CLIMATE RESPONSIVE URBAN DESIGN FOR GREEK PUBLIC SPACE



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Pic Source : http://abroad.uconn.edu/wpcontent/uploads/sites/1729/20 16/01/Athens.jpg



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Concept





Make public space liveable and regain people's interest in public realm

Optimize accessibility and comfort through urban design

lhe ancient agora was a public space where many democratic and philosophical values were developed throughout the history. Nowadays, economic crisis and climate change have caused shrinkage and degradation of the Greek public space.

Pic Source : •http://www.factinate.com/wpcontent/uploads/2017/04/Anci ent-Athens.jpg •http://metroportal.rtl.hr/img/repository/201 2/05/medium/atena_grcka.jpg



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Climate Analysis

Outdoor comfort

Urban design









Optimization



An iterative process of analysis and evaluation of the climate and the space was followed to reach an integrated design approach.

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Constitution square is the central square of Athens and is located in front of the Greek Parliament. It is a space of high historical importance for Athens' residents, because the first Constitution of Modern Greece was signed there.

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Site - Model





The site is a meeting place for social activities, a touristic spot and an important transportation hub for Athens.

A 3D model of the site was created for the microclimate analysis of the space.

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Constitution Square, Athens





High temperatures (over 35° C) can be developed in the summer period, and in combination with other parameters (solar radiation, humidity, wind, etc.) can lead to high heat stress of the people.

View of the space from east (left) and west (right).

Pic Source : •https://commons.wikimedia.or g/wiki/File:Attica_06-13_Athens_04_Syntagma.jpg •https://www.instantstreetview. com

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Weather data

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National Observatory of Athens Weather Station (NOA)





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The climate analysis was conducted based on data of 2016 from the National Observatory of Athens (NOA). This data was selected because of the proximity of NOA weather station to the Constitution Square (1 km) compared to the available IWEC file weather station (8 km).

Data Source : National Observatory of Athens, 2016

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Climate analysis – focus period











Athens is characterized by hot-summer Mediterranean climate. 1st May to 30th of September was chosen as the focus period of the analysis. A generic outdoor comfort study was also conducted regarding the selection of the focus period for the design.

Data Source : National Observatory of Athens, 2016



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Outdoor comfort

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How environmental factors influence the usage and occupancy of a space?

Pic Source : https://img.buzzfeed.com

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Outdoor comfort analysis





Outdoor thermal comfort is influenced by air temperature, humidity, radiation, wind conditions, as well as activity and clothing of a person.

Universal Thermal Climate Index (UTCI) combines all the aforesaid parameters to evaluate the thermal sensation of man.

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Outdoor comfort – period analysis



Winter and shoulder period: 01 Oct. – 30 Apr. **Hours:** 08.00 – 21.00 **Total hours:** 2756



- Shaded - 80% wind - Albedo 0.6 The worst case scenarios for each period were simulated for the evaluation of outdoor thermal comfort. Consequently, summer was selected as the focus period for the design.



Existing situation

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For the evaluation of the outdoor thermal comfort conditions, software simulations were performed regarding solar radiation and wind.

* Data Source : National Technical University of Athens, School of Architecture

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Proposed design strategies



Water surfaces

interventions were proposed considering the microclimatic characteristics of the plaza, aiming also to accessibility and create a vibrant space in the

center of the city.

Pic Source : https://farm4.static.flickr.com/3 849/15104806219_699958a7c c_m.jpg

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Outdoor Comfort Analysis - Existing design



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Outdoor Comfort Analysis – Proposed design



Conclusions

At this work, a climate responsive design approach was presented based on outdoor thermal comfort analysis and investigation of different design strategies for an outdoor public space in Athens.

These interventions aim to improve the attractiveness of the space, increase its vibrancy, boost the local market, enhance the interaction of the people and lead to an urban regeneration, bringing agora back at the place it was born.

Transsolar academy By far the greatest and most admirable form of wisdom is that needed to plan and beautify cities and human communities.

Socrates (470-399 BC)

I would like to express my deep gratitude to all the staff of Transsolar for their inspiring ideas and willingness to help in any phase of this project.

Thank you!

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