



Sustainable Urban Planning in Athens

Report of the 2nd COP meeting in Athens
February 18th 2010

Municipality of Egaleo,
Iera Odos 364, Egaleo, Athens, Greece
Conference room: "Dimitris Trepas".

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Executive Summary

The Bridge project aims at bridging the gap between the bio-physical sciences and urban planners and demonstrating the advantages of accounting for environmental issues during the planning process. As such a number of Community of Practise (CoP) meetings are being held to connect city planners with researchers and other stakeholders. On the 18th February 2010 the second CoP meeting was convened at the Municipality of Egaleo, Athens, Greece. The 29 participants included BRIDGE researchers, academics, urban planners, architects engineers and researchers all interested in sustainable urban planning. Most of them are working in the technical and planning dept. of the Municipality of Egaleo, which is the case study area of Athens.

The objectives of the meeting were: a)continue the sharing of experience on sustainable urban planning in Athens, b) to familiarize with the planned intervention for the Athens case study and discuss underlying challenges, planning alternatives and collected indicators. c) To discuss further and define sustainable urban planning objectives and correlating environmental and socio –economic indicators related to the real life project.

The 2nd Athens COP meeting identified the following priorities for sustainable city planning in Athens:

The final sustainability objectives in order of priority that were identified are the following:

Environmental

- 1. Reduce Thermal Discomfort**
- 2. Improve Air Quality and Reduce Emissions**
- 3. Increase Green Space Areas**
- 4. Optimize Water Use**
- 5. Improve Energy Efficiency**
- 6. Optimize Quality of Materials Used**

Socio - Economic

- 7. Mobility**
- 8. Public health and safety**
- 9. Social inclusion**
- 10. Economic criteria**
- 11. Place identity**

The associated environmental and socioeconomic indicators were thoroughly discussed and a final list was produced with the help of BRIDGE researchers:

Environmental

Sustainability Objective (in order of priority)	Indicators
1. Reduce Thermal Discomfort	<ul style="list-style-type: none"> • Average outdoor temperature (air) and humidity; • Average surface temperature (roads, buildings, etc.); and • Wind speed.
2. Improve Air Quality and Reduce Emissions	<ul style="list-style-type: none"> • Concentration of pollutants (NO_x, SO_x, PM₁₀, PM_{2.5}); • CO₂ concentration; • Source of emissions (% per building/sector type); • Number of days above established air quality thresholds; and • Effects of meteorological conditions (e.g. temperature) on concentrations.
3. Increase Green Space Areas	<ul style="list-style-type: none"> • Area (% or m²) of urban green space; • Number of trees planted; and • Types of trees planted.
4. Optimize Water Use	<ul style="list-style-type: none"> • Volume of water used (for irrigation).
5. Improve Energy Efficiency	<ul style="list-style-type: none"> • Energy consumption for lighting the avenue; and • % of energy from renewable sources (i.e. solar panels).
6. Optimize Quality of Materials Used	<ul style="list-style-type: none"> • Solar reflectance of materials used.

Socio – Economic

Sustainability Objective (in order of priority)	Socio-economic complement of the Environmental indicators
7. Mobility	<ul style="list-style-type: none"> • road traffic intensity, • quality of pedestrian sideways, • number of parking slots.
8. Public health and safety	<ul style="list-style-type: none"> • number and severity of road accidents and pedestrian injuries, • number of people suffering from short term effect of air pollution (upper respiratory infections such as bronchitis and pneumonia, allergic reactions) • number of people suffering from long term effects of air pollution (e.g. chronic respiratory disease, lung cancer, heart disease)
9. Social inclusion	<ul style="list-style-type: none"> • extent to which roads and sideways can be used by disabled or differently able people and groups (e.g. number of safe-street-crossing points, number of repose places along the street), • local community composition – compared to other areas:

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	% of elderly people, foreigners, low-income families etc.
10. Economic criteria	<ul style="list-style-type: none">• financial costs of the interventions,• estimated side-effects on local economy
11. Place identity	<ul style="list-style-type: none">• aesthetic value of the area and changes due to planning intervention

An umbrella CoP meeting is envisaged on the 5th May 2010. This will include further discussions on indicators and the availability of data as well as testing of the DSS first version. Two representatives from the Athens CoP have been selected to participate at the Umbrella CoP meeting.

2nd COP meeting - Sustainable Urban Planning in Athens

Time: Thursday 18th February - 10:00 to 16:30

Place: Conference Room “Dimitris Trepas”, Municipality of Egaleo, Athens.

1.1 Summary of presentations and discussions

There have been some modifications in the original agenda so as to convene the work schedule of some of the speakers.

(Q: question, A: answer, C: comment)

1.1.1 Welcome

A. Synnefa, N. Chryssoulakis

The goal for the day was set out i.e. to explore the sustainability issues of Egaleo, Athens and try to connect them to the work of the BRIDGE team.

1.1.2 Presentation on the BRIDGE project and CoP, review of the 1st Athens CoP meeting and objectives of this meeting.

A. Synnefa

Presentation

BRIDGE project and CoP

- The objectives of the BRIDGE FP7 project: to develop a decision support system that helps city planners to decide which planning alternatives are the most sustainable.
- Problem of urban development associated with energy, water and air quality
- The challenge of the BRIDGE project, urban metabolism, was highlighted
- The decision making diagram with components, including alternatives, indicators, criteria and objectives toward the sustainable planning goal
- The methodology including measurements, modelling the role of the users was explained.
- Demonstration of a mock DSS system for Athens based on GIS
- The vision and roles of users of the DSS was discussed.

Review of 1st Athens CoP meeting

- Attempt to connect city planners with researchers and other stakeholders.
- The 51 participants included BRIDGE researchers, academics, urban planners, architects engineers and researchers all interested in sustainable urban planning.

- Presentation of the Athens case study
- Priorities and objectives for sustainable city planning in Athens have been identified.
- A preliminary list of the associated sustainability indicators was produced.

Objectives of the 2nd CoP meeting

- Gathering local knowledge on key urban planning priorities, issues and challenges; Gathering local views and perceptions on sustainability objectives and associated indicators; Discussion with BRIDGE researchers.
- Presentation of Athens case study i.e environmental issues, alternatives, indicators.
- List of the indicators (environmental and socio –economic) that will be used for the assessment of the Athens case study.

1.1.3 Presentation of the Progress on the Athens case study

M. Santamouris

Presentation

Athens case study measurement and simulation results

- Presentation of the experimental area and the measurements that were held.
- Measurement results for the Athens case study in comparison with neighboring municipalities (heat island problem).
- Outdoor thermal comfort conditions and air quality are found to be not satisfactory in the case study area.
- Simulation results for Thivon Av. – the real life project

Design Objectives (for the real life project)

- Decrease Ambient Temperature during the peak period by 2° C.
- Improve Outdoor Thermal Comfort conditions by 20 %
- Decrease pollutants concentration by 20 %
- Decrease the surface temperatures during the peak period by 4 ° C
- Decrease the cooling needs of the buildings in the area by 20 %

Design Strategy

- Extended Use of Trees and Green Spaces
- Use of Cool Materials for Pavements.
- Use of Cool and Photocatalytic Asphalt

- Extended Use of Shading
- Use of Earth to air Heat Exchangers and wind chimneys

Simulation results show that by the above design strategy the design objectives can be achieved.

Discussion

Q: What will be the cost of the material used in comparison with conventional materials?

A: The cost will be higher mainly because of the use of photocatalytic asphalt (approximately double price of standard). It is considered unimportant in comparison with the overall gain.

Q: Is there a connection between temperature and pollution (Particulate Matter)?

A: Traffic is mainly responsible for particulate matter; particulate matter is poorly connected with high temperatures

Q: Should the design strategies and objectives include the issue of mobility/traffic?

A: Traffic management is out of our scope.

C: A study has been conducted by “ATTIKO METRO” about the benefits of the underground station in Western Athens.

1.1.4 Presentation of real life Project : planning challenges,-planning objectives planning alternatives

F. Xyrafi, (architect engineer & landscape architect)

Presentation

- Importance of Thivon Av. for Egaleo (Athens case study)
- Problems of Thivon Av. were highlighted.
- Description of the principles and the goal of the study conducted:
- Detailed description of the technical specifications of the technology used for the bioclimatic requalification of Thivon Av.

(More information on the real life project can be found in 1st Athens CoP report.)

1.1.5 Presentation of the Scenarios (planning alternatives) used in the Athens case study

M.Santamouris

Presentation

- Scenario A: Use of cool materials and asphalt, green spaces, earth to air heat exchangers, solar control and solar chimneys. Use of photocatalytic

technology (as described by the presentations “Progress on the Athens case study” and “Real life Project: planning challenges,-planning objectives planning alternatives”).

- Scenario B: Same as A, but without the use of photocatalytic technology.
- Scenario C: Same as A, but without the earth to air heat exchangers and the solar chimney.

Discussion

Q: Was the socio –economic component taken into consideration?

A: A cost analysis has been conducted by F. Xyrafi.

Q: Should the traffic component be taken into consideration?

A: Boundary conditions could be changed i.e reduction of traffic load because of the use of the Metro in order to re-run simulations for the aforementioned scenarios.

Q: What are the thoughts of the local people about the bioclimatic requalification of Thivon Av? (Question addressed to all participants)

A: Although they believe that the bioclimatic requalification of Thivon Av. is essential they believe that the cost could delay or cancel it.

Discussion about the cost of every technology introduced for the Athens case study was held. Difficulties about budget procedures in Greece were highlighted.

C: Cost benefit is not the only thing needed. It is important to introduce socio-economic and environmental indicators in order to be able to quantify the bioclimatic requalification of Thivon Av.

C: The BRIDGE DSS should take into account real costs

C: Technical specifications i.e life time, of the materials used are needed

Q: Is it a common practice for the municipality to examine different scenarios for urban planning before proceeding with an intervention? (Question addressed to members of the technical and planning dept. of the Municipality of Egaleo)

A: Yes. Conversations are held for the different options always in regard to the cost.

Q: Could direct measures be taken in order to deal with the mobility/traffic issues i.e ban the use of cars one day per week within a specific area?

A: Alternative mobility is not developed yet in Athens. It is mainly focused to the extension of the underground.

Discussion about the characteristics of the photocatalytic technology

2 Summary of discussions regarding Sustainability Environmental Objectives and Associated Indicators

2.1.1 Sustainable urban planning indicators (environmental, socioeconomic) in relation to the real life project

Ain. Gonzalez gave an introduction for the objectives of the afternoon session. She presented the socioeconomic indicators that were defined during the 1st Athens CoP and are described in the following tables.

Table 1 Environmental sustainability objectives and indicators as defined during the 1st CoP meeting in Athens

Sustainability Objectives	Indicators
Improve Air Quality	<ul style="list-style-type: none"> • Concentration of pollutants (NO_x, SO_x, PM₁₀, PM_{2.5}, etc.); and • Number of days above established air quality thresholds.
Improve Energy Efficiency	<ul style="list-style-type: none"> • Energy consumption per capita; and • % of energy from renewable sources.
Reduce CO₂ emissions	<ul style="list-style-type: none"> • CO₂ concentration; • % of CO₂ emissions from anthropogenic sources: transport, industry, households; and • Effects of meteorological conditions (e.g. temperature) on concentrations.
Reduce Thermal Discomfort	<ul style="list-style-type: none"> • Average outdoor temperature (surface and air); and • Average indoor temperature (particularly in old buildings).
Increase Green Space Areas	<ul style="list-style-type: none"> • Area (ha) of urban green space; • Number of trees planted; • Coverage (m²) of green infrastructure (from new plantations and growth); and • % of urban green space of total urban area.

Table 2 Socio-economic sustainability objectives and indicators as defined during the 1st CoP meeting in Athens

Sustainability Objectives	Indicators
Improve the Built Fabric	<ul style="list-style-type: none"> • Building characteristics; and • Number of dwellings where insulation improvements have taken place.

- Increase Mobility**
- Number of municipal passenger transport services;
 - % of population using public transport; and
 - Number of new car-parking spaces.

The revision of the environmental objectives and indicators during the afternoon session focused on the case study of the regeneration of Thivon Avenue, in the Municipality of Egaleo. The participants were divided in two groups (with approximately 7 individuals in each group) to separately address environmental and socio-economic indicators. The discussions of the “environmental indicators group” were facilitated by A. Gonzales and A. Synnefa and the discussion of the “socioeconomic indicators group” by M. Jaroslav and K. Berli. After the discussions, one representative of each group presented the results and revised list of environmental and socioeconomic indicators.

2.2 Environmental objectives and indicators

The environmental group revised the objectives and indicators defined during the first CoP meeting, contextualizing them to the case study (real life project) considerations. The objectives and indicators were subsequently categorized in order of significance. The table below lists the objectives in the order of priority set by the participants. Therefore, the revised set stands as follows:

Table 3 Environmental sustainability objectives and indicators as defined during the 2nd CoP meeting in Athens

Sustainability Objective (in order of priority)	Indicators
1. Reduce Thermal Discomfort	<ul style="list-style-type: none"> • Average outdoor temperature (air) and humidity; • Average surface temperature (roads, buildings, etc.); and • Wind speed.
2. Improve Air Quality and Reduce Emissions	<ul style="list-style-type: none"> • Concentration of pollutants (NO_x, SO_x, PM₁₀, PM_{2.5}); • CO₂ concentration; • Source of emissions (% per building/sector type); • Number of days above established air quality thresholds; and • Effects of meteorological conditions (e.g. temperature) on concentrations.
3. Increase Green Space Areas	<ul style="list-style-type: none"> • Area (% or m²) of urban green space; • Number of trees planted; and • Types of trees planted.
4. Optimize Water Use	<ul style="list-style-type: none"> • Volume of water used (for irrigation).
5. Improve Energy Efficiency	<ul style="list-style-type: none"> • Energy consumption for lighting the avenue; and • % of energy from renewable sources (i.e. solar panels).

6. Optimize Quality of Materials Used	<ul style="list-style-type: none"> • Solar reflectance of materials used.
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Afterwards it was asked by the participants to choose from the list the five most important indicators that are listed below

Table 4 Top 5 most important environmental indicators as chosen by the “environmental indicators group” during the 2nd CoP meeting in Athens

Top 5 environmental indicators
<ol style="list-style-type: none"> 1. Average outdoor temperature (air) and humidity; 2. Concentration of pollutants (CO₂, PM_x, NO_x, etc.); 3. Average surface temperature (roads, buildings, etc.); 4. Area (% or m²) of urban green space; and 5. % of energy from renewable sources

It is worth noting that the participants perceived ‘cost’ as being the key consideration when assessing and selecting planning alternatives. Therefore, the cost implications will play a significant role (i.e. will have a greater weight than environmental or social criteria) in the assessment of the Thivon Avenue case study.

Environmental objectives and indicators updated list was presented by A.Synnefa

2.3 Socio - economic objectives and indicators

The socio-economic group focused on defining the key concerns in the area. The socio-economic objectives identified during the first CoP included: increase the built fabric and improve mobility

During the Second COP meeting the socioeconomic indicators were discussed more in depth, further specifying the areas of concerns of the COP members/participants. The discussion can be summarized into categories Mobility, Public health and safety issues, Social inclusion, Economic costs, and Aesthetic values.

Mobility includes both public and private transportation, pedestrian areas and parking slots. It was noted that the road traffic represents major issues as the key avenue crossing the suburb serves predominately long-distance transportation. The participants pointed out to city council’s hesitance to apply economic instruments (such as congestion charges) to limit the traffic, or to deviate the traffic to other areas. Bad quality of pedestrian sidewalk further exacerbate the situation, forcing people to use or cross the street.

Public health and safety issues include both car and pedestrian accidents, and the inhalation of the air pollutants. Lack of green areas make the situation worse.

Social inclusion has been mentioned in relation to marginalized groups (families with children, elderly people) being most exposed and vulnerable to further deterioration of living conditions in the area.

Economic criteria include financial costs of the planning alternatives, but also side-effect to local community, as a result of improved situation/living conditions. Furthermore, saving in water and energy use have been highlighted should the situation improve (e.g. less energy use for air conditioning should the in- and outdoor thermal comfort improve, less water needed for basic sanitation).

As a composite effect of the above mentioned issues, the participants raised concerns about the public perception of the 'ownership' (who should care to improve the living conditions) and lack of awareness about the direct and indirect health and other effects of current living conditions in the area. Related to that is the general lack in compliance with the existing city regulation (e.g. where cars can and cannot be parked), which the COP participants attributed to persistence of the intolerable situation. The COP participants feel that the area has a little 'place identity' and low aesthetic value; both could be improved by the planning interventions. In addition, the issue of 'novelty' acceptance was raised, particularly in connection with the observed cases of vandalism in the past. It has been noted that all these aspects are connected in a vicious circle, making difficult any attempt to improve the current situation.

Table 5 Socio – economic objectives and indicators

Sustainability Objective (in order of priority)	Socio-economic complement of the Environmental indicators
7. Mobility	<ul style="list-style-type: none"> • road traffic intensity, • quality of pedestrian sidewalks, • number of parking slots.
8. Public health and safety	<ul style="list-style-type: none"> • number and severity of road accidents and pedestrian injuries, • number of people suffering from short term effect of air pollution (upper respiratory infections such as bronchitis and pneumonia, allergic reactions) • number of people suffering from long term effects of air pollution (e.g. chronic respiratory disease, lung cancer, heart disease)
9. Social inclusion	<ul style="list-style-type: none"> • extent to which roads and sidewalks can be used by disabled or differently able people and groups (e.g. number of safe-street-crossing points, number of repose places along the street), • local community composition – compared to other areas: % of elderly people, foreigners, low-income families etc.
10. Economic criteria	<ul style="list-style-type: none"> • financial costs of the interventions, • estimated side-effects on local economy
11. Place identity	<ul style="list-style-type: none"> • aesthetic value of the area and changes due to planning intervention

Socio – economic objectives and indicators were presented by K. Berli.

2.4 Outlook to Umbrella CoP meeting

The Umbrella CoP meeting will be held in Athens on 5th May 2010. Two representatives from each CoP will be selected and invited to participate. From the Athens CoP meeting the two participants proposed for the Umbrella CoP meeting are:

- Mrs. Katerina Berli from the Municipality of Egaleo (Technical Dept.) – (berli@egaleo.gr)
- Mr. Vassilis Kostovassilis (urban planner) from the Unification of the Archaeological Sites of Athens S.A. –(v.kostovassilis@yahoo.com)

A short conversation between these two potential participants and A. Gonzalez and A. Synnefa about their availability to participate at the Umbrella CoP meeting, took place during the meeting.

ANNEX I: Agenda

10.00–10.10	Welcome	Prof. Mat Santamouris NKUA D. Kalogeropoulos – Mayor of Egaleo – President of Local Union of municipalities and communities of Attica -Urban planner
10.10 -10.15	Introduction of participants	All
10.15-10.25	Introduction to BRIDGE and CoP	M. Saliari
10.25 – 10.45	Review of the 1 st Athens CoP meeting and objectives of this meeting	A. Synnefa, A.Gonzalez, A. Groot
10.45 – 11.15	Progress on the Athens case study	M. Santamouris
11.15-11.30	Coffee break	
11.30 – 12.15	Presentation of real life project -planning challenges -planning objectives -planning alternatives	M. Santamouris, F. Xyrafi,
12.15 -13.30	Sustainable urban planning indicators (environmental, socioeconomic) in relation to the real life project	A.Gonzalez, M. Breil, J. Mysiak
13.30- 14.30	Lunch	
14.30 -15.30	Sustainable urban planning indicators (environmental, socioeconomic) in relation to the real life project	A.Gonzalez, M. Breil, J. Mysiak
15.30 -15.45	Summarizing, end of meeting	A. Synnefa, A.Gonzalez, A. Groot

ANNEX II: List of participants

i/i	Name	Institution/ Company
1	Afroditi Synnefa	National and Kapodistrian University of Athens, Greece (CoP Coordinator)
2	Mat Santamouris	National and Kapodistrian University of Athens, Greece (Athens case study leader)
3	Maria Saliari	National and Kapodistrian University of Athens, Greece - BRIDGE researcher
4	Eleni Niarxou	Secondary Education
5	Evagellia Chyta	Municipality of Egaleo
6	Evgenia Kanellopoulou	Municipality of Egaleo
7	Nektarios Nikas	Municipality of Egaleo
8	Anthoula Miti	Municipality of Egaleo
9	Efrosini Maragou	Municipality of Egaleo
10	Vassilis Kostovassilis	Technical services of the Prefecture of Athens - Unification of the Archaeological Sites of Athens S.A.
11	Themistoklis Ondeniotis	Technical services of the Prefecture of Athens - Unification of the Archaeological Sites of Athens S.A.
12	Maria Teskou	Municipality of Egaleo
13	Maria Tzavella	Civil Engineer
14	Eleni Stamellou	Municipality of Egaleo
15	Panagiotis Kyriakopoulos	Municipality of Egaleo
16	Evangellos Apergis	Municipality of Egaleo
17	George Rodatos	Municipality of Egaleo
18	Elizabeth Michailidou	Municipality of Egaleo
19	Katerina Berli	Municipality of Egaleo
20	Dimitrios Sfiris	Municipality of Egaleo
21	Nikos Kalatzis	Municipality of Egaleo
22	Dimitrios Tzebelikos	Municipality of Egaleo
23	Marina Stathopoulou	National and Kapodistrian University of Athens, Greece - BRIDGE researcher
24	Katerina Katsiabani	National and Kapodistrian University of Athens, Greece - BRIDGE researcher
25	Nektaria Adaktylou	National and Kapodistrian University of Athens, Greece - BRIDGE researcher
26	Nektarios Chrysoulakis	FORTH, BRIDGE coordinator
27	Ainhua Gonzalez	Trinity College Dublin, BRIDGE researcher
28	Annemarie Groot	ALTERRA, Netherlands
29	Jaroslav Mysiak	Euro-Mediterranean Center of Climate Change