



STATENS BYGGEFORSKNINGSINSTITUT
AALBORG UNIVERSITET KØBENHAVN



New European Daylighting Standard prEN 17037 Process and Expected Impact

,
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Danish Building Research Institute (SBI-AAU)
Convenor of EN TC169/W11 “Daylight”



Photos: Henning Larsen
Architects / SBI-AAU



Presentation of calibrated photorealistic images by pairs (Thurstone test)

Video Projection, Full HD, 4K 8K, 12 K screens or Head Mounted Displays
Low power (max 500 cd/m²) , High power (up to 20 Kcd/m²), Crowd testing

Process:

Why a daylighting standard for European buildings?



Pantheon , Roma,
House common to all Gods,
29-19 BC



Buildings need electric lights (during night-time)

Electric light can be used at day-time, and well adapted to functions

So maybe we do not need so much daylight (energy, costs, ...)?



Reasons for a daylight standard

Window industry, roof top manufacturers : no references to use in comparison to electric lighting industry...

Health organizations: psychological and physiological well-being,

University and research: powerful and well structured daylight community in Europe (Scandinavia, Germany, Austria, England, The Netherlands, Slovakia)



CEN/TC 169 "Light and lighting" ▾



CEN/TC 169/WG 01 "Basic terms and criteria" ▾



CEN/TC 169/WG 02 "Lighting of work places" ▾



CEN/TC 169/WG 03 "Emergency lighting in buildings" ▾



CEN/TC 169/WG 04 "Sports lighting" ▾



CEN/TC 169/WG 06 "Tunnel lighting" ▾



CEN/TC 169/WG 07 "Photometry" ▾



CEN/TC 169/WG 08 "Photobiology" ▾



CEN/TC 169/WG 09 "Energy performance of buildings" ▾



CEN/TC 169/WG 11 "Daylight" ▾



CEN/TC 169/WG 12 "Joint Working Group with CEN/TC 226 - Road lighting" ▾



CEN/TC 169/WG 13 "Non-visual effects of light on human beings" ▾



CEN/TC 169/WG 14 "ErP Lighting Mandate Management Group" ▾

History

CEN TC 169 / WG11 « Daylight »

Created in 2010 (The Netherlands, Denmark, Germany, UK, Czech Republic, Slovakia, Norway, France, Sweden, Italy)

Convenor: Peter Raynham (Bartlett School, UK)

Then from 2014, *New Convenor: Prof Marc Fontoynt, SBI -Aalborg University in Copenhagen, Denmark (elected by CEN TC 169 board)*



Status 2014

Daylight, View, Sunlight, Glare are the components

Frustration by industry: non applicable

Complexity of document

Relations with Germany (German Standard)

Issue of calculations

So I started to make a critical analysis of the document, launched individual interview of contributors, and started with a number of new proposals

Status 2014 (continued)

Big debate concerning minimum requirements vs minimum recommendations

Strategy: define normative section and annexes, with minimum recommendations (which are indicative)

Also standard focus on spaces not on buildings. Standard should allow a range of minimum recommendations (minimum, medium, high)

About 50 Participants to manage



Jørgen Hagelund,
DS, WG11 Secretary



Jens Christoffersen,
Velux, , Danish Expert

Registered members:

M. Cyril Chain, France

M. Nicolas Dupin, France

M. Bernard Lepage, France

Mrs. Khadija Loud, France

M. Mohamed Trabelsi, France

Mrs. Eloise Sok, France

Mr. Peter Dehoff, Austria

Mr. Oliver Ebert, Austria

Mr. Davide Siciliano, Austria

Mr. Dorin Beu, Romania

Mr. Dimcho Mihailov, Bulgaria

Mr. John Mardaljevic, United Kingdom

Mr. Peter Raynham, United Kingdom

Mr. Peter Thorns, United Kingdom

Mr. Koen Chielens, CEN

Mr. Knud Skovgaard Nielsen, CEN

Mr. Wolfgang Cornelius, Germany

Mr. Roman Jakobiak, Germany

Mr. Sohél Moghtader, Germany

Mzrs Martina Knoop, Germany

Mr. Martin Sengebusch, Germany

Mr. Per Arnold Andersen, Denmark

Mr. Jens Christoffersen, Denmark

Mr. Jørgen Hagelund, Denmark

Mr. Levente Filetóth, Hungary

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Mr. Arnaud Deneyer, Belgium

Mr. Bertrand Deroisy, Belgium

Mr. Tom Vandamme, Belgium

Ms. Wiene Fokkinga, Netherlands

Ms. Lisette Groeneveld, Netherlands

Mrs. G. J. Hordijk, Netherlands

Mr. H. J. J. Meutzner, Netherlands

Mr. P. H. M. Vierhout, Netherlands

Ms. Nancy Westerlane, Netherlands

Mr. Tommy Govén, Sweden

Mr. Rodrigo Muro, Sweden

Mr. Björn Nilsson, Sweden

Ms. Ulla Rosenius, Sweden

Mr. Grega Bizjak, Slovenia

Ms. Barbara Matusiak, Norway

Mr. Daniel Tschudy, Switzerland

Mr. Jan Wienold, Germany / Switzerland

Mr. Stanislav Darula, Slovakia

Mr. Giuseppe Giuffrida, Italy

Mr. Paolo Soardo, Italy

Mrs. Ditka Mohelnikova, Czech Republic

Mr. Marcel Pelech, Czech Republic

Mrs. Martina Sapletalova, Czech Republic

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Organization of the work:

- Two meetings per year +skype/webex,
- 2 webex per year with General secretary of TC169 (Sohéil Moghtader, DIN, Berlin)
- All contribution by members sent 2 weeks before meeting in a written form,
- Compromise to be achieved during meetings. In case of disagreement, next propositions should be made in written form, with arguments



Usually around 20 participants out of 50 experts...

External obstacles:

Building engineers: daylighting cannot be approached independently from energy concern.

Lighting industry: standard should promote use of daylight sensors/controls in luminaires, value combination of daylight and electric light.

City planners: providing daylight at lower levels of buildings
And in areas construction is dense / spaces vs buildings

Attention!

This standard do not target the calculation of energy savings due to daylight
CEN 15193 Energy requirements (LENI)

It is not defining daylight levels at work places
CEN 12 464-1 Lighting of Indoor Work Places

It does not linked to energy regulations which are conducted at the national level

It does not propose calculations methods, just target performance criteria



Levels exceeded 50% of daylight hours per year

Table 1 —Recommendations of daylight provision by daylight openings in a vertical and inclined surface

Level for daylight openings in a vertical and inclined surface	Target illuminance E_T (lx)	Fraction of space for target level $F_{plane, \%}$	Minimum target illuminance E_{TM} (lx)	Fraction of space for minimum target level $F_{plane, \%}$
Minimal	300	50%	100	95%
Medium	500	50%	300	95%
High	750	50%	500	95%

* the recommended values of daylight factors to be used for the method 2 for each performance level should be extracted from Table A.3. The minimum target daylight factor (D_T) corresponding to the target illuminance level and the minimum target daylight factor (D_{TM}) corresponding to the minimum target illuminance shall be selected based on the geographical location of the considered building.

Recommendations for daylight provision in (pr)EN 17037 - 2017

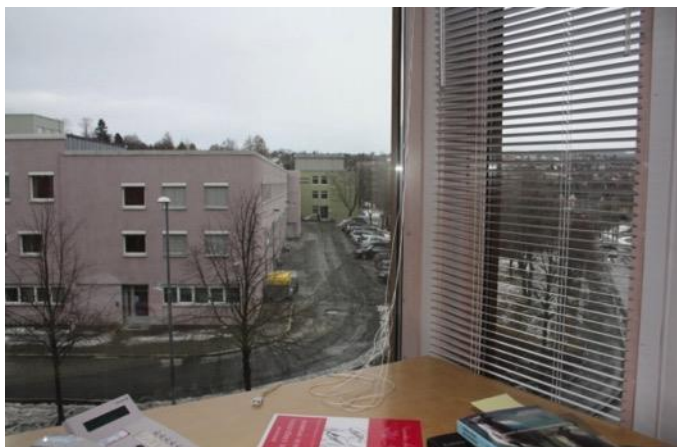


Table 1 — Assessment of the view outwards from a given position.

Parameter*	Rating of view-out		
	minimum	medium	high
Width of view window(s), horizontal sight angle	≥ 14°	≥ 28°	≥ 54°
Outside distance of the view	≥ 6 m	≥ 20 m	≥ 50 m
Number of layers to be seen from at least 75% of utilized area: - sky - landscape (urban and/or nature) - ground	At least landscape layer is included	minimum two layers are included in the same view window	all layers are included in the same view window
* For a space with room depth more than 5 m, it is recommended that the respective sum of the view window(s) dimensions is at least 1m x 1.25 m (width x height).			

Recommandations for view out
in (pr) EN 17037 - 2017



A.1 Recommendations for exposure to sunlight

The minimum recommendation is that the space should receive possible sunlight for a duration at least exposure to sunlight after Table A.5 (supposed to be cloudless) on a selected date between February 1st and March 21st.

Table A.5 proposes three levels for exposure to sunlight. See Annex D for further details.

When applying the recommendation to a whole dwelling, the proposal is that at least one room in the dwelling should have at least exposure to sunlight after Table A.5.

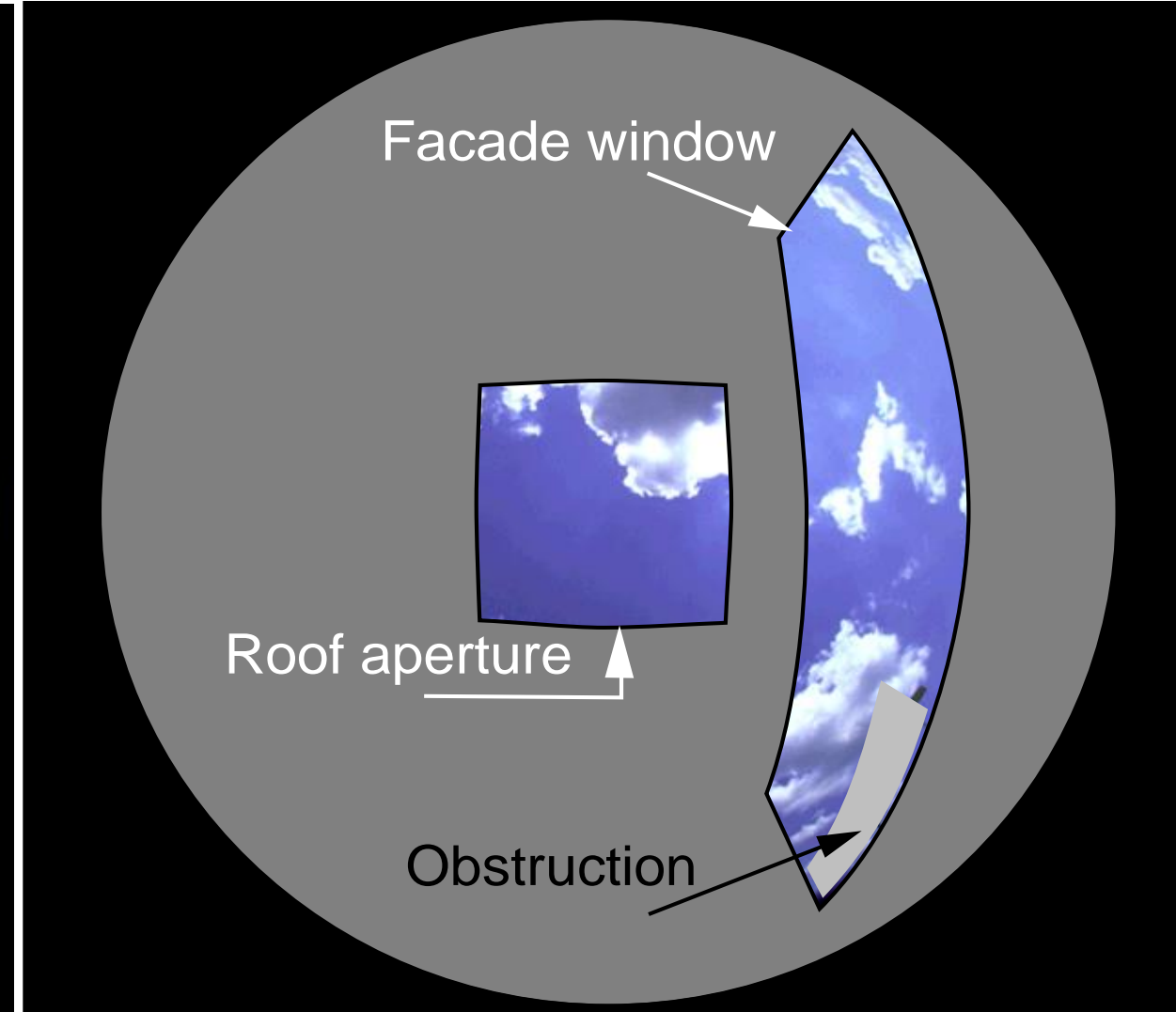
Table 1 — Recommendation for daily sunlight exposure.

	Sunlight exposure
minimum exposure to sunlight	1.5 hours
medium exposure to sunlight	3.0 hours
high exposure to sunlight	4.0 hours

Recommendations for minimum exposure to sunlight in (pr) EN 17037 - 2017



Limitations of access to daylight related to street width and building height



From inside buildings, only sections of sky are visible

Marc Fontoynt et al, Building with Daylight, Construire avec la lumière naturelle, CSTB, 2011



Standard will facilitate sizing of roof apertures

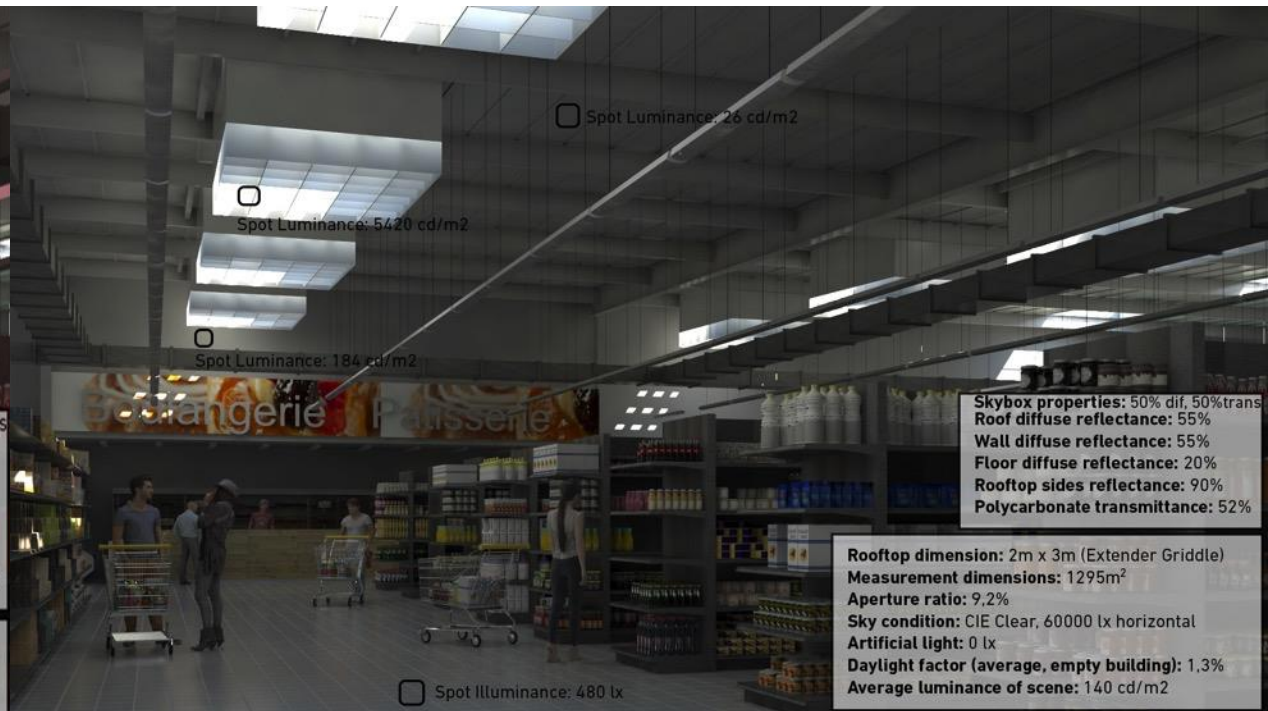
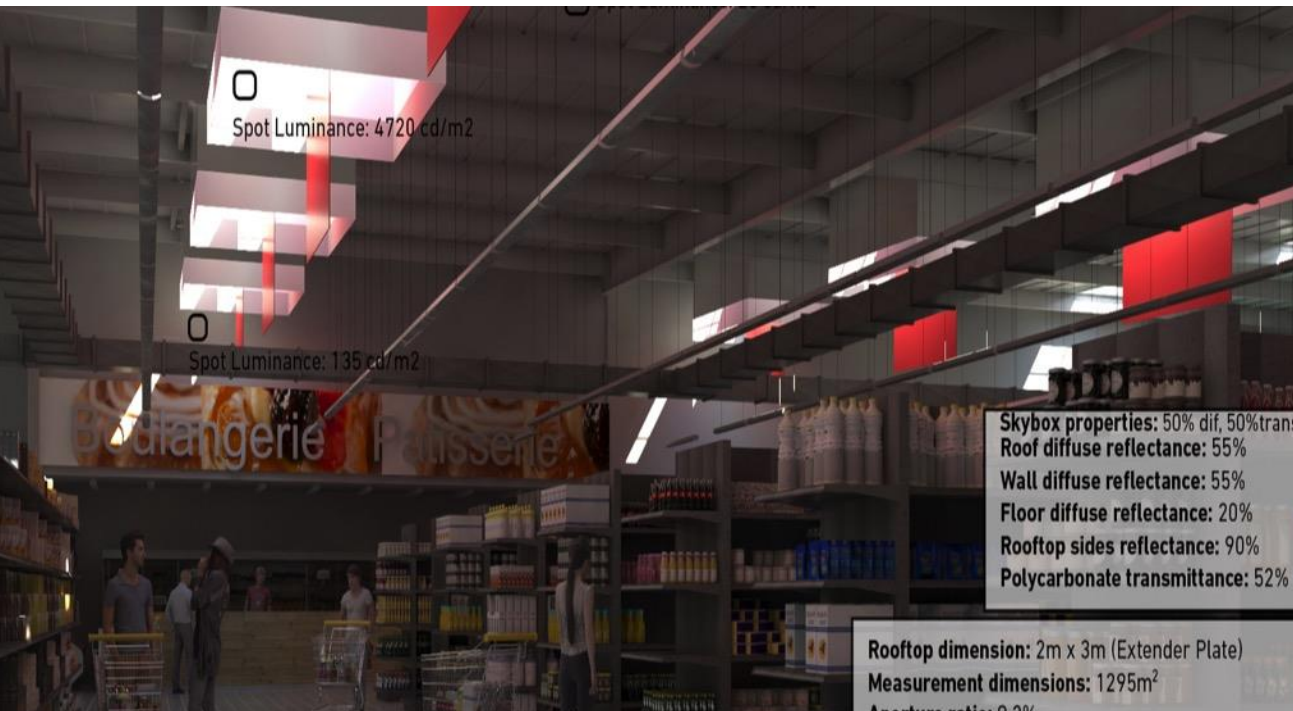


And borrowed
light solutions

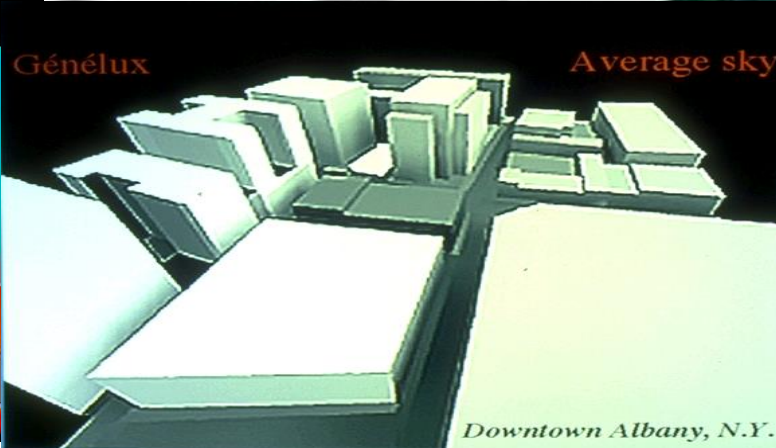
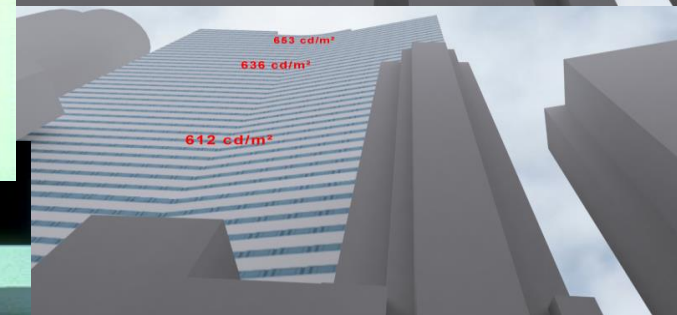
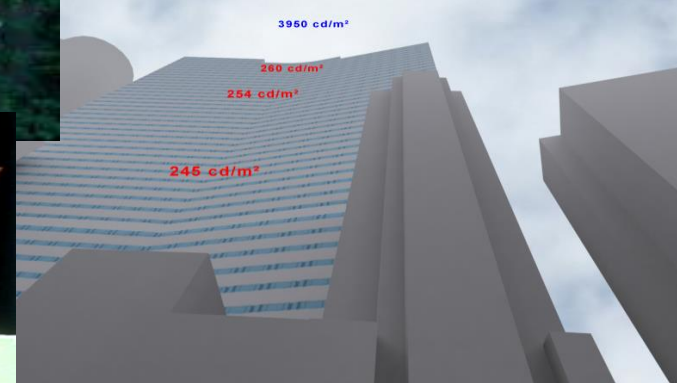
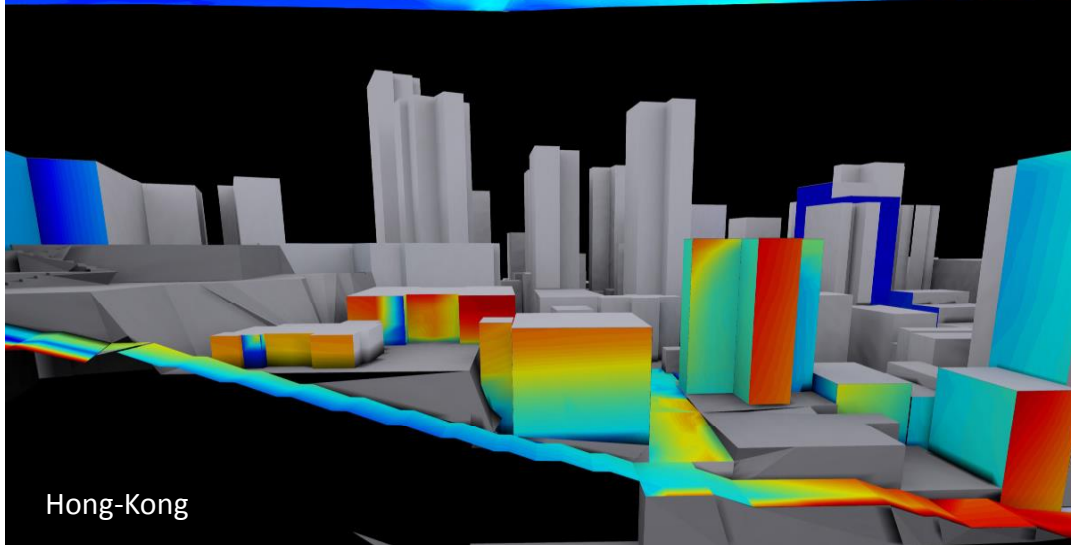
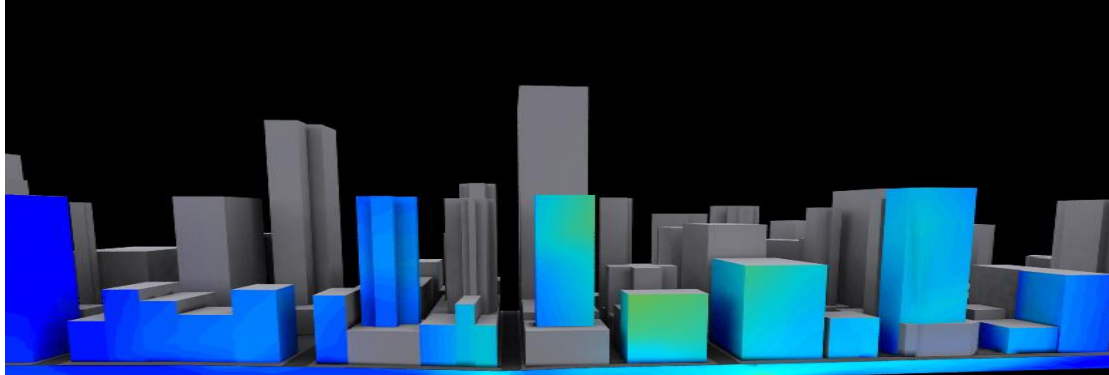




Exploration on the effect of balcony sizes in relation to daylight penetration in apartments, and duration of sunlight penetrations



Exploration of various alternatives to improve status of roof tops in supermarkets



Assessment of daylight availability in dense urban areas, study of impacts of construction schemes.

Marc Fontoynt, 2006-2009
Albany, NY, USA
Wanchai, Hong Kong,

Expected impact

Adjustment and **homogenization** of presentation of performances by window manufacturers

Allowing building clients/owners **to write specifications** with various levels of performances

Raise interest around the potential of daylighting

Involve **software developers, labelling** organizations

Actions to conduct

Bring stakeholders together during workshops and present successful and convincing **case studies**

Establish a **monitoring** of the impact of the standard on building construction in the next 10-20 years.



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Final voting by countries in process until 28 June,
Translation in German and French and other languages in process
Integration of some aspects of EN 17037 in Danish BR18 – Kjeld Johnsen,
SBI-AAU

