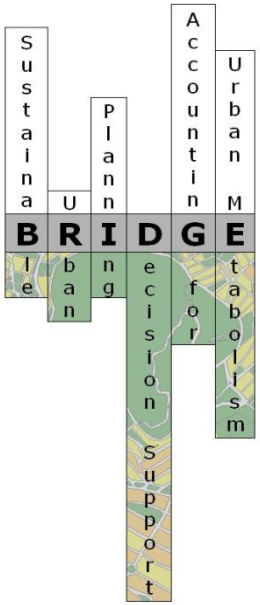
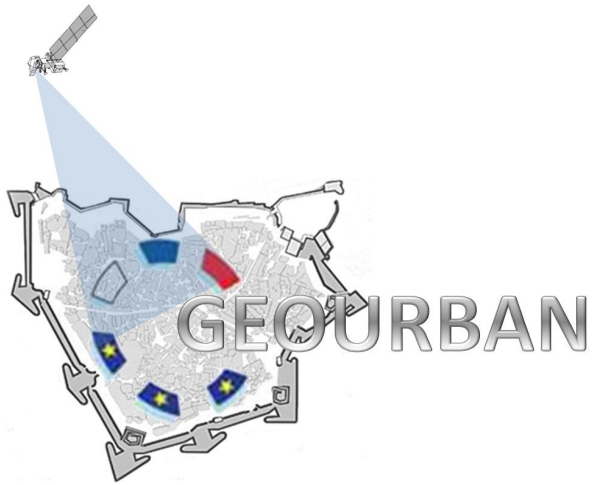
Communities of Practice: Lessons/Examples from BRIDGE and GEOURBAN Projects

Workshop on "*Fostering innovative dialogue between researchers and stakeholders to meet future challenges: Land, Soil, Desertification, Urban and Community-Based Environmental Management*"

Brussels, June 10-11, 2013.





ExploitinG Earth Observation in sUstainable uRBan plANning & maNagement

Nektarios Chrysoulakis

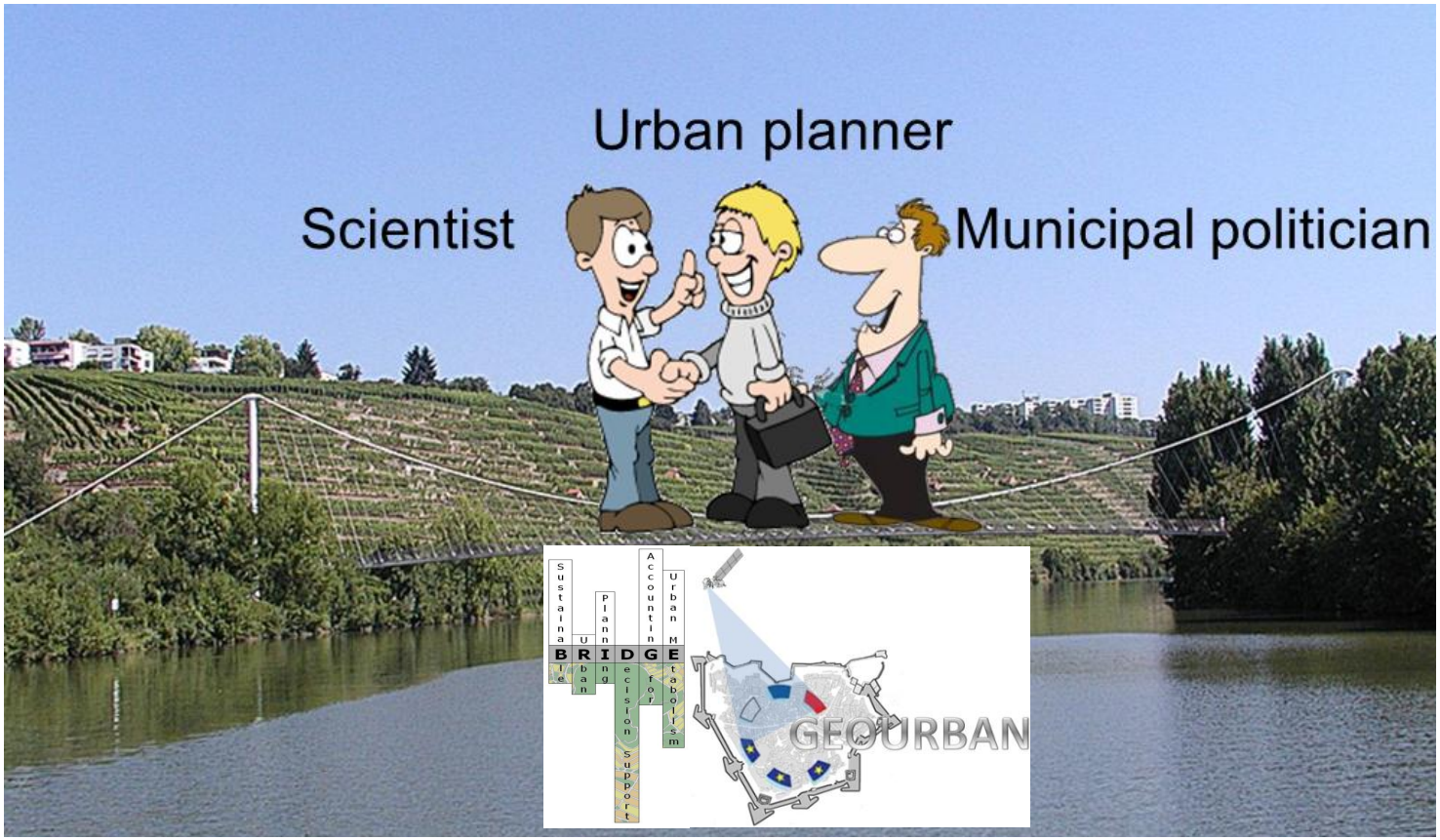
FORTH

The problem

- Urban development has to meet the main requirements for **sustainability**, by optimising the use of space, energy and materials and by decoupling resource use from economic development.
- The planning policies reflect the logic of the market. They would better reflect a vision of urban development, in which **environmental considerations** play more important role in urban planning.
- The problems of cities cannot be solved at the local level alone. Better **policy integration** is needed, involving closer coordination at micro-scale (building block) and local scale (neighbourhood, city), as well as at regional scale (region, country).

The problem

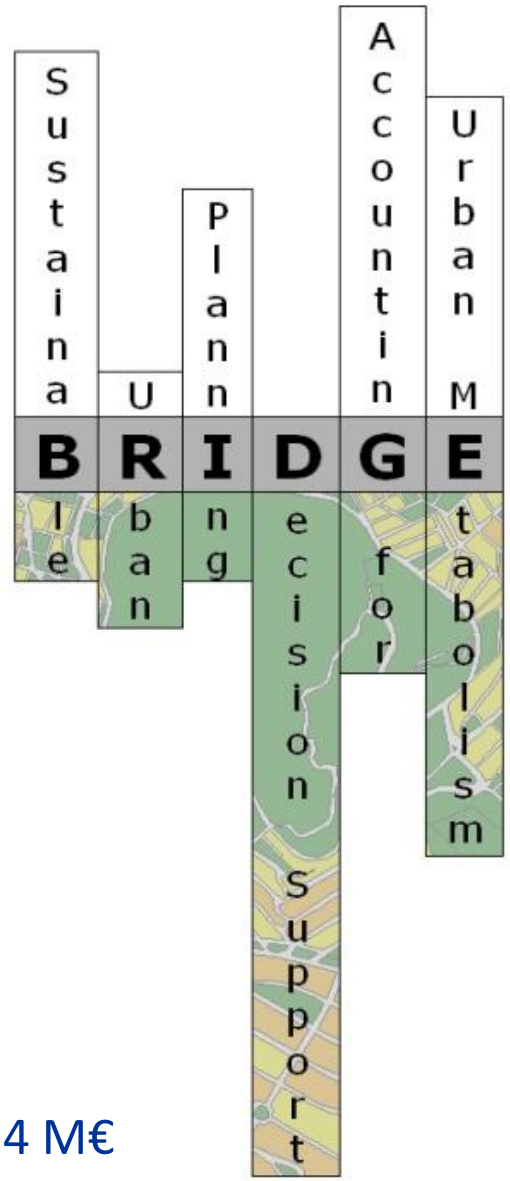
- All the available data on many case studies are useless, if the link between the scientists and the urban planning community is missing.



The BRIDGE idea

- To define urban metabolism by means of energy, water, carbon and air pollution fluxes in local scale.
- To examine how the change of land use and resources use affects the above fluxes.
- To develop indicators to quantify their impacts.
- To develop a DSS based on these indicators.
- To use this DSS to evaluate urban planning alternatives in several case studies.
- To support sustainable planning strategies based on these evaluations.

The BRIDGE Consortium



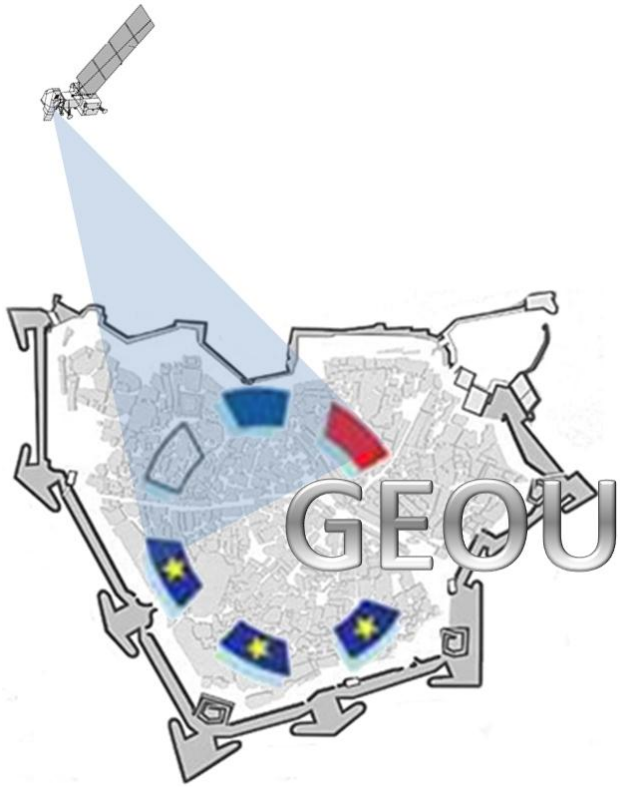
1. FOUNDATION FOR RESEARCH AND TECHNOLOGY - HELLAS
2. KING'S COLLEGE LONDON
3. CONSIGLIO NAZIONALE DELLE RICERCHE
4. INSTYTUT EKOLOGII TERENOW UPRZEMYSLOWIONYCH
5. TECHNICAL UNIVERSITY OF MADRID
6. UNIVERSITY OF AVEIRO
7. UNIVERSITY OF BASEL
8. TRINITY COLLEGE DUBLIN
9. UNIVERSITY OF HELSINKI
10. NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS
11. CENTRO EURO-MEDITERRANEO PER I CAMBIAMENTI CLIMATICI S.c.a.r.l.
12. METEO-FRANCE CENTRE NATIONAL DE RECHERCHES METEOROLOGIQUES
13. ALTERRA
14. UNIVERSITY OF SOUTHAMPTON

Budget ~ 4 M€

The GEOURBAN idea

- To demonstrate the ability of current and future EO systems to depict parameters of urban structure and urban environmental quality.
- To develop a set of products and indicators, easily understood by non-experts, to link the satellite derived information with multidimensional issues of urban planning and management.
- To develop a web-based information system capable of evaluating these indicators.

The GEOURBAN Consortium



FORTH
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GRADI

GRAD Inform Ltd.

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DLR
Deutsches Zentrum für Luft- und Raumfahrt

Kuzgun Bilisim

UNI BASEL
University of Basel

Budget ~ 1 M€

The users' involvement: Communities of Practice

- CoPs are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly (Wenger, 1998).

SEVENTH FRAMEWORK PROGRAMME
THEME 6: Environment (including climate change)

Environment (including Climate change)

Contract for: Collaborative Project

D.2.3
Protocol for Developing Communities of Practice in the context of BRIDGE

Project acronym:	**BRIDGE**
Project full title:	sustainaBle uRban planning Decision support accountinG for urban mEtabolism
Contract no.:	211345
Date:	30/11/2009
Document Reference:	211345_002_PT_Alterra BV
Book Captain:	Annemarie Groot (Alterra BV.)
Authors:	Annemarie Groot (Alterra BV.) Judith Klostermann (Alterra BV.) Eddy Moors (Alterra BV.)
Contributors:	Nektarios Chrysoulakis (FORTH) Zina Mitraka (FORTH)
Issue:	1.0
Deliverable no.:	D.2.3
Dissemination Level:	RE

CoPs: Three key dimensions

- Shared **Domain** of interest: Issue, practice (e.g, sustainable urban planning).
- **Community**: members are actively engaged and they develop a common identity, trust and a feeling of belonging.
- **Practice**: members develop a shared practice through an exchange of knowledge, developing stories, tools

CoPs vs other organizational structures

Project teams	**CoPs**
Driven by (planned) project results	Driven by improving performance in practice
Committed to fixed agreements / tasks	Driven by issues, question and continuous learning

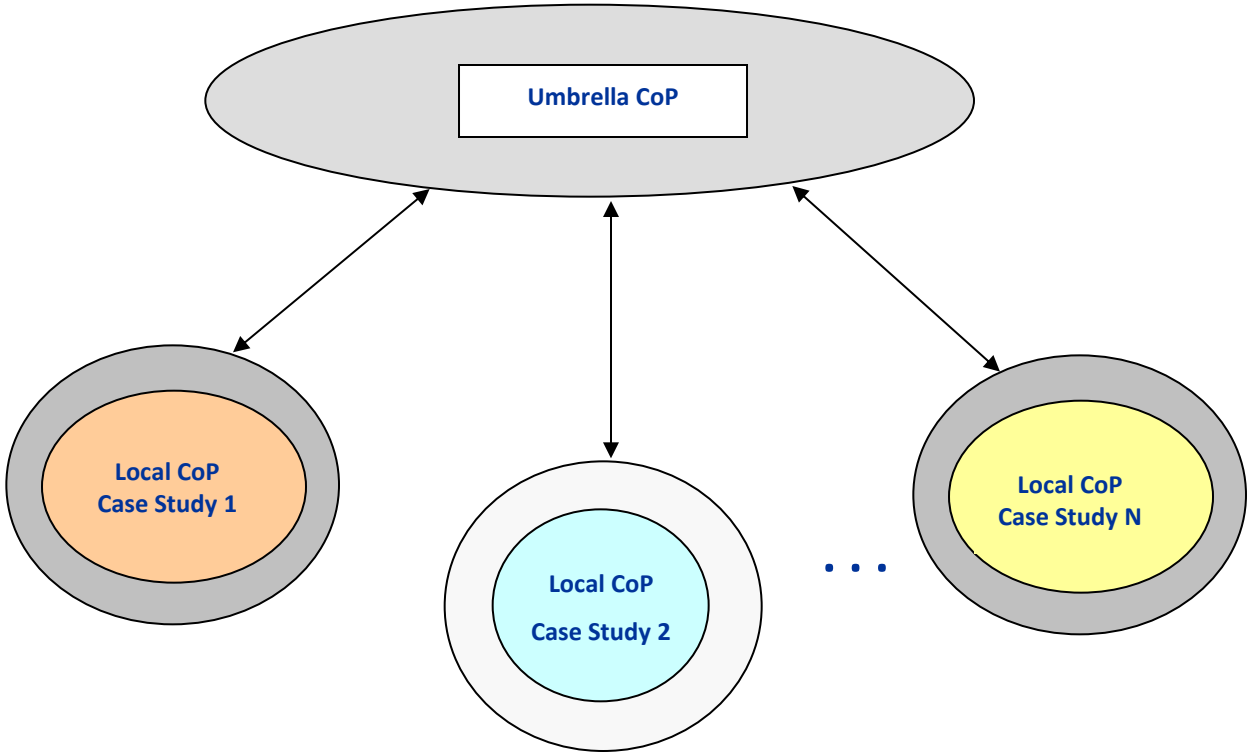
Networks	**CoPs**
Open membership	Closed membership
Large	Small
Interactions	Contributions
Creates relationships	Creates identity – belonging

CoP as organizing principle in BRIDGE/GEOURBAN

- To involve future users in the design of the tools.
- To create a learning environment for the team.
- To organize a dialogue.
- Two different but cross fertilizing processes:

Structure of CoPs

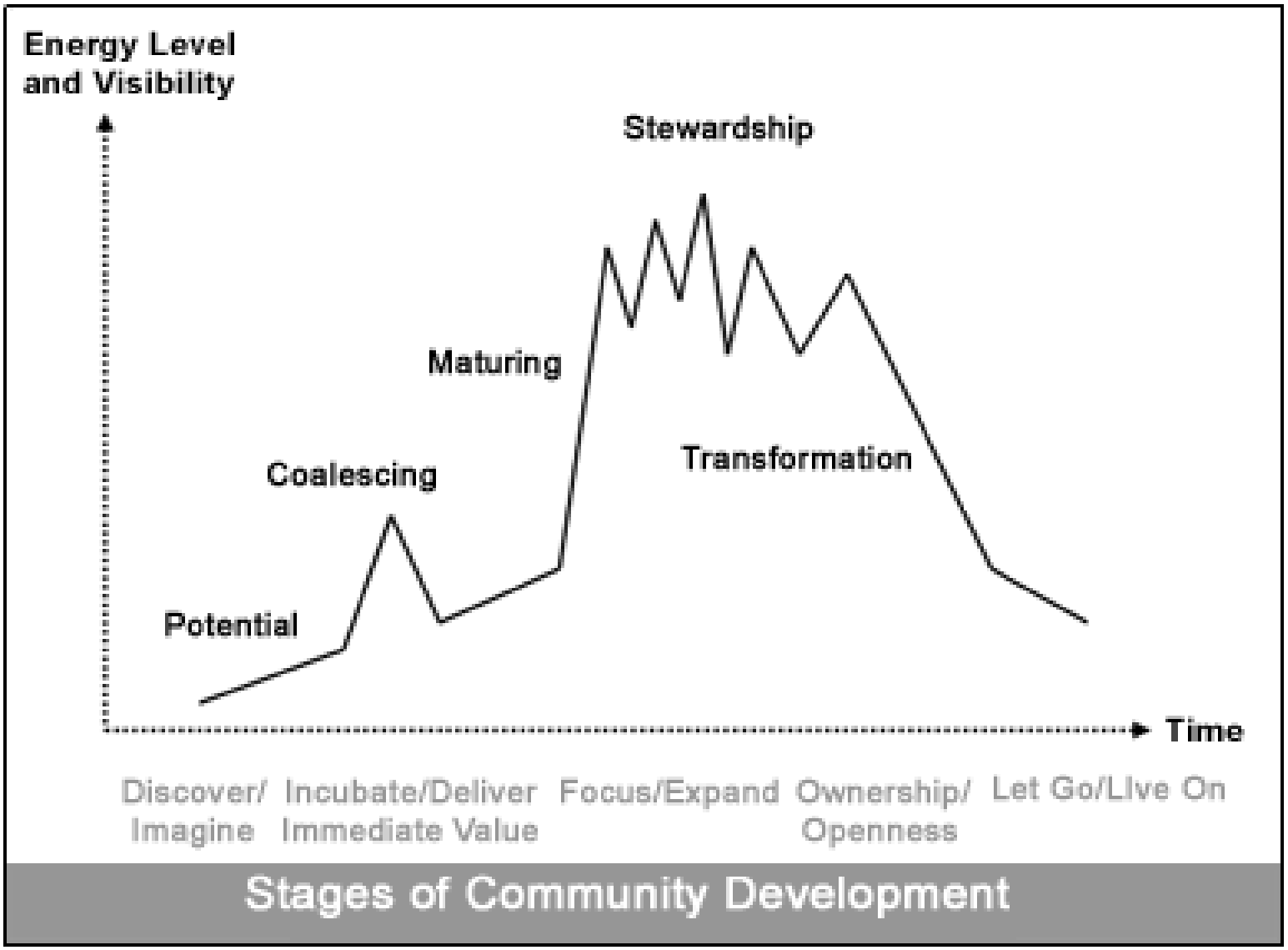
- In each city a Local CoP.
- Some members of Local CoPs join Umbrella CoP.
- Local CoP meetings alternated by Umbrella CoP meetings.



CoP Members

- Sharing a concern for sustainable urban planning.
- Users of the the BRIDGE DSS /GEOURBAN Web-based tool.
- Data providers for BRIDGE/GEOURBAN.
- City counselors, board members, civil servants.
- Departments such as spatial planning, energy, waste, water, green infrastructure / city parks, mobility and housing.
- A CoP may begin with an informal group of people who loosely network on the topic “sustainable urban planning”:
  - ✓ identifying and talking with prospective community members;
  - ✓ identifying and contacting a community Coordinator;
  - ✓ community kick off meeting.

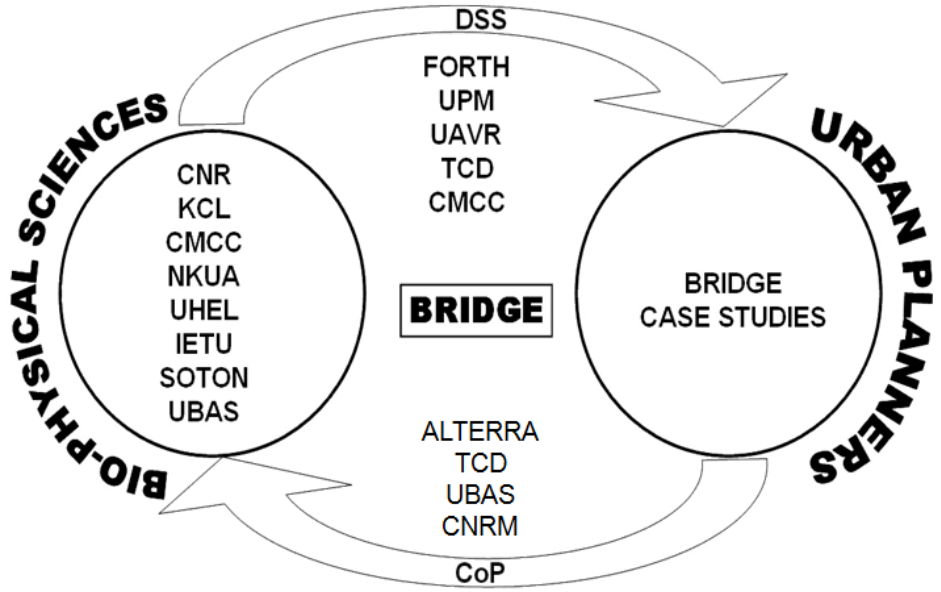
CoP development

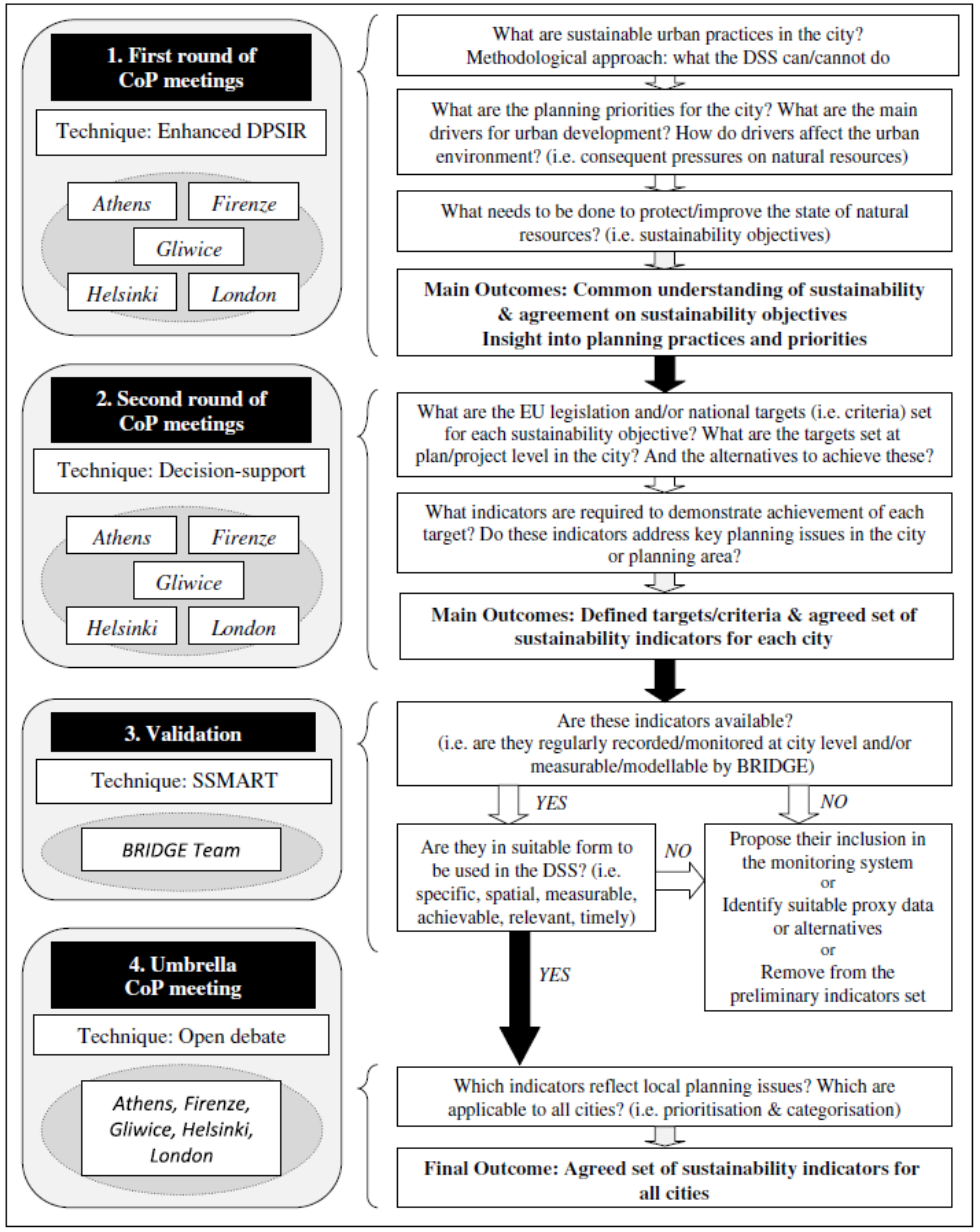


CoPs in BRIDGE

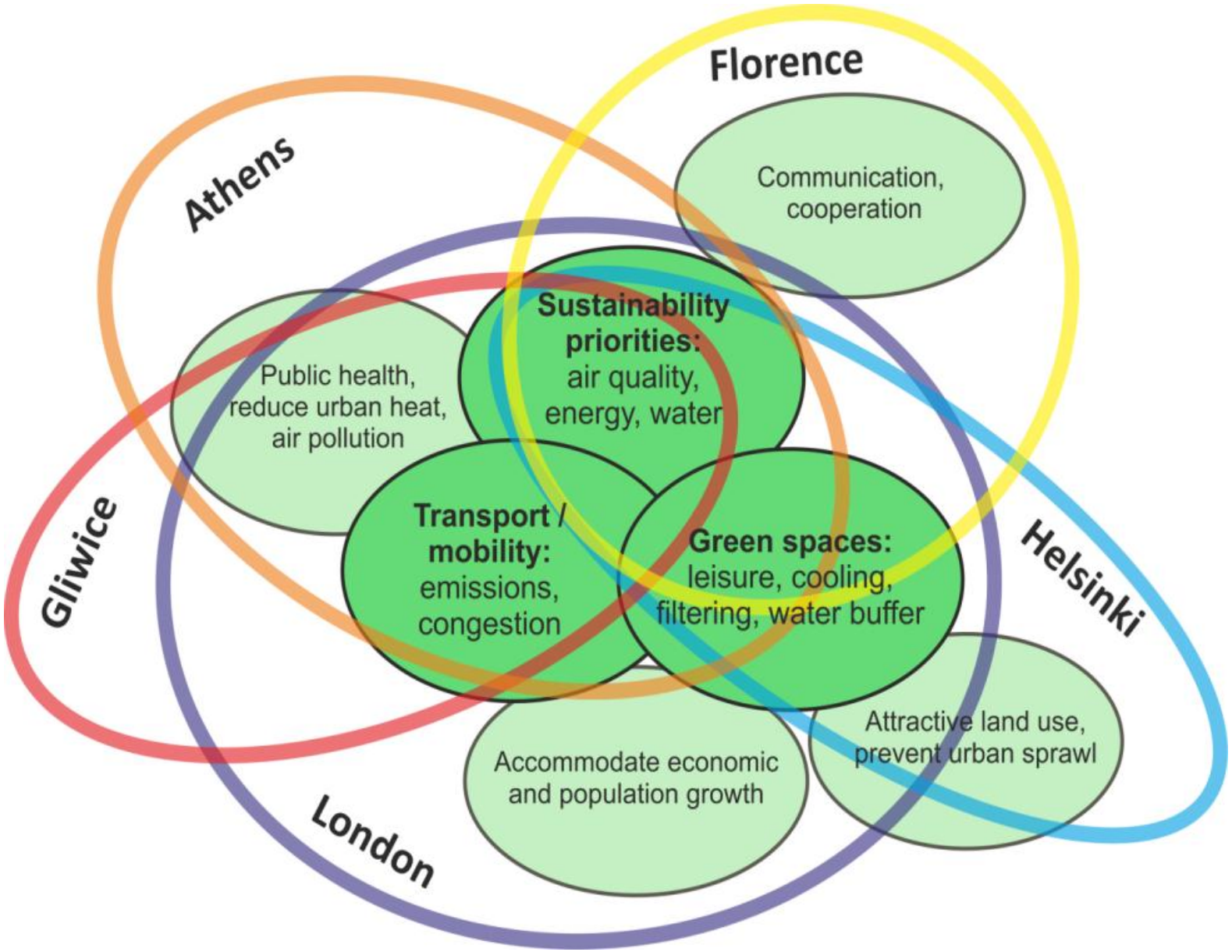
Case Study	Date CoP1	Group size	Date CoP 2	Group size
Helsinki	15 June 2009	21	20 Jan 2010	17
London	24 Aug 2009	24	1 April 2010	10
Athens	8 Oct 2009	50	18 Febr 2010	29
Florence	16 Oct 2009	17	3 Dec 2009	14
Gliwice	20 Oct 2009	30	28 Jan 2010	26
Total		142		96

CoPs in BRIDGE



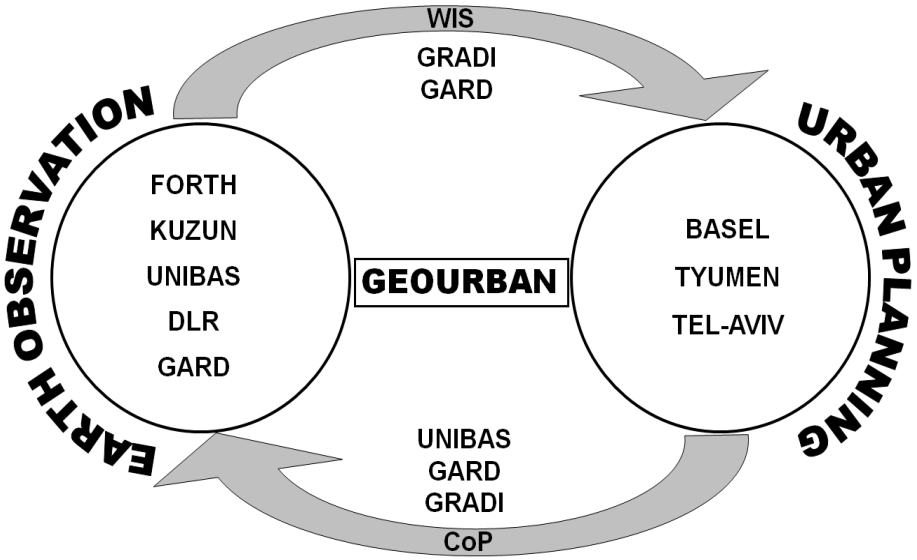


CoPs in BRIDGE



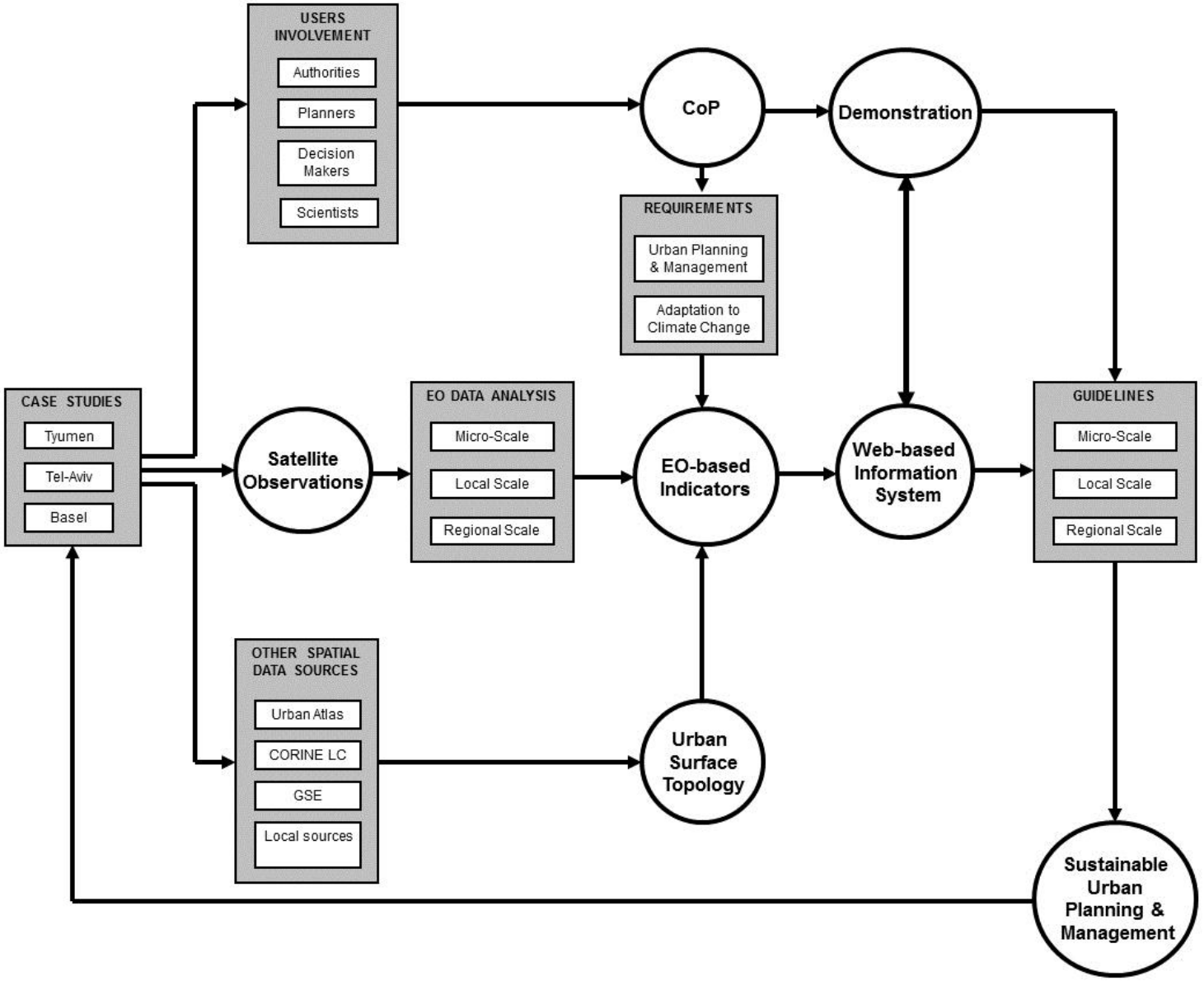
CoPs in GEOURBAN

CoPs in GEOURBAN



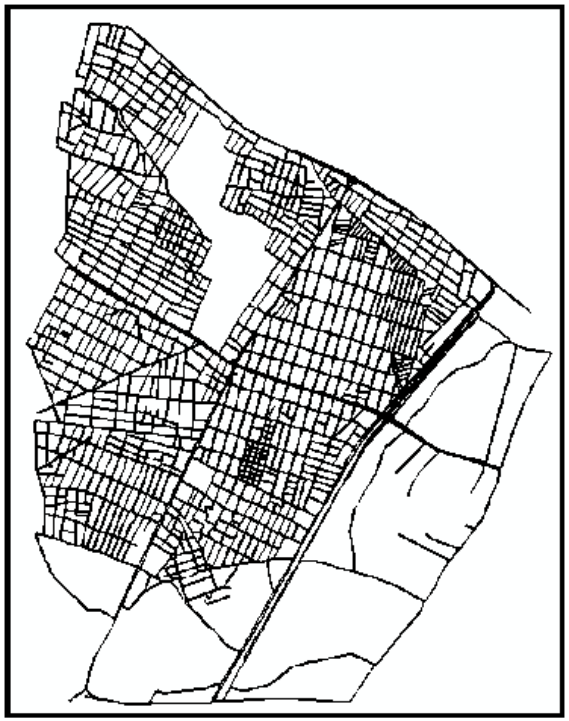
Category	Indicator	Importance for Basel	Importance for Tel Aviv	Importance for Tyumen	GEOURBAN Priority
Urban Surface Structure	Open Spaces	++		++	High
	Green Spaces	++		++	High
	Built-up Density	++		++	High
	Building Dendity	++		++	High
	Building Volume	++		++	High
Urban Surface Type	Imperviousness	+	++	++	Very High
	Vegetation Fraction	++		++	High
	Surface Albedo		++	++	High
	Surface Emissivity		++	++	High
	Urban Form	++			Moderate
	Surface Materials		++		Moderate
	Land cover Type	++			Moderate
Urban Sprawl	Land Cover Change	++		++	High
	Built-up Density Change	++			Moderate
	Building Volume Change	++			Moderate
	Contagion Index Change				Low
Urban Environmental Quality	Heat Island Intensity	+	++	++	Very High
	Aerosols Concentration	++	++		High
	Landscape Fragmentation		++		Moderate
	Greenhouse Gases		++	++	High
	Vegetation Fraction	+	++	++	Very High
Vulnerability to Hazards	Surface Topography				Low
	Built-up Density				Low
	Population Distribution				Low
	Accessibility	++		++	High
	Ground Subsidence		++		Moderate
	Critical Infrastructure				Low
Socio-economics	Land Use	+			Moderate
	Population Distribution			++	Moderate
	Access to Green Areas	+		++	High
	Traffic	+		++	High
	Exposure to PM		++	++	Low

CoPs in GEOURBAN

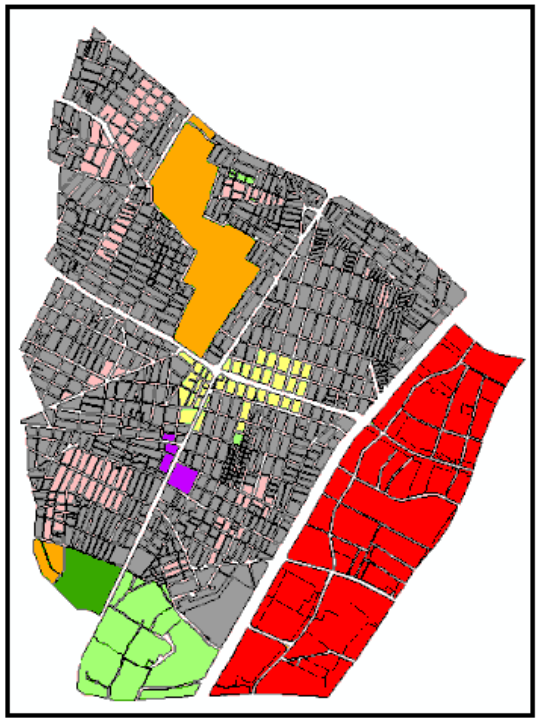


Examples of BRIDGE Indicators Maps

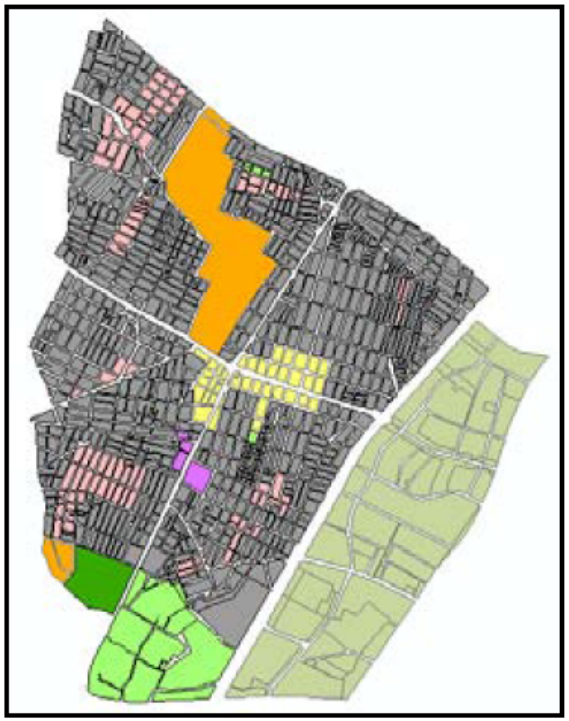
Athens Planning Alternatives:



Apply cool materials on all buildings at Egaleo municipality and on roads



Change the land use of Eleonas from brownfield to built area



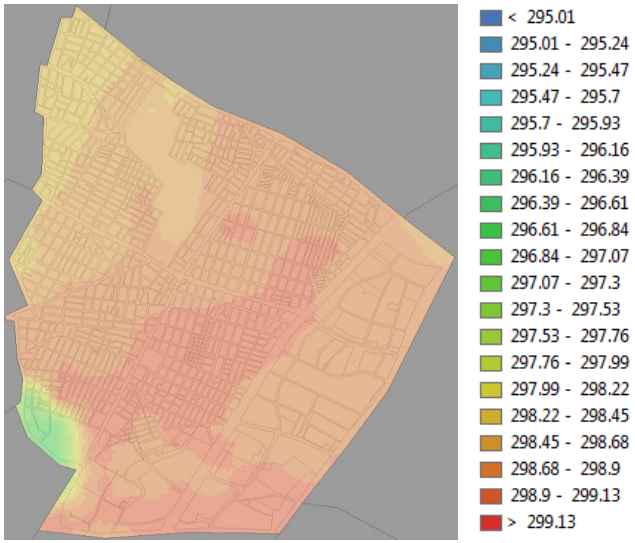
Change the land use of Eleonas from brownfield area to green space

Examples of BRIDGE Indicators Maps

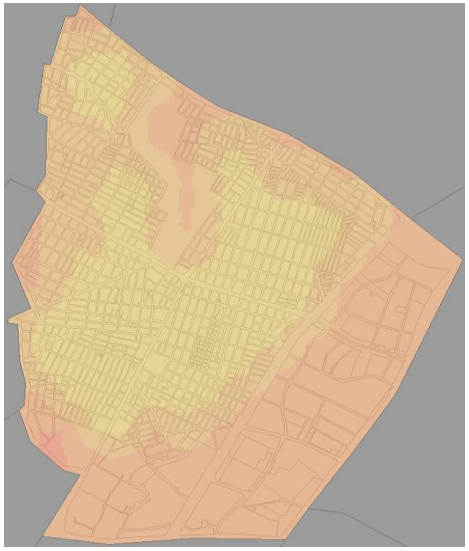
Athens.

Mean air temperature (K)
20:00 - 23:00 LST in Summer.

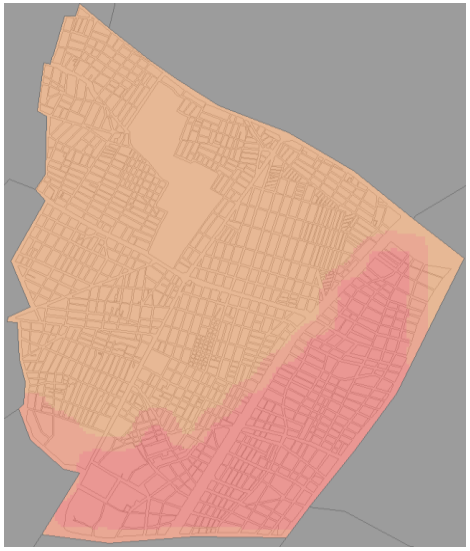
Alternatives' maps present the difference from Base.



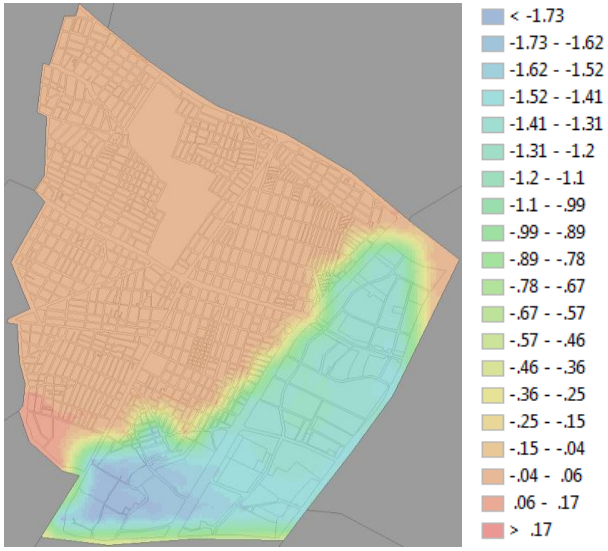
Base



Alternative 1



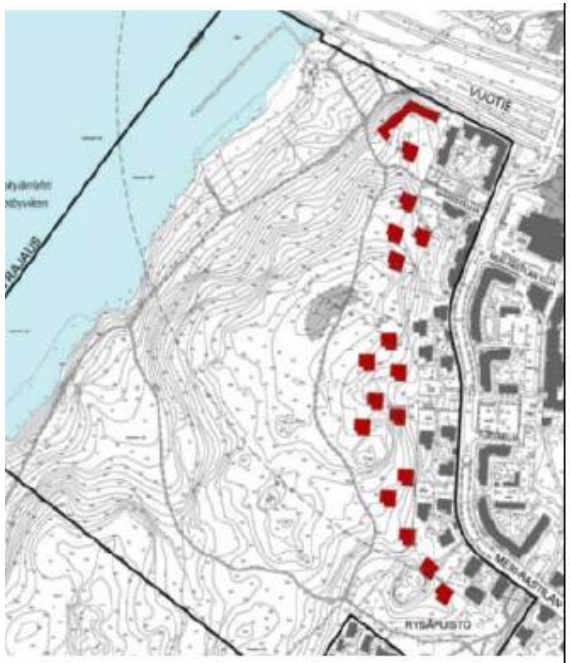
Alternative 2



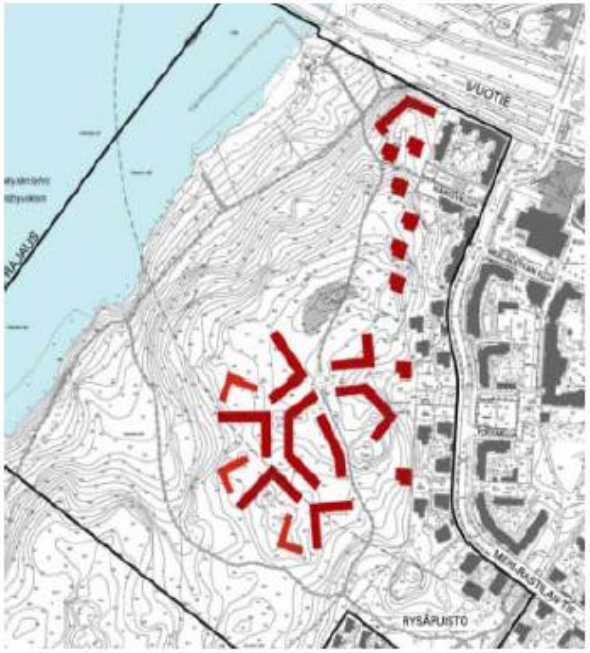
Alternative 3

Examples of BRIDGE Indicators Maps

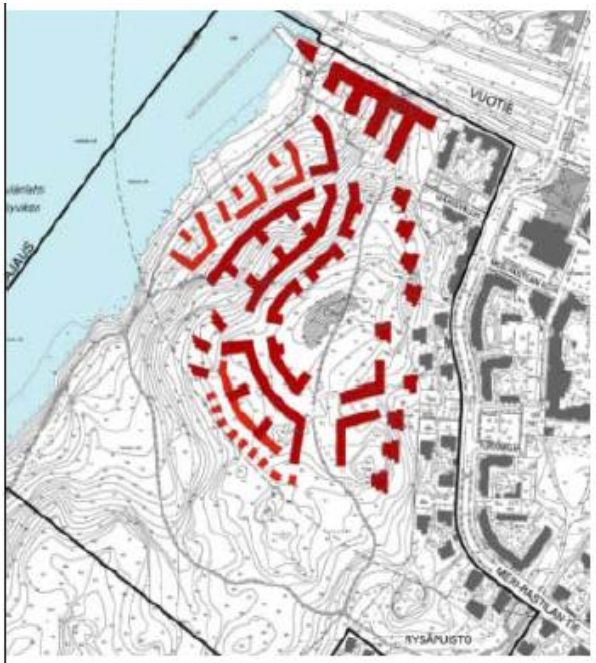
Helsinki Planning Alternatives:



Buildings for 500 inhabitants



Buildings for 1500 inhabitants



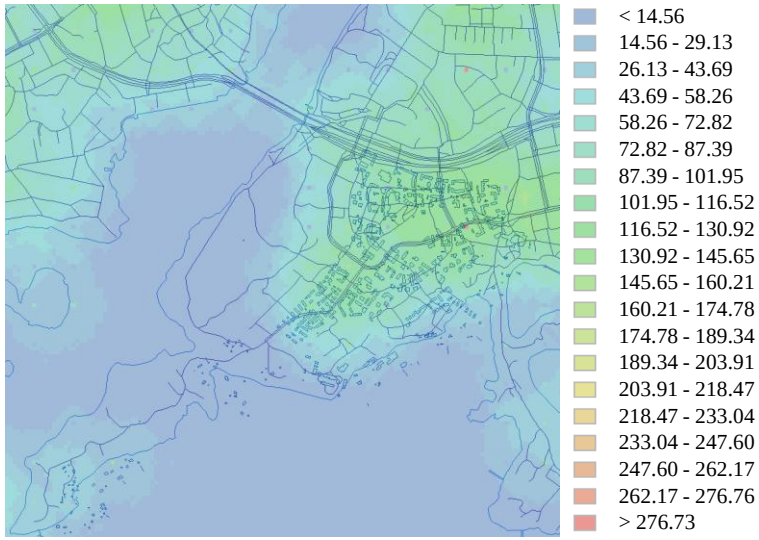
Buildings for 1800 inhabitants and 1000 new jobs

Examples of BRIDGE Indicators Maps

Helsinki.

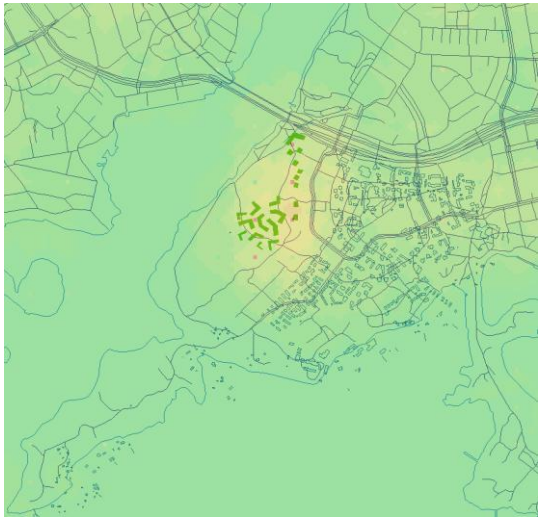
Yearly CO_2 emissions.

Alternatives' maps present the difference from Base.

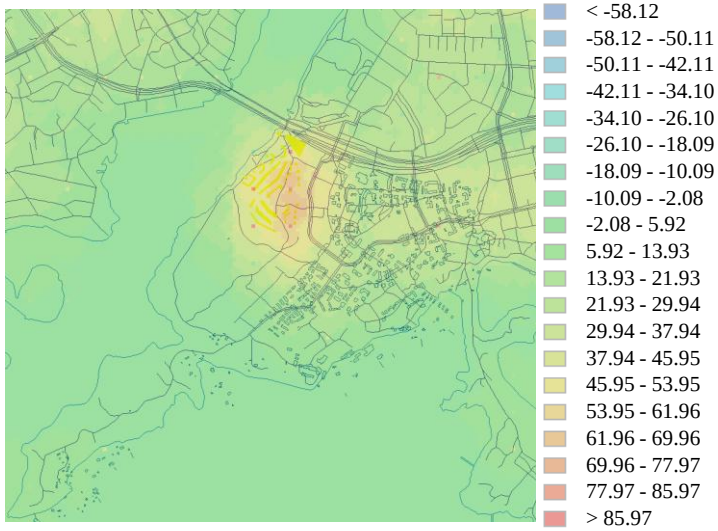


Base

Alternative 1



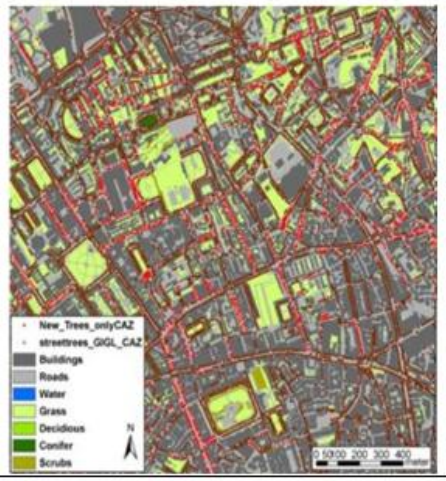
Alternative 2



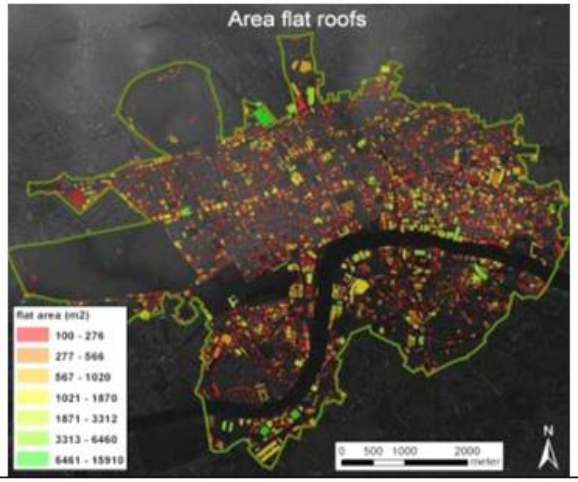
Alternative 3

Examples of BRIDGE Indicators Maps

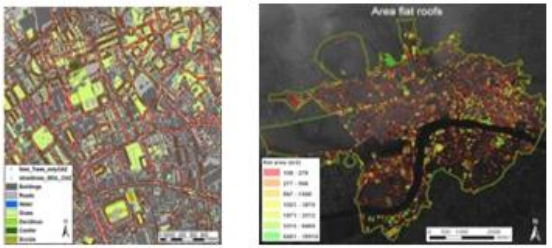
London Planning Alternatives:



Add new street trees.



Add green roofs (varying slopes).

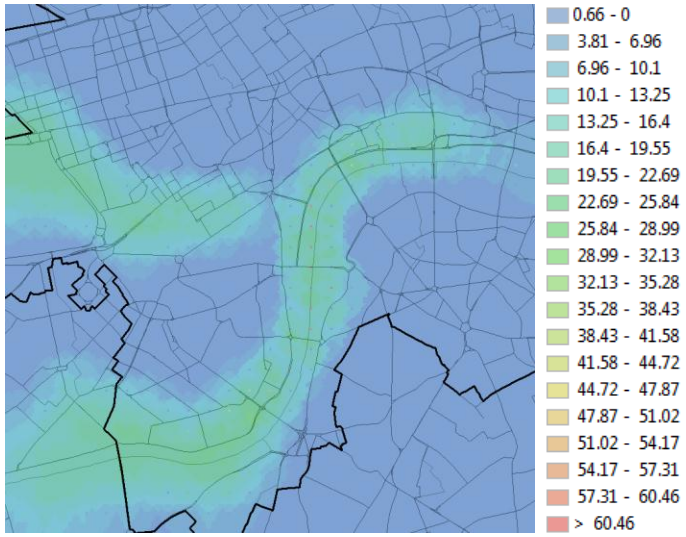


Implementation of both.

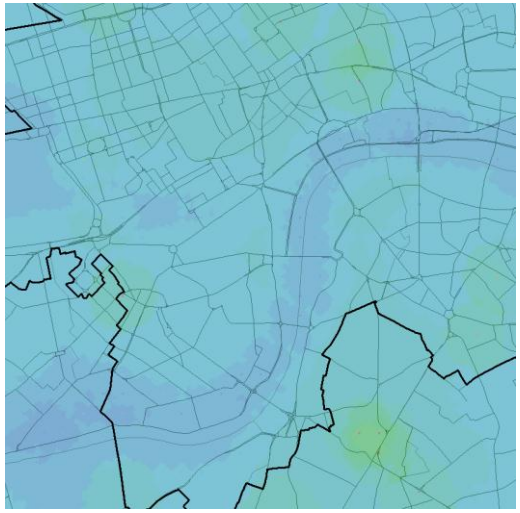
Examples of BRIDGE Indicators Maps

London.
Yearly mean daytime Latent Heat Flux (W/m^2).

Alternatives' maps present the difference from Base.

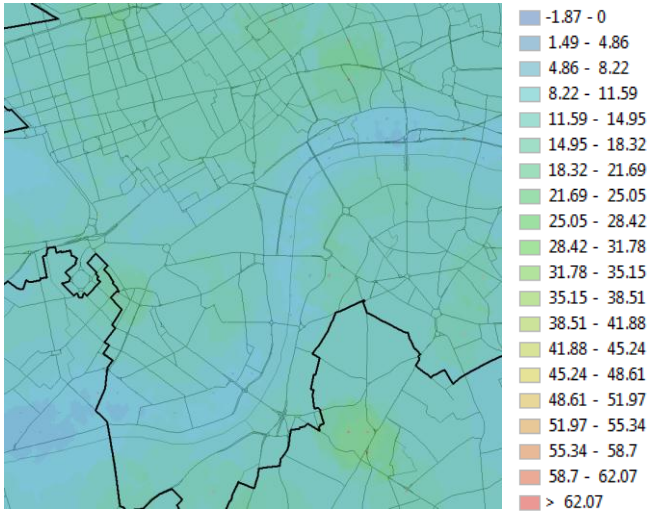


Base



Alternative 1

Alternative 2

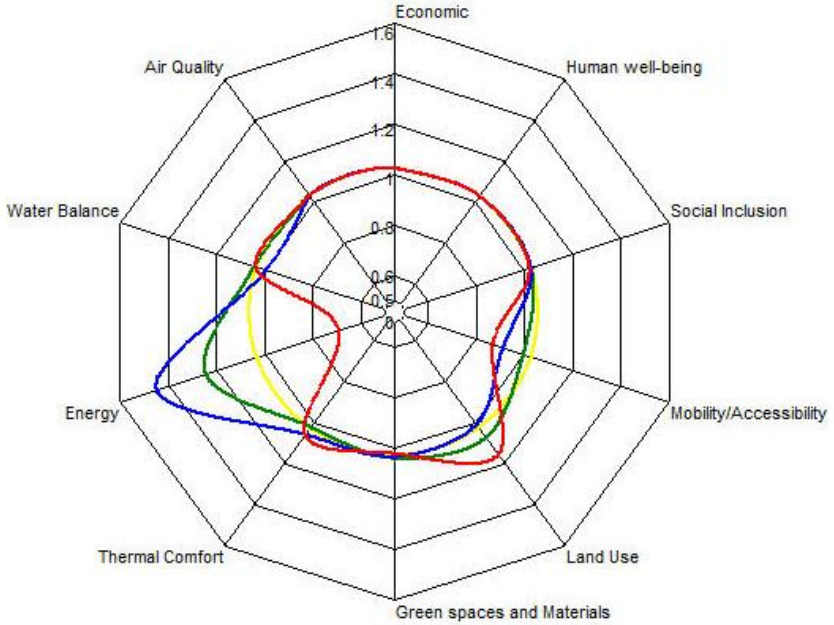


Alternative 3

Examples of BRIDGE alternatives evelauation

Comparison

Reference	Alternative 1	Alternative 2	Alternative 3
1.000	1.023	1.021	0.961



	Base	Alter 1	Alter 2	Alter 3
Enviromental	**1.00**	**1.02**	**1.03**	**0.96**
Air Quality	1.00	1.00	1.00	1.00
Water Balance	1.00	1.01	0.96	1.00
Energy	1.00	1.22	1.44	0.65
Thermal Comfort	1.00	1.00	1.03	1.04
Green spaces and Materials	1.00	1.02	1.01	0.99
Social	**1.00**	**1.00**	**0.99**	**1.00**
Land Use	1.00	1.05	0.98	1.14
Mobility/Accessibility	1.00	0.97	0.89	0.84
Social Inclusion	1.00	1.00	1.00	1.00
Human well-being	1.00	1.00	1.00	1.00
Economic	**1.00**	**1.00**	**1.00**	**1.00**

Hide Legend | Hide Values | OK

Examples of BRIDGE Strategic Scenarios

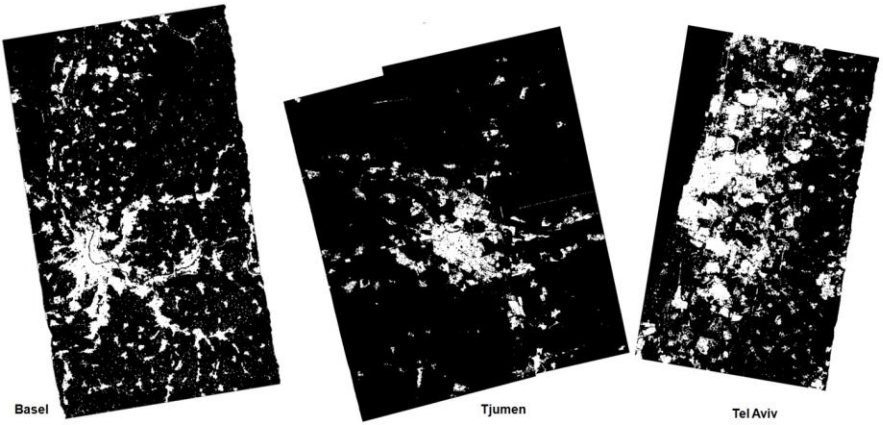
	Climate Change	Energy / Technological Development	Economy
1	+	+	+
2	-	+	+
3	+	-	-

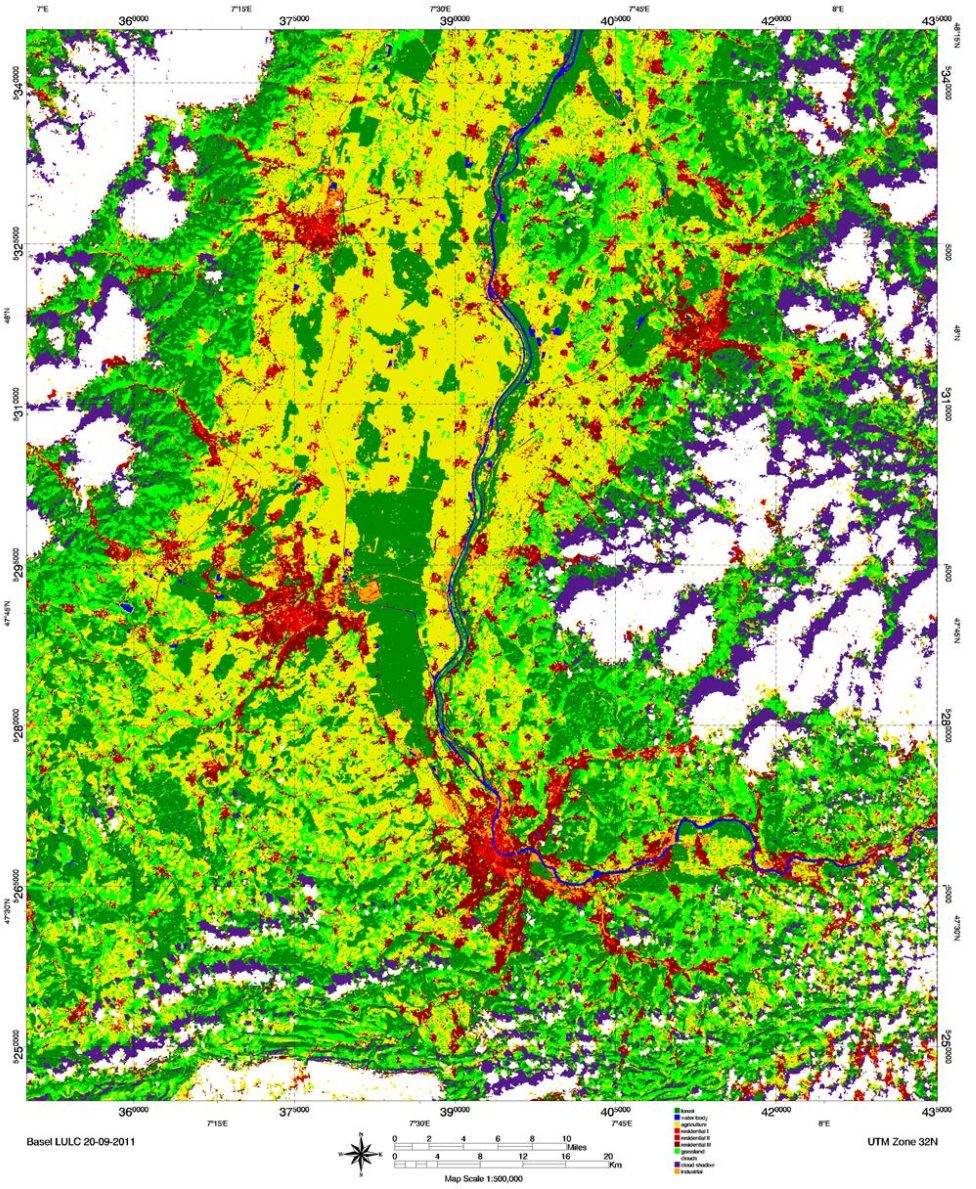
Scenario 1

Scenario 2

Scenario 3

Examples of GEOURBAN EO Products





Examples of GEOURBAN Indicators

Category	Indicator	Importance for Basel	Importance for Tel Aviv	Importance for Tyumen	GEOURBAN Priority	
Urban Surface Structure	Open Spaces	++		++	High	
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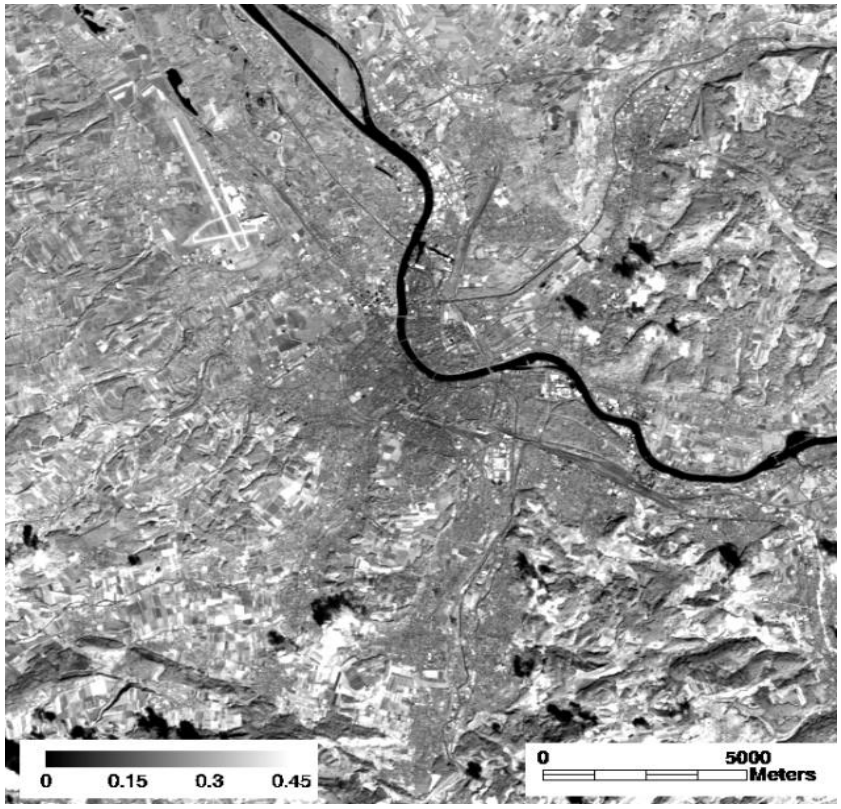
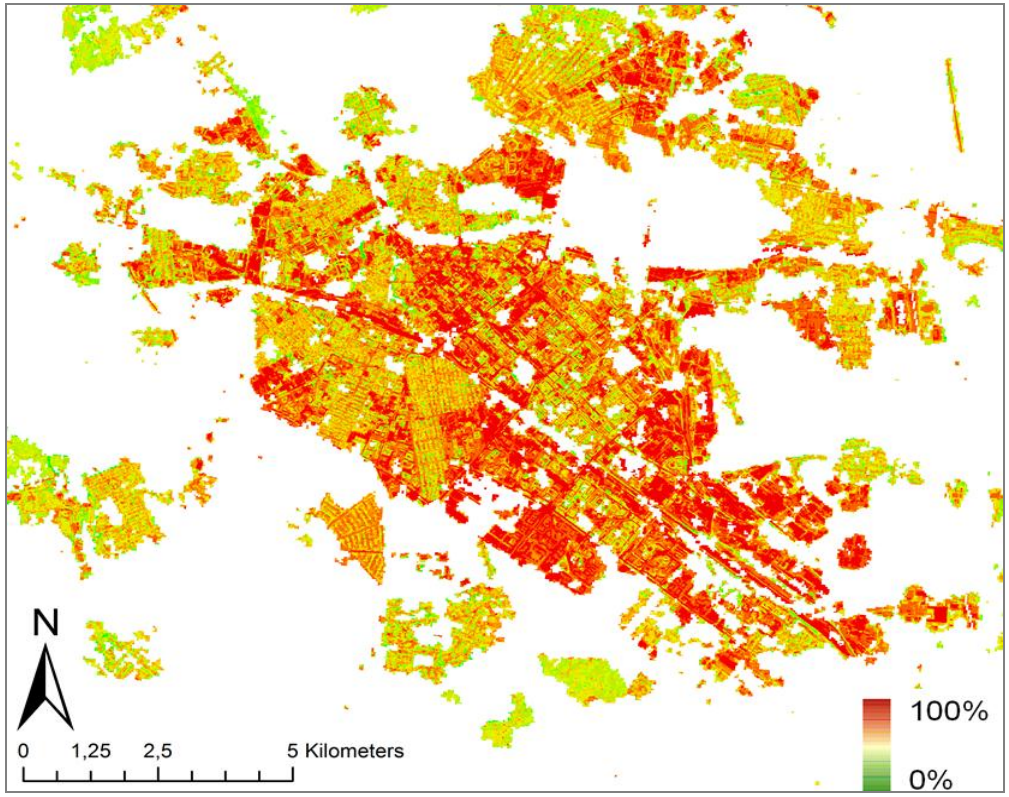
	Built-up Density	++		++	High	
	Building Dendity	++		++	High	
	Building Volume	++		++	High	
Urban Surface Type	Imperviousness	+	++	++	Very High	✓
	Vegetation Fraction	++		++	High	
	Surface Albedo		++	++	High	
	Surface Emissivity		++	++	High	
	Urban Form	++			Moderate	
	Surface Materials		++		Moderate	
	Land cover Type	++			Moderate	
Urban Sprawl	Land Cover Change	++		++	High	
	Built-up Density Change	++			Moderate	
	Building Volume Change	++			Moderate	
	Contagion Index Change				Low	
Urban Environmental Quality	Heat Island Intensity	+	++	++	Very High	✓
	Aerosols Concentration	++	++		High	
	Landscape Fragmentation		++		Moderate	
	Greenhouse Gases		++	++	High	
	Vegetation Fraction	+	++	++	Very High	✓
Vulnerability to Hazards	Surface Topography				Low	
	Built-up Density				Low	
	Population Distribution				Low	
	Accessibility	++		++	High	
	Ground Subsidence		++		Moderate	
	Critical Infrastructure				Low	
Socio-economics	Land Use	+			Moderate	
	Population Distribution			++	Moderate	
	Access to Green Areas	+		++	High	
	Traffic	+		++	High	
	Exposure to PM		++	++	Low	

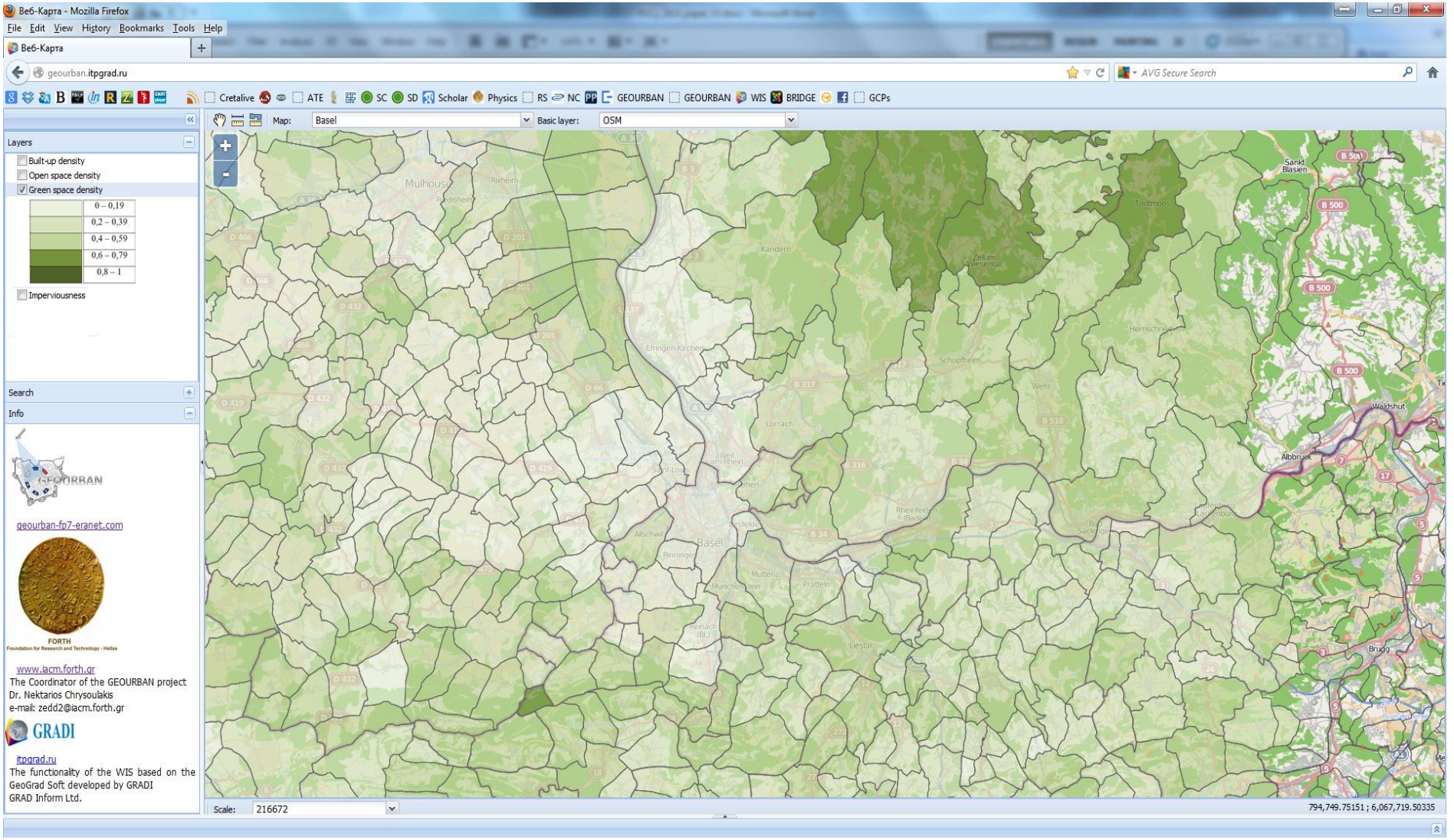
Examples of GEOURBAN Indicators





Examples of GEOURBAN Web-maps

http://geourban.itpgrad.ru/



Dissemination

May 2011

Issue 4

BRIDGE newsletter

Editorial

The FP7 project BRIDGE *(sustainaBle uRban plannIng Decision support accountinG for urban mEtabolism) is a joint effort of 14 European Organizations aiming at incorporating sustainability aspects in urban planning processes, accounting for some well recognised relations between* ***urban metabolism*** *and* ***urban structure. BRIDGE*** *was launched in 2008 in order to* ***assist urban planners to present and evaluate planning alternatives towards a sustainable city.***

As the project evolves towards its conclusion, the 4th issue of the newsletter provides a more complete picture of its achievements so far. Emphasis is being put on the presentation of the first Prototype of the BRIDGE Spatial Decision Support System. The aim of the system is to assist decision making by providing an assessment of alternatives and methods for the urban environment linking biophysical processes with socioeconomic parameters. The foresight exercise that was held in the framework of the project is also described in this issue. Other articles which demonstrate the progress and findings of the project regarding the models' simulations and results for case study cities as well as the sustainability of planning alternatives are also included in this issue.

BRIDGE partners:

1. Foundation for Research and Technology - Hellas (FORTH), Greece
2. King's College London (KCL), United Kingdom
3. Consiglio Nazionale delle Ricerche (CNR), Italy
4. Instytut Ekologii Terenów Uprzemysłowionych (IETU), Poland
5. Technical University of Madrid (UPM), Spain
6. University of Aveiro (UAVR), Portugal
7. University of Basel (UBAS), Switzerland
8. Trinity College Dublin (TCD), Ireland
9. University of Helsinki (UHEL), Finland
10. National and Kapodistrian University of Athens (NKUA), Greece
11. Centro Euro-Mediterraneo per i Cambiamenti Climatici S.c.a.r.l. (CMCC), Italy
12. Météo France Centre National De Recherches Météorologiques (CNRM), France
13. DLO/Alterra B.V. (ALTERRA), The Netherlands
14. University of Southampton (SOTON), United Kingdom

Sustainable Urban Planning Decision Support Accounting for Urban Metabolism

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December 2012

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GEOURBAN Newsletter

Editorial

GEOURBAN is an ERA.Net Project co-founded by the European Commission under INTAS, focusing on "ExploitinG Earth Observation in sUstainable uRBan plAnning & maNagement". It is a joint effort of 6 European Organizations from 6 European countries aiming at bridging the gap between Earth Observation (EO) and urban planning by demonstrating the ability of current and future EO systems to provide parameters of urban structure and urban environmental quality over large areas at detailed level. GEOURBAN was launched in December 2011 and will last 2 years.

This newsletter initiates an open dialogue between the partners of the GEOURBAN consortium and all potential end-users and informs about activities, progress and achievements of the GEOURBAN project. The newsletters will be published every 6 months and will be open to articles, news and opinions.

Geourban partners:

1. FORTH Foundation for Research and Technology, Greece
2. GRADI Ltd. Specializes in complex method of urban planning, Russia
3. GARD Ltd. – Specializes in algorithms, software and systems development – Israel
4. DLR – The German Remote Sensing Data Center (DFD) of the German Aerospace Center (DLR), Germany
5. KUZGUN Specializes in geospatial solutions for urban planning, Turkey
6. UNIBAS – University of Basel, Switzerland

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- FRENZ Sandpit on ICT Tools for Governance and Policy Modelling

Dissemination

- Chrysoulakis, N., Lopes, M., San José, R., Grimmond, C.S.B., Jones, M.B., Magliulo, V., Klostermann, J.E.M., Synnefa, A., Mitraka, Z., Castro, E., González, A., Vogt, R., Vesala, T., Spano, D., Pigeon, G., Freer-Smith, P., Staszewski, T., Hodges, N., Mills, G. and Cartalis, C., **2013**. Sustainable urban metabolism as a link between bio-physical sciences and urban planning: the BRIDGE project. *Landscape and Urban Planning*, **112**, 100 – 117.

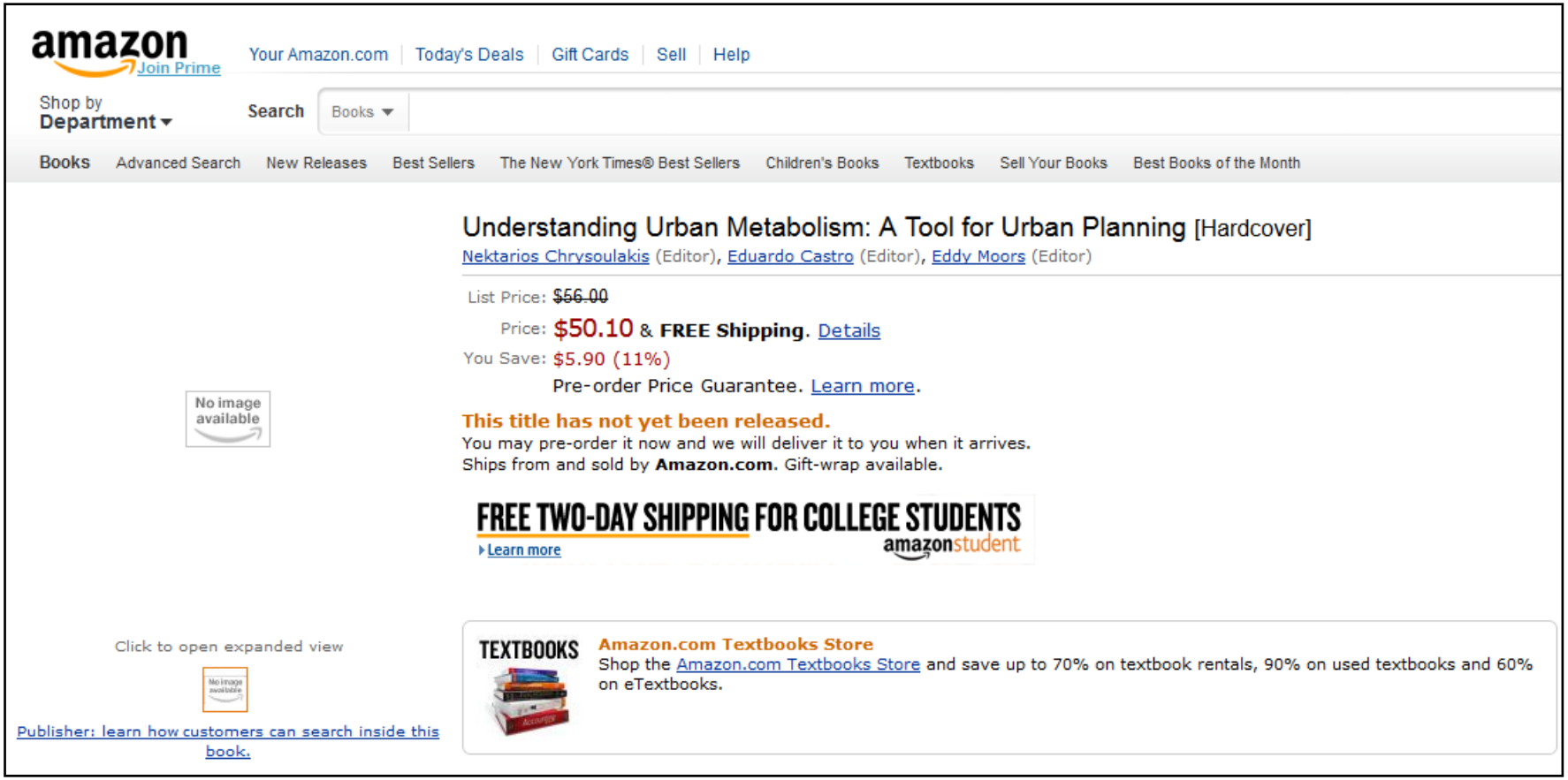
- González, A., Donnelly, A., Jones, M., Chrysoulakis, N. and Lopes, M., **2013**. A Decision-Support System for Sustainable Urban Metabolism in Europe. *Environmental Impact Assessment Review*, **38**, 109 -119.

- Lindberg, F., Grimmond, C.S.B., Yogeswaran, N., Kotthaus, S. and Allen, L., **2013**. Impact of city changes and weather on anthropogenic heat flux in Europe 1995 – 2015. *Urban Climate* (**in press**).

Dissemination

Understanding urban metabolism: a tool for urban planning

Editors: N. Chrysoulakis, E. Castro, E. Moors



On-line Evaluation

BRIDGE Decision Support System Evaluation

Thank you for participating in the evaluation of the BRIDGE Decision Support System (DSS). You are welcome to complete this form multiple times if you complete parts of it and want to add additional comments later. You only need to fill in your name and email address every time, we will aggregate the other information. Please note: whenever you fill in an answer entitled 'Other' make sure to tick the corresponding box. Otherwise your answer will NOT be recorded.

* Required

Information on Evaluator

Name *

Email Address *

Your exposure to BRIDGE before this evaluation? Given the broad range of people that are being asked to evaluate the DSS, we would like to determine for what audience additional material is needed. Tick as many boxes as appropriate. Please note: if you fill in the answer entitled 'Other' make sure to tick the corresponding box, otherwise your answer will NOT be recorded.

- ☐ I am part of BRIDGE project
- ☐ I have been to a BRIDGE meeting
- ☐ I am a Planner
- ☐ I am a Consultant in the urban planning sector
- ☐ I am a Researcher
- ☐ I am an Academic
- ☐ I am a PhD student
- ☐ I am a Masters student
- ☐ Other:

What is your experience with GIS software? As the DSS is implemented in ArcGIS, we would like to know if you are familiar with using GIS software.

- ☐ I am an expert in the use of GIS software and I have worked with ArcGIS before.

Representation of Results

This section addresses plots and diagrams that are provided to illustrate the results.

Regarding the presentation of the results, were you able to interpret the spider diagram?

	1	2	3	4	5	
yes	●	●	●	●	●	no

How do you like the indicators visualisation tool?

	very useful, easy to interpret	useful, but design of plot could be improved	the idea is good, but I have difficulties interpreting the diagram	I would prefer another way of presenting this data	I could not find this plot
Maps	●	●	●	●	●
Time Series	●	●	●	●	●

What could be improved in the indicator visualisation tool? Please provide any comments and suggestions on the design of the plots, the provided information and the data presentation.

Interpretation of Results

This section deals with the interpretation of the assessment results presented in the DSS.

Do you think enough information is provided so that the results can be interpreted?

- ☐ yes, enough background information is provided
- ☐ I understand the content, but could not find the information I was looking for
- ☐ the results are too confusing

Do you think that the assessment results are useful for sustainable decision making?

	1	2	3	4	5	
yes	●	●	●	●	●	no

Demonstration events

- BRIDGE: Brussels, October 2011.

- GEOURBAN: Basel, November 2013.

Conclusions - future research priorities

- The role of users in both BRIDGE and GEOURBAN was crucial, because they were involved in these projects from the beginning, supporting the identification of the wide range of information that municipalities need to gather in order to assess sustainability.
- BRIDGE evaluated how planning alternatives modify urban metabolism components and is able to promote sustainable planning strategies by enhancing planning processes through the quantitative assessments of environmental aspects on a pair with socio-economic considerations.
- GEOURBAN web-based tool is expected to introduce a coherent handling of the different scales in urban planning, supporting the exploitation of future EO data.
- Future plans:
  - ✓ Operationalization of resulted prototypes.
  - ✓ Exploration of the interplay of UWECE with land use and climate change (proposal to Horizon 2020 by a joined consortium).