DELTA Q

Making the Difference

Design for Performance

Lessons from the NABERS UK IDR Process

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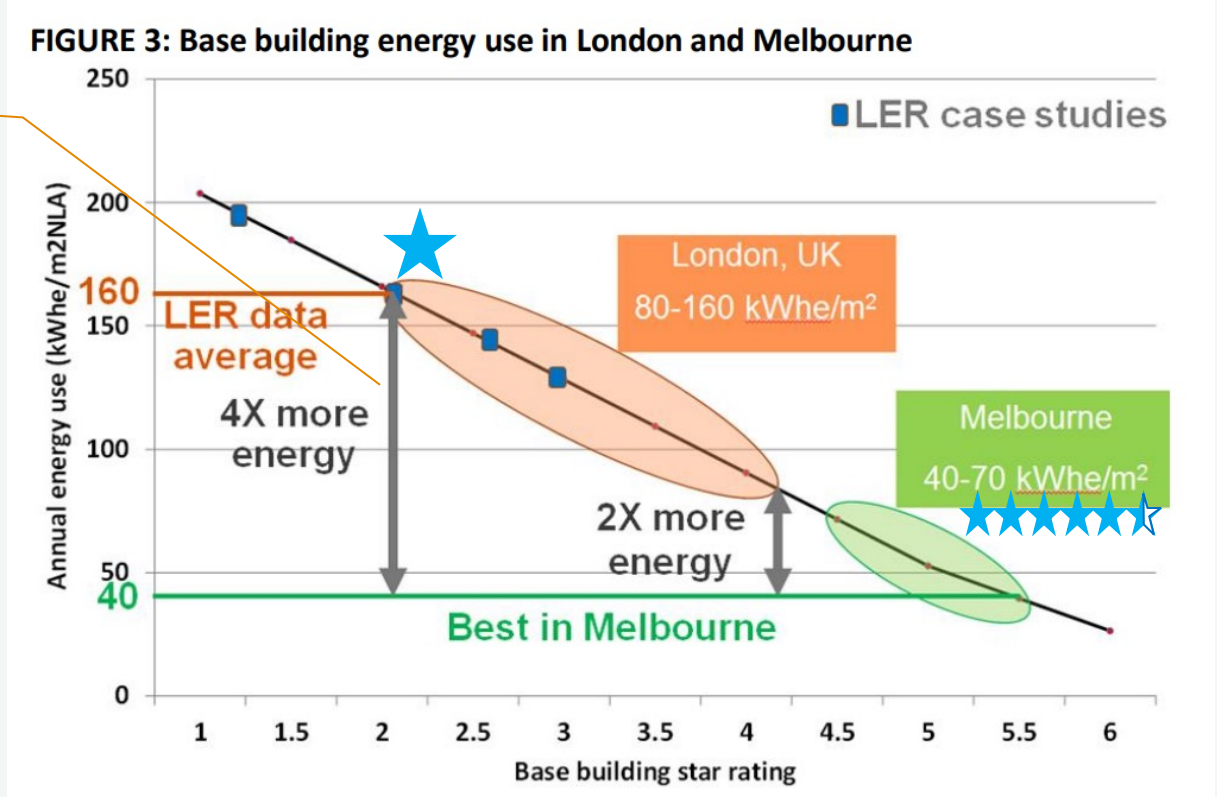
Case for Change – the Performance 'Chasm'

If we have EPC, Building Regs with Target Emissions Rates and a GLA energy hierarchy of Lean, Clean and Green….

Why do London buildings still consume 2 to 4 times more energy than a Melbourne building?

REEB data average = 136 kWhe/m²



Source: UK Commitment Agreement Feasibility Study Final Report (BBP, 2016).

Note:

These figures are based on a standard building operating 60 hours/week. The absolute energy use intensity that a NABERS rated building is benchmarked against varies depending on hours and occupancy.

“

*The process whereby a developer or owner commits to design, build & commission a **new development** OR **major refurbishment** to achieve a specific NABERS UK base building energy rating....*

Design for Performance (DfP)

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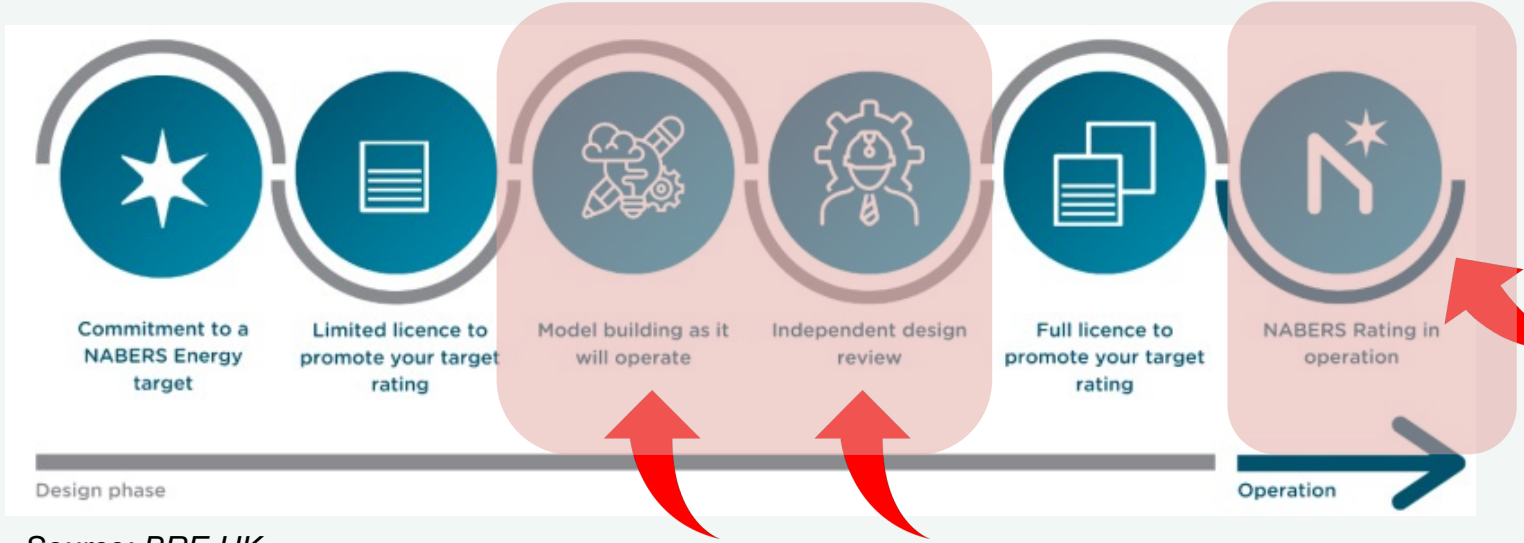
A industry-led initiative developed to close the performance gap between building design & operational performance.



Don’t forget the post-handover certified rating!

Source: BRE UK.

Motivations

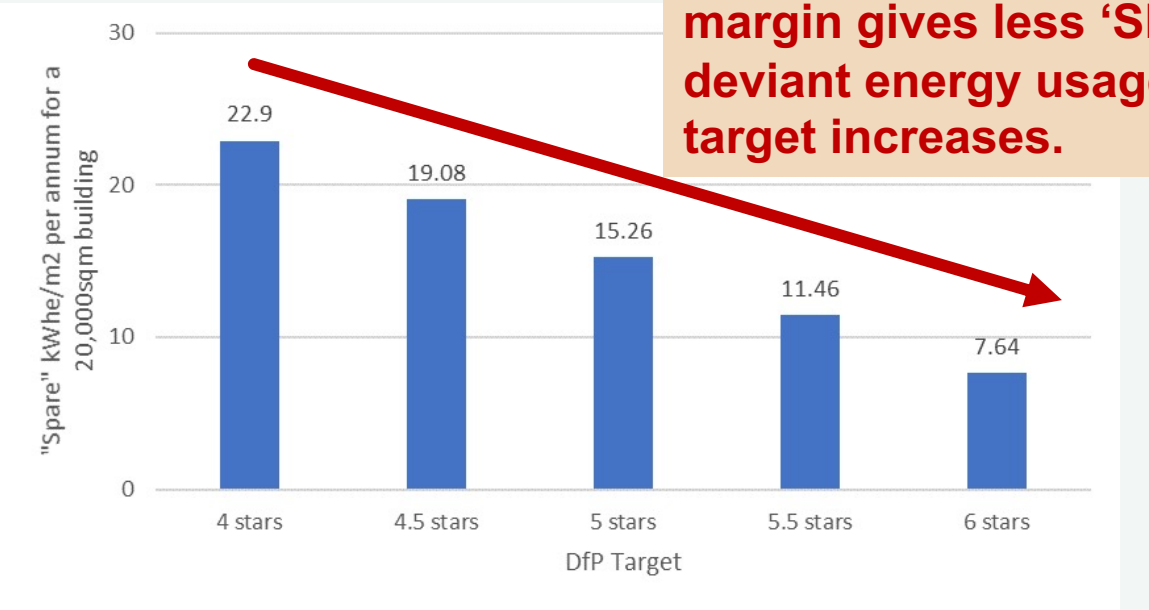
- Stakeholder engagement with DfP depends on:
  - How well they understand DfP, and,
  - Their role (therefore, exposure to DfP principles and incentives).

- Why do stakeholders care about DfP? Well it depends…

Who?	Why?	Thorn
Owner-Developer	Gain leasing & reputational advantage	High optimism levels & pressure to register high rating targets
Leasing & Managing Agents	Guided by owner objectives	Leasing pressure drives behaviour to reap immediate marketing rewards despite high risk targets. Building under-performance risk held by operation team
Modellers, M&E consultants & contractors	Led by owner objectives, project brief and budget.	Highly knowledgeable, but could be defensive when challenged or critiqued as part of DfP.
Facilities Management team	Early interactions forced by DfP process – guided by client brief.	Faces massive institutional culture change, and wary of such changes.

Modelling Margins

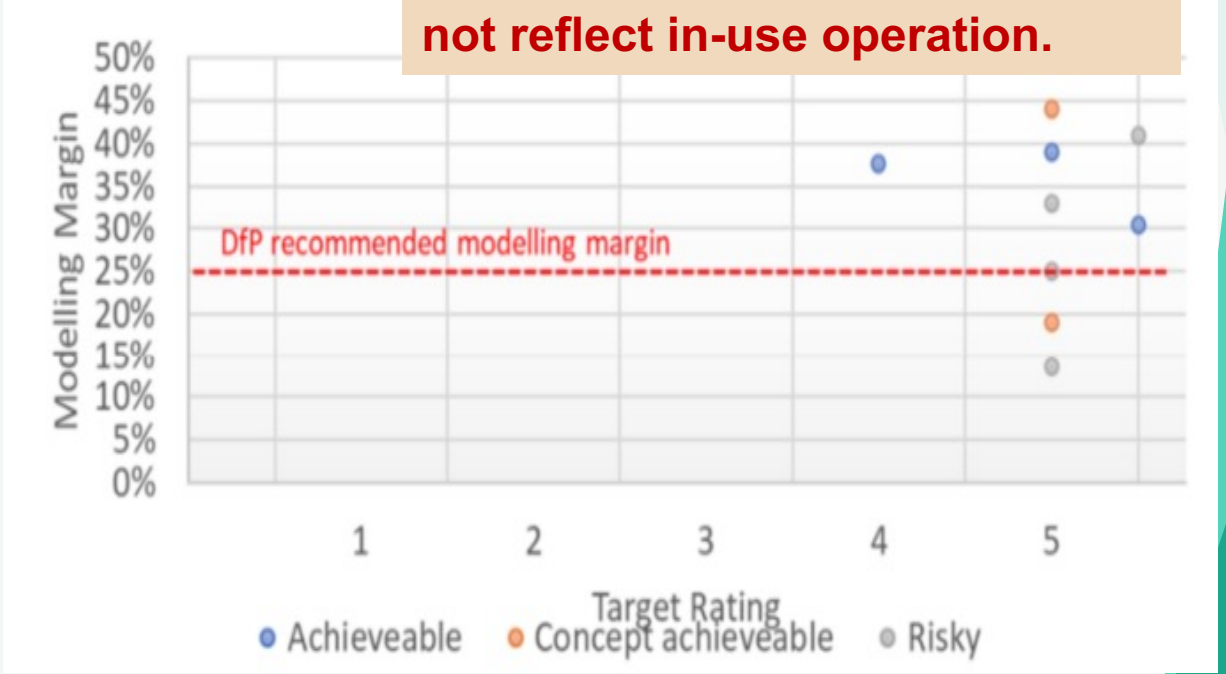
The same 25% modelling margin gives less ‘SPARE’ deviant energy usage as your target increases.



DfP Guide recommends a minimum 25% modelling margin.

$$Modelling\ Margin = \frac{Target\ Energy\ Intensity - Estimate\ Energy\ Intensity}{Estimate\ Energy\ Intensity}$$

High modelling margins may not be as high as you thought due to non-technical risks OR idealised simulations that do not reflect in-use operation.



Timing and Project Integration

- IDRs
  - DfP Guide recommends stage 4 being most appropriate for a **single snapshot** review.
  - However, best outcome if **multi-stage IDRs** are engaged – continuity from Stage 2 to Stage 5 RIBA.

- Simulation
  - Can be conducted at any stage
  - Early simulations require more experience, especially for HVAC controls, plant selection and parameters.
  - BREEAM and Part L investigation already instigate early simulation models.
    - Additional effort to ensure realistic and detailed (advanced) simulation models.
  - Simulation models is the design team's best friend…. **we just need it to be trusted.**
    - Integrate into feedback loop for evidence-based decision making
    - Ensure that simulation inputs are realistic.

Multi-Stage IDRs

Stage 2

- Design concerns for project budget and coordination consideration.
- Greatest opportunity for architectural changes.
- Educate client & design team on DfP process, NABERS rating requirements & promote simulation as a design tool.

Stage 3

- Review focus on design elements & veracity of simulation report results & modelling margin.
- Higher chance for changes to design and equipment.
- Non-technical risks are highlighted.

Stage 4

- Architectural & façade design likely 'locked-in' & MEP design more challenging to change.
- Review focus on equipment selection, control strategy & tenant fit-out brief.

Stage 5

- Review focus on metering & BMS controls functional description.
- Most advanced, lowest risk – but too late in the process for changes.

Stakeholders, stakeholders, stakeholders….

- The performance gap is not just a technical problem.
- Performance requires engagement and communication across full building value chain
  - Especially building post-handover.
- A good IDR should identify risks across full operational lifecycle
- Key observations:
  - The briefing workshop is a scene-setting exercise – this starts the conversation
  - The Rating Achievement Plan, and the tenant fit out brief, is the star of the show.
  - Who can drive this process?
    - MEPs
    - Sustainability consultants or dedicated NABERS champions
    - Engaged owners

Common Issues

- Technical Risks
  - Can we design HVAC equipment in tenancies differently?
    - CAT-A instead of Shell and Core – and landlord to retain centralised control and monitoring.
    - Dedicated sub-metered mechanical services riser from landlord switchboard, with sub-metered tee-offs to tenant floors.
  - Zoning of outside air AHUs
    - Centralised perimeter and interior zone AHUs instead of a tenant-by-tenant basis.

- Non-Technical Risks
  - Locked-in obsolete designs – technology and thinking moved on during construction hiatus –gas equipment leading to stranded asset?
  - More prescriptive tenant fit-out briefs required.
  - Post-construction contracting - Maintenance service contracts vs. Construction defects contract

Conclusion

- If we want our buildings to perform as designed, we must break the **design-for-compliance** mindset, and start **designing-for-performance.**

- Use multi-stage simulation and IDRs as a tool to identify risks and design solutions.
  - ★ Value extracted at various points of design differs

- Closing the performance gap is not just a technical problem.
  - ★ The DfP process is a framework facilitating early engagement with stakeholders in the building leasing and operational phase.
  - ★ The status quo must be challenged and success is dependent on holistic & collaborative approach.
  - ★ Champions within each stakeholder group must step up and advocate the responses.

Source: A Tale of Two Buildings (BBP, 2012)

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