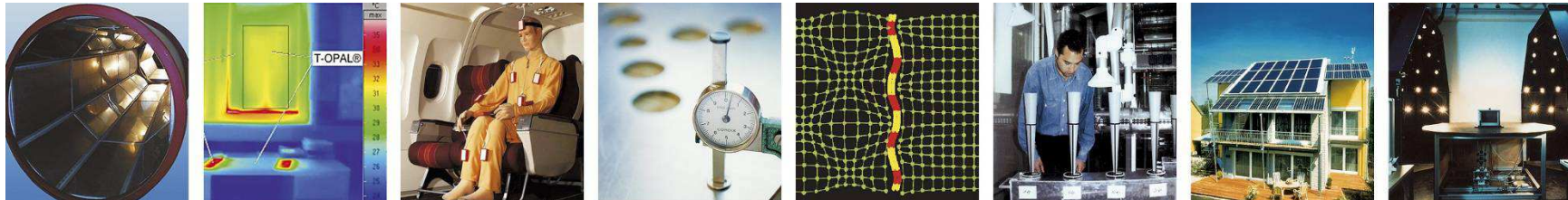

Fraunhofer Institute for Building Physics

»Morgenstadt: City Insights« Analysis of Interactions Between Key Factors

Dipl.-Wirt.-Ing.
Elvira Ockel

Auf Wissen bauen

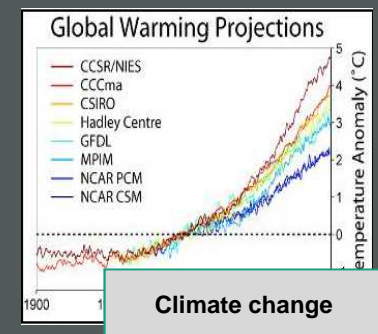
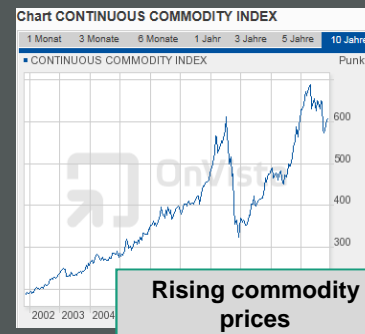
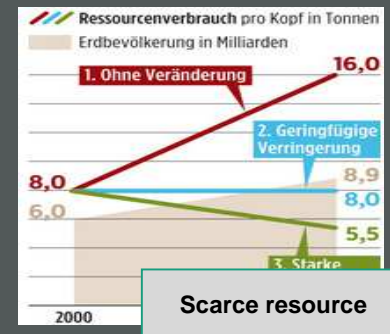
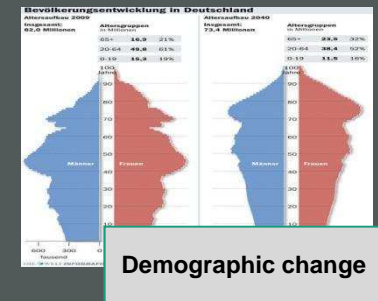
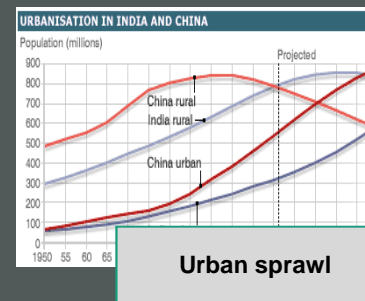
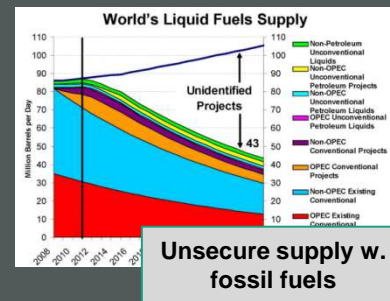
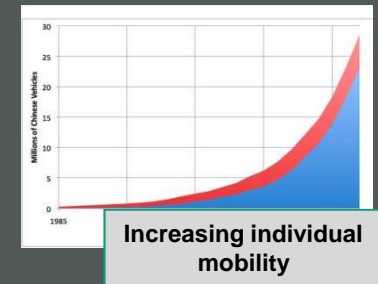
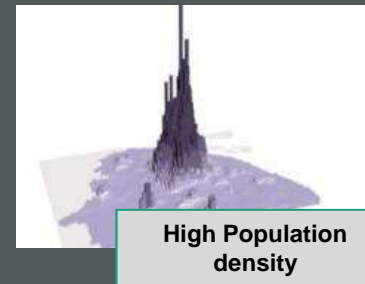
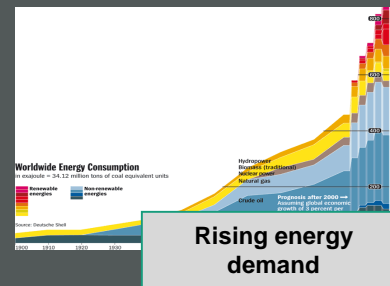


Cities: Today's problem, tomorrow's solution

Global challenges for cities

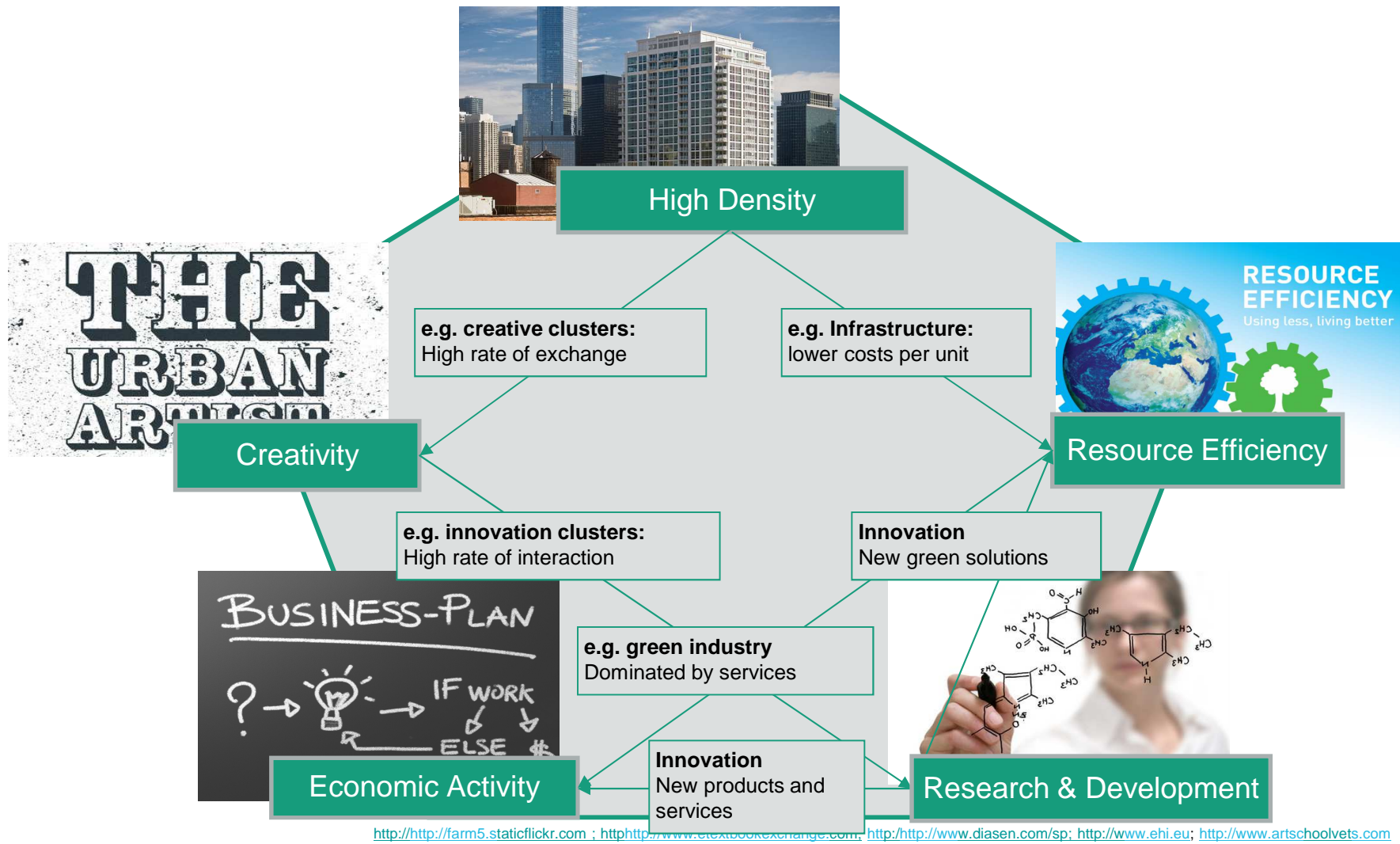
Industrial patterns of consumption and production lead to big challenges for our cities

- Cities are increasingly developing a demand for sustainable solutions.
- The solutions of tomorrow will have to be fundamentally different from those of today.



Quellen: UN Populations Division, SPIEGEL, BBC, IPCC; NY Stock Exchange, Die Welt, Business Insider

Why cities are the solution? 5 essentials of sustainable societies

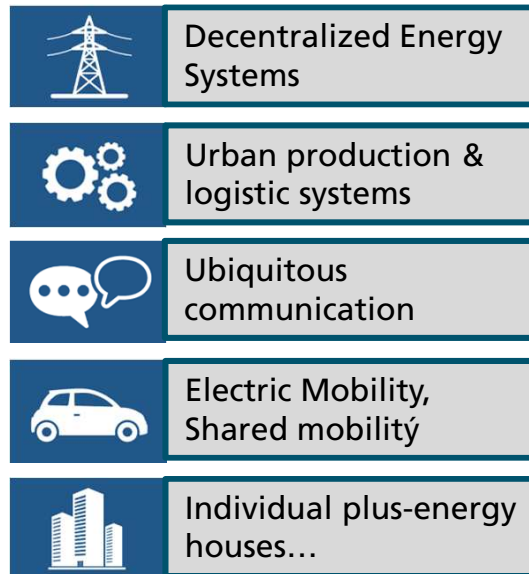


What is happening in the cities at current...

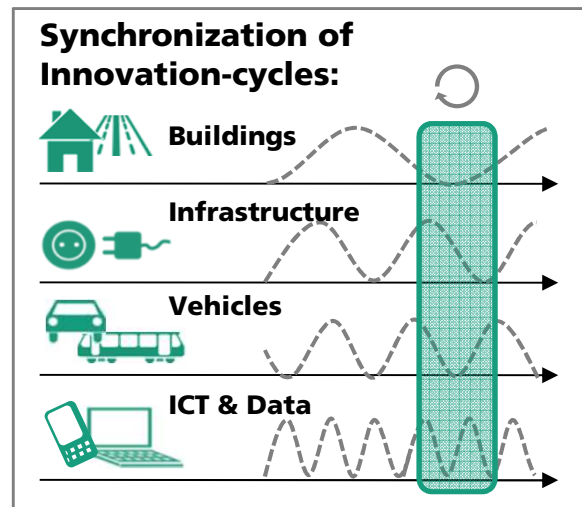
Megatrend: sustainable transformation of technical systems...

3 great transformations of technical systems are currently impacting upon our cities:

Technological change in multiple sectors



Increasing rate of change



Mergence of separated sectors

Divergent Technology-management



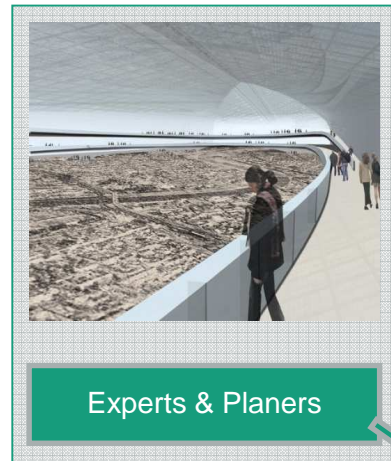
Convergent Technology-management



The missing link: **Interconnection of relevant actors**

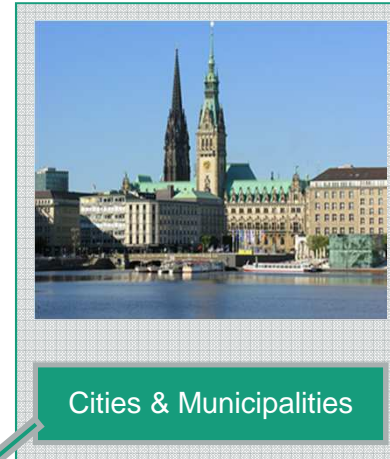
- Have expert knowledge about urban subsystems

- Don't produce, can't enact



- Have systemic knowledge about cities

- Don't develop products and solutions



- Enabler of cities by producing sustainable products and solutions

- Need future markets



- Represent interests of civil society and 'city dwellers'

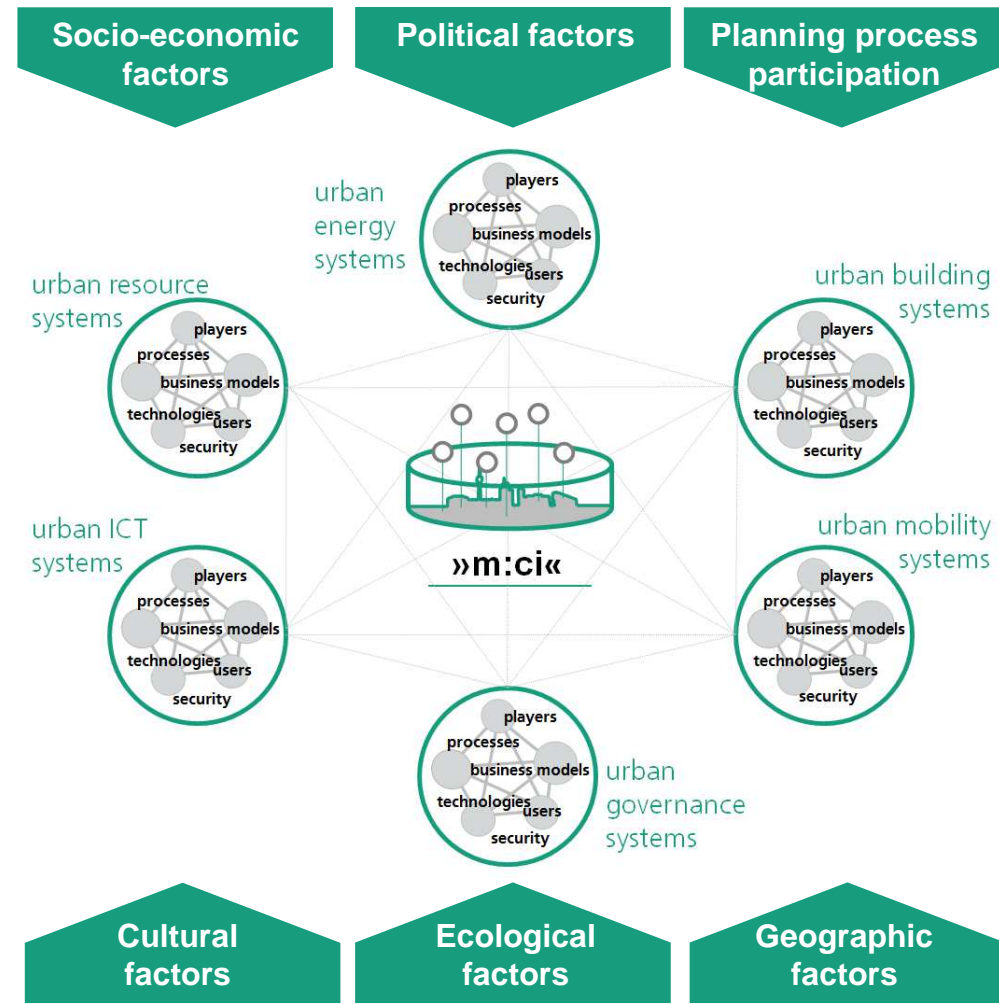
- Facilitate political dialogue



»Morgenstadt: City Insights« Cities as complex systems

Basic conditions for successful cities

- Analysis of each single key factor to the city.
- Analysis of interconnection between key factors in one city.
- Development of systemic concepts for influencing the cities key factors.
- Evaluation of best practice projects and other methods by all systemic components.

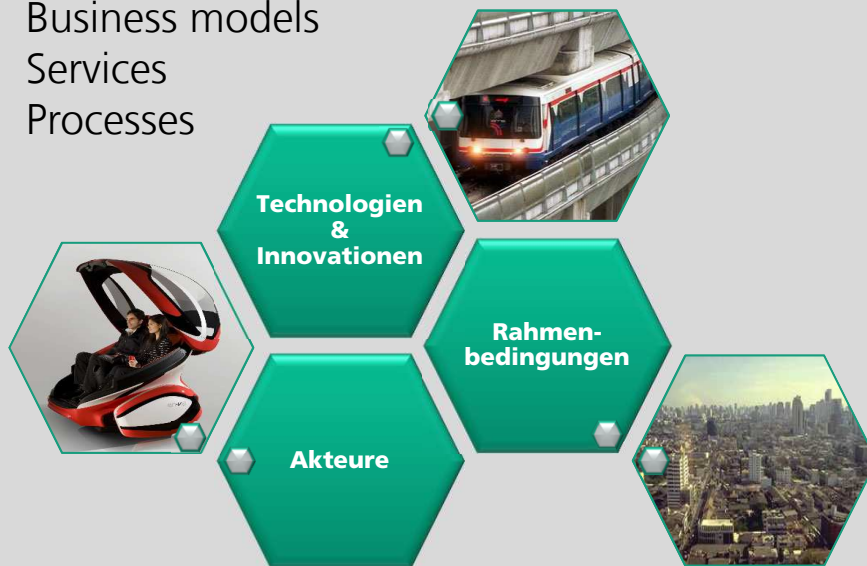


»Morgenstadt: City Insights«

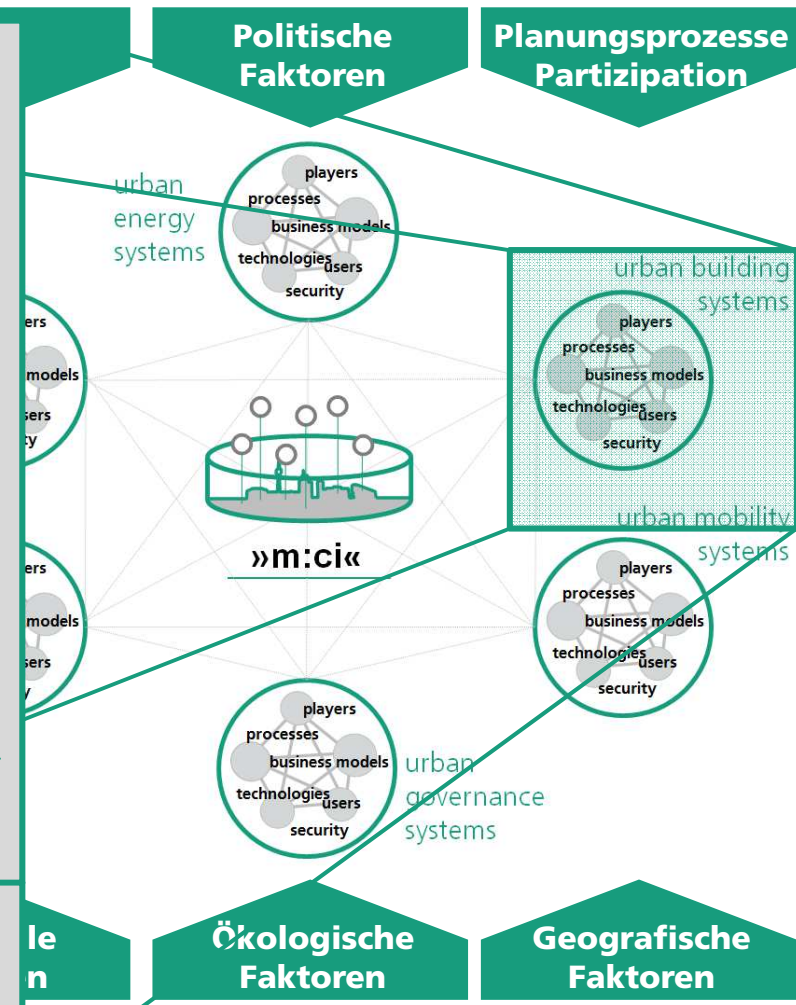
Research approach – step two

e.g. holistic view of the field of building in concrete cities

- Stakeholders
- Interfaces
- Technologies
- Business models
- Services
- Processes



How do socio-economic systems in cities today interact and which dynamics of change do they feature? How can we learn from that?



Joint research project – systemic approach

- In depth analysis of six inspiring global cities.
- On-site research by interdisciplinary teams of Fraunhofer Experts



- Analysis of the interfaces between technology systems, socio-economic factors and governance systems

Energy • Mobility • ICT • Governance • Buildings • Security • Resources



New York City



Systemic view: Example of Hurricane Sandy in NYC

- Storm presented two main types of flood hazards – stillwater flooding and wave action
- Atlantic Coast shorelines faced storm surge plus wave action.

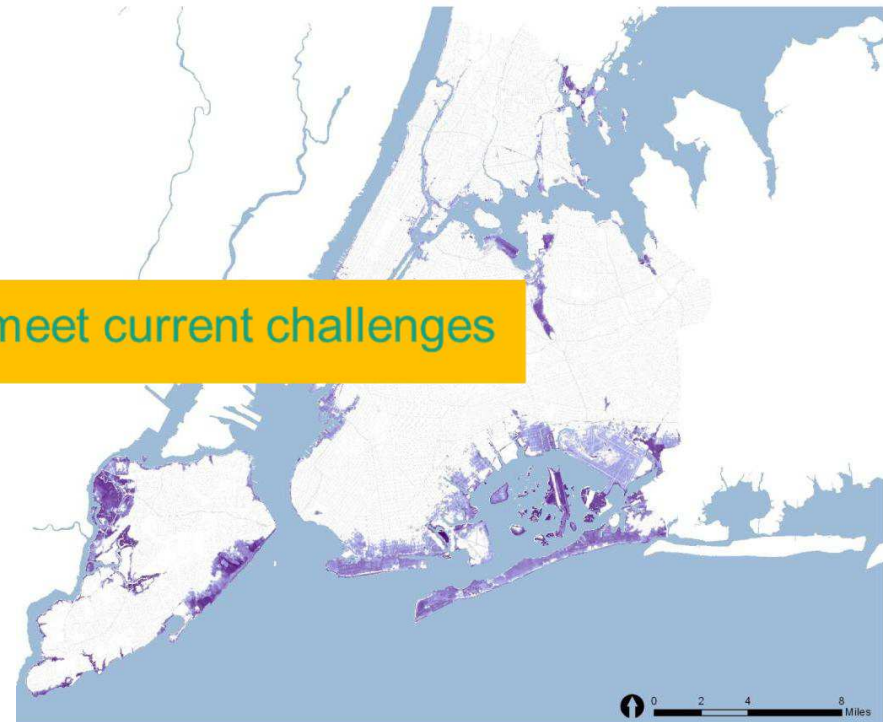
→ Damage from flooding and impact of wave action

→ Severe structural damage concentrated in areas directly facing shoreline

PlaNYC has to be adapted to meet current challenges

Upper Harbor and other areas to the north generally experienced inundation only

→ Damage primarily to building systems and contents



Hurricane Sandy

Building Code and Zoning

- Need for Upgrades to Building Code, Zoning, and Flood Maps
- FEMA Federal Emergency Management Agency updates flood maps, including recently damaged zones.
- additional impediments to flood-resistant construction

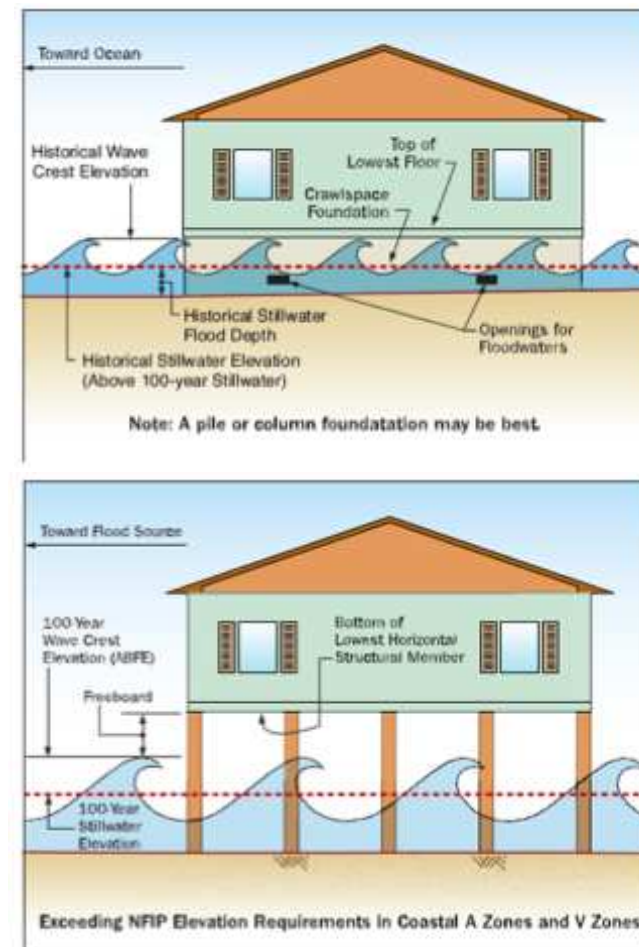


Fast reaction and adaption to situation

Hurricane Sandy

Zoning

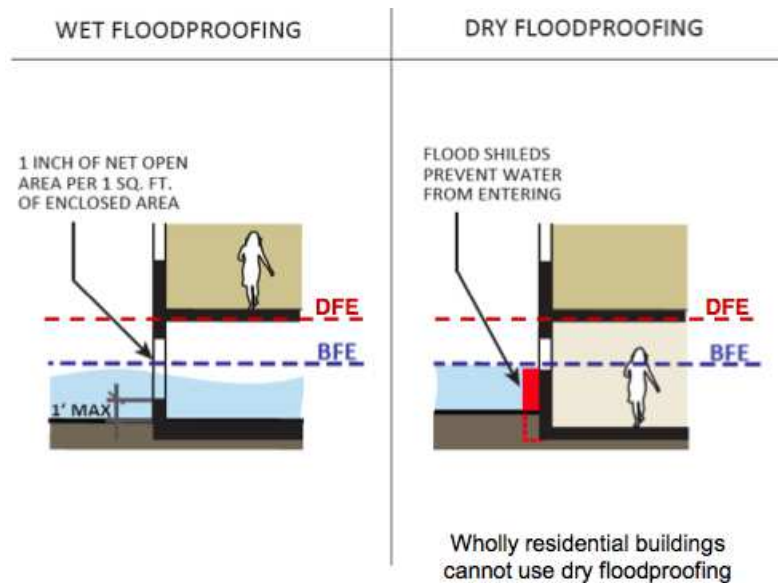
- Different floodproofing standards for different zones apply in areas where stillwater flooding is expected (A-zone) and where wave action is expected (V-zone)
- A-zone: Elevate lowest floor above BFE(Base Flood Elevation)
- Enclosure below the BFE must be wet flood proofed
- V-zone (high-velocity wave action zone) buildings elevated above BFE on piles or columns above open foundation



Adaption of methods to requirements

Hurricane Sandy

Floodproofing Requirements for Buildings

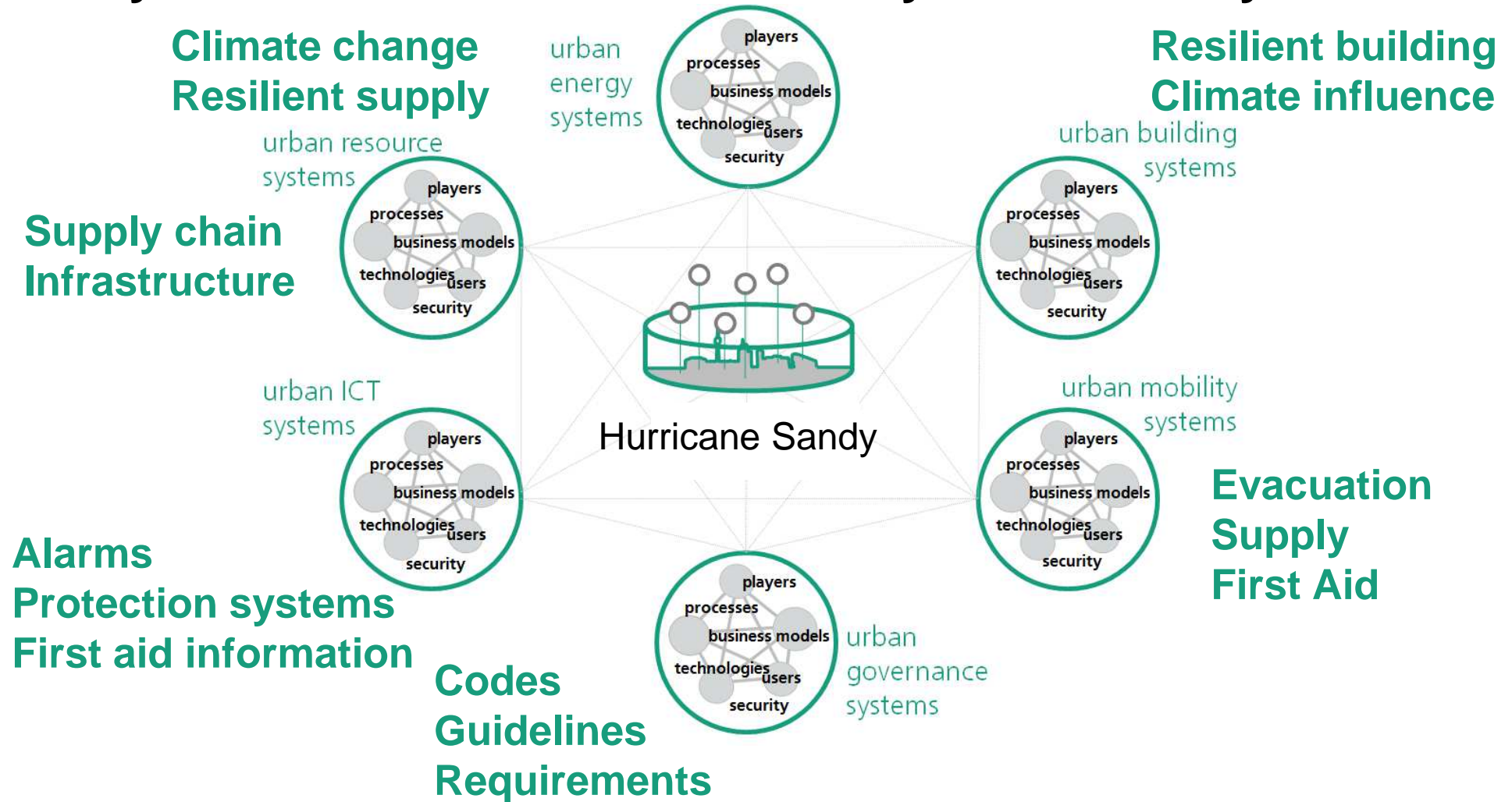


- Local codes must comply with FEMA standards in order to maintain eligibility for National Flood Insurance Program
- Two main techniques of floodproofing exist – applicable to different building types
- Buildings must be floodproofed to Base Flood Elevation (BFE)
- Highly risky buildings must be elevated to Design Flood Elevation (DFE)
- Wholly residential buildings cannot use dry floodproofing

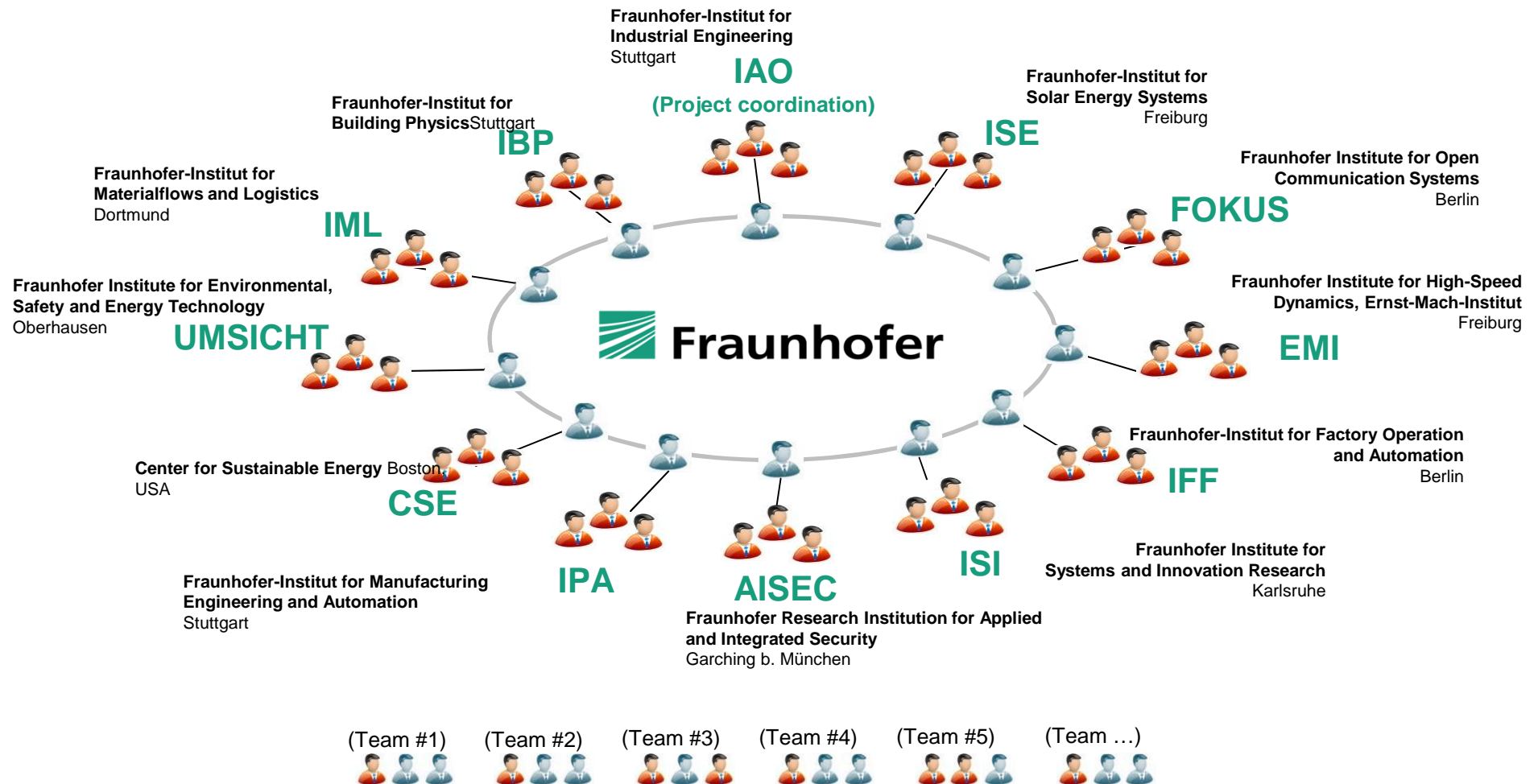
Adaption of requirement to risk factors

Hurricane Sandy

Systemic relation between security and other key factors:



Research in interdisciplinary teams



Current state of partners in the network

Membership confirmed



Membership planned



Summing up

- Fraunhofer uses interdisciplinary and international teams to solve future city problems with new concepts
- The Innovation Network: »Morgenstadt: City Insight« is analyzing systemic relations in city networks.



- In the example of the reaction to Hurricane Sandy by the NYC government, systemic relations are recognized and addressed

Systemic insight are needed for future concepts for city development

Contact

Elvira Ockel

Dipl.-Wirt.-Ing.

Tel: +49 (0)711 970-3373

Elvira.Ockel@IBP.fraunhofer.de

Nobelstraße 12

70569 Stuttgart

www.ibp.fraunhofer.de



...research and solutions for a sustainable world