International Conference and Workshop

Advances in Urban Mitigation Technologies

Bari, 12 July 2018

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INTRODUCTION

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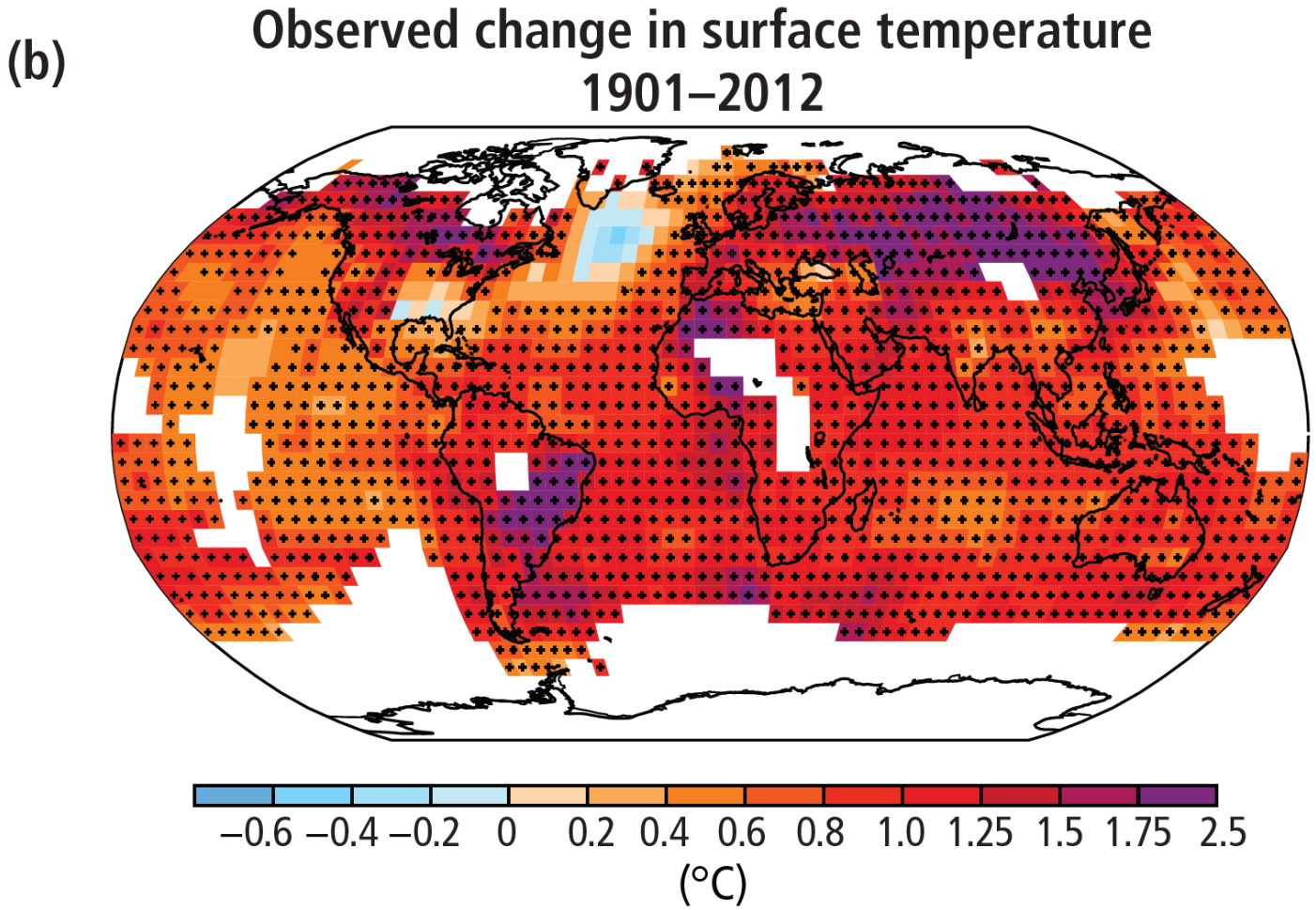
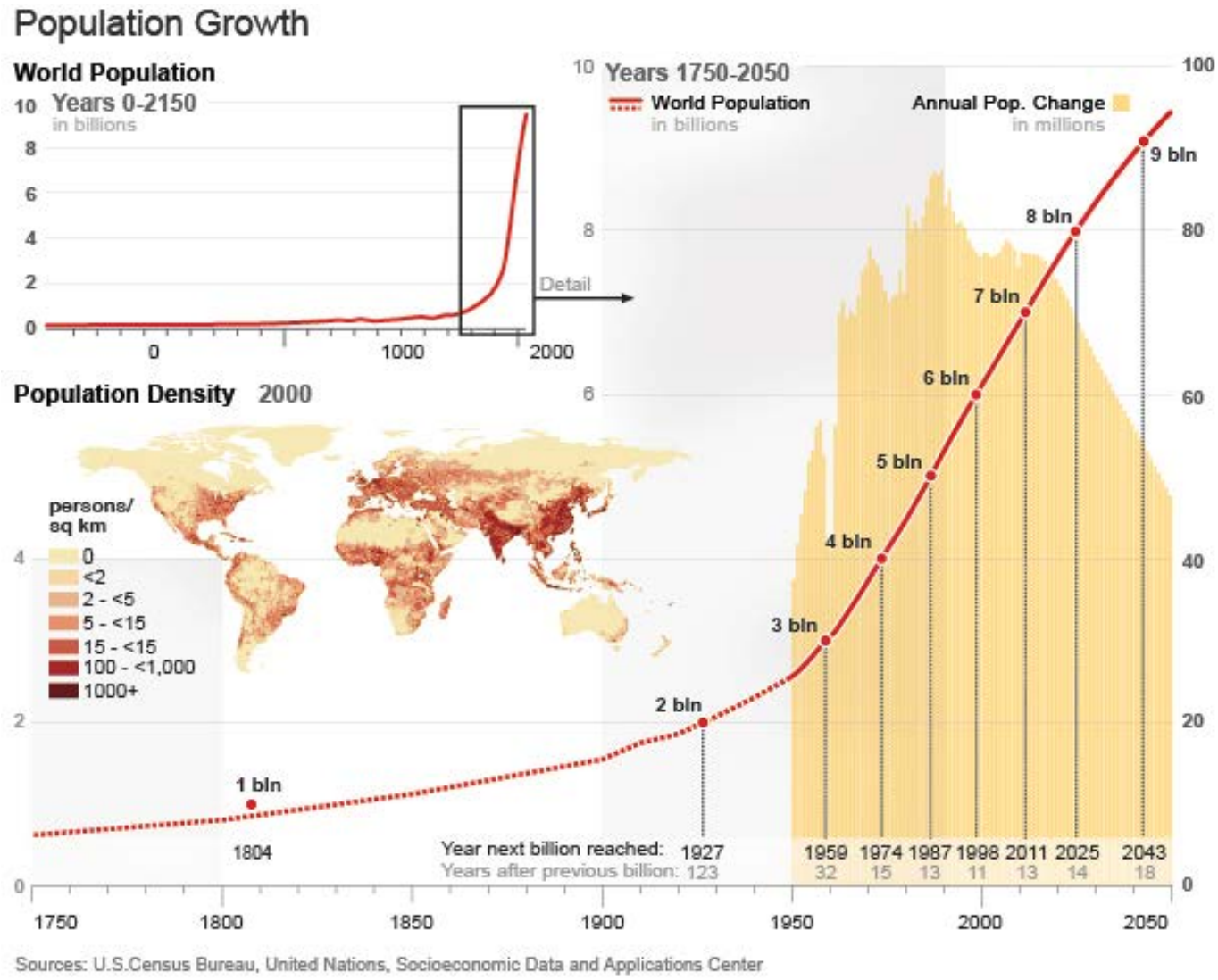
Major challenges of XXI century: global climate change



Source: IPCC (2014). "Climate Change 2014: Syntesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change." Core Writing Team, R. K. Pauchauri, and L. A. Meyers, eds., IPCC, Geneva, Switzerland, 151.

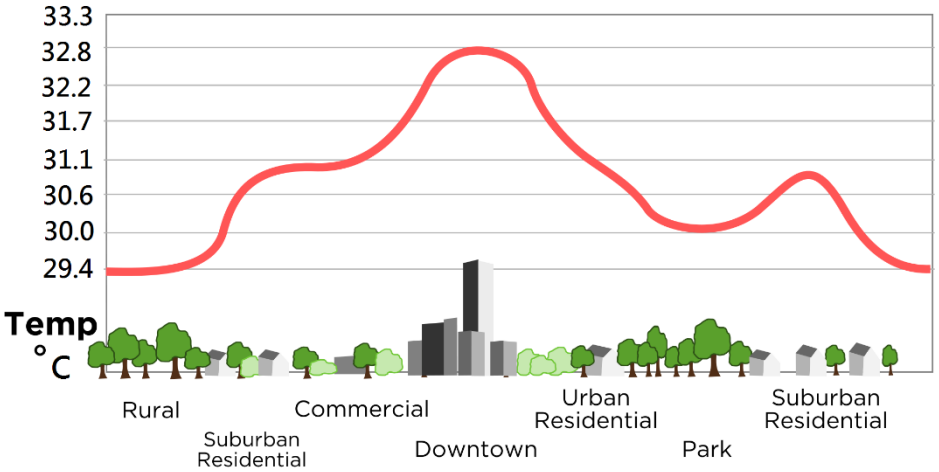
Major challenges of XXI century: population as global challenge



Source: https://www.reuters.com/subjects/worldPopulation

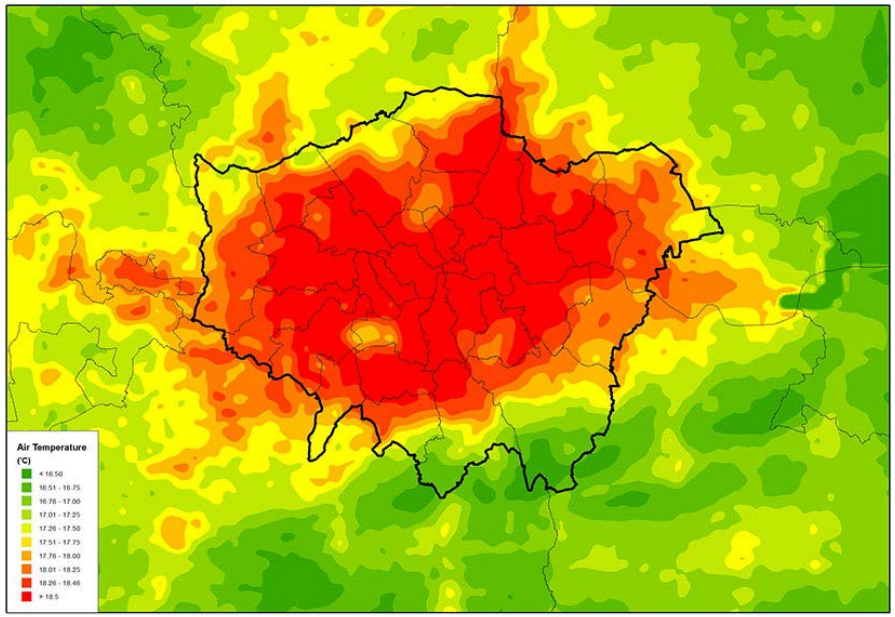
Major challenges of XXI century: effects of climate change at the urban scale

Urban Heat Island phenomenon

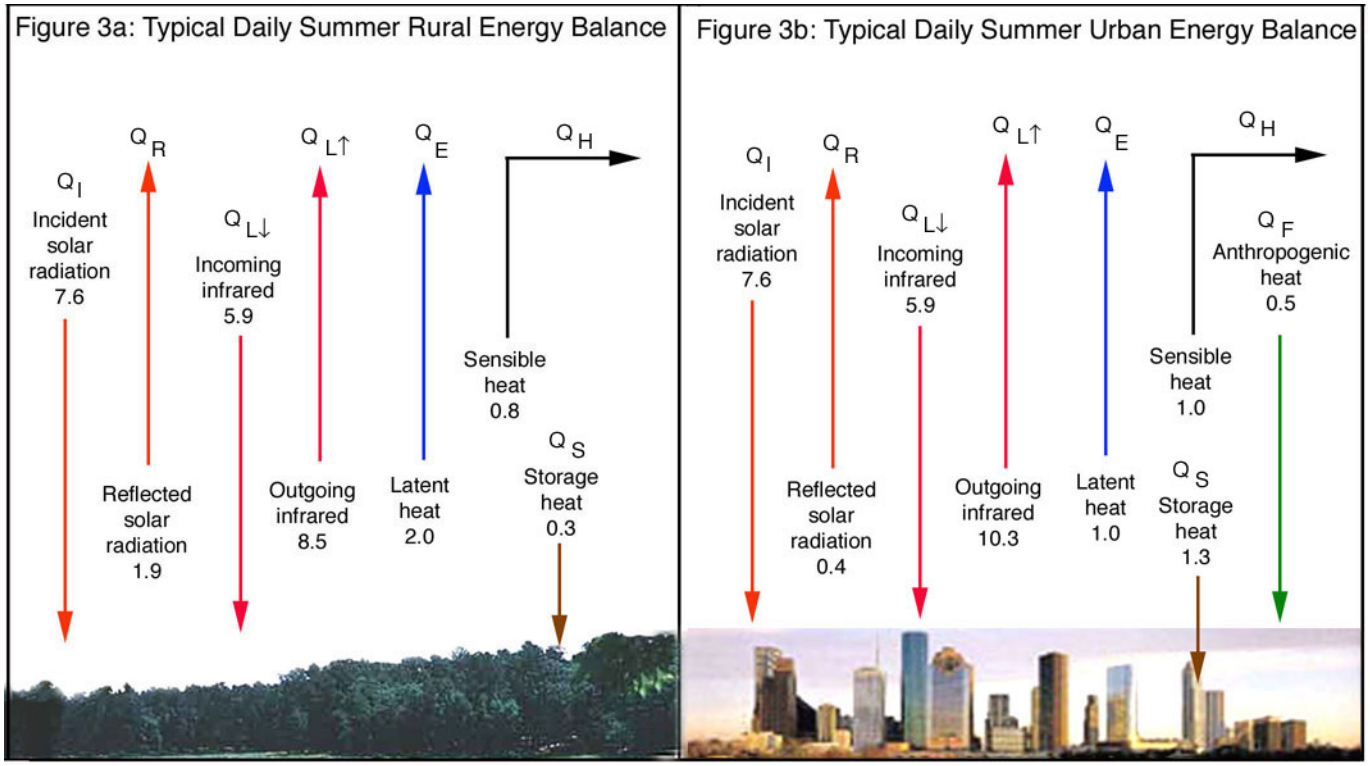


TYPICAL URBAN HEAT ISLAND PROFILE
https://upload.wikimedia.org/wikipedia/commons/7/7d/Urban_heat_island_%28Celsius%29.png

URBAN HEAT ISLAND EFFECT IN LONDON
https://informedinfrastructure.com/5503/satellite-images-reveal-londons-heat-island-effect/

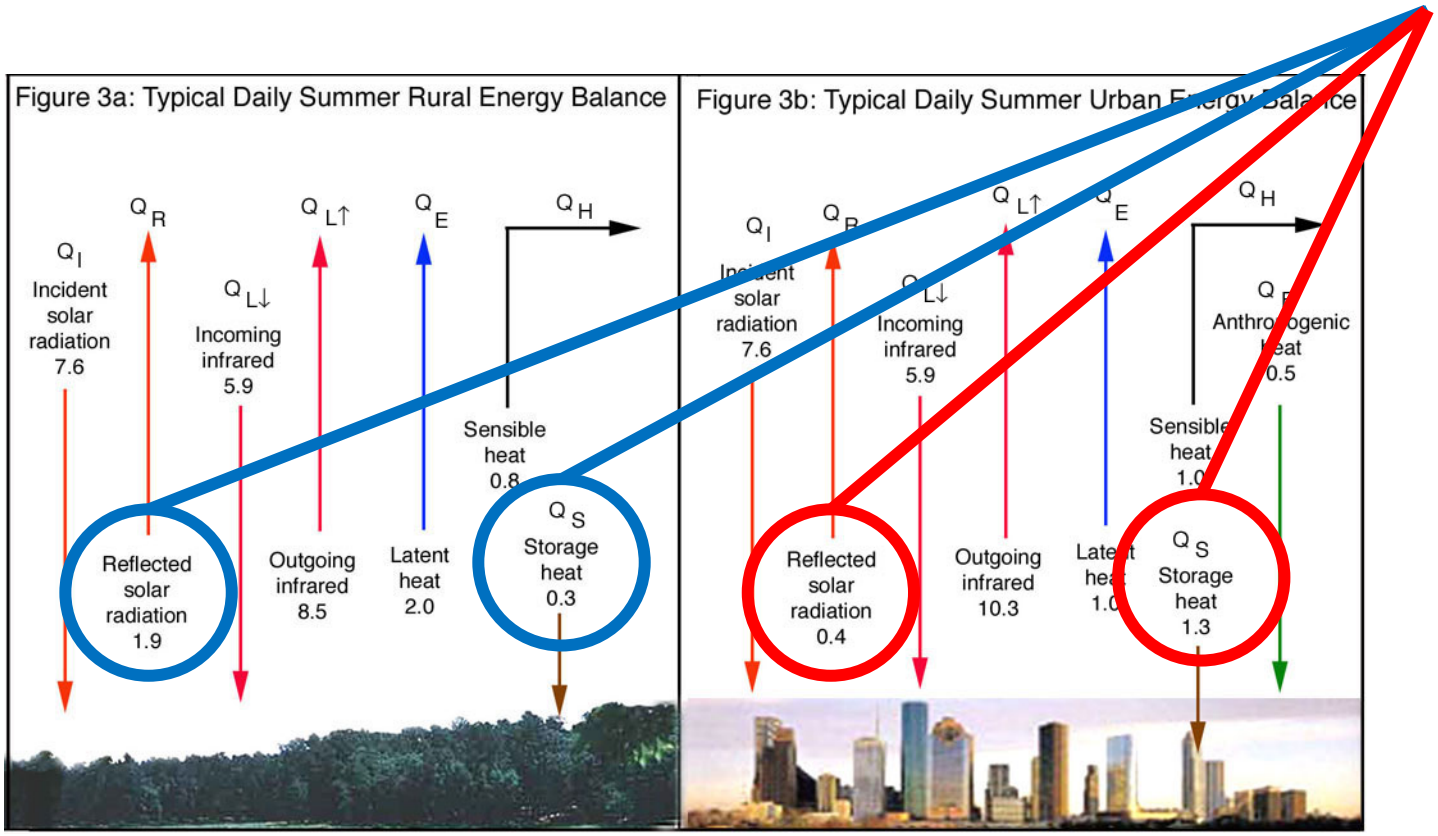


Factors contributing to UHI



http://www.ruf.rice.edu/~sass/Policy%20Stuff/Figure%203%20Sym%20.jpg

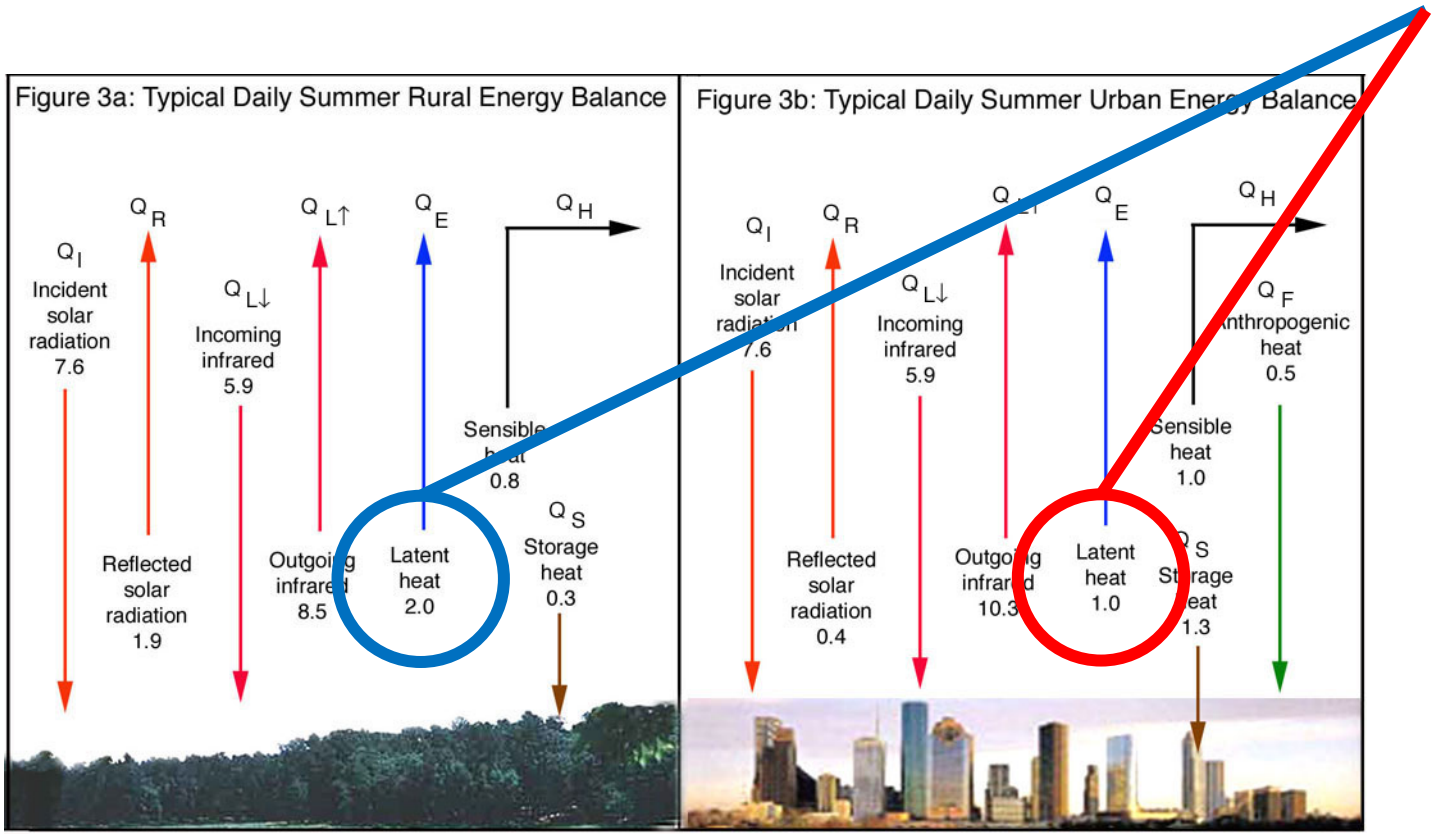
Factors contributing to UHI



1. Reduction of reflected solar radiation and consequent increase of storage heat

http://www.ruf.rice.edu/~sass/Policy%20Stuff/Figure%203%20Sym%20.jpg

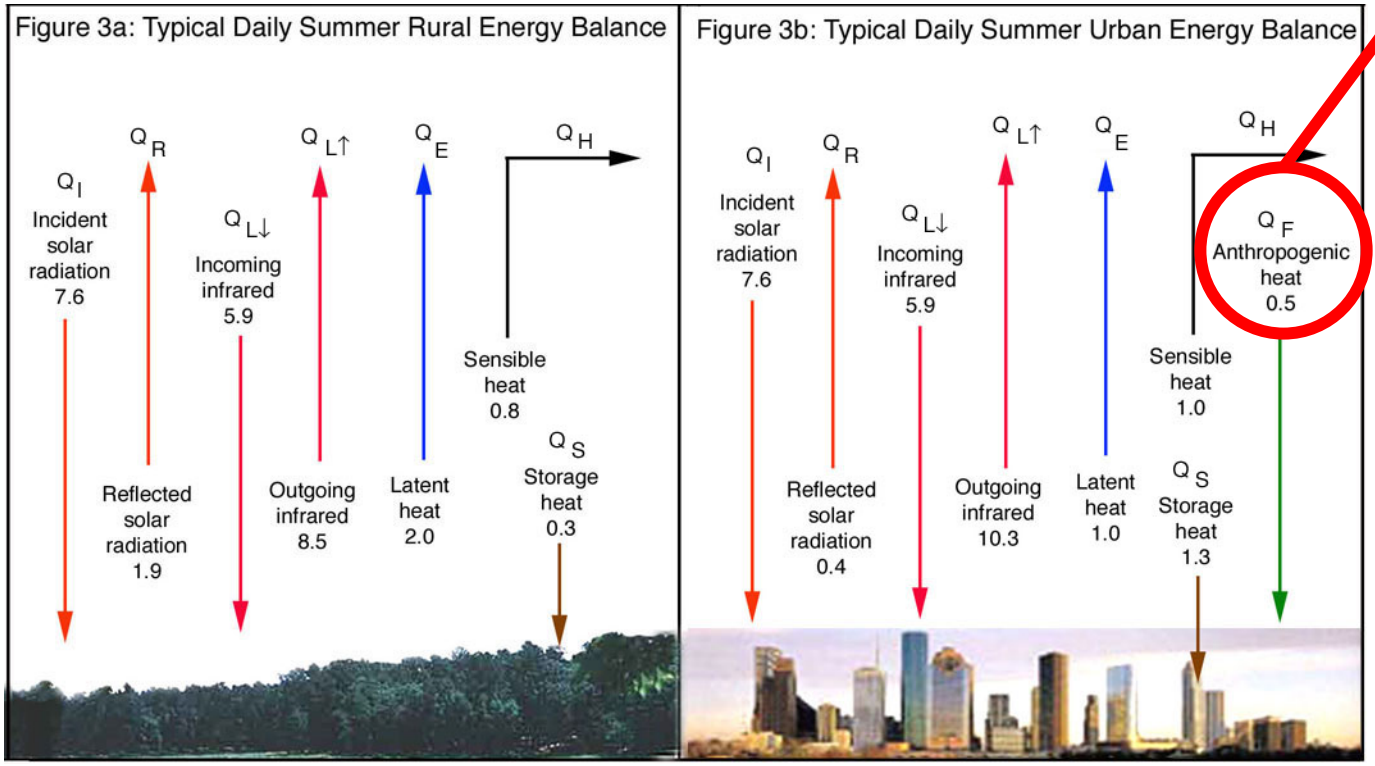
Factors contributing to UHI



2. Reduction of emission of latent heat

http://www.ruf.rice.edu/~sass/Policy%20Stuff/Figure%203%20Sym%20.jpg

Factors contributing to UHI

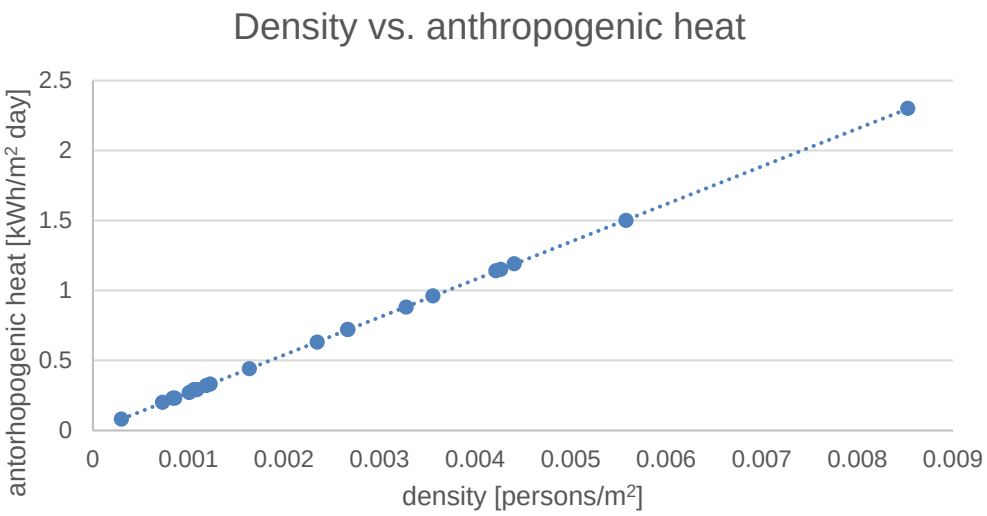


3. Anthropogenic heat intake

Direct conseguence of the density of the city

http://www.ruf.rice.edu/~sass/Policy%20Stuff/Figure%203%20Sym%20.jpg

Factors contributing to UHI



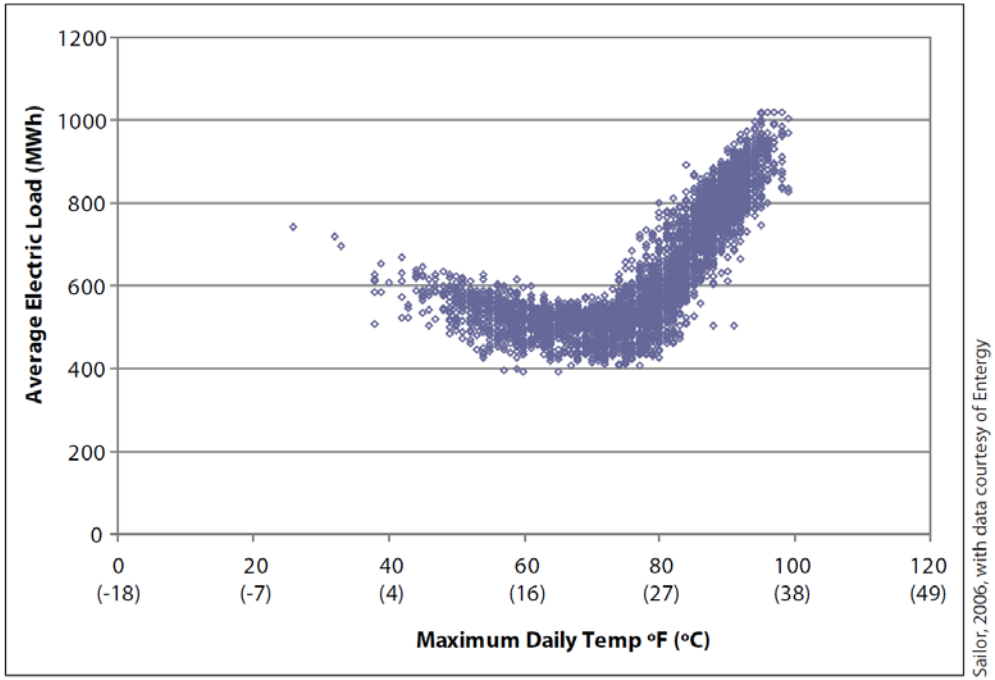
Rank	Place	Population	Land area (sq miles)	Persons per sq mile	Persons per sq meter	Anthropogenic heat (kWhr/m2day)
1	New York city, NY	7,322,564	308.9	23,705	0.00853	2.3
2	Los Angeles city, CA	3,485,398	469.3	7,427	0.00267	0.72
3	Chicago city, IL	2,783,726	227.2	12,252	0.00441	1.19
4	Houston city, TX	1,630,553	539.9	3,020	0.00109	0.29
5	Philadelphia city, PA	1,585,577	135.1	11,736	0.00422	1.14
6	San Diego city, CA	1,110,549	324	3,428	0.00123	0.33
7	Detroit city, MI	1,027,974	138.7	7,411	0.00267	0.72
8	Dallas city, TX	1,006,877	342.4	2,941	0.00106	0.29
9	Phoenix city, AZ	983,403	419.9	2,342	0.00084	0.23
10	San Antonio city, TX	935,933	333	2,811	0.00101	0.27
11	San Jose city, CA	782,248	171.3	4,567	0.00164	0.44
12	Baltimore city, MD	736,014	80.8	9,109	0.00328	0.88
13	Indianapolis city, IN	731,327	361.7	2,022	0.00073	0.2
14	San Francisco city, CA	723,959	46.7	15,502	0.00558	1.5
15	Jacksonville city, FL	635,230	758.7	837	0.0003	0.08
16	Columbus city, OH	632,910	190.9	3,315	0.00119	0.32
17	Milwaukee city, WI	628,088	96.1	6,536	0.00235	0.63
18	Memphis city, TN	610,337	256	2,384	0.00086	0.23
19	Washington city, DC	606,900	61.4	9,884	0.00356	0.96
20	Boston city, MA	574,283	48.4	11,865	0.00427	1.15

http://www.ruf.rice.edu/~sass/UHI.html

Urban Heat Island Effect

Increasing power loads with temperature increases

Figure 8: Increasing Power Loads with Temperature Increases[14]

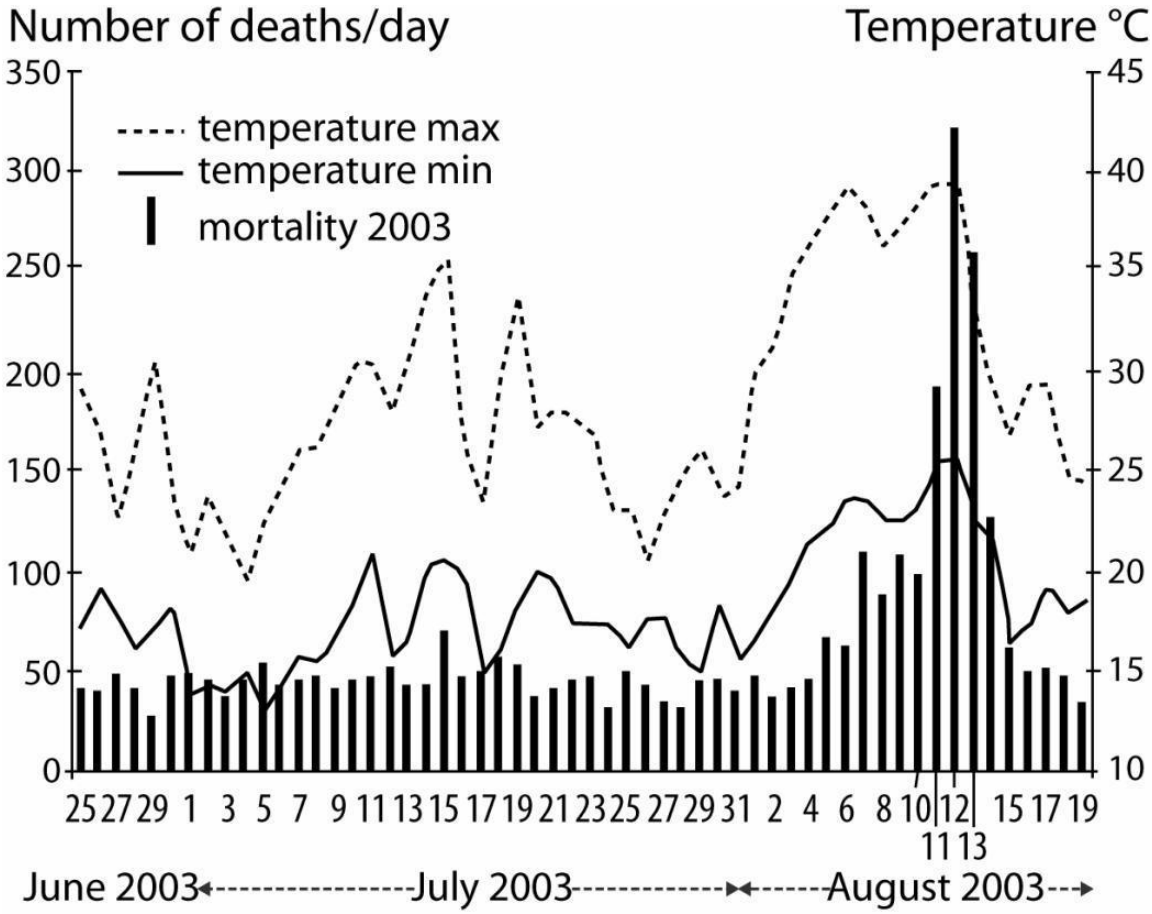


As shown in this example from New Orleans, electrical load can increase steadily once temperatures begin to exceed about 68 to 77°F (20 to 25°C). Other areas of the country show similar demand curves as temperature increases.

Source: U.S. Environmental Protection Agency. 2008. Reducing urban heat islands: Compendium of strategies. Draft. https://www.epa.gov/heat-islands/heat-island-compendium.

Urban Heat Island Effect

effect on mortality



https://www.nasa.gov/images/content/505098main_Fig2.JPG

… it is imperative to find solutions in terms of materials, technologies and design strategies to mitigate UHI and, in general, local and global climate change

Therefore, the aims of today's international conference and workshop are:

1. to present the latest developments in the field of urban mitigation technologies

2. to present the results of recent large scale urban mitigation projects

3. to review the future prospects and priorities in the field of urban mitigation

Thank you for your attention!