

HafenCity University Hamburg

HafenCity University (HCU) Hamburg is dedicated to the urban built environment and metropolitan development in its physical, ecological, socio-economic and aesthetic dimensions. This new university was founded by the Free and Hanseatic City of Hamburg in January 2006. It was formed out of three former academic institutions (HAW, HfbK and TUHH) in Hamburg to address to the current and future issues facing our towns and cities. Today our profession is based on the disciplines of the HCU, which cover the spectrum from "building to city" and comprises the subject areas: Architecture, Civil Engineering, Geomatics and Urban Planning. Within and across these disciplines it brings together different approaches to research, teaching and practice as they concern the urban environment.

Contact REAP Group

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photo: Johanna Ahlers

Klimzug-Nord

Strategic concepts for adaptation to climate change in the metropolitan region of Hamburg

One of the new projects of 2009 is the regional based project "Klimzug-Nord" funded by the Federal Ministry of Education and Research (BMBF). It runs for five years until March 2014. Three professors of the REAP Group are involved in this project. Within this project there will be developed Concepts for technologies and methods to minimize the consequences of climate change. Another intention is to help the population and the economy to adapt to the higher risks caused by climate change. The principal focus is on three main topics: Astuary River Management, Integrated Urban Development and Sustainable Cultivated Environment. REAP is engaged within the topic Integrated Urban Development with the three following projects:

The project „Stormwater Management“ analyses how existing methods of stormwater management can be adapted to climate change, particularly regarding 100-year storm events and dry spells. These methods will be integrated into different structures of urban development also with respect to nature conservation.

(Prof. Dr. Wolfgang Dickhaut and Elke Kruse)

The project „Passive Air Conditioning in Administration Buildings“ deals with passive climate control of administration buildings. Subjects are existing buildings as well as new planned buildings concerning the existing and future climate adaptation by passive air conditioning, to increase the user's comfort and to reduce the energy consumption.

(Prof. Dr. Udo Dietrich and Lydia Ax)

The project „Regulative Forms of Regulation of Climate Adaptation Governance“ aims to evaluate national and international legal standards for climate adaptation. Legal principles and instruments are examined with a focus on the potentials laws might offer to allow a more flexible response to the possible risks occurring in different climate change scenarios.

(Prof. Dr. Wickel and Nelly Morgenstern)

For further information please visit: <http://klimzug-nord.de>.

SAWA

Strategic Alliance for integrated Water management Actions

Another project concerning water management is the EU project "SAWA". This Interreg IV North Sea Region project is funded by the European Union Regional Development Fund (ERDF) and is running since December 2008 with duration of four years. Lead by the Landesbetrieb für Straßen, Brücken und Gewässern (Agency for Roads, Bridges and Water Hamburg) 22 partner institutions from Germany, The Netherlands, Norway, Scotland and Sweden aim at facilitating the implementation of the Directive on the Assessment and the Management of Flood Risks.

The international partner Institutions strive for a transdisciplinary development of an implementation strategy. This implementation strategy proposes to adapt existing water management systems to the effects of extreme flood events and to accommodate them with the integrated river basin management of the Water Framework Directive.

The REAP Group investigates the potentials of synergetic measures that help to reduce flood risks and achieve a good the good ecological status in the catchment of the river Wandse. These measures refer to storm water management and optimizing the use of retention capacities in and along the watercourses.

Responsible: Prof. Dr. Wolfgang Dickhaut and Tobias Ernst



photo: Johannes Gerstenberg

SWITCH

Water Management for Tomorrow's Cities' Health

This EU-funded project started in February 2006 and will end in January 2011. It belongs to the 6th Framework Program (FP 6) - Integrated Projects: Global Change and Eco-Systems. Cities' Health" and is lead by the UNESCO. The overall objective is to enforce a sensitive handling of water in urban areas. There are two main tasks that are dealt with. One is the development of a manual for water sensitive urban design. Herein best practice principles are developed especially with respect to stormwater management. The methodological approach comprises the analysis of case studies that could possibly support those principles.

The second task is the implementation of a so-called Learning Alliance. The latter is an institutionalised group of stakeholders that comes together to discuss the possibilities of an integrated approach to urban water management strategies for Hamburg-Wilhelmsburg for the year 2030. In this case the developed strategies focus on the question of the future use of surface waterbodies. The aim is to integrate separate parts of waterbodies regarding their future uses in terms of conservational and recreational purposes. The Learning Alliance is one of the key elements within the SWITCH project.

Responsible: Prof. Dr. Wolfgang Dickhaut, Jacqueline Hoyer and Björn Weber



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The REAP Group

Resource Efficiency in Architecture and Planning (REAP) aims to advance research and teaching in resource efficient building and in urban services technologies as well management and planning practices. Its primary focus is on promoting the diffusion of existing technology, bringing it "from the shelf into the world". This involves integrating novel environmental technologies and management strategies into architectural and urban design as well as understanding and addressing barriers of implementation. The REAP Group represents a broad range of academic disciplines including: Architecture, Civil and Construction Engineering, Geomatics, Physics, Law and Economics, Urban and Infrastructure Planning. Most of its members have worked abroad for several years. The Group maintains a variety of international contacts.

Sustainability and the Built Environment

Resource efficiency in the built environment is crucial for the sustainable development of our cities. Construction, renovation, operation and demolition of buildings and technical infrastructure make up the largest share of European and global energy and material consumption. Moreover, increasing water efficiency in the building sector is a must to take pressure off the world's precious water resources. The built environment presents tremendous opportunities for conservation and efficiency improvements and is the "low hanging fruit" in any effort to foster broader resource efficiency. The challenge is to implement what is already out there, riding the learning curve and overcoming habits, risk aversion and the complexities of coordination.



Use Efficiency

Universities and Students for Energy Efficiency International Training

This international project started in June 2009 and is one example for our concept of "Research Integrated Teaching" where students are involved into research activities during their studies. It is funded within the Intelligent Energy Europe (IEE) Program of the EU and will run for three years. It is coordinated by the University of Rome „Tor Vergata“ and involves nine universities from different EU countries as well as four technological market players. This project aims to create know-how for energy efficient systems in university buildings through the application of the Energy Performance for Buildings Directive (EPBD). The goal is that universities and the people that inhabit them, students and staff, develop into model examples for both technical solutions and energy efficient behaviours. The innovative aspect of this project is that it involves students as the main actors of the project implementing EPA methodologies as well as working and interacting together with research, teaching, and technical staff. This promises a high leverage as today's students are tomorrow's leaders in politics, economics, and public opinion.

Responsible: Prof. Dr. Udo Dietrich and Sonja Schelbach.

For further information please see: <http://www.useefficiency.eu>

Primero

Simulation program for primary energy demand

The project "Primero" is one example for applied research embedded in the REAP Group. It was funded by the Rud. Otto Meyer-Umwelt-Stiftung and will be completed in the spring of 2010. Within the project a simulation program for the identification of primary energy demand of services such as heating, warm water, ventilation, cooling, and electricity for artificial light in buildings will be developed. This program will be especially designed for architects. Project partners are ALware (Andreas Lahme) from Braunschweig and the FH Wolfenbüttel Department of Informatics with further support from students from the University of Hamburg (UHH) and the HCU.

Responsible: Prof. Dr. Udo Dietrich.

QPBT

Development of an efficient algorithm for the simulation of sound diffraction on the basis of Quantized Pyramidal Beam Tracing

Noise is one of the most underestimated environmental effects. Until today prognosis suffer from inaccuracies and hence avoidable costs for noise protection, mainly due to the fact that multiple reflections and diffractions appearing with sound propagation in built-up areas cannot be computed satisfyingly. QPBT is a Fundamental Research project which is supported by the German Research Association (DFG). It started in February 2009 and will run for three years. The aim of this project is to find a new method for the simulation of sound propagation. Currently in both room acoustics and noise emission prognosis ('city acoustics') ray or beam tracing algorithms are widely used and have proved to be efficient. The crucial point is that computation time noticeably increases if simulation of diffraction or scattering is applied. Yet a revolutionary new algorithm to solve the problem was discovered by Prof. Uwe Stephenson. The idea is to realize a reunification of the solid angles of the beams through quantization. Additionally a method of beam diffraction, based on the uncertainty relation has recently been found, which seems to be generalizable.

Responsible: Prof. Dr. Uwe Stephenson and Alexander Pohl.

EnEff City

Energy-Efficient City Competition, the Hamburg Way

This project (2009-2010) is funded by the German Ministry for Research and Education (BMBF) and is coordinated by the City-State of Hamburg („Wettbewerb Energieeffiziente Stadt, der Hamburger Weg“). The team includes a variety of German partners. The project's aim is to identify heating and cooling strategies that integrate the demand and supply side, esp. in their regional coincidence. The team develops a tool to map heat demand and supply in a Geographical Information System, allowing for interactive exploration of renovation and district heating strategies. This is a cooperation with the Digital City Research Group of HCU.

Responsible: Prof. Irene Peters, Ph.D., and Prof. Dr.-Ing. Jochen Schiewe

Research Integrated Teaching

at Universities of Hamburg

The concept "Research Integrated Teaching" ("Forschende Lehre") is representative for the objectives of the REAP Group. It aims to introduce state-of-the-art knowledge from research projects and insights into teaching to form practical understanding and relevant know-how at early stage. This project was running for two semesters and completed in 2009.

This project aims at directly integrating new research results and scientific insights into student projects and lectures. Within the interdisciplinary project "Urban Quality of Life and Environment – Correlation between deconstruction, conversion and redevelopment on the example of Große Bergstraße (Hamburg-Altona)" nine different REAP teaching modules followed from the project and were integrated into the curriculum. The project was funded by the Körber Stiftung and completed in 2009.

Responsible: Prof. Dr. Wolfgang Dickhaut and Prof. Wolfgang Willkomm



Teaching at HCU Hamburg

After two Years of preparation our REAP Master Program started in Winter Semester 2009/2010. Now it already brought together students from five continents. Lectures and seminars are grouped around a central project work, which is inspired by- and contributing to the research activities of the REAP Group. The project-based work allows student interests and experiences be applied practically. They learn to design and plan concepts in the context of real- or potentially real problems.

Reports and Studies of REAP

The compilation of reports and studies is part of the research activities of the REAP Group. They often concern the topic "Energy Efficiency" and include the collection and documentation of data as well as the analysis of comprised potentials, which are needed for further research.

In 2009 members of the REAP Group were working on several reports and studies, such as "Planning Energy Efficiency for the Hamburg Quarter of Uhlenhorst" and "Retrofitting Hamburg's historical brick buildings for energy efficiency" (Prof. Peter Braun) and "Implementation of a wind based passive air conditioning method on the new HCU building" (Prof. Dr. Udo Dietrich).