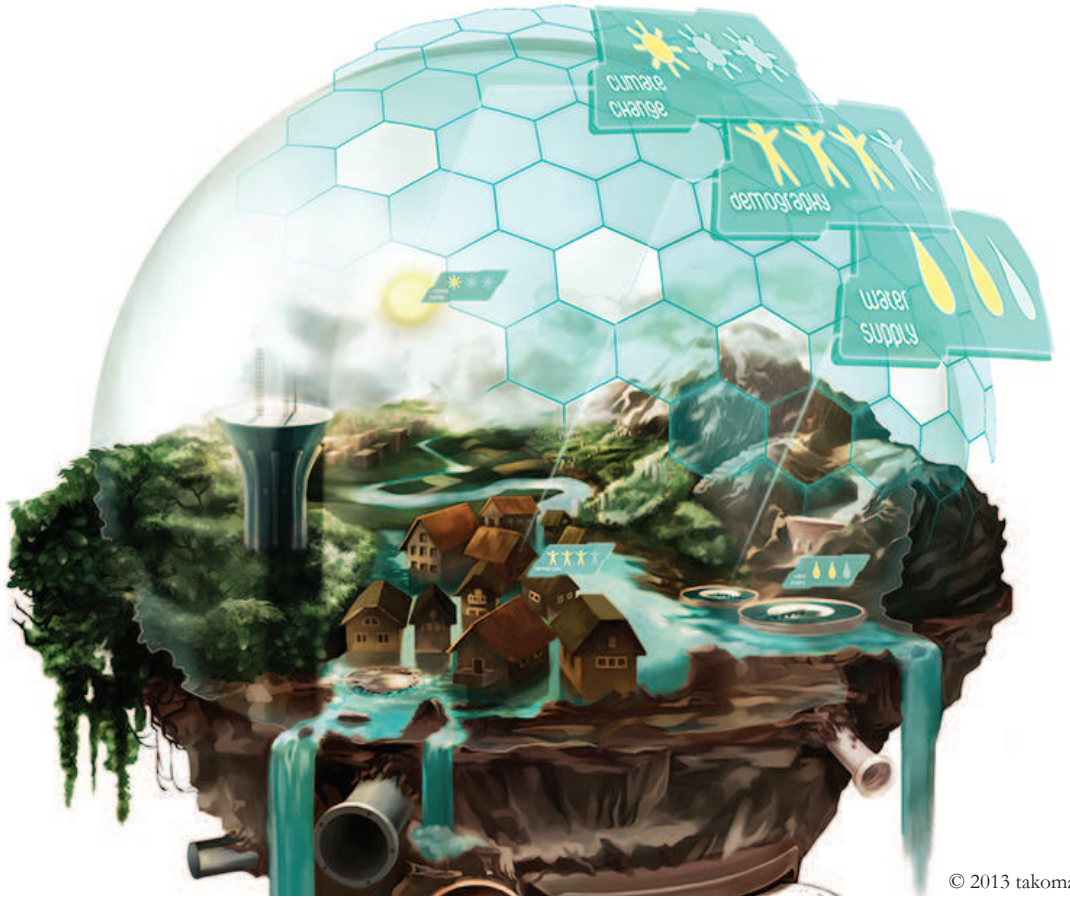
Bauhaus-Universität Weimar

Case Study Competition on Smart Cities
Organisational Models for Water Infrastructure

BWL im Bauwesen

K C @ W

Project Summary



One UN Millenium Goal is to halve the number of people without sustainable access to safe drinking water and improved sanitation facilities by 2015.

In 2012, 748 million people had no access to safe drinking water. Despite progress, 2.5 billion people in developing countries still lack access to improved sanitation facilities.[1]

The situation in developed countries is different. In most countries, access to drinking water and sanitation facilities is ensured, still these countries are underlying demographic change, structural transformation, change in ecological values and other factors. Both settings – despite they are quite different – are subject to significant ecological, social and economic challenges.

The landscape of infrastructure provision is changing. Decision-makers acknowledge the need to find solutions that take into account the perspectives of different infrastructure sectors. The approach to see infrastructure as a system of single systems aims to find potential synergies between different infrastructure sectors and to create smarter infrastructure solutions. This again will lead to "Smarter Cities".

One innovative approach in the water sector is to combine water-linked services with waste management and energy supply (cf. Hamburg Water Cycle®[2]).

Because it combines several (at least four) infrastructure sectors, this solution can be considered a "Smart City"-solution.

[1] UN, 2014: Ensure Environmental Sustainabilty; http://www.un.org/millenniumgoals/environ.shtml. 27.10.2014

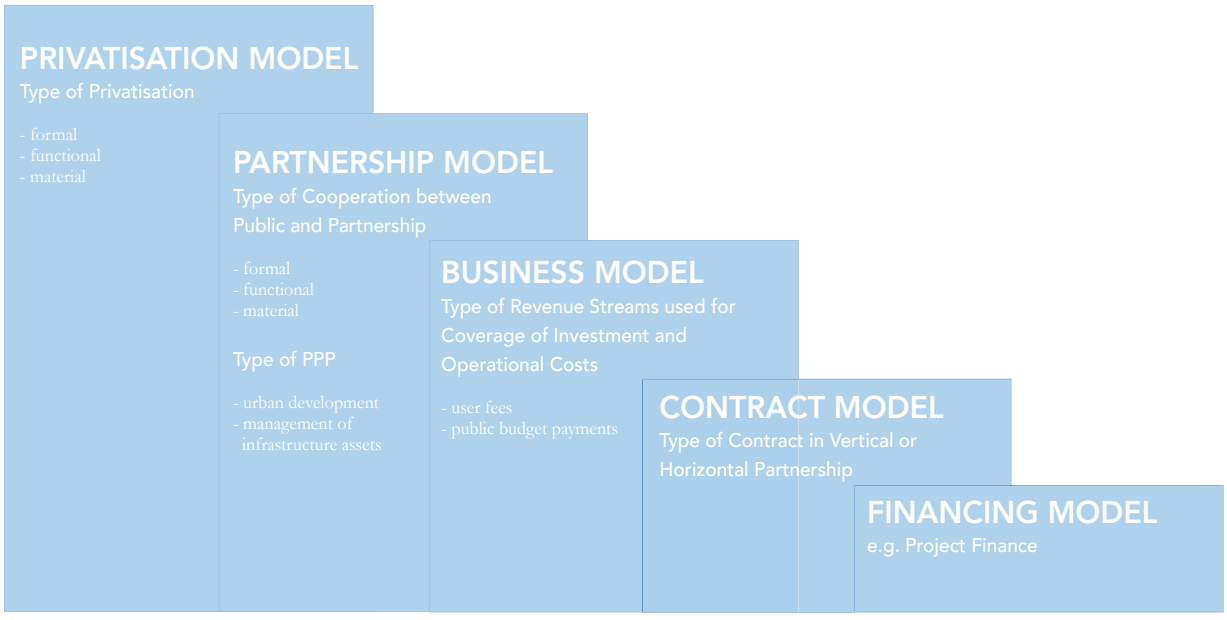
[2] „The HAMBURG WATER Cycle® (HWC) concept provides a holistic approach to both the energy supply and sanitation needs in urban areas. In this approach, the complimentary areas of water and energy infrastructure become interdependent, simultaneously protecting water resources and utilizing wastewater to produce energy. Thus, it is possible to close the material cycles directly in the residential environment. The most critical component of the HAMBURG WATER Cycle® is the separate treatment of the different wastewater streams, the so-called partial flow treatment. Stormwater, wastewater from the toilet, and wastewater from the kitchen and bathroom (when washing hands or using the washing machine for example) are separately collected and then separately treated." (Source: Hamburg Water Cycle; http://www.hamburgwatercycle.de/index.php/hamburg-water-cycle-44.html. 06.11.2014)

Besides technical innovation, one central question is how infrastructure provision can be organised. This leads to following questions:

- What are the current challenges of cities regarding infrastructure (and in our case especially water infrastructure)?
- What organisational models do exist (in both theory and practice)?
- What innovative technical solutions do exist in the water sector?
- Why is it so difficult to integrate different infrastructure sectors into one solution?
- How does the regulatory landscape look?
- How and where could be generated an added value by combining different infrastructure sectors?
- What recommendations can be derived from the general organisational model analysis and the identified case studies?

To address these questions, we decided to organise a case study competition (CSC).

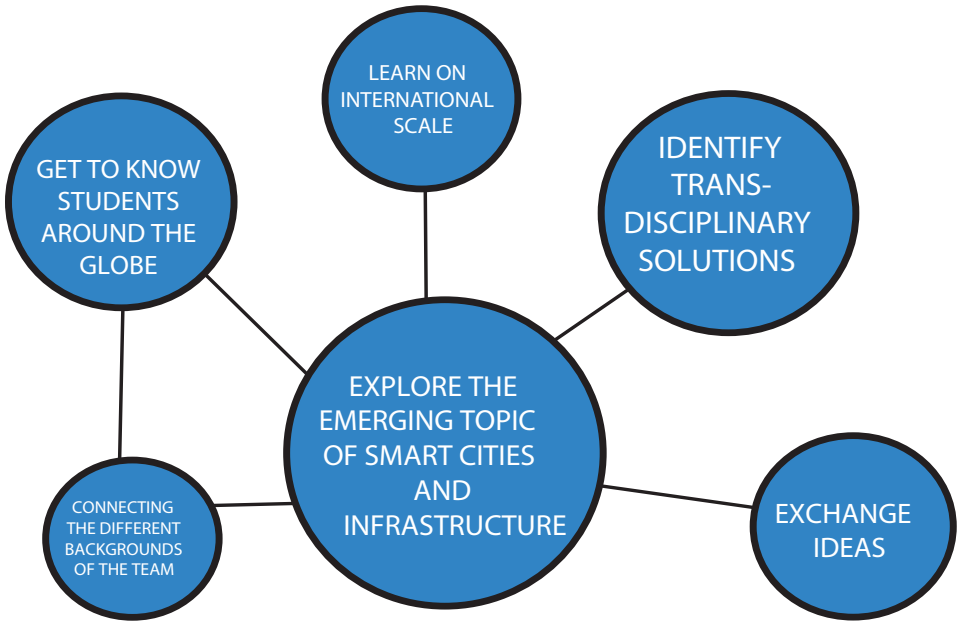
The goal is to develop an organisational model for a public authority to implement smart city elements of water infrastructure into its daily business. Students should analyse the situation of today's infrastructure in one urban setting. They should identify current problems and challenges. In the next step they should develop ideas how to implement smart water systems by focusing on possible organisational models. Finally, the students will present their results.



Determinants of the overall organisational model (Source: Weber, B. et al., 2010: Infrastructre as an Asset Class, p. 56)

Reasons to become part of CSC

The project is an innovative learning platform, integrating different disciplines. In a case study the students work on practical problems and learn how to work in an international and interdisciplinary team. The teams (consisting of five students) work on the project for about three months (April to June 2015). The organising partner is the Knowledge Centre @ Weimar[3] (KC@W) based at Chair of Construction Economics at Bauhaus University Weimar.
The students gain insights to current research projects of the Chair of Construction Economics at Bauhaus University Weimar which are closely linked to the CSC. These are "KREIS[4] - From disposal to supply: Linking renewable energy production with innovative urban wastewater drainage" and „TWIST++[5]- Paths of transition for water infrastructure systems: Adapting to new challenges in urban and rural areas | Smart and Multifunctional Infrastructural Systems for Sustainable Water Supply, Sanitation and Stormwater Management".



Learning methods

Since the project brings together students from various geographical origins and disciplines, the team members have different methodologies and cultural perspectives to solve a task. The international CSC-teams work remotely with the help of software tools for communication, sharing tasks and team coordination.

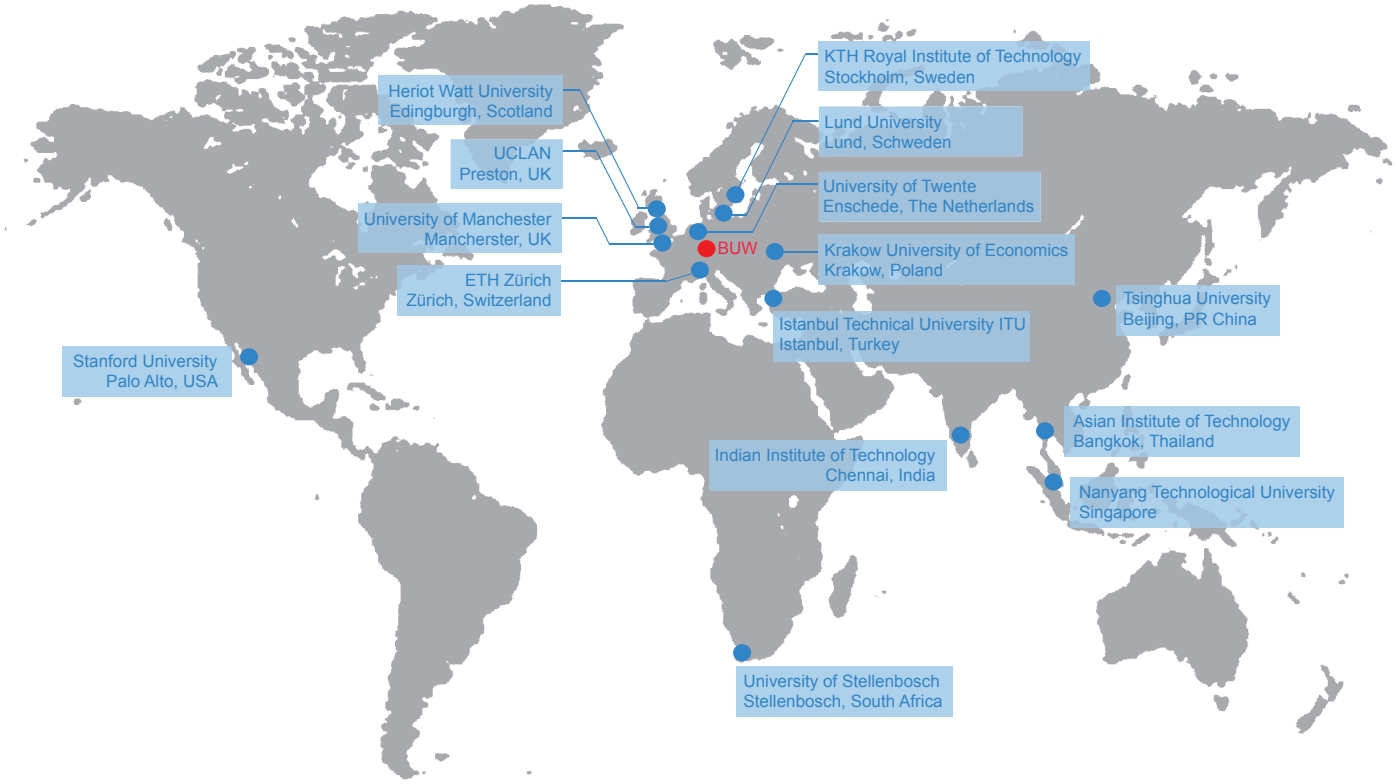
The students organise their work autonomically. KC@W-coaches support the process. During the biweekly meetings the teams receive feedback on their working progress and team organization. The learning process of the students is supported by experts who give input lectures about the project topics. Moreover, the students can exchange ideas and possible solutions with the other teams, e.g. during the interim presentations.

[3] KC@W-Homepage: www.uni-weimar.de/kcw
[4] KREIS-Homepage: www.kreis-jenfeld.de/home.html
[5] TWIST++ -Homepage: www.bmbf.nawam-inis.de/en/inis-projects/twist

The students work together with partners and students of the KC@W network. The KC@W was established as a Special Purpose Vehicle (SPV) entity in 2002 as part of an international network of six universities and industry partners around the globe. The founder of the network is the Bauhaus-Universität Weimar in Germany.

Since 2004, the network has been expanded considerably as Asian universities have joined the network in the framework of the "EU-Asia Network of Competence Enhancement on Public-Private Partnerships (PPPs) in Infrastructure Development". Supported financially by the European Commission, several project involving teaching, research and training are currently being conducted.

Current partners are:

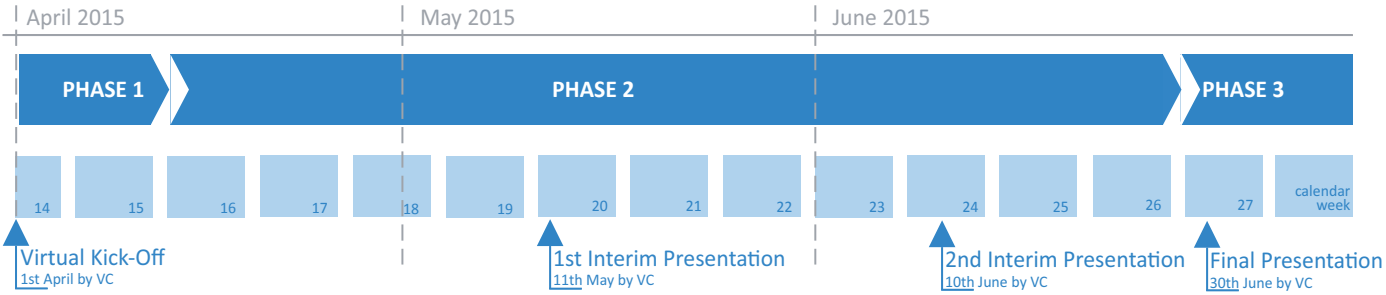


Prizes

The most successful team will be awarded by the Federal Association of Smart City e.V. Germany (300€) and gets the opportunity to present their ideas to leading "Smart City"-experts at an international conference. The results will be published in the Bauhaus Journal. The posters of all teams will be presented at the annual exhibition of Bauhaus University Weimar.

Details

Time Frame



Phase 1: Calendar Week 15-2015

Virtual Kick-Off

For the virtual Kick-Off where all students and professors get to know each other, each student should prepare a short presentation of him-/herself to introduce his/her background, personal strengths and motivation. During this session students also receive an introduction in collaboration and communication via ICT (tools, methods, tips).

Kick-Off: 1st April 2015

Input sessions

Experts and project partners will give input lectures aboutdifferent aspects of this CSC. The first input session introduces technologies of innovative water solutions. The second part of the first session gives an overview about organisational models. In further input sessions the project leaders of KREIS and TWIST++ will share their experiences and give their insights about the implementation of innovative water infrastructure. Relevant literature will be shared by KC@W-coaches.

First Input Session: TBA

Second Input Session: TBA

Phase 2: Calendar Week 16 to 25-2015

The goal here is to develop organisational models for smart water infrastructure. First , the team should develop a preliminary project plan including work packages, timelines, milestone definitions, resource planning, etc. At the second biweekly meeting, the project plan has to be presented. During phase 2 the teams present their intermediate results in two review sessions to the whole research group. The students get feedback on their ideas and can exchange ideas during the reviews. Between the sessions, the team works together autonomously and receives feedback during the biweekly meetings with their KC@W-coaches.

1st Interim Presentation: 11th May 2015

2nd Interim Presentation: 10th June 2015

Phase 3: Calendar Week 26-27-2015

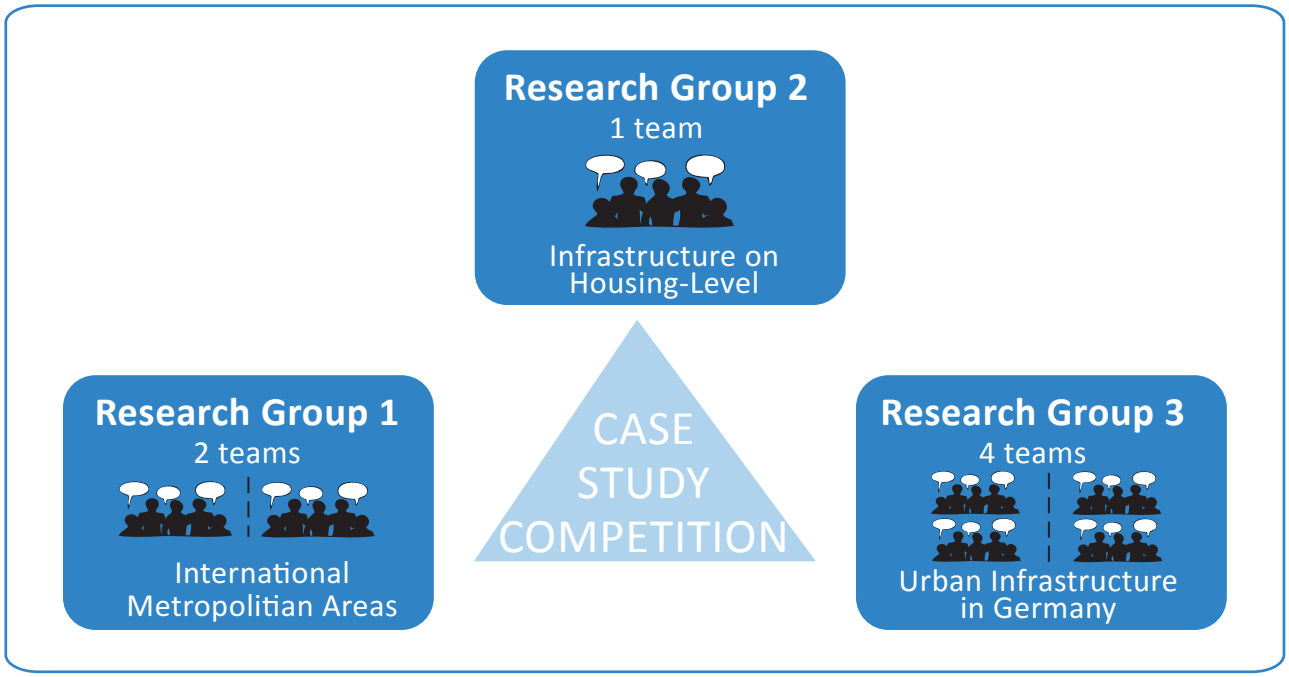
In the final, virtual presentation the teams should present their results. The last week before the final presentation is so to say the climax of the project. The team members summarize their ideas and focus on the deriving conclusions from their work. Besides the final presentation, the teams create a poster where they show their findings.

Final presentation: 30th June 2015

Student Working Groups

The student teams (in each five students) examine "Organisational Models for Smart Water Infrastructure".
There are three different urban settings:

- international metropolitan areas,
- infrastructure on housing level and
- urban infrastructure in Germany.



The first research group focuses its research on one international metropolitan area. The teams consists of international students from different disciplines. The application is open to international students and students from Bauhaus University Weimar (application deadline 31st January 2015).

The research activity of the second group will be "Organisational Models for self-sufficient water supply on a housing level". This team will consist of students from different disciplines. The application is open to students of all relevant study programmes at Bauhaus University Weimar (application deadline 31st January 2015).

The third research group consists of four teams dealing with urban infrastructure in Germany. These teams are open for students of the Master's programme in Management [Construction, Real Estate, Infrastructure] of Bauhaus University Weimar (no application needed, interested students register for the course).

General Information and Application

Disciplines

The project is addressed at master students or 3rd year Bachelor students. Students of the following disciplines are welcome to apply:

- Architecture
- Building Technologies/Environmental Engineering/Renewable Energies
- Civil engineering
- Sanitary Environmental Engineering
- Management
- Regional Management/Agriculture
- Urban Planning

Very good to excellent English in speaking and writing is mandatory.

Credits/ Grades

We suggest that students who successfully participated in the CSC obtain academic credits. The grading will be done by KC@W coaches in agreement with students' home university.
Students from Bauhaus University Weimar can obtain up to 12 ECTS (CSC can be recognized as a student research project (Studienarbeit).
Participants should plan to devote 25 hours per week to the project and during the preparatory period of presentations a bit more.

Application

The application should consits of a resume and a letter of motivation (max. 400 words).
Please also send us language or grade certificates if available.

Application deadline is 31st January 2015. Please send your documents to andrea.lueck@uni-weimar.de.
Confirmation of acceptance into the programme will be provided by the organizing committee by the mid of February 2015.
In case of any questions contact Andrea Lück (details next page).

Costs

Participation in the CSC is free of charge. All communication and meetings will be provided virtual and with free software.

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Bundesverband Smart City e. V.