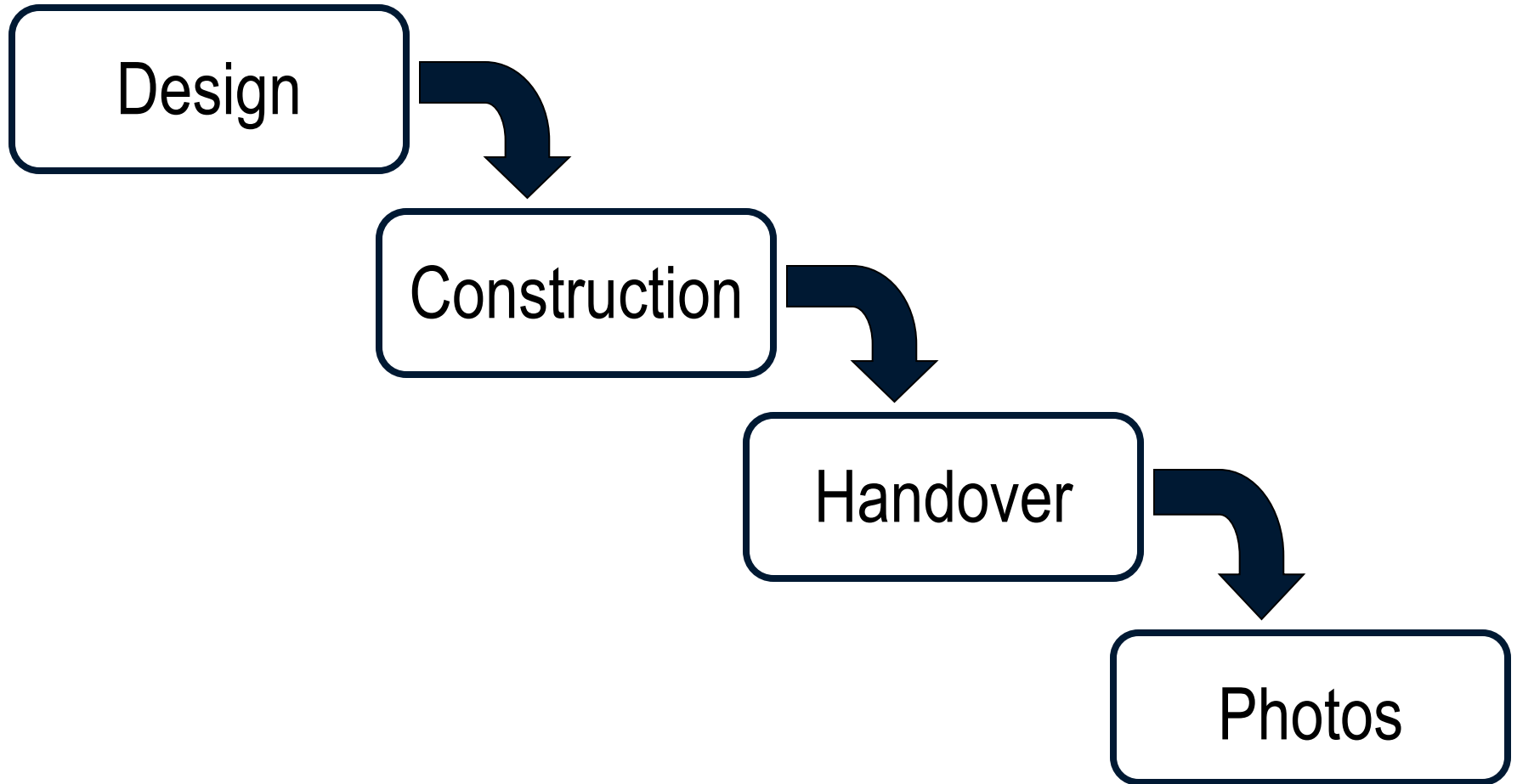


How closing the loop between design & build improved Te Puni Kokiri's performance

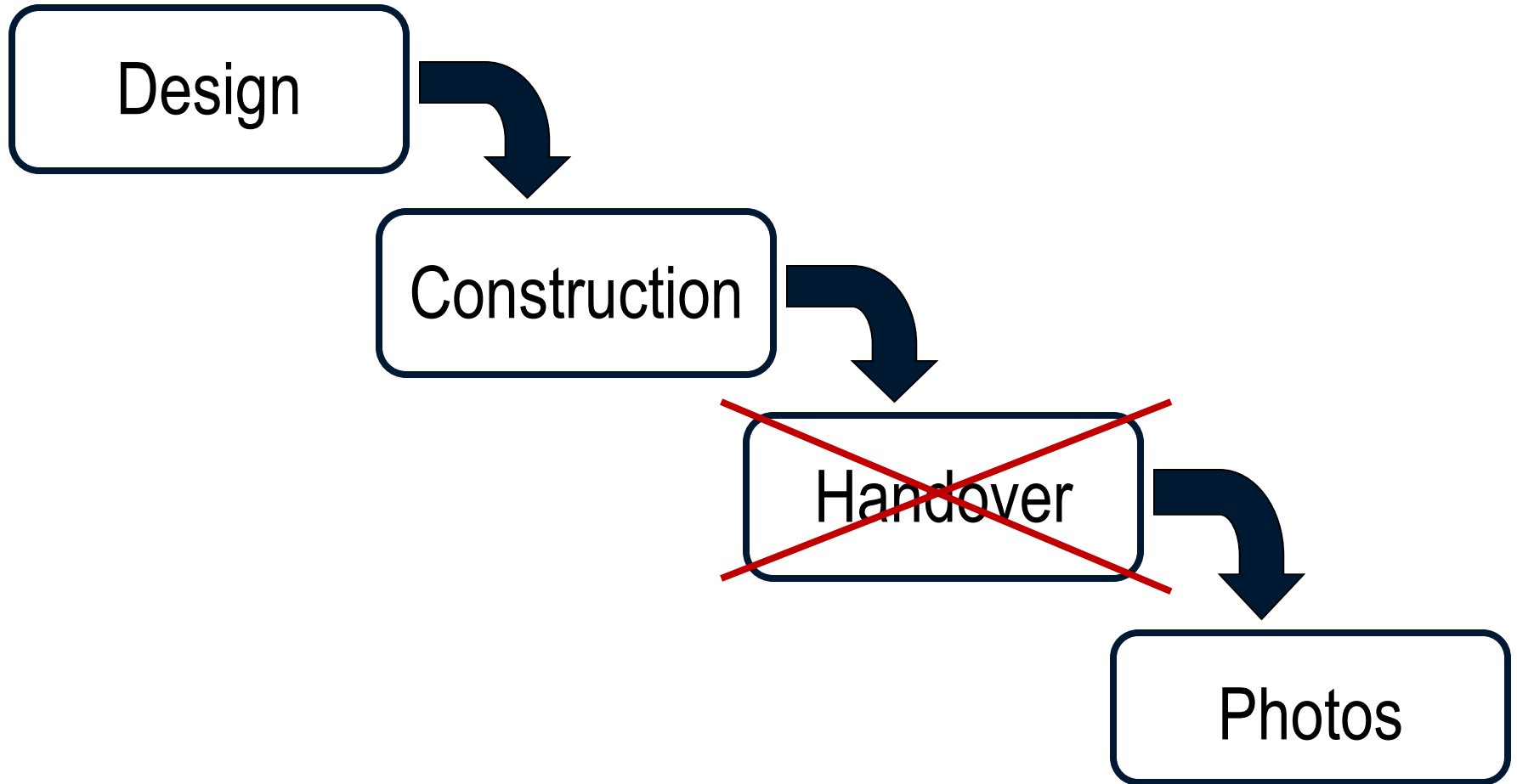
- Patrick Arnold, Director, eCubed

Current Practice



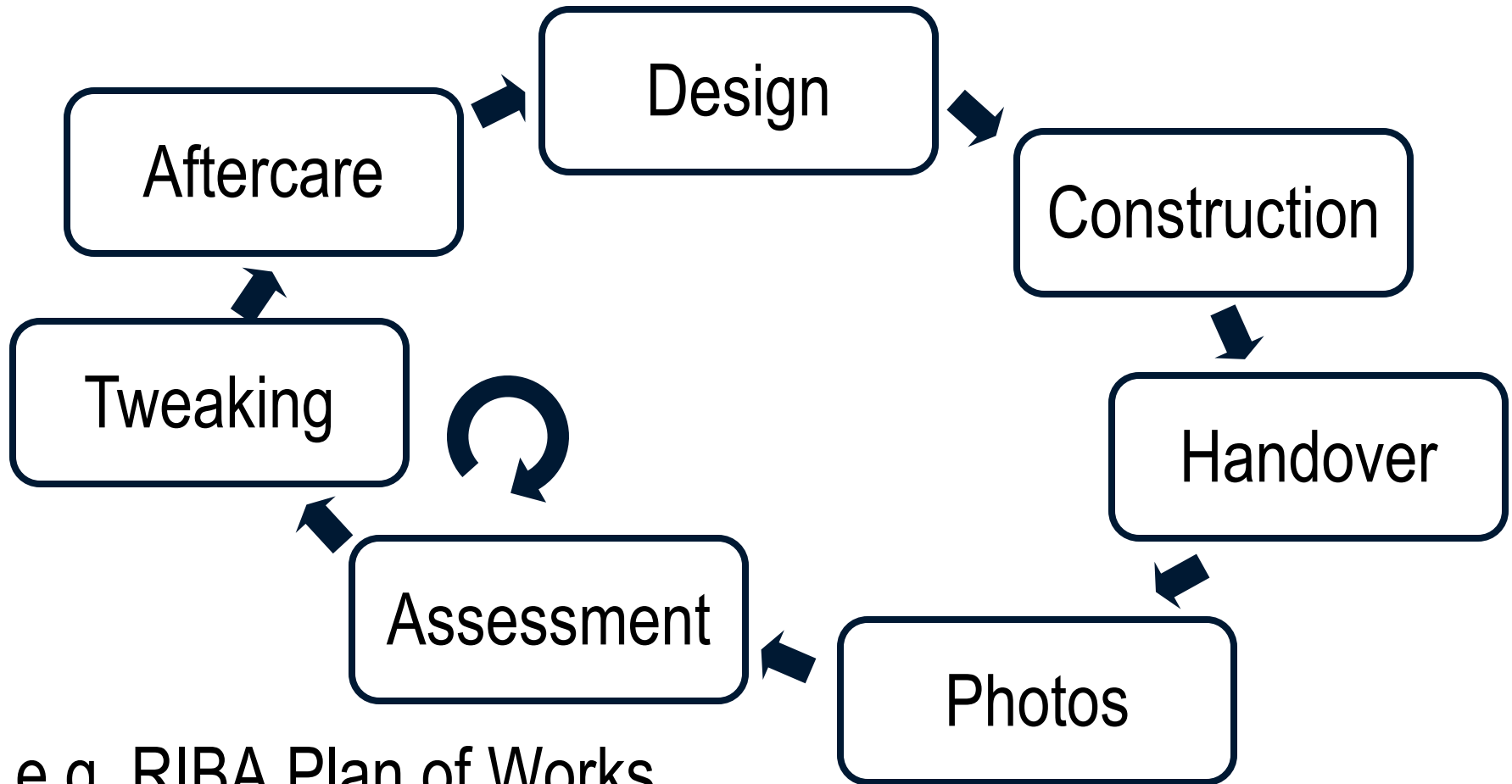
A linear approach to buildings...

Current Practice



e.g. CIC Guidelines

What We Want



e.g. RIBA Plan of Works

We need a feedback loop...

TPK House

- Historically listed façade (for the lower 8 floors)
- ~6,200m²
- Refit of building services, floors and ceilings – but not fit out.



Initial Work

- Energy Audit (ETS Ltd)
- Chiller / services options (NDY)
- Lift options (NDY / suppliers)
- Energy efficiency options (NDY, Ecosystems, eCubed)
- Lots of talking (Argosy, TPK)

Target Setting

- Argosy wanted a 20% energy reduction (205 to ~160 kWh/m²/yr)
- 4-star Built Green Star rating (revised to 5-stars)

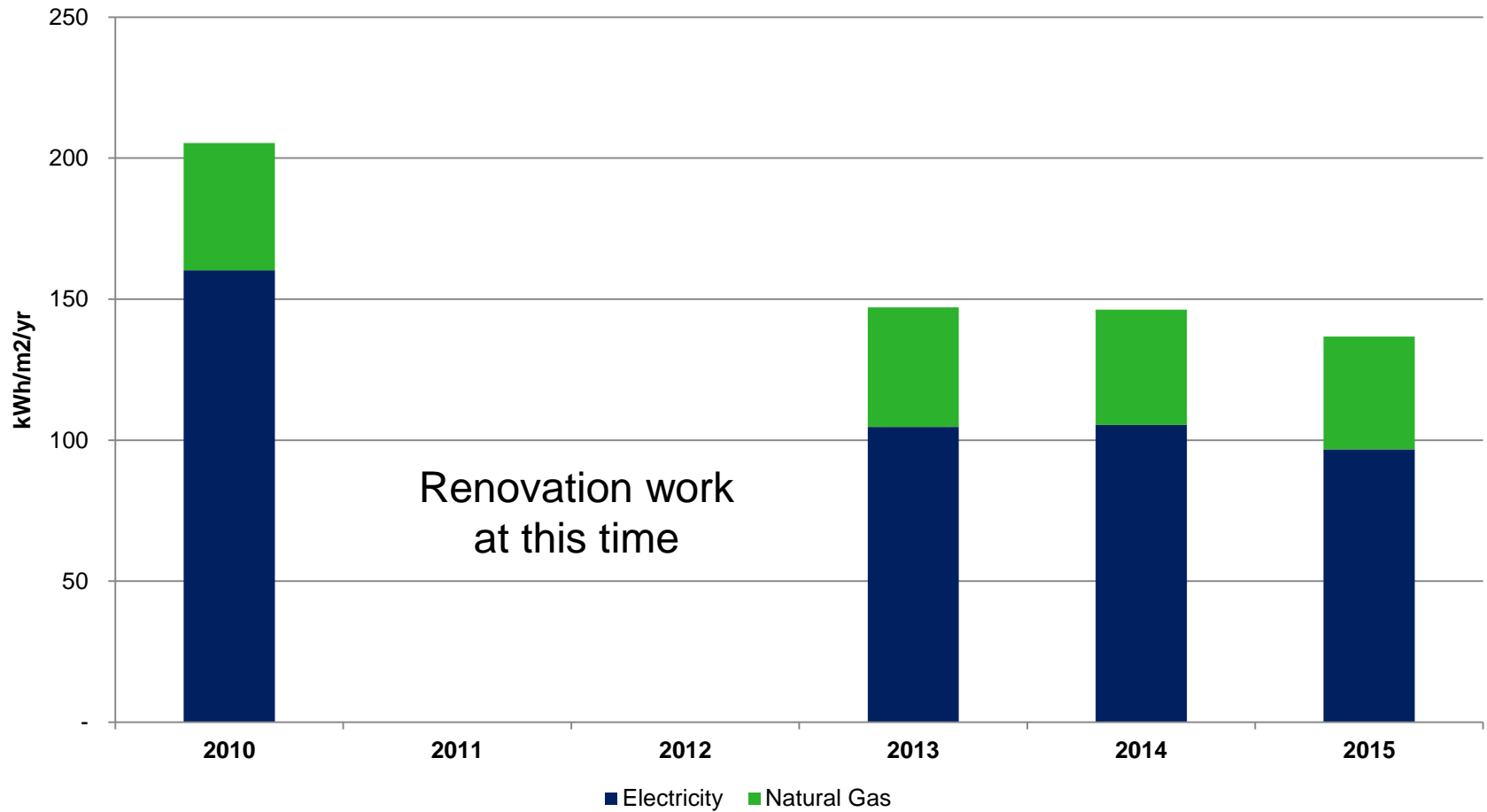
Design Features / Limitations

- Existing historic (and uninsulated) façade, small single glazed windows
- Existing riser sizes limit air quantities and low temperature plant
- Brand new lighting and controls
- Brand new central plant; larger chiller, smaller condensing boilers
- New EC fan coils, with occupancy controls
- Water efficiency improvements, but no recycling

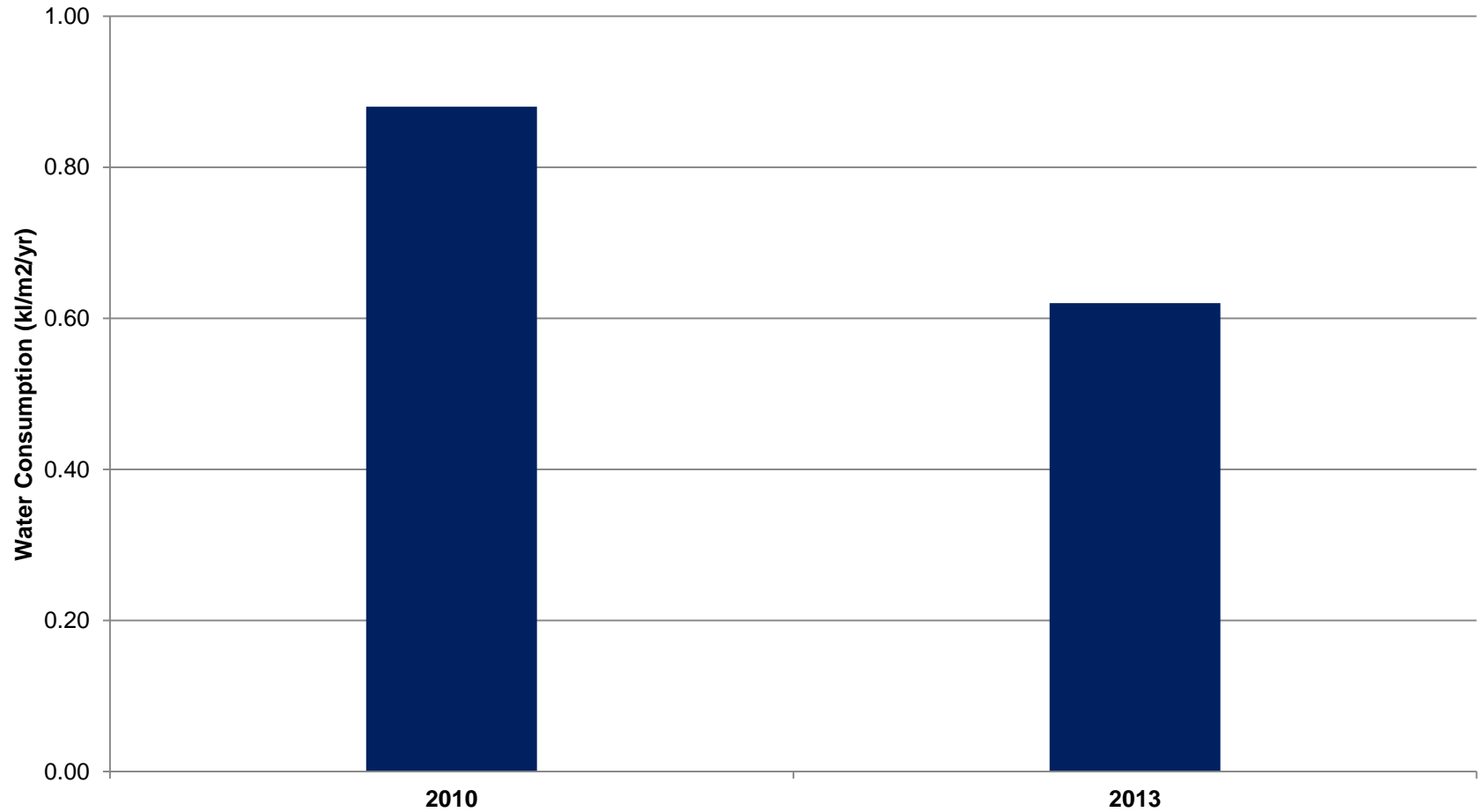
Build and Handover

- Floors delivered one at a time, with client decanted out.
- This meant commissioning of floors was done individually, but full system not until complete.
- Independent commissioning agent
- 24 month fine 'eight season' tuning period
- Ongoing energy and water consumption monitoring
- Post-occupancy evaluation

Results - Energy



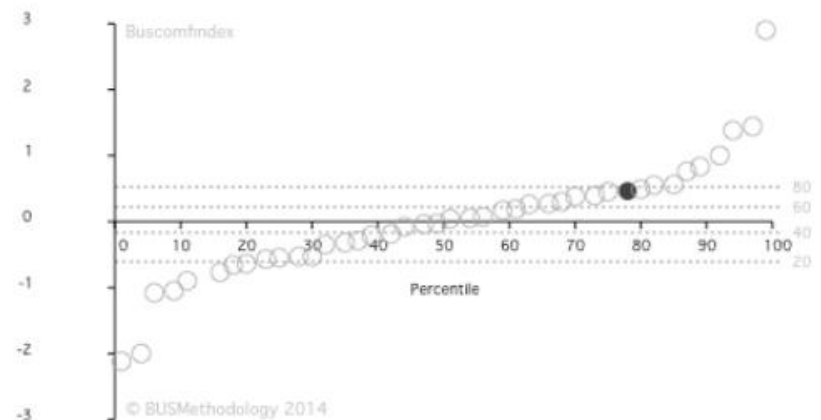
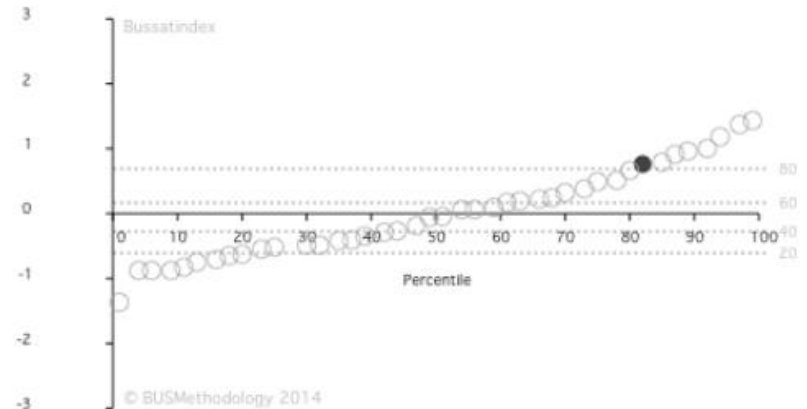
Results - Water



Results - POE

Used the BUS Methodology
(administered by Arup UK)

- Building scored at around the top 20% of NZ buildings.
- Some issues around noise and lifts (due to construction work)
- Productivity score of +6.7%
- High 'forgiveness' score.



NABERSNZ

- 4-Star base building rating earned (expired Sept '15)
- Re-rated this year for 4.5-Star rating (expires May '17)
- Rated base building energy consumption of 81 kWh/m²/yr



Things to work on

- Heat reclaim for hot water preheating
- Gas consumption is still higher than we'd like:
 - Boiler controls?
 - Heating demand issues?
- Water consumption