Smart City Governance – energy efficiency URBIS and DECUMANUS Solutions

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Energy in City Context

* Considerations of energy efficiency are set in the city context
* **Cities are responsible** of some 70 % of GHG emissions. 70% of mitigation measures and up to 90% of adaptation measures are put in place in cities.
* The **Covenant of Mayors** includes 7000 signatory cities and towns and has 5000+ Sustainable Energy Action Plans (SEAP) under implementation.
* Going forward, the **new energy system will require changes**: the way we live, the way we consume etc. and solutions need to be found where science, innovation and practice meet and solutions are only successful when they are widely implemented
* **Report of the Horizon 2020 Advisory Group on Energy (June 2016)**

Engaging cities in the energy transition

* Rooting research and innovation into practice: The energy transition needs to happen with cities and citizens and calls for a **collaborative approach –** bringing city administration, universities, business, civil society together
* Where all stakeholders collaborate to find solutions that ultimately motivate society as a whole towards a **new energy system**
* Transition is **technological and social**: In addition to deploying new technologies, new ways to engage with society are an essential part of innovation processes
* An **integrated and systemic approach** – find solutions that serve multiple purposes: Cities define themselves via their local strategies and their climate and energy plans how they want to develop
* 'Smart' is about taking **a holistic approach** and ensuring a proper integration of different policy areas; locally and create solutions that are based on the needs of the cities and their citizens□

* **Report of the Horizon 2020 Advisory Group on Energy (June 2016)**

urban management challenges

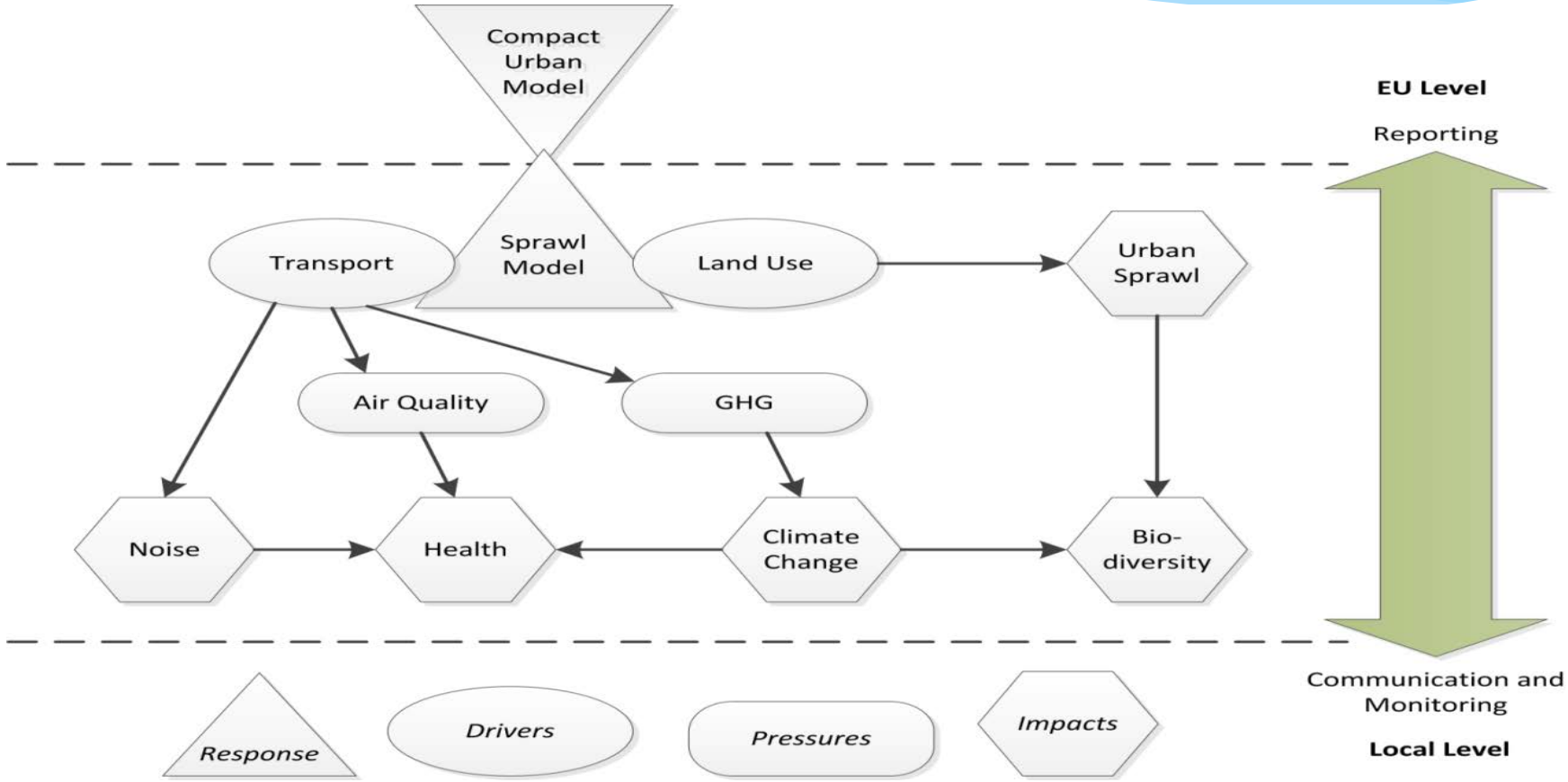
* **Urban Management – multiple challenges**

* finite resources and energy efficiency
* climate change impacts and environmental vulnerability
* demographic change and social cohesion
* economic and financial crisis

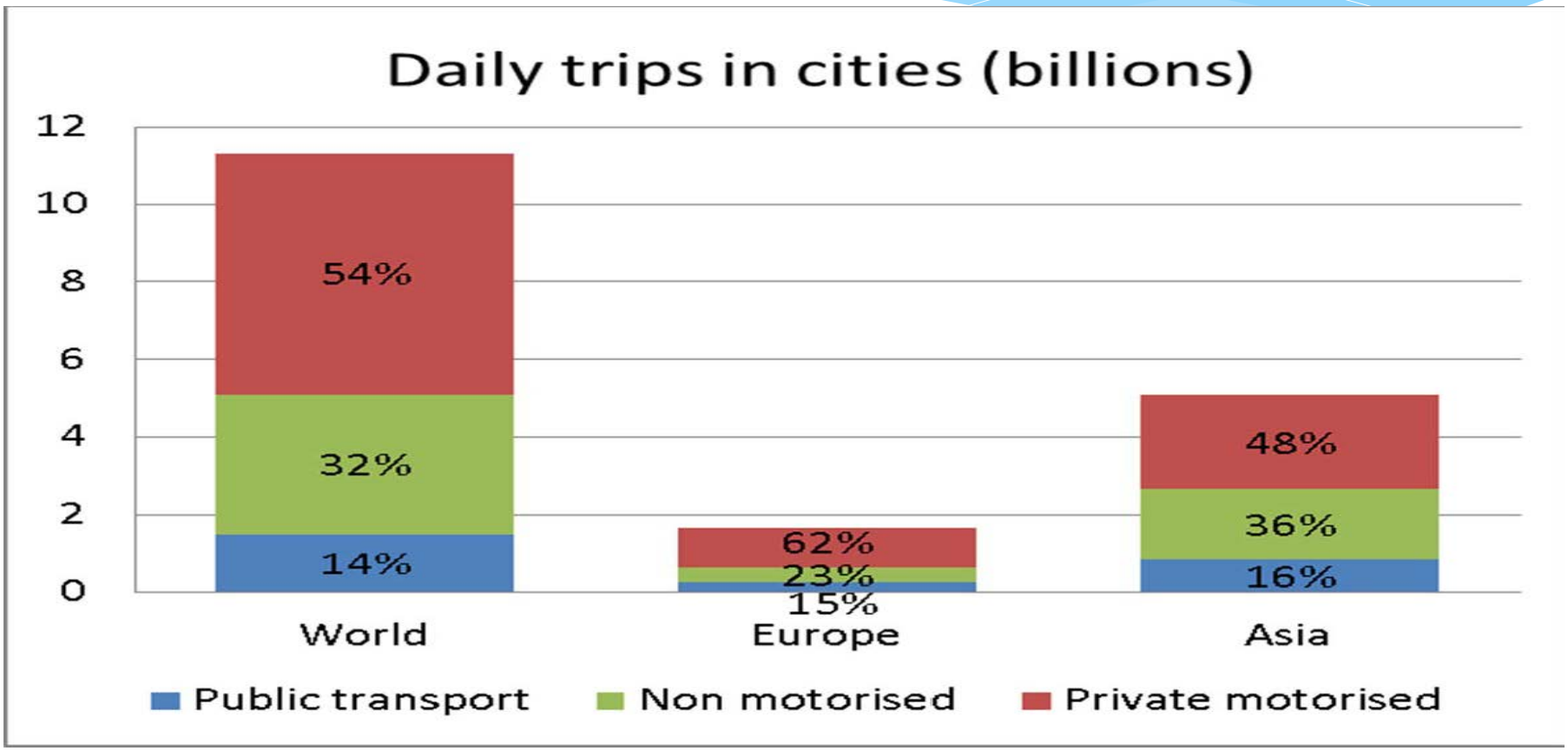
* Hence management complexity and **need an integrated governance to manage this complexity**

* **Drivers of change –** global and local

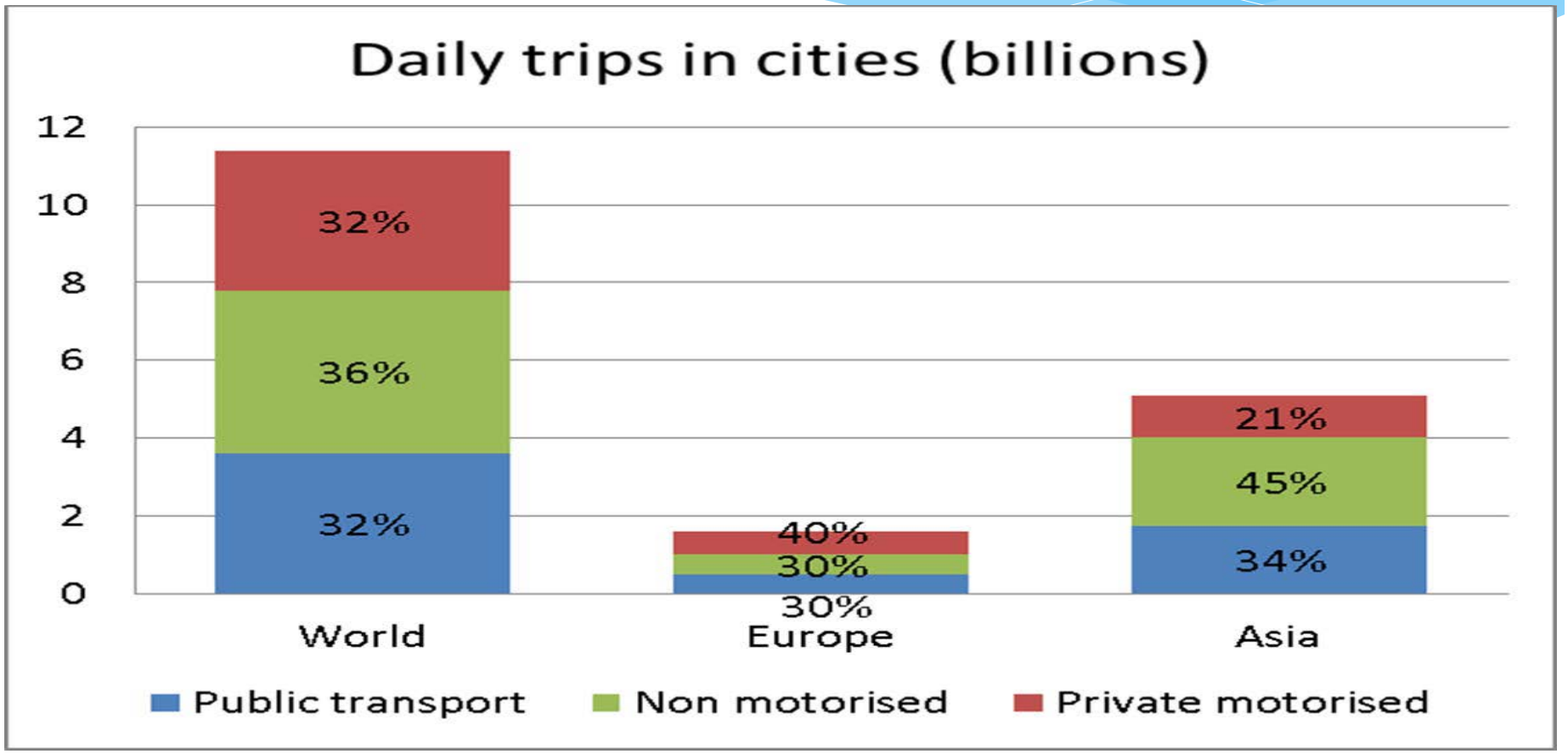
urban complexity + integrated urban management



urban mobility 2020 – business as usual



Win–win potentials - urban mobility 2025 = PTx2



energy consumption for urban mobility

	2005	2025 PTx2	% change
World	700 MToe	720 MToe	+3%
Europe	140 MToe	110 Mtoe	- 21%
(% world total)	20%	15%	
Asia	124 Mtoe	208 Mtoe	+68%
(% world total)	18%	29%	

Policy "Win – Win" potentials

* **urban mobility nature-based solutions** for cities are adaptable, multi-purpose and energy efficient and provide simultaneously environmental, social and economic benefits:

* In addition to improvements to energy efficiency – also ……
* improve city **resilience** to **CC** and natural **disasters** contributing to both **CC adaptation** and **mitigation**;
* restore urban **biodiversity**, **ecosystems** and their **services**;
* Improve air and water **quality**, reduce **noise**;
* improve **quality of life,** and **social cohesion…..**

* **Hence offer prospect of substantial policy co-benefits and win-win solutions – *question how to unlock the potential***

urban planning requirements

* Urban planning is central to managing complexity (socio-economic and environmental) in territorial context - and securing win-win policy solutions

* **Requires:**
* integration of information and analysis (cross departmental/multi-scalar)
* Information, intelligence and communication
* assessment methodologies, visualisation, simulation
* engagement of stakeholders and co-production of plans (bottom up)

* **All supported by ICT** tools and methodologies

* **Intelligence - communication – assessment - decision**

spatial planning - operationalising intelligence

* **Intelligence - communication – assessment – decision**
* **policy cycle** – operationalising and mobilising intelligence - integrating governance with inter-agency communication
* **assessment** of socio-economic and environmental impacts of alternative territorial development options
* **stakeholder engagement** regarding alternative development options (co-design and innovation in solutions)
* **political decision making** and plan implementation (democracy, legitimacy, trust)

planning cycles – operationalising intelligence

Green infrastructure - requirements

* green infrastructure planning objectives set in the **strategic planning framework t**hat extends across the administrative boundaries from city centre to hinterland at the local level

* focus here is on the **connectivity** of the network of green (and blue) infrastructures, and the definition of green routeways linking city centre to countryside

* gaps in the network must be filled to ensure connectivity that is essential to meet the requirements of the policy**. Gaps in the network only filled at the local level** – where neighbourhood planning is essential to the realisation of city-wide planning objectives

Green infrastructure - levels

* Solutions to support and develop both planning and implementation of the green infrastructure policy at **all levels of governance** in an integrated perspective

* At the local level integration of green open space with street tree information, as well as socio-economic (young families) and proximity (to green open space) indicators to define priorities for green infrastructure neighbourhood planning

* At the citywide scale of integration of green open space with green tree assessments combined with connectivity/accessibility indicators to define city wide green corridors supporting the recreational and mobility needs of the population

* And at the EU level harmonised assessments (EU urban atlaso offer pan-European comparability of green cities strategies across Europe – defining potentials for EU level interventions to support local actions including targeted cohesion fund urban development investments leveraging national and EU funds for local benefit

URBIS +DECUMANUS Solutions

* Green Layer Services developed from satellite images driven by EU Copernicus programme (European Space Agency) support planning of green infrastructure at all levels of governance in an integrated perspective:

* **local level** the green layer is integrated with the urban atlas street tree information, as well as socio-economic and proximity (to green open space) indicators to define priorities for green infrastructure neighbourhood planning;
* **citywide** green layer/green tree assessments are combined with connectivity/accessibility indicators to define city wide green corridors supporting the recreational and mobility needs of the population;
* **EU level** solutions based on the urban atlas offer pan-European comparability of green cities strategies across Europe.

URBIS GI Solutions

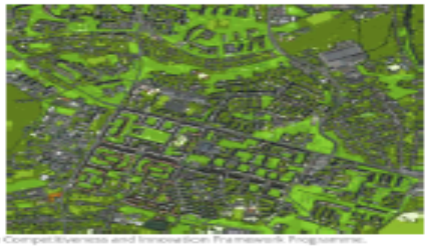
* URBIS green layer services support the identification of the amounts and spatial distribution of urban green in the city - building blocks of GI.

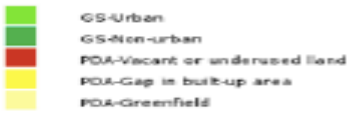
* At the same time potential development areas are identified (see Figure below), including vacant or underused land that may provide opportunity for the implementation of GI solutions or alternatively for densification of the city

URBIS Green Layer Services

Amount and spatial distribution of gaps, open spaces, pervious areas and urban green in the city.

- **Urban green sites - to be protected as part of GI**
- **Potential development areas - space for city densification**
  - Vacant or underused land
  - Gaps in built-up areas
  - Greenfields with development perspectives





URBIS

URBIS project has received funding from the EU FP7 ICT Policy Support Programme as part of the Competitiveness and Innovation Framework Programme.
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DECUMANUS GI Solutions

* DECUMANUS green infrastructure solutions map current and potential green roofs (Figure below) as well as tree locations and their canopy coverage.
* Products address climate change mitigation and adaptation, planning strategies aimed at reducing stormwater runoff, lowering air pollution, mitigating the urban heat island effect, reducing energy consumption, improving health, as well as enhancing the quality of life of urban residents

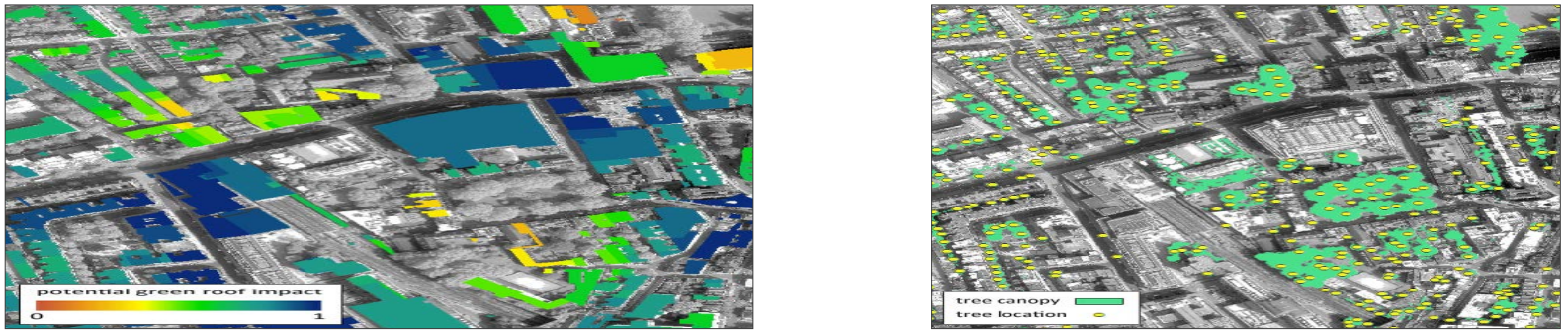
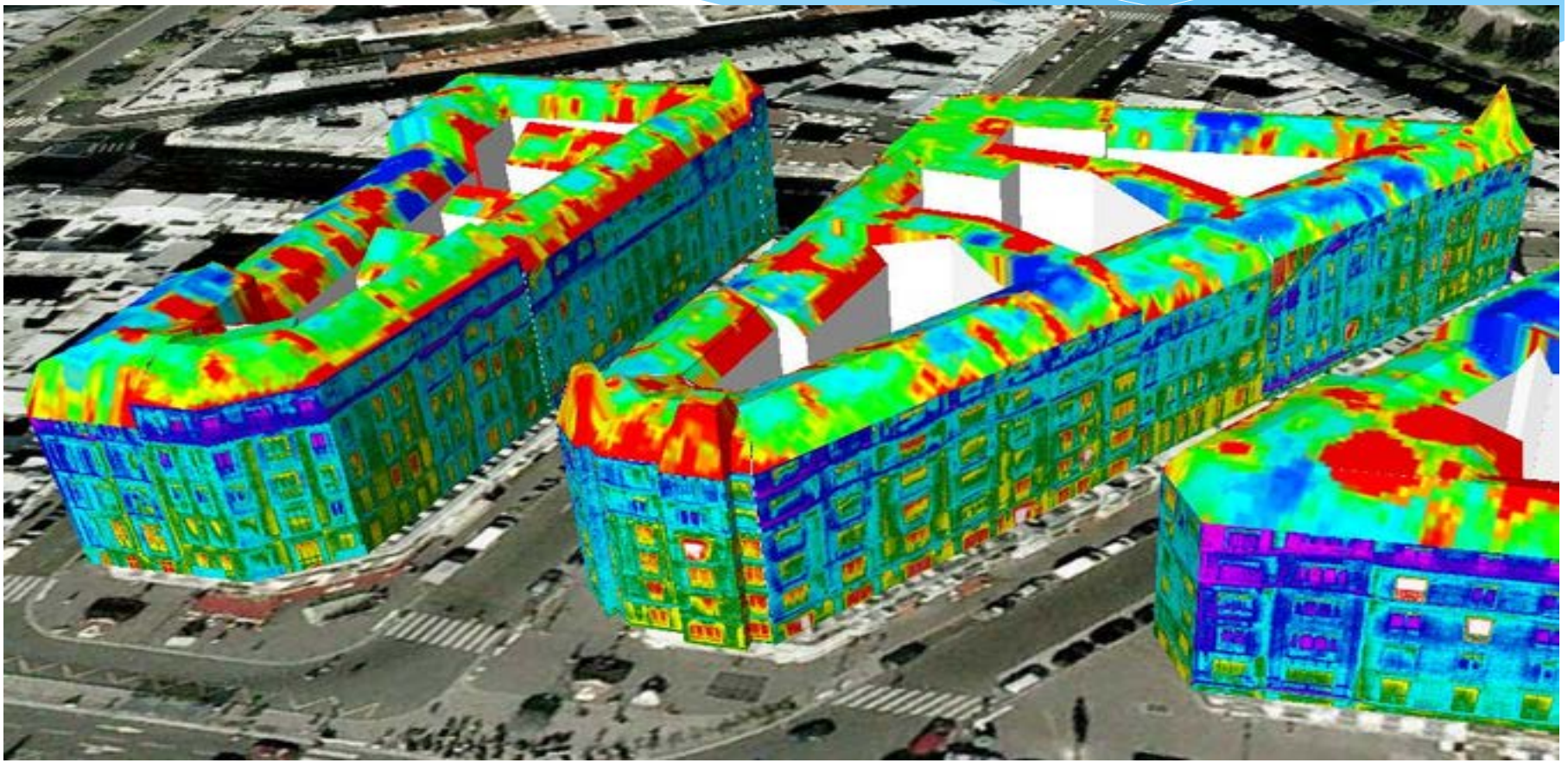
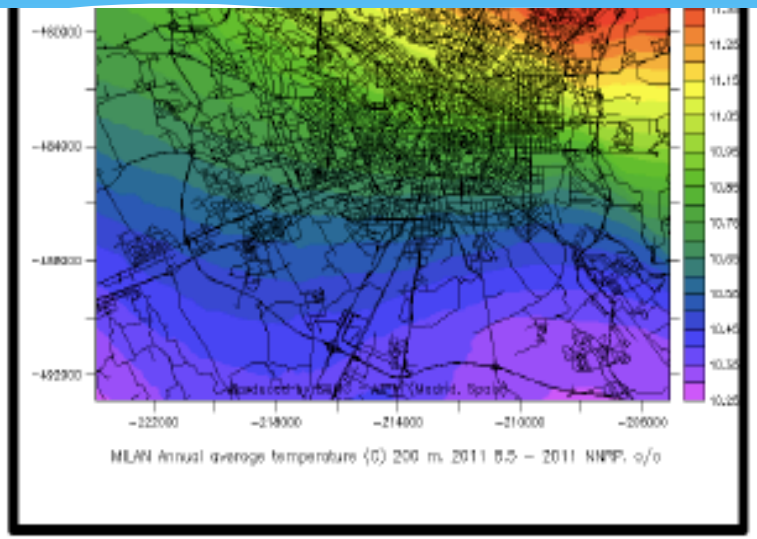


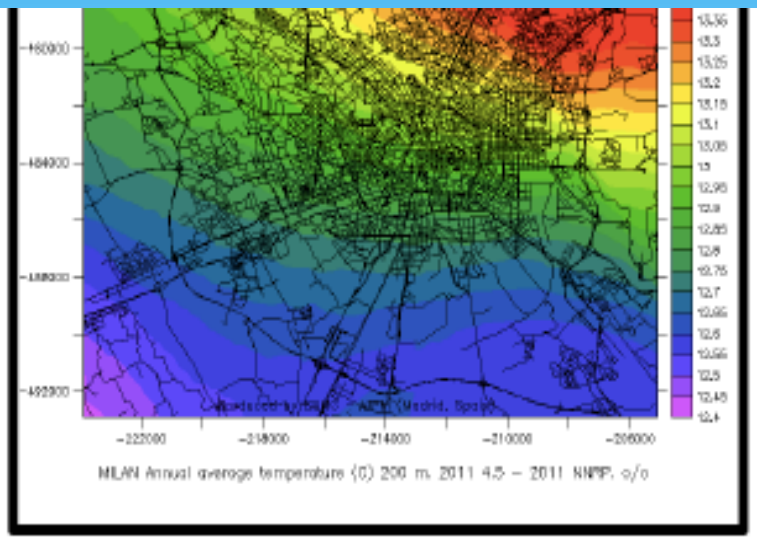
Figure: London – estimated potential green roof impact (left), tree canopy coverage and tree locations (right) derived for part of the Royal Borough of Kensington and Chelsea

DECUMANUS EU FP7
Heat Loss Detection



Heat Impact


MILAN Annual average temperature (C) 200 m. 2011 8.5 – 2011 NMP. o/o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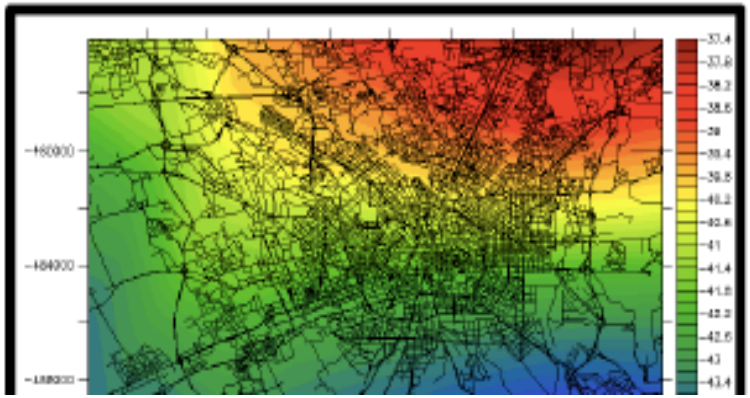
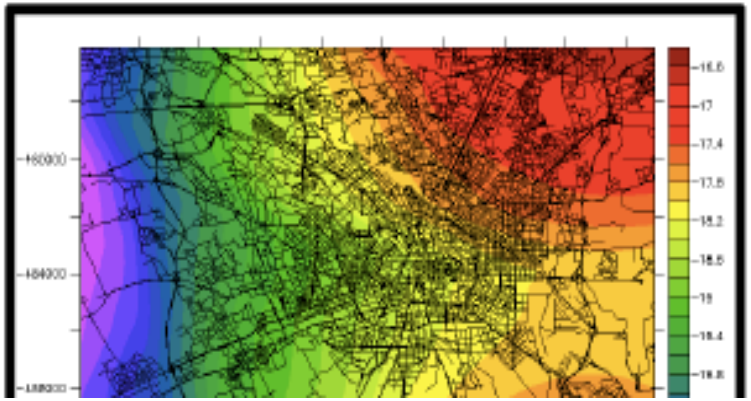
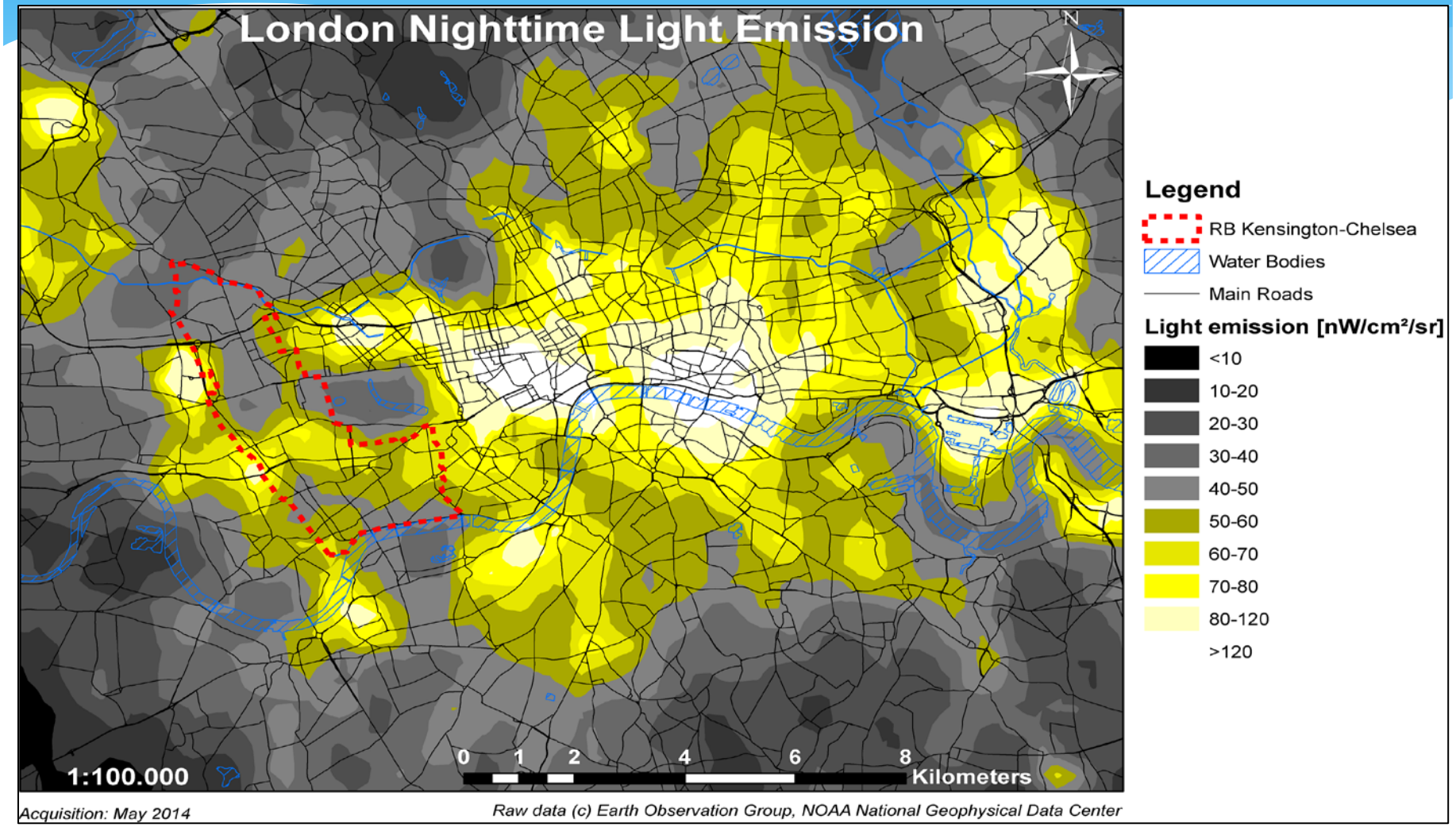




Light Emission Detection



Conclusions

* strong consensus in both European and global contexts surrounds the opportunity for spatial planning to assist in efforts to develop more energy efficient cities and citizens – delivering a **new energy system**
* "win-win" potentials define broad socio-economic and environmental policy co-benefits – including and extending beyond energy efficient cities
* delivery of "win-win" potential is a major urban governance challenge in view of the integrated complexity of the issues
* smart city solutions driven by EU funded projects working directly with cities are creating new intelligence, new communication channels, and new assessment methodologies essential to the delivery of integrated urban management and energy effciency
* smart city solutions developed in the context of open governance and stakeholder engagement are furthermore developing new ground in the co-production of city energy plans, and defining the new political pathways to implementation

Thank you!