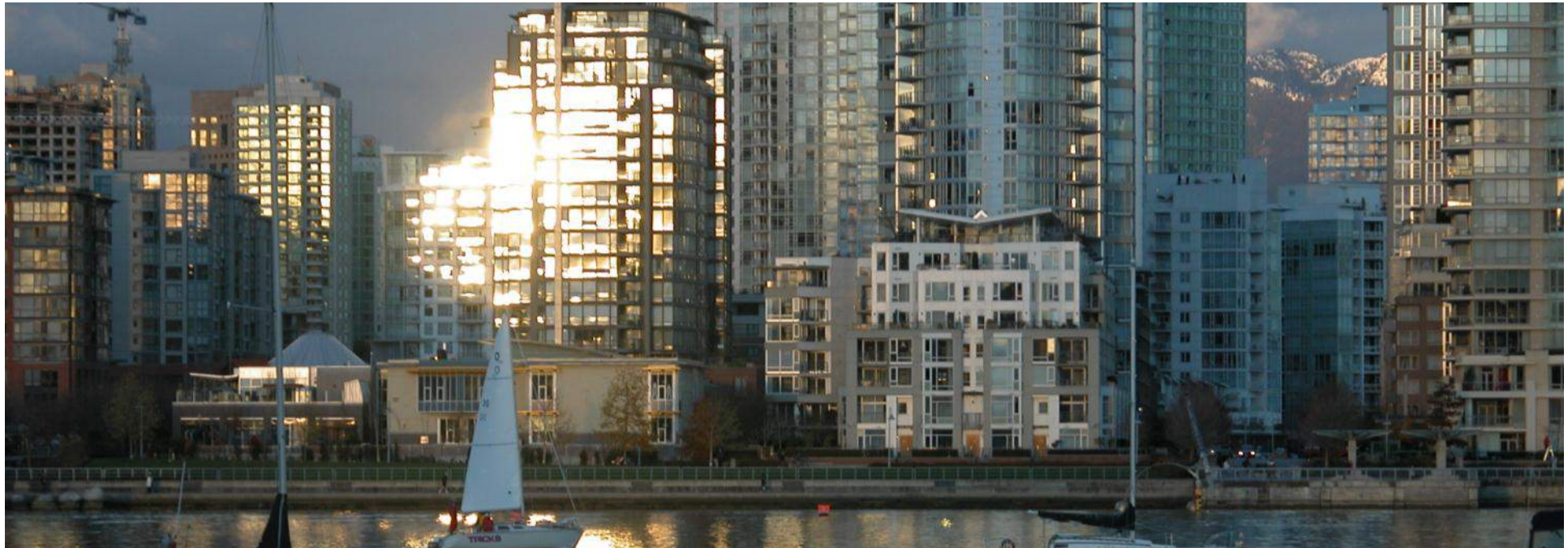


Tapping Solar Energy in Urban Areas as significant means to Climate Change Mitigation



Daiva Jakutyte-Walangitang, Austrian Institute of Technology, Energy Department
2015.02.19 CCSH15 Conference

Challenges, Facts and Figures

Focus on Cities

IEA SHC Task 51 Solar Energy
in Urban Planning

Ways Forward?

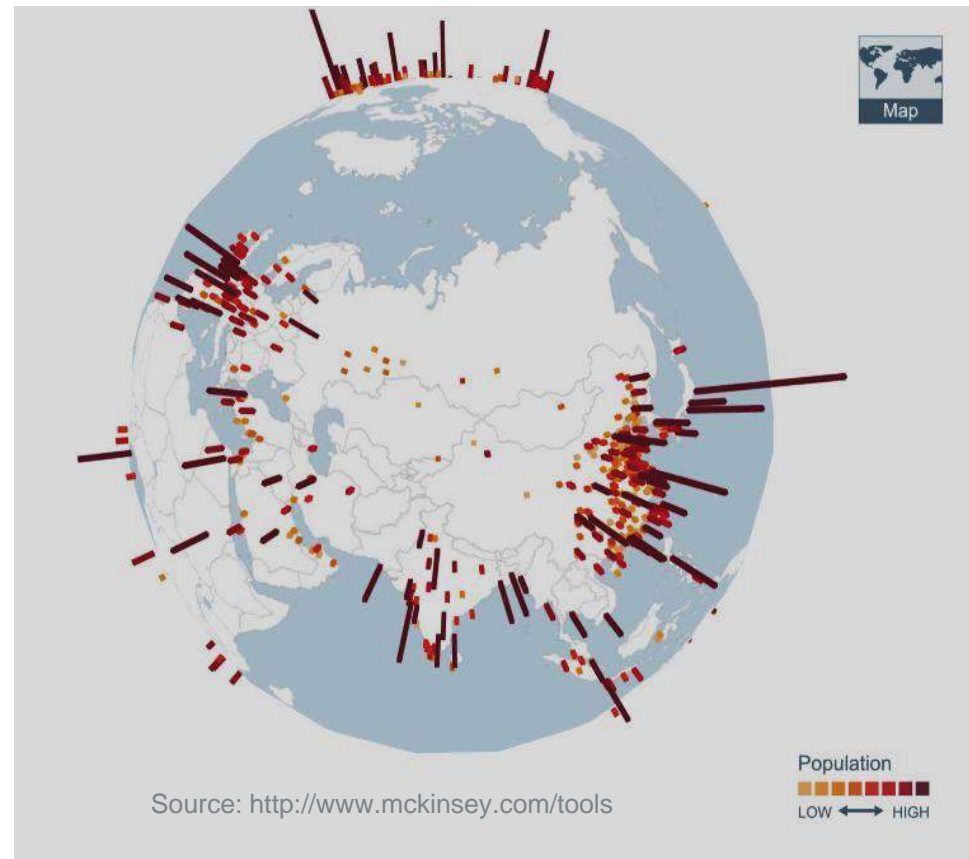
Challenges, Facts and Figures

Urbanisation

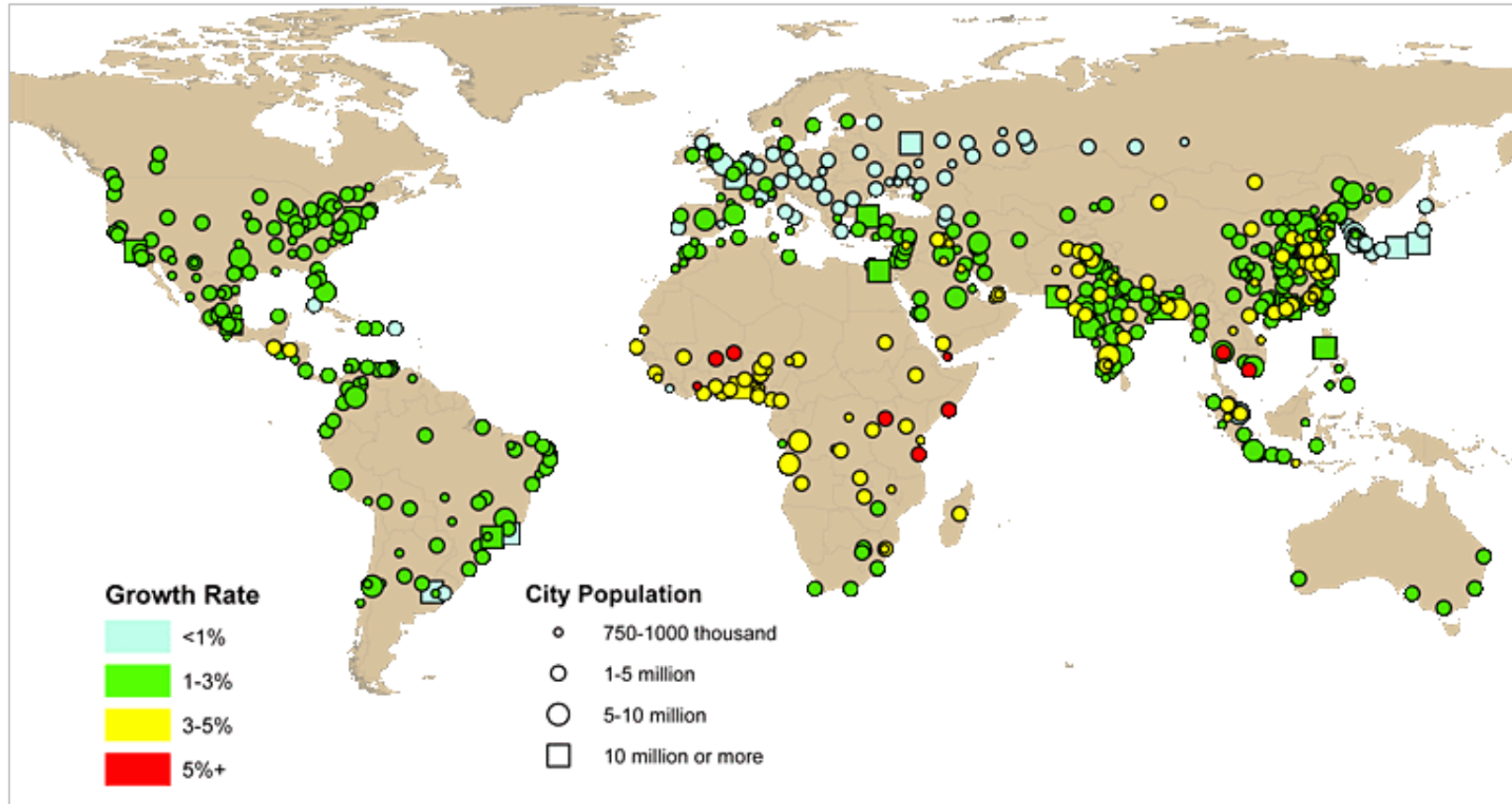
World's Population in 2010
6,1 Billion People

Urban Population
(% of the total world population)

1950	30%
2000	47%
2030	60%



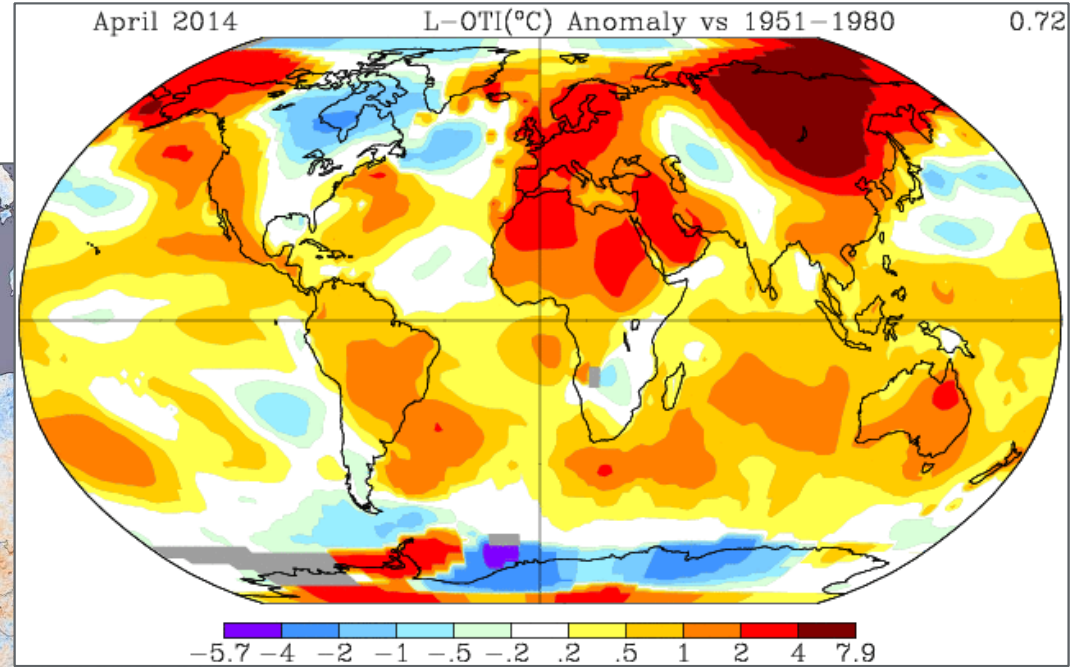
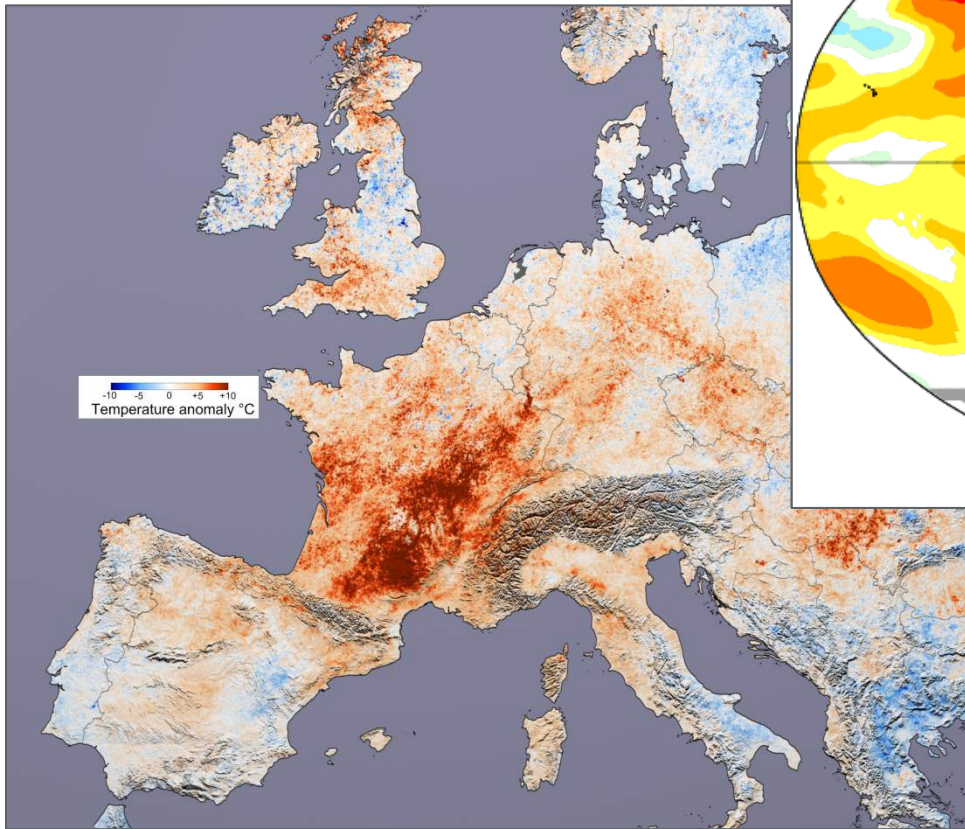
World Urbanisation 2011-2025



1980 -2004 Increase of urban population: by 250 Million People

Sources: United Nations, Department of Economic and Social Affairs, Population Division: *World Urbanization Prospects, the 2011 Revision* (2012), You-tien Hsing (2010)

Climate Change



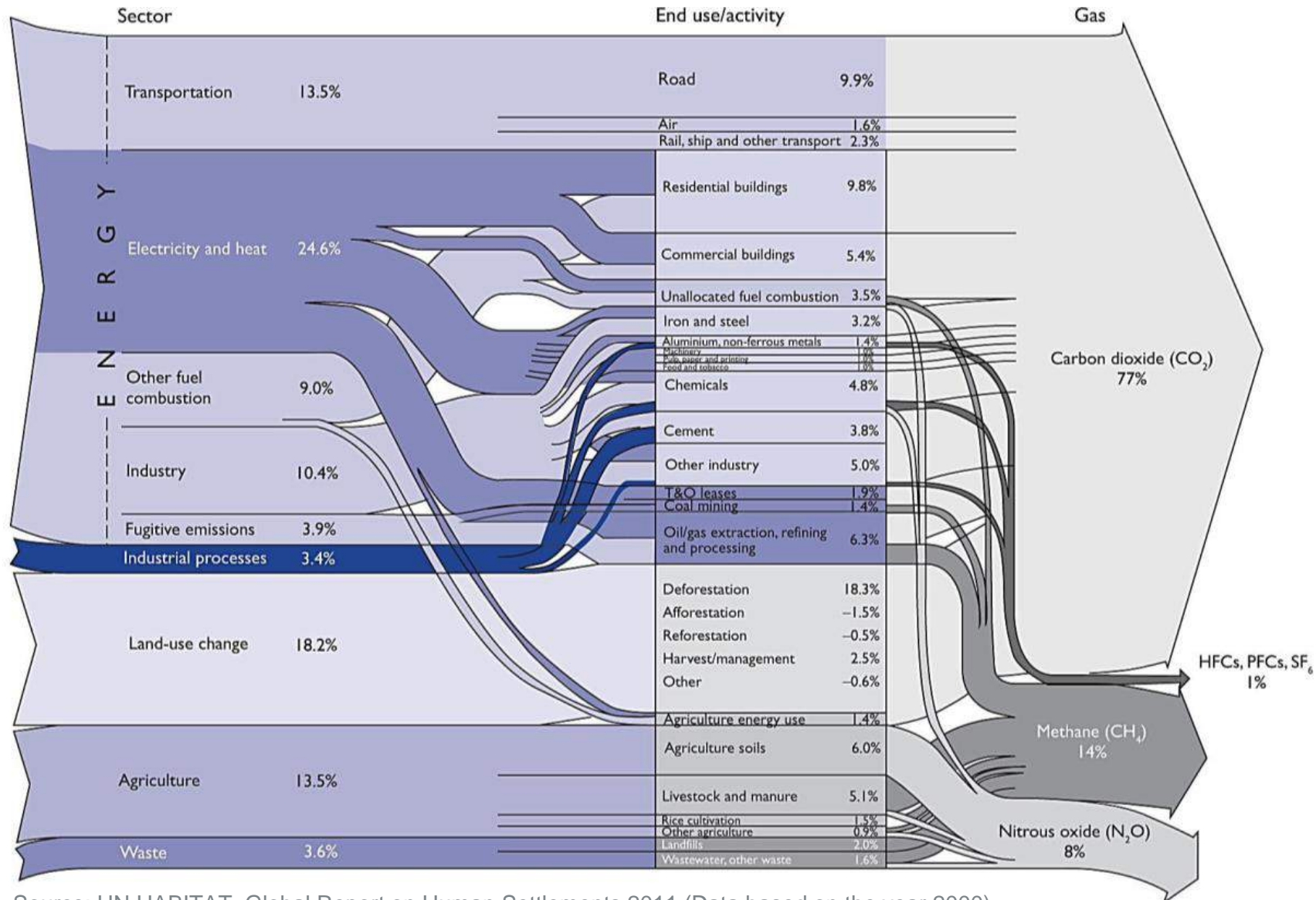
Source: NASA GISS



Source: Blue Marble Research. Scientific Computation, Data Analysis and Visualization

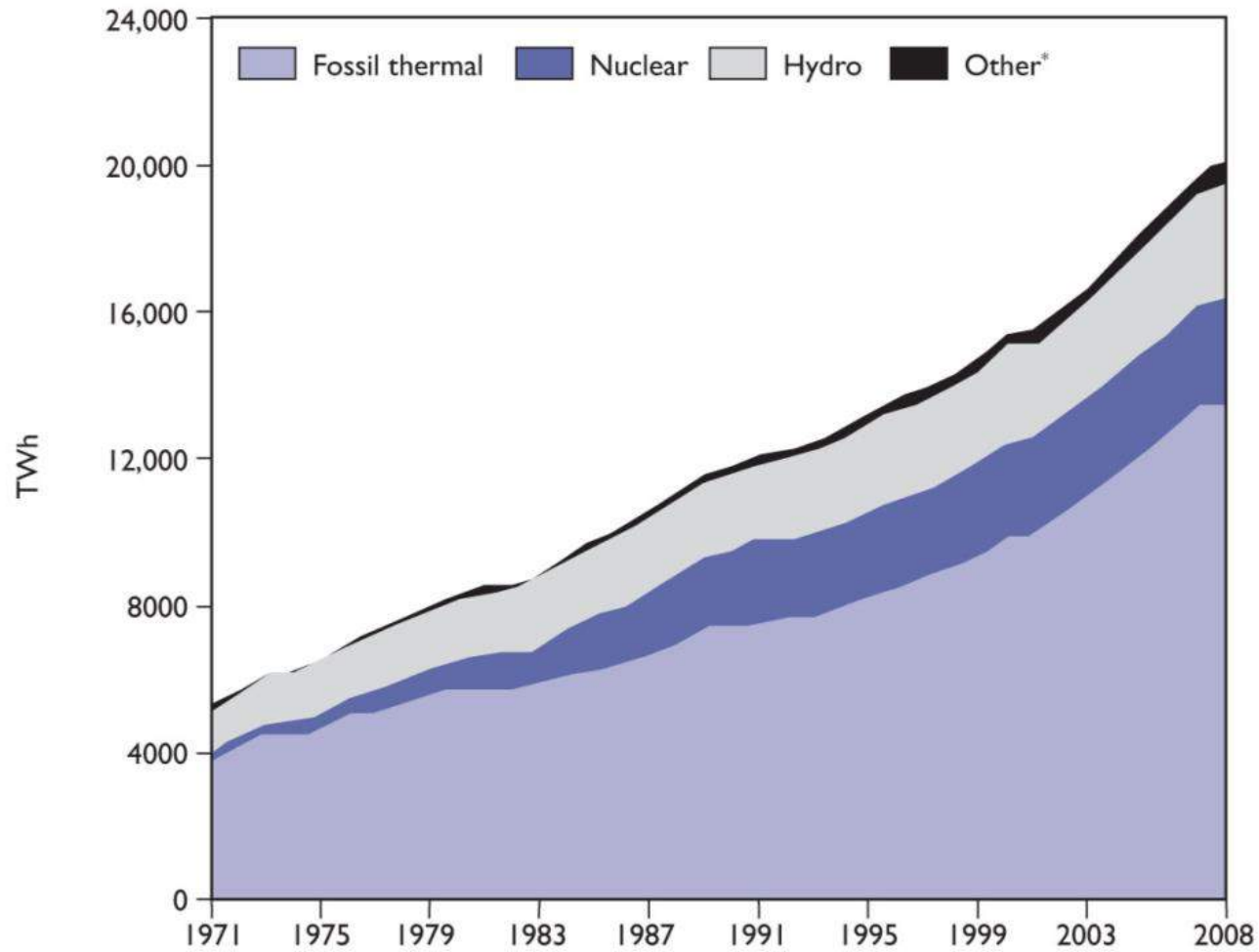
Temperature anomaly summer 2003

Global Emissions by Sector



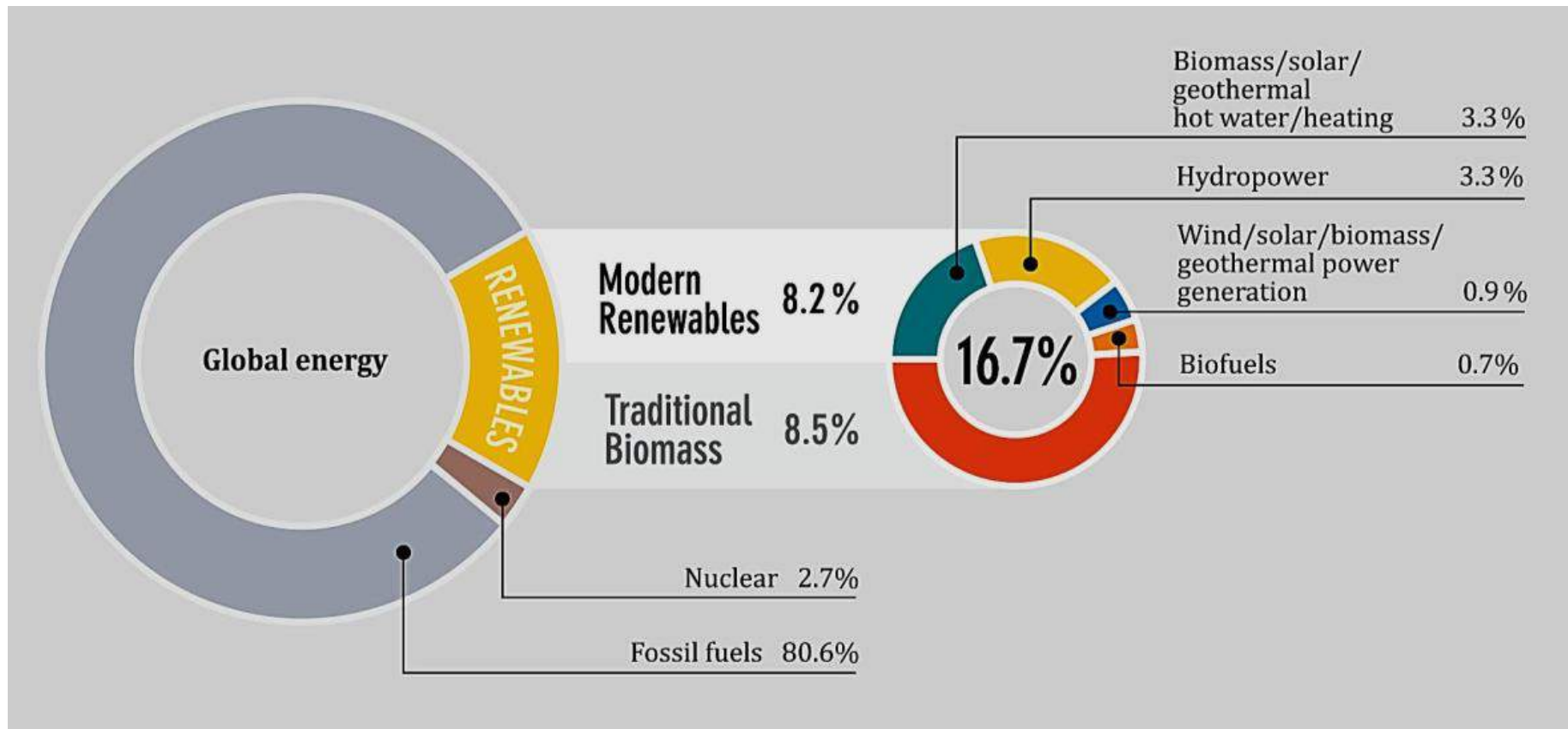
Source: UN HABITAT, Global Report on Human Settlements 2011 (Data based on the year 2000)

World electricity generation by fuel type (1971-2008)



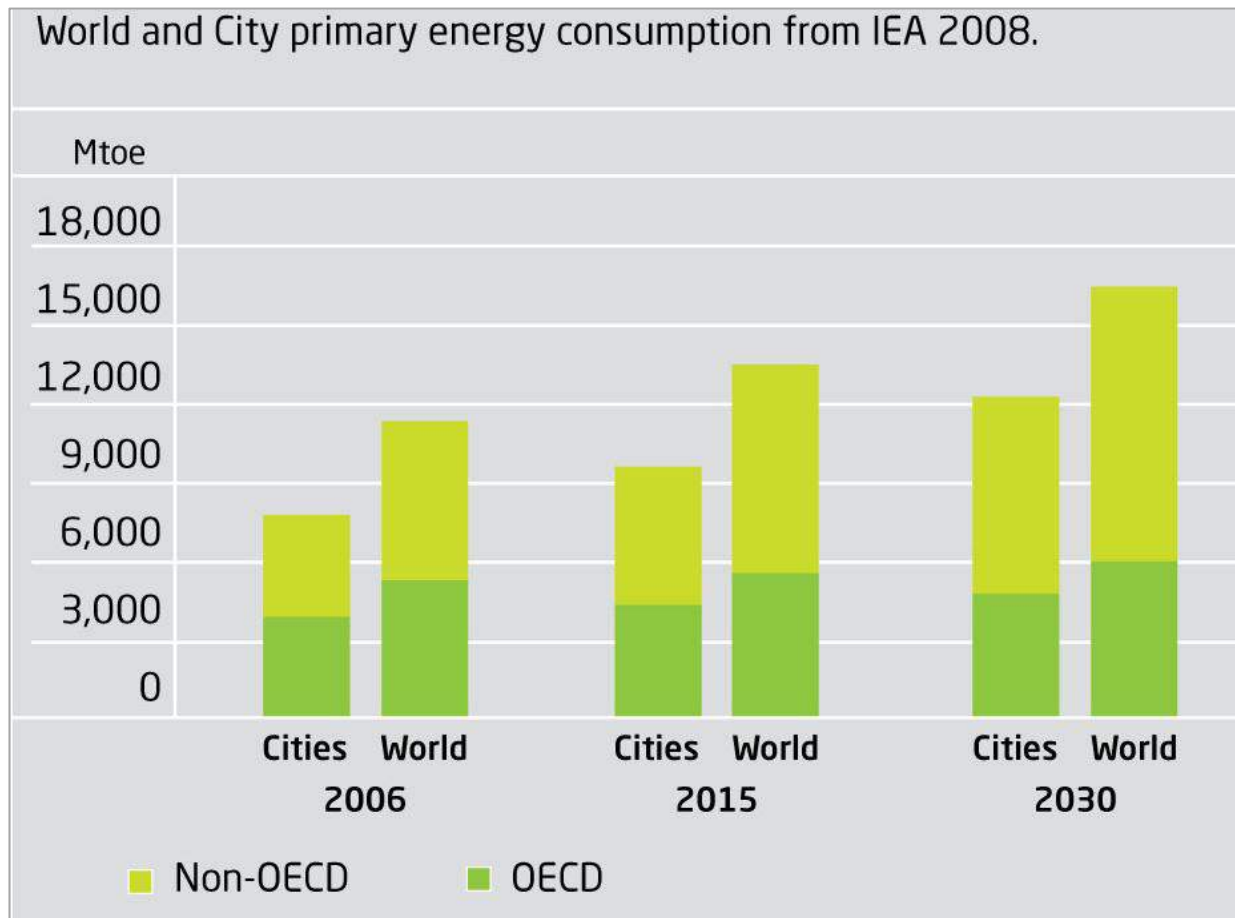
Source: UN HABITAT, Global Report on Human Settlements 2011 (Data based on the year 2000)

Renewable Energy share of global final energy consumption, 2010



Source: Renewables 2011, Global Status Report

Consumption of global primary energy



Source: Riso Energy Report 10, Energy for smart cities in urbanised world, 2011

The global and local urban challenges

- Urban development speed, urban management issues and growing appetite for energy
- Ongoing demographic growth while maintaining and improving quality of life
- Suburbanization, sprawl, land consumption, sealing of green surface
- Energy security and stability of energy supply: energy shortages and increasing costs
- Increasing emissions and pollution
- Climate change
- Preservation of natural resources and environmental protection
- Urban resilience



Focus on Cities

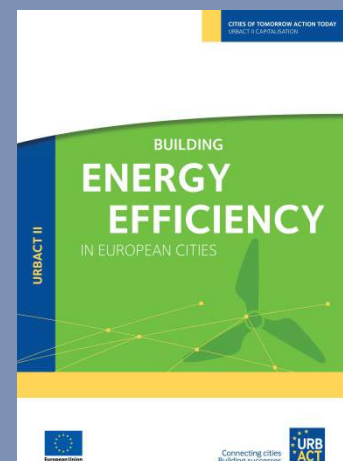
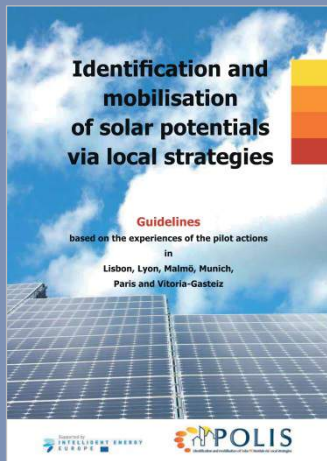
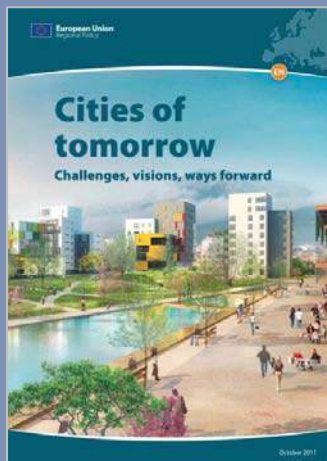
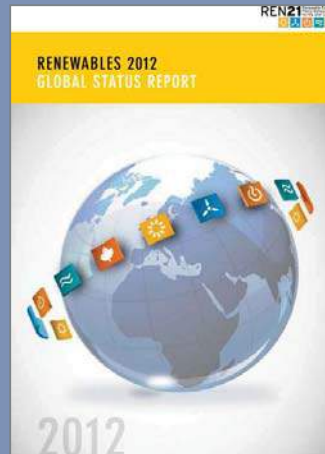
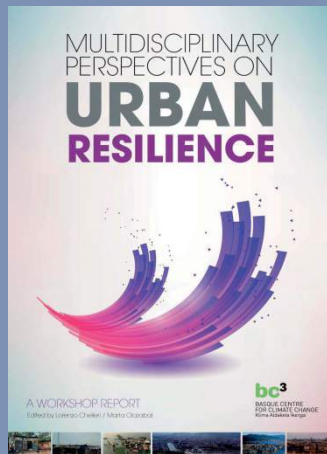


Stadt	CO ₂ Emissionen (Mt/a)	Land	CO ₂ Emissionen (Mt/a)
New York	196	Argentinien	192
Tokio	174	Niederlande	174
Los Angeles	159	Vereinigte Arabische Emirate	155
Shanghai	148	Vietnam	127
London	73	Chile	73
Mumbai	25	Angola	24
Berlin	21	Kroatien	23
Hyderabad	8	Costa Rica	8
Potsdam	0,87	Afghanistan	0,8
Eberswalde	0,23 (0,18)	Zentralafrikanische Republik	0,26

Source: Reusswig F., Klimawandel im Urbanen Raum, Potsdam-Institut für Klimafolgenforschung, 2013

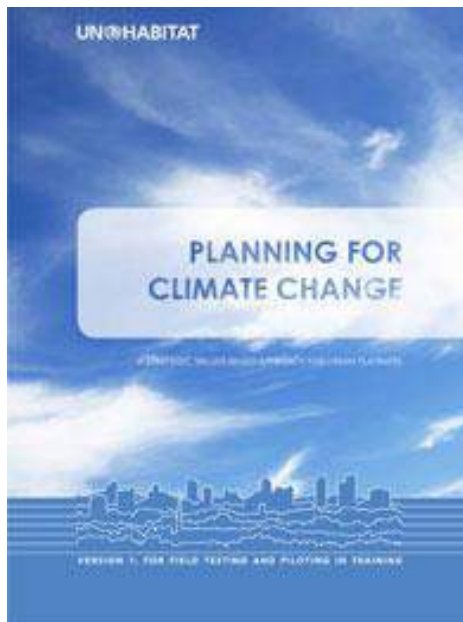
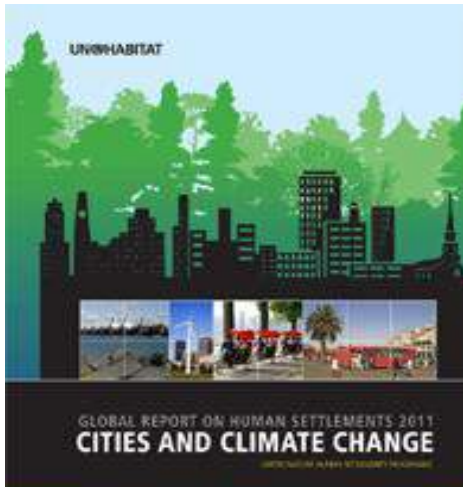


Change of the Game



UN - Habitat

The United Nations Human Settlements Programme



Cities and Climate Change

Global Report on Human Settlements 2011

- Cities and Climate Change reviews the linkages between urbanization and climate change.

Planning for Climate Change

A Strategic, Value Based Approach for Urban Planners

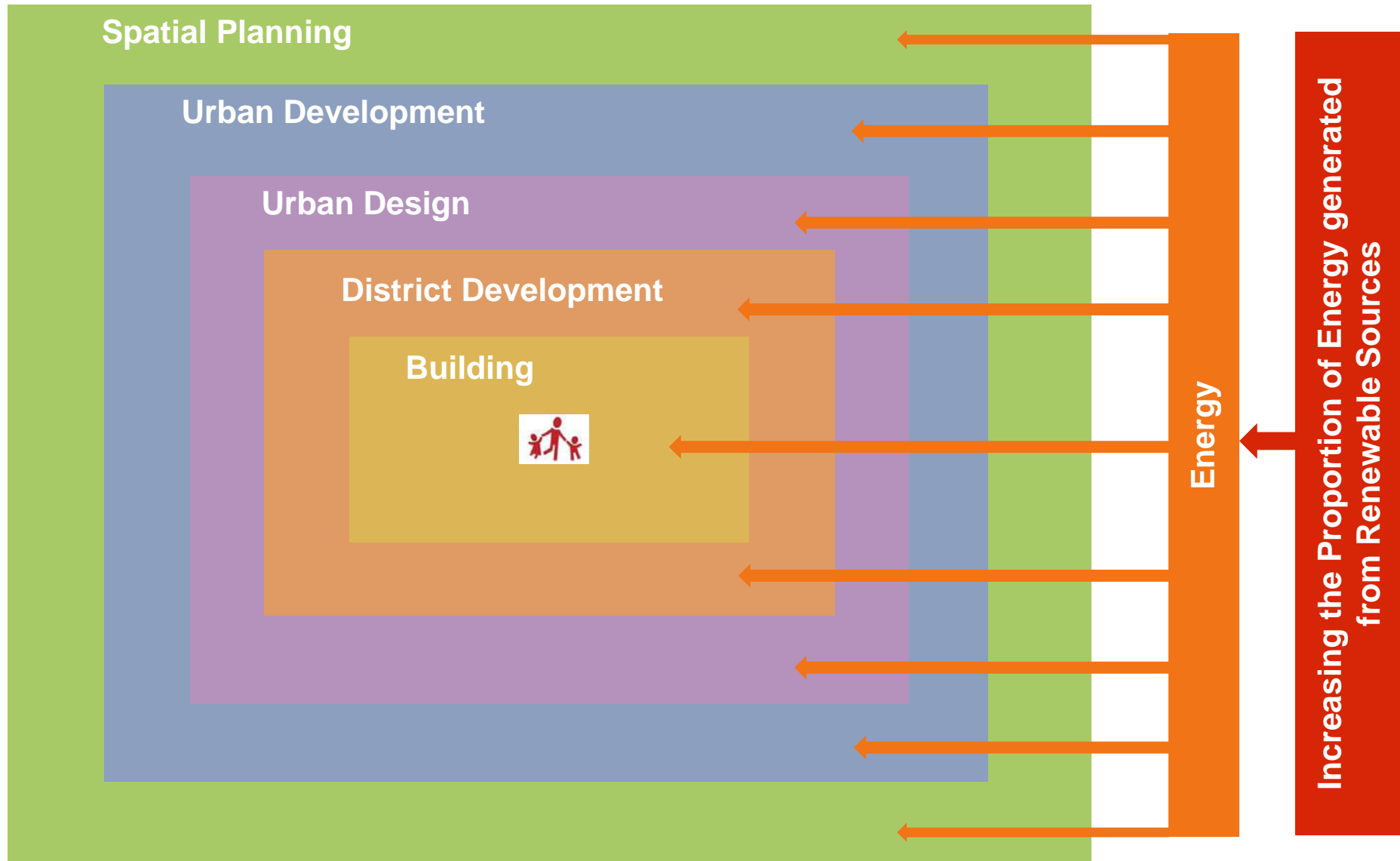
- (UN-HABITAT) developed this guide for city planners and other allied professionals to better understand, assess, and take action on climate change at the local level.

Change of the Game

- **Smart City**
 - **Resilient City**
 - **Low Carbon City**
- Sustainable City = Living System**

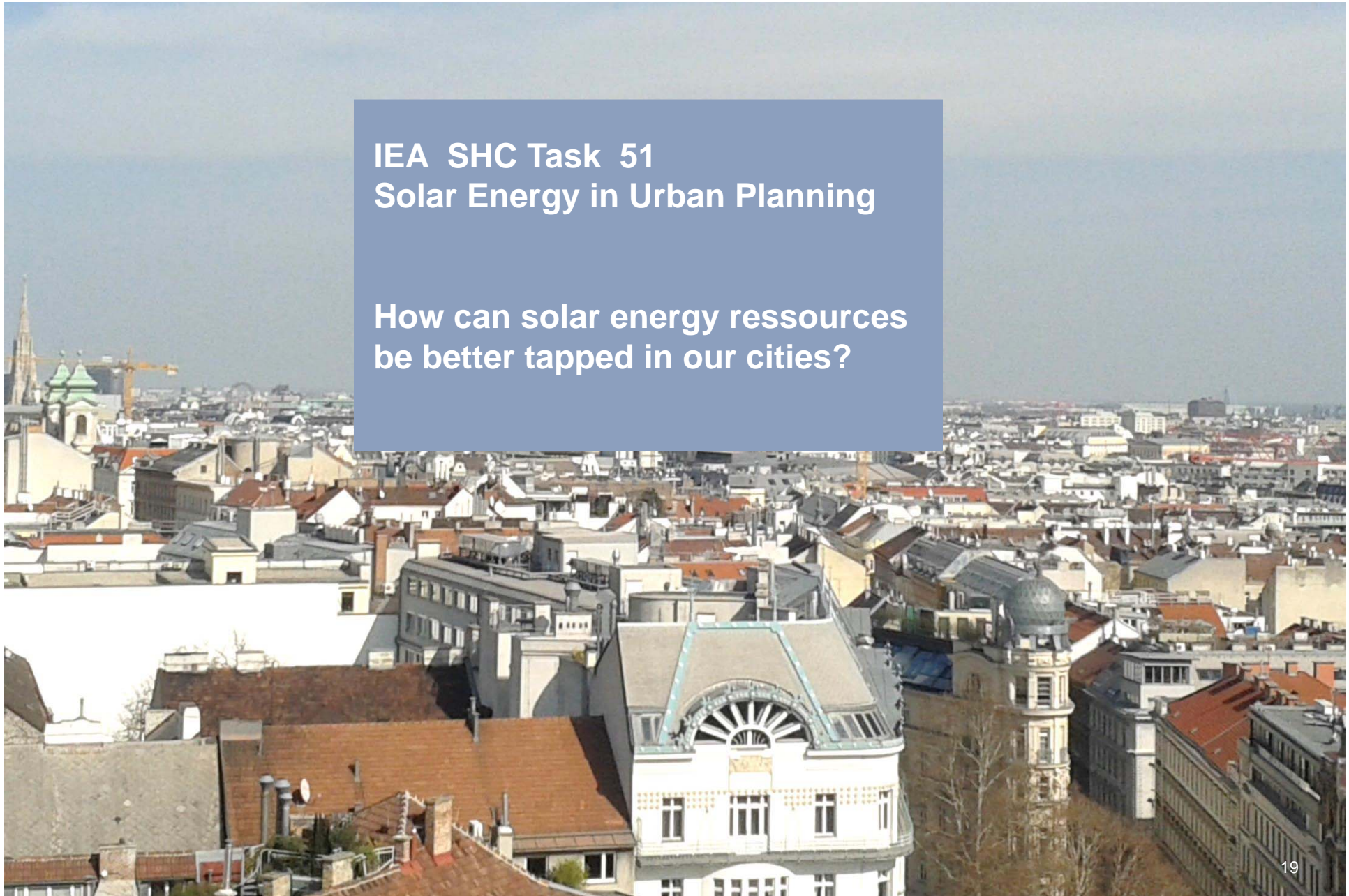


Interconnectedness Energy – Space and Place – City

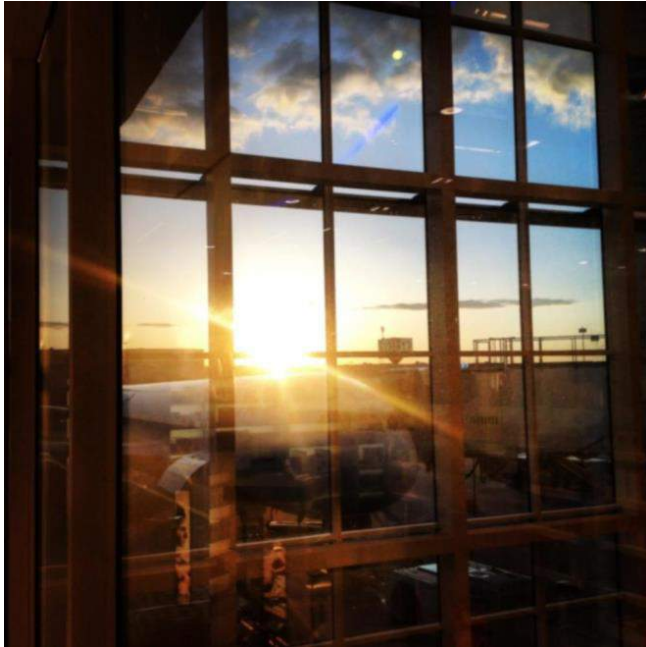


**IEA SHC Task 51
Solar Energy in Urban Planning**

**How can solar energy resources
be better tapped in our cities?**



Solar Energy in Urban Planning



The Duration of the International Task

May 2013 – April 2017

Participating Countries

Australia, Austria, Canada, China, Denmark, Germany, Italy, France, Luxembourg, Norway, Sweden, Switzerland

Operating Agent – Maria Wall, Sweden

Participation of the Austrian Team

November 2013 - August 2017

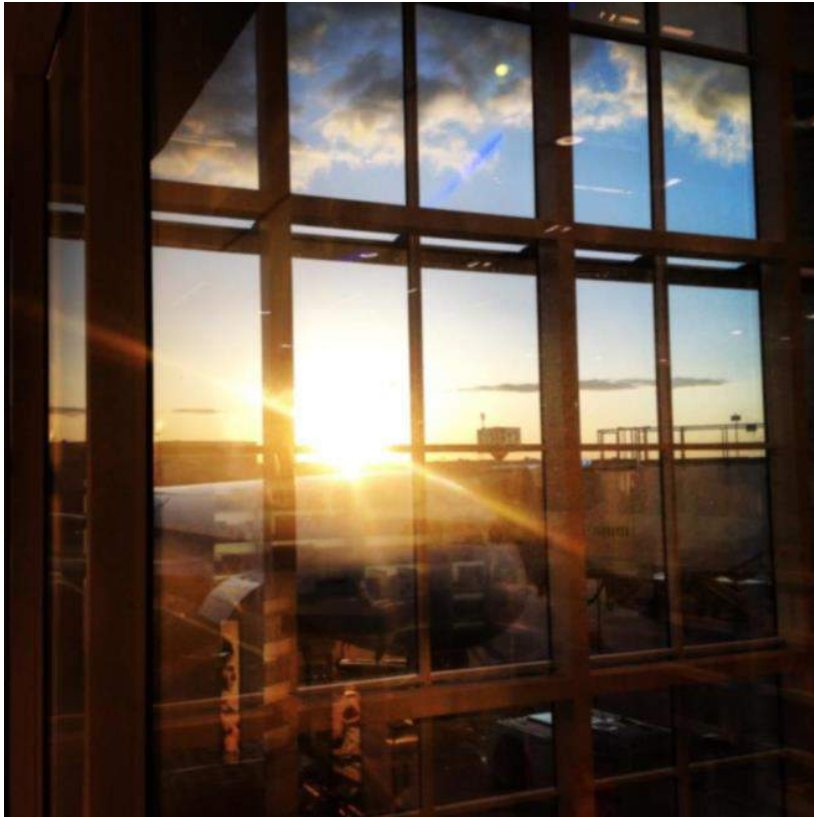
Austrian Partners

- **Austrian Institute of Technology, Energy Department**
- **Graz University of Technology, Institute of Urbanism**
- **Graz University of Technology, Institute of Thermal Engineering**
- **Salzburg University of Applied Sciences, Smart Buildings**
- **BauXund, Research and Consulting**

Overarching questions in the Task



- What is the Status Quo in participating countries? What are the National targets?
- What methods and processes are being used for solar energy integration in urban projects at present and where are gaps?
- What are the dormant potentials for a better integration of solar energy in urban planning processes?
- How can this topic be better integrated in educational programmes?



4 Subtasks

A

Legal framework, barriers and opportunities for solar energy use

B

Development of processes, methods and tools

C

Learning from case studies and action research

D

Education and Dissemination

A - Legal framework, barriers and opportunities for solar implementation

- Screening of legal framework, barriers and opportunities
- Interviews with urban planners
- In-take workshop with at least one Austrian city
- Screening of case studies

B - Development of processes, methods and tools

- Interviews with urban planners, architects, urban designers and other relevant stakeholders
- Screening of process examples and tools used in case studies
- Interviews with educational staff at universities



C - Case studies and action research

- Interviews with stakeholders involved in implementation of concrete projects at urban scale
- Screening the process and framework, experienced barriers and opportunities taken in case studies
- Documentation and exchange of the findings

D - Education and Dissemination

- Interviews with educational staff at universities and other educational institutions
- Testing and recommendations of new teaching methods
- Communication and building of awareness
- Publications



Ways Forward?



IEA SHC Task 51 Solar Energy in Urban Planning



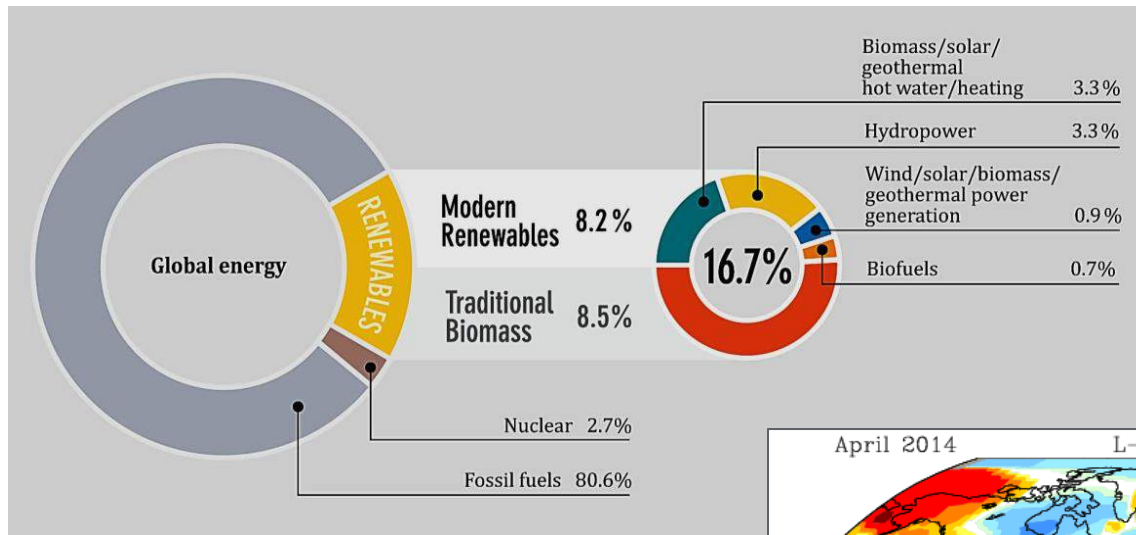
Expected Outcomes

Using the diverse international experience for Cross- Inspiration & Exchange



- International umbrella document targetting the audience of urban planning
- AtlasKompakt
 - ✓ Legislative framework conditions, barriers and opportunities
 - ✓ Processes, methods and tools
 - ✓ Case Studies
 - ✓ Education and dissemination
- Publications

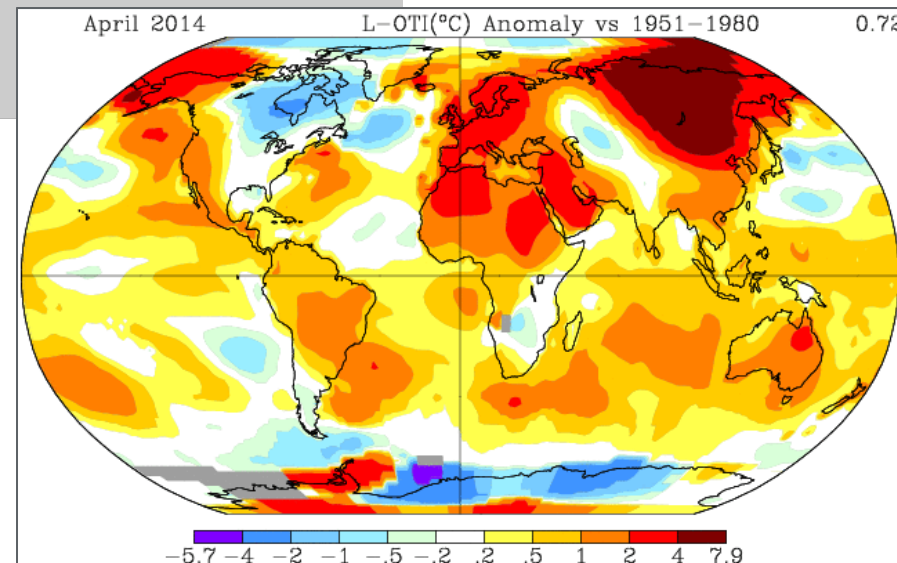
Increasing the proportion of energy generated using solar energy



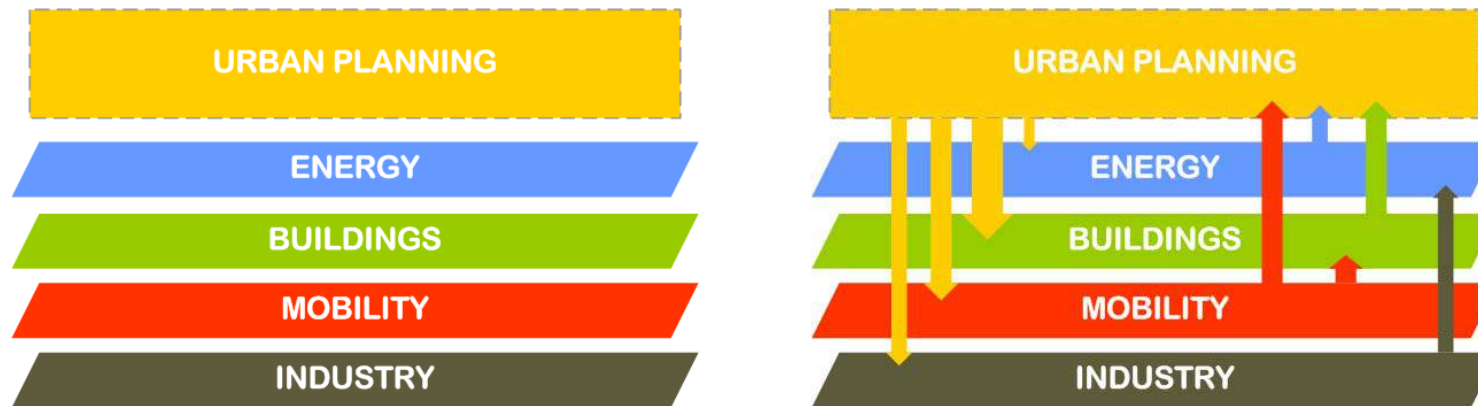
Source: Renewables 2011, Global Status Report

Reduction of CO₂ Emissions

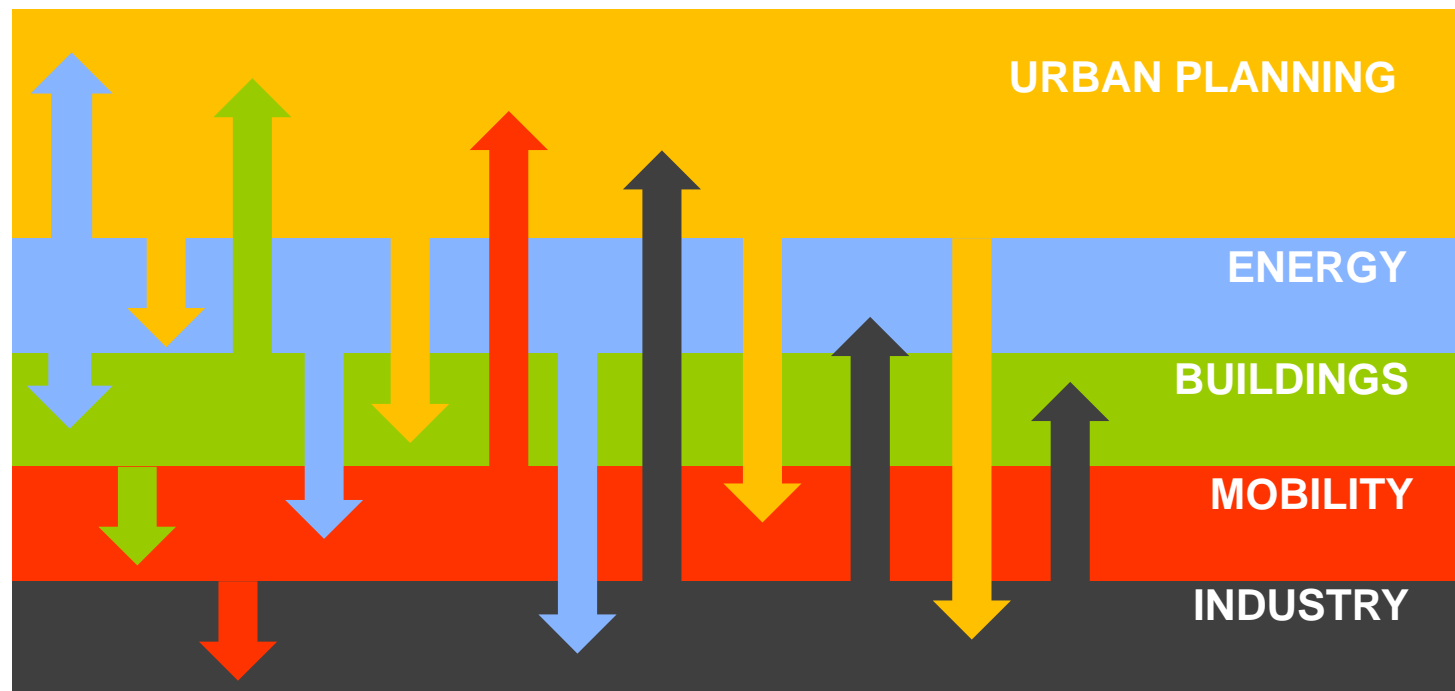
Impact on Climate



Current sectoral – disciplinary approaches



Integrated approached and processes



"We can't solve problems by using the same kind of thinking we used when we created them."

Albert Einstein



**Thank you
for your attention!**



Austrian Institute of Technology

Energy Department

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