

ASSET ENERGY AUDIT

Creative Quarter, Cardiff

Rev 1. May '23

Draft

EXECUTIVE SUMMARY

Creative Quarter, Morgan Arcade, Cardiff, CF10 1AF

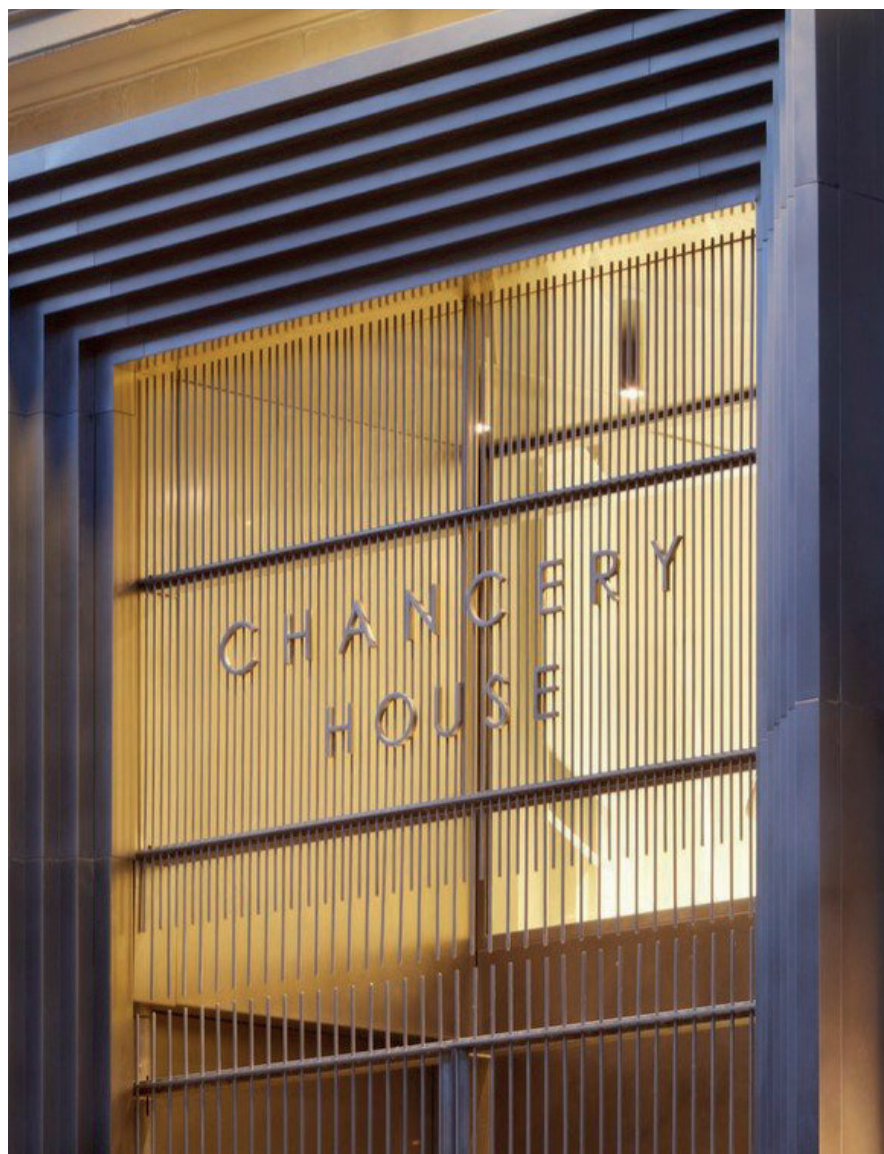
Vantage Zero have been commissioned by Catella APAM to investigate and propose carbon & energy reduction scenarios for the asset at The Creative Quarter, Morgan Arcade, Cardiff. The asset is currently let to multiple start-up / scale-up businesses alongside more established companies using the Creative Quarter as their Cardiff base..

The building is managed by JLL and energy is recharged to customers based on their own usage. The building has tenant submetering which is manually read on a monthly basis by the facilities manager.

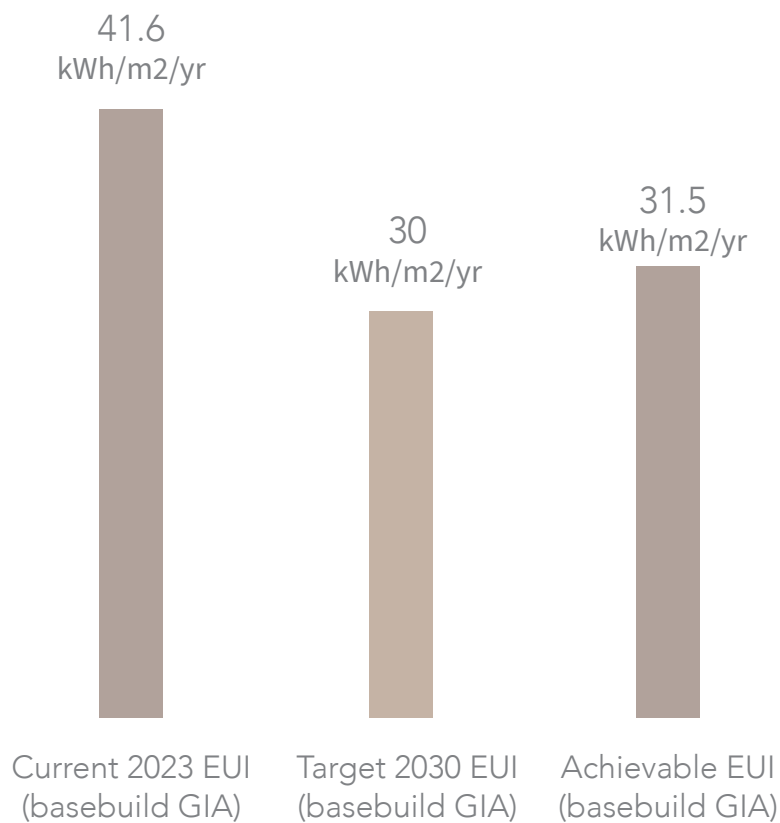
Due to the nature of the building usage (start-ups and scale ups) the sub leases can be more flexible than traditional office agreements. There are 33 separate companies currently occupying space within the building & each has the opportunity to move around within the building as their business grows.

The building has a high variance in office occupancy, some companies operating a completely flexible policy with others appearing to mandate full team office working.

For the purposes of interpretation, this report shall look at energy data from 2019 (Pre-Pandemic) in order to gain understanding for how the asset may perform in a future 'return to work' scenario (although it is believed that the current way of working will be present for some time into the future)



	Project	Budget	saving (MWh)	saving (t CO₂)
1	Smart metering	£35k	18	4.4
2a	EPH replacement	£200k	18	4.4
2b	Heat pump install	£225k	40-70	9.8-17.1
3	Landlord Lighting	£3k	2	0.5
4	PV project	£25k	17	4.15



Current EPC Ratings ————— B

THE ASSET

Creative Quarter, Morgan Arcade, Cardiff, CF10 1AF



The Creative Quarter sits within the Morgan Quarter development, this comprises 60+ ground floor retail units alongside the multi-let office space which spans first, second and third floors.

Most of the 33 current tenancies have commenced during the last 2 years since April 2021 (20 of 33) although the building has proved popular since it was last refurbished in 2015 and brought into its current use.

The building is listed which limits what can be achieved in terms of fabric improvements without incurring large capex costs and disruption. For example, the front façade and all the fenestration overlooking the retail arcade is single glazed.

The floor plates are arranged such that there is a central common breakout area and a number of perimeter self-contained office suites.

The building is all-electric; serviced by local electric panel heaters both within the tenant suites and in the landlord areas, some tenants have opted for cooling systems which are generally split systems of varying ages.

Ventilation is generally provided via opening windows, although there are small local extract systems servicing toilet / showers and tea points. Hot water is provided by local point-of-use electric storage type units.

Lighting is generally LED and there is a good energy management regime in place for the landlord areas. Tenants have control over their own space and are recharged based on their usage from separately metered, manually read DBs within their demise.

17,525
ft2



NIA

31,850
ft2



GIA



Tenants



33

Occupancy rate
(last 12 months)



100%

EPC Rating (whole
building)



B33



ENERGY
DATA

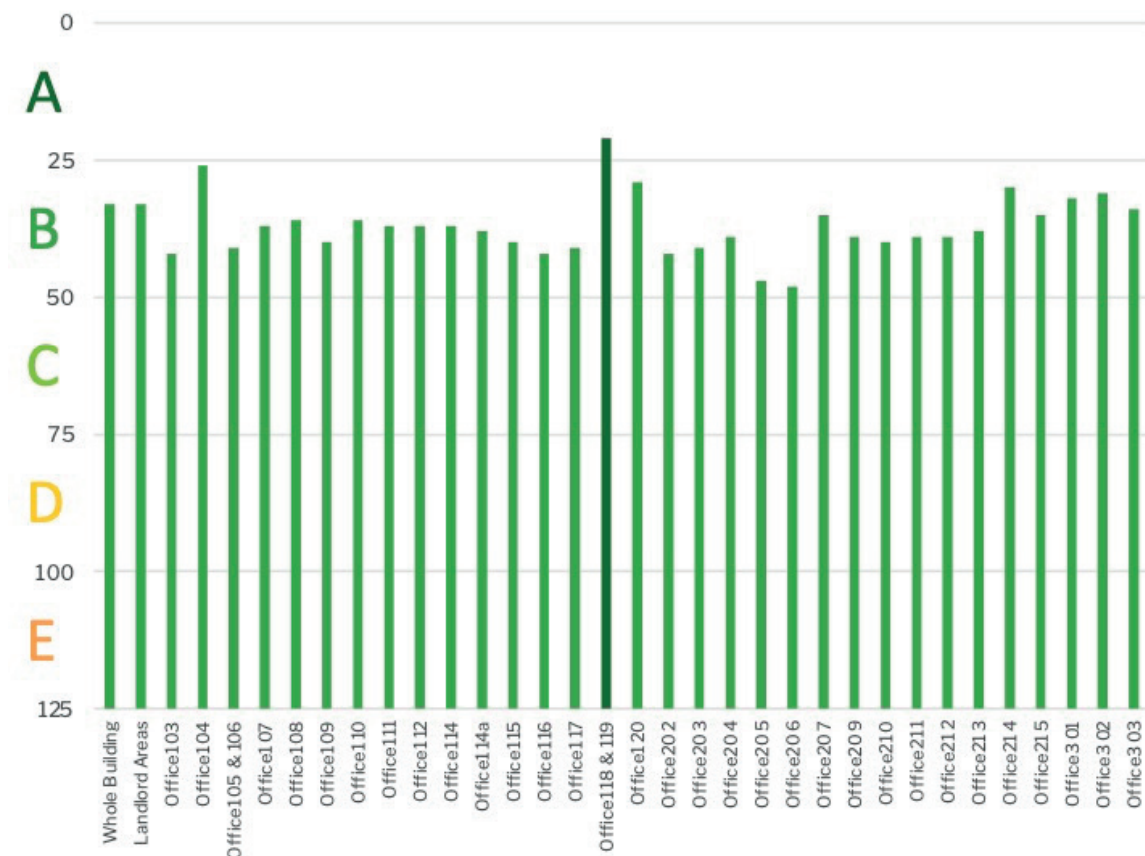
CURRENT ENERGY PERFORMANCE

EPC Performance

All EPCs have been re-evaluated as part of this project. Previously the whole building was covered by 1 No EPC.

A Dynamic Simulation Model has been created for this purpose and the EPCs have been generated with complexity level 5.

The results are charted opposite, demonstrating that each commercial unit can be rated within the 'B' banding. This means that the units have no strand potential prior to 2050. The EPCs are valid for 10 years and will need to be renewed in 2033.



Building Operational Energy

Building operational energy is the energy actually consumed in the asset (rather than the theoretical performance of EPCs) the chart opposite demonstrates 2022 performance against a baseline year of 2019.

The baseline is pre-pandemic where office space was operated at higher occupancy.

As locally controlled, direct electric is the main source of heat, the weather has a larger influence on energy consumption within this particular building. even though 2022 had 12.7% more Heating Degree Days, the estimated heat demand was some 54% lower.

One reason for this would be that the building is simply operated at a far lower occupancy – on days when any given office unit is unoccupied, there is nobody present to switch the heating on.

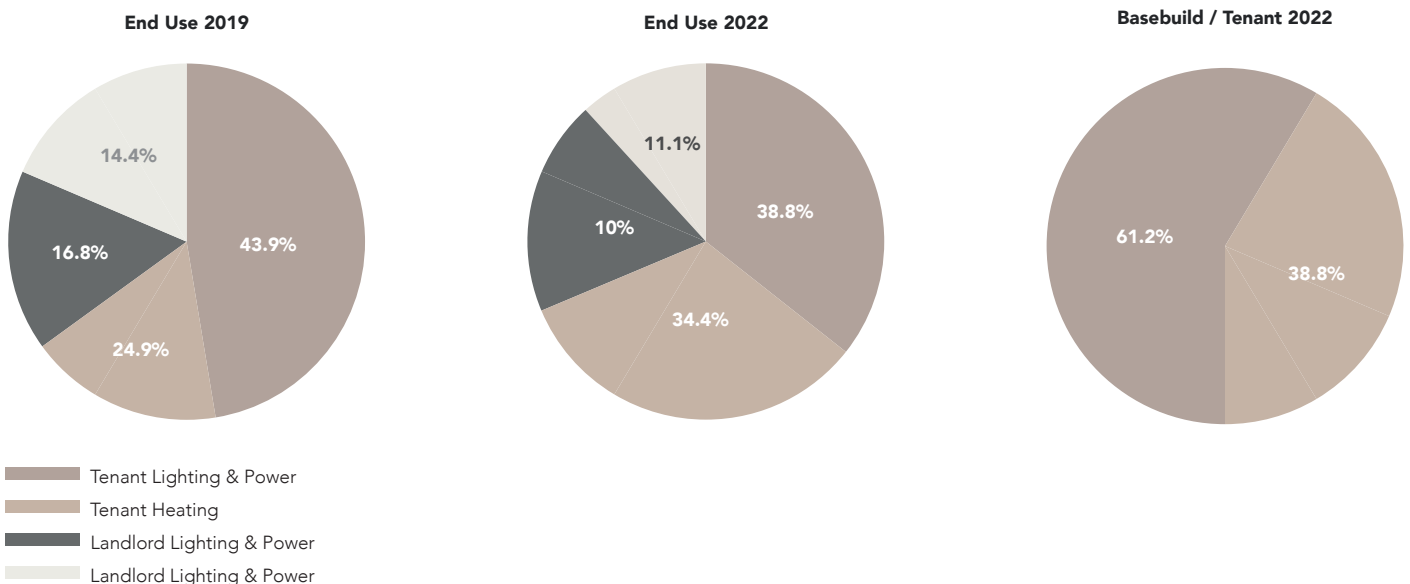
Energy breakdown can be found overleaf.



Energy Split

Although 2022 total energy usage was substantially lower (-26.6%) the split remained relatively consistent. This would indicate that the main contributory factor to the reduction was reduced operation of the building rather than any particular energy reduction initiative.

The basebuild / tenant split (40/60) is fairly typical for this kind of building. The basebuild energy would include heating for the 'whole building' – tenant areas have therefore been estimated via baseline elimination (i.e. assuming no heat is required in summer, the summer reading is a consistent power & light requirement)



Energy Costs

Building energy rate has increased from 0.19p/kWh (day rate) to 0.54p/kWh.

This is supplemented by the Government assistance scheme which contributes 0.2236p/kWh (current expiry of this scheme is Apr '24)

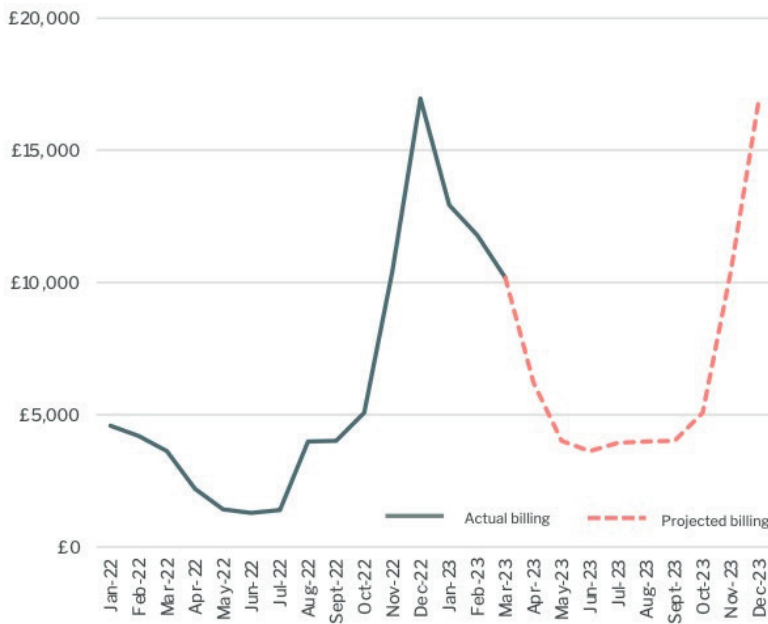
Projected costs based on last years consumption pattern is shown below

Actual energy costs
(2022)

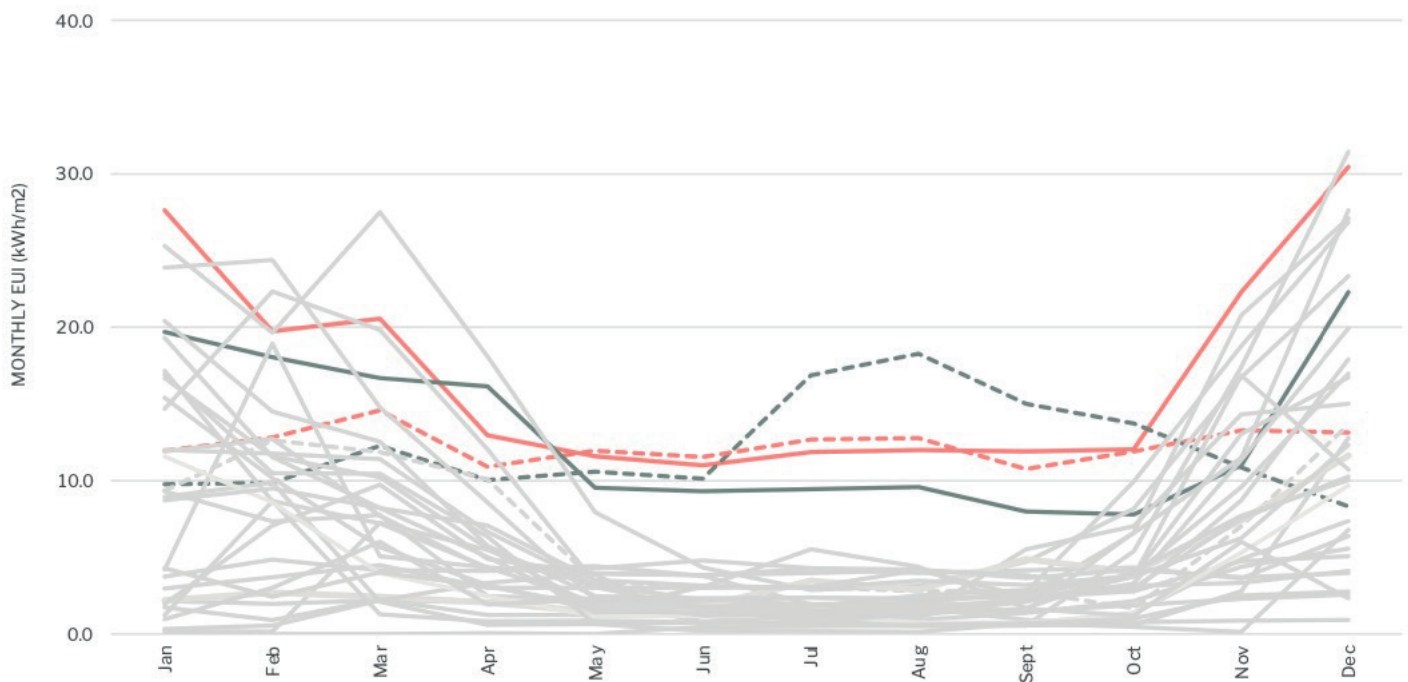
£59,250/yr

Projected energy costs
(2023)

£93,200/yr



EUI summary (monthly)



EUI for each office unit is shown above. There is significant seasonality associated with the energy use, which is to be expected with the kind of building systems present at CQ.

The 4No spaces which do not exhibit the same baseline behavior are all fitted with split system air conditioning and more importantly their own server racks.

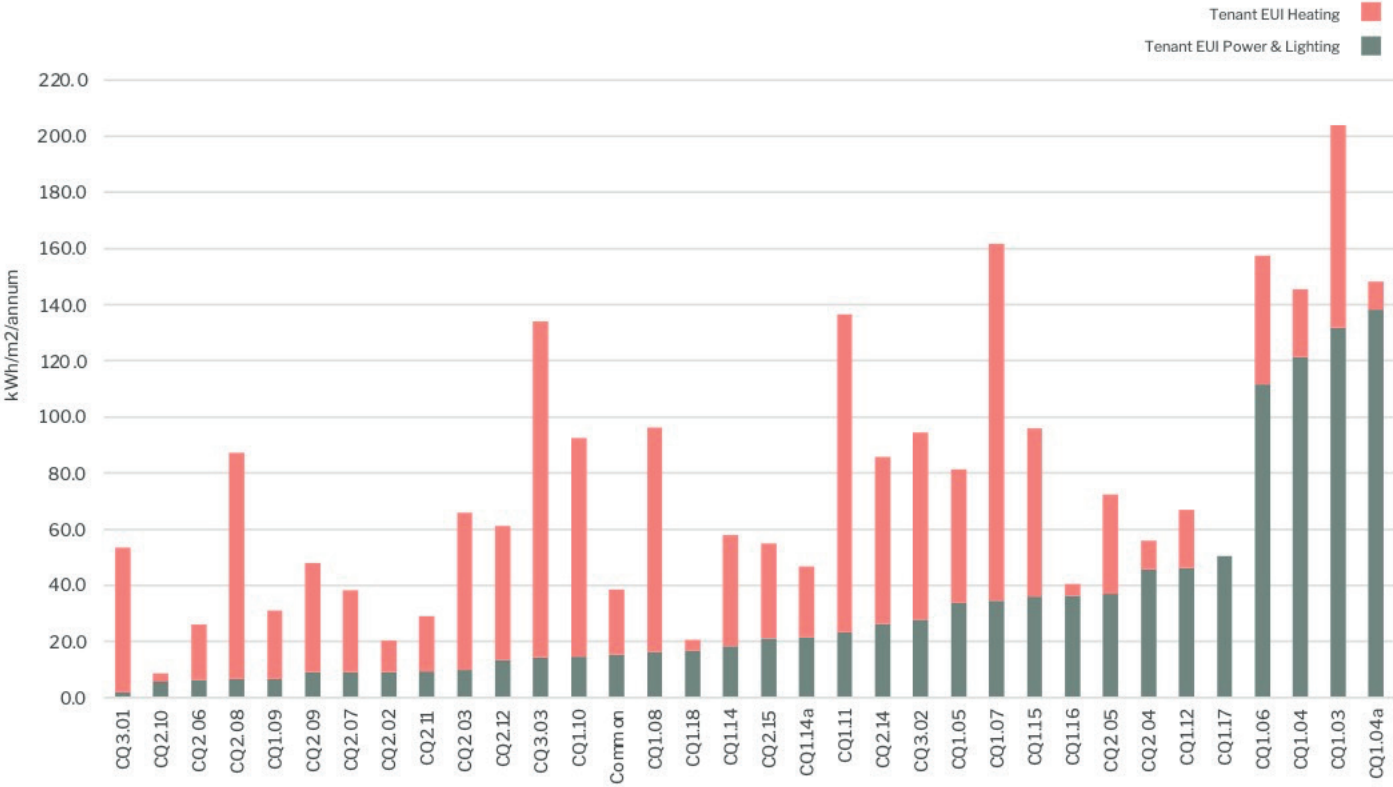
The companies are national firms & therefore require some level of connectivity with other office locations.

Below is a tabular form for varying methods of operational energy benchmarking, we can see that CQ is performing ahead of expectation in this regard, based on 2022 consumption data.

		UKGBC 2025	UKGBC 2030	UKGBC 2035	APAM Target 2025	APAM Target 2030	CQ Current	CQ Potential
NETT	Whole	160	115	90	-	-	113.6	61.2
	Basebuild	90	70	55	-	-	75.7	34.4
	Tenant	70	45	35	-	-	37.9	26.9
GROSS	Whole	130	90	70	130	90	62.5	33.7
	Basebuild	70	55	45	70	55	41.6	18.9
NABERS	Star Rating (BB)	4.5	5	5.5	-	-		
	Basebuild MWh/e	N/A*	N/A*	N/A*	-	-	N/A*	N/A*
	Building MWh/e	218	174.6	130.9	-	-	184.9	99.6

*basebuild cannot be assessed due to metering arrangement

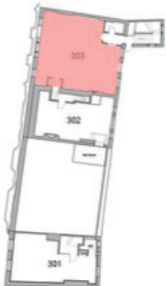
EUI summary (annual)



First Floor



Second Floor



Third Floor

The graph above shows the energy split for the tenant areas (heating, lighting & power are all metered from the tenant sub-panels in each office)

The impact of the offices with servers can be clearly seen at the far right, with the remainder of the offices falling within a reasonable range of between 15-30W/m² for their power and lighting.

The heat energy is more varied (as expected with the manual- only control) and this lies anywhere between 40 and 100W/m².

The worst performing rooms are shaded below, indicating that location / fabric factors may be more significant than behavioral ones.

ENERGY PROJECTS OVERVIEW

Below is a summary table of the energy retro-fit projects proposed. Each is examined in further detail in the following sections.

Summary

		Budget Cost (£'000)	Capex/opex	Energy saving (MWh)	Carbon saving* (tonnes)	£/MWh (£'000)	EUI reduction (kWh/m ² GIA)	Resultant EUI (GIA)
1	Smart metering (reduce night use)	£35k	Capex & opex	18	4.4	1.94	6.2	56.2
2a	Heating Upgrade	£200k	Capex	18	4.4	11.1	6.2	50.0
2b	Heat pump heating	£225k	Capex	40-70	9.8-17.1	5.62-3.21	13.5-23.6	42.7
3	Landlord Lighting	£3k	Capex	2	0.5	1.5	0.67	42.0
4	PV Install	£25k	Capex	17	4.15	1.47	5.7	36.3
Total		£275k		55-107	18.8-26.2			



The feasibility of fabric related projects has not been considered in great depth for this building.

It is not believed these would be financially viable in order to demonstrate a payback of less than 15 years.

It is estimated that the building has a current heat demand of around 103MWh, which at current tariffs equate to annual bill of around £30-35k.

Assuming a full package of fabric upgrade works (windows, roof & draught proofing, it is reasonable to assume that a reduction of 30-40% may be achieved, equating to a saving of around £10k per year.

It's unlikely that such a comprehensive project could be delivered for under £150k, especially considering the Listed nature of some of the building aspects.

*calculated using 2023 consumption based long-run marginal factor of 0.244 kgCO₂e/kWh for electricity & 0.183kg/kWh for natural gas

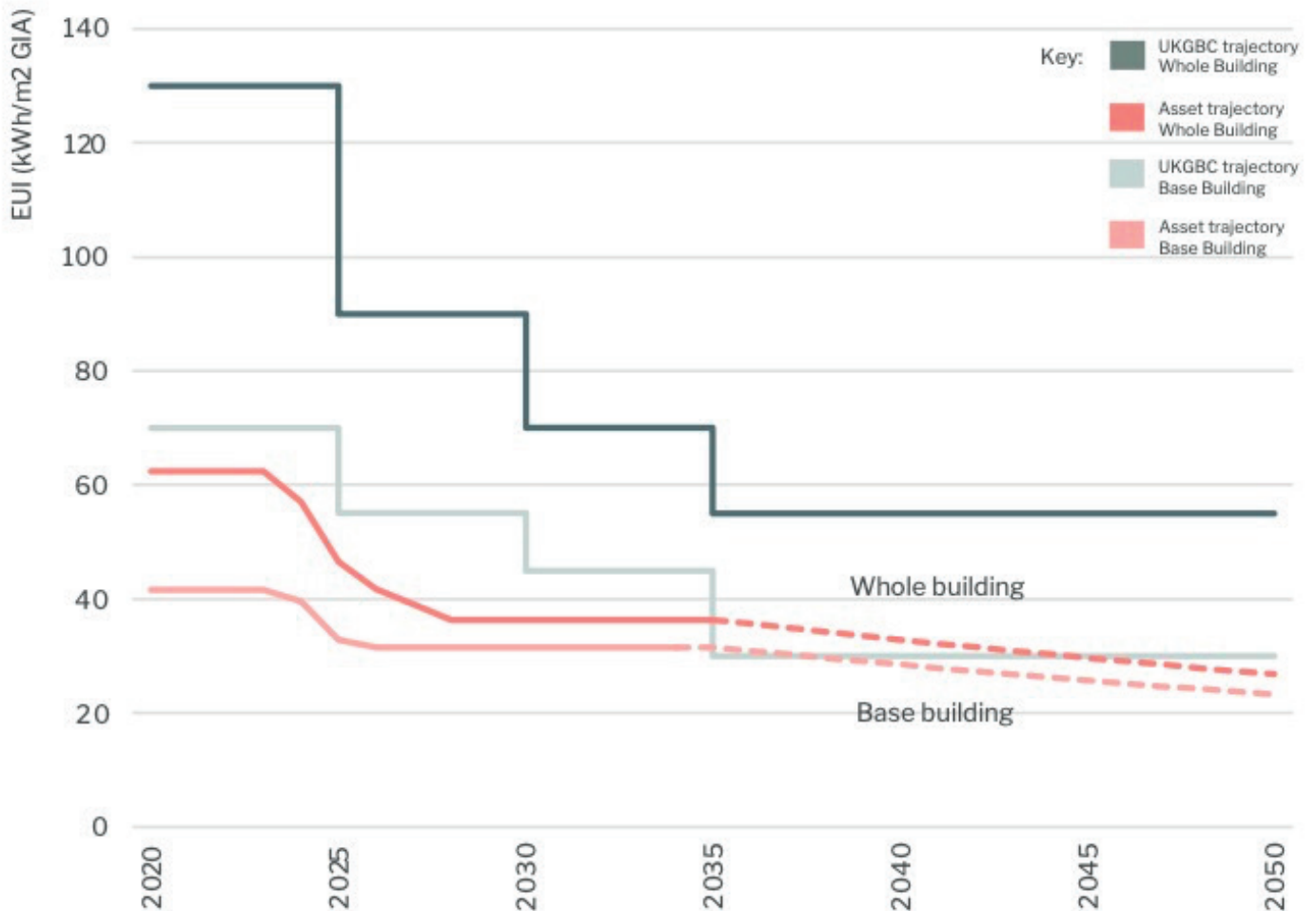
Net Zero Pathway

Assuming Option 2b would be pursued as a viable retro-fit option for the tenant spaces, the asset can demonstrate a strong potential towards a net-zero pathway.

The chart opposite shows the pursuit of projects 1, 2b and 3 during the next 5 years.

The base-build energy will not be changed by project 2b as the electric only heating strategy is proposed to be maintained.

Any subsequent retro-fit of tenant and communal space, including re-supplying white goods, AV equipment etc should consider energy efficient equipment as a priority.



ENERGY REFIT PROJECT 1

Smart metering / energy wastage

Analysing the billing data has brought it to attention that around 23.5% of the whole building energy use occurs between the hours of midnight and 7am.

This amounts to around £6,200 per annum at current energy tariffs.

It is a given that buildings should & do have some element of energy baseline, the LETI (Low Energy Transformation Initiative) suggest that parasitic energy wastage should be limited to around 2.5W/m² for unoccupied periods, which for this building equates to around 25,000 kWh.

The billed night consumption for Bristol Bridge is 42,723 kWh, almost 70% over the net-zero recommendation. The usage is very consistent at around 2,000kWh/month, meaning that a building load of around 9kW is evident during these hours.

Ridding the building of this energy waste will take time, it is a case of monitoring, identifying and eliminating. A prudent first step would be to upgrade the metering system such that half- hourly data can be collected remotely and analysed. The current 'monthly manual read' arrangement gives very little insight into where, when & how much energy is being used on a live basis, it is therefore very difficult to target wastage.

This initiative may mean supplementing the existing tenant boards / meters with IoT clamp on type and supplementing this with equipment to enable external communications to a data gathering platform. Once in place, there will be some analysis cost, after which suggestions for automated energy management can be made for the systems found to be being misused.

Budget costs for smart meter replacement would be £700-1000 per meter (there are around 40No meters)

Cost Estimate	Annual Saving	Simple Payback	EUI (kWh/m ² NIA/yr)
£35k	18MWh	6 years	-6.2

Speed



Whilst the meter installation can be completed relatively quickly (2-3 weeks) the process of identifying & eliminating waste is an ongoing task.

Disruption



There will be work required at tenant DBs which will require working in tenant space & powering down to undertake the works.

Lifespan



New meter installations should perform for 20+ years

In association with

forstå
PROJECTS

VANTAGE

Location:

The Bloomsbury Building, 10 Bloomsbury
Way, London, WC1A 2SL

Contact:

+55 5555 5555 555
lorem@example.com
www.example.com