



Managing Water for the City of the Future

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www.switchurbanwater.eu

EXECUTIVE SUMMARY

Increasing global change pressures, escalating costs and other risks inherent to conventional urban water management are causing cities to face ever increasing difficulties in efficiently managing scarcer and less reliable water resources. In order to meet these challenges SWITCH (Sustainable Water Management Improves Tomorrow's Cities Health) is facilitating a paradigm shift in urban water management.

SWITCH is an EU funded action research program being implemented and co-funded by a cross-disciplinary team of 33 partners from across the globe, including 17 from the EU and 12 from developing countries. The "consortium" is from the fields of academic, urban planning, water utility and consulting interests. This network of researchers and practitioners are working directly with stakeholders in ten cities around the globe. The overall goal behind this global consortium is to catalyse change towards more sustainable urban water management in the "City of the Future". Demonstrating research and sharing knowledge across a range of different geographical, climatic and socio-cultural settings is expected to lead to global adoption and acceleration of more sustainable solutions.

SWITCH CITIES AND STUDY SITES



THE SWITCH APPROACH

The paradigm shift proposed by SWITCH is based on several key concepts of urban water management including: resilience of urban water systems to global change pressures; interventions over the entire urban water cycle; reconsideration of the way water is used (and reused); and greater application of natural systems for water and wastewater treatment.

- **Resilience of Urban Water Systems to Global Change Pressures** – Projections of future global change pressures are plagued with uncertainties and hence there is a need to develop urban water management strategies that are insensitive to these global change uncertainties. SWITCH is developing processes to generate optimal urban water management systems that are robust, adaptable and sustainable under future global change pressures. These flexible systems will be characterized by their capability to adapt to new, different, or changing requirements and will that provide the best solutions in an uncertain world.
- **Interventions over the entire urban water cycle** - By applying an integrated approach to urban water management it is should be possible to satisfy the water needs of a community at the lowest cost whilst minimizing adverse environmental and social impacts. SWITCH is developing an integrated approach that will provide tools to analyze the interactions across the urban water cycle for a range of management and technological solutions. The approach will encompass various aspects of water management, including environmental, economic, technical, political, as well as social impacts and implications. It will enable optimal urban water systems to be developed, driven by sustainability criteria.
- **Reconsider Water Use** - The challenge of servicing more people with water requires us to critically look into water use practices and to develop strategies that maximize the benefits of water services while minimizing the usage. Balancing the demands for water between the various sectors will need to be accompanied by the use of new and alternative resources. Increased recycling of wastewater will ensure better access to safe water, reduced vulnerability to extremes and increased adaptive capacity. SWITCH is developing a combination of end-use efficiency, system efficiency, storage innovations, and reuse strategies would reduce water demand.
- **Application of Natural Systems** - Besides pipes and treatment plants, the natural capacities of soil and vegetation should be applied to absorb and treat water. Many natural systems are capable of removing multiple contaminants in a single system, and are better able to absorb a variety of both hydraulic and contaminant shocks. Natural systems are found to be more cost-effective as they require lower capital costs and lower operation and maintenance costs. SWITCH is developing innovations in the area of natural systems, including: constructed wetlands, soil aquifer treatment and river/lake bank filtration.

The SWITCH approach is designed to contribute to a reduction in the vulnerability of cities and an increase in their capacity and preparedness to cope with future global changes pressures.

THE SWITCH RESEARCH PROCESS

The SWITCH research process is a combination of:

- **Learning Alliances** – SWITCH is linking up a wide range of stakeholders at city level to interact productively and to create win-win solutions along the water chain. They consist of a series of structured platforms, at different institutional levels (national, river basin, city, community etc), designed to break down barriers to both horizontal and vertical information sharing thereby speeding up the process of identification, adaptation, and uptake of new innovations.
- **Action Research** - SWITCH is carrying out more demand-led, action-orientated research in cities with a view to achieving greater integration and wider impact through the Learning Alliances.
- **Multiple-way learning** – SWITCH is promoting multiple-way learning, where European cities learn from each other and from developing countries, and vice versa.

The three main components of the SWITCH research process will lead to greater impact and more potential for taking innovations to scale through the development of locally appropriate innovations and ownership of the concepts and process. In addition, undertaking research at different institutional levels will both shorten the time between developing new knowledge and scaling it up; and, ensure that local solutions are nationally relevant and applicable. Also, by sharing the learning process among cities, replication of innovations will be accelerated.

HIGHLIGHTS OF 2007

ACHIEVING A COMMON VISION

City visioning exercises

SWITCH researchers have been working with Learning Alliances in the SWITCH cities to create a “Vision for Water Management in the City of the Future”. Accra, Hamburg, Birmingham and Alexandria have created their vision, mapped potential strategies and begun to select sustainability indicators to track their status. The remaining SWITCH cities will develop their visions in early 08.

Collaborations to increase impact

SWITCH is working with a number of other large global networks in the urban water management field to increase the overall impact of its activities including:

- UNESCO-IHP –Have aligned urban program to SWITCH. Joint workshops on sustainability in urban water management have been held
- International Water Association (IWA) – Ongoing discussions to align Future Cities activities including activities for the IWA Congress in Vienna in 08
- International Water Resources International (IWRI) – Focused on bringing global industries into the SWITCH approach. Anglo-American has expressed interest in adopting SWITCH approach

Raising the priority of water planning for urban planners

A series of seminars to bring together urban planners and water planners has been organised. The object is to raise the priority and emphasis given to water in urban planning. Rotterdam, Utrecht, Tel Aviv, Belo Horizonte, Hamburg and UK have all agreed to participate in the first seminar focusing on North countries in March 08.

GROWING THE SWITCH APPROACH

SWITCH Asia-Pacific

In 2007 the Director General of UNESCO announced the initiative SWITCH – Asia Pacific. This programme will follow the SWITCH approach but be targeted at cities in the Asia Pacific region with local partners and UNESCO.

New SWITCH Cities

Cali, Columbia and Lima, Peru were originally designed as SWITCH study sites. On their own initiative SWITCH partners UNIVALLE and IPES together with local stakeholders decided to create Learning Alliances on and have lobbied the Consortium to be recognized as SWITCH cities. The MT has agreed that they fit the criteria and is including them in the official list.

2nd Scientific Meeting

The 2nd SWITCH Scientific Meeting in Tel Aviv, Israel was attended by over 70 researchers from around the globe. During 2007 the Consortium produced over 100 reports on various aspects of urban water management.

CITY WATER – A TOOL TO MAKE RESEARCH REAL

Teams from UNESCO-IHE, University of Birmingham, NTUA, EPFL, Unit Middlesex, Univ Abertay, and WEDC have joined forces and modeling efforts to create a shared effort towards integrated urban water management.

A GLOBAL TRAINING INITIATIVE

International Research School for Urban Water Management (IRS-UWM)

SWITCH has established the IRS-UWM in collaboration with the International Hydrological Programme (IHP) of UNESCO, building on its well-established network and extensive experience in the field. This collaboration ensures the continuity of the IRS-UWM beyond the SWITCH project term. IRS-UWM activities will include postgraduate training of PhD students and scientific research, in disciplinary and multidisciplinary sustainable UWM issues. In addition it will aim to support of society, urban water actors, and policy makers with independent and scientifically based expert advice.

SWITCH On-Line Training Platform

An online global training platform (www.switchtraining.eu) has been activated. This online, interactive training platform includes case-studies, example designs with calculations, worksheets and tutorial sessions. The structure of the platform reflects the thematic structure of the SWITCH programme.

The platform contains two foundation themes (urban water paradigm shift and governance and institutional change), that underpin all other themes in the training platform and will promote SWITCH's integrated approach to urban water management. This component of the platform will include games, where users can create different urban water management scenarios and then investigate the performance of these scenarios using the SWITCH sustainability framework.

In addition to the foundation themes, the online global training platform will also include four specialized themes (storm water management; urban water supply & use; water use in sanitation and waste management; urban water environments and planning).

UPCOMING ACTIVITIES

In addition to progressing the planned research and demonstration activities across SWITCH a number of new initiatives are planned for the period from March 08 until July 09 including:

A Film documentary of SWITCH activities in Accra, Beijing and Lodz in collaboration with UNESCO-IHP. Initial screening will be at EXPO 08.

A series of policy briefing notes aimed at regulators and policy makers. Three will be produced by August 08 with initial topic areas potentially covering Learning Alliances, Innovative Approaches to Reuse and Threats and Uncertainties for Urban Water Management.

IUWM Research School Programme of activities including sessions on Urban Water Reuse in Tehran, Natural Systems and Urban Water Management in Lodz, Integrated Urban Water Modeling in Brazil and Demand Led Research in Urban Water in Egypt. The first session on Advances in Demand Management will occur in April in Accra.

City Water Tools - Focused effort across SWITCH with city learning alliances to develop City Integrated Urban Water Management strategies including launch of the City Water Tools and training in cities in spring 2009.

Collaboration with multiple groups to continue to increase impact including:

- EXPO 08 – The SWITCH partner in Zaragoza, AYTO (Javier Celma) is responsible for organizing the Water Tribune session on Water and Cities. He has asked the SWITCH Scientific Director and SWITCH training coordinator (ICLEI) to contribute to this initiative and as a result SWITCH is likely to be well represented at EXPO. Tribune activities will be complimented by the SWITCH film documentary and SWITCH posters in the Country Pavilions of SWITCH cities.
- In December 08 SWITCH will hold its 3rd Scientific Meeting in Belo Horizonte, Brazil. To capitalize on this opportunity and enhance the impact of SWITCH effort is being made to link the SWITCH event with other major urban planning events happening in South America. The SWITCH Scientific Director is on the editorial board of the Urban Water Environmental Congress and is actively linking the SWITCH event to other activities.
- World Water Forum – SWITCH is coordinating the theme on Science and Innovation in Water Management and should have a strong presence at this event. As part of this exercise SWITCH has been approached to invite mayors from SWITCH cities to help draft a declaration for Future Cities and Integrated Urban Water Management.
- IWA World Water Congress – SWITCH is actively working with IWA on the Cities of the Future section of the Congress.

“City of the Future” symposium series continuation bringing together urban and water planners, this time with an emphasis on South countries

SWITCH Partners

Netherlands

UNESCO-IHE
Stichting International Water & Sanitation Center (IRC)
ETC Foundation (ETC)
Wageningen University (WU)

United Kingdom

Middlesex University Higher Education Corporation (MU)

The University of Birmingham (UNI BHAM)
Ove Arup and partners Limited (ARUP)
Greenwich University Enterprises Limited (GUEL)
Loughborough University (WEDC)
University of Abertay (UA)

Germany

Technische Universität Hamburg-Harburg (TUHH)
ICLEI – European Secretariat, GmbH (ICLEI)
Ingenieurgesellschaft Prof. Dr. Sieker mbH (IPS)

Technische Universität Berlin (TU Berlin)
Hamburg Municipality (FHH/BSU/LP)
Hafencity University Hamburg (HCU)

Israel

Mekorot Israel National Water Company (MEKOROT)
The Hebrew University of Jerusalem (HUJI)

China

Institute of Geographical Sciences and Natural Resources
Research, Chinese Academy of Science (IGSNRR CAS)
Chongqing University (CHONU)

Spain

Ayuntamiento de Zaragoza (AYTO)

Poland

University of Lodz (UL)

Ghana

International Water Management Institute (IWMI)
Department of Civil Engineering, Kwame Nkrumah University of
Science and Technology (DCE-KNUST)

Brazil

Prefeitura Municipal de Belo Horizonte (SUDECAP)
Universidade Federal de Minas Gerais (EFMG)

Switzerland

Swiss Federal Institute of technology Lausanne (EPFL)

Greece

National Technical University of Athens (NTUA)

Colombia

Centro Inter-Regional de Abastecimiento y Remocion de Aqua
(CINARA)
Universidad Nacional (UNAL)

Peru

IPES – Promocion del Desarrollo Sostenible (IPES)

Palestine

House of Water and Environment (HWE)

Egypt

Center for Environment and Development for the Arab Region &
Europe (CEDARE)

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