GREATER**LONDON**AUTHORITY

REQUEST FOR ASSISTANT DIRECTOR DECISION – ADD2370

Title: Building the business case for heat pump retrofits

Executive Summary:

The net zero carbon target for London requires a phased shift away from the use of gas heating in buildings, and a rapid transition to low carbon forms of heating. The GLA's zero carbon modelling estimates that nearly 80,000 heat pump installations will need to be deployed in existing buildings by 2025, including residential, commercial and public sector buildings. Currently there are only around 10,000 a year installed as retrofits across the whole of the UK. Capital and operational costs are often cited as a barrier to deployment in existing buildings. There are also different types and configurations of heat pumps, making it difficult to decide which is most appropriate to a particular building and energy consumption pattern. Whilst these barriers persist, retrofitting buildings with heat pumps can make economic sense in certain circumstances.

We propose to commission a study that will inform strategic planning of how heat pumps and low carbon heating solutions can be deployed in existing buildings across all London boroughs. It will do so by identifying priority locations for installing heat pumps in the near term. The study will thereby support the delivery of the ambitions of the London Environment Strategy, specifically on efforts targeted at reducing local air pollution, improving energy efficiency and reducing CO2 emissions, deploying heat networks and increasing the flexibility of our energy system. The study is already actively supported by officers at least one London borough, and the support of further boroughs will be sought following approval. Boroughs will provide vital energy data and inform typology choice.

Decision:

That the Assistant Director of Environment approves:

Expenditure of up to £45,000 for consultancy support to identify the optimal business cases for retrofitting heat pumps into existing buildings in London.

AUTHORISING ASSISTANT DIRECTOR/HEAD OF UNIT

I have reviewed the request and am satisfied it is correct and consistent with the Mayor's plans and priorities.

It has my approval.

Name: Aram Wood **Position:** Assistant Director - Environment

Signature: Aram Wood **Date:** 26/9/19

PART I - NON-CONFIDENTIAL FACTS AND ADVICE

Decision required – supporting report

1. Introduction and background

1.1. London has very ambitious targets for the deployment of heat pumps. This ambition is driven by the need to transition rapidly to low carbon forms of heating. London's homes account for roughly 37% of the city's carbon emissions, with 24% of all of London's carbon emissions derived from the use of gas for heating/hot water[1]. Achieving the targets for getting London to Net Zero by 2050 will require a phased shift away from gas heating, particularly through a large increase in the use of heat pumps in buildings. Heat pumps can be a very efficient way to heat buildings especially if using waste heat or heat from water or the ground. In addition, given the rapid decarbonization of the electricity system, they are already a lower carbon form of heating than gas-based solutions, and this carbon benefit is expected to increase in future as the grid factor is likely to decrease further[2].

1.2. Three of the four scenarios associated with the GLA's 1.5C Compatible Zero Carbon plan require the uptake of at least 300,000 heat pumps by 2025 in London across all building types. In the short term, the majority of these are expected to be in new developments but increasingly they will need to be deployed in existing buildings, both as part of low carbon heat networks and as building level only heating systems. More than 80,000 heat pumps will need to be installed in existing buildings by 2025, with around 120,000 deployed in existing buildings each year in London in the 2030s and 2040s[3]. This is in stark contrast to the current levels of heat pump installations, where on average, only 10,000 units per year are installed in existing buildings across the whole of the UK. The current heat pump retrofit market is focused on off gas grid properties where heat pumps have a stronger economic case due to the high cost of non-gas heating fuels e.g. fuel oil.

1.3. Another driver for moving to low carbon heating systems is air pollution concerns. Over 70% of the energy used in homes and workplaces is for space and hot water heating of which around 90% is currently met using gas-fired boilers[4]. These result in a significant amount of NO_x emissions, contributing to air pollution effects in London and emissions from boilers are also expected to grow as a proportion of local emissions, from 30% in 2013 to 38% in 2020. In addition, the health impacts of air pollution are more likely to fall disproportionately on those on lowest incomes, the elderly, the young and those with pre-existing health conditions. More detailed assessments of the most effective strategies to deploy low carbon retrofit heating solutions in London would support work to address these air quality concerns.

1.4. The current London Plan includes new energy efficiency targets and a heating hierarchy that encourages developers to ensure new buildings are built to high standards and move towards low carbon forms of heating. However, whilst the higher energy performance standard requirements of new builds more readily facilitates the deployment of heat pumps, around 80% of London's existing building stock is expected to be still standing in 2050. It is crucial that existing buildings undergo the transition to low carbon heating solutions as well.

1.5. Despite their growing use in new builds, there are a number of barriers which currently mean in most conditions, installing heat pumps in existing buildings currently using gas heating is not economically viable. Strategic advice is now required to support boroughs in identifying such typologies that are suited to installing heat pumps now and the business models that will make it economically viable. This study will improve the understanding of the most economic route to

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[1] Greater London Authority (2018), 'London Energy & Greenhouse Gas Inventory', figures are for 2016

[2] Greater London Authority (2018), 'Low carbon heat: heat pumps in London'

[3] There are projected to be around 4.3 million homes in London in 2030, so this is the equivalent of 3% of London's homes being retrofitted with heat pumps each year in the 2030s and 2040s

[4] Greater London Authority (2018), 'London Environment Strategy', (p.94)

decarbonizing London's existing building typologies, and the balance between energy efficiency measures and the type of low carbon heat technology deployed.

1.6. This is not work that could be undertaken internally in the GLA as it requires experts that have technical understanding of heat pumps and building energy demands. The experts will also be required to get cost data from heat pump developers and engineering firms. It is expected that the consultants will be engineering consultants who already have many of the relevant connections required to gather this data.

1.7. The letting of the contract will be managed by the GLA's Zero Carbon Policy Team. A contract will be granted after a competitive tender process.

1.8. The evaluation process will be conducted to ensure that submissions are evaluated fairly to select the most economically advantageous offer. The quotation evaluation process will take account of the following:

Requirement	**Weighting(s)**
Quality of proposal • Demonstrate understanding of the requirements. • An effective approach to collecting and analysing data, and stakeholder engagement. • Evidence of working with the SDGs, particularly with local or national government	35%
Technical capabilities and capacity • Evidence of relevant expertise, inclusive of CVs • Evidence of undertaking similar work	35%
Conformance with the GLA's Responsible Procurement Policy including Equality, Diversity, and sustainability	10%
Total Technical Weighting	**80%**
Assessment of value for money against the project budget - proposals will be recognised for being proportionate to the amount of time and budget available.	20%
Total Commercial Weighting	**20%**

2. Objectives and expected outcomes

Objectives

2.1. The study will have the following objectives:

- Enable a more detailed targeting of what measures and low carbon heating options are most viable for particular building types, and where to best target investments at an overarching GLA strategic and local authority level to support the zero-carbon target.
- Increase the publicly available data on the upfront and running costs, carbon savings and air quality benefits of different heat pump system options, when retrofitted in existing buildings of key typologies.
- Provide policymakers with evidence to identify and develop policies that will drive low carbon heat deployment.
- Increase in the use of MEEF and other funds for heat pumps by helping identify where these technologies should be deployed.
- Increase the number of heat pumps being installed in GLA programmes, e.g. home energy accelerator, due to increased understanding of the typology of building that would be heat pump priority buildings.

Outputs

2.2. In order to achieve these objectives, we propose to commission a pre-feasibility study which will:

- Identify typical building typologies that represent priority locations for installing heat pumps.
- Propose business models for financing the installation and operation of heat pumps, considering carefully the ability to pay of the different actors and different available support mechanisms and available finance.
- Identify any additional barriers to retrofitting the building typologies with heat pumps (building on the work done looking at barriers to installing heat pumps in new build carried out for the GLA in 2018) and possible solutions to these barriers.

2.3. The study will also consider:

- The range of buildings of different ages and sizes typical across London, including both domestic and non-domestic.
- The existing energy demand profile of the typical buildings chosen.
- The number of buildings of a particular building typology for which a particular heat pump solution and business case are likely to be applicable.
- The range of heat pump solutions from different manufacturers/providers that could be applicable.
- The extent to which fabric energy efficiency upgrades would make economic sense before installing a heat pump.
- Real costs from heat pump providers and capital and operation costs – and the level of sensitivity around these costs under current energy prices and taxation/policy regimes and possible future scenarios. The study could also consider how the costs of running heat pumps could be reduced through running the heat pumps in a smart way and using time of use tariffs and potentially storage options.
- Impact on air quality and likely carbon savings in 2025 and beyond of different retrofit heat pump systems for each of the typology.
- Accessibility of the content to Londoners, with non-technical summaries available for the public.

Outcomes

2.4. Boroughs have additional support in delivering the objectives of the London Environment Strategy, its zero carbon targets and air quality ambitions.

2.5. London boroughs and Londoners will be able to use the report to understand whether the building(s) they have responsibility for are priority sites for installing heat pumps.

2.6. GLA staff will have the evidence to identify and develop policies that will drive low carbon heat deployment.

2.7. Increase in the use of MEEF and other funds for heat pumps by helping identify where these technologies should be deployed.

2.8. Increase in heat pumps being installed in GLA programmes, e.g. home energy accelerator, due to increased understanding of the typology of building that would be heat pump priority buildings.

3. Equality comments

3.1. Under section 149 of the Equality Act 2010, as public authorities, the Mayor and the GLA are subject to a public-sector equality duty and must have 'due regard' to the need to (i) eliminate unlawful discrimination, harassment and victimisation; (ii) advance equality of opportunity between people who share a relevant protected characteristic and those who do not; and (iii) foster good relations between people who share a relevant protected characteristic and those who do not. Protected characteristics under section 149 of the Equality Act are age, disability, gender re-assignment, pregnancy and maternity, race, religion or belief, sex, sexual orientation, and marriage or civil partnership status.

3.2. The project will comply with the GLA's policies on equality and accessibility, and public sector duties to promote equal opportunities, avoid unlawful harassment and discrimination, and foster good relations between people who have a protected characteristic and those who do not.

3.3. This work is not expected to have any negative impact on protected groups or others.

3.4. We will ensure that our criteria for identifying priority buildings for investing in heat pumps will require that vulnerable Londoners would not need to pay more for their energy, with a priority on business cases where energy costs to those in fuel poverty are significantly reduced.

3.5. This work will also make sure that there is no gender, age or other bias, in the assumptions made around building occupation patterns or energy consumption patterns. This is to make sure that where building typologies are deemed attractive, they are attractive irrespective of the demographic of the building occupier.

3.6. The health impacts of air pollution are more likely to fall disproportionately on those on lowest incomes, the elderly, the young and those with pre-existing health conditions. These people are also less likely to be living in new, state of the art homes with low carbon heating systems installed. This work will therefore help identify if there are opportunities in the short term to install heat pumps in the homes of Londoners in these circumstances.

3.7. This is a research project looking at the options available to the Mayor for accelerating the deployment of heat pumps in London. We will ensure our equalities duty is met by implementing our equalities compliant approach through the procurement of this research project. The results of this project will be relevant and applicable to all people and groups in society.

4. Other considerations

a) Key Risks and Issues

Risk	Probability	Impact	Mitigation
Unable to get the data we need from heat pump providers	M	H	Support the consultants, together with the boroughs to explain to the heat pump developers the commercial benefits of us identifying genuine business cases for their products
Unable to get the energy demand data profiles from the building typologies	L	M	We have already been in conversations with a London borough who believe they should be able to get us all this data for their main typologies in their borough. However, if there is a key typology for which no real data is available, we can resort to modelled data for this building typology

Heat pump developers do not agree to their data being made public	M	M	We can present the data generically for the type of heat pump and provide indicative costs, and critically, costs at which the business case makes sense
No favourable business models are identified as suitable to the building typologies	L	L	The consultants will be asked to identify the conditions under which the business models could be viable – this will give us the evidence we need to request additional funding or lobby for regulatory barriers to be removed
No bids come back in response to the invitation to tender	L	H	The tender will follow best practice to ensure clarity of purpose and potential interested parties will be identified and engaged that have the knowledge and expertise to deliver the project.

b) Links to Mayoral Strategies

4.1. The Mayor's Environment Strategy and 1.5C compatible climate action plan highlights the important role that heat pumps will play in meeting his zero carbon by 2050 target. All scenarios that get London to zero carbon require a significant increase in the number of heat pumps installed in London. This study represents a core part of how the *Mayor can demonstrate he is responding to the climate emergency and supporting boroughs to drive down emissions.*

4.2. The findings of the study would also be useful for wider teams within the Environment directorate. It would:

- Provide valuable insights for our programmes targeted at energy efficiency such as the home energy accelerator and RE:FIT, as well as our work on the deployment of district heat networks across the city.
- Inform our work on flexible energy systems in business cases that explore flexibility benefits.
- Support the work of the air quality team and strategies for reducing a key contributor to air pollution in London.

c) Impact assessments and consultations

4.3. This programme of work has been designed – and will be delivered - in collaboration with officers from the GLA directorates and departments to ensure that the methodologies and results are robust and relevant.

4.4. Production of the outputs of this programme of work will be developed with consultation from key GLA teams who cover the issues and areas of focus for the report – e.g. Energy Efficiency Delivery, Air Quality, Smart Energy Systems.

4.5. This work will also be scoped in close collaboration with the boroughs to ensure that the typologies considered are relevant to London.

d) Conflicts of interest

4.6. There are no known conflicts of interest arising and bids will not be considered that have the potential to financially benefit any GLA.

5. Financial comments

5.1. Approval is sought for expenditure of up to £45,000 for consultancy support to identify the optimal business cases for retrofitting heat pumps into existing buildings in London.

5.2. The expenditure will be funded from the Zero Carbon budget.

6. Planned delivery approach and next steps

6.1. The specification for the work will be put out to tender in early October with the aim of the project starting in November, and for to be completed by the end of March 2020, as outlined in the table below.

Activity	Timeline
Procurement of contract	w/c 7 October 2019
Delivery Start Date	w/c 18 November 2019
Main milestones – Priority building typologies and heat pump solution identified with costs	27 January 2020
Main milestones – Draft report incorporating business models	25 Feb 2020
Delivery End Date	31 March 2020
Project Closure	31 May 2020

Appendices and supporting papers:
None.

Public access to information

Information in this form (Part 1) is subject to the Freedom of Information Act 2000 (FoIA) and will be made available on the GLA website within one working day of approval.

If immediate publication risks compromising the implementation of the decision (for example, to complete a procurement process), it can be deferred until a specific date. Deferral periods should be kept to the shortest length strictly necessary. **Note**: This form (Part 1) will either be published within one working day after it has been approved or on the defer date.

Part 1 - Deferral

Is the publication of Part 1 of this approval to be deferred? NO

If YES, for what reason:

Until what date: (a date is required if deferring)

Part 2 – Sensitive information

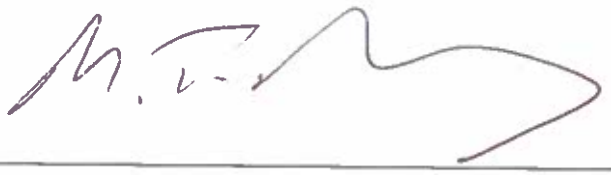
Only the facts or advice that would be exempt from disclosure under FoIA should be included in the separate Part 2 form, together with the legal rationale for non-publication.

Is there a part 2 form – NO

ORIGINATING OFFICER DECLARATION:	Drafting officer to confirm the following (✓)
Drafting officer: Claire Jamieson has drafted his report in accordance with GLA procedures and confirms the following:	✓
Corporate Investment Board This decision was agreed by the Corporate Investment Board on 23 September 2019.	

ASSISTANT DIRECTOR OF FINANCE AND GOVERNANCE:

I confirm that financial and legal implications have been appropriately considered in the preparation of this report.

Signature  **Date** 23-09-19