CARBON NEUTRAL URBAN DEVELOPMENT

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1. Cities and the Built Environment
2. Precinct scale carbon abatement
3. Barriers & Incentives to low carbon development
4. Overview of ARC project
5. Accrediting urban development
6. Further research
Can land development be accredited for its carbon reduction potential?

What are the benefits of doing so?
Cities a huge consumer of resources

- Over \( \frac{2}{3} \) of primary energy demand globally
- Up to 70\% of GHG’s
Based on centralised infrastructure

- Electricity
- Water
- Waste
WHY WE NEED TO CHANGE THE WAY WE DESIGN CITIES

Climate Change, Peak Oil, Resource depletion...
AN INCREASING FOCUS ON CITIES GLOBALLY

- Clinton Climate Initiative & C40
- Carbon Disclosure Project (CDP)
- World Mayors Council on Climate Change
- Cities for Climate Protection (CCP)
  - ICLEI - (International Council for Local Environmental Initiatives)
- Urban & Regional Carbon Management
DOMESTIC GOVERNMENT INITIATIVES

- Federal
  - Solar cities
  - $80 million for low carbon communities
  - Carbon Trust
    - Energy Efficiency Trust
    - $80 million funding

- State
  - ZEN - Zero Energy Neighbourhoods (VIC)
  - Living Smart

- Local
  - ICLEI - Carbon Neutral
  - Stirling City Redevelopment
  - Sydney Green Transformers

Buildings = 23% of emissions

Abundant energy efficient abatement opportunities in built environment

PRECINCT SCALE THE FOCUS OF NEW TOOLS

- **BREEAM COMMUNITIES**
  BRE Environmental Assessment Method UK

- **LEED ND**
  Leadership in Energy & Environmental Design - Neighbourhood Development USA

- **GBCA COMMUNITIES**
  Green Building Council of Australia (under development)

**NEW!**
- CATSS report on community scale sustainability tools
Identified the need for “energy efficient hubs”

Why this focus?
MOST OPPORTUNITIES AT PRECINCT LEVEL

1. Scale of community
2. Scale of developers
3. Scale of emerging technologies
DISTRIBUTED INFRASTRUCTURE

- Fewer/no transmission losses
- Less demand on grid
- Reliability of supply
  - Diverse sources of power
- Greater efficiencies - when combined
- Greater community awareness of resource consumption
CHARACTERISTICS OF A CARBON NEUTRAL PRECINCT...
1. Dense, Mixed & Good Design

Solar orientation and walkable design

Green roofs & facades

TOD Design - based around transport
2. DECENTRALISED SYSTEMS

Medium to large scale co- & tri-generation - providing electricity, heating and cooling to local area

Re-use of grey water

Recovery & utilization of waste to energy

Small scale renewable energy
3. SMART TECHNOLOGIES

- Live energy monitoring, IHD’s, smart meters & intelligent grids
- Intelligent buildings - automatic functions
- Recycled, re-used and renewable materials

4. LOW CARBON MATERIALS
IF WE KNOW HOW TO DO IT...

...Why aren’t we doing it?
Barriers to carbon neutral communities

- High capital cost (long payback periods)
- Energy market barriers
- Split incentives
- Lack of information
- First mover disadvantage
- Policy & pricing uncertainty
- Longer approvals process
OPTIONS TO OVERCOME BARRIERS

- Government to lead
- Energy Service Companies (ESCO’s) to manage systems
- Property Assessed Clean Energy (PACE) financing
- Deregulate the energy market
- Reward early mover - provide incentives...
  - “Green door” - fast track approvals process
  - Land Tax exemptions
ESCO identifies energy efficiency opportunities within a precinct

Apply for approval to local council

If approved, ESCO applies for funding through financier with payback being provided through increased land rates for owners

Allows upfront capital costs to be spread over 20 years or so with investment costs being attached to property rather than to a person
Innovations require a government framework

Ideals without substance lead to credibility issues
...So if developments can achieve/demonstrate innovation, can it be recognised?
CURRENT ACCREDITATION

- Green Star Communities (under development)
- Envirodevelopment (UDIA)
- SPEAR (ARUP)
- LESS (Hassell)
- ISAP (CSIRO)
- SSIM (AECOM)
- PRECINX (Landcom)

Great for rating sustainability! - but few actually measure the specific carbon content or emission savings
The need for a quantitative carbon assessment framework...
“A significant area of concern which has emerged from this analysis is the general lack of robust indices for measuring urban environmental quality or ‘green infrastructure’ performance as a key component of overall urban sustainability.”

Australian Institute of Landscape Architects, 2010
“What is the national standard for calculating greenhouse gas emissions in development projects? It doesn’t exist.”

Adam Beck, 2010
The need to align carbon emission data collection for comparability

“What is that data? Who reports it and what’s the comparability? That’s the problem in industry right now... There’s not an international standard. It doesn’t mean a lot if somebody else is doing it completely different...that’s what business really needs”

Lauren Haas, 2010
No universal comprehensive framework for calculating GHG emissions associated with urban development...
Developments around world claiming all sorts of things...
- most commonly ‘carbon neutrality’

But what emissions are calculated?
- Operational emissions?
- Full life cycle?

NPQ - a prime example of the need for a framework for calculating emissions
Aim: To develop a national carbon neutral accreditation scheme for urban and regional land development, which can be used to influence policy decisions and assist Australia in the transition to a low carbon future.
1. Urban Redevelopment & Subdivisions
2. Urban New Development
3. Remote Aboriginal Communities
4. Mining Camps
5. Accreditation, Policy & Governance
DEFINING THE BOUNDARY:

1. Construction
2. Embodied energy in materials
3. Operational energy
4. Water
5. Waste
6. Transport
7. Decommissioning?

Distributed infrastructure versus conventional supply
National Carbon Offset Standard and the Carbon Neutral Program Guidelines

- Replaced Greenhouse Friendly
- Largely based on the CPRS
- Brings credibility to concept

General steps in gaining certification
- Measure emissions
- Write an EMP outlining reductions
- Offset emissions etc

5 year accreditation period

...But not completely relevant and applicable for land development
ISSUES FOR LAND DEVELOPMENT UNDER NCOS...

- Redevelopment versus new development
- Mechanisms for behaviour change
- Transaction costs
- Ongoing reporting
- Designing & implementing Environmental Management Plan
- Issue of offsets
- Which methodology?
- Who benefits, who pays?
- Agreement between multiple players
ACCOUNTERTATION - WHICH METHOD?

Accounting Method?

1. Company: Inventory
2. Product: Life Cycle Analysis (LCA)

Responsibilities & ‘scopes’ in emissions (similar framework to NGERs)

All emissions associated with development
Regardless of carbon neutrality, still need decarb framework...

A framework & methodology can:

1. Help to assess decarbonisation measures
2. Help to compare carbon claims - ACCC
3. Allow for incentives/rewards
4. Provide basis for future carbon/energy efficiency trading schemes
5. Allows sector targets to be developed

Ongoing reporting critical to determine success of measures
FURTHER RESEARCH

- Investigate who should be responsible for accreditation & ongoing reporting

- Develop specific:
  - **Methodology** for assessing/calculating emissions and;
  - **Guidelines** and tips including:
    - *Financing options*
    - *How to encourage collaboration between multiple players*
    - *Owner/occupier arrangements*
    - *Incentives for low carbon developments*

- Investigate carbon trading opportunities for the built environment
Thank you!

Questions?