WATERGY
International Group

COOL CONSTRUCTION MATERIALS

PAPER 11

PRESENTATION OF SUCCESS STORIES

It's time to be cool.

Introduction

There are three main ways to stop global warming and climate change from getting worse and that will, one hope, enable us to manage our global temperature:

a) To reduce emissions of greenhouse gases (GHGs), b) To sink carbon from the atmosphere in forests and oceans, c) To reduce solar heating of the lower atmosphere

The first two are well known but the third is often not considered. There are quite a few methods that have been suggested to utilize albedo, a surface or an object's reflectivity, to reflect the Sun's energy and cool the Planet.

There have been many suggestions: Whitening clouds, making clouds, covering large areas with white plastic, increasing the albedo of grasses and plants, reflective dust in the upper atmosphere and space shields of various sorts.

So far, the only use of albedo to be advocated by the UN's IPCC, is to increase the solar reflectivity of our Cities based upon the work of Hashem Akbari et al., "The Heat Island Group", in 1998. They advocate it because of the energy savings and reduction in associated emissions.

It is considered that the dark surface of buildings and pavements is one of the major heat sources causing the urban heat islands, as it absorbs more heat from the sun.

Cool pavements are a means of reducing the urban heat island effect. The term refers to materials chosen to reduce pavement temperature by increasing pavement reflectivity or controlling temperature by other means through choice of materials and engineering design.

Pavements are critical to transportation in all of its aspects – walking, riding in passenger vehicles, carrying goods in commercial vehicles, providing mobile services, and parking. They account for a significant percentage of the land surface in an urban area.

By altering land-cover, pavements have important localized environmental effects in urban areas. As with roofing materials, paving materials can reach 70° C in daytime, radiating away this excess heat during both day and night into the air in the urban canopy layer (as well heating stormwater that reaches the pavement surface). Due to the large area covered by pavements in urban areas, they are an important element to consider in heat island mitigation.

In the following pages we present some succeed projects in Greece level, which basically refer to cool pavement applications. The core target of the specific projects, in terms of sustainability, was the increasing of the treated area surface by 0, 2. For each Project there is an estimation of the CO_2 equivalency offset.

Throughout our experience, the issue of the promoting and implementing high solar reflective pavement materials into Local communities it is strongly connected with the influence of the legislation. Critical success factor for the implementation of the specific projects were initiatives and actions which were taken by our partner Abolin Co. in order for the legislation to become cool roof and cool pavement specific. In the following pages there are also some points which refer to technical requirements and to cool roof and cool pavements friendly programs.

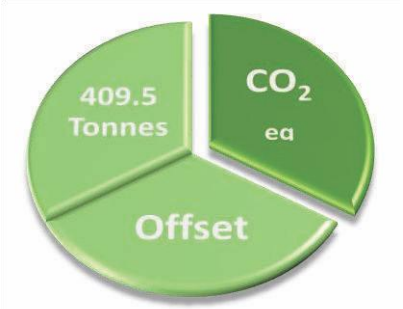
SAINT THOMAS SQUARE – ATHENS

PROJECTS DETAILS:

PROJECT NAME: REGENERETION OF SAINT THOMAS SQUARE WITH BIOCLIMATIC CRITERIA (July 2010)

AUTHOR: MUNICAPALITY OF ATHENS

CONTRACTOR: MATHAIOS TECHNICAL COMPANY



PROJECTS PRODUCT CHARACTERISTICS:
APPLICATION OF COOL GREY CONCRETE PAVERS

TOTAL SURFACE: 12.500 SQUARE METERS

TECHNICAL SPECIFICATIONS AND PLANNING:

The project's proposal had drafted from our partner Abolin Co and the technical service department of the municipality of Athens. The approval of the proposal is implemented through the "REGENERATION FOR URBAN AREAS PROGRAM ATTIKI 2007-2013" and the contract is co-funded by the European Regional Development Fund and by national resources through the "Public investment Program" as well as by own resources of the municipality of Athens. The technical specifications are based on the temporary national technical standard PETEP 03 11 20 00.

TEST MEASUREMENTS AND STANDARDS:

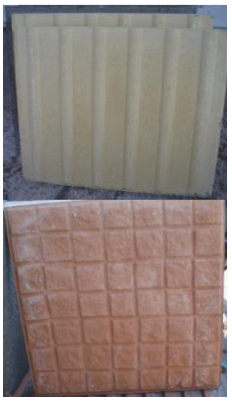
SOLAR REFLECTANCE: SR VALUE = 0, 60: The solar reflectance of the cool pavers measured according to the ASTM E903-96 and ASTM G159-98

INFRARED EMMITANCE: E VALUE = 0, 90: The infrared emittance of the cool pavers measured was measured according to the ASTM E408-71 (2002)

FANEROMENIS AVENUE HOLARGOS - ATHENS







PROJECTS DETAILS:

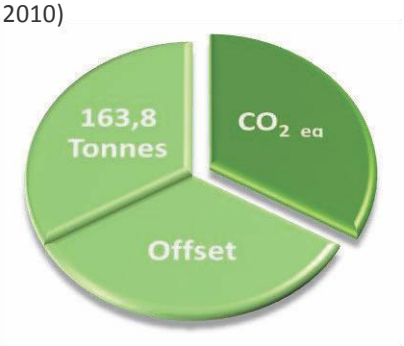
PROJECT NAME: REFORMATION OF FANEROMENIS AVENUE (September 2010)

AUTHOR: MUNICAPALITY OF HOLARGOS

CONTRACTOR: KAT CONSTRUCTIONS

PROJECTS PRODUCT CHARACTERISTICS:
APPLICATION OF COOL and PHOTOCATALYTIC CONCRETE BLOCKS AND TILE S

TOTAL SURFACE: 5.000 SQUARE METERS



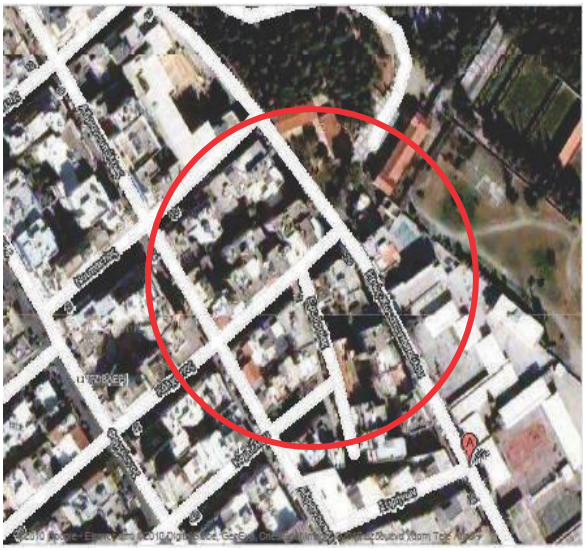
TECHNICAL SPECIFICATIONS AND PLANNING:

The project's proposal had drafted from our partner Abolin Co. and the technical service department of the municipality of Holargos. The approval of the proposal is implemented through the "GREEN LIFE IN CITY PROGRAMM" and the contract is co-funded by the European Regional Development Fund and by national resources through the "National Strategic Reference Frame 2007 -2013 Program" as well as by own resources of the municipality of Holargos. The technical specifications are based on the temporary national technical standard PETEP 03 11 20 00.

TEST MEASUREMENTS AND STANDARDS:

The solar reflectance of the cool pave blocks and tiles measured according to the ASTM E903-96 and ASTM G159-98**.** The infrared emittance of the cool blocks and tiles measured was measured according to the ASTM E408-71 (2002) **Projects Requirements:** SOLAR REFLECTANCE VALUE more than 0, 60 & INFRARED EMITTANCE more than 0, 80. The Photocatalytic activity measured according to JIS 1701 Std. Analytical measurements are available on request.

KONSTANTOPOULOY AVENUE KAISSARIANI - ATHENS



PROJECTS DETAILS:

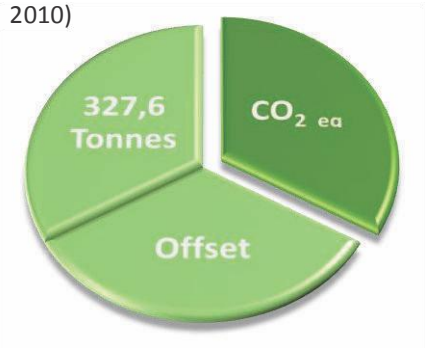
PROJECT NAME: REFORMATION OF IROS KONSTANTOPOYLOY (August 2010)

AUTHOR: MUNICAPALITY OF KAISSARIANI

CONTRACTOR: SYMBOLO ATE

PROJECTS PRODUCT CHARACTERISTICS:
APPLICATION OF COOL CONCRETE BLOCKS AND TILES

TOTAL SURFACE: 10.000 SQUARE METERS



TECHNICAL SPECIFICATIONS AND PLANNING:

The project's proposal had drafted from our partner Abolin Co. and the technical service department of the municipality of Kaissariani. The approval of the proposal is implemented through the "National Strategic Reference Frame
2007 -2013 Program" as well as by own resources of the municipality of Kessariani. The technical specifications are based on the temporary national technical standard PETEP 03 11 20 00.

TEST MEASUREMENTS AND STANDARDS:

The solar reflectance of the cool pave blocks and tiles measured according to the ASTM E903-96 and ASTM G159-98**.** The infrared emittance of the cool blocks and tiles measured was measured according to the ASTM E408-71 (2002). **Projects Requirements:** SOLAR REFLECTANCE VALUE more than 0, 50 & INFRARED EMITTANCE more than 0, 80.

NATIONAL ORGANISATION OF MEDICINES

PROJECTS DETAILS:

PROJECT NAME: REHABILITATION OF FACADES (August 2010)

AUTHOR: NATIONAL ORGANISATION OF MEDICINES

CONTRACTOR: PAPAS ATE

PROJECTS PRODUCT CHARACTERISTICS: APPLICATION OF PAINTS FOR EXTERIOR WALLS

TOTAL SURFACE: 1.500 SQUARE METERS

TECHNICAL SPECIFICATIONS AND PLANNING:

The project's proposal had drafted from the technical service department of the National organization of medicines and was implemented by own resources of the organization. The technical specifications are based on the temporary national technical standard PETEP 03 11 20 00.

TEST MEASUREMENTS AND STANDARDS:

The solar reflectance of the cool paint was measured according to the ASTM E903-96 and ASTM G159-98**.** The infrared emittance of the cool blocks and tiles measured was measured according to the ASTM E408-71 (2002) **Projects Requirements:** a) GREY COLOUR WITH SOLAR REFLECTANCE VALUE more than 0, 60 & INFRARED EMITTANCE more than 0, 85. b) LIGHT BROWN COLOUR WITH SOLAR REFLECTANCE VALUE more than 0, 60 & INFRARED EMITTANCE more than 0, 85.

CENTRAL SQUARE – ILION ATHENS

PROJECTS DETAILS:

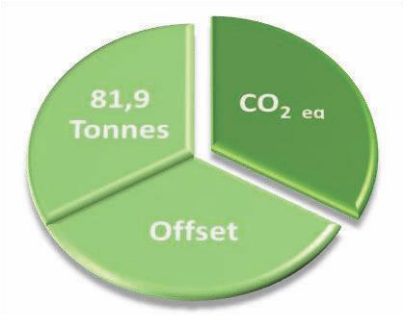
PROJECT NAME: REFORMATION OF CENTRAL SQUARE OF ILION MUNICIPALITY WITH BIOCLIMATIC CRITERIA (August 2010)

AUTHOR: MUNICIPALITY OF ILION - ATHENS

CONTRACTOR: TSEKOURAS ATH ATE

PROJECTS PRODUCT CHARACTERISTICS:
APPLICATION OF CONCRETE BASED COOL PAVES

TOTAL SURFACE: 2.500 SQUARE METERS



TECHNICAL SPECIFICATIONS AND PLANNING:

The project's proposal had drafted from our partner Abolin Co. and the technical service department of the municipality of Ilion. The approval of the proposal is implemented through the "GREEN LIFE IN CITY PROGRAMM" and the contract is co-funded by the European Regional Development Fund and by national resources through the "National Strategic Reference Frame 2007 -2013 Program" as well as by own resources of the municipality of Ilion. The technical specifications are based on the temporary national technical standard PETEP 03 11 20 00.

TEST MEASUREMENTS AND STANDARDS:

The solar reflectance of the pavers was measured according to the ASTM E903-96 and ASTM G159-98**.** The infrared emittance of the cool blocks and tiles measured was measured according to the ASTM E408-71 (2002)
Projects Requirements: Colored paving materials with solar reflectance more than 0, 50