



DAMIEN GIURCO    INSTITUTE FOR SUSTAINABLE FUTURES

# URBAN INFRASTRUCTURE & IMPACTS

COMPLEX SYSTEMS SCIENCE IN THE URBAN CONTEXT, 3-4 OCTOBER 2007



THINK.  
CHANGE.  
DO



Institute for  
Sustainable  
Futures



UNIVERSITY OF  
TECHNOLOGY SYDNEY

# Key urban problems

- > **What are the impacts of current and future structures of our urban ecology?**
  - which configurations are more desirable, more resilient?
  - to what risks?
  - how does infrastructure affect behaviour?
- > **What policy approaches deliver good outcomes for our city?**

# Presentation overview

## > **Urban context: issues and impacts**

- population
- land use
- water
- transport
- energy



SWC, 2007

## > **Our approach to integration and modelling**

- model strengths, weaknesses, data
- role of tool in good policy

## > **Future possibilities**

# Project background

## > **Institute for Sustainable Futures, UTS**

- *25 researchers diverse backgrounds – applied research*
- *10 PhD students – transdisciplinarity*

## > **UTS Challenge Grant**

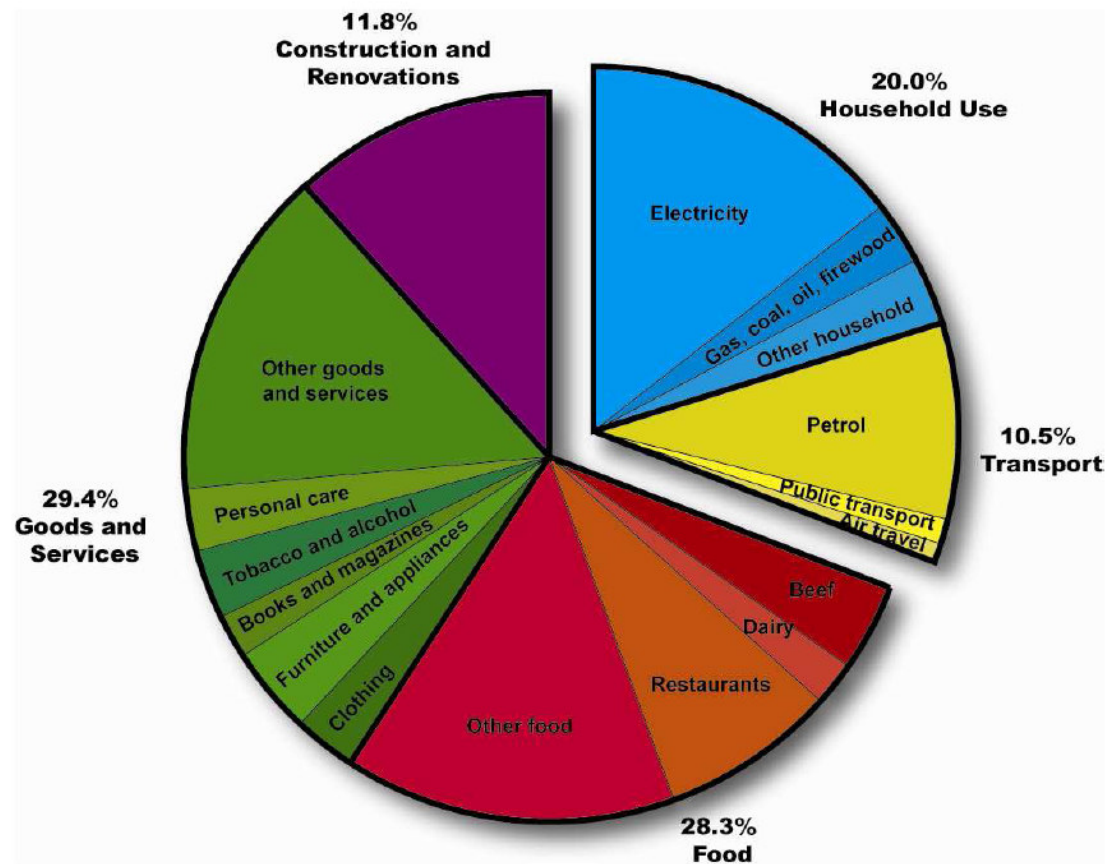
- Interdisciplinary (ISF, DAB, Science)
- Seed funding leading to ongoing collaboration
- 10 / 18 months

## > **Acknowledgements**

- Peter Rickwood, Garry Glazebrook, Alex Kazaglis, Leena Thomas, Michelle Zeibots, Spike Boydell, Stuart White, Graziella Caprarelli and Janet McDougal

# Greenhouse profile - overall

Fig 1. Average household profile: greenhouse gas pollution

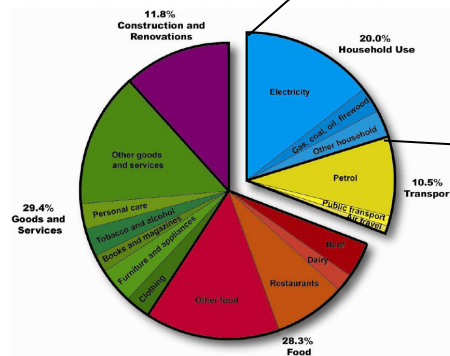


ACF, 2007

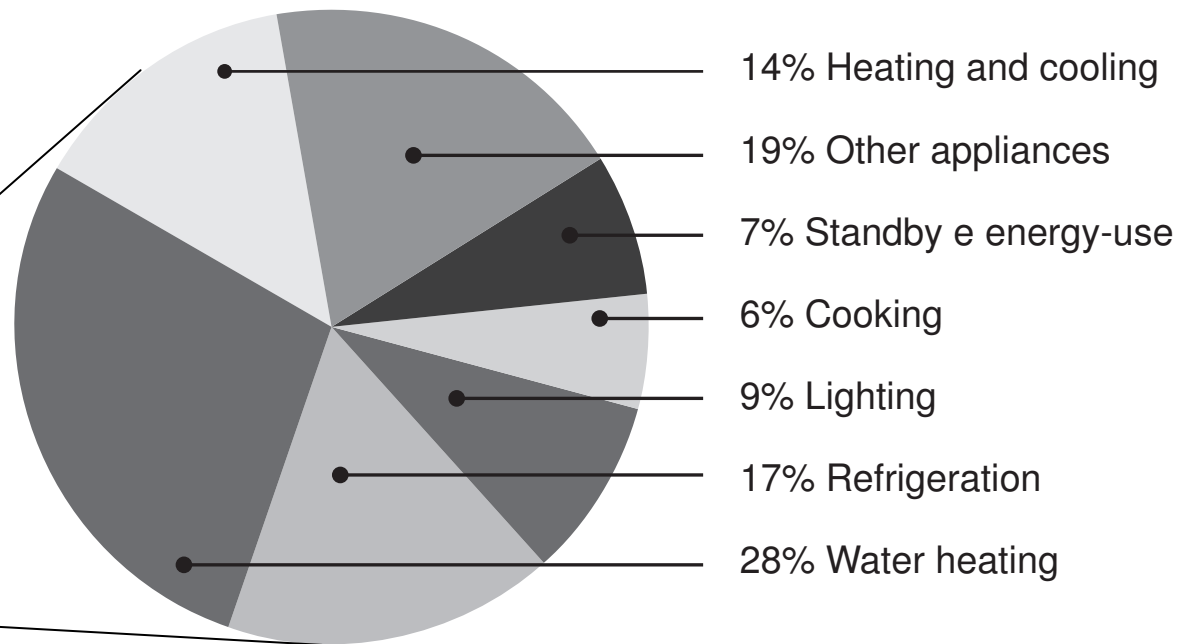
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# Greenhouse profile in home

Fig 1. Average household profile: greenhouse gas pollution



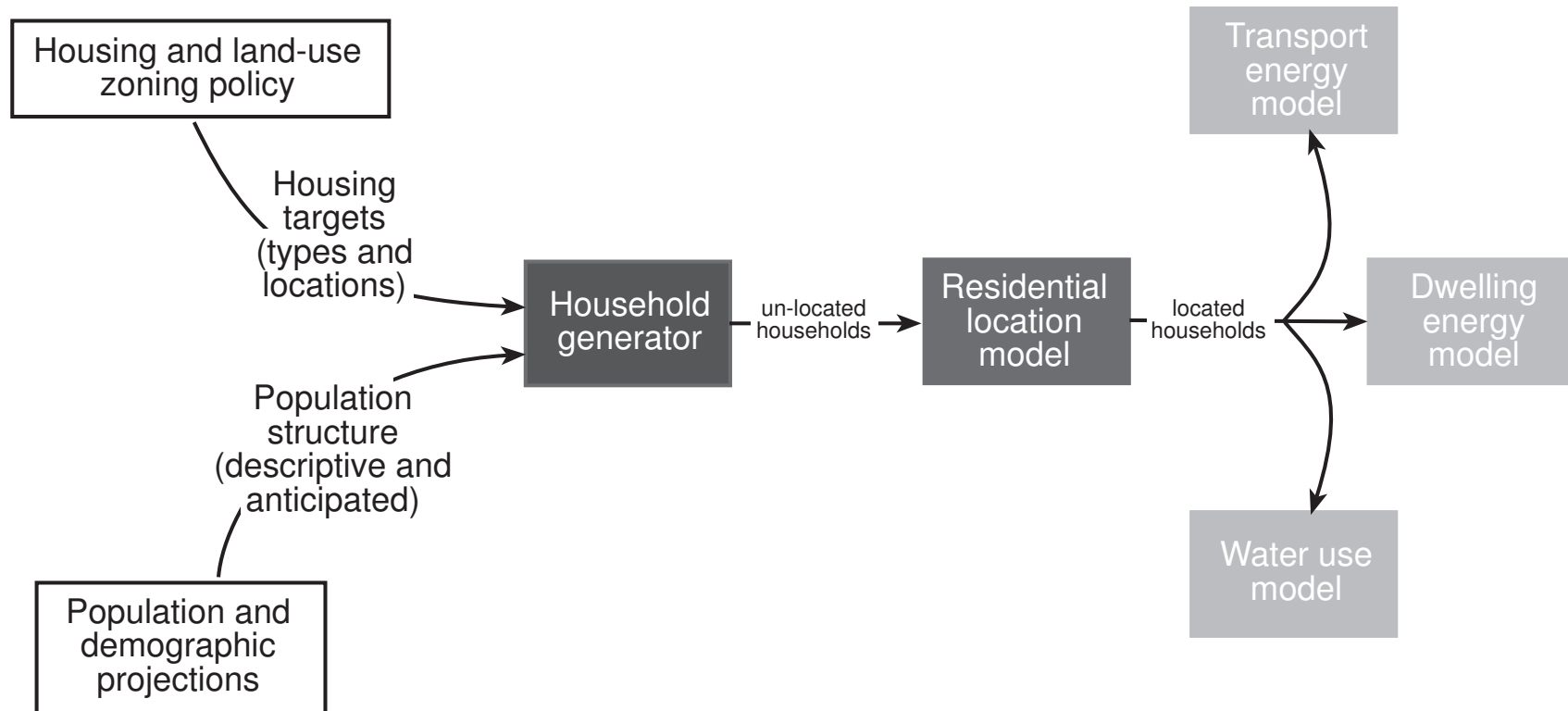
ACF, 2007



## Greenhouse gases from home energy use

Reardon, 2005

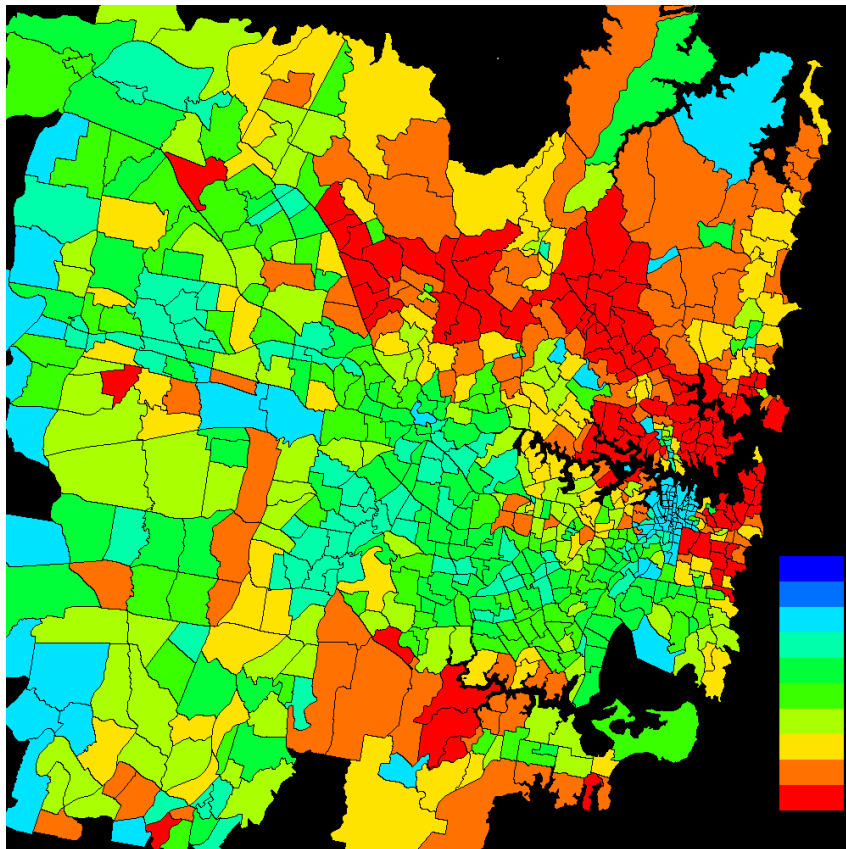
# Model structure



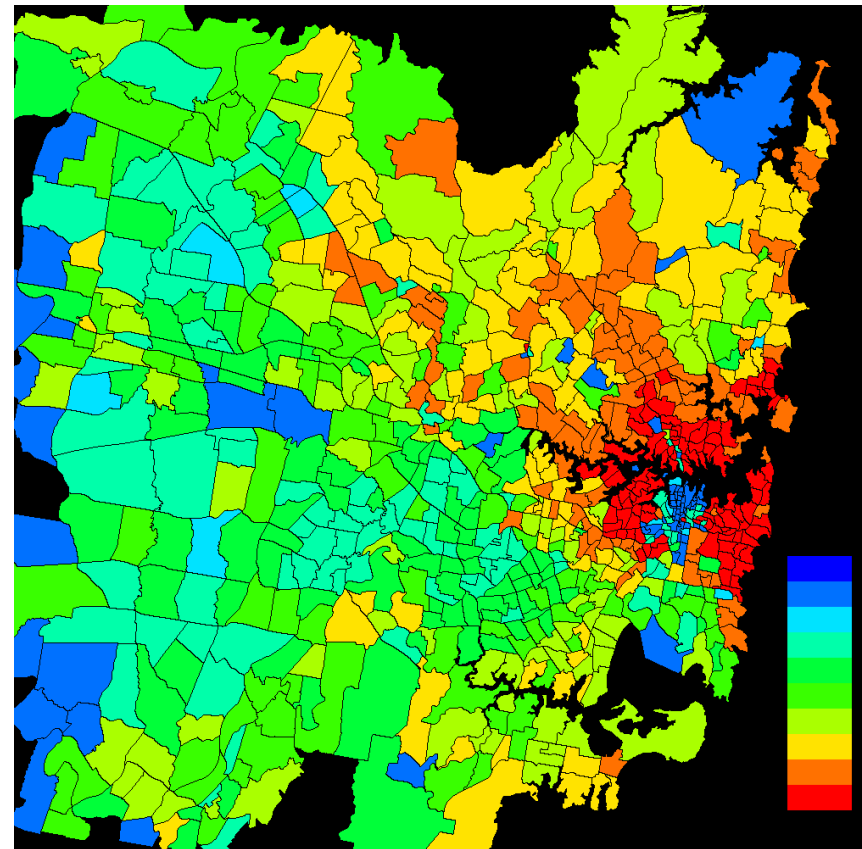
Rickwood et al, 2007

# Example model outputs (red = hotter / better)

Couples with children wish to live.....



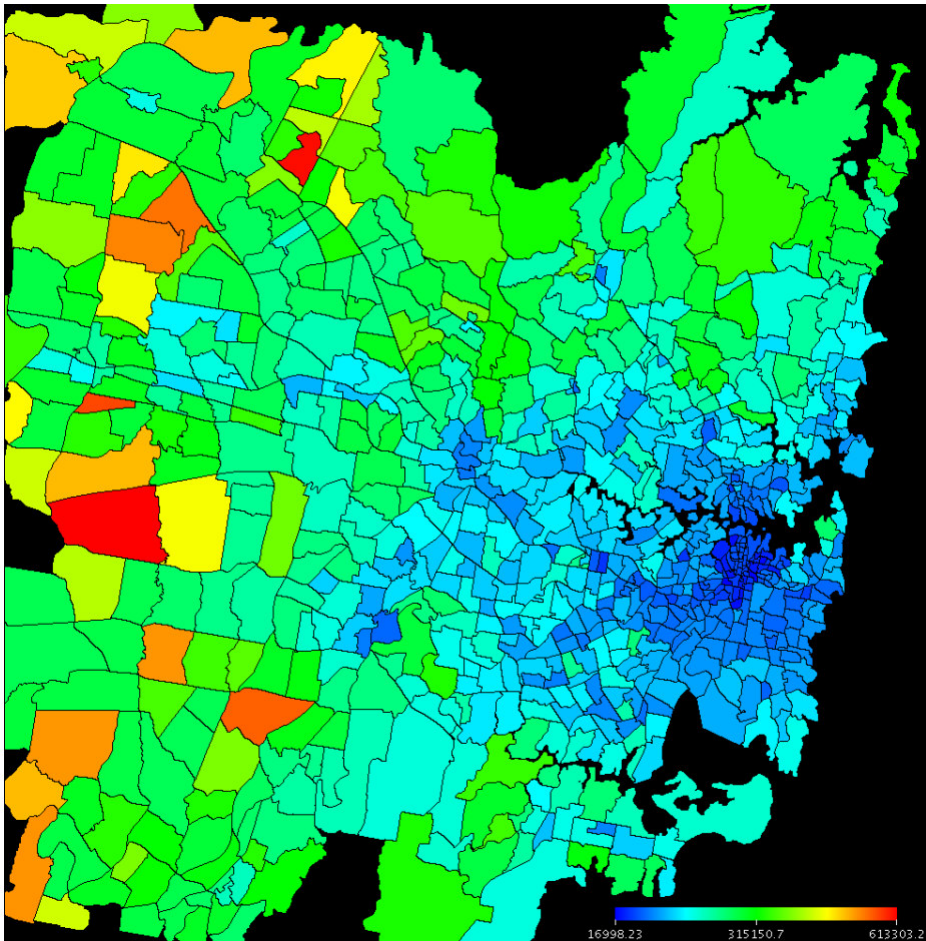
Singles wish to live.....



Rickwood, 2007

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# Model outputs - energy



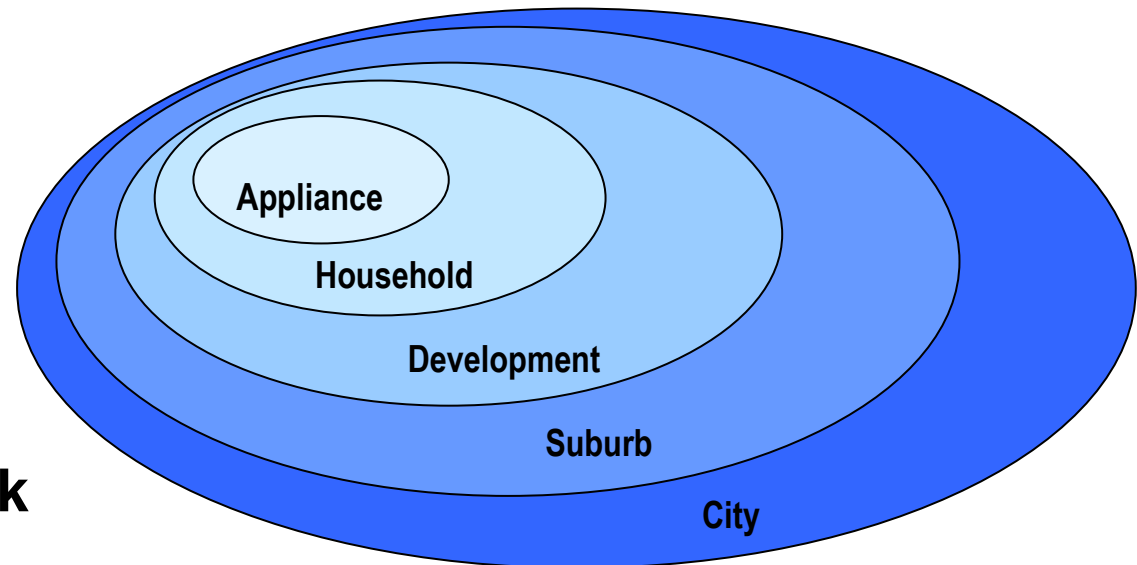
Energy footprint

- transport
- in-dwelling

Lower near public transport

# Potential across scales

- > Understand potential across scales –  
**infrastructure** changes, **behaviour** changes



- > **Connected feedback**
  - domain of influence
  - domain of impact
  - hard and soft systems

Giurco, 2007

# Data is a challenge

## > Current model limitations

- residential focus, operational energy, water, transport
- validated data

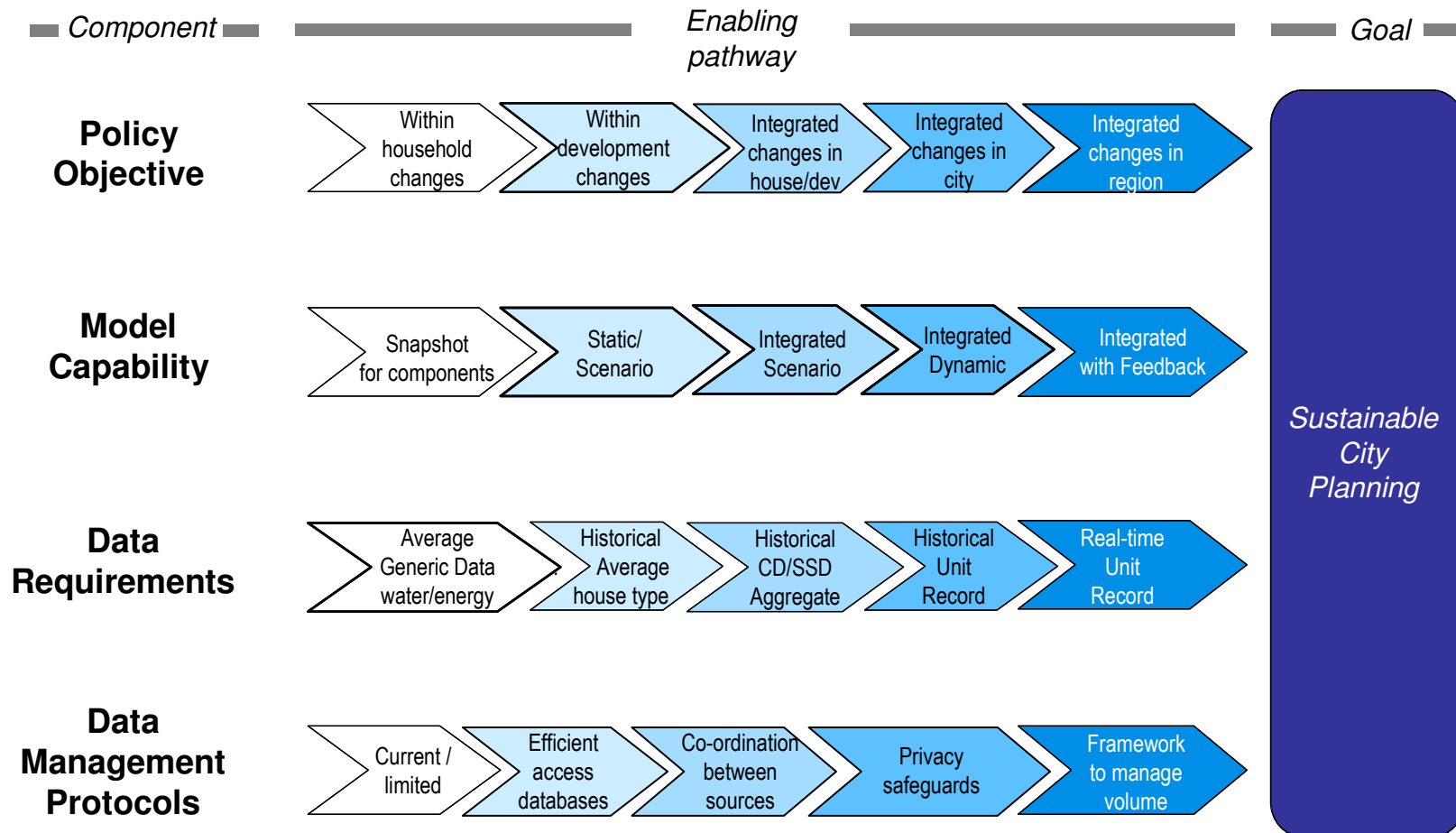
## > Data & Stakeholders

- TPDC
- BASIX
- Sydney Water
- Energy Australia
- IPART

*Co-ordination*

*Privacy*

# Parallel progress – good tool ≠ good policy



Giurco, 2007

# Implementation is a challenge



# Future directions

- > **Begin with breadth, add depth**
  - simple model well integrated and used: fantastic
  - imagine the possibilities to add....
    - information detail
    - peri-urban
    - non-residential
    - other impacts, social, economic
    - resilience indicators
  
- > **Links to complex systems**
  - where appropriate model feedback loops, actor behaviour
  - consider real-time information

## Further information

- > **Institute for Sustainable Futures, UTS**
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