Agenda Item No: 7

BATTERY ENERGY STORAGE SYSTEM MARKET OPPORTUNITY & RISK

To:	**Commercial and Investment Committee**
Meeting Date:	**21 June 2019**
From:	**Executive Director, Place and Economy**
Electoral division(s):	**All**
Forward Plan ref:	**N/a** *Key decision:* **No**
Purpose:	**To outline the opportunities and risks of developing battery energy storage projects.**
Recommendation:	**The Committee is asked to:**

a) note the risks in developing battery storage projects,
b) agree the continued development of battery storage projects within the context of a changing market
c) agree the proposals in paragraphs 2.10-2.11 to monitor and shape the changes in the battery storage market, and
d) agree the proposal in paragraph 2.12 to set up a member working group to review battery revenues ahead of investment decisions on projects.

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1.0 BACKGROUND

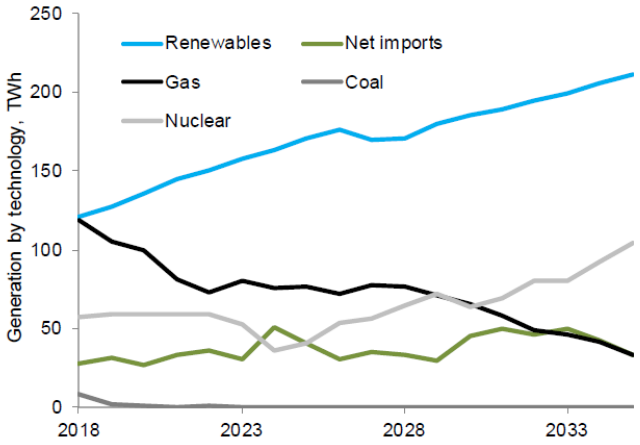
1.1 The Energy Investment Unit is developing four significant battery energy storage projects at Babraham and Trumpington Park and Rides plus Stanground and Woodston closed landfill sites. These form part of its energy investment programme. Outline business cases presented to Committee in May and September 2018 requested initial development budgets of £150,000 per project to progress these to stage 1 of the Investment Grade Proposals. The total indicative investment across all four projects is estimated at £30.5 million with forecast total 25 year net returns of £77.4million. Since outline business cases for these projects were presented to Committee, the immaturity and uncertainty of the market for battery services has become apparent. This paper identifies issues and risks pertinent to all of these and subsequent projects.

2.0 MAIN ISSUES

Evolving Low Carbon Energy Market – the opportunity

2.1 Total electricity demand is projected to increase, driven by factors including the electrification of transport and heating in order to meet the 80% carbon reduction target for 2050 enshrined in UK legislation. Electricity generation is also changing, with intermittent, renewable generation such as solar PV and offshore wind providing an ever increasing share in order to decarbonise this electricity. By 2030, Government projects that 70% of UK electricity will come from low carbon sources.

Electricity Generation by Fuel Source[1]



2.2 With electricity increasingly coming from intermittent generating technologies, there is a clear need for energy storage capacity to bridge the mismatch between timing of generation and demand. Projected growth in electricity demand will also increase the challenge of stabilising the electricity grid e.g. managing supply and demand, and maintaining supply voltage and frequency in real-time will place more burden on the electricity transmission and distribution network. Battery energy storage systems are extremely well suited for providing grid stabilisation services and can help reduce grid reinforcement costs.

2.3 There is a clear strategic need for more battery energy storage capacity as without it, the UK electricity system will collapse. This need has been reflected by a quadrupling of

[1] Updated Energy & Emissions Projections 2018, BEIS

planning applications for battery projects over the past 2 years with over 300 businesses active in the sector[2].

Battery Storage –Investment Risk

2.4 The market for battery services is at an early stage of development. Some services have emerged, but these have been subject to change and uncertainty, for instance:

- Firm Frequency Response, which assists in maintaining the grid within safe frequency boundaries, became over-subscribed in 2018, rapidly driving down revenues; and
- the Capacity Market, a mechanism introduced by the Government to ensure that electricity supply continues to meet demand, has been subject to changing rules for battery participation and is currently suspended due to a State Aid challenge.

Whilst we are confident that further battery service incentives will emerge, the timing and nature of these, alongside revenues, are impossible to predict at present.

2.5 Traditionally, Committee has considered energy projects on the basis of business cases that model revenue streams based on relatively stable historic revenue data e.g. electricity wholesale market prices, with reasonable assumptions around future growth. In these business cases uncertainty over forward electricity prices can be handled by applying low and high price growth assumptions. The immaturity of the battery service market and the resulting volatility seen in prices for battery services to date makes business case modelling for battery energy storage revenues, based on historic data, meaningless as a tool for supporting decision making at this time.

2.6 The UK is committed to a low carbon future for electricity supply. This implies a future market for battery storage in the longer term. For the Council to capture benefits from the battery market, it must plan and develop projects to be ready to capture market incentives as they come forward ahead of final investment decisions. The risk is that, if the market does not evolve in the way currently envisaged, expenditure on development budgets will be lost or completed projects will not generate the expected returns.

Lessons learnt from the Solar Market

2.7 The Council's Triangle Farm Solar Park was originally designed to access Feed In Tariff (FIT) revenues for larger projects. The Council was entering the market at the back end of the FIT scheme which had been in existence for a few years. Whilst developing the project, the FIT scheme was withdrawn by Government with little notice, just as the project was moving towards investment decision. This was a low point for the project. In discussions with Government, it became clear that the FIT would be replaced by a new scheme, Contracts for Difference (CFD), designed to reduce the costs for low carbon electricity through projects competing to provide electricity at the lowest price. With the withdrawal of FIT the risk for the Council was not winning the CFD funding, which is why work started immediately to understand the scheme and develop a bidding strategy. Analysing our success in the CFD competition, it was only possible as the project was at an advanced stage of development with clear sight on the costs for discharging planning conditions and

[2] "UK's energy storage revolution happening faster than expected, study finds", EDIE, https://www.edie.net/news/8/UK-s-energy-storage-sector-has-quadrupled-since-2016--study-finds/

construction, and Economy and Environment Committee were willing to take the risk to enter the auction. The Council's bid was submitted based on a £/MWh of electricity, winning against projects that either bid too high to cover uncertainty on costs or needing aggressive profits or bids that were too low and unable to deliver against the CFD price agreed by the competition.

2.8 Learning the lesson from the solar market, it is likely that Government and its partners will use competitions to drive down the cost to consumers for low carbon delivery and it is likely this will apply to the battery storage market. To compete, advanced planning and development on projects is necessary to understand costs and to minimise risk to the investment when competitions for revenues start.

2.9 Other local authorities that have been successful in solar projects and also active in batteries, such as West Sussex, are continuing to develop battery projects and take this longer term view, whereas commercial developers are struggling to progress battery projects in this current market. This offers the Council the opportunity to get ahead of the private sector in planning projects, helping to offset the advantage the private sector normally has through its ability to mobilise more swiftly in response to market incentives.

Monitoring and shaping the Evolution of the Battery Market

2.10 Market intelligence is currently gathered through discussions with Government advisors and departments, the Greater South East Energy Hub, other Local Authorities, sector stakeholders such as UK Power Networks and National Grid, conferences, energy sector press reports and engagement with energy sector businesses. This engagement must continue to help pick up business intelligence and will be reported via the Quarterly Monitoring Reports to Committee.

2.11 Government is currently using funding competitions, such as Innovate UK, as a means to develop pilot projects to scope business cases and market mechanisms to inform the low carbon energy market. In particular, it wants to understand what regulation is needed to facilitate battery storage integrated with power, electrification of heat and transport to understand how these technologies work together to provide financial benefits to consumers and investors. It is important to develop bids for these competitions and include the Council's projects where possible as this offers the opportunity to shape market mechanisms with Government. It also provides learning and understanding on how to develop and create projects to maximise benefits both financially for the Council and for the community.

Progressing projects through the development stages of an Investment Grade Proposal

2.12 Paragraphs 2.4 and 2.5 described the difficulty of modelling battery business case revenues. For the Council's four battery storage projects identified in paragraph 1.1, it is proposed that modelling assumptions for revenues are based on long term projections of the market rather than on current market conditions. This different approach to modelling would be needed for as long as the current market uncertainty exists. It is proposed that a working group be set up with Councillors to agree the detailed methodology for arriving at long term projections for revenue on battery projects.

3.0 ALIGNMENT WITH CORPORATE PRIORITIES

3.1 A good quality of life for everyone

Battery storage capacity offsets dirtier forms of fossil-fuel peaking plant and the associated impacts on air quality.

3.2 Thriving places for people to live

There are no significant implications for this priority.

3.3 The best start for Cambridgeshire's children

There are no significant implications for this priority.

4.0 SIGNIFICANT IMPLICATIONS

Resource Implications

4.1 If, following the development of projects, the Council decides not to proceed to construction, the development costs will have been paid. Forecast development budgets to progress Babraham Park and ride and Stanground projects, the first two projects, to investment grade proposal, totals £858,653 (if approved by Committee). The current proposition is to offset any sunk costs against the revenues generated from the wider programme of energy projects on our assets, excluding the schools and corporate building energy projects. To put this in context, it is approximately 2.4 years net profits from Triangle Farm Solar Park. The more diverse the energy project portfolio that is developed, the better risk profile emerges for the programme.

4.2 There are no implications for Information and Communications Technologies or data ownership.

4.3 Impact on human resources: None for this decision. Resource impacts will be discussed in reports on individual projects.

4.4 Sustainable Resources: The goals of battery storage projects are to support low-carbon electricity, generate an income for the Council and provide solutions to the grid capacity problems experienced across Cambridgeshire.

4.5 Procurement/Contractual/Council Contract Procedure Rules Implications

None for this decision. Procurement impacts will be discussed in reports on individual projects.

4.6 Statutory, Legal and Risk Implications

Paragraph 2.12 identifies the setup of a Member group to agree a methodology to assess modelling assumptions based on long term revenue projections for projects identified in paragraph 1.1. The quarterly monitoring report will include a review of market and regulatory risks on battery storage projects identified in paragraph 2.4 and 2.5.

4.7 Equality and Diversity Implications

There are no significant Equality and Diversity implications.

4.8 Engagement and Communications Implications

None for this decision. Engagement and communications implications for specific projects will be covered in reports on these projects.

4.9 Localism and Local Member Involvement

Not Applicable. This decision does not relate to a specific project location. Localism issues will be covered in reports on specific projects.

4.10 Public Health Implications

None for this decision. Public health issues for specific projects will be covered in their reports.

Implications	**Officer Clearance**
Have the resource implications been cleared by Finance?	Yes Name of Financial Officer: Sarah Heywood
Have the procurement/contractual/ Council Contract Procedure Rules implications been cleared by the LGSS Head of Procurement?	Yes Name of Officer: Gus de Silva
Has the impact on statutory, legal and risk implications been cleared by LGSS Law?	Yes Name of Legal Officer: Debbie Carter-Hughes
Have the equality and diversity implications been cleared by your Service Contact?	Yes Name of Officer: Elsa Evans
Have any engagement and communication implications been cleared by Communications?	Yes Name of Officer: Jo Shilton
Have any localism and Local Member involvement issues been cleared by your Service Contact?	Yes - agreed not applicable for this paper Name of Officer: Emma Fitch
Have any Public Health implications been cleared by Public Health	Yes Name of Officer: Stuart Keeble

Source Documents		Location
1	**Updated Energy & Emissions Projections 2018**	1. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/794590/updated-energy-and-emissions-projections-2018.pdf
2	**Offshore wind energy revolution to provide a third of all UK electricity by 2030**	2. https://www.gov.uk/government/news/offshore-wind-energy-revolution-to-provide-a-third-of-all-uk-electricity-by-2030
3	**“UK's energy storage revolution happening faster than expected, study finds”**	3. https://www.edie.net/news/8/UK-s-energy-storage-sector-has-quadrupled-since-2016--study-finds/