Unlocking Clean Energy in Greater Manchester

Workstream 2 – Improving the business case for renewable energy

29th June 2022

@EnergySysCat

About the authors

Energy Systems Catapult was set up to accelerate the transformation of the UK's energy system and ensure UK businesses and consumers capture the opportunities of clean growth on the way to Net Zero.

The Catapult is an independent, not-for-profit centre of excellence that bridges the gap between industry, government, academia and research. We take a whole-systems view of the energy sector, helping us to identify innovation priorities, in order to decarbonise the energy system at the lowest cost

ESC Contributors
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Cornwall Insight provides research, analysis, consulting and training to businesses and stakeholders in the GB and Irish energy markets.

We provide bespoke advisory services on commercial, regulatory and policy issues to companies across the industry, including generation project developers and investors, flexibility providers, energy retailers, network companies, and government departments and other public bodies.

Cornwall Insight Contributors
Tom Andrews, Malwina Qvist, Craig Lowrey

Local Partnerships is a joint venture between the Local Government Association, HM Treasury and Welsh Government. We help the public sector deliver projects and change at the local level. We provide an interface between central government policy and local delivery to ensure key priorities are achieved and clients secure excellent value for money.

We are a hands-on organisation and work collaboratively for the benefit of our clients, often sitting alongside project teams, rather than providing advice from afar. We bring public and private sector experience that provides confidence, additional capacity and commercial capability

Local Partnership Contributors
Vicky Kingston, Jo Wall, Emma Bull

Unlocking Clean Energy in Greater Manchester

Programme Overview

European Union
European Regional Development Fund

£8.6m ERDF funding

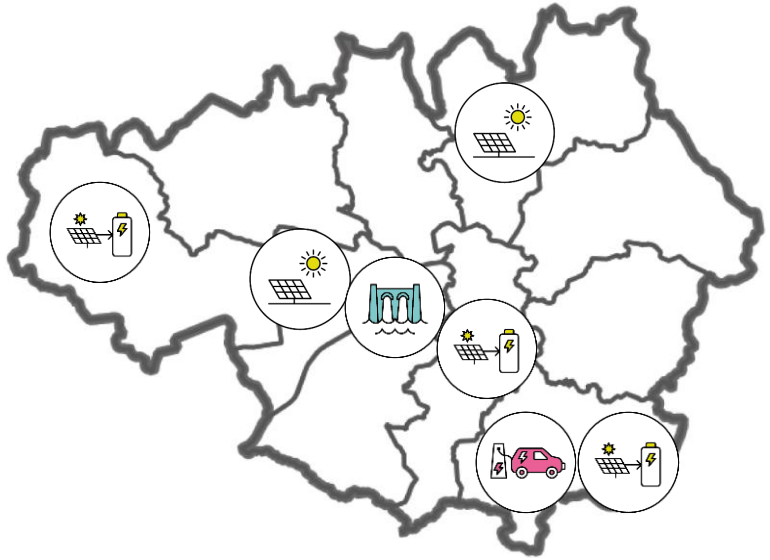
CATAPULT Energy Systems

Workstream 1

- Five local authority partners: **Manchester, Rochdale, Salford, Stockport, Wigan**
- **£8.6m** match funding
- **10 MW** new renewable energy capacity

Workstream 2

- Investigate **innovative new business models**
- Provide options to **improve business case**
- Develop detailed recommendations to **support future investment**



3,134 tCO_2 annual reduction in emissions

10 MW new renewable energy generation capacity – **22% of 2024 target** for new capacity in GM

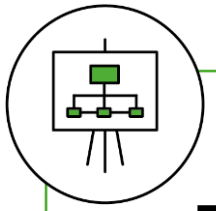
8,881 MWh annual energy generation

Generating electricity to **reduce long-term costs** for local authorities

Workstream 2 – Aims

Problem	Approach
GMCA and authorities in the district are currently **reliant on grant funding** to develop and initiate renewable energy generation projects.	• WS2 will demonstrate how **innovative business models, robust procurement methods and new routes to finance** can improve the business case for future renewable generation projects to **negate the need for grant funding**. • The outputs, whilst using GMCA as a pilot, will be **useable by all local authorities** and will include steps that will improve the business case for renewable projects. • To understand how changes to the energy system will affect local authorities, ESC will simulate the performance of the business models in **defined future market scenarios**.

Workstream 2 – Approach



Phase 1 – Explore Options

- Understand the business models, opportunities and barriers for GM to deliver their climate targets
- Define how best to assess the value created through business models
- Agree a shortlist of business models to develop further

Phase 2.1 – Short Term Business Model Assessment

Detailed design and assessment of business models that can be delivered on near term projects for GMCA. This includes supporting the delivery of a business model solution for WS1 projects and developing a business case for pilot projects.

Phase 2.2 – Longer Term Business Model Assessment

Detailed design and assessment of higher value but more complex business models. This includes a commercial assessment based on future market conditions, recommendations on future policy/regulations, and a roadmap for delivery.

Phase 2.3 – Replicability and Scalability for all Local Authorities

Validation with external stakeholders to understand replicability for other local authorities in the UK. This also includes a review of opportunities for local authorities to work collaboratively (e.g. aggregating projects to improve value, JVs and SPVs).

Where are Local Authorities at currently?

THE CASE FOR LOCAL ENERGY

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- There is a strong desire for increased local action on climate change with over 80% of local authorities (local authorities) declaring a climate emergency
- Two thirds of local authorities are looking to go net zero 20 years before the national target
- Accordingly, many local authorities are starting to pull together climate strategies and local area energy plans……
- …… but face difficulties turning plans into action due to a lack of time, resources and skills
- Projects to date have been largely reliant on grant funding (e.g. Public Sector Decarbonisation Scheme) or subsidies (e.g. Feed in Tariffs)
- Local authorities should prioritise what they can do now such as setting long term energy strategies and decarbonising their own estate
- There is also a need for longer term business models that allow local authorities to drive wider decarbonisation of the local area
- Already, there are encouraging, emerging examples where local authorities are taking the lead on projects
- Also, there is an increasing number of solutions targeted at local authorities that can enable decarbonisation at scale without having to take on all the complexity

The Case Against…..

- Number of high profile failures for local energy in the past (e.g. Robin Hood, Bristol Energy)
- Complexity in procurement and setting up the right contracts with partners
- Difficult to find sites and the right type of projects
- Understanding how to manage financial risks and price uncertainty
- Lack of clarity and evidence on how energy from local sources should be valued

The Case For…..

- Much improved business case for renewable energy projects at the right sites and scale
- Energy price volatility driving a need for new solutions for community
- Successful partnerships with community energy and private sector
- Future market conditions increasing revenue opportunities for local generation and flexibility

EMERGING EXAMPLES FROM LOCAL AUTHORITIES - PROJECTS

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Solar Farms and PPAs

[Forest Heath District Council Solar Farm]
£14.5 million to acquire the 12.4MW solar farm at Toggam Farm in Lakenheath

[City of London]
Signed a PPA with Voltalia to buy all electricity from 49.9MW solar farm in Dorset

[Warrington Borough Council]
60MW solar farm in Hull and York built in partnership with Gridserve

Rooftop solar projects

[Bristol City Council]
117kWp system on local football stadium, funded through PPA with Bristol City Council

[Hounslow Borough Council]
Western International Market has largest rooftop array put up by a local authority at 1.73MW

[Hackney Borough Council]
Solar being rolled out to 10 local buildings to generate up to 1MW of clean energy

Battery Storage

[West Sussex Council]
Subsidy-free 7.4MW solar park on a former landfill site and includes 4.4MW of storage

[Warrington Borough Council]
27MW storage co-located with solar farm in York, built in partnership with Gridserve

[South Somerset Council]
Invested £9.8m on 25MW battery facility near Taunton to provide services to National Grid

Transport projects

[Drive Dundee Electric – Princess Street]
EV charging hub for 18 vehicles supported by 36kWp of solar and 90 kWh of storage capacity

[Nottingham Solar Car Port]
76kWp solar car port with 40 parking spaces at Harvey Hadden Leisure Centre

[Oxford Superhub]
Pivot Power and Oxford City Council project for 50 EV chargers linked to 50MW battery

EMERGING EXAMPLES FROM LOCAL AUTHORITIES - BUSINESS MODELS

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Energy service companies and joint ventures

[Hackney Borough Council]
Hackney Light and Power is owned by the council and has plans to roll out 10 solar installs for its own buildings and on 15,000 council houses

[BHESCo]
Since 2015 BHESCo have completed more than 50 community funded low carbon energy projects across Sussex. Model is no upfront cost to customer.

Innovative Procurement

[RE:FIT (Greater London Example)]
Allows local authorities to procure energy performance contracts on things like energy efficiency or low carbon assets

[iChoosr]
Dutch group buying experts iChoosr work with local authorities to establish the level of interest in getting solar, then use this to inform and run a reverse auction

Community partnerships

[Plymouth City Council]
Helped setup and develop Plymouth Energy Community. The volunteer organisation now leads local action on renewable energy projects, supporting homes with energy efficiency and development of net zero affordable homes

City wide deals

[Bristol City Leap]
25 year partnership with Ameresco and Vattenfal to increase investment and delivery of local renewable projects

[Zero Carbon Rugeley]
Demonstration project led by Equans as part of a 3,000 home redevelopment of the old power station site. It will be a community led, user centric model for local decarbonisations that a central trust will help facilitate and find investment for.

HOW TO OVERCOME BARRIERS FOR LOCAL AUTHORITIES

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Despite the promise of early projects, the roll out of local renewables is not happening at the scale or speed local authorities need to hit their climate targets.

Local authorities face a number of barriers including finding best way to procure and contract manage, getting business cases signed off and having the right resources in place to deliver.

ESC 10 main barriers identified from our Local Authority User Group

1. Not being able to **justify why / demonstrate co-benefits**
2. Not knowing **how to deliver / lack of guidelines / best practice**
3. Not knowing **what's possible / where to start**
4. Difficulty **persuading decision makers**
5. Having to reinvent the wheel on **procurement and legal**
6. Not having access to **support from trusted, experienced parties**
7. Not knowing what **funding and investment** is available / making projects **investable and scalable**
8. Not having the **commercial and technical knowledge** to be an intelligent customer
9. Not being able to **collaborate regionally**
10. Not being able to **access the data** that is needed

HOW TO OVERCOME BARRIERS FOR LOCAL AUTHORITIES

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Our engagement with local authorities in GMCA and across the UK, shows four main recurring issues when looking to deliver renewable energy projects. The remainder of the UCEGM project will focus on potential solutions to these barriers.

1 Procurement and Contracts

Many local authorities have highlighted the lack of internal knowledge on renewable energy projects, especially with key decision makers. There is also limited time and budget for resources that do have the expertise.

2 Raising Finance

Local authorities have expressed difficulties in knowing which finance options are available and in some cases pointed out challenges around securing funds for initial project concepts and feasibility studies.

3 Creating More Value

In the absence of grant funding or other financial incentive schemes, new revenue streams are required as well as new value that will make projects commercially viable.

4 Evolving Policy Environment

Local authorities have expressed challenges in understanding what impact an ever-changing regulatory environment will have on the business case for renewable energy.

1. Procurement and Contracts

PROCUREMENT AND CONTRACTS INSIGHTS FROM LOCAL AUTHORITIES

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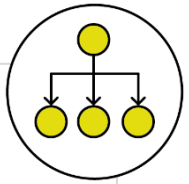
Public procurement is going to play a vital role in delivery of net zero. ESC and Local Partnerships' wider research on public procurement identified some key barriers that need to be addressed:

Culture

- **Limited knowledge sharing** across local authorities
- **Limited engagement** internally – early stage, advisors
- Competing **priorities** – social value, Net Zero, local supply chain etc
- **Upskilling** and embedding net zero priorities – carbon literacy



Procedure

- Internal **governance structure** – levels of sign off/buy in required
- Procurement often blamed as barrier – **slow, lack of innovation,** but not engaged sufficiently early in process
- Gov. **funding sources** don't always take procurement challenges into account – social housing example

Process

- Lack of **standards and templates, relevant case studies**
- Difficulty navigating and assessing **framework options** available
- Suitable suppliers may not be on existing frameworks for quicker simpler procurement
- **Lack of skilled resources** to support procurement processes

PROCUREMENT AND CONTRACTS INSIGHTS FROM LOCAL AUTHORITIES

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There are several existing routes for procuring projects. However, the delivery of net zero may require greater innovation regarding how projects are procured and delivered, with emerging examples from Bristol, Warrington and Suffolk.

Existing process being used

Standard / Static Frameworks
Sets pre-agreed terms and conditions including price and quality levels for the duration. Usually 4-5 years in length. New providers cannot be added. Mini-competition for specific projects.

Dynamic Purchasing System
Like a framework, except new providers can join at any time. No fixed duration on time. Supplier appointed through mini tender.

Direct Procurement
Where framework is not a suitable route to market. Needs to follow public procurement law and recommendation is for an open procedure. Time frame can be 12-18 months depending on project and significant internal resource required to support

Emerging processes and new innovations

City wide deals (e.g. Bristol City Leap)
Move away from piecemeal projects and aggregating all net zero projects into single programme. Two staged process of project identification and then a Private Public Partnership for delivery of city-wide programme

Energy performance contracting (e.g. RE:FIT (co-owned by LP and GLA))
Framework for energy performance contracting, moving to more outcome-based procurement. Local Authorities can procure contracts which guarantee energy savings or generation over lifetime of the contract.

Innovation Challenge (e.g. KTN and West Suffolk Council)
West Suffolk are looking at Local Energy Markets which do not fit with standard procurement frameworks. Worked with Innovate UK to create a challenge call through the KTN, and organisations are invited to submit against a specification.

SPVs and ESCo arrangements (e.g. Midlothian Heat Network)
Joint venture between public and private sector to invest in and operate an energy asset. Most relevant where IRR on a project is below private sector expectations.

PROCUREMENT AND CONTRACTS INSIGHTS FROM GREATER MANCHESTER

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On energy supply contracts

Commonalities Across Local Authorities

- Access to **procurement frameworks** for supply
- **Limited forecasting** to inform purchasing options
- **Limited, if any, challenge** to existing procurement practices
- Utilise **fixed contracts** and **renewable energy tariffs**
- Limited use of sleeving and balancing services
- PV used for **self supply**

Divergence Across Local Authorities

- **Knowledge** of energy supply
- **Delivery model** for management of energy supply
- Use of **energy management policies**
- **Market assessment/ benchmarking**
- Use of **brokerage**
- Type of **supply frameworks** utilised

On energy projects and programmes

Commonalities Across Local Authorities

- **Procurement is project driven**, rather than an interactive discussion
- Default use of frameworks
- Challenges internally, with **resource** & **resistance to risk**
- **Gov. grant funding** sources don't take procurement timescales into account
- Limited experience of **collaborative procurement**
- Seeking **best practice** outside of GMCA is limited
- **Social value** considered critical

Divergence Across Local Authorities

- Mechanism for engagement with procurement teams
- Varying levels of engagement with the **local energy hubs**
- Use of **Owners Engineers** (expert client to manage Operations & Maintenance)
- Potential for use of **'Go Neutral' Framework**
- Approach to **market engagement**

SHORT TERM RECOMMENDATIONS FOR BETTER ENERGY PROCUREMENT

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Barriers Identified Within GMCA

1. Inconsistent knowledge and experience in relation to energy supply, energy management policies, market assessments and the use of brokerage services
2. Internal processes for engagement and approval of procurement contracts is lengthy and one sided
3. Lack of visibility of supply options and wider energy services such as green tariffs and sleeving
4. Visibility of procurement options, their suitability and alignment with internal policies
5. Energy management of existing sites could be stronger to reduce size of decarbonisation challenge for public sector estate
6. How to scale up opportunities - often projects considered independently, and the benefit of collaboration and economies of scale not widely explored

Recommendations

1 Develop an energy management policy to determine / agree procurement strategy

2 Improve forecasting activity and market assessment processes to improve purchasing decisions

3 Ensure use of auditable green energy (beyond REGOs)

4 Engage early and encourage two-way dialogue with procurement teams

CORNWALL INSIGHT

CREATING CLARITY

2. Raising Finance

FNANCING LOCAL DECARBONISATION

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- Local Authority projects to date have largely been delivered through grant funding or reliant on subsidies
- In the absence of such opportunities some local authorities are unaware of what finance options are available
- To begin to address this challenge, we use findings from Cornwall Insight to introduce and explain some of the finance options available for renewable projects
- The initial eight finance options considered by Cornwall Insight are summarised in Table 2.
- Out of the long-list of options explored, the following three were selected to be covered in greater depth: **The Public Works Loan Board, Crowdfunding and Green Investment Bonds**
- For each, a case study is provided to illustrate how local authorities have successfully secured and utilised these types of finance in the past

Finance Option	Brief Overview
Public Works Loan Board (PWLB)	A lending facility operated by Government to provide loans to LAs (and other bodies) in order to fund capital projects.
Salix/ Public Sector Decarbonisation Scheme	This scheme offers interest-free loans to the public sector to reduce energy costs by installing energy efficiency technologies.
The UK Municipal Bond Agency (UKMBA)/ Green Investment Bond	The UKMBA was established to provide LAs easier access to the bond market and to provide an alternative debt finance source to the PWLB.
Project Finance	This involves the creation of a Special Purpose Vehicle (SPV) to raise finance against specific project developments.
Crowdfunding	Finance is sourced from the general public with a large number of relatively small-scale funders.
Green Lenders	A range of dedicated green lenders which exist to provide finance to renewable generation projects.
Balance Sheet Investment	The deployment of reserve funds for investment in capital projects to derive income.
UK Infrastructure Bank (UKIB)	A lending facility operated by Government to provide loans to LAs (and other bodies) in order to fund capital projects. Focused on the following strands: Clean Energy, Transport, Digital, Waste and Water.

Public Works Loan Board

Throughout the financial year of 2021, 264 loans with a total value of £2.8bn were issued through the PWLB.

- Metropolitan, borough, county, city and combined authorities all have access to this funding stream and are required to submit a Certainty Rate Return.
- The funding process is straightforward and provides interest rates that alternative sources would unlikely be able to beat.
- The applicants themselves are responsible for deciding as to whether they can service the debts through revenue.
- Authorities cannot borrow money for investments primarily for yield.
- However, it is possible to invest in revenue generating assets which align with long-term strategic purposes such as housing, regeneration or decarbonisation – this has been tested in the marketplace.

Interest Rates: Can be fixed (based on gilt yields at the time +1%) or variable (between 1.22-2.00% as of Nov 21)
Amount of Funding Available: Virtually unlimited
Loan Tenure: 1-50 years
Benefit(s) to the Local Authority: Light touch application process

Strengths	Weaknesses
• Very low-cost source of finance • Realistically, no limits to funding available • Easy and rapid to access • Low cost of accessing • Can be applied flexibly once achieved	• Cannot be invested primarily for yield • Early repayment incurs additional costs • In some instances, other routes to finance (Green Bonds as an example) may be lower cost

Opportunities	Threats
• Virtually unlimited funding is available to LAs– with only internal sign-off processes to meet	• PWLB is controlled by central government meaning there is a possibility that they could adjust interest rates, limit the finance available and/or change the eligibility at short notice

Crowdfunding

- Multiple platforms exist to support crowdfunding such as Seedrs, Triodos Crowdfunding, Ripple and Abundance.
- These platforms charge for their services which may include management tools such as distributing profits, suitability checks, money laundering checks and due diligence on potential investors.
- Onus is on the authority to provide a compelling proposition to potential investors as well as to provide access for the local community to buy-in to the project.

Interest Rates: 1.2-5.0% (usually at the higher end of this scale when returns on investment aren't secured by subsidy schemes like FiT)
Amount of Funding Available: Typically in the region of £10,000-£100,000
Typical Level of Investment: £50-£100
Benefit(s) to the Local Authority: Creates a sense of local ownership and increases community engagement

Strengths	Weaknesses
• Community engagement • Retains some profits in the local economy • Considerable amounts of (potentially) low-cost finance can be available	• No clarity ahead of time as to what level of funds may be available • Can be more expensive than PWLB loans • Requires more due diligence to access funding (there are platforms which can assist)

Opportunities	Threats
• Can be used to raise capital with PWLB "top up" to the levels required	• Subject to regulation from Financial Conduct Authority • If other generation projects fail, this will limit investor confidence in crowdfunding opportunities

Green Investment Bond (UKMBA)

- The number of bonds successfully issued by local government is small with very few deals achieved to date.
- The size of bonds would require large portfolios of projects to be in development pipelines in order to absorb the capital.
- However, if a project pipeline was built over a period of years, this would leave money on deposit for extended periods which would incur costs whilst not generating revenue.
- As a potential solution to address this risk, the UKMBA are intending to offer pooled bonds in which numerous LAs could raise capital collectively.

Amount of Funding Available: >£250m for stand-alone bonds and >£1m for pooled bonds

Strengths	Weaknesses
• Low cost of capital (equivalent to PWLB) • Long-term debt raising is possible to finance activities across the local authority's entire portfolio • Could replace PWLB if investing entirely for yield	• Slower to access funding – likely a 4–5-month minimum turnaround time • Very few deals successfully issued to date • Requires more due diligence to access funding • Higher costs to obtain and manage the bond • It has not yet been demonstrated whether rates will be as low as PWLB
Opportunities	**Threats**
• Very large amounts of capital available for the right opportunities • Provides access to another funding route should PWLB funding be cut off or if its interest rates increase again	• If any LA becomes insolvent, this could be seen as a threat to all investors in LA bonds • Local authorities can not invest for yield (using this option) if they have received PWLB loans for projects in their wider portfolio • The long-term sustainability of UKMBA has been questioned given the low levels of successful issues to date

Third Party Ownership

- In some instances, LAs may wish to opt for a third party ownership financing model where other organisations are better suited to manage the risk of asset underperformance as well as maintenance and repair.
- Should LAs wish to opt for this arrangement, the most common business models are as follows:
  - A PPA where the price (p/kWh) is based on the level of consumption of the LA
  - A rental agreement where the LA would make a regular fixed payment to secure all generation output from the assets installed.
- For each of these arrangements, the LA may be able to make a partial investment and therefore access part of the revenue generated (through shared ownership of the asset).

Strengths	Weaknesses
• No need to obtain finance for the asset therefore a less labour-intensive investment process • Hassle free operation – no need to provide maintenance to the asset • Asset performance risk lies with the third party • LA do not need to worry about market conditions	• No access to revenue from excess electricity production or additional services provided by the asset owner • Potential of greater costs to LAs (in terms of PPA or rental agreement) as risks are carried by third party.
Opportunities	**Threats**
• Opportunity for the site owner to co-invest with third party and access some of the additional revenue • Plays to traditional LAs' strengths and experience in procuring services from third parties	• Asset is owned and operated by a third party, so site owner does not have operational control in case of difficulties • In the current environment, a credit-worthy off-taker needs to be selected to minimise the risk of the off-taker collapse

LOCAL AUTHORITIES' EXPERIENCE WITH PROJECT FINANCE

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Public Works Loan Body – West Sussex County Council (2018)

- Using the PWLB, West Sussex City Council funded a subsidy-free solar and battery farm project on an ex-landfill site at Westhampnett.
- The project cost approximately £11.5m and included 7.4MW of solar capacity which was accompanied by 4.4MWh of battery capacity.
- Power exports are being routed back to the Council's estate via a sleeved PPA with the LASER public energy procurement framework.
- The council wholly own the site through an SPV.

Community Benefits

- Benefits were originally provided by 'Your Energy Sussex' who provided low-cost tariffs to local residents.

Lessons Learned

- Benefits of using brownfield site such as low cost of land and ease of planning
- Difficulties in remediating the site and securing connections

Crowdfunding – West Berkshire Council (2020)

- Using the platform Abundance, West Berkshire Council raised £1m to install a portfolio of assets.
- Abundance took 0.19% of the total amount raised.
- The proceeds were used to install rooftop solar across four council properties and a number of schools as well as numerous energy efficiency upgrades.
- In total, there were 640 investors with the average investment amounting to £1560.
- The assets are wholly owned by the council who are liable for paying returns.

Community Benefits

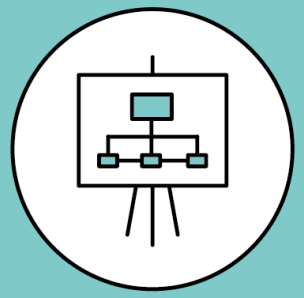
- Schools are benefiting from lower power prices as a result of the investment.
- 1 in 6 investors have nominated their returns to be invested in a local wildflower project.

Lessons Learned

- Nearly £200,000 was raised on the first day and 80% of the target was achieved in two weeks due to a successful marketing campaign

Green Investment Bond – Lancashire County Council (2020)

- To date, the only bonds issued by UKMBA have been to Lancashire County Council.
- These totalled to £600m and consisted of a £350m, five-year bond and a £250m, 40-year bond.
- For the former, the interest rate is set at 0.8% above Gilt and the latter is set at 1.0% above Gilt.
- No specific projects have been financed by these investments.
- Tranches of £100,000 were made available to investors.
- Returns will be paid by the Council's full array of income streams.
- According to UKMBA, no English Authority has ever defaulted on its borrowing.



3. Creating value through new business models

CURRENT COMMERCIAL CASE FOR RENEWABLE PROJECTS

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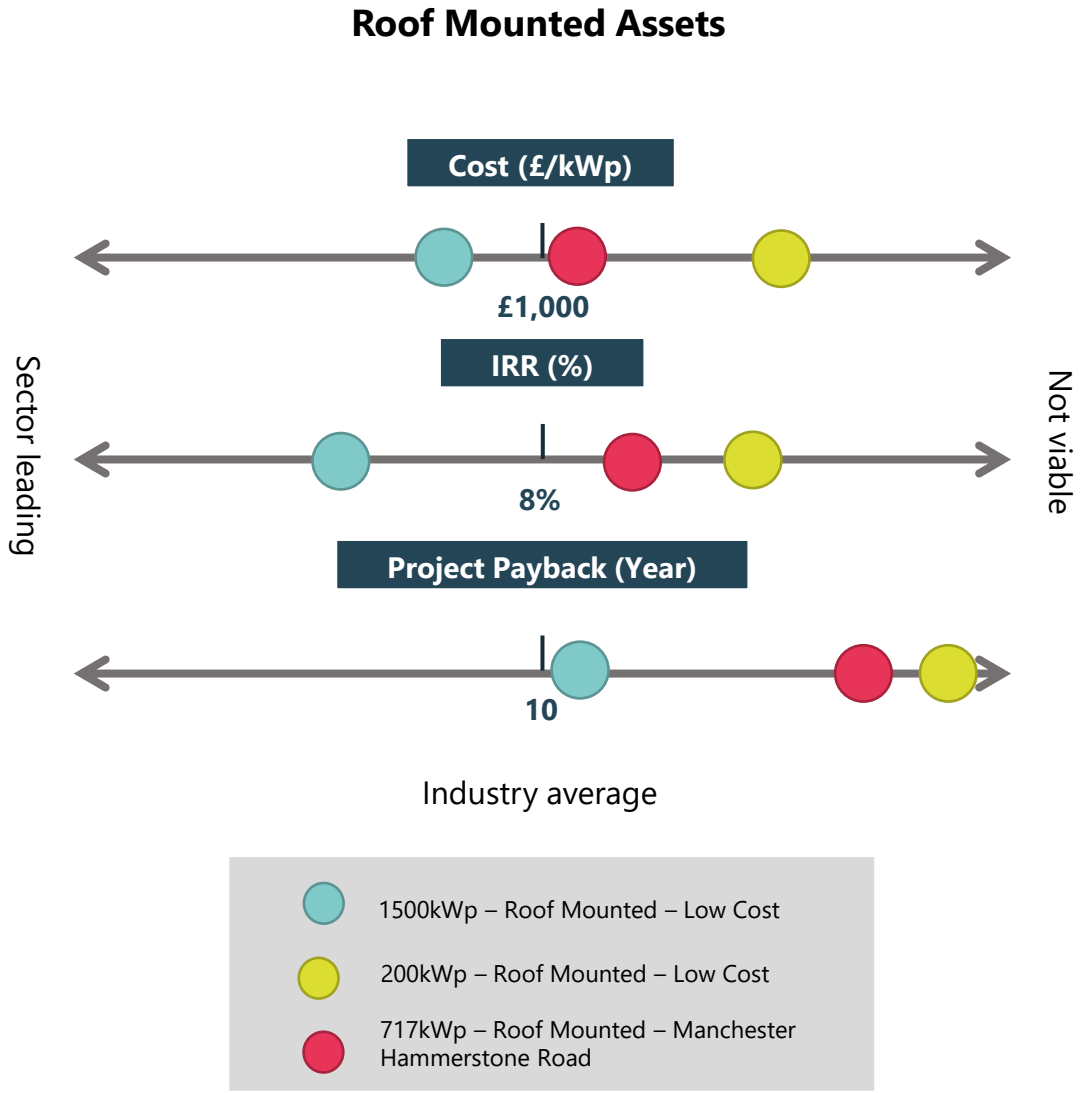
- There are emerging examples of local authority and community led solar projects that do not require grant funding or subsidies to stack up
- In order to understand the current commercial case, we have analysed examples from UCEGM and the wider public sector including:
  - Roof mounted solar (up to 1,500 kWp)
  - Grid connected solar (up to 5,000 kWp)
- Two benchmarks have been derived from information we have collected on other public sector projects
  - A 'low cost" which would be considered sector leading
  - A 'high cost' which is the top end where projects becomes commercially unviable
- For roof mounted assets we assume they operate under a **self consumption and export** model where a site owner builds and operates a solar PV system on site
- The electricity generated is used to offset grid import and any surplus is exported through the Smart Export Guarantee



CURRENT COMMERCIAL CASE FOR RENEWABLE PROJECTS

European Union
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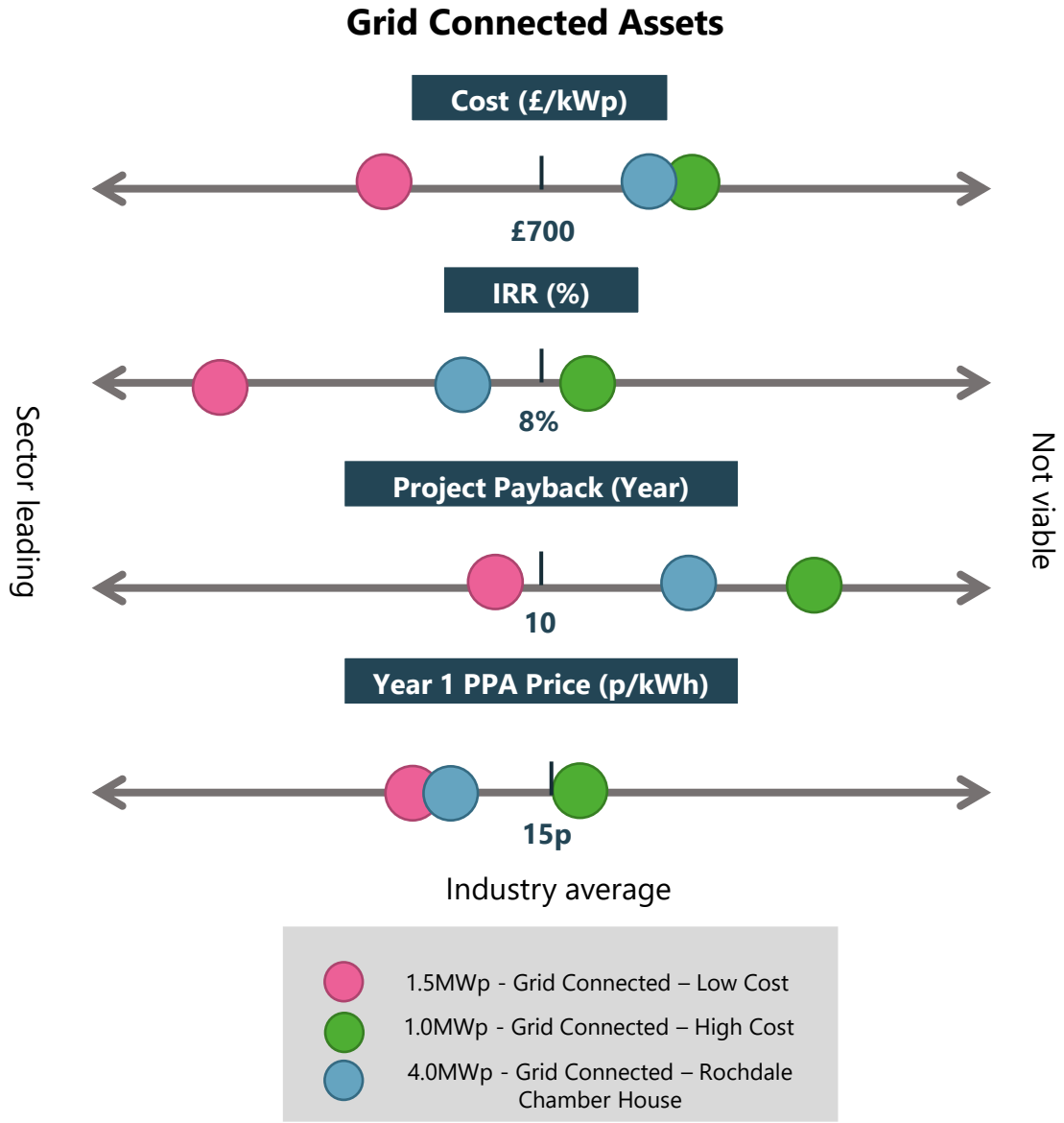
- We assume grid connected assets operate under a **power purchase agreement (PPA)**
- In this model a renewable energy generator and an off-taker enter into a long term electricity supply agreement which underpins the price and volume of electricity supplied
- We fixed the required IRR (for generator only) to 5% to calculate an off-taker year 1 PPA price – this is inclusive of finance costs, sleeving fees and policy network costs.
- Costs vary significantly for both asset types which has a knock on effect on other factors such as the internal rate of return (IRR), project payback and the Year 1 PPA price
- Increased costs are often resultant of high grid connection fees and/or high installation costs – both associated with the complexity of a specific site.



WHY ARE NEW BUSINESS MODELS REQUIRED?

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- We used available data from several Workstream 1 solar projects to compare the total cost per kW peak capacity against our benchmark figures
- For the right sites, e.g. Rochdale Chamber House, solar is already commercially viable and this business case will only improve with rising energy prices
- However many of the WS1 sites are more complex and expensive then our cost benchmarks and would result in one (or all) of the following outcomes:
  - Grant fund required to bridge any CAPEX gaps
  - Higher PPA prices (potentially above existing supplier rates)
  - Greater exposure to risk / acceptance of a lower IRR
  - Periods of negative cash flow
- If solar is to be delivered at scale in local areas, we need innovative solutions could increase the commercial viability of projects.

FINDING THE RIGHT SOLUTION FOR A LOCAL AREA

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A business model is how resources are organised in a way in which they can deliver value to users. The most effective business model for local decarbonisation will be dependent on the characteristics of the local area and the low carbon interventions most suited to the place. Some business models will be applicable to all, some will be very site or technology specific.

1 Place characteristics

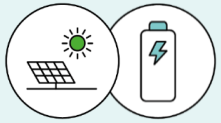
- Local Needs – how is energy used by locals currently and what problems do they face? Can additional value or pain points be solved at the same time as decarbonising the site or region?
- Resources - what resources available to decarbonise (solar, wind, hydro, etc.)
- Energy Profile – what does demand look like, things like the time and the intensity of energy required
- Spatial – what space restrictions are there, where can generation be located, how close is it to the demand you are trying to decarbonise
- Density – are their buildings are home in close proximity, how can generation be shared
- Energy System – what constraints are their for connecting new generation, or what constraints are there on existing demand?

It is also worth factoring in how these characteristics might change over time as energy needs and the local area change. For example what does land use and energy use look like in 10 years based on development plans?

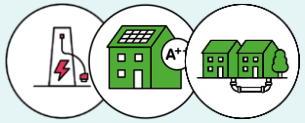
2 Low Carbon Interventions

Based on the site characteristics what is the best technical solution for decarbonising the site or region. For the project we have considered the following technologies and how they can be combined:

Primary low carbon measures:



Secondary considerations:



3 Business Model

The business model should be considered in parallel with the technical solutions. So based on what is best for the site the right balance needs to be made between what is technically possible (i.e. the technical solution) and how value can be maximised

CREATING VALUE THROUGH NEW BUSINESS MODELS

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- As part of Phase 1, we considered a range of business models that would allow a local authority to increase local renewable generation

- Each business model has been assessed based on the value it can create, and any technical limitations to rolling out the business model at scale.

1. **Revenue and Cost Savings**
   How does a local authority make a financial return on its investment

2. **Other benefits**
   What wider benefits to the local area can be claimed or quantified?

3. **Scalability**
   Can the business model and solution be delivered at scale in the local area?

4. **Project delivery**
   How difficult will the business model be to deliver, is it already a well established business model?

Revenue and Cost Savings

- Savings on energy bills
- Increased value of energy sold
- Revenue from flexibility services
- Other energy services

Scalability

- Geographical Restrictions
- Economies of Scale
- Regulation

Other Benefits

- Accelerating the delivery of Net-Zero
- Increased System Resilience
- Green skills and jobs
- Equity and Community
- Health and Well-Being

Project Delivery

- Contractual Arrangements
- Model Maturity
- Complexity of Installation
- Resources Required
- Policy and Regulation

CREATING MORE VALUE THROUGH NEW BUSINESS MODELS

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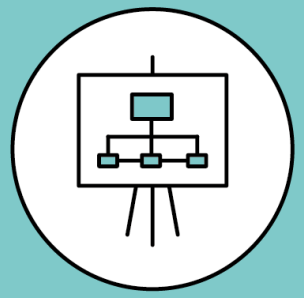
- Each category has been given a score based on its improvement to existing business models for renewable energy
- The ***short term category*** is for solutions that are already possible in the market and there is evidence of local authorities adopting this approach
- The ***long term category*** is for emerging concepts which have the potential to generate higher value, both financial and wider benefits, but have a greater amount of complexity and uncertainty
- Longer term business models show more risk but enable wider decarbonisation beyond a local authority's existing estate.

Short Term Business Models

Business Model	Financial	Other Benefits	Project Delivery	Scalability
1.1 Sleeved PPA	Fair	Fair	Good	Good
1.2 Private Wire	Fair	Fair	Difficult	Poor
1.3 Storage & Site Optimisation	Uncertain	Fair	Fair	Good
1.4 Solar & Storage Licensing Agreement	Fair	Fair	Fair	Very Good
1.5 Solar Car Port	Uncertain	Good	Fair	Good

Longer Term Business Models

Business Model	Financial	Other Benefits	Project Delivery	Scalability
2.1 Sleeving Pool / LEM	Very Good	Good	Hard	Good
2.2 Local Energy Tariff	Good	Good	Hard	Fair
2.3 ESCo	Fair	Good	Fair	Fair
2.4 EV Charging Hub	Fair	Very Good	Fair	Good
2.5 Low carbon heat network	Uncertain	Very Good	Hard	Fair
2.6 Collective Self Consumption	Good	Good	Hard	Poor
2.7 Private Network / Micro grid	Good	Good	Hard	Poor



Short Term Business Models

1. Sleeved PPA

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Revenue	Other Benefits	Delivery	Scalability
Fair	Fair	Good	Good

- A sleeved PPA is when an organisation "sleeves" their generated power to their own sites despite not being physically connected
- An energy supplier facilitates the sleeving and will charge a fee dependent on location and time of generation
- The generator and off-taker will agree a price structure for the lifetime of the PPA, even if they're the same organisation
- Reduction in CO_2 emissions through transfer of Renewable Energy Generation Origin (REGOs) certificates for the energy purchased
- Can include storage to increase revenue opportunities

Key Benefits

Financial and CO_2
- Decrease in energy bills for off-taker
- Minor uplift in revenue as a generator depending on PPA setup
- Provides long term price security for generator and off-taker
- Reduces carbon emissions - for off-taker through the purchase of REGOs

Other Benefits
- Local skills and jobs
- Easy to setup
- Highly scalable if right sites can be found in local area

Risks and Considerations

- Limited commercial viability for smaller scale projects and more complicated sites
- Business case dependent on future energy price forecasting
- Existing supply contracts may not include best value terms for sleeving, need to negotiate at the same time supply contract is up for renewal
- Best pricing will be for projects, or aggregation of projects, above 5MW

Examples from the market

WARRINGTON Borough Council

BRISTOL CITY COUNCIL

CITY OF LONDON

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1. Sleeved PPA - Contracts and Value Flow

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Most Suitable For

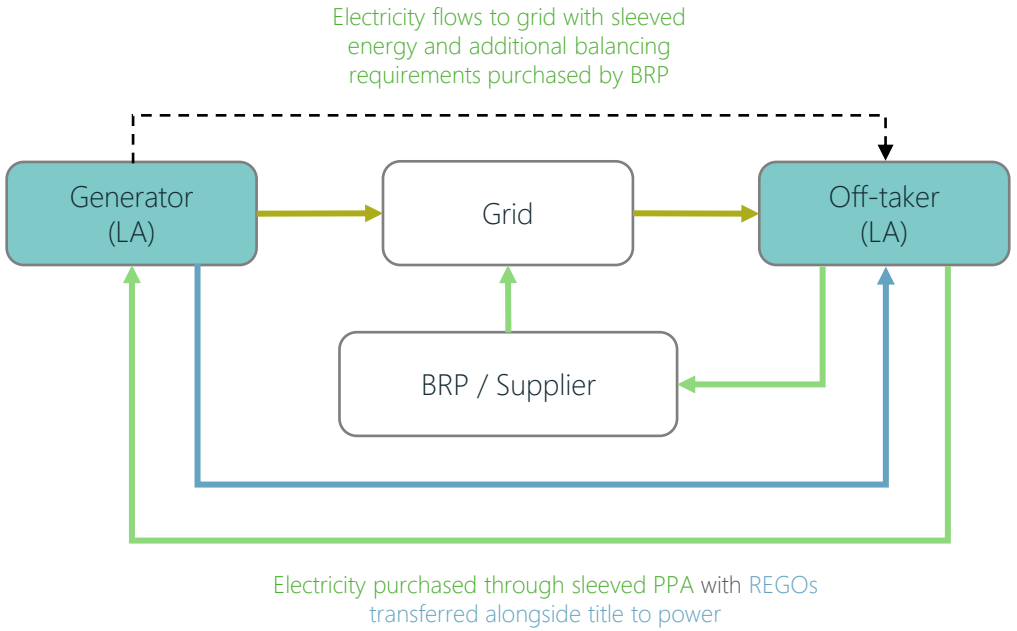
- Technology – **solar** and **potential for storage**
- Local authorities looking to invest in renewable energy assets and with a **large public sector estate** to decarbonise
- Where rooftop solar is more difficult to do
- Values long term price stability and guaranteed 100% renewable electricity
- Where the local authority does not want to own assets, they can still setup different PPA variations with generation owned by a 3rd Party

Contracts Required

- **Renewable Energy PPA** – price, term, volume
- **Utility/off-taker PPA** –this second PPA requires the utility to act as the buyer's agent in managing the off-take of power from the generation facility. The Utility PPA will pass the REGO certificates to the off-taker.
- **Generator/utility off-take PPA** – this agreement makes provision for the generator to supply the utility and for the REGO certificates to pass from the generating station to the utility supplier.
- **Aggregation** – if storage is involved and looking to make additional revenue from flexibility services

Contractual Considerations

- **Contracting is straightforward** and there are industry standards which energy suppliers can help facilitate.
- Existing supply **contracts may not include terms for sleeving and balancing** in which case it may be necessary to **wait for the end of the existing supply contract** prior to entering into a sleeved PPA
- The **additional sleeving** can be a challenge to business cases, potentially making the power purchased more expensive than wholesale power



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Warrington Borough Council Case Study

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Overview of Project

- York and Hull solar farms are projects developed by Warrington Borough Council which integrate ground mounted solar PV with battery storage.
- The PWLB was used to finance the two sites.
- There are two routes of revenue for Warrington:
  - Sleeved PPA directly with its own local authority demands
  - Npower optimises operation of battery and provides route to market
  - 90% value of wholesale market and ancillary services and 100% of embedded benefits flows through to Warrington Borough Council.

Scale of Deployment

- Investment of £60m across the two sites
- Hull is a 25.7MWp solar farm that includes a 21MW battery
- York is a 35MW solar farm with 27MW battery
- Expected to return £210m over 30-year project lifetime.

2. Private Wire

- A private wire is where a generator connects directly to a building or site, replacing any power they would have imported.
- A private wire is not subject to the same regulation and charges (e.g. use of system or policy charges) that standard exported electricity would face.
- This is highly valuable for both parties depending on the cost of setting up the private wire:
  - For the off-taker, they will have to import electricity as normal when there is not any power available from the private wire
  - For the generator, anytime there is not sufficient demand from the off-taker, the excess power will be exported onto the grid which requires separate commercial arrangements.

Examples from the market

Revenue	Other Benefits	Delivery	Scalability
Fair	Fair	Difficult	Low

Key Benefits

Financial and CO_2
- Decrease in energy bills for off-taker
- Uplift in price for generator
- Reduces carbon emissions for off-taker through reduced import from grid

Other Benefits
- Long-term price security for generator and off-taker
- Local skills and jobs
- Can be expanded with additional capacity at good site locations

Risks and Considerations

- Complex to deliver
- Requires suitable locations and demand close to generator
- "Optimism bias" – can suffer from poor initial cost estimates and spiralling costs
- Value from avoided system and policy costs likely to be removed in future
- Very difficult to find sites of sufficient size next to an off-taker
- Cost of setting up the private wire

2. Private Wire- Contracts and Value Flow

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Most Suitable For

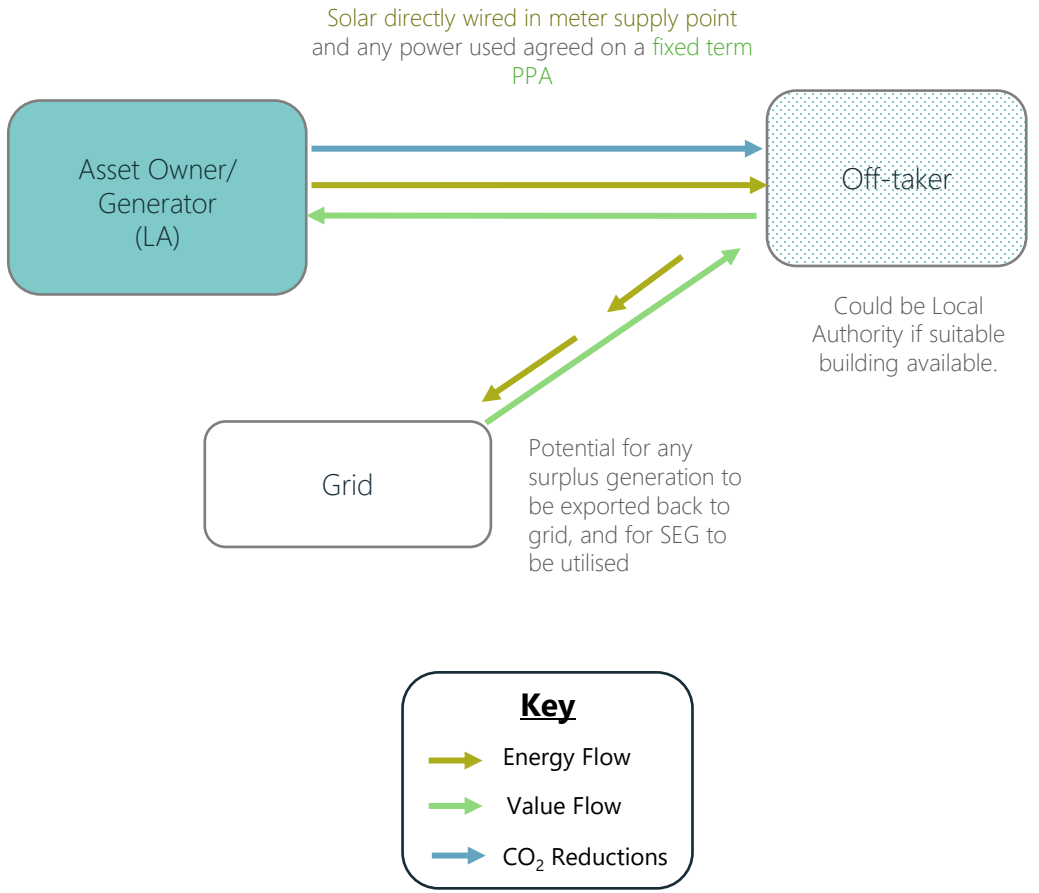
- Technology – **primarily solar, storage could be included in future**
- Schemes with a **large baseload** which is guaranteed over time
- Sufficient network and grid connection capacity, so that the off-taker does not incur any upgrade costs
- **Suitable land** needs to be available in the area, where generation can be placed close to demand and create limited issues in terms of planning consent for the private wire

Contracts Required

- **Direct PPA** – if the generator and off-taker are different parties
- **Contract with Electricity Supplier** – off-taker contracts with electricity supplier for balance of electricity
- **DNO –** Grid Connection Offer and agreement to be in place
- **Construction & Legal** – construction contract for generation, installation and for "Private Wire". Legal contracts to fulfil third party land rights and H&S issues.
- **Operational –** Operational contracts for running and maintenance of "Private Wire"

Contractual Considerations

- **Specifying the requirements** for the private wire is a **specialist skill** and will require a **proper engineering review** of the proposed route to identify additional challenges.
- It is likely that the generator would be an exempt supplier under the Supply Licence Exemption Rules – but specialist advice on this should be sought by the project.
- Connection arrangements can become complex as the generator will generally not be allowed to connect to the grid other than at the off-taker's site.



Brynwhillach Solar Farm Case Study

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Overview of Project

- The Brynwhillach Solar Farm (owned by Swansea Bay Health Board) will provide up to 25% of Morriston's Hospital power via a 3km private wire.
- This will reduce the hospital's electricity bill by £439,000 per year.
- Funding from the project has been sought from a variety of means i.e. Covid Recovery funds & RE:FIT programme.

Scale of Deployment

- The Brynwhillach Solar Farm is a 4MW, 1000x panel solar farm with a 3km private wire to Morriston Hospital.
- Provides 25% of hospital demand.

Future Ambitions

- A third phase of development (with the solar farm being the second) is due to be completed in March 2022.
- This will include LED lighting across Swansea Bay Health Board sites, the installation of heat pumps at two locations and roof mounted solar at another hospital.

3. Site Optimisation and Storage

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Revenue	Other Benefits	Delivery	Scalability
Uncertain	Fair	Fair	Good

- Installing a battery to maximise the use of solar energy generated, and other commercial opportunities
- The battery can be used for different purposes:
  - Get a higher value for solar export (e.g. waiting to sell at times of high prices)
  - Reducing the cost of imported electricity (by using stored power during high prices or importing electricity at low prices for later use)
  - Working with National Grid to provide power into Ancillary Services, Balancing Mechanism or Capacity Market
  - Working with DNOs to provide local flexibility services
  - Working with energy partner to improve their trading position or imbalance position
- Most viable at a large scale

Examples from the market

London Borough of Hounslow

Portsmouth International Port

Key Benefits

Financial and CO_2

- Increasing self consumption of solar and reducing cost of imported energy
- Additional revenue opportunities from aggregator / energy supplier may be viable for some sites
- CO_2 savings limited under current regulations

Other Benefits

- Increases local system resilience
- Increase local skills and jobs in growth area

Risks and Considerations

- Storage being used for increasing self consumption only not commercially viable
- Further modelling and trials recommended to understand value and risks
- DNO needs to be engaged early, can be difficulties in getting projects signed off
- Supply chain and procurement not as mature as solar market
- Difficult to compete with private sector for revenue and costs

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3. Site Optimisation and Storage - Contracts and Value Flow

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CATAPULT Energy Systems

Most Suitable For

- **Technology** – **most commonly co-located with new solar projects** but can be utilised on existing solar installations
- **Technology** – lithium-ion most commonly used but different types of storage will continue to develop in the market
- Most scalable when co-located with solar but the depends on factors like site location and time of use
- **Higher revenue** opportunities when **located in constrained areas** and when managed as part of a bigger portfolio of assets
- Significant roof space or space on site / where generation potential outweighs demand on site

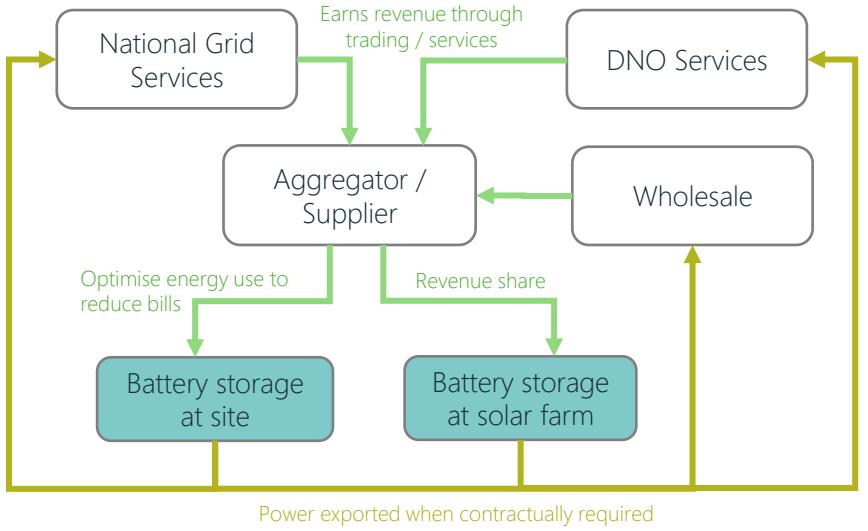
Contracts Required

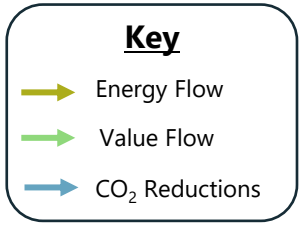
Assuming the role of the local authority is as the asset owner and that the asset comprises a combination of generation and energy storage:

- Potential for synthetic or **sleeved PPA** for self-consumption
- **Import PPA** for the storage element (connection needs to be of a suitable size)
- **Aggregation contract** for the storage element
- Hardware will be required for battery control and site optimisation
- This could be the same as the aggregator or may be a sperate partner
- **May look to setup a PPA for offtake** for generation from the renewable asset and any peripheral supply from the **storage**

Contractual Considerations

- The **size and scale** of the assets will determine the market interest, both for the PPA and the aggregation contracts.
- Smaller schemes will be less attractive to the market and may attract less interest.
- There can be a **conflict for use of a shared grid connection** for combined schemes and this needs to be managed through the offtake/aggregation contracts to ensure that arrangements are clear in the event that both assets require the grid export connection.





Hounslow Council Case Study

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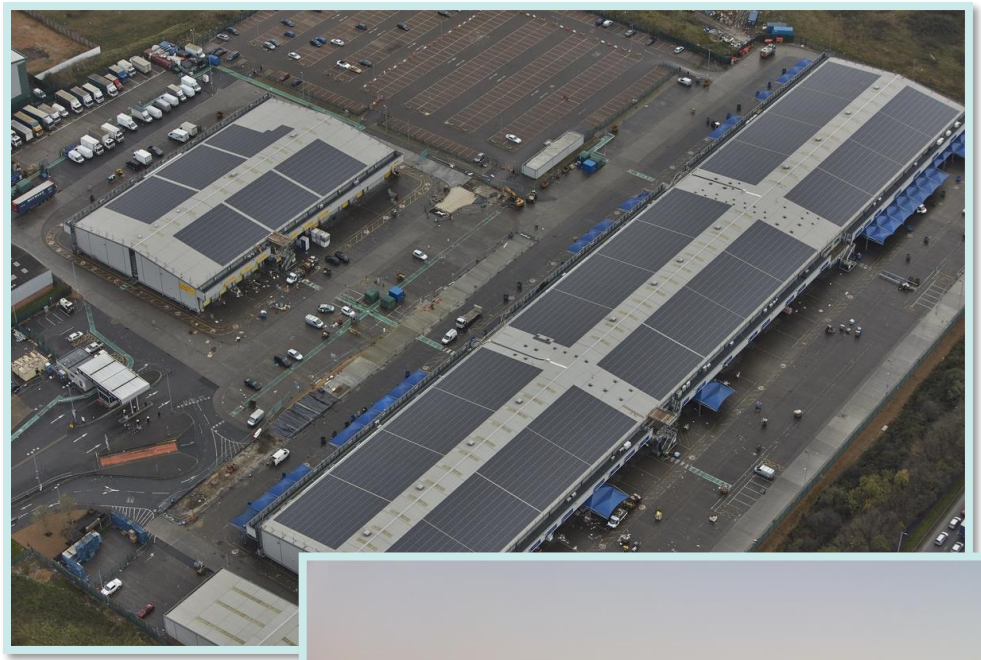
Overview of Project

- In 2016 London Hounslow Council installed solar panels on the Western International Market building.
- This is the largest array ever installed by a local authority.
- The building currently rents units to approximately 70 tenants which, collectively, consume up to 3.4MWh of electricity per annum.
- The power generated reduces grid imports by nearly 45%.

Scale of Deployment

- Installation of 1.73MW system and 4x 60kW lithium-ion batteries
- Emission reduction of >780t CO_2 per year (2% of Hounslow's carbon reduction target)
- £148,000 savings in energy costs (Y1)
- £100,000 in generation tariff payments as part of Feed-in Tariff scheme (Y1)
- £7,000 in export tariffs (Y1).



4. Solar and Storage Licensing Agreement

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- Local Authority benefit from solar and storage without having to invest
- Installation covered under a "licensing arrangement", which means the assets are owned by a 3rd party
- Any power used on site from the assets is covered under a PPA, and should provide a reduction in energy bills for no up front cost
- The asset owner uses value they generate to recover costs - any extra is kept as margin
- Primarily aimed at cluster of homes (e.g. social housing) and can include further upgrades like low carbon heating or retrofit
- Model is also applicable for any organisation with multiple sites depending on suitability

Examples from the market

SMS

sero

Revenue	Other Benefits	Delivery	Scalability
Fair	Fair	Fair	Very Good

Key Benefits

Financial and CO_2

- Energy bill reduction - estimated 10-20% reduction in energy bills for no up front investment
- Fixed price PPA and provides price certainty.

Other Benefits

- Helps finance roll out of solar and storage at scale
- Fair transition – Allows low cost access to net zero transition,
- Reduces complexity and effort of delivery in house

Risks and Considerations

- Potential legal issues of roof licensing and 3rd party asset ownership
- Complexity on energy supply contracts, especially with tenants
- Only deployed in social housing currently
- LA loses control of future revenue opportunities
- Cost of finance likely to be higher

4. Solar And Storage Licensing Agreement - Contracts And Value Flow

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Most Suitable For

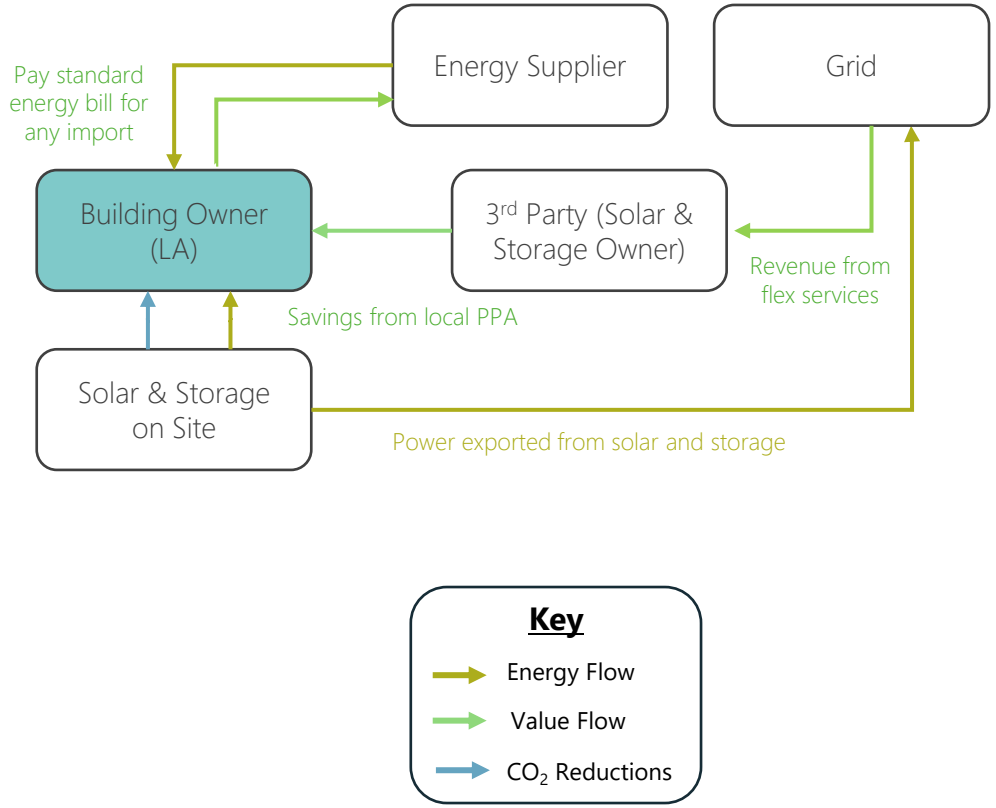
- **Technology** – **solar and storage** installed on site
- Where local authorities lack resource, this could be the most viable option to mobilise more quickly
- Looking for **3rd party to manage complexity and risk**
- Best suited for local authority housing assets or working in **partnership with local Housing Associations**
- Could look at adapting model to be joint venture where local authority looks to roll out across local area

Contracts Required

- Lease or licence for equipment to be installed
- **PPA for energy supply** (on site generation/ balancing supply)
- **Export supply agreement** with the DNO (Note this is likely to be best placed with the building owner as opposed to leaseholder or concession holder)
- **Contract with meter operator -** will need to allow for both import and export metering
- Depending on occupation this might also have implications for onward supply to either commercial or domestic tenants

Contractual Considerations

- On site generation across multiple sites could lead to a **breach of a minimum supply requirement** on existing contracts
- Costs associated with **grid infrastructure upgrades** required to support export could be disproportionate to export
- PPA for on-site generation will require long term contract
- Significant on-site generation may impact pricing on balancing supply
- Where the building is **tenanted** there are **significant additional complexities**



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SMS and Solopower Case Study

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Overview of Solution

- **Solopower** is a turn-key Solar PV and Battery Storage solution for social housing
- Assets are installed at no upfront cost to the tenant through a PPA contract between the provider and the landlord. Typical contract length is circa 15-20 years
- **Flexigrid** technology remotely controls the battery storage asset to optimise when it charges and when it dispatches and exports stored energy into the grid to generate revenue.
- Trialled in Orkney as part of **Re:Flex Orkney**, an IUK demonstration project
- **Social Housing Demonstrator in Aberdeen** is a £5.2m pilot project which combines this solution with fabric retrofit and low carbon heating, again using controls developed with Flexigrid.
- For over 100 social houses and the project aims to improve comfort levels and lower energy costs.
- The installation phase of the scheme completed in Feb 2022 and has created 39 local jobs. Energy performance of homes currently being assessed.

5. Solar Car Port

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Revenue	Other Benefits	Delivery	Scalability
Uncertain	Good	Fair	Good

This model can be operationalised using two approaches:

1. Utilising public car parking and putting solar over the top
2. Providing EV charging services, integrated with solar and storage at the site

- Requires an off-taker of sufficient size to make business case stack up
- A solution will be required to bill EV users, most likely through a partner
- An export connection required for any power not used on site and where storage is being used for flexibility services
- More ambitious "charging hub" projects being explored by Dundee, Oxford and West Midlands Combined Authority

Examples from the market

Rotherham Metropolitan Borough Council

Dundee City Council

Nottingham City Council

Key Benefits

Financial and CO_2

- Value is dependent on utilisation of EV chargers and battery
- More EVs and reduced costs of storage will increase value in future

Other Benefits

- Accelerating roll out of Net Zero by integrating solar and EV charging
- Improved access to EV charging
- Local skills and jobs
- Improved air quality and impact on health

Risks and Considerations

- Financial uncertainty – not a lot of real world data available
- Requires a number of partners to maximise value (aggregator, charge point operator)
- More technically complex to design and manage
- Could be combined with business case to electrify public sector fleets
- Very scalable – site capacity could be increased in future and business case will improve over time

5. Solar Car Port - Contracts and Value Flow

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CATAPULT Energy Systems

Most Suitable For

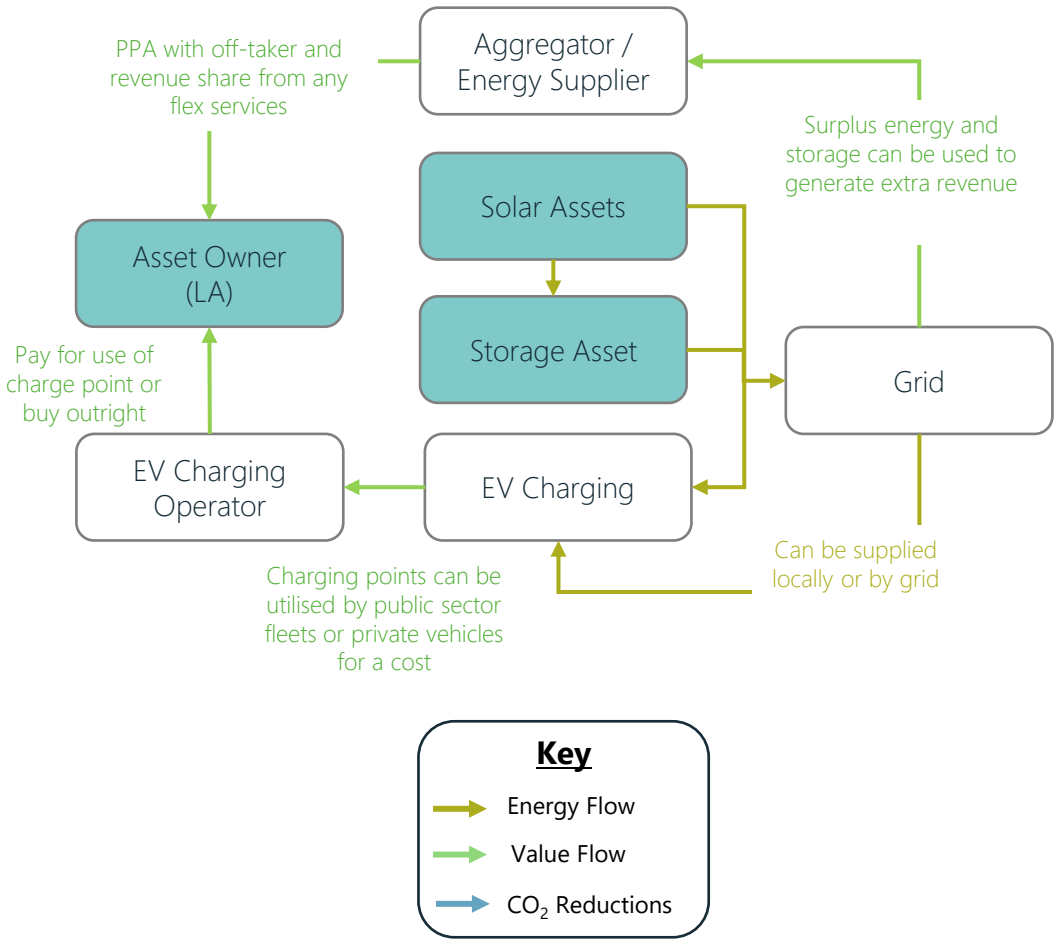
- Technology – solar, potentially supported by EV charging and storage
- Urban areas where available sites / roof space for solar is more limited
- Public car parking, especially multistorey car parking where top level can be used for installation
- Public sector sites where parking is available, and they are looking to electrify fleets
- Partnerships with other government departments (e.g., Transport and Healthcare) where large public car parking is situated

Contracts Required

- Delivery contractor – will need a multidiscipline installer who can support on the design and installation of the solution
- Export connection – any excess electricity will need an export agreement in place with potential impacts on existing grid connection
- Aggregator – if looking to earn revenue from flexibility services will need an energy partner or aggregator
- Charge point operator – to maintain, operate and bill for an EV charging on site

Contractual Considerations

- Need to consider how EV users will be charged and how revenue will be collected from the charge point operator - high utilisation of EV charging is crucial to business case.
- Higher complexity for delivery contractor due to integrating multiple technologies - may require single specialist or a main contractor with the ability to sub-contract
- More data would be required on availability of flexibility to enter into a contract with aggregator



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Drive Dundee Electric Case Study

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Overview of Project

- A city wide programme that is aimed at both residents and businesses of Dundee.
- Charging hubs are installed across the city and the wider region provide solutions for residents who may otherwise struggle to access services (I.e. those who live in flats / tenements).
- Hubs are located in local communities, supporting businesses and residents.
- Council fleets are electrified with multiple charging points across the council estate.
- Funding received from OLEV to become and exemplar of an EV city.

Scale of Deployment

- Across the three main charging hubs c.12 rapid chargers (50kw) and 7 fast chargers (22kw) chargers.
- 36 kWp PV system and 90kW storage with rapid chargers being installed across multi storey car parks.

Future Ambitions

- Further expansion across suitable sites and 100% electrification of council fleets.

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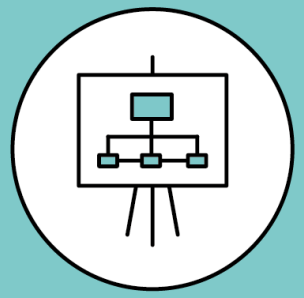

Long Term Business Models

1. Sleeving Pool / Local Energy Market

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- Links multiple generators with multiple off-takers for increased value
- One version is a "Sleeving Pool" where a "Pool Manager" plays the central role in co-ordinating contracts and finding the best mix of local generation that matches demand
- Generators can setup direct PPAs with off-takers or leave supply open to be traded in the pool
- Second version is a Local Energy Market (LEM) or Local Energy Exchange which are facilitated by a digital platform.
- In both cases an organisation is responsible for local balancing and intraday trades
- The differences are in how the price is set for trades -with a LEM being more an open market in theory
- LEMs also have the potential to offer a wider array of services as the market matures

Examples from the market

Bristol City Council · regen transforming energy · together housing · UrbanChain

Revenue	Other Benefits	Delivery	Scalability
Very Good	Good	Difficult	Good

Key Benefits

Financial and CO_2
Improves on a Sleeved PPA by:

- creating economies of scale
- matching generation and demand
- reduced network charges and improved imbalance position
- further revenue if flexibility traded

Other Benefits

- Creates a stronger business case for local generation
- Improves system resilience and flexibility
- Retains value locally

Risks and Considerations

- Value is dependent on market design and local price signals
- Need enough scale, or liquidity, in the pool / market
- Only a few trial projects and feasibility studies
- A partner is required to be the Pool Manager or Local Energy Exchange
- Risk that the Pool or LEM becomes more regulated and value opportunities are reduced.

UrbanChain Case Study

European Union
European Regional Development Fund

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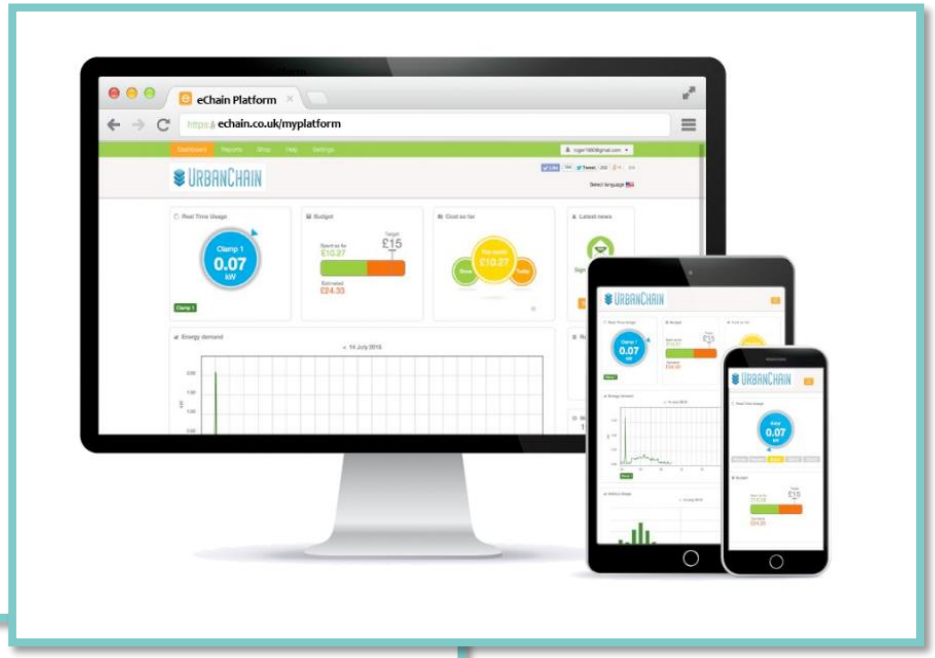
CATAPULT Energy Systems

Overview of Project

- Urban Chain is a Peer-2-Peer software platform that serves both local generators and local energy users to provide matched renewable power.
- There are different applications of the platform:
  - Local Peer-2-Peer where UrbanChain serves an entire local area with a mix of generators and end users
  - Private Peer-2-Peer where it is a closed exchange serving only buildings and generation specified by the main investor.
- Cost savings are derived from network efficiencies and the licence exempt cost avoidance.



Scale of Deployment

- Working with West Suffolk Council and an industrial park with 50 businesses participating in a local energy exchange and demand side management trial.
- Businesses save £40-50 per MWh on bills and get an upliftt of £30 per MWh of solar energy exported.
- Also working with Together Housing Association.
- Partnership will allow 500 houses and bungalows within Lancashire and Yorkshire to buy (and sell) green energy amongst themselves and others.

UrbanChain

This document is marked as confidential

2. Local Energy Tariff

- A specific tariff or service offer for locally generated energy
- There are a few variations of local energy tariffs that exist today:
  - "Local generation tariff" – customers get a reduction in their bills when there is local generation online (e.g. Octopus fanclub, Energy Local)
  - "Local Investor tariff" – customers part invest in a generation asset and get a rebate or share in revenue (e.g. Ripple Energy)
- Tariffs currently aimed at domestic consumers and community energy groups
- Likely that local authorities would be an off-taker initially
- Local authority may act as generator in partnership with a community energy group in future

Examples from the market

Revenue	Other Benefits	Delivery	Scalability
Good	Good	Difficult	Fair

Key Benefits

Financial and CO_2
- Decrease in energy bills for off-taker
- Could sell local energy tariff in LEMs in future

Other Benefits
- Creates a stronger business case for local generation
- Retains value locally
- Community engaged in local decarbonisation
- Minor system resilience improvements
- Local skills and jobs

Risks and Considerations

- Not yet tried with local authority
- Reliant on an energy supplier to do local matching - only one supplier in the market currently
- Contractually complex to setup
- Could be scaled over time and encourages diversity in investment in local renewables
- Flexibility in location - examples (e.g. Ripple) do not require generation and demand to be closely located.

3. Energy Services Contract

European Union
European Regional Development Fund

NORTHERN POWERHOUSE

CATAPULT Energy Systems

- Local Authority enter into an Energy Services Contract with a 3rd party (ESCo)
- ESCo install low carbon technology and other energy efficiency measures at no up front cost
- Current energy supply agreement (for power and heat) replaced by fixed price energy service contract
- Energy savings delivered shared between local authority and 3rd party (to recover costs)
- ESCo acts as intermediary between local authority and other partners such as energy supplier and aggregator
- Local authority likely to be customer initially but could form ESCo through partnerships or joint ventures

Examples from the market

refit

BHESCo

Revenue	Other Benefits	Delivery	Scalability
Fair	Good	Fair	Fair

Key Benefits

Financial and CO_2
- Potential reduction in energy bills for customer (off-taker)
- Reduced capital expenditure for local authority

Other Benefits
- Low complexity and can be delivered at speed and scale
- Accelerates the roll out of Net-Zero
- Reduces public sector costs in delivering Net-Zero
- Offers wider access to Net-Zero
- Local skills and jobs
- Better comfort from energy efficiency improvements

Risks and Considerations

- Energy partner required to deliver energy performance contract
- Sites need to be evaluated and costs understood
- Range of technology being installed adds complexity / disruption
- Scalability is dependent on commercial viability of sites and 3rd party
- Protection needs to be in place in the event of 3rd party failure

4. EV Charging Hub

European Union
European Regional Development Fund

NORTHERN POWERHOUSE

CATAPULT Energy Systems

Revenue	Other Benefits	Delivery	Scalability
Fair	Very Good	Fair	Good

- Delivers a combination of solar, storage and EV charging at scale within a local area
- Goal is to increase the quality and availability of EV charging - especially in towns and cities
- EV hub led by an Energy Service provider who takes responsibility for project development and operations once the charging hub is live
- Solar and storage used to optimise power supplied to the charging hub
- Contract can be setup with local authority to exclusively power fleets that are looking to electrify

Key Benefits

Financial and CO_2
- Electrification of LA fleets more cost effective
- Reduces future investment required for EV charging

Other Benefits
- Accelerates roll out of Net Zero by integrating solar and EV charging
- Improved access to EV charging
- Local skills and jobs
- Improved air quality and impact on health
- Improved system resilience through battery
- Can increase availability and affordability of transport

Risks and Considerations

- Emerging concept
- Reliant on 3rd party in setting up and developing the project
- Highly complex and long lead times
- EV Hub would be of sufficient scale to serve a large amount of the local area
- Possibility to expand over time but highly dependent on network constraints and costs
- High EV charging demand would be required

Examples from the market

pivot power EDF renewables

Sandwell Metropolitan Borough Council

OXFORD CITY COUNCIL

Pivot Power Case Study

European Union
European Regional Development Fund

NORTHERN POWERHOUSE

CATAPULT Energy Systems

Overview of Project

- Collaboration led by Pivot Power which allows the delivery of new electric transport services (fleet, taxis, etc.), energy storage services for grid and heat services through local assets.
- The transmission connected EV Charging superhub is served by a private wire, sharing a connection with a 50MW hybrid battery which provides services to National Grid.
- Habitat Energy are providing aggregation, optimisation and trading software.
- Kensa are trialling their shared ground loop heat pump and trialling flexibility services in social housing.

Scale of Deployment

- 40x public fleet vehicles.
- 20x rapid chargers and 22x fast chargers at the Superhub.

Future Ambitions

- Pivot Power are investing heavily in this concept and aiming for 40+ sites around the country.
- Oxford - 25% of council fleet electrified by 2023 and electrification of Oxford's bus fleets.
- Kensa looking at integration into SLES.

OTHER OPTIONS CONSIDERED

Low Carbon Heat Network

Combining solar and storage with a heat network to deliver low carbon heating services to the local area. Concept is being trailed in Islington and Southend as part of IUK programme on smart local energy systems. Still early concept so further info from trials required

Collective Self Consumption

Model run in Germany focused on medium and high density buildings (e.g. tower blocks). Involves generation assets supplying a building, usually under a private wire arrangement, and benefits being shared equitably amongst all residents and tenants in the area. More relevant to a region wide decarbonisation plan.

Private Network / Micro Grid

Most suitable for new build development such as housing projects, industrial estates and business parks. Would mean creating self contained network similar to a LEM that is run by a property developer or land owner. Highly complex and unproven concept.