, which will serve the development through specialist supplier contracts;
- To provide financial benefit to LCC through the sale of the ESCo once all of the Site is complete;
- The advantages of forming an ESCo for LCC;
- Streamlined governance;
- Ability to ring-fence the ESCo liabilities, meaning the Council is not responsible for Paddington Village Energy risk;
- The ability for LCC to sell its interest in the future;
- Ability to source funding (such as HNDU and HNIP); and
- The ability to create a distinct brand.

15.3 Financial Strategy

15.3.1 For the Commercial arrangements, it was critical to distinguish which plots are under LCC's ownership and which plots are planned to be sold to third parties, as this affects the commercial arrangements. There are five plots at Paddington Village Central which are owned by LCC. There are two plots at Paddington Village Central which are owned by differing third parties, which includes the only residential plot with approx. 200 units.

15.3.2 The financial strategy for the scheme is structured to the effect that LCC directly invests and pay for all aspects of district heating installation. The newly formed ESCO, wholly owned by LCC, will then adopt the installed equipment and payback to Liverpool City Council all profits, while the ESCo is in LCC ownership.

15.3.3 This is currently estimated to be a period of 5-6 years to match the projected build-out of Paddington Village Central scheme.

15.3.4 At year 5 or 6, the ESCo can be considered as an attractive asset in the market, de-risked, to be sold for profit to LCC.

15.4 Benefits of 100% Wholly owned ESCo establishment

- There is a significant potential for wide-ranging benefits at various local, district-wide and national levels:
- Paddington Village offers a different way of doing things, which complements the idea of transformation in council services creating an energy service company that can focus exclusively on low carbon energy for the good of the city;
- Paddington Village ESCo will allow the Council to create a distinct brand which could have presentational benefits;
- The use of an ESCO will provide a more exceptional ability for the Council to sell its interest in the Project in the future;
- The existence of an ESCo offers a significant advantage for leveraging in a wide range of funding sources;
- Social benefits for local householders and businesses with attractive rates for heat and guaranteed savings against the equivalent price of traditional gas.

15.5 Risks of 100% wholly owned ESCo

15.5.1 LCC has taken all necessary precautions and sought the advice of legal experts.

15.5.2 The following risk and considerations of forming an ESCo has been identified.

- Tax implications;
- Additional initial production of legal scheme documentation such as the main supply agreement;
- Additional time and cost of ESCo set up; and

- Additional requirements to manage the ESCo.

15.6 Technical Solution

15.6.1 The technical solution, which was subsequently accepted by LCC, is a traditional district heating scheme:

- Gas CHP - thermally led;
- Private Wire Electricity from CHP Generation and Sleeving;
- Gas Boiler - lopping and resilience;
- Steel District Heating network – 80/60 flow and return temperatures.

15.7 Gas CHP plus full resilience gas boilers

15.7.1 The gas CHP unit has been sized to meet the forecast heating demand for the scheme. The overall annual percentage of the heat demand for the intermediate phase met by the CHP, based on the EnergyPro (ePro) software profile modelling carried out by the DBOM partner is 90%.

15.7.2 The Energy Centre was also be fitted with gas boilers with a capacity to supply the entire peak heating demand of the connected plots. Should the CHP not be available, the gas boilers will also supply peak demand on colder winter periods.

15.7.3 The Energy Centre is connected to the surrounding national grid at the capacity to supply the four plots as well as its own parasitic requirements. It contracts through supply agreements with the four plots.

15.7.4 The electrical demand at Paddington Village Central is greater than the electrical output of the CHP, as such, there is a requirement to “sleeve” the remaining electricity demand from the National Grid.

15.7.5 When the CHP is not operational, the ESCo will simply trade the cost of electricity from the grid to the connected customer.

15.8 Private Wire

15.8.1 A Private Wire Electricity network was installed to the Site and connected to buildings where it was practical . This enables it to operate a stand-alone supply in the event of the national grid failing and vice versa.

15.8.2 The Plots that were selected for a private wire have been commercially modelled on the basis, that Liverpool City Council is acting as the landlord and is therefore in control of the type of electricity supply; and the electricity demand is sufficiently large enough.

15.9 Electricity Licencing Regime and Paddington Village

15.9.1 The Council has decided to establish a dedicated Special Purpose Vehicle or energy services company ESCo to deliver the Project, including the supply and sale of heat and electricity to customers at the Site.

15.9.2 Due to the complexity of Electricity licencing regime for supply, distribution and generation, that required an in-depth review, the procured legal team has work alongside of commercial advisors and technical advisors on the production of several advice papers to supply, generate and distribute that has been then used to advice LCC on the relevant direction of Private Wire and its licence.

15.10 The Licencing Regime for Supply

15.10.1 In UK legislation, there is a requirement for anyone who supplies electricity to hold a licence, unless the person benefits from an exemption. To supply electricity to customers on the Site, the ESCo will need to hold a supply licence or benefit from an exemption to hold such a licence. Supplying electricity in the absence of either would be a criminal offence.

15.10.2 Exemptions to supply electricity may either be granted individually on a case-by-case or are available if the supplier falls within a prescribed “Class Exemption”. Based on the information provided three Class Exemptions were likely to be relevant to the Project:

- Class A: Small Supplier;
- Class B: Resale; and,
- Class C: On-Site Supply.

15.10.3 Given the nature of the Project, the Class Exemption that have been suggested for this Project as the most likely applicable **was Class C Exemption for On-Site Supply**. However, this was far from certain at the beginning of the Project and it was based on limited understanding of the electricity supply aspects for the Site.

- For the purposes of understanding whether the ESCo will be able to benefit from the Class C exemption it was important to understand which entity will own:
- the Private Wire Network;
- the Generating Station (i.e. the CHP);
- any other electricity infrastructure at the Paddington Village Site;
- as well as any potential leasing arrangements for the Generating Station between the LCC and the ESCo?

15.10.4 To consider the most applicable exemption , further information were required from the wider team and the Council .

15.10.5 Several areas to consider were:

15.10.6 ***Amount of electricity supplied.*** The electricity modelled to be supplied (at full build completion) is for Total reserved peak = 3.53MW

15.10.7 The Project has a 1.2MW CHP and the forecast operating hours of the CHP (based on the heat requirement) forecasts that c50% of the overall electrical annual demand will be met by the on-site generation.

15.10.8 Some of the exemptions (e.g. Class A: Small Suppliers) place a cap on the amount of electricity that may be supplied to customers in certain circumstances. The Council should understand the projected levels of supply through each phase of the Project.

15.10.9 ***Who is being supplied?*** The availability or scope of some exemptions vary dependent on the nature of the customers (i.e. domestic or commercial) supplied under the Project. Broadly, the exemptions are narrower in respect of domestic customers given the policy considerations for providing greater regulatory protection to domestic customers. The Council should understand the customer profile through each phase of the Project.

15.10.10 ***Who is generating the electricity?*** The source of the electricity supplied by the ESCo will affect the availability and the scope of some exemptions. The Council should understand the projected sources of electricity and projected demand

- wherever possible ,the electricity will be generated by the ESCo (using the on-Site CHP) for supply to customers at the Site, and

- only where the CHP is unable to meet the electricity demand will the ESCo "resell" electricity it procures from licenced suppliers.

15.10.11 ***The location of consumers being supplied***. The availability of some exemptions is contingent on where consumers are located. For example, Class C (On-Site Supply) is only applicable for supply to consumers located on the same Site as the generating station or otherwise supplied by the Private Wire Network. A review of the intended physical layout and the property ownership structure of the Private Wire Network should be undertaken to determine to whether some exemptions will be available. The Council should understand the location of all future electricity consumers.

15.11 The Class Exemption for generation

15.11.1 From the information that has been provided, the ESCo will benefit from a Class Exemption to hold a licence to generate electricity under the Project.

15.11.2 The Class Exemption for the generation that Paddington Village will benefit from is the **Class A Generation Exemption.**

15.11.3 The only generation Class Exemption of potential relevance to the Paddington Village ESCo given the nature of the Project is **Class A: Small generators**.

15.11.4 The maximum amount of electrical power that will be generated at any one time will fall below the 10MW threshold referred to in paragraph below;

- This is on the basis that the CHP generating station used in the Project (the "CHP Generator") will generate **no more than 10MW** of electrical power at any time.

- The CHP Generator for the Project is a **1.2MW CHP** and which has a total reserved peak for electricity of 3.53MW. Accordingly, the maximum amount of electrical power that will be generated by the CHP Generator at any one time should fall below this threshold.

15.11.5 Class A: Small Generators

15.11.6 A person (other than a licensed generator) will be exempt from the electricity licensing regime relating to the generation of electricity where they do not at any time provide more electrical power from any one generating station than:

- 10 megawatts; or
- 50 megawatts in the case of a generating station with a declared net capacity of less than 100 megawatts

15.11.7 The Council and the ESCo should keep under review the sizing of the ESCo's CHP Generator and any future electricity generation arrangements throughout the life of the Project. If it appears that the above threshold could be exceeded, it is possible that the Class A generation Exemption could still be relied upon, although there are additional conditions and considerations that would apply in these circumstances.

15.12 The Class Exemption for distribution

15.12.1 The Paddington Village ESCo will be distributing electricity to the Site.

15.12.2 On the assumption that the electrical lines in the Private Wire Network have a nominal voltage **of less than or equal to 132kW**, the ESCo will be distributing electricity through the Private Wire Network and will be caught by the distribution licensing regime for the purposes of the Electricity Act

15.12.3 Persons who distribute electricity for the purpose of giving (or enabling) a supply to any premises must hold a licence to do so unless they benefit from an exemption to hold such a licence (sections 4(1)(bb) and 5 The Electricity Act.

15.12.4 From the information provided, there was "*no forecast*" for the ESCo "*to supply domestic customers or premises*" under the Project.

15.12.5 Accordingly, there was only one **Class Exemption (Class C: Distribution to non-domestic consumers)** of relevance for the distribution of electricity.

15.12.6 The Council and the ESCo should keep under review whether electricity would be supplied to domestic customers throughout the life of the Project, as if this were to be the case the regulatory requirements for the distribution of electricity would need to be re-considered!

15.12.7 In benefiting from the Class Exemption to distribute electricity, it is required to provide to Ofgem with any information that Ofgem considers necessary (and in the manner and the times that they direct) for the purpose of performing its statutory functions under the Electricity Act.

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Appendix

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16 Appendix 1

16.1.1 The following extracts are from the Small-Scale sections of The Electricity (Class Exemptions from the Requirement for a Licence) Order 2001. Parts understood to be relevant to this report are highlighted in pink. These are for the onsite supply and distribution of renewable generation to mixed use customers (residential and commercial).

16.2 Generation Exemptions Applicable

16.2.1 The Electricity (Class Exemptions from the Requirement for a Licence) Order 2001, states that:

The Class A: Small Generators

Persons (other than licensed generators) who do not at any time provide more electrical power from any one generating station than –

1) 10 Megawatts; or

2) 50 Megawatts in the case of a generating station with a declared net capacity of less than 100 Megawatts;

Disregarding –

a) Power supplied to –

(i) a single consumer who occupies premises which are on the same site as the premises where the generating station is situated and who consumes all the power provided to him from that generating station at those premises or supplies all or some of such power in circumstances specified in the description of Class B in Schedule 4 and consumes at those premises any of such power not so supplied by him; or

(ii) two or more consumers who form a qualifying group each of whom occupies premises which are on the same site as the premises where the generating station is situated and consumes all the power provided to him from that generating station at those premises or supplies all or some of such power in circumstances specified in the description of Class B in Schedule 4 and consumes at those premises any of such power not so supplied by him; and

b) for the purposes of paragraph 2) above power temporarily provided in excess of 50 megawatts due to technical circumstances outside the reasonable control of the person providing that power.

17 Appendix 2

17.1 Distribution Exemptions Applicable

17.1.1 The Electricity (Class Exemptions from the Requirement for a Licence) Order 2001, states that:

The Class A: Small Distributors

Persons (other than licensed distributors) who do not at any time distribute more electrical power than 2.5 megawatts for the purpose of giving a supply to domestic consumers or enabling a supply to be so given with that electrical power.

A.1. *For the purposes of Class A electrical power distributed by a body corporate, which is associated with, connected to or related to any distributor and which does not fall within Class B below, shall be treated as distributed by that distributor.*

Class B: On-site distribution

Persons (other than licensed distributors) who do not at any time distribute from any distribution system more electrical power than one megawatt for the purpose of giving a supply to domestic consumers or enabling a supply to be so given with that electrical power provided that each domestic consumer receives the electrical power, disregarding stand-by electrical power, from a generating station embedded in the same distribution system as himself.

B.1 *For the purposes of Class B "stand-by electrical power" means electricity supplied periodically or intermittently to a person to make good any shortfall in the availability of electricity to that person from its own generation for the purposes of its supply of electricity to domestic consumers seeking such supply, where such shortfall arises from the generating station being wholly or partly out of commission for a temporary period.*

Class C: Distribution to non-domestic consumers

Persons (other than licensed distributors) who do not at any time distribute electrical power for the purpose of giving a supply to domestic consumers or enabling a supply to be so given with that electrical power.

18 Appendix 3

18.1 Supply Exemptions Applicable

18.1.1 The Electricity (Class Exemptions from the Requirement for a Licence) Order 2001, states that:

Class A: Small suppliers

Persons (other than licensed suppliers) who do not supply any electricity except electricity which they generate themselves and who do not at any time supply more electrical power than 5 megawatts of which not more than 2.5 megawatts is supplied to domestic consumers.

A.1. For the purposes of Class A electrical power supplied by a body corporate which is associated with any supplier shall be treated as supplied by that supplier.

Class B: Resale

Persons (other than licensed suppliers) who—

1) do not supply any electricity except—

a) electricity which is supplied to their premises by—

i) a licensed supplier; or

ii) by a person in circumstances such that he falls within Class C in this Schedule (in this Class referred to as a "Class C supplier") provided that for the purpose of determining for the purpose of this Class and paragraphs B.1 and B.2 below whether a person is supplying electricity in such circumstances paragraph (2)(a), (b), (c), (d) and (e) in Class C in this Schedule shall have effect as if sub-paragraph (ii) and the preceding "and", in each case, were omitted; or

b) electricity which they generate themselves or which is supplied to them by a person authorised by an exemption to supply electricity when—

i) the supply of electricity which is normally available to them from a licensed supplier or a Class C supplier (their "normal supply") is interrupted temporarily due to circumstances outside their control; or

ii) the plant or equipment which is used to generate electricity for the purpose of giving their normal supply is being tested; and

2) to the extent that they supply Class C electricity—

a) supply such electricity only to premises, which are on the same site as the relevant premises; and

b) comply with all the conditions set out in paragraph B. 2 below.

B.1. *For the purposes of Class B—*

"Class C electricity" means electricity which is supplied by a person in circumstances such that he falls within Class C in this Schedule;

"relevant premises", in relation to any reference to a supplier falling or seeking to fall within Class B, means the premises from which he supplies that electricity; and

"year" means a period of twelve months running from 1st April to 31st March.

B.2. *The conditions referred to in paragraph (2) in Class B are as follows.*

1) In respect of each relevant premises the supplier must not in the previous year have supplied from those relevant premises an amount of Class C electricity which is more than 10 per cent of the Class C electricity supplied in that year to those relevant premises.

2) If during a year the supplier starts to supply Class C electricity from any particular relevant premises for the first time, at the time he starts to make such supplies he must reasonably expect that the total amount of Class C electricity supplied by him during the remainder of that year from those premises will be no more than 10 per cent. of the Class C electricity supplied in that year to those relevant premises.

3) In respect of each relevant premises the supplier must not in any year supply from those relevant premises more than 250 megawatt hours of Class C electricity to domestic consumers.

B.3. *A supplier shall not, if and to the extent that it would lead to his falling outside Class B, be treated as supplying Class C electricity to any premises during a year in which the relevant premises are being supplied with electricity by licensed suppliers, unless he supplies more electricity in that year than the amount of electricity which is supplied to those relevant premises by licensed suppliers in that year.*

Class C: On-site supply

Persons (other than licensed suppliers) who—

1) do not supply any electricity except—

a) electricity which they generate themselves; or

b) electricity which they generate themselves together with electricity which is supplied to them by a licensed supplier; and

2) provide the output of each generating station at which they generate electricity only to—

a) one consumer who—

i) occupies premises which are on the same site as the premises where the generating station is situated; and

ii) consumes all the electricity provided to him by the supplier in question at those premises other than any of that electricity supplied by that consumer in circumstances such that he falls within Class B in this Schedule;

(in this Class referred to as a "single consumer") or

(b) two or more consumers who form a qualifying group each of whom—

i) occupies premises which are on the same site as the premises where the generating station is situated; and

ii) consumes all the electricity provided to him by the supplier in question at those premises other than any of that electricity supplied by that consumer in circumstances such that he falls within Class B in this Schedule;

(in this Class referred to as an "on-site qualifying group") or

c) one or more consumers who—

i) each occupy premises which are—

aa)on the same site as the premises where the generating station is situated; or

bb)not on the same site but which receive the electricity supply from that generating station over private wires; and

ii) each of whom consumes all the electricity provided to him by the supplier in question at those premises other than any of that electricity supplied by that consumer in circumstances such that he falls within Class B in this Schedule;

(each in this Class referred to as an "additional group consumer")

where the total maximum amount of electrical power supplied to those additional group consumers at any time is 100 megawatts of which not more than one megawatt is supplied to domestic consumers; or

d) one consumer who—

i) receives at least a third of the output of that generating station at premises he occupies which are—

aa) on the same site as the premises where the generating station is situated; or

bb) not on the same site but which receive the electricity supply from that generating station over private wires; and

ii) consumes all the electricity provided to him by the supplier in question at premises he occupies other than any of that electricity supplied by that consumer in circumstances such that he falls within Class B in this Schedule;

(in this Class referred to as a "remote consumer") or

e) two or more consumers who form a qualifying group—

i) who between them receive at least a third of the output of that generating station at premises they occupy which are—

aa) on the same site as the premises where the generating station is situated; or

bb) not on the same site but which receive the electricity supply from that generating station over private wires; and

ii) each of whom consumes all the electricity provided to him by the supplier in question at premises he occupies other than any of that electricity supplied by that consumer in circumstances such that he falls within Class B in this Schedule;

(in this Class referred to as a "remote qualifying group") or

f) additional group consumers within the 100 megawatt limit and one of the following—

i) a single consumer;

ii) an on-site qualifying group;

iii) a remote consumer; or

iv) a remote qualifying group; or

g)

i) a single consumer, or an on-site qualifying group, or additional group consumers within the 100 megawatt limit, or a remote consumer, or a remote qualifying group, or a mixed group of consumers of a type described in sub-paragraph (f) above; and

ii) any other person in circumstances where the provision of the output of the generating station in question does not amount to the supply of electricity.

***C.1.** The following provisions have effect for the purposes of Class C.*

1) Where at any time the supplier in question and some other person generate electricity at the same generating station or provide the output of the same generating station, the generation of electricity by that other person or the provision of the output of that generating station by that other person shall be treated as the generation of electricity and the provision of the output of that generating station respectively by that supplier if that other person, being a body corporate, is associated with that supplier.

2) Two or more generating sets which are operated by the same person or by bodies corporate which are associated with each other shall be treated as a single generating station if they are on the same site as each other (whether or not there is an electrical interconnection between any of them) but otherwise shall be treated as separate generating stations, and in this sub-paragraph—

a) "generating set" means a combination of the plant and equipment that produces electricity and any other plant or equipment by which that plant or equipment is driven; and

b) generating sets shall be treated as being on the same site as each other if they are—

i) situated on the same premises as each other;

ii) situated on premises which are immediately adjoining each other; or

iii) situated on premises which are separated from each other only by a road, railway or watercourse or by other premises occupied by the supplier in question or by a body corporate which is an associate of that supplier.

***C.2.** In Class C—*

"additional group consumers within the 100 megawatt limit" means consumers described in paragraph (2)(c) in Class C;

"output" in relation to a generating station means the electricity generated at that generating station other than electricity consumed by the plant; and

"private wires" in relation to a generating station means electric lines owned by—

a) the supplier in question;

b) a consumer who receives a supply from the supplier in question from the generating station;

(c) the owner, lessor or lessee of the generating station or of one of the premises to which a supply is made by the supplier in question; or

(d) any of the persons described in paragraphs (a) to (c) above jointly with any other of the persons described in those paragraphs;

provided that the owner of those wires is not a licensed distributor.

19 Appendix 4

19.1 ESCo Market Services and Supply Chain

	Services			ESCo Ownership		Scheme Types	
Entity	**D&B**	**O&M**	**M&B**	**Wholly Owned**	**Joint Venture**	**Reside-ntial**	**Comm-ercial**
E.on	Yes	Yes	-	Yes	Yes	Yes	Yes
Vital Energi	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SSE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pinnacle Power	Yes	Yes	-	Yes	-	Yes	Yes
Metropolitan	Yes	Yes	Yes	Yes	Yes	Yes	-
Veolia	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Engie	Yes	Yes	Yes	Yes	-	Yes	Yes
Switch 2	Yes	Yes	Yes	Yes	-	Yes	-
Vattenfall	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nova Power	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calore Verde	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kensa Utilities	Yes	Yes	-	-	-	Yes	Yes
Enercret	Yes	Yes	-	-	-	Yes	Yes
GEON	Yes	Yes	-	-	-	Yes	Yes
Solidenergy	Yes	Yes	-	-	-	Yes	Yes

Supply Chain

Company	Services	Stage	Website
Vattenfall	Technical Advisors	Feasibility-onwards	https://group.vattenfall.com/
Enecret	Technical Advisors	Feasibility-onwards	https://www.enercret.uk/
WSP	Technical Advisors	Feasibility-onwards	https://www.wsp.com/
CWC	Technical Advisors	Feasibility-onwards	https://www.cwcon.co.uk/
AECOM	Technical Advisors	Feasibility-onwards	https://aecom.com/
Hydrock	Technical Advisors	Feasibility-onwards	https://www.hydrock.com/projects/
Atkins	Technical /Commercial	Feasibility-onwards	https://www.atkinsglobal.com/
Carbon Trust	Technical /Commercial	Feasibility-onwards	https://www.carbontrust.com/
Ener-Vate	Commercial	Feasibility-onwards	https://ener-vate.co.uk/
Sweco	Commercial	Feasibility-onwards	https://www.sweco.co.uk/
Ramboll	Technical/ Commercial	Feasibility-onwards	https://uk.ramboll.com/
SmartKlub	Community Design/Operational Customer Service	Feasibility-onwards	https://smartklub.org/
Bevan Brittan	Legal	Strategic, planning, development-onwards	https://www.bevanbrittan.com/
TLT	Legal	Strategic,planning-development-onwards	https://www.tltsolicitors.com/
Luxnova Partners	Legal	Strategic,planning-development-onwards	https://www.luxnovapartners.com/
Weightman's	Legal	Strategic, planning-development-onwards	https://www.weightmans.com/sectors/energy-and-utilities/
Osborne Clarke	Legal specialist for class exemptions	Strategic, planning-development-onwards	alan.john@osborneclarke.com

20 Appendix 5

20.1 Supporting files

Stakeholder Plan Tool	Stakeholder%20Plan%20Tool%20v1.xlsx
Unlicensed Supply Calculator	Unlicensed%20Supply%20Power%20Calcu
Risk Register	Risk%20Register.xlsx