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Low Carbon Cities: London explorations

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Explorative options analysed for CO₂ reductions in London

1. Urban Form: compact or dispersed?

- Argument for compact development (Newman and Kenworthy, 1999)
- Assessment of alternative urban form (Echenique et al, 2012)

2. Pricing congestion

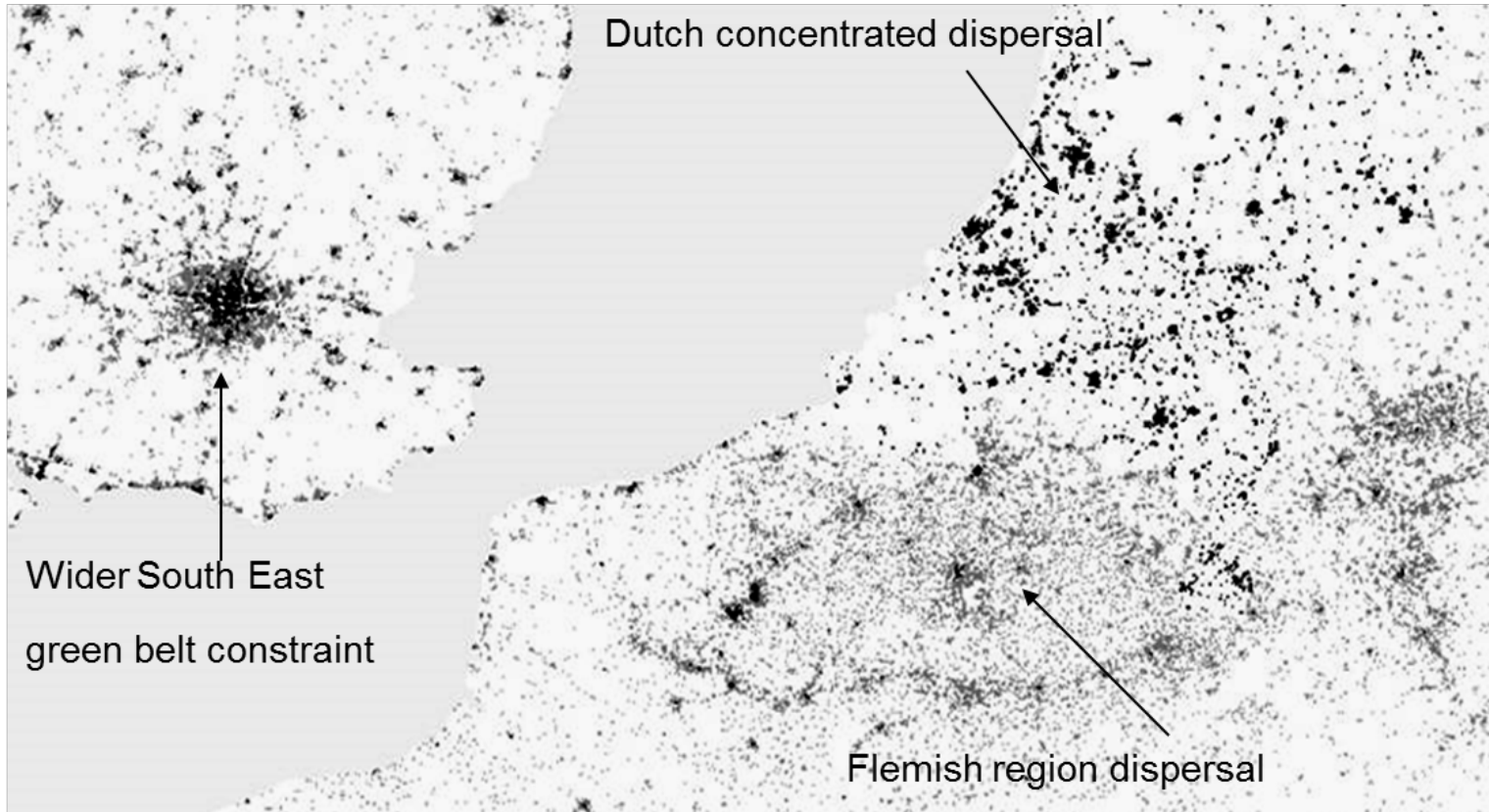
- London experience
- Other - Cambridge

3. New technologies in transport and buildings

- Compact and dispersed
- retrofit

4. Conclusions

Alternative urban forms: Energy in Transport (30%) & Buildings (42%)



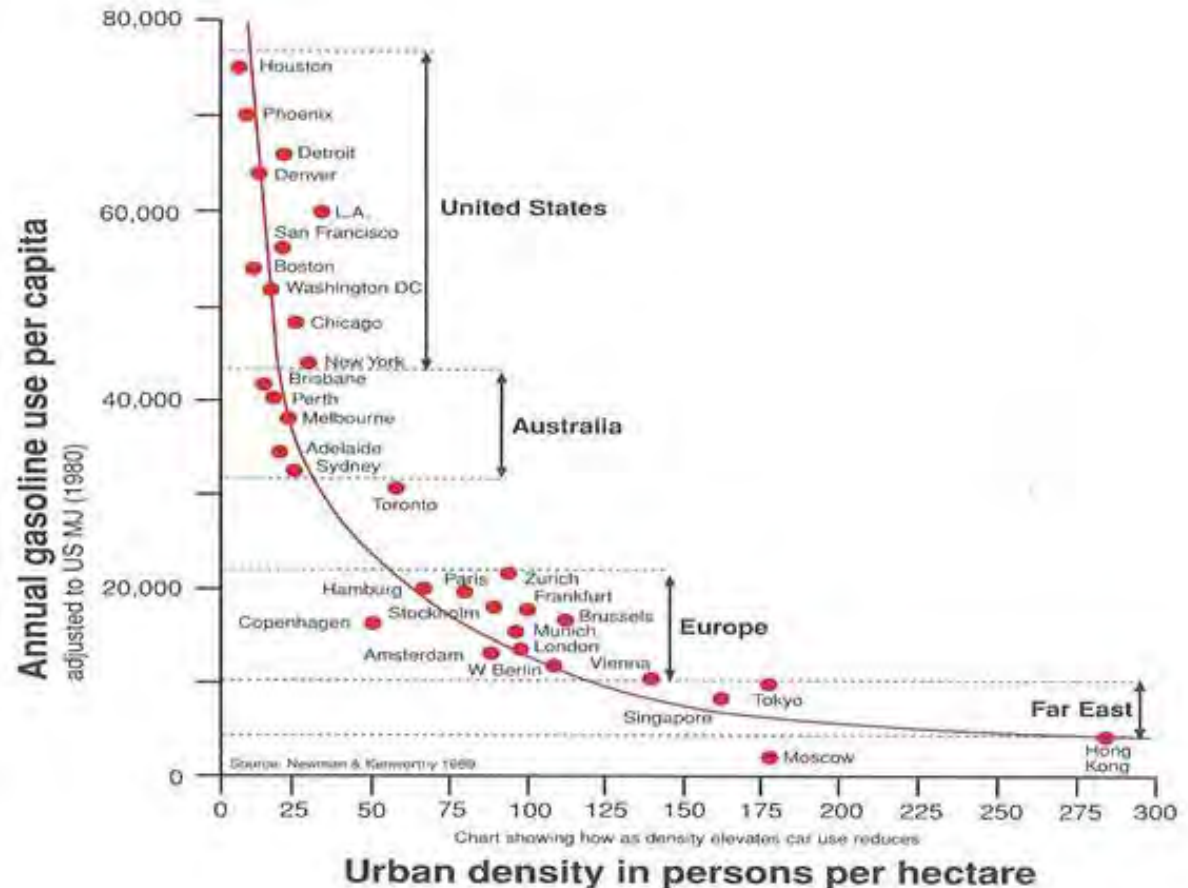
- Research (mainly South East of the UK) by a consortium of universities

London: current land and transport policies

- Green belt and compaction in the last decade:
 - 72% new built housing is in “brownfield” (not where employment is growing necessarily)
 - 89% increase in gross density in new built (from 56 to 106 dw/ha)
- Investment in public transport and pricing congestion in central area:
 - 19% increase in public transport trips in London (mainly rail) but increased VKT in the outer region due to separation of jobs and housing
 - Effective congestion pricing in central London (17% reduction of cars entering the area)

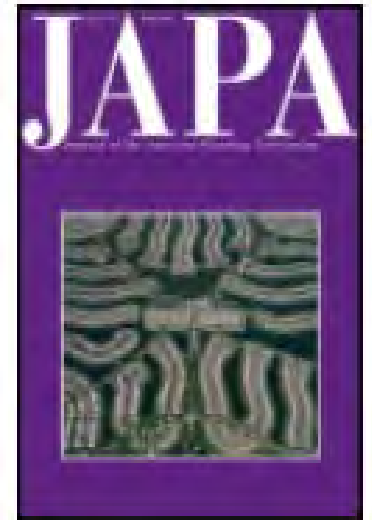
The case for compact development: Newman & Kenworthy (1999)

- Faulty causal argument
 - Higher density reduces transport energy
- Real causal argument
 - Lower transport cost reduces density



Urban Form Results

- Published in **Growing Cities Sustainably: Does Urban Form Really Matter?** *Journal of the American Planning Association* Vol 78:2 2012
- **Conclusions:**
 - Relatively minor environmental differences between urban forms which are overwhelmed by socio-economic trends
 - Compact cities reduces environmental impacts by less than 5% but increases economic and social costs
 - Dispersed cities increases environmental impacts marginally but reduces economic and social costs
 - More scope for reduction of carbon in cities is by the introduction of ***new technologies in transport and energy generation***



Pricing congestion for CO₂ reduction

- **London experience:**
 - 17% reduction of car traffic into central area (but no change in speeds due to reduction of road space)
 - 16% reduction of CO₂ emissions (but increase in the fringes of the pricing area)
- **Other - Cambridge study:**
 - 27% reduction of car traffic (but increase in bus use)
 - 8% reduction in CO₂ (less impact due to bus increase)
- **Source:** Road Congestion Pricing in Europe (Eds. H W Richardson and C Bae, 2008)

Exploration of technology in future cities

Compact: CHP, public transport, etc.

Dispersed: renewable energy – ground source heat pumps, PV, electric cars, etc.

Retrofit is essential



Conclusion: Buildings: medium to low density may enable a greater saving in CO₂ emissions than higher density development

Conclusions

- **Urban Form:**
 - dispersed around transport corridors
 - Polycentric structure (nodes of public transport)
- **Congestion pricing:**
 - Effective in reducing car traffic and CO₂ emissions
 - Encourage dispersal
- **Technological potential in building and transport:**
 - Dense nodes facilitate CHP
 - Dispersal facilitates renewables (PV, heat pumps, etc.)
- **Thanks**