NTNU

Det skapende universitet

Smart Sustainable Cities and Communities @ NTNU

Annemie Wyckmans, Rolee Aranya & many others
NTNU Faculty of Architecture and Fine Art
Meeting with Xi'an/Beijing delegation, Trondheim, 10 August 2015

http://www.ntnu.edu/smartcities

~~Cities as polluters~~

Smart Sustainable Cities

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Energy-Efficient,
Climate-Resilient,
Health-Promoting,
Inclusive & Attractive
by default

Smart Sustainable Cities & Communities

Spatial intelligence
Enhanced design, planning & management for transforming urban form and planning, incl nature-based solutions

Intelligent mobility systems
Multi-modal transport, transit-oriented development, interaction between traffic monitoring & urban infrastructures

Human smart cities & communities
Participation, behaviour & lifestyles. Knowing how people experience & use their environment so we can design & manage it better

Smart tools & technologies
ICT as enabler of improved urban structures & services. Which ones are available – which need to be created?

Targets, KPIs & assessment
Measuring. Vision, criteria, targets, indicators & assessment of urban sustainability performance

Transition, governance, learning
Transitions as multi-level, multi -actor change processes; learning; role of intermediary organisations & technologies

Value Creation & Business models
Services, knowledge creation, productive cities, social and cultural values, attractive and inclusive cities

Out of the lab, into the city
Testing & improving promising methods & solutions together with cities, industry, service providers and citizens

Smart City:
From Science to Practice
(and back)

How can research contribute to making cities smarter and more sustainable?

- Now
- In 20 years from now

What kind of research is needed now in order to help cities reach their long-term visions of energy, greenhouse gas emissions and sustainability?

How can we contribute to develop the right indicators and assessment methods to help cities in their transformation to a low carbon society?

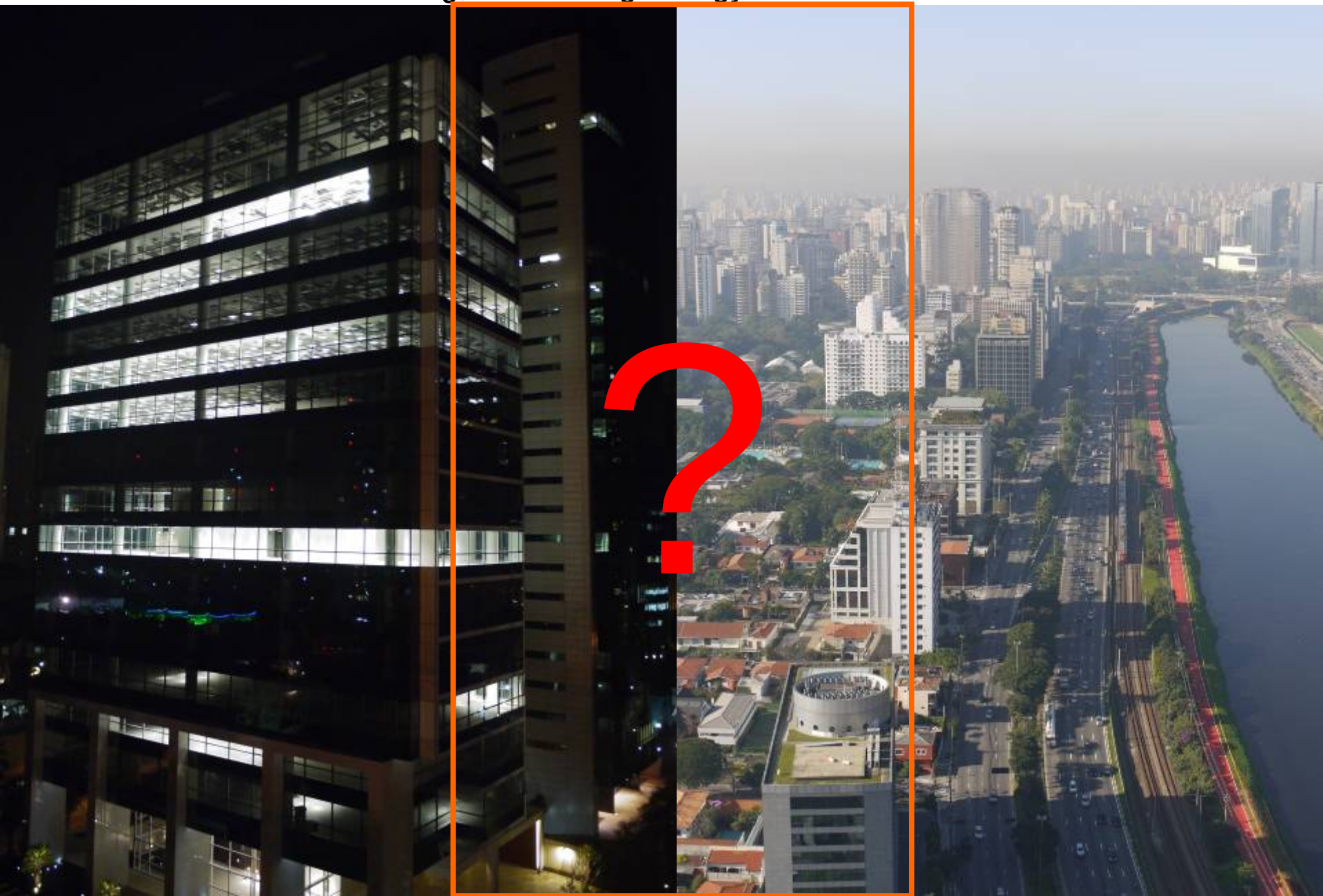
How can we provide science-based information as decision support for cities that need to make risky decisions? (i.e., not business as usual)

Resilient design

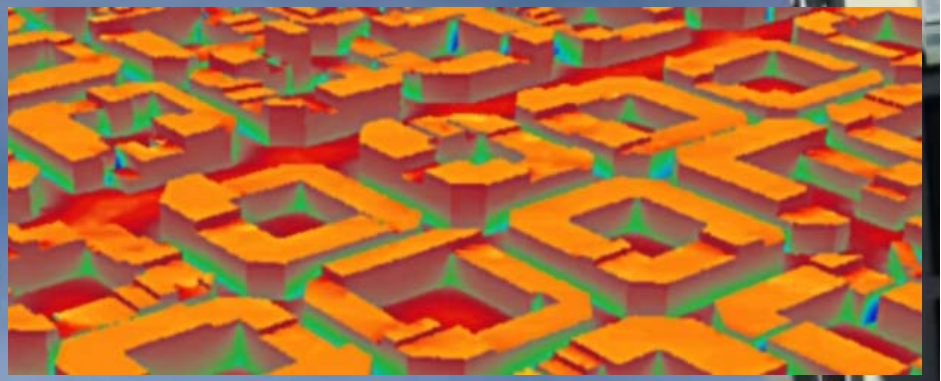
When everything functions as intended we hardly notice it…

… while poor design and errors are perceived very quickly, can create severe hindrances in our daily lives, and diminish our quality of life

A new role for buildings in generating, distributing, consuming, storing, and saving energy at urban scale



Solar Radiation in Norway - Trondheim case study
Overshadowing effect - Lack of preliminary study



Next step: Case study in Shanghai

RAMSES Reconciling Climate Change Adaptation, Mitigation and Sustainable Development in Cities

RAMSES
Science for cities in transition

HOME ABOUT RESEARCH CITIES RESOURCES EVENTS

"The road to sustainability runs through the world's towns and cities. By building sustainable towns and cities, you will build global sustainability"

Ban Ki Moon
Secretary General of the United Nations

www.ramses-cities.eu

ZenN Near Zero Energy Neighbourhoods. Energy Efficient Renovation of Domestic Building Blocks www.zenn-fp7.eu

ZenN
Nearly Zero energy Neighborhoods

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Mobilising cities and urban decision-makers

Four voices on ZenN – different actors with complementing perspectives

In order to achieve the desired holistic approach towards energy retrofitting, a wide range of dedicated participants is essential for the success of a project such as ZenN. Representing the variety of participants, a few of our project members give their views on the projects potential and their expectations.

Kerstin Rubenson, City of Malmö, project manager:
The demonstration sites in Malmö are in the need of refurbishment, and the owners are highly interested in turning their property into energy-efficient buildings. ZenN provides the opportunity to make this happen, and to evaluate which measures that are relevant to include when other buildings are being renovated. I hope that the project leads to better knowledge on what a nearly zero energy building is, and to packages of measures that can be used in different circumstances. For the city of Malmö, getting good examples on how to turn existing multi-family houses into low-energy buildings is valuable when communicating with other property owners. Also, it is a way for us to reach our emission-reduction targets. So far, we have not seen a lot of existing post-war multi-family houses succeed in large energy-reduction refurbishment projects. There is of course a risk that we will not reach all the way, but we will gain valuable knowledge and insight.

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Four voices
actors with co
perspectives
In order to achieve the
approach towards energy re a
wide range of ded...

More news »

Deliverables

Project deliverables will be published throughout project duration.

Project partners

Tecnalia
CEA
Ville de Grenoble
IVL Swedish Environmental Research Institute
Malmö stad
SINTEF
NTNU
Oslo Kommune
EJ-GV
City of Eibar
Debegesa
ASM

COSSMIC Collaborating Smart Solar-Powered Microgrids

www.cossmic.eu

Mobilising cities and urban decision-makers

HOME NEWS RESULTS LINKS & RESOURCES PROJECT STRUCTURE PARTNERS & PEOPLE CONTACT

Governance and Public Participation

Mobilising cities and urban decision-makers

Community improvement/ Neighbourhood upgrading of Saupstad-Kolstad in Trondheim

Urban Lab Trondheim

Landuse & transportation planning

ZEB buildings

Smart Cities

Low energy/ emission neighborhood planning

Health promoting areas

Social inclusion & participatory processes

Urban governance

Public space and Art

Summer Course «Sustainable Energy in Cities»

60 students: 20 NTNU/Europe, 20 SJTU, and 20 from other Chinese schools
2015-2016: Shanghai; 2017: Beijing?

- Key performance indicators for smart sustainable cities and communities
- Near-zero emission buildings: life cycle design, greenhouse gas emission evaluation
- Increasing solar potential of urban districts
- Energy-efficient construction, operation, maintenance and refurbishment of buildings
- Energy systems and services
- Interaction between buildings and users (professional and end users)
- Building and district heating and cooling
- Building integrated solar energy technologies
- Waste-to-energy conversion
- Smart buildings and grids technologies

Zhoukanghang (周康航) Residential Development Project; Illustration courtesy of Y. DAI

上海交通大學 Shanghai Jiao Tong University

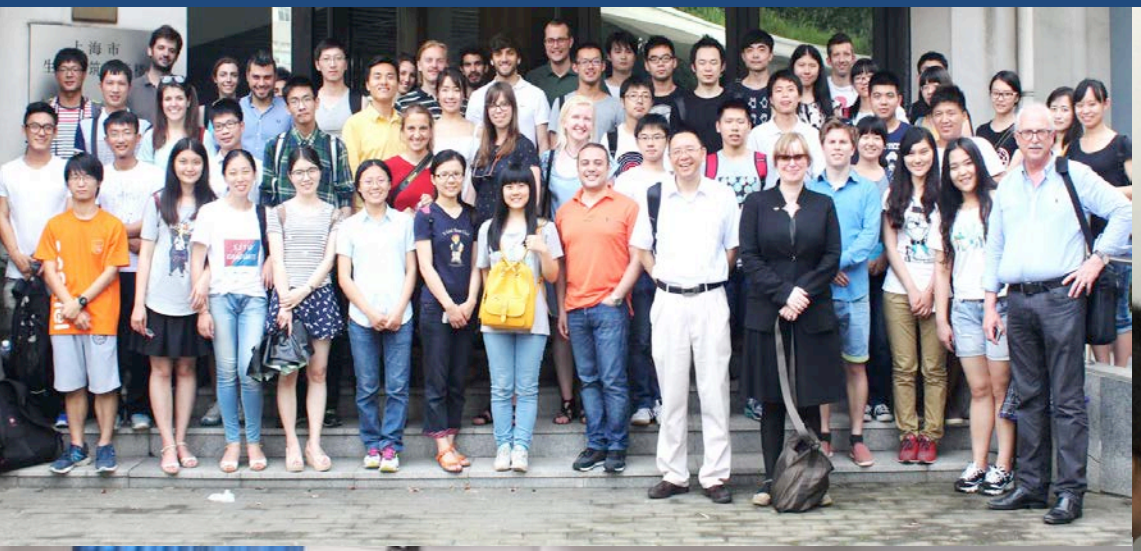
SIU NORWEGIAN CENTRE FOR INTERNATIONAL COOPERATION IN EDUCATION

NTNU – Trondheim Norwegian University of Science and Technology

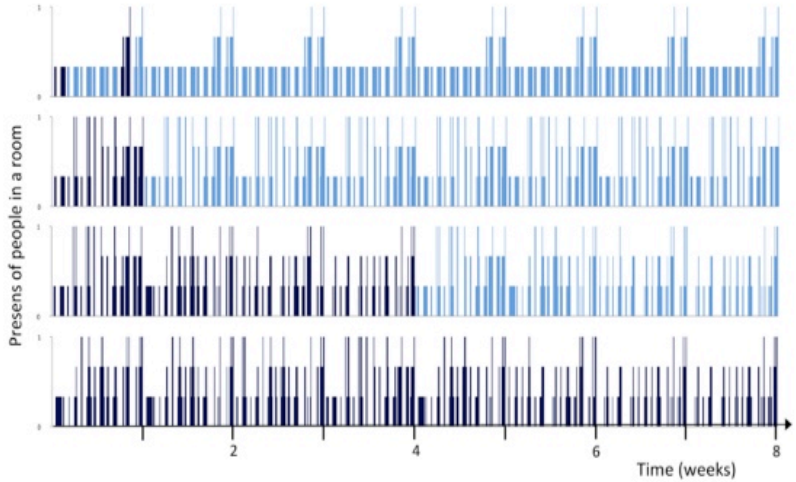
Summer Course «Sustainable Energy in Cities»

2015: SJTU–NTNU 6 – 17 July 2015, SJTU Minhang Campus, Shanghai

http://www.sjtuirc.sjtu.edu.cn/en/Resources.html



YEARLY OCCUPANCY BEHAVIOUR MODELS

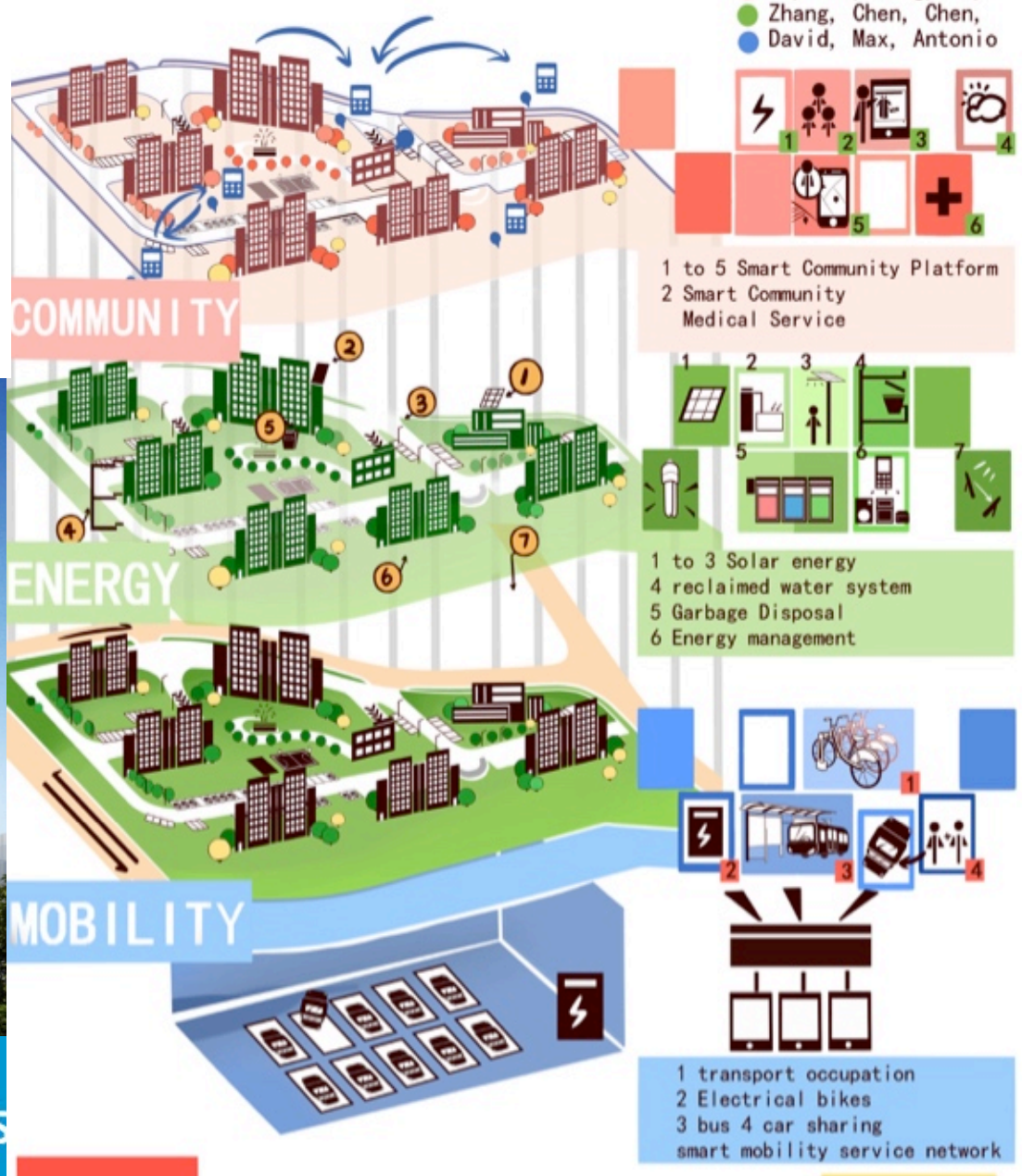


CARBONATORS

Group A

" The role of Smart Low Carbon Districts in the Transformation towards a Green Society – Zhoukanghang as a Low Carbon District"

Xu, Jin, Yang, Li,
Zhang, Chen, Chen,
David, Max, Antonio



Instigation of Research and Innovation Partnership on Renewable Energy, Energy Efficiency and Sustainable Energy Solutions for Cities (IRES-8)

EU-CHINA Research and Innovation Partnership Grant Application Form

<u>European partners:</u>

University of Manchester (UK)

University of Bologna (Italy)

University of Zagreb (Croatia)

Norwegian University of Science and Technology (Norway)

<u>Chinese partners:</u>

Tsinghua University, Beijing

North China Electric Power University

Beijing Jiaotong University

State Grid Smart Grid Research Institute

Contracting Authority: European Union

Represented by the European Commission

Reference: **EuropeAid/135-587/DD/ACT/Multi**

Sino-Norwegian Partnership on Sustainable Energy (SiNoPSE) SJTU – NTNU – THU

Under application

SiNoPSE will establish NTNU, SJTU and THU as «one-stop shops» for Sino-Norwegian cooperation on sustainable energy.

An integrated approach towards sustainable energy requires cooperation and communication between many different types of partners, stakeholders and public. A strong partnership between NTNU, SJTU, THU in SiNoPSE will be able to:

- engage key research, education and industry partners on sustainable energy in Norway and China
- facilitate knowledge transfer and mutual learning
- document ongoing experiences
- promote cooperation through peer-to-peer activities: double degrees, summer Schools, and sandwich PhDs with joint supervision

上海交通大學 Shanghai Jiao Tong University

NTNU – Trondheim Norwegian University of Science and Technology

EU-China cooperation on sustainable urbanisation (H2020 ENG-GLOBALLY-08-2016/2017)

Call program announced Autumn 2015

Cultural & socio-economic aspects of urban issues in China (Research & Innovation Action)

This topic is expected to provide in-depth insights on EU-China cultural and socio-economic aspects on urbanisation highlighting the common challenges and possible solutions that may apply in both EU and China.

EU-China innovation platform on sustainable urbanisation (Coordination & Support Action)

The Coordination action is expected to increase stakeholder awareness, exchanges and synergies between Chinese and European industrial, academic and public players engaged in sustainable urbanisation research, innovation and application.

Improved complementarity and coordination between different sustainable urbanisation funding programmes supported by the EU, the EU Member States and China should be achieved.