BRIDGE

sustainaBle uRban plannIng Decision support accountinG for urban mEtabolism

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Ainhoa González, Alison Donnelly, Mike Jones
Department of Botany and Centre for the Environment, Trinity College Dublin, Ireland

1. Introduction

The EU-funded project BRIDGE was launched in 2008 with the aim of linking bio-physical sciences with urban planning, to ***provide the means to quantitatively assess components of urban metabolism*** in an attempt to ***promote sustainable planning***. One of the goals of the project is to develop a set of sustainability objectives and indicators for 5 European cities (Figure 1). In addition, a Decision Support System (DSS) will be designed. The DSS will be used to assess planning alternatives within the case studies, and will be made available to planners once the project is completed. BRIDGE adopts a Community of Practice (CoP) approach, whereby stakeholders are involved from an early stage to establish key sustainability issues and validate the project's achievements.

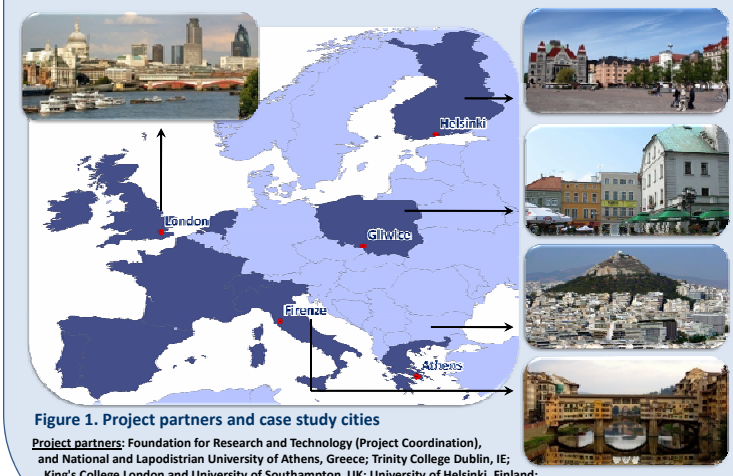

Figure 1. Project partners and case study cities

Project partners: Foundation for Research and Technology (Project Coordination), and National and Lapodistrian University of Athens, Greece; Trinity College Dublin, IE; King's College London and University of Southampton, UK; University of Helsinki, Finland; University of Basel, Switzerland; Alterra B.V., The Netherlands; Institut Ekologii Terenów Uprzemyslowionych, Poland; Météo France CNRM, France; Technical University of Madrid, Spain; University of Aveiro, Portugal; Consiglio Nazionale delle Ricerche andCentro Euro-Mediterraneo per i Cambiamenti Climatici, Italy.

2. Research Specifications & Approach

BRIDGE focuses on energy and material flows in the urban system. It evaluates the exchange and transformation of **energy**, **water**, **carbon** and **pollutants** (urban metabolism components) for a given urban structure at the local level.

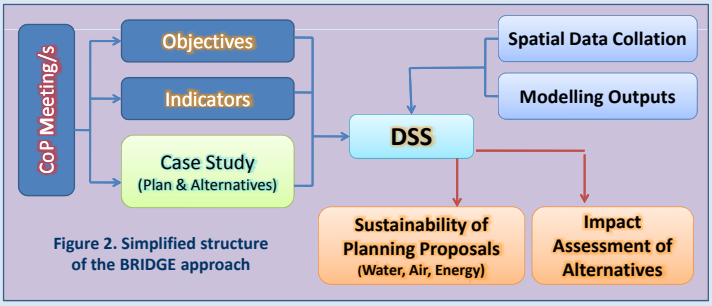

Figure 2. Simplified structure of the BRIDGE approach

Sustainability objectives and indicators are established for the different components through CoP meetings (Figure 2). In addition, the CoPs: facilitate linkages between BRIDGE scientist and local planners/stakeholders; help define planning priorities; and determine the case study area plan and the associated alternatives.

The indicators will be collated, measured and/or modelled, and subsequently integrated into the DSS for a holistic assessment. Therefore, ***the DSS will spatially assess proposed alternatives on the basis of relevant indicators***. The outputs of the DSS will assist in predicting the environmental and socio-economic impacts of alternatives, as well as in measuring progress towards the established sustainability objectives. These results will be fed back to local planners to help make informed planning-decisions to promote sustainability in the urban context.

3. Work Packages and the Role of TCD

The research is composed of 9 interlinked Work Packages (WPs) as illustrated in Figure 3. **Trinity College Dublin (TCD)** is responsible for **WP5**: the ***development of sustainability objectives, targets and indicators***, as well as the ***identification of potential environmental and socio-economic impacts*** of the planning alternatives in each of the case studies.

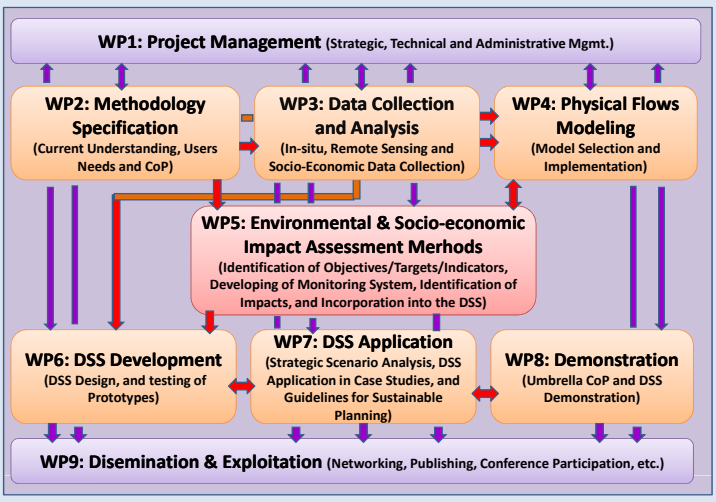

Figure 3. Work Packages and links

TCD is currently identifiying the core objectives and indicators through CoP (WP2). The final set of objectives/indicators will be validated with the datasets available from WP3 and the outputs of the modeling exercises by WP4. This final set will be incorporated into the DSS (WP6) and applied to assess the sustainability of planning alternatives.

4. Developing Sustainability Objectives & Indicators

The identification of ***sustainability objectives*** is based on the planning priorities and challenges identified during the relevant CoP meetings (by answering questions such as: *What are the socio-economic drivers in the city? What are the environmental challenges they pose?*). The final selection is based on current sustainable urban planning principles and on their relevance with regards to the scope of BRIDGE.

Consequently, the ***indicators*** that would allow monitoring of sustainability achievements are established. The final set of indicators will be robust, spatially-specific, relevant and timely, ensuring it is:

- Critical for decision-making (i.e. addresses core issues);
- Linked to sustainable planning (i.e. the domain of interest); and
- Can be monitored (i.e. DSS compatible measured on a regular basis).

Each case study will choose a maximum of 10 indicators to enable monitoring of urban metabolism in their specific city (Table 1). BRIDGE will develop a combined list of indicators from all the case studies.

BRIDGE Component	Objective	Indicator
Water	***Protect the water balance***	•Water balance: precipitation, surface run-off, evapotranspiration, filtration, and flooding events; •Water quantity and quality (i.e. BOD, N, P load) at discharge.
Air	***Improve air quality***	•Concentration of pollutants (methane, ozone, sulfates, nitrates, particulate matter, etc.); •Greenhouse gases and CO_2 emissions per capita/sectoral split.
Energy	***Optimize energy consumption***	•Energy demand (i.e. electricity consumption per capita and sectoral split); •Percentage of energy from renewable sources.
Human Well-being	***Enhance human well-being***	•Density of developments (persons/m2); •Population exposure to air pollutants.

Table 1. Preliminary objectives/Indicators established for Helsinki, Finland

Further information can be found at: www.bridge-fp7.eu
or contacting Ainhoa González at: agonzal@tcd.ie