RAHVUSVAHELINE KONVERENTS LIGINULL
NOVEMBER 14, 2018

TERVISLIK SISEKLIIMA, PÄEVAVALGUS JA EUROOPA TERVISLIKE KODUDE RAPORT

Healthy Indoor Climate, Daylight and the European Healthy Homes Barometer

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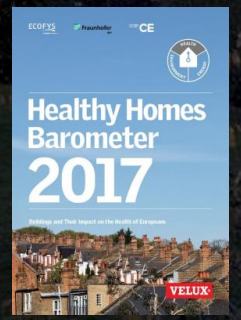


HOW TO CREATE HOMES FOR THE INDOOR GENERATION ?

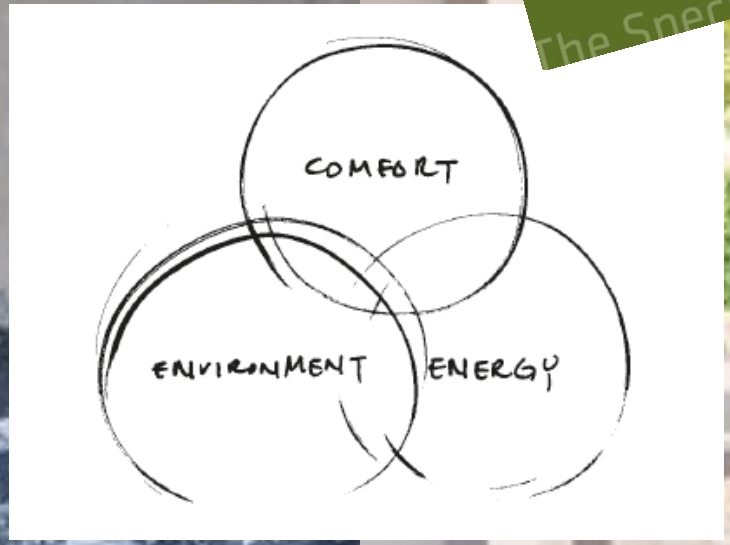
of our time is spent indoor; our homes (2/3 of this time), at workplaces, schools, and other public spaces.

WHO Europe (2014)


160 SEKUNDI PÄRAST OTSUSTATE, KUIDAS SEE LUGU LÕPEB

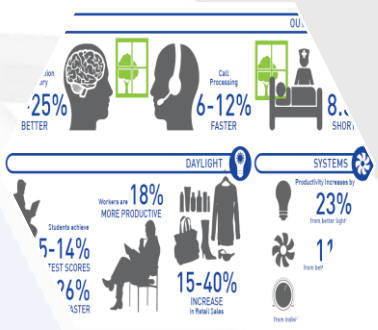
COMFORT, ENERGY AND ENVIRONMENT

Our definition of a healthy home relies on knowledge, inherited from the Active House concept



The vision of Active House is to create buildings that offer better comfort and healthier indoor conditions without impacting negatively on the climate.

Sleep, Work, Live
- Healthy Living Around the Clock



The environment can positively influence productivity and well-being

Healthy light is linked to healthy darkness at night

Human well-being relies on regular exposure to light and dark each day.

SLEEP, WORK, LIVE
- Healthy Living Around the Clock

The environment in the bedroom has a huge impact on our health and wellbeing

The daily light dose received might be too low.

Our biology responds to light intensity,duration, timing, and spectrum

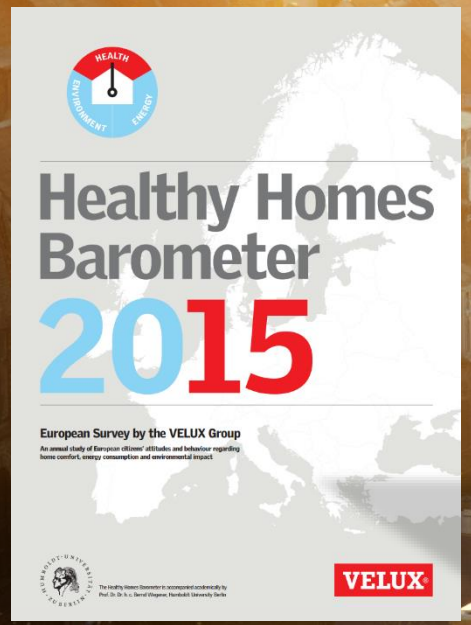
In 2004, CIE promulgate five "principles of healthy lighting" (CIE, 2004/2009), and the same report also suggested that these principles should lead to a renewed emphasis on architectural daylighting

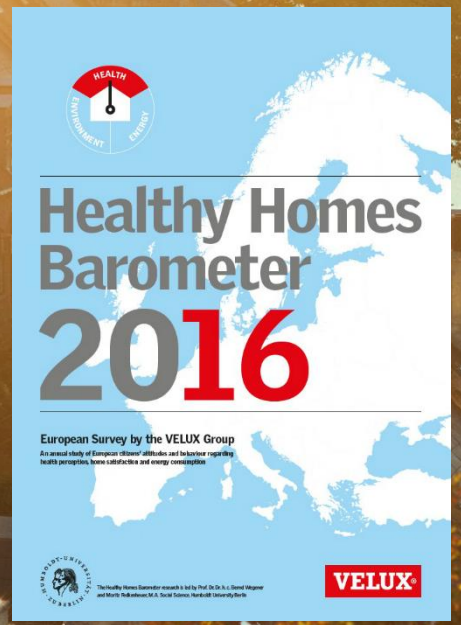
HEALTHY HOMES BAROMETER

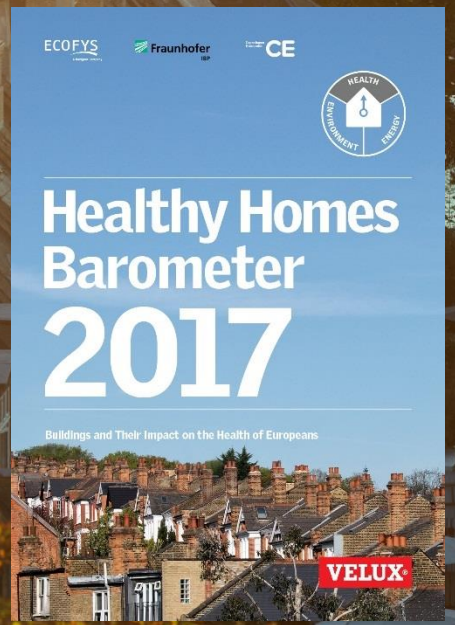
2015 2016 2017 2018

1st & 2nd Healthy Homes Barometer (2015/16) was a questionnaire-based survey and 12-14.000 Europeans replied. It ensure statistical representation, and represent more than 430 million Europeans.

3rd & 4th Healthy Homes Barometer (2017/18) use Eurostat SILC database (Survey on Income and Living Conditions) to show the correlation between the health of an inhabitant and the building's state. It is based on 250.000 adults (+16) and 100.000 households across all EU Member States.



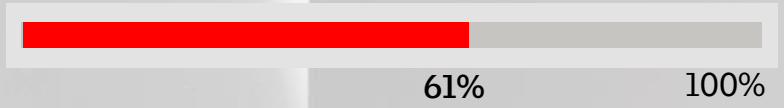




REAL LIFE STATUS

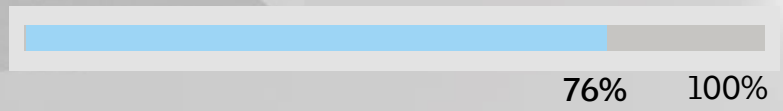
VELUX®

What we want

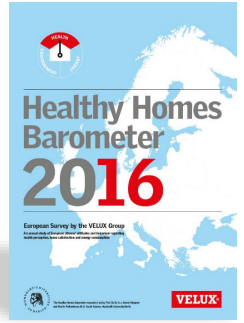


- 61% of all Europeans rank daylight and fresh air as the most or second most important in relation to their health.

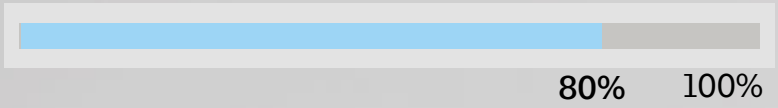
How it is



- 76% of the Europeans report that they need to turn on the light during the day when it is daylight outside.

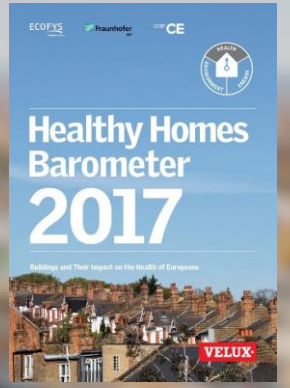


- 20% of the Europeans say that they are too dependent on artificial light during the day.

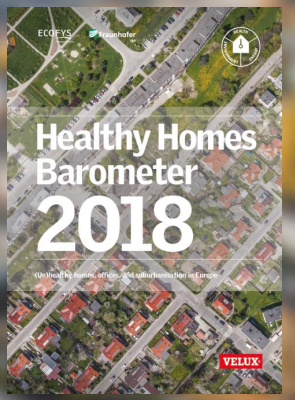


- .... but 80% of all Europeans express above average satisfaction with the amount of daylight in their current home.

The Healthy Homes Barometer 2017 is the first report to use detailed statistical data from Eurostat SILC (Survey on Income and Living Conditions) to show the correlation between the health of an inhabitant and the building's state.

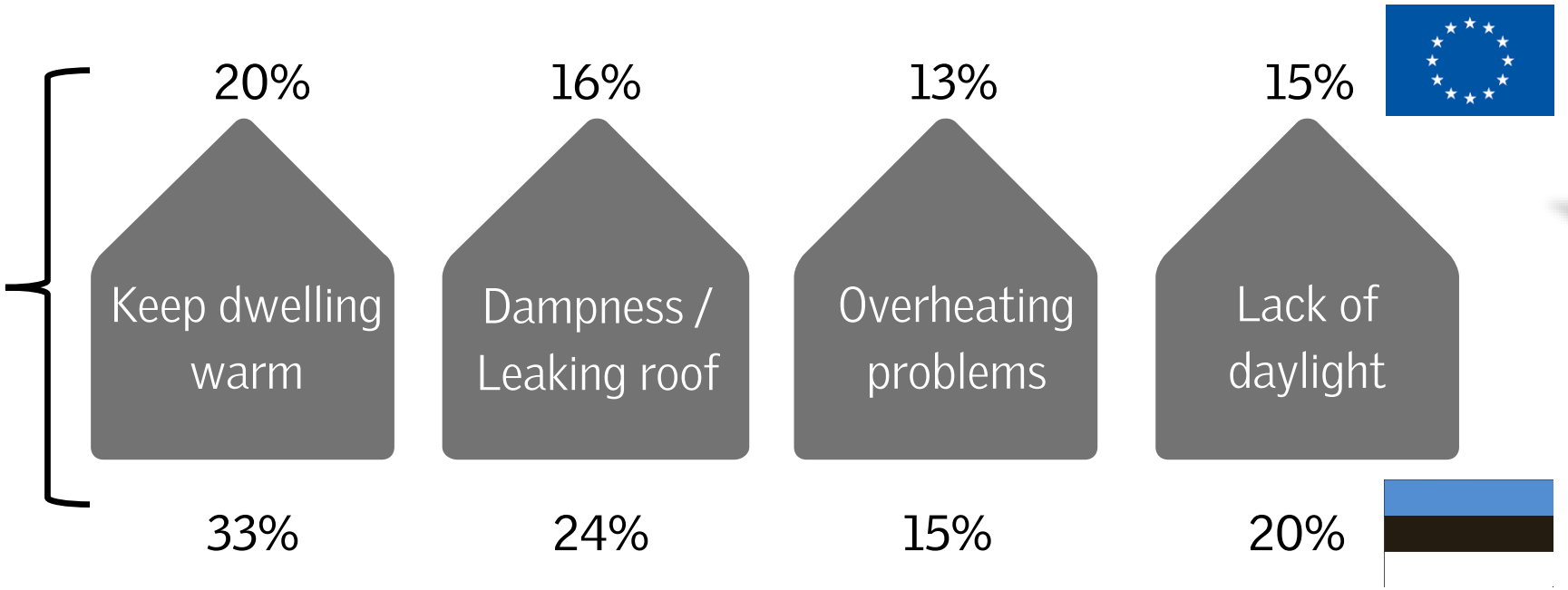


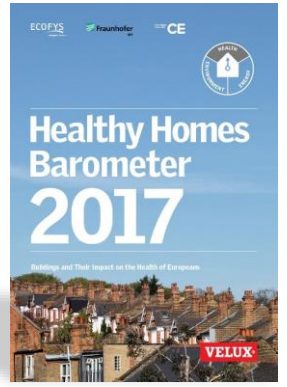
This year's study continue 2017 to further demonstrates just how important our suburban areas are to achieve a healthier building stock, as well as also offices and buildings where we spend our working days

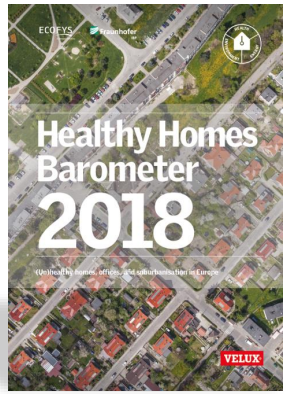


ACCORDING TO EU SILC DATA, THE DESCRIPTION OF UNHEALTHY BUILDINGS IS BASED ON

Share of Europeans reporting poor health, if:



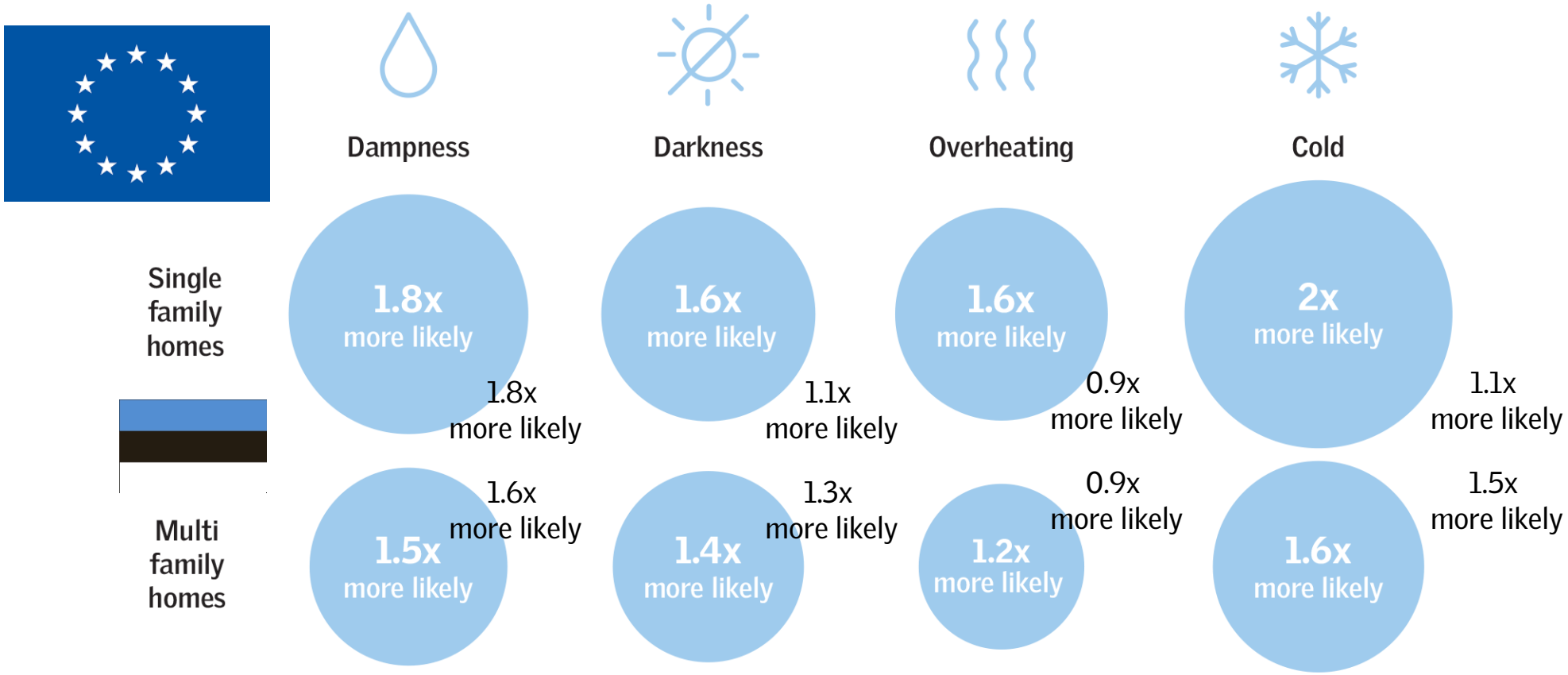




Residence in Europe who reports living in unhealthy buildings, i.e. buildings that have damp (leaking roof or damp floor, walls or foundation), lack of daylight, 'inadequate' heating during the winter or overhating problems, report poor health

SINGLE-FAMILY HOMES ARE KEY TO ADDRESSING HEALTH

In all cases, single-family homes (SFHs) with deficiencies are more likely to have a negative impact on health than multi-family homes (MFHs).



COLD HOMES ARE THE MOST DAMAGING

The most damaging deficiency from a health perspective is having a home that is too cold in winter, which, if you live in a single-family home, means you are twice as likely to report poor health.

x2

Twice as many Europeans report poor health

x2

Twice as many Europeans report lack of daylight

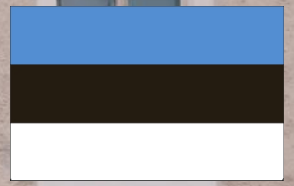
x3

Almost three times as many Europeans report dampness

Should we focus on the existing building stock which are unhealthy and start making healthy buildings ?

1/6

Europeans live in unhealthy buildings

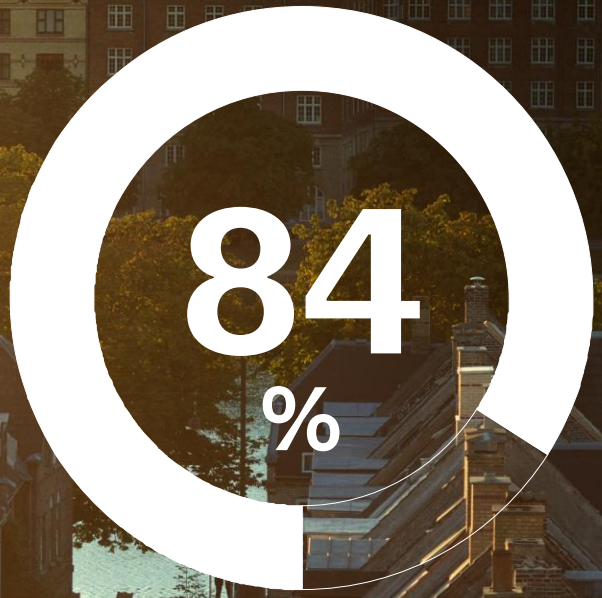


About 1/5 Estonians live in unhealhty buildings

PRIVATE HOMEOWNERS ARE KEY TO INCREASE RENOVATION RATE

110 million

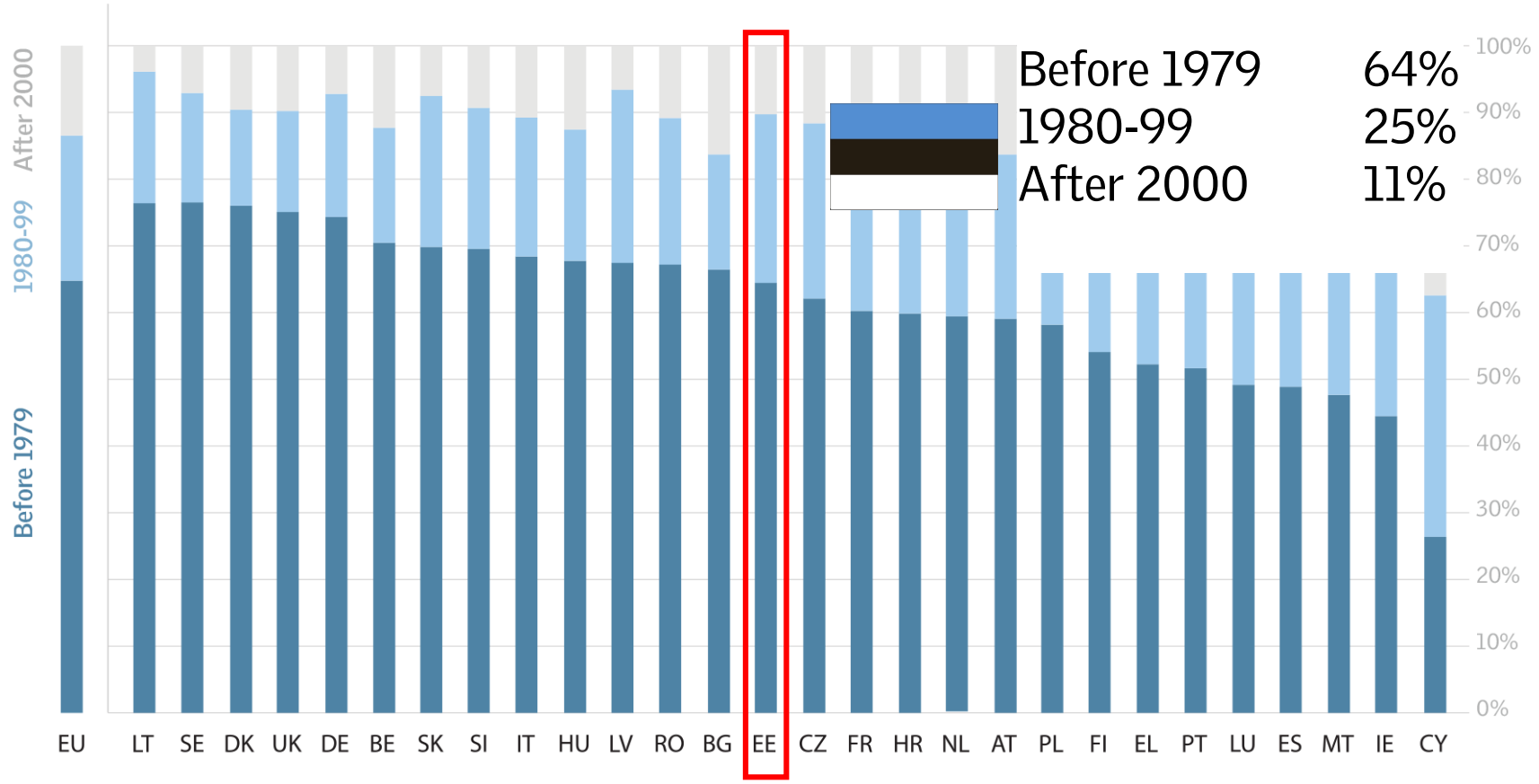
is the number of single-family homes in Europe; 160,000 in Estonia



of single-family homes are privately owned, 82% in Estonia

OLD RESIDENTIAL STOCK

In most EU countries, about two thirds of the residential stock was built before the first European thermal building regulations came into effect (i.e. before 1979)



EU Buildings Database: https://ec.europa.eu/energy/en/eu-buildings-database

THE RENOVATION CHALLANGE

Overcoming barriers

Renovations can be challenging at the best of times. In order to increase the renovation rate we must address the most common barriers faced by homeowners, while shaping effective policies.

Only 1-2%
of the building stock is renovated each year

3 out of 4 European buildings are not energy efficient

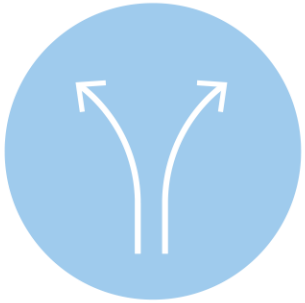
BARRIERS TO RENOVATION

If we are to increase the renovation rate, we need to work to address these barriers.

lack of available and understandable information regarding the efficiency and comfort benefits resulting from renovation.

in smaller renovations, the costs involved in initiating the project and finding suitable contractors can be disproportionately large.

Information failures



Split incentives

especially in rented accommodation, tenants are unlikely to renovate because their incentive is time-limited; landlords are unlikely to renovate because they do not see themselves as immediate beneficiaries of the investment.

High transaction costs

Capital market failures

especially in light of the 2008 financial crisis, lenders are less active in facilitating this type of investment, and there is a lack of available information about financing.

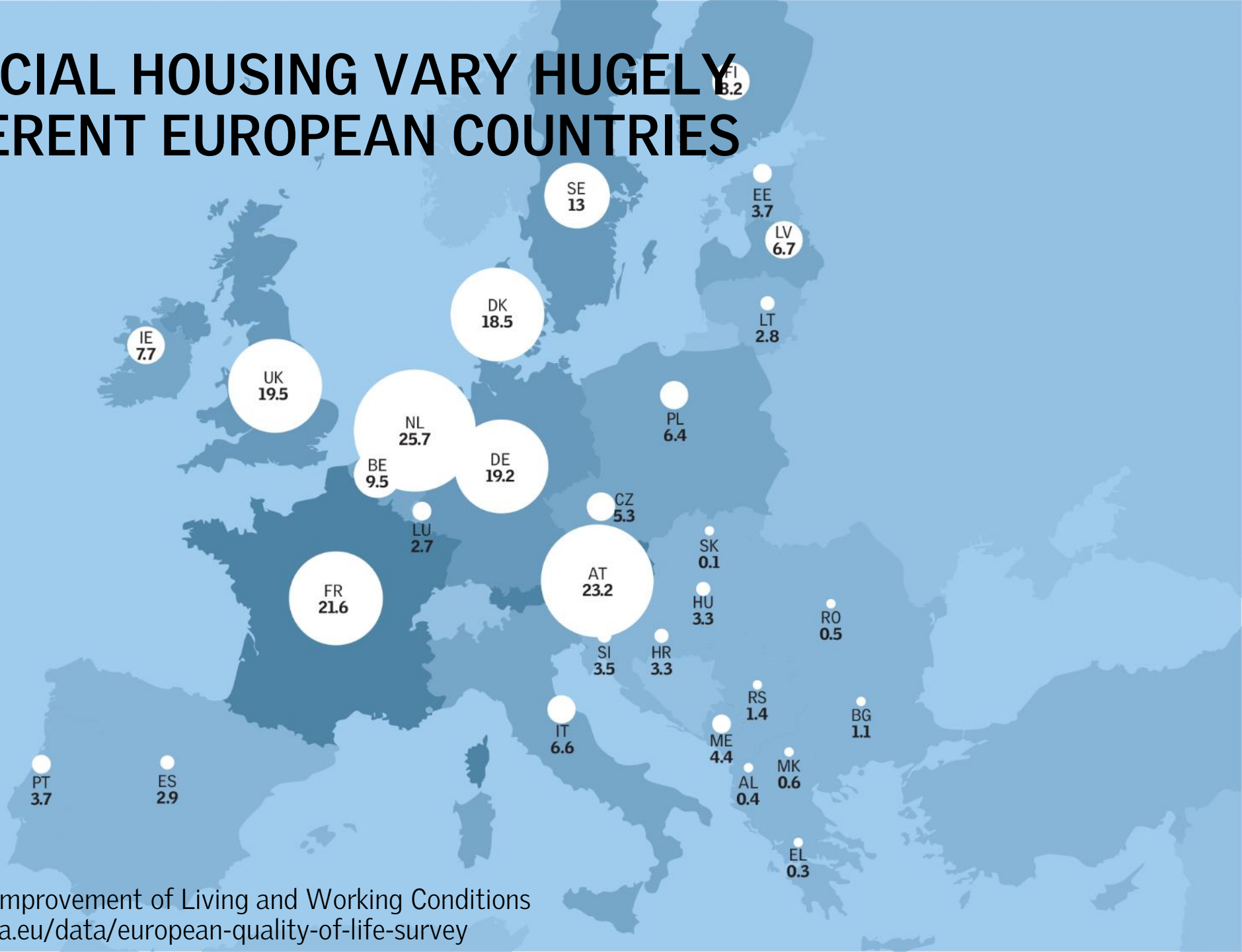
Impact Assessment for the Energy Efficiency Directive 2016:
https://ec.europa.eu/energy/sites/ener/files/documents/1_en_impact_assessment_part1_v4_0.pdf

SOCIAL AND AFFORDABLE HOUSING
Renovating for life

People with lower available income are more likely to be tenants than homeowners, or to live in social or municipal accommodation. Strategies that catalyse renovation in this sector are a win-win, with huge potential benefits for societies and individuals.

LEVELS OF SOCIAL HOUSING VARY HUGELY ACROSS DIFFERENT EUROPEAN COUNTRIES

% of population living in rented social, municipal, or non-profit housing



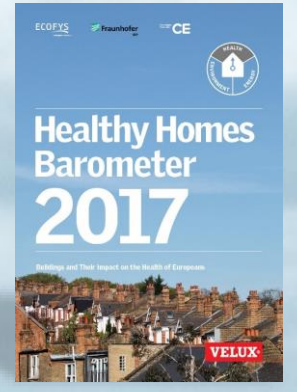
European Foundation for the Improvement of Living and Working Conditions
https://www.eurofound.europa.eu/data/european-quality-of-life-survey

RENOVACTIVE: A CASE STUDY IN BUDGET-FOCUSED RENOVATION

- Improved health: residents state that they have better sleep quality, fewer sick days, and less need for medication.
- Indoor air quality, with controlled natural ventilation, is high – CO2 levels in all the main rooms remain below 1,150 ppm.
- No overheating in summer: indoor temperatures are usually below 26°C in all main rooms.

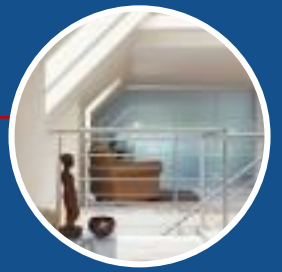
LOW DAYLIGHT PROVISION ACROSS EUROPE

- About 6% of all European households report living in a dark home
- And when the household is dark, they are 52% more likely to report poor health when compared to households not living in a dark home.



The proposal for a European Daylight Standard could bring a 'brighter' future and ensure that our homes have better daylight conditions

CEN Daylight Standard (EN 17037)



Daylight

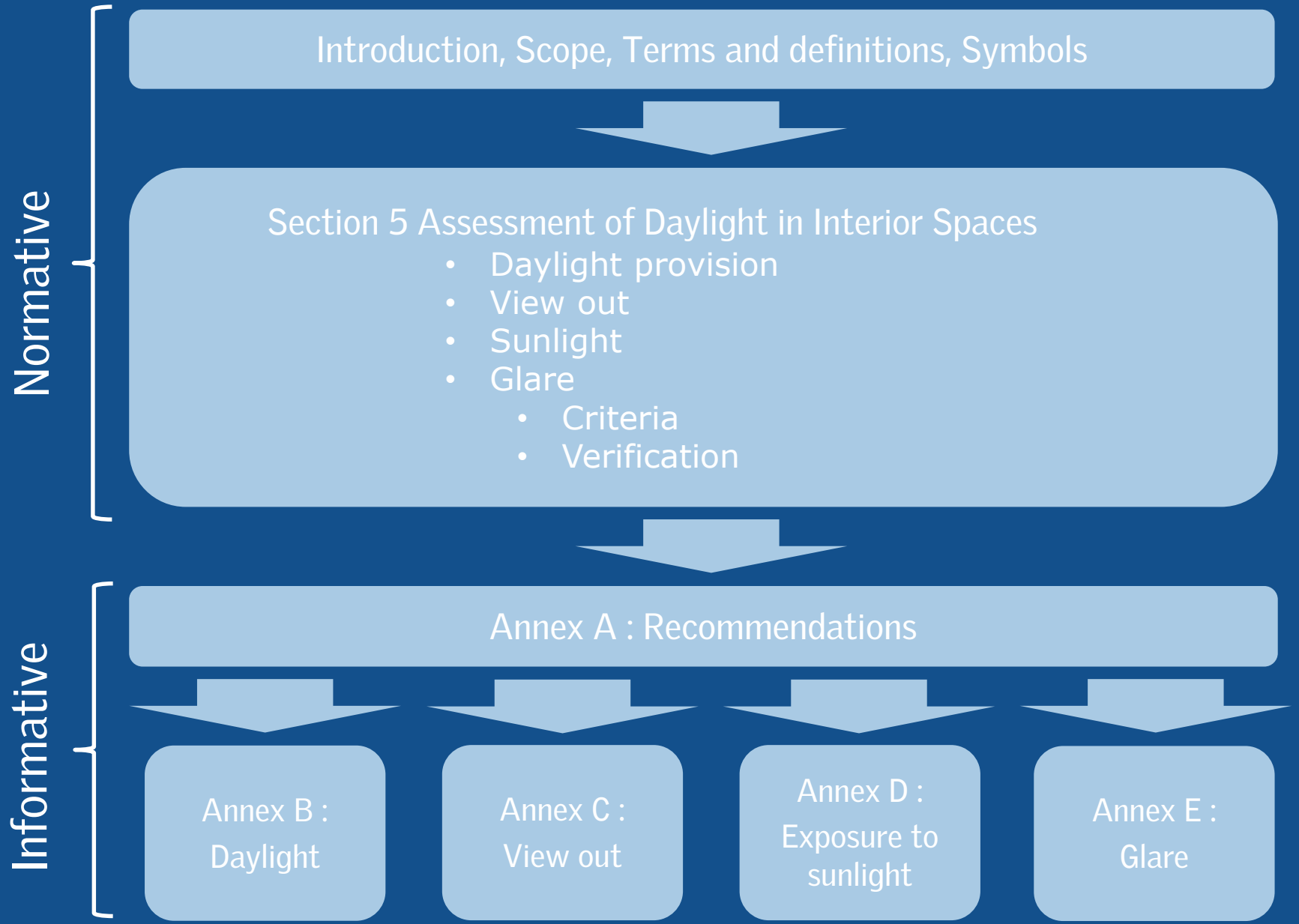
View

Sunlight

Glare

Applies to all spaces (e.g workplaces and dwellings)

CEN Daylight Standard (EN 17037)



CEN Daylight Standard (EN 17037)

- Daylight recommendation for openings in the façade

The target Daylight Factor (D_T) is based on internal illuminance of 300 lux and the external diffuse horizontal illuminance at the location of interest.

Daylight design should achieve a target daylight factor (D_T) across a fraction of the relevant floor area (i.e. 50% vertical) and the minimum target daylight factor (D_{TM}) should be achieved across 95% of the area.

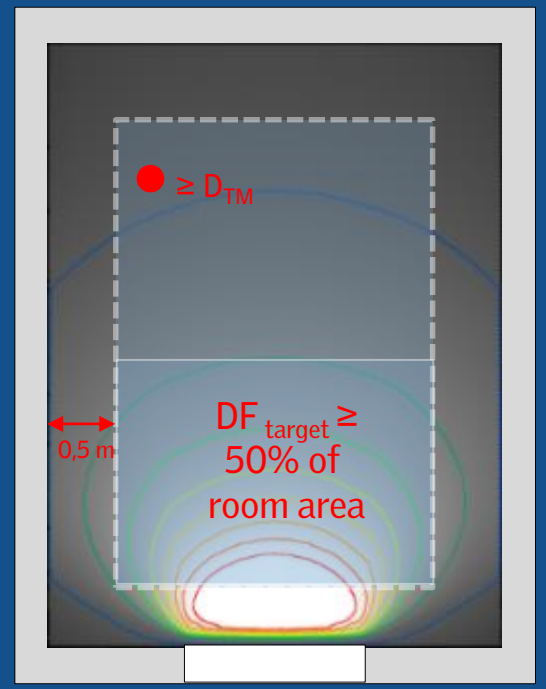
Estonia
Tallin

$$D_T = \frac{Internal}{External} = \frac{300 \cdot 100}{13.600} = 2{,}2\%$$

$$D_{TM} = \frac{Internal}{External} = \frac{100 \cdot 100}{13.600} = 0{,}7\%$$

City	Internal lux	External lux	D_T %	D_{TM} %
Tallinn	300	13.600	2,2%	0,7%
Paris	300	15.900	1,9%	0,6%
Rome	300	19.200	1,6%	0,5%

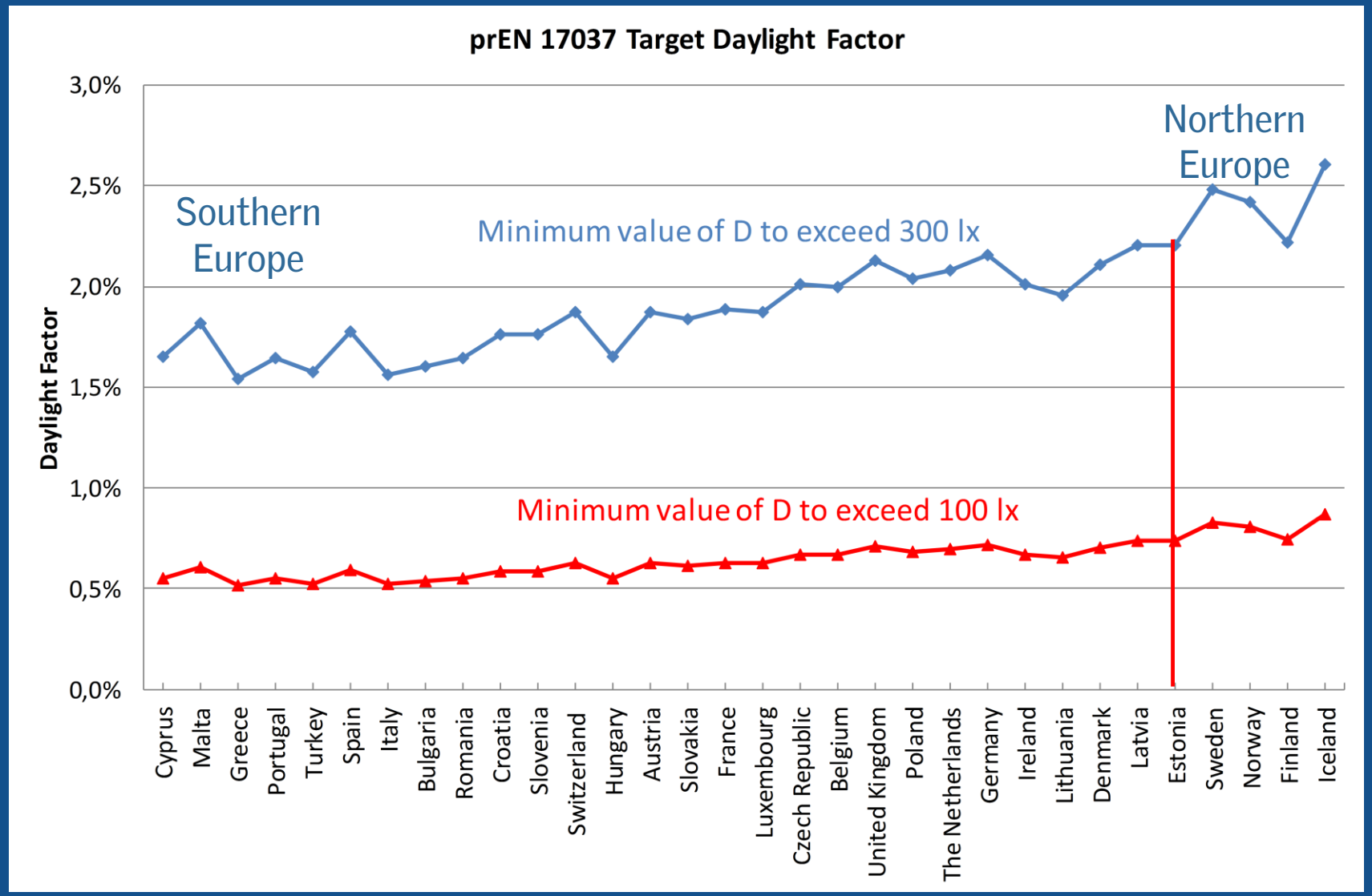
Vertical façade windows



PLAN

CEN Daylight Standard (EN 17037)

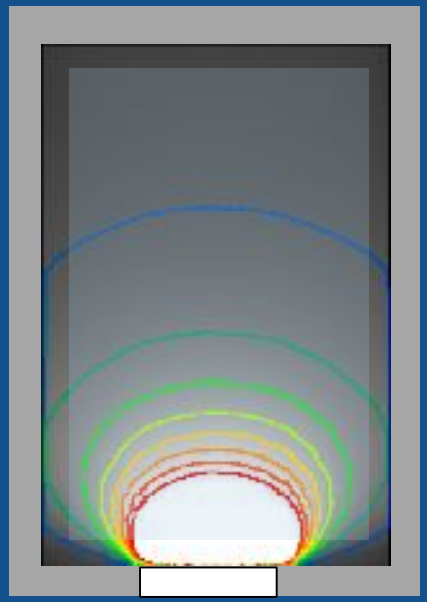
- Daylight recommendation for openings in the façade and roof



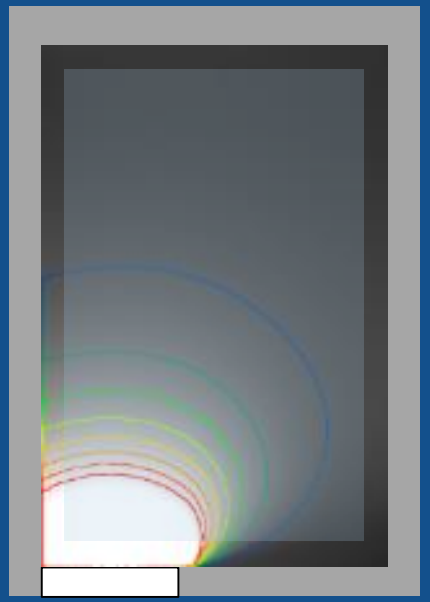
The proposed methodology for daylight provision require only a modest enhancement to existing practice.

CEN Daylight Standard (EN 17037): $D_T \geq 2.0\%$

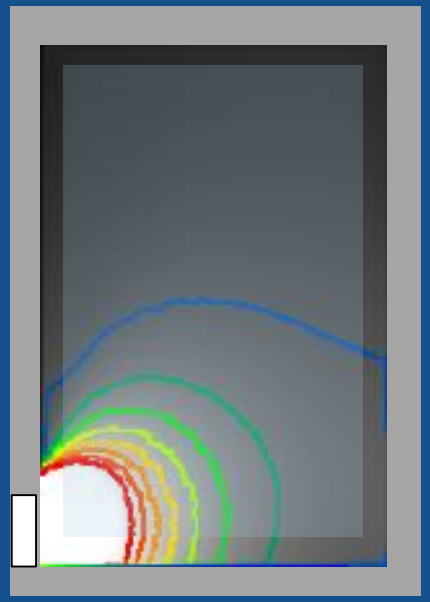
- Daylight recommendation for façade windows and roof windows



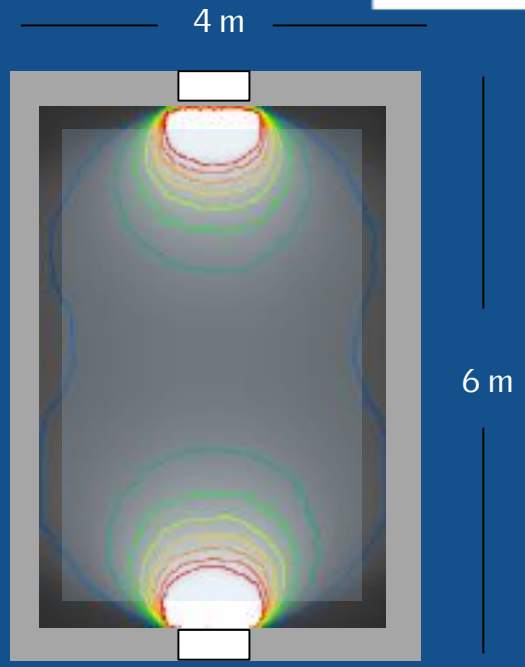
Daylit area ≥ 41%
Window 1,73x1,73
W/floor = 1:8



Daylit area ≥ 23%
Window 1,73x1,73
W/floor = 1:8



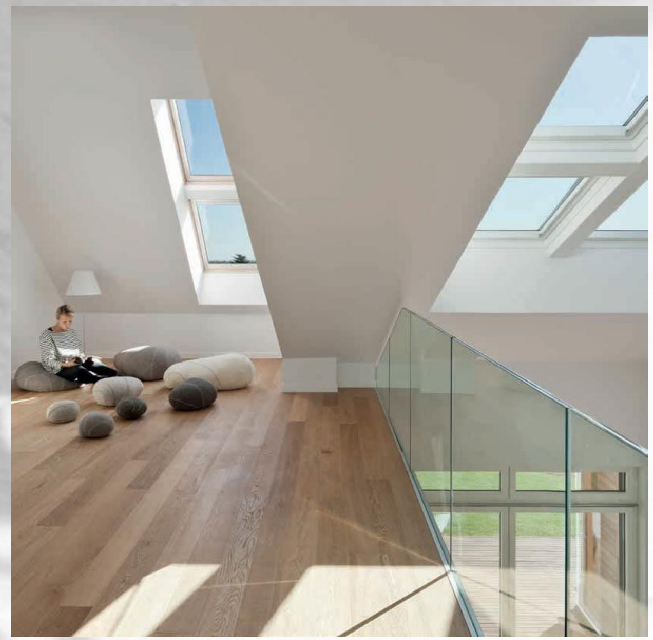
Daylit area ≥ 21%
Window 1,07x2,8
W/floor = 1:8



Daylit area ≥ 38%
Windows(2) 1,0x1,5
W/floor = 1:8

The examples shows that daylight performance for the same window-to-floor ratio (1:8) can vary significantly, giving a percentage daylit area [DF ≥ 2.0%] from 21% to 41%.

And in this case; the window need to be increased ! (or the location of the space is more southern)



MAISON AIR ET LUMIÈRE

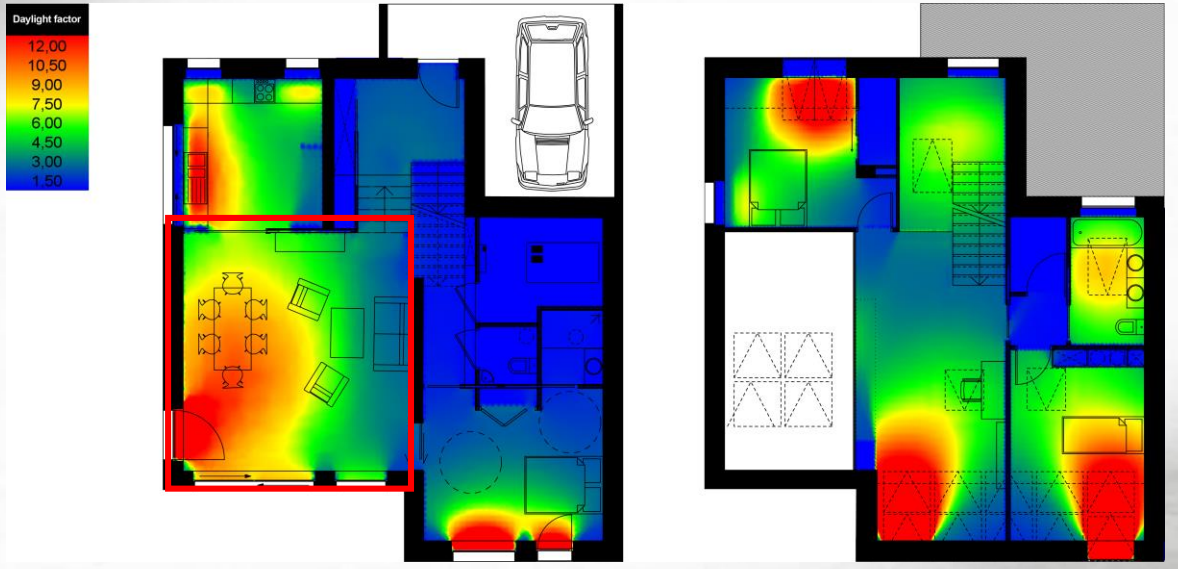
- Maison Air et Lumière (2011) revolves around natural light and ventilation.
- The window-to-floor ratio is 1:3.

DAYLIGHT PERFORMANCE: prEN 17037

France
Paris

$$D_T = \frac{Internal}{External} = \frac{300 \cdot 100}{15.900} = 1{,}9\%$$

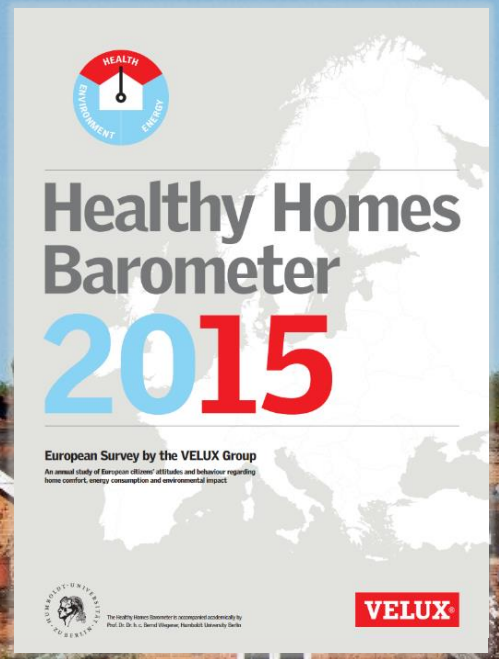
$$D_{TM} = \frac{Internal}{External} = \frac{100 \cdot 100}{15.900} = 0{,}7\%$$

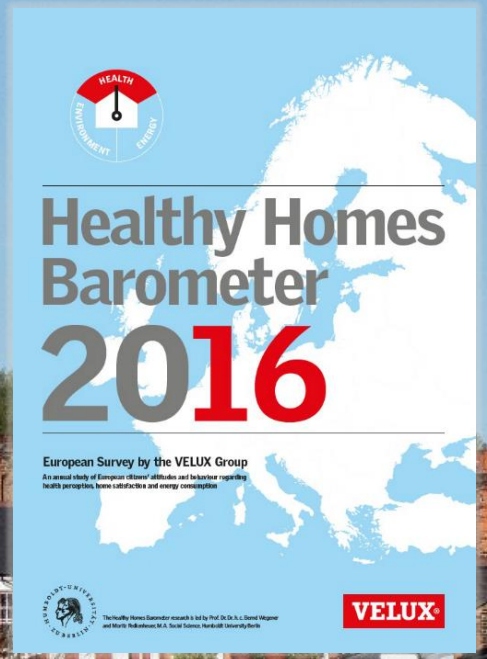


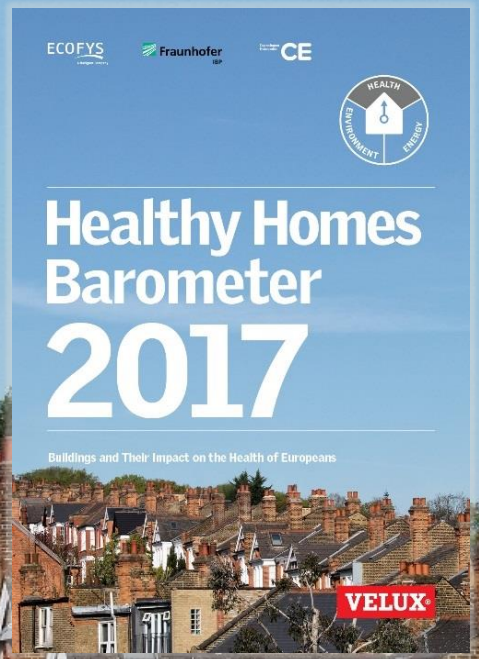
Maison Air et Lumière Daylight Analysis	Daylight factor results	
	prEN 17037 D_{300} (France, Paris: $D_{300} \geq 1{,}9\%$)	prEN 17037 D_{100} (France, Paris: $D_{100} \geq 0{,}6\%$)
Kitchen	5.2% D_{300} (pass)	2.9% D_{100} (pass)
Dining/living room	6.3% D_{300} (pass)	1.7% D_{100} (pass)
Study room	3.4% D_{300} (pass)	0.9% D_{100} (pass)
Bedroom 1	2.5% D_{300} (pass)	1.2% D_{100} (pass)
Bedroom 2	4.5% D_{300} (pass)	1.8% D_{100} (pass)
Bedroom 3	6.7% D_{300} (pass)	1.5% D_{100} (pass)

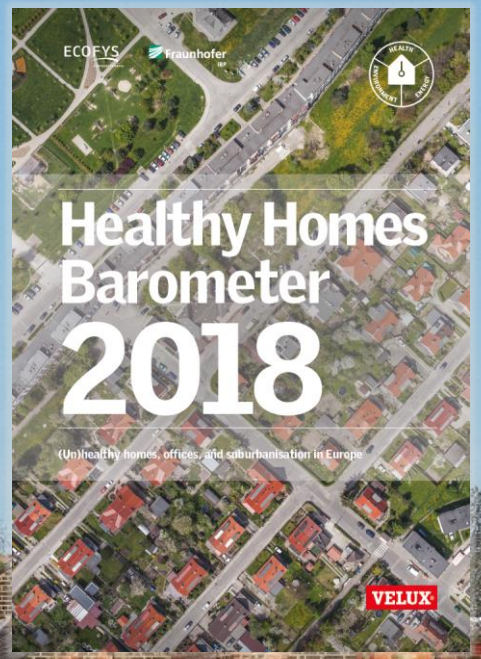
Vertical daylight opening

https://www.velux.com/hbd







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