07

GMCA GREATER MANCHESTER COMBINED AUTHORITY

LOW CARBON HUB BOARD

Date: **7th October 2016**

Subject: **SMART SYSTEMS AND HEAT PROGRAMME - ENERGYPATH NETWORK AND PHASE 2 DEMONSTRATOR**

Report of: **Mark Atherton, GM Environment Director**

PURPOSE OF REPORT

At the last Board meeting, the Board received a presentation on the Salford Energy House and requested a paper to outline how the development of Energy House 2.0 could fit into GM's wider plans for a Smart Systems and Heat demonstrator. The purpose of this report is to fulfil this request, provide an update on the Smart Systems and Heat (SSH) programme, identify the next steps required to complete Phase 1 of the programme and propose a model for wider Phase 2 activity.

RECOMMENDATIONS:

The Board are recommended to:

- Note the report and next steps for Phase 1 - Energypath modelling;
- Comment on GM's proposed approach towards Phase 2 activity;
- Consider how other stakeholders could contribute to the further development of SSH activities and potential project opportunities.

CONTACT OFFICERS:

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TRACKING/PROCESS	[All sections to be completed]	
Does this report relate to a Key Decision, as set out in the GMCA Constitution or in the process agreed by the AGMA Executive Board		No
EXEMPTION FROM CALL IN		
Are there any aspects in this report which means it should be considered to be exempt from call in by the AGMA Scrutiny Pool on the grounds of urgency?	[Please state any reasons here]	
AGMA Commission	TfGMC	Scrutiny Pool
7th October 2016	[Date considered at TfGMC; if appropriate]	[Date considered/or to be considered at Scrutiny Pool; if appropriate]

1. INTRODUCTION

1.1 In 2013, GM successfully bid to the Energy Technology Institute/Energy Catapult[1] to be one of three partner cities participating in the Smart Systems and Heat Programme (SSH) funded by the Department of Business, Energy and Industrial Strategy (DBEIS). The focus of SSH is on creating future-proof and economic local heating solutions for the UK, through the electrification of domestic heat. The project has two elements:

- Phase One is the development of software tools to design location-specific smart energy systems
- Phase 2 will deliver projects that demonstrate the benefits of a 'designed' local smart energy system.

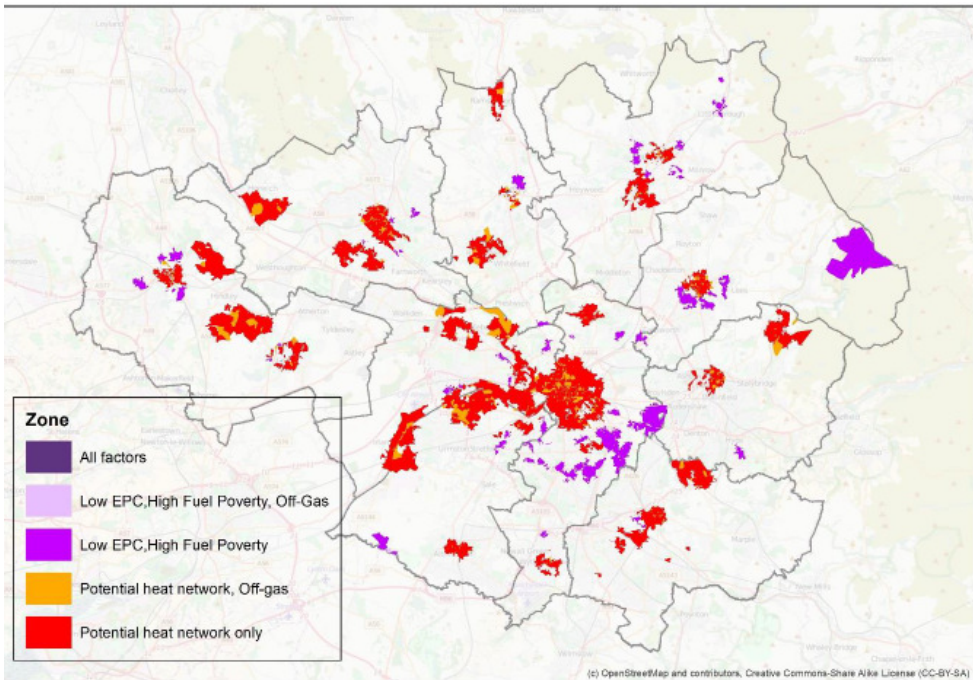
1.2 SSH's Phase 1 software tool 'EnergyPath networks' is a bottom up modelling tool which creates a route map for the most appropriate low carbon heating solutions to 2050, based on the unique characteristics and growth plans of the area. By 2016, the tool had been tested in other SSH pilot cities and is undergoing continual refinement to allow larger, more complex, areas to be modelled. Currently, GM is too complex for EnergyPath to process, with the Energy Catapult (ESC) preferring to focus on one GM district.

1.3 Following completion of the GM Heat and Energy Evidence base (see separate paper), the ESC has undertaken work to inform GM's selection of its localised route map area. The ESC has used four main criteria (detailed below) as a baseline:

- **EPC rating** - Areas with significant numbers of thermally poor buildings (rated D or below) providing opportunities for retrofit with subsequent benefits for residents and local economy.
- **Off Gas** – Areas with properties without a gas connection (off gas grid). These areas tend to have fewer heating options and higher energy bills.
- **Fuel Poverty** – As decarbonisation strategies are likely to be more costly than business as usual, understanding the potential impacts on fuel poor households will be highly valuable to ensure safeguards are in place.
- **Heat Networks** – GM has identified a number of heart network opportunities across the conurbation. These could provide the basis of low carbon energy infrastructure in the future. Inclusion of heat network areas in the EnergyPath area can allow further scoping of opportunities.

[1] ETI were incorporated into Innovate UK's Energy Systems Catapult in late 2015.

The map below highlights areas of interest according to the criteria above:



2. OTHER CONSIDERATIONS

2.1 There are other factors which should be taken into consideration when selecting a location for GM's localised route map. The EnergyPath software will require robust and comprehensive data in order to produce an effective route map. Earlier work, undertaken with Newcastle, (as part of the Smart Systems and Heat Programme) has identified the following issues which should be taken into account:

Access to a wide range of data sources including; UPRN, postcode, housing stock condition and maintenance programmes, growth projections, regeneration plans, infrastructure development (eg Heat networks, electric vehicle charging points)

Robust data sets to ensure that EnergyPath uses standardised and completed data where applicable to build a validated route map

Dedicated support/resource within the selected district to coordinate data gathering and validation. Local Authority data sets can be often outdated/incomplete/non standardised and an embedded resource will be required to manage and 'clean' the data before its inclusion in the EnergyPath model.

Timescales. ESC believe that the EnergyPath model will take approximately 9 months and are keen to initiate data gathering in the chosen district to ensure that overall SSH timescales are met and development of Phase 2 activities (see below) are aligned.

3. PHASE 2 DEMONSTRATOR

3.1 GM and the other SSH pilot cities are also in discussion regarding the scope of SSH Phase 2 Demonstrator activities which will test business models, technological innovation and delivery methods in each pilot city.

The current proposals will be to primarily focus Phase 2 activity within the GM district selected for EnergyPath modelling. Phase 2 Demonstrator activities are due to commence 2018 – 2020 and ESC has secured conditional funding from DBEIS to develop a programme of pilot activity over the next 18 months.

3.2 The development phase will work to develop pilot activity into Business Case level proposals including; stakeholder identification, timescales, costs and appropriate routes for funding. As an indication, ESC aims to develop a pipeline of circa £20m of investment in GM Phase 2 activity, comprising of a range of funding streams including; public, private & European. ESC will be providing dedicated resources to support GM in this activity.

3.3 GM's proposal is to build on local strengths and aspirations to '*capitalise on existing low carbon GM programmes, enhancing and combining them with new smart heat projects and processes to create a national demonstrator of smart heating which exemplifies a systemic approach to innovation in technology, product integration and delivery models, in order to test the business models outlined in the SSH Phase 2 programme.'*

3.4 In practice, GM aims to build on the foundations of three systemic innovation areas; an interconnected set of innovations where each influences the other and the ways in which they interconnect:

a) Laboratory Testing of Tech (Technology Innovation)

Using and building on GM's existing capabilities to develop, test and innovate low carbon products which can then be piloted at scale in a physical demonstrator. The University of Salford's Energy House, and proposed Energy House 2.0, is a prime example of the ability to test products in a physical environment under laboratory conditions. Work undertaken by the Manchester Metropolitan University (Hydrogen Partnership) and University of Manchester's (Manchester Energy) in energy forecasting and grid balancing could also feed into demonstration activity.

b) Pilot Scale Testing of Tech (Integration Innovation)

Technological innovation can be combined with the innovative integration of products, with each other and the grid, to blend and test different types of technology within demonstrator homes. GM already has a developing district heating programme, a pre-existing base of domestic homes retrofitted for energy efficiency, others fitted with smart technology through the NEDO project which could be further utilised and expanded to provide data on air source heat pumps and/or 'home gateways'. Domestic demonstrators could also include emerging commercial market offers around PV & storage, which include retrofit and HEMS units, and potential expansion of existing capital projects (such as Heat Networks and energy storage) depending on timescales, funding and feasibility. Wider stakeholders, (such as the DNO) can also support this area and already have plans for network wide IT to support demand side response.

c) Delivery Models & Control (Delivery Innovation)

GM has the expertise to test different business models at scale in order to determine which are the most appropriate for the market. GM has a history of delivering large domestic projects (such as Green Deal Communities, Fuel Poverty alleviation and

the NEDO Smart Communities projects) which required customer role out, marketing, engagement, contracted delivery and installation of retrofit measures in the private and social housing sectors. The potential development of the GM Energy Company could provide a bespoke further delivery route for market testing of business models through establishing project specific SPV/ESCOs.

3.5 Separately, GM has the ability to stimulate the local supply chain through procurement and existing support programmes, such as the Green Growth programme, which supports SMEs to grow (or diversify) into the low carbon environmental goods and services (LCEGS) sector.

3.6 The attached graphic (Annex 1) provides an idea of how the concept of a SSH demonstrator could be built upon the interaction of a wider set of existing and proposed GM programmes.

4. NEXT STEPS

4.1 The success of the EnergyPath model and Phase 2 Demonstrator will rely on support from the chosen district and delivery of existing planned projects by a range of GM stakeholders, including collaboration on new project opportunities as they arise.

4.2 A paper on the proposed Energypath Networks location is currently being prepared for consideration by CEX. Following agreement, it is anticipated that the Energy Network modelling will commence in October 2016. At the same time, additional resources will be put in place to better define the exact scope of the Phase 2 demonstrator.

5. RECOMMENDATIONS

5.1 The Board are recommended to:

- Note the report and next steps for Phase 1 - Energypath modelling;
- Comment on GM's proposed approach towards Phase 2 activity;
- Consider how other stakeholders could contribute to the further development of SSH activities and potential project opportunities.

ANNEX 01 – Schematic DRAFT – GM Demonstrator