# Greater Manchester Combined Authority

Date: 30 September 2022

Subject: GM Local Area Energy Plans

Report of: Councillor Martyn Cox, Portfolio Lead for Green City Region and Harry Catterall, Portfolio Lead Chief Executive for Green City Region

## Purpose of Report:

GMCA is the first city region in the country to compile and complete Local Area Energy Plans from street to network level. These plans set out a detailed pathway for the energy infrastructure changes required to meet our Carbon Neutral 2038 ambition.

This paper provides background information on the research and process undertaken to develop the 10 district and one city-regional Local Area Energy Plan (LAEP) for Greater Manchester. The paper also identifies the required, `low regret' next steps and proposes mechanisms to establish the capacity needed to deliver them.

The purpose of the paper is to seek GMCA approval to adopt the GM LAEP as a city regional document, to be utilised to inform future policy, market, and investment development. The paper also sets out the proposed next steps to accelerate delivery of the LAEPs for agreement.

## Recommendations:

The GMCA is requested to:

1. Note and comment upon the draft GM Local Area Energy Plan, its contents and the research undertaken to inform its development.
2. Approve the GM Local Area Energy Plan for design & publication (Annex 1).

3. Approve the next steps in delivering the city-regions Local Area Energy Plan(s):
    - Establish a small specialist Programme Delivery Unit centrally, which will provide additional resources to Districts to enable delivery. This can be funded via existing Retained Business Rates approvals.
    - This unit will provide capacity to Districts to: accelerate the deployment of renewable energy generation and storge, support the work on decarbonising the public estate and help Districts with domestic retrofit measures. In addition, this capacity will help to define a regional position on heat networks and the role of hydrogen.
    - GMCA is currently seeking feedback from each District on the type of support most needed by each (via Directors of Place)
    - GMCA will undertake further work on delivery mechanisms to support the transformation outlined in the LAEPs, including how we can draw in further private finance for delivery. A Strategic Outline Business Case will be developed over the next few months and brought back for approval early 2023.

## Contact Officers:

mark.atherton@greatermanchester-ca.gov.uk
sean.owen@greatermanchester-ca.gov.uk

# Equalities Impact, Carbon and Sustainability Assessment:

## Impacts Questionnaire

| Impact Indicator | Result | Justification/Mitigation |
|---|---|---|
| Equality and Inclusion | G | The LAEP aims to accelerate the deployment of low carbon measures across the region, which may lead to increased benefits for residents e.g. increased air quality, mitigated enery costs etc<br>The LAEP aims to accelerate the deployment of low carbon measures across the region, which may lead to increased benefits for residents e.g. increased air quality, mitigated enery costs etc<br>The aim of the LAEP is to inform all walks of life from policy makers to communities |
| Health | | |
| Resilience and Adaptation | G | Accelerated transition towards carbon neutrality will ensure a more resilient and prosperous city region<br>The proposal seeks to reduce the environmental impact of our city regions communities, buildings and businesses.<br>The LAEP aims to co exist with wider environmental plans, and where possible accelerate the benefits of both |
| Housing | G | The LAEP is implemented will support the affordabilty fthrough the lens of running costs<br>The LAEP identfies areas of land that could be used to support renewable generation, where growth is not an option<br>The LAEP identifies the scale and priority areas for retrofiting of energy efficiency measures |
| Economy | G | The LAEP if implemented requires cr£65bn of investment including BAU across the region, potentially supportig local jobs<br>The LAEP if implemented requires cr£65bn of investment including BAU across the region, potentially supportig local jobs<br>The LAEP if implemented requires cr£65bn of investment including BAU across the region, potentially supportig local jobs<br>The LAEP if implemented requires cr£65bn of investment including BAU across the region, potentially supportig local jobs<br>The LAEP identifies immediate need but also areas for further innovation, providing a clear direction to the market.<br>The LAEP if implemented requires cr£65bn of investment including BAU across the region, potentially supportig local jobs<br>The LEAP requires cr80,000 construction and skilled opertives to esnure delivery is achieved. |
| Mobility and Connectivity | G | The deployment of the required low carobon technologies will require enhanced connectivity and smart operation e.g. Demand Side Response / flexible service provision<br>The LAEP requires increased smart EV charging infrastructure to support our transtion |
| Carbon, Nature and Environment | G | The implementation of energy efficiency measures and removal of gas boilers and replaced with other forms of low-carbon heating would reduce emissions associated with heating and |
| Consumption and Production | | |
| Contribution to achieving the GM Carbon Neutral 2038 target | | The LAEP provides a clear pathway to meeting carbon neutrality in 2038 from a low carbon pespective, when combined with wider environmntal projects |

**Further Assessment(s):** Equalities Impact Assessment and Carbon Assessment

| | | | |
|---|---|---|---|
| **Positive impacts overall, whether long or short term.** | **Mix of positive and negative impacts. Trade-offs to consider.** | **Mostly negative, with at least one positive aspect. Trade-offs to consider.** | **Negative impacts overall.** |

## Carbon Assessment

| Overall Score | | |
|---|---|---|
| **Buildings** | **Result** | **Justification/Mitigation** |
| New Build residential | N/A | |
| Residential building(s) renovation/maintenance | | |
| New Build Commercial/ Industrial | N/A | The LAEP aims to retrofit our building stock to a level where the reqion can be carbon neutral |
| **Transport** | | |
| Active travel and public transport | N/A | |
| Roads, Parking and Vehicle Access | N/A | |
| Access to amenities | N/A | |
| Vehicle procurement | N/A | |
| **Land Use** | | |
| Land use | N/A | |

| | | | | | | |
|---|---|---|---|---|---|---|
| No associated carbon impacts expected. | High standard in terms of practice and awareness on carbon. | Mostly best practice with a good level of awareness on carbon. | Partially meets best practice/ awareness, significant room to improve. | Not best practice and/ or insufficient awareness of carbon impacts. |

## Risk Management:

*This Plan has been informed by both national and local actors and/or polices. The Plan will require further updates in the future as technology and solution innovation is increased.*

## Legal Considerations:

*The contents of this Plan are not legally binding. As such, the aim of this document is to support and guide our activities.*

## Financial Consequences – Revenue:

*There are no financial consequences for GMCA revenue budgets in adopting the LAEPs. However, the identified next steps, specifically the establishment of a Programme Delivery Unit which initially can be met from existing retained business rates and may also be the subject of future separate approvals.*

## Financial Consequences – Capital:

*There are no current financial consequences for GMCA capital budgets that are not covered by existing budgets. However, the identified next steps (if all are adopted) will require subsequent funding which will be the subject of separate approvals*

## Number of attachments to the report: 1

## Comments/recommendations from Overview & Scrutiny Committee

N/A

## Background Papers

See the attached

Annex 1: GM Local Area Energy Plan

## Tracking/ Process

Does this report relate to a major strategic decision, as set out in the GMCA Constitution?

Yes

## 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 relevant Scrutiny Committee on the grounds of urgency?

No

**GM Transport Committee**

N/A

**Overview and Scrutiny Committee**

24th August 2022

# 1. Introduction/Background

1.1 In 2018, the Government invested in a new Prospering from the Energy Revolution Challenge fund via UK Research and Innovation (UKRI) 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 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 £5.9m GM LEM programme was one of the successful ~10 detailed designs, which included the production of Local Area Energy Plans (LAEPs).

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
- Calculate the cost of delivery, inclusive of network and energy import e.g., electric and gas.

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

## 2. The GM Local Area Energy Plan (LAEP)

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

2.2 To move quickly towards the 2038 target, the region will need to lead the way with local action, with a modelled £65bn investment required[1]. The LAEP sets out the current position and a roadmap towards that decarbonised future and describes a range of near-term, low regret, priority zones and opportunity areas for different technologies. It also 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[2]
- 8,000 homes and buildings newly connected to heat networks
- 116,000 heat pumps in homes.

2.4 The LAEPs all highlight the need for delivery to rise dramatically over the coming fifteen years, with around a million heat pumps in homes (assuming a primarily

[1] Includes costs that would be spent even without decarbonisation to maintain the current system (figures are for the primary scenario assuming a largely electrified future). When considered at an individual district level, this typically equates to in the region of 70% of the overall investment cost.
[2] Including plug-in hybrid. Domestic/personal vehicles only

electrified future for heating) and a million EVs needing charging by 2038, requiring additional works to enhance GM's local electricity network and find 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[3] in the early 2030's.

2.6 The critical take way issues from the LAEPs is not only `what will power and heat our buildings, homes and or cars of the future', but also `the low/least cost regret measures that we should and could be installing now, at scale'. These include:

**Fabric Retrofit**: Most homes across GM will need some level of fabric retrofit, and the case for this is likely to have increased with recent energy price rises.

**Heating systems and networks**: Areas have been identified as low regret areas for electrification, heat zoning, with further opportunities to consider expanding and even joining up heat networks across district boundaries, particularly at the nexus of Salford, Manchester, and Trafford, where several existing/planned schemes and further heat network opportunities are in proximity.

**Transport and EV charging**: Co-ordination between the districts, GMCA and TFGM offers opportunities for efficient roll-out programmes that could make use of economies of scale, whilst also continuing to consider emerging solutions for providing communal and on street EV charging systems

[3] HyNet North West is being delivered by a consortium of partners, each of which will lead a different part of the project. Progressive Energy is leading the development of the low carbon hydrogen production plant and the $CO_2$ pipeline, while Cadent is leading development of the hydrogen pipeline

**Local Energy Generation and Storage**: It is more beneficial to deploy generation as early as possible, while the national electricity mix is more carbon intensive. Deploying such high quantities of generation will be very challenging and may present challenges to the electricity network as well as requiring considerable coordination. Battery storage (whether at building or larger scale) offers potential to alleviate some of these network cost, reinforcement challenges. Even with successful deployment of high levels of local generation, GMCA will still rely on the grid for a large proportion of its electricity needs, even under the secondary scenario

**Energy Networks – Electricity**: The plan provides an overall modelled requirement for increased capacity of over 200% at low voltage substations, and over 80% at high voltage substations. GMCA and the districts should work closely with ENWL to understand how this can be addressed, including exploring flexibility.
**Energy Networks – Gas**: A very small quantity of natural gas remains in 2038 in the primary scenario, largely for industrial uses that cannot easily be electrified. However, much of the existing network could be suitable for repurposing to hydrogen, if it becomes available for heat: a key decision will be required at the earliest opportunity about whether hydrogen will form a substantial part of the region's decarbonisation pathway.

**Cost and investment**: The plan identified a total cost of GM's energy system out to 2038 will be £86-92bn (inclusive of energy import costs of Gas, Hydrogen and Electric). The plan also recognised a significant proportion of these costs (~70%) would be expended anyway under a `business as usual' model. The plan also sets out the need for investment to accelerate rapidly, presenting an opportunity for the region to work with partners to develop and pilot new products and services in the low-regret priority areas in the early years, enabling rapid changes at larger scale in the following period

**Carbon Budget**: The energy system changes set out in this report and the individual ten district LAEPs that support it have the potential to keep emissions within the carbon budget for GM, however, this also depends on emissions reductions in areas outside of the scope of the LAEP work, for example, transport related emissions.

# 3. The Process

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

- 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.
- Hydrogen into the grid- Hynet phase 3 (gas network hydrogen repurposing from 2030 onwards) is highly speculative and may arrive to late for the regions carbon budget. So should the possibility of its impact affect current decision making? 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.
- 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, with the remaining acting as counterfactuals across all 11 plans in total. Thereafter, 9 areas were utilised to provide the granular detail focus of the plans, including fabric Retrofit as most homes across GM require some level of fabric retrofit, only made more pertinent in recent months energy price rises:

**Focus Area 1**: Fabric retrofit is also generally regarded as low regret/ cost across all scenarios.

**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.

**Focus Area 3 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.

**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.

**Focus Area 5 Energy Networks** - **Electricity:** A net result of transitioning the low carbon will come 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.

**Focus Area 6 Energy Networks** - **Gas and Hydrogen**: 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.

**Focus Area 7 Networks - District Heat:** 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

**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. Thus, supporting how we prioritise the inherent need for investment as we strive to meet 2038.

**Focus Area 9 Carbon Budget:** The energy system changes set out in the LAEP's provides the potential to keep emissions within the carbon budget for GM. The trajectory of emissions reductions in the LAEP may allow some flexibility for large scale trials and smaller pilots, which could then support accelerated emissions reductions in the following periods, helping to bring the trajectory in line with the overall carbon budget.

# 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:

- Accelerating retrofit: the stock condition modelling (Parity Projects) of 1.2m homes across the region
- 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
- Public Sector Buildings: the review of the public estate, their Display Energy Certificates and energy consumption over the last few years.
- EV charging hubs: A review of potential sites for future public owned EV infrastructure
- 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. Next Steps

5.1. The activity of the last 2 years, inclusive of more than £100m investment (PSDS 1+3), has delivered several notable successes and identified lessons to be learnt:

5.2. **The need for a standardised**, data led approach and strategy to achieving our public sector decarbonisation ambition. How we develop our future schemes should be predicated on robust and informed data led positions.

5.3. **Accelerated deployment of renewable generation and storage at scale**. We need all key partners to agree to this approach. The current Go Neutral Framework is not moving forward at the pace and scale anticipated. If we create a similar framework for retrofit, we need to have full commitment to its use.

5.4. **Accelerated deployment of Public Sector decarbonisation measures including:**

- A sustained programme of investment grade audits across the public estate, to ensure we are informed and able to prioritise. All annual maintenance and capital programmes should be informed by stock condition surveys and whole building investment grade audits, that support RIBA stage 2/3 designs.
- A retrofit framework of suppliers and contractors capable of delivering the city region's needs, which generates a circular income for the region to support some of the devex costs through a rebate fee. This would be similar to the Go Neutral Smart Energy Framework, launched in February 2022.
- An 'Invest to Save' programme focused on the delivery of cost effective and known schemes, which do not require or are not best served by grant funding e.g., Solar PV.
- An agreed and standardised approach to measurement and verification, to ensure we are achieving our aims and capable of reporting accordingly. How we measure our in-use performance will be critical to understanding the impact of our delivery.

5.5 **The deployment of domestic retrofit measures identified in least cost regret areas**: The LAEPs provide and highlight areas of least cost regret, or priority areas for delivery. These measures include renewables, retrofit, electrification of heat, heat networks and more. All of which are deemed to provide carbon savings with little or no regret. However, these are not currently being installed at scale.

5.6 **Exploration and agreement on our regional position on heat zones**: The region has been and remains part of a cohort investigating and influencing policy on the provision of heat zones. As a region we can lead and act as a convenor, co-ordinator for development and designation of heat zones, building on the work completed through the LAEPs. How the heat networks within are constructed, owned, and operated, would be a separate decision.

5.7 **Exploration of a regional position on the role of Hydrogen:** delays in national policy decisions are creating market confusion which will not be resolved until a national decision is taken on the potential for hydrogen ingress into the gas grid in 2025/6. The LAEP's Plan sets out low regret options which can be implemented in the interim.

5.8 **Exploration of a regional position on EV infrastructure with TFGM –** Work is currently underway to understand the options to support publicly accessible charging infrastructure.

5.9 It makes sense to consider all of these identified `needs' together, as they are complimentary and, in some instances, required sequentially.

5.10 Feedback from Districts has highlighted a lack of capacity (and sometimes specialist expertise) to drive forward low carbon programmes. It is recommended that a Strategic Options Case (SOC) is produced which outlines the city-region's options to implement the strategic activities which are within our direct influence as outlined above. The implementation plan would then be supported by an adequately resourced Programme Delivery Unit (PDU) capable of supporting the city-region's Districts and partners, consisting of a mixture of internal and external skill sets. The initial funding for establishing the PDU can be funded via the agreed Retained Business Rates.

5.11 The outcome of the recommended Strategic Outline Case (SOC) would be presented at a future meeting for further consideration.

## 6. Opportunities/risks

6.1. The key opportunities include:

- Provide clear strategy and policy direction for the region to move towards our 2038 carbon neutrality target;
- Opportunity to encourage inward investment, innovation, research, and development in this area, by providing a clear direction of travel;
- Encourage the market to develop solutions and infrastructure to support our transition towards carbon neutrality;
- Encourage greater uptake of low/least cost regret measures across generation; storage, decarbonisation of heat, retrofit of homes, buildings and EV infrastructure;
- Ability to drive the creation of a transformative low carbon market and supply chain which is fit for purpose, skilled and quality assured.

6.2. The key risks include:

- Business as Usual is currently failing to meet the region's low carbon ambition;
- Failure to provide a clear direction and steer on how we retrofit can and will support our low carbon ambition;
- Insufficient capacity to deliver across the local low carbon goods and services supply chain;
- Growing the supply chain at a time when the industry has full order books.

## 7. Financial Implications

7.1 The adoption of the GM LAEP and supporting district level plans alone presents no direct financial implications. The plan(s) set out the scale of the challenge to meet the climate emergency that the city region and the 10 districts have already declared.

7.2 The acknowledged next steps and delivery will however require both revenue and capital expenditure to bring the plans outcomes and road map into reality. These will require subsequent funding which will be the subject of separate approvals.

## 8. Recommendations

The GMCA is requested to:

1. Note and comment upon the draft GM Local Area Energy Plan, its contents and the research undertaken to inform its development;
2. Approve GM Local Area Energy Plan for design & publication (Annex 1);
3. Approve the next steps in delivering the city-regions Local Area Energy Plan(s):
    - Utilising a standardised data led approach and strategy to achieving our decarbonisation ambition;
    - Deployment of renewable generation and storage at scale;
    - Deployment of Public Sector decarbonisation measures at scale;
    - Deployment of domestic retrofit measures identified in least cost regret areas;
    - Exploration of a regional position on heat zones, the role of hydrogen and EV infrastructure (with TfGM);
    - Complete a Strategic Outline Case (SOC) on the implementation of the LAEPs; and
    - Establish a central Programme Delivery Unit to provide regional support and expert resources for Districts to help develop the above.