

GREEN CITIES: NET ZERO HIGH RISE RESIDENTIAL MASTERCLASS: INSIGHTS

Final Program

- Attached.

Attendees

- 50 registered, 43 attended.

Key take-outs:

- Several participants said this was the best event of the Green Cities conference.
- Developers attitudes towards net zero have moved on remarkably over the last 12 months or so.
 - In mid-2016, when we undertook consultations regarding the report, *Accelerating Net Zero High Rise Buildings in Australia*, there was considerable scepticism in the development community about the feasibility of such an outcome
 - At this event, the developers were treating net zero as highly feasible and desirable for low-rise residential (and other forms like shopping centres and aged care facilities) and also feasible for taller buildings using power purchase agreements and embedded retailer/network arrangements
 - There was less focus on incremental costs, and more focus on practical and successful strategies to commercialise net zero
 - In the absence of clear policy (building codes), developers are getting on with it
 - Achieving net-zero in high rise is still more challenging than lower buildings.
- Net-zero / carbon neutral needs to be a combination of energy efficiency, onsite and offsite renewables, and offsets.
 - Most developers see renewable energy as the primary strategy for achieving net zero, with a secondary focus on energy efficiency or offsets
 - There seems to be acceptance that the building must be energy efficient – noting the draft NCOS standards set the bar fairly low at 4 star
- A key enabler of net zero (or very high star ratings) for taller residential buildings is to reduce window-to-wall ratios and utilise very high efficiency glazing, with the net cost of this strategy being low overall, due to reduced glazing area.
 - Developers tend to assume that consumers want extensive glazing for views, but this leads to problems with glare and over-heating in summer
 - This may be an area where an awareness campaigns and professional development training may be able to change market perceptions
 - More controversially, the City of Sydney's planning scheme could be used to limit over-glazing and/or to require appropriate shading of glazed areas.
- A useful rule-of-thumb emerged – that approximately as much PV area is required as building area for 100% coverage of building energy needs on-site (this requirement will diminish slowly over time as the energy density or efficiency of PV panels increases)

- Policy and market transformation necessary to reduce costs and fully value the multiple benefits being created
- Better certification will be necessary
- Solutions and language needs to be simplified
- Trust is necessary in brands, developers and energy providers
- Take people on the journey. For example “No Bills” is a most compelling message, but may not agree with the embedded retailer/network model, as there are bills to pay in this solution
- Total cost of ownership needs to be calculated and communicated.
- Affordability implications need to be considered at each stage – energy performance is a relatively minor element in total dwelling costs, but this is not widely understood.

Emerging opportunities:

- Increased awareness and demand (eg with new NABERS tool)
- Improved PV energy density and building-integrated PV (with solar access protection)
- Changing technologies, eg PV powered heat pump DHW
- Customer led demand (eg 1700 on nightingale wait list)
- Developer led supply (eg 3 major developers now have embedded energy departments)

What are the critical enablers?

- Co-benefits can help us sell solutions
- Resilience benefits to have power source on your building; how to you distribute power in an equitable way?
- EE – always a winner as you don’t want to pay for energy you don’t need
- Need a trajectory to net-zero (long-term market signals)

What are the critical roadblocks?

- When people are buying don’t see value, costs are spread
- If all developers bear same raising costs then its ok
- Affordability is key
- Difficult to quantify occupant well-being
- Taller buildings – do they have less of a chance?
- Cannot ignore the gap – offset until we don’t need to offset anymore
- BiPV scepticism

Key Points Emerging from Audience:

- Solar access will become key issue
- Off-site solutions will be required
- Market drivers for net-zero – in commercial, tenants are demanding it. Fragmented nature of resi market. Real estate market does not market sustainability.
- Nightingale project – huge waitlist

Key Points by Speakers

Nik Midlam, City of Sydney

- Net-zero targets are out there. City of Sydney, New South Wales Government, Urban Growth, Greater Sydney Commission, Investa (and now AMP Capital) and Green Building Council.
- Cost premium on net-zero high rise buildings studied by pitt&sherry – around 7-8% above meeting current code, but could be less
- New NABERS Energy tool for apartment common areas will start to expose and raise awareness by building owners and occupants on the performance of their buildings as a market driver.

Philip Harrington, Strategy. Policy. Research.

- Net-zero definition: delivered energy less than or equal to on-site renewable exported energy – not the same as carbon neutral.
- Key strategies: maximise energy efficiency, then, for balance of energy needs: Onsite (renewables) – Offsite (renewables) – Offset (carbon offsets).
- Reducing window to wall ratios important to cost effectively and significantly improve performance and can result in improved aesthetic and internal amenity (less contrast). Glass boxes are a high-cost choice.
- Market transformation, common overseas, is needed locally to mainstream technologies and skills to significantly bring down prices, notably for high-performance glazing, heat pumps and heat recovery ventilation.
- Buildings are estimated to contribute around 50% of Australia’s total emissions
- Given the slow rate of building stock turnover, and high costs of deep retrofits, we need to start the transition to net-zero buildings now
- Pathways: Build incentives, transform key markets, build capacity, build awareness
- Developers/owners cannot currently monetise all of the benefits so the proposition is not fully commercial however socially cost effective
- Policy leadership is needed to monetise the benefits and drive down costs

Dennis Lee, NABERS

- NCOS can help local industry to receive international recognition (GRESB, Dow etc.)
- NCOS based on carbon hierarchy to encourage efficiency and renewables first, then offsets.
- ‘Trust’ in brand is essential.
- Stick and carrot policies required.
- NCOS standards – focus on operational energy/emissions only
- Aus property market – world leading led by commercial
- Net-zero and carbon neutrality standard: would you use these definitions interchangeably?
 - The difference is system boundary. NZ looking at energy on-site (scope 1 and 2) CN looks at scope 3 emissions.

- Also onsite v offsite. CN allow off-site solutions eg. offsets. Ie. Offsite would benefit apartment buildings
- CN details what needs to be included through its standard. EE first.
 - To get carbon neutrality go to dept use NABRES or Green Star to avoid duplication
 - There is a public disclosure requirement
 - Standard just been out for consultation
 - Is there a demand for the standard? Yes need more recognition for leaders. Recognition for additional purchases.
 - Barangaroo is carbon neutral now
 - Demand will be increasing
- NABERS for apartment central services underway
- Consistency around carbon neutral
- Provides government market forces to drive further
- CBD scheme is the stick, carrot – govt will only tenant buildings with certain performance level
- Average star rating for NABERS 4.4 star – rated over 80% nettable area of Aus
- Not a matter of if but when – so adopt early.

Paul Stoller, Atelier 10

- Multiple examples from the US, especially education buildings.
- Occupant behaviour critical to achieve low energy consumption
- Area required to run a building on biomass resource is prohibitively large
- All examples to date are grid connected
- Most are limited to 4-storey based on roof PV capacity to supply ultra-efficient buildings
- How much power can you generate on a building? 1m2 PV supplies 1m building area
- Apartment buildings different ratio (if you assume roof only for PV, rather than building-integrated PV)
- Competition for roof space, PV only power a fraction of common area. Wind is generally not suitable due to noise, vibrations, structural reinforcement, cost
- BedZed UK – public housing project. People weren't living as efficiently as they used to. Occupant behaviour – need committed tenants
- zHome flurry in the US – California mandates net-zero. Cheaper to put PV on 20 multi-family resi than 1. Keep it at 2-3 storey.
- Perrins Row Colorado
- Sol-Lux Alpha
- Struggled to find case-studies in Australia
- Market has gone to off-site solutions or precinct solutions
- Battery storage – generate, sell, change the value.

Clare Parry, Grun Consulting

- Lower maintenance and running cost benefits with passivhaus

- Health benefits (healthy buildings)
- Passivhaus relates to envelope, air-tightness and ventilation
- Passivhaus Plus standard is equivalent to net-zero
- Performance gap of measured passivehaus certified buildings is <1%
- 50-70% energy improvement compared with similar buildings

Simon O'Brien, Frasers Group

- Transition to net-zero has been slow over past decade or more
- Zero carbon – there's an easier way
- Who gets the cheese? Who gets the value? Embedded networks an attractive solution
 - Developer operates like an energy retailer
- Sell 70% of apartments to investors
- What is the mechanism to show them an improved value proposition – distrust of developers
- Would only get benefit through base building
- If value is diluted to individual apartments, the amount will not be significant enough incentive
- If instead, the value can be aggregated to a single entity (developer), the value capture is worthwhile
- Value may be captured by developer via embedded network
- Frasers committed to zero-gas new developments as a precursor to zero carbon.

Davina Rooney, Stockland

- Technical and finance options change for each asset class
- Shellharbour solar
 - Retail works well – peak load matches peak solar – 7 days a week. This asset class – winter size.
 - Solar tipping point reached for retail shopping centres
- Office – gross lease (owner pays all costs) or net lease structure (tenant gets everything) usually a blend
 - Need a PPA arrangement – sell solar as power
 - Movement of EUA's
 - Often big, lots of roof plant and overshadowing eg. really big blg 30Kw
 - Retirement living acts as long term leases. Deploy solar with residents and let them buy it
- Resi – solar peaks when no-one is home
 - Community scale infrastructure
 - How to shift conversation – we can't employ in isolation
 - Blended solutions
 - Drivers – so much to drive solar
 - 'bids' change of land bidding structure
 - Customer communication – sales journey is complex

- Survey residential communities each year. A year later satisfaction relates to community, connection to infrastructure
- Stamford Park to be a net-zero residential development (low rise)
- Embedded networks – complex regulation, however
- Land bidding is driving change (eg requiring solar on each new development)
- People need to be taken on the journey.
- Net zero can be cheaper, healthier and better for planet.

Amir Girgis (Northrop)

- Cost is always a driver for developers – need to reframe
- There is different levels of commitment and experience.
- Embedded networks for experienced larger developers makes compelling economic sense.
- Leap of faith required to embrace sustainability
- Lack of practical experience
- Operational financial mechanisms
- Talking the same language
- Renewables were 'added' later
- Solution – embedded networks. Lifetime investment beyond early procurement.
- Change from how much we were spending to what revenue we could be generating?
- Whole of lifecycle conversation

Time	Program	Lead
12.30pm on	Gather at venue	
1.00pm	Opening – Welcome and Overview	Nik Midlam, Manager Carbon Strategy, City of Sydney
<i>The Big Picture</i>		
1.10pm	Net Zero High Rise Residential – Why & How? <ul style="list-style-type: none"> • Definitions • Why net zero? • Key findings from the City of Sydney/Carbon Neutral Cities Alliance study 	Facilitator
1.30pm	Net Zero Target and Market Drivers <ul style="list-style-type: none"> • NCOS Building and Precinct Standards • Will the market understand this product well enough to pay the premium? 	Dennis Lee, NABERS Leader – NCOS Standards Development
1.45pm	Local and International Net Zero Building Precedents <ul style="list-style-type: none"> • Building and precinct level case studies • Mix of on- and off-site solutions 	Paul Stoller, Director, Atelier10
2.00pm	The Role of Passivhaus for Achieving Net Zero <ul style="list-style-type: none"> • Passivhaus for high rise residential – what does it look like? • Challenges and opportunities for the passivhaus approach in this market 	Clare Parry, Principal Consultant, Grun Consulting
2.15pm	Q & A: <ul style="list-style-type: none"> • Are we clear about the policy drivers? • Gaps and opportunities for policy development? 	Facilitator
2.30pm	Coffee Break	

Industry Perspectives and Solutions

2.45pm	Efficient and Renewable Residential Case Study <ul style="list-style-type: none"> • Case study • Role of offsets and renewables vs energy efficiency 	Simon O’Brien, Sustainability Coordinator, Frasers Group
3.00pm	The Consumer Perspective <ul style="list-style-type: none"> • Net zero drivers for different asset classes • Lessons from Net Zero Home at Willowdale 	Davina Rooney, General Manager Sustainability, Stockland
3.15pm	Reframing Sustainability and Net Zero for Developers <ul style="list-style-type: none"> • A developer’s perspective – challenges, obstacles and opportunities for reframing and financing. 	Amir Girgis, Associate, Sustainability Consultant, Northrop

Accelerating Net Zero – What Will It Take?

3.30pm	Roundtable Discussions <ul style="list-style-type: none"> • Critical enablers – how could we make this happen? • Key roadblocks – how do we manoeuvre around them? 	Facilitator to introduce. Tables to nominate a lead to carry questions into the panel discussion
3.45pm	Panel Discussion <ul style="list-style-type: none"> • Q & A format with all speakers up the front • Each table to raise their key enabler or roadblock for discussion by the panel and room 	Facilitator
4.30pm	Closing Remarks	City of Sydney