East Midlands Gateway
Phase 2 (EMG2)

Document DCO 6.19D/MCO 6.19D

ENVIRONMENTAL STATEMENT

Technical Appendices

Appendix 19D

Energy Report

October 2025

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The East Midlands Gateway Phase 2
and Highway Order 202X and The East Midlands Gateway
Rail Freight and Highway (Amendment) Order 202X

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Environmental Statement: Appendix 19D - Energy Report

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Phase 2
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Quality Management

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EXECUTIVE SUMMARY

This Energy Strategy has been carried out for the Development Consent Order (DCO) Application and Material Change Order (MCO) Application for the proposed logistics park at East Midlands Gateway (together the EMG2 Project). The EMG2 Project consists of the development of a multi-unit logistics/industrial development (Class B2 and B8) together with supporting and co-located office functions. A maximum of 300,000 m^2 of employment floorspace with an additional 200,000 m^2 of mezzanine space is proposed within the DCO Application, along with up to 500m^2 for a bus terminal and associated office space and 500m^2 for an amenity space/office for HGV parking. An additional 26,500 m^2 of warehousing and 3,500 m^2 of mezzanine space is proposed within the MCO Application on land known as Plot 16 at the existing EMG1 site. This report will form part of the planning submission to the Planning Inspectorate and relates to an outline planning application. Due to the absence of detailed drawings at the early stage of this development, the energy analysis to estimate the energy consumption and carbon dioxide emissions of the proposed development is undertaken by using prior modelled building typologies, as no detailed energy modelling could have been carried out.

The results of the indicative calculations should not be used for any other purpose other than those for which they are intended (namely as a basis for this energy statement). Formal assessments will be required at a later stage of the development.

This report establishes how the site will achieve compliance with Building Regulations and Local Authority requirements. This has been achieved, in accordance with the Northwest Leicestershire District Council (March 2021), by following the Energy Hierarchy: be lean (improved building performance); be clean (centralised heating and cooling systems); and be green (use of low or zero carbon technologies).

Reduce Carbon Dioxide Emissions Through Lean Measures

To maximise the energy efficiency of the development and thus reduce the energy demands, the following design principles and features have been incorporated:

- Building fabric elements and glazing specifications significantly improved to the Building Regulation requirements.
- Reduced air permeability compared to maximum required standards.
- Specification of efficient heating services and control systems.
- Energy efficient lighting through the development.

Reducing Carbon Dioxide Emissions Through Clean Measures

The inclusion of a site wide heating system was investigated. Potential options at the site included either connection to an area wide low carbon heat distribution network, a site wide heat network or a Combined Heat and Power (CHP) system. It was considered that the installation of either of these options was not practical. Further information is provided in Section 3.

Reducing Carbon Dioxide Emissions Through Green Measures

A low or zero carbon (LZC) technology feasibility study was completed as part of this Energy Strategy which compared the feasibility of different technologies based on the energy demand of the developments. Based on this, it was identified that the most appropriate technology to meet the energy and sustainability requirements is the installation of Photovoltaic Panels (PV). Further analysis will be undertaken during Reserved Matters. Based on the robust approach to the energy hierarchy, the development could meet the required sustainability and energy targets. By following the proposed strategy, it is estimated that a site wide total reduction of the regulated carbon dioxide emissions of 151% over Building Regulations 2021 can be achieved through enhanced energy efficiency measures and the installation of a PV array that contributes to 140% of the overall CO_2 reductions. On later design stages, when detailed energy calculations will be carried out, the emissions for every step of the Energy Hierarchy will be calculated in more detail.

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1 INTRODUCTION

1.1.1 RPS Consulting Services Ltd (RPS) was commissioned by SEGRO to undertake an energy strategy and produce a statement for a proposed development at East Midlands Gateway. This report will form part of the planning submission to the Planning Inspectorate and relates to the DCO Application and MCO Application.

1.1.2 This report outlines the scheme and current planning context and assesses likely energy demands of the development prior to consideration of low and zero carbon technology options. The report concludes with the proposed energy strategy.

1.1.3 This Energy Strategy comprises:

- A scheme overview.
- A review of the planning context.
- A review of any applicable legislation or sustainability targets.
- An energy assessment of the project, following the energy hierarchy.
- A presentation of results and recommendations.

1.2 Scheme Overview

1.2.1 The DCO Application comprises the EMG2 Works – a multi-unit logistics/industrial development (Class B2 and B8) together with supporting and co-located office functions. The main site comprises land immediately south of East Midlands Airport and to the east of the village of Diseworth. It is located immediately west/north-west of Junction 23A of the M1 motorway and approximately 3 km south of Junction 24. It extends to approximately 105ha.

1.3 Purpose of the Energy Assessment

1.3.1 The report has been written in accordance with the planning requirements of an Energy Strategy. A summary of the policy requirements relevant to energy consumption within the development are provided in Section 2 of the report.

1.3.2 The preferred method to show compliance with both national policies and those of the Northwest Leicestershire District Council site wide energy strategy is the adoption of a hierarchical approach which ensures that the energy requirements and associated emissions are reduced as far as possible before applying renewable energy options. Section 3 of this report detail the steps taken to follow the energy hierarchy (be lean, be clean, be green). A summary of findings and a suggested approach for the development is presented in Section 4.

2 REGULATION & POLICY

2.1.1 The requirements of the North West Leicestershire District Council and other relevant planning authorities have been taken into account within this feasibility study. The key policy framework applicable to the energy aspects of the development is outlined below.

2.2 National Level Policies

National Planning Policy Framework

2.2.1 The National Planning Policy Framework (NPPF) was revised in December 2024 and replaced the first NPPF published in March 2012 and the subsequent updates. The NPPF set out the Government's planning policies for England and how these are expected to be applied. The NPPF is designed to make the planning system less complex and more accessible; to protect the environment and promote sustainable growth. It provides a framework within which local people and their respective councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.

2.2.2 At the heart of the NPPF is a presumption in favour of sustainable development (paragraph 11). The three dimensions of sustainable development can be defined as the economic, social, and environmental.

2.2.3 Plans should provide a framework for addressing housing needs and other economic, social, and environmental priorities; and a platform for local people to shape their surroundings. Strategic policies should set out an overall strategy for the pattern, scale, and quality of development.

2.2.4 The NPPF (paragraph 164) states that new development should be planned for in ways that avoid increased vulnerability to the range of impacts arising from climate change; and help to reduce greenhouse gas emissions. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.

2.2.5 The NPPF aims to strengthen local decision making, with the use of decision-taking in a positive way, as a means of fostering the delivery of sustainable development.

2.2.6 Finally, the NPPF (paragraph 16) also highlights that plans should be prepared with the objective of contributing to the achievement of sustainable development and in a way that is aspirational but deliverable.

Building Regulations Part L

2.2.7 Building Regulations are statutory instruments that seek to ensure that the policies set out within any relevant UK legislation are carried out. Building regulations approval is required for the majority of building work carried out in the United Kingdom.

2.2.8 Part L 2021 of Building Regulations covers the requirements with respect to the conservation of fuel and power in all building types. It controls the insulation values of building fabric elements and openings, the air permeability of the structure, the efficiency of heating, ventilation and air conditioning systems together with hot water storage and lighting efficiency.

2.3 Local Level Policies

2.3.1 The Planning and Energy Act 2008 enables a local planning authority in England, through their development plan documents, to include policies imposing reasonable requirements for:

- A proportion of energy used in development in their area to be energy from renewable sources in the locality of the development.

- A proportion of energy used in development in their area to be low carbon energy from sources in the locality of the development.
- A development in their area to comply with energy efficiency standards that exceed the energy requirements of building regulations.

North West Leicestershire Local Plan (Adopted March 2021)

2.3.2 The North West Leicestershire Local Plan was adopted in March 2021 with the principal aim of outlining a strategy and locations to drive sustainable development towards the north-west part of the county of Leicestershire and is a mainly rural district.

Policy D1- Design of New Development

2.3.3 "*The Council will support proposed developments that are well designed and as a minimum offer a good standard of design:*

(1) All developments must be based upon a robust opportunities and constraints assessment and be informed by a comprehensive site and contextual appraisal;

(2) New non-residential developments must positively address our Place Making principles:

a) A National Forest or locally inspired identity;

b) Streets and Spaces shaped by buildings;

c) A greener footprint;

d) Vibrant and Mixed communities;

e) Responsive to their context;

f) Connected places;

g) Easy to get around;

h) Well designed and well managed public spaces;

i) Architectural quality.

(3) For residential developments Building for Life 12 will be used instead of the Place Making Principles. New residential development will need to perform positively against Building for Life 12;

(4) Existing neighbour amenity should be safeguarded in accordance with Local Plan Policy D2;

***(5) New development should have regard to sustainable design and construction methods.**"*

2.4 Policy summary

2.4.1 In conclusion, compliance with several national and local policy standards is required for the proposed facility. These are presented in Table 1 below.

Table 1: Summary of applicable policies

Policy Level	Standard
National Policies	National Planning Policy Framework
	Building Regulations Part L2
Local Policies	North West Leicestershire Local Plan (Adopted March 2021) Policy D1 & Cc1

3 ENERGY MODELLING

3.1.1 Integrated Environmental Solutions (IES) thermal modelling is the Government's recommended system for the energy rating of non-residential units. It is a tool which enables qualified energy assessors to calculate the energy demand and the CO_2 emissions of a non-residential space. The energy demand calculated using the IES methodology is relative to the regulated emissions which include the energy consumed to power space heating, hot water, ventilation and internal lighting systems. The unregulated emissions (i.e. small power such as cooking and anticipated power usage such as tools or computers) are also calculated within IES taking into account the NCM equipment gains from the NCM templates. The National Calculation Methodology (NCM) is defined by the Health and Safety Executive (HSE) in consultation with the Devolved Administrations (DAs).

3.1.2 The proposed development consists of the construction of circa 13 warehouse and office units, totalling approximately 530,000 m^2 of usable floor area. For the purpose of this report, as no detailed drawings are available at this stage, an archetype model type has been used with the same use type (Class B2 and B8) and the energy consumption results have been pro-rated for each unit floor area.

3.2 Energy Hierarchy

3.2.1 The proposed energy strategy approach is based on a recognised structure of reduction in carbon dioxide emissions through:

- Reducing the building energy consumption (Be Lean) by optimising the design and construction of the building to ensure less energy is required.
- Supplying the energy required in an efficient manner (Be Clean).
- Supplying the energy from Low Zero Carbon and Renewable Energy Sources (Be Green).

Figure 3.1: The three stages of the Energy Hierarchy

3.2.2 On the whole, it becomes more expensive to implement both carbon reduction and sustainability measures the further along the design process, as the opportunities available diminish. This highlights the importance of early consideration of these measures within the design process.

3.3 Notional Building

3.3.1 In order to establish the baseline carbon dioxide emissions for the EMG2 Project, an archetype building with use type has been used and modelled using the Government-approved software IESVE 2024.1.0.0. This is known as the notional building and outlines the minimum requirements needed to achieve building regulation compliance, this forms the baseline of the energy hierarchy which each step improving beyond this notional building.

3.3.2 The emission factors used within the calculations are the SAP10 emission factors as published by the UK Department for Business, Energy and Industrial Strategy (BEIS) and the Building Research Establishment (BRE). The CO_2 equivalent factor for grid supplied electricity is 0.136 kg CO_2e/kWh and is a five year projection of emissions for 2020-2025.

3.3.3 The notional building assumes the minimum values required to meet Building Regulation 2021 Part L v2. The notional building is represented by the Part L 2021 of the Building Regulations Compliant Development.

3.3.4 The high-level modelling undertaken, identified the total CO_2 emission rate of the Part L notional building as 619.9 tnCO_2/yr as illustrated in Table 2 and the energy consumption as 4,558 MWh (Table 3).

Table 2: Carbon dioxide emissions and savings for Baseline

	Regulated Target Emissions rate (tnCO_2/year)	CO_2 Savings (tnCO_2/year)	Percentage saving (%)
Part L 2021 baseline	619.9	-	-

Table 3: Energy Consumption for Baseline

	Regulated Energy Consumption (MWh/year)	Energy Savings (MWh/year)	Percentage saving (%)
Part L 2021 baseline	4,558	-	-

3.3.5 The high-level modelling undertaken also estimates the EMG2 Project's un-regulated power consumption using the National Calculation Methodology Templates. Un-regulated power consumption typically refers to electrical power consumption of equipment and appliances within a building. The un-regulated power consumption cannot be influenced by the energy hierarchy as it down to how the building occupiers utilise the building and beyond the level of which can be accounted for at design stage.

3.3.6 The predicted per annum unregulated carbon dioxide emissions and unregulated energy consumption are presented in Table 4.

Table 4: Unregulated CO_2 and Energy

	EMG2 Works	EMG1 Works
Unregulated CO_2 tonnes/yr	7,206.44	133.31
Unregulated Energy MWh/yr	52,988.50	980.24

3.4 Energy Saving Measures (Lean)

3.4.1 Energy demand reduction within the building can be utilised to improve compliance with Part L Volume 2 2021. This development has been reviewed to maximise both passive and active design measures to reduce the energy demand within the building.

Building Fabric

3.4.2 To reduce the energy consumption and CO_2 emissions of the Proposed Development, it is important to minimise the heat losses through the building fabric. To achieve this the SEGRO specification

meet or exceed the minimum requirements detailed in approved document L. U-values for all building fabric elements and openings have been specified to exceed the levels required by Building Regulations. In addition, heat losses from infiltration have been minimised and a low air permeability target has been set. The details of these measures are summarised in the Table 5.

Table 5: Building fabric values

Element	Proposed values	Maximum values under Part L2 2021
Roof	0.18 W/m^{2}K	0.16 W/m^{2}K
External wall	0.26 W/m^{2}K	0.26 W/m^{2}K
Ground floor	0.18 W/m^{2}K	0.18 W/m^{2}K
Windows	1.50 W/m^{2}K	1.60 W/m^{2}K
Rooflights	1.30 W/m^{2}K	1.60 W/m^{2}K
Personnel doors	1.20 W/m^{2}K	1.30 W/m^{2}K
Vehicle Access doors	1.20 W/m^{2}K	1.30 W/m^{2}K
Air permeability	2.5 m^3/hm^2@50Pa	8 m^3/hm^2@50Pa

Building Services

3.4.3 In addition to upgrading the insulation standards, it is important that the energy used within the building is efficient. Therefore, the building systems will be designed to optimise the efficiency of the systems by matching installed capacity to anticipated building demand. Items of equipment, which make up the building's mechanical building services installation, will be specified to achieve high annual energy efficiency in operation and will be regularly serviced to maintain their performance. All systems will have efficiencies and controls which meet or exceed the requirements of Part L2 2021. Please note that the main warehouse areas are unheated.

Table 6: Building service values

Space heating systems (Offices block)	
Air Source Heat Pump -Coefficient of Performance	>3.0
Air distribution systems (Office block)	
Continuous supply – Specific Fan Power	≤0.3 W/l/s
Continuous extract– Specific Fan Power	≤0.4 W/l/s
Heat recovery efficiency	≥70%
Internal lighting systems	
Luminous efficacy – lumens per circuit watt	120 lm/W

3.4.4 Comfort cooling/heating shall be provided to offices and main reception areas. Comfort cooling/heating shall be provided by means of either a Mitsubishi Electric VRF (Variable Refrigerant Flow) City Multi system or Daikin VRV (Variable Refrigerant Volume) system, or equal and approved. The warehouse areas are assumed to be unheated.

3.4.5 Domestic hot water to the toilets, cleaners sink, and tearoom will be provided by either a monobloc air source heat pump installation or connected back to the office VRF system via a 'Hydrobox'. Hot water will also be provided from the main heating system.

3.4.6 A solar thermal system has also been specified. The solar thermal system shall consist of an external collector with a twin coil internal storage unit. The air to water source heat pump / 'hydrobox' shall serve a pre plumbed Solar hot water cylinder. The cylinder will be matched to a monobloc air source

heat pump. Solar collectors and associated controls will be installed to provide an additional source of energy for producing hot water and the array will be matched to the size of the proposed cylinder installation. The cylinder shall incorporate an electric immersion heater element for legionella prevention and emergency back-up modes. The system shall be complete with all necessary controls to prevent the growth of Legionella bacteria. The system shall be sized to achieve 20% of the calculated annual energy consumption of the hot water system.

3.4.7 A Mechanical Supply and Extract Ventilation system shall be provided to the office areas. Mechanical ventilation shall be provided from an air handling unit located on the designated plant area distributing air at room temperature for fresh air and general ventilation purposes. Heat Recovery systems will also be employed.

3.4.8 Electrical lighting also represents a significant energy use within a building. To maximise energy savings the installation of low energy lighting (LEDs) across all the units has been specified.

3.4.9 The high-level modelling undertaken, identified the total CO_2 emission rate of the 'Be Lean' scenario as 551.29 $tnCO_2/yr$ as illustrated in Table 7. This is 11% lower than the baseline. The correspondent regulated energy consumption figures are given in Table 8.

Table 7: Carbon dioxide emissions and savings after energy demand reduction

	Regulated emissions rate ($tnCO_2$ /year)	CO_2 Savings ($tnCO_2$/ year)	Percentage saving (%)
EMG2 Works			
Notional Building - baseline	583.07		
Be lean	518.54	64.53	11%
EMG1 Works			
Notional Building - baseline	36.83		
Be lean	35.23	1.60	4%
Total			
Notional Building - baseline	619.90		
Be lean	551.29	68.61	11%

Table 8: Energy consumption and savings after 'be lean' measures

	Regulated Energy Consumption (MWh/year)	Energy Savings (MWh/year)	Percentage saving (%)
EMG2 Works			
Notional Building - baseline	4,287		
Be lean	3,794	492	11%
EMG1 Works			
Notional Building - baseline	270		
Be lean	259	11.8	4%
Total			
Notional Building - baseline	4,558		
Be lean	4,053	505	11%

3.4.10 The unregulated energy consumption and associated emissions are unchanged at this stage and are presented within Table 9.

Table 9: Unregulated CO_2 and Energy

	EMG2 Works	EMG1 Works
Unregulated CO_2 tonnes/yr	7,206.44	133.31
Unregulated Energy MWh/yr	52,988.50	980.24

3.5 Heating Infrastructure (Clean)

3.5.1 Connection to a decentralised energy network and the use of combined heat and power is a recognised method of generating energy more efficiently. Where an existing decentralised energy network is not present, an assessment of the feasibility of establishing a decentralised energy system for the proposed development should be undertaken; including an assessment of the feasibility of a Combined Heat and Power (CHP) communal heating system.

Connection to an Area Wide Heat Network

3.5.2 Consideration will be given to the possible connection to an existing or proposed area wide decentralised energy network. However, following a review of online information, it has been established that there are currently no existing district heating networks or major heat sources located in the vicinity that the development could link to. Desk study research also highlights that the site is not located within a proposed network or focus area for future consideration of heat distribution networks. Given the absence of any suitable systems, connection to an area wide district heating system has not been considered further.

Communal Heating System

3.5.3 The installation of a Combined Heat and Power (CHP) unit for the proposed units has also been considered. CHP units can achieve considerable savings in CO_2 emissions when installed and utilised correctly. To maximise the performance of a CHP, long operating hours are required, and the heating demand of the development needs to match the power generation. At this stage is it not known what the usage of the warehouses will be and so the viability of a CHP plant cannot be confirmed.

3.5.4 With the future buildings standard and UK Net Zero Carbon Buildings Standard being considered CHP has become a less favourable option due to its onsite combustion and direct generation of CO_2 and potential local air quality issues arising from CHP installations. The use of CHP is not explicitly prohibited but must form but should be adaptable to renewable fuels and form part of a wider decarbonisation strategy.

3.5.5 In view of the above, the installation of a CHP system will not be considered any further for this scheme.

3.6 Low and Zero Carbon Technologies (Green)

3.6.1 This section discusses the feasibility of using low and zero carbon (LZC) technologies for the proposed scheme. The North West Leicestershire Local Plan encourages the on-site renewable energy generation systems, where feasible, in accordance with Policy D1.

3.6.2 In order to address the planning requirement for the integration of LZC technologies on site, the installation of solar thermal panels, photovoltaics, wind turbines, biomass and heat pumps has been investigated.

Table 10: Summary of LZC technologies

LZC Technology	CO_2 savings	Capital cost	Considerations
Photovoltaic panels	Medium	Medium	PV Panels can be used on the roofs to further reduce the CO_2 emissions. There is available roof area, so PVs have been considered.
Solar thermal panels	Low	Medium	South facing roofs used for Solar thermal to generate electricity. Have been considered.
Air source heat pumps	Medium	Medium	This is a very effective technology to provide space heating and cooling to the building. ASHPs have been considered at Be Lean stage.
Ground source heat pumps	Medium	High	This is a very effective technology to provide space and water heating to the building, as well as cooling. Ground works and investigations are required. Due to the ground works it is typically amongst the most expensive options to heat a building. Not considered for further analysis at this stage.
Wind turbines	Low	High	Due to the population density in the vicinity of the development, local community will be affected. Not considered for further analysis at this stage.
Biomass	High	High	Negative impact on air quality. High operational and maintenance costs. Not considered for further analysis at this stage.

3.6.3 These technologies meet all requirements as defined by Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

3.6.4 After taking into consideration several different factors, including local authority requirements, land use, potential noise impacts and available space within the development, it was concluded that the best strategy for this scheme is the installation of PV (photovoltaic) panels and solar thermal panels. For the purpose of this study, we are proposing a 20% of available roof to be covered by PVs. This is 2,470 m^2 for the EMG1 Works and 26,022 m^2 for the EMG2 Works, and corresponds to 0.55 MWp of installed PV capacity for the EMG1 Works and 5.8 MWp for the EMG2 Works – 6.35 kWp in total, generating 5,656 MWh of electricity annually. Allowance has been made for other essential roof top services such as rooflights and access ways which may be needed for maintenance of solar PV. It should be noted that the building structures will be designed to support 100% PV coverage (on available roof space), futureproofing the Proposed Development should additional PV be requested by tenants during its operation.

3.6.5 Upon consideration of the LZC technology (PVs), the high-level modelling identified that a further reduction of 769.32 $tnCO_2/yr$ can be achieved for the regulated emissions. The total site CO_2 emissions for the Proposed Development after the incorporation of the LZC technologies are illustrated in Table 11 and Figure 3.3. This equates to a 140% reduction in CO_2 over regulated emissions compared to the lean measures (be lean) scenario, which equates to overall savings of 151%. Table 12 below gives a breakdown of the CO_2 emissions and savings for each of the EMG1 Works and the EMG2 Works, and Table 13 provides a breakdown of energy consumption and savings.

Table 11: Site wide Carbon dioxide emissions and savings after LZC

	Regulated emissions rate ($tnCO_2$/ year)	CO_2 Savings ($tnCO_2$/ year)	Percentage saving (%)
Baseline	619.90		
Be lean	551.29	68.61	11%

	Regulated emissions rate ($tnCO_2$/ year)	CO_2 Savings ($tnCO_2$/ year)	Percentage saving (%)
Be clean	-	-	-
Be green	-218.03	769.32	140%
Overall Savings		**837.93**	**151%**

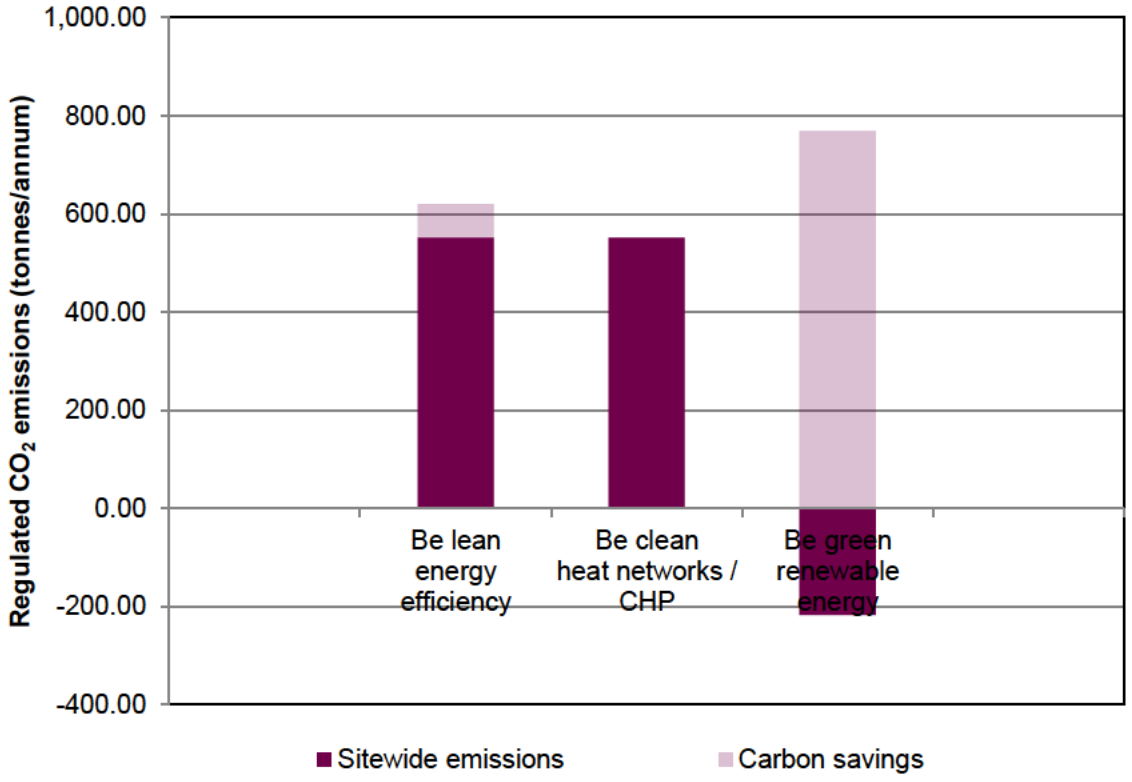

Figure 3.2: EMG1 Works and EMG2 Works regulated carbon dioxide emissions and savings

Table 12: Regulated Carbon dioxide emissions and savings after LZC for EMG1 and EMG2

	Regulated emissions rate ($tnCO_2$ /year)	CO_2 Savings ($tnCO_2$/ year)	Percentage saving (%)
EMG2 Works			
Notional Building - baseline	583.07		
Be lean	518.54	64.53	11%
Be Green	-186.57	702.63	136%
Total		**769.64**	**148%**
EMG1 Works			
Notional Building - baseline	36.83		
Be lean	35.23	1.60	4%
Be Green	-31.46	66.69	-189%
Total		**68.29**	**193%**
Total			

	Regulated emissions rate ($tnCO_2$ /year)	CO_2 Savings ($tnCO_2$/ year)	Percentage saving (%)
Notional Building - baseline	619.90		
Be lean	551.29	68.61	11%
Be Green	-218.03	769.32	140%
Total		**837.93**	**151%**

Table 13: Regulated energy consumption and savings for EMG1 and EMG2

	Regulated Energy Consumption (MWh/year)	Energy Savings (MWh/year)	Percentage saving (%)
EMG2 Works			
Notional Building - baseline	4,287		
Be lean	3,794	493	11%
Be Green	3,794		136%
PV Generation		5,166	
Total		**5,659**	**148%**
EMG1 Works			
Notional Building - baseline	270		
Be lean	259	11	4%
Be Green	259		189%
PV Generation		490	
Total		**501**	**193%**
Total			
Notional Building - baseline	4,558		
Be lean	4,053	505	11%
Be Green	4,053		140%
PV Generation		5,656	
Total		**6,161**	**151%**

3.6.6 The resultant CO2 emissions are 1.5 times lower than the regulated baseline emissions, since the warehouses remain unheated the regulated energy demand is limited and only relates to lighting and the HVAC system installed in the offices and other amenity areas. If however, we assess the contribution of the PVs to the overall carbon emissions including regulated and unregulated energy we can then observe that 10% of carbon savings can be achieved through the use of PVs on the two sites. Please see Table 14 and Figure 3.3. For the purposes of this study, regulated emissions are those captured by PART L of building regulation and therefore the bellow unregulated energy data are for indication only. Please note that the unregulated energy figures vary significantly dependent on intended usage and should an actual calculation is required this should be performed after fit out.

3.6.7 Please note: the regulated energy demand which is a prediction of controllable energy consumption based on NCM templates, regulated energy covers: heating, cooling, auxiliary energy (fan powers),

lighting and hot water. Regulated energy does not account for items that tenants could plug in to mains electric such as laptops or energy use attributed to activity use of the buildings e.g. refrigeration or manufacturing.

Table 14: Total (Regulated + Unregulated) Carbon dioxide emissions and savings for EMG1 Works and EMG2 Works

TOTAL	Total emissions rate ($tnCO_2$/ year)	CO_2 Savings ($tnCO_2$/ year)	Percentage saving (%)
Baseline	7,959.65		
Be lean	7,891.04	68.61	1%
Be clean	-	-	-
Be green	7,121.72	769.32	10%
Overall Savings		**837.93**	**11%**

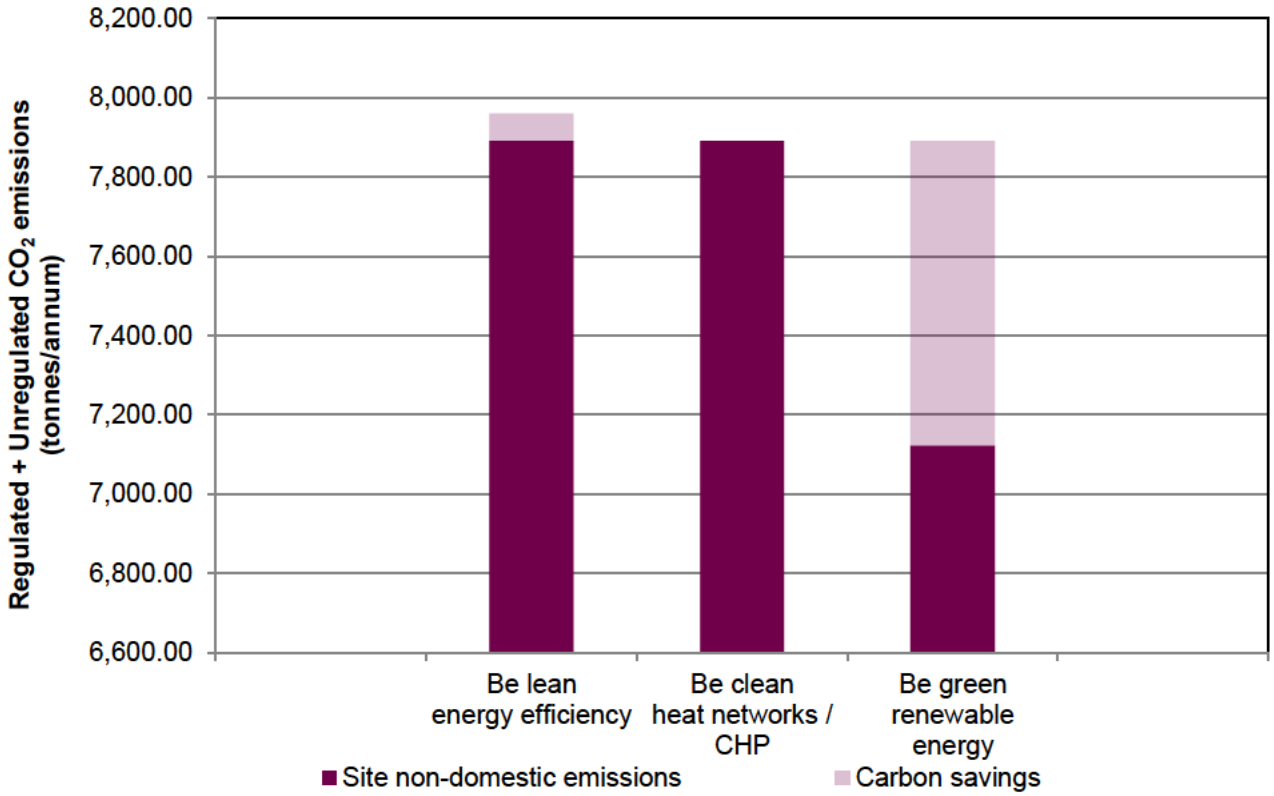

Figure 3.3: EMG1 Works and EMG2 Works total carbon dioxide emissions and savings

3.6.8 The use of batteries on site to store and distribute electricity has been considered. The solar battery extends the use of a PV-system's generated energy and will provide free, sustainable power even when the panels don't produce energy due to the lack of solar energy (overcast periods etc). Centralised and distributed battery systems have been considered as well as their use as part of a private or DNO network. Profiling the use of batteries will be investigated at detailed design stage as some options have benefits such as optimising the renewable generation consumption, the ability to buy and store cheap energy and discharge at increased costs depending on the energy use.

3.6.9 The option of 100% coverage by PVs of available roof space has also been investigated and the results are presented in Annex B. In this case a combined capacity of 31 MWp is predicted generating a total of 28,283 MWh of electricity annually.

4 CONCLUSIONS

4.1.1 This report will form part of the planning submission to the Planning Inspectorate and relates to a Development Consent Order for phase 2 of the East Midlands Gateway development. Due to the absence of detailed drawings at the early development stage, an archetype model type has been utilised with the same use type and the energy consumption results have been pro-rated for each unit floor area.

4.1.2 In conclusion, based on the measures outlined in the report; by implementing the best practice guidance, the development can achieve the relevant sustainability and energy targets. The proposed strategy includes high insulation standards, very efficient building services, individual ASHPs for the offices and installation of solar panels. According to the initial calculations, it is anticipated that based on the measures outlined in the report, the development will achieve 151% CO_2 reductions over the regulated CO_2 emissions, incorporating 0.55 MWp of PV in the EMG1 Works and 5.8 MWp in the EMG2 Works.

4.1.3 During later design stages, energy calculation based on the actual drawings and specifications will be carried out. At this stage, it should be noted that the results presented in this report are purely indicative.

4.1.4 The unregulated energy demand estimates of the development are unaffected by the energy hierarchy and the processes implemented to lower the buildings carbon emissions. The unregulated energy is a predicted based on the National Calculation Methodology templates for buildings within the B8 category and may vary significantly depending on how the end user utilises the building.

5 LOOKING AHEAD

5.1 UK Net Zero Carbon Buildings Standard – Pilot Version

5.1.1 In September 2024 the Pilot Version of the UK Net Zero Carbon Buildings Standard (UKNZCBS) was published. It was collaboratively developed by a range of industry stakeholders in the UKs building industry. "*The UKNZCBS creates a unified definition for 'Net Zero Carbon Aligned Buildings' in the UK, underpinned by an evidence-based reporting methodology. The Standard is for everyone connected with the UK's real estate industry. Its development has been led by a coalition of Professional Institutions, industry bodies and leaders in the field who recognise the need for consistent rules, both to reduce spurious claims around net zero carbon, and to accelerate the design, construction and use of buildings that deliver lower-carbon outcomes in line with the UK's legally binding carbon targets.*"

5.1.2 As it stands none of the targets within the UKNZCBS are mandatory as the document is yet to be formally adopted. It does however *"contain the technical details on how a building should meet the Standard, including what limits and targets it needs to meet, the technical evidence needed to demonstrate this and how it should be reported. In the future, projects will be able to verify that a project conforms to the Standard."*

5.1.3 Two key building metrics of relevance to this Energy Report outlined within the UKNZCBS are the energy use intensity limits of new buildings and on-site renewable energy generation targets.

5.1.4 The energy use intensity limits are outlined with Table OE-1 in Annex A of the UKNZCBS. The UKNZCBS lists energy use intensity targets per year, where the applicable target aligns with the start date of construction. The targets are as follows:

Table 15: Table OE-1 from Annex A

Year	Storage and Distribution kWh/m^2 GIA/yr (unconditioned storage)
2025	35
2026	34
2027	33
2028	32
2029	31
2030	30
2031	29
2032	28

5.1.5 Regulated Energy consumption is predicted to be offset by the electricity generation of the PVs. The predicted regulated energy use intensity of the regulated energy demand of the development is 0 kWh/m^2 GIA/yr.

5.1.6 The unregulated energy estimates that the development will consume 53,969 MWh of electricity. When this is added to the development's regulated energy the predicted energy use intensity becomes: 172 kWh/m^2. This is a rough estimate based on NCM templates and would have to be re-assessed via a detailed energy model when the development is going through detailed design, and the building use can be more accurately modelled.

5.1.7 The on-site renewable electricity targets are detailed in Table RE-1 in Annex A of the UKNZCBS, see table below.

Table 16: Table RE-1 from Annex A

A – Scotland	• for Single Family Homes, and single-storey Storage and Distribution: minimum 60 kWh/m^2 building footprint / year • for all other building types: minimum 30 kWh/m^2 building footprint / year
B – Middle and North England, Northern Island, Wales	• for Single Family Homes, and single-storey Storage and Distribution: minimum 65 kWh/m^2 building footprint / year • for all other building types: minimum 40 kWh/m^2 building footprint / year
C – South England	• for Single Family Homes, and single-storey Storage and Distribution: minimum 75 kWh/m^2 building footprint / year • for all other building types: minimum 45 kWh/m^2 building footprint / year

5.1.8 The development is currently predicted to displace approximately 5,656 MWh of grid electricity. When applied over the development this is equal to 18.6 kWh/m^2 of building footprint area which does not meet the target of 65 kWh/m^2 building footprint / year. The development is not currently predicted to utilise all of the roof space of the development, if 100% of the available roof space is covered by PVs the ratio increases to 93 kWh/m^2 and the scheme complies.

ANNEXES

Annex A

General Notes

RPS Health, Safety & Environment

Sustainability and Energy Assessments – General Notes

General

1. The report is based on information available at the time of the writing and discussions with the client during project meetings. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party.
2. The review of local and regional policy does not constitute a detailed review. It is simply used as a guide to provide the context for the development and to determine the likely requirements of the Local Authority.
3. No site visits have been carried out as any part thereof, unless otherwise specified.
4. This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in guidance may necessitate a re-interpretation of the report in whole or in part after its original submission.
5. The copyright in the written materials shall remain the property of the RPS Company but with a royalty-free perpetual licence to the client deemed to be granted on payment in full to the RPS Company by the client of the outstanding amounts.
6. The report is provided for sole use by the Client and is confidential to them and their professional advisors. No responsibility whatsoever for the contents of the report will be accepted to any person other than the client. [Unless otherwise agreed]
7. These terms apply in addition to the RPS Group "Standard Terms of Business" (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms of Business the said Standard Terms of Business shall prevail.) In the absence of such a written contract the Standard Terms of Business will apply.

Energy Feasibility Studies

8. Energy Feasibility Studies are intended as a guide as to potential technologies considered feasible for the proposed scheme. The Studies should not be used in place of other energy assessments typically required during the design process (e.g. SAP / SBEM, Part L compliance, M&E Design etc).
9. Energy Feasibility Studies are typically undertaken at an early stage of the design process and therefore make a number of assumptions about the ultimate design. All assumptions are agreed with the client prior to their inclusion. Should any of the assumptions ultimately prove false, the client should be aware that this may have implications with regards to the inclusion of the technology.
10. Consideration is given to a range of zero and low carbon technology solutions. Whilst due care has been taken to ensure that the information is accurate, it should be noted that there may be some discrepancy between actual performance and predicted performance on the basis that environmental factors play a significant role in affecting performance.
11. Energy demand is calculated on the basis of best available information at the time of writing the report.
12. System sizes are indicative and based upon manufacturer information and appropriate guidance values. CO_2 emissions are based upon published benchmarks and guidance documents.

Annex B

100% Available roof PV coverage calculations

100% PV coverage of the available roof has also been examined to provide further context regarding this optionality. This coverage equates to 12,350 m^2 for the EMG1 Works and 130,110 m^2 for the EMG2 Works, and corresponds to 2.8 MWp PV capacity for the EMG1 Works and 29 MWp for the EMG2 Works, generating a total of 28,283 MWh of electricity annually.

Upon consideration of the LZC technology (PVs), the high-level modelling identified that a further reduction of 3,847 $tnCO_2$/yr can be achieved for the regulated emissions. The total site CO_2 emissions for the Proposed Development after the incorporation of the LZC technologies are illustrated in Table 17. This equates to a 698% reduction in CO_2 over regulated emissions compared to the lean measures (be lean) scenario, which equates to overall savings of 709%. Table 18 below gives a breakdown of the CO_2 emissions and savings for each of the EMG1 Works and EMG2 Works, and Table 19 a breakdown of energy consumption and savings.

Table 17: Site wide Carbon dioxide emissions and savings after LZC

TOTAL	Total emissions rate ($tnCO_2$/ year)	CO_2 Savings ($tnCO_2$/ year)	Percentage saving (%)
Baseline	620		
Be lean	551	69	11%
Be clean	-	-	-
Be green	-3,295	3,847	698%
Overall Savings		**3,915.2**	**709%**

Table 18: Regulated Carbon dioxide emissions and savings for EMG1 and EMG2

	Regulated emissions rate ($tnCO_2$ /year)	CO_2 Savings ($tnCO_2$/ year)	Percentage saving (%)
EMG2 Works			
Notional Building - baseline	583.07		
Be lean	518.54	64.53	11%
Be Green	-2,997	3,513	681%
Total		3,508	692%
EMG1 Works			
Notional Building - baseline	36.83		
Be lean	35.23	1.60	4%
Be Green	-298.24	333.4	814%
Total			818*
Total			
Notional Building - baseline	619.90		
Be lean	551.29	68.61	11%
Be Green	-3,295	3,847	698%
Total		3,915	709%

Table 19: Regulated energy consumption and savings after 100% of available roof PV coverage for EMG1 and EMG2

	Regulated Energy Consumption (MWh/year)	Energy Savings (MWh/year)	Percentage saving (%)
EMG2 Works			
Notional Building - baseline	4,287		

	Regulated Energy Consumption (MWh/year)	Energy Savings (MWh/year)	Percentage saving (%)
Be lean	3,794	493	11%
Be Green	3,794		681%
PV Generation		25,832	
Total		**26,325**	**692%**
EMG1 Works			
Notional Building - baseline	270		
Be lean	259	11	4%
Be Green	259		947%
PV Generation		2,452	
Total		**2,463**	**951%**
Total			
Notional Building - baseline	4,557		
Be lean	4,053	504	11%
Be Green	4,053		698%
PV Generation		28,284	
TOTAL		**28,788**	**709%**

The resultant CO_2 emissions are 7 times lower than the regulated baseline emissions, since the warehouses remain unheated and the regulated energy demand is limited and only relates to lighting and the HVAC system installed in the offices and other amenity areas. If however, we assess the contribution of the PVs to the overall carbon emissions including regulated and unregulated energy we can then observe that 48% of carbon savings can be achieved through the use of PVs on the two sites, resulting to overall 50% carbon savings. Please see Table 20 below.

Table 20: Total (Regulated + Unregulated) Carbon dioxide emissions and savings for EMG1 and EMG2

TOTAL	Total emissions rate ($tnCO_2$/ year)	CO_2 Savings ($tnCO_2$/ year)	Percentage saving (%)
Baseline	7,960		
Be lean	7,891	69	1%
Be clean	-	-	-
Be green	4,044	3,847	48%
Overall Savings		**3,916**	**50%**