PhD

Title and Author
Closing cycles in the built environment: Urban Harvest Approach- An urban resource management approach. Agudelo-Vera, C.M.

Date of Completion
September 2011

Abstract (~500 words)

Hypothesis: Cities are able to be self sustaining if there is an efficient management of the different urban flows by applying demand minimization, output minimization (cascading, recycling and recovery), and multi-sourcing,.

Main Objective: Develop a methodology to scan an urban area and its flows, and propose measures and technologies to improve urban resources management towards self-sustainability by applying demand minimization, output minimization (cascading, recycling and recovery), and multi-sourcing. This scan should elaborate a mass balance of primary and secondary resources available within the urban area; calculate the potentials for harvesting those resources taking into account spatial and temporal variations and provide insight in the consequences of urban typologies on reaching self-sufficiency. This research focuses on urban water flows. The developed methodology can be used by city planners and other urban stakeholders to identify measures and scenarios to improve urban resources management towards self-sustainability.

In order to prove the stated hypothesis, the urban residential water flows have been studied in relation to the spatial characteristics of cities. This study is being carried out at three different scales: dwelling, block and neighborhood level and different scenarios are being modeled at each level assuming different house typologies. Different scenarios are analyzed by developing water balance models. To assess the efficiency of the urban metabolic system, un-used resources and losses of existing systems will be identified and improvements will be assessed and quantified. After studying

the existing water cycles, different alternatives for more efficient urban resources management will be tested. Implementation at different levels will bring different opportunities and trade offs as well. Comparison of the implication of the various alternatives will be analyzed with the aim to develop guidelines for urban resources management for various urban typologies. The models focuses on quantity and quality of the water flows and spatial and temporal characteristics. Balancing is done for a time span for a year, with a time step of one hour to one day (depending on the flow). Statistical sources were used to generate data. The interdependence among the water and urban typology are analyzed and general principles and rules will be defined.

SWITCH Deliverable Contribution
D. 4.1.10.

Description of how PhD contributes to goals/objectives of deliverables
Closing cycles in the built environment can be achieved when waste flows are seing as secondary resources and re-using is implemented. This research investigate the limitations/potentials given by the urban typology to harvest urban waste water.