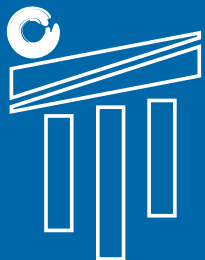


1^ο ΠΑΝΕΛΛΗΝΙΟ ΣΥΝΕΔΡΙΟ ΓΙΑ ΤΑ ΠΑΘΗΤΙΚΑ ΚΤΙΡΙΑ

ΕΝΑ ΜΟΝΤΕΛΟ ΓΙΑ ΝΑ ΖΕΙΣ ΚΑΙ ΝΑ ΕΠΙΧΕΙΡΕΙΣ ΤΟΝ 21^ο ΑΙΩΝΑ

ΔΙΟΡΓΑΝΩΣΗ:



ΕΛΛΗΝΙΚΟ
ΙΝΣΤΙΤΟΥΤΟ
ΠΑΘΗΤΙΚΟΥ ΚΤΙΡΙΟΥ

Εργαλεία αξιολόγησης και
πιστοποίησης
περιβαλλοντικής ποιότητας
και αειφορίας στις
κατασκευές

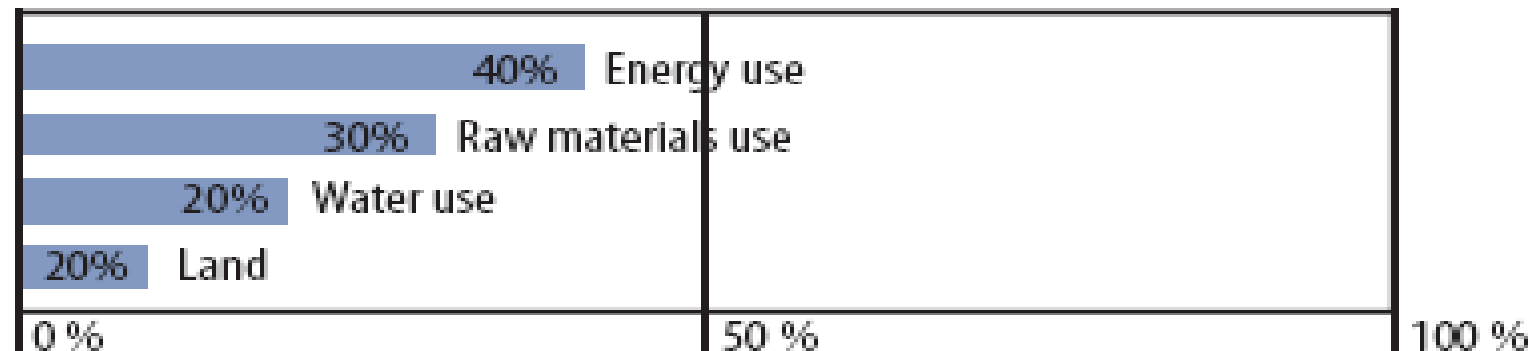
Στέλλα Κυβέλου, Επ.καθηγήτρια, Πρόεδρος SDMed

1. Επίπτωση του αστικού περιβάλλοντος στην χρήση των φυσικών πόρων και στην εκπομπή ρύπων

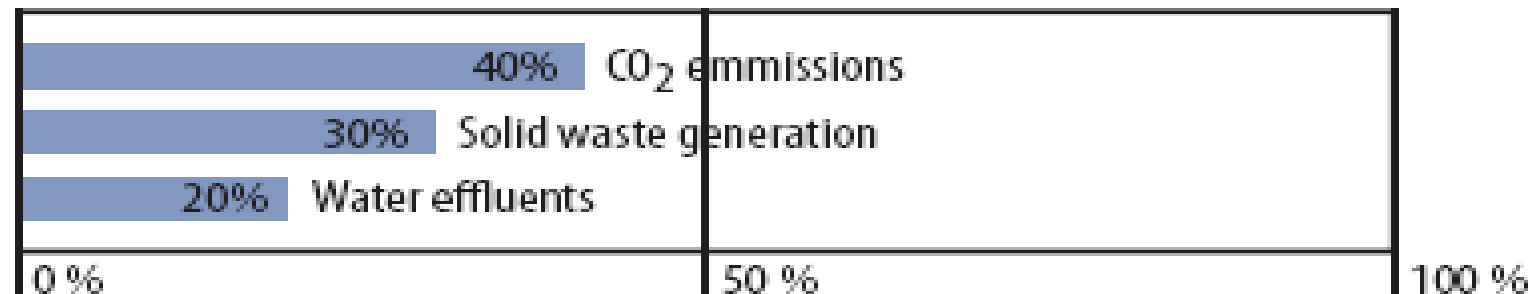
Impact of the built environment in resource use and pollution emission

The built environment

SHARE OF THE BUILT ENVIRONMENT IN RESOURCE USE



SHARE OF THE BUILT ENVIRONMENT IN POLLUTION EMISSION



2. Το αστικό κλίμα και μικροκλίμα

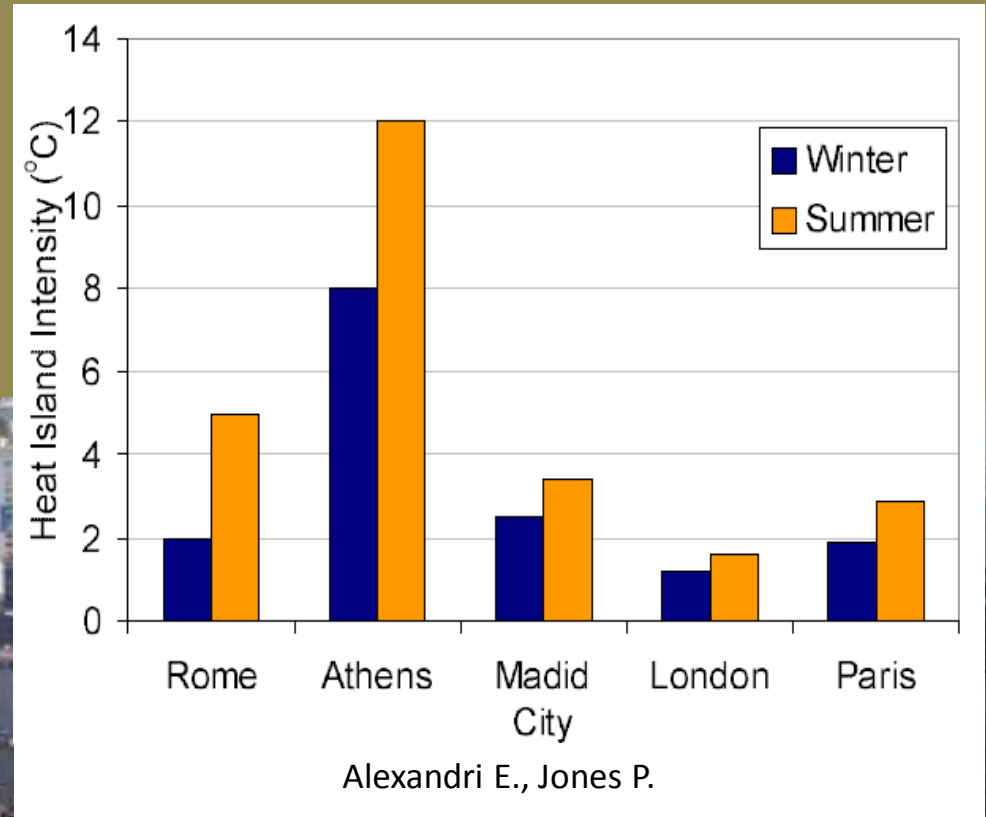
ΥΨΗΛΗ ΕΝΤΑΣΗ ΑΣΤΙΚΗΣ ΝΗΣΙΔΑΣ

ΘΕΡΜΟΤΗΤΑΣ ΣΤΙΣ ΕΥΡΩΠΑΙΚ΄Σ ΠΟΛΕΙΣ

Heat Island intensity ranges between 1 and 10 C.
Heat Island is present in low, mid and high latitude locations.

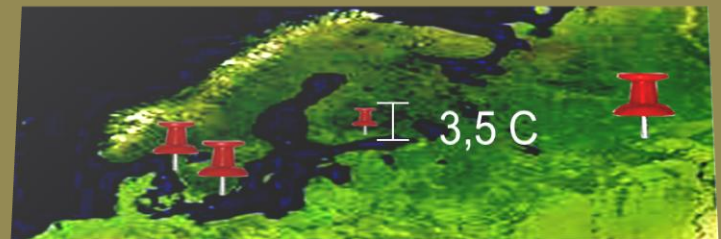
It is observed during the day and the night period

Source : M.Santamouris.



ΥΨΗΛΗ ΕΝΤΑΣΗ ΑΣΤΙΚΗΣ ΝΗΣΙΔΑΣ ΘΕΡΜΟΤΗΤΑΣ ΣΤΙΣ ΕΥΡΩΠΑΙΚΕΣ ΠΟΛΕΙΣ

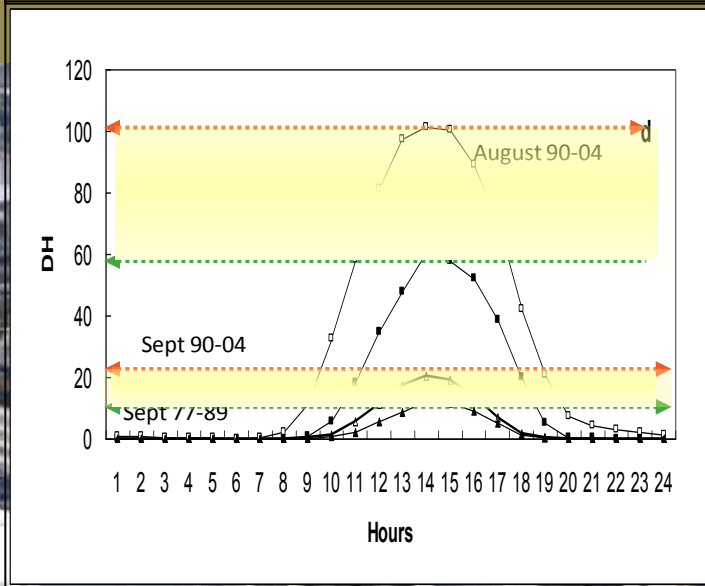
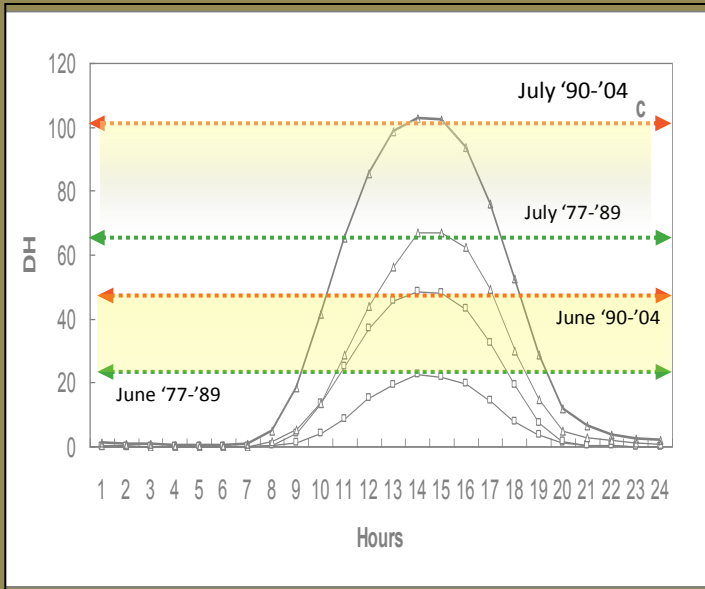
Especially in south Europe, **heat island is very intense during the day period**, contributing to a high increase of **discomfort hours**, increase of the **cooling load** of buildings and a very important increase of the **peak electricity demand**.



ΕΝΑ ΠΑΡΑΔΕΙΓΜΑ ΑΣΤΙΚΗΣ ΚΛΙΜΑΤΙΚΗΣ

ΜΕΤΑΒΟΛΗΣ : ΑΘΗΝΑ

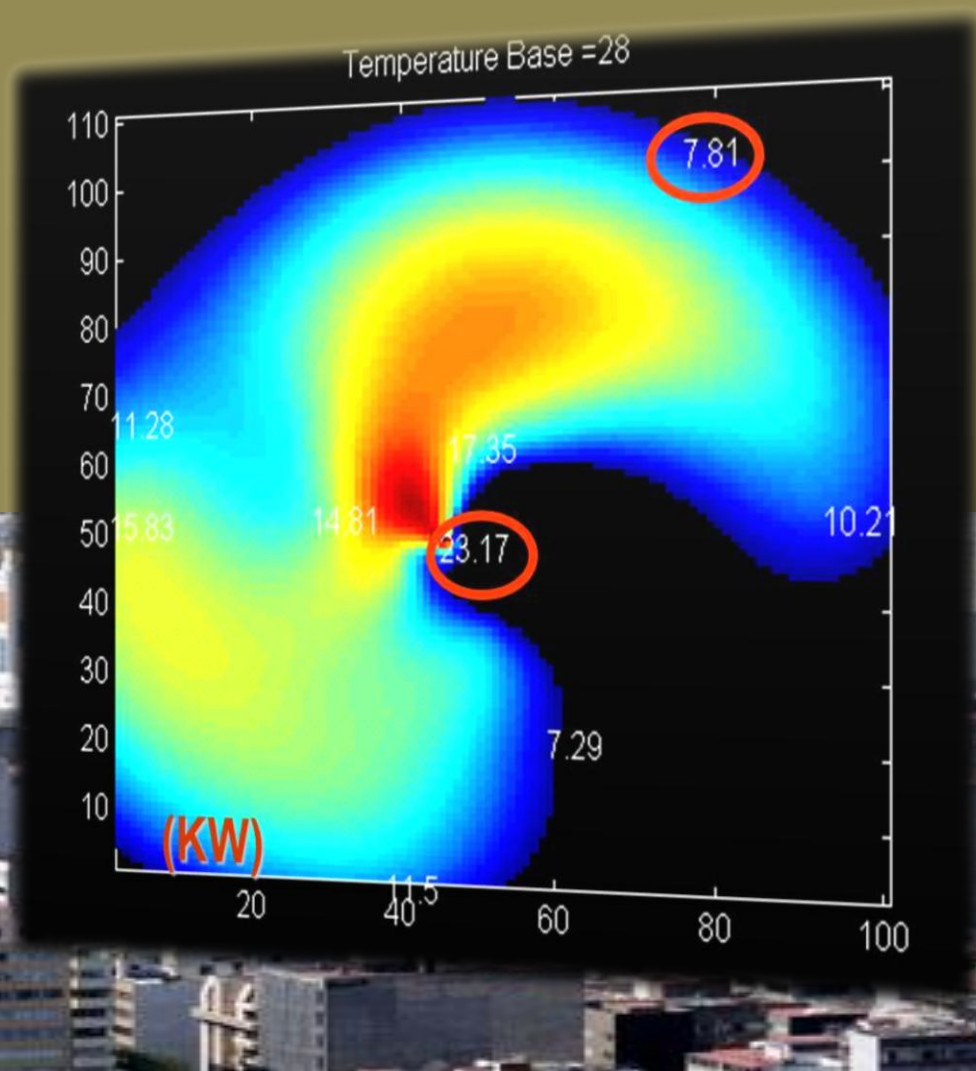
In Athens, the number of hours and degree hours above 30° C, has increased considerably during 1990-2004, compared to the period 1977-1989. The whole phenomenon is statistically significant. For July and August the corresponding increase is around 30-40 %..

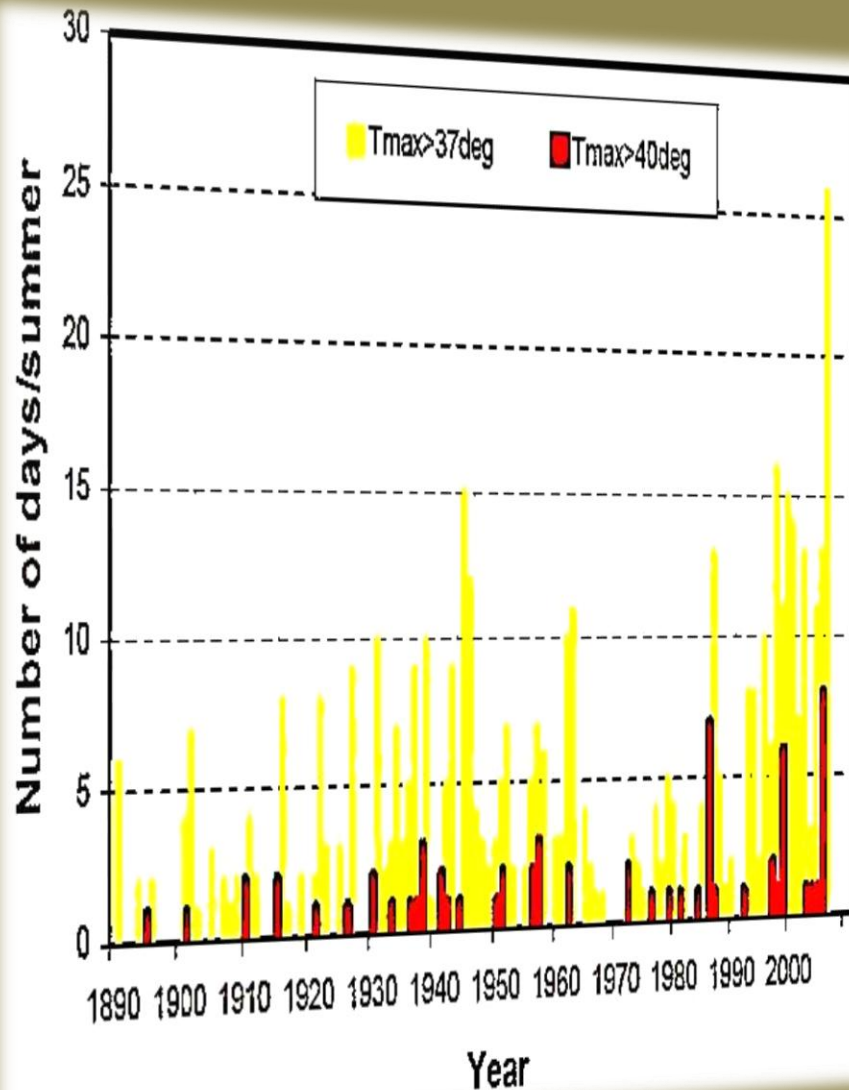


ΕΠΙΠΤΩΣΕΙΣ ΤΗΣ ΑΣΤΙΚΗΣ ΚΛΙΜΑΤΙΚΗΣ ΜΕΤΑΒΟΛΗΣ

In Athens the peak electricity demand for cooling of an office building increases by 300 % because of the heat island.

Πηγή : Παν.Αθηνών, Καθ.Μ.Σανταμούρης

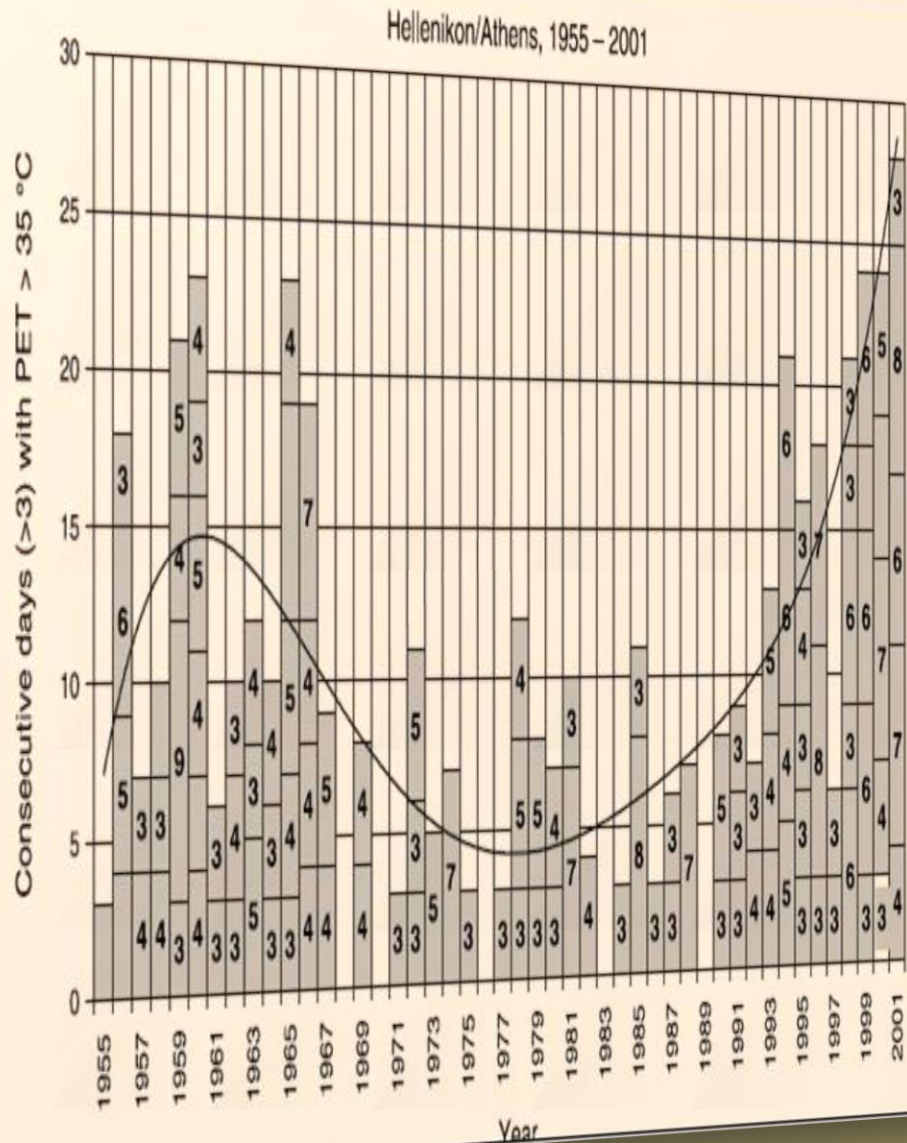




ΕΝΑ ΠΑΡΑΔΕΙΓΜΑ ΑΣΤΙΚΗΣ
ΚΛΙΜΑΤΙΚΗΣ ΜΕΤΑΒΟΛΗΣ:

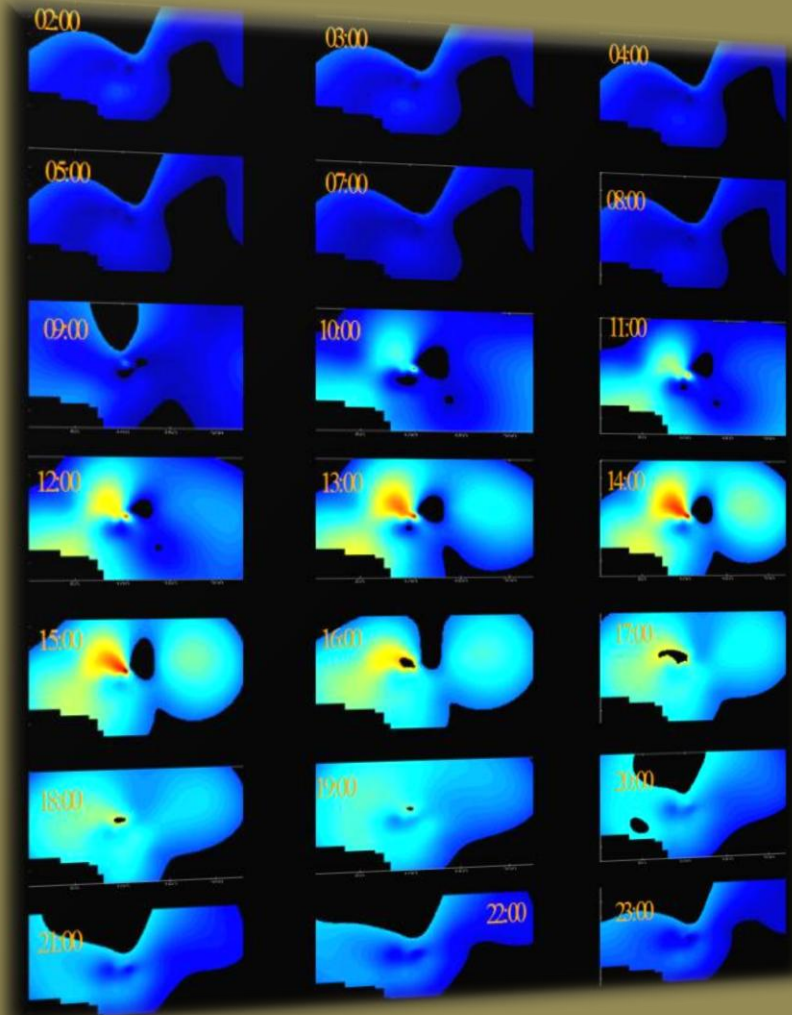
ΑΘΗΝΑ

The annual number of hours
above 37° C and 40° C
is continuously increasing.



**ΕΝΑ ΠΑΡΑΔΕΙΓΜΑ
ΑΣΤΙΚΗΣ ΚΛΙΜΑΤΙΚΗΣ
ΜΕΤΑΒΟΛΗΣ:
ΑΘΗΝΑ**

The number of consecutive hours above 35° C is increasing continuously.

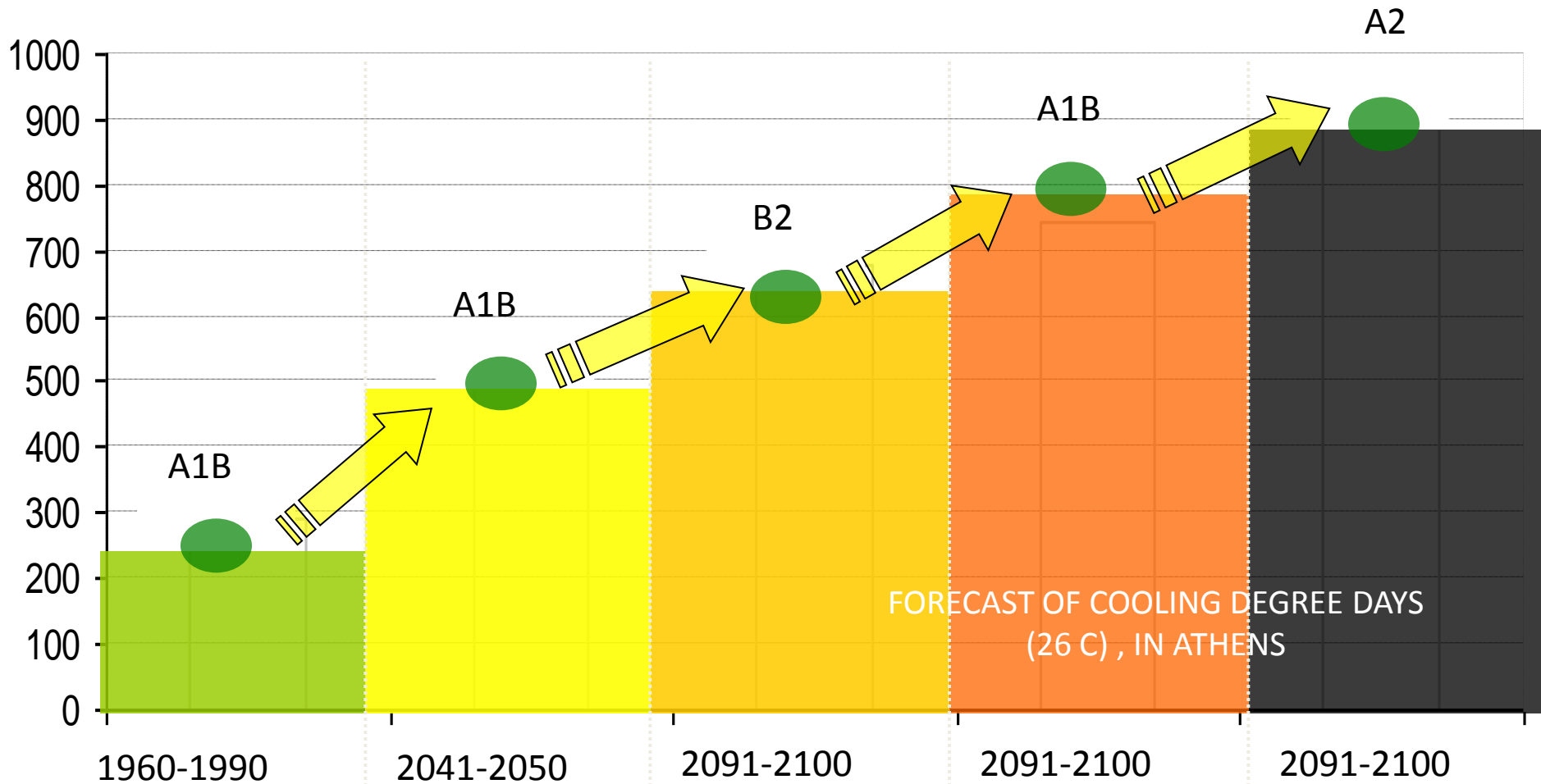


HEAT ISLAND IS WELL DOCUMENTED

Heat Island in dense Mediterranean cities is strong and is developed in dense urban areas with important anthropogenic heat and with a positive heat balance because of the use of absorbing materials, lack of vegetation and low urban ventilation rates.

Heat Island Intensity may reach values close to 10 K.

ALL FUTURE CLIMATIC SCENARIA SHOW AN IMPORTANT INCREASE OF URBAN TEMPERATURES

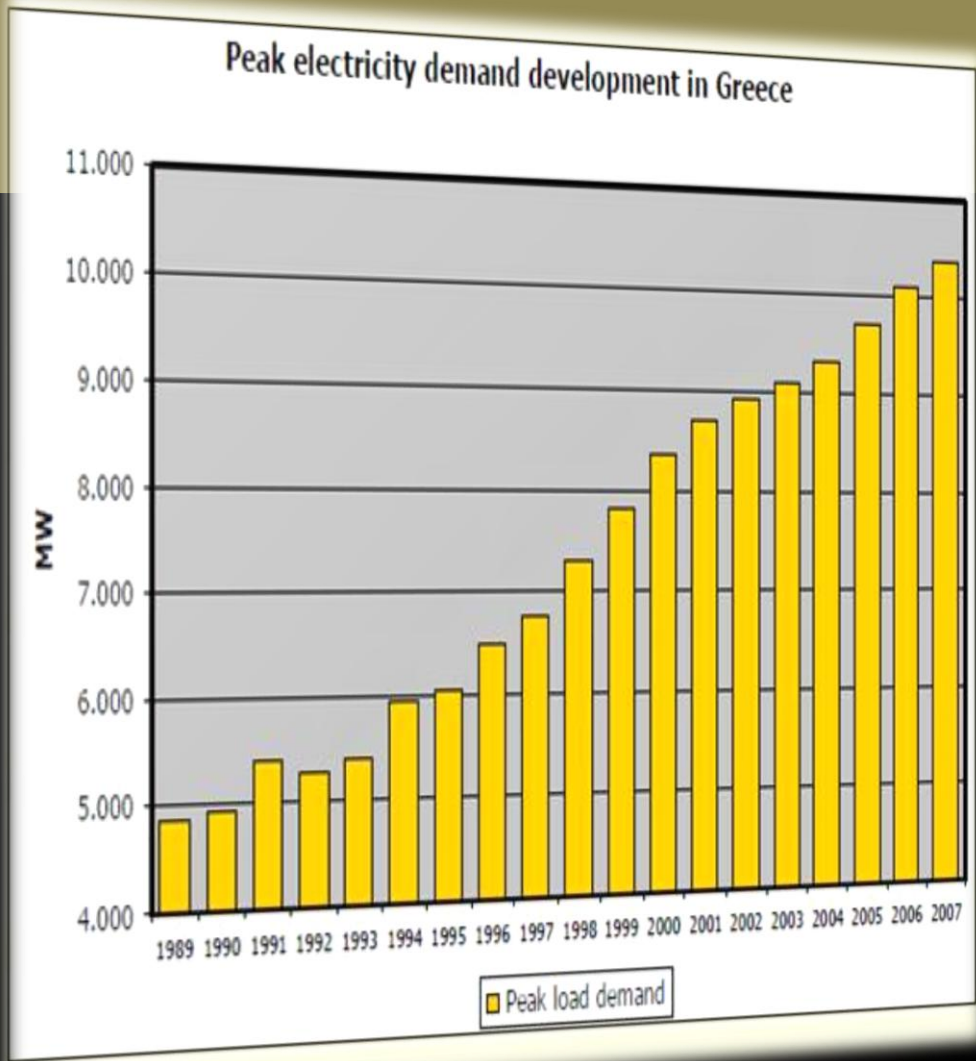


ΕΠΙΠΤΩΣΕΙΣ ΤΗΣ ΑΣΤΙΚΗΣ ΚΛΙΜΑΤΙΚΗΣ ΜΕΤΑΒΟΛΗΣ

Heat Island causes:

- Temperature rise
- Thermal discomfort
- **Increase of the electricity demand**
- **Rise of the electricity peak**
 - Decline of the economy
- **Greenhouse gases emissions increase**

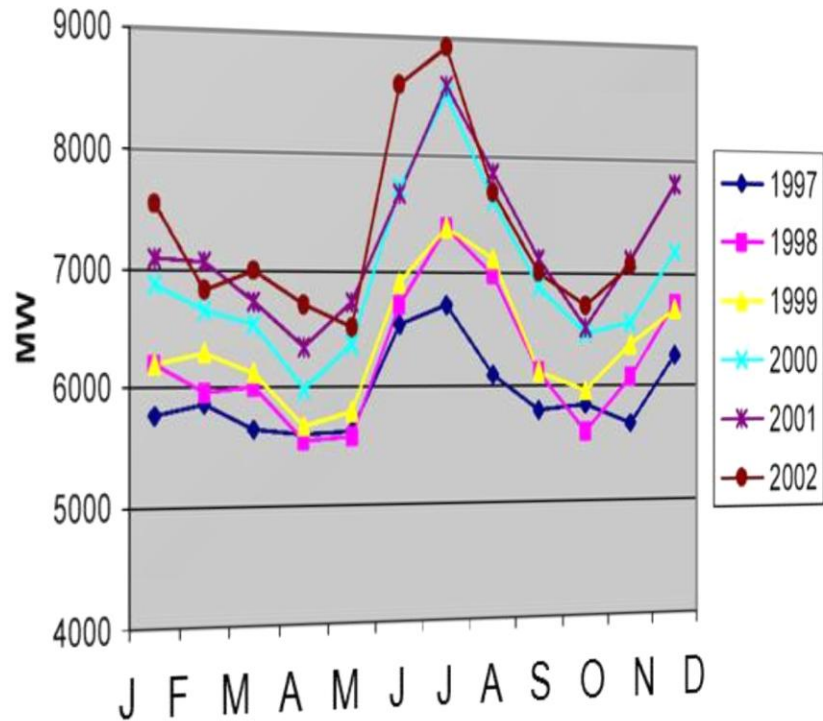




ΕΠΠΤΩΣΕΙΣ ΤΗΣ ΑΣΤΙΚΗΣ ΚΛΙΜΑΤΙΚΗΣ ΜΕΤΑΒΟΛΗΣ

The peak load demand is constantly increasing

Monthly Peak Electricity Load

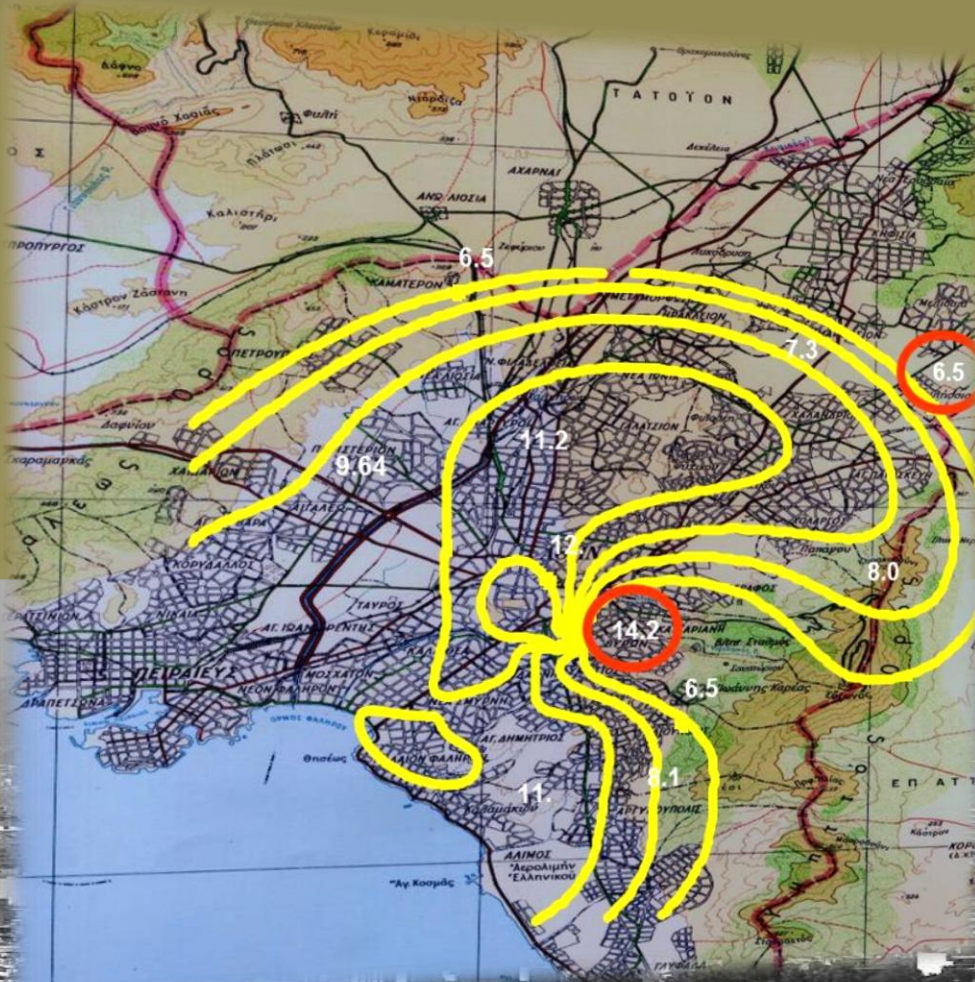


The use of air conditioning increases the peak electricity demand in most of the Southern European countries. In parallel, this is the main reason for blackouts and electricity shortage.

Such a huge increase of the peak electricity demand **oblige utilities to build** additional power plants operating under a low **utilisability** factor, and thus, increase the cost of electricity.

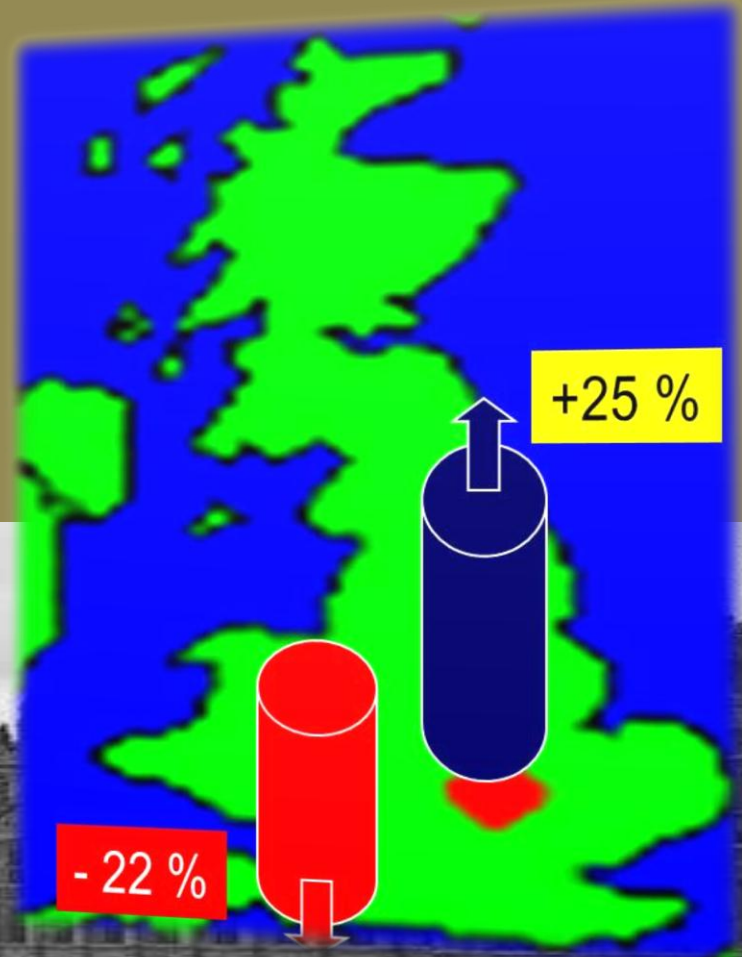
ΕΠΙΠΤΩΣΕΙΣ ΤΗΣ ΑΣΤΙΚΗΣ ΚΛΙΜΑΤΙΚΗΣ ΜΕΤΑΒΟΛΗΣ

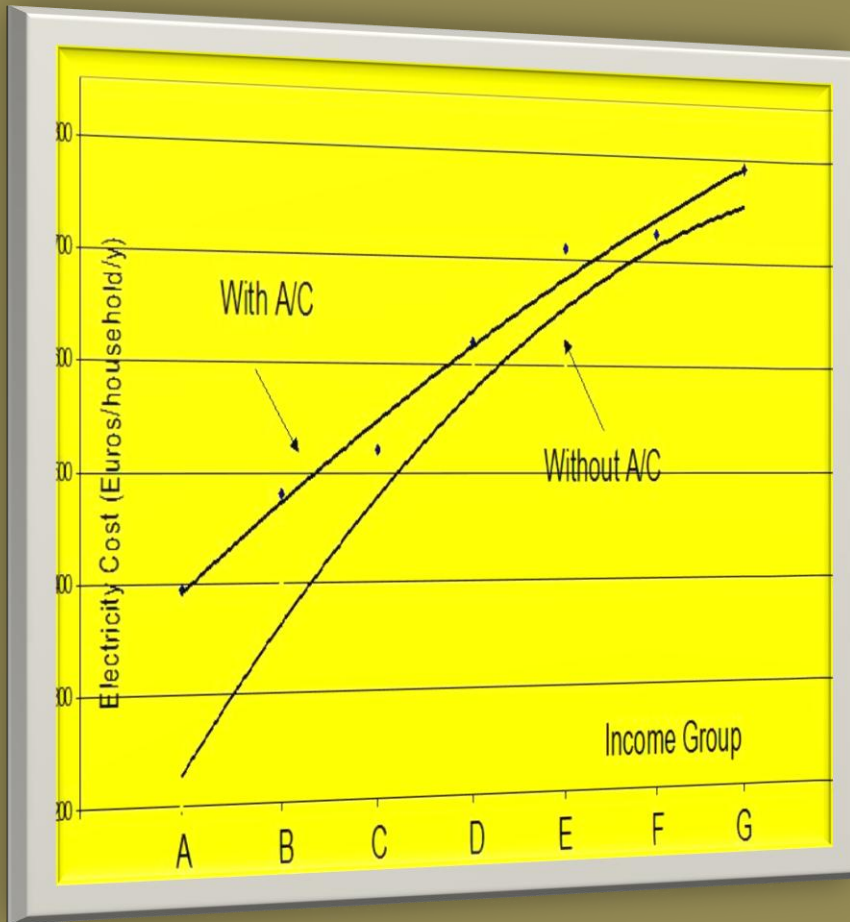
In Athens the cooling demand of an office building increases by 120 % because of the heat island.



ΕΠΙΠΤΩΣΕΙΣ ΤΗΣ ΑΣΤΙΚΗΣ ΚΛΙΜΑΤΙΚΗΣ ΜΕΤΑΒΟΛΗΣ

Because of the Heat Island in London, the cooling load is increased by 25% while the heating load is reduced by 22%. Also the cooling potential of night ventilation techniques is reduced by 55%.





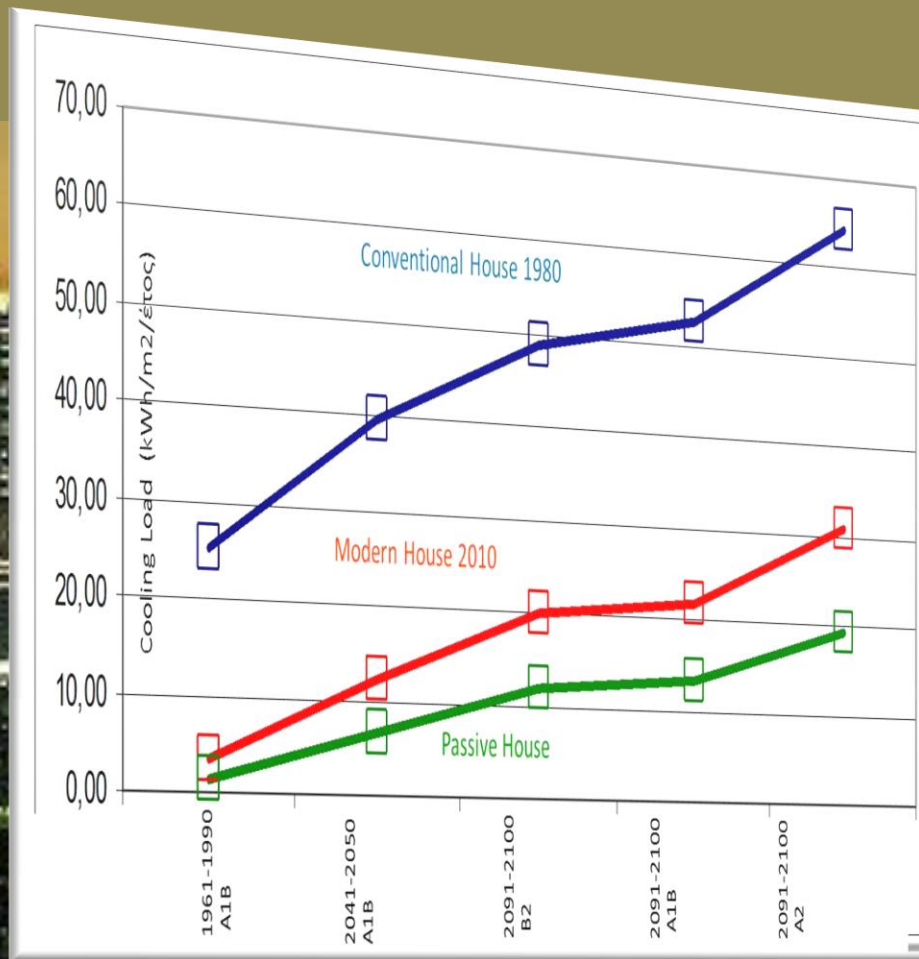
IMPACTS OF CLIMATE CHANGE

The use of air conditioning increases considerably the annual electricity expenses, especially in the low income groups.

As a mean value, the use of air conditioning increases the annual expenses to about 100 Euros per household, or 0,6 Euros/m², or 12.5 Euros per person. The increase is much higher for the low income groups, where the relative increase of the cost because of the air conditioning use is close to 195 Euros/household, or 1.2 Euros/m², or 87 Euros/person.

FUTURE SCENARIO

The Cooling Load of buildings is expected to increase by 120% by 2050 and almost 250% by 2100



ΤΕΧΝΙΚΕΣ ΓΙΑ ΤΟΝ ΜΕΤΡΙΑΣΜΟ ΤΗΣ ΑΣΤΙΚΗΣ ΝΗΣΙΔΑΣ ΘΕΡΜΟΤΗΤΑΣ

Techniques to Improve the Urban Microclimate and Heat Island
Mitigation strategies concentrate on:

- the increased use of **green areas**,
- the use of **appropriate materials, more specifically the use of white and colored high reflective materials/coatings**,
 - the decrease of **anthropogenic heat**
 - the use of **cool sinks for heat dissipation**,
- **appropriate layout of urban canopies** involving the use of solar control, techniques to enhance air flow, etc.

Περιβαλλοντικές μεθοδολογίες και εργαλεία για την εκτίμηση της ενεργειακής και περιβαλλοντικής απόδοσης των κτιρίων αλλά και την εκτίμηση της αειφορίας.

Σε παγκόσμια κλίμακα, διακρίνονται τόσο το SBTool (Sustainable Building Tool), ένα διεθνές εγχείρημα που συντονίζεται από τον Καναδά, το LEED for Home (Leadership in Energy and Environment Design), μια μέθοδος που αναπτύχθηκε στις ΗΠΑ, και το CASBEE μια μέθοδος που αναπτύχθηκε στην Ιαπωνία. Στην Ευρώπη μια από τις πιο διαδεδομένες μεθόδους είναι η BREEAM (Building Research Establishment Environmental Assessment Method) στη Μ.Βρετανία. Εξάλλου, εξαιρετικό ενδιαφέρον παρουσιάζει η μέθοδος HQE (Haute Qualité Environnementale) η οποία αναπτύχθηκε στη Γαλλία κατά τη τελευταία δεκαπενταετία αλλά και το εργαλείο VERDE που αναπτύχθηκε στην Ισπανία.

Τέλος εξαιρετικό ενδιαφέρον παρουσιάζει η μέθοδος SDMed που έχει εκπονηθεί από Ομάδα εμπειρογνομώνων της ομώνυμης Ένωσης βασισμένη στην γαλλική πολύ-κριτηριακή μέθοδο HQE και με δυνατότητα προσαρμογής στις τοπικές συνθήκες της Μεσογείου και της Ελλάδας.



LEED BREEAM DGNB HQE..... in Europe

DGNB	Source: www.dgnb.de Status: 7 May 2012
LEED	Source: www.gbci.org Updated: 27 March 2012
BREEAM	Source: www.greenbookfive.com Status: 30 April 2012; BRE statistics September 2009
HQE	Source: www.ceriva.fr Status: 11 April 2012

Included are all building certificates (commercial and residential apartment buildings).
The top figures in bold refer to 2012 data; the figures below refer to 2011.

The 3 labels world-wide

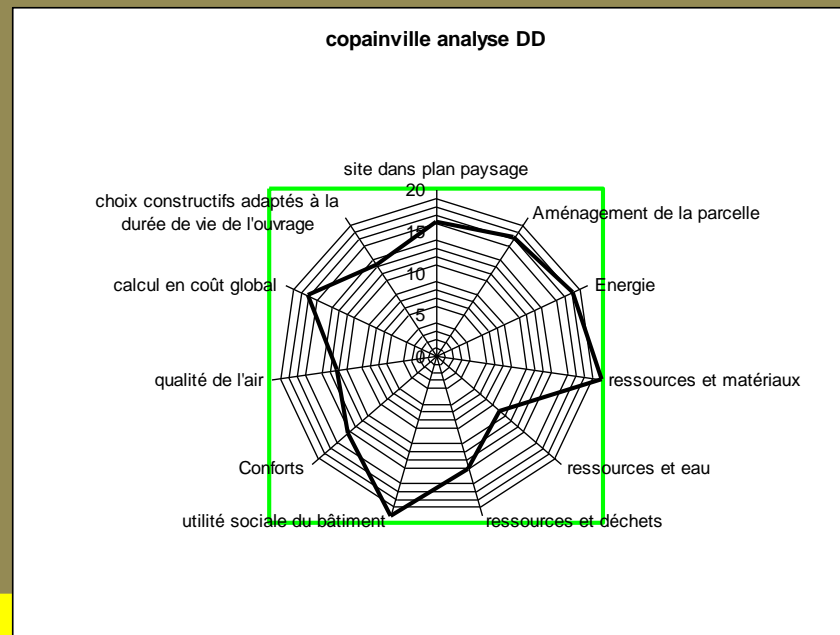


BREEAM is leader

LABEL	Number of certifications	use	emphasis	Strategy
BREEAM	200 000	Certification of commercial centres e.g Unibail-Rodamco with 80 shopping centres	Transport (at least one public transport station-500 m) Biodiversity	1000 experts on sustainable construction to enhance homogeneity world-wide
LEED	10 000			Tertiary buildings - China
HQE	700			

Η μεθοδολογία SD-MED Process for buildings σχεδιασμού και αξιολόγησης κτιρίων με κριτήρια βιώσιμης ανάπτυξης

Εμπειρογνώμονες της Ένωσης “SD-MED” εκπόνησαν
μεθοδολογία βασισμένη στην Γαλλική προσέγγιση HQE και
με δυνατότητα προσαρμογής σε τοπικό επίπεδο



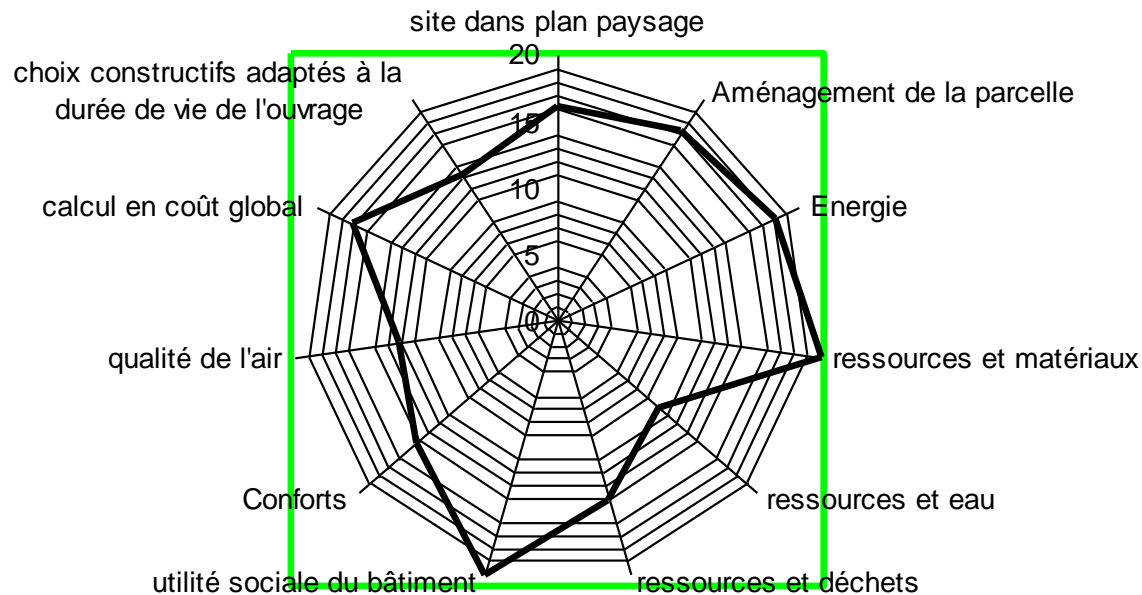
General comparison of the main tools

Tool	Geographical Range	Life cycle phases	Usage of tool	Outcome
HQE	national - France	all phases	simple / open, linked to the French regulations	Base, Performant, very performant
VERDE	global – med	all phases	spreadsheet	from 0-5 for each parameter
BREEAM	national - UK	all phases	import data for third party to asses	poor, good , very good, excellent environmental performance
GBPtool	global	all phases	complex spreadsheet	-1 to +5 scale for each environmental issue
LEED	national USA	all phases	import data for third party to assess	Labeling (certified – platinum performance)
CASBEE	global	all phases	complex spreadsheet and manual	Score graphs, Labeling (poor- excellent sustainable building)

Sustainable development analysis for buildings

source: J.Hetzel, 2006

copainville analyse DD



Main Issues of Concern (Cibles et Sous-cibles) to be taken into account in a Mediterranean SD-MED process for buildings

A. Criteria affecting environmental efficiency

A1. Ressources and environmental impact

CIBLE 1 : Minimize impacts on Resources (ENIC)	<ol style="list-style-type: none"> 1. <i>impact on energy resources</i> 2. <i>depletion of raw materials</i> 3. <i>water use and water management</i>
CIBLE 2 : Minimize Pollution emission (ENIC)	<ol style="list-style-type: none"> 1. <i>emission to air (CO2)</i> 2. <i>water effluents</i> 3. <i>solid waste generation</i>
CIBLE 3 : Minimize Local and regional impacts (ENIC)	<ol style="list-style-type: none"> 1. <i>impact of building with regard to urban form</i> 2. <i>heat island effect</i> 3. <i>3. atmospheric light pollution</i>

A2. Environmental quality

CIBLE 4 : Improving Indoor environment (ENIC)	<ol style="list-style-type: none"> 1. <i>Acoustic comfort</i> 2. <i>Thermal comfort</i> 3. <i>Visual Comfort</i> 4. <i>Air Quality</i> 5. <i>Activity comfort</i> 6. <i>Olfactory Comfort</i> 7. <i>Adaptive opportunity</i>
CIBLE 5 : Improving Quality of service(ENIC)	<ol style="list-style-type: none"> 1. <i>Functionality- Controllability</i> 2. <i>Flexibility-Adaptability</i> 3. <i>Durability-maintenance</i> 4. <i>Waste management</i>

Main Issues of Concern (Cibles et Sous-cibles) to be taken into account in a Mediterranean SD-MED process for buildings

B. Criteria affecting economic efficiency

CIBLE 6 :
Improving Economic efficiency
(ECIC)

1. *Cost of land and construction*
2. *Life Cycle cost (€/year)*
3. *Waste management and emission costs (€/year)*

C. Criteria affecting social efficiency

CIBLE 7 :
Improving Social efficiency(SIC)

1. *user participation*
2. *health and productivity*
3. *security for building users*
4. *access for physically handicapped persons*
5. *access to direct sunlight from living areas of dwelling units*
6. *access to private open space from dwelling units*
7. *visual privacy from the exterior in principal areas of dwelling units*
8. *access to views from work areas on offices and other commercial buildings*
9. *job creation*



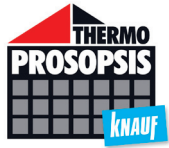
Athina tower, La
Defense, triple
certification HQE-
LEED Gold-
BREEAM very good

Contract between
Bouygues Immo
and Allianz

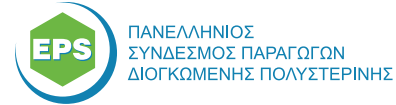
*“Στο μέλλον ένα κτίριο θα αποκτά το «δικαίωμα»
να κατασκευάζεται ακριβώς επειδή θα
συνεισφέρει στην παροχή ενέργειας
των γειτονικών κτιρίων των οποίων το δυναμικό
ενεργειακής αναβάθμισης είναι εξαντλημένο..”*

Valérie David, Directrice du développement durable
du Groupe Eiffage

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