



## WILL THE METRO STRATEGY DELIVER ON CLIMATE CHANGE?


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## WILL THE METRO STRATEGY DELIVER ON CLIMATE CHANGE?



- WHAT ARE THE CHALLENGES IN DEALING WITH CLIMATE CHANGE IN A COMPLEX, DYNAMIC AND INTEGRATED CITY?
- WHAT ARE THE APPROACHES THE METRO STRATEGY PROPOSES
- WHAT ARE THE BIG QUESTIONS THE METRO STRATEGY MISSES?
- WHAT CAN LOCAL COUNCILS DO IF METRO FAILS TO DELIVER?

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### SOME BACKGROUND: Cities must be a focus of adaptive innovation




- Buildings and their occupants account for 23% of Australia's greenhouse gas emissions
- 80%+ live in cities and larger towns
- \$158bn spent on new construction in Australia in 2007
- Market value of Australia's homes: \$2.7 trillion
- Market value of Australia's investment grade commercial property assets: \$360billion
- 875,000 employed in construction

(Source: CIE/ASBEC, 2007; BEMP, 2008)

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### Drivers of Change in Australia's Cities – not just Climate Change




- Complex decision making environment within which climate resilience needs to be planned and delivered.
- Some are **continuing** – demographic change, pressures for urban consolidation and densification, securing water supplies, and the need to address social equity and inclusion issues are matters that cities have historically needed to respond
- Others are **new** – most significantly a belated but now concerted recognition of the impact of climate change against which all other drivers are likely to become increasingly aligned.
- But all these need to be considered in planning adaptive actions in towns and cities.

**7** Drivers of change which will shape our towns and cities

- CLIMATE CHANGE
- PEAK OIL
- DEMOGRAPHIC CHANGE
- URBAN DENSIFICATION
- SOCIAL INCLUSION AND SOCIAL EQUITY
- INFORMATION TECHNOLOGY
- GLOBAL COMPETITIVENESS

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### Challenges for Sustainable Metro areas



- 7 drivers of change present significant challenges to the built environment industry in moving forward.
- They clearly have implications for all sectors and interests, but also opportunities to take a lead in shaping the **adaptive transition**
- What are the challenges that are relevant to adaptation?
- Technology offers significant opportunities for further innovation and will play a key role in adaptation strategies.
- But our focus here is on the **broader challenge** to be addressed in adapting to climate change

**6** Challenges facing built environment industries and innovation policy

- URBAN RETROFITTING
- MOVING TO SCALE
- INTEGRATING THE FINANCE CHAIN
- INTEGRATING THE DELIVERY CHAIN
- METRICS AND SHAPING BEHAVIOUR
- LEADERSHIP AND GOVERNANCE

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### Challenge 1: Urban retrofitting



- **Most of our built environment looking 50 years forward already exists.** In large part, preparing for the future is about retrofitting (including renewing) what we already have.
- **New buildings can provide a focus for innovation**, not least driven by enhanced building code requirements, expectations of clients and financiers. **But they represent only a small minority of the stock at any one time.**
- **Upgrading existing commercial stock will be a 'herculean' task** (Davis Langdon, 2008) due to cost constraints, design, and construction industry resource limitations.
- **Market drivers (even with carbon emissions trading) are insufficient** in themselves. Additional incentives, such as tax breaks and subsidies, will be needed
- *The big focus over the next 30-40 years must be maintenance and refurbishment. No regulation will create the impetus for bringing forward refurbishment, you must have fiscal incentives.* (Stakeholder interview, 2008)
- The **residential sector** is even more challenging, in terms of levers available to promote transition, but also issues of inclusion, affordability and heritage
- **Vulnerable and low income households** will also need to be assisted by 'transitional arrangements' in order to ensure social inclusion and equity aims are facilitated and not exacerbated in moving towards carbon constrained cities

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## Challenge 2: Moving to scale

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- *The majority of an average individual's carbon emissions come from their use of shared infrastructure and services ... Reducing emissions is therefore not just about the design and management of individual buildings and individual behaviour but planning and designing for sustainability at the scale of neighbourhoods, cities and regions (CABE, 2007)*
- The same logic applies to adaptive responses. The necessary responses to the challenges arising occur across and between a **variety of scales**
- Demands that the **focus moves beyond the building footprint** to think about how neighbourhoods and cities as a whole can prepare, adapt and maximise potential opportunities arising
- **Importance of integrated spatial planning**, mindful of triple bottom line considerations and how they play out across a range of scales.
- Raises expectations of our planning system and the planner's role as strategic thinker, arbiter and regulator – but **is the current system 'fit for purpose'?**
- **But city planning has few real levers to effect such a step change in reality.**

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## Challenge 3: Integrating the finance chain

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- **How we price, fund, seek return, and then reinvest in** our built environment has a crucial impact on the future adaptive resilience of our cities
- Investor demands, priorities and the challenge of **split incentives** – which, to date, have acted as a barrier to innovation and movement towards sustainable building practices – are likely to transform into drivers.
- Whole of life costing, sustainability reporting, corporate social responsibility and a **re-evaluation of long term 'risk'** require different thinking and different responses
- **Redefining value in the built environment:**
  - Thinking about longer term adaptive capacities, not just short term financial value
  - Impact of Carbon Tax and Emissions Trading Scheme on property values
  - Commitment across the life cycle: alliance arrangements, PPPs
- **Many global companies are already spearheading change.** The broader challenge will be for these shifts to be facilitated amongst all those involved in city building, management and utilisation – both large and small.

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## Challenge 4: Integrating the delivery chain

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- *The built environment needs to be viewed as a totality – an integrated system. It follows from this that the built environment industry has to be seen as a totality, not separated. (Stakeholder interview, 2008)*
- The **complex and fragmented** nature of the built environment's design, delivery and management chain is an oft-cited barrier to innovative practice across the sector
  - Trade/profession/disciplinary barriers
  - Poorly connected legislative/regulatory frameworks
  - Transfer of risk down the supply chain
  - Expertise/knowledge project based
- Demand for **more integrated practice** requires new (and better use of existing) skills, and more effective models for research, industry and labour collaboration
- What can planning do to encourage this? Is BASIX the saviour?

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## Challenge 5: Metrics and shaping behaviour

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- A lack of robust, comparable, verifiable, consistent **information** is seen as a significant barrier to transforming practice and behaviour
- **Metrics/targets** need to be used to drive change, establish markets and create opportunities rather than seen as additional red tape and legislative burden
- Metrics driving **business/industry behaviour**
  - Increased performance reporting for investment community/CSR
  - Responding to legislative and regulatory arrangements e.g. EEO Act, State based requirements such as NSW Basix
  - Achieving best practice/improving operations - Greenstar, NABERS
  - Monitoring and evaluation, role of urban informatics, BIM
- Metrics to help shape **consumer behaviour**
  - *We need a 'new Australian dream' - how is that to be manufactured, conveyed, resisted, adopted and appropriated?* (Stakeholder interview, 2008)
  - Evidence of what works: demonstrating the impact of changing practices and behaviours

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## Challenge 6: Leadership and governance

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- *To those involved in attempts to move our cities forward, coherent and practical strategies seem almost unattainable, in large part due to the vice-like grip of overly-complex, anachronistic and even contradictory urban governance systems in Australia. (Stakeholder interview, 2008)*
- **Leadership** from the front: responsibilities for the city development are fragmented within national Government itself - with a number of Ministers/Departments having responsibilities for aspects of policy
- **Fragmented urban governance** structures do not serve our cities well
- Recognition of the spatial drivers/outcomes across policy agendas areas reinforces need for integrated, more 'spatially aware' policy
- But equally, the rise of '**network governance**'
  - More inclusive approaches to planning and community level, and acknowledging others shaping urban governance – Local is good!
  - A shift away from centralised provision to locally based infrastructures e.g. micro/co generation - Sydney 2030 'green transformers'
  - And what about the growth of strata title governance?

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## The London Plan A Spatial Strategy for London

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## planyC A Greener, Greater New York

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- Planning** - Develop a plan to address climate change by integrating climate change into planning and decision-making.
- Open Space** - Increase green spaces and parks to reduce the urban heat island effect.
- Greenfields** - Focus on development in greenfields to reduce urban sprawl.
- Conservation** - Protect natural resources and biodiversity through planning and management.
- State of Good Repair** - Invest in infrastructure to reduce energy consumption and emissions.
- Water Quality** - Improve water quality and reduce pollution from urban areas.
- Water Network** - Develop a water network that is resilient to climate change and supports sustainable growth.
- Energy** - Increase energy efficiency and use renewable energy sources.
- Air Quality** - Reduce the amount of air quality pollutants from the city.
- Climate Change** - Reduce greenhouse gas emissions from the city.

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## Sydney Metro Strategy: The key objectives

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### Tackling climate change and protecting Sydney's natural environment

- Reduce greenhouse gas emissions from the manufacturing and commercial sectors
- Review the scope and stringency of BASIX
- Prepare a climate change adaptation strategy for Sydney
- Integrate environmental targets into land use and infrastructure decisions
- Implement water, air and biodiversity plans for Sydney

METROPOLITAN PLAN FOR SYDNEY 2036

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## Metro Sydney and Climate Change – What's the problem?

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- Climate impacts in Sydney by 2050:**
  - <3 Degrees Centigrade warmer and heatwaves
  - Greater frequency of bush fires
  - More summer rain, more flood events, less winter rain
  - Sea rise <40cm
- NSW State Plan target is 60% reduction in GGEs by 2050**
- Who pollutes?**
  - Industry – 31%
  - Residential – 25%
  - Commercial – 24%
  - Transport – 20%

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## The Metro approach

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*“Encouraging a compact, multi-centred city and integrating land use with transport planning will help slow emissions growth in Sydney by encouraging smaller homes and promoting more walking, cycling and public transport use. This also improves health and local air quality”*

Through a mix of Mitigation and Adaptation strategies

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## Sydney Metro Strategy: Tackling Climate Change and Protecting Sydney's Natural Environment

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**Lots to do: 9 Objectives and 25 Actions**

- Objective G1** To Reduce Sydney's greenhouse gas emissions (7)
- Objective G2** To lead the Asia-Pacific region in capital city adaptation to climate change (4)
- Objective G3** To integrate environmental targets into land use planning (3)
- Objective G4** To improve the health of waterways, coasts and estuaries (3)
- Objective G5** To achieve sustainable water use (2)
- Objective G6** To protect Sydney's unique diversity of plants and animals (2)
- Objective G7** To improve Sydney's air quality (2)
- Objective G8** To minimise household exposure to unacceptable noise levels (1)
- Objective G9** To minimise and recycle waste (1)

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## Sydney Metro Strategy: Tackling Climate Change

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**But its all rather bitty and a lot of it will involve getting others to actually do it – local councils, in fact.**

e.g.

- Objective G2** To lead the Asia-Pacific region in capital city adaptation to climate change
  - G2.1 Develop a climate change adaptation strategy for Sydney in collaboration with Councils
  - G2.2 Incorporate adaptation to climate change in the program to review BASIX
  - G2.3 Investigate incorporating street tree planting and other green cover opportunities into grant funding programs, particularly in Western Sydney
  - G2.4 Incorporate climate change adaptation into centre renewal

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### Competing agendas? Sustainable Sydney 2030

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Now for the grand idea – the all embracing City of Sydney plan

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### Sustainable Sydney 2030: green transformers and 'cross-cutting adaptation'

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But how achievable is it?

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### So will BASIX save us?

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Sustainable multi-unit features encouraged by BASIX

### Perhaps BASIX will.... but density won't

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The research that burst the density bubble

Annual per capita greenhouse emissions vs dwelling type

Source: Myers et al. (2005) Figure 2

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### BASIX performs poorly in terms of savings for higher density

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Costs and benefits of BASIX compliance to 2050

BASIX Post-Implementation Cost Benefit Analysis. Fact Sheet  
<https://www.basix.nsw.gov.au/docs/monitoring/PIR/BASIXCostBenefitAnalysis2009FactSheet.pdf>  
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### BASIX and density

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#### BASIX energy targets – the higher, the lower!

Project type	Target		
	Zone 1	Zone 2	Zone 3
Detached and attached houses	40	35	25
Low-rise units (2 to 3 storeys)	35	30	20
Mid-rise units (4 to 5 storeys)	30	25	15
High-rise units (6 storeys or more)	20	15	5

Why do different project types have different energy targets?  
 Energy targets for multi-dwelling projects vary according to building type. The targets were established following data collation and analysis which found that unit dwellings have higher per capita greenhouse emissions than houses and were therefore likely to incur significant additional costs to meet a 40% reduction in emissions. Factors impacting on this higher energy consumption include lower occupancy rates per dwelling, common area energy use and heat loss in central hot water systems. On average, a pre-BASIX high-rise unit generated almost twice the household greenhouse gas emissions per occupant than a detached house occupant.<sup>15</sup>

So how come higher density gets to achieve lower targets?

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### BASIX and density

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#### Why, it's those naughty split incentives

- Lower over-compliance in multi-dwellings reflects the split incentive issue in the property sector. i.e. a reluctance by home builders or unit developers to invest in higher efficiency designs and technologies that would achieve reduced running costs for owners and occupiers, but which may not translate into a direct return on investment.
- There may be room to change the minimum energy and water targets, which in turn would serve to meet consumer expectations for lower running costs and further support the State's water and greenhouse gas reduction targets. Any such increase would require a supporting cost-benefit analysis for industry.

..... but not for the resident (or the environment)!

Source: BASIX 06-09 Multi-Dwelling Outcomes Report NSW DoP 2011 p32.  
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### And higher density is less adaptable at current BASIX settings

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Dwelling type	Kilograms of emissions saved, per year
Detached houses	~3,600
Attached houses	~3,200
Low-rise units	~2,400
Mid-rise units	~2,200
High-rise units	~1,500
Mixed houses and units	~2,600
Average multi-dwelling	~2,500

Source: BASIX 06-09 Multi-Dwelling Outcomes Report NSW DoP 2011 p7.  
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### Adapting to climate change: for whom?

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Then there is the whole issue of social vulnerability and affordability .....

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### Who can afford to adapt? Vulnerability to a carbon constrained future

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#### 'VIPER' - Sydney

**Greater Car Dependence and Low Socio-economic Status In:**

- Outer areas
- Areas with poor PT

**Less car dependence and Higher Socio-economic status In:**

- Inner areas
- Better PT services

Oil Vulnerability Index for Sydney

0 5 10 Kilometres

Thanks to: Jago Dodson and Neil Sipe, Griffith University

### Vulnerability will be greater for those on lowest incomes

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SEIFA Advantage / Disadvantage Index 2010

- Top 20% most disadvantaged
- Top 20% most advantaged

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### The impact of a polarised city on property values

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#### What price adaptation in the West?


2010 Average Sale Price

- > \$1,000,000
- \$800,000 - \$1,000,000
- \$600,000 - \$800,000
- \$400,000 - \$600,000
- \$200,000 - \$400,000
- < \$200,000

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But low income does not mean there are no solutions.....

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**Bed Zed – affordable & sustainable social housing in London:**  
**Bill Dunster, Peabody Trust, ARUP**

<http://www.youtube.com/watch?v=XkenbQoDV4w>

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Summary remarks – how we can best adapt to climate change

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Its the bigger, complex and 'cross cutting' issues that really matter – and which we have little research on this, rather than specific technology issues:

1. A key requirement is a more informed engagement by all levels of government - this is not about having all the answers or all necessary funding in place, but to provide leadership and frameworks to enable local councils to perform and innovate
2. More informed engagement implies better city scale metrics on climate resilience and how well we are moving to a more sustainable position
3. The impetus for change and innovation is already here. Investment funds, corporate social responsibility drivers and changing interpretations of risk (especially with the Carbon Tax/ETS) are likely to drive changes: climate resilience should be the expected market norm rather than a novelty
4. Promoting landmark green buildings is an important part of spearheading the transition to sustainability. But these pioneering sites must not detract from addressing the much harder policy challenges, notably retrofitting our existing built environment and 'moving to scale'

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Summary remarks – how we can best adapt to climate change

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5. In rising to the challenge of adaptation and urban climate vulnerability, **integration is a central theme:**
  - across a variety of spatial scales
  - across the entire building/neighbourhood life cycle
  - across organisational practice
  - across all levels of governance impacting on our built environment
6. Dealing with the **fragmentation of urban life and economy** – of jurisdictions, ownership, interests groups, decision making
7. Above all, a better understanding of what **behavioural changes** will be needed to deliver changes in our cities and towns to changing climatic challenges is needed:
  - People, households, businesses, public agencies,
  - Costs, pricing, incentives, risks, affordability

*Changing how we use and behave within the built environment is a central component of this challenge\**

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UNSW

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