

GREATER MANCHESTER GREEN CITY REGION PARTNERSHIP

Date: **24 July 2020**

Subject: **DOMESTIC RETROFIT FOR A CARBON NEUTRAL FUTURE: MODELLING THE NEED AND OPPORTUNITIES FOR HOUSING RETROFIT IN GREATER MANCHESTER**

Report of: **David Shewan, Parity Projects**

PURPOSE OF REPORT

To provide a short summary of the project currently underway to identify realistic pathways to net zero carbon housing by 2038.

RECOMMENDATIONS:

It is requested that the Partnership:

- Note and comment upon the contents of the report.

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1.0 BACKGROUND INFORMATION

- 1.1 In September 2019, GMCA was successful in bidding for £49,980 grant funding from the Local Government Association's Housing Advisers Programme 2019/20¹ to procure expert advice to model the need and opportunity for domestic retrofit in GM. The project will develop a GM housing stock data baseline and energy modelling to provide an estimation of the potential for low carbon retrofit across that stock.
- 1.2 The GM Environment Team contributed an additional £35k to extend the remit of the project, to enable future scenarios for energy and CO₂ modelling to be undertaken for a wide range of energy efficiency measures. This will provide robust evidence for developing business cases to unlock investment opportunities for housing retrofit and also identify the potential for enforcement intervention and the ability to compare housing stock consistently across Greater Manchester.
- 1.3 GMCA undertook procurement for the project between November 2019 and January 2020, and Parity Projects Ltd (as part of a consortium with Bays Consulting, ADE Research and Energy Systems Catapult) were appointed as the successful bidder in January 2020.
- 1.4 The project started in February 2020 and will conclude in October 2020. It has four main parts:
'Where are we now'
 - 1a. an energy model of the housing of Greater Manchester at an address level,
 - 1b. a statistical model that will predict the probability of hazards in homes at an address level using the Home Health and Safety Rating System (HHSRS)² framework
 2. 'Where do we want to get to': identify the most likely and realistic end-result that would result in zero emissions from housing by 2038
 3. 'How do we get there': model a range of possible policy interventions using the Greater Manchester model described above to identify a suitable outline pathway to zero emissions housing by 2038
- 1.5 The housing energy model of the housing stock of Greater Manchester has been produced using open data sources and Ordnance Survey data. This is being enhanced before August to include an analysis using LIDAR data to identify the potential for solar panels, and using GIS information to identify the potential for electric vehicle charging points. This energy model will be used as the basis for modelling the effect of possible policy interventions.
- 1.6 The model to predict the probability of HHSRS hazards in homes is in progress. It is based on the latest English Housing Survey, which identifies HHSRS hazards within a wide dataset for a sample of UK homes each year. The model will use data from the housing energy model, and from data sources available at small area level (such as census, Indices of Multiple Deprivation) to predict probability of hazards in individual addresses.
- 1.7 'Where do we want to get to' has been more difficult than anticipated to determine. The main reason for this is that housing cannot be considered in isolation from national policy which will determine factors such as:
 - the extent to which the electricity grid will decarbonise

¹ <https://www.local.gov.uk/topics/housing-and-planning/lga-housing-advisers-programme/housing-advisers-programme-hap-2019-2020>

² <https://www.gov.uk/government/publications/hhsrs-operating-guidance-housing-act-2004-guidance-about-inspections-and-assessment-of-hazards-given-under-section-9>

- the capacity of the future electricity grid
- the ability of the future electricity grid to handle seasonal and short-term demand fluctuations
- whether national infrastructure will develop for emerging technologies like hydrogen

2.0 CURRENT FINDINGS

2.1 Our analysis and literature review supports the following key conclusions, noting that it will be essential to review policy over time as technology and national policy develop:

Our analysis and literature review supports the following key conclusions, noting that it will be essential to review policy over time as technology and national policy develop:

- Natural gas is predominant in GM housing. We cannot see any scenario where housing can approach net zero CO₂ while any significant proportion of homes remain gas-heated. Technical considerations aside, biogas/hydrogen are unlikely to become available in sufficient quantity to displace it in the next few years at least.
- Electricity is projected to decarbonise radically over the next few years before 2038 but it seems unlikely that the grid can be upgraded to have sufficient capacity to support widespread conventional electric (resistive) heating.
- (Electric) Heat pumps seem likely to be of key importance in decarbonising GM (and UK) housing stock. The roll out of heat pumps needs to dramatically increase. They use far less energy to heat a home than conventional electric heating. Literature review indicates that an upgraded grid could support very high rollout by 2038.
- Fabric measures play an important role in decarbonisation and grid resilience and are 'low regret'. Retrofitting most houses to a 'good' level is likely to be important, but a very deep retrofit of every house is unlikely to be necessary. Policies need to ensure fabric measures are targeted to support effective measures as fabric measures vary widely in cost-effect. Heat pumps may reduce CO₂ but are not likely to reduce bills, so fabric measures will remain key to fuel poverty alleviation.
- Heat Networks can provide localised solutions that are lower carbon than heat pumps and should be pursued where viable. The business case is only likely to be viable in the significant minority of homes (perhaps 15%) where housing is denser and/or closer to heat sources. GM can have a key strategic role in this.
- Domestic Renewables allow housing to become net zero by offsetting remaining CO₂ linked to home energy use. In fact it doesn't matter whether renewables are installed on housing or elsewhere.
- Energy storage (including batteries) is likely to be more important for grid resilience in the longer term when and if heating becomes largely electrified.
- Hydrogen: There is considerable ongoing work to develop low carbon hydrogen for a range of sectors, with heating for domestic properties competing with other sectors that might claim a higher priority for this fuel, but the technology seems likely to be some way off still.

The prospect of the technology playing more of a part than anticipated in future does not pose a risk to rolling out measures as above.

3.0 NEXT STEPS

3.1 'How do we get there' will be the focus of the project in July to September. We are currently modelling the likely effect of different policy frameworks towards the decarbonisation of GM housing. Initial work indicates that decarbonisation will need a radically increased ambition compared to programmes to date.

3.2 The progress on delivery of the interim steps above will be reported to GMCA.

4.0 RECOMMENDATIONS

It is requested that the Partnership:

- Note and comment upon the contents of the report.