

# Jeremy Cockroft Seminar 2026

Building Performance – NABERS  
Industry Viewpoints



CIBSE Scotland

# Jeremy Cockroft Annual Seminar

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## **30 Semple Street**

Building Performance & NABERS:  
An Architect's Perspective

# The Transformation of 30 Sempole Street



2001



2025

# Project Team

Development Manager:

**CORRAN** PROPERTIES

Architect:



Services Engineer:



Structural Engineer:

**BLYTH & BLYTH**

Quantity Surveyor:



Planning Consultant:



Fire Engineer:



Transport Consultant:



# Existing Building

- Constructed Circa 2000;
- Existing services at end of life;
- Opportunity to reposition on the market;

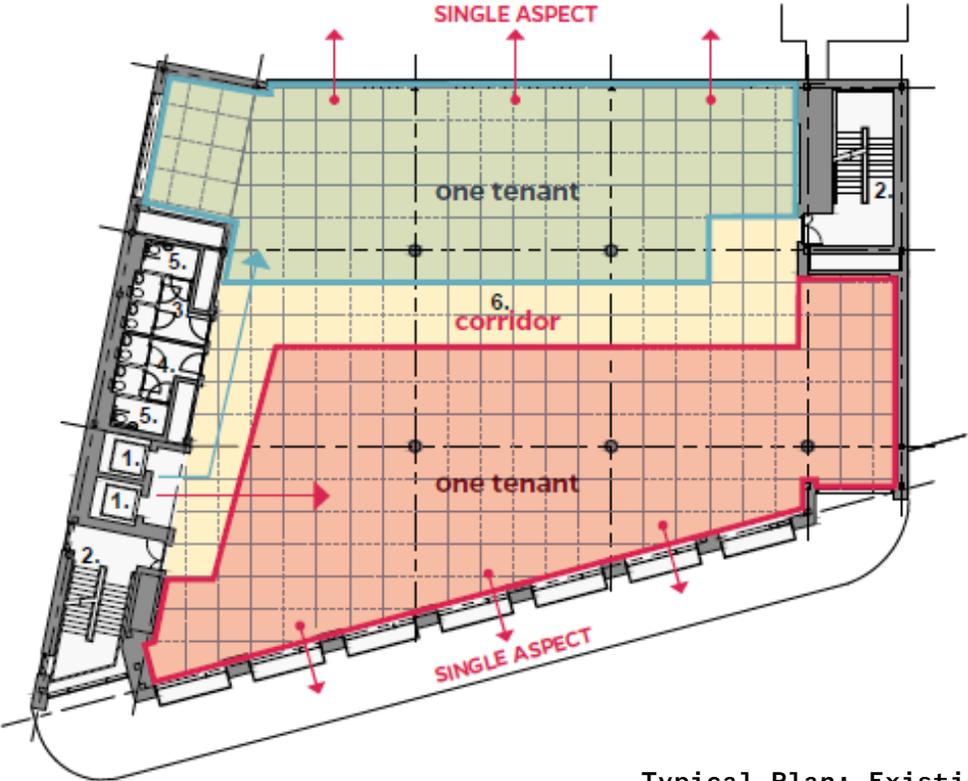


*“What can and should be done to re-position the existing building as a Grade A office?”*



# Concept : Core Relocation

EXISTING FLOORPLAN WITH COLOURED AREAS HIGHLIGHTING DIFFICULT SUB-DIVISIBILITY

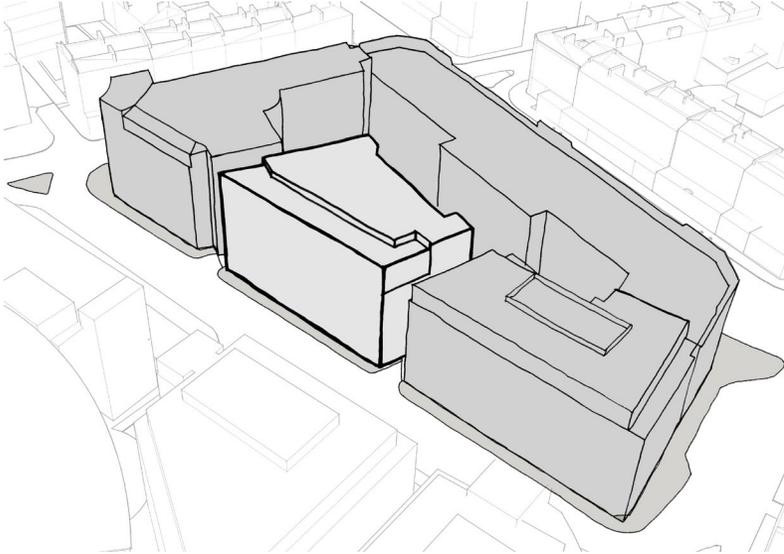


Typical Plan: Existing

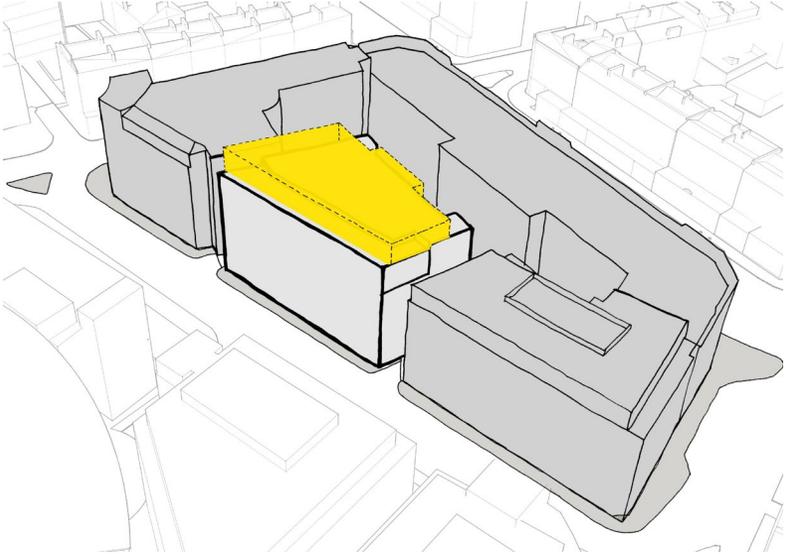


Typical Plan: Proposed

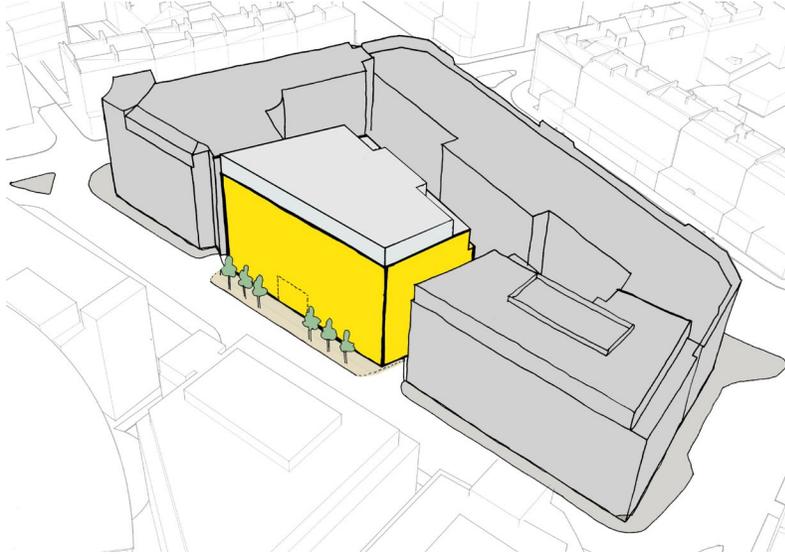
# Concept: Massing & Streetscape



Existing condition with raised plant area and narrow pavement provision



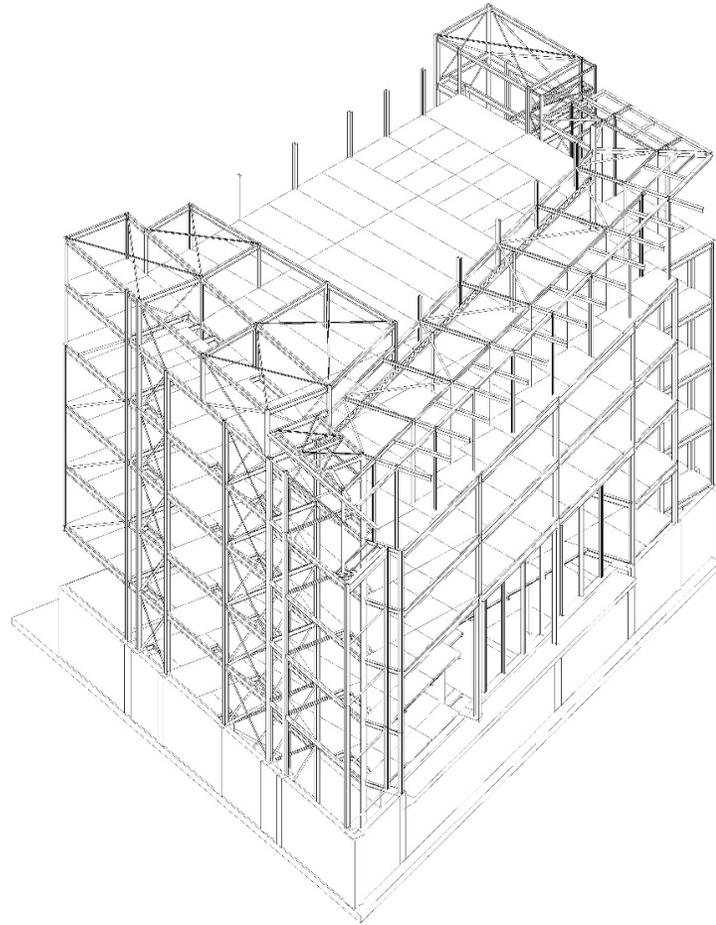
Added height creates identity for Semple Street



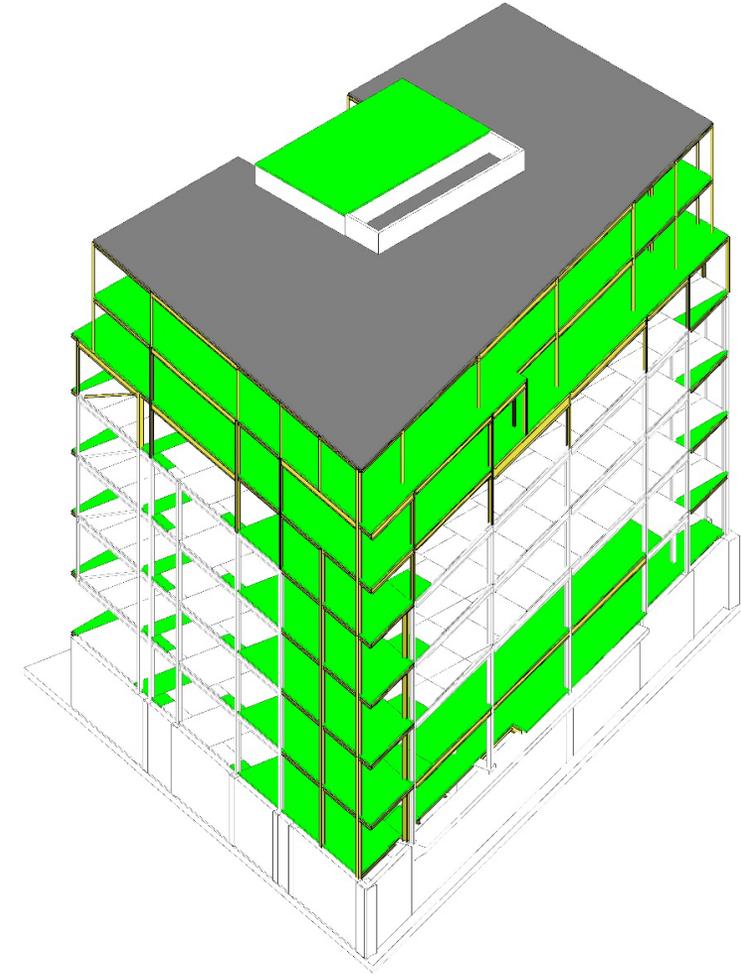
New façades and revised entrance. Improved fabric performance

# A Series of 'Surgical' Interventions

- Relocation of the circulation core;
- Relocation of large plant to basement level;
- New rooftop extension;
- Replacement of external envelope and of the building services to minimise energy demand;



Existing Structural Frame

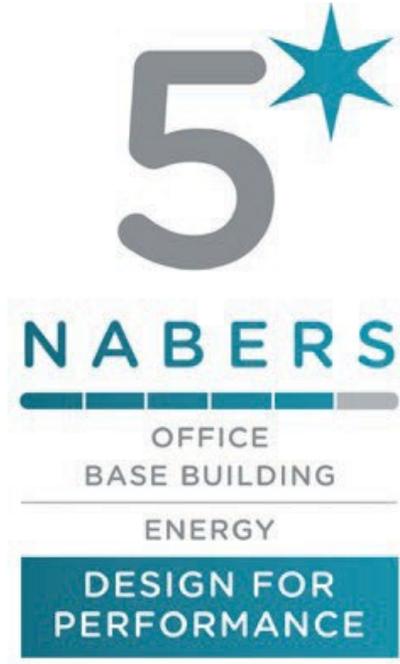


Proposed Structural Interventions

# A Holistic Sustainability Approach

*“What can and should be done to re-position the existing building as a Grade A office?”*

- Sustainability strategy central to the discussions;
- Retrofit not Demolish;
- Improve energy efficiency & decarbonise;
- Holistic sustainability strategy
  - Backed by accreditations;
  - Backed by evidence.



Commit to a NABERS Energy Target

Limited licence to promote target rating

Model building as it will operate

Independent Design Review

Full licence to promote target rating

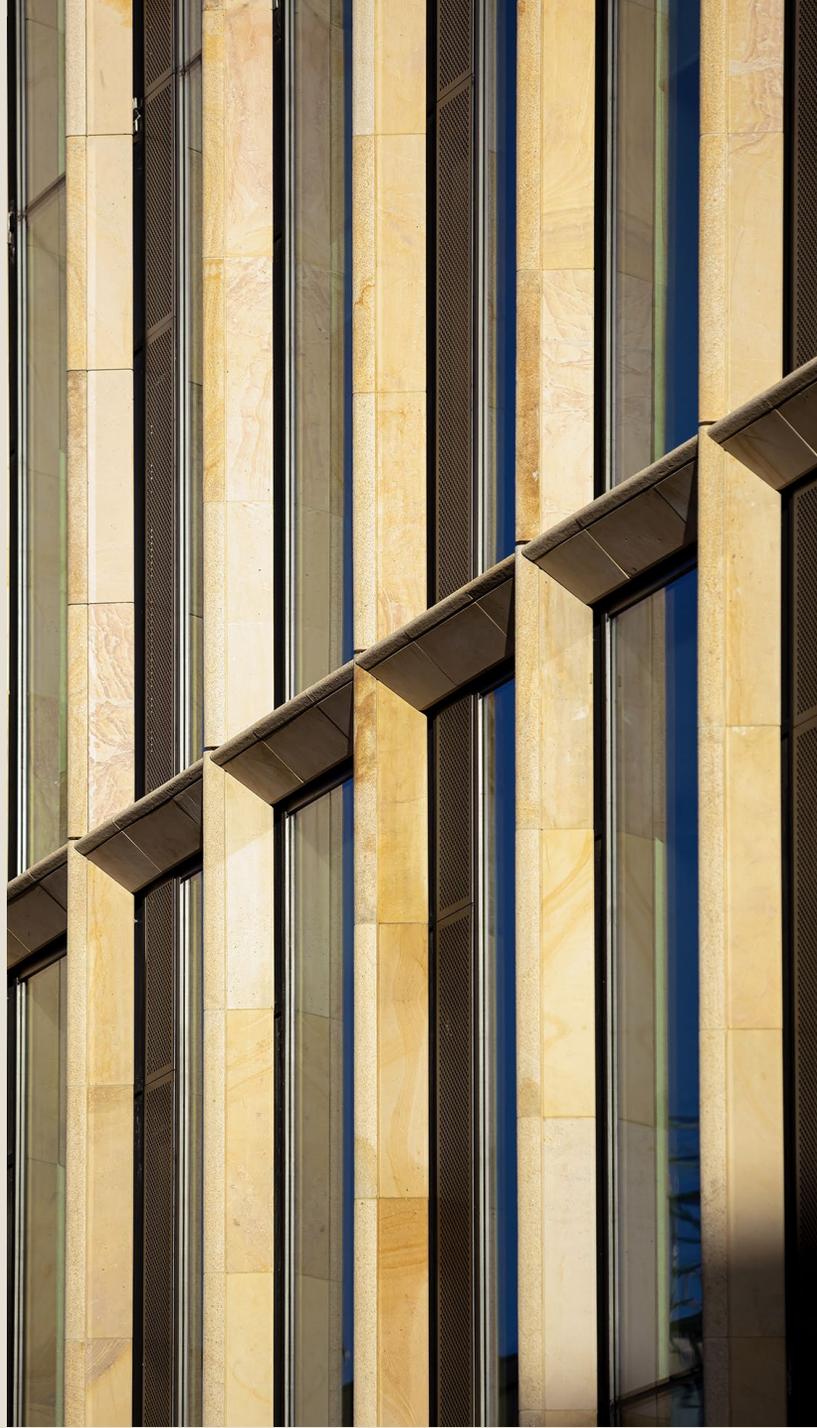
NABERS Rating in Operation



# How did Nabers Influence Design Decisions

## Fabric Performance

- Insulation
- Airtightness
- Daylight
- Solar Gains & Thermal Comfort
- Ventilation Strategy



# 30 Semple Street



30 Semple Street



30 Semple Street

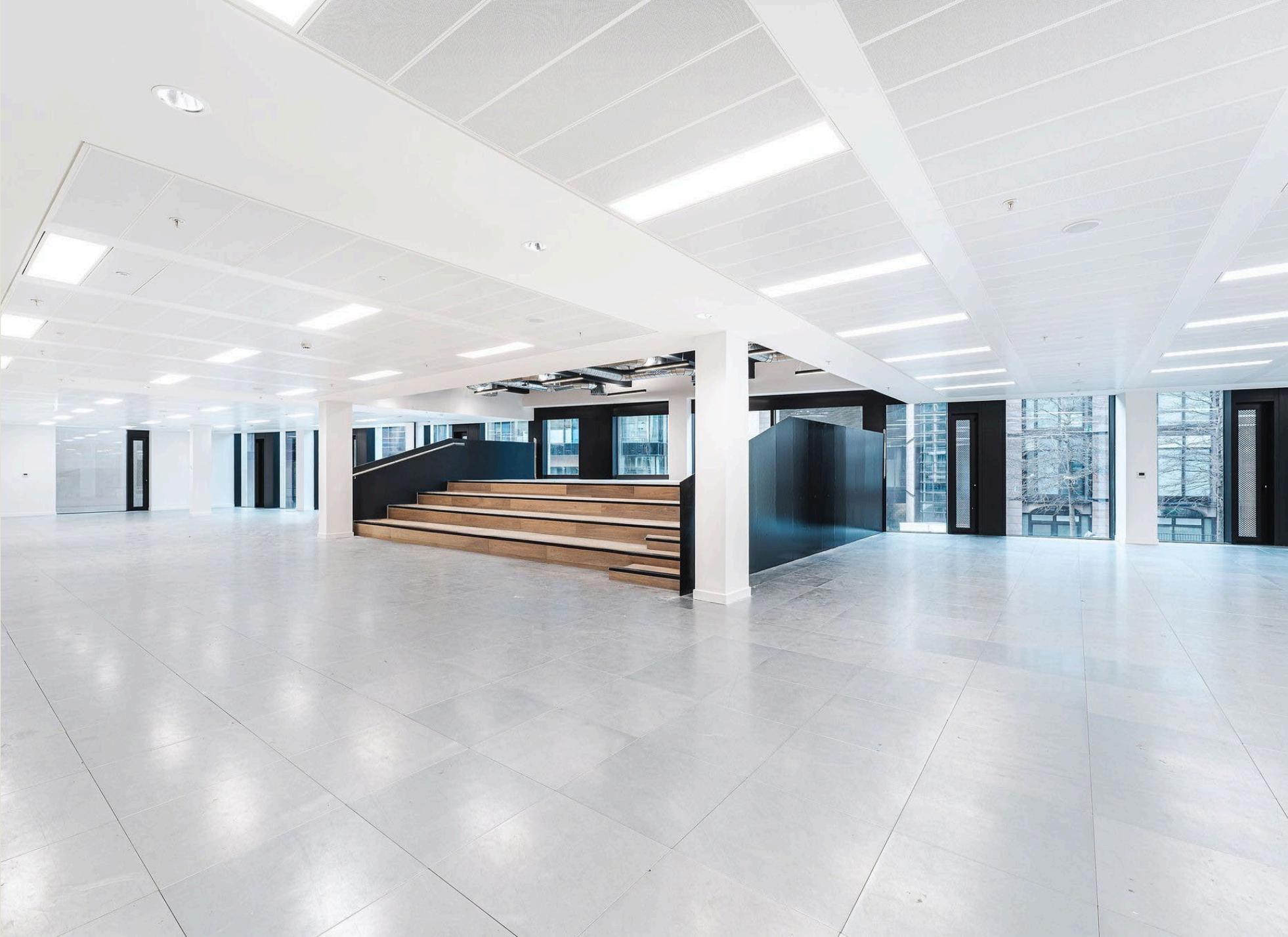


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**30 Semple Street**



**30 Semple Street**



30 Semple Street



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30 Semple Street



**30 Semple Street**



# 30 Semple Street



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# 30 Semple Street, Edinburgh

## NABERS UK Design for Performance — Project Case Study

KJ Tait were appointed to support the refurbishment of 30 Semple Street, Edinburgh under the NABERS UK Design for Performance (DfP) framework. This case study sets out the scope of our involvement, the energy measures incorporated, the challenges encountered, and the lessons learned through to operational handover and beyond.

NABERS UK

RIBA STAGES 2-5

DESIGN FOR PERFORMANCE



# What We Did on the Project

KJ Tait's role focused on ensuring the building was designed, delivered, and handed over in a way that maximised the likelihood of achieving its Design Reviewed Target Rating in operation. Our involvement spanned the full DfP lifecycle, from early stage energy modelling through to handover.

## Energy Modelling & Targeting

- NABERS UK DfP energy model developed throughout and finalised at RIBA Stage 4 using IES VE
- Robust NABERS target identified, balancing ambition with modelling margin
- Off-axis and sensitivity testing to identify performance risks
- M&E Designers

## Delivery & Handover Support

- Rating Achievement Plan prepared to protect design intent through construction, fit-out and early operation
- Metering strategy reviewed for NABERS UK compliance
- Operational Handover Guide produced for facilities managers and tenants
- Post handover technical input on ventilation control issues

All Design for Performance work was reviewed by an Independent Design Reviewer as part of the NABERS process.

# Energy Saving Measures Incorporated

The energy strategy was structured around reducing operational energy demand and avoiding unnecessary mechanical system operation. Measures were modelled using realistic performance assumptions to give a credible picture of in-use performance.



## Fabric & Passive Measures

- Replacement façade with improved thermal performance
- Enhanced insulation to walls and roof beyond regulatory minimums
- Solar control through façade design and shading modelling
- Air tightness target modelled conservatively to reflect build risk. We did not use Macroflo for infiltration for this project.

## Heating, Cooling & Ventilation

- Hybrid VRF systems on office floors; fully electric building
- MVHR with high-efficiency thermal wheel heat recovery
- Demand controlled ventilation via CO<sub>2</sub> sensors
- Economy cycle to limit mechanical cooling in suitable outdoor conditions (this was VE'd out the project)

## Mixed Mode & Renewables

- Openable windows with contact sensors; local FCUs disabled automatically when open
- Natural Ventilation Indicator Panels guide occupant window use
- High efficiency LED lighting with occupancy and daylight controls
- Roof mounted PV array modelled with estimation of consumption used by base services

# Issues & Challenges Encountered

The Design for Performance process is specifically structured to surface performance risks before they become operational problems. At 30 Semple Street, several critical risks were identified during modelling — and a number materialised in early operation, requiring active technical response.

## Occupant Behaviour Risk

Modelling demonstrated that failure to use openable windows for natural ventilation would reduce the NABERS rating from **5 stars to circa 4.5 stars** — identified as the single biggest performance risk. Mitigation relied on tenant guidance, controls integration, and clear operational documentation embedded in the handover package.

## Ventilation Noise & Control

Post handover, tenants reported elevated noise from ventilation systems. Investigation revealed the system was operating under a **constant pressure control strategy** even at low demand, unnecessarily increasing noise and fan energy. KJ Tait recommended a transition to true demand controlled ventilation, incorporating AHU pressure reset, improved BMS logic, and reduced duct pressures at low demand.

## Operational Control Risk

Changes to BMS setpoints during commissioning or early operation were identified as a material risk to the NABERS rating. The project relied on **clear landlord control of central plant**, disciplined logging of out-of-hours operation, and a well-documented handover to prevent unintended drift from the design intent.

# Handover Guide — Summary

30 Sempole Street, Edinburgh | KJ Tait for BBC Pension Fund & CBRE Global Investors

## Mechanical Systems

Mitsubishi hybrid VRF (21°C/23°C setpoints), AHU with thermal wheel heat recovery (15 l/s/person), openable windows on all facades G–L6, air source heat pumps for domestic hot water.

## Key Operational Recommendations

VRF off when unoccupied; ventilation CO<sub>2</sub> controlled (800ppm threshold); out of hours use must be pre-agreed and logged; use openable windows when conditions allow.

## Fit-Out Requirements

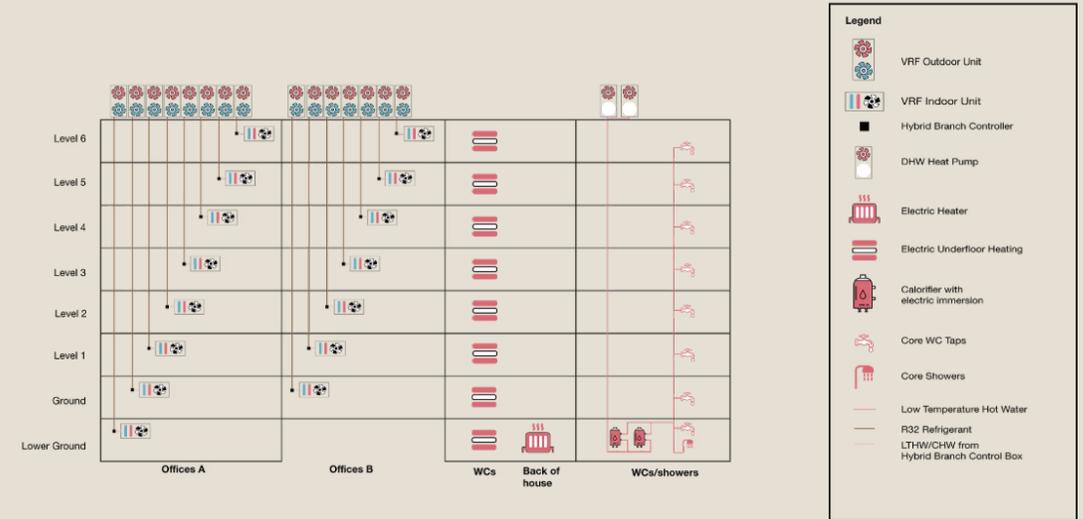
Tenants must install dedicated split units for comms rooms; point-of-use hot water heaters from tenant power boards; all fit-out to protect NABERS, BREEAM Outstanding and EPC A ratings.

## Managing Agent Obligations

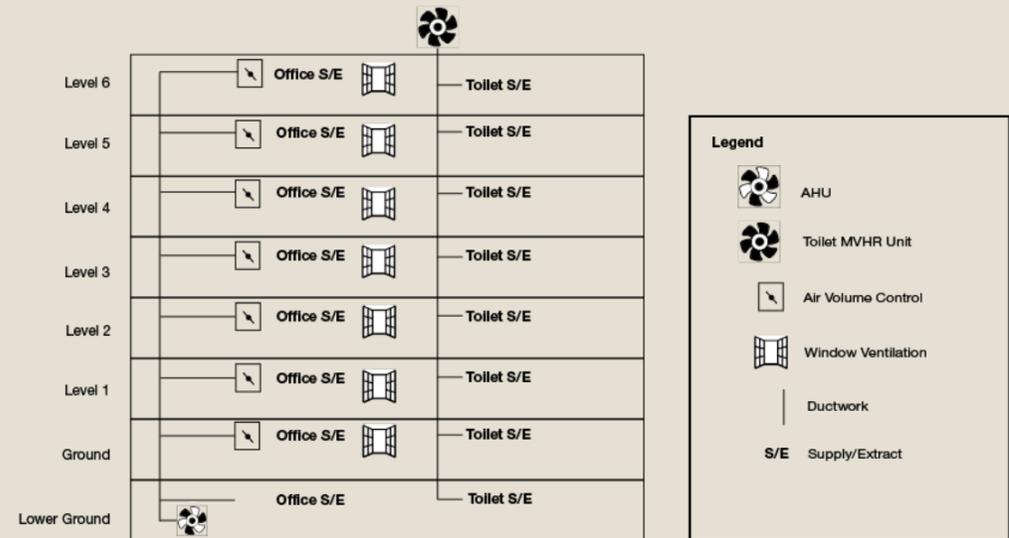
Track and log all out of hours occupancy requests; coordinate with CBRE for NABERS assessment; manage energy metering and green tariff supply.

## Metering & Energy

Single electricity utility meter; true green tariff with additionality required; roof mounted PV array reduces grid draw; sub-metering for tenant and landlord loads.



Heating & Cooling — Floor-by-Floor Equipment Layout



Mechanical Ventilation — Supply & Extract Layout



# Key Takeaways

## Controls & Operation Matter as Much as Plant

Energy performance at 30 Simple Street was shaped as much by BMS logic, ventilation control strategies, and occupant behaviour as by the specification of high-efficiency plant. Design alone is insufficient.

## Risk Must Be Identified Early

NABERS UK DfP requires early identification of performance risks and active management of those risks through to handover and into operation. The ventilation control issues encountered reinforced the value of this proactive approach.

## Mixed Mode Needs Clear Communication

Mixed mode operation was essential to achieving the target rating. Its success depends not only on good design, but on tenant engagement, intuitive controls, and operational guidance that translates design intent into everyday behaviour.

# New Clarendon: Installation Background & Operational Context

CASE STUDY

5-STAR TARGET

## Building Overview

New Clarendon is a multi-floor office development where landlord and tenant spaces are served by VRF systems and a central AHU arrangement. The building was designed under NABERS UK Design for Performance with a **5-star target rating**, and early dynamic results remain closely aligned with the model.

## Metering & Monitoring

The electrical metering strategy includes separate mechanical and lighting channels and landlord meters feeding into the BMS and a live dashboard. Monthly actual readings override modelled values, enabling dynamic performance tracking against the DfP model throughout the operational period.

### Systems

VRF heating & cooling, central AHU, landlord and tenant areas served separately

### Metering

Sub-metering for mechanical, lighting and landlord loads; integrated with BMS via metering device

### Monitoring

Monthly model vs actual comparisons via dashboard

# New Clarendon: Key Lessons Learned

Early operational monitoring at New Clarendon highlighted several areas where the gap between design assumptions and operational reality required prompt intervention. These lessons are directly transferable to future DfP projects.

## → Metering Configuration Must Be Correct from the Outset

Early grouping of tenant lighting and mechanical loads inflated reported landlord energy figures. Multiple BMS corrections were required to correctly display and separate meter channels, distorting early NABERS performance tracking until resolved.

## → Remote Access Is Critical for Ongoing Optimisation

A reliable internet connection and remote BMS access tools proved essential for diagnosing and resolving operational issues efficiently. Without remote access, it is difficult to keep up a regime of gathering data and checking BMS settings

## → VRF Schedules and Setpoints Must Reflect Actual Occupancy

VRF systems operating on full schedules in unoccupied floor areas caused significant avoidable energy use. Reducing runtimes to match actual occupancy patterns delivered measurable consumption reductions. Temperature setpoints and operating schedules must be aligned with DfP modelling assumptions to avoid unnecessary energy penalty.

# 76–78 Portland Place: Installation Background & Operational Context

CASE STUDY

4.5-STAR TARGET

## Building Overview

76–78 Portland Place is a mixed-use office building targeting a **4.5-star NABERS rating** under Design for Performance. The building uses a combination of VRF condenser units, a basement AHU with DX coil, MVHRs, and FCUs for heating, cooling and ventilation. Additional electrical loads include lifts, overdoor heaters, DHW immersion heaters, and an on-site PV system.

## Monitoring Approach

Multiple meters feed into BMS, with results displayed on a Power BI dashboard. Monthly metered data is used to track actual performance against the DfP model. Early results show condenser units as the dominant electrical load, with consumption significantly above modelled values in the initial operational period.

## Systems at a Glance

- VRF condenser units
- Basement AHU with DX coil
- MVHRs and FCUs
- DHW immersion heaters
- Lifts and overdoor heaters
- On-site PV generation

## Dashboard

Power BI dashboard with monthly model vs actual comparison. Early results indicate higher-than-modelled consumption, particularly from condenser units.

# 76–78 Portland Place: Key Lessons Learned

Early operational monitoring at Portland Place revealed that the gap between modelled and actual energy use was substantial, driven by a combination of operating hour misalignment, metering quality issues, and control logic deficiencies. Each issue has clear implications for future DfP projects.

1

## Operating Hours Must Match DfP Assumptions

Actual energy use was significantly higher than modelled, driven partly by plant running outside DfP assumed hours. Overnight operation of condenser units and the basement AHU resulted in substantial unnecessary consumption. The DfP model must either reflect realistic operating hours or schedules must be enforced to match model assumptions.

2

## Metering Quality Requires Active Verification

Multiple metering issues were identified: capped meter logs, lift and PV meters not recording, and meters displaying incorrect running totals. These errors directly impact the accuracy of NABERS performance tracking and required systematic correction before reliable analysis was possible.

3

## Control Logic and Trend Logging Need Review

FCU control issues were observed, including units heating already-warm rooms, indicating setpoint logic was not functioning as intended. AHU alarms, DX coil hold-off settings, and data retention required follow-up commissioning. Improved trend logging will be essential for effective ongoing optimisation and fault diagnosis.

# Cross-Project Lessons: What DfP Experience Tells Us

Patterns emerging from 30 Semple Street, New Clarendon and 76–78 Portland Place



## Metering is Foundational

Across all three projects, metering configuration and data quality were among the earliest and most consequential challenges. Errors in meter grouping, logging gaps, and incorrect totals undermine performance tracking. Metering must be verified as a commissioning priority, not an afterthought.



## Controls Define Operational Reality

BMS setpoints, pressure control strategies, and equipment schedules have a direct and measurable impact on NABERS ratings. Commissioning must extend beyond functional testing to confirm that controls operate in a manner consistent with DfP modelling assumptions, and that this alignment is maintained over time.



## Occupants and Operators Shape Outcomes

Mixed mode operation, window use, and out of hours controls all depend on clear communication to facilities managers and tenants. Handover documentation that translates design intent into operational guidance is not optional, it is central to achieving a Design for Performance rating in practice.

□ The NABERS UK Design for Performance framework places accountability on the entire project team, from designer to operator. This is to protect the performance intent of the building throughout its operational life. The process never stops.

**Thank You!**



**Adam Frickleton**

Director

[A.Frickleton@mlaarchitects.co.uk](mailto:A.Frickleton@mlaarchitects.co.uk)



**Paul Miller**

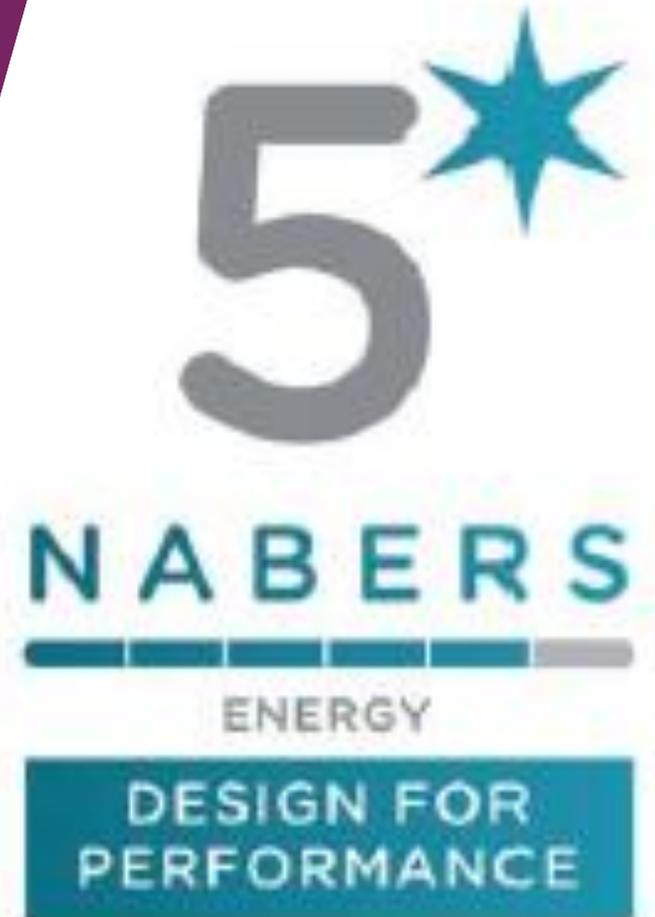
Director

[Paul.Miller@kjtait.com](mailto:Paul.Miller@kjtait.com)



# Cost, Programme and Procurement Implications of NABERS

Why early decisions matter more than the rating itself



# What I'll cover

- ✓ Principles of cost certainty
- ✓ Impact of early (or late) decisions
- ✓ What drives building cost
- ✓ Impact of NABERS
- ✓ Retrofit vs new build
- ✓ Key takeaways



# 5 PRINCIPLES OF COST CERTAINTY

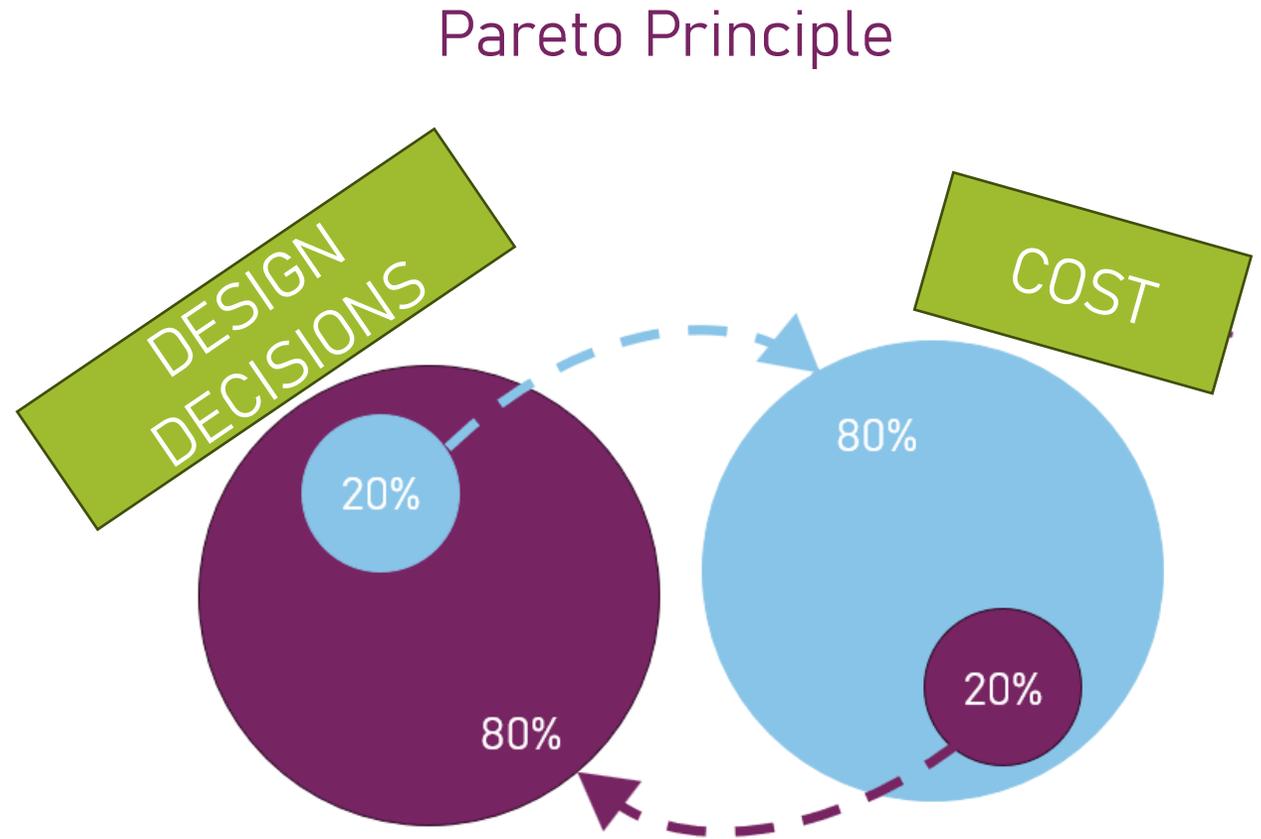


# The most important cost decision

When do you decide?

Early decisions = lower cost

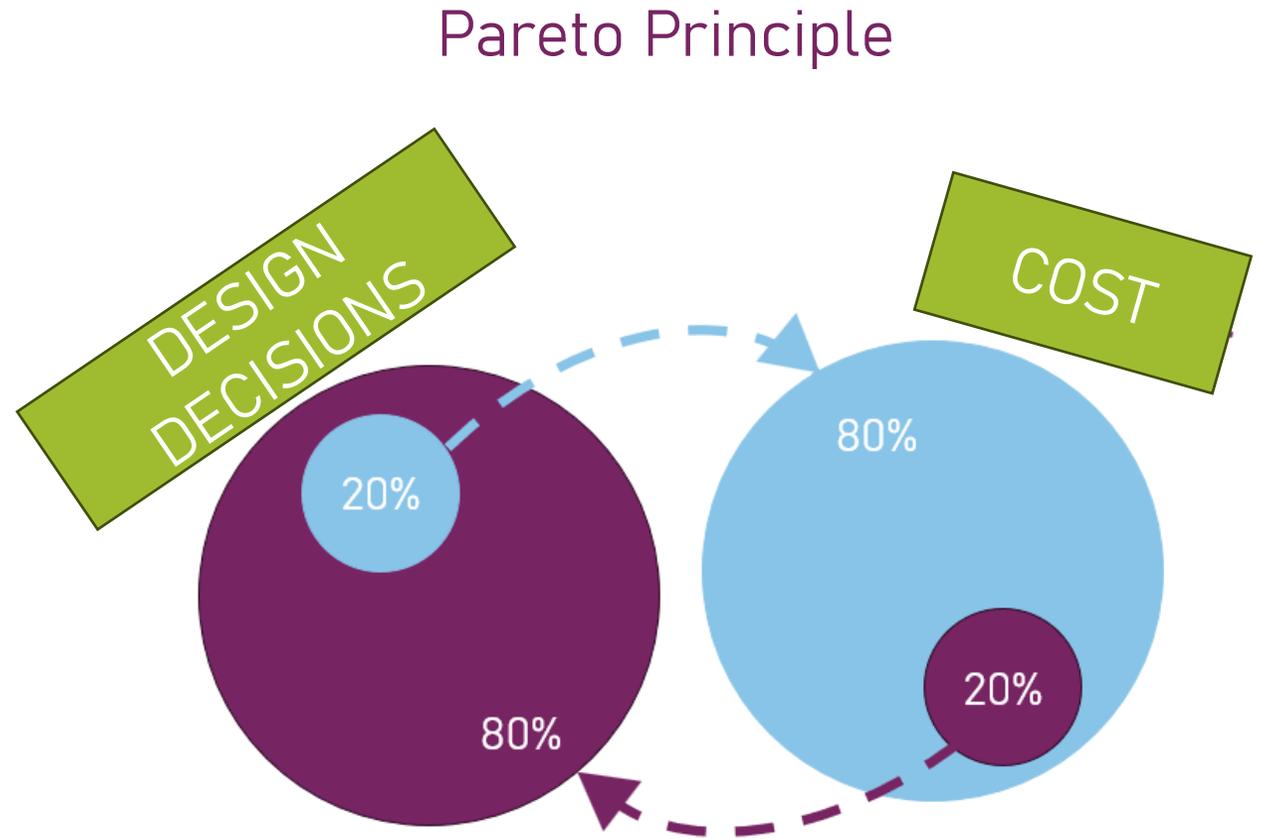
Late decisions = expensive change



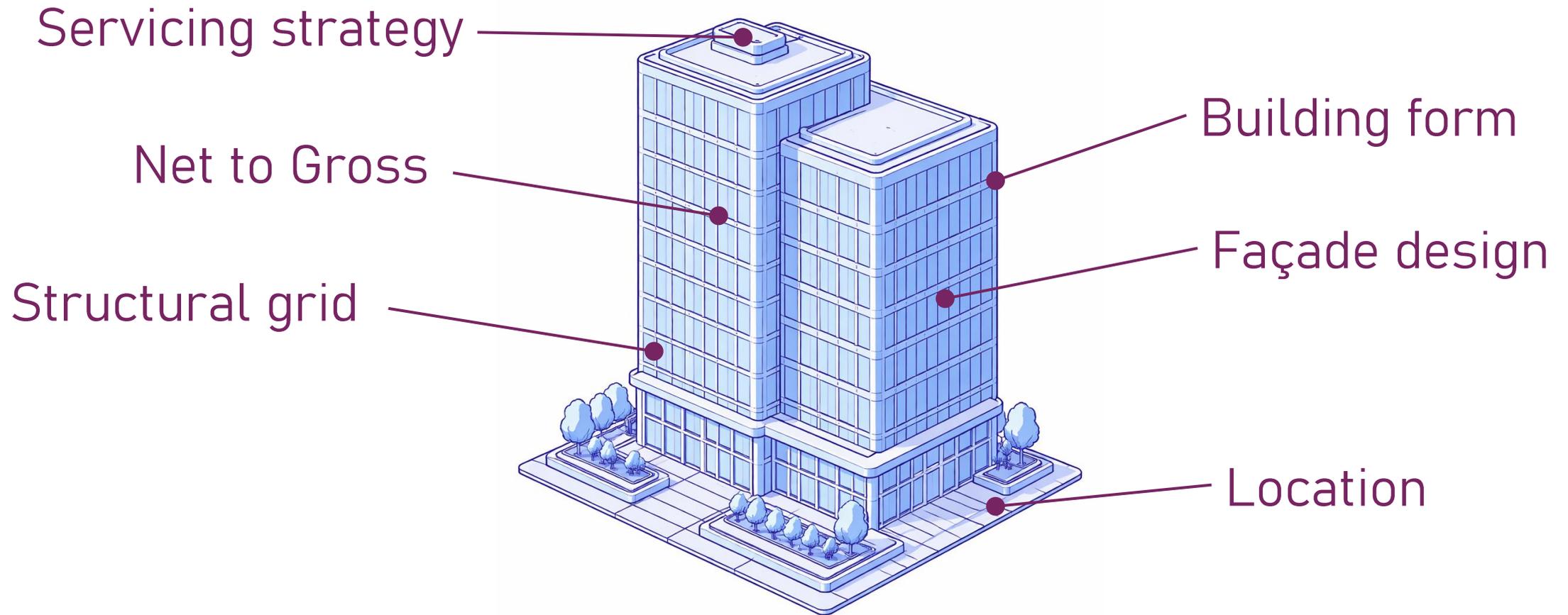
# This applies to EVERY type of target

- NABERS
- BREEAM
- LEED
- WELL
- Net Zero

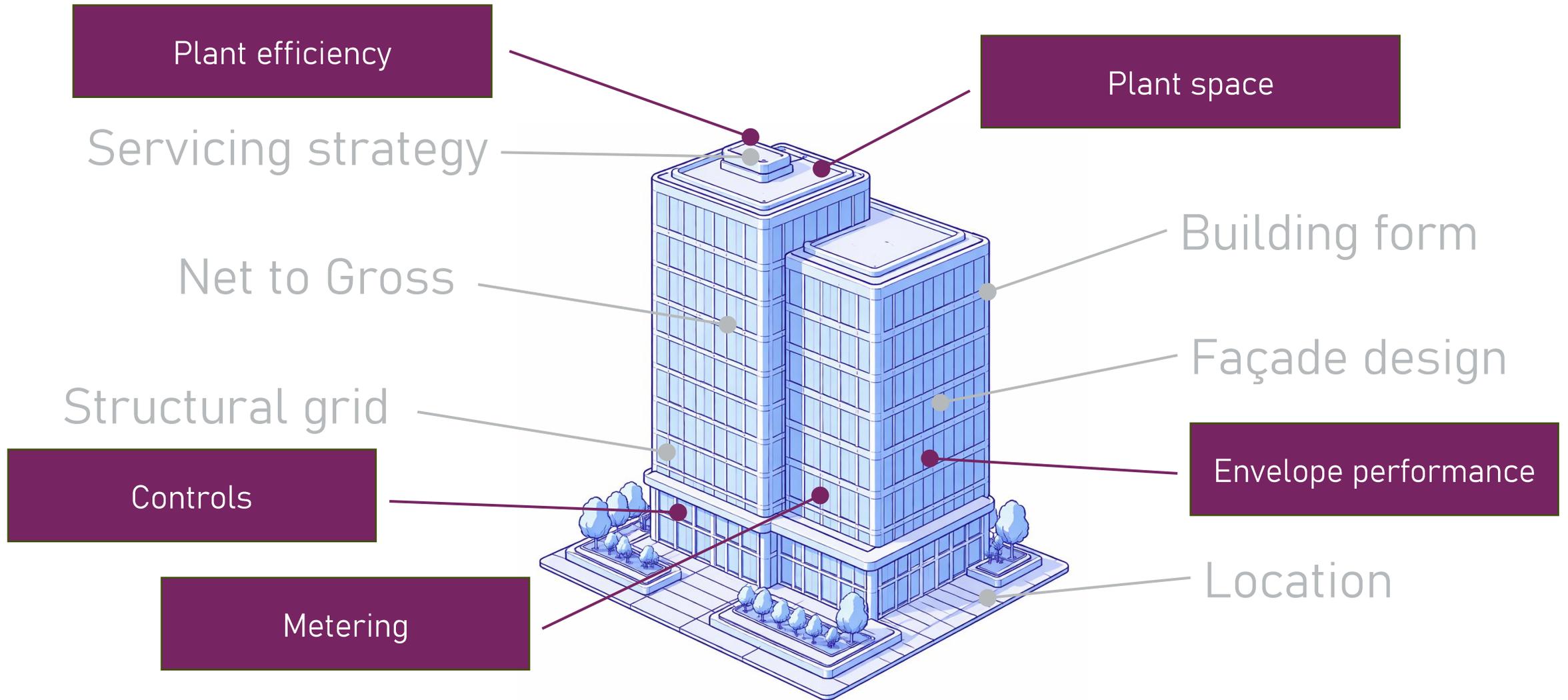
The earlier the target is set, the more cost effective (and easier) it becomes to meet.



# What drives building cost?



# Where NABERS starts to influence cost



# Impact of NABERS (DfP)?

## Cost

- Energy monitoring and controls
- Sub-metering
- Commissioning
- Performance verification
- Preliminaries
- Fees (assessment and design team)
- Post occupancy measurement

## Programme

- Similar duration
- Key difference:
  - More commissioning
  - More tuning
  - More verification

## Procurement & Risk

- Performance target vs design responsibility
- Who carries the risk?
  - Developer
  - Contractor
  - operator

# Impact of NABERS?

Cost impact on elemental construction\* costs (NABERS versus a typical office building)

	Element	4-5 Star	6 Star	Cost change
0	Facilitating works			Unlikely to change, except in retrofit
1	Substructure			Unlikely to change
2	Superstructure			External envelope tends to be impacted. Typically higher impact on a retrofit project
3	Internal finishes			Unlikely to change
4	Fittings, furnishings and equipment			Unlikely to change
5	Services			Biggest impact typically in Mechanical and Electrical services, and commissioning
7	Work to existing buildings			Unlikely to change, except in retrofit
8	External works			Unlikely to change, assuming utilities connections would change in any case
9	Main contractors preliminaries			Impacted by management, commissioning
10	Main contractors OH&P			Oncost, so will be proportionate to the above cost changes
11	Project and design team fees			Additional assessment fees, design fees, modelling, verification etc
13	Risks			Project specific and dependent on procurement strategy

\*Excludes operational and facilities management costs.

# Retrofit vs new build

Some additional considerations for retrofit that impact cost



Existing facade performance

Ceiling heights

Plant & riser space

Structural constraints

Location

Risk profile

Opportunity

Embodied carbon savings

# Key takeaways

- ✓ Decide the NABERS target early
- ✓ Most of the cost is in services and commissioning
- ✓ Allow time and budget for commissioning
- ✓ Procurement must align responsibility with performance
- ✓ Retrofit increase complexity, but also introduces opportunity



# Thank you.

Contact details:

David Shaw

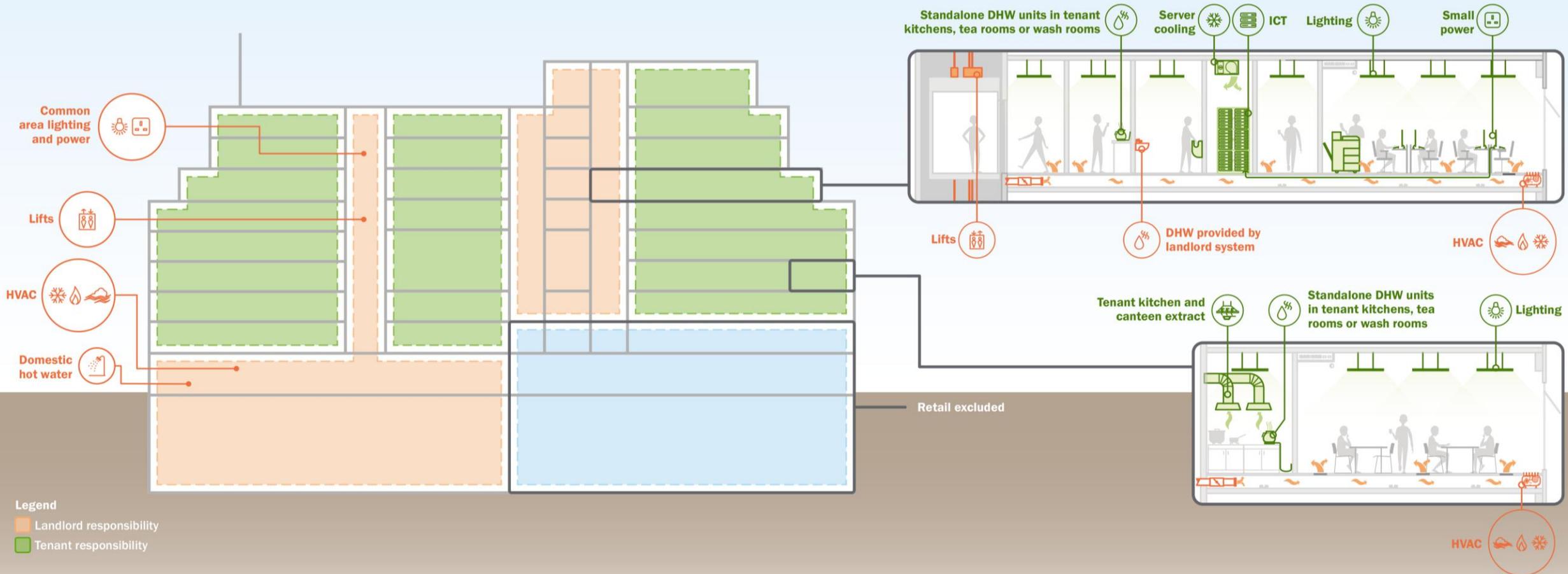
Director, Torriron Cost Consultancy

[david@torriron.co.uk](mailto:david@torriron.co.uk)

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# NABERS Requirements from an MEP Perspective

CIBSE Scotland – Jeremy Cockroft Annual Seminar - March 2026



# Presentation key points



1

NABERS and Design for Performance principles and requirements



2

Implications on design, commissioning and operation from an MEP perspective



3

Case studies

# My background and experience



Low  
Carbon  
Consultant



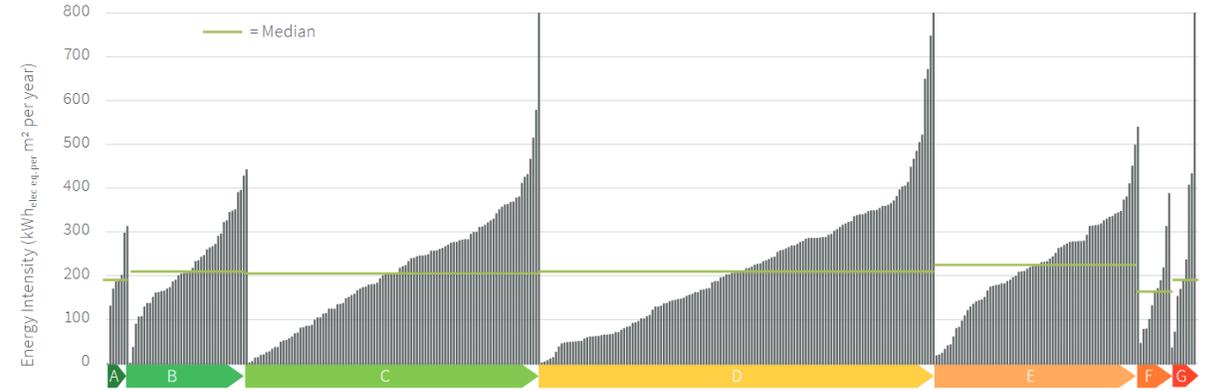
- Background in **mechanical building services engineering**
- **Low Carbon Energy Assessor** since 2016
- Registered **NABERS UK assessor**
- My experience in Atelier Ten on projects that successfully passed IDR:
  - **James Thomson House, Dundee**
  - **33 Cadogan Street, Glasgow**
  - **55 Old Broad Street, London**



# **NABERS and Design for Performance – principles**

# Why NABERS?

- **Building performance gap** caused by ‘design for compliance’ culture
- **EPCs and BRUKLs are not fit** for measuring performance
- Need to move towards an **operational energy-focused metric**
- Recognised under the **UK Net Zero Carbon Buildings Standard**

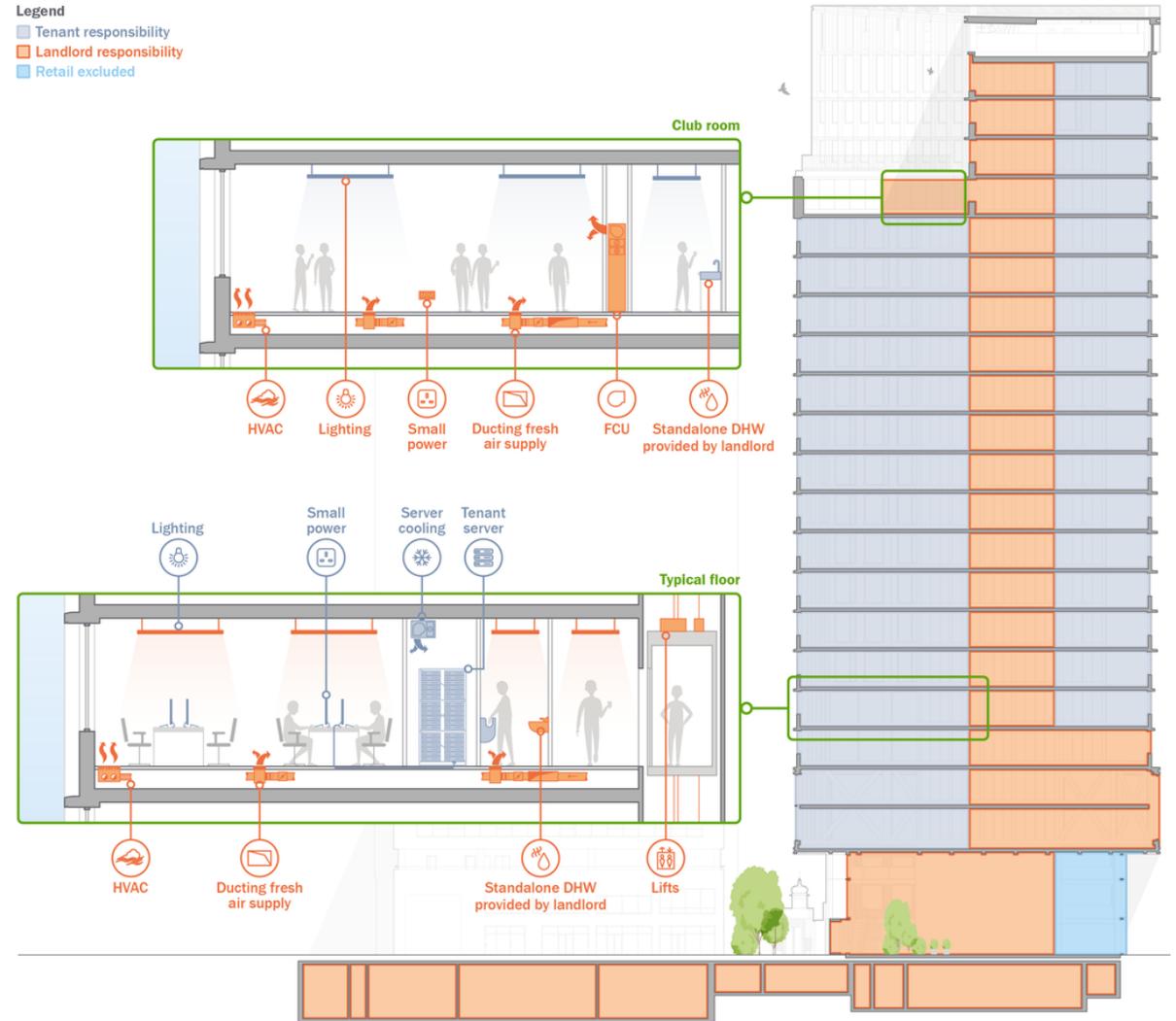
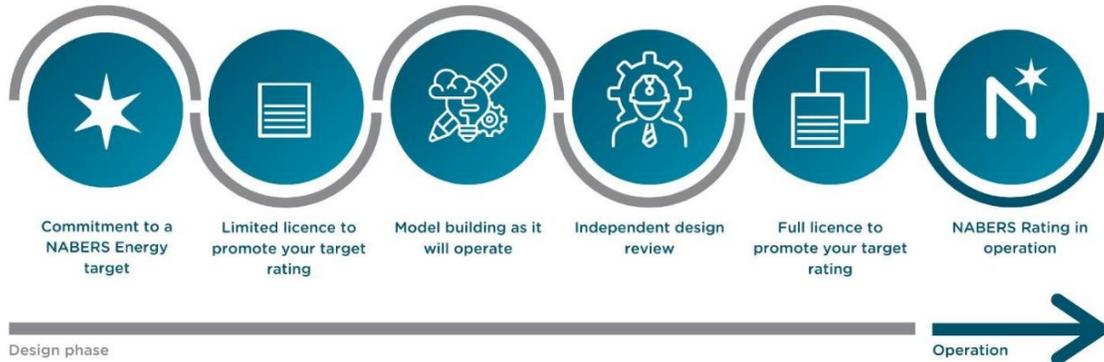


Source: Design for Performance (Better Buildings Partnership, 0219)



# NABERS Design for Performance requirements

- Base Build only
- Commitment to Target Rating (minimum 4 Stars)
- Rating Achievement Plan
- Compliant simulation using advanced HVAC plant modelling
- Independent Design Review
- Quarterly operational energy reports
- Final validation of NABERS Rating on site by an independent NABERS UK Assessor not involved in design or construction of project

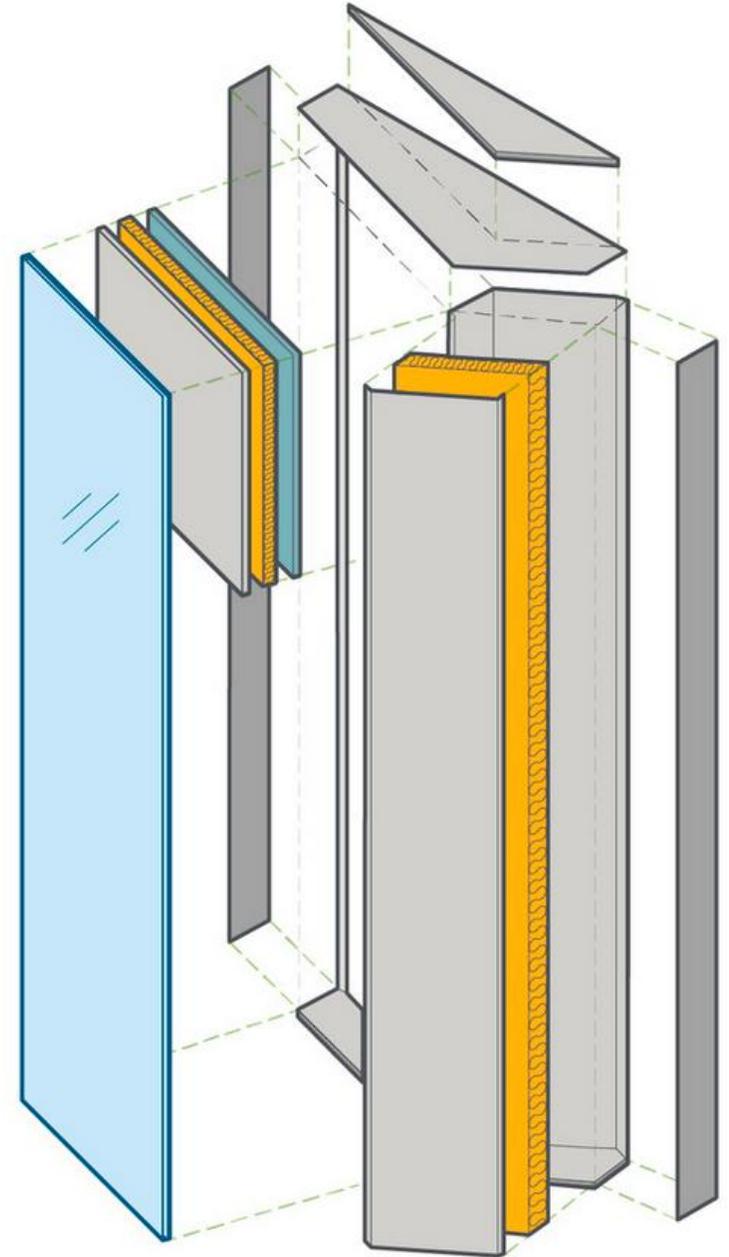


**NABERS implications – design, commissioning, operation**

# NABERS implications on design process

## Façade performance

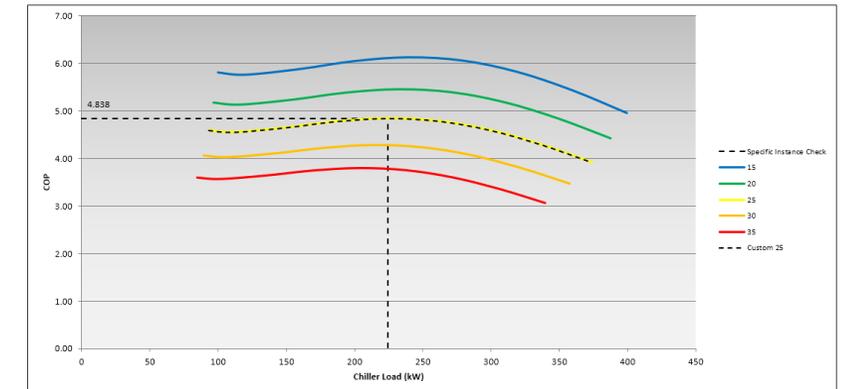
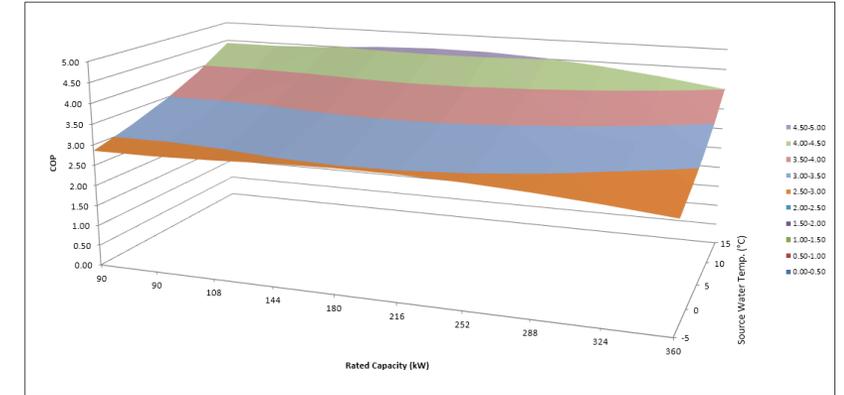
- Optimise U-values, g-values, glazing ratios
- Ensure façade performance figures are well communicated and detailed in advance
- Consider curtain wall limitations
- Include shading and solar gain control
- Minimising cooling load leads to improved plant sizing
- Early detailed modelling benefits the project



# NABERS implications on design process

## HVAC systems

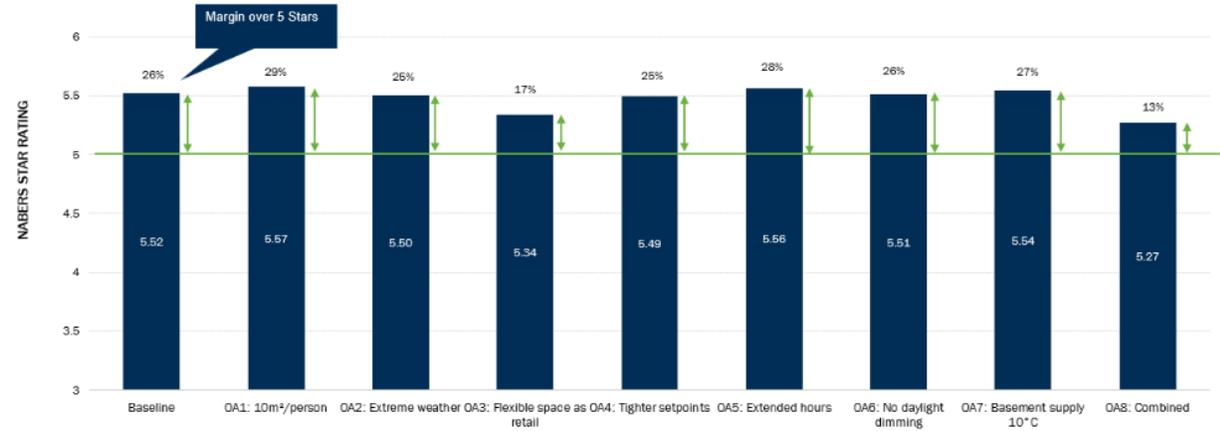
- **Advanced HVAC plant modelling** (e.g. IES VE ApacheHVAC)
- Increased focus on **part-load efficiency curves for selecting HVAC plant**
- **Oversizing plant** can lead to **suboptimal operation**
- **Certain system types** tend to operate more efficiently, such as **water-based loops with ASHPs and heat recovery**
- Use **heat recovery** where possible
- **Cool tenants' server rooms** with **dedicated DX units**



# NABERS implications on design process

## Simulation and modelling

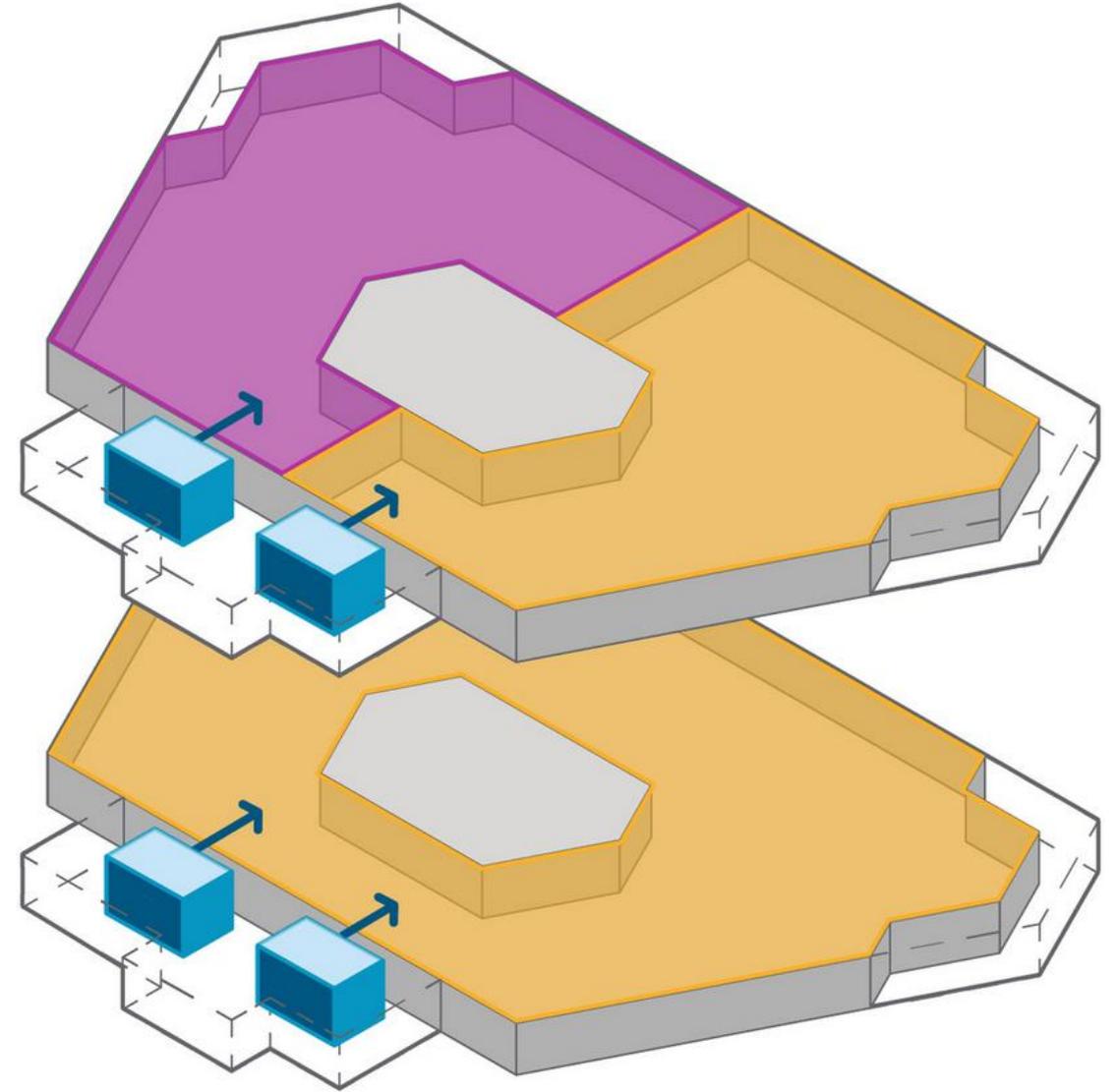
- **Sensitivity analysis** and tuning
- **Off-axis** scenarios
- Bridging **gap** between design and performance
- Common considerations during DfP:
  - Sub-metering suitability
  - Detail in controls strategies
  - 24/7 use spaces (e.g. reception)
  - Car park lighting and ventilation



# NABERS implications on design process

## BMS controls strategy

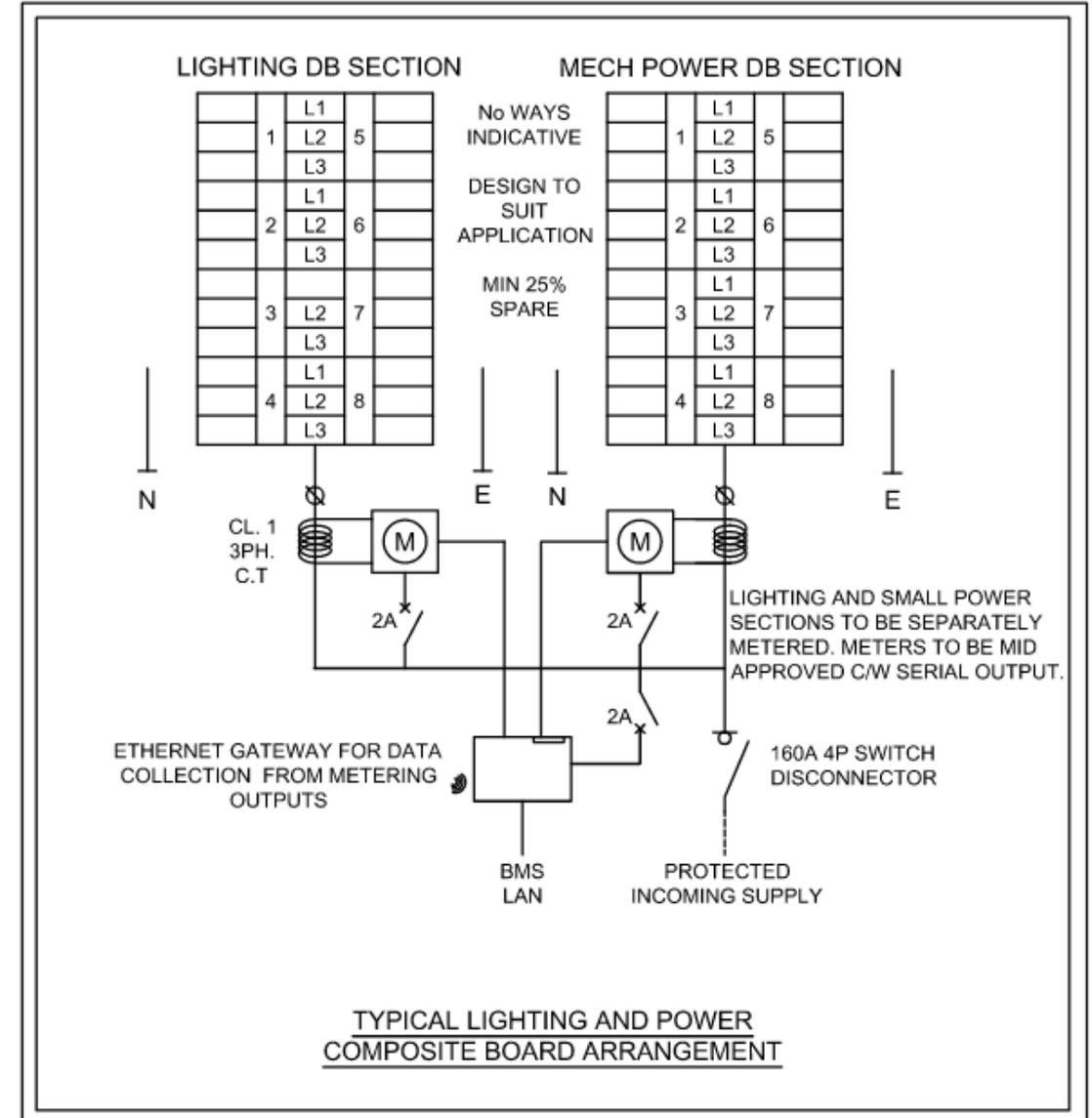
- **Open-plan zoning** tends to perform better than cellular
- **Plant sequencing** needs consideration to align with optimal part-load operation
- **Early-stage optioneering** builds knowledge
- **Seasonal commissioning** is key



# NABERS implications on design process

## Metering and submetering

- **Submetering** matters
- Tenant on-floor equipment – **split metered** distribution boards
- Meters need **grouping** to reflect the report categories
- **BMS graphic** to show the categories as per report
- **Metering matrix** provides clarity



# NABERS implications on construction and handover

- Consider using **Independent Commissioning Agents**
- Metering **validation** requirements
- Ensure quality of **BMS documentation** and **staff training**
- **Longer commissioning periods** will need to be accommodated in **project programmes** and not rushed in the end

The Rules | Metering and Consumption | Version 2.1

Appendix B | Non-utility metering system validation records



Example 1: Validation record for electrical non-utility metering systems								
(See Section 7.3.2 on requirements for validating electrical non-utility metering systems.)								
Name of premises:			Name of person undertaking validation:					
Address of premises:			Qualification and/or certified licence number:					
			Date of validation:					
ID (meter number or tenancy/unit number)	Description (meter brand and type)	Wiring check <sup>1</sup>	CT ratio (of installed CTs)	For externally multiplied meters:		For meters with internal multipliers:		
				Does meter face reading need to be multiplied to calculate true consumption?	If so, confirm multiplication factor to be applied to account for CT ratio	Can meter multiplier be interrogated on meter face?	If so, record meter multiplier and attach photographic evidence	If not, use tong-testing or a hand-held meter to compare measured current and meter face current per phase
				Yes/No		Yes/No		/ / / /
				Yes/No		Yes/No		/ / / /
				Yes/No		Yes/No		/ / / /
				Yes/No		Yes/No		/ / / /

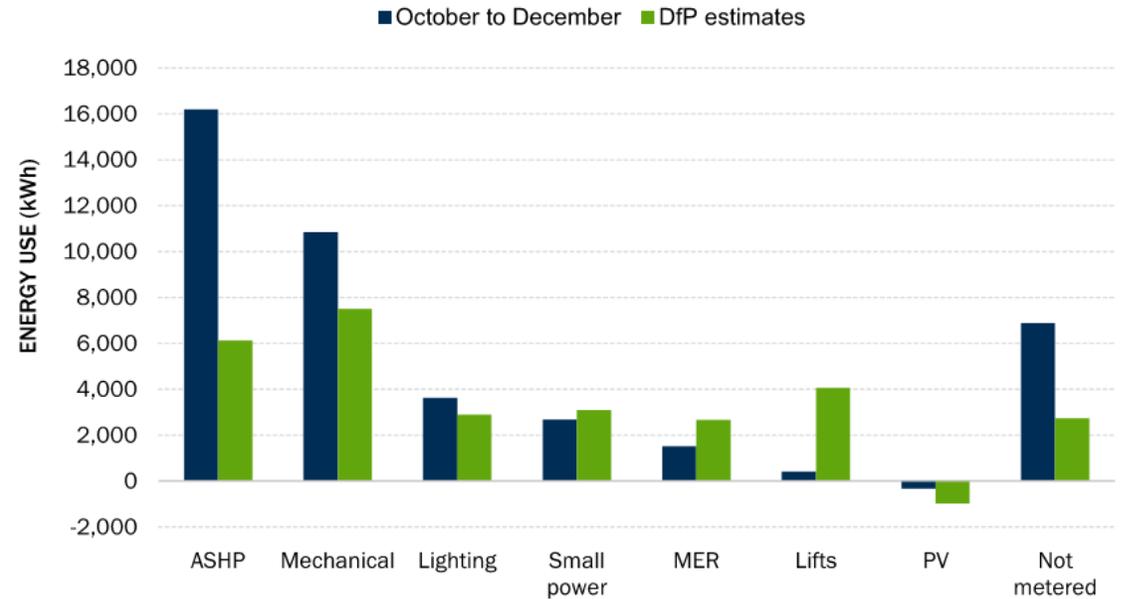
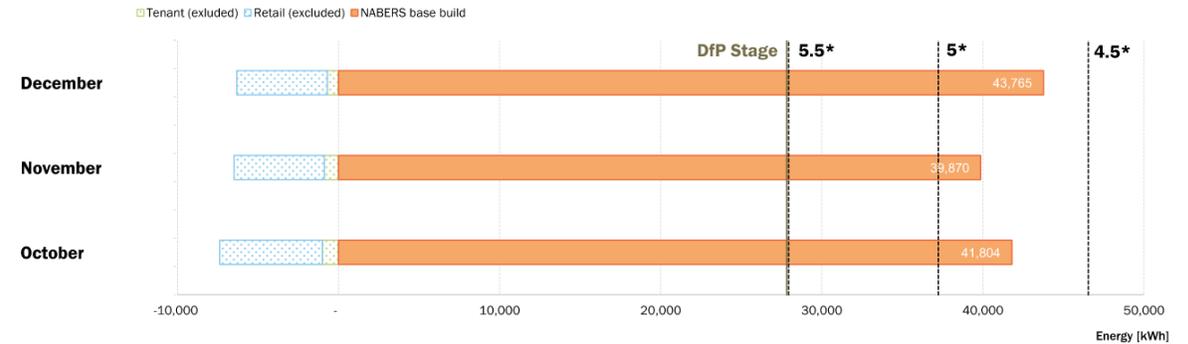
<sup>1</sup> Wiring check including reverse CT connection errors, cross phase CT connection errors, phase sequence connection errors and faulty or missing potential fuses.

Sign to record that the above non-utility metering systems are correctly configured and have been validated:

.....

# NABERS implications on operational phase

- Client to follow measures stated in the **Rating Achievement Plan**
- Ensure completeness of metered data
- Monitor setpoints, scheduling, overrides
- Quarterly operational energy reporting
- Extensive tuning in first year of operation
- Ongoing tuning needed to **avoid negative rating implications**
- Consider continuous commissioning vs. seasonal



# NABERS implications on costs and marketability

- Increased project costs
- Responsibility for **energy monitoring** and **collating info**
- Significantly **lower energy bills – increased marketability and valuation for Grade A offices**
- **Increased HVAC systems’ lifespan** as they are sized closer to load conditions and work as designed
- NABERS as emerging market differentiation:
  - **Lendlease (5\*+ in their development standards for new buildings)**
  - **British Land**
  - **Landsec**
- Increased visibility in Scottish market
- Alignment with UK Net Zero Carbon Buildings Standard Version 1 targets and corporate **Environmental, Social and Governance (ESG) metrics**



## UK Net Zero Carbon Buildings Standard

Building type	Sector	Date of Commencement	Minimum star rating
New	Offices	2026-2030	5★
		2031-2035	5.5★
Existing	Offices	2026-2030	4.5★
		2031-2035	5★

For details on Date of Commencement, see section 4.2.6

# Case studies

# Case studies

## James Thomson House, Dundee

- **Targeting NABERS 4 Star rating**
- **Key design features**
  - 5,600 m<sup>2</sup> NIA
  - Two retail units on ground floor
  - Changing rooms exclusive for tenant use
  - Amenity space on L5 (tenant exclusive)
  - Part Cat A, HVRF heating and cooling
  - Dedicated DHW ASHP
- **Challenges**
  - Indoor VRF units and BC boxes fed from the tenants' distribution board
  - Lack of detail in seasonal commissioning plan
  - Shell and core retail units fitted with electric panel heaters not submetered
- **Lessons learned**
  - Review commissioning plans early
  - Incorporate split distribution boards including mechanical power section



Credit: Cooper Cromar

# Case studies

33 Cadogan Street, Glasgow

- **Targeting NABERS 5 Star rating**
- **Key design features**
  - 27,250 m<sup>2</sup> NIA
  - Changing rooms exclusive for tenant use with HRUs
  - Ground floor café area accessible to the public
  - VRF for heating and cooling in offices
  - Centralised MV to offices
  - Dedicated DHW ASHP
- **Challenges**
  - Café area not submetered
  - Lack of detail around reporting BMS data at time of review
- **Lessons learned**
  - Detailed BMS Description of Operations document needs to be developed as early as possible



Credit: Cooper Cromar

# Case studies

55 Old Broad Street, London

- Two-stage IDR engagement (from end of Stage 3)
- Targeting NABERS 5 star rating
- Key design features
  - 25,537 m<sup>2</sup> NIA
  - Retained basement of existing 80s building
  - LTHW & CHW circuits with trench heating and FCUs
  - Heating and cooling done by chiller & ASHPs
  - WWHP covering simultaneous heating and cooling loads by using water in LTHW/CHW loops
  - Dedicated DHW ASHP
- Challenges
  - Correct sizing of WWHP
- Lessons learned
  - Plant sizing and sequencing is key to efficiency
  - Two-stage IDR engagement enabled early risk identification



Credit: Fletcher Priest Architects

# Summary and recommendations

# Recommendations for NABERS projects

-  • Set targets for energy efficiency at start
-  • Model at every stage to track performance
-  • Engage NABERS IDR early
-  • Obtain plant curves from manufacturers
-  • Separate DHW plant from space heating
-  • Plan BMS DesOps early
-  • Watch out for metering pitfalls
-  • Allow for continuous commissioning vs. seasonal
-  • Plan operational building tuning and data collection & processing before handover



**Building Services Engineers  
Environmental Design Consultants  
Strategic Sustainability Consultants  
Fire Engineers  
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**Bearford House  
39 Hanover Street  
Edinburgh EH2 2PJ**

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**Q&A**

# **Panel Session**

Building Performance – NABERS

Industry Viewpoints



# Thank You!!

Please join us for some networking drinks in the foyer.

