

SMART ENERGY SYSTEMS - INNOVATE UK FUNDING BID SUPPORT

To: Commercial and Investment Committee

Meeting Date: 20th July 2018

From: Graham Hughes, Executive Director - Place and Economy

Electoral division(s): All

Forward Plan ref: 2018/055 **Key decision:** Yes

Purpose: Support for preparation of a 'Smart Energy Systems Demonstrator Project' bid for submission to Innovate UK by 25th July 2018.

Recommendation: Members are asked to support:

1. Cambridgeshire County Council coordinating and leading a Smart Energy Systems Demonstrator Bid and its submission to Innovate UK;
2. The inclusion of Babraham, Trumpington and St Ives Smart Energy Grid development projects within the bid;
3. Investment is committed to Babraham, Trumpington and St Ives Smart Energy Grids following the agreement of the business cases, and that match funding is made available for the Smart Energy Systems Demonstrator project, if the bid is successful.

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1. BACKGROUND

- 1.1. Economic growth in and around Greater Cambridge over the last 15 years has outpaced UK growth by 13%. To catch up with the scale and pace of growth, significant investment in housing and transport infrastructure is planned through the Cambridgeshire and Peterborough Combined Authority and the Cambridge City Deal.
- 1.2. The take up of electrical capacity and costs of grid reinforcements have led to constraints on the local energy distribution network in Cambridgeshire but most acutely in and around the Greater Cambridge area. The costs and timescales for designing, and delivering grid reinforcements is delaying development.
- 1.3. The Council has taken a leadership role in seeking to address this issue by supporting the development of new business models for smart energy grids. For example, the St. Ives Smart Energy grid at the Park and Ride site when delivered will demonstrate integrated energy generation, supply and demand solutions for local consumers and electric vehicles. The Babraham and Trumpington Smart Energy Grids will build on this model by including significant energy storage capacities to help balance supply and demand across the National Grid. Committee supported the development of these projects in May 2018, and requested that opportunities for grant funding be identified to improve the business cases and bring forward delivery.
- 1.4. There is now wider recognition across Government that energy infrastructure in the UK needs to change and modernise. The UK's Industrial Strategy, published in 2017, highlights the Government's support of clean energy development. For the UK to become a world leader, it identifies the need for rapid transformation within the energy sector. To achieve this, the Industrial Strategy launched a programme called 'Prospering from the energy revolution' to develop world-leading local smart energy systems. These systems deliver cheaper and cleaner energy across power, heating and transport, whilst creating high value jobs and export capabilities. UK Research and Innovation (UKRI) has been allocated funding to aid the development of innovative approaches to deliver cheaper and cleaner energy services. UKRI has now identified £40 million from the fund for investment (as grants) in up to three practical smart-energy systems demonstrator projects. Bids need to be submitted to UKRI by 25th July 2018, and the projects need to be delivered between 2019 -2022.
- 1.5. Accessing UKRI grants is a competitive process. Projects need to demonstrate the integration of electricity, transport and heat into smart energy systems and bring forward robust partnership and project arrangements. **Appendix A** shows project criteria and eligibility.

2. MAIN ISSUES

2.1 Developing a Smart Energy Systems Demonstrator Project for the Greater Cambridge area

- 2.2 Cambridgeshire County Council has been working with a range of partners (including Cambridge University, UKPN, Cambridge City Council, Origami Energy and energy consultants) to scope a smart local energy system that links electricity, transport and heat assets across the Greater Cambridge area.
- 2.3 The Smart Energy Systems Project will look to address the challenges of limited network capacity and high grid reinforcement costs experienced across Cambridge. These challenges impact on the delivery of our major growth areas (e.g. Southern Fringe Biomedical Campus); raise the costs for decarbonisation and air quality improvements and curtail new low carbon energy supplies onto the local network.
- 2.4 The project will focus on energy and development projects that are already built or in the development pipeline. These will include the County Council's St. Ives, Babraham and Trumpington Smart Energy Grids and battery storage projects and a selection of Cambridge University's existing buildings and infrastructure schemes at North West Cambridge (including the Combined Heat and Power (CHP) energy centre), several buildings on West Cambridge and the New Museums site.
- 2.5 In addition to addressing the physical constraints on the network, there is a need for a platform that enables peer-to-peer trading to link existing and planned energy supplies with major energy demands (including heat, cooling, transportation, and electricity) across the city. Such a platform would help smart local energy grids to deliver lower energy costs and emissions in the future.
- 2.6 By bringing together the Councils and Universities generating assets with residential and commercial energy loads, the project will attempt to address the above challenges by:
- Managing energy generation assets and demand flexibly across the distribution network using a software platform to monitor and control electricity flows. This will provide in turn: a better understanding of network capacity limits; additional connections available for projects; reduce the need for some grid reinforcement; save money and speed development.
 - Testing models for peer-to-peer trading of energy and along with this identifying the regulatory regime and finance mechanisms required to support the development of such trading.
- 2.7 The potential of this kind of project is significant as it can:
- Demonstrate how a range of distributed energy resources (including solar, electric vehicles, storage and CHP) can be deployed successfully within constrained networks;

- Promote advanced common protocols for communication between a range of different energy resources;
- Identify how the future local network operator role can supervise, control and monitor complex, distributed energy resources;
- Improve forecasting of local energy demand and supply profiles to bring improvements to local energy network resilience; and
- Release electrical capacity to bring forward the electrification of transport across Greater Cambridge accelerating the improvement of air quality with the associated health and economic benefits.

2.8 A committed group of organisations and businesses are collaborating on the bid development. UK Power Networks (UKPN) has agreed to be a project partner and work with local stakeholders to identify new flexible models for the Greater Cambridge area to facilitate additional connections. Local energy stakeholders including the County Council, University of Cambridge, Addenbrooke's Hospital Trust and Cambridge City Council are reviewing their work to identify a pipeline of projects that will support the demonstrator and future opportunities to replicate the demonstrators. Industrial facilitators Origami Energy and Bouygues Energy Solutions will help deliver technical solutions. Technical specialists Delta Energy and Environment, and Element Energy are helping to structure and shape the project identifying research and analysis requirements and wider opportunities for replication that will be of interest to Innovate UK.

2.9 **Benefits to the Council coordinating the Smart Energy Systems Demonstrator Project**

- 2.10 If successful, the project could unlock mechanisms that facilitate energy trading at a local level between local generators and consumers. This would be helpful for the Council's smart energy grid projects. For example, the Trumpington Smart Energy Grid includes plans to sell energy to surrounding consumers such as Addenbrooke's Hospital.
- 2.11 Currently the business cases for Babraham and Trumpington Smart Energy Grids do not rely on grant funding. If the bid is successful, grant monies from the UKRI smart-energy systems demonstrator project would shorten pay back periods and hence improve the business cases for these projects.
- 2.12 This UKRI bid competition will provide the County Council with a further opportunity to lead and build on strong collaborations with local energy stakeholders and cement its place at the forefront of the UK's changing energy sector. This in turn would place the County Council in a good position to capitalise on commercial energy opportunities that emerge over the next few years.

3. ALIGNMENT WITH CORPORATE PRIORITIES

3.1 Developing the local economy for the benefit of all

In many parts of Cambridgeshire, energy generation sites cannot connect to the local grid as the grid has reached capacity and fault levels on existing networks are in danger of being breached.

The development of mechanisms to overcome this grid constraint will benefit the local economy through: building a local energy economy; enabling existing and planned developments across the city to connect viably to the energy network; unlocking clean growth; and developing skills and high quality jobs locally.

3.2 Helping people live healthy and independent lives

All the energy initiatives are looking to reduce greenhouse gas emissions and improve air quality leading to improve health for all.

3.3 Supporting and protecting vulnerable people

Without a strong focus on upgrading our energy infrastructure and developing local energy markets, the cost of energy will become unaffordable putting more homes and people into fuel poverty.

4. SIGNIFICANT IMPLICATIONS

4.1 Resource Implications

Should the bid be successful, and the investment grade proposals approved for Babraham and Trumpington, the Council's investment will act as match funding to draw down grant monies.

If successful, a project manager would need to be employed to manage the grant funding and delivery partners.

The project will be continually assessed for compliance with the Innovate UK grant conditions in order to continue to receive funding, putting a small amount of risk on the match funding investment should the project move out of scope.

4.2 Procurement/Contractual/Council Contract Procedure Rules Implications

There are no significant implications within this category.

4.3 Statutory, Legal and Risk Implications

There are no significant implications within this category.

4.4 Equality and Diversity Implications

There are no significant implications within this category.

4.5 Engagement and Communications Implications

Engagement with Cambridge City Council, Greater Cambridge Partnership and Combined Authority have been positive and supportive. Large organisations and developments across the City have been identified for engagement into the project and letters of support will be collected from major stakeholders to submit with the bid.

As the plans for the Park and Ride Smart Energy Grid projects get underway, further community engagement is planned.

The bid involves a consortium of private businesses and the University of Cambridge. This will facilitate closer ties between the Council and industry partners.

4.6 Localism and Local Member Involvement

There are no significant implications within this category.

4.7 Public Health Implications

Unlocking current constraints on the national grid will allow the further development of clean energy initiatives which will help mitigate climate change and bring air quality benefits for our communities.

Source Documents	Location
Funding competition Smart local energy systems: demonstrators UK organisations can apply for a share of up to £40 million to develop world-class smart local energy system demonstrators.	https://www.gov.uk/government/news/design-and-trial-smart-energy-systems-apply-for-funding

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: Paul White
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: Tamar Oviatt-Ham
Have any engagement and communication implications been cleared by Communications?	Yes Name of Officer: <i>Joanna Shilton</i>
Have any localism and Local Member involvement issues been cleared by your Service Contact?	Yes Name of Officer: <i>Tamar Oviatt-Ham</i>
Have any Public Health implications been cleared by Public Health	Yes Name of Officer: <i>Tess Campbell</i>

Appendix A: Smart local energy systems: demonstrators

1.0 Background

The Government's Industrial Strategy announced the creation of the Prospering from the Energy Revolution (PFER) Industrial Strategy Fund (ISCF). This fund is designed to aid the development of innovative approaches to deliver cheaper and cleaner energy services.

2.0 Eligibility

To be eligible, demonstrators must:

- be a UK-based organisation
- carry out at least 90% of your project work in the UK
- exploit the results from or in the UK
- work in collaboration with other businesses, research organisations, public sector or third-sector organisations
- include at least one micro, small or medium-sized enterprise (SME)
- include at least one university, higher education institution, RTO (including Catapults) or public sector organisation
- include a local authority or equivalent organisation

If a local authority leads, there must be at least two business within the consortium and applications must clearly explain why it is not appropriate for it to be business-led.

There is a requirement to share important information with Prospering from the Energy Revolution stakeholders.

3.0 Funding

Total project costs must be between £26 million and £160 million, with grants of up to £13 million available.

4.0 Project Criteria

Smart local energy models are being developed in the UK – this competition is to demonstrate and realise the functionality of these models by 2022.

The project must:

- be based over a specific large UK location such as a medium-sized town
- seek to optimise energy across a diverse range of energy supplies, varieties of infrastructure and types of demand
- deliver significantly lower costs and emissions while creating economic benefits for the local area and the UK as a whole
- encourage private investment to replicate your model nationally through the 2020s
- use innovations that intelligently link energy supply and demand across power, heat and transport
- deliver benefits to a range of stakeholders by 2022
- develop processes and skills in the UK for designing, financing, building and operating smart local energy systems, joining up supply chains where appropriate