Cambiamenti climatici ed effetti sulle città

T. Georgiadis
IBIMET-CNR, Bologna, Italy
• Policy and Science
• The climate problem
• Architectural and Physical approaches
• Nature Based Solutions
• The modelling
How long does it take to build a city?

How long does it take to be re-elected?
Temperature issue

Water issue
CLIMATE DRIVERS
- More frequent elevated temperatures
- Prolonged heat waves
- Seasonal timing of event

ENVIRONMENTAL & INSTITUTIONAL CONTEXT
- City planning: Urban heat island effect
- Access to support services & resources (electricity, water, cooling centers)

EXPOSURE PATHWAYS
- Exposure to elevated temperatures (daily maximum, minimum, and mean)
- Combined impact of temperature, humidity, wind, & sunlight

SOCIAL & BEHAVIORAL CONTEXT
- Social isolation, poverty, and homelessness
- Access to & use of air conditioning
- Outdoor work, recreation, and commuting
- Appropriate heat prevention messaging
- Chronic illness, medication use, or personal, physical, & cognitive constraints

HEALTH OUTCOMES
- Deaths, illness, hospital and emergency department visits
Models of cities / City models

Architects
Urbanists
Engineers
Social scientists
Biologists
Agronomers
Economists
Historians
Chemists
Physicists
Policy makers
...

A wonderfully complex world
• "Les matériaux de l'urbanisme sont le soleil, le ciel, les arbres, l'acier, le ciment dans cet ordre et dans cette hiérarchie."

• Le Corbusier

Le Modulor

Une nouvelle mesure humaine
Heat-Sensitive cities Framework

Water-Sensitive Cities Framework

Urban water transition phases

Drivers
- Population growth
- Public health
- Population growth and development
- Social amenity and environmental health
- "Limits to growth"
- Intergenerational equity, resilience to climate change

Water Supply City
- Supply hydraulics
- Separate sewerage schemes
- Drainage / flood protection
- Point source and diffuse (storm water) pollution management

Sewered City
- Adaptive and multi-functional infrastructures and landscapes reinforcing water-sensitive behaviors

Drained City
- Adverse, fit-for-purpose sources and conservation promoting and linked with waterway protection

Waterway City
- Water-sensitive City

Management response

NATURE BASED SOLUTIONS
Modelling what?

➢ HEAT

➢ WELLNESS

➢ AIR-FLOW

➢ ECO-SYSTEM SERVICES
Reduction area with $T > 33^\circ C$
Improvement of PET from VERY HOT to WARM

Variazione da VERY HOT a WARM