Glass Forum / 2025
31/10 & 01/11 ΩΔΕΙΟ ΑΘΗΝΩΝ

SKYLINE FACADES

Αρχιτεκτονικό Γυαλί στην Πράξη

Προκλήσεις για τον Facade Engineer

Πέτρος Καρατζάς

Executive Director

Skyline Facades

Λυδία Ταλιούρα

Architect / Façade Engineer

Skyline Facades

SKYLINE FACADES

Facade Engineers

Facade Designers | Architects

Facade Consultants

OUR PROJECTS

THE ARCHES TOWER – NEW YORK

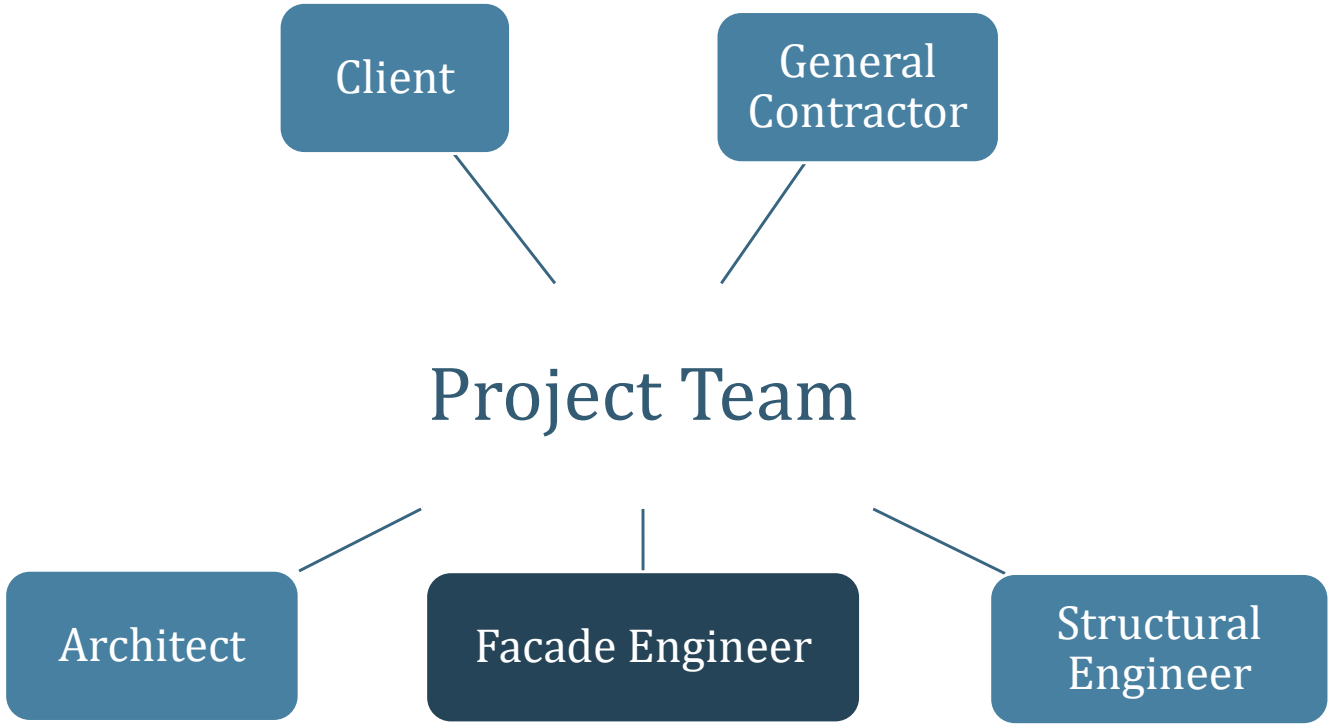
BEAM ON FARMER ARIZONA

MALDRON HOTEL – BRIGHTON, UK

ICON TOWER – TEL AVIV

SKLN
SKYLINE FACADES

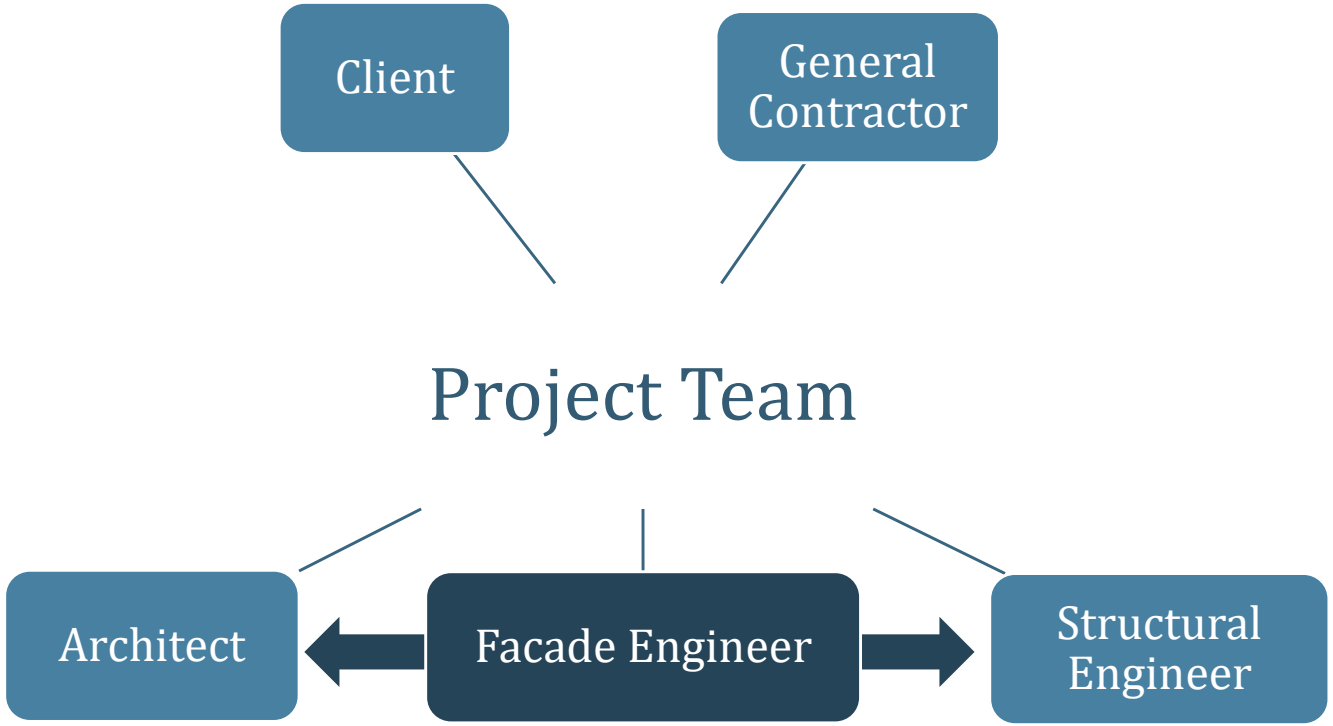
ABOUT A FACADE ENGINEER / CONSULTANT



Project Team
with Architect, Engineers, contractor & client

SKYLINE FACADES

ABOUT A FACADE ENGINEER / CONSULTANT



Bridge between
design intent and **buildability** of façade

SKYLINE FACADES

Project Costa – Old Paradise Street, London

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PROJECT COSTA
OLD PARADISE STREET

- Architect: FEILDEN CLEGG BRADLEY STUDIOS (FCBS)
- Main Contractor: Gilbert Ash
- Facade Consultant: ARUP
- Facade Contractor: Imperial Facades
- Facade Engineer: SKYLINE FACADES

- Transformed the former Costa Coffee Roastery Site
- 7-Storey Office Building
- Approx 8500 m2
- Lowest Embodied Carbon Mass Timber Development in UK
- Completed: March 2025

Project Costa – Old Paradise Street, London

- **Sustainability / Circular economy - Whole Lifecycle Design**

  | Ολοκληρωτικός σχεδιασμός κτιριακού κύκλου ζωής

- **35% Less embodied carbon**

  | Ενσωματωμένος Άνθρακας

- **Stores 1800MT of CO2e**

  | Δεσμεύει 1800 MT διοξειδίου του άνθρακα (= 24 κατοικίες)

- **Exceeds RIBA 2030 targets by 5 years**

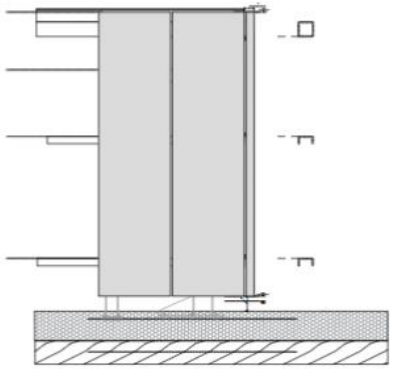
  | Υπερβαίνει τους στόχους του RIBA 2030 κατά 5 χρόνια

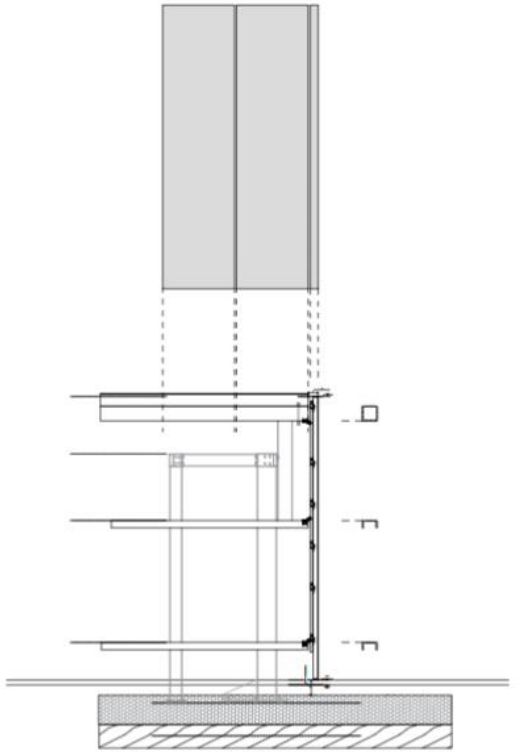
- **Modern Office Building / Low CO2 / Human-Centered Design**

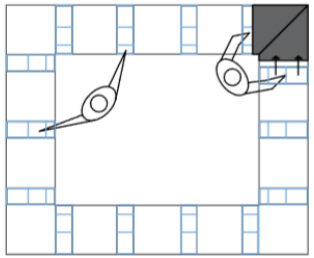
  | Ανθρωποκεντρικός σχεδιασμός / Σύνδεση με αστικό ιστό

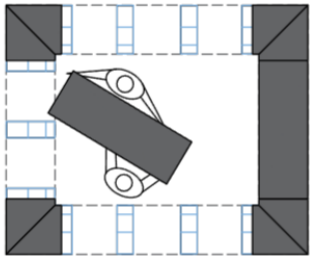
SKYLINE FACADES

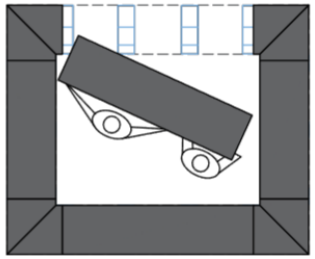
Συναρμολόγηση / Αποσυναρμολόγηση
Assemble / Disassemble / Reuse

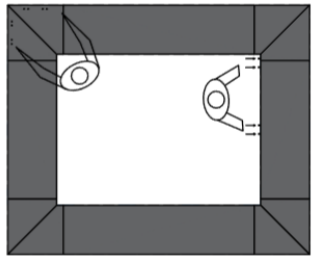












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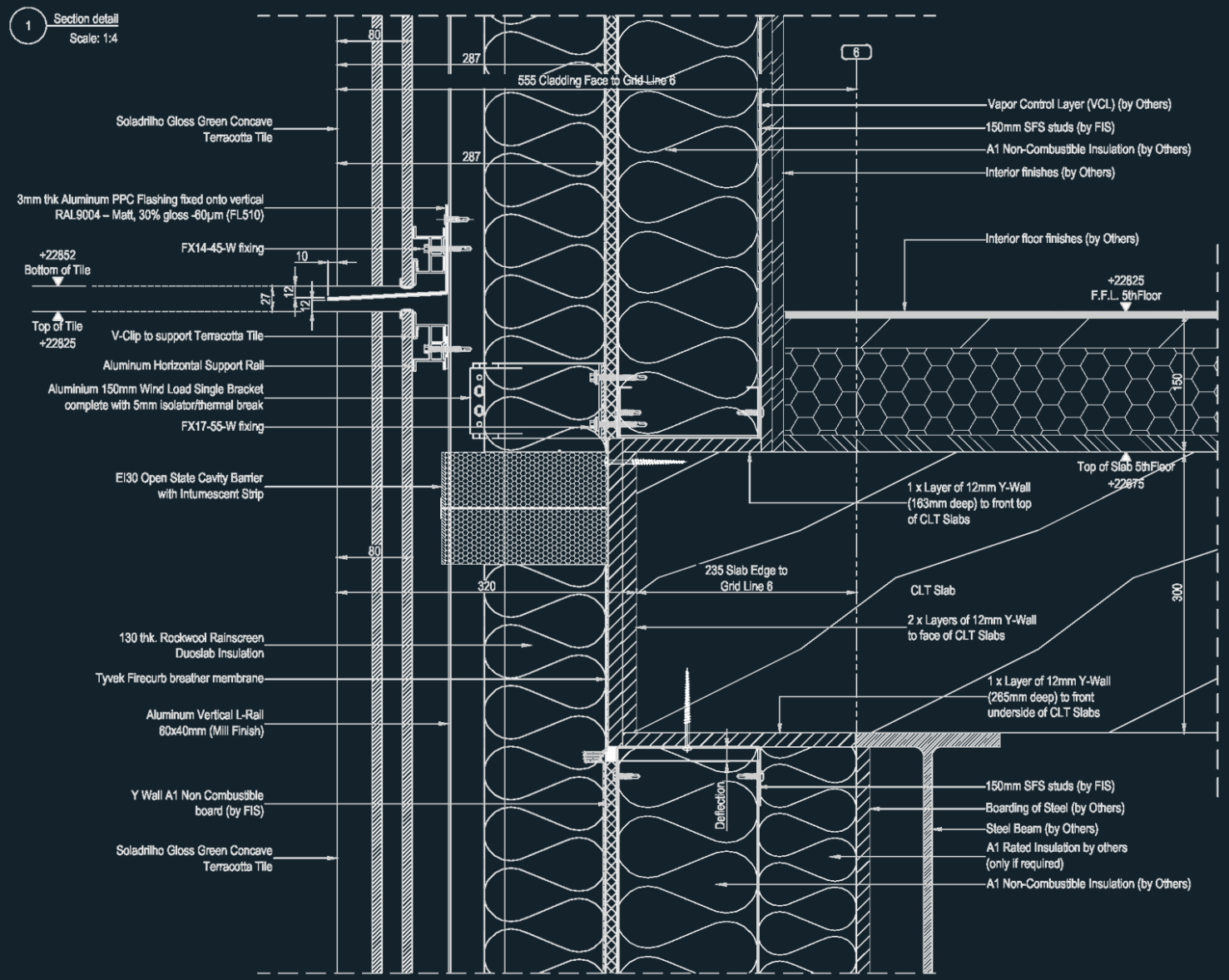
Project Costa – Old Paradise Street, London



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Project Costa – Old Paradise Street, London

Wellbeing
Natural Day Light
Vision to Old Paradise Gardens
Access to green spaces

SKYLINE FACADES

Project Costa – Old Paradise Street, London

Natural Ventilation to promote human well-being

Designed for lifecycle over 100 years

SKYLINE FACADES

Project Costa – Old Paradise Street, London

Sustainability / Circular Economy

Collaboration between **Architects, Engineers, Consultants**

BREEAM Excellent and WELL Gold Rated and won the “Working” category in the New London Awards

SKYLINE FACADES

Design Assist

- Early-stage Involvement -

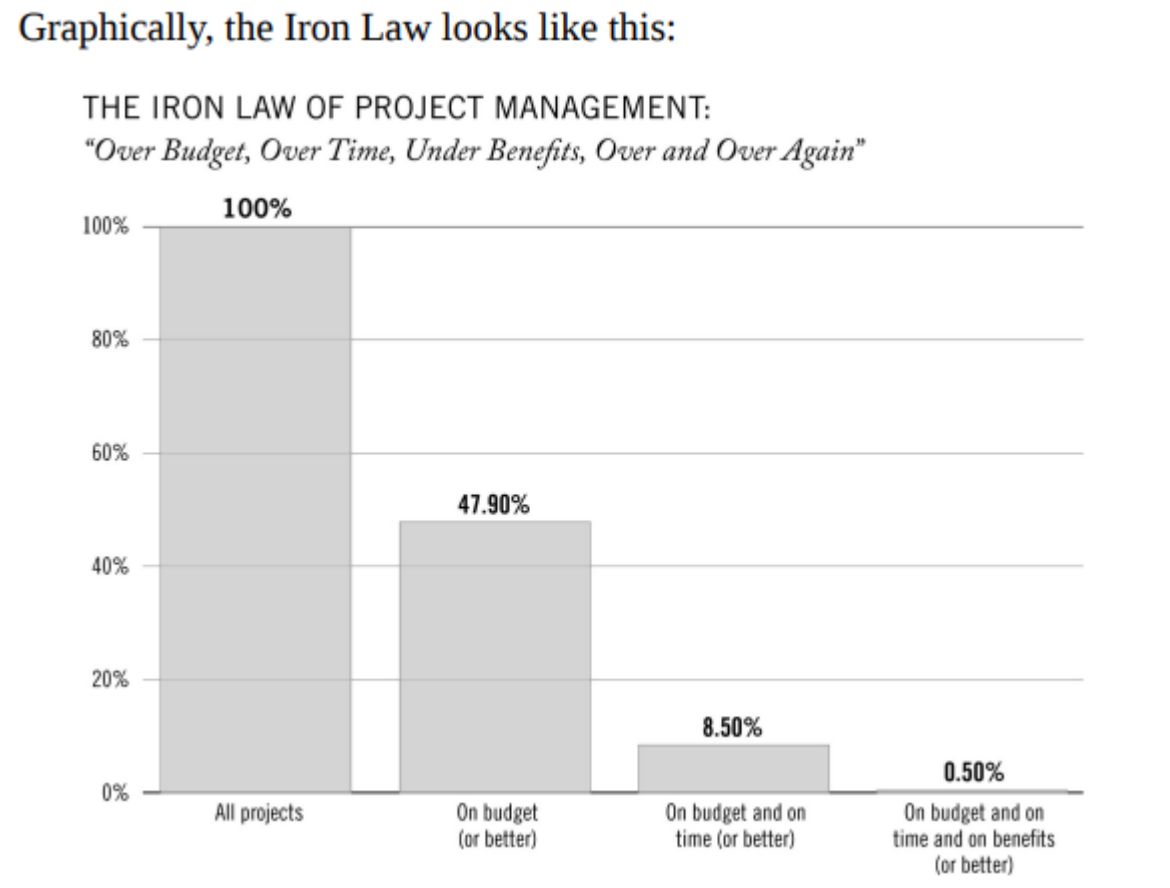
SKYLINE FACADES

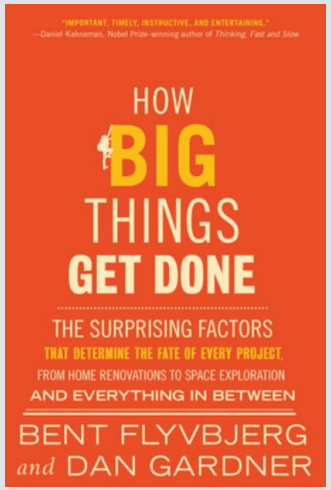
DESIGN ASSIST

Early-Stage Involvement

- Balance Architect's Intent/Aesthetics/ Buildability/ Safety
- Ensure what's on paper can be built correctly
- Respect Budget / Timeframe
- How Big Things Get Done, Bent Flyvbjerg

Graphically, the Iron Law looks like this:





How Big Things Get Done
Bent Flyvbjerg

Το ποσοστό των project που είναι εκτός χρόνου, εκτός budget και εκτός αρχικών προδιαγραφών, που δεν ικανοποιούν και τα 3 αυτά κριτήρια επιτυχίας, είναι 99,5% του συνόλου.

*Source: Flyvbjerg, Bent, How Big This Get Done, New York, Currency, 2023

APOLLO HILLS - VOULA, GREECE

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SKYLINE FACADES

APOLLO HILLS - VOULA, GREECE

- DEVELOPER: **HINES**
- GENERAL CONTRACTOR: **ELEMKA**

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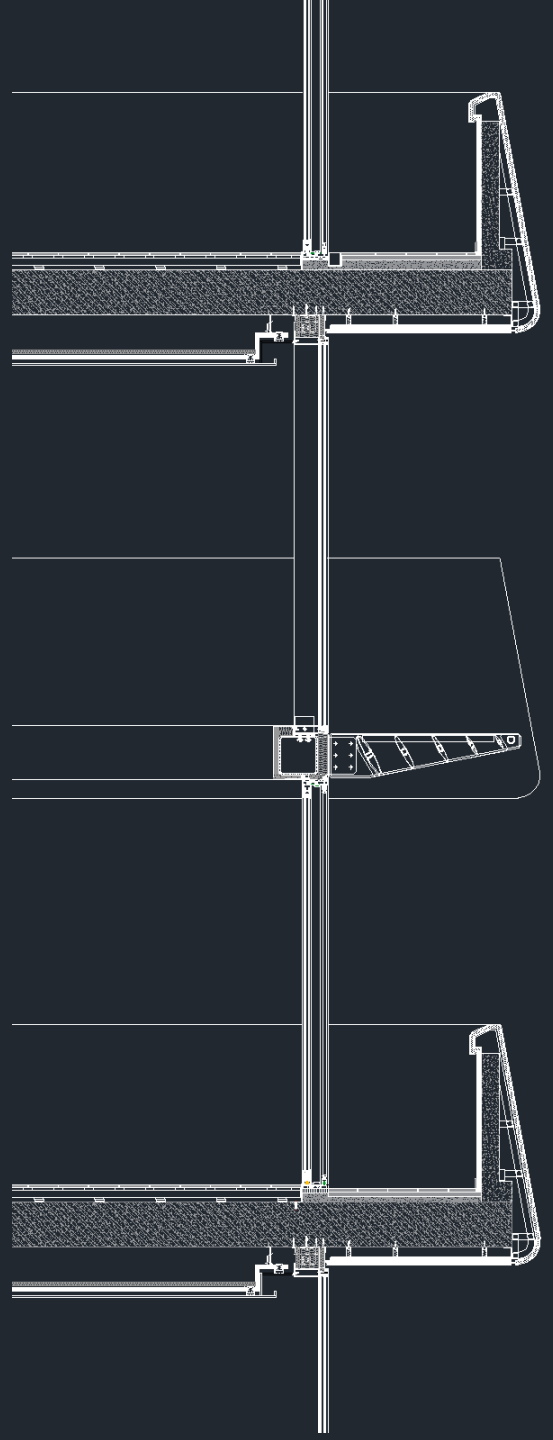

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SILICON PARK - LIMASSOL, CYPRUS

- DEVELOPER: **IMPERIO PROPERTIES**
- CONCEPT ARCHITECT: **EPSTEIN ARCHITECTS**

- EARLY-STAGE INVOLVEMENT
- BIM

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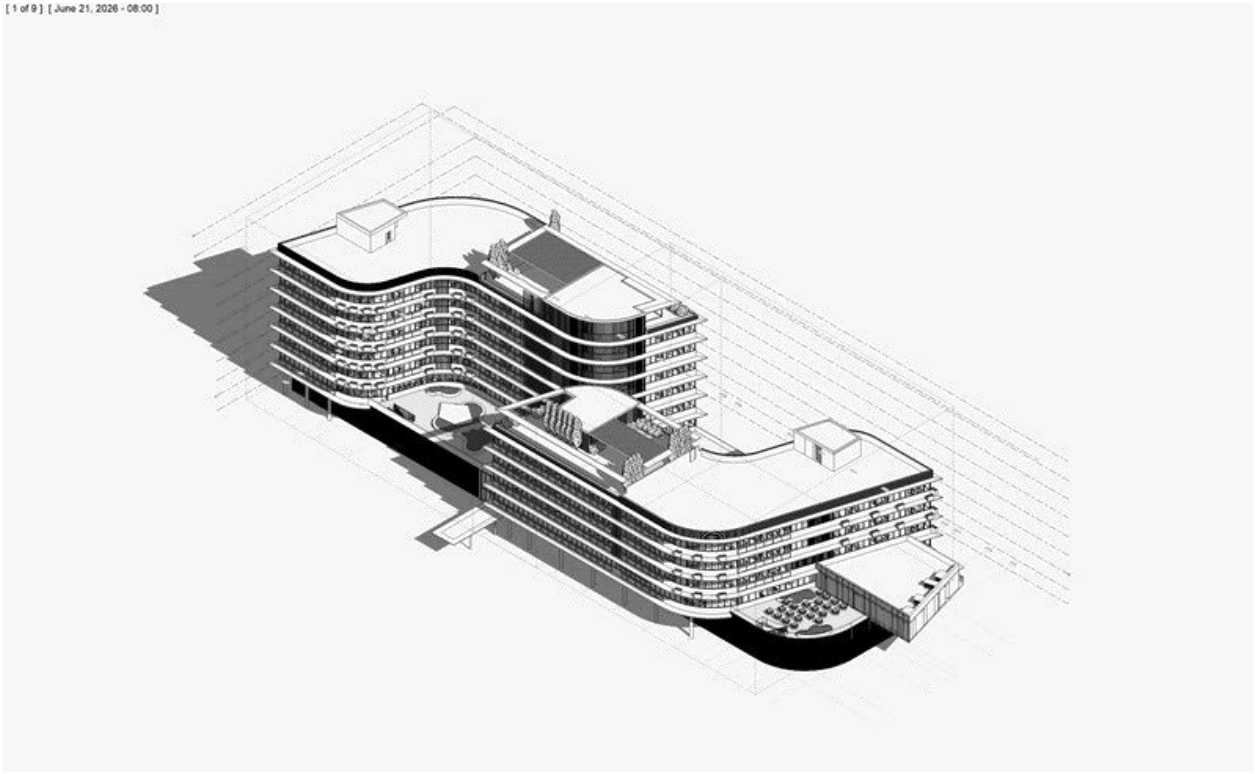
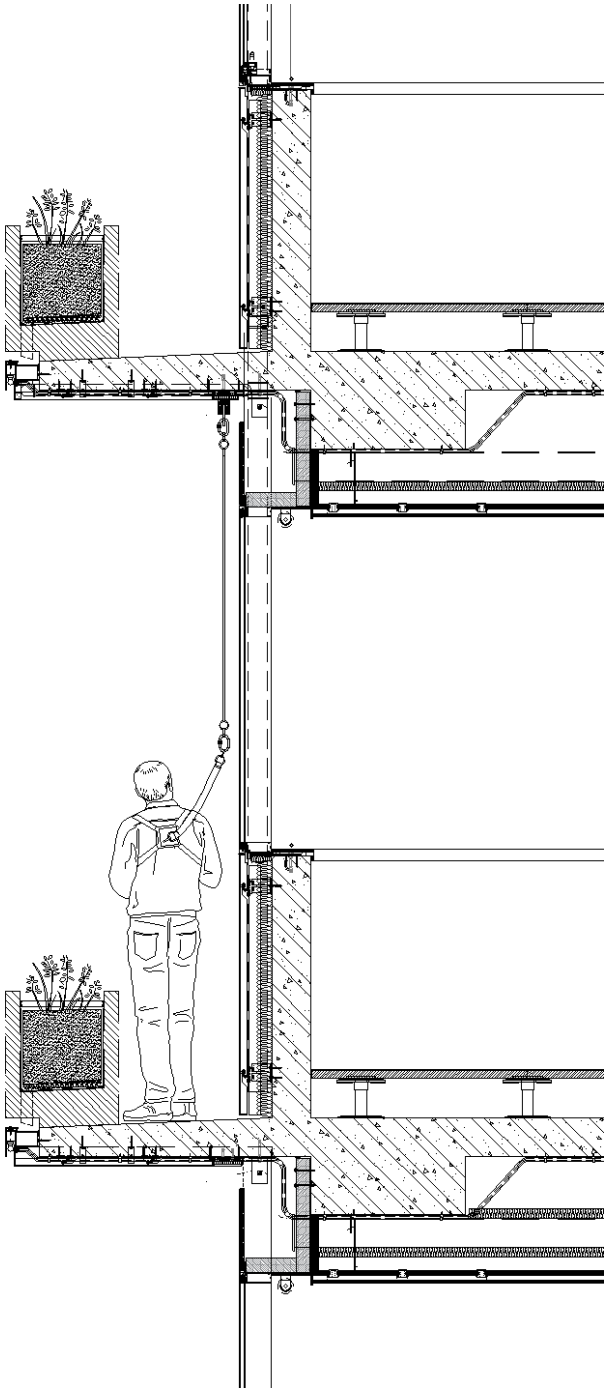
SILICON PARK - LIMASSOL, CYPRUS

Glass Panes South Side
Balance Brightness, Vision, Shading
Sun position in Cyprus
No shadings





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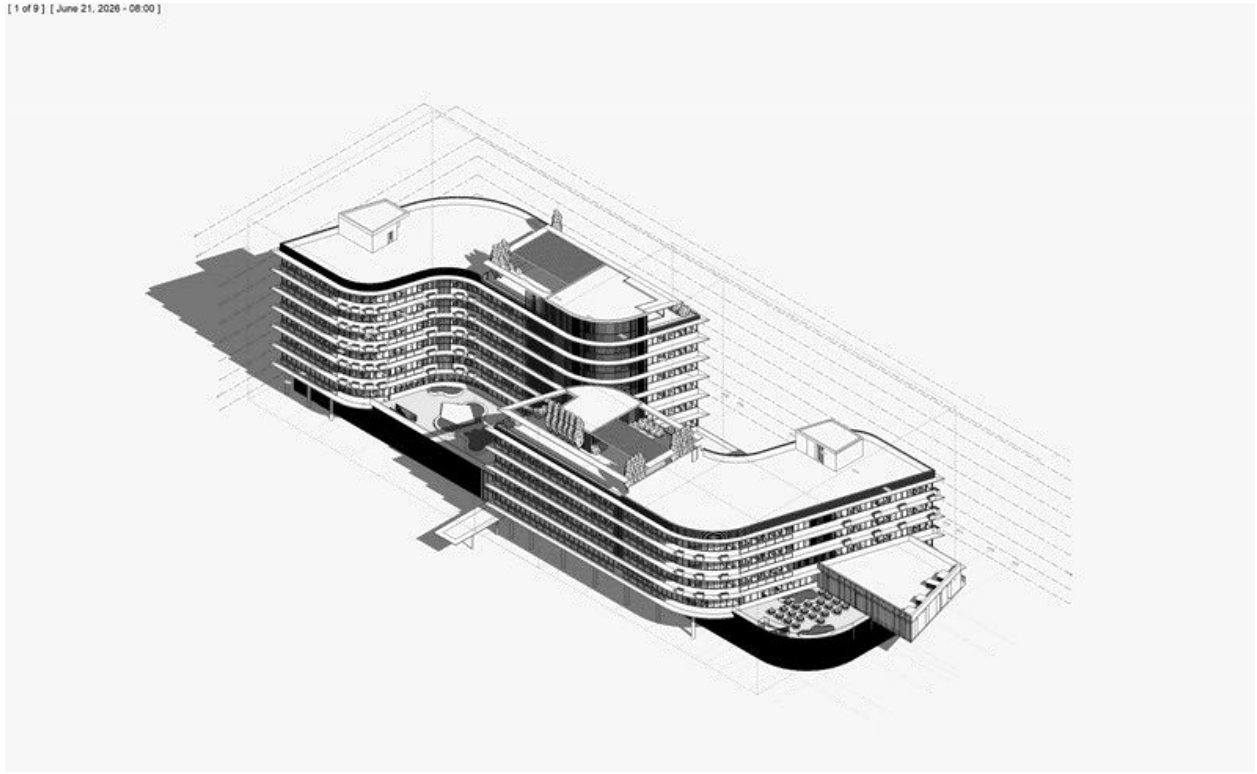
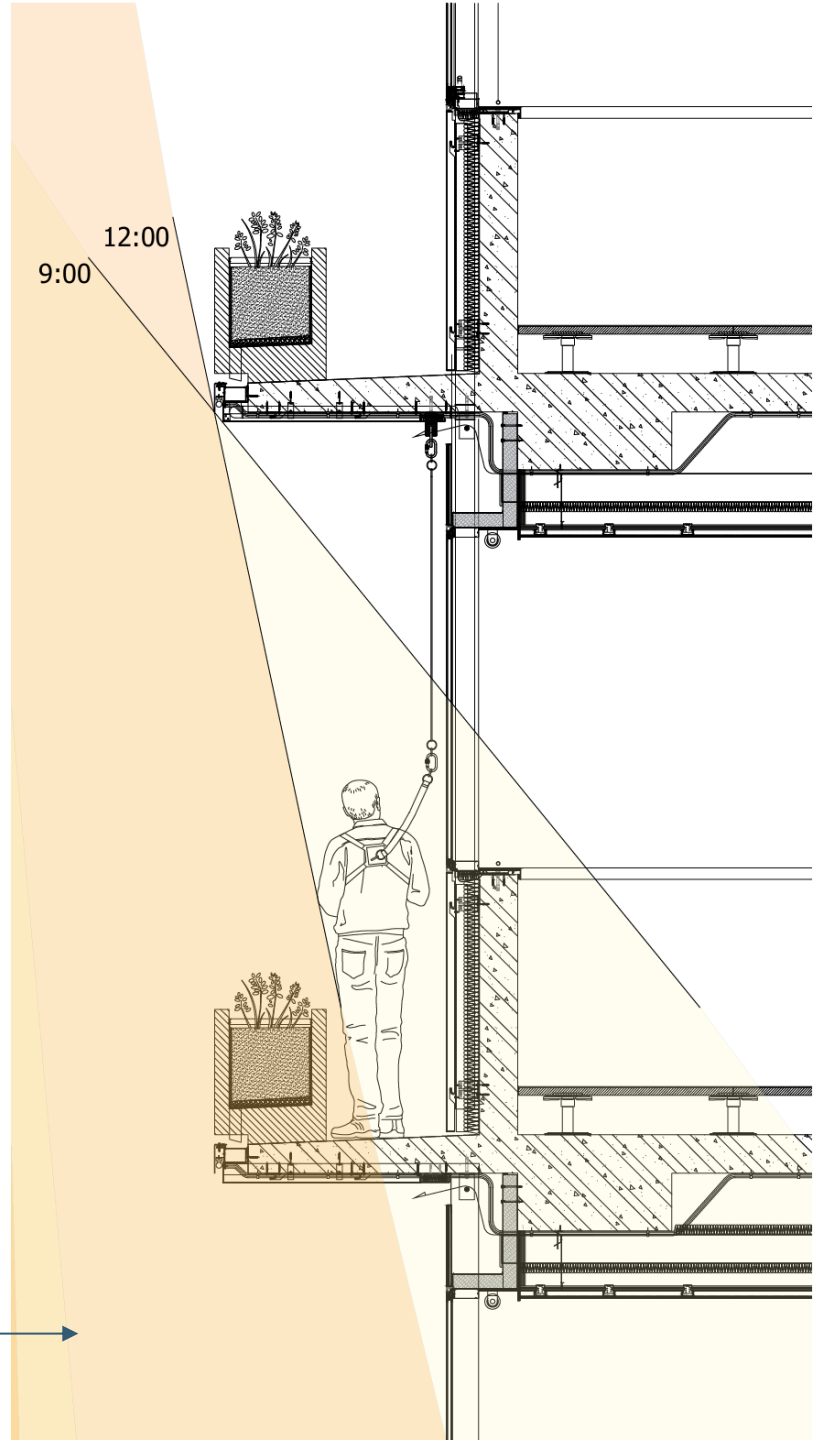
SILICON PARK - LIMASSOL, CYPRUS

Temperature in panes – cantilever
Thermal Shocks
Cantilever length / CW Height / Special glass



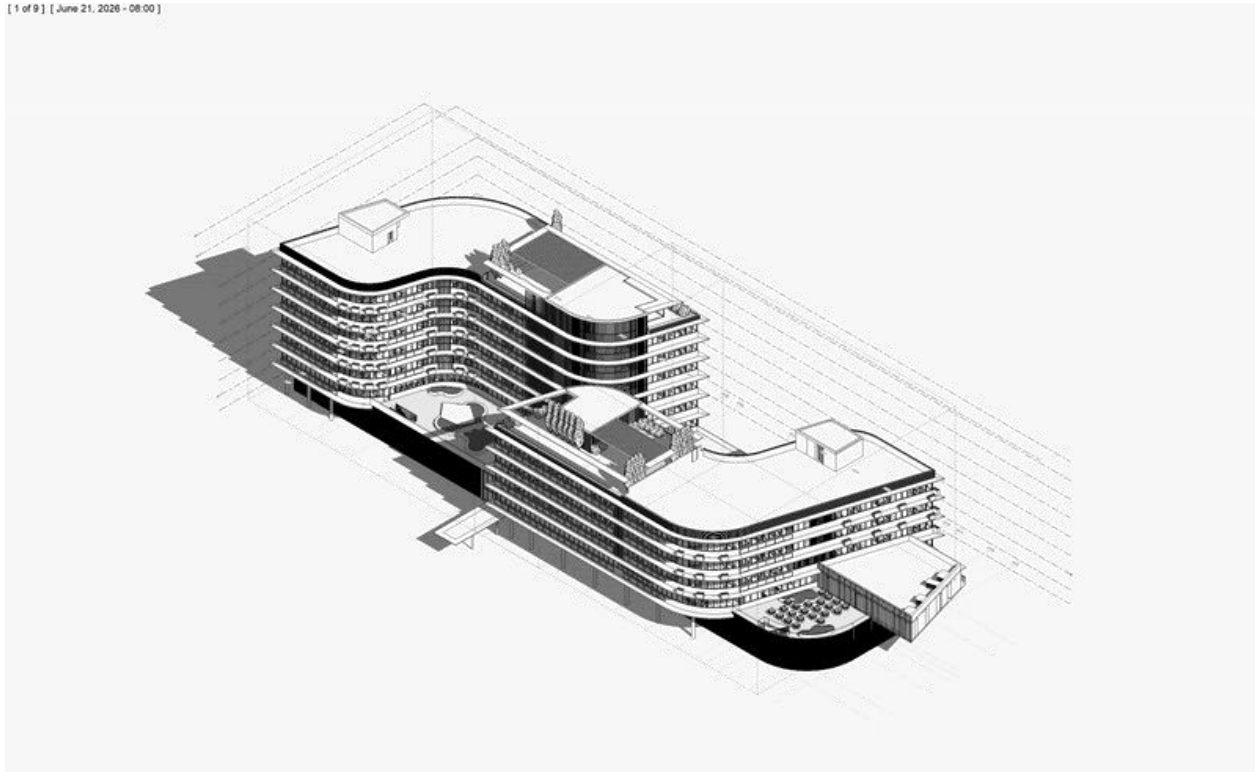


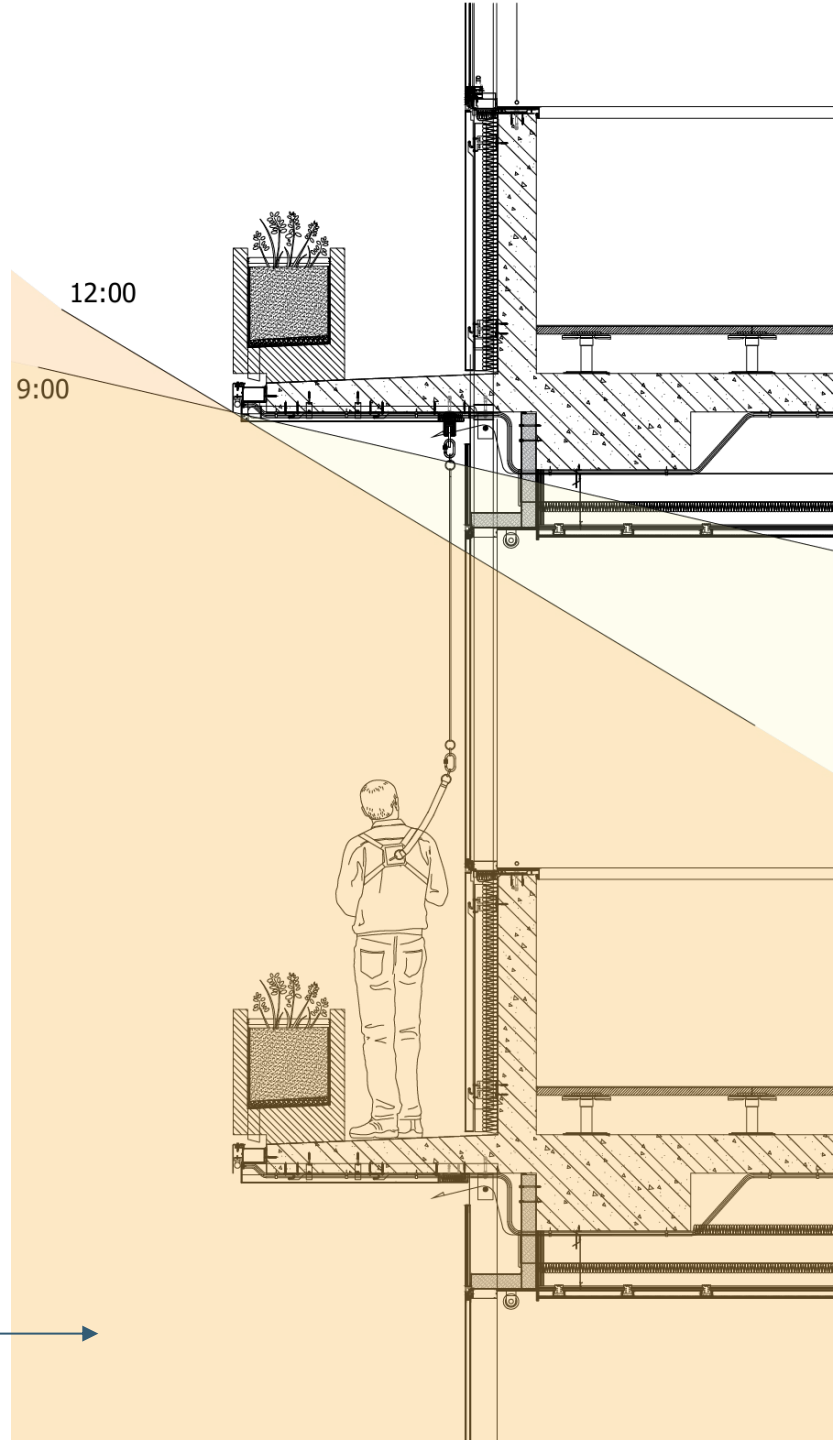
Summer sun

SKYLINE FACADES

SILICON PARK - LIMASSOL, CYPRUS

Temperature in panes – cantilever
Thermal Shocks
Cantilever length / CW Height / Special glass





Winter sun

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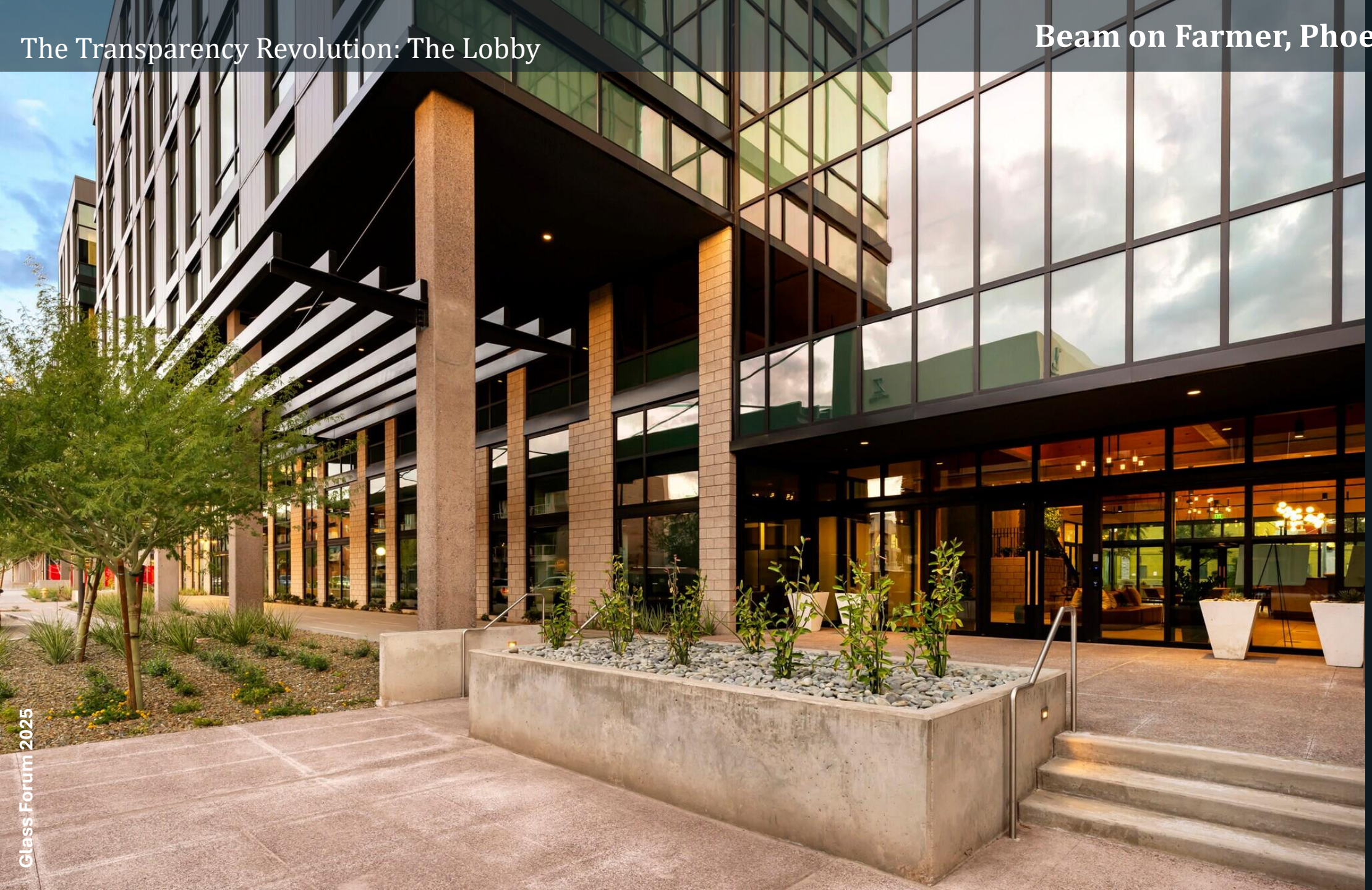
Φως, Διαφάνεια και η Εμπειρία του χώρου

Beam on Farmer, Phoenix - Arizona

SKYLINE FACADES

Beam on Farmer, Phoenix - Arizona



SKYLINE FACADES

Beam on Farmer, Phoenix - Arizona

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SKYLINE FACADES

Beam on Farmer, Phoenix - Arizona

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SKYLINE FACADES

HIGHLY-GLAZED FACADES

- Transparent, bright
- WWR (Window-to-Wall Ratio) variability (>80%)

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SKYLINE FACADES

Icon Tower, Tel Aviv / Israel

HIGHLY-GLAZED FACADES

SKYLINE FACADES

ARCHITECTURAL OFFICE IN 1970s

*Source: ASEA and Brown Boveri Merger | https://www.prolec.energy/timeline/asea-and-brown-boveri-merger/

SKYLINE FACADES

INDOOR SPECIES

Natural Habitat

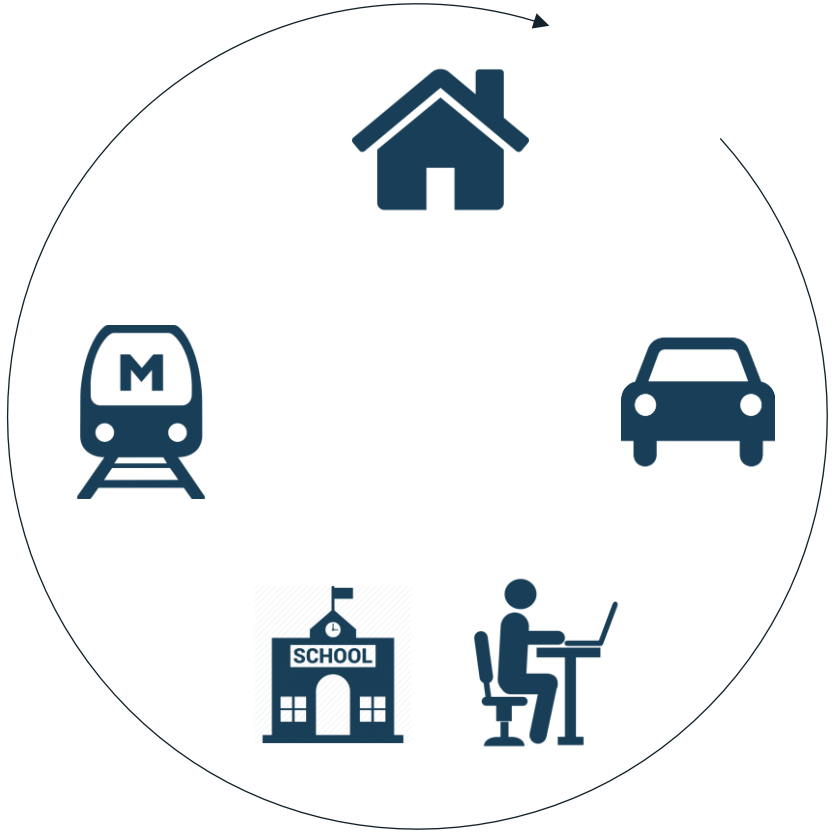
...the finding that emerges is that
we are basically an **indoor species**...
William R. Ott

*Source: NHAPS, 2001

SKYLINE FACADES

INDOOR ENVIRONMENT / INDOOR BIOME

Natural Habitat



…the finding that emerges is that we are basically an indoor species…

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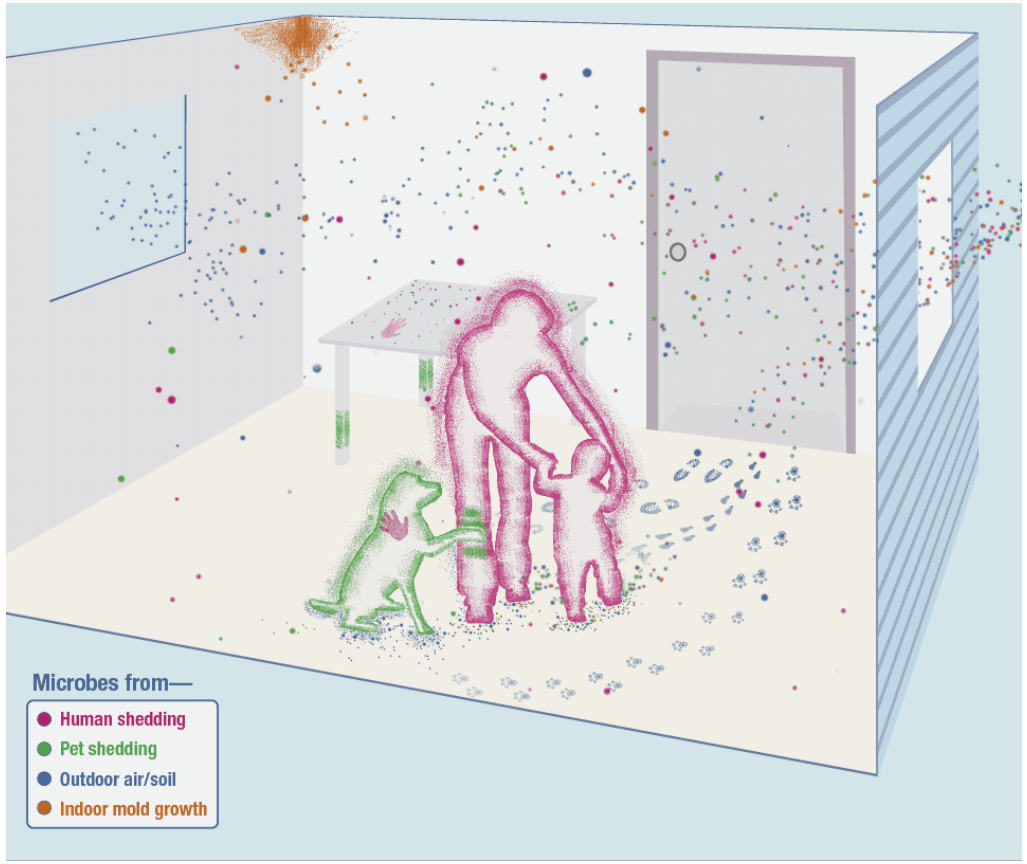

‘built environment microbiome’

‘οικοσύστημα εσωτερικών χώρων’

*Source: The Indoor Microbiome | https://www.epa.gov/indoor-air-quality-iaq/indoor-microbiome

SKYLINE FACADES

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Natural Habitat

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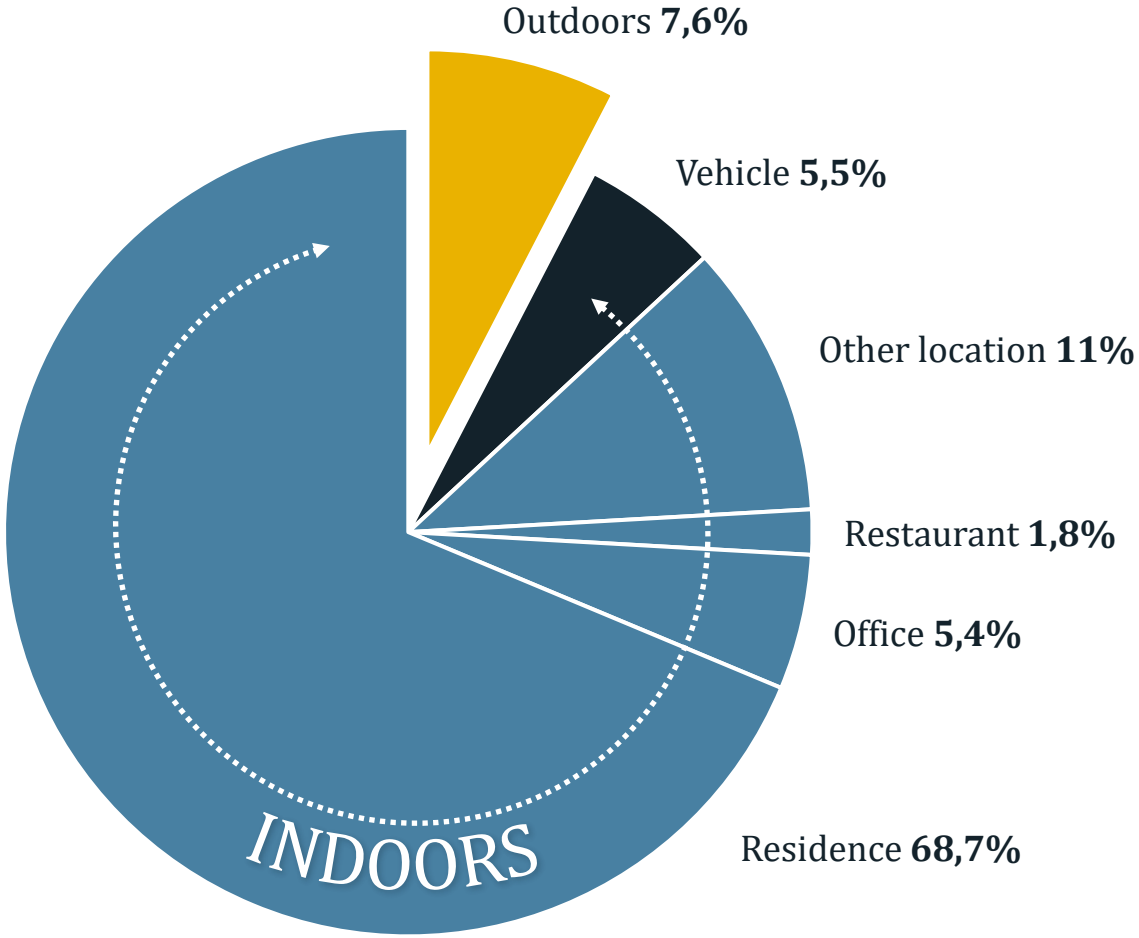


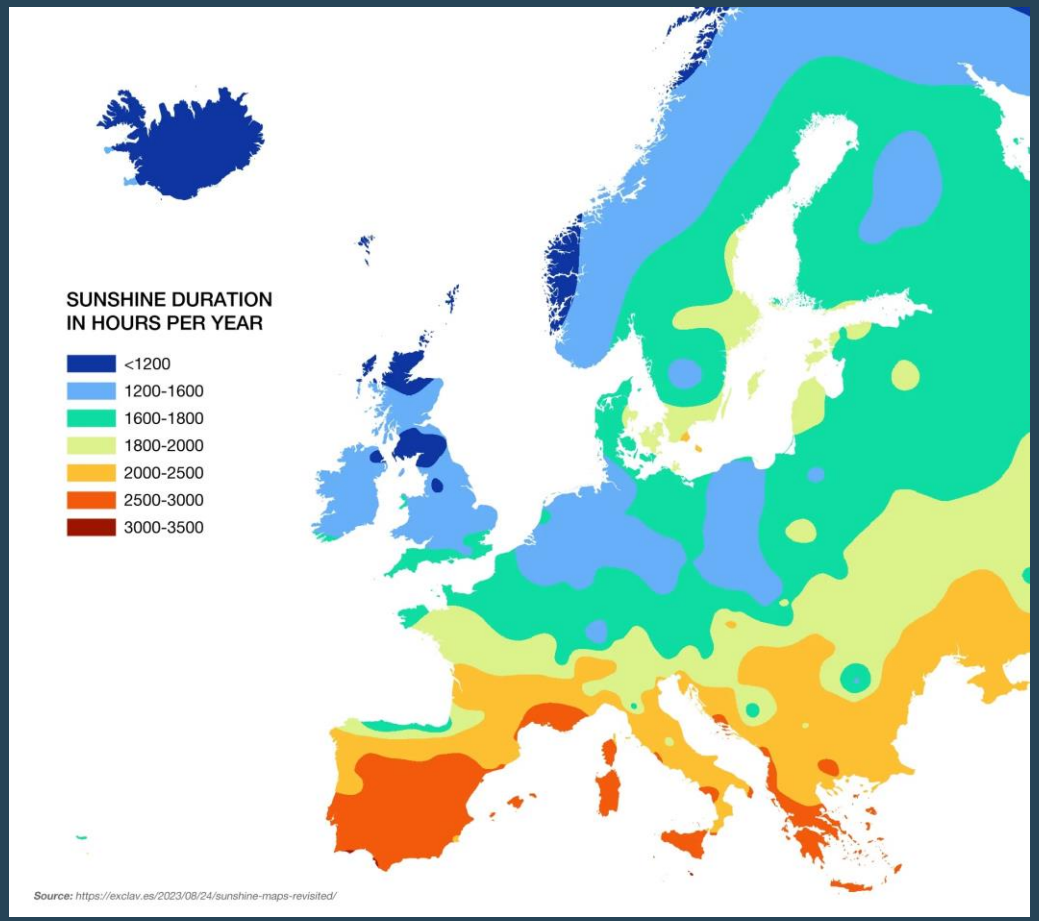
92,4%
Indoors

*Source: NHAPS, 2001

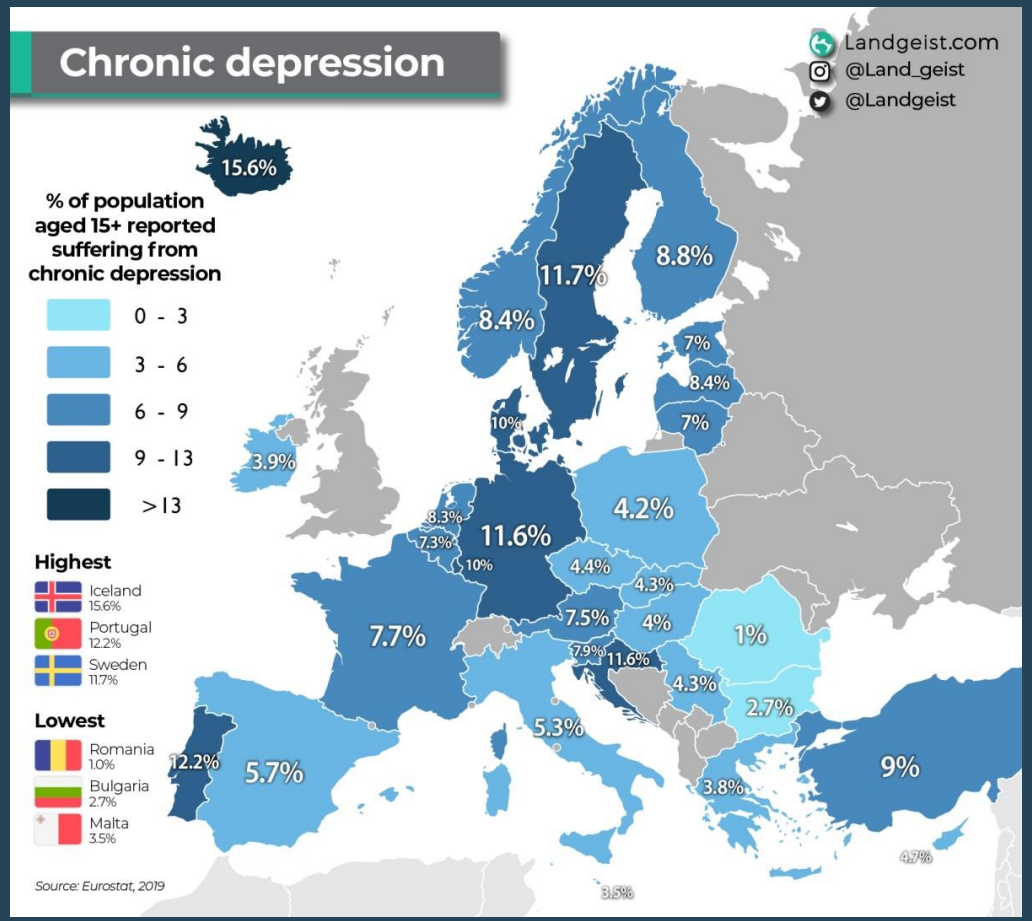
SKYLINE FACADES

LIGHT AND MENTAL HEALTH

Ετήσιες ώρες **ηλιοφάνειας**



Ποσοστό χρόνιας **κατάθλιψης**

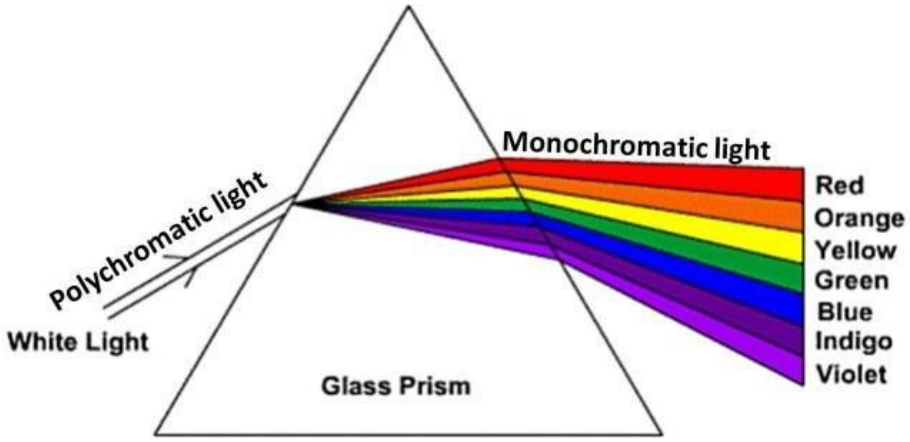


*Source: Eurostat, 2019

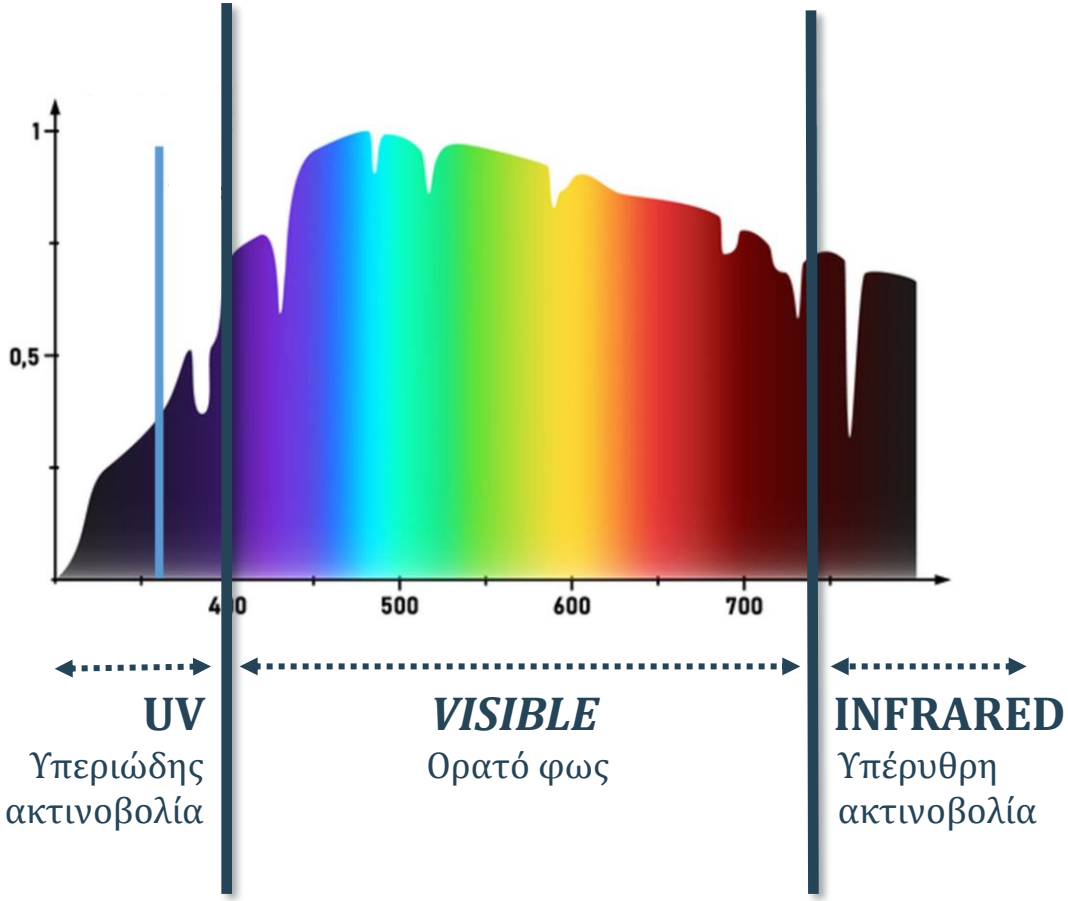
SKYLINE FACADES

VISIBLE LIGHT

Natural white light



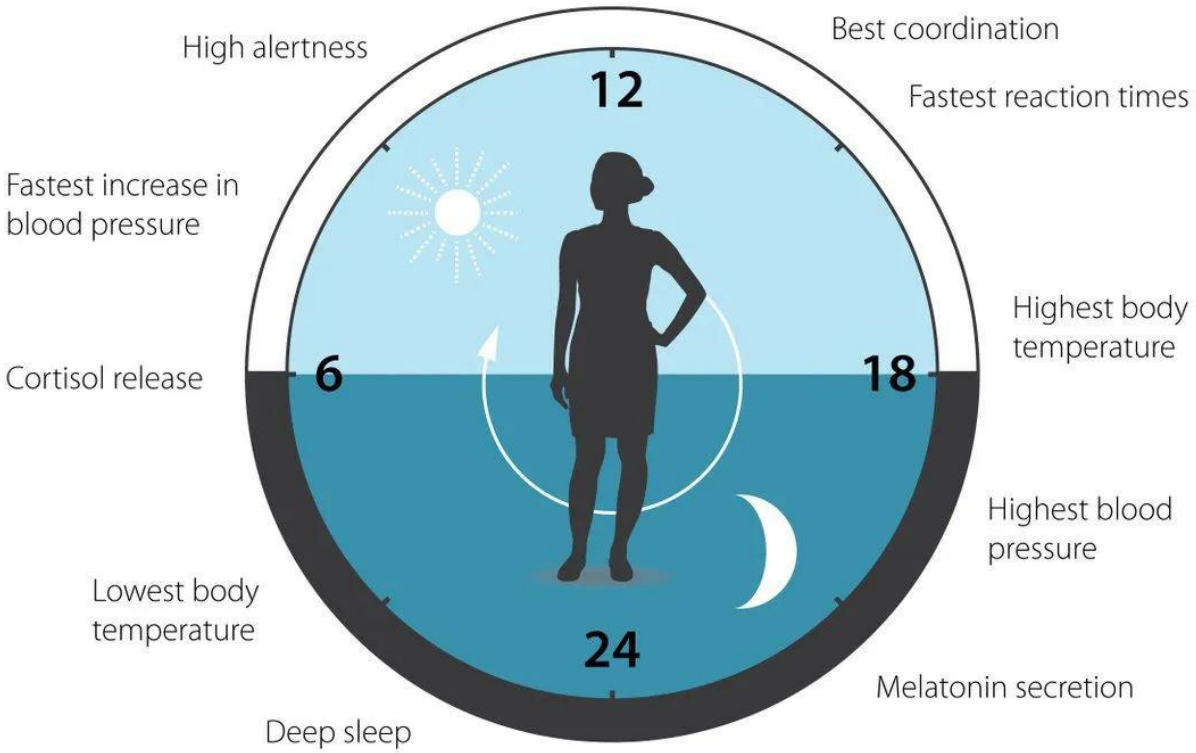
Visible light wavelength | 380-750nm



*Source: The Light Doctor | https://lightdoctormartinmooreede.substack.com/p/the-artificial-light-we-live-in-violet

SKYLINE FACADES

LIGHT AND CIRCADIAN RHYTHM



*Source: The Nobel committee for Physiology or Medicine

SKYLINE FACADES

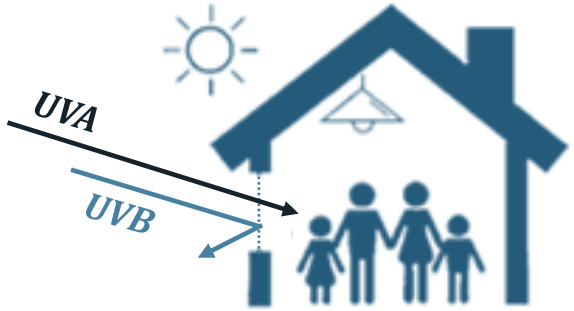
LIGHT AND VITAMIN D

…**more than 40%** of the population has deficiency in Europe.
…the main natural way of obtaining this vitamin for humans is from endogenous production by **solar exposure**…

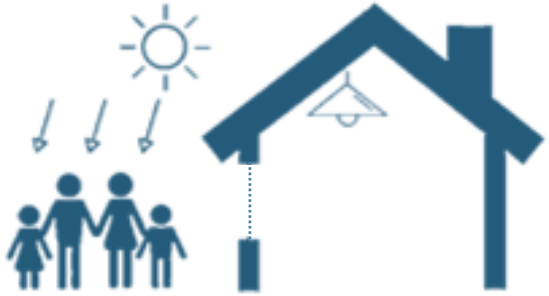
Díaz-Rizzolo, D.A., Kostov, B., Gomis, R. et al.

*Source: Nature / Paradoxical suboptimal vitamin D levels in a Mediterranean area: a population-based study

LIGHT AND VITAMIN D



Indoors
Filtered light



Outdoors
Direct sunlight

NATURAL LIGHT

…**more than 40%** of the population has deficiency in Europe.
…the main natural way of obtaining this vitamin for humans is from endogenous production by **solar exposure**…

Díaz-Rizzolo, D.A., Kostov, B., Gomis, R. et al.

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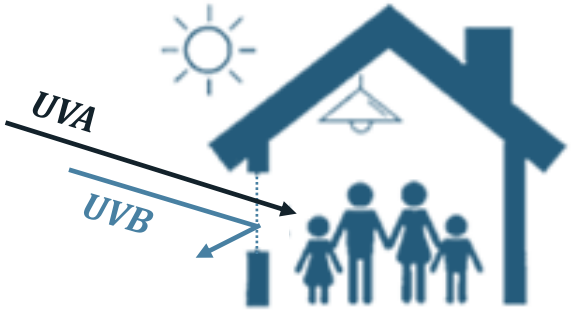
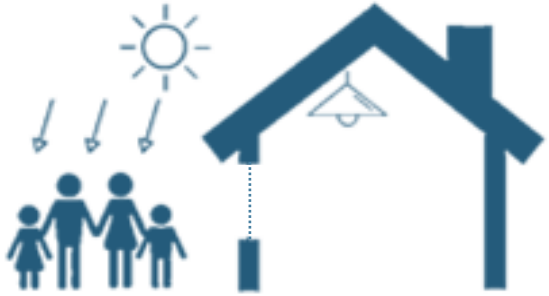
SKYLINE FACADES

LIGHT AND VITAMIN D



Indoors
Filtered light



Outdoors
Direct sunlight

NATURAL LIGHT

*Source: Vitamin D Tracking app - DMINDER

*Source: Nature / Paradoxical suboptimal vitamin D levels in a Mediterranean area: a population-based study

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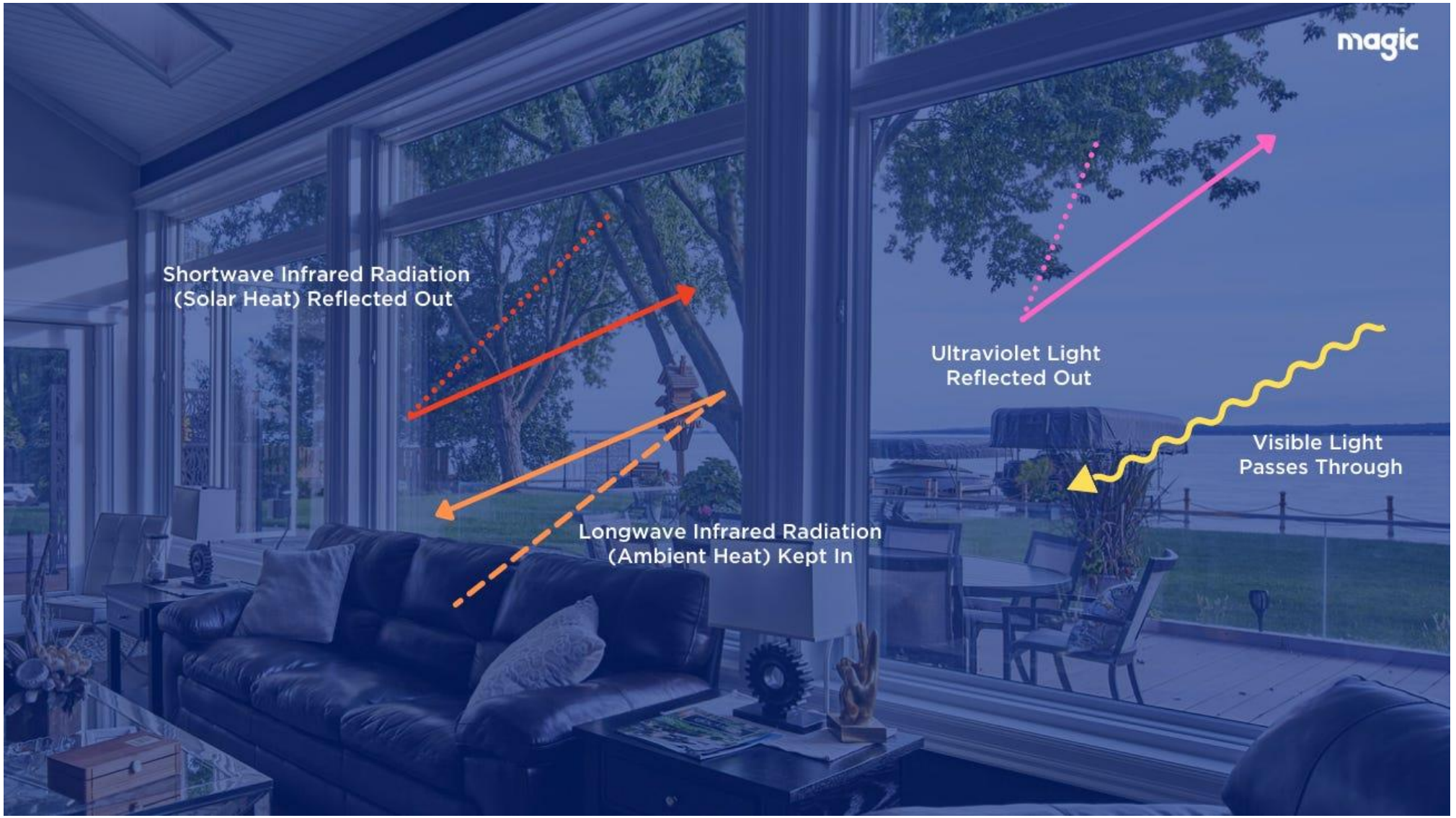
LIGHT THROUGH GLASS



*Source: How Low-E glass cuts infrared and UV light | https://lloydalter.substack.com/p/low-e-coatings-on-windows-save-energy

Η επιλογή του αρχιτεκτονικού γυαλιού

- επίδραση στην ενεργειακή απόδοση του κτηρίου -

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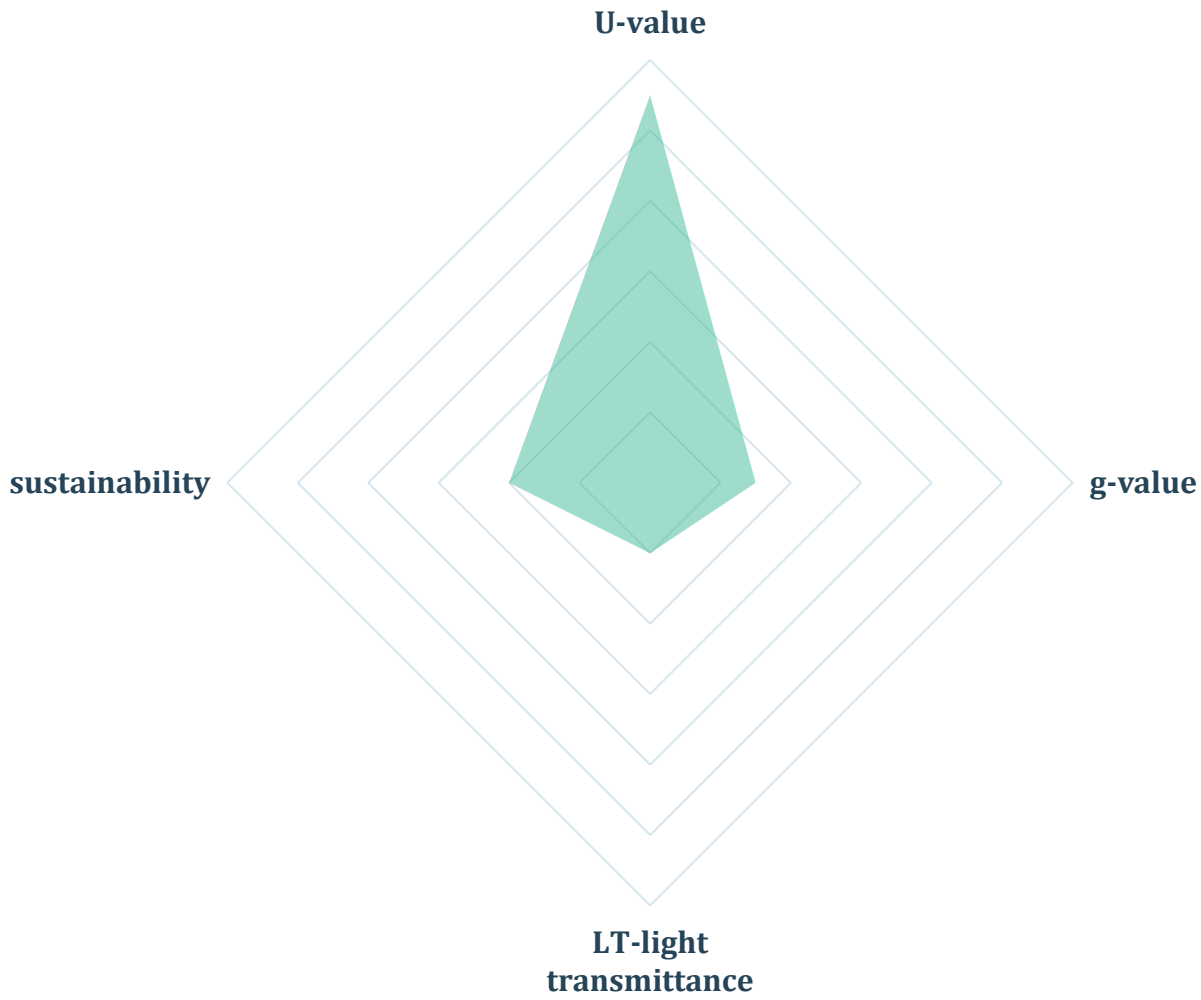
THERMAL PERFORMANCE
Θερμοπερατότητα - U-value

SOLAR CONTROL
Συντελεστής ηλιακού κέρδους - G-value

VISUAL COMFORT
Φωτοδιαπερατότητα – LT Light Transmittance

LIFE CYCLE - SUSTAINABILITY
Recyclability | Αποσπώμενα συστήματα



SKYLINE FACADES

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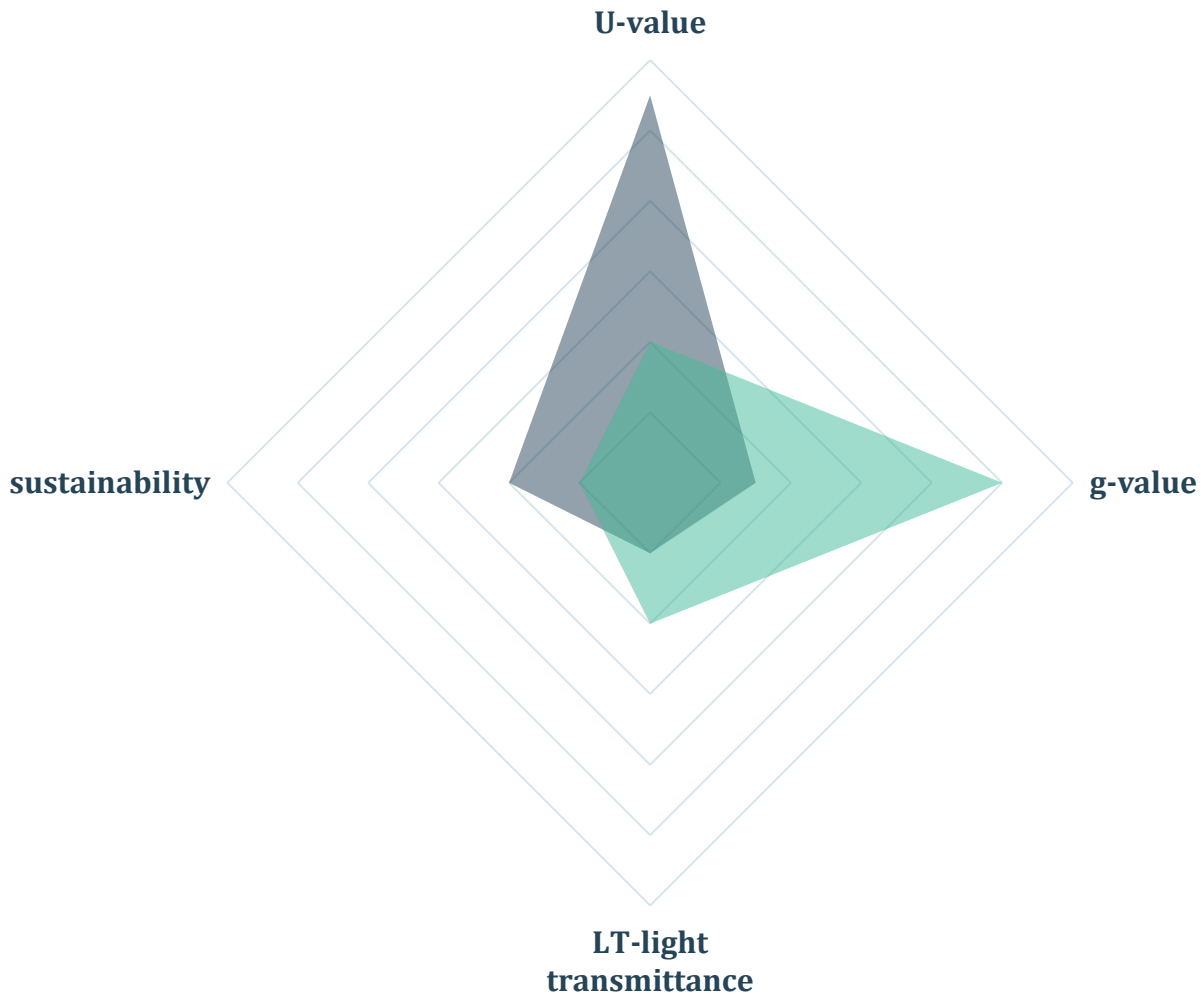

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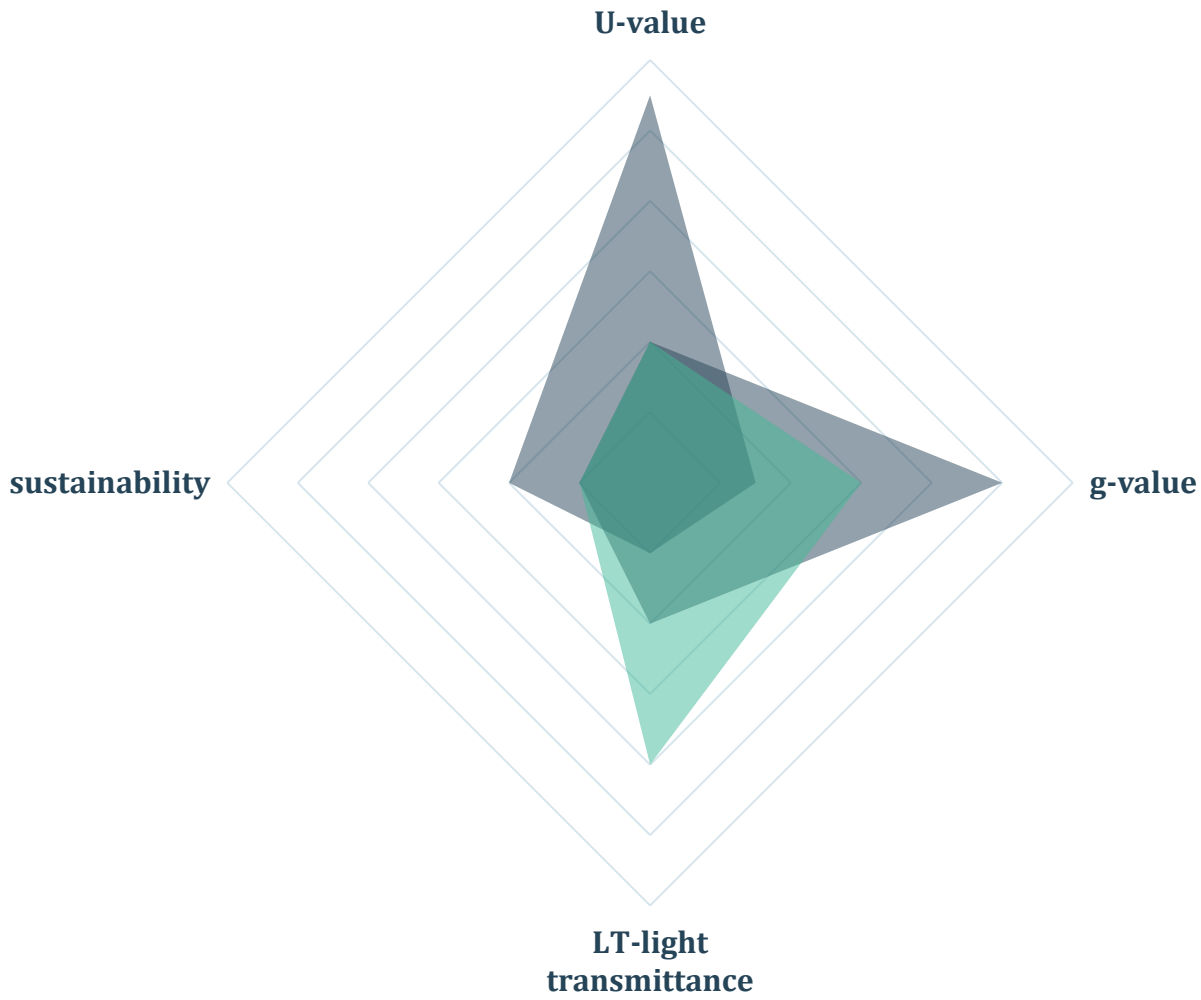

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ΔΥΝΑΜΙΚΑ ΚΑΙ ‘ΕΞΥΠΝΑ’ ΓΥΑΛΙΑ Electrochromic | Thermochromic

*Source: GSC| https://generalsolar.net/photochromic-film-2/

SKYLINE FACADES

THERMAL PERFORMANCE
Θερμοπερατότητα - U-value

SOLAR CONTROL
Συντελεστής ηλιακού κέρδους - G-value

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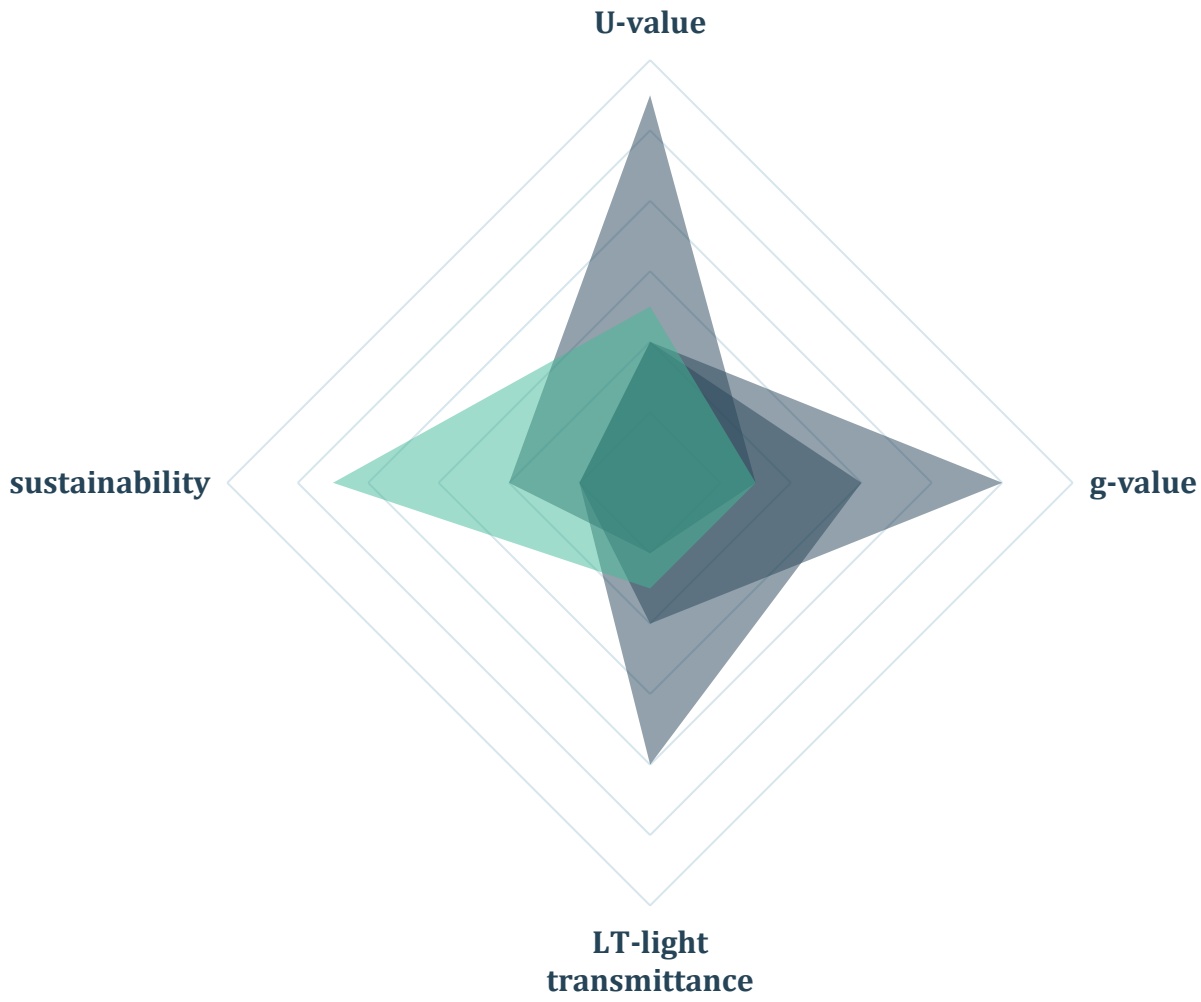
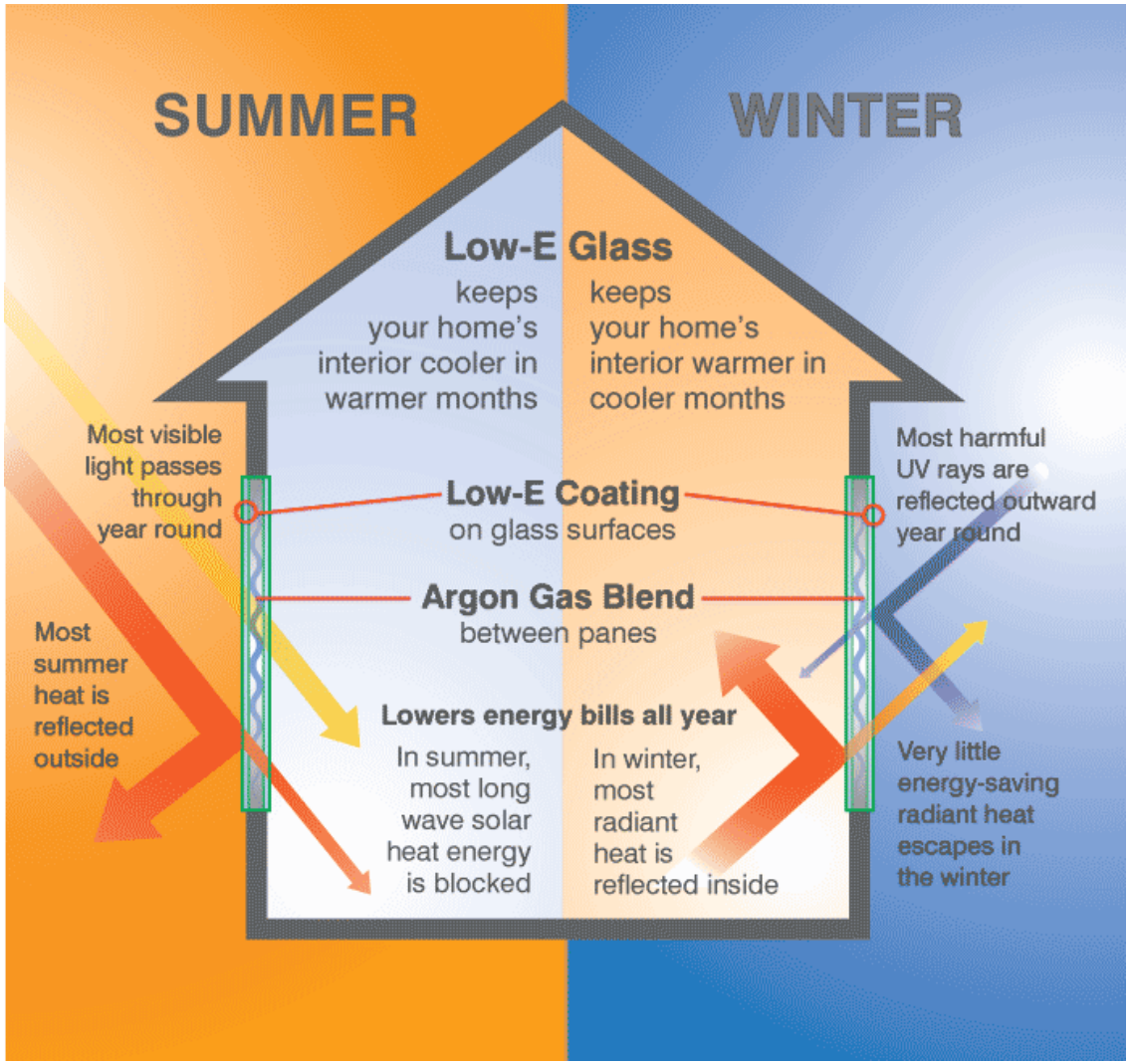


SKYLINE FACADES



YES

- Filters out most of the **UV / IR**
- Allows the **visible** spectrum

BUT

- …**filters out too much** of the ultraviolet, deep violet, and infrared parts of the natural light spectrum
- …it has led to a **global epidemic of myopia**…

*Source: Low-E coatings on windows save energy but may be messing with our health

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LIGHT AND MENTAL HEALTH

Regular Article

EFFECTS OF COLOUR OF LIGHT ON NONVISUAL PSYCHOLOGICAL PROCESSES

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Abstract

This study investigated the influence of colour of light ('warm', 'cool' and artificial 'daylight' white lighting) on subjects' self-reported mood, cognitive performance and room light estimation. Although no direct effect on positive and negative mood was indicated, a main effect of gender on several room light estimation dimensions showed that females perceived the room light, across all light settings, as more expressive than did males. Cognitive task data revealed findings not earlier indicated by the behavioural lighting research. Main effects of colour of light on short-term memory and problem solving showed that subjects performed better in the 'warm' than in the 'cool' and artificial 'daylight' white lighting. Interaction effects between colour of light and gender on long-term memory showed that males performed best in the 'warm' and 'cool' white

Building envelope impact on human performance and well-being: experimental study on view clarity

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Steve Selkowitz
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1. ABSTRACT

This project focused on investigating the links between daylight and human visual perception and performance in relation to the building envelope, first broadly, and then focused on view clarity. We conducted a brief literature review on current daylight metrics used in building industry. We found that debate remains on the practical applicability of these metrics, and gaps exist between daylight and other building envelope-related aspects such as view. We also provide an overview of research methods on human visual perception and performance measurements in relation to daylight and view, including subjective and objective measurements. In the later section of this report, we introduce and show results from a pilot study done at Lawrence Berkeley National Laboratory's Windows Testbeds. We tested High Dynamic Range (HDR) photography techniques to capture the different view clarity through the selected building envelope layers (shades and electrochromic glass) under various sky conditions. The experimental study reveals that light fabric shades restrict the view compared to dark fabric shades, and that view clarity through a blind can be significantly reduced when there is direct sun in the field of view (at certain sun angles). The direct sun caused white-spotted visual noise at the partial area of the fabric shade. Hence, the view was more obscured by the effect of the direct sun even though in this case there was a greater vertical illuminance than the others. The study also shows the potential of HDR photography techniques to be used for a standard view clarity rating method, while noting that further support is needed from human subject testing and advanced computational image analysis algorithms.

How to create sustainable lighting for users? Psychological mechanisms underlying lighting effects

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Introduction

The ongoing discussion on sustainable lighting should not neglect a crucial dimension: sustainability for users. Sustainable illumination should not only protect our energy resources, but also their user's resources. In a similar vein, it has long been argued that high quality lighting does not merely prevent damage to health, but increases well-being and supports task completion (e.g., Veitch, 2001). In our knowledge society, this view becomes increasingly important because knowledge worker's performance largely depends on mental and psychological factors such as concentration, mood, and motivation.

Current psychological models distinguish environmental stressors and resources (e.g., Bakker & Demerouti, 2007) to describe potential psychological benefits and costs associated with contextual social, organizational, and environmental conditions. Lighting conditions can be comfort is understood not merely as thermal or visual comfort. Instead, comfortable rooms or lighting conditions should support user's well-being, satisfaction, and performance. Although the habitability pyramid is not new, the current paper substantiates its theoretical grounding by identifying and detailing the underlying psychological mechanisms and relating the comfort generation to important psychological theories.

In this model, four levels of comfort are distinguished (Vischer, 2007): discomfort, physical comfort, functional comfort, and psychological comfort. In the following, section the comfort generation from one comfort level to another will be described via the psychological mechanism of resource depletion, facilitation through fit effects, and need satisfaction, and illustrated by recent lighting research.

Physical comfort: Preventing resource depletion

Effects of indoor lighting conditions and window views on occupants' well-being and behavior: a systematic review.

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Abstract. This paper reviews 49 studies that addressed how window view, daylighting, and lighting in buildings affect occupants' behavior and well-being. The systematic literature search was performed in November 2021 and focused on office and educational buildings. We quantified the number of papers per study type, study aim, and lighting condition. Predictor categories and methods for data collection were also considered. We analyzed the results according to a structure of records, defined by the number of predictors and type of outcomes from a study. We obtained 106 records. A gap in the number of studies under different lighting conditions and building types was identified. Studies under natural light and studies conducted in learning environments were fewer than studies dealing with artificial lighting in offices. A wide variety of methods for data collection was found. Artificial lighting features and correlated color temperature were the most used predictors. Based on the analysis of records, we found that 61.3% of the associations between predictors and outcomes were statistically significant. The type of effect was not reported in 3.8% of the records-meaning that approximately 35% of the records found no significant associations between predictors and outcomes.

Simulating the natural lighting for a physical and mental Well-being in residential building in Dubai, UAE

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ABSTRACT

The United Arab Emirates (UAE) is well aware of energy consumption and the reduction in carbon emissions from the quantitative analysis for lighting, but well-being, does not have a well-defined characteristic. This paper aims to investigate the context, analyze the appropriate lighting in the residential interiors in UAE, and present the planning direction of interior spaces. The methodology analyses the residential interiors' functions, human well-being status, and main innovative lighting characteristics. The analysis results are as follows; First, it is essential to establish the location and space plan in the planning phase due to the nature of the interior space functions. The context of the location has significant effects. Second, it is essential to establish the required lighting fixtures and bulbs. Third, strategic lighting layouts for the multiple interior spaces in the residential project. Interior architects provide the various lists and contents for creating a healthy lighting environment and the appropriate space. This study will serve as fundamental data to enhance the housing interiors in the UAE. Additionally, it will serve future research that supplies an efficient guide for the decision-making process to prepare the design guidelines and operational plans. Accordingly, trends, innovation, and national efforts serve as the backdrop for this study, which aims to present new strategic lighting layouts (lighting scenes) standards related to light in residential spaces for a healthy life in Dubai, UAE, by presenting and simulating natural lighting diversity throughout the day to adapt with the circadian rhythm for physical and mental well-being.

Lighting Quality Contributions from Biopsychological Processes

Jennifer A. Veitch, Ph.D.

THIS PAPER WAS ACCEPTED FOR PUBLICATION IN THE JOURNAL OF THE ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA AS A NON-CONFERENCE PAPER

Renewed interest in lighting quality emerged in the early 1990s, in parallel with the development of energy codes and standards. Lighting practitioners remembered the energy conservation strategies of the 1970s energy crisis, in which delamping reduced overall light levels and produced uneven distributions of light. Energy was saved, but lighting quality declined. Lighting designers of the day decried this simplistic approach to conservation and feared that similar strategies would occur again.[1-3] Committees were struck by the major associations and many conference sessions on lighting quality were convened.

The definition of lighting quality most widely adopted in these discussions has been an emergent one, in which lighting quality is the degree of excellence achieved, in terms of meeting human needs[4] and integration of these outcomes with energy conservation and architecture.[5] Veitch and Newsham presented a behaviorally-based model for the relationships between luminous conditions and human needs served by lighting (**Figure 1**).[4] This review used this model as a basis for an examination of the body of knowledge about these relationships.

The procedure in conducting this review was, first, to identify empirical research relating luminous conditions to behavioral outcomes. The behavioral outcomes fell into the six categories described by Veitch and Newsham: seeing; task performance; communication and social interaction; mood; health and safety; and aesthetic judgments.[4] The luminous conditions are those generally agreed as useful descriptors of the lit environment: luminance/illuminance; uniformity across tasks; luminance which they would categorize as a direct effect.[10] This model makes no such distinction. All behavioral outcomes — including perception — are the result of cognitive processing, and may therefore be considered indirect in the sense that if there is no mental processing, the luminous energy has no effect on behavior. Lighting for visibility is a minimum criterion for lighting quality, and visibility is central to the processes by which good-quality lighting will be achieved. Where this discussion of lighting quality differs from others is in explicitly considering other outcomes to be as important as making objects visible.

As has been noted elsewhere, the scholarly quality of lighting research is generally poor,[4,11-15] but an extensive critique of each study is beyond the scope of a journal article. Instead, the conclusions here are limited to those that may be reasonably drawn from each study.

Within the discussion of each process, the review is structured using the luminous conditions to group similar studies. Not all luminous conditions have been equally studied with respect to each process. The absence of one or more conditions under a process means no literature concerning it was identified, and is not a theoretical statement about the luminous conditions triggering each process. In addition, relatively little detail concerning spectral power distribution is presented here because the topic has been reported extensively elsewhere.[15] The heavy emphasis on office lighting applications reflects the focus (and the economic imperative) in most of the literature. In keeping with this focus, the review is limited to suprathreshold viewing at adaptation levels typical of interiors.

*Source: Google Scholar

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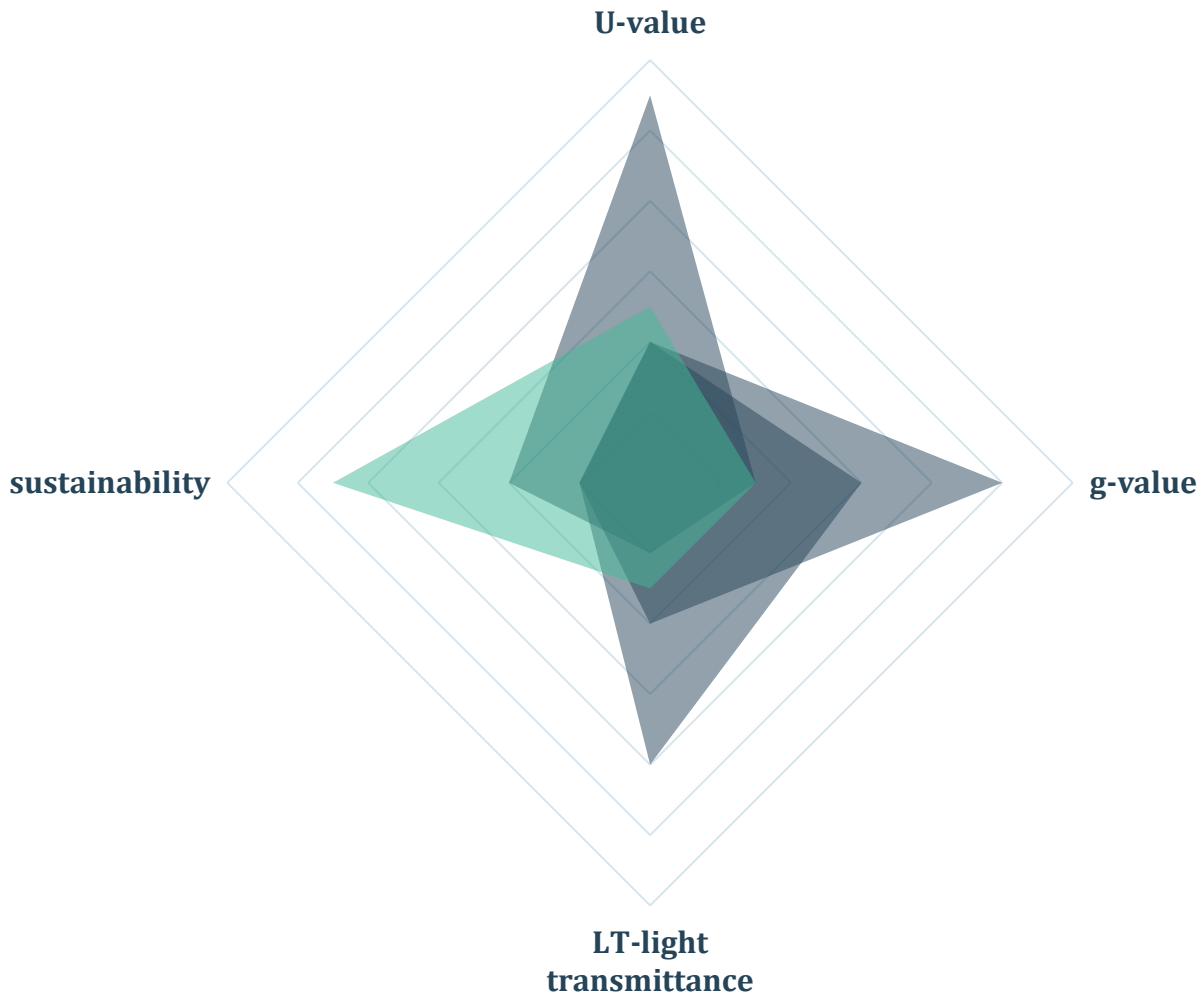
SOLAR CONTROL
Συντελεστής ηλιακού κέρδους - G-value

VISUAL COMFORT
Φωτοδιαπερατότητα – LT Light Transmittance

LIFE CYCLE - SUSTAINABILITY
Recyclability | Αποσπώμενα συστήματα



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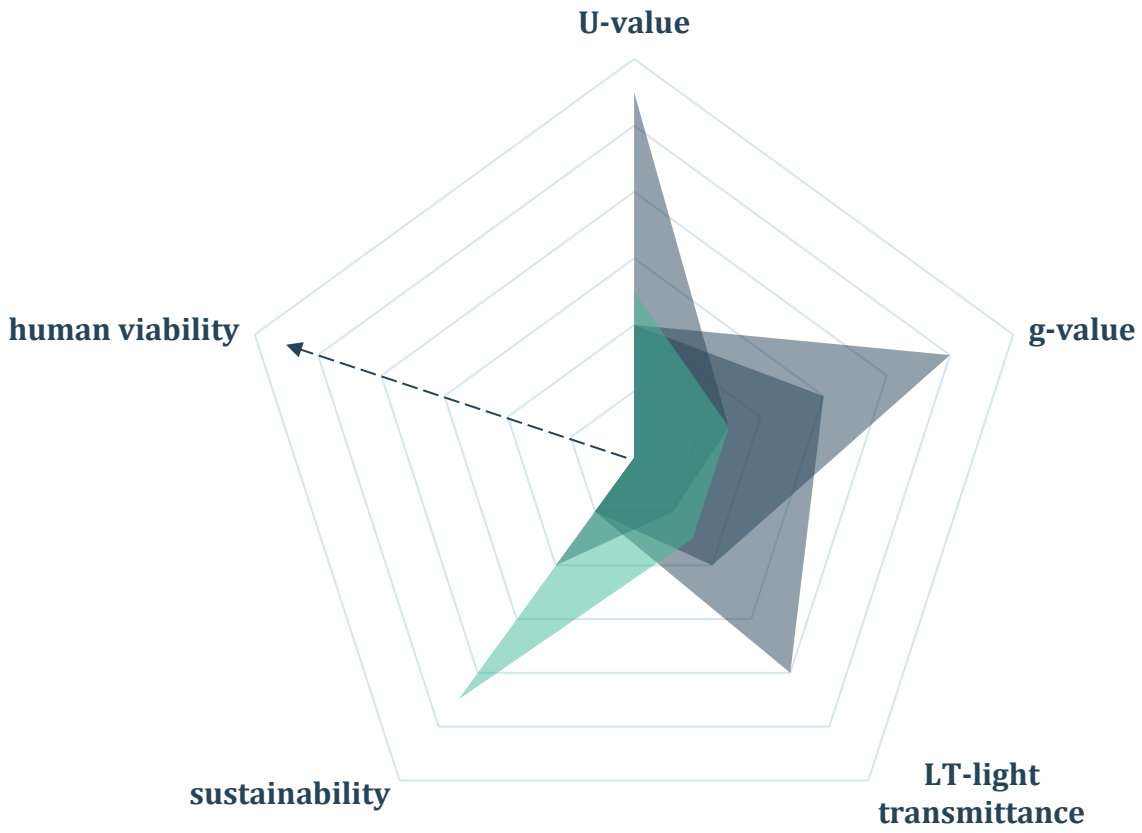

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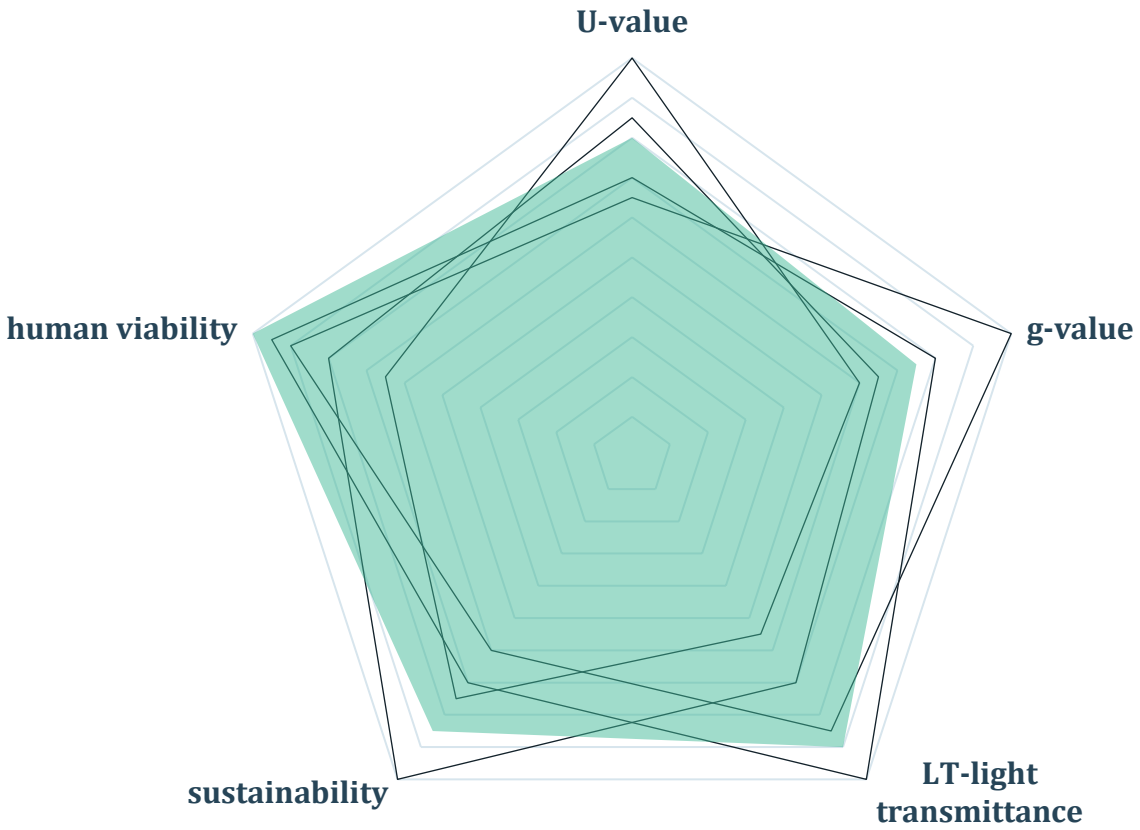

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The Transparency Revolution is not only technological

*Source: How offices have changed in the last 100 years | https://limobelinwo.com/en/old-offices-vs-modern-offices-how-we-have-changed/

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The Transparency Revolution is not only technological

It is deeply **human**

*Source: How offices have changed in the last 100 years | https://limobelinwo.com/en/old-offices-vs-modern-offices-how-we-have-changed/

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