Urban development and transport in Greater Copenhagen.

IEA-EGRD WORKSHOP

MOBILITY: TECHNOLOGY PRIORITIES AND STRATEGIC URBAN PLANNING, 22 -24 May 2013, ESPOO, Finland

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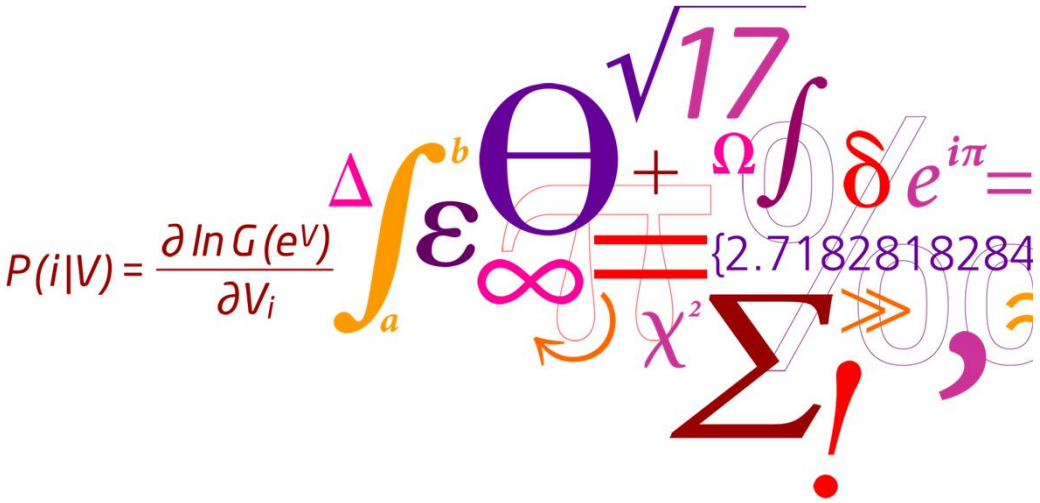

DTU Transport
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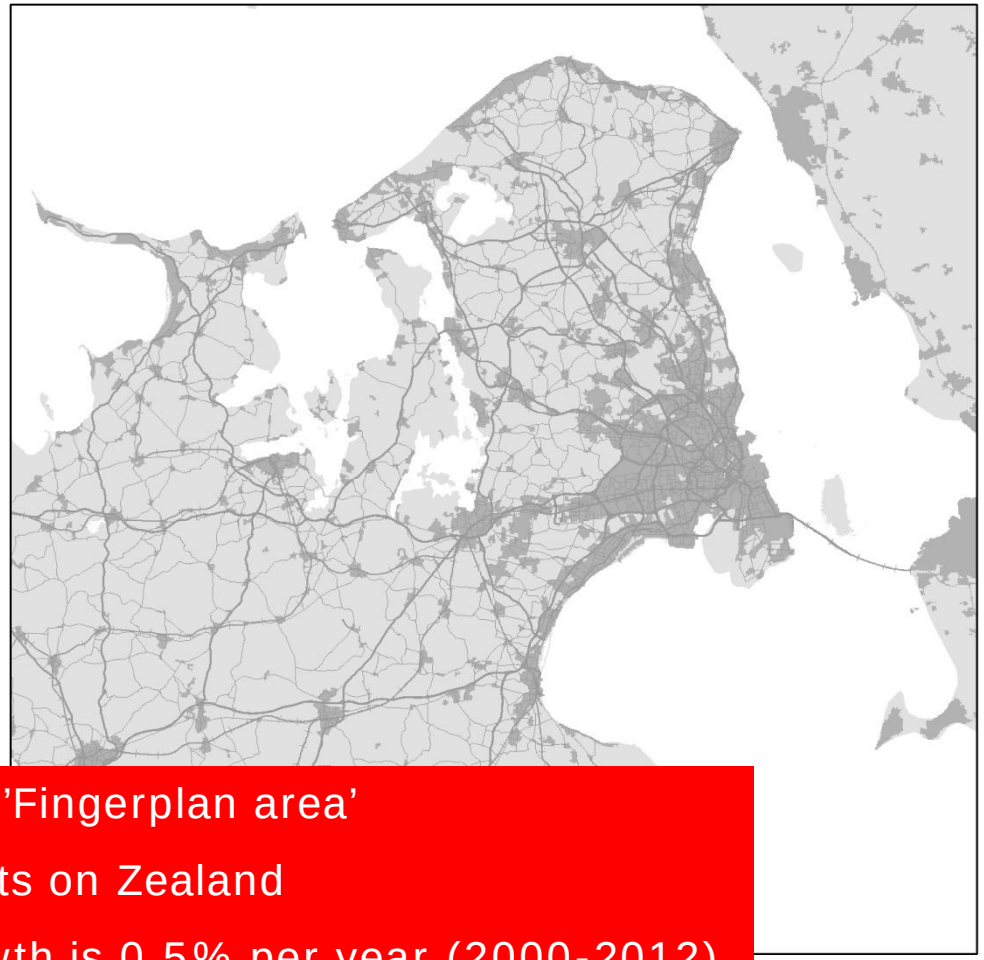
Contents of the presentation

- Structure and trends
- Travel and subcenters
- Stability and change 2006-2012
- Cycling
- Planning and Fingerplan 2013
- Challenges

Urban areas and networks*



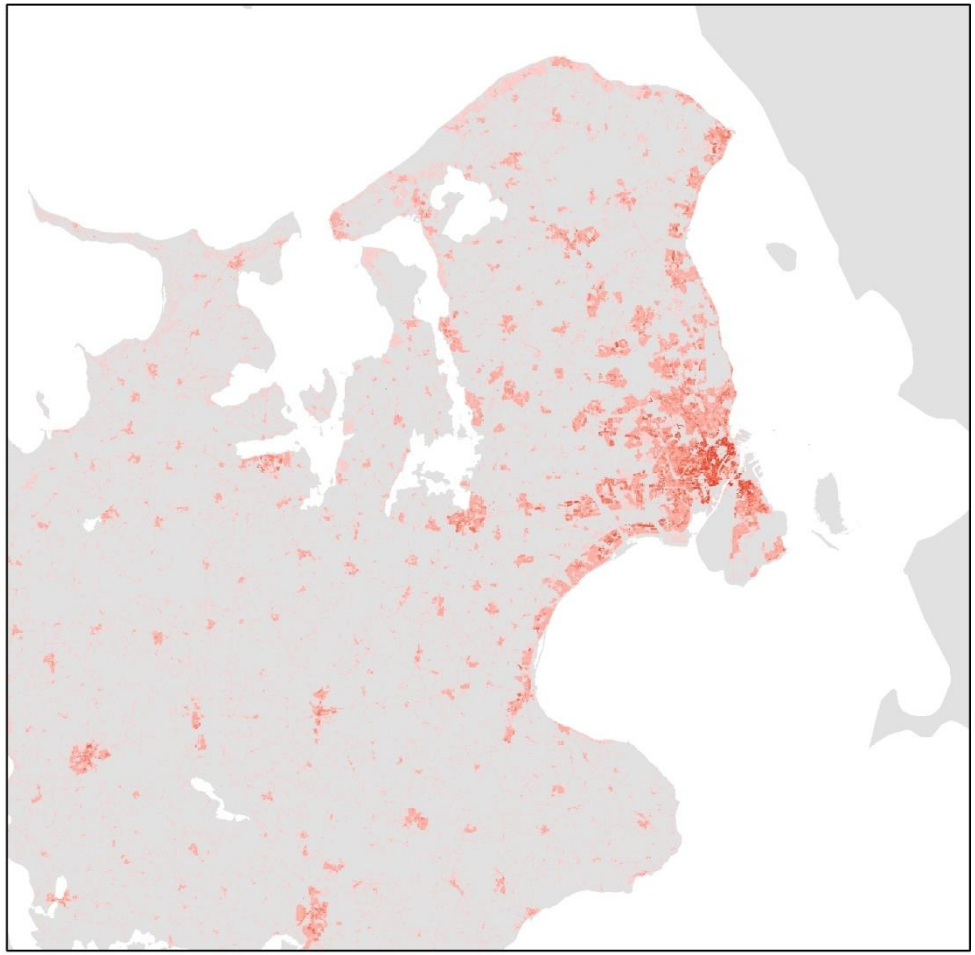
1,85 Mill in the 'Fingerplan area'

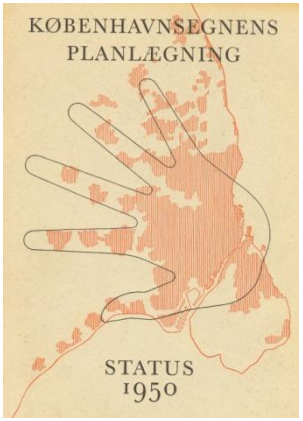
2,2 Mill residents on Zealand

Population growth is 0,5% per year (2000-2012)

*Corine Urban Land Cover 2006 combined with road and rail networks (Navteq + BaneDanmark)

Population densities*



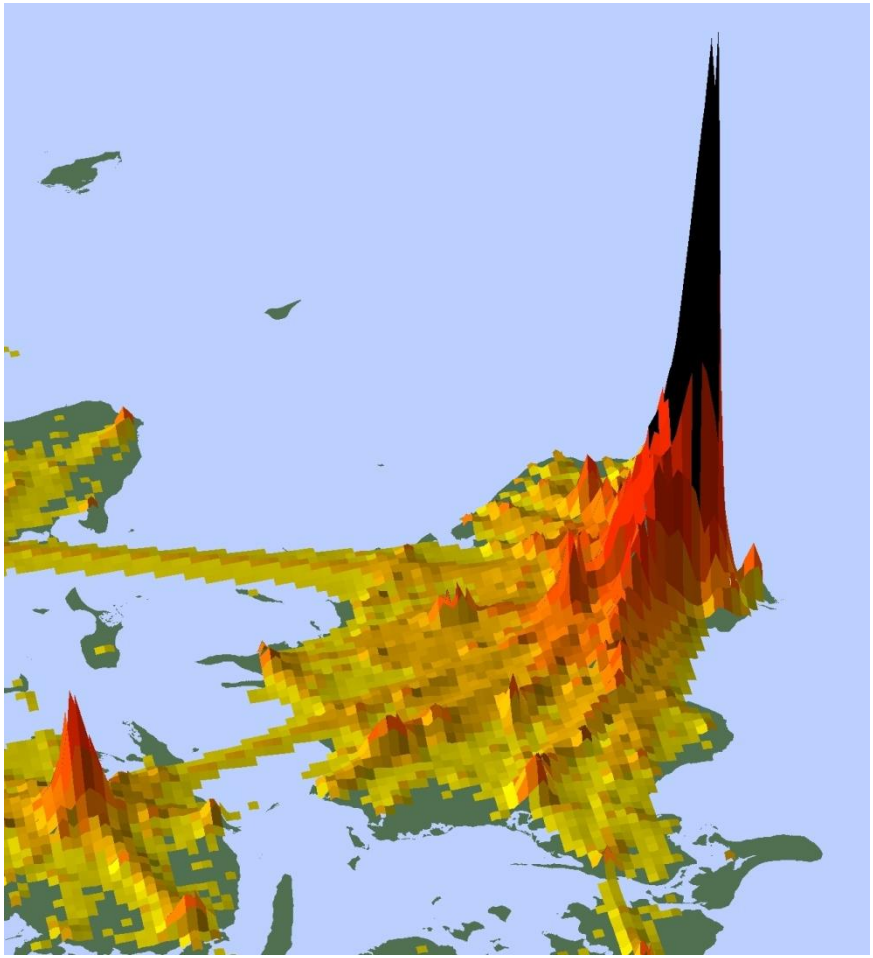


*Residential population in Danish 100x100 meter datagrid

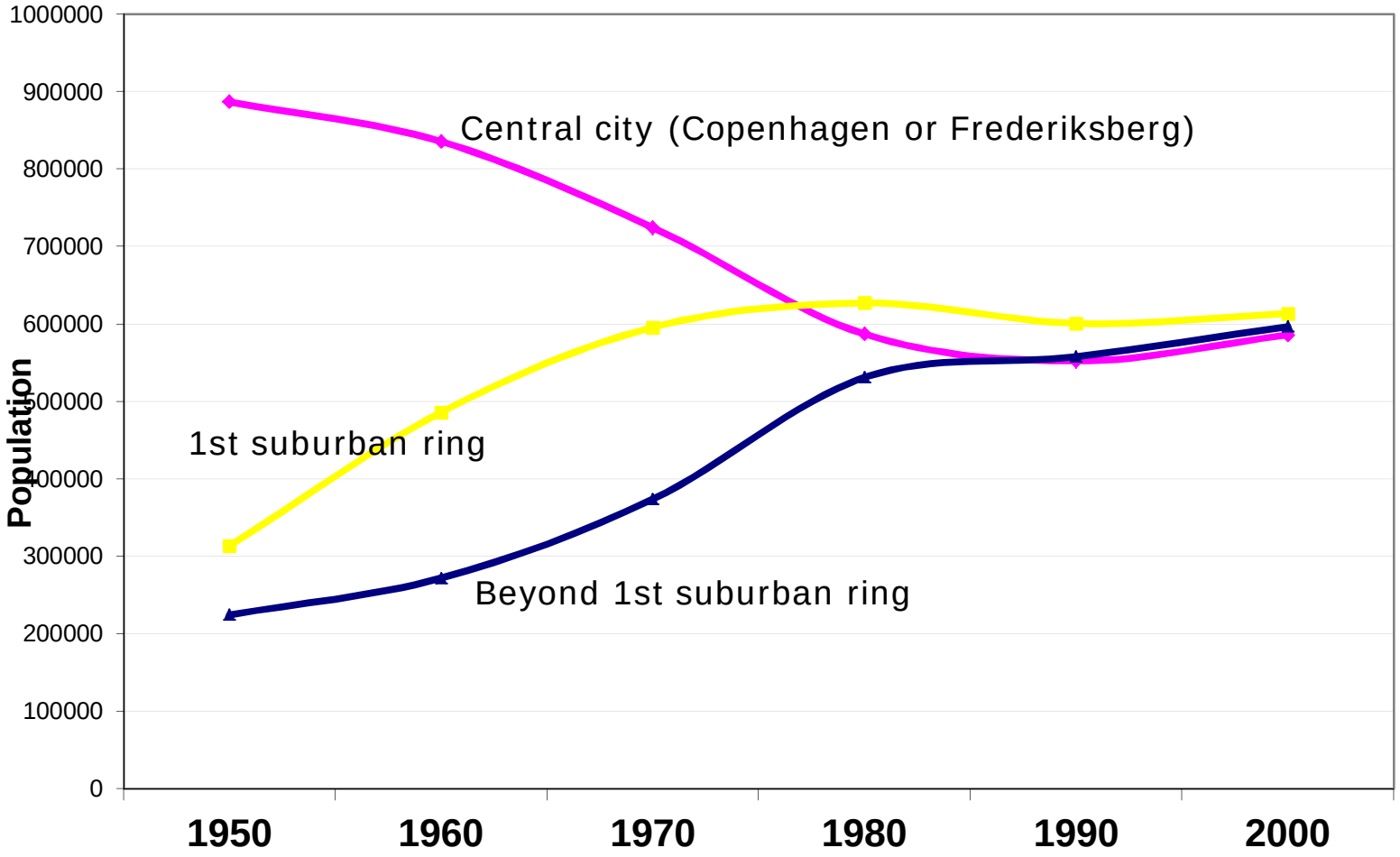
Commuting directions*

*Average directional vectors calculated from outcommuting from parishes

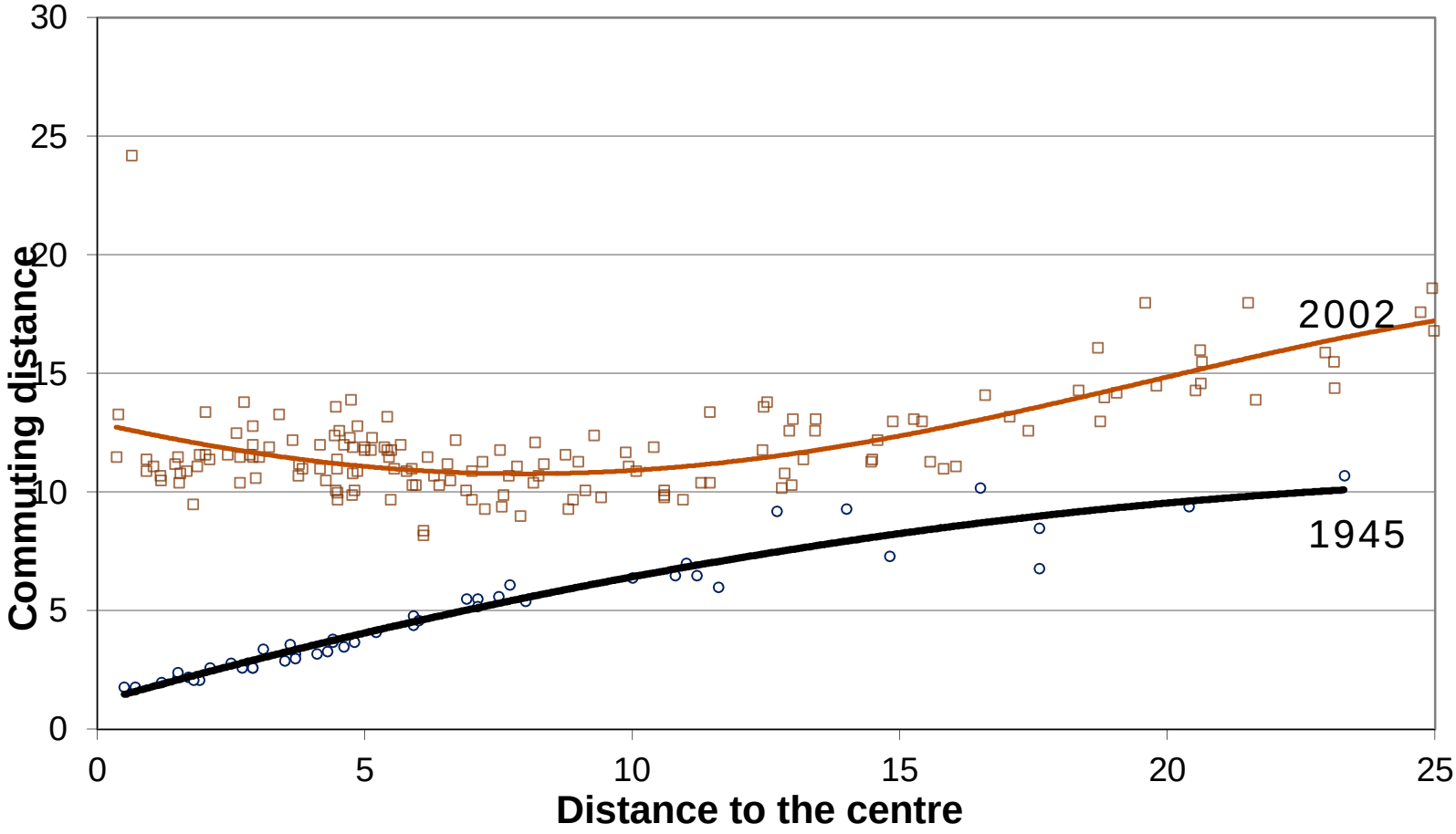
Commuting desireline traces



Distribution of regional population 1950-2000



Commuting distance by centrality 1945 and 2002



Research into the importance of subcenters

Adequate interpretation of the functional geography of the metropolitan region, and especially development of location criteria for smart growth, requires careful analysis of subcenters – considering land values and transportation in tandem and the location derived imprint on travel demand and property markets.

How can subcenters be identified and validated – and how does subcenters affect travel?

Research into the stability of location correlates of travel

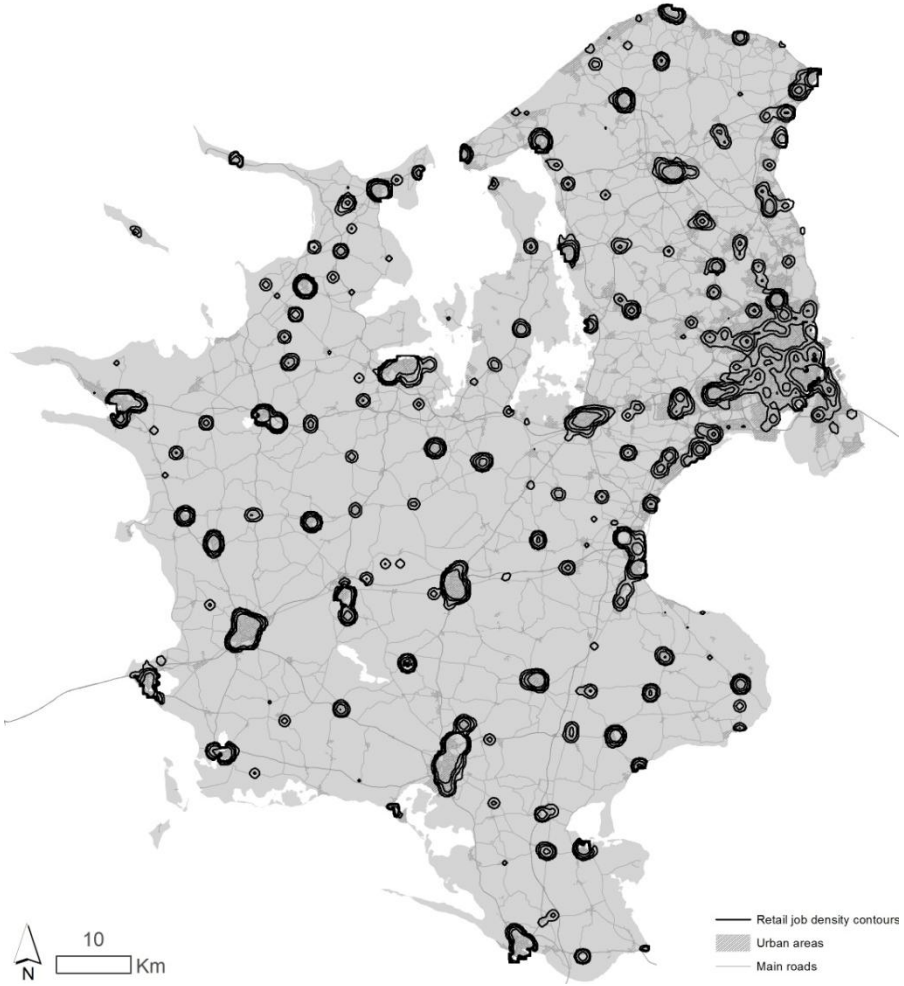
Few have looked at the stability of location determinants of transport and included other travel purposes than work.

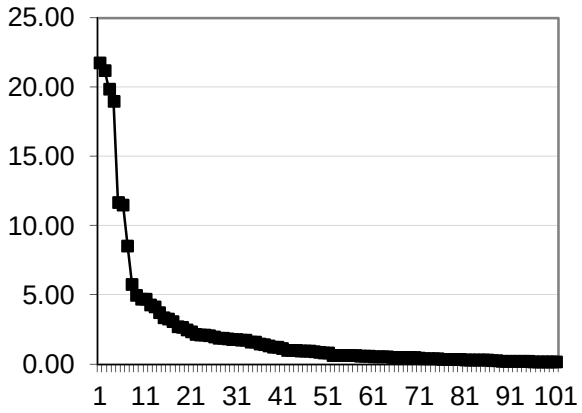
Changes in interactions and regional structure over time suggest time trends in the role of location and urban form. Furthermore location impacts may change as conditions for transport changes.

The stability or trend in location and urban form impacts should be highly relevant to regional policy as well as to scenario development.

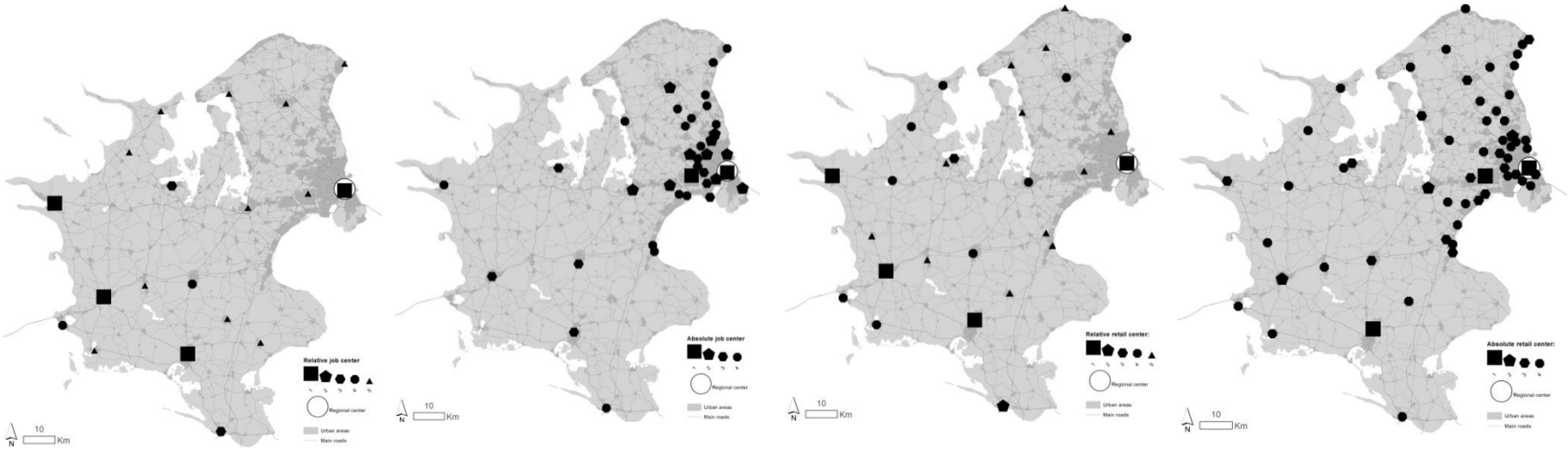
How stable are urban form and location correlates of travel over time?

Delineation and summary statistics





Classification of subcenters, 4 concepts



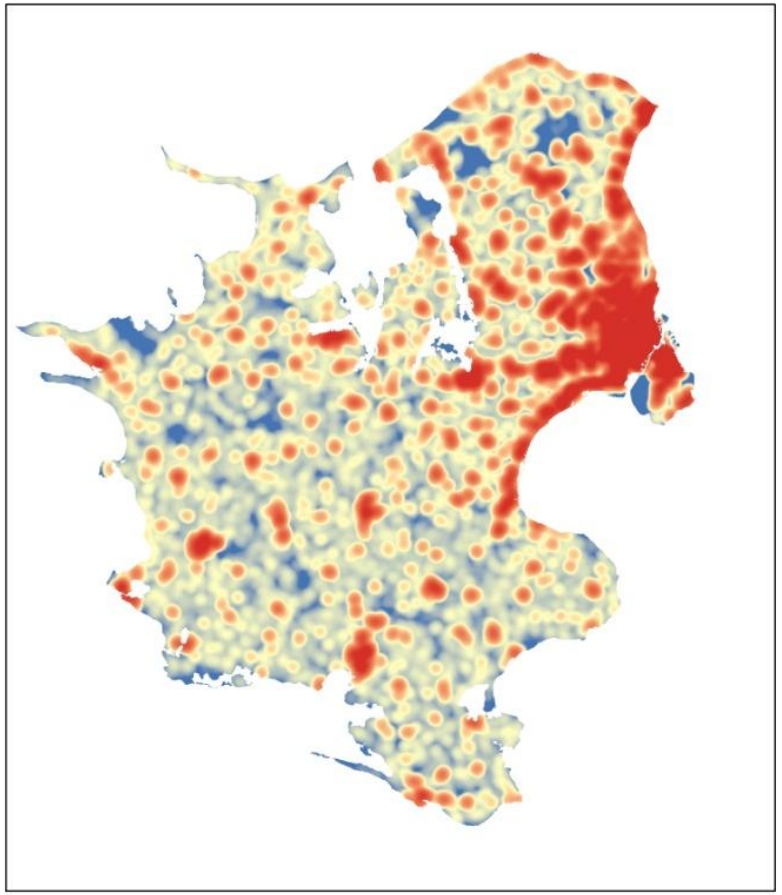
Center level	Share of employment in subregion	Absolute employment	Share of retail employment in subregion	Absolute number of retail jobs
1	19%	50000	20%	1500
2	15%	20000	15%	950
3	10%	10000	10%	400
4	5%	5000	5%	100
5	2,5%	-	2,5%	-

Other urban form and location measures

- Density
- Diversity
- Design
- Destination accessibility
- Distance to transit
- Demand management

(Ewing and Cervero 2011)

- Measured based on spatially explixit datasets and assigned to survey respondents by their home address.



Danish National Travel survey

- Computer assisted telephone interviews of representative sample of 10-85 year olds
- One day of travel is registered
- Sample size is approx. 10000 persons/year
- Detailed account of travel by trip-stages, trips, and journeys; time, distance, mode, and purposes.
- Background data include household composition and vehicles; as well as socio-demographic variables, education, and income.
- Location references are available at the address and coordinate level: home, work, origins, and destinations.

Subcenter structure

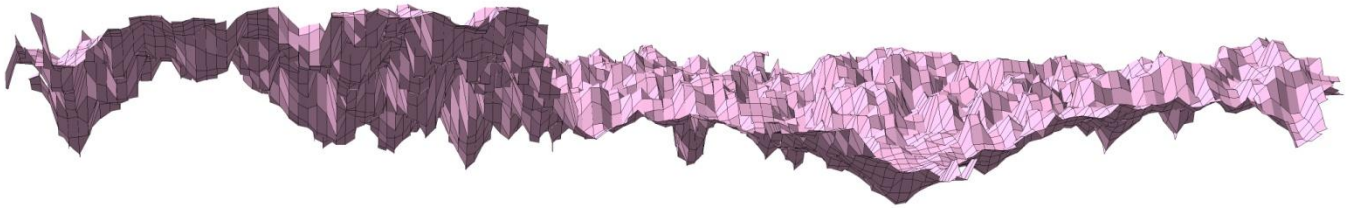
The regional centre is most important, but there are also several levels of subcenters

Regional travel demand depend on regional centrality two levels of subcenters + local density.

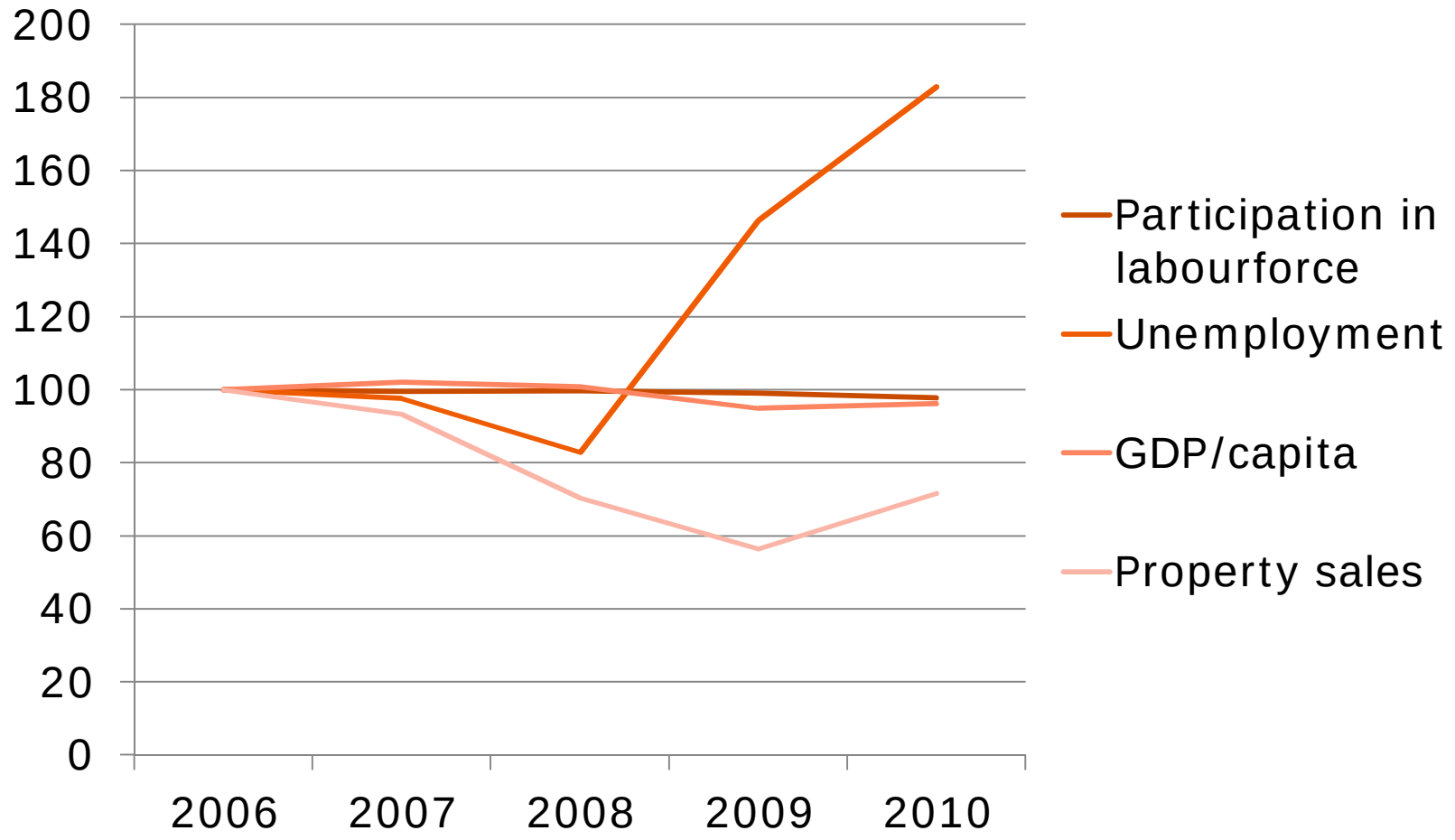
Subcenters are mainly to be identified as important concentrations of services (rather than employment per se).

Location determinants of travel can be described as a predicted daily travel distance surface (next slides).

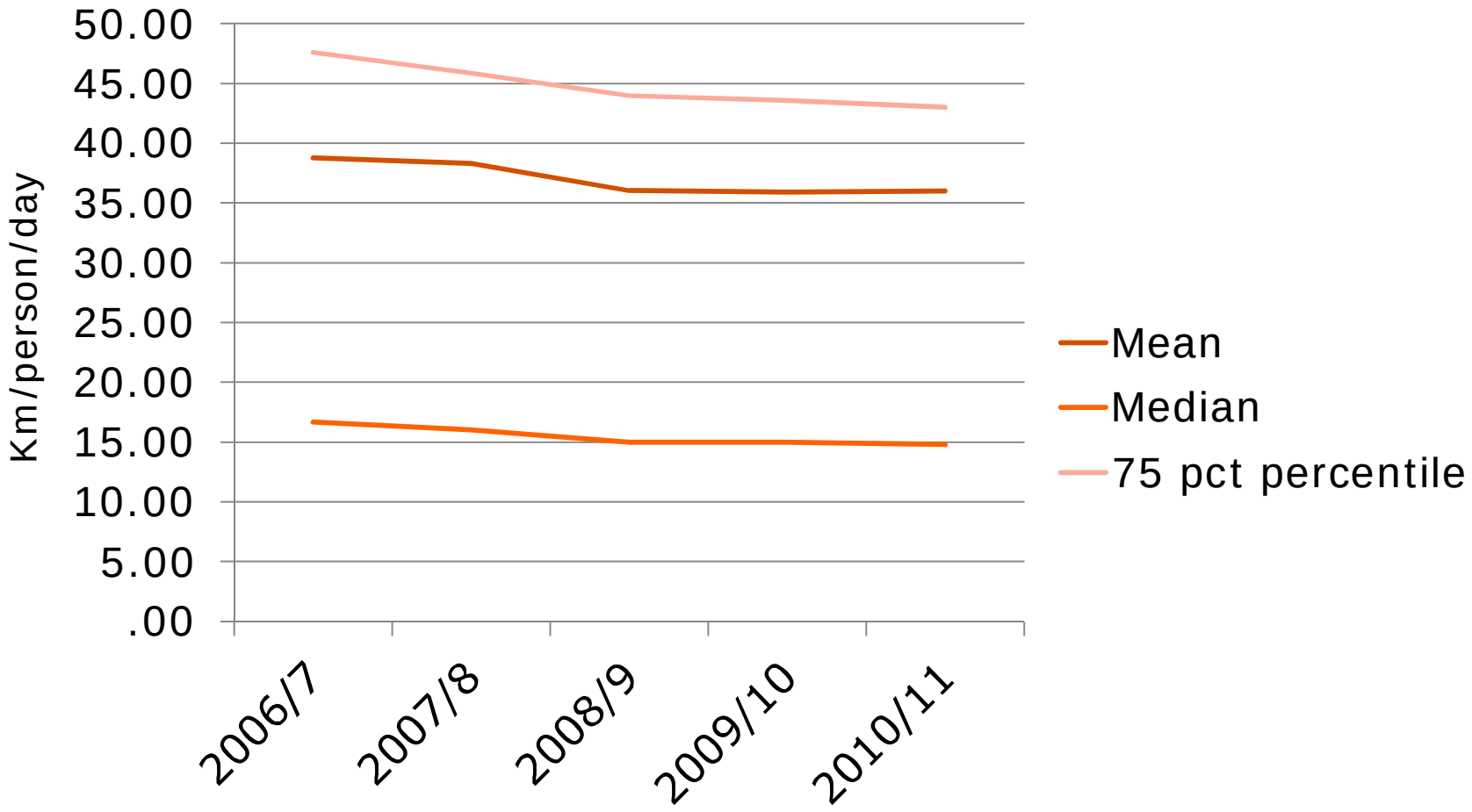
Predicted daily travel distance surface



Economic changes 2006-2010



Travel demand 2006-2010/11*



*Based on the Danish National Travel survey

Changes in location dependency of travel

- Regional centrality; density and job surplus at the neigbourhood level – *no significant changes*.

- Significant changes in the role and effects of subregional centers /subcenters:
  - For travel to work or education a three level center hierarchy is in effect in 2010/11 (regional center; and two levels of subcenters)
  - For travel for nonwork and noneducation the role of subregional centers changes from induction by proximity - into distance defined travel.

Other changes 2006/07 – 2010/11

- Cutting down on travel distances:
  - Women
  - Singles with children
  - Older people

- Stepping up in travel distances:
  - Unemployed
  - Driverslicense holders

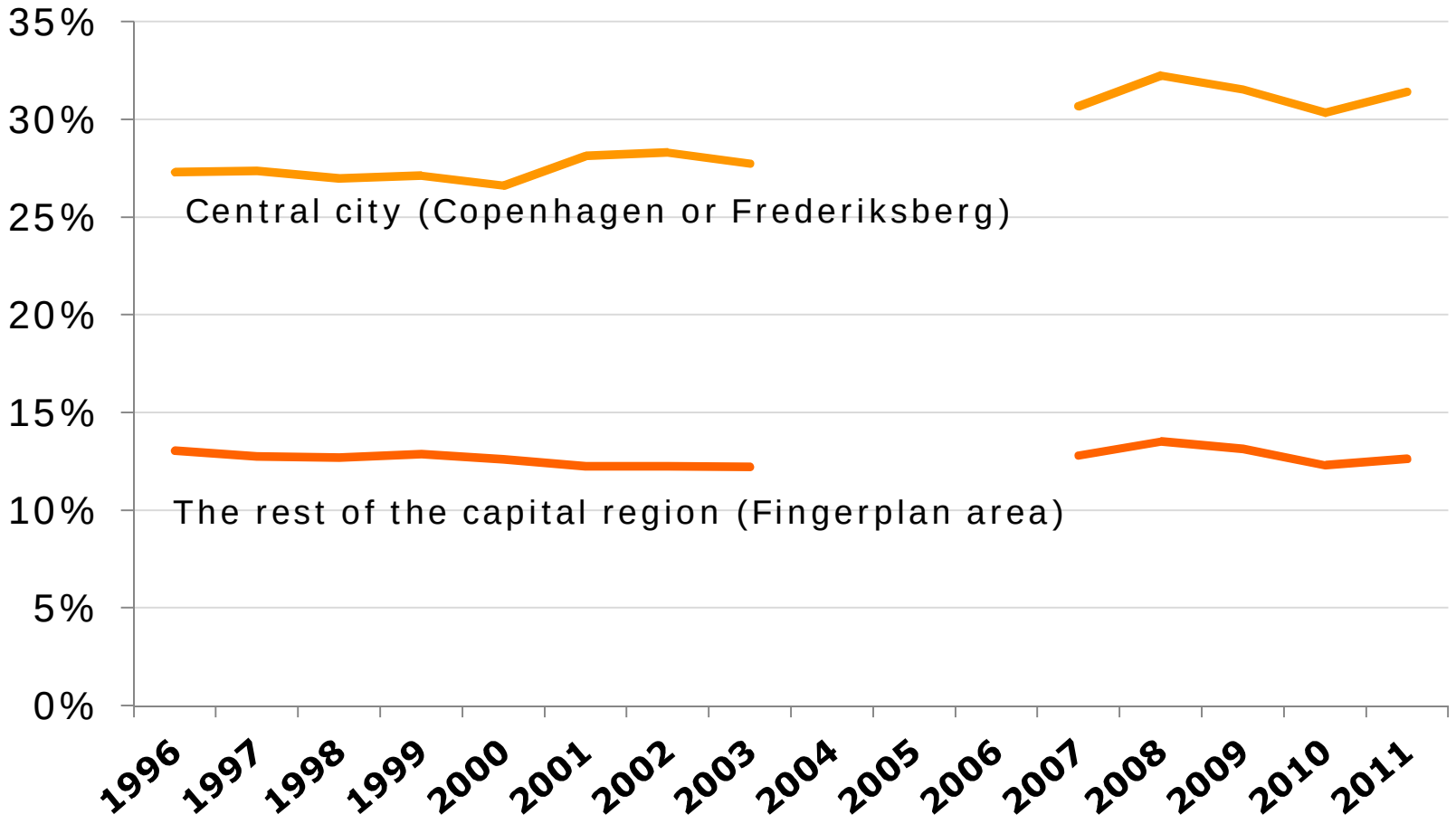
Some conclusions

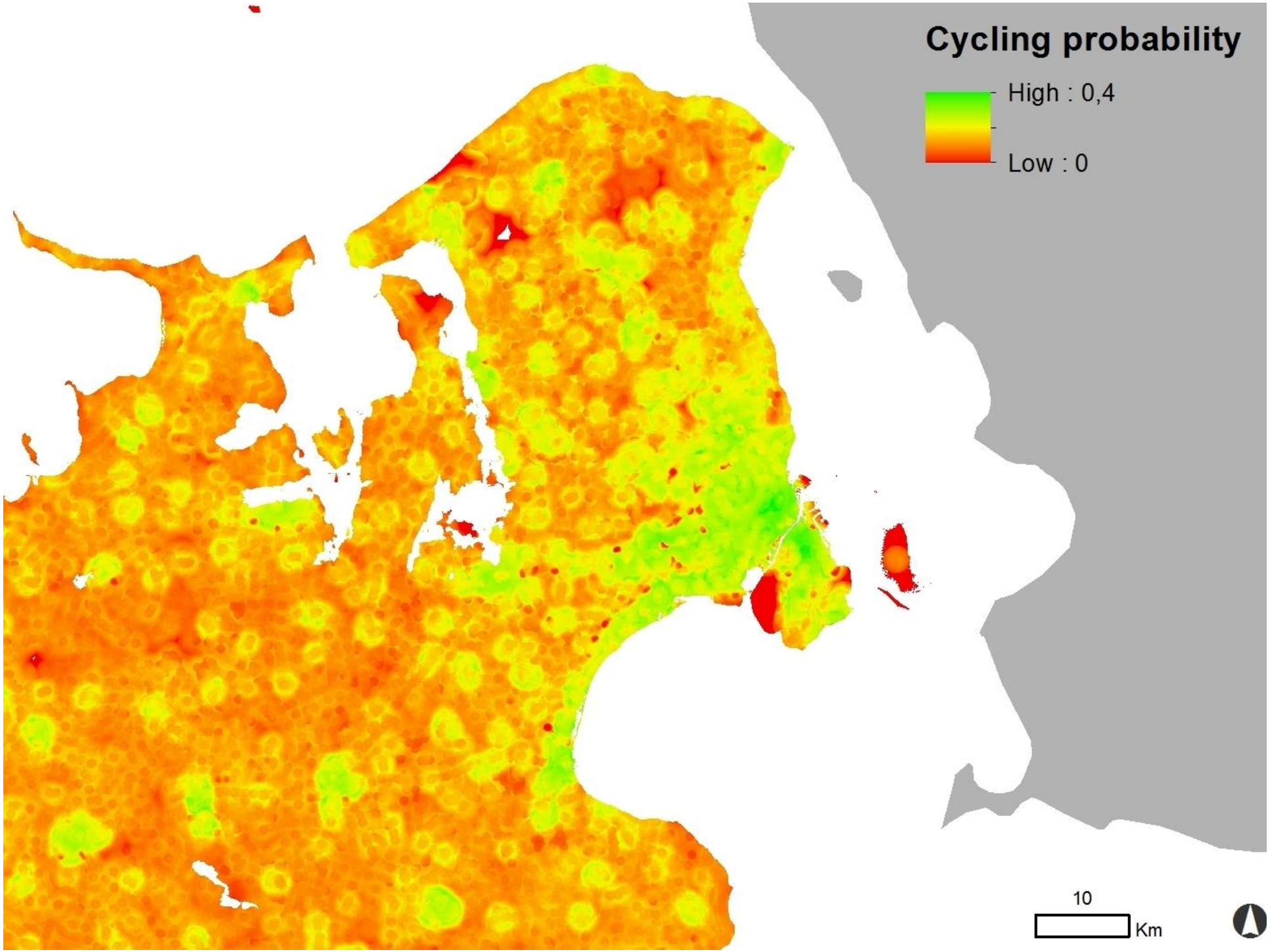
- Several levels of centers exist: regional center; and 2-3 levels of subcenters.
- The regional center remains the most important location criteria.
- Effective subcenters are important subregional concentration of services

- Behaviours have changed between 2006/07 and 2010/11 and this is reflected in the location dependency of travel.
- The importance of location in explaining travel distances has increased – based on subcenters.
- Changes probably reflect a reduced activity level and a tendency to ’save’ travel and expenses.

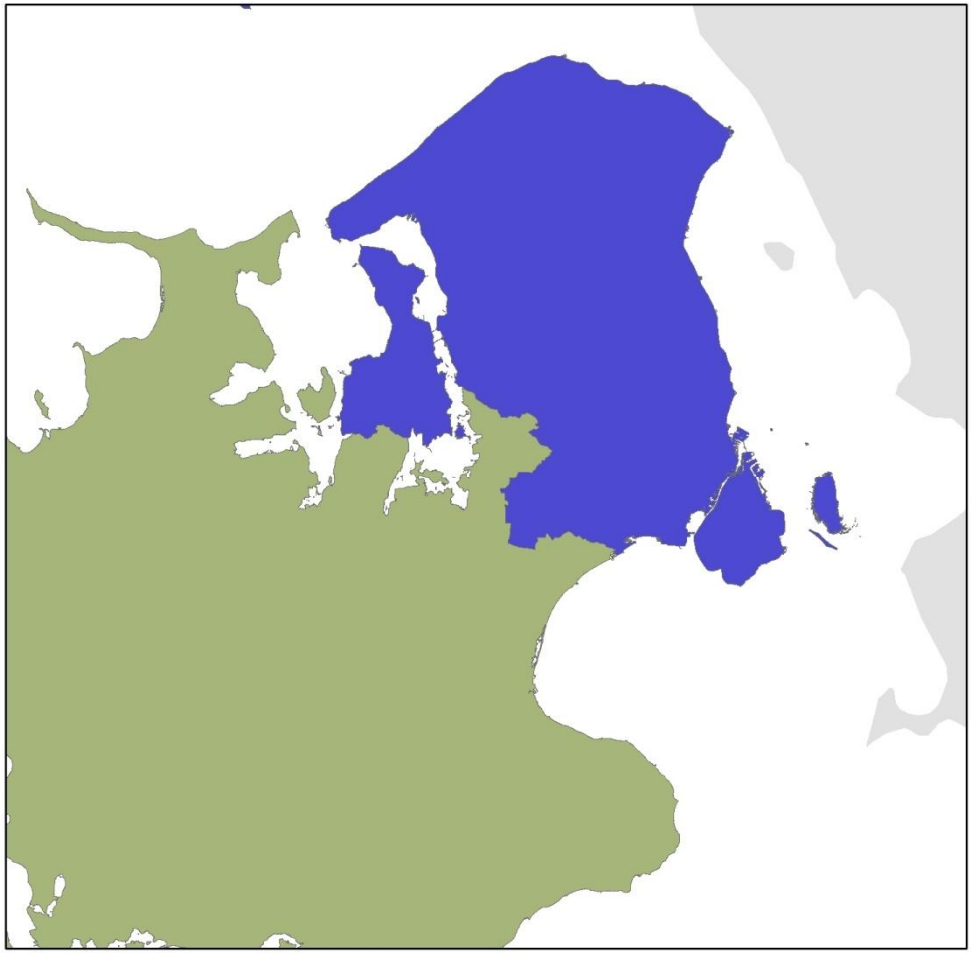
Cycling

Cycling modeshare 1996-2011

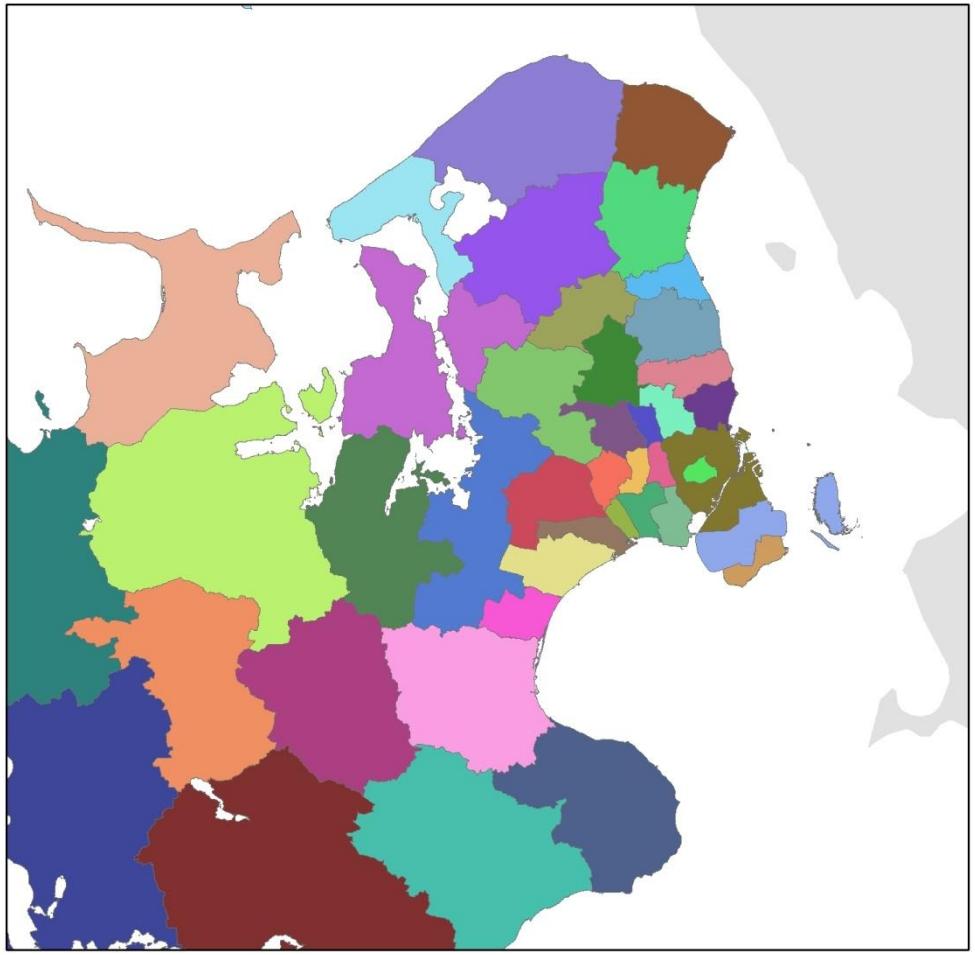



Cycling probability
High : 0,4
Low : 0
10
Km

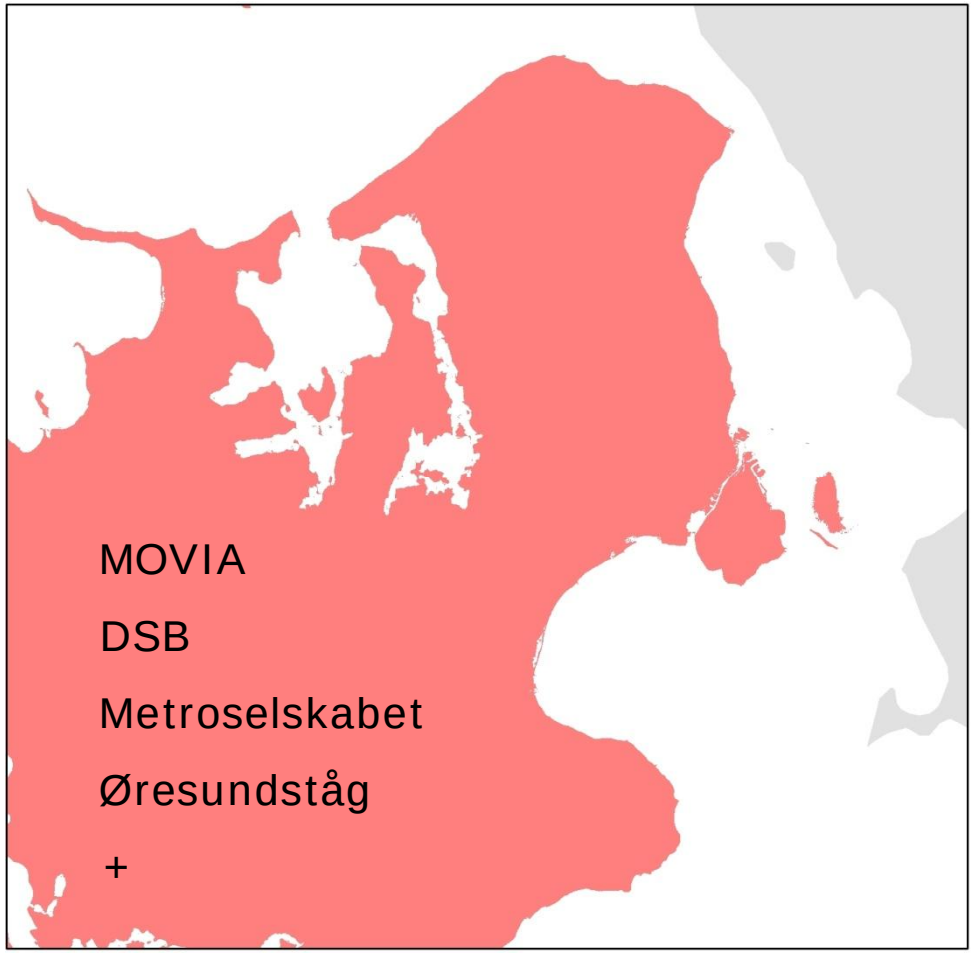
Regions



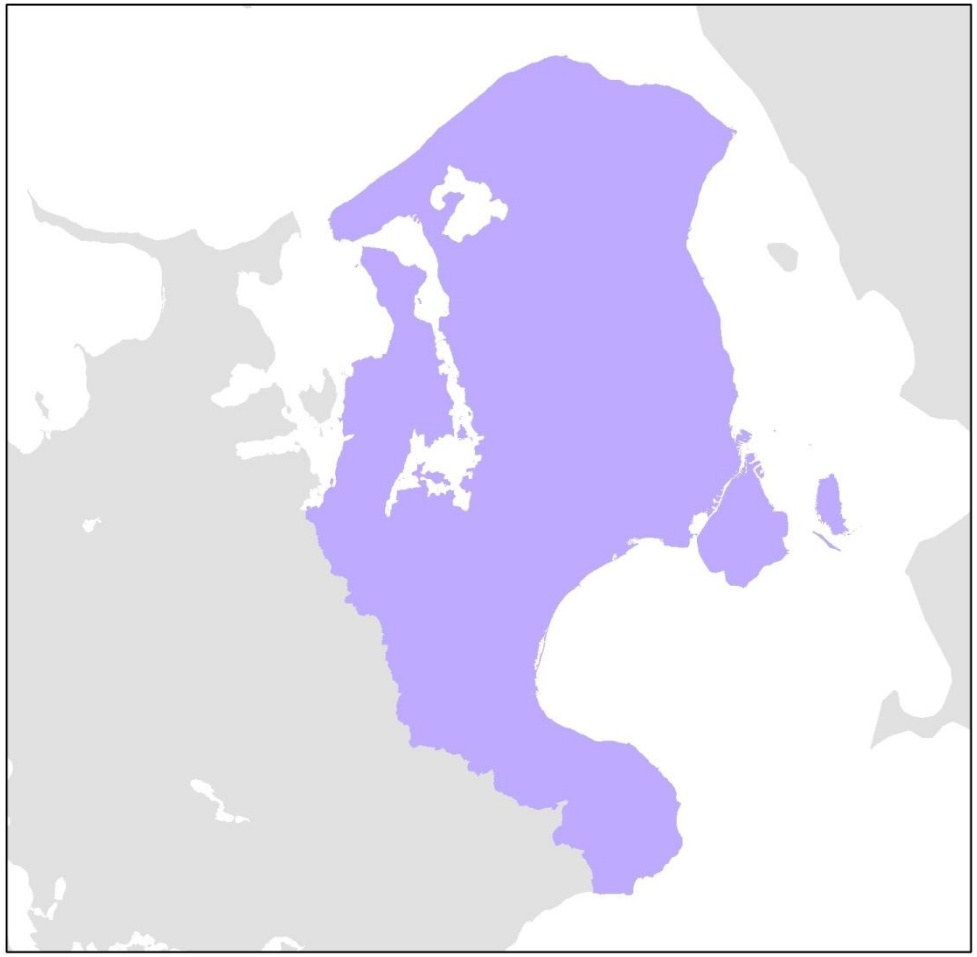
Municipalities



Transit authorities



Fingerplan area



Fingerplan 2013

Coordination of urban development and transport with particular emphasis on mass transit

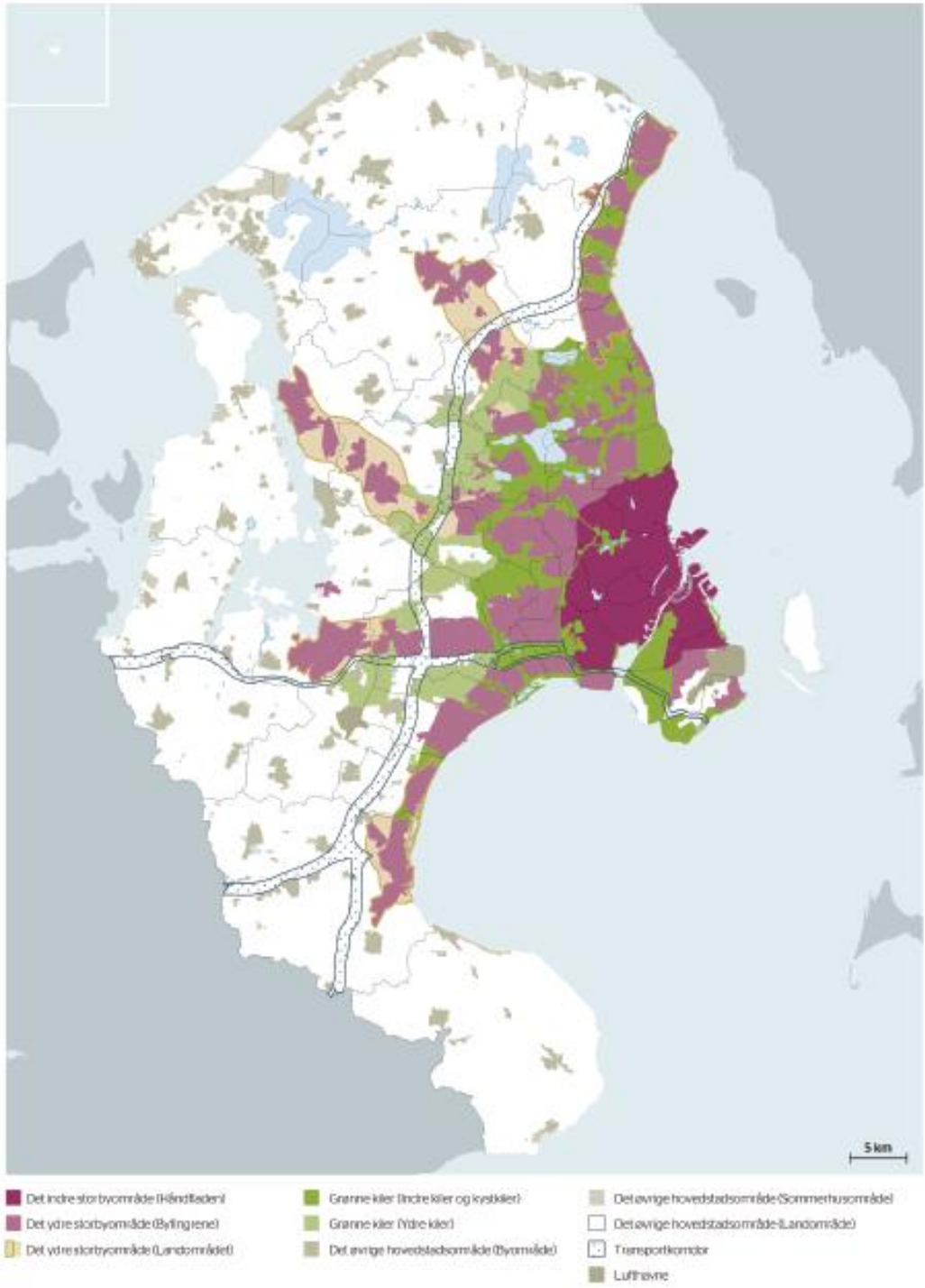
Location strategies should contribute to reduce congestion and promote cycling and the use of public transport.

Regional zoning for urban development:

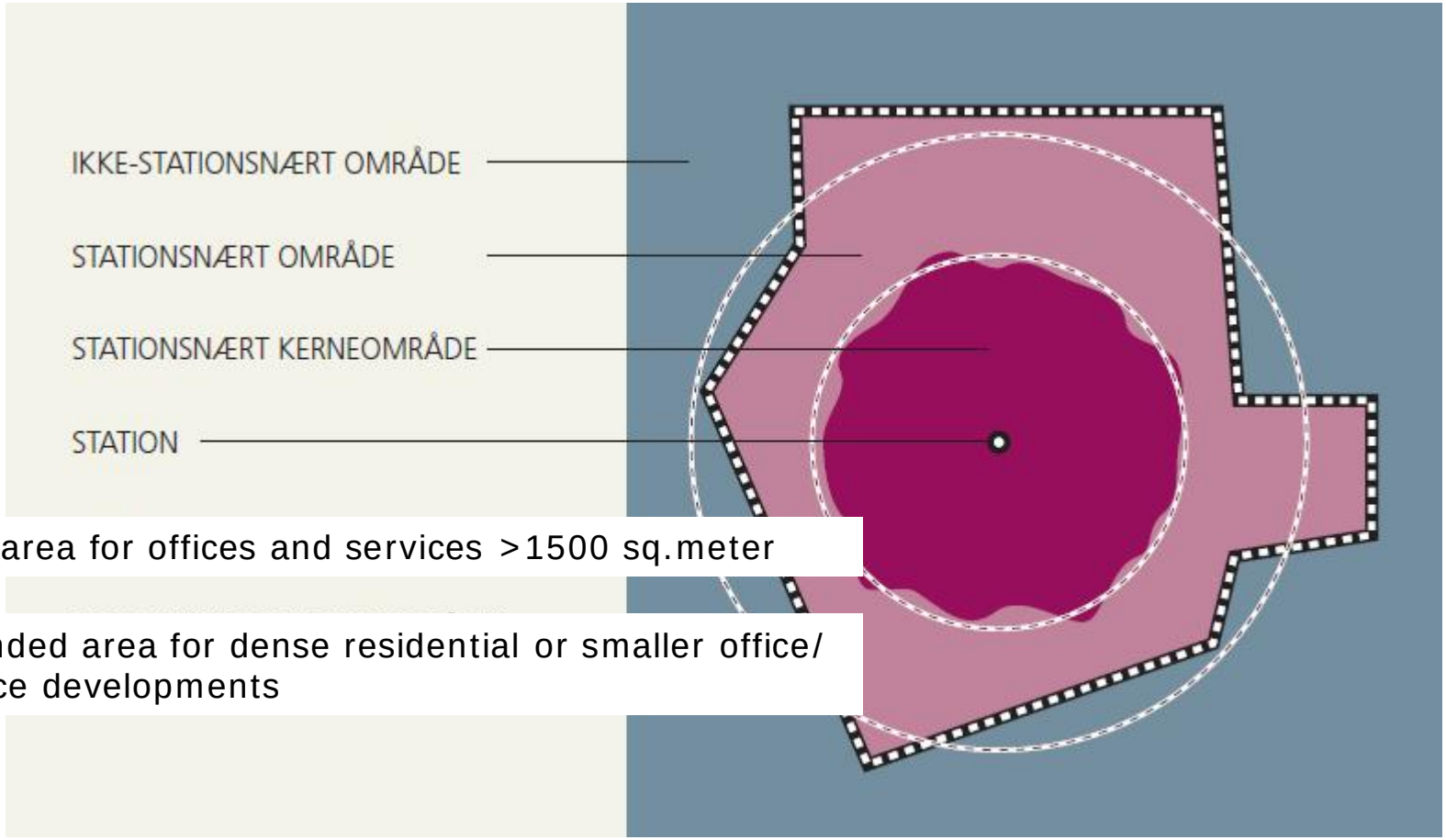
Inner- and outer metro-area

Green vedges

Other areas



Location principles

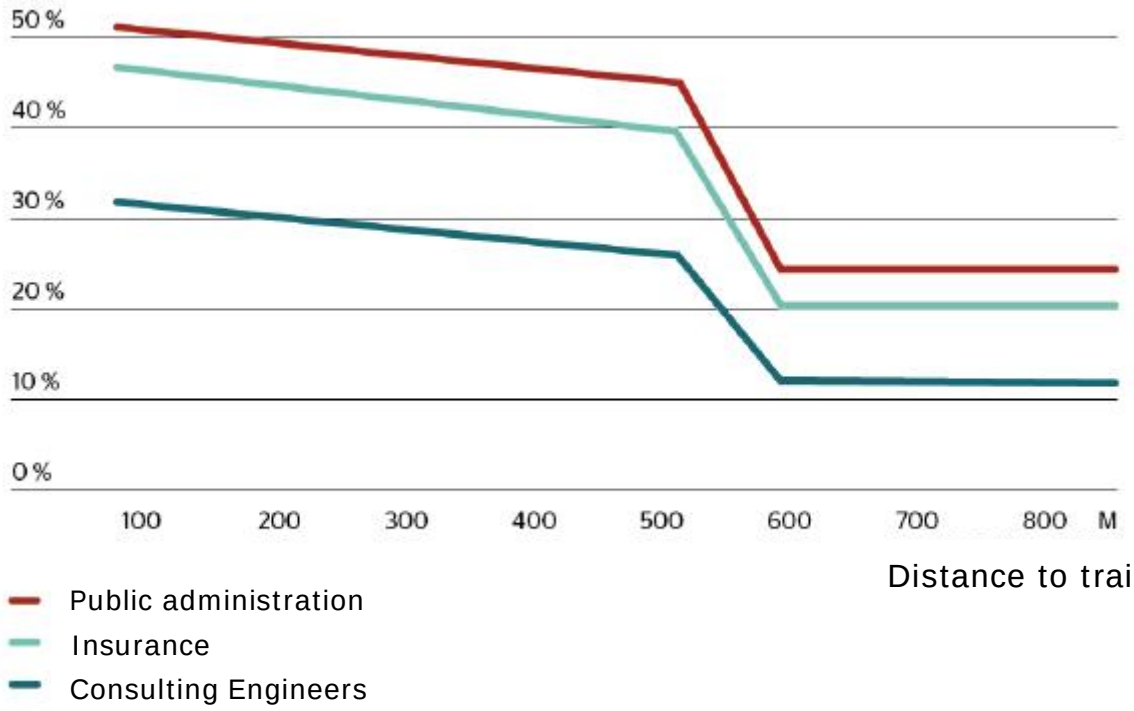


Core area for offices and services >1500 sq.meter

Extended area for dense residential or smaller office/ service developments

Employees travelling by public transport

- as a function of distance from place of work to a train station



Source: Miljøministeriet 2013. Forslag til Fingerplan 2013, hovedbudskaber, Miljøministeriet, Copenhagen

Main urban development sites

Brownfield

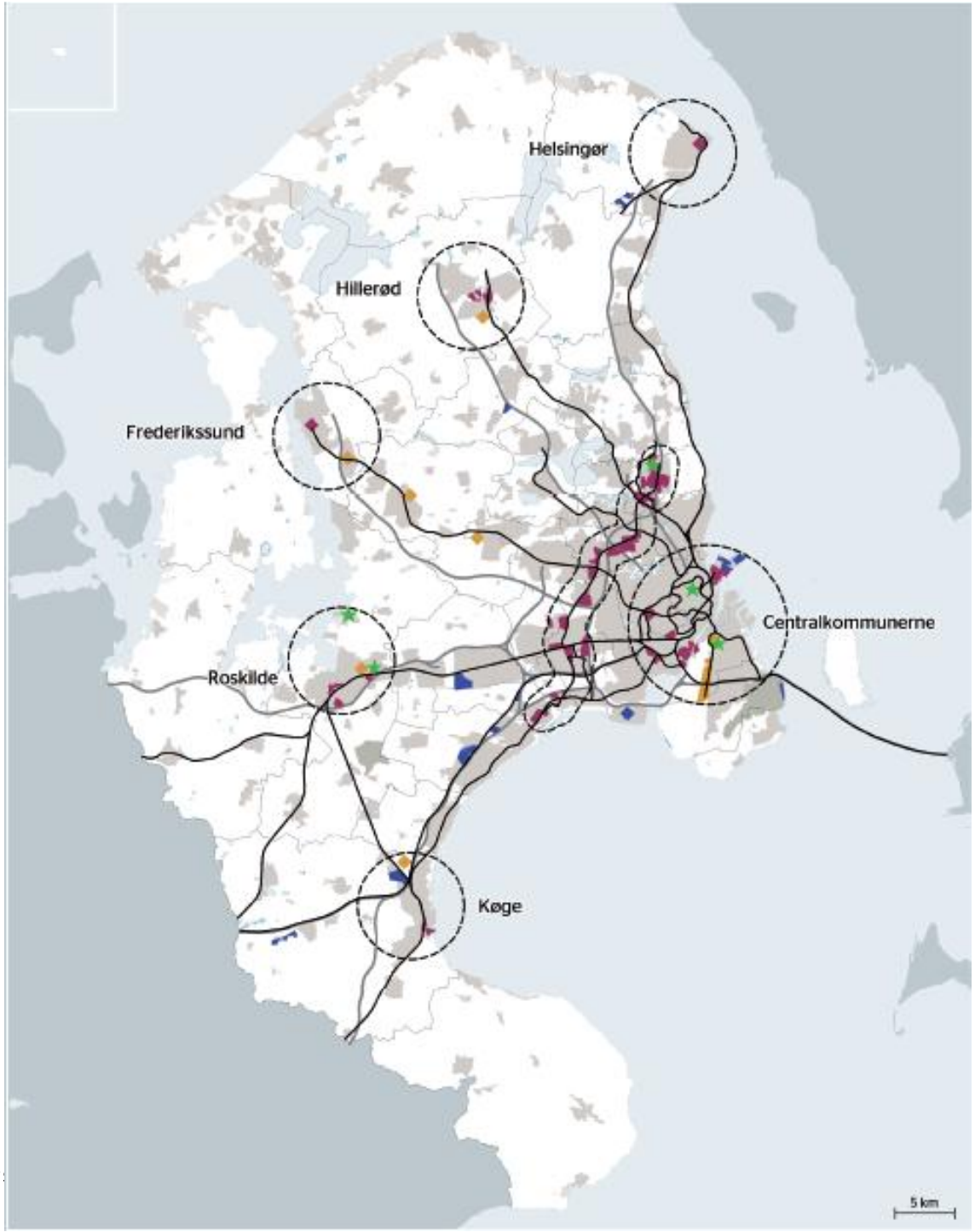
Greenfield

Transport-related

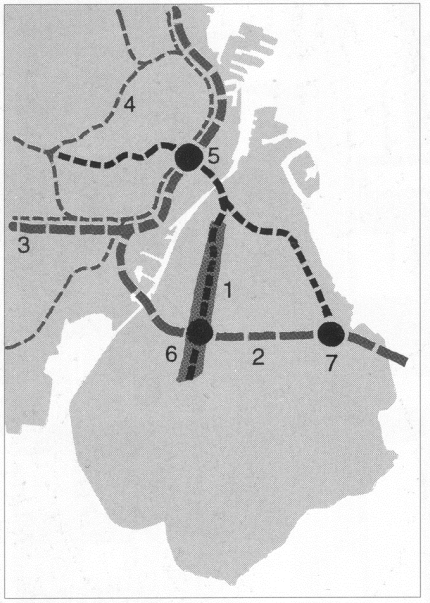
and

University-related

development sites



Ørestad

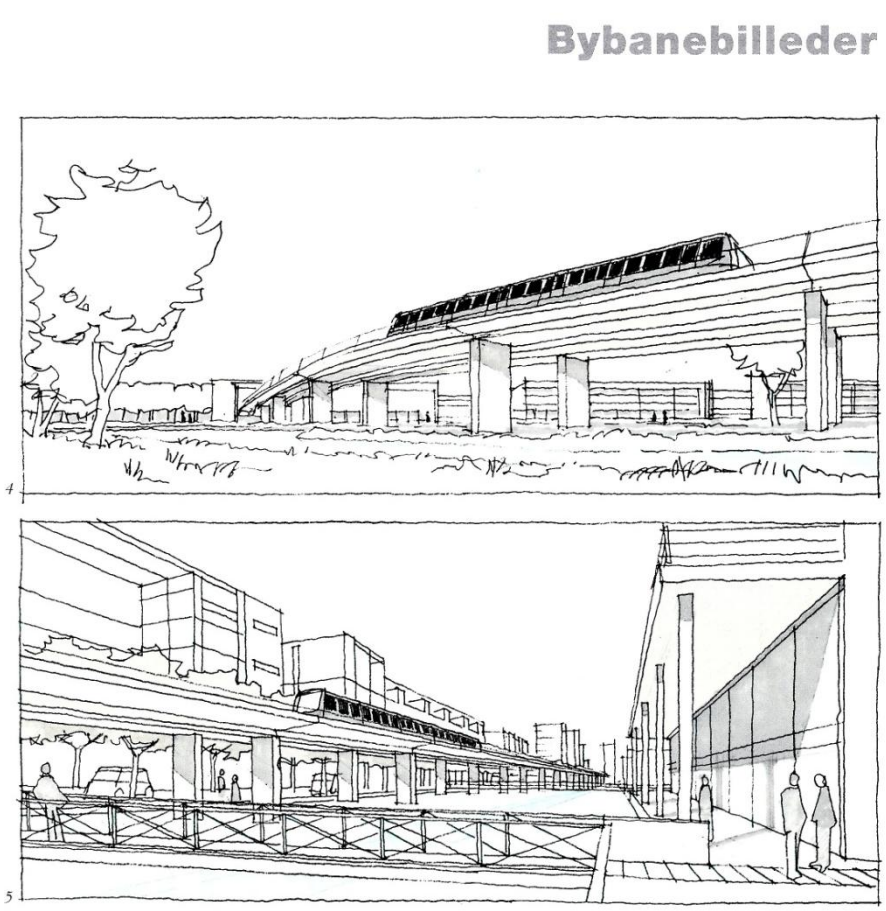


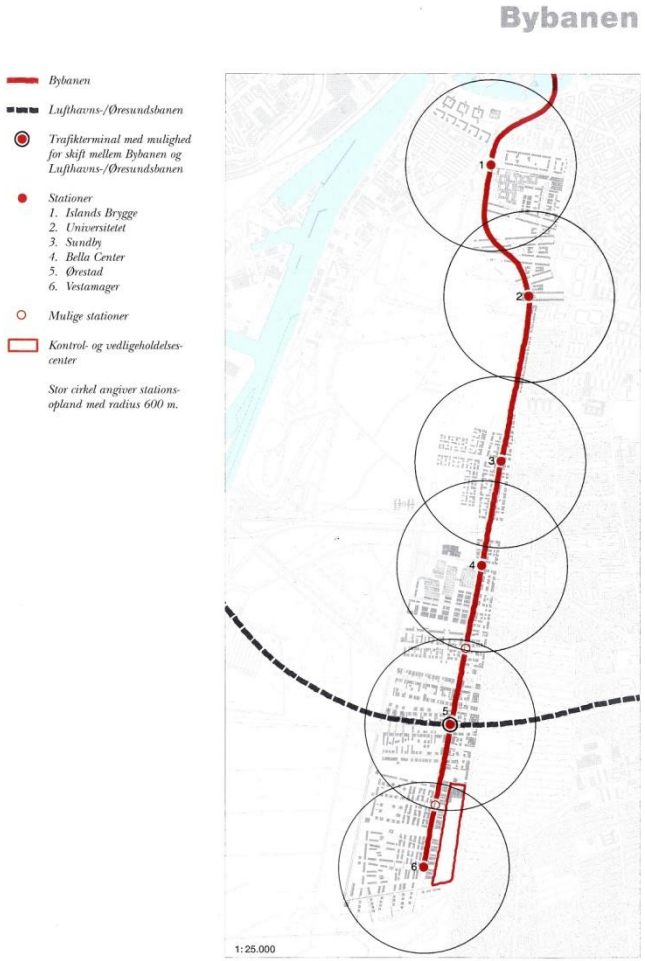
Baner

1. *Bybanen*
2. *Lufthavns-/Øresundsbanen*
3. *Øvrige nationale banenet*
4. *S-banen*
5. *Nørreport station*
6. *Ørestad station*
7. *Københavns lufthavn*

Forudsætningen for at Ørestanden kan få sin fulde attraktionsværdi, er imidlertid, at den nye bydel byplanmæssigt knyttes til Københavns City og forbindes med dette nationale center med gode nærforbindelser.... Efter lovforslaget etableres der derfor en letbane... (F.t. Lov om ørestaden mv.)

Ørestad (1995 masterplan)



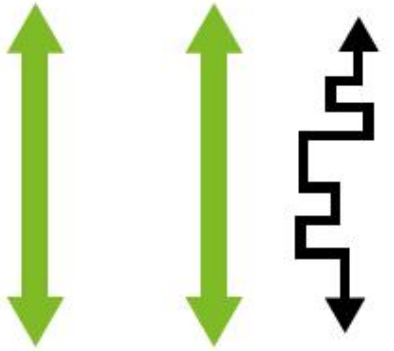


Metro ring in the centre 2007-2018

First part of extension to 'Nordhavn' has also been decided

Nordhavn strategy (2009)

FIVE-MINUTE CITY
FEM-MINUTTERS BY



FIVE-MINUTE CITY
PUBLIC TRANSPORT WITHIN FIVE MINUTES WALKING DISTANCE
FEM-MINUTTERS BY
KOLLEKTIV TRAFIK INDENFOR FEM MINUTTERS GANGAFSTAND

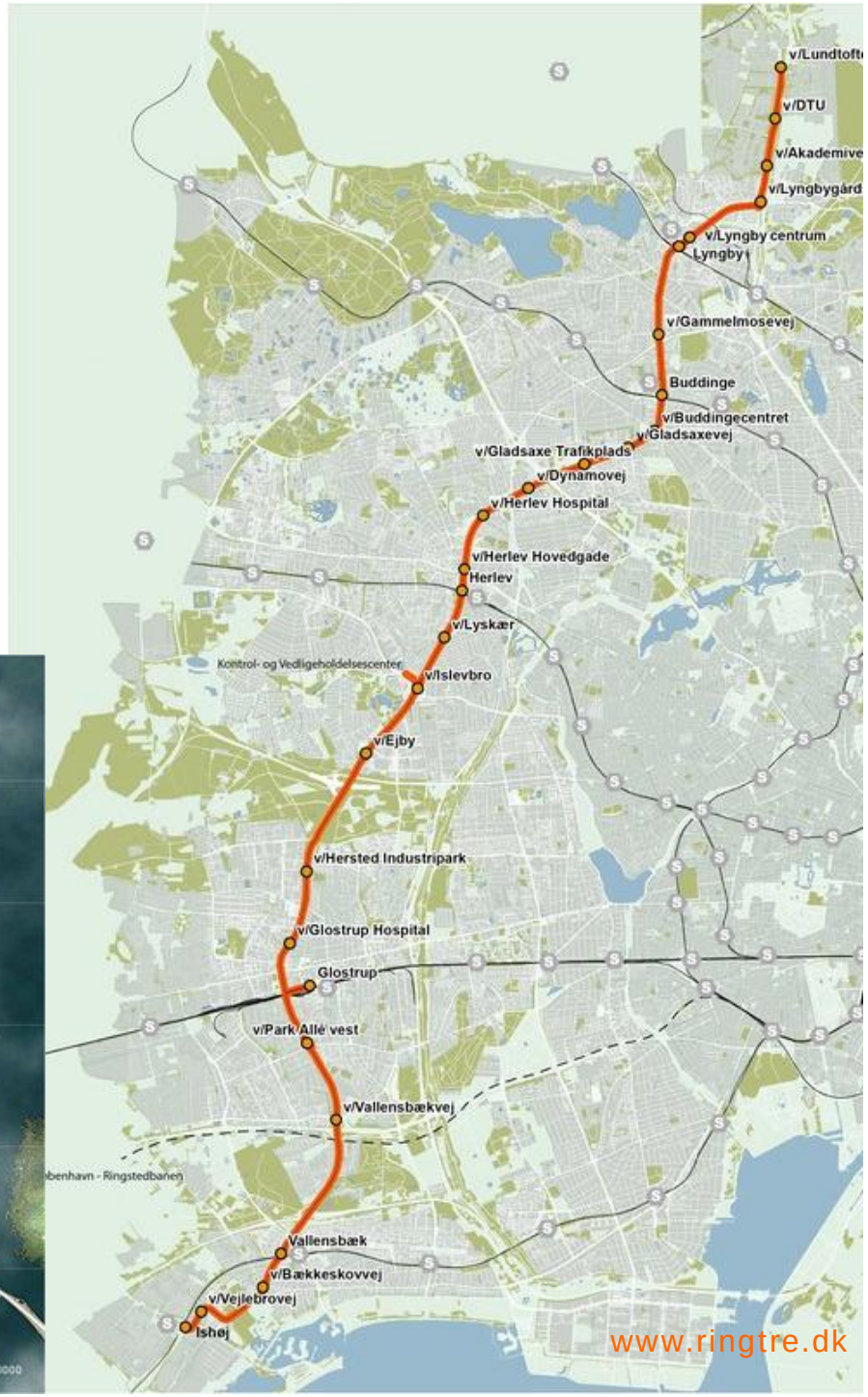
PUBLIC TRANSPORT **BICYCLES** **CARS**
KOLLEKTIV TRAFIK **CYKLER** **BILER**

New lightrail (2019-2020) with 'loopcity' visions

Browfield-development /regeneration

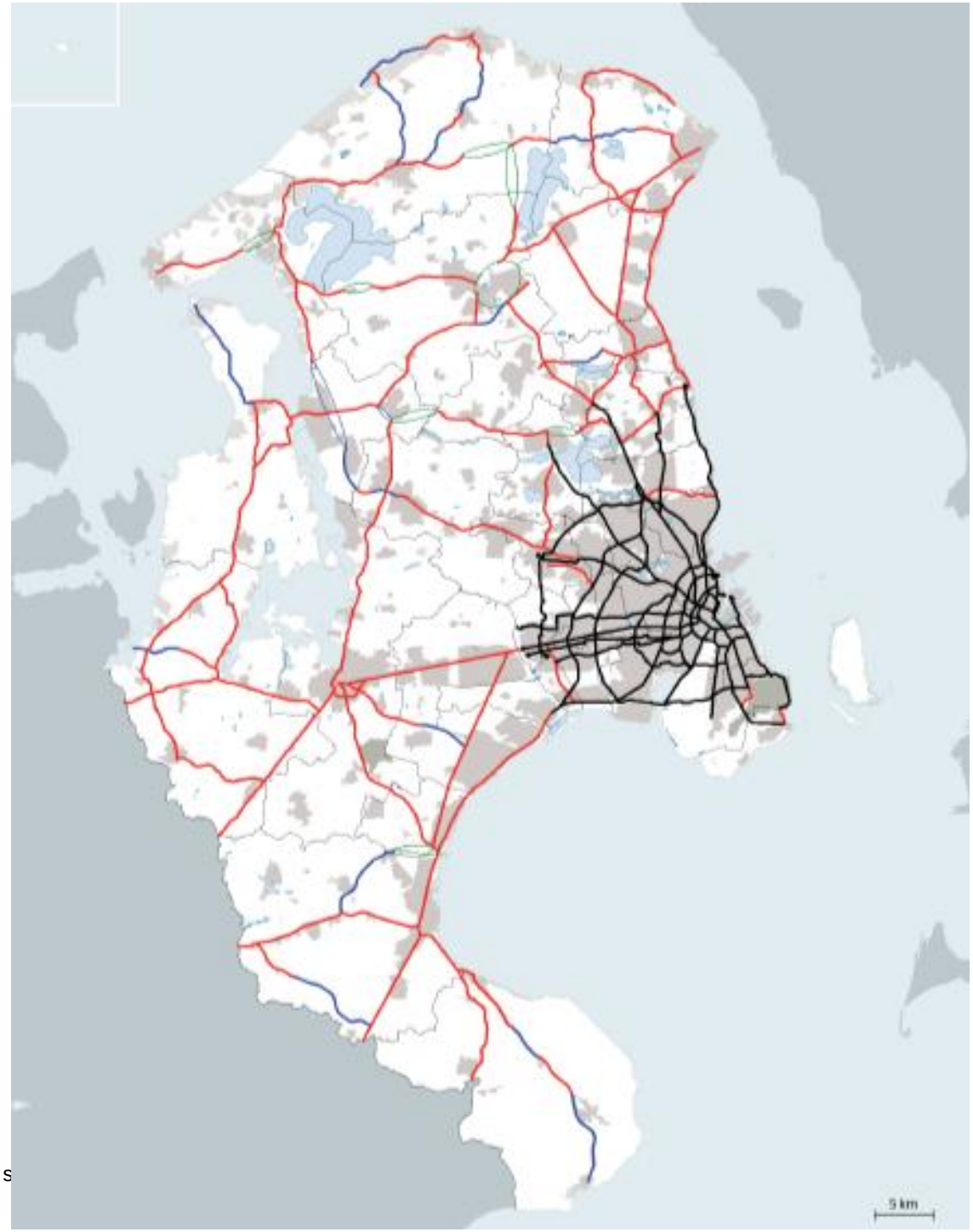
in old suburbs

Loop vision by BIG architects



Cycle highways

New integration and grading of cycle networks



The state of affairs...

- Substantial carotting of travel behaviours towards public and cycling
- Support from fairly restrictive land-use planning regime + public and private urban development corperations
- Proactive efforts to promote cycling – widely supported

- Favouring of carsharing in central areas by P-space provision
- Restrictions on parking provision in some urban developent areas
- Provisions for el-vehicle carging in central areas
- EL-vehicle policies in some municipalities
- General favouring of el-vehicles in the form of tax-releif (no spatial criteria).

- This will have an effect on the energy efficiency of transport and travels

Challenges / knowledge needs

- Adequacy of mobility management packages for new urban development sites (parking, transit provision, cycling, urban density and services) depending upon spatial context
- Policy innovations to support energy efficient travel patterns and behaviours – exploiting services and capacities
- Boundary crossing travel and cities wihout limits – effects – and how to deal with it.

Acknowledgements

Results have been derived from projects funded by the Danish Council for Strategic Research:

- Drivers- and Limits for transport – possible contributions to climate change

  http://www.transport.dtu.dk/driversandlimits

- Bikeability: cities for zero-emission travel and publich health

  http://www.bikeability.dk/