Ref: EMS067

19th September 2016

Client: **A2Dominion Development Limited**
Development: **156 West End Lane**

Subject: **Addendum to Energy Statement**

silver

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Approver: Mark Hutchison

INTRODUCTION

Silver produced a revised Energy Statement dated June 2016 to support the full planning application for the 156 West End Lane mixed-use development which included details of the development's proposed energy strategy.

After resubmission of the planning application, A2Dominion Development Limited (A2Dominion) received feedback from the council which included comments and questions regarding the energy strategy proposals. The relevant comments together with Silver's responses are provided in the following section of this document for ease of reference.

This document has been produced as an Addendum to the submitted Energy Statement aiming to address the council's comments and questions and should be read in conjunction with the Energy Statement and other relevant documents.

RESPONSE TO COUNCIL'S COMMENTS

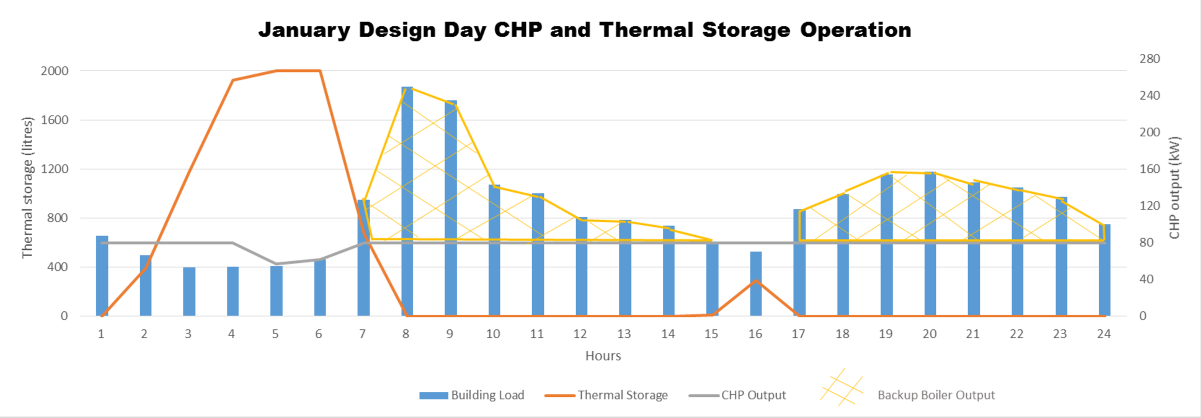
7.1 *Please send through some commentary on heat and CHP profiles included in Appendix C to explain what is being modelled.*

We would want the applicant to include measures on the graphs, include the backup boiler output on the graphs and also explain why there are big spikes in CHP output during June and September profiles. This is more of an Energy and Sustainability issue rather than AQ but would still need this information.

Response:
The information regarding the backup boiler output along with the explanation of the spikes during representative months is presented below.

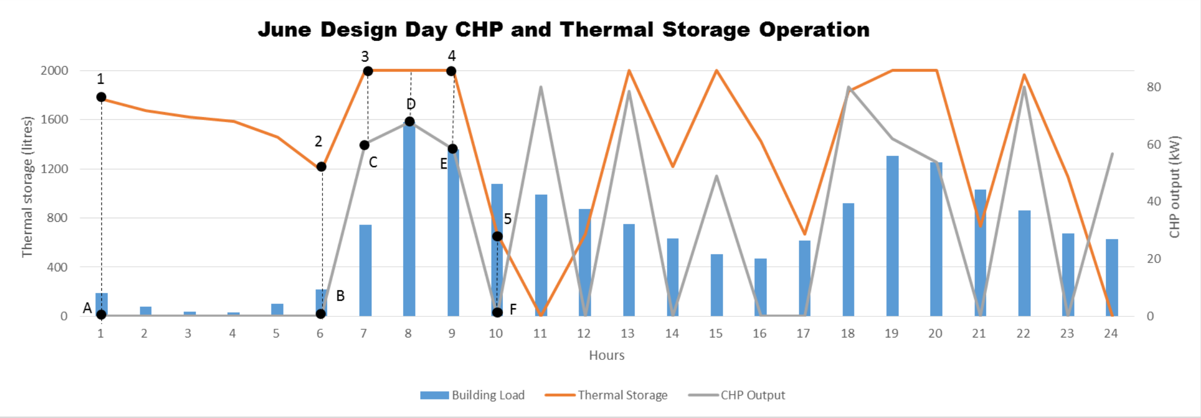
Figure A1 depicts the operation of the CHP unit along with the thermal storage, the building load for a typical day in January. The grey line indicates the CHP output, the orange the thermal storage and the blue bar the building load/demand. As shown in the graph the CHP unit during the winter peak load will be working almost constantly producing 80 kW of power. For the late night hours (02:00 – 05:00 am) the demand from the development is lower than the CHP power capacity of 80 kW. Hence, the CHP unit will utilise this additional energy production to heat the thermal storage tank up to its maximum capacity. When the building demand exceeds the CHP capacity (08:00 – 15:00 and 17:00 – 24:00) the backup boilers will fire up to provide the remaining required power (yellow area of below).

Figure A1 – January Design Day CHP, thermal storage and backup boiler output



During the summer design day the CHP unit follows the thermal storage availability to supply the hot water demand. Thus, from point 1 to point 2 the thermal storage hot water capacity is used in the development without the utilisation of the CHP. Then to address the expected morning peak hot water demand and prevent the depletion of the thermal storage at point B (equal to 2) the CHP starts working covering the building load and filling the thermal storage tank at the same time. At point C the CHP meter reads that the thermal storage is full and slows down its function until point D when the peak demand reaches its peak. From point E to point F the CHP is slowing down as the thermal storage can meet the demand. This interaction between the CHP unit and the thermal storage tank causes the spikes.

Figure A2 – June Design Day CHP, thermal storage and backup boiler output



Further information requested is presented in Appendix A of the present document.

7.2 ENERGY

Overall: 37.2% site-wide carbon reduction beyond Part L predicted, meeting policy targets. Some conflicting reduction figures stated in the report (e.g. in one section overall carbon reduction is stated as 35%) – applicant should review and confirm.

Be Green: 6.2% savings at the Be Green stage (later on in report it says 9% - applicant should confirm)

Response:
It can be confirmed that the overall carbon emissions reduction site-wide is anticipated to be circa 37.2%. The 35% carbon reduction, wherever found on the statement, refers to London Plan target reduction and not to the development's actual CO_2 reduction.

It can also be confirmed that the overall reduction at the Be Green stage is estimated to be 6.2%, what is stated later in the report is the partial reduction from the Be Lean to the Be Green stage having as a starting point the Be Lean CO_2 emissions (thus the reference to the energy efficient building).

The calculations for the latter are as follows:
From Table 4.14 of the submitted energy statement, taking into consideration the CO_2 emissions for the Be Lean and Be Green stage:
Percentage of improvement = $\frac{147.1-134.0}{147.1}$ = 8.9%, hence the reference of circa 9% reduction from the energy efficient building.

However, the approach to get the overall CO_2 emissions reduction (figures appearing in the main tables), according to Table 2 of the Energy Planning GLA Guidance, March 2016 should be estimated as shown below:
Sample calculation of the Be Green stage: x = $\frac{147.1-134.0}{213.4}$ = 6.2%

The results from the implementation of this approach are shown in the Table provided in the Energy Statement's Executive Summary and Summary and Conclusions

7.2 Actions for applicant:
A. *Seek further CO_2 savings from renewable energy with a view to meeting the policy requirement.*

Response:
The output of the assessment of Renewable Energy Options (Appendix A, Revised Energy Statement) shows that PV technology is the suitable and feasible renewable energy option for the development. All the major areas of unused roof space that do not result in a significant visual impact have been utilised to accommodate PV panels.

Any further increase would either suggest reducing amenity space on shared terraces or placing PV panels on the lower roof at the north end of the site. This lower roof is in a sensitive area overlooked by neighbouring properties and any extra height would generate additional overshadowing on the surrounding properties. In any case, the area available on the lower roof is limited.

The other main areas of roof are used principally for communal shared gardens. As there is a need to make the most of amenity space generally for the health and wellbeing of the tenants on this tight urban site, the development seeks to avoid replacing this either partially or completely with PV panels.

B. *Confirm if it is feasible to relocate the CHP plant room nearer to the road to reduce the pipe length needed to transport the heat.*

Response:

Moving the CHP plant room close to the road would mean locating it on the ground floor of the western building, currently mostly taken up by employment space. Moving the plant room to here would mean an unavoidable and significant reduction in employment space committed to be provided. It would not be feasible to move office or retail uses to the eastern end of the site away from the road and where servicing and access would be problematic. The developer would accept the increased costs associated with increased pipe lengths to connect to a future network should one become available in the future.

C. *The applicant should also demonstrate at detailed design how the CHP network will be designed to minimise heat loses and minimise the risk of overheating in the development, as well as high energy costs associated with inefficient operation.*

Response:

In detailed design stage fully considered information and drawings regarding the optimisation of the pipework length particularly lateral pipework in corridors of apartment blocks, and adopting pipe configurations which minimise heat loss e.g. twin pipes underground system. High standards of internal distribution network insulation will be maintained throughout the development. The risk of overheating will be assessed and additional mitigating measures, such as natural or mechanical ventilation will be implemented. Furthermore the operation of the CHP network will be optimised through energy efficient design.

D. *Confirm when the development would be ready to connect to a heat network, should one become available i.e. what conditions the developers would need to be met in order to connect to a network (would simply just having one available be sufficient for them to connect? Or, would they want their CHP to have operated for a certain amount of years or have achieved simple payback of the CHP?)*

Response:
The developers would consider the connection to a future heat network after the CHP unit would have achieved the simple payback. The simple payback time is estimated as circa 9.1 years past the full occupation of the development.

7.3 Sustainability
Actions for applicant:
A. *Confirm if greywater harvesting has been considered, in line with our policy requirements.*

Response:
In regards to greywater harvesting, this was appraised but was not considered to be viable due to the following reasons:

- In terms of drainage, RWH provide greater benefit with a more manageable maintenance regime that do not produce hazardous waste
- The upfront costs of installation are considerable in relation to the savings in water usage
- The systems require dual water feeds into the building which would unnecessarily complicate the public health design as well as increase capital and operational costs. Increase in operational costs will likely increase the service charges of the residents.

B. *Seek to achieve BREEAM Excellent, in line with minimum policy requirements.*

Response:
Please refer to pre-assessment report document dated on the 28th September 2016.

C. *Remove comfort cooling as this is not supported and the cooling strategy demonstrates that it is not required.*

Response:
The cooling strategy (or hierarchy) is a couple of measures that help in reducing the demand for cooling and thus avoid excessive requirements that would result in intensive energy consuming. Thus, they demonstrate in this case that the present development has been designed to prevent overheating and avoid excessive requirements for cooling.

However, paragraph 1.2.1 *Overheating vs cooling demand* of the adopted GLA document '*Creating benchmarks for cooling demand in new residential developments*' presents the difference between an overheating assessment and the cooling demand.

The study suggests that 'cooling demand in homes is an issue of growing concern in its own right (separate to overheating). It could represent a new building energy demand that did not previously exist in the UK and that could potentially have a significant negative impact on carbon emissions abatement efforts.

The energy and carbon emissions associated with meeting this cooling demand are only displayed in the modelling outputs and accounted for in the carbon compliance calculations if an air conditioning unit is specified to meet this demand. Therefore a design could result in a high cooling demand that remains undetected and unaddressed unless the designer specifies air conditioning. This can potentially create problems if air conditioning is not included and therefore high cooling demands are likely to go undetected.'

Therefore, cooling will be utilised in the present development to improve the health and wellbeing of occupants. It is proposed to provide comfort cooling to private dwellings to enable residents to achieve a more controlled and pleasant internal environment during hot days in summer which will help the residents who are intolerant to high temperatures and vulnerable residents with health issues.

There is no conflict between following the cooling hierarchy and provide cooling. The first point suggests that the provision of comfort cooling will not result in high cooling demands that remain undetected and unaddressed which will later lead to a significant negative impact on the carbon emissions reduction efforts.

Appendix A – CHP Preliminary sizing and Technical Details

The table below shows the comparison between the actual and the maximum CHP output for a single day per each calendar month. The design-day approach is utilised and the results are extrapolated to each month and then annually.

Table A1 – Daily and monthly comparison between the actual and the maximum CHP output

	Jan	Feb	Mar	Apr	May
Daily Total Output (kWh)	1879.12	1819.48	1698.81	1332.34	915.66
Daily Maximum output from CHP (kWh)	1920.00	1920.00	1920.00	1920.00	1920.00
Utilisation (0-no utilisation to 100% utilisation)	98%	95%	88%	69%	48%
Days (N)	31	28	31	30	31
Monthly Total Output (kWh)	58253	50946	52663	39970	28385
Maximum monthly output from CHP (kWh)	59520	53760	59520	57600	59520

	Jun	Jul	Aug	Sep	Oct
Daily Total Output (kWh)	726.07	683.63	738.01	757.36	1249.69
Maximum output from CHP (kWh)	1920.00	1920.00	1920.00	1920.00	1920.00
Utilisation (0-no utilisation to 1-100% utilisation)	38%	36%	38%	39%	65%
Days (N)	30	31	31	30	31
Monthly Total Output (kWh)	21782	21193	22878	22721	38740
Maximum monthly output from CHP (kWh)	57600	59520	59520	57600	59520

	Nov	Dec	Annually
Daily Total Output (kWh)	1730.27	1871.98	

Maximum output from CHP (kWh)	1920.00	1920.00	
Utilisation (0-no utilisation to 1-100% utilisation)	90%	97%	**67%**
Days (N)	30	31	
Monthly Total Output (kWh)	51908	58031	**467471**
Maximum monthly output from CHP (kWh)	57600	59520	**700800**

The design day graphs of representative months are presented below along with the further information and clarification requested.

Figure A1 – January Design Day CHP, thermal storage and backup boiler output

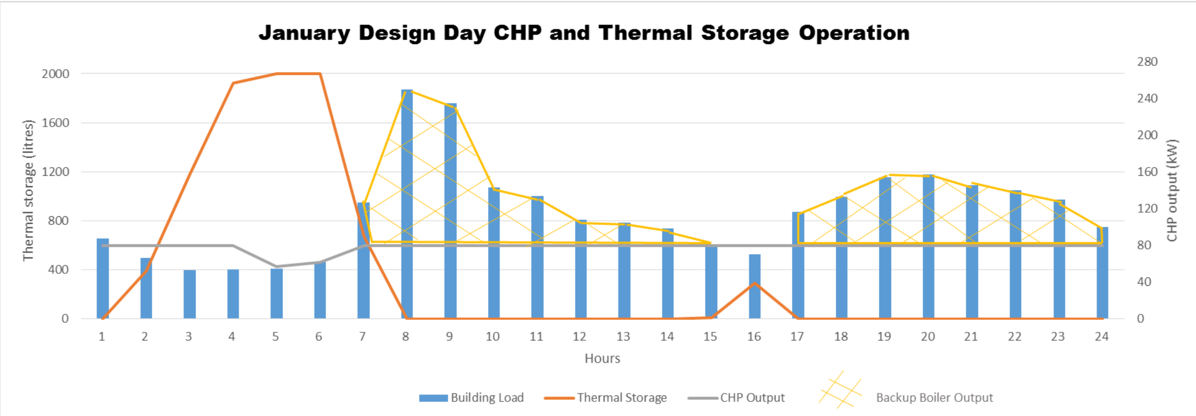


Figure A2 – June Design Day CHP, thermal storage and backup boiler output

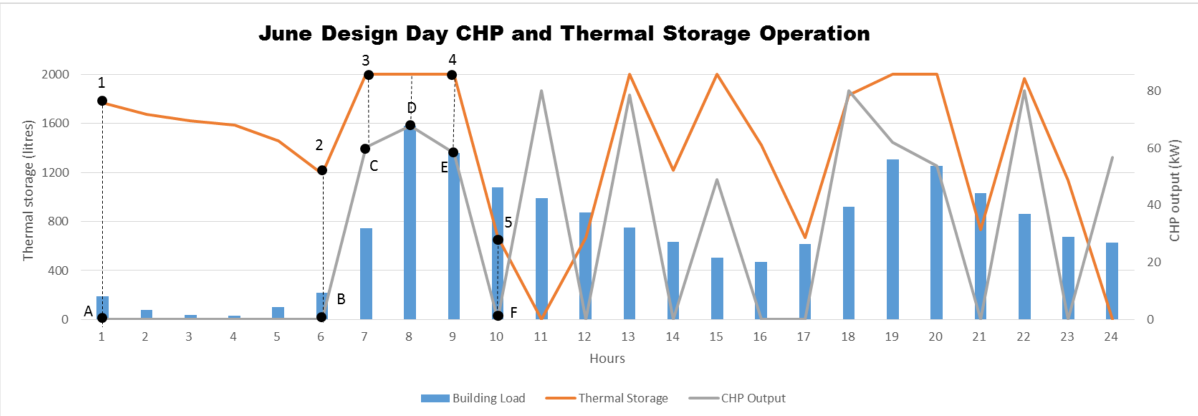


Figure A3 – February Design Day CHP, thermal storage and backup boiler output

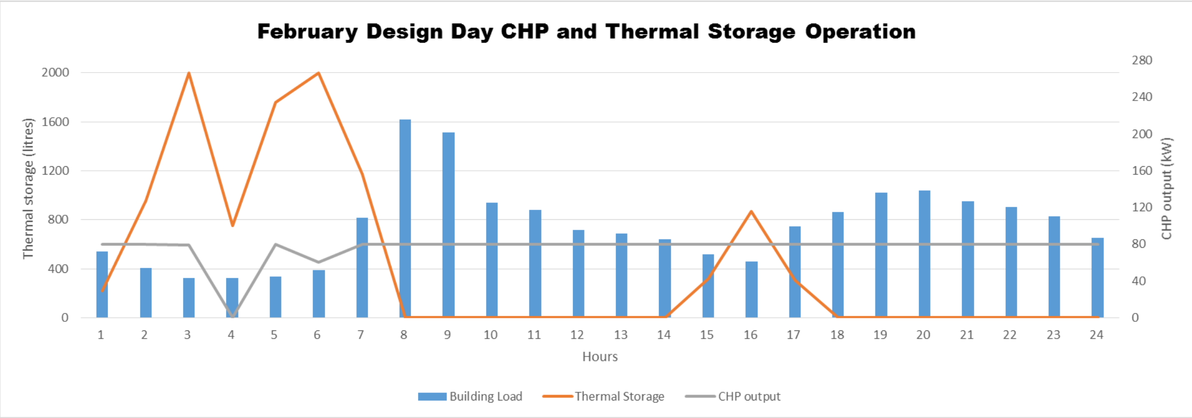


Figure A4 – March Design Day CHP, thermal storage and backup boiler output

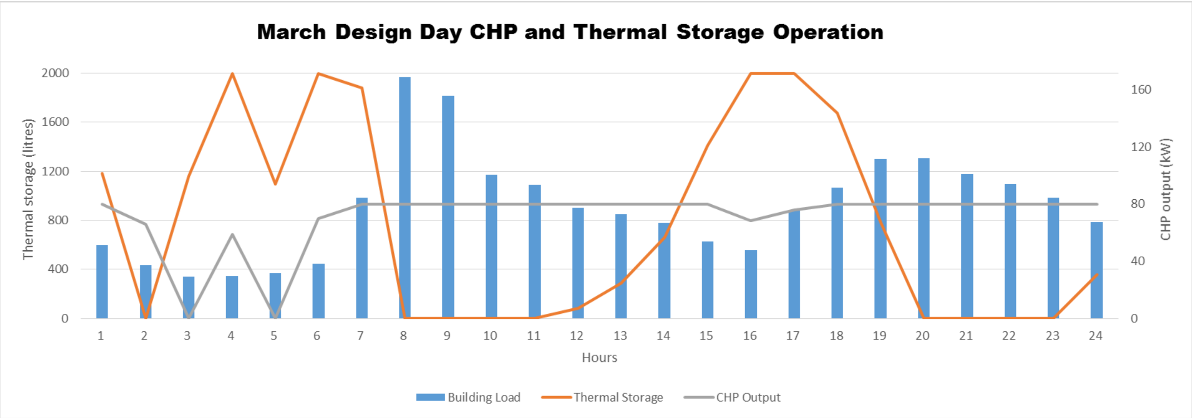


Figure A5 – September Design Day CHP, thermal storage and backup boiler output