

SOLUTIONS

SUSTAINABILITY OF LAND USE AND TRANSPORT IN OUTER NEIGHBOURHOODS

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University College London

Modelling cities for sustainability

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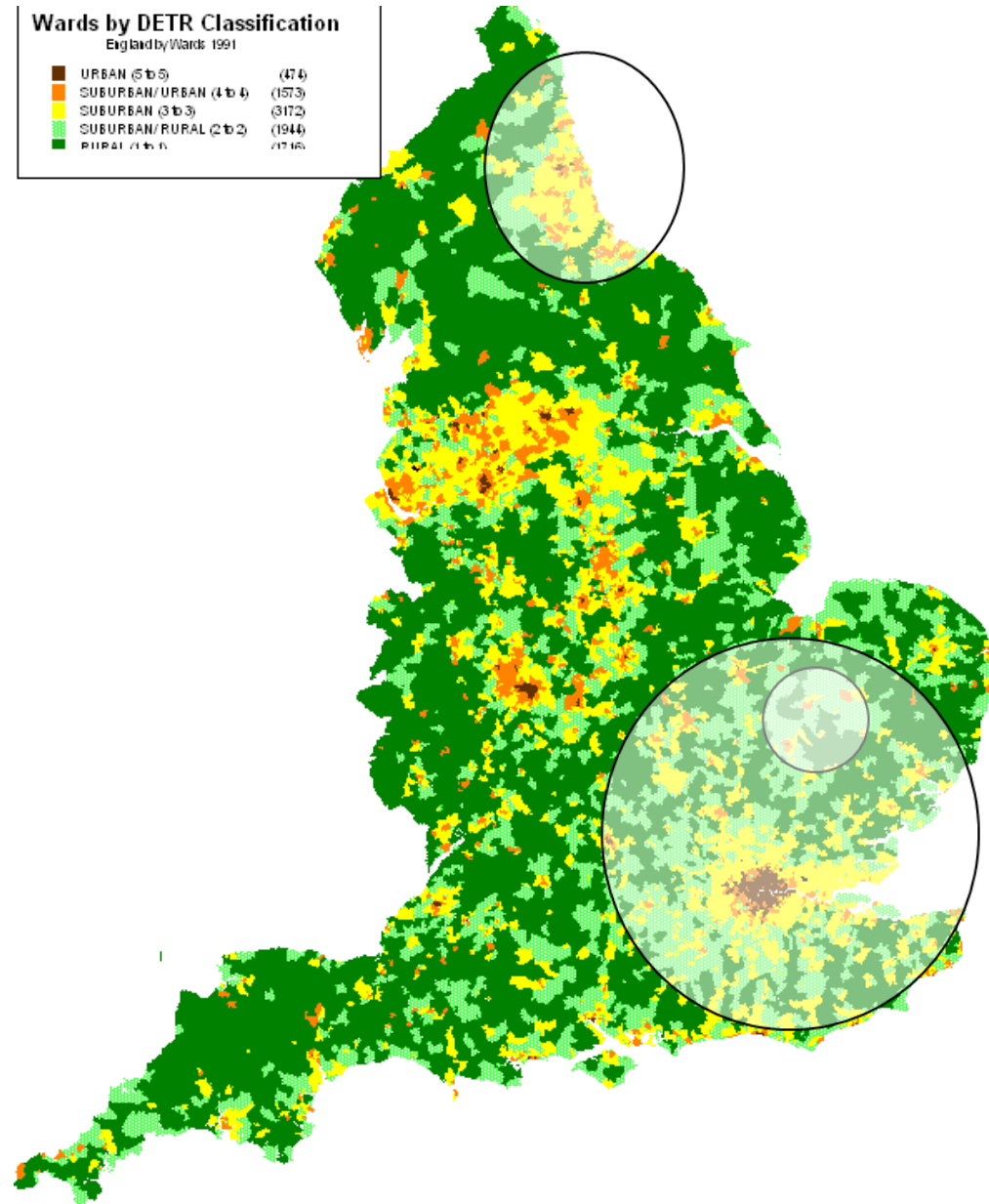
May 21-23, 2010

SUMMARY (strategic scale)

- Investigates - sustainability of land use and transport in city-regions
- Focus - design of spatial plans and transport systems.
- Aims - contribution to the key questions: of how far, and by what means, can towns and cities be planned so they are:
 - economically efficient,
 - socially inclusive and
 - environmentally sustainable.

Prospects in the North East and South East

- In the wider South East there is substantial demand for houses due to population growth and affluence.
- In Tyne & Wear, by contrast, the population is static but demand for houses results from rising incomes.
- Cambridge

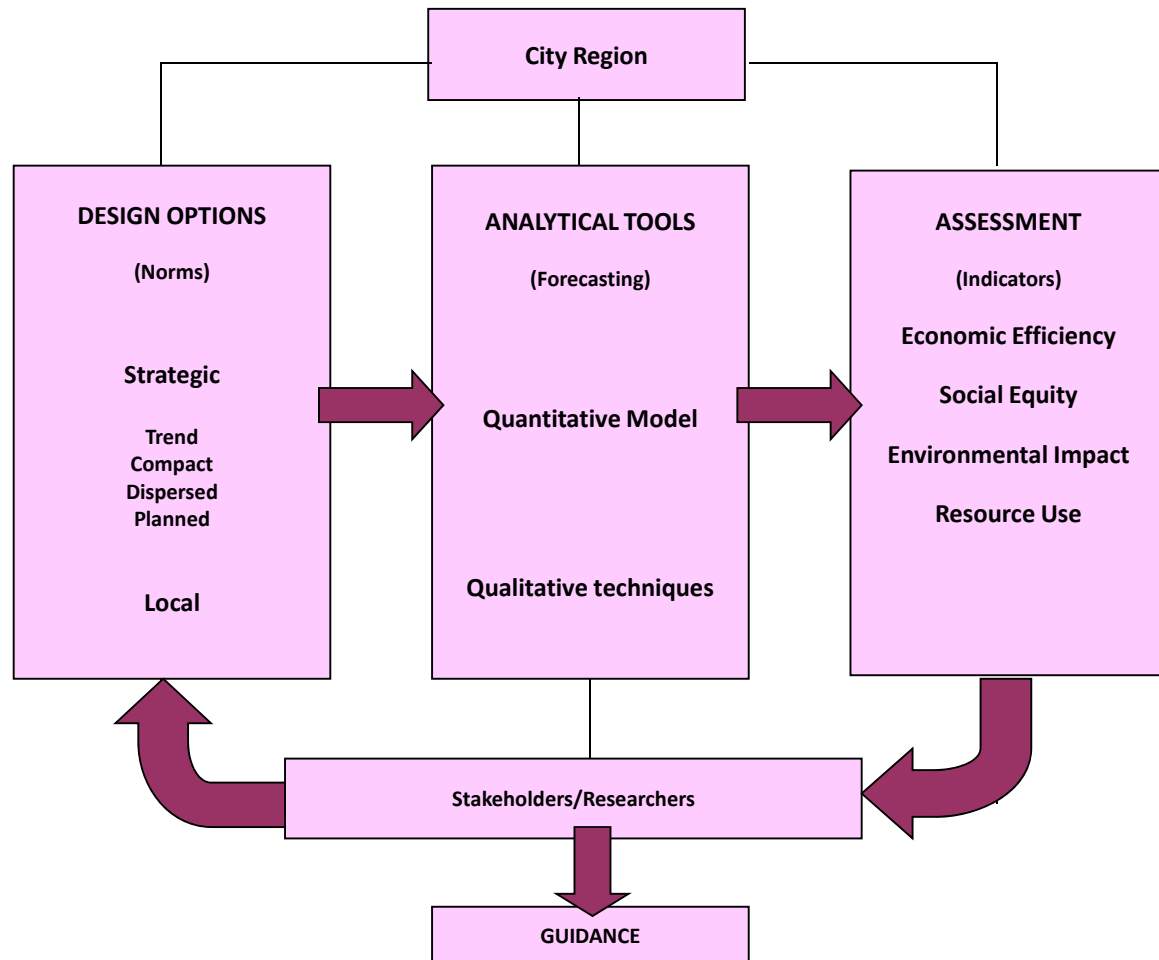


Method

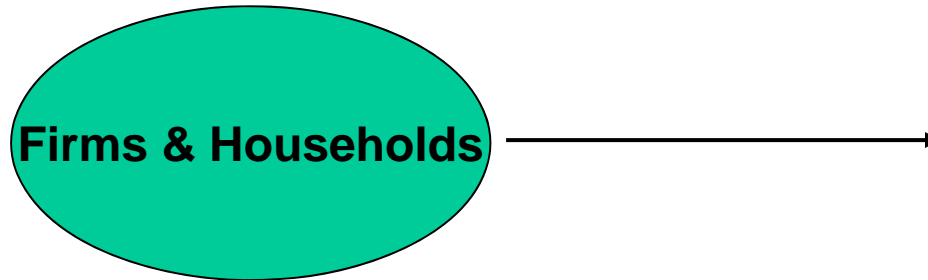
Three steps:

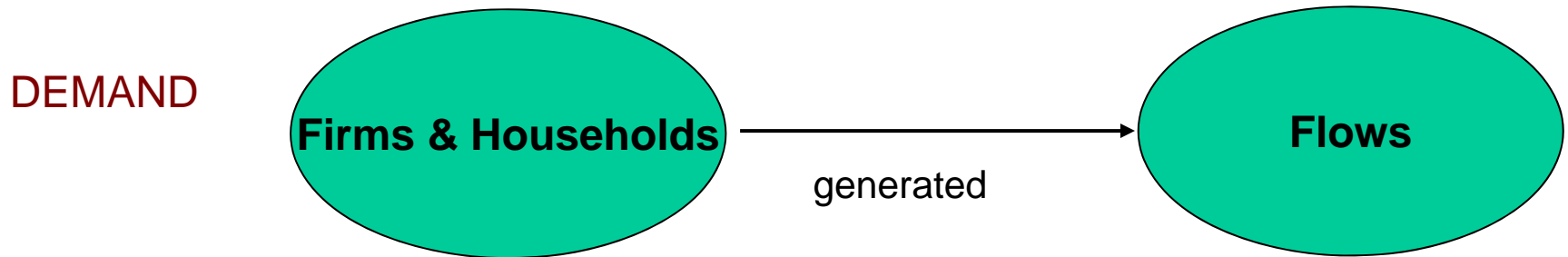
The policy analysis in this study involved three steps;

- (i) identify the policies being used to deliver today's development and use these 'levers' to explore alternative urban forms.
- (ii) Use existing computer models to forecast the likely effect on the location and travel of households and firms in response to the use of these policy levers.
- (iii) assess the outcomes by means of indicators that measure economic efficiency, social equity, environmental protection and resource use.

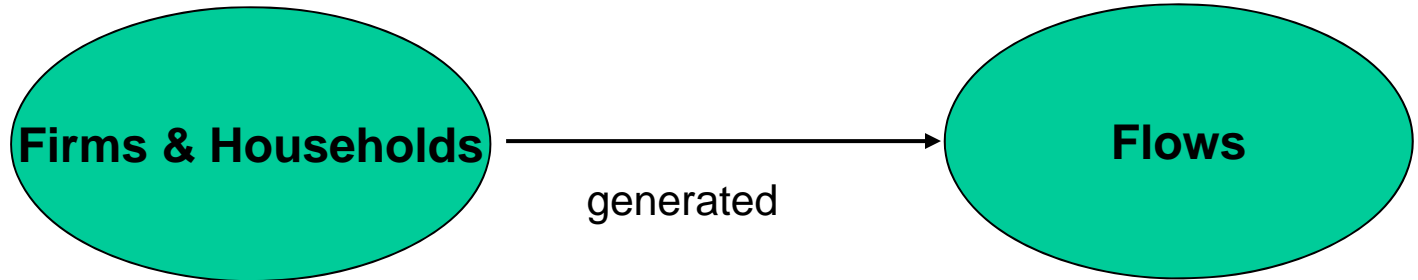


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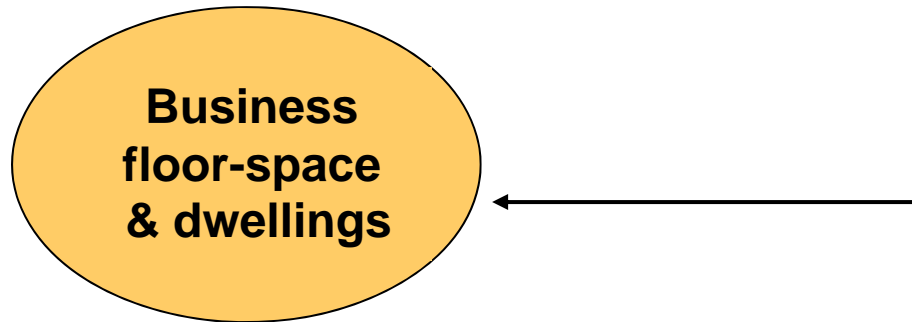




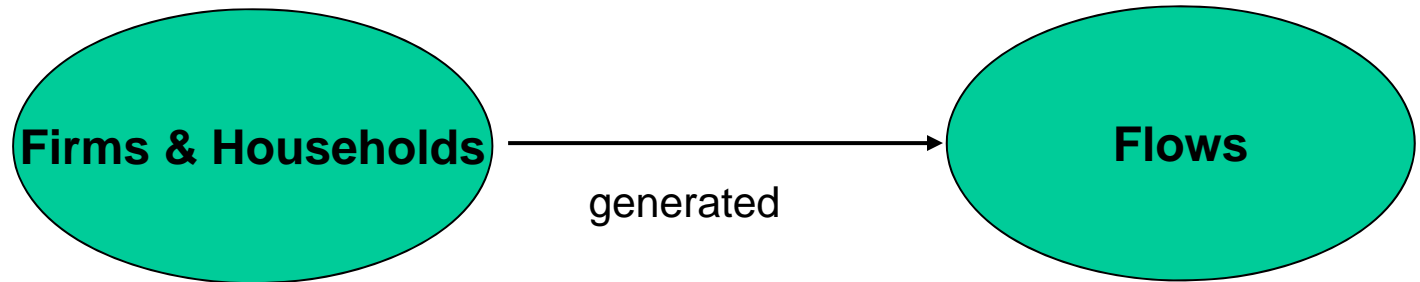
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SUPPLY

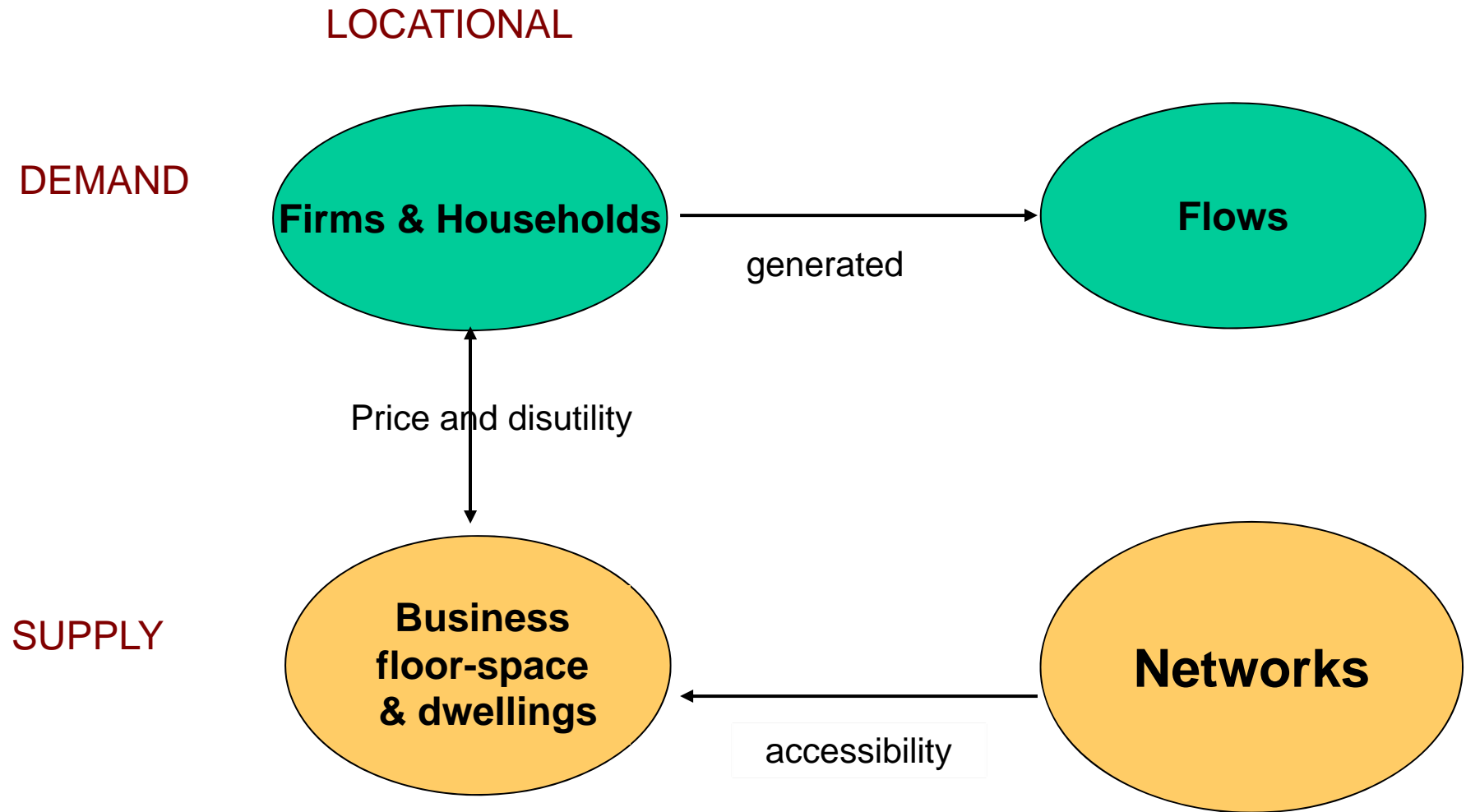


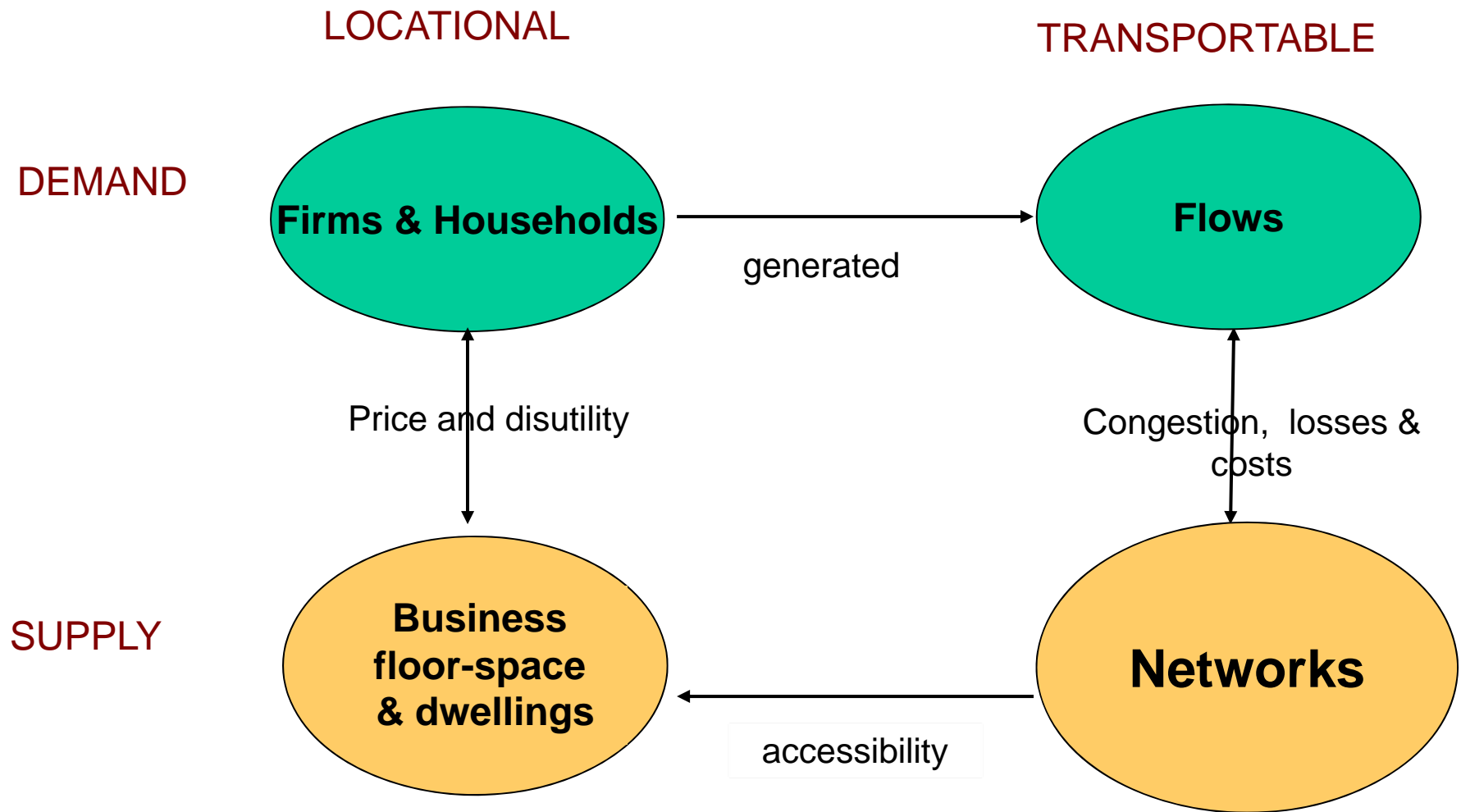
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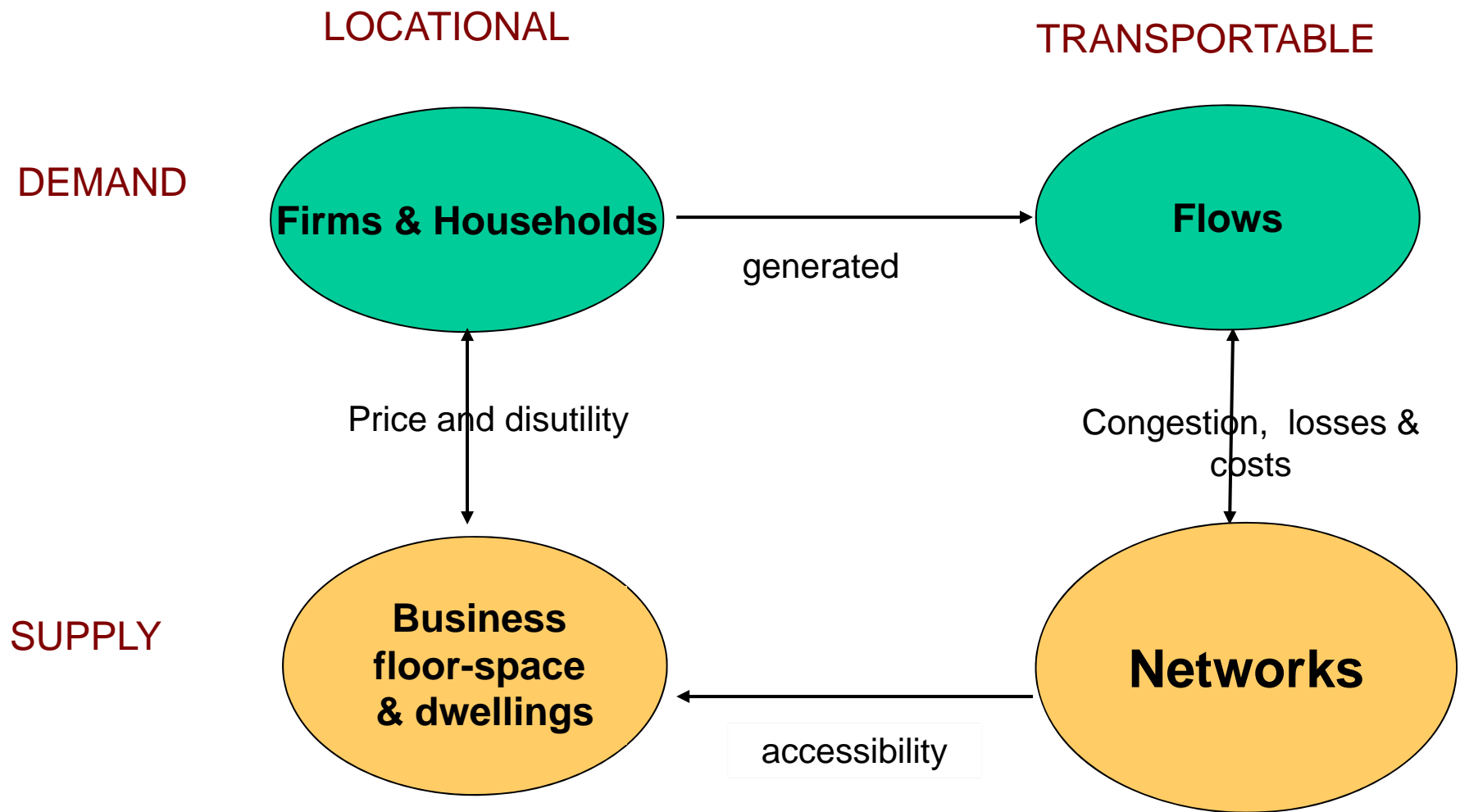


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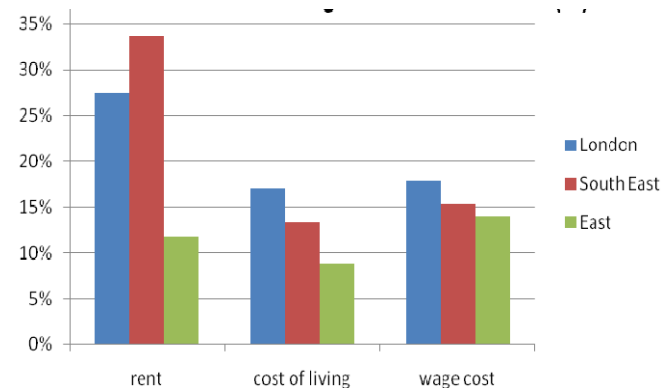
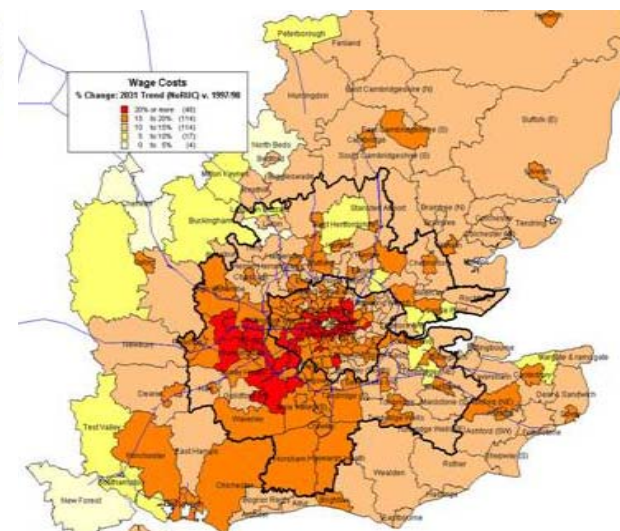
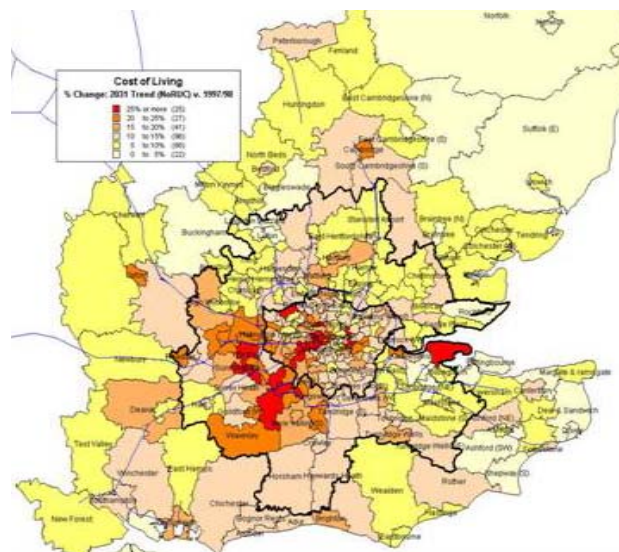
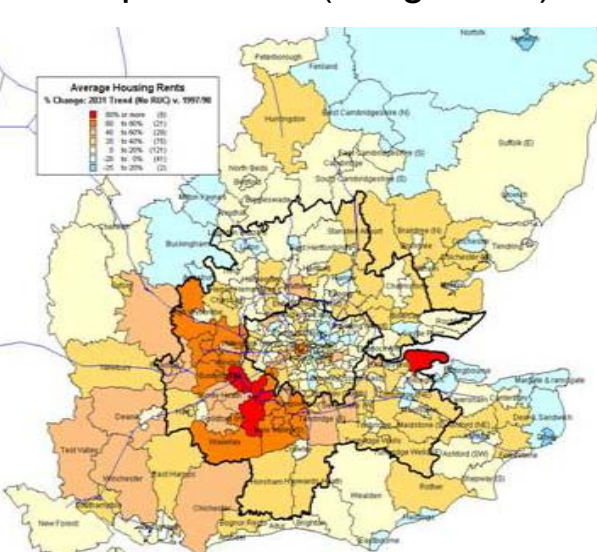


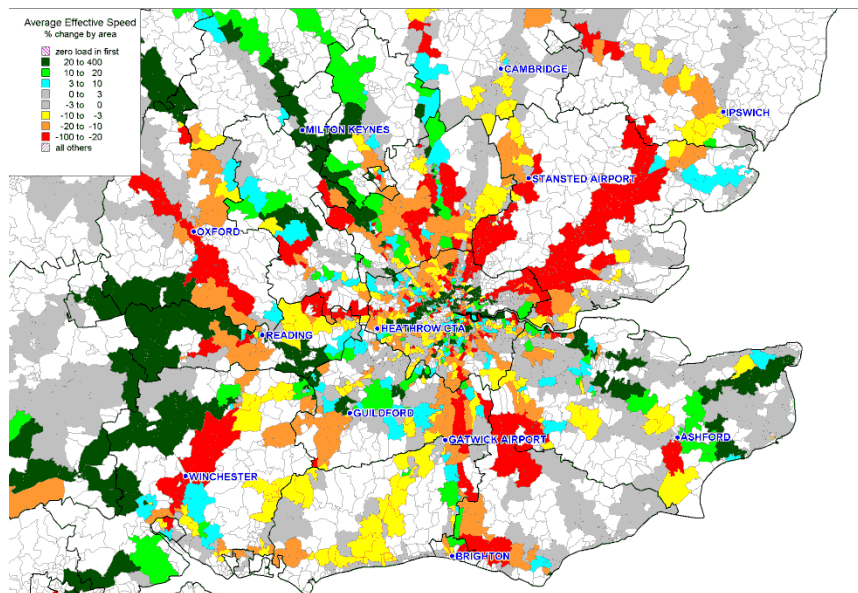


**MEPLAN land use transport interaction model
(Behavioural market simulation)**

Rents, living costs, and wage costs

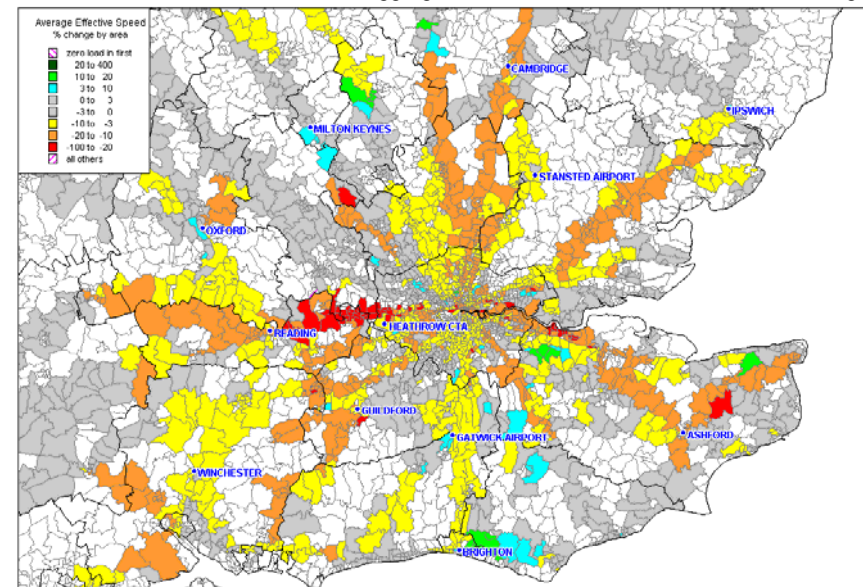
Large increases in London, Surrey and Berkshire, reflecting increases in housing cost and transport costs (congestion)



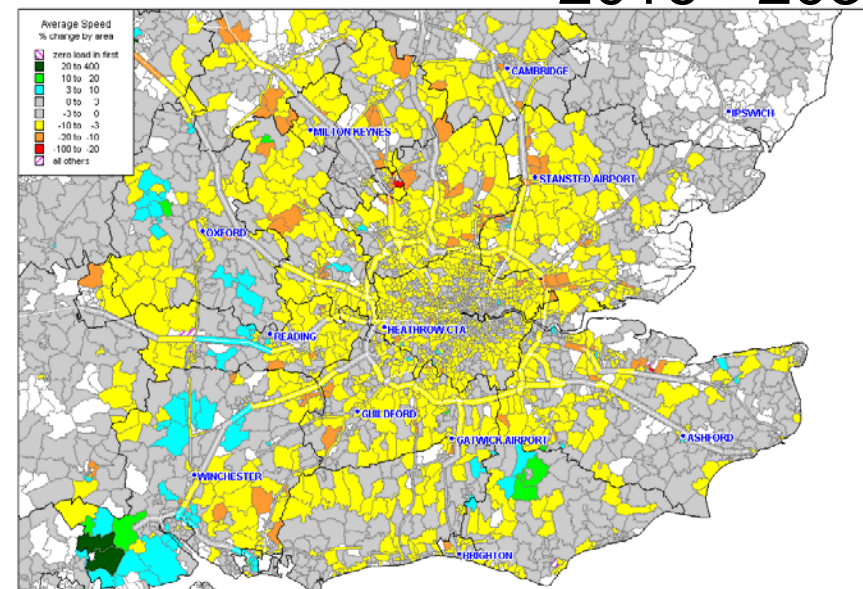
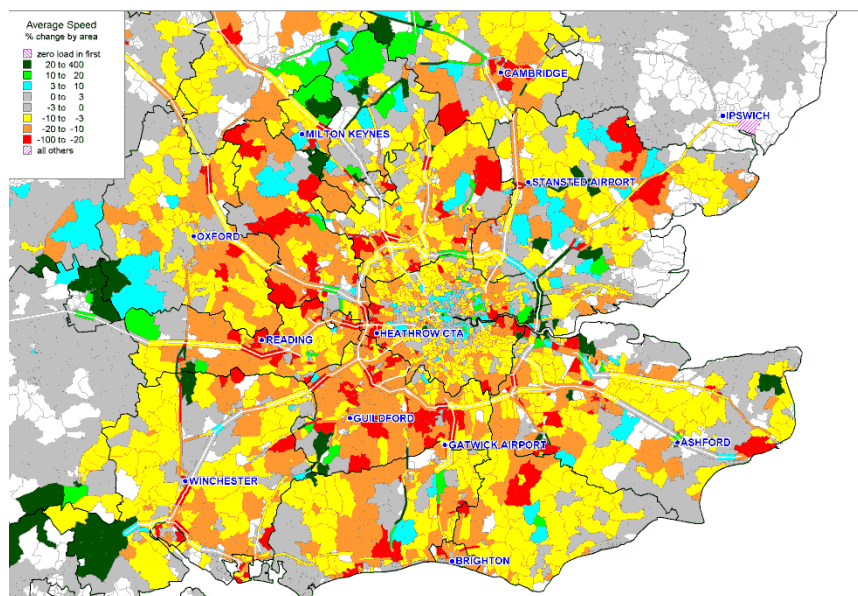


1998 - 2016

Rail comfort is an aggregate measure of level of service and crowding



2016 - 2031



Shortcomings in current urban policy:

- They do not satisfy demand for housing in places where people want to live. Supply is, in effect, largely restricted to flats built on brownfield sites in locations where there is little employment growth.
- Despite a substantial shift of investment to public transport, bus and rail services do not adequately meet travel needs. One problem is that separation of jobs from homes increases journey lengths for all forms of travel. Another is that much demand for travel lies along routes not well served by public transport. This leads to road traffic congestion.

Alternatives

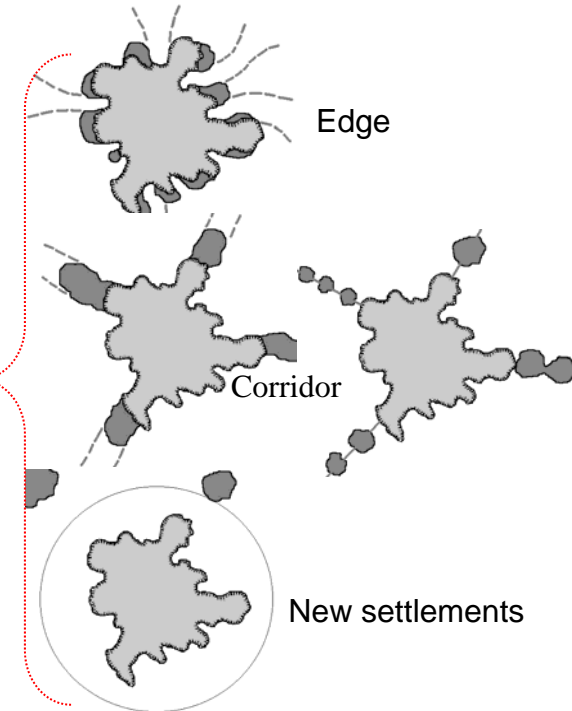
Possible alternative future urban growth can be considered beyond current development trends in the South East and on Tyneside:

- (i) Compact City; high density development related to public transport and located within existing towns and cities.
- (ii) Market Led Dispersal; medium to low density development oriented towards travel by car, but preserving areas of natural and historic interest.
- (iii) Planned Expansion; new settlements and suburbs built at medium densities and oriented towards both public transport and cars.

Compaction



Planned Extensions

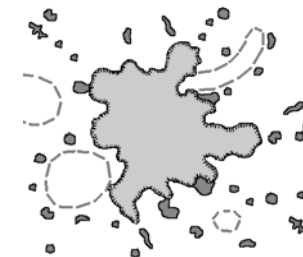


Edge

Corridor

New settlements

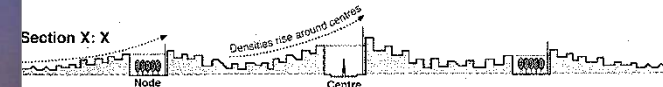
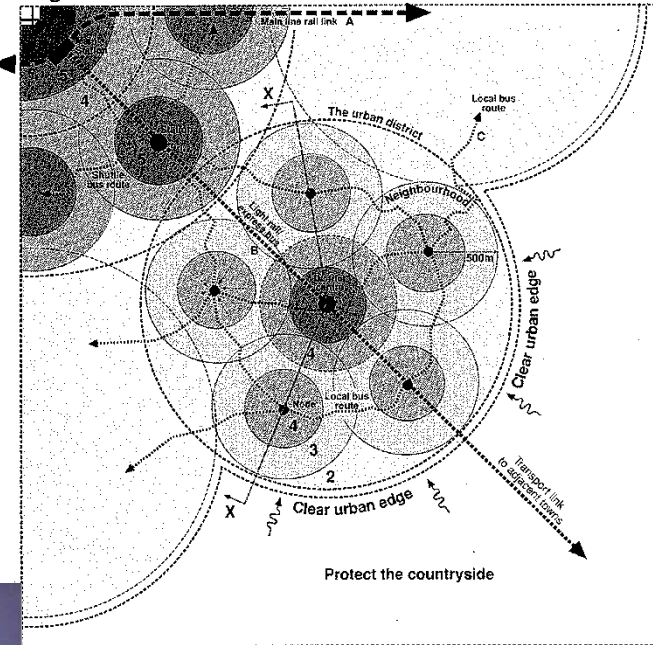
Dispersed



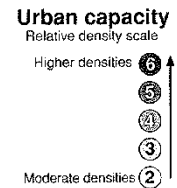
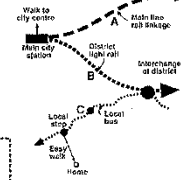
Comparing current trends with compact settlements



Compact urban area: clear urban districts and distinct neighbourhoods



A clear movement hierarchy from city centre to the home



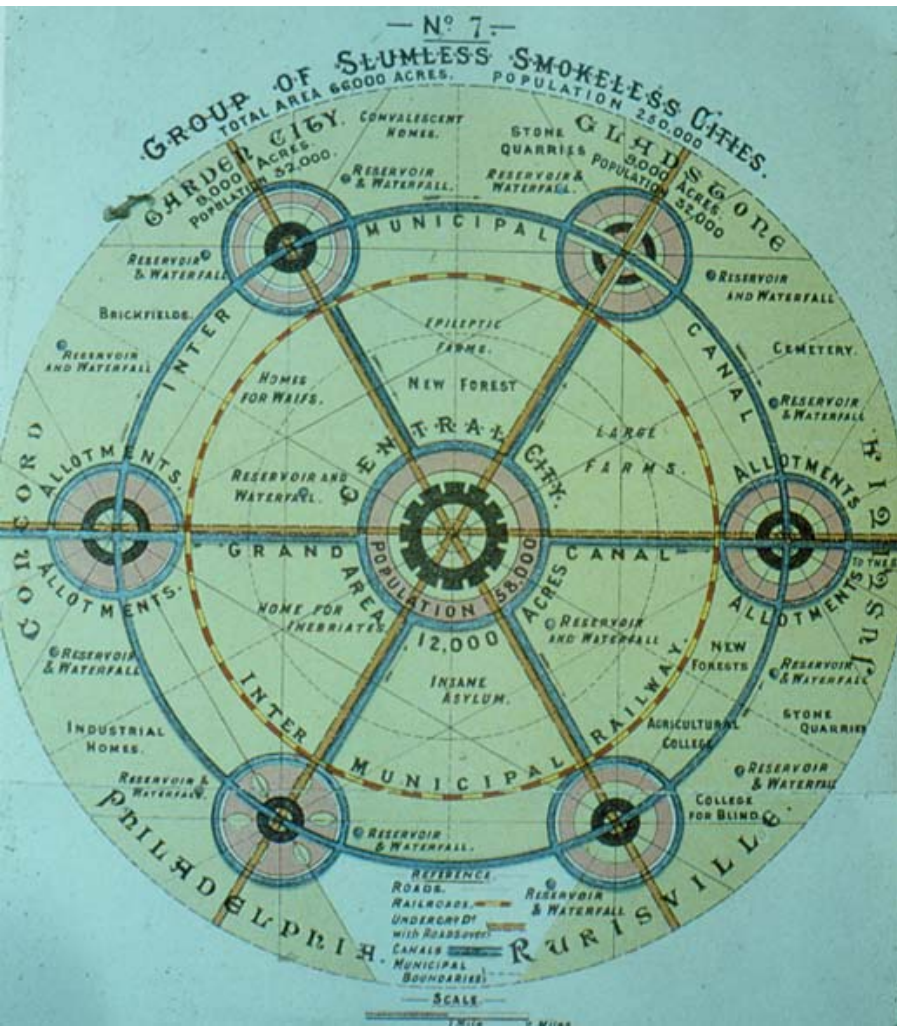
Comparing current trends with market led urban dispersal



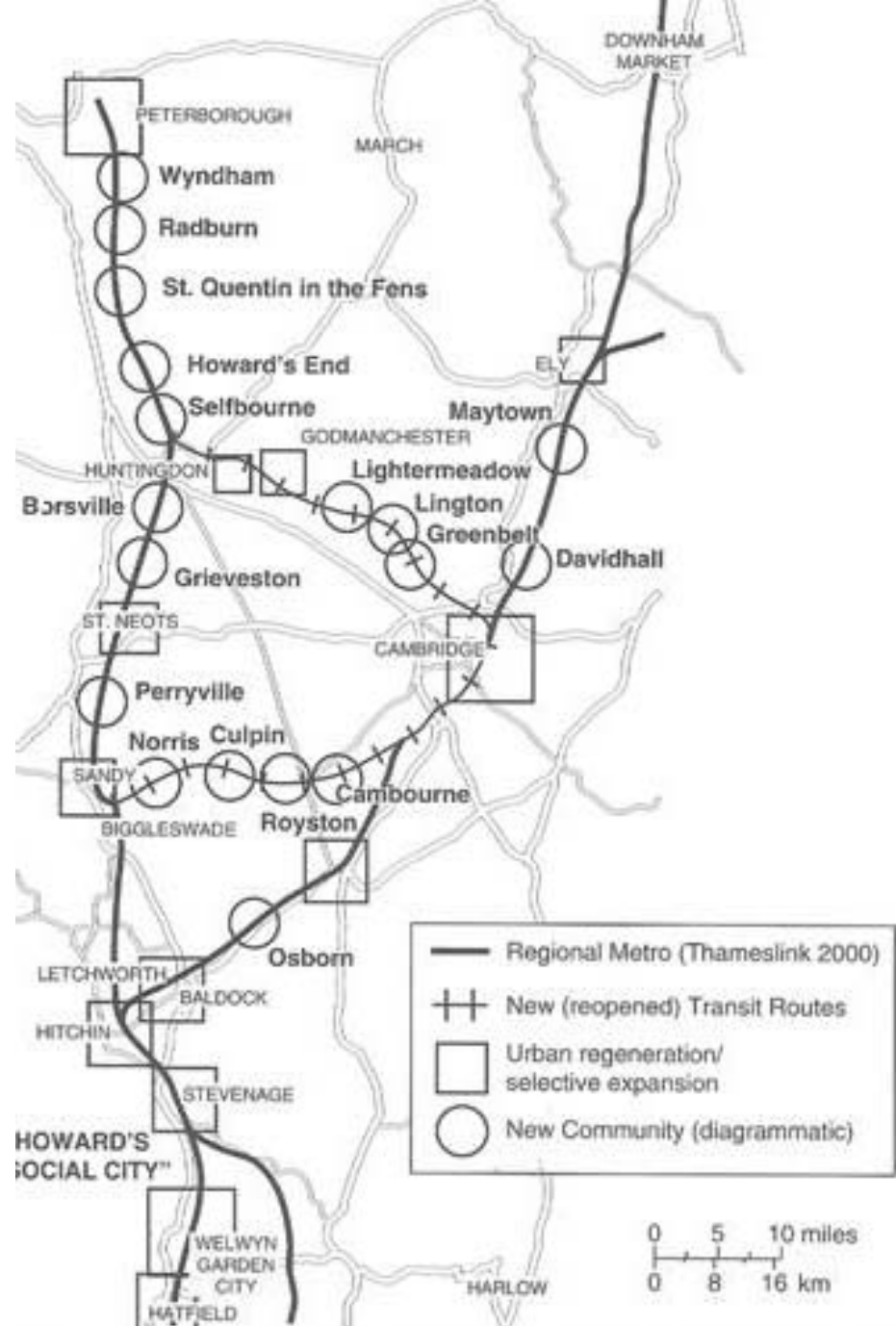
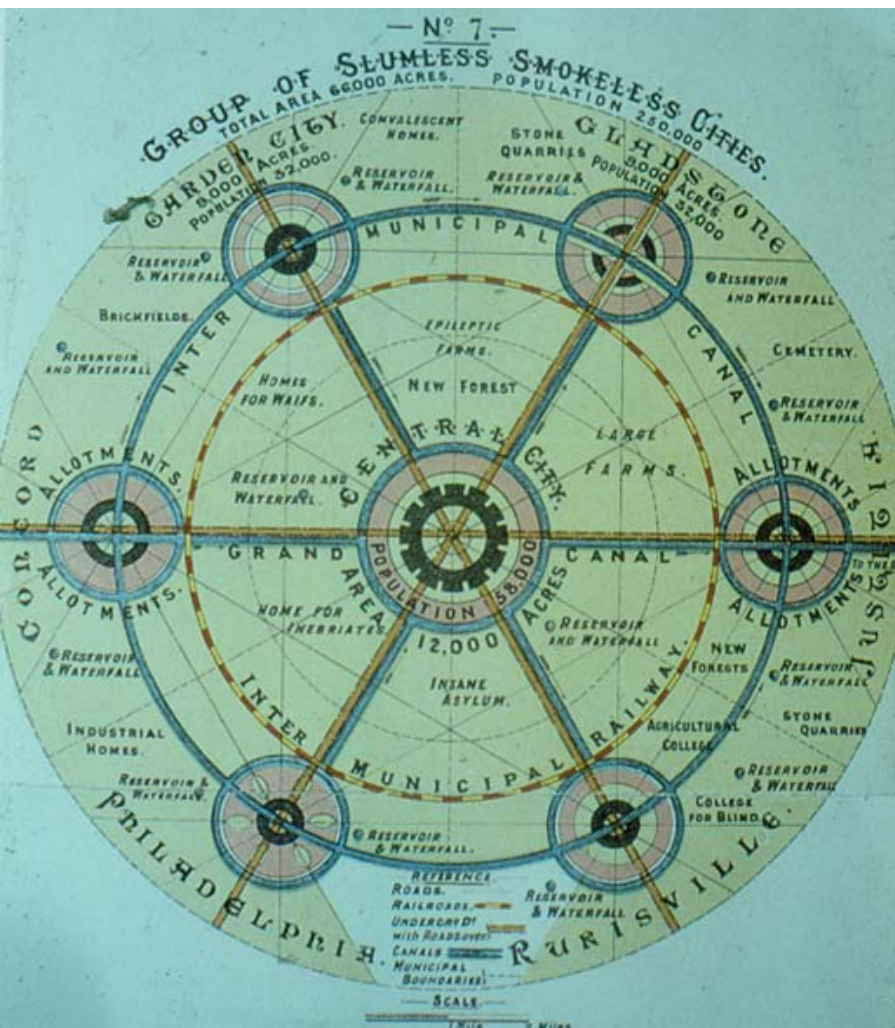
Comparing current trends with market led urban dispersal



Comparing current trends with planned expansion



Comparing current trends with planned expansion

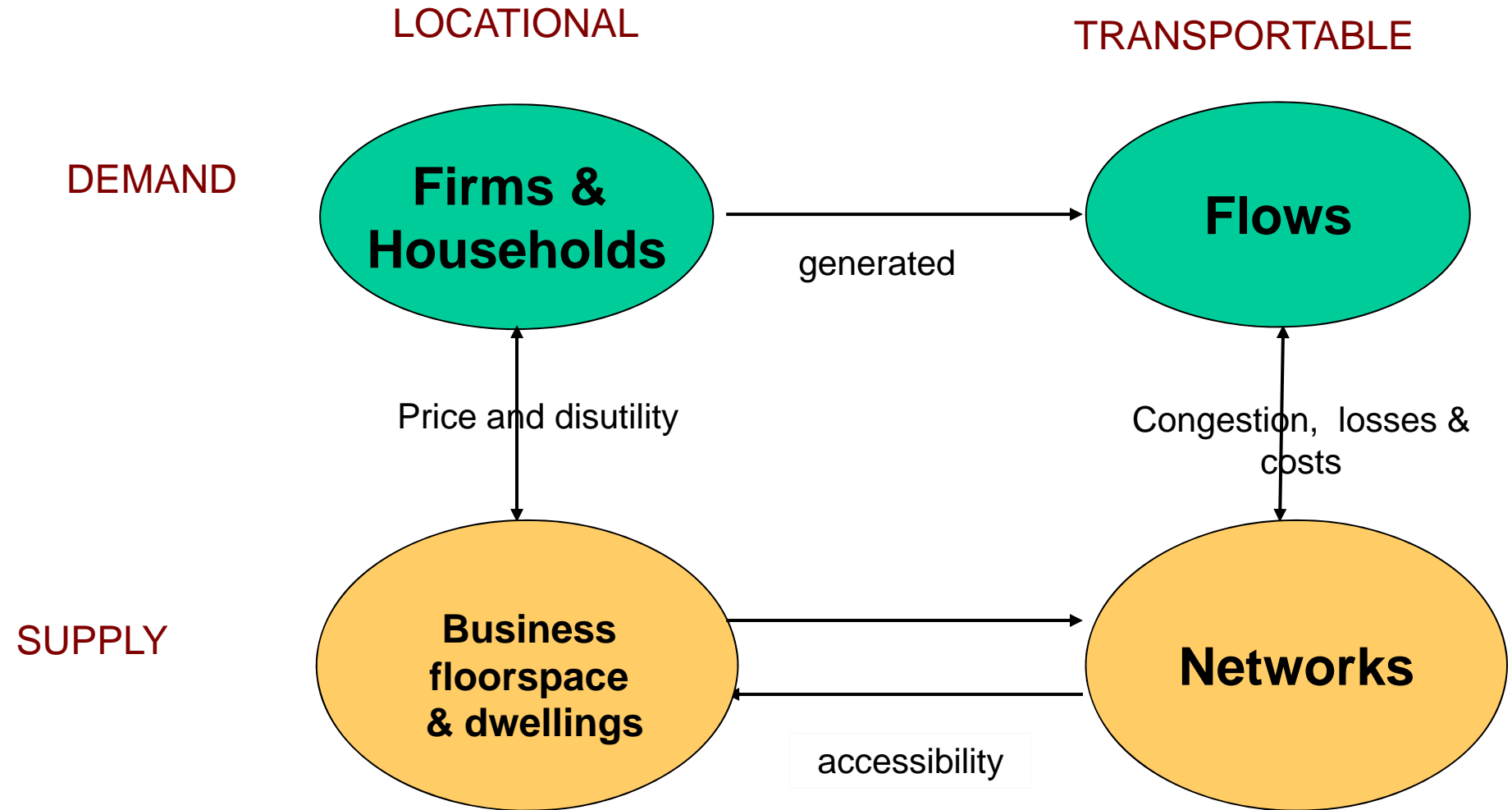


Overall conclusions

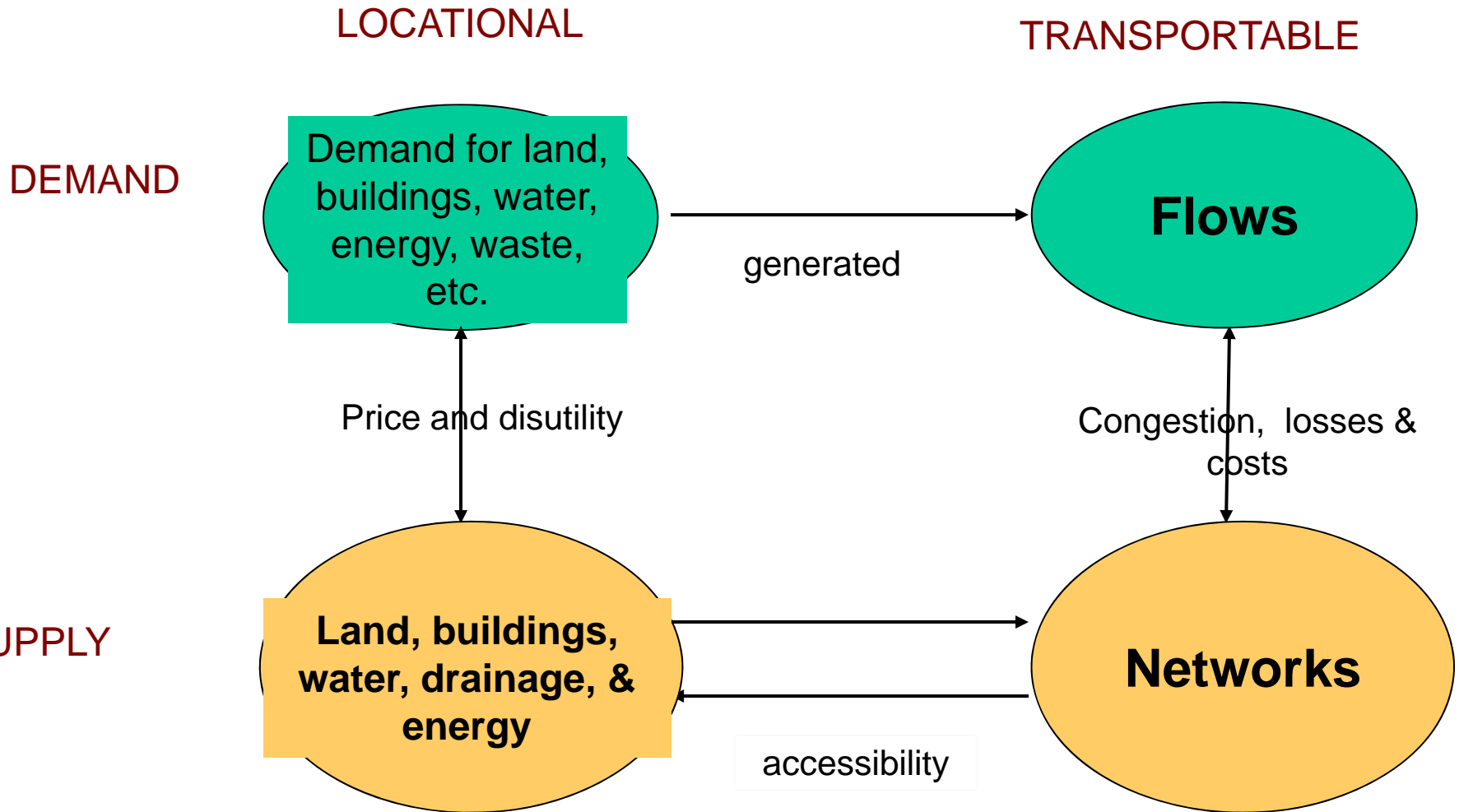
- Relatively small differences between the three land use options are overwhelmed by rising incomes, a shift from manufacturing to service employment and other socio-economic trends.
- Current strategic land use and transport policies have virtually no impact on long term increases in land use and energy consumption. But they do tend to increase costs and reduce economic competitiveness.
- Environmental sustainability - the options have only a small effect: 5% either way.
- Compact development results in a small reduction in resource use and environmental damage but has negative social and economic impacts.
- Market led dispersal has a negative impact on resource use and on some of the environmental indicators but has social and economic benefits.
- Planned extension lies between the other options and gains as much as dispersal option in living space and economic efficiency but with less environmental impact.

The benefits to be gained from land use and transport planning are modest

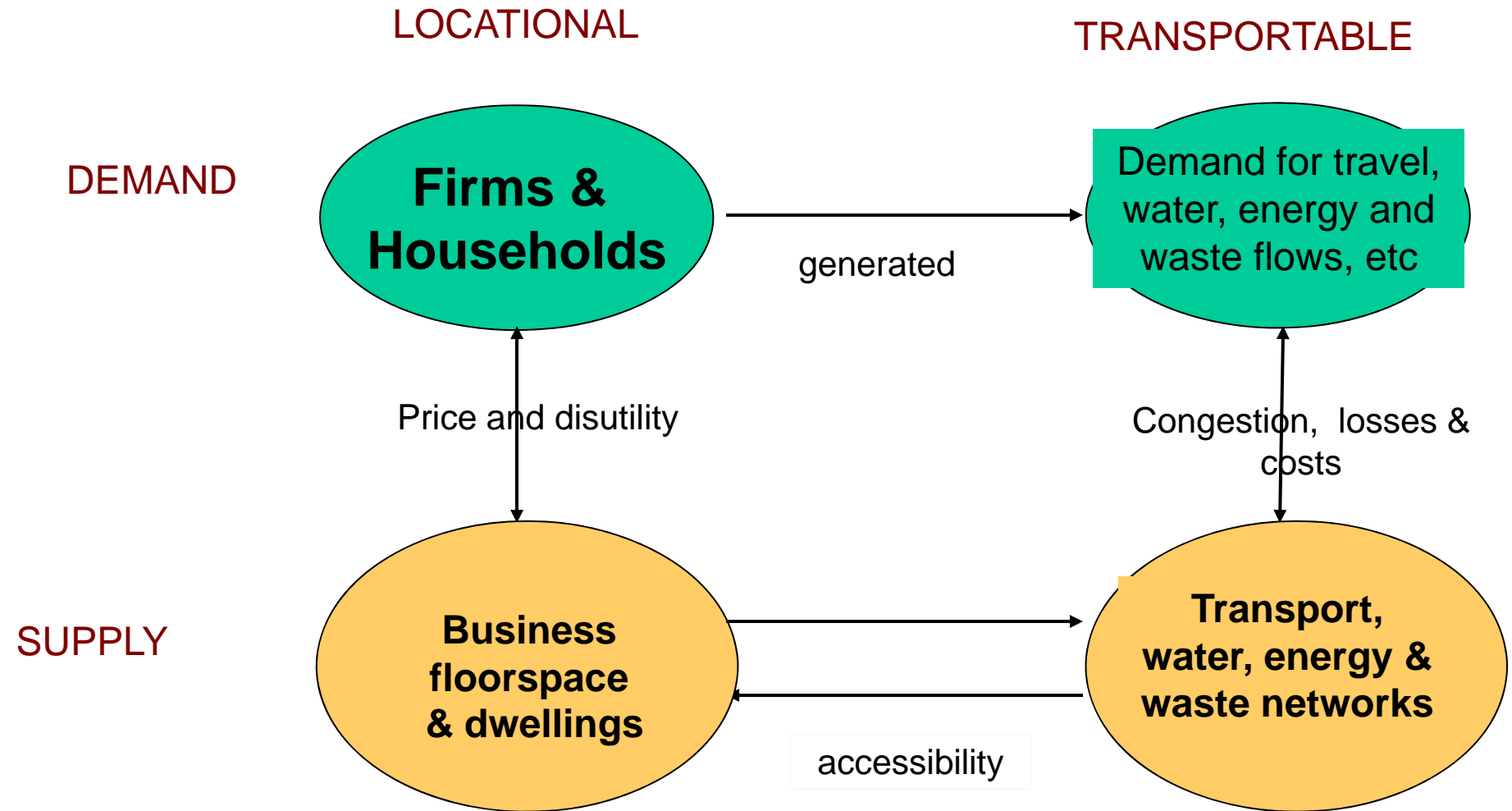
- It follows that improvements to the environmental sustainability are likely to require technological improvements and behavioural changes.
 - Changing behaviour would demand strong incentives or penalties and could have detrimental social and economic effects.
 - Technology developments is more promising and could contribute order of magnitude reductions in CO₂ emissions from transport (King, 2007) and in buildings (MacKay, 2009).
- While patterns of land use and transport policies do not, in themselves, contribute to significant changes in sustainability they do determine what technologies are practical.
 - Ground source heat pumps and solar power, for instance, are most practical in relatively low density development.
 - Combined heat and power is better suited to towns that are compact.
- Research into the effects of spatial planning on the applicability of 'green-technologies' will be explored in ReVISIONS, a forthcoming EPSRC Sustainable Urban Environment research programme.



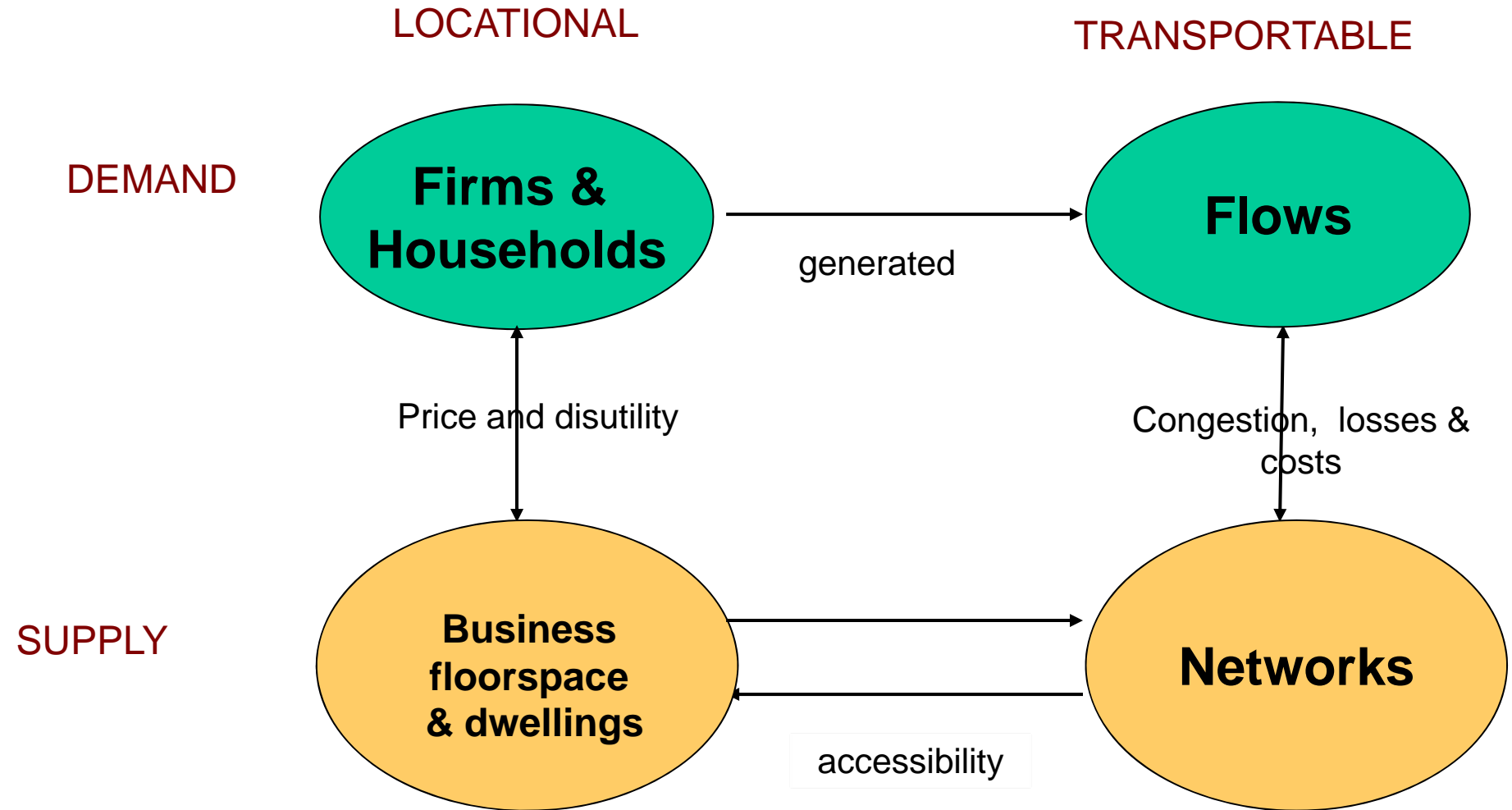
**Quantitative land use transport interaction model
(Behavioural market simulation)**



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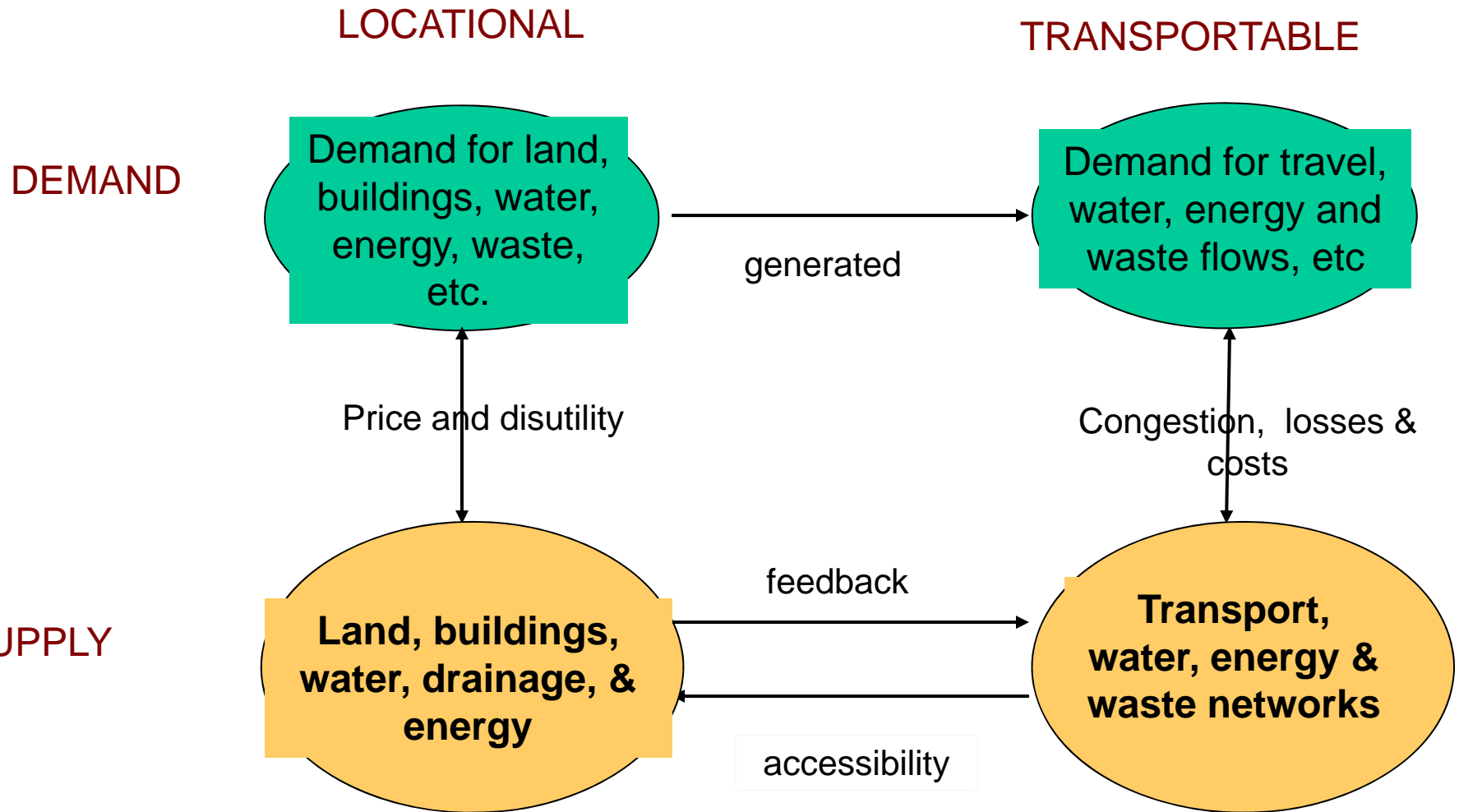


**Quantitative land use transport interaction model
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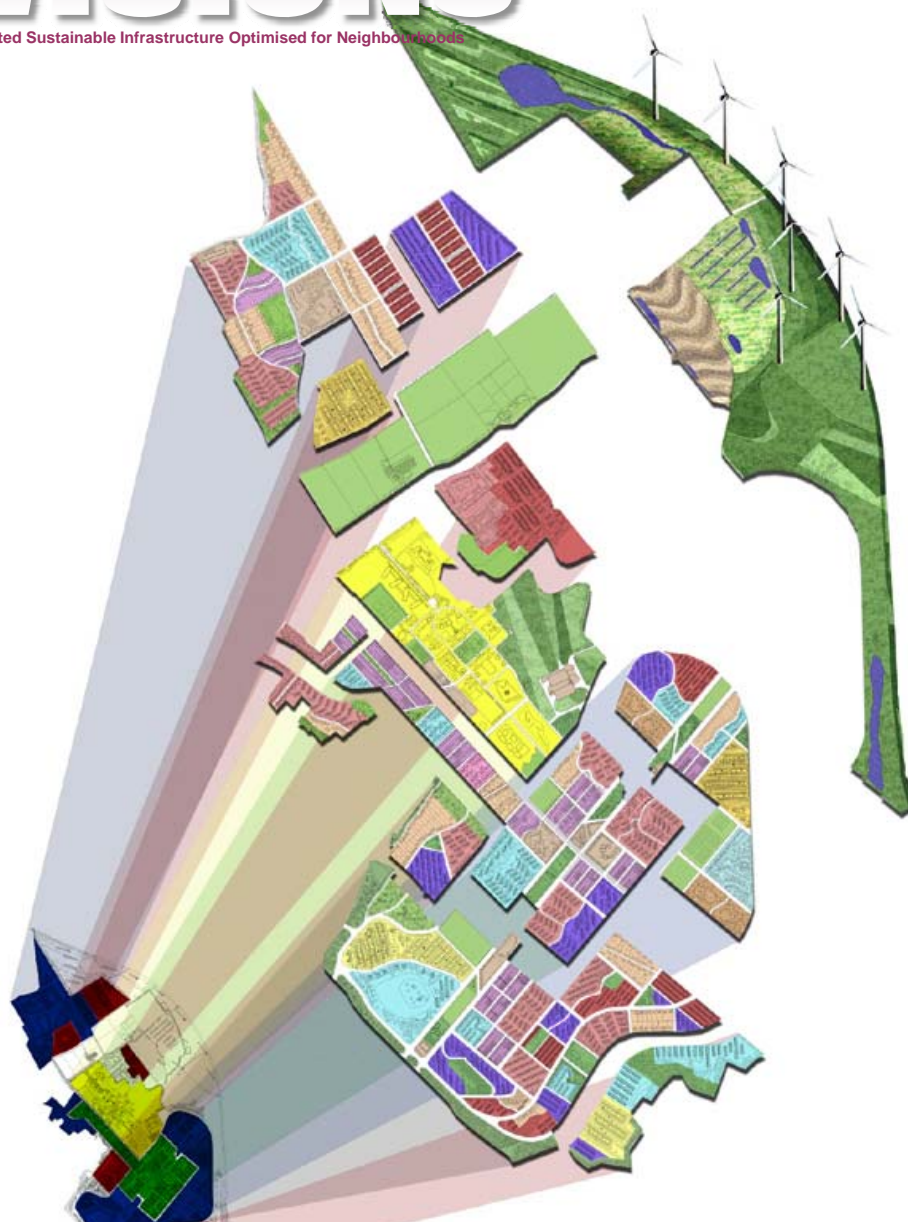


**Quantitative land use transport interaction model
(Behavioural market simulation)**

Overview: Model Framework



**Quantitative land use transport interaction model
(Behavioural market simulation)**



Eco – town

Energy micro-generation

- Solar
- Wind
- Geo-thermal
- Waste processing

Water

- Harvesting
- Reuse
- Grey water recycling

Waste

- Processed on site
- Use for energy
- Recycling

Transport

- Local cycling/pedestrian
- Long distance (regional centre by Public transport, elsewhere by car)

Materials

- Renewable (e.g. timber)
- Self built or kit assemblage possibilities

ReVISIONS

Regional Visions of Integrated Sustainable Infrastructure Optimised for Neighbourhoods

Low energy development: renewable materials, grey water, ground source, wind & solar power



Designing Cities of the Future



The
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Thanks

[*www.regionalvisions.ac.uk*](http://www.regionalvisions.ac.uk)