LONDON FIRE BRIGADE

Decision title

Carbon Reduction Strategy

Decision by	Decision Number
London Fire Commissioner	LFC-0256x-D

Protective marking: **NOT PROTECTIVELY MARKED**
Publication status: Published in full

Summary

The attached report sets out the proposed Carbon Reduction Strategy for the London Fire Commissioner (LFC) to achieve the 2025 target of 60% CO_2 reduction, and the associated funding requirement of £2,943k over 3 years to deliver the necessary energy demand reduction works. Whilst the strategy identifies that a switch to 100% renewable electricity supply through utility contracts would achieve the 2025 target, this is not the only recommended approach as it will do nothing to mitigate the rising cost of energy, and does not correlate with the Mayor's London Environment Strategy (LES). Energy price rises of some 16-20% for 2020 and 75% by 2030 are projected for all forms of grid supplied energy.

The 2025 carbon reduction target applies to the whole Greater London Authority (GLA) group. The Metropolitan Police Service (MPS) are expected to achieve the target as a result of significant organisational change, with estate reductions of over 50%. The GLA have moved their electricity supply to 100% renewable, and Transport for London are requesting additional funding for carbon reduction measures. Achieving the further target of zero carbon by 2050 as set out in the LES and the Climate Change Act (2008), will be substantially more challenging for the whole group. For LFC this will require significant investment to move away from gas dependency. This is on the assumption that substantial organisational change such as that undertaken by MPS would not be possible. In line with the Mayor's recent budget guidance, future decision making must take into account carbon emissions to ensure they result in reduced or neutral carbon impact to avoid exacerbating the challenge of meeting the target set.

Decision

The London Fire Commissioner approves the Carbon Reduction Strategy for 2019–2025 as set out in Appendix 1 of the attached report, which is based on implementing the combined strategy options subject to available funds.

Andy Roe
London Fire Commissioner

Date 28/02/20.

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LONDON FIRE BRIGADE

Report title

Carbon Reduction Strategy

Report to	Date
Commissioner's Board Fire and Resilience Board	23 November 2019 3 December 2019
Report by	**Report number**
Assistant Director, Technical & Commercial	LFC-0256x

Protective marking: **NOT PROTECTIVELY MARKED**
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Summary

This report sets out the proposed Carbon Reduction Strategy for the London Fire Commissioner (LFC) to achieve the 2025 target of 60% CO_2 reduction, and the associated funding requirement of £2,943k over 3 years to deliver the necessary energy demand reduction works. Whilst the strategy identifies that a switch to 100% renewable electricity supply through utility contracts would achieve the 2025 target, this is not the only recommended approach as it will do nothing to mitigate the rising cost of energy, and does not correlate with the Mayor's London Environment Strategy (LES). Energy price rises of some 16-20% for 2020 and 75% by 2030 are projected for all forms of grid supplied energy.

The 2025 carbon reduction target applies to the whole Greater London Authority (GLA) group. The Metropolitan Police Service (MPS) are expected to achieve the target as a result of significant organisational change, with estate reductions of over 50%. The GLA have moved their electricity supply to 100% renewable, and Transport for London are requesting additional funding for carbon reduction measures. Achieving the further target of zero carbon by 2050 as set out in the LES and the Climate Change Act (2008), will be substantially more challenging for the whole group. For LFC this will require significant investment to move away from gas dependency. This is on the assumption that substantial organisational change such as that undertaken by MPS would not be possible. In line with the Mayor's recent budget guidance, future decision making must take into account carbon emissions to ensure they result in reduced or neutral carbon impact to avoid exacerbating the challenge of meeting the target set.

Recommended decision

1. The London Fire Commissioner approves the Carbon Reduction Strategy for 2019–2025 as set out in Appendix 1, which is based on implementing the combined strategy options subject to available funds.

Background

1. The LES was published in May 2018 with the support of LFEPA (FEP 2797). This reinforced the existing group wide 60% reduction target and set the further carbon zero target. Following this, the Deputy Mayor for the Environment tasked each of the Functional Bodies to develop a strategy setting out how the 60% CO_2 reduction target for 2025 would be met along with the 5 year carbon budgets introduced through the LES. Further to this the Mayor declared a Climate Emergency in December 2018, with no change to the targets set. The proposed Carbon Reduction Strategy for 2019 - 2025 for the LFC is set out in Appendix 1. It aligns to the Mayors guidance as set out in the LES, identifying actions to achieve the 2025 target.

2. It is recognised that throughout this report there is technical terminology that can make the report a challenging read. A glossary is therefore provided in Appendix 2 to provide greater clarity on a number of terms.

3. The strategy sets proposes an action plan to deliver the strategy as detailed in Appendix 1 that focuses on improving building energy efficiency and moving to 100% renewable electricity. This is in recognition that the current property asset replacement programme will not deliver improvements of the scale required. The new building improvement measures require additional funding as requested, with short to medium term payback periods as noted in Table 3 later in this report. The financial implications of renewable electricity supply are also discussed later in this report, and will be detailed in a future report regarding the replacement utility supply contracts.

4. Fleet related carbon reduction actions are referenced in the strategy, however due to the life policy of fleet vehicles, much of the fleet actions will not deliver carbon reductions until after 2025. The potential uptake of zero emission capable vehicles is still under review so the potential for improvement through this route has not been factored into the strategy.

5. The strategy also sets out the trajectory to work towards the further Mayor's target of carbon zero by 2050. This target is in accordance with guidance from the Intergovernmental Panel on Climate Change (IPCC)to limit global warming to 1.5°C, which is expected to occur sometime between 2030 and 2052. Twenty four London councils (and half of UK principal authorities) have declared climate emergencies over the past year and adopted earlier targets, that reflect the IPCC's statement that urgent changes are needed by 2030. The earlier date also provides a greater degree of confidence of limiting warming to 1.5°C.

6. Achieving zero by 2050 will require the replacement of all fleet to zero emission and a move to renewable gas supplies or replacing all gas fired boilers at all premises with alternative technology. This would result in a significant shift in spend from diesel and gas to electricity revenue budgets.

7. Technologies to achieve zero for heavy fleet and heating are still in development and the costs and technical challenges of adopting them are unclear. The current understanding is that the zero carbon fleet will come at a significantly higher cost, as would the electrification of heating systems. Evidence has shown that costs fall when demand for these technologies increases, as has been the case with vehicle battery technology, photovoltaics and offshore wind in recent years. Government policy changes are however needed to drive this forward, along with increasing green (renewable) gas supply, which is currently insufficient to meet our needs.

Research has projected that green gas production in the UK will achieve 183 TWh by 2050[1] in the high scenario, against the current UK gas consumption of around 583 TWh[2] (excluding electricity generation).

8. Whilst the financial implications of carbon reduction are challenging against existing budget pressures, they must be considered alongside the scale and cost of the impact of climate change, and the financial payback of many actions. The risks associated with warming by 2°C have been defined by the IPCC as catastrophic, incurring substantial financial, social and environmental cost to all as outlined in section 1.5 of Appendix 1. Included in the risks of a changing climate are areas that will directly impact the LFC's service provision such as flooding and wildfires. The UK Government's Climate Change Committee (CCC) noted that accepting the economic impact of action is preferable to inaction given the risks, echoing the earlier HM Treasury's Stern Review[3] that identified the cost of inaction outweighed the cost of action.

9. The Mayor's Budget guidance to the LFC for 2020/21 advised that proposals needed to address the carbon budgets and 2025 target as set out below. Further to this talks are in progress with the officers under the Deputy Mayor for the Environment to discuss the LFCs progress in delivering on the LES and any challenges identified. This has helped to provide a shared understanding on how progress to date and planned activity should be presented in the budget report and reinforced mayoral priorities.

   'Budget proposals will need to ensure sufficient resourcing and budget necessary for the efficient and effective delivery of the LES…. contributing to key Mayoral ambitions set in the LES: Meeting the GLA Group carbon budgets which include a target of 60 per cent reduction in GLA Group CO_2 emissions on 1990 levels by 2025;'.

10. The three carbon budgets set for the LFC are set out in Table 3 of Appendix 1 in detail and cover 2018/19 – 2022/23; 2023/24 – 2027/28; and 2028/29 – 2032/33. They do not replace the overall 2025 and 2050 targets, but provide more detail on the performance trajectory required to achieve those targets, enabling better scrutiny of performance. A further review of progress, along with new proposals for action will be required for 2025-2050.

GLA Group progress

11. Table 1 below sets out the expected performance of the GLA Group against the 2025 target and carbon budgets under the 'do nothing' approach. This presumes energy consumption is static, and that CO_2 reductions would be delivered solely through decarbonisation of electricity supplied to the national grid, whereby increasingly cleaner forms of energy generation are fed into the national grid. The improvements projected are therefore reliant on UK Government policy to deliver cleaner energy. Achieving the targets would be increasingly challenging for organisations with higher levels of gas consumption, which is not projected to decarbonise on the same scale as electricity. The red and amber figures in Table 1 identify the percentage the target or carbon budget is expected to be missed by, whereas green figures indicate the percentage that the target is expected to be exceeded by.

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[1] Review of Bioenergy Potential: Summary Report

[2] UK Energy in Brief 2018

[3] HM Treasury (2006) *Stern Review on the Economics of Climate Change*.

Table 1: GLA Group projected performance against carbon budgets

GLA Group projected performance against budgets	Carbon Budget 2018-2022	Carbon Budget 2023-2027	Carbon Budget 2028-2032	Target 2025
TfL	15%	20%	27%	17%
MPS	-15%	-4%	11%	-5%
LFC	-3.5%	7%	23%	6%
equivalent (LFC) CO_2 reduction target	*55%*	*63%*	*71%*	*60%*
GLA	2%	5%	10%	3%
LLDC	-26%	-23%	-30%	-26%

TfL – Transport for London; MPS- Metropolitan Police Service; LLDC – London Legacy Development Corporation

12. As noted in the table above, the LFC is expected to achieve its first carbon budget, which ends in 2023 with no further action if the projections for national grid decarbonisation are realised. The LFC is not expected to achieve the 2025 target or second carbon budget as grid decarbonisation is not expected to keep pace with those targets as demonstrated in figure 4 in Appendix 1. As such considerable works will be required to achieve the 2025 target and the second and third carbon budgets.

13. Both the Metropolitan Police Service (MPS) and the London Legacy Development Corporation (LLDC) appear to be on track to exceed the 60% reduction target by 2025. For the MPS the projected reduction is primarily due to a significant transformation project that is reducing building stock by over 50%. For LLDC similar gains are being delivered through a reduction in the estate and a reduction in the use of the parks facilities from its peak (or baseline) during the Olympics. TfL with an electric heavy asset base, will benefit more from grid decarbonisation, but will require further energy efficiency works, switching to renewable electricity and continuing the electrification of fleet as reflected in their draft carbon strategy, with significant additional funding required.

Strategy options in summary

14. Paragraphs 15-23 below discuss the different strategy approaches that could be undertaken in order to achieve the 2025 target, setting out the business case for each, their alignment to the LES and other guidance from the Greater London Authority, and the risks associated with implementation, which are detailed in Table 2. In summary:

    i. Certified grid supplied renewable electricity can achieve the target alone, but falls short of the LES policy intentions, carries risks of future availability, and is subject to approval by the GLA as the eligibility criteria are still the subject of debate.

    ii. A Power Purchase Agreement (PPA) for 'new or additional' grid supplied renewable energy, supports the LES policy intentions and addresses availability risks, however it will take some years to implement, and may not achieve the target alone.

    iii. Demand reduction actions support the LES policy intentions. Whilst this activity alone will not achieve the 2025 target, it is the only option that has the potential to help reduce the impact of projected price increases in the energy supply market.

15. The draft strategy in Appendix 1 has been developed on the basis of taking forward the combination of all three options, whereby option 3 addresses the Mayor's priority of demand

reduction. Option 2 and 3 combined will achieve the target; and option 1 provides the more immediate reduction, whilst options 2 and 3 are implemented. Option 1 will be necessary to go beyond the 2025 target, and contributes towards the 2050 target.

Option 1 – Renewable electricity grid supply only

16. The first two carbon budgets and the 2025 target could be met solely by switching to 100% renewable electricity grid supplied, although as noted this would not meet the LES policy requirements. This could deliver performance of around 68% CO_2 reduction, safely meeting the 2025 target, but failing to achieve the third carbon budget (71%). It is expected that the new energy supply contract, recently tendered through the London Energy Project will require additional funds due to energy supply price rises, these are not specific to renewable or non-renewable energy supply, but due to other non energy costs. This will be the subject of a future report which will detail any requirement for additional funds.

17. This option carries a number of risks as defined in the 'risks' Table 2 below, most notably that it does not involve any further activity to reduce energy demands, and therefore there is no payback opportunity or protection against budget increases. As such it is not recommended this option is taken forward alone, but is taken forward in combination with the other 2 options.

Option 2 – PPA for renewable electricity supply

18. The recently tendered energy supply contract via the London Energy Project , which is the subject of a future report, will allow a PPA to form part of the future utility supply arrangements for the LFC. Essentially this would mean the LFC's electricity supplier is required to buy or 'sleeve', renewable electricity generated by a third party that the LFC contracts with, providing part of the LFC's electricity requirements. As renewable energy generation is not constant (i.e. the sun and wind are not present 24/7), this is unlikely to provide 100% of supply requirements. Establishing a PPA arrangement will require a further tendering exercise and is likely to take 1-2 years for a new installation (e.g. solar or wind farm) to be in place and commence supplying energy. With the potential to operate at an indexed fixed price, it will provide greater budgeting certainty, along with the expectation that this approach would deliver savings over the longer term when compared to wholesale prices via a utility provider given the market is expected to become more volatile and rising.

19. With the potential to have a PPA in place long before 2025, the risk of insufficient grid supplied renewable energy in the longer- term is avoided, and there is potential financial benefit. Therefore it is recommended that a PPA forms part of the carbon strategy. The utility supplier would need to provide renewable electricity until the new generation is online and to cover the shortfall in demand not provided through the PPA. The shortfall could be as much as 50% of demand depending on the PPA put in place. Therefore a PPA may not be able to achieve the target alone, and is best taken forward as part of a broader strategy approach.

Option 3 – Demand reduction through building improvement works

20. Energy prices are expected to rise over the next year, and up to 75% by 2030 as projected by Laser Buying Services[4], and Crown Commercial Services who have advised that they expect price rises of 20% for gas and 16% for electricity for 2019/20[5]. In real terms a 20% energy price rise would result in a budget increase of some £400k for the LFC. Additionally peak demand

[4] derived from the National Grid Future Energy Scenarios

[5] Crown Commercial Service: Energy Budget Forecast January 2019. http://ccsutilities.energycloud.com/wp-content/uploads/2019/01/4989-19-Energy-Budget-Forecast-January-2019-FINAL.pdf

tariffs introduced for supply between 5-7pm that apply to all LFC sites, have resulted in considerable increases in billing, with some additional £2k/month spend for Union St alone over the winter months.

21. Energy efficiency gains expected from planned improvement works as set out in the capital budget strategy such as boiler replacements and site refurbishments will not be enough to achieve the carbon targets. Further works will be required.

22. The additional works proposed are those that have reasonable payback or return on investment in terms of carbon reductions. They are expected to contribute to, rather than achieve outright the target and they fit within the scope of works that is considered achievable over that period of time. Demand reduction works will do far more to help to protect budgets against price rises than option 2.

Strategy risks

23. Table 2 sets out the range of risks associated with each of the different strategy options that could be taken to achieve the 2025 target. The greatest level of risk lies with taking forward strategy option 1 in isolation, which has both financial impacts and the potential to miss the target. Strategy option 2 also carries risk if it is taken forward in isolation as it can only address a portion of electricity demand in an increasingly competitive market. Option 3 carries a low level of risk that it will deliver less against the target than projected, and as noted it needs to be taken forward in combination with one of more of the other strategy options.

Table 2: Risks of strategy options

Option	Strategy Risk	Likelihood
1, 2	Other sources of emissions (e.g. gas, fuel) increase, reducing the contribution of renewable electricity towards the target	Frontline fleet emissions increased by 20% in 2018/19, further increases are expected (LFC-0209)
1, 2	LFC strategy does not comply with the Mayor's policy due to lack of energy demand reduction activity	Demand reduction is at the top of the energy hierarchy set out in the London Plan, renewable supply is the last priority.
1, 2	Demand for renewable electricity outstrips availability and targets not met.	Commitments of RE100" companies to move to renewable electricity supply in the UK exceeds current supply volumes.
1	The electricity supply contract does not deliver recognised new renewable energy generation, and REGO certified supply is not considered by the GLA to count towards the target.	REGO* certificates are sold separately to purchases of renewable energy generation, potentially allowing for double counting. Clarification has been requested and is yet to be issued on reporting criteria.
1	The new energy contract includes specific renewable technologies that are not aligned to the LES e.g. biomass and waste to energy, and are not considered by the GLA to count towards the target.	These technologies are included as renewable supply options in the new energy contract.
3	Decarbonisations of the grid accelerates beyond projections, reducing the benefit of energy efficiency works against the target (this would not affect payback).	To date decarbonisation projections have tended to closely follow reality.
Option	**Cost Risk**	**Likelihood**
1,2	Lack of demand reduction work increases energy requirements and subsequent cost of station upgrades to meet future fleet electrification.	At present no station has spare capacity to meet projected fleet requirements. Upgrade costs increase with greater energy demand, potentially including new substations.
1, 2,	Energy prices rise impacting revenue budgets.	Projections of 16% price rises by 2020 and doubling by 2030 (para 20)
3	If energy prices fall, payback periods will increase.	Projections of 16% price rises by 2020 and doubling by 2030 (para 20)

"RE100 - 186 global companies that have made a commitment to go '100% renewable' www.there100.org

*REGO – Ofgem's Renewable Energy Guarantee of Origin certificates are issued for every unit of electricity from a renewable source

Additional funding requirements

24. The first carbon budget is expected to be met due to grid decarbonisation and the benefits of the carbon reduction activity undertaken since 2005 to date across the estate. This includes energy efficiency and renewable energy works completed at the end of 2018/19 and the start of 2019/20, which will be reflected in the 2019/18 performance monitoring. This was kick started

through the sustainability reserve of £4.4M in 2005 (FEP 848), and interest free SALIX loans. The strategy includes works already identified in future budgets, such as the Zero Emissions Pumping Appliance project, and asset replacements set out in the capital strategy. Whilst these actions will further contribute to the targets, they will not achieve the second or third carbon budgets. An increase in funding is required for further works. These additional 'step change' actions are highlighted in Appendix 1 as **(NEW)** for the purposes of clarity.

25. Table 3 sets out newly proposed actions and the funding requirement of £2,943k over three years. The proposed actions will provide paybacks varying from 2.5 years to 22 years where they are known. Payback periods refer to the projected timeframe to recoup savings against energy bills from projected reductions in energy consumption, factoring in inflation and energy price changes, although these may be offset by underlying increases in energy costs. The payback period for air source heat pumps is marked as unknown. The technology has not been used in a fire station to date and has had limited use in replacing gas fired heating systems, it is however considered to be part of the approach necessary to move away from gas.

26. The zero carbon fire station feasibility study, will not deliver a direct payback. It is however necessary to inform future budget setting beyond 2025 and actions to work towards the 2050 carbon zero target. Dedicated resources for carbon reduction within the Property team are also necessary to deliver the new actions set out; to investigate and manage sources of external funding as necessary; and to undertake more rigorous monitoring of building management systems to ensure the optimum performance of heating, hot water, cooling, and renewable energy systems is maintained at expected levels.

27. Delivering these actions in the first carbon budget will put the LFC on a better trajectory to achieve future carbon budgets. This is because emissions reduction works has a time lag of a year or more post completion for the benefits to be realised against targets. It will also reduce the impact of energy supply price rises on revenue budgets sooner. If undertaken in combination with moving to a renewable electricity supply contract, the 2025 target will be exceeded.

28. Future budget pressures for the LFC were identified in the Mayor's Budget Guidance report of July 2018 (LFC 0206). That report set out a budget gap of £20m by 2023/24, with the first year's gap and part of the second year's gap met through the use of reserves. This additional funding requirement from 2020/21 to 2022/23 will increase the budget gap. Talks have been held with officers working to the Deputy Mayor for the Environment to understand the challenges.

29. There is the potential to explore alternative finance arrangements to support projects, such as community investment funds, which frequently support PV installations. SALIX Finance, also supports PV and some forms of LED lighting upgrades. Other measures identified are unlikely to be supported by such schemes. All external sources of funding come with challenges that need to be considered for their suitability to take forward. By example the use of SALIX interest free finance as used previously, carried with it a heavy administrative burden, and the challenge of identifying funds to repay the loan at the end of the period. These funding options will be explored if additional funds are approved.

30. Delivery against the longer term 2050 target will be far more challenging. It is expected to require considerably more funding, which needs to be included within the 20 year capital ambition, investment and funding plan as part of the ongoing Capital Strategy. At present there is insufficient information to identify the funding requirements to include in the capital strategy for 2025 onwards. Furthermore it is recognised that developments in technology and changes to government policy over this period will impact the sums required.

Table 3:Proposed additional funding requirements by fiscal year

Capital	**2020/21 (£k)**	**2021/22 (£k)**	**2022/23 (£k)**	**Total (£k)**	**Payback (yrs)**	**Payback (£k p.a.)***	**CO_2 (t) saved**	**£k/t CO_2 saved**
PV at 28 stations	258	231	231	720	8	90.0	78	9.2
LED lighting upgrades 30 sites	200	200	200	600	5	120.0	43.2	13.9
Pilot Air Source Heat Pumps	350	0	0	350	unknown	unknown	26	14
Boiler Replacement 15 stations	100	100	100	300	9-10	31.6	109	2.7
capital sub-total	***908***	***531***	***531***	***1,970***				
Revenue								
Optimising heating controls 90 sites	24	24	24	72	2.5	28.8	208	0.3
Station switch off controls	187	187	187	561	22	25.5	183	3.1
Zero carbon fire stations feasibility	100	0	0	100	-	0	0	0
1 x FRS F Carbon Reduction Manager	80	80	80	240				
revenue sub-total	***391***	***291***	***291***	***973***				
Total	**1,299**	**822**	**822**	**2,943**	**-**	295.9	647.2	

*annual payback from2023/24 onwards once all works are completed, any savings provided are subject to any change in costs of energy supply

31. The carbon zero fire station feasibility study is intended to work towards addressing this information gap, providing indicative costs for future works at stations. A separate review is likely to be necessary to achieve zero for other LFC premises that are functionally different and may require different approaches. This would outline the approach and initial estimations of budget required, in association with a new build or major refurbishment. Stations identified in the capital strategy for rebuild or major refurbishment works would be used as an example, with the data extrapolated to provide indicative costs and a high level strategy for all fire stations.

Carbon literacy

32. To achieve the carbon reductions demanded by science and in accordance with the LFCs 2050 target, fundamental changes to our ways of working and/or the technology we use will need to be made. To ensure decision making takes this into account senior managers need to better understand the scale of the issue, the impact on London and the Brigade. Senior managers must become carbon literate. This is vital to ensure future change programmes are correctly assessed for impacts, and that business decisions support rather than impede our ability to achieve carbon zero. It is therefore proposed that a carbon literacy programme is developed for Heads of Service and above, and that decision making processes are considered as part of this. Proposals will be presented to a future meeting for discussion.

Reporting and Monitoring

33. The LFCs corporate performance indicators includes the CO_2 reduction target, which is reported annually. More detailed performance monitoring information, including progress against carbon budgets will be captured through the Sustainable Development Annual Report to the Commissioners Board.

34. The Mayor's published annual report has included the CO_2 emissions of the GLA group for many years. Performance against the 60% target and carbon budgets is expected to be included in future reporting along with requests for updates on delivery of strategy actions to GLA officers and ultimately the Deputy Mayor for the Environment through the quarterly GLA group meeting of sustainability leads.

Communications

35. Given the significance of the targets and that the GLA has declared a Climate Emergency, it is intended that the strategy will receive a formal launch. A foreword to accompany the strategy will be drafted for the Commissioner and discussions will take place with the Communications Department and the GLA with regards to appropriate launch activity and press.

Finance comments

36. This report sets out the Carbon Strategy to meet the Mayor's target of a 60% reduction in carbon emissions by 2025, and on to a zero carbon budget by 2050. The report sets out three options towards meeting these.

    - The first option would be to switch to 100% renewable electricity, which is expected to meet the 2025 target. Additional funding is not requested in this report for this option as it is the subject of a future report on the tender of energy supply contracts.

    - The second is to enter into a Power Purchase Agreement which could result in savings over the longer term.

    - The third is to reduce demand through additional property works to reduce the LFC's carbon CO_2 emission levels. These works were not included in the 2019/20 Capital

Strategy and are additional costs for the LFC of £1,299k in 2020/21, £822k in 2021/22 and £822k in 2022/23. The schemes include photovoltaic energy installations, LED lighting upgrades, air source heat pumps, boiler replacements, the optimization of heating controls and station switch off controls together with a feasibility study into a zero carbon fire station. £1970k of these costs are deemed to be capital works, whilst some £973k will be a revenue cost.

37. This report recommends that a combination of three options are progressed. Options 2 and 3 could both result in ongoing savings that are not part of current forecasts, although these may be offset by underlying increases in energy costs. Further work to assess the impact of these should be carried out where possible to help support decision making.

38. If the capital expenditure in this report is agreed and funded by external borrowing, then the additional debt charges would be £114k in 2021/22, £180k in 2022/23 and £246k in 2023/24 – the debt charges on completion of the works would be per year based on a ten year life and an interest rate of 2.5%.

39. The capital works resulting from LFC's Carbon Strategy have been included in the 2020/21 Capital Strategy, which will form part of the November 2019 Budget Submission to the Mayor.

40. The revenue works have also been included as part of the November 2019 Budget Submission to the Mayor, along with the resultant impact on the budget gap over the next four years. The capital financing costs of any capital expenditure will also continue to be considered as part of the budget setting process.

Workforce comments

41. There are no direct implications associated with this report requiring consultation.

Legal comments

42. Under section 9 of the Policing and Crime Act 2017, the London Fire Commissioner (the "Commissioner") is established as a corporation sole with the Mayor appointing the occupant of that office. Under section 327D of the GLA Act 1999, as amended by the Policing and Crime Act 2017, the Mayor may issue to the Commissioner specific or general directions as to the manner in which the holder of that office is to exercise his or her functions.

43. By direction dated 1 April 2018, the Mayor set out those matters, for which the Commissioner would require the prior approval of either the Mayor or the Deputy Mayor for Fire and Resilience (the "Deputy Mayor").

44. Paragraph (b) of Part 2 of the said direction requires the Commissioner to seek the prior approval of the Deputy Mayor before "[a] commitment to expenditure (capital or revenue) of £150,000 or above as identified in accordance with normal accounting practices…".

45. The General Counsel has reviewed this report and notes that the arrangement proposed is consistent with the Commissioner's power under section 5A of the Fire and Rescue Services Act 2004 to do anything it considers appropriate for the purposes of the carrying-out of any of its functions. In addition it also ensures compliance with the LES as published in May 2018.

46. Furthermore, under section 7 (2)(a) of the aforementioned legislation, the Commissioner has the power to secure the provision of personnel, services and equipment necessary to efficiently meet all normal requirements for firefighting.

47. The General Counsel also notes that the newly proposed actions in the fist carbon budget will need to be procured in compliance with the Public Contracts Regulations 2015.

Sustainability implications

48. This strategy sets out draft carbon reduction plans for the London Fire Commissioner, in accordance with the targets and policies set out in the LES.

Equalities implications

49. It is widely recognised that the impacts of climate change will affect the most vulnerable and poorest the hardest, this includes those at risk of fuel poverty and subsequently vulnerable to fire. This draft strategy proposes actions for the LFC to work towards the targets as set out in the LES and aligned to the recommendations of the Committee on Climate Change, which aims to minimise the risks associated with climate change.

50. The approach set out in this strategy includes actions that will continue to deliver works that will provide a more consistent standard of comfort across the estate. This includes actions to provide stations with heating override switch off controls, and aspirations to achieve minimum ratings for Display Energy Certificate ratings across the estate.

List of Appendices

Appendix	Title	Protective Marking
1.	Carbon Reduction Strategy 2019 - 2025	No protective marking
2.	Glossary	No protective marking

Consultation

Name/role	Method consulted
Corporate Services Directorate Board	CSDB meeting
Lloyd Bentley, Principe Property Manager Neville Harper, Energy Manager	Meetings and draft circulation of this report
Rhys Powell, Deputy Assistant Commissioner TSS Robert Whitmore, Engineering (Fleet & Equipment) Manager (now retired)	Draft circulation of this report

Carbon Reduction Strategy

1 Introduction

1.1 The London Environment Strategy (LES) published in May 2018 set the ambition for London to become zero carbon by 2050, in recognition of the role cities must play in tackling climate change. It also reaffirmed the target for London (and the Greater London Authority (GLA) group of organisations to achieve 60% reduction in CO_2 emissions from 1990 levels by 2025 on the pathway towards achieving zero carbon.

2.1 The LES aims to achieve energy efficient buildings, clean transport and clean energy. A range of policy actions were set out in the 'Leading by Example' chapter for the LFC to deliver on. In particular:

a. identifying measures to increase the level of low carbon energy generation across the GLA group and opportunities to connect buildings to existing or new district heating networks;

b. offset emissions from all air travel for GLA group business and continue to avoid unnecessary air travel;

c. ensuring the Mayor's zero carbon commitment is reflected in GLA group funding and decision making;

d. meeting a 60 per cent reduction in GLA group CO_2 emissions on 1990 levels by 2025

e. trialling the purchase of surplus electricity from low and zero carbon facilities in London for use in its buildings; and

f. pursuing options to power services through local renewable generation in London and also through power purchase agreements to support the delivery of renewables outside of London.

1.2 This strategy sets out the planned approach that the LFC (as part of the GLA group) will take in support of these targets. The focus of this strategy is on actions to achieve the 2025 target. It will be reviewed during the second carbon budget to set out more detailed plans for achieving zero carbon by 2050.

2 Background

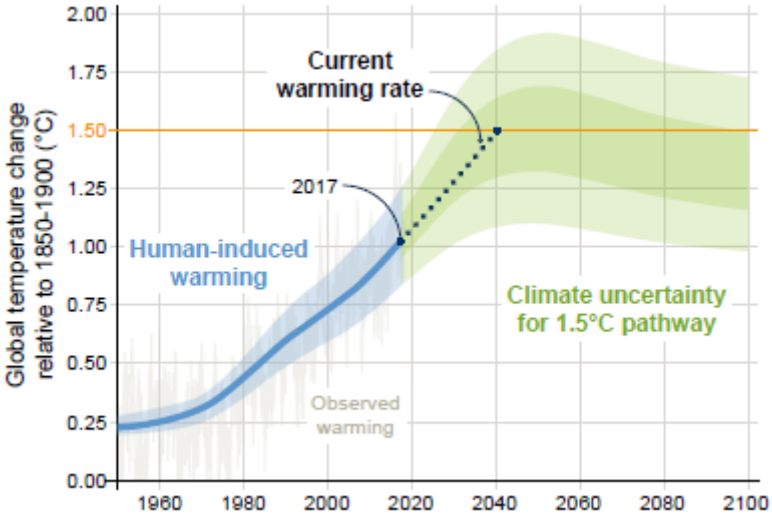
2.2 The LFC's Sustainable Development Strategy 2016-20 set out the aspiration of achieving carbon neutrality by 2100, with the interim target of 45% reduction in CO_2 by 2020 from 1990 levels. This was in line with the recommendations of the United Nations Intergovernmental Panel on Climate Change (IPCC) that global average temperature increases are stabilised to below 2ºC to limit the serious and irreversible impacts of climate change. At the time, the IPCC estimated that carbon neutrality needed to be achieved by the end of the century[i].

2.3 The Paris agreement of 2015[ii] had emphasised the urgent need to take action and to limit temperature rises to well below 2°C, and pursue efforts to limit the increase to 1.5°C. The MET office reported[iii] at that time that temperatures has already increased to 1°C above pre-industrial levels.

2.4 Following the Paris agreement, the IPCC was tasked with reported on the impacts of global warming of 1.5°C above pre-industrial levels and the risks associated with 1.5°C of warming compared to 2°C. The reported back in October 2018[iv] with a high degree of confidence that **temperatures are likely to reach 1.5°C between 2030 and 2052** if warming continues to

increase at the current rate as shown in Figure 1. Limiting warming to 1.5°C was noted as possible, but requires '*rapid, far-reaching and unprecedented changes in all aspects of society….with clear benefits to people and natural ecosystems, limiting global warming to 1.5°C compared to 2°C*'.

Figure 1: Current rate of global warming identified by the IPCC



2.5 The report noted that to achieve this level of mitigation of temperature rises will require energy demand reductions, decarbonisation of electricity and other fuels (e.g. cleaner renewable energy), electrification of transport and heat, deep reductions in agricultural emissions, and some form of carbon capture and storage. Low energy demand and low demand for energy intensive consumption goods will help to get as close as possible to 1.5°C.

2.6 The IPPC described warming of 1.5°C as not considered 'safe' for most nations, communities, ecosystems and sectors, posing significant risks to natural and human systems as compared to the current warming of 1°C. In particular the report identified numerous catastrophic risks associated with 2°C. The impacts would be far reaching with greater risks of flooding, storms, drought, wildfires, species loss and extinction, loss of land and marine based biodiversity, damage to ecosystems, fisheries, health, livelihoods, food security, water supply, human security, and economic growth. More specifically the risks of warming by 2°C as opposed to 1.5°C include:

a. Northern Europe (including the UK) is one of the regions that will be subject to the largest increases in heavy precipitation events;
b. the global population exposed to water stress would increase by 50%;
c. coral reefs would be decimated with 99% lost, as opposed to 70-90% loss;
d. 457 million people exposed to climate risks and vulnerable to poverty as opposed to 62 million;
e. 420 million more people frequently exposed to extreme heatwaves, and 65 million more exposed to exceptional heatwaves;
f. global sea level rise would be 10 cm higher, exposing 10.4 million more people to the impacts of sea level rise;

g. species losing over half of their habitat, would increase by a further 12% for insects, 8% for plants, and 4% for vertebrates;

h. the Arctic Ocean would be free of sea ice once per decade, as opposed to once per century; and

i. the risk that the changes would be irreversible.

2.7 The new recommendations of the IPCC were that net zero (or carbon neutral) needed to be reached around 2050, with urgent changes needed by 2030 in order to limit warming to 1.5°C. Current global emissions are on track for 3°C warming.

London Context

2.8 It is clear that climate change will impact considerably on the provision of an emergency response service in the number and type of incidents that we attend and planning our resourcing accordingly. The scale of impact on our services will however be interlinked with the success or lack of in limiting warming as a result of global efforts. Expectations for London are that whilst annual rainfall is likely to be consistent, variability and the occurrence of intense storms is expected to increase, and with it the risk of flooding and related rescues[v]. Hotter drier summers are also expected[vi], increasing the risk of grass fires.

2.9 Variability of climatic events could be considerable from year to year, as is the number of weather related incidents we currently attend. We attended 402 weather related flooding incident in 2017/18, which was a 52% drop from the previous year, in July 2018 we attended 43 significant grass fires, 6 times more than the previous year. Whilst our operating capacity has spiked during extreme climatic events, civil disturbances have resulted in a heavier use of resources. Most frequently it is large fires that place the heaviest demand on our resources.

3 Carbon reduction progress to date

3.1 The latest CO_2 performance by the LFC stands at 50.3% reduction from 1990 levels as at the end of 2018/19. As shown in Table 1 below the majority of emissions are from gas and electricity use in buildings, followed by the heavier frontline fleet vehicles.

Table 1: Sources of CO_2 emissions for LFC

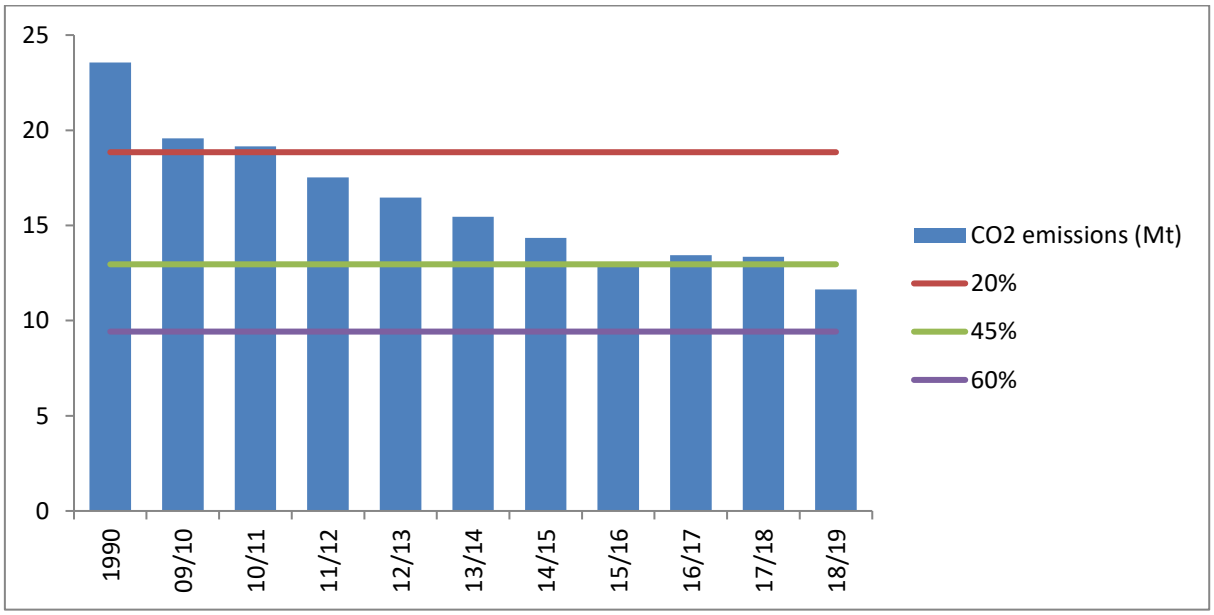
Source of emissions	Proportion of emissions %	Sub-category		
Buildings	71.4%	Gas	Electricity	
		36.0%	35.4%	
Fleet	26.9%	HGVs	Light vans	Low emission cars
		23.0%	3.8%	0.1%
Grey Fleet	1.2%	Lease	ECUS	Casual
		0.4%	0.4%	0.4%
Air Travel	0.5%			

3.2 The LFC instigated its first comprehensive programme of energy efficiency improvements across its sites in 2005, and has delivered an ongoing programme of installing energy efficiency

measures and renewable energy generation at LFC premises since then. Measures have been installed across the estate in line with the energy hierarchy as set out in the London Plan: undertaking efficiency improvements that reduce demand, such as insulation; more efficient supply through the installation of Combined Heat and Power systems; and providing greener renewable energy such as photovoltaics (PV).

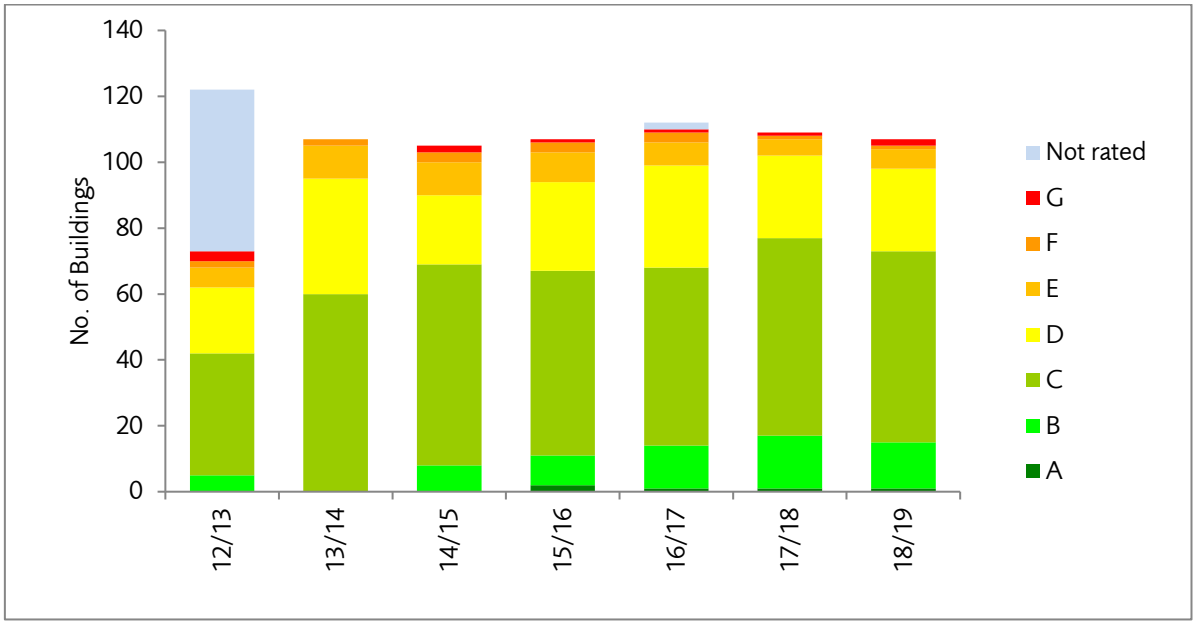
3.3 The first CO_2 emissions reduction target was set in 2010 at 20% reduction by 2012. When that target was exceeded a further target was set, with several further reviews undertaken to ensure the target remained challenging through to the most recent target of 45% reduction by 2020. Figure 2 illustrates the continual improvement in carbon reduction achieved since 2005, to the most recently reported position.

Figure 2: LFB CO_2 emissions reduction



3.4 Display Energy Certificates (DECs) for buildings provide a useful measure of progress, and help to identify sites to prioritise for improvements. Since measurements commenced in 2008/09 the average energy rating of buildings has moved from D to C as shown in figure 3. The number of sites assessed has varied over the years as a result of changes to regulations and the portfolio of premises. The ratings of individual buildings has both improved by demand reduction activity, and been downgraded as a result of increased energy consumption due to occupancy changes such the LFC's headquarters building with tenants now occupying around a third of the building space. Periodically weather related energy consumption increases also affect ratings.

Figure 3: DEC ratings of premises



3.5 Following some 15 years of delivering energy efficiency and easy to install measures to our premises, the majority of measures with short term payback periods, such as thermal insulation, and passive infrared sensor lighting controls have been installed, along with low complexity measures such as PV arrays and LED lighting as defined in Table 2. The focus has now moved to identifying sites with higher cost and more complex improvement opportunities that come with longer-term paybacks, to be delivered as part of the phased asset replacement programme. Taking account of asset condition and remaining life span, this could include measures such as heating systems, hot water heaters, boiler condenser technology, roofing upgrades, windows and the fitting of Combined Heat and Power (CHP) units. Opportunities exist for further installations of low complexity and higher cost measures such and PV and LED lighting.

Table 2: Measures installed at stations

Quick wins, low complexity – estate wide
• Lighting control upgrades to LED and PIR sensors – internal/External lights • Reducing the use of floodlighting throughout the estate • Optimising the on/off control of heating systems • Removing inefficient heating systems and controls • Photovoltaics installations • Installing improved fenestration to premises • Controlling appliance bay temperatures to prevent waste heat escape • Draught proofing, cavity wall, loft, roof, and pipework insulation
Phased estate upgrades
• CHP installations • Heating system upgrades , TRVs • Boiler upgrades to Ultra low NOx boilers • Windows replacements – achieving WERA • Roofing upgrades – increased thermal insulation

3.6 The LFC has had an ongoing programme of renewable energy installations at it 106 sites since the first PV array installed at a fire station in the UK was installed at Richmond Fire Station in 2005. Renewable energy installations to date are set out in Table 3, they cover a range of technologies and continue to be driven by our corporate target to deliver onsite renewable energy generation. A target has been in place since 2009/10. Now over half of the LFC's estate has PV installed (65 sites and 70 arrays), delivering some 830 kWp of solar power. Currently providing 8.25% of all the LFCs energy needs through onsite renewables, against the target of 12% onsite generation by 2020/21.

Table 3: Renewable energy installations to date

Solar Photovoltaic	**Combined Heat & Power**	**Solar thermal**	**Wind**	**Biomass**	**Ground source heat pumps**
65 sites	45 sites	15 sites	3 sites	1 site	1 site

4 Carbon budgets and targets

4.1 The LES sets the target of 60% CO_2 reduction by 2025 and proposes three 5 year carbon budgets through to 2032, providing an emissions reduction pathway towards the final target of zero carbon by 2050. These targets supersede the aspiration of carbon neutrality by 2100 as set out in the LFC's Sustainable Development Strategy.

4.2 The UK Government set five-yearly carbon budgets through to 2032 to meet the target set out in the Climate Change Act (2008) to achieve 80% reduction in CO_2 emissions by 2050 from 1990 levels. The carbon budgets set out the amount of greenhouse gasses that can be emitted over the defined budget period. The UK target for 2050 was revised to carbon zero following the release of the IPCC's report on the risks of 1.5°C. The UK Climate Change Committee have stated that achieving the revised 2050 target is within the expected economic cost accepted by parliament when the Climate Change Act was established6.

4.3 The LES, reaffirms the target for London to achieve 60% reduction by 2025 and sets the further target of achieving carbon zero by 2050. In order to achieve this the Mayor has also adopted a system of five-year carbon budgets, with the intention of reviewing progress against these budgets annually and setting future budgets 10 years in advance. The carbon budgets for London align with the UK carbon budget periods, with the first covering 2018-22.

4.4 Table 4 below sets out the carbon budgets for the LFC to work towards the 2025 target and the 2050 target. The intention is that the LFC should work towards achieving the carbon budget midway through the budget period, with the following years savings offsetting the higher emissions in the earlier years of the budget period. Success in achieving the carbon budget will be based on the collective tonnes emitted over the budget period. This approach is expected to provide more flexibility, helping to even out seasonal differences across the period, thereby assisting in achieving the target.

Table 4: Carbon budgets for London Fire LFC 2018-2032

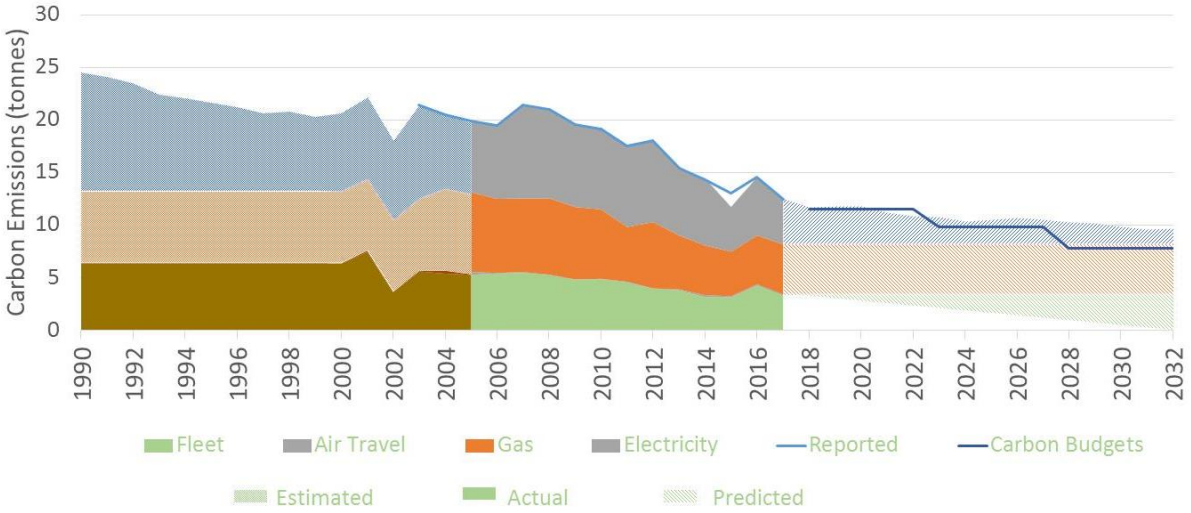
Budget Period	**2018/19 – 2022/23**	**2023/24 – 2027/28**	**2028/29 – 2032/33**
Mid year target carbon (tonnes)	11,954	9,794	7,835
Carbon Budget mid point	2020/21	2025/26	2030/31
Carbon budget (tonnes)	59,771	48,969	39,175
Grid decarbonisations delivers at mid point	2.8%	5.1%	2.8%
Do nothing, projected LFB performance at mid point (against 1990)	53%	58%	61%
Target % reduction (mid point)	**51%**	**60%**	**68%**

[6] https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf

4.5 The UK Governments' *Green Book supplementary guidance*[vii] provides detailed projections of grid decarbonisation expected in future years. Whereby cleaner sources of electricity are expected to be provided through the national electricity grid network. These projections indicate 10% reductions in emissions per kWh of power will be delivered by 2025 and 10-13% by 2030. As illustrated in Figure 4 and Table 3, expected levels of grid decarbonisation require no action to be taken by the LFC to achieve the first carbon budget. Some action would be required to achieve the second budget, with substantially more activity required to achieve the third budget.

4.6 Those organisations with significant levels of electricity use should benefit substantially from decarbonisation of the national grid, helping them to achieve their carbon reduction targets. The LFC with its significant demand for heating and hot water and resulting high levels of gas usage and fuel consumption for fleet, will need to take forward measures that reduce gas and diesel dependency in order to achieve future budgets.

Figure 4: LFC Carbon budgets for LES

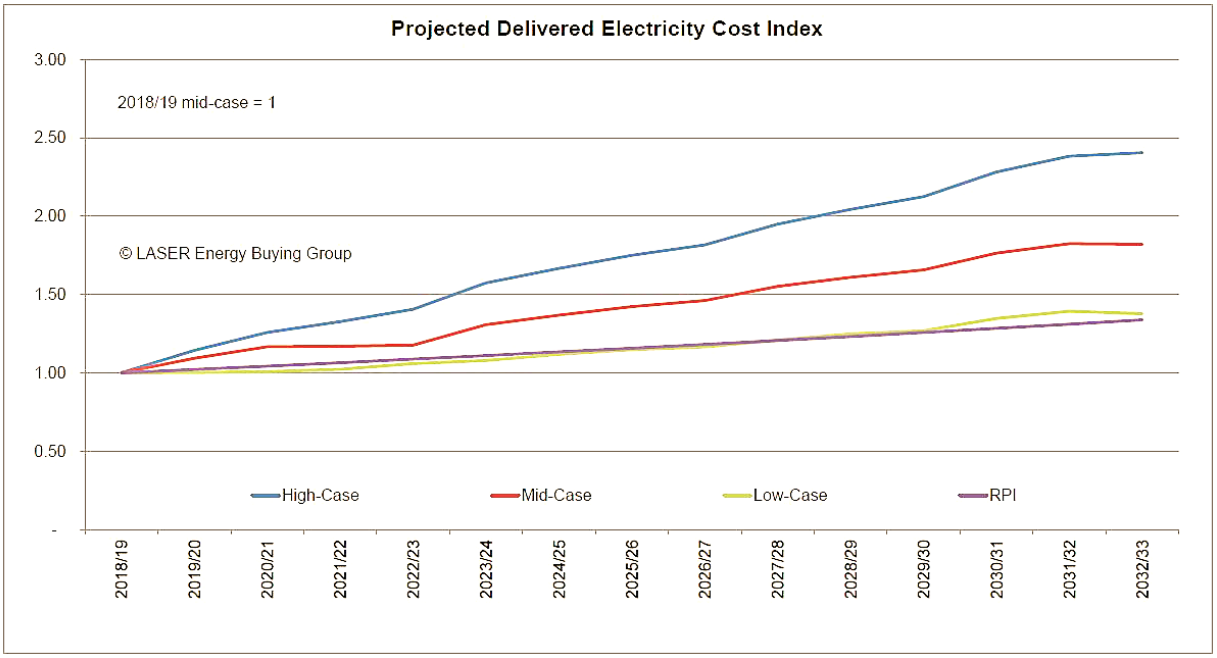


5 Future energy costs

5.1 Energy prices are expected to rise over the next fiscal year and into the future, with expectations for 2019/20 of price rises of up to 20.7% for gas and 16.2% for electricity[viii]. In real terms a 20% price rise across the board would result in a budget increase of some £400k for the LFC. Price rises are expected to be primarily the result of increased costs related to supply across the board, with the cost of renewable energy expected to be on par with fossil fuel derived energy by 2020[ix].

5.2 Laser (the commercial buying service arm of Kent County Council) has indicated that electricity costs are expected to double between 2018 and 2030, with gas increasing by some 75% by 2030 based on the mid case scenario of the National Grid Future Energy Scenarios (Figure 5)[x]. Added to this is the increasing costs of additional charges for consuming energy during times of peak demand. These charges are incurred across all LFC sites and have resulted in additional costs of some £2k per month for the LFC Headquarters site alone during the November – February period.

Figure 5: Projected electricity costs



5.3 As a 24/7 emergency service, any approach to avoid energy consumption during peak periods (5-7pm) would require the use of energy (battery) storage systems. Reducing consumption through the installation of further energy efficiency, behaviour change and renewable energy can reduce, whilst not avoid peak charges.

5.4 Whilst energy storage does not fall into the energy hierarchy as a management solution, it may be a necessary cost avoidance measure in future. Added to this is the very real likelihood that energy storage will be necessary at fire stations to support the increased demands of the electrification of the fleet.

5.5 The increasing costs of energy combined with cost reduction of measures resulting from technological advancements, such as LED lighting, is delivering better payback periods for energy efficiency measures. LED lightning is now expected to provide a payback of 5 - 7.5 years. Payback periods for PV have also reduced significantly since the first installations at fire stations, delivered largely through grant funding, to the present day of some 10 years return on investment. Going forward it is less clear if payback periods will remain the same or continue to drop due to the removal of the Government Feed in Tariff. Future payback periods are dependent on whether demand and thereby prices stay low. Energy efficiency measures provide the greatest potential to reduce year round costs, and as they sit at the top of the energy hierarchy they should be the priority.

5.6 Whilst battery storage technology has reduced in price significantly in the last 5 years and is expected to reduce by another 50% over the next decade[xi], it will not address demand reduction and does not form part of the energy hierarchy. It may however act as an enabler to deliver other carbon reducing technology, particularly for future fleet requirements, in addition to any potential to reduce peak energy costs. This could avoid the potentially high costs associated with electrical upgrades of fire stations to support an electric pumping appliance or other heavy frontline vehicle. As the timeframe for major fleet changes and associated infrastructure falls into the third carbon budget and beyond, battery storage does not form part of this current strategy, which is focussed on delivering against the 2025 target.

6 Reducing emissions

6.1 Energy use in buildings and from fleet vehicles are the biggest sources of emissions as noted in Table 1 and therefore present the greatest opportunity for significant reductions. To date building works have been the predominant focus of emissions reductions, with clear financial payback associated with the works and little if any impact on delivering the operations of a fire service. As they account for over 70% of emissions, they will continue to be the focus of reduction efforts through to 2025.

6.2 The Mayor of London's spatial development strategy know as the *London Plan* sets out the policies that major development proposals that are referable to the Mayor must achieve. The London Plan advises that development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:

1 Be lean: *use less energy, reducing demand through sustainable design principles*

2 Be clean: *supply energy efficiently, prioritising decentralised energy*

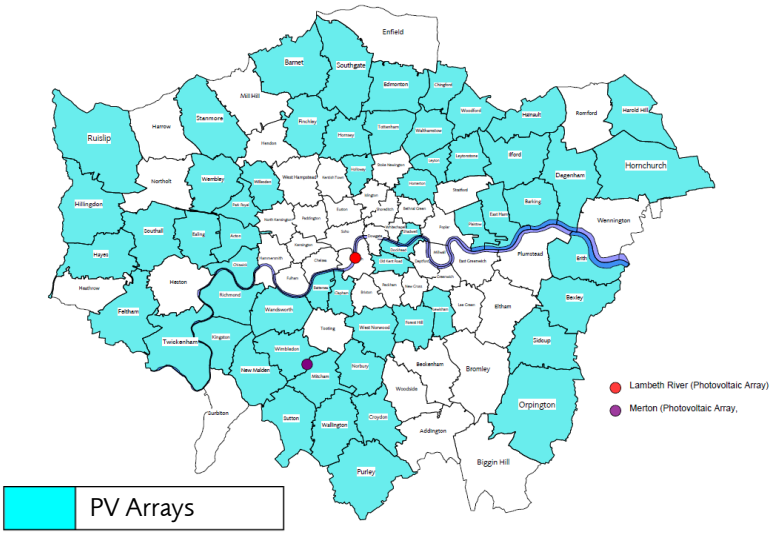
3 Be green: *use renewable energy*

6.3 Very few developments undertaken by or for the LFC will ever be of the scale or meet the strategic importance criteria to be referable developments and thereby subject to the requirements of the London Plan. However the local development plans of the London Boroughs' also have to be 'in general conformity' with the London Plan. The LFC as part of the Greater London Authority Group, could also be expected to support the general intentions of the London Plan, particularly with regards to energy and carbon when undertaking major works projects. As such this strategy has identified actions in line with the energy hierarchy of the London Plan as detailed further in section 8.

6.4 Onsite renewable energy installations will still form a key area of action. PV continues to be the most viable form of renewable energy at stations, closely followed by CHP, which when suitably sized have demonstrated very efficient operation at fire stations. Other forms of renewable energy have been installed over time with less success as discussed below. As a result further installations of these other renewables are not expected to form part of our future plans to 'be greener' through our energy supply.

6.5 Figure 5 maps the installation of fire stations with PV installed across London. Of the locations that have not had PV installed a number will not be possible due to heritage listings, unsuitable roof space or aspect. The remaining sites that are suitable for PV are identified within the action plan for works.

6.6 Figure 5: Fire stations with PV installed



6.7 Solar thermal installations compete for the same space as PV and over time have not been as cost effective as PV; few sites are suitable for wind turbines, and maintenance has proved challenging for small turbines; biomass is more resource intensive, and unsuitable for our mostly constrained sites for space, whilst having air quality concerns; and ground source heat pumps are challenging to find suitable sites given the ground works required for installation. Air source heat pumps may present a future opportunity, however as they are yet to be successfully installed at LFC premises, they are included in the strategy as a trial, with the potential to form part of future phased estate upgrades.

6.8 Replacing natural gas dependency is the most challenging area of emission reduction for buildings, with a significant heating and hot water demand across the estate. It is necessary to undertake a feasibility study to determine how a zero carbon fire station can be delivered and the appropriate technologies to use. Such an assessment will help to set out the future strategy toward 2050 for building asset upgrades, balancing out the option to move to electric heating and hot water supply over the potential for green gas to supply premises.

6.9 With a fleet dominated by diesel fuelled heavy incident response vehicles as shown in Table 5, fleet emissions are significantly affected by the number and scale of incidents attended in any given year. Opportunities to deliver significant emission reductions will therefore be delivered through changes in the types of vehicles used and their fuel use in particular. Opportunities to deliver reductions through changes to fleet cars will be negligible as they are already predominantly low emission and account for only some 0.1% of total emissions. The fleet of entirely diesel light vans, responsible for around 3.6% of emissions, provide an opportunity for reductions as part of their next replacement round, which falls within the second carbon budget. Overwhelmingly though the biggest and most challenging opportunity for reductions from fleet is through the heavy vehicles.

Table 5: Existing frontline fleet of low emission vehicles

Vehicle Type	Electric (Rex)	Petrol Hybrid	Hydrogen Dual Fuel	Diesel
Car	53	5	0	8
Light GV (3.5T >)	0	0	0	67
Heavy GV (3.5T <)	0	0	2	311

6.10 The next major vehicle replacement round for HGVs is expected to start around 2030, in the latter part of the third carbon budget and after the 2025 target. Ensuring key frontline resources are robust and reliable to provide an emergency response takes considerable testing to provide adequate assurance before any changes can be undertaken. Added to this is the high costs associated with replacements, and a resulting vehicle life of some 12 years for the heavy fleet vehicles. Consequently fleet carbon reductions activity up to 2023 will focus on enabling actions for future replacements.

6.11 Achieving the 2025 target through fleet action alone, would require the replacement of a further 30% of the fleet with electric vehicles by 2025, and 80% by 2032. This is based purely on fleet numbers and does not differentiate by vehicle size. Achieving the 2025 target through fleet alone is not possible, as it would require the replacement of heavy specialist operational vehicles with electric vehicles. Not only would this require replacements to be undertaken some 5 years early or more, but at present there are no suitable electric heavy vehicles to meet the requirements of the majority of these vehicles.

6.12 Embodied energy consumed in the manufacture of products and materials consumed in the provision of a fire service fall into the area of scope 3 emissions, which do not form part of the targets this strategy is working towards meeting. They are nevertheless important to consider to ensure carbon reductions for the LFC are not the result of a transfer of emissions elsewhere. It is widely recognised that electrifying the fleet will provide reductions against our reported emission. More recently research has identified that an electric vehicle emits half of the total CO_2 emissions of a diesel combustion vehicle, including embodied emissions related to the vehicle manufacture and the batteries[xii]. The overall emission reductions between electric and diesel vehicles will improve with grid decarbonisation, and will reduce further again as battery recycling develops in the future.

7 Achieving zero emissions by 2050

7.1 It is noted that achieving the carbon zero target will require the move away from gas for heating and hot water. At present it is though this would require significant change of infrastructure in buildings and is likely to come at significant cost. An alternative could be the supply of zero carbon 'Green' gas, such as biogas or hydrogen. The supply of green gas is currently far less certain than the supply of renewable electricity, and the associated certification schemes (that demonstrate the supply is truly zero and is not double counted) are immature with limited credibility at present. It is also thought that transport will compete for green gas, with the viability of large volumes of supply still very uncertain. By example one of the smaller energy suppliers, Good Energy, that has committed to green gas has only been able to source 6% of its customers requirements to date.

8 Carbon reduction action plan

8.1 The carbon reduction action plan below has been split by carbon budget, with the first carbon budget being the focus of this strategy and actions therein. A number of longer term actions for fleet and buildings have been identified against carbon budgets 2 and 3, going up to 2028. Long-term actions covering other areas such as renewable energy will be identified with the review of this strategy to be undertaken during the second carbon budget to set out further measures to work towards carbon zero by 2050. Actions have been grouped under the headings of innovation, building design, energy efficiency, renewable energy, fleet, business travel and behaviour change as explained below.

Innovation

8.2 In order to achieve the targets innovations will need to be introduced, in particular to reduce the dependency on gas for heating and hot water. Gas consumption is the Brigade's largest source of emissions and there are currently alternative zero emission technologies that have been tried and tested within fire stations.

Building design

8.3 Our Standard Station Design Brief (SSDB) sets out the requirements for fire station building design elements, to deliver consistency in the facilities provided to staff, whilst driving continual improvement in other areas such as carbon reduction. The SSDB is revised as new technologies or design improvements are piloted and proven for suitability.

Energy efficiency

8.4 Energy efficiency in buildings has been a major contributor to the improvements delivered at stations to date and the reductions in emissions delivered. Although further efficiency opportunities exist as identified in the action plan, the types of measures available increasingly have longer payback periods and more stringent planning requirements, with over one quarter of our stations having some form of heritage listing.

Renewable Energy

8.5 Photovoltaics (PV) continues to be one of the most viable forms of renewable energy for fire stations. With PV already in place at some 65 stations, and further installations planned, the number of suitable sites left is now reducing and further assessments are needed to identify what is possible.

Fleet

8.6 We have a fleet of over 400 vehicles that accounts for around one quarter of our carbon emissions. The vehicles range from light cars and vans through to heavy specialist vehicles. Some 13% of the fleet has already achieved zero emission capable, supported by electric vehicle charging facilities at some 80 Brigade sites. Whilst the heavy vehicles make up the majority (~70%) of our fleet, and due to their specialist nature have long life policies and are more challenging to decarbonise.

Business Travel

8.7 Air travel undertaken by staff for business purposes is relatively low when compared to other GLA organisations such as MOPAC (~55% lower per employee) and the Home Office (>90% lower). It is controlled through the approvals process, with all overseas air travel requiring

Commissioner approval. On average it represents some 0.7% of CO_2 emissions per year or 500,000 km of air travel.

8.8 Our Grey fleet consists of leased vehicles and private vehicles used by operational staff for the purposes of business travel including attending incidents, this averages some 457k miles per year or 1% of emissions. Grey Fleet data also includes infrequent low levels of mileage by non-operational staff for business purposes.

Behaviour Change

8.9 Behaviour change is a core component to delivering carbon reduction. Technology upgrades, is recognised as having the potential to deliver savings of 5% or more. The behaviour of individuals will influence the success of the strategy through the actions they take, from making strategic decisions through to building users behaviour. We have had a Green Champions programme in place for more than a decade with over 200 champions in operational and non-operational roles, however with varying levels of engagement, it is time for a refresh

8.10 Carbon Budget 1: 2018 - 2023

Innovation

A1 *To pilot the use of Air Source Heat Pumps at a fire station to deliver lower emission heating and hot water supply, and update the SSDB as appropriate* ***(NEW)***.

Building Design

A2 *Designs for all major works we will adopt the Mayor's energy hierarchy as set out in the London Plan.*

A3 *Compliance with our Standard Station Design Briefing (SSDB), which sets the design standard that all fire stations are to be built or refurbished to, delivers carbon reductions that exceed building regulations, in particular specifying for any major works projects or asset replacement the installation of:*

i. *high efficiency and low NOx emission boilers (90%)*

ii. *CHP where appropriate for site energy demands and space requirements*

iii. *PV as part of any new flat roof*

iv. *Windows replacement to WERA A rated*

v. *Fenestration improvements- (air tightness of building doors, windows etc)*

A4 *Aspiration to deliver the first carbon neutral fire station by 2025* ***(NEW)***.

A5 *Aspiration to deliver all new build and major refurbishments of stations to a minimum DEC rating of B* ***(NEW)***.

Energy Efficiency

A6 *With the average site achieving a Display Energy Certificate (DEC) rating of C, we will prioritise further actions in line with the energy hierarchy to improve the efficiency and comfort of our buildings for our staff* ***(NEW)****:*

i. *Aspiration to bring the majority of our premises (75% or more) up to a C DEC rating or better by 2023*

ii. *Aspiration to bring a greater majority (90% or more) of our premises up to a C DEC rating or better by 2028*

A7 *Through our asset replacement programme that prioritises replacements based on the life condition survey, boilers at all premises will be upgraded to high efficiency (98%) and low NOx boilers by 2022.*

A8 *As part of our asset replacement programme:*

i. *Install high efficiency, low emission boilers at 90% of premises by 2023*

ii. *Upgrade 3 stations with WERA A rated windows by 2023*

iii. *Install local heating switch off override controls at all stations*

Renewable Energy

A9 *Update the mapping of our estate to define the potential for further solar PV installations to take account of efficiency improvements and cost reductions:*

i. *Identify and install PV at a further 28 sites by 2022, with consideration of alternative finance arrangement such as community investment where suitable (**NEW**)*

A10 *Undertake further Installation of PV systems at fire stations:*

i. *Design and install PV at the new Operational Support Centre by 2020.*

ii. *Design and install PV at the Croydon Training Centre by 2022.*

iii. *To include PV in the design of all future major works projects in line with the SSDB where possible – up to 4 projects expected to be delivered by 2022.*

A11 *Install CHP at up to 5 sites as part of planned heating replacements where suitable by 2022.*

A12 *Work with the London Energy Project to secure 100% renewable energy supply by April 2020.*

A13 *Establish a Power Purchase Agreement for the supply of additional clean renewable electricity generation within the UK **(NEW)**.*

Fleet

A14 *Delivery of the Ultra Low Emissions Fleet (ULEF) Plan:*

i. *Replace all frontline pumping appliances with Euro 6 vehicles by October 2021*

ii. *Develop a prototype ultra low emission pumping appliance by 2022 to support future fleet replacement cycles.*

A15 *Install infrastructure to support the roll out of ultra low emission vehicles:*

i. *95% of Fire Stations to have dedicated Electric Vehicle Charge Points by 2020 for fleet and staff.*

ii. *Publicly accessible rapid charging to be installed at up to 10 fire stations by 2022.*

A16 *To work with key suppliers to comply with the Work Related Road Risk and Direct Vision Standards.*

Business Travel

A17 *Continue to offset emissions from air travel through Gold certified offset schemes, moving towards other appropriate mechanisms where they discourage unnecessary air travel or enhance emissions reduction.*

A18 *Implement new requirements to reduce the emissions of our Grey Fleet:*

i. *Provide more accurate monitoring of emissions through improved data capture to recognise lower emission vehicles.*

Behaviour Change

A19 *Deliver behaviour change programmes to help staff understand the impacts of their actions and motivate them to take action:*

i. *Develop a carbon literacy programme for senior managers to better inform decision making.*

ii. *Roll out the Environment Matters guidance tool to all staff.*

iii. *Continue working with other fire services to deliver the annual energy savers competition for fire stations.*

iv. *Refresh our Green Champions network with a new programme of guidance to support them to make local improvements.*

8.11 **Carbon Budget 2: 2023 - 2027**

Energy Efficiency

A20 *Replacement of all existing internal and external lighting, including all flood lighting at all fire stations with LED lighting by 2025.*

A21 *As part of our asset replacement programme:*

iv. *Upgrade 9 stations with WERA A rated windows by 2028*

v. *Upgrade the air conditioning system at Headquarters with a low emission cooling system by 2027*

Fleet

A22 *Delivery of the Ultra Low Emissions Fleet (ULEF) Plan:*

i. Trial a zero emission pumping appliance at 10 fire stations from 2023, supporting carbon reduction through future fleet replacement.

ii. Replace all light fleet vehicles with zero emission capable vehicles by 2025.

A23 *Install infrastructure to support the roll out of ultra low emission vehicles:*

i. All premises to have dedicated Electric Vehicle Charge Points by 2025.

ii. Identify suitable charging solutions to support the testing of the prototype pumping appliance.

Business Travel

A24 *From 2025 all new lease and essential cars used for operational purposes to be zero emission capable.*

9 Estimated carbon reductions

9.1 The figures in Table 6 below are based on 2017/18 performance and do not include any projections for increased energy demand, aside from Croydon Training Centre. It is expected that any policy action to deliver renewable electricity or green gas will aim for 100% of supply, addressing any future changes in demand. Details are set out by Carbon Budget period (CB1, CB2, CB3).

Table 6: Proposed actions and estimated CO_2 reduction by carbon budget period

CB1	Actions 2018 – 2023	Year	CO_2 reduction (t)	Basis of emissions estimation
Be lean	LED lighting at 30 stations*	2020	43	*Based on consultants audit report*
	Windows replacement	2023		*3 projects*
	Local heating controls*	2020	208	*Based on consultants audit report*
Be clean	Boiler replacements*	2023	109	*Based on consultants audit report*
	Boiler replacements	2023	25	5 projects assume improvement of 5t per project based on site audits

Be green	90.56 kWp PV at 7 stations	2020	19	*Based on consultants audit report*
	PV at 28 stations*	2022	*78*	*Based on consultants audit report*
	PV at the Operations Support Centre	2020		*Still in design stage, size of array unknown*
	PV at Croydon Training Centre	2023	*0*	*Neutral- will offset the additional emissions of the new facility*
	Renewable energy supply*	*2020*	*3,960*	*if 100% renewable electricity supply is secured on an ongoing basis, total emissions from electricity supply (4100) discounting electricity related efficiency measures (PV & LED) and grid decarbonisation*
	Identify suitable approach to carbon offset flights	*2020*	*93*	*2017/18 emissions*
	Estimated reduction	**2023**	**4,535**	*Performance: ~70.5%*

*actions not included within existing approved budgets

CB2	**Actions 2023 – 2028**	**Year**	**CO_2 reduction (t)**	**Basis of emissions estimation**
Be lean	Windows replacement	2028		*9 projects*
Be clean	Boiler replacements	2028	*55*	*11 projects assume improvement of 5t per project based on site audits*
	All light vans low emission capable	2025	220	Estimate 50% improvement for EVs
	Implement stricter emission standards for grey fleet – zero emission capable	2028	20	*Estimate 50% improvement for EVs on lease*
	Estimated reduction	**2028**	**295**	*Performance: ~71.7%*

CB3+	**Actions 2028 – 2050**	**Year**	**CO_2 reduction (t)**	**Basis of emissions estimation**
Be clean	All Fleet zero emissions	2050	2,920	*Total fleet emissions - light van reductions in CB2*
	Green Gas Supply	2050	3,930	*Based on 2018/19 emissions, availability of green gas unknown*
	UK Govt new petrol & diesel car	2050	50	*Estimate 100% EVs on lease, 50%*

	ban by 2040– zero emission capable grey fleet			*on ECUS – reflects current ECUS vehicle age profile*
	Estimated reduction	**2050**	**6,900**	*Performance: 99.8%*

10 Monitoring and reporting

10.1 The published corporate performance suite of indicators includes the following:

Indicator	Target	Frequency
CO_2 emissions reduction from1990	60%	Annual
Renewable energy onsite generation	12%	Quarterly

10.2 More detailed performance reporting against this strategy will be captured in the Sustainable Development Annual Report as published on the LFC website.

11 References

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[v] London Environment Strategy, Chapter 8: Adapting to climate change pg 330
https://www.london.gov.uk/sites/default/files/london_environment_strategy_0.pdf

[vi] Managing risks and increasing resilience- The Mayor's climate change adaptation strategy 2011

[vii] https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

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[xi] https://ec.europa.eu/jrc/en/science-update/lithium-ion-batteries-mobility-and-storage-applications

[xii] Messagie, M. (year). Life Cycle Analysis of the Climate Impact of Electric Vehicles, Vrije Universiteit Brussel, research group MOBI. https://www.transportenvironment.org/sites/te/files/publications/TE - draft report v04.pdf

Appendix 2: Glossary of Terms

Biomass	Considered a form of renewable energy due to the quick growth times of trees, which then absorb carbon during the growth phase. It is not always considered to be as environmentally friendly as other forms of renewable energy as there can be localised air quality impacts such as particulate matter from burning materials, and dependent on the source of the feedstock. More sustainable sources are derived from wastes from other industries such as tree surgery, agricultural waste and wood residues (sawdust).
Carbon budget	A carbon budget is the cumulative amount of carbon dioxide (CO_2) emissions permitted over a period of time, generally 5 years. They set out the amount of carbon that is 'allowable' to be emitted over that period that would keep emissions on track to achieve a longer term target.
Decarbonisation	The reduction in the carbon intensity of the energy consumed, it can be referenced to specifically relate to an organisation or the national grid. Describes the process whereby the energy provided via the national grid or consumed by an end user is becoming cleaner with time as the proportion of energy supply from zero carbon sources increases.
Green (renewable) gas	Green gas is that produced form renewable sources rather than fossil fuels. It can be pumped into the national grid gas network and used in the same way as natural gas. It is produced from the break down and processing of biodegradable materials such as food waste, wood, agricultural crops, sewage and animal manure, and even grass.
Intergovernmental Panel on Climate Change (IPCC)	The United Nations body for assessing the science related to climate change. Created to provide policymakers with regular scientific assessments on climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation options.
Non-Energy Costs (NECs)	Costs that utility suppliers bill customers for that are additional to the commodity price of the energy consumed. This can make up a significant portion of an energy bill, they are essentially costs placed on suppliers such as tariffs, distribution and transmission costs, balancing the network between demand and supply, and investment in new capacity.

Power Purchase Agreement (PPA)	PPAs act to provide finance to new large scale renewable energy generation schemes, by providing a long-term supply contract, such as 10-15 years. Industry indications are that PPA's are the best method of hedging against price rises due to the fall in renewable energy prices, with their supply now cheaper than other forms of energy[xii]. A recent review of PPA opportunities by a London local authority projected savings in excess of £3m over the course of a 10 year PPA contract. Although PPAs account for a relatively minor part of the energy supply market, they have been used by both the private and public sector, supplying some 13.5GW of energy in 2018 and growing following the Government's recent removal of tariffs that supported renewable energy.
SALIX	Interest-free Government funding to the public sector to improve energy efficiency, reduce carbon emissions and lower energy bills. Salix is funded by the Department for Business, Energy and Industrial Strategy.
ULEZ related emissions	The ULEZ aims to address air pollutants that are linked to poor health, primarily nitrogen oxides (NOx) and particulate matter (PM). Transport is one of the major sources of these emissions. Euro standards for vehicles focus on improvements to NOx and PM. Carbon emissions do not form part of the Euro standards.
Waste to energy	Classes as a type of renewable energy. Energy is generated through the incineration or other treatments method of managing waste. Considered less environmentally friendly that some other renewable energy sources, as air pollutants can be a by-product of treatment methods, and it relies on waste being generated, which is in itself an environmental problem. In order to be efficient some waste to energy plants will need a minimum amount of feedstock (waste), which can be in excess of what is produced locally. Waste is then imported from further afield. Waste of high calorific value (e.g. organic matter) improves efficiency of the process, however this material can often be processed by other methods that may be more environmentally friendly.
Zero emission vehicles	Produce no air pollutants from the vehicle exhaust, this includes CO_2, NOx and PM. Zero emission capable vehicles, must be able to driven in zero emissions mode e.g. electric for a period of time, and are therefore of the plug in variety.

LONDON FIRE BRIGADE

Report title

Fire and Rescue Staff (FRS) Pay Settlement 2019/20

Report to	Date
Corporate Services Directorate Board Commissioner's Board Fire and Resilience Board London Fire Commissioner	12 November 2019 20 November 2019 03 December 2019

Report by	Report number
Assistant Director, People Services	LFC-0270x FRB-0092

Protective marking: **NOT PROTECTIVELY MARKED**

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Summary

This report recommends formal approval and implementation by the London Fire Commissioner of the pay settlement for Fire and Rescue Staff for 2019/20 which has been agreed by the staff side of the Joint Committee for Support Staff (JCSS), GMB and UNISON, by majority vote.

The London Fire Commissioner Governance Direction 2018 requires the London Fire Commissioner to seek prior approval of the Deputy Mayor for Fire and Resilience before a commitment to expenditure (capital or revenue) of £150,000 or above as identified in accordance with normal accounting practices. The cost of the recommendations within this report will exceed £150,000 as described in paragraph 9.

Recommended decision

That the London Fire Commissioner formally approves and implements the pay settlement for Fire and Rescue Staff for 2019/20 which is set out in paragraph 2 below. This settlement has a budgetary impact of £939k, and is to be implemented in the January 2020 payroll, effective from 1 April 2019 (general pay increase) and 1 July 2019 (salary progression increase).

Background

1. The annual settlement date for the FRS general pay increase is 1 April; the effective date of the annual Salary Progression Increase (SPI) is 1 July.

2. For 2019/20 the original claim was lodged by the trade unions in May 2019, and negotiations then continued for a number of months. Following a joint meeting with the London Fire Commissioner on 18 September 2019, the pay offer below was put to the trade unions. The headline offer was 2% in line with the budgetary provision, with an additional 0.5% for the lowest paid, similar to the 2019/20 GLA pay settlement. The detail of the offer is as follows:

With effect from 1 April 2019 (general pay increase)**:**

- 2% for grades FRSE-FRSG
- 2.5% for grades FRSB-FRSC
- FRSD as follows (as there is an overlap between the minimum of FRSD and the maximum of FRSC):
    - 2.5% for those between the minimum of FRSD (£34,751) and the maximum of FRSC (£35,107)
    - For those above £35,107, the higher of 2% or an increase to the new maximum of FRSC (which will be £35,985).
    - In practice this means those on £35,279 or above will receive 2%.

  (This differential offer is to ensure that no one will end up worse off than someone else who is currently on a lower salary.)

With effect from 1 July 2019 (salary progression increase)**:**

- SPI of up to 2.5%, i.e.:
    - Those on their grade maximum – zero
    - Those within 2.5% of their grade maximum – to grade maximum
    - Those more than 2.5% from their grade maximum – 2.5%.

3. On 5 November 2019 the GMB Branch Secretary notified the Assistant Director People Services (ADPS) that the JCSS Staff Side had met on 30 October 2019, and a resolution to accept the pay offer had been carried. This was on a majority vote, with GMB accepting the resolution, and UNISON voting against. The notification also advised that UNISON would be holding a branch meeting on 11 November to consider a ballot for strike action. Officers were subsequently advised that the UNISON branch meeting had voted to take the next steps in organising such a ballot: a 'consultative' ballot of UNISON members is currently being conducted to see if their members wish to hold a full statutory strike action ballot. The outcome of this consultative ballot is expected in the second week in December.

4. This is the first occasion that officers can recall when both trade unions have not respected the outcome of the joint Staff Side meeting to vote on the pay offer. The breakdown of this arrangement has put the Brigade in a difficult position as ordinarily an employer would not implement a pay offer when an independent trade union is contemplating industrial action in connection with that offer. GMB has however been extremely insistent that the Brigade should now be implementing the pay increase based on the majority JCSS Staff Side decision.

5. Having considered all of the circumstances, the recommendation to the Board is that the London Fire Commissioner approves and implements the pay offer which the JCSS Staff Side majority have accepted. It is recognised that this is not ideal as this removes a key incentive for UNISON to settle their dispute, however it is felt unlikely that any industrial action by UNISON will have a significant impact, and the pay offer is not going to change given that it has been accepted by GMB, the majority trade union. In this situation it is unfair to penalise FRS staff by delaying implementation of the pay increase.

Strategic Drivers

6. Approval of the proposed pay increase, and adherence to the annual uprating of salaries, is consistent with Pillar 1 of the Mayor's Good Work Standard, Fair Pay and Conditions. The LFC meets the 'Excellence' criteria 1.5 within this Pillar, as it applies a London premium to its

employees to reflect higher pay rates and the costs of living in London. The separate London Weighting allowance was consolidated into basic pay in 2011, but this London premium still exists as a consolidated sum. This would be eroded if annual pay increases were not applied.

7. The proposed pay settlement maintains comparability with the GLA: the settlement is identical to the 2019/20 GLA pay settlement of a headline 2%, with an additional 0.5% for the lowest paid.

8. The LFC recognises the importance of having good industrial relations, as stated in the 2017 London Safety Plan. Part of this is the commitment to annual pay bargaining with the recognised FRS trade unions.

Budgetary impact

9. The estimated budget for a 2% pay award for FRS staff in 2019/20 is £867k. Provision of an additional 0.5% to FRSB and FRSC staff (and FRSD staff within the FRSC overlap) increases the budget requirement to £939k, an increase of £72k.

10. There is a notional budget for the SPI based on a 2.5% increase, however the actual funding for this is generated through staff turnover.

Finance comments

11. This report recommends the approval and implementation of the pay offer made to the Fire and Rescue Staff. This includes the provision of an additional 0.5% for FRSB and FRSC staff, at a total additional cost of £72k. If agreed this additional cost will be included as part of the regular financial position reporting and also as part of the budget process for future years.

Workforce comments

12. This report concerns negotiations with GMB and UNISON over the 2019/20 FRS pay settlement. Details of the negotiations, and the dialogue with the trade unions, are set out in paragraphs 2-5 above. Details of the workforce equalities implications are set out in paragraphs 24-26 below.

Legal comments

13. Under section 9 of the Policing and Crime Act 2017, the London Fire Commissioner (the "Commissioner") is established as a corporation sole with the Mayor appointing the occupant of that office. Under section 327D of the GLA Act 1999, as amended by the Policing and Crime Act 2017, the Mayor may issue to the Commissioner specific or general directions as to the manner in which the holder of that office is to exercise his or her functions.

14. By direction dated 1 April 2018, the Mayor set out those matters, for which the Commissioner would require the prior approval of either the Mayor or the Deputy Mayor for Fire and Resilience. Paragraph (b) of Part 2 of the said direction requires the Commissioner to seek the prior approval of the Deputy Mayor before "[a] commitment to expenditure (capital or revenue) of £150,000 or above as identified in accordance with normal accounting practices...". The Deputy Mayor's approval is accordingly required for the London Fire Commissioner to incur the expenditure set out in the recommendation to this report.

15. The statutory basis for the actions proposed in this report is provided by the Fire and Rescue Services Act 2004, under which the Commissioner must secure the provision of personnel and may take any action they consider appropriate to do this.

Sustainability implications

16. The report recommends approval and implementation of a proposed FRS pay settlement which supports continued fair employment. The minimum FRS rate (increasing from £13.53 to £13.86 per hour) will continue to be above the London Living Wage (recently increased to £10.75 per hour). The LFC's lowest paid staff are the Business Apprentices who are paid at the London Living Wage rate, a commitment within the LFC's pay policy (PN821).

Equalities implications

17. The London Fire Commissioner and decision-takers are required to have due regard to the Public Sector Equality Duty (s149 of the Equality Act 2010) when exercising our functions and taking decisions.

18. It is important to note that consideration of the Public Sector Equality Duty is not a one-off task. The duty must be fulfilled before taking a decision, at the time of taking a decision, and after the decision has been taken.

19. The protected characteristics are: Age, Disability, Gender reassignment, Pregnancy and maternity, Marriage and civil partnership (but only in respect of the requirements to have due regard to the need to eliminate discrimination), Race (ethnic or national origins, colour or nationality), Religion or belief (including lack of belief), Sex, and Sexual orientation.

20. The Public Sector Equality Duty requires us, in the exercise of all our functions (i.e. everything we do), to have due regard to the need to:
    (a) Eliminate discrimination, harassment and victimisation and other prohibited conduct.
    (b) Advance equality of opportunity between people who share a relevant protected characteristic and persons who do not share it.
    (c) Foster good relations between people who share a relevant protected characteristic and persons who do not share it.

21. Having due regard to the need to advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it involves having due regard, in particular, to the need to:
    (a) remove or minimise disadvantages suffered by persons who share a relevant protected characteristic where those disadvantages are connected to that characteristic;
    (b) take steps to meet the needs of persons who share a relevant protected characteristic that are different from the needs of persons who do not share it;
    (c) encourage persons who share a relevant protected characteristic to participate in public life or in any other activity in which participation by such persons is disproportionately low.

22. The steps involved in meeting the needs of disabled persons that are different from the needs of persons who are not disabled include, in particular, steps to take account of disabled persons' disabilities.

23. Having due regard to the need to foster good relations between persons who share a relevant protected characteristic and persons who do not share it involves having due regard, in particular, to the need to:
    (a) tackle prejudice, and
    (b) promote understanding.

24. An Equality Impact Assessment (EIA) was undertaken on 25 November 2019. The impact assessment found positive and neutral impacts identified in respect of the differential pay offer (2% and 2.5%). The fundamental positive impact is in respect of people on low income, in that an extra 0.5% is being paid to the lowest paid FRS staff. Whilst low income is not a protected characteristic, those on low income are one of the additional groups identified in the LFC EIA as meriting an impact assessment.

25. Table 1 below sets out the race/sex/staff with disabilities composition of the workforce by grade groups in light of the additional 0.5% being paid to FRSB and FRSC staff, and those FRSD staff within the FRSC overlap. FRSD staff have been treated separately in the table as under the pay offer, they will be receiving a pay award of between 2% and 2.5% depending on their position within the FRSD pay band.

26. It will be seen that the additional 0.5% has a negligible impact in terms of sex, with the percentage of women in the FRSB/C and FRSE/G bands broadly mirroring that of the FRS workforce as a whole. It is in the FRSD band where women are less well-represented. However there is a strong impact in terms of race as BAME staff are significantly more highly represented within the FRSB/C band (38.4%) compared to the FRSE/G band (17.0%). A higher proportion of FRS BAME staff will therefore be receiving the additional 0.5%, however this is because BAME staff have a higher representation amongst the lower paid FRS grades. There is a smaller, but discernible, similar impact amongst FRS staff with disabilities who are more highly represented within the FRSB/C band (16.5%) compared to the FRSE/G band (10.7%). A higher proportion of FRS staff with disabilities will be receiving the additional 0.5%, however again this is because staff with disabilities have a higher representation amongst the lower paid FRS grades.

Table 1 – Race/sex/staff with disabilities composition of (a) FRSB/FRSC; (b) FRSD; (c) FRSE/FRSG; and (d) Total FRS workforce (as at 31 October 2019). Percentages shown are those of the total workforce within the given grade range.

	Staff with disabilities	**BAME**	**White**	**Race not known**	**Female**	**Male**	**Total**
FRSB/FRSC	58 (16.5%)	135 (38.4%)	211 (59.9%)	6 (1.7%)	196 (55.7%)	156 (44.3%)	352 (100%)
FRSD	26 (12.7%)	68 (33.3%)	135 (66.2%)	1 (0.5%)	84 (41.2%)	120 (58.8%)	204 (100%)
FRSE/FRSG	29 (10.7%)	46 (17.0%)	220 (81.2%)	5 (1.8%)	143 (52.8%)	128 (47.2%)	271 (100%)
Total	113 (13.7%)	249 (30.1%)	566 (68.4%)	12 (1.5%)	423 (51.1%)	404 (48.9%)	827 (100%)