



*Brief overview of COST Action TU0902:
Integrated Assessment for urban sustainability*

Urban Fabrics Workshop

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Background to Action

Widely recognised urgent need to reconfigure urban areas to:

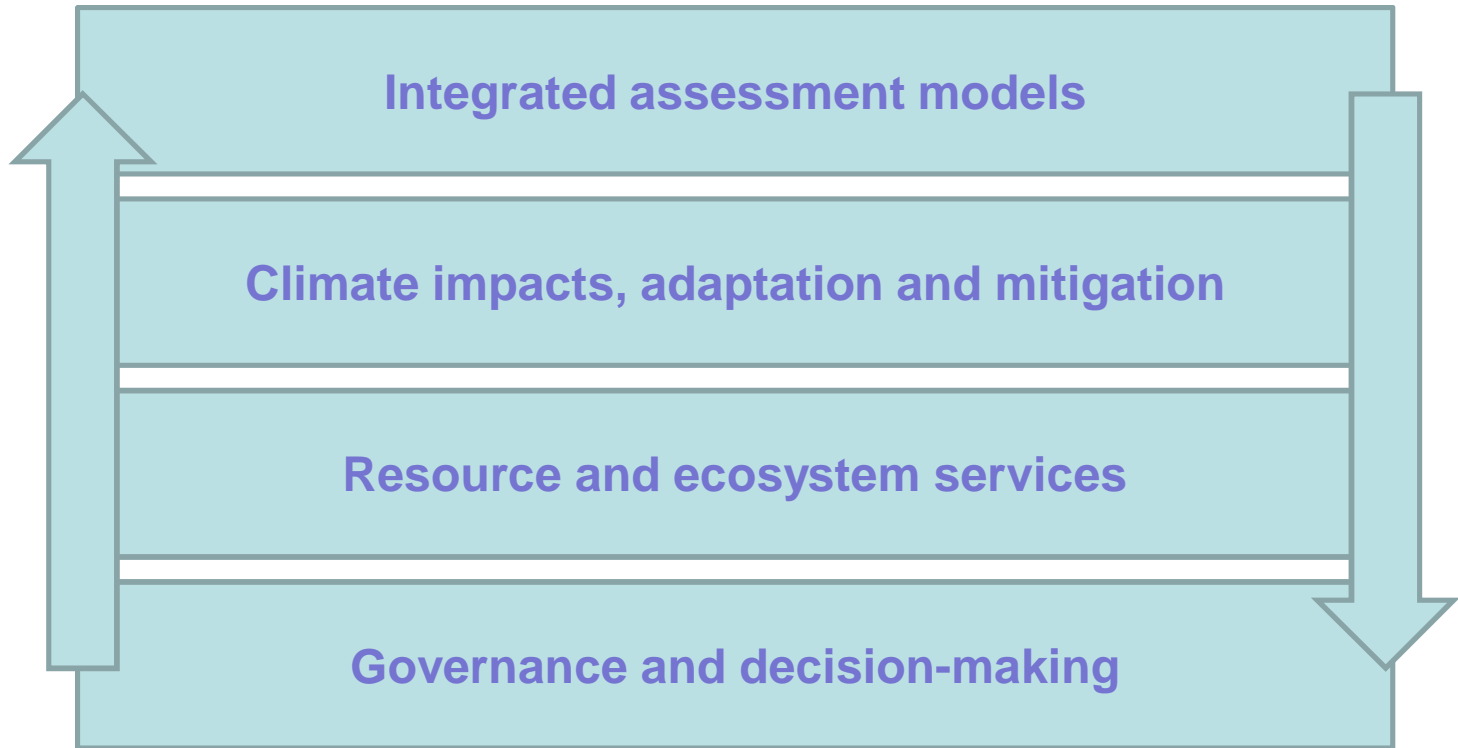
- Consume fewer resources
- Emit less pollution (including greenhouse gases)
- Have greater resilience to the impacts of climate change
- Be more sustainable in general

Policy makers are struggling to implement sustainable transitions in cities as it requires a multidisciplinary, integrated, response involving:

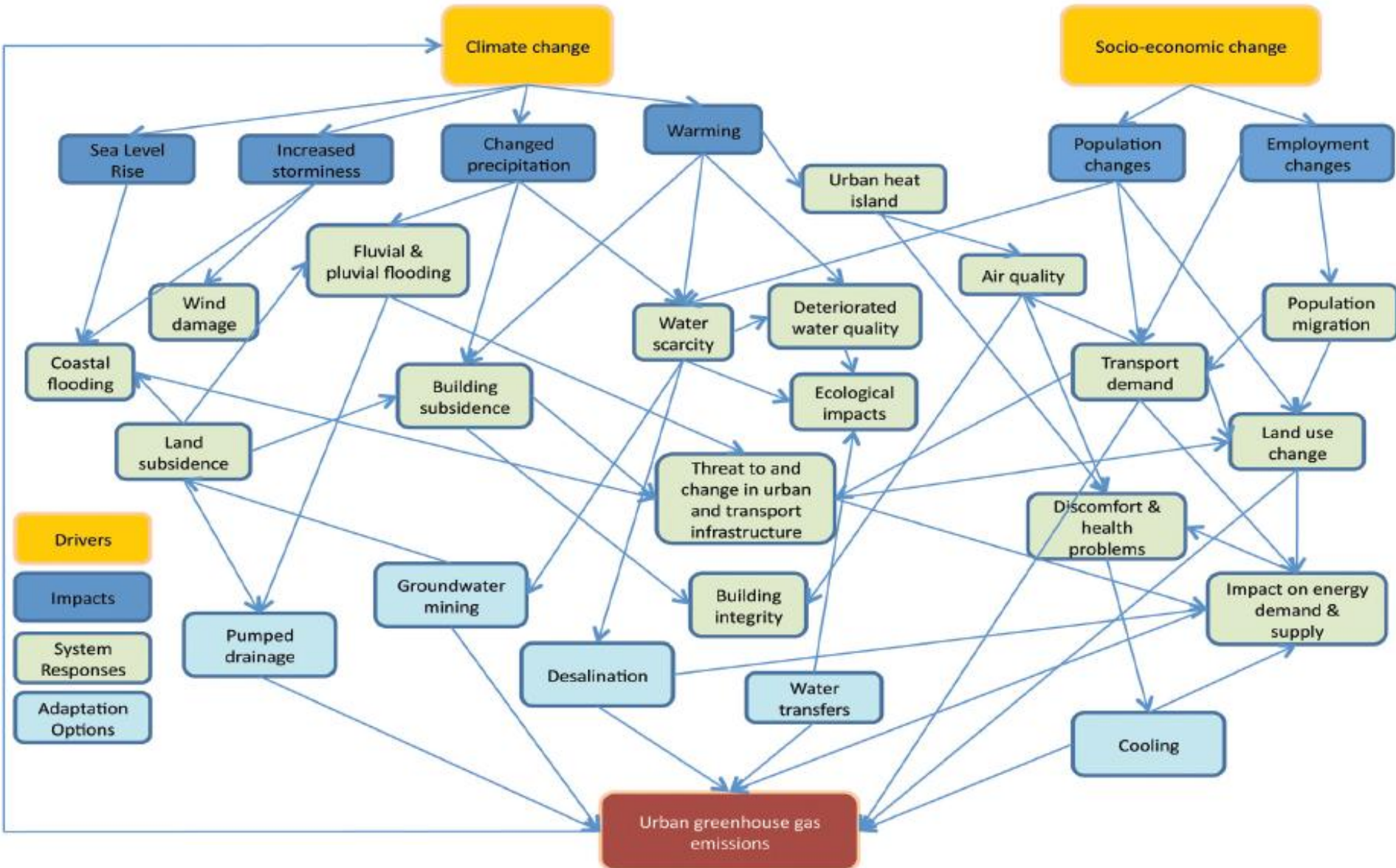
- Land use
- Transport
- Resource flows (energy, water, nutrients)
- Building form and function
- Urban climate
- Information networks

Moreover, grappling with this complex information places new challenges on policy makers

Background to Action



The importance & challenge of an integrated perspective



Walsh et al. (2011), Assessment of climate change mitigation and adaptation in cities, *Proc. ICE: Urban Design and Planning*, Special issue on Urban Development and Sustainability, 164(DP2): 75-84.

The importance & challenge of an integrated perspective

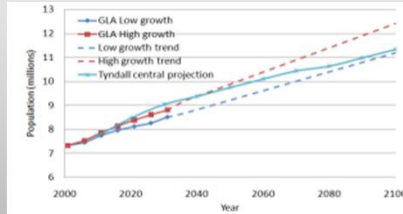
Response	Potential benefit	Potential negative impact
<i>Air conditioning</i>	Reduce heat stress	Increase energy needs and emissions
<i>Densification of cities</i>	Reduce public transport emissions	Increase urban heat island intensity and exposure to grater noise pollution
<i>Desalination plants</i>	Secure water supply	Increase greenhouse gas emissions
<i>Irrigation</i>	Supplying water for food	Salinisation of soil, degradation of wetlands,
<i>Biofuels for transport and energy</i>	Reduce GHG emissons	Encourage deforestation; replace food crops raising food prices; can increase local air quality pollutants such as NO _x
<i>Catalytic convertors</i>	Improve air quality	Large scale mining and international resource movements
<i>Cavity wall insulation</i>	Reduce GHG emissions	Increase damages from a flood event
<i>Raise flood defence</i>	Reduce flood frequency	Encourage more development (positive feedbacks)
<i>Pesticides</i>	Control vector borne disease	Impact on human health, increased insect resistance
<i>Conservation areas</i>	Preserve biodiversity and ecosystems	Loss of community livelihoods
<i>Insurance/disaster relief</i>	Spread the risk from high-impact events	Reduce longer term incentive to adapt
<i>Traffic bypasses or radial routes</i>	Displaces traffic from city centre, improving air quality and reducing noise	Can increase congestion and journey times (consequently overall greenhouse gas emissions)
<i>Vehicle user charging</i>	Discourage vehicle use to reduce greenhouse gas emissions	Lead to greater social inequality

Benchmarking IA models (WG1)



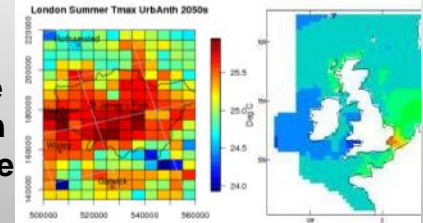
Voinov and Shugart (2013) 'Integronsters', integral and integrated modeling, *Environmental Modelling and Software*, 39: 149-158

Socio-economic scenarios

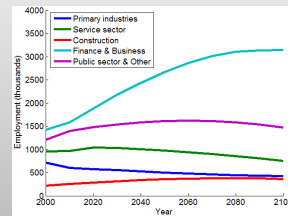


City-scale climate scenarios

- Temperature
- Precipitation
- Sea level rise
- Storm surge



Regional economy



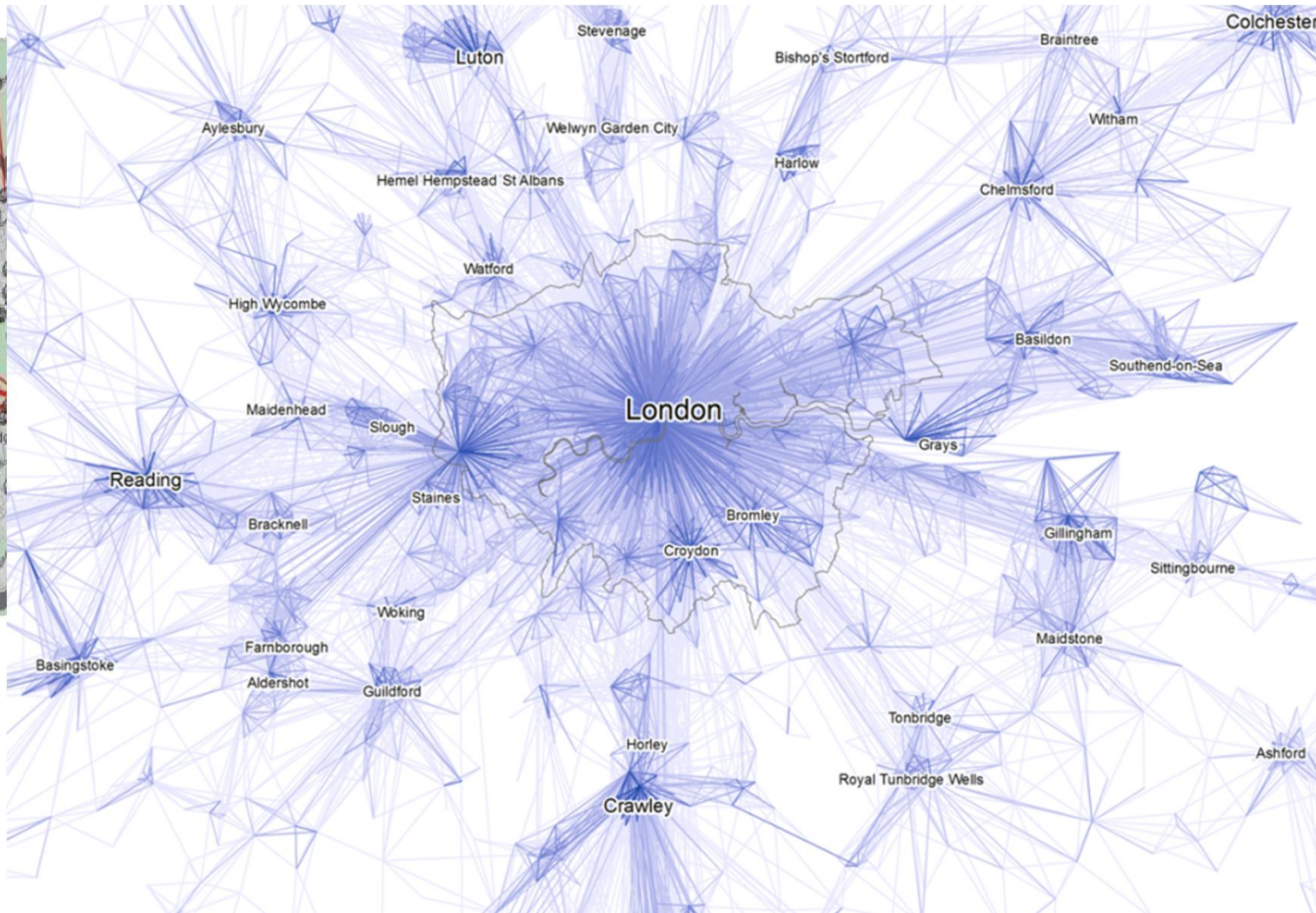
- Dynamic resource interactions between sectors
- Specialist energy sector module

Land use Transport Model



- Employment
- Multi-modal transport
- Developed land cover
- Population
- Planning constraints and attractors

Transport fabrics interact across urban system (WG1)



Empty Station Full Station
Circle sizes correspond to station size

System: BIXI. Weather: 16°C. Partly cloudy

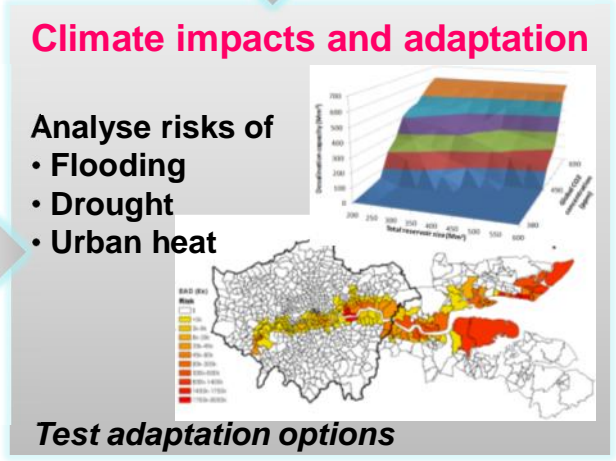
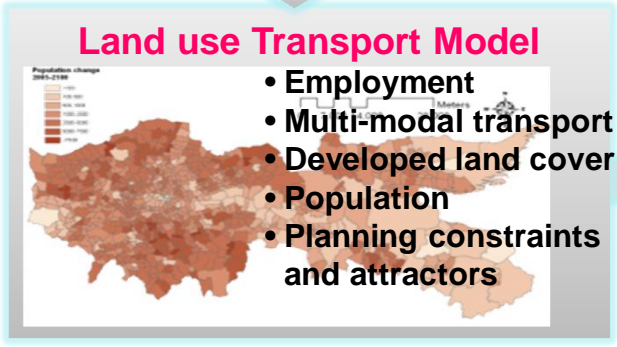
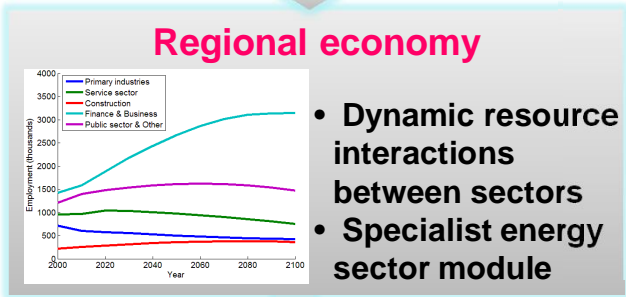
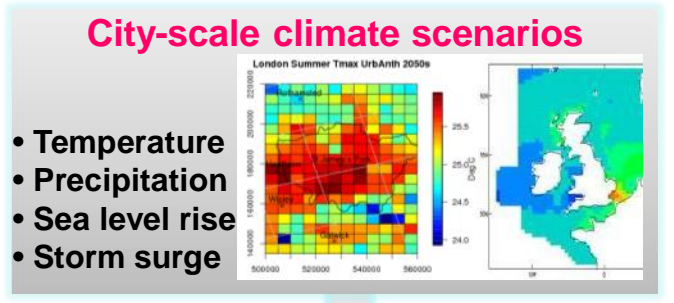
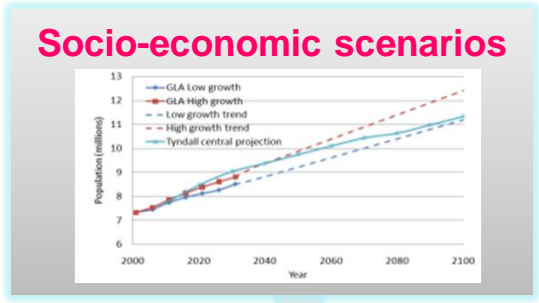
Warsaw - Moscow - Changwon - Daejeon - Seoul

PLAISTOW
NORTH W...
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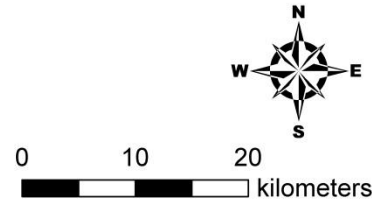
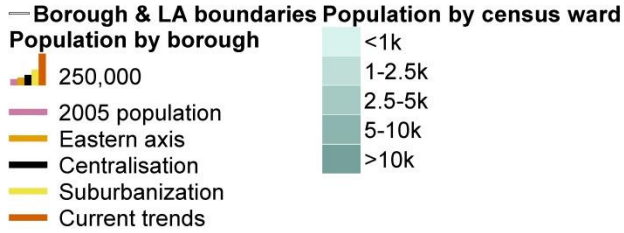
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Bikes in Docks

1 km 1 mi

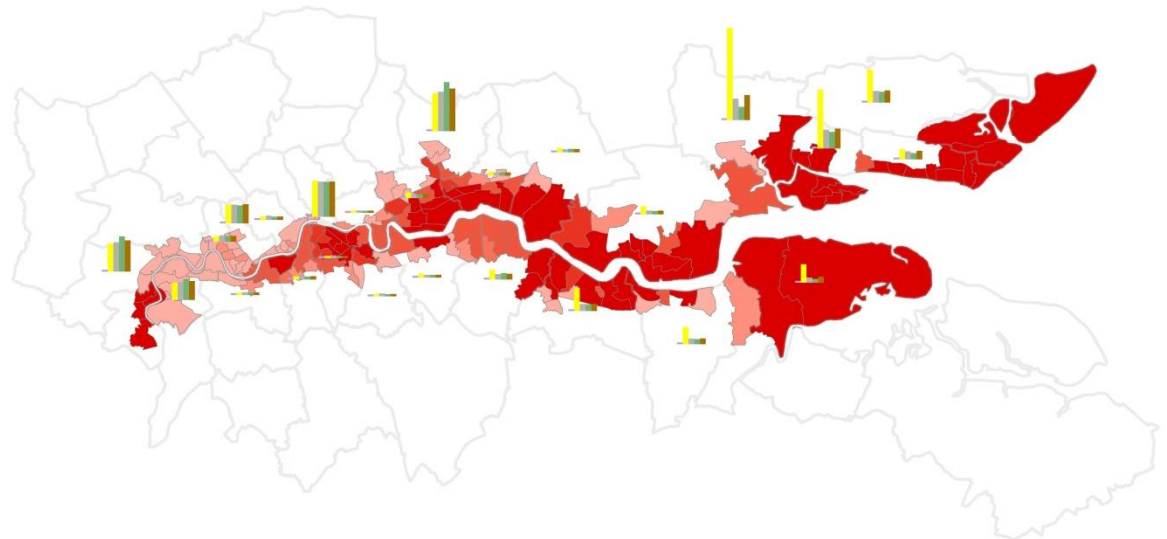
About

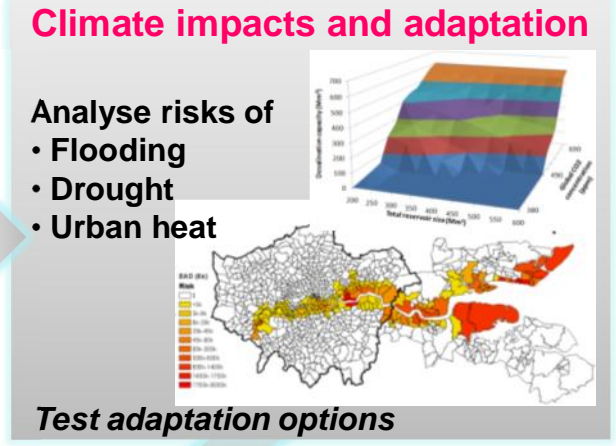
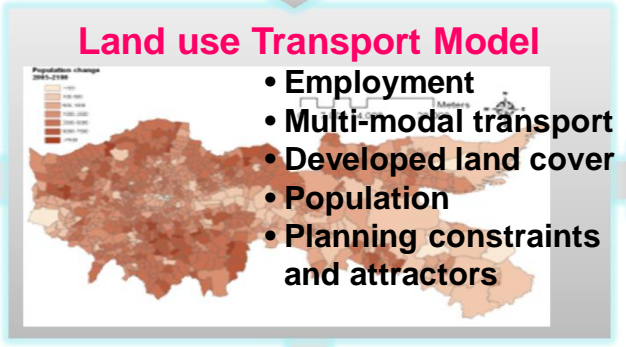
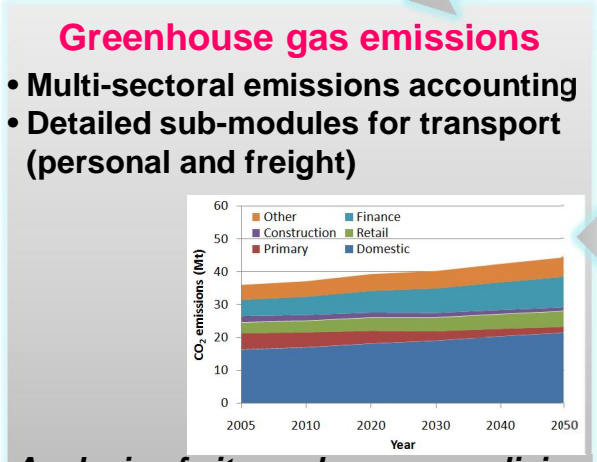
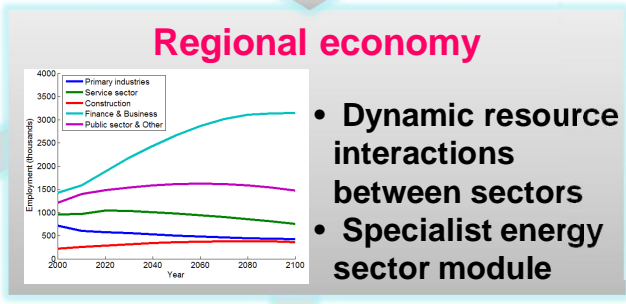
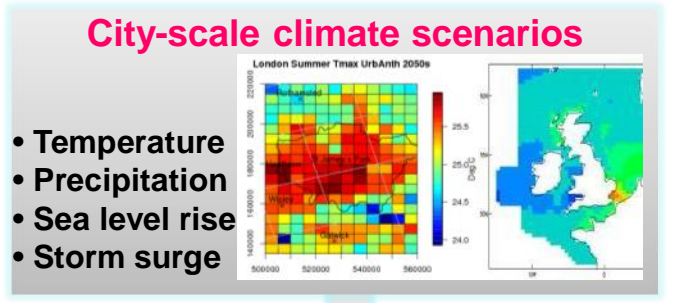
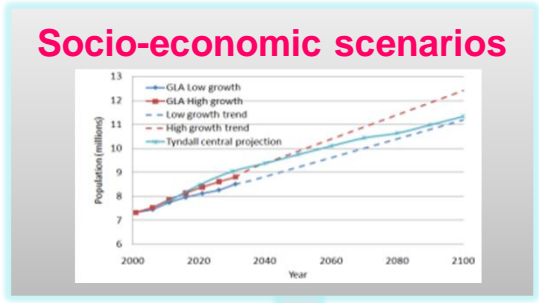


Transport fabrics interact across urban system (WG1)



Legend





Analysis of city-scale energy policies

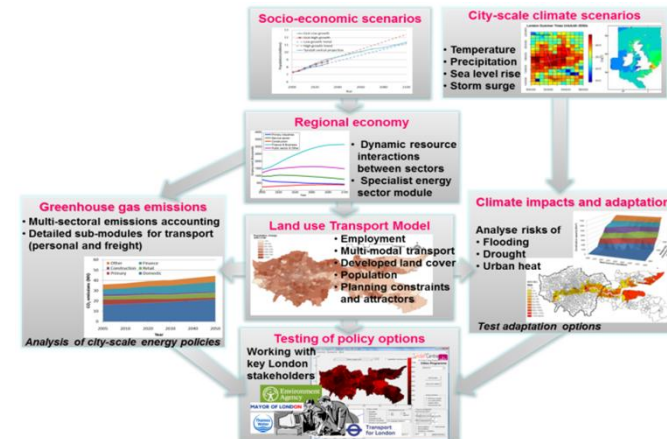
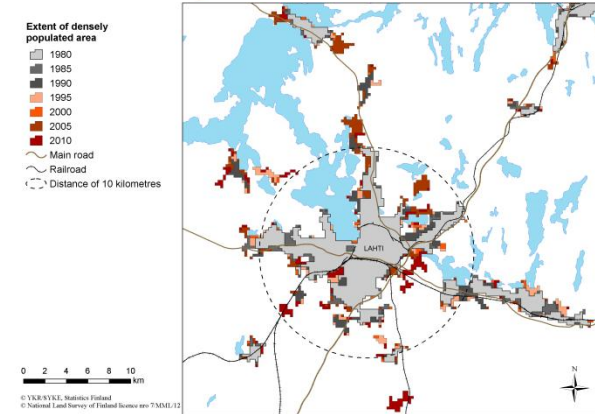
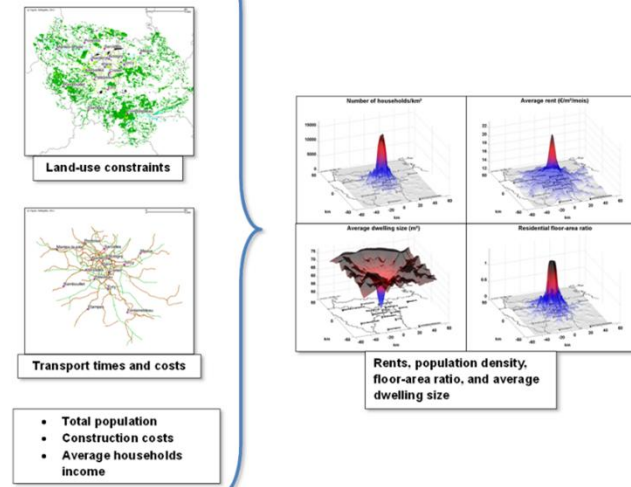
Testing of policy options

Working with key London stakeholders

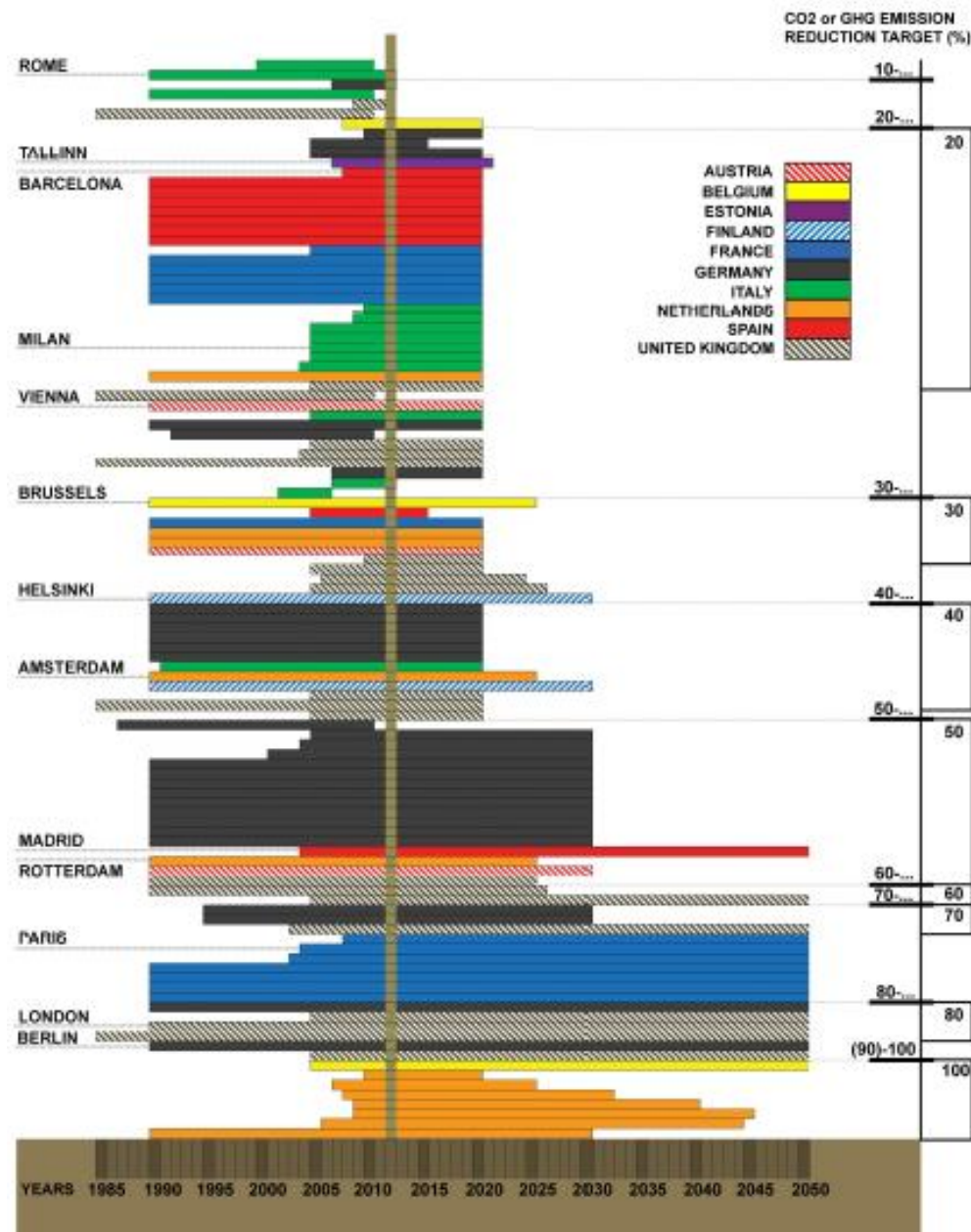
Benchmarking Integrated Assessment models (WG1)

Analysis of 10 city-scale IA approaches:

- Integrating mechanism (e.g. mega-model; loose coupling; qualitative)
- Drivers of model development (e.g. stakeholder; academic)
- Sectoral analysis and outputs (e.g. models used; reported variable and detail)
- Integrated insights (e.g. tradeoffs and synergies explored)

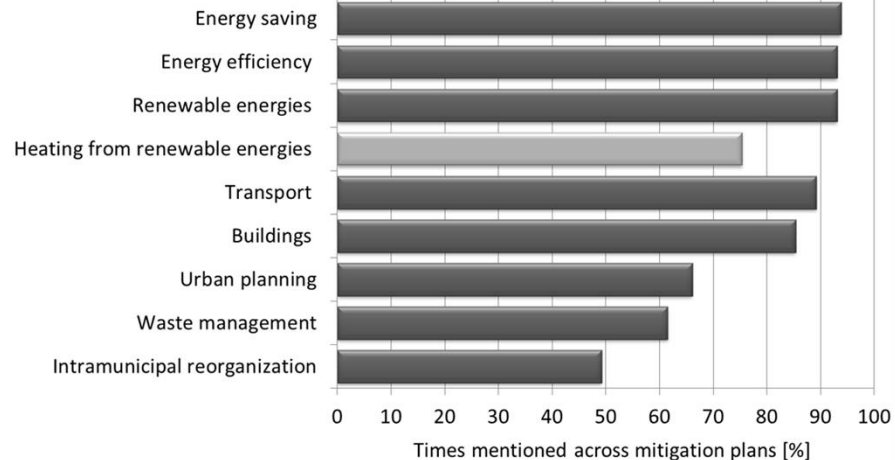


Analysis of climate policy in 200 EU cities (WG2)



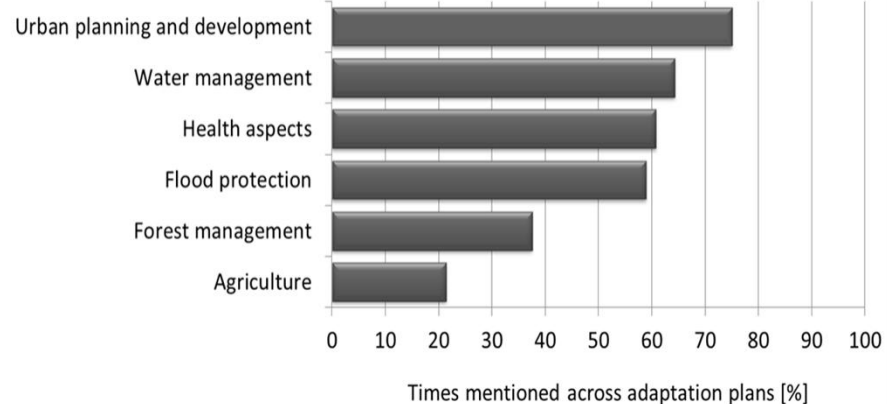
A)

Mitigation topics

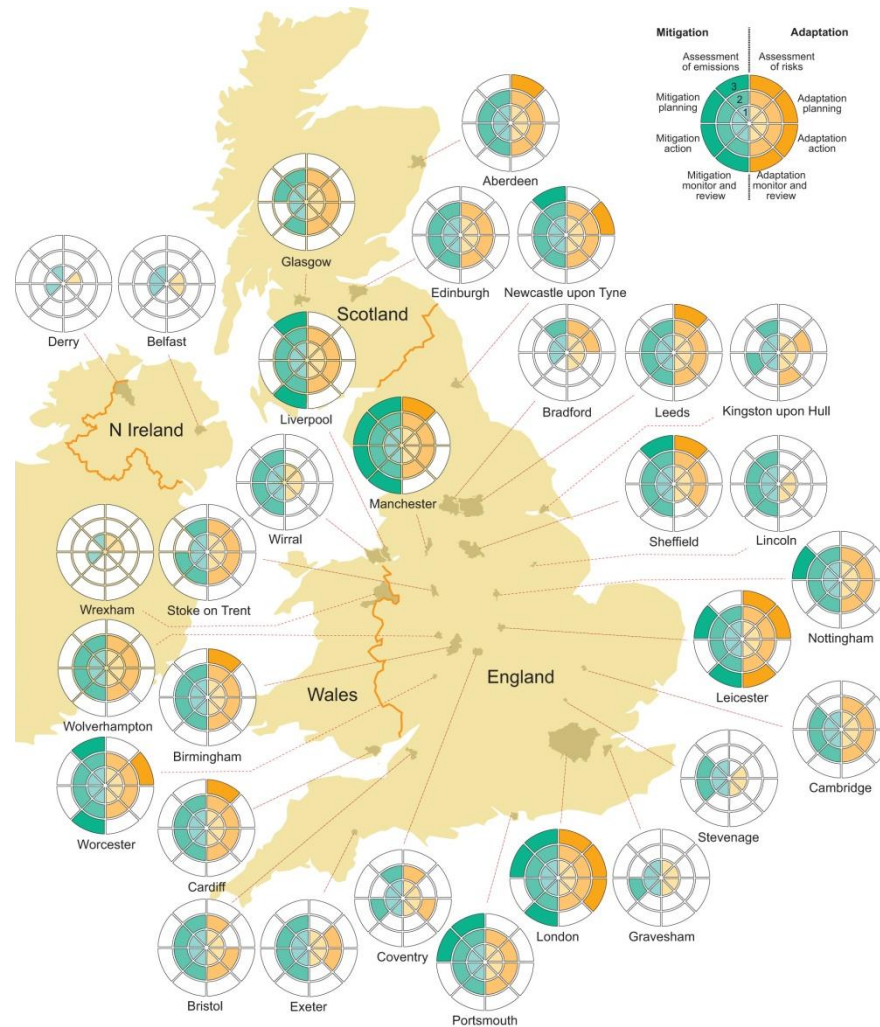
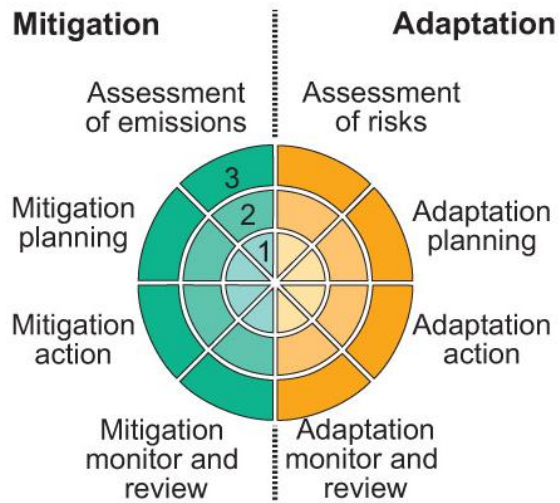


B)

Adaptation topics



Analysis of urban 'climate preparedness' (WG2)



Heidrich, O., Dawson, R. J., Walsh, C. and Reckien, D. (2013)
 Urban Climate Preparedness of UK Cities, *Climatic Change*, 120(4): 771-784.

Integrated Governance (WG4): Gaps and opportunities for Green infrastructure

	Green open spaces identification	Nature conservation	Storm water management	Spatial Planning	Sustainable Development
Co-k	Poland	NATURE CONSERVATION ACT (2004)		ORDINANCE ON THE REQUIRED SCOPE OF THE LOCAL PLANS (2003)	ENVIRONMENTAL PROTECTION ACT (2001)
Trac		Defines functions and categories of green open spaces		Green urban spaces are elements of planning documents	Minimal size of biologically vital area (covered with vegetation and/or water) in relation to plot size
Polic	Turkey	CONSTRUCTION LAW (1985)		ORDINANCE ON THE FUNDAMENTALS FOR PERFORMING PLAN (1985)	
		Defines the limitations and the forms of use of public open and green areas		Defines the green area types and minimal standard of urban green spaces per capita	
	Czech Republic	LAW OF CITY PLANNING AND CIVIL ENGINEERING REGULATION (1976)		LAW OF CITY PLANNING AND CIVIL ENGINEERING REGULATION (2008)	
		Defines categories of green open spaces		Green urban spaces are elements of planning documents	
	United Kingdom	PPG17 PLANNING FOR OPEN SPACE, SPORT AND RECREATION (2002)	PPS25 DEVELOPMENT OF FLOOD RISK	PPS12 LOCAL SPATIAL PLANNING (2008)	PPS1 DELIVERING SUSTAINABLE DEVELOPMENT (2005)
Dobson wildnes De Gre adaptiv		Defines functions and categories of green open spaces	Green infrastructure is crucial for supporting sustainable drainage and mitigating flood risk	Provisions for local green infrastructure in planning documents	Requirements to optimise potential for green spaces development

Portuguese, Spanish and British approaches by the Central Government, submitted to *Journal of European Federation for Landscape Architecture*.

Giedych, Szulczewska, Dobson, Halounowa, Nurlu and Doygun, 'Planning measures applied to build adaptation capacity of cities', submitted to *Journal of European Federation for Landscape Architecture*.



Warsaw



Engineering Cities:
How can cities grow
whilst reducing
emissions and
vulnerability?

Tyndall°Centre
for Climate Change Research

“We have come to recognise how integrated modelling of the type delivered by the Tyndall Centre Cities programme can help to bring different stakeholders together to develop common understanding of processes and consequences of long term change.

That collective understanding is essential if we are to manage change rather than become its victims.”

Alex Nickson,
Strategy manager: climate
change adaptation and water,
Greater London Authority



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