

Appendix 1

Table 1 - Investment and Delivery Activity

Project	High Level Description
Retrofit of Individual Energy Conservation Measures	Develop an ongoing pipeline of investments through a series of building audits focussing on retrofitting proven energy efficiency measures, on a Return on Investment basis. This is an expansion and continuation of the existing Carbon Reduction Programme, generally referred to as "Phase 2".
Zero Carbon whole building retrofit pilot	This is intended to be an exemplar from which learning can be applied to all future design and investment decisions. This will set the bar for what good looks like for non-domestic retrofit in Manchester and be the catalyst for the transformation of our approach to the built environment internally.
Building analysis	Complete an analysis of the operational estate to identify and rank buildings based on size / kWh consumption per m2 and DEC rating. The buildings with the worst kWh per m2 and DEC ratings may be more suitable candidates for a whole building approach, whereas the better performing buildings (likely to be newer or recently refurbished) would be more suitable for targeted Energy Conservation Measures (ECMs).
Building Management System (BMS) Roadmap	The existing BMS used by the Energy Management Team will need replacing before 2022, when support for the system is expected to be removed by the supplier. This presents a timely opportunity for the Authority to establish a clear roadmap for the future development of BMS including: <ul style="list-style-type: none"> • A full audit of all existing functionality (both connected and remote BMS) • Establishing a standard BMS specification and building suitability criteria • Ensuring all BMS provide the Energy Management Bureaux with either direct management of the BMS or an oversight of energy consumption (where we have 3rd party providers responsible for Facilities Management)
Building Management System Expansion & Optimisation	Once the roadmap is in place we will have a clearer view of the overall strategy and opportunities for investment, a full business case for investment will be developed in line with the requirement to upgrade the main Energy Bureau BMS. Implementation plans will also be developed in line with the overall Roadmap.
Data driven performance management	This work stream will look to build on existing energy reporting, establishing an MI Dashboard to highlight variations in expected and actual performance based on previous trends or energy models (for new build / major refurbishments). Focussing on key assets initially, the aim being to support contract management with FM providers and as a result drive additional efficiencies.
Small to medium scale behind the	By the end of 2020/21 we will complete Solar PV feasibility studies including structural assessment & condition survey of 25 buildings. We will then develop business cases for investment (on

meter Solar PV	a rolling basis) and secure a route to market either through existing options (i.e. the Refit Framework), a new MCC procurement or a joint procurement with the GMCA (Go Neutral 2).
Large scale remote generation Solar PV	There are a number of approaches to consider when developing large scale Solar PV, the approach chosen will depend on the level of local opportunity and the commercial options. The initial output of this work stream will be a full options appraisal, followed by the development of a full business case for investment.
Working with GM	Ensuring we have the capacity to work with GM will mean we are well placed to make best use of and learn from the expertise now available. Opportunities exist to work with GM to develop standard tools and templates as well as common approaches to challenges such as 'building the case for investment in schools', access to resources and analysis, and the potential for joint procurement (benefits of scale).
Boiler replacement programme	It is proposed to complete a fresh review of the stock condition surveys to establish a priority pipeline of work focussed on low carbon heat, identifying buildings with boilers approaching end of life.
Gas phase out	Plan that all new or replacement heating systems deliver low or zero carbon heating solutions, be this new build schemes, major refurbishments or end of life replacement via the Asset Management Programme. Gas should only be approved by exception based on a full technical and financial options appraisal. This approach would be in line with (although more ambitious) other national strategies e.g. the policy to ban gas from all new residential developments from 2025. This approach should be adopted once learning from the 'Accelerated boiler replacement project' is available and formalised in standard building specifications and via checkpoint approval routes.
Time Shift	To be explored during each Solar PV deployment, as the cost of storage comes down the opportunity to deliver larger arrays supported by battery storage will increase. The programme should look to make use of second hand battery packs wherever possible, re-using batteries that no longer have the performance needed for electric vehicles but perfectly fine for buildings. This approach will help reduce the impact of producing the batteries, both the embodied carbon associated with their manufacture and the environmental impact associated with lithium mining.
Demand Side Response	Work with GM & ENW to identify MCC building and land assets in areas where storage capacity could support the grid, explore opportunities for revenue generation to support wider carbon reduction measures within the Authority. This opportunity is expected to increase as more renewables are brought into the energy mix over the next ten years.

GM Local Energy Market	Supporting GM to develop the proposals above will initially require the Authority to generate and share a significant amount of information about our assets and energy consumption. This will need to be co-ordinated centrally. The output of this initial work will be an Energy Plan for Manchester produced in conjunction with Electricity Northwest and Cadent, this will become a key document to identify opportunities and inform energy investments going forward. Once this is in place work will begin on development of the local energy market, requiring technical (BMS and FM), Commercial and Legal support to be provided by MCC.
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Table 2 - Decision Making, Policy and Standards Activity

Step	Description
Step 1 - Become more informed	Identify examples of best practice design and retrofit (active / passive / green infrastructure), identify learning to be shared and incorporated into a communications plan.
	Complete staff consultations & skills audit
	Support the development of the NWCH Sustainability Special Interest Group
	Develop targeted communications & training plan based on the output of research & benchmarking activities. To include: Programme of site visits to best practice ; Programme of tool box talks, bringing in area specialists to promote the benefits and business case for areas such as Green Infrastructure, Renewable Heat etc.
Step 2 - Change the way we assess success	Produce a building accreditation assessment report outlining the options and limitations of each
	Agree the Manchester Build Standard / Standards to be used going forward and embed this within decision making processes.
	Working with colleagues involved in the management of the Capital Strategy Board identify proposals for additional assessment criterion to enable the Authority to develop a more rounded view of the environmental impact of its investments and assets.
Step 3 - Change the way we buy	Embed further new assessment criterion into the standard Checkpoint Process.
	Ensure all standard specifications and employers requirements are updated to reflect new build standards and assessment criteria.
Step 4 - Change the way we track benefits	Greening the supply chain – update standard procurement questions to identify and assess the green credentials of the organisations themselves. Agree what weighting this should have.
	Produce ‘Zero Carbon 2038’ Project Closure Template to be completed at the end of a major project or refurbishment and signed off by the Project Manager and SRO. This will enable more effective benefit tracking and ensure accountability for ‘value engineering’ decisions. This should also include a question about the energy management plan for the building,

	who is responsible for producing and reviewing the performance data, what will be reported and how frequently.
	Soft Landings, focussing on the 'performance gap' complete analysis of our experience to date and the challenges experienced and areas of good practice. Identify 3 rd party research and good practice. Link in with the BMS Expansion & Optimisation work described above.