



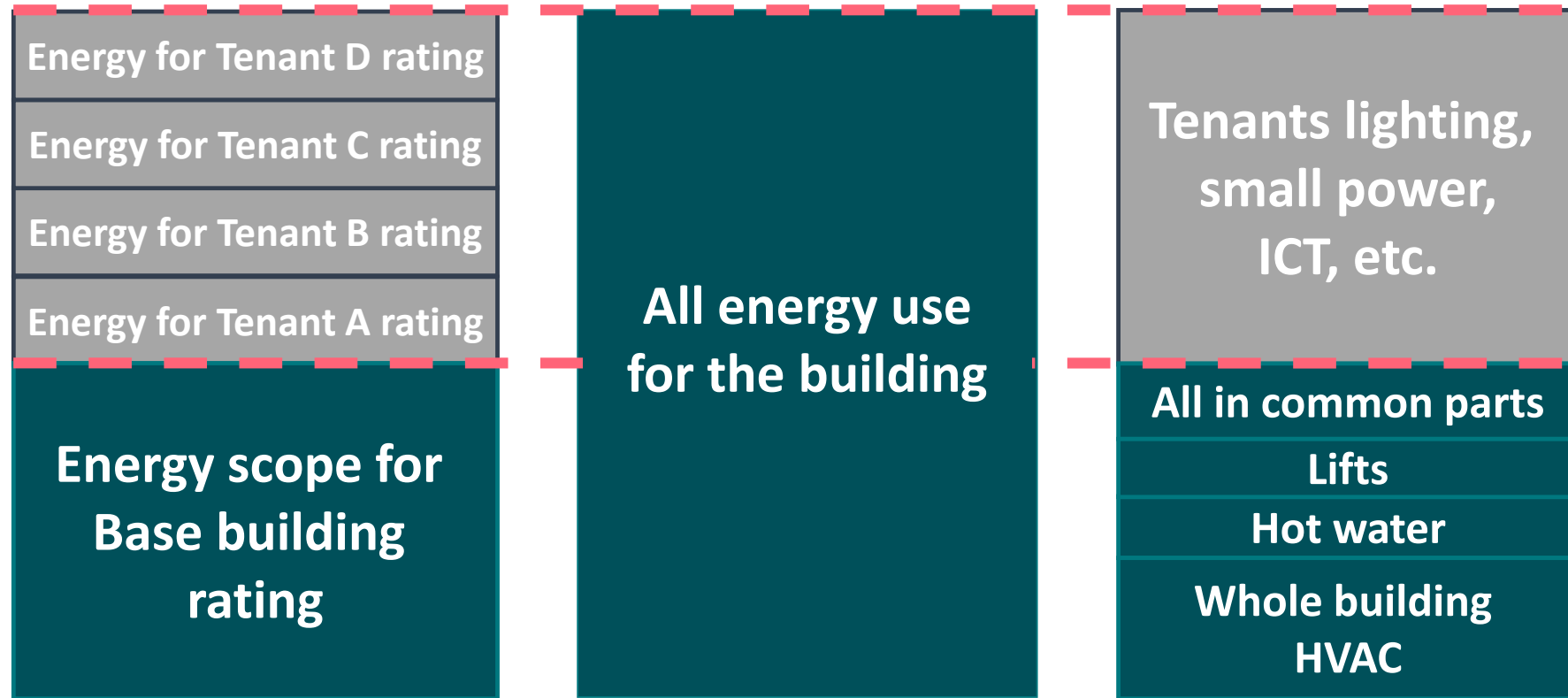
**CIBSE YEPG and BSG Event**  
**Advanced Simulation & Design for Performance**  
**Hoare Lea, 12-13 Stable Street, London N1**

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29 October 2019

**By following the process in a NABERS Commitment Agreement, Australian teams can now routinely achieve in-use operational energy performance ratings in line with the predictions of design stage models**

# Delineation of whole building energy use between landlord (base building) and tenants to define a suitable metric for building energy efficiency and give agency to each party

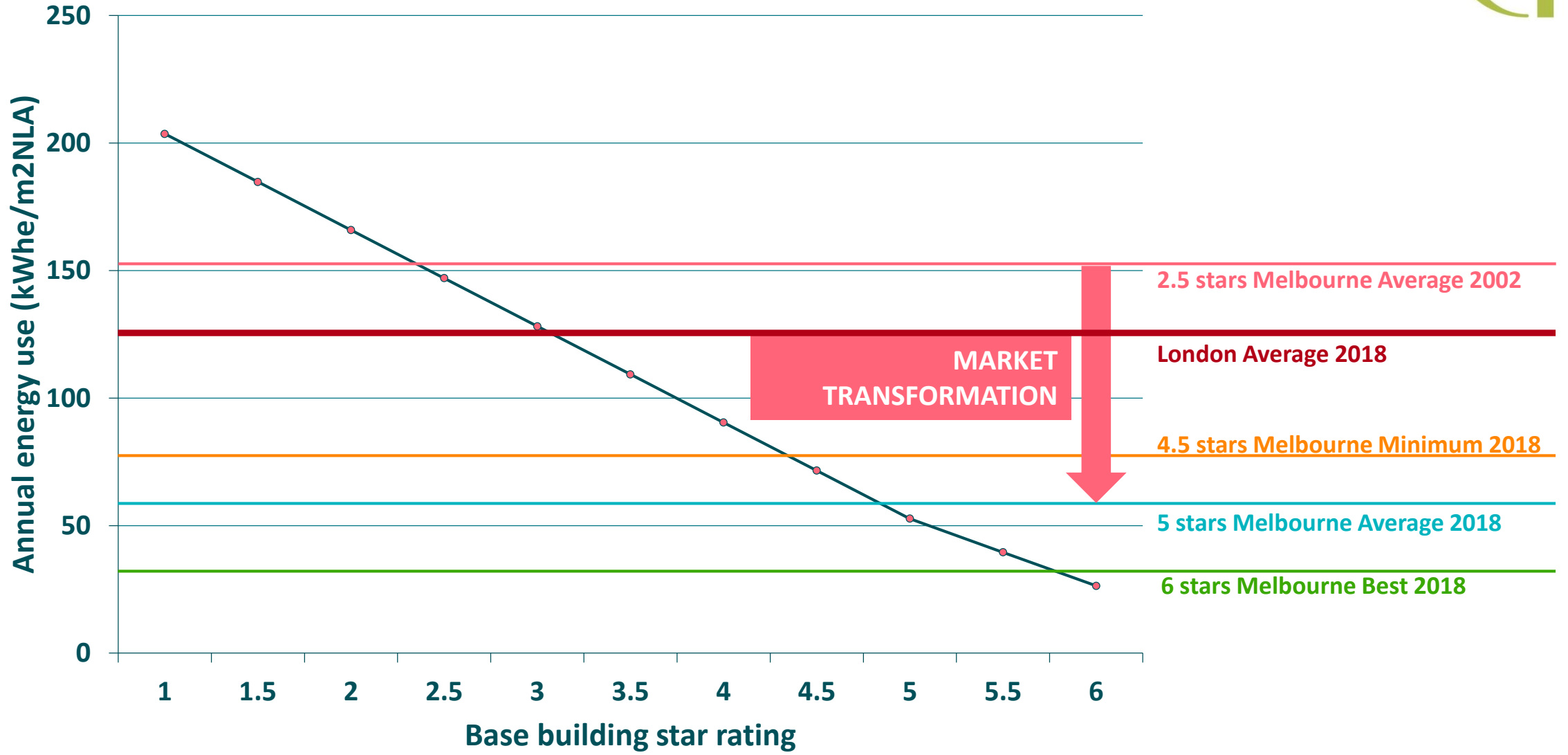


By delineating, measuring, rating and disclosing base building operational energy performance, the base building rating expressed as NABERS stars has become a KPI for all stakeholders, FM to FD

# What has been achieved in Australia (new office buildings)

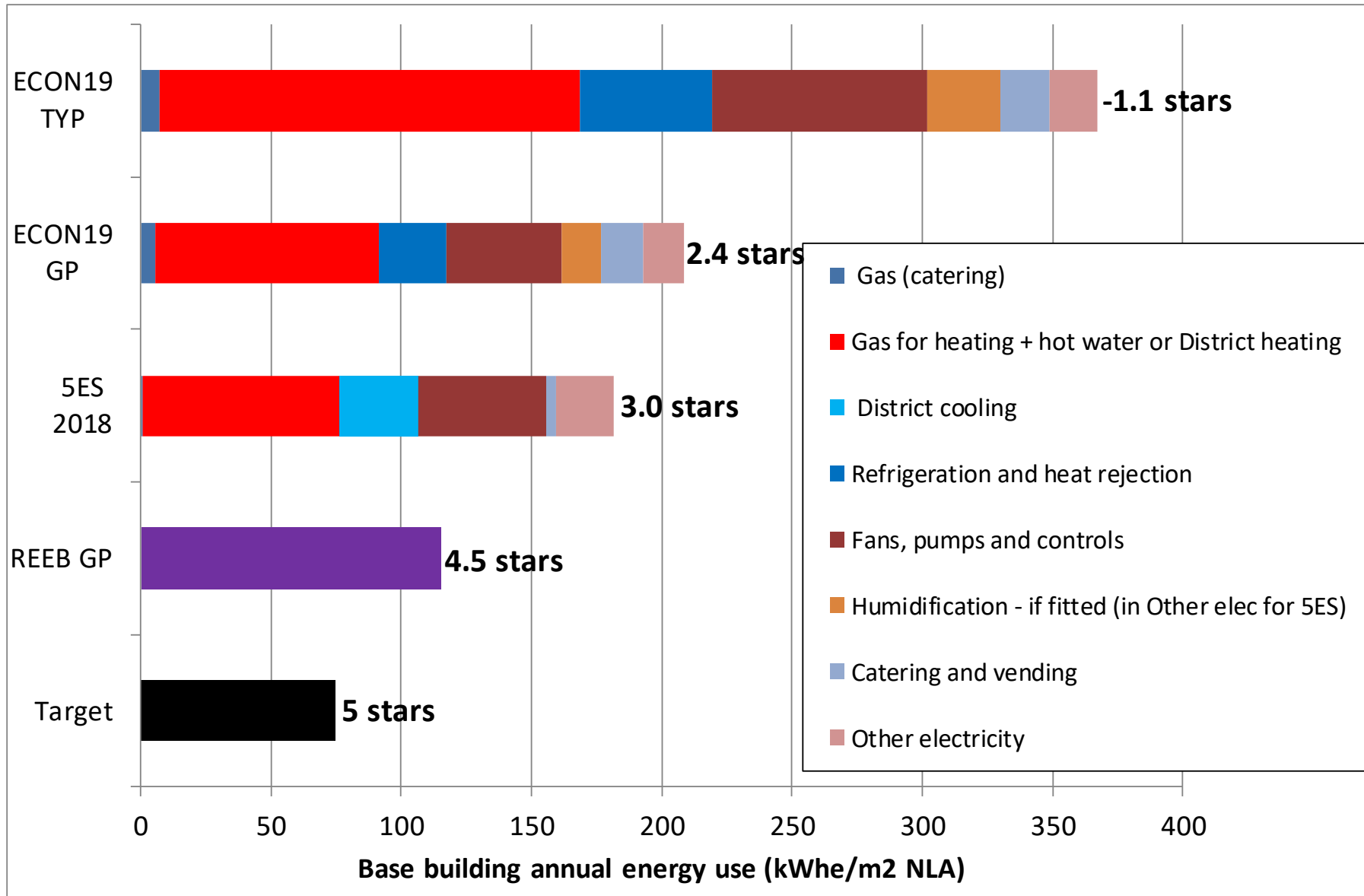


# How does London compare with Melbourne Australia?



# How achievable is a 5-star rating in UK?

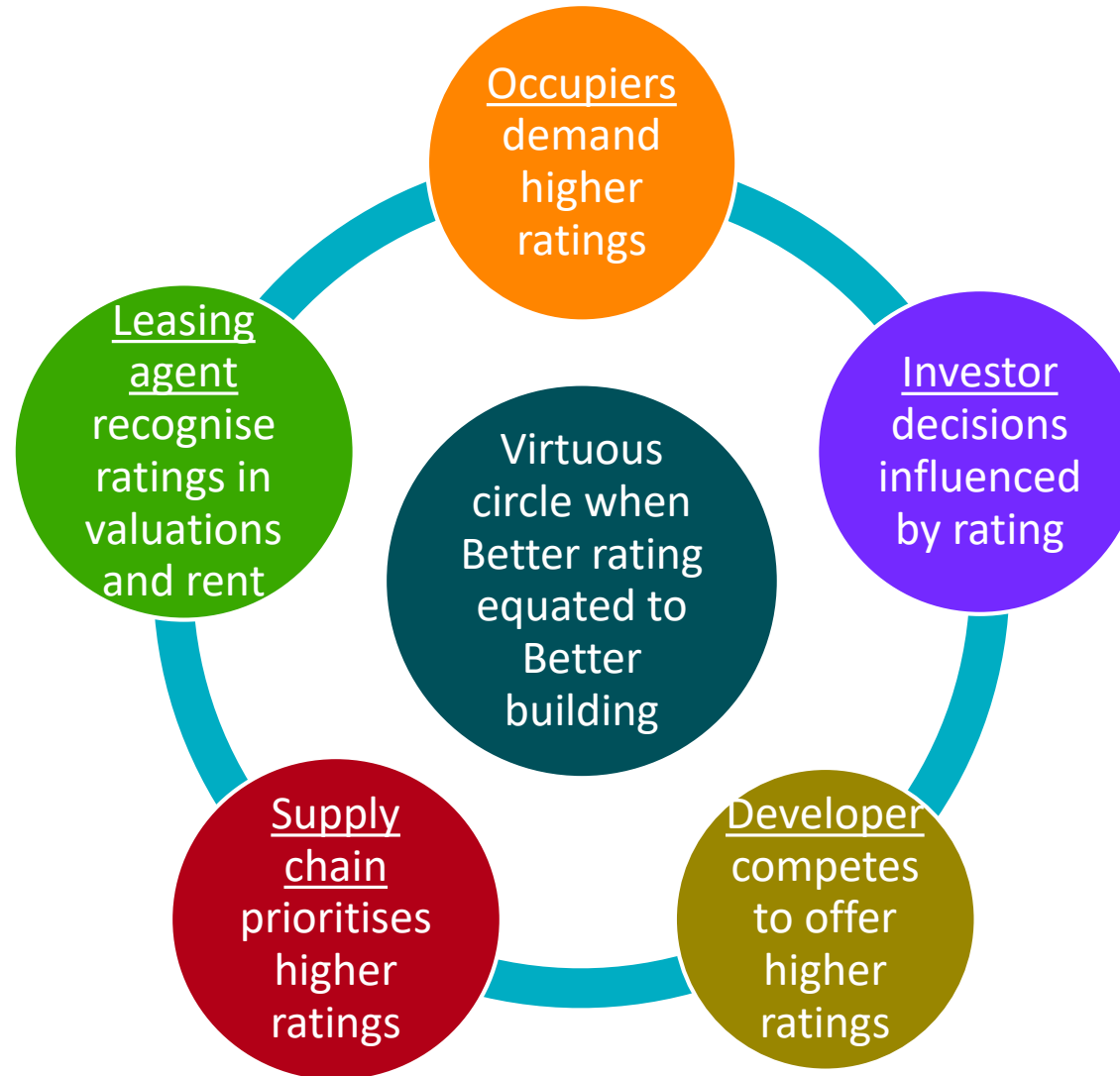
## DfP pilot study: measured vs modelled vs benchmarks





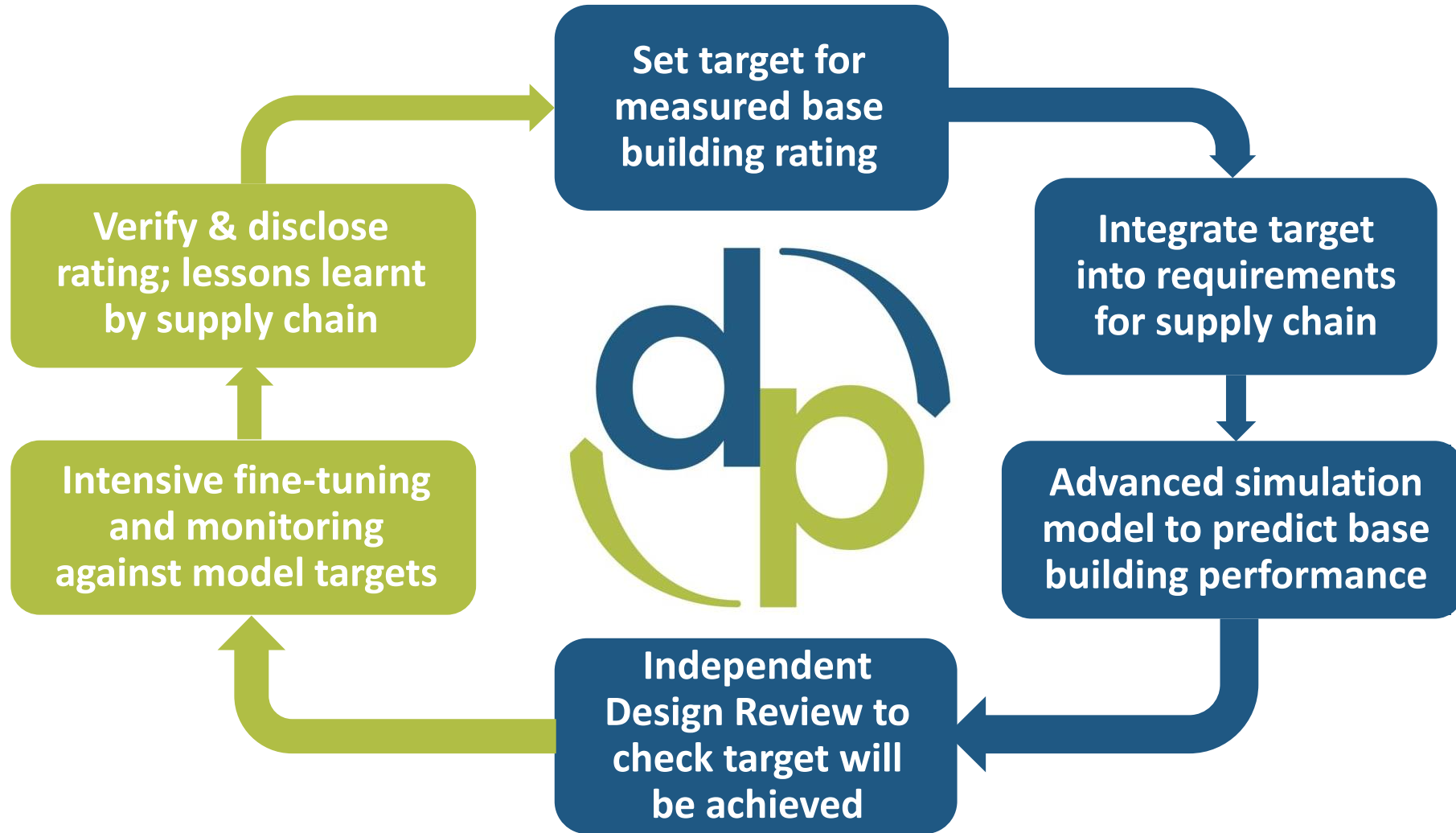
**Factors behind change**

# What has been transformational in Australia 1 of 2: Market asks for and values operational performance





# What has been transformational in Australia 2 of 2: Commitment Agreements and Design for Performance



# Project Agreement implications

Documentation to be provided to Scheme Administrator to demonstrate completion of:

- Advanced simulation
- Independent Design Review
- Responses to Independent Design Review
- Control plan
- Validation plan
- Quarterly monitoring reports
- Measured performance rating & disclosure (govt planning to mandate)



**The point of much better modelling**

## Model confirms performance target is achievable under likely scenarios

Tests ability of design to perform efficiently under non-standard conditions

*To improve performance, we must target performance*

>>>> weather

>>>> hours of use and occupant/equipment densities in each tenancy

>>>> voids

>>>> all of the above

Strengthens resilience of design to whatever actual operational parameters might occur

## Model empowers designers to specify optimum control and plant capacity

Tests benefits of “advanced” control strategies, leads to optimum approach

Underpins design of systems and controls which tailor services to demand through space and time: e.g. CO2 control of fresh air to each zone, VSD fans and pumps

Creates greater confidence to reduce plant capacity contingencies after off-axis scenario analysis quantifies load duration curves

Reduces costs and whole life carbon by avoiding wasteful systems over-capacity

## Model helps defend design intent during RIBA stages 5 - 6

Prevents value engineering which undermines performance  
e.g. Proving the value of more sophisticated controls

Manages tenant fit-out proposals to sustain design intent

## Model underpins commissioning, tuning-up and verification activities

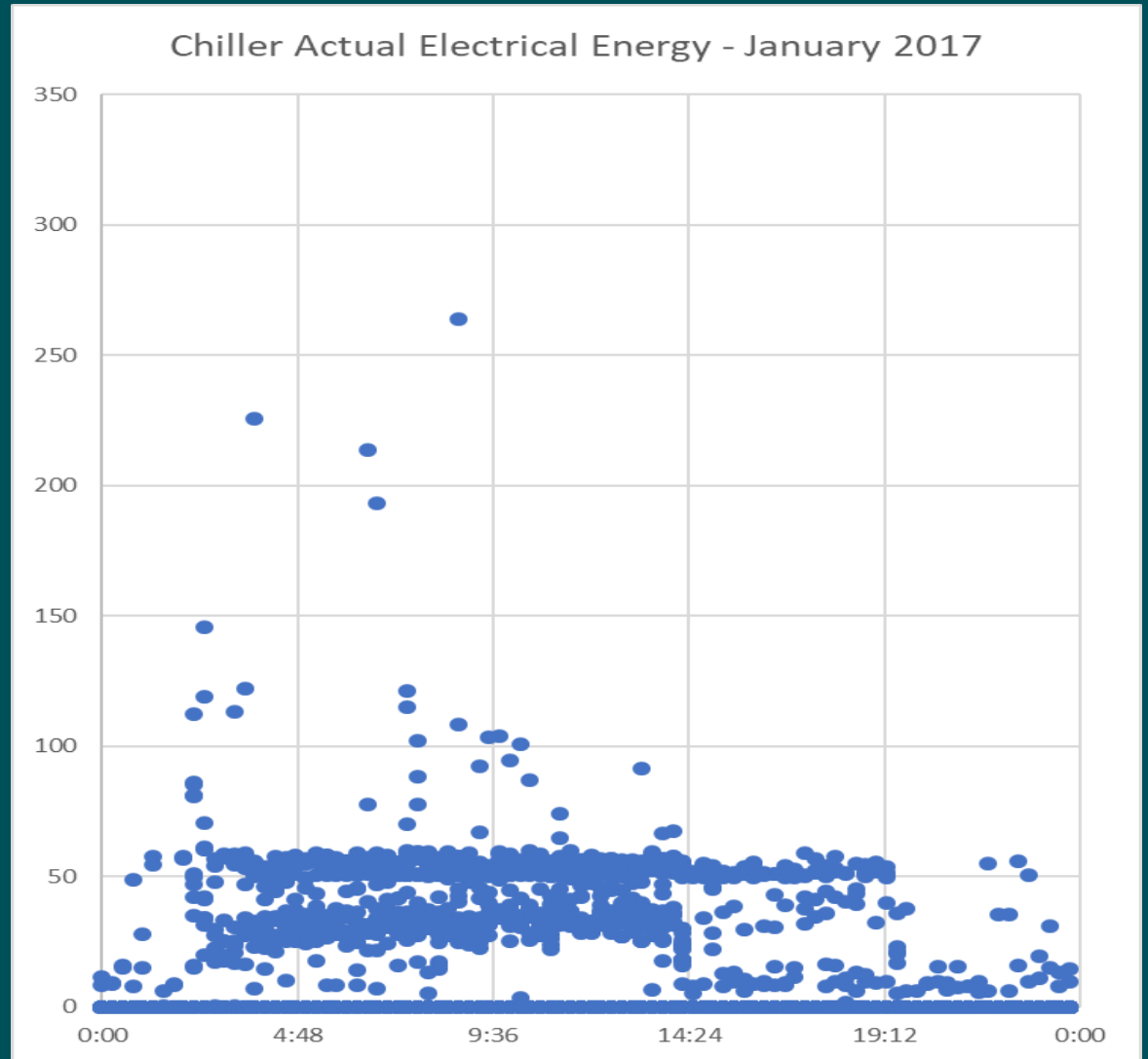
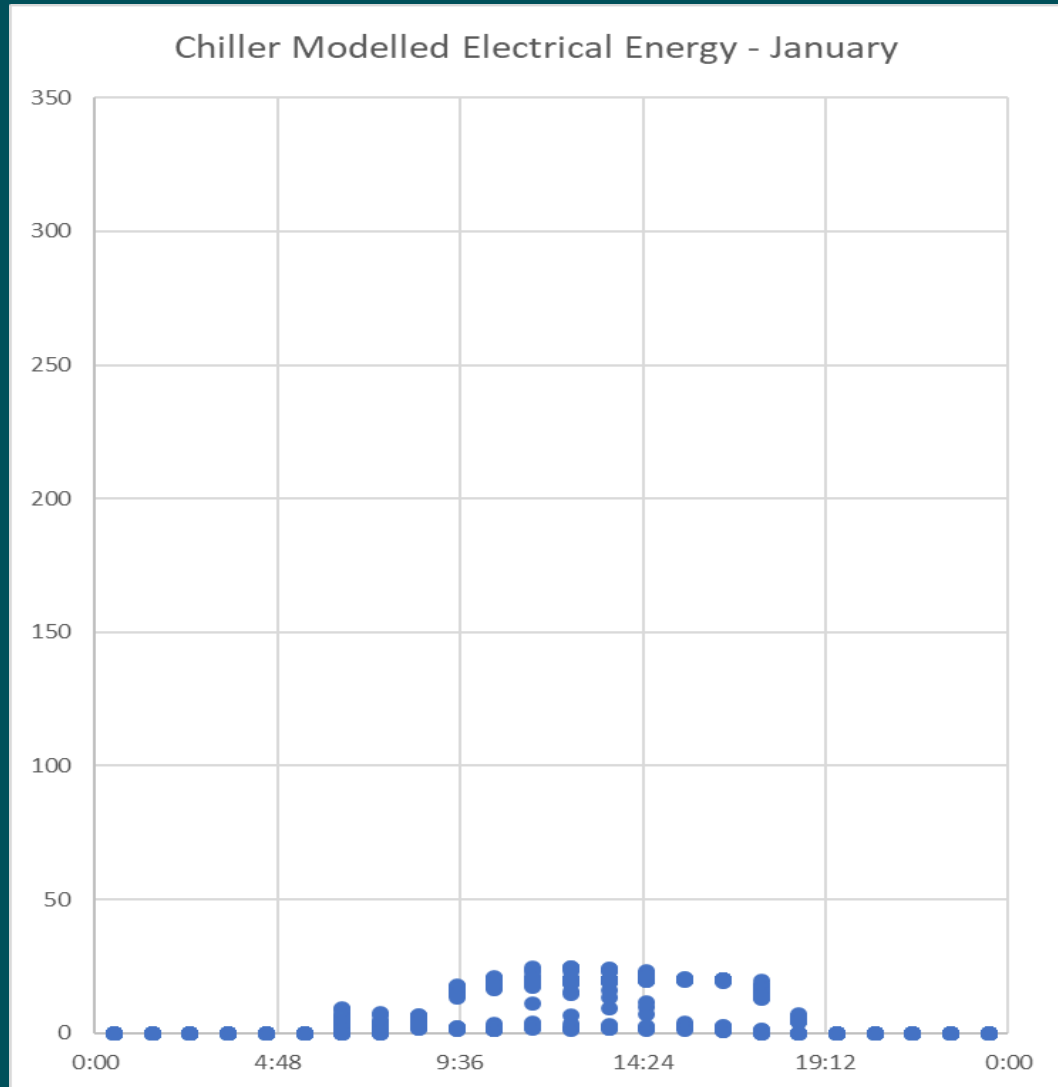
Model creates collateral which identifies to all parties what should happen which can then be verified by detailed measurements

Operation teams can tune the actual building (BMS) to the simulation

Monitoring & Verification teams with monthly targets (budgets) for each sub-meter can track progress towards achieving rating and identify remedial measures where necessary

Original designers will improve their next design by learning from feedback  
*To improve performance, we must measure performance*

# Pilot study: measured performance vs advanced sim







**Conclusions**

# How engineers can make the difference

## Delineation

Enables unfettered agency for whole supply chain to pursue achievable outcome

## Transparency

Through measurement and disclosure - entrains all stakeholders into endeavour  
Creates feedback for continuous improvement

## Accountability

Design team commits to target  
Simulation provides confidence design can achieve challenge  
Engineers have skin in game: delivering target is KPI for success - owner and occupiers obtain the quality of building they asked for



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Aiming to achieve zero 0