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TÉCNICO LISBOA

open innovations
moscow international forum
for innovative development

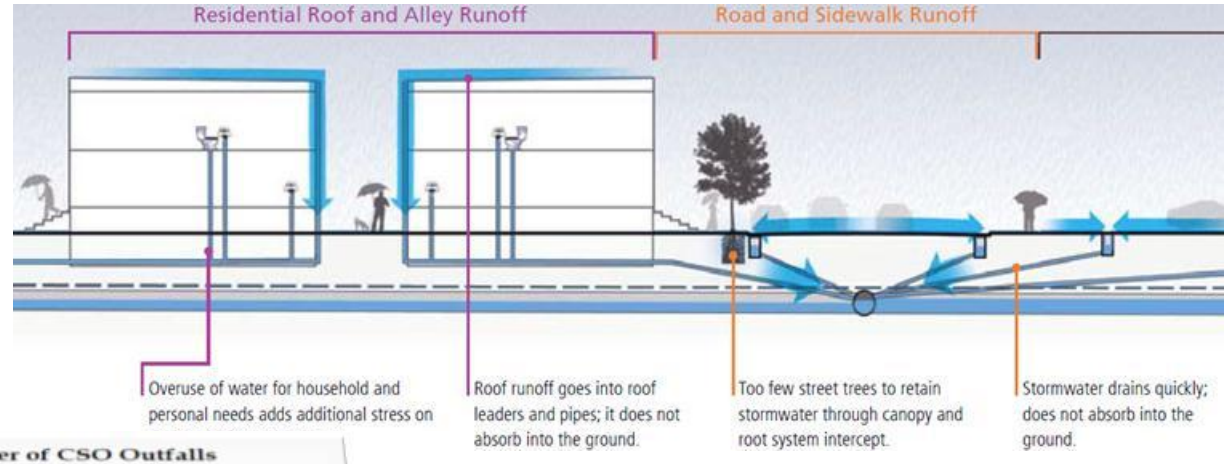
Urban metabolism and city governance for smart cities

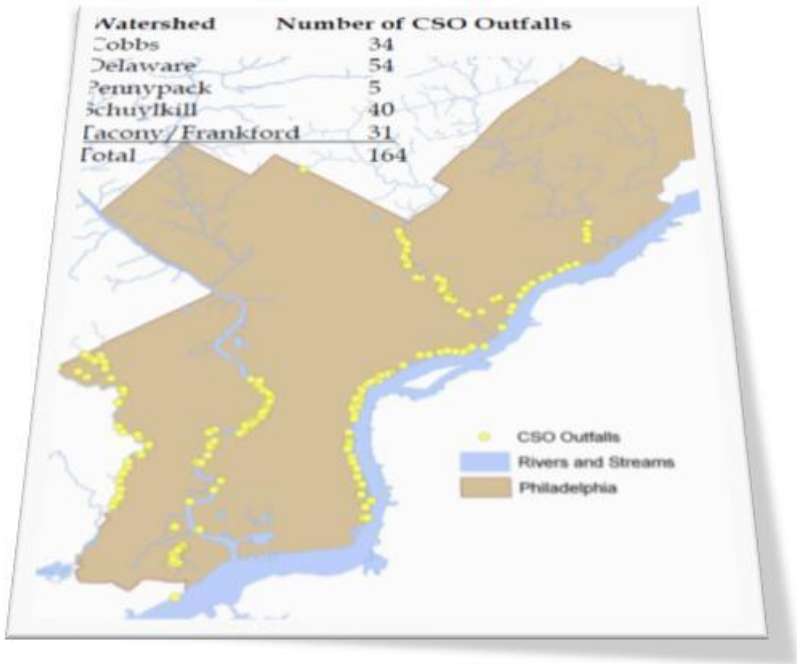
Paulo Ferrão,
Director, MIT- Portugal Program

Philadelphia Overflow Program

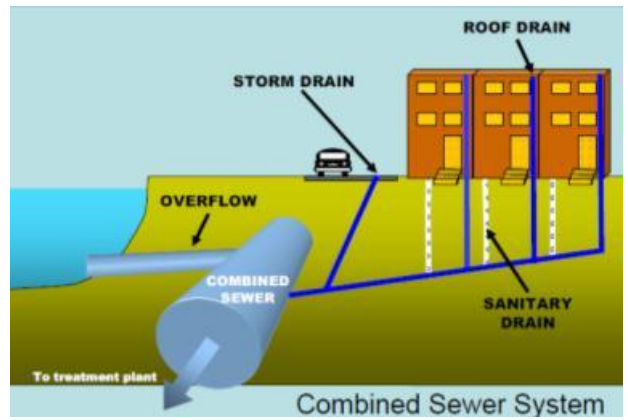
The encapsulation of Mill Creek in 1883

Wingohocking Creek Combined Sewer under construction, 1909





CSO outfalls in Philadelphia



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http://www.phillyriverinfo.org/

Philadelphia Overflow Program

GREEN CITIES CLEAN WATERS — Philadelphia Water Department

Low Impact Development (LID) programs

Green roof on the Free Library

Porous parking lot

Infiltration garden

Porous parking lot

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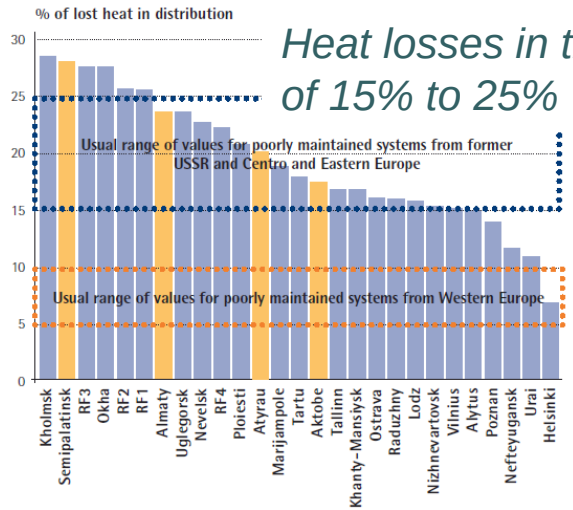
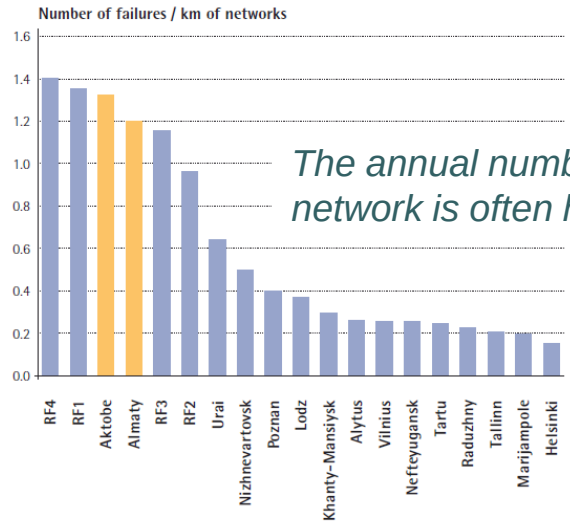
Philadelphia – lessons learned

- Normative and legal issues:
  - Infrastructure to collect and dispose of water; EPA legislative approach
- Fragmented structure of urban governance.
  - Water, energy, safety…
- Holistic perspective :
  - Green roofs and spaces to absorb water, with other benefits (water, energy, environment, urban farms, etc)

District heating - Supply Driven vs demand side management



Heat losses in the range of 15% to 25%



The annual number of failures per km of network is often higher than 1

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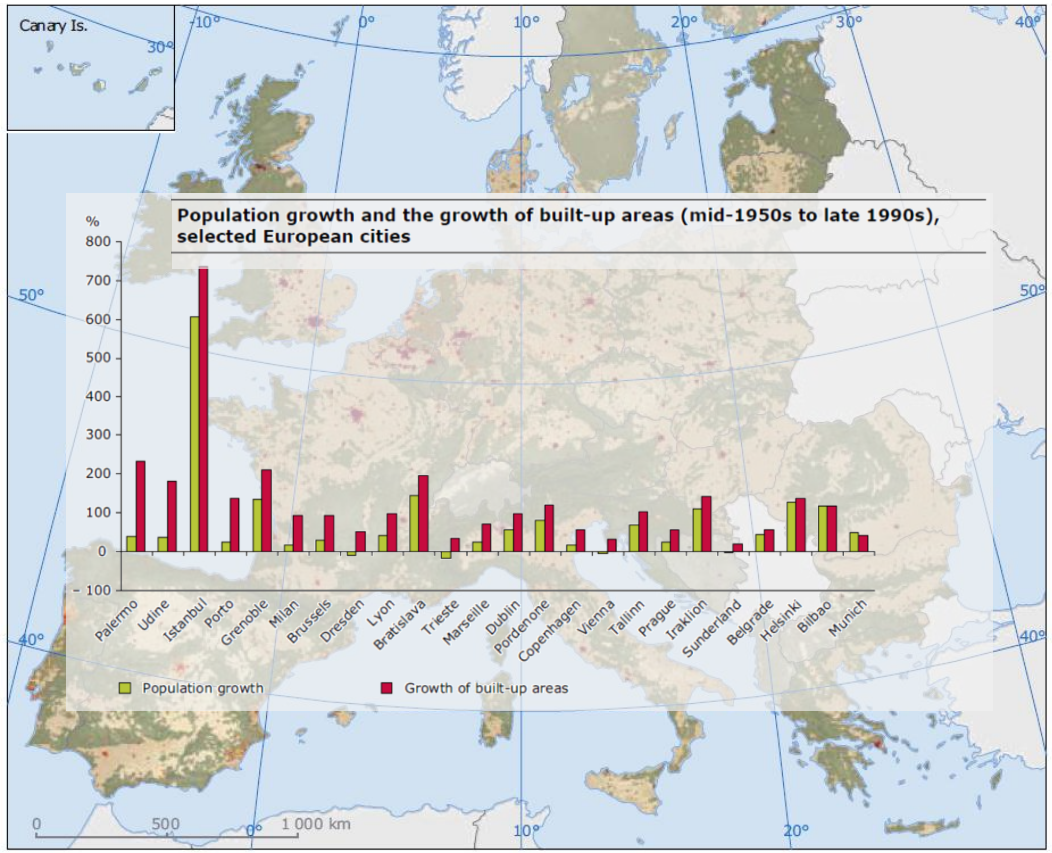
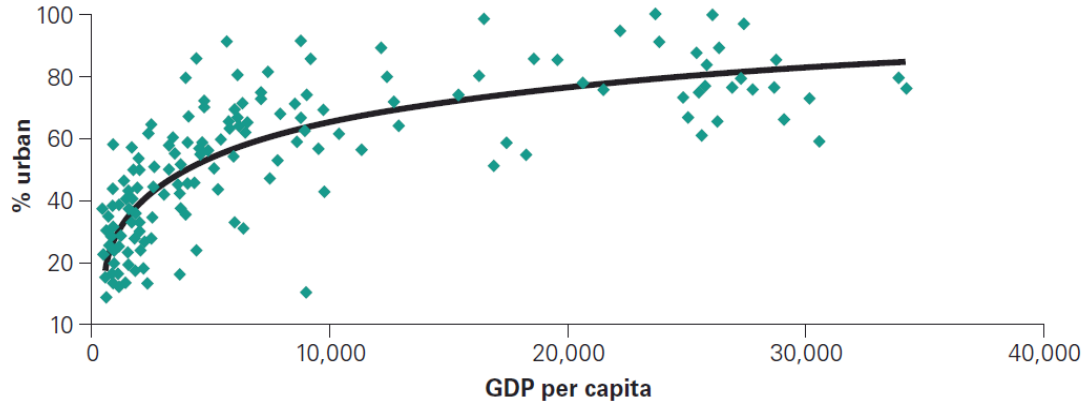
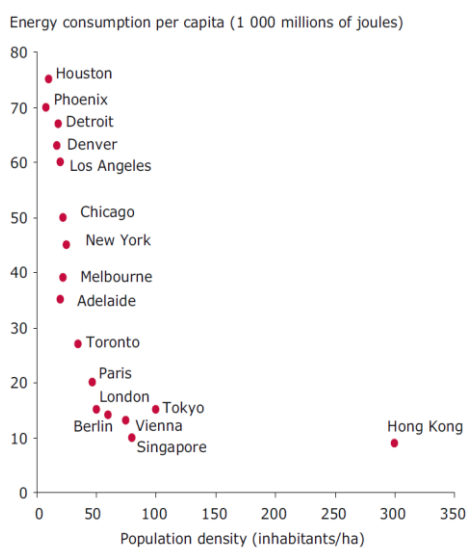
Urbanization trends



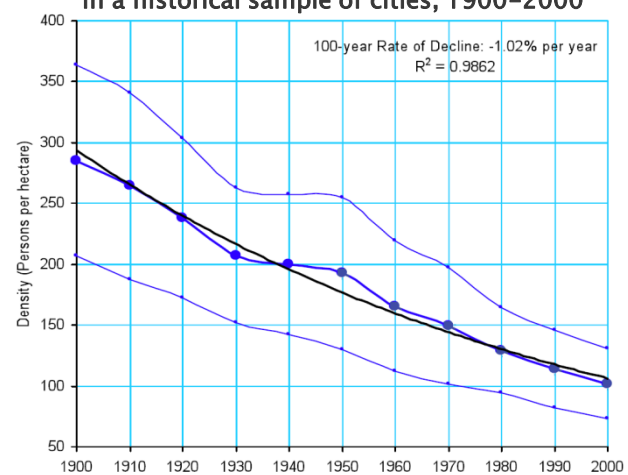
Urbanization and Per Capita GDP across Countries, 2000 (1996 US$)
World Bank 2009



Population density and energy consumption, selected World cities



Decline in average density in a historical sample of cities, 1900–2000



EEA, 2006; Newman, P. and Kenworthy, J., 1999; Ambiente Italia, 2003; Angel et al. 2010

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Key Issues

- The lack of **integration between urban planning and sustainability** has been recognized for nearly two decades.
- **Bridging the gap between the science and practice of planning** can help planning institutions better respond to the challenges of urbanization in the 21st century.
- Requires: Holistic overview of materials and energy flows, more and better data and feedback mechanisms- **Urban Metabolism**

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Envisioning the future

- **Technologies**: User-driven information with **ICT**
- **The science**: Understanding the **Urban Metabolism**
- **Governance principles:** Copenhagen agenda for sustainable cities (10 commandments for governance)

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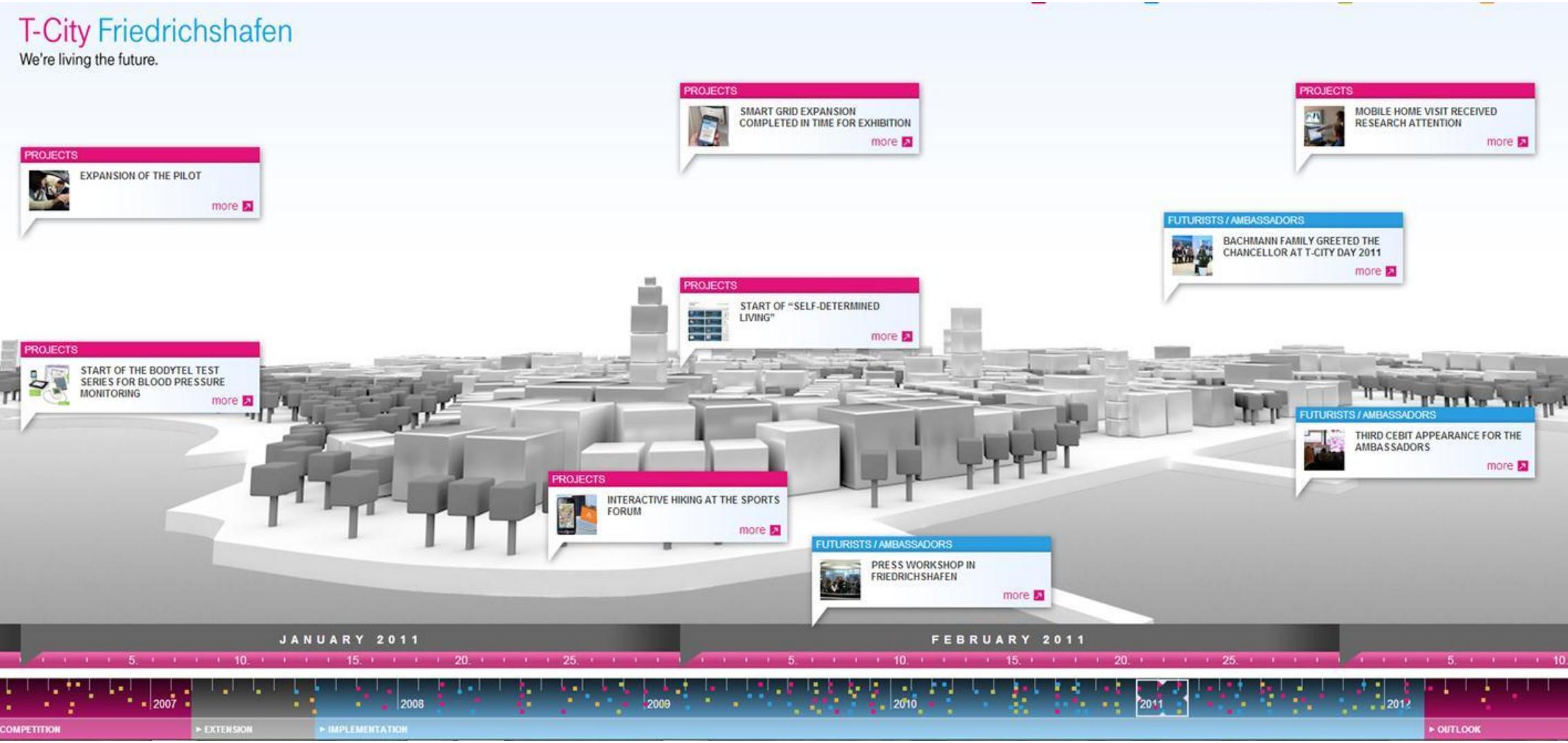
ICT Cities – user-driven information



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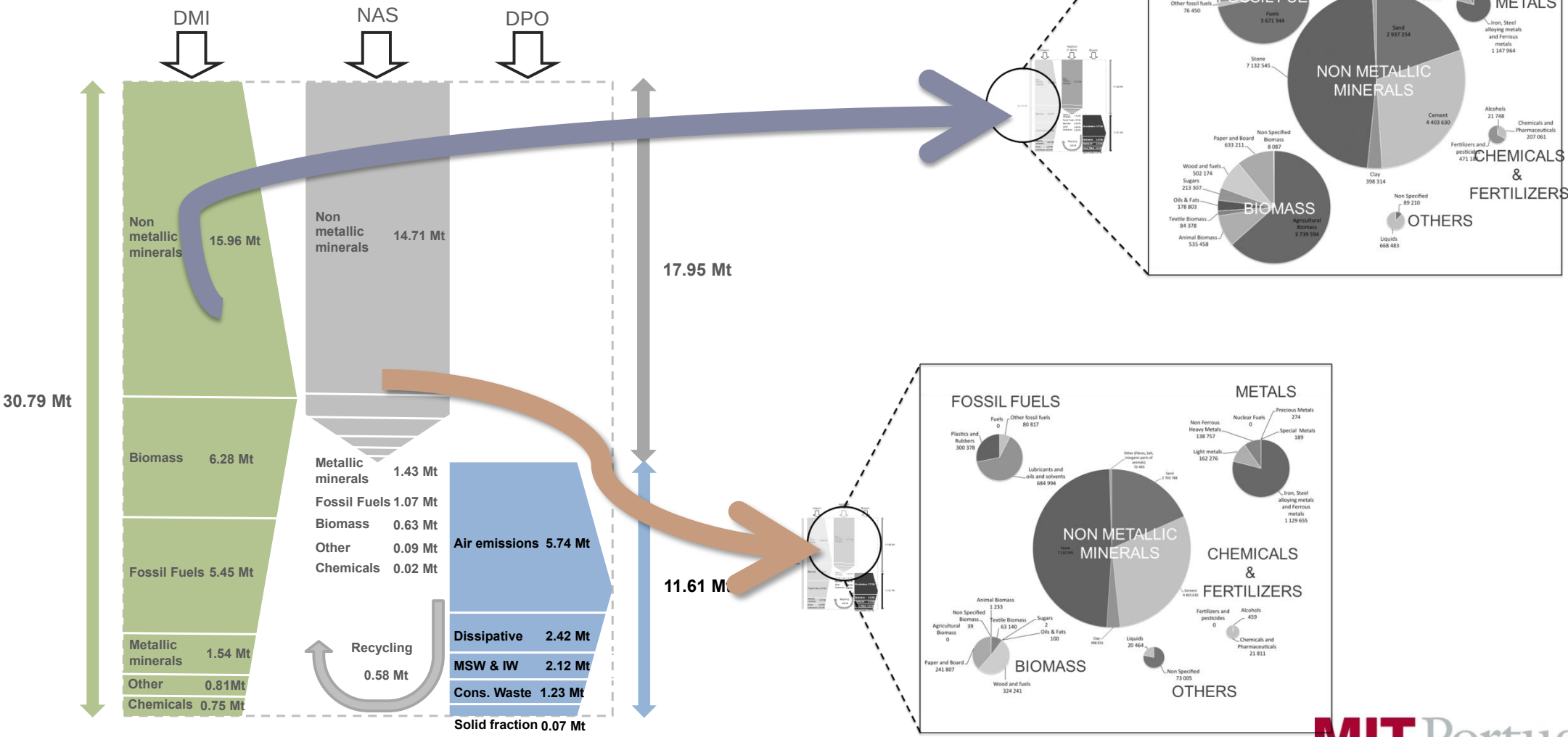
Urban metabolism – Lisbon Case study



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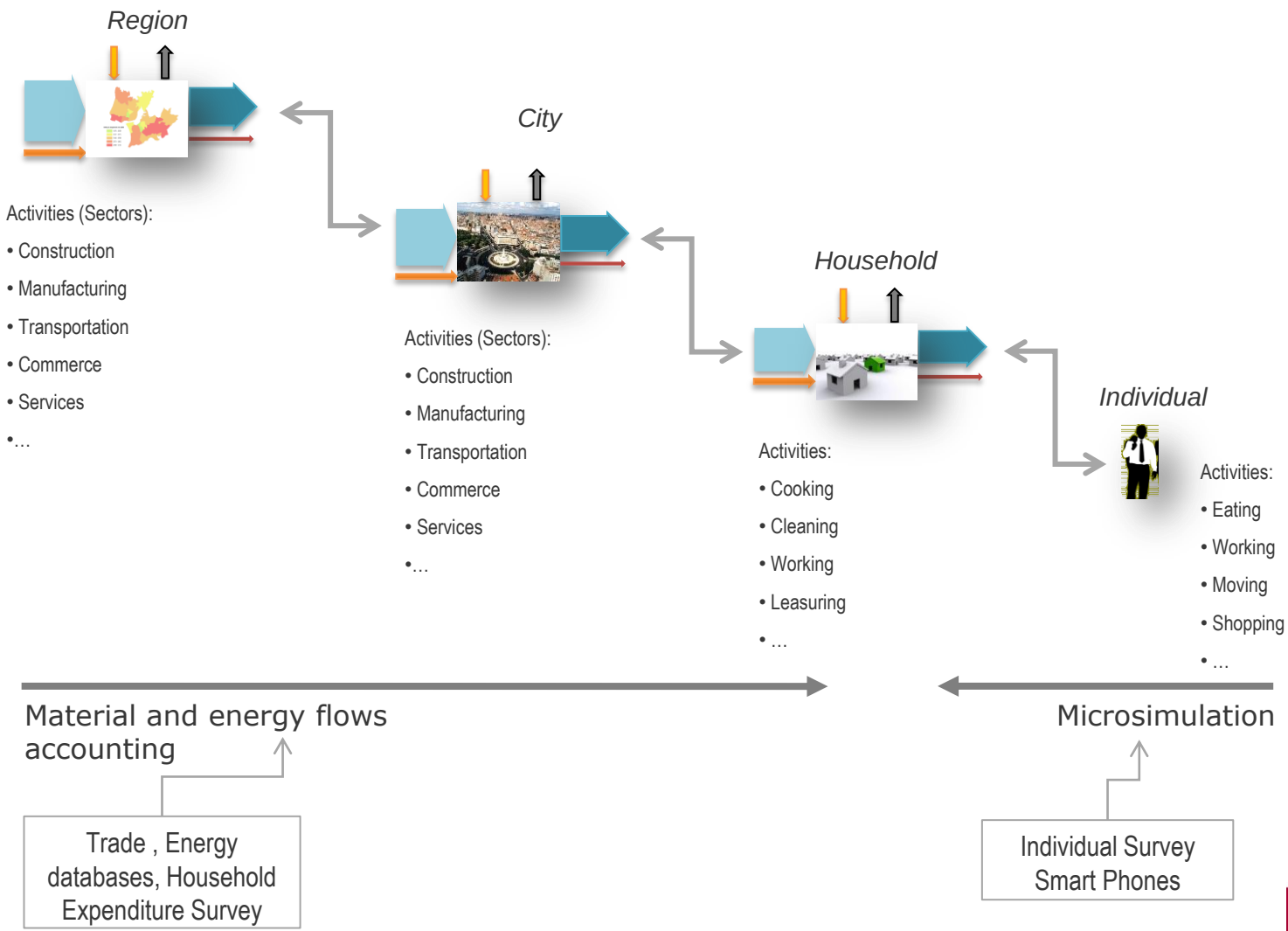
ICT and Urban metabolism – iTEAM



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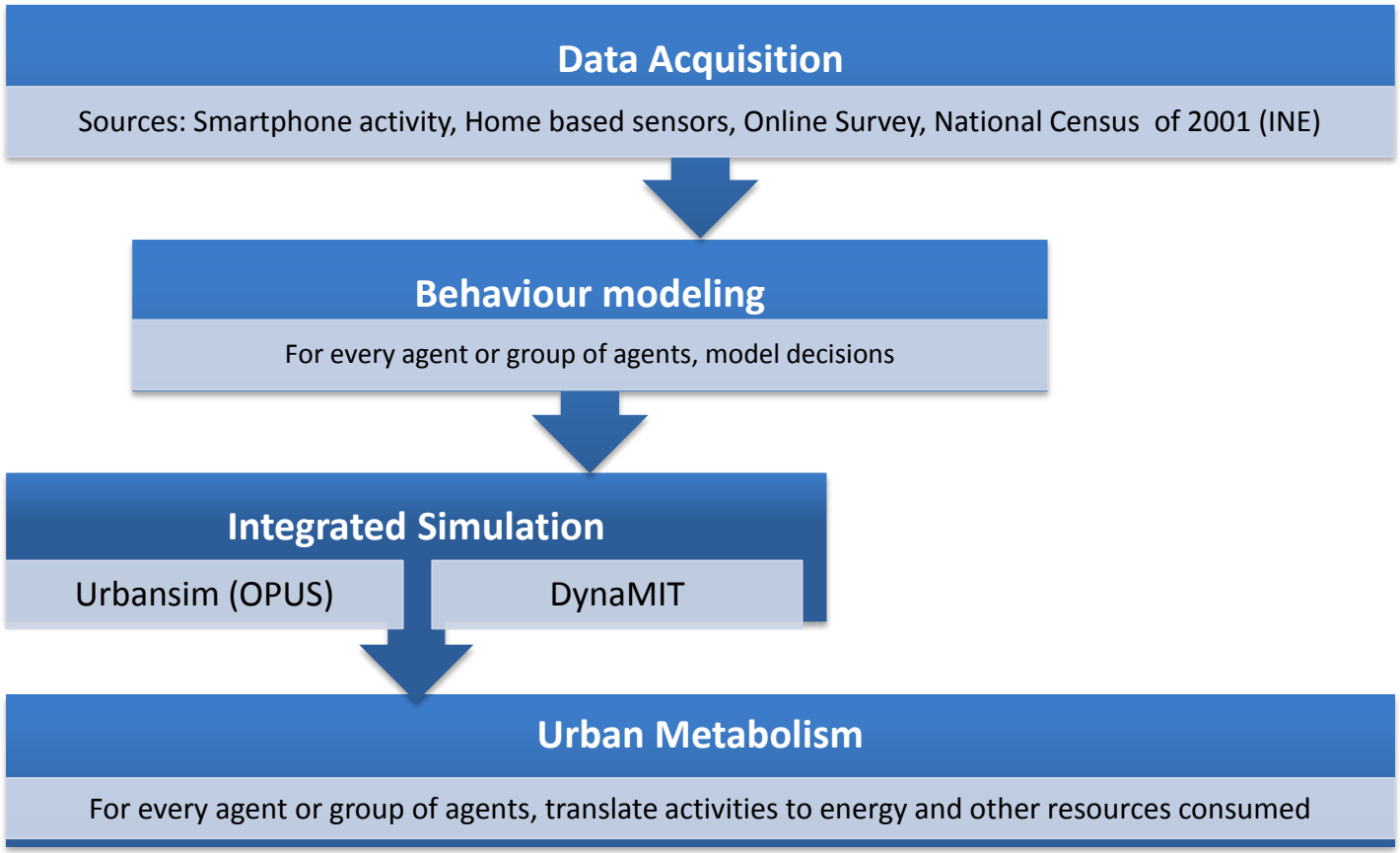
ICT and Urban metabolism - iTEAM



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Copenhagen Agenda for Sustainable Cities

1. Rediscover the city
2. Redefine city value
3. Involve everyday experts
4. Break down the silos
5. Redistribute urban decision making
6. De-design urban planning
7. Promote corporate urban responsibility
8. Go global
9. Embrace chaos, crisis and change
10. Encourage passion in urban leadership

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Implications

- What opportunities does the use of advanced technologies provide for the development of city management systems?
  - Better information supports **crosscutting city management** (waste/ energy, combined with services and economic functions, linkages)

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Implications

- What management decisions are required for effective implementation of technological innovations?
  - Promote the use of advanced **modeling tools** based on more and **better data**.
  - **Integration** of different stakeholders views and needs, enabling the information exchange between stakeholders, holistic government system (removing silos) – **leadership**

Implications

- Which socio-economic impact of technological innovation in city governance?

  – Improve accessibility of people to services - **Responsibility**
  – Reduce costs to services - **Accessibility**
  – Open opportunities for innovative SME's – **Opportunity**

Urban Sustainability

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