GREATER MANCHESTER LOW CARBON HUB BOARD

Date: 29th July 2019

Subject: Funding Bids – Local Energy Market

Report of: Sean Owen, Regional Energy Lead

PUPOSE OF REPORT

The purpose of this report is to outline the progress made in bidding for funding under the ‘Prospering from the Energy Revolution’ funding call for the detailed design of a Local Energy Market.

The total project bid is for £6-10m (50% intervention) over 24 months. If successful, the project will commence on 1 January 2020.

Further detail on the proposed GM Bid is provided at Annex 01.

RECOMMENDATIONS

The Board asked to:

• Note the progress report.

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ANNEX 01 - GM Local Energy Market Proposal (Phase 2)

1. The Challenge

Under the Climate Change Act (the UK’s legal requirements), the two guiding objectives for the nation’s approach to reducing carbon emissions are:

- To meet our domestic commitments at the lowest possible net cost to UK taxpayers, consumers and businesses; and
- To maximise the social and economic benefits for the UK from this transition.

To meet these objectives, the UK will need to nurture low carbon technologies, processes and systems that are as cost effective as possible.

The need to transition, accelerate and deliver challenging carbon budgets and targets nationally and locally requires that we do things differently.

The local challenge is that GM currently use 51.6 TWh/yr. of energy and emit 12.5 MtCO₂/annum. However, if we incorporate expected future growth to 2035, as stated in the GM Spatial Energy Plan, this will, unless action is taken, lead to a 3% increase in energy demand, arising from heating and electricity use in new homes and buildings. This results in an additional 2,400 GWh/yr. energy.

Poorly planned energy related programmes invariably lead to underutilisation, often stranded assets, which are also not optimised and create future unnecessary barriers to delivery.

2. Project summary

GM Local Energy Market (GM LEM), is a region wide digital energy market (platform), responding to `place based' constraints and market needs, at a regional, district, and micro grid level, capable of supporting urban, semi-rural and rural settings.

The key drivers for the project are to overcome known delivery barriers, reduce end user cost, enable and increase the flexibility of the energy distribution network through:

- Development and trialling of novel management tools (such as a real time forecasting, optimisation and despatch platforms)
- Utilisation of a range asset management systems (eg: building management systems),
- Enabling higher penetration and accelerated deployment of renewable energy sources (RES) and wider generation/storage assets (Distributed Energy Resources, DERs)

In turn, these will provide opportunities for market aggregators, community energy and the provision of virtual power plants (VPP) to provide demand side response (DSR) services.

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2 DSR: Demand Side Response is the ability to turn down and up controllable energy assets to meet a given energy network service demand.
The GM Local Energy Market (LEM) project aims to reduce and remove the challenges highlighted above through,

- Geo spatial Energy Master Planning
- Digital Energy Platform Design
- Deployment of new assets alongside the leveraging of existing energy related legacy projects
- Operational testing (inc controlled energy assets)
- Validated investment ready business model

3. Project Method

To address the identified national/local challenges and drivers, GM LEM platform design will focus on a 4 energy trading transitional phases;

1. Phase 1: LEM Platform supplies current market balancing services
2. Phase 2: LEM adds local supplier with primary supplier
3. Phase 3: Multiple suppliers and capacity management
4. Phase 4: Ad hoc trading

These transitional phases will use predefined scenarios (use cases) across the energy vectors of Generation, Heating and mobility; along with the assets required to enable these (both strategically and physically).

As part of this design and piloting of the GM LEM, the required business model validation, enablers and regulatory challenges will be investigated, with solutions provided leading to an investment ready business case for further deployment and delivery.

The projects key design, validation and network understanding activities are:

a) Platform Design

- Design the requirements for a regional LEM platform, i.e. control, optimisation and trading
- Design the required integration with other local control platforms, particularly those operated by ENWL, which will provide constraint management locally and will interface with the national transmission system.

b) Validate the business model

- GM LEM platform pilot: Demonstration of the required capabilities to support current and near term services, with the ability to offer longer term DSR ambition(s) in a controlled environment – providing greater learning and supporting the longer term development of a viable investment case
- Refinement: During the pilot phase, we will undertake further refinements to the platform design to demonstrate the value that a LEM local can bring to regional stakeholders, including,
  - Domestic and commercial consumers,
  - Smaller renewable projects,
  - Vehicle to grid projects and;
o DNO\textsuperscript{3}/DSO\textsuperscript{4} (ENWL) through the provision of a platform for energy optimisation across a complex and highly populated region.

- Value sharing proposition validation through the Installation and trial of smart EV infrastructure to support the development of EV centric Value Sharing Propositions (non-public realm) alongside connected low carbon heating assets.

c) Network Understanding

- Comprehensive Local Area Energy Planning (LAEP), capable of providing district and aggregated region scale understanding and optimisation of current and future energy system.

The project is proposed to be led by Greater Manchester Combined Authority (GMCA)], bringing together the resources and expertise of over 10 specialist organisations.

It is proposed that the project will share and disseminate learning and knowledge with other Prospering from the Energy Revolution projects, UK cities and regions, with Bristol CC And Nottingham CC being the pioneer cities and the EU Regions/cities of Tampere, Amsterdam, Porto and Burgas acting as the followers.

4. Benefits of approach

Currently where energy assets are deployed is on a case by case evaluation, with no consideration for the wider energy system and or how they may interact. As a consequence future deployment may be prohibitive, due to previously unforeseen capacity and or financial constraints.

An optimised energy system which includes:

- Geo spatial master planning,
- Controlled legacy and future energy assets via a GM LEM,
- A validated investment/business model,

Is proposed would lead to reduced end user costs, create market confidence and accelerate future deployment and uptake of new services and energy/low carbon assets.

The projects framework approach to the design of the GM LEM and investment ready business case, enables,

Existing legacy projects to be leveraged (which are otherwise stranded assets)

- **NEDO Smart Communities**: cr550 Heat pumps across 3 districts with no enabled connectivity. Optimising these homes could provide new Heat as a Service\textsuperscript{5}, revenue generation, cost avoidance for residents and provide the additional understanding to overcome financial barriers to mass market electrification.

Current and future projects to be energised and optimised i.e.

\textsuperscript{3} DNO: Distribution Network Operator, regulated local network operator
\textsuperscript{4} DSO: Distribution Service Operator, which is the anticipated regulated network operator model from the early 2020s.
\textsuperscript{5} Heat as a Service: A move away from traditional kWh energy bills to comfort and heating hour solutions/service. This market is currently in its infancy.
• **Triangulum**: A mixture of deployed generation and storage assets linked to public and academia buildings. Optimising these assets via a GM LEM approach could lead to greater revenue generation and cost avoidance, supporting future deployment.

• **Home as Energy Systems (HaES)**: ERDF funded project exploring the integration of energy assets with a domestic property and geo spatial area. The project builds on learning from NEDO, however could be further optimised post project through the use of a GM LEM

• **EV charging Infrastructure**: As EV cars become more accessible, affordable and take-up via fleet user's increases, optimised and diverse charging infrastructure will be required to reduce demands on the energy network. A GM LEM could support, operators (TFGM), fleet users and the DNO (ENWL) with diversity and flexibility, through optimisation, portfolio and new services.