Greater Manchester Green City Region Partnership

Date:　　　**15 July 2022**

Subject:　　**GM LOCAL AREA ENERGY PLANS**

Report of:　**Sean Owen, Head of Low Carbon, GMCA**

Purpose of Report:

This paper provides information on the research undertaken to support the development of the 10 district and one regional Local Area Energy Plans (LAEPs). GMCA is the first city region in the country to compile and complete Local Area Energy Plans from street level to network.

The purpose of the paper is to seek members comments and feedback on the LAEPs as regional documents, which can be utilised to inform future policy, market, and investment development.

Recommendations:

The Partnership is requested to:

1. Note and comment upon the draft GM Local Area Energy Plan and its contents (Annex 01).
2. Note the research supporting the development of the Local Area Energy Plans

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1. Introduction/Background

1.1 In 2018, the Government invested in a new Prospering from the Energy Revolution Challenge, led by UK Research and Innovation (UKRI). UKRI funded research institutions and industry to develop future smart energy systems and prove their use at scale.

1.2 The Energy Revolution Challenge brought together businesses, research, and public sector to develop and demonstrate new approaches to provide cleaner, cheaper and more resilient energy. This included providing energy in ways that consumers want by linking low-carbon power, heating and transport systems with energy storage and advanced IT to create intelligent, local energy systems and services.

1.3 The Government invested in fast-tracking up to 3 practical local energy systems demonstrators and ~10 whole system design studies. The design studies objective was to create a pipeline of investable projects for the future.

1.4 The GM Local Energy Market (LEM) £5.9m programme was one of the successful ~10 detailed designs, which included the Local Area Energy Planning or LAEP concept.

1.5 The LAEPs bring together a range of data and research assets to:
- geo-spatially model the quantum of low carbon assets required to meet our 2038 carbon neutrality target;
- identify the types of measures to be deployed across generation and storage, heating, retrofit, and EV infrastructure;
- identify where they should be placed and, finally,
- estimate the cost of delivery inclusive of network and energy imports e.g., electric and gas

1.6 GM is the first region in the country to deploy the concept of LAEPS across the M10 and core cities, with many other combined authorities, cities and districts commencing the journey now.

2. The GM Local Area Energy Plan

2.1. This GM LAEP provides an overview of the ten LAEPs created for the city region's ten districts and provides insights into what is required for GM to meet our carbon budget and 2038 carbon neutrality target.

2.2. To meet the 2038 target, the region will need to lead the way with local action, with a modelled £65bn investment required. The LAEP sets out the current position and a roadmap towards that decarbonised future. It describes a range of near-term low regret priority zones and opportunity areas for different technologies and highlights key decision points that will determine the longer-term decarbonisation pathway for the city region.

2.3. In the shorter term, the region will need to deliver the following over the next 5 years,

- 140,000 homes with fabric retrofit

- Nearly 2 GW of rooftop PV on our buildings

- 190,000 EVs

- 8,000 homes and buildings newly connected to heat networks

- 116,000 heat pumps in homes.

2.4. The LAEPs all highlight the real need for delivery to rise dramatically over the coming fifteen years, with around a million heat pumps in homes (assuming a primarily electrified future for heating) and a million EVs needing charging by 2038, requiring additional works to enhance GM's local electricity network. Finding options for flexibility on the grid will also be vital.

2.5. The GM LAEP and supporting 10 districts LAEPs consider two scenarios: a primary scenario where GM leads the way with local actions, resulting in a predominantly electrified future, and a secondary scenario where hydrogen for heating becomes available as proposed by the HyNet project in the early 2030's.

2.6. The critical take way from the LAEPs is the least cost/regret measures that we should and could be installing now at scale.

3. The Process

3.1. The process for creating the LEAPs included the use of 4 differing scenarios:

    3.1.1. GM led – the optimised scenario to drive the local plans, focusing on GM meeting our carbon budget and 2038 target, by making use of proven technologies within our local control where possible.

    3.1.2. Hydrogen into the grid- Hynet phase 3 (gas network hydrogen repurposing from 2030 onwards) is highly speculative and may arrive too late for the regions carbon budget. This scenario compares hydrogen to other options to see if it has a role to play in a optimised systems and to what extent it influences what decisions are low regret now.

    3.1.3. Electric or hydrogen only – Both scenarios explore if a single approach would meet the region's needs. A single approach is often easier, however at what cost and time?

3.2. The GM Led scenario was chosen as the **primary** and Hydrogen into the grid as **secondary**, with the remaining acting as counterfactuals across all 11 plans in total. Nine focus areas were utilised to provide the granular detail of the plans, including fabric retrofit as most homes across GM require some level of fabric retrofit, made more pertinent in recent month's energy price rises.

3.3. **Focus Area 1 Fabric retrofit** is generally regarded as low regret/ cost across all scenarios, as the later deployment of hydrogen means more carbon savings are required in earlier years from retrofit in the secondary scenario.   The use of fabric retrofit as part of a package of measures e.g., heat pumps and solar PV, where relevant for an individual home may help to minimise disruption and be more cost-effective for a household overall.

3.4. **Focus Area 2 Heating Systems** and in particular the identification of priority areas for heat pumps across all districts, provides a focus for low regret, near term action to scale up and roll out installation of heat pumps, regardless of whether hydrogen for heating becomes available.

3.5. **Focus Area 3 Energy Networks**: District Heat networks have the potential to supply a significant proportion of buildings in GM and can be considered low regret. There may also be opportunities to consider expanding and even joining up heat networks across district boundaries and understanding the role Hydrogen may play in future as a valuable option for heating in many parts of GM, should it become available at the necessary quantities, cost, and carbon content.

3.6. **Focus Area 4 Local Energy Generation and Storage**: There is significant potential for local renewable energy generation in region. It is more beneficial to deploy generation as early as possible, while the national electricity mix is more carbon intensive.

3.7. **Focus Area 5 Transport and EV Charging**: it is recognised that all areas of the region will require an extensive shift away from liquid fuels to electric vehicles for personal cars by 2038. Across all districts, all homes with off-street parking are expected to have EV charging facilities installed by 2038, with publically available charging hubs offering a potential solution for charging for those homes that have no off-street parking. The identification of these possible sites across all 10 districts is critical to ensuring inclusivity and choice for all.

3.8. **Focus Are 6 Energy Networks** – Electricity: A net result of transitioning to low carbon will be an increase in electricity demand across all districts of GM and all scenarios by 2038. Understanding this impact in a whole systems approach is critical to how we model our transition.

3.9. **Focus Area 7 Energy Networks – Gas and Hydrogen**: It has been recognised for some time in carbon reduction pathways that a very small quantity of natural gas remains in 2038, for industrial uses that cannot easily be electrified. As much of the existing network could be suitable for repurposing to hydrogen, understanding and identifying where the initial priority areas for hydrogen are likely to be within region is key.

3.10. **Focus Area 8 Cost and Investment**: The understanding of what the total cost of GM's energy system out to 2038 is, inclusive of energy import costs (Gas, Hydrogen and Electric) depending on the pathway selected. This supports thinking on how we prioritise the inherent need for investment as we strive to meet 2038.

3.11. **Focus Area 9 Carbon Budget**: The energy system changes set out in the LAEP's provide the potential to keep emissions within the carbon budget for GM.

4. Supporting Research for the Plan(s)

4.1. The LAEPs utilise a wealth of both local and national data sets, many of which have been commissioned locally. These include:

4.1.1. Accelerating retrofit: the stock condition modelling (Parity Projects) of 1.2m homes across the region

4.1.2. Go Neutral Programme: the review and collation of all the publicly owned land assets and buildings, which were not destined for growth and or future rationalisation

4.1.3. Public Sector Buildings: the review of the public estate, their Display Energy Certificates and energy consumption over the last few years.

4.1.4. EV charging hubs: A review of potential sites for future public owned EV infrastructure

4.1.5. Energy Network Data: Data provided by both the gas and electricity network operators, detailing their sub stations and ingress points from national to street level.

5. Recommendations

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