Territorial and Urban Planning Contribution to Climate Change Adaption and Mitigation

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POTENTIAL RISKS ASSOCIATED WITH CLIMATE CHANGE

Climate change is among the most important issues of our time.

Rising global temperatures, are likely to have severe—and potentially catastrophic—effects on both:

- the earth's natural systems
- and human society.

Sea level rise and dramatic changes in weather patterns, predicted as a consequence of sustained global warming, could accelerate:

- the disruption of economic systems,
- dislocation of coastal communities and port facilities,
- shortages of food and water supplies,
- increases in disease,
- additional health and safety risks from natural hazards,
- and largescale population migration.

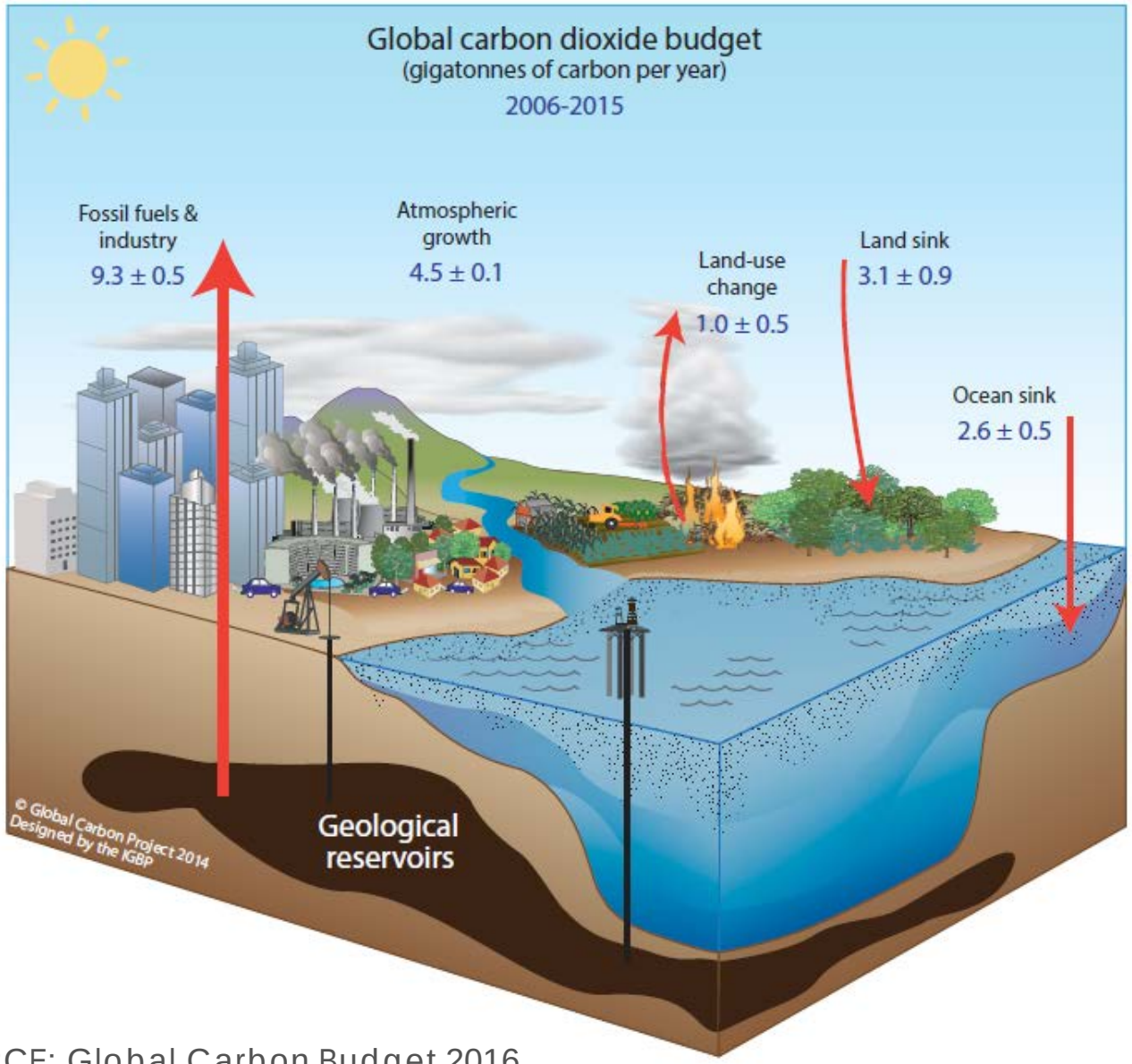
Secondary effects may include:

- the potential for civil unrest and war.

SOURCE: http://www.greenews.info/ www.focsiv.it www.liberta.it

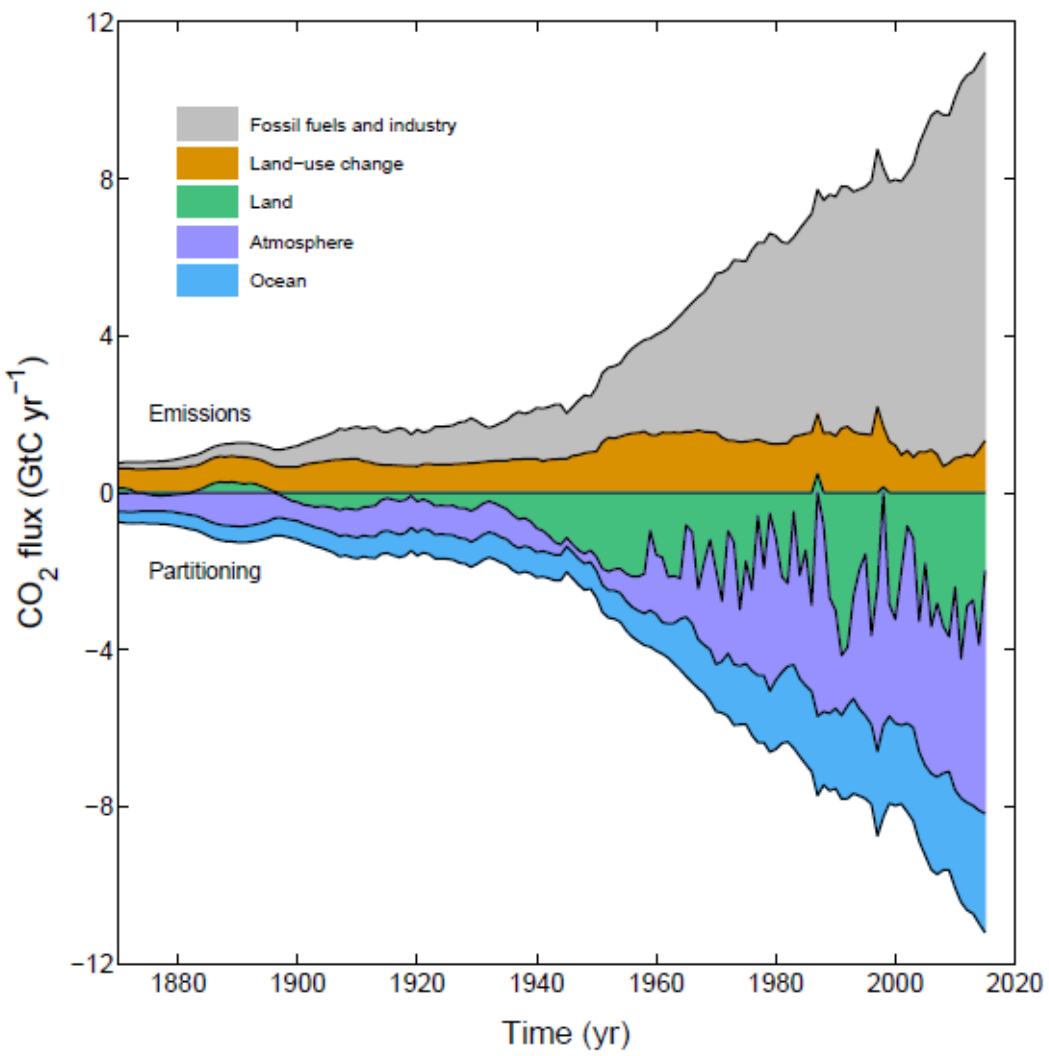
SOURCE: Urban Planning Tools for Climate Change Mitigation (Condon, Cavens, Miller, 2009)

CLIMATE CHANGE: LARGELY THE PRODUCT OF HUMAN ACTIVITY



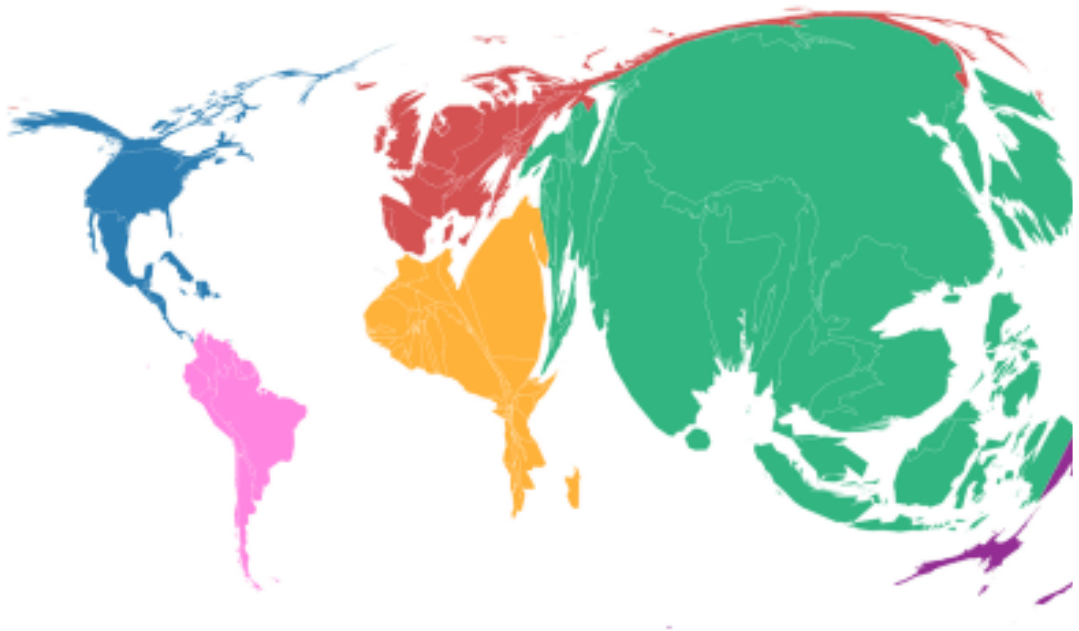
AtmGrowth = E (ffi) + E (luc) - LS - OS

4.5 = 9.3 + 1 - 3.1 - 2.6



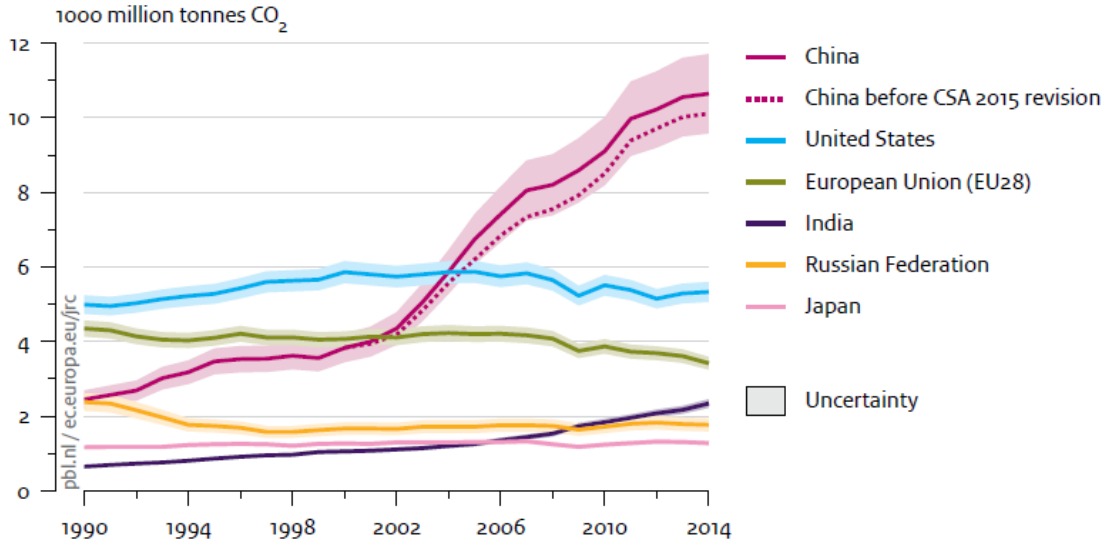
SOURCE: Global Carbon Budget 2016

WHO IS LIKELY RESPONSIBLE FOR CLIMATE CHANGE?



SOURCE: https://www.fastcodesign.com

CO_2 emissions from fossil-fuel use and cement production in the top 5 emitting countries and the EU



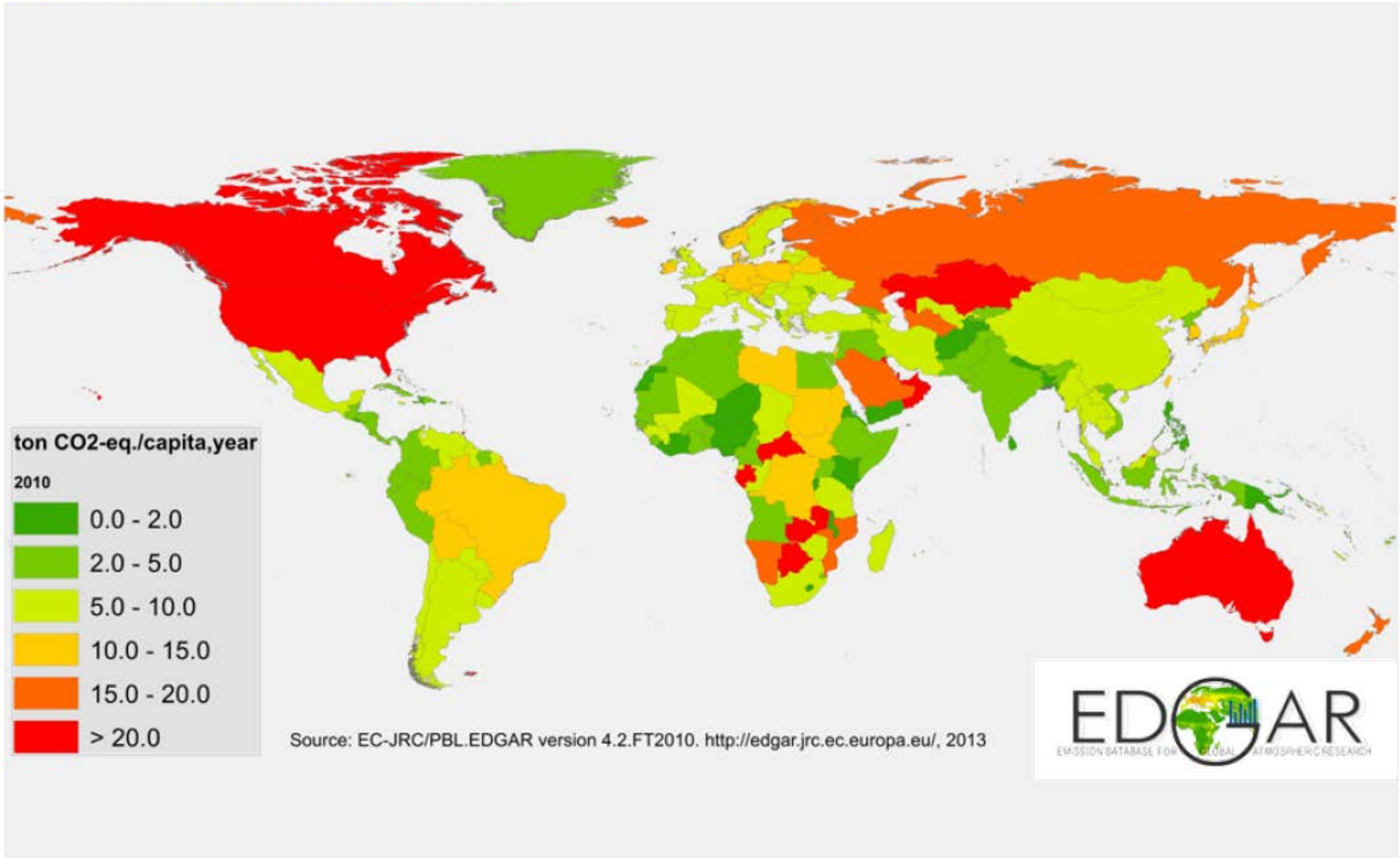
Source: EDGAR 4.3 (JRC/PBL, 2015) (1970-2012; notably IEA 2014 and NBS 2015); EDGAR 4.3FT2014 (2013-2014): BP 2015; GGFR 2015; USGS 2015; WSA 2015

CSA=Chinese Statistical Abstract

SOURCE: http://edgar.jrc.ec.europa.eu/news_docs/jrc-2015-trends-in-global-co2-emissions-2015-report-98184.pdf
Trends in global CO^2 emissions:2015 Report

WHO IS LIKELY RESPONSIBLE FOR CLIMATE CHANGE?

Geenhouse gas emissions per capita, 2010



Source: http://edgar.jrc.ec.europa.eu/overview.php?v=GHGt

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SOURCE: http://edgar.jrc.ec.europa.eu/news_docs/jrc-2015-trends-in-global-co2-emissions-2015-report-98184.pdf
Trends in global CO^2 emissions:2015 Report

CLIMATE CHANGE AND THE ROLE OF CITIES

The potential for cities to lead and organize a response to CLIMATE CHANGE is currently widely acknowledged.

First URBAN PLANNING ACTIONS began with a narrow focus on ENERGY EFFICIENCY and MITIGATION. They are currently expanded to include even the issue of ADAPTATION.

CLIMATE MITIGATION is any action taken to permanently eliminate or reduce the long-term risk and hazards of climate change to human life, property.

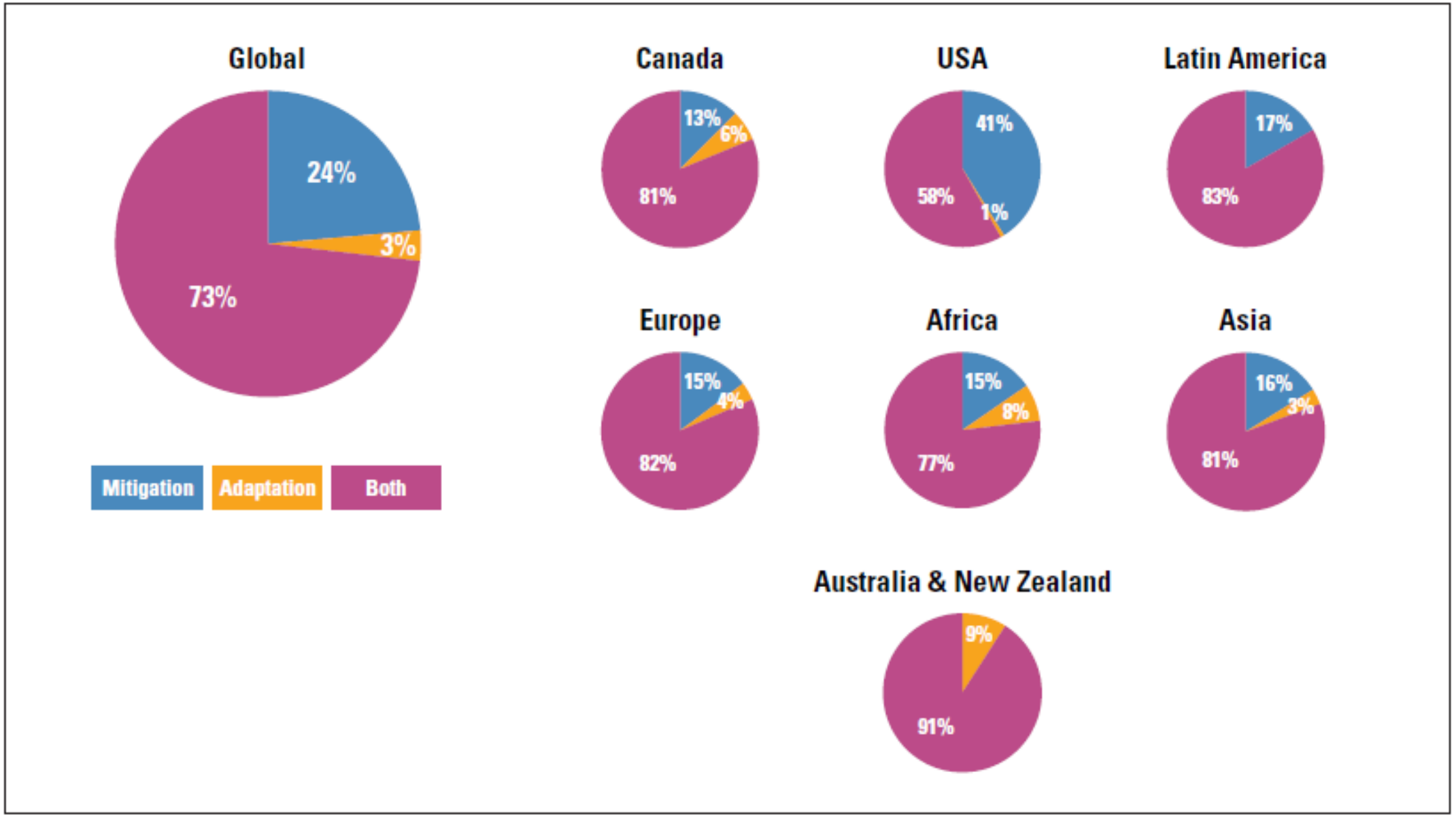
CLIMATE ADAPTATION refers to the ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damage, to take advantage of opportunities, or to cope with the consequences.

CLIMATE CHANGE AND ENERGY USESE RELATED ISSUES ARE FACED AT CITIES SCALE

Urban activities have strong impacts on natural ecosystems going beyond city's borders, they have enormous ecological footprints. They are even the places where more relevant is the impact of natural risks/hazards.

SOURCE: http://www.global-greenhouse-warming.com

MITIGATION/ADAPTION: RESULTS OF AN INVESTIGATION DONE FROM ICLEI (350 cities ww responding)



SOURCE: MIT – ICLEI. Progress and Challenges in the Results of a Global Survey Urban Governance of Climate Change

CITIES IMPACT ON CLIMATE CHANGE

- Cities are responsible for between 30% to 70% of global greenhouse gas emissions (Satterthwaite2008)
- and consume roughly 60% of the world's energy (Van der Hoeven 2012).
- the projected impacts of climate change show that urban populations and infrastructure around the world are at significant risk (Carmin, Nadkarni, and Rhie 2012, Hunt and Watkiss 2011, IPCC 2014).
- Finally, CITIES have emerged as IMPORTANT PLAYERS in global efforts:

  to mitigate greenhouse gas emissions and

  to enact adaptive policies to protect both people and assets.

SOURCE: MIT – ICLEI, Progress and Challenges in the Results of a Global Survey Urban Governance of Climate Change

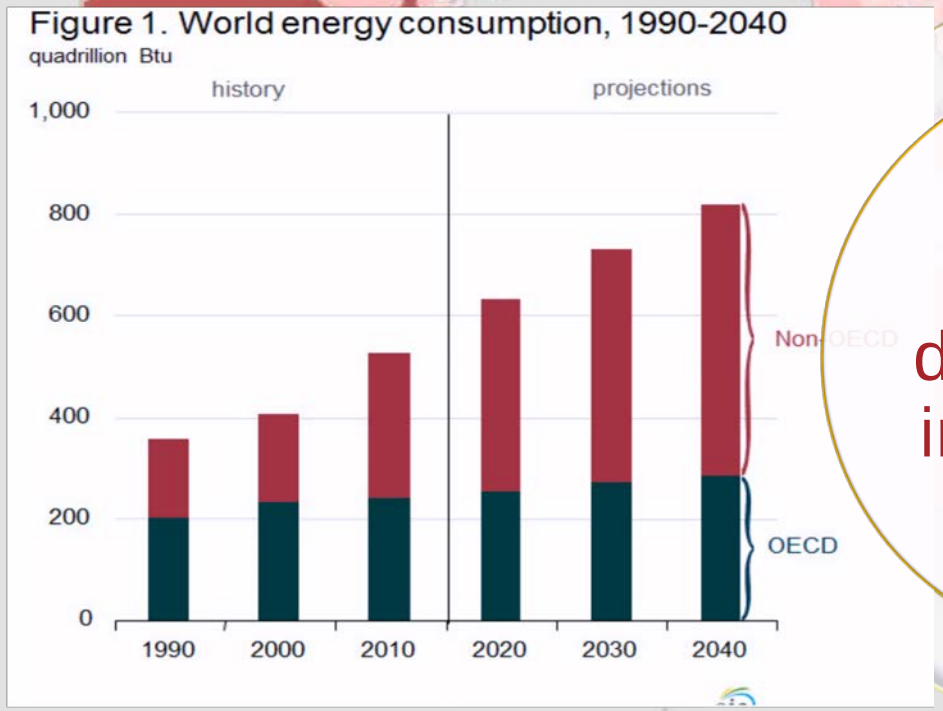
RAPID URBANIZATION AND DEMOGRAPHIC CHANGE

- **global life expectancy (32% of population aged 60 years or over, by 2050,) plus delayed retirement**:
  - higher transport demand for daily passenger transport
  - more medium-long distance trips by car and more urban distance trips by public transport and car
  - More demand for health services

net migration (China and South East Asia) will offset the expected excess of deaths over births

- **By 2030 78% of people will live in urban areas; 84% by 2050**

Energy, the global issue

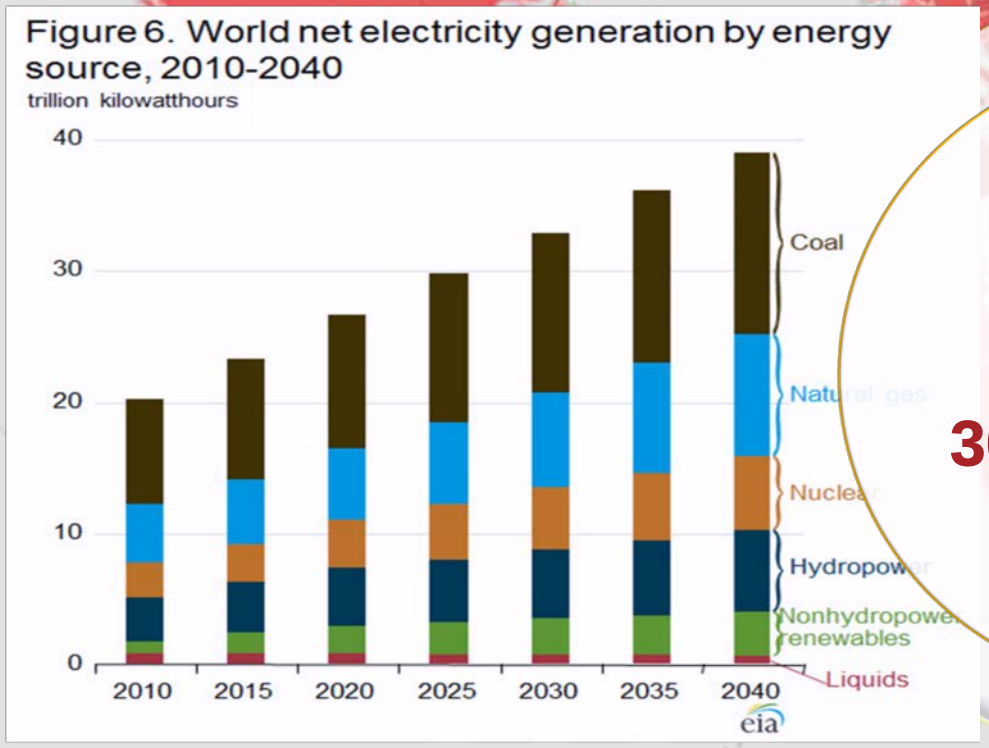


By 2040 energy demand will increase by 60%

Shaded Points

Electric power consumption (kWh)
229.0 million 4.433 trillion

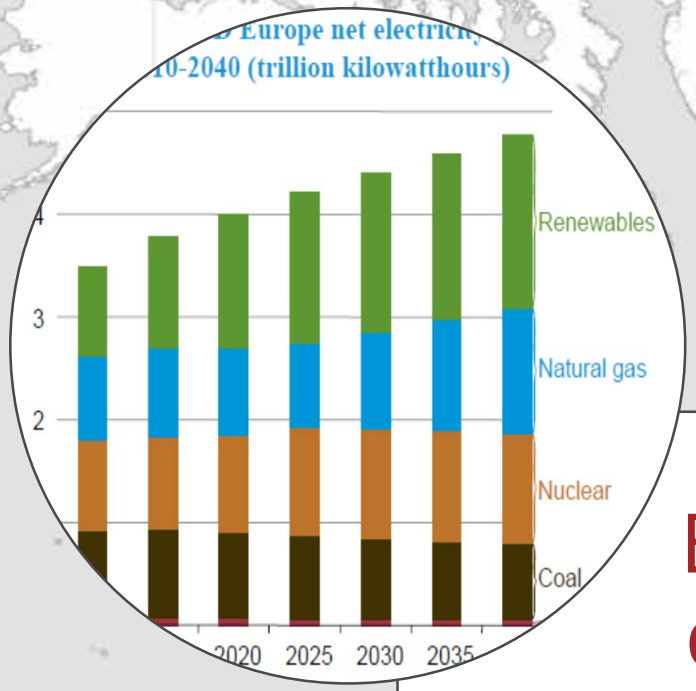
Energy, the global issue



Worldwide coal will account for **30%** of energy demand

Fossil fuel energy consumption (% of total)
4% 101%

Energy, the global issue



By 2040, in EU **30%,** of electricity should come from renewables

Residential buildings account for over **20%** of consumption of delivered energy

Electric power consumption (kWh per capita)

HOW CAN URBAN PLANNERS HELP?

SOURCE: http://www.canadianbusiness.com/lists-and-rankings/best-jobs/2016-urban-planner-canadas-hottest-job/ (Illustration by Aleksandar Savić)

COMMON URBAN DESIGN SOLUTIONS

GREENING THE CITY

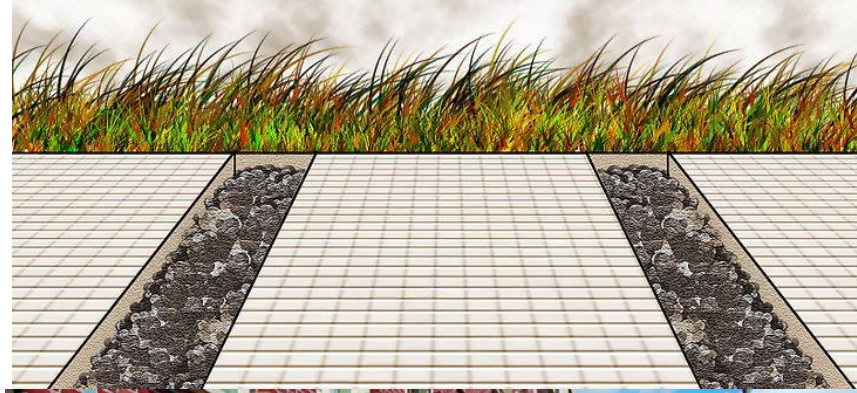
- Connected, Pedestrian and Landscaped Public Spaces (increasing pedestrian mobility, capturing rain water/feeding underground water, capturing pollutants)
- Realizing vertical gardens (capturing pollutants, refurbishing housing)
- Increase biodiversity of green areas (using local plants, diverse plants typology and age)
- Greening roofs and terraces (reducing surface temperatures increasing rate of captured water)

SOURCE: https://inhabitat.com

SOURCE: http://www.wikihow.com/

MANAGING THE WATER CYCLE

- Designing solutions for reducing volume and speed of runoff water (lowering destructive potential of running water)
- Minimizing potable water consumption



DESIGNING CLEVER PUBLIC SPACES

- Promoting slow mobility/soft traffic solutions (networked cycle paths, car speed reducing through design/hybrid zones)
- Using, as much as possible, km 0 materials for realizing streets, piazzas… (valorizing local economies and resources)
- Keeping under control light pollution (optimizing use of energy in lighting systems)

SOURCE: https://thecityateyelevel.com/

ARCHITECTURAL ACCURACY…IT CAN HELP!

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 695944

DESIGNING MORE ENERGY ZERO BUILDING AND LESS ENERGIVOROUS GLASS-TOWERS

DESIGNING MORE SOLUTIONS BASED ON PASSIVE ARCHITECTURE PRINCIPLES

USING KM 0 MATERIALS…IF POSSIBLE (IF STILL THERE)

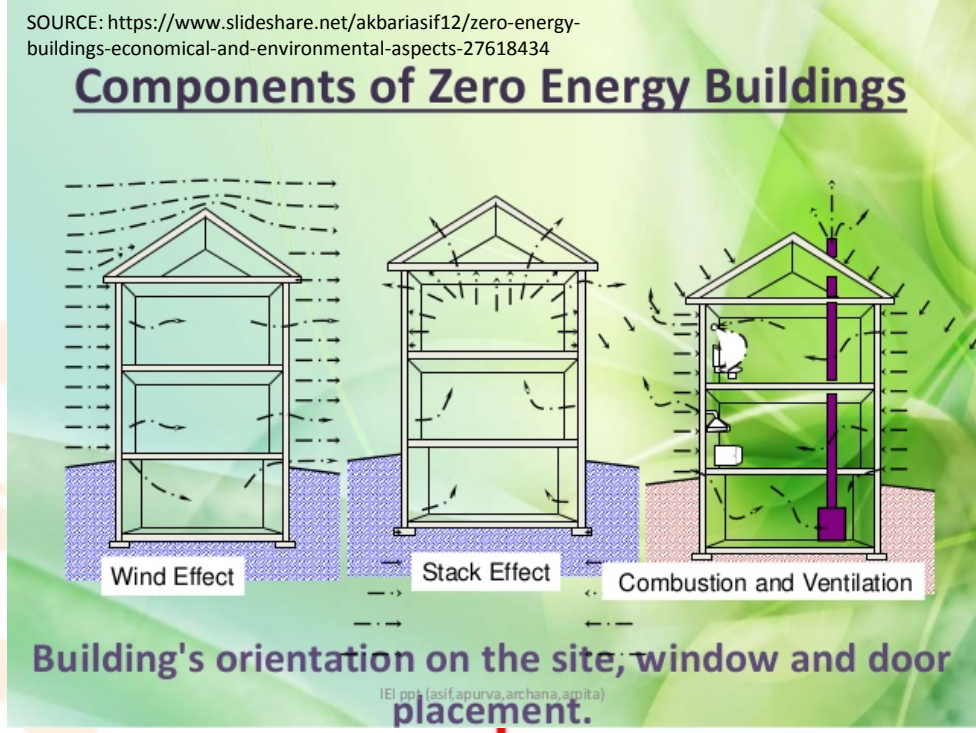
USING RECYCLED AND INNOVATIVE MATERIALS FOR NEW HOUSING

COLLOCATE BUILDINGS WITH CORRECT ORIENTATION…AND IN THE RIGHT PLACE (E.G. NEAR RIVERS CAN BE DANGEROUS AND DECREASING BIODIVERSITY)

MAKING USE OF SOLAR AND WIND RELATED TECHNOLOGIES (ENERGY PRODUCTION, COOLING OR WARMING SYSTEMS)

PROMOTING ECOLOGICAL REFURBISHMENT OF OLD BUILDINGS (ENERGY RETROFIT OF HISTORICAL BUILDINGS)

SOURCE: https://www.slideshare.net/akbariasif12/zero-energy-buildings-economical-and-environmental-aspects-27618434



http://www.ecologicalbuildingsystems.com/Ireland/Blog/Post-Detail/A-synopsis-of-our-Retrofit-Insulation-Masterclass

SOURCE: http://ukgreenhome.com

URBAN PLANNING SOLUTIONS

- Avoiding urban sprawl → keeping the city compact (green belts, planning the edge between rural and urban areas, infrastructures/facilities lead UD and not follow it)

- Having strategic plan for housing, both private and public, development (right collocation, right density, innovative materials)

- Promoting slow mobility, especially within the city core areas (balanced interaction between cars, bicycles and other slow means, pedestrians)

- Designing sustainable transport system (multi-modality, inter-modality, integrated ticketing …)

- Designing and connecting green and blue corridors within the city fabric (Highways for life and biodiversity)

- Proposing and approving Land Use Management Plans respecting overarching sustainable strategies (local, regional and national…if existing)

- Facilitate city accessibility and exchange with neighboring cities (Developing a real connected polycentric development at local/regional scale → looking at train and tramway systems more than to electro cars/bus – Properly infrastructuring functional urban areas)

- Planning ecologically equipped productive areas and favoring industrial symbiosis

SOURCE: http://www.slowmobility.net/

SOURCE: https://landarchs.com

SOURCE:https://commons.wikimedia.org/wiki/File:CarGoTram_Dresden.jpg

URBAN POLICIES SOLUTIONS

PROMOTING POLICIES FOR RESEARCHING AND PROMOTING INNOVATIVE DESIGN FOR PUBLIC SPACES (BOTH INDOOR AND OUTDOOR)

PROMOTING POLICIES FACILITATING VERTICAL AND HORIZONTAL GOVERNANCE ACTORS INTEGRATION/DIALOGUE (DECENTRALISATION/PLURALISM IN DECISION MAKING)

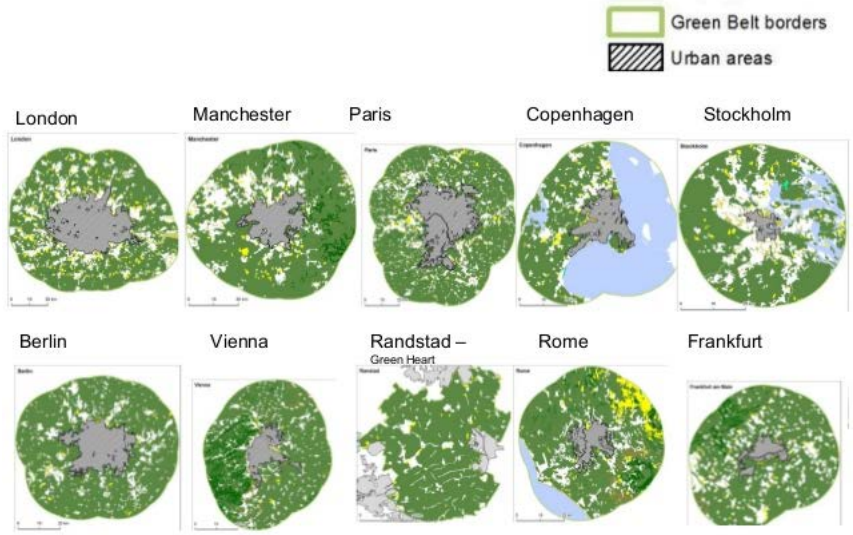
PROMOTING POLICIES FOR SOFT AND SMART MOBILITY (INTEGRATION, MULTIMODALITY, INETR-MODALITY, PEDESTRIANS AS MAIN TARGET)

CONTINUING INVESTING ON ACTIONS SUPPORTING SUSTAINABLE DEVELOPMENT (BUILDING UP LOCAL ROOTED PROJECTS, LOOKING AT ECOLOGICAL ECONOMIES, BALANCING CITIES ECOLOGICAL FOOTPRINT)

PROMOTING POLICIES FOR INNOVATING WASTE MANAGEMENT SOLUTIONS (BUILDING UPON CIRCULAR ECONOMY OPPORTUNITIES)

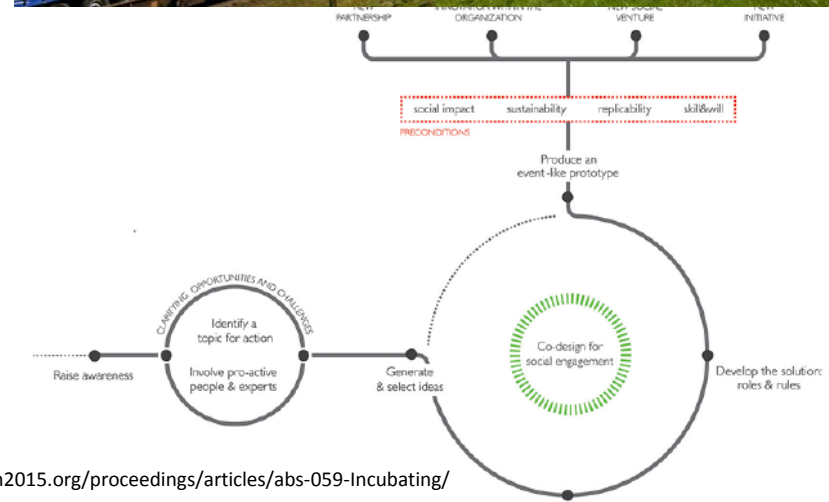
SUPPORTING POLICIES FOR DESIGNIG INNOVATIVE TOOLS FOR LAND USE MANAGEMENT AND CORRECT USE OF SOILS (LESS ANACHRONISTIC NORMATIVE TOOLS, MORE TOOLS BASED ON PPPP)

PROMOTING POLICIES FINANCING SOCIAL INNOVATIVE AND PARTICIPATORY PLANNING PROCESSES (ENALRGING THE ARENA OF DECISION MAKING USING INNOVATIVE DIGITAL TECHNOLOGIES)



SOURCE: https://www.slideshare.net/CIFOR/rural-landscape-services-from-food-security-to-better-environment-within-greenbelts-of-metropolitan-areas

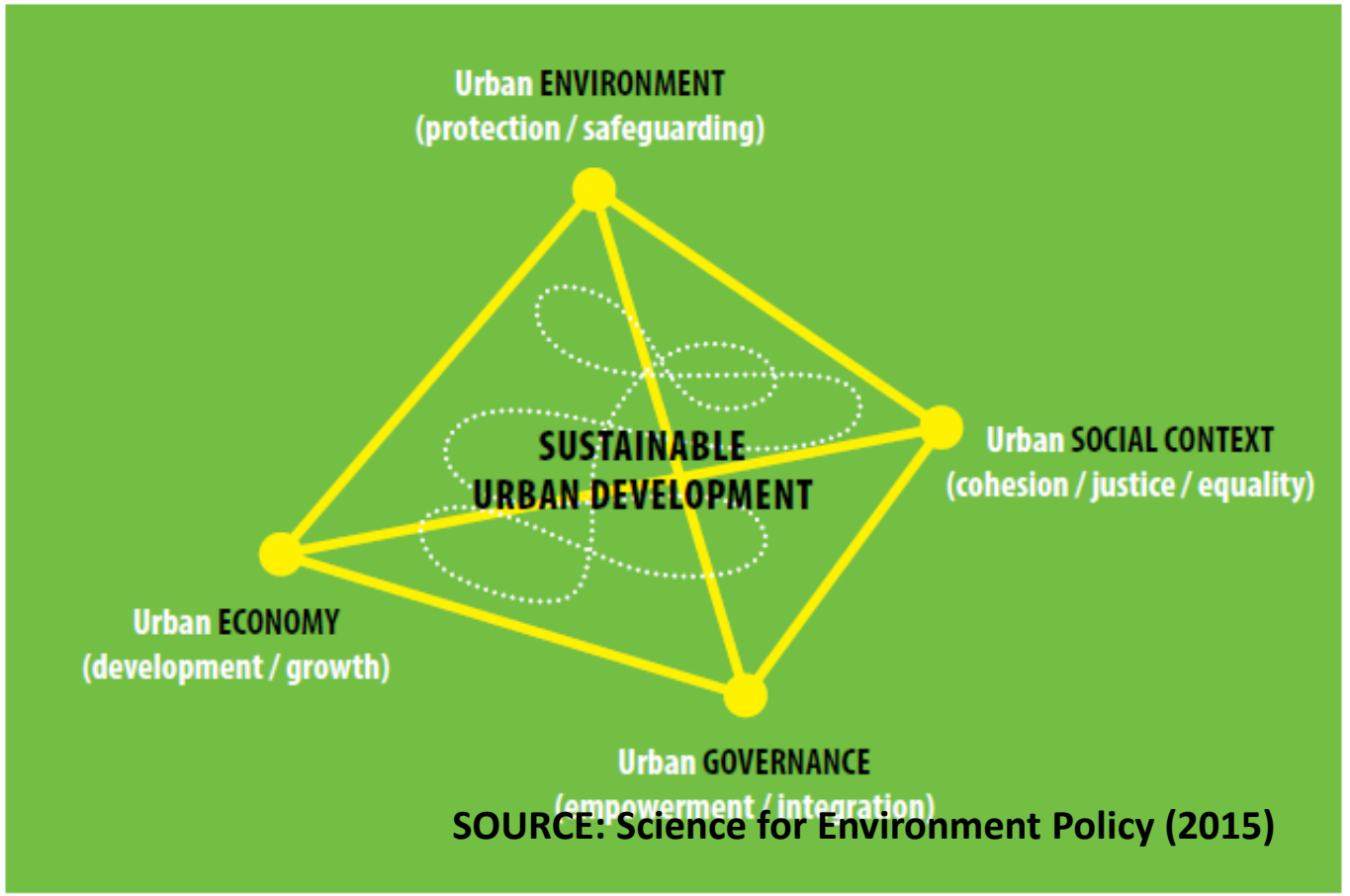
SOURCE: http://www.polish-railways.com



SOURCE: http://cumulusmilan2015.org/proceedings/articles/abs-059-Incubating/

SUSTAINABLE DEVELOPMENT MATTERS…

Figure 1. The Prism of urban sustainability



SOURCE: Science for Environment Policy (2015)

Source: Turcu, C., 2010, on the basis of Valentin & Spangenberg, 1999

DESIGNING FOR ACHIEVING SUSTAINABLE DEVELOPMENT IS STILL A PRIORITY

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691944

	ECONOMIC DIMENSION	SOCIAL/EQUITY DIMENSION	ENVIRONMENTAL DIMENSION	GOVERNANCE DIMENSION	LOGISTICS DIMENSION
SUSTAINABLE PLANNING CHOICES	COSTS BENEFITS ECONOMIC RETURN OF PROJECTS STABLE JOBS CRETAED TEMPORARY JOBS CREATED	STAKEHOLDERS INVOLVED GUARANTEED EQUITABLE ACCESS TO BENEFITS LOCAL DIVERSITY UNDERSTOOD AND CONSIDERED INDIVIDUAL/COMMUNITIES EMPOWERMENT IS PURSUED INCLUSIVE ACTIONS ARE PROMOTED QUALITY OF LIFE	NEGATIVE IMPACTS ON ENVIRONMENT ARE AVOIDED OR MITIGATED PROJECTS FAVORS THE USE OF RENEWABLE SOURCES/RESOURCES PROJECTS ARE CONFORM TO EU DIRECTIVE ON: • WASTE MANAGEMENT • WATER MANAGEMENT • SOIL CONSUPTION • AIR POLLUTION • NOISE POLLUTION	LOCAL CLARIFICATION: ALL COMPETENT ADMINISTRATIVE AUTHORITIES SUPPORT THE SOLUTION AND DEFINE THEIR ROLE IN FACILITATING THE IMPLEMENTATION POLICY TOOLS ARE AVAILABLE TO MANAGE THE DEVELOPMENT OF PROPOSED SOLUTIONS PROJECTS ARE CONFORM TO TECHNICAL NORMS AND NORMATIVE PLANNING TOOLS	BUDGETARY SUPPORT TO THE PROJECTS INSTITUTIONAL SUPPORT TO THE PROJECTS RIGHT SCALE OF PROPOSED SOLUTIONS (PROJECTS CAN BE MANAGED AT THE SCALE OF THE TOWN AND OF AVAILABLE RESOURCES AND CAPABILITIES)

FINAL REMARKS → RELEVANT CLIMATE CHANGE POLICY CHALLENGES

DECREASING THE INERTIA OF RUNNING CLIMATE CHANGE IMPACTING SOCIAL AND ECONOMIC SYSTEMS: Re-setting/Innovating productive processes, services and products

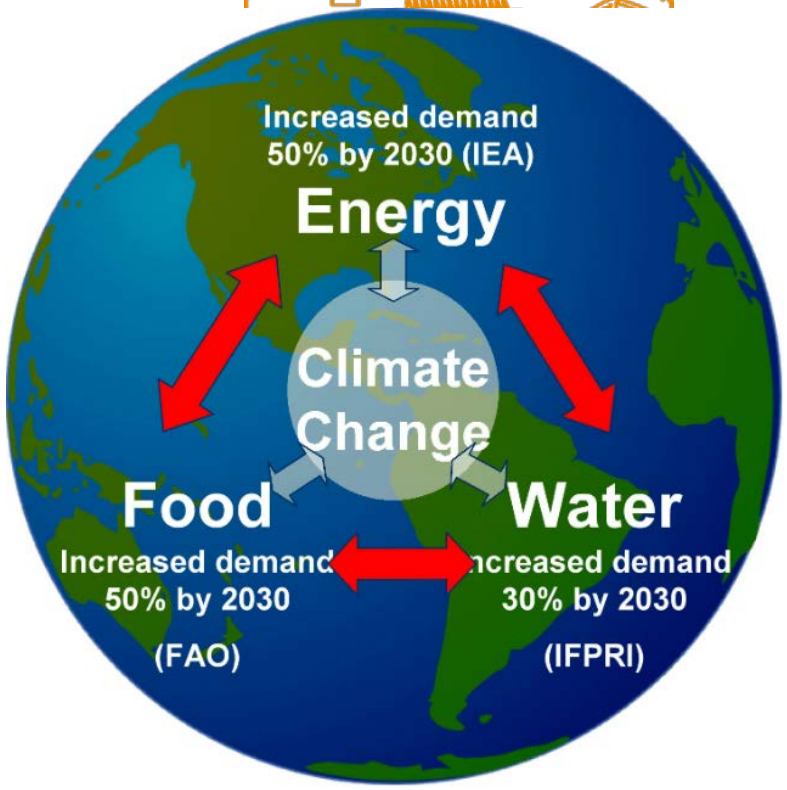
RAISING AWARENESS IN GOVERNMENTS TO ACT ON CLIMATE CHANGE WITH CONCRETE AND COHERENT MEASURES

REDUCING THE INFLUENCE OF INTERESTS (STATES, COMPANIES, MULTI-NATIONALS…) THAT INCREASE EMISSIONS AND REDUCE NATURAL AND URBAN SYSTEMS RESILIENCE

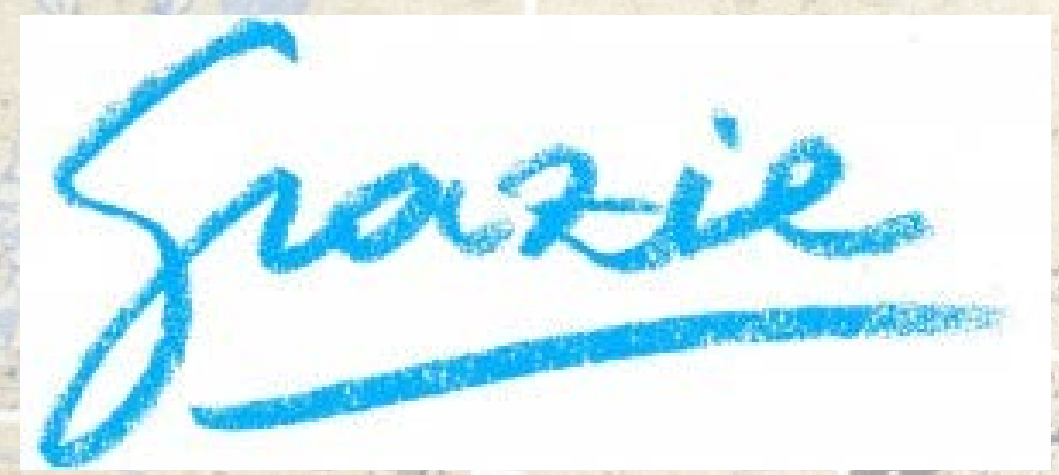
EMPOWERING THE CHANGES FROM INEFFECTIVE GOVERNANCE AND WEAK INSTITUTIONS TO INNOVATIVE LEADERSHIP IN TERRITORIAL GOVERNMENT AND URBAN TRANSFORMATIONS

CONTINUING PROMOTING MODELS FOR SUSTAINABLE DEVELOPMENT

USING DIGITAL TECHNOLOGIES AND/OR SMART CITIES SOLUTIONS TO INCREASE RESILIENCE AND SUSTAINABILITY OF THE MATERIAL AND IMMATERIAL URBAN SYSTEMS



SOURCE: http://www.makingitmagazine.net



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