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# Noi exigențe pentru cladirile viitorului. Conceptul de Casa Activa.

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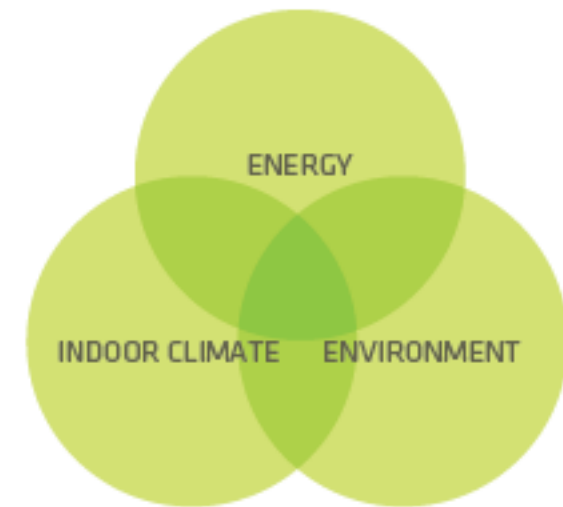
**Arh. Alexandra MAIER**

VELUX Romania

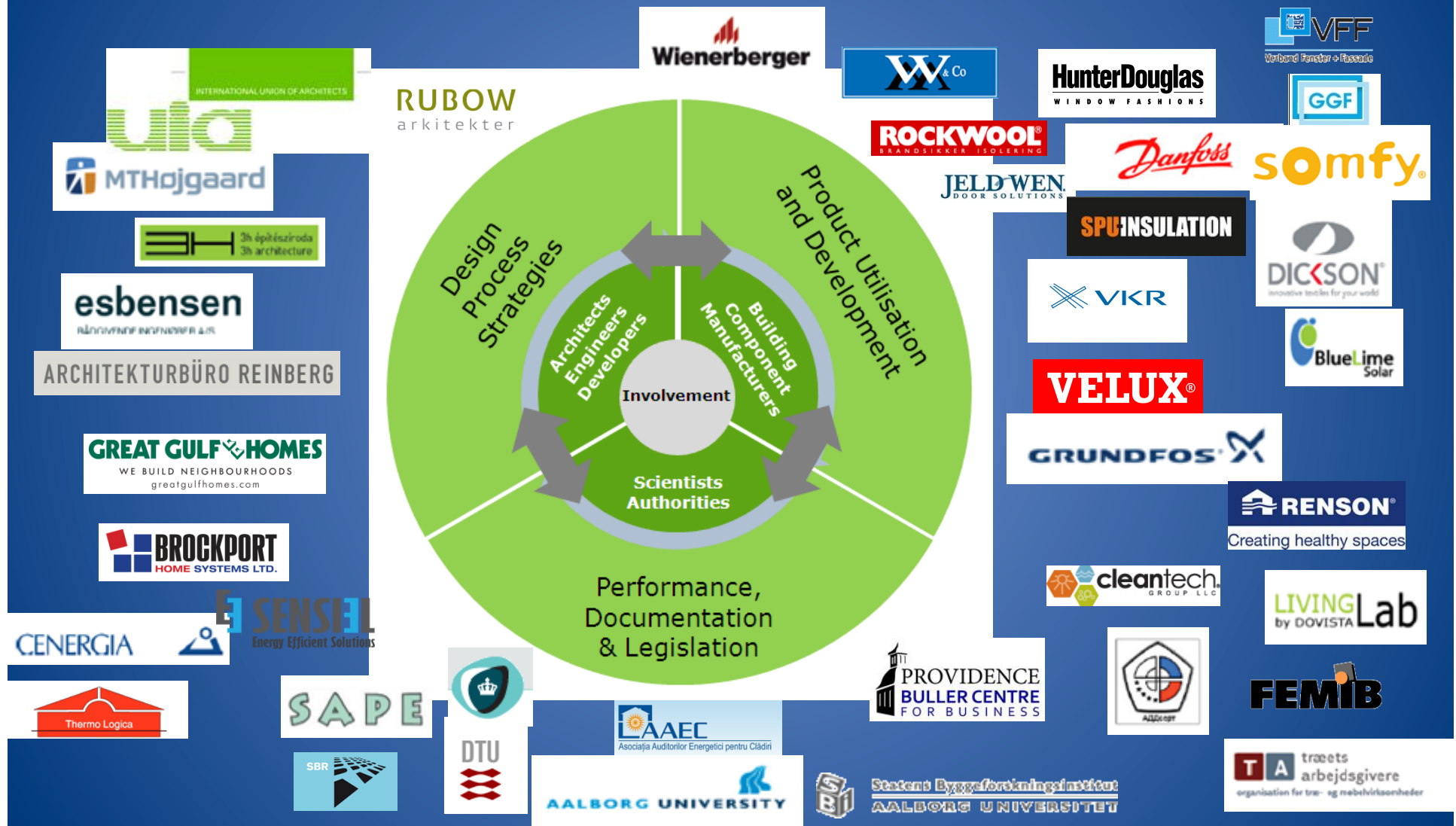
5/7/12, EURO-Constructii 2012, București

**Casa Activa** reprezintă viziunea holistică asupra echilibrului energetic, climatului interior și mediului înconjurător, vizând un stil de viață sănătos, responsabil și confortabil.

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# Grupul de parteneri ai Aliantei Casei Active



In competitia mondiala de sailing, pilotul echipei Around the World with ActiveHouse, Derek Hatfield, a terminat pe locul 4.



7 May 2012

# PROVOCAREA

Astăzi ne petrecem **90%** din timp în interior, în clădiri care sunt responsabile pentru mai bine de **40%** din consumul de energie.

Până la **30%** din totalul clădirilor nu contribuie la obținerea unui climat interior sănătos și nici nu oferă unul.

Casa activă reprezintă acea clădire care asigură un **climat sănătos și confortabil** pentru locatari fără a avea un impact negativ asupra mediului înconjurător.

Casa activă **iși produce singură energia necesară**, majoritar pe baza unor surse de energie regenerabilă care sunt fie înglobate în construcție, fie într-un sistem energetic colectiv aflat în apropiere.

**Impactul unei case active asupra mediului**, ținând cont de condițiile locale (materiale, surse de apă, vegetație, infrastructură, tradiții arhitecturale) și utilizând judicios resursele, **este pozitiv** pe parcursul întregului ciclu de viață al construcției.



# Care sunt factorii care vor fi diferiți la o Casa Activă față de una obișnuită?

**ENERGIE** – O Casa Activa este eficienta din punct de vedere energetic, iar energia de care are nevoie este produsa majoritar din resurse regenerabile.

- **Design optimizat, axat pe eficienta energetica**
- Utilizarea **solutiilor naturale** printr-o proiectare inteligenta pentru incalzire si racire
- Utilizarea **energiilor regenerabile**, fie integrate in cladire, fie, preluate de la sisteme colective din vecinatate
- Includerea energiei folosite la punerea in opera a materialelor si a emisiilor de CO<sub>2</sub> in calculul energetic total a cladirii
- **Evaluarea per m<sup>2</sup> si per locuitor**

# **CLIMATUL INTERIOR** – Casa Activa ofera un climat interior mai sanatos si un confort sporit gratie aportului generos de lumina si aer proaspat.

- Nivel ridicat de **lumina naturala**, aport solar cu evitarea riscului de stralucire/orbire
- **Aer interior de calitate** pentru confort fiziologic si acces la aer proaspat exterior
- **Confort termic** atat in sezonul cald, cat si in cel rece
- **Conceperea inteligenta a spatiilor interioare**, care sa incurajeze un climat interior sanatos
- Calculul **impactului materialelor folosite**, asupra climatului interior

# ***MEDIUL INCONJURATOR*** – Casa Activa

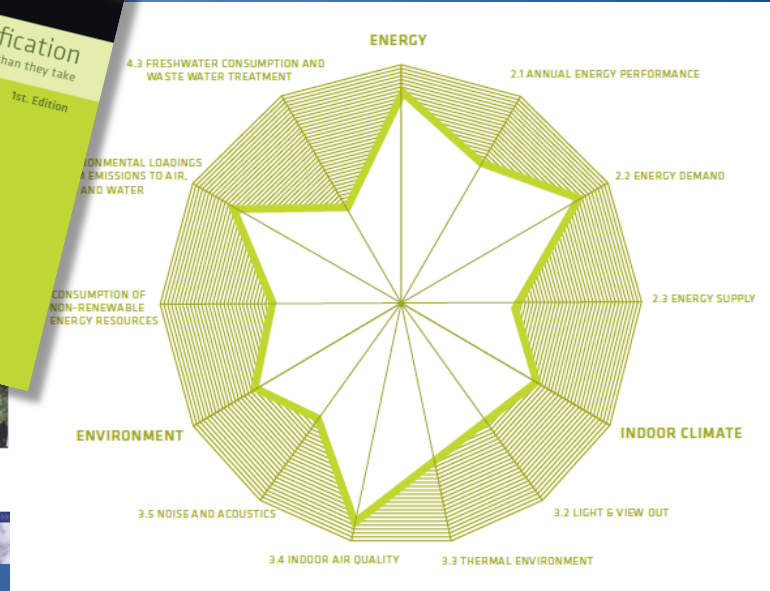
are un impact pozitiv asupra mediului inconjurator, printr-o abordare ecologica a intregului sau ciclu de viata.

- **Evaluarea materialelor folosite** la constructia cladirii, din punct de vedere al impactului asupra mediului
- **Utilizarea resurselor naturale**, cum ar fi apa de ploaie
- **Minimizarea deseurilor** rezultate in urma constructiei, intretinerii si a demolarii
- Luarea in calcul **a interactiunii cu infrastructura si conditiile locale** (de ex. transportul)

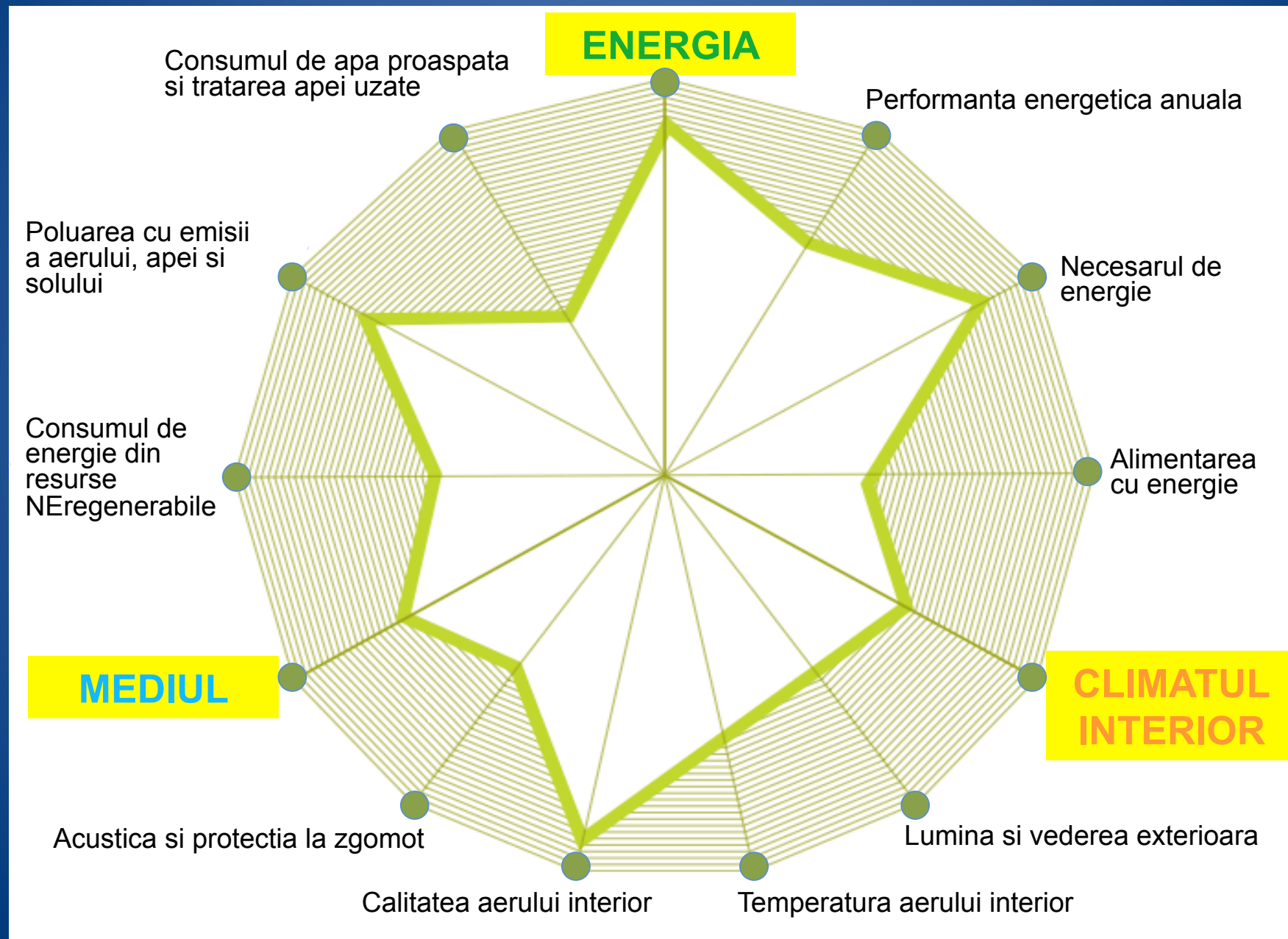


# Activities

Specification and demonstration



# Analiza multi-criteriala a performantei "casei active"



# ENERGIA

① Performanta energetica anuala

1:  $\leq 0$  kWh/m<sup>2</sup> for the building and appliances  
2:  $\leq 0$  kWh/m<sup>2</sup> for the building  
3:  $\leq 15$  kWh/m<sup>2</sup> for the building  
4:  $\leq 30$  kWh/m<sup>2</sup> for the building (modernization)

② Necesarul de energie

1:  $\leq 30$  kWh/m<sup>2</sup>  
2:  $\leq 50$  kWh/m<sup>2</sup>  
3:  $\leq 80$  kWh/m<sup>2</sup>  
4:  $\leq 120$  kWh/m<sup>2</sup> (modernization only)

③ Alimentarea cu energie

1: 100% of the energy is produced on the plot  
2: more than 50% of the energy is produced on the plot  
3: more than 25% of the energy is produced on the plot  
4: less than 25% of the energy is produced on the plot

④ Validarea energetica prin masuratori si monitorizare

# CLIMATUL INTERIOR

## ① Nivelul de exigenta pe categorii de cladiri

1. Pentru persoane foarte sensibile (bolnavi, batrani, copii mici)
2. Pentru cladiri noi si renovari majore
3. Pentru renovari moderate sau referinta pentru cladirile existente
4. Pentru cladiri mai vechi

## ② Lumina si vederea exterioara

- 1: DF > 5% on average
- 2: DF > 3% on average
- 3: DF > 2% on average
- 4: DF > 1% on average

- 1: At least 10% of probable sunlight hours.
- 2: At least 7,5% of probable sunlight hours.
- 3: At least 5% of probable sunlight hours.
- 4: At least 2,5% of probable sunlight hours.

## ③ Temperatura aerului

1.  $T_{i,o} < 0.33 \cdot T_{rm} + 20.8^{\circ}\text{C}$
2.  $T_{i,o} < 0.33 \cdot T_{rm} + 21.8^{\circ}\text{C}$
3.  $T_{i,o} < 0.33 \cdot T_{rm} + 22.8^{\circ}\text{C}$
4.  $T_{i,o} < 0.33 \cdot T_{rm} + 23.8^{\circ}\text{C}$

- 1:  $T_{i,o} < 25.5^{\circ}\text{C}$
- 2:  $T_{i,o} < 26^{\circ}\text{C}$
- 3:  $T_{i,o} < 27^{\circ}\text{C}$
- 4:  $T_{i,o} < 28^{\circ}\text{C}$

- 1:  $T_{i,o} > 21^{\circ}\text{C}$
- 2:  $T_{i,o} > 20^{\circ}\text{C}$
- 3:  $T_{i,o} > 19^{\circ}\text{C}$
- 4:  $T_{i,o} > 18^{\circ}\text{C}$

## ④ Calitatea aerului interior (poluanti, emisii, umiditate in exces)

1. 350 ppm above outdoor CO<sub>2</sub>-concentration
2. 500 ppm above outdoor CO<sub>2</sub>-concentration
3. 800 ppm above outdoor CO<sub>2</sub>-concentration
- 4: 1100 ppm above outdoor CO<sub>2</sub>-concentration

## ⑤ Acustica si protectia la zgomot exterior/interior

- 1: 25 dB(A)
- 2: 30 dB(A)
- 3: 35 dB(A)
- 4: 40 dB(A)

- 1: 20 dB(A)
- 2: 25 dB(A)
- 3: 30 dB(A)
- 4: 35 dB(A)

# MEDIUL

Efectele asupra mediului sunt evaluate **pe durata de viata a cladirii** (de ex. 75 ani), incluzand si energia inglobata in componentele principale ale constructiei si instalatiilor.

## ① Consumul de energie din resurse NE-regenerabile

1. The consumption of non-renewable PE during life cycle is below  $-150 \text{ kWh/ m}^2\cdot\text{a}$
2. The consumption of non-renewable PE during life cycle is below  $15 \text{ kWh/ m}^2\cdot\text{a}$
3. The consumption of non-renewable PE during life cycle is below  $150 \text{ kWh/ m}^2\cdot\text{a}$
4. The consumption of non-renewable PE during life cycle is below  $200 \text{ kWh/ m}^2\cdot\text{a}$

## ② Poluarea cu emisii a aerului, apei si solului

- Global warming potential (GWP) in  $\text{kg CO}_2\text{-eq. / m}^2\cdot\text{a}$
1. The global warming potential (GWP) during life cycle is below  $-30 \text{ kg CO}_2\text{-eq. / m}^2\cdot\text{a}$
  2. The global warming potential (GWP) during life cycle is below  $10 \text{ kg CO}_2\text{-eq. / m}^2\cdot\text{a}$
  3. The global warming potential (GWP) during life cycle is below  $40 \text{ kg CO}_2\text{-eq. / m}^2\cdot\text{a}$
  4. The global warming potential (GWP) during life cycle is below  $50 \text{ kg CO}_2\text{-eq. / m}^2\cdot\text{a}$

## ③ Consumul de apa proaspata si tratarea apei uzate

1. Rain water is used for watering the garden. Grey or rain water is used for toilets as well. Treated grey or rain water is used for the washing machine.
2. Rain water is used for watering the garden. Treated grey or rain water is used for the washing machine.
3. Rain water is used for watering the garden. Grey or rain water is used for toilets as well.
4. Rain water is used for watering the garten.

# Exemple de case active



Austria



Norvegia



Rusia

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Danemarca

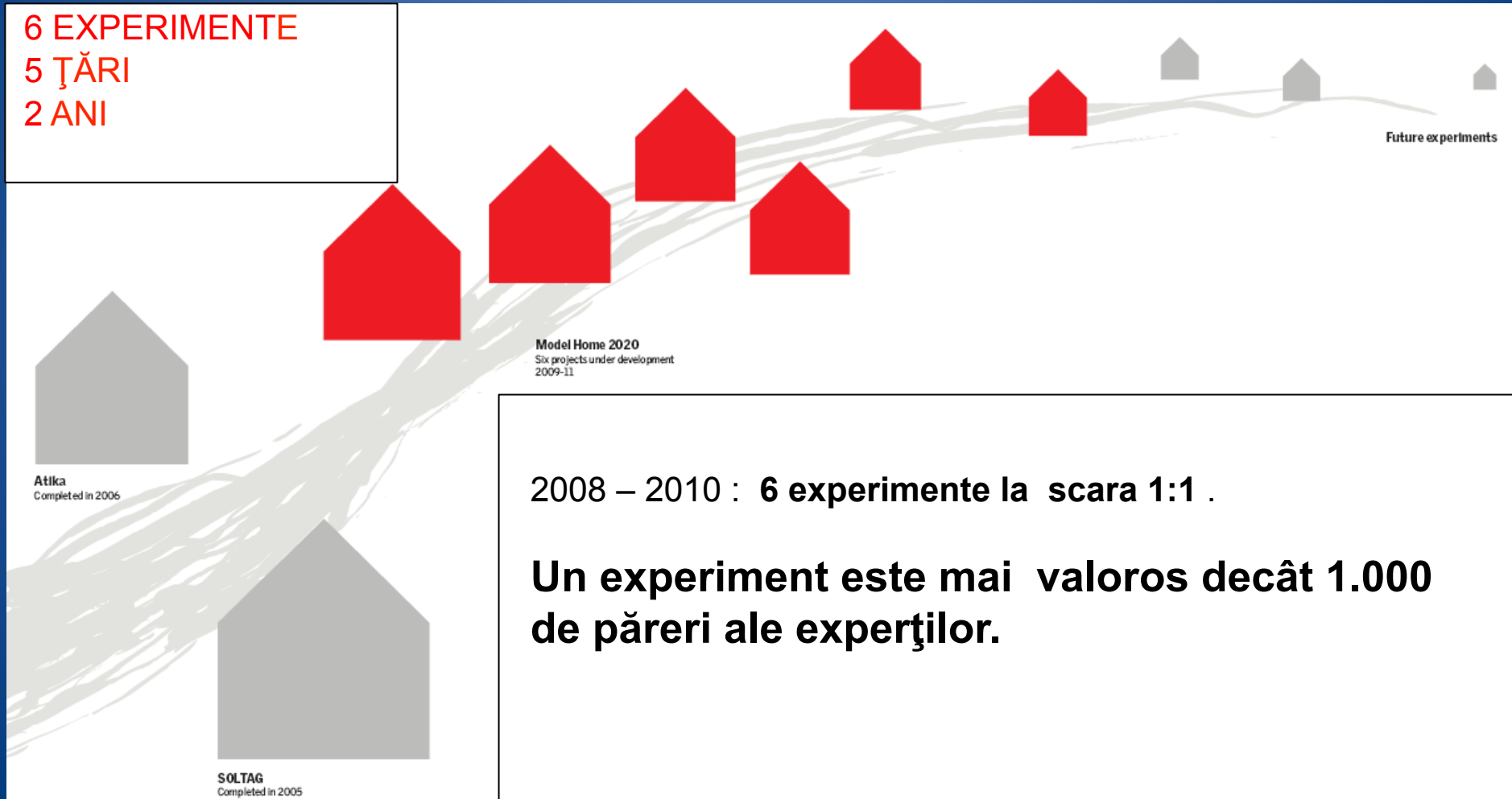


Olanda

# MODEL HOME 2020

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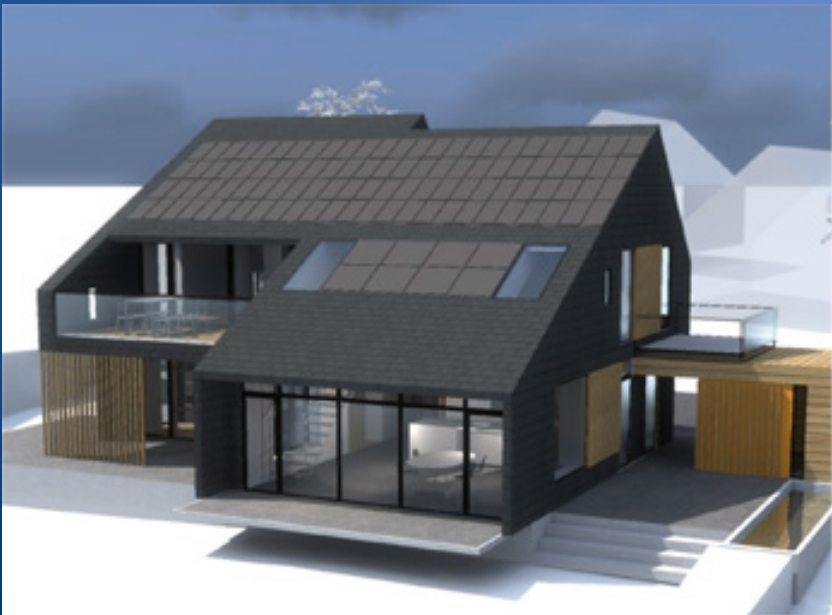
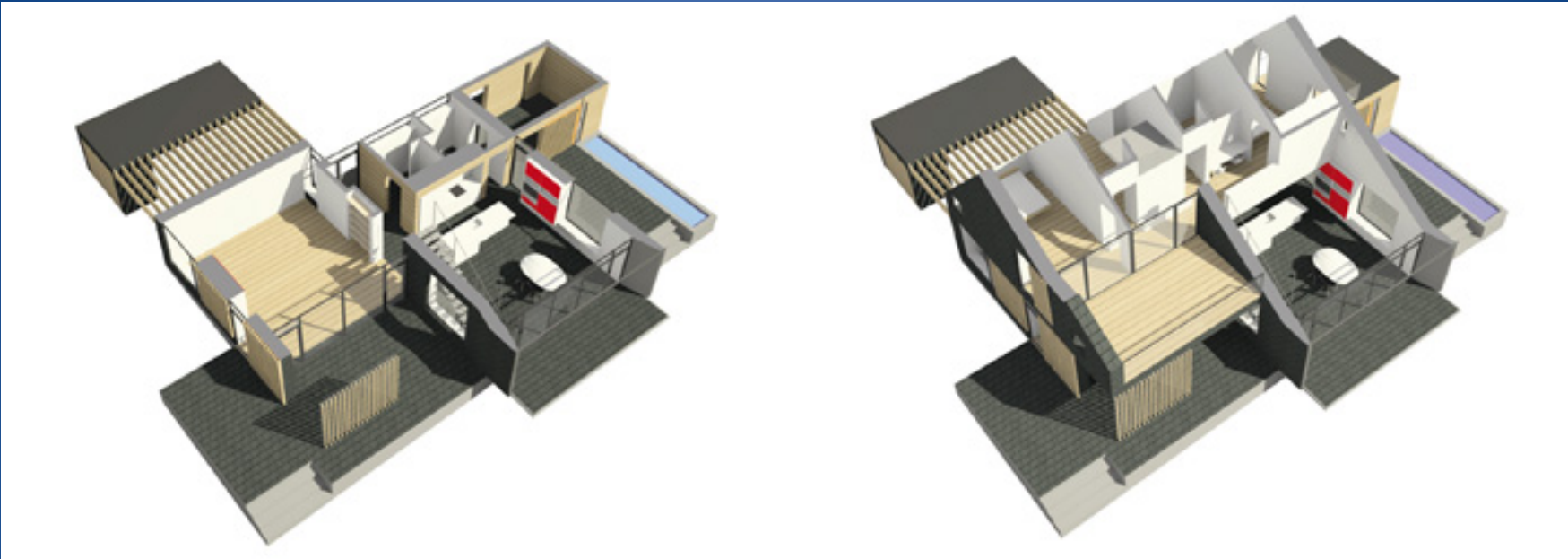
6 EXPERIMENTE  
5 ȚĂRI  
2 ANI



2008 – 2010 : **6 experimente la scara 1:1 .**

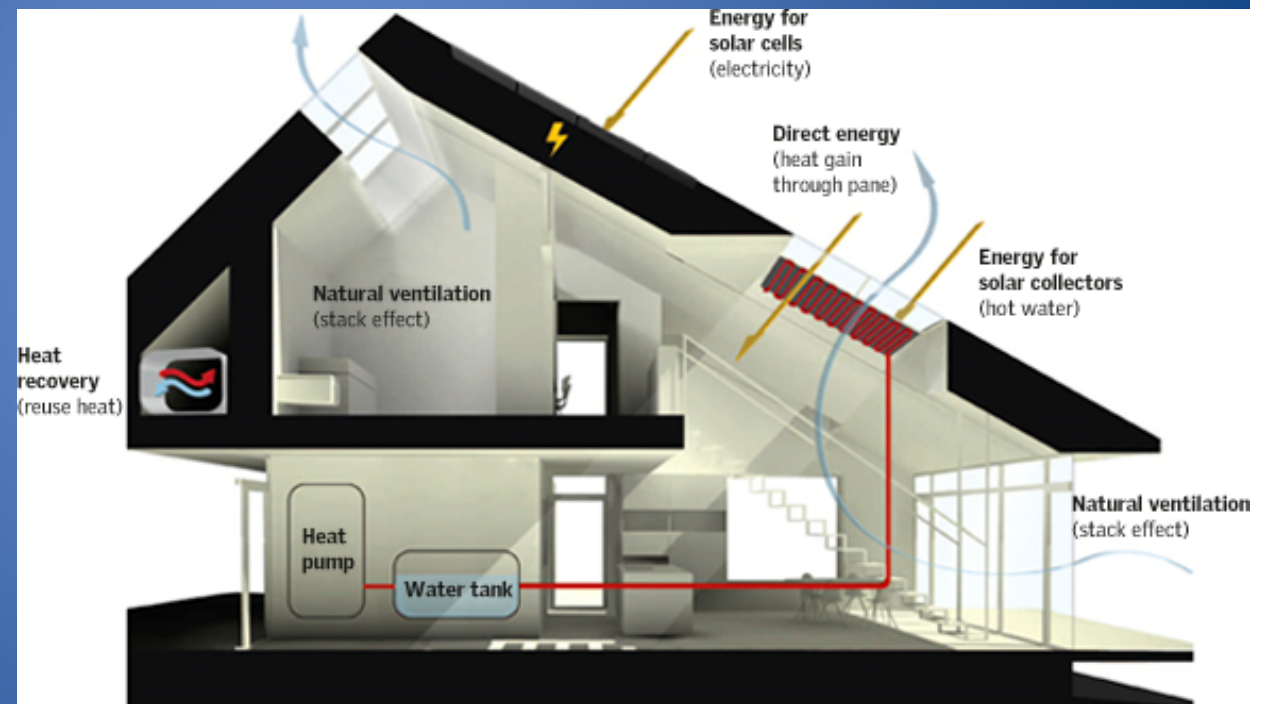
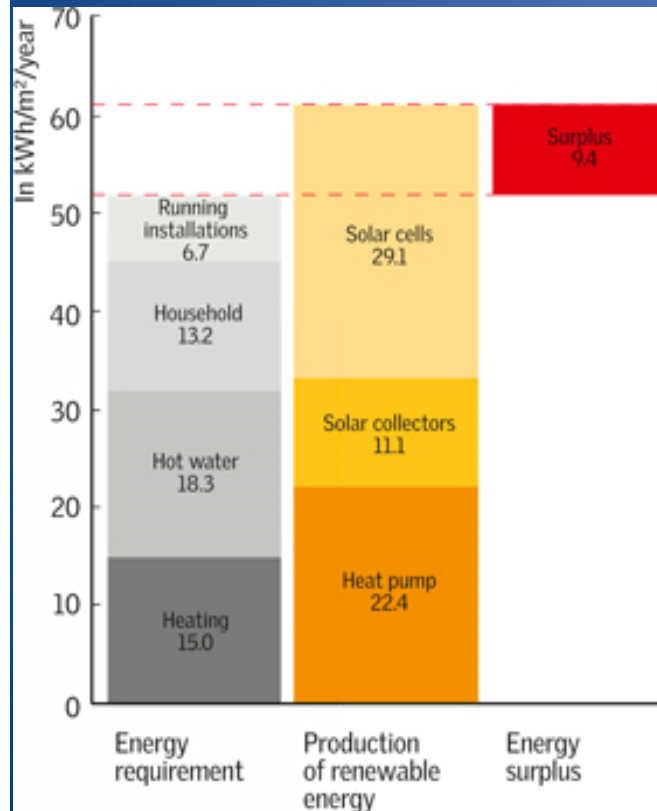
**Un experiment este mai valoros decât 1.000 de păreri ale experților.**

# EXPERIMENT # 1 Danmark HOME FOR LIFE, AARHUS





# Home for life





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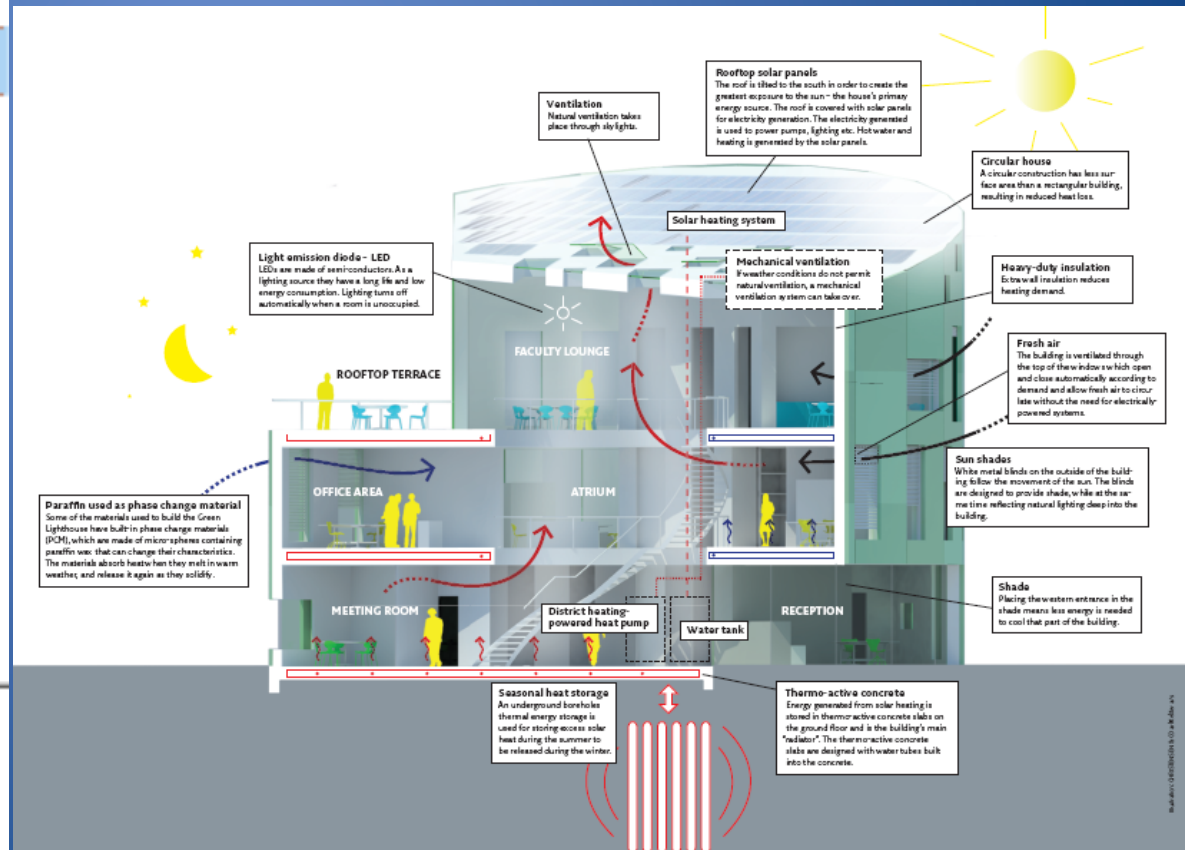
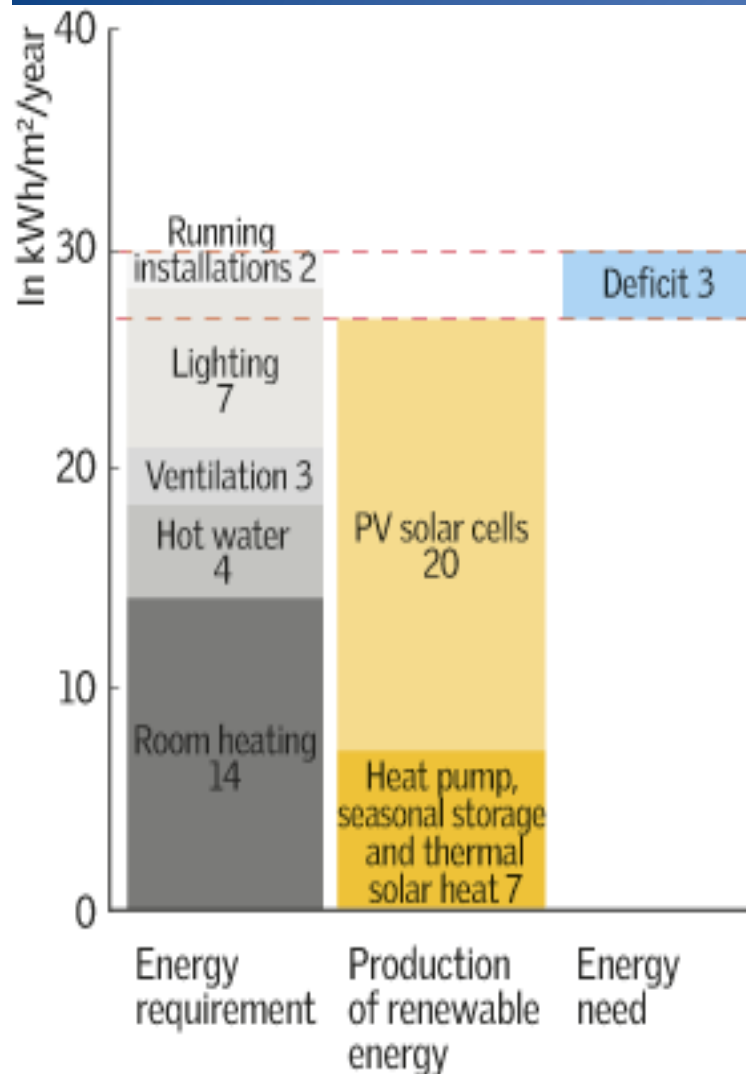
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# EXPERIMENT #2 Danmark, Copenhagen Green Lighthouse







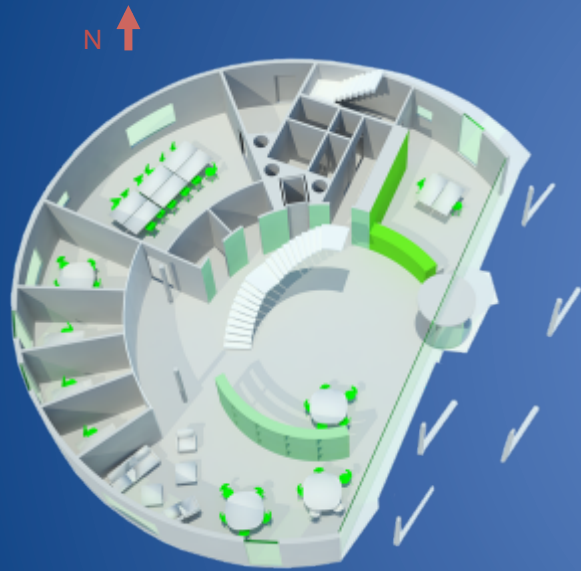
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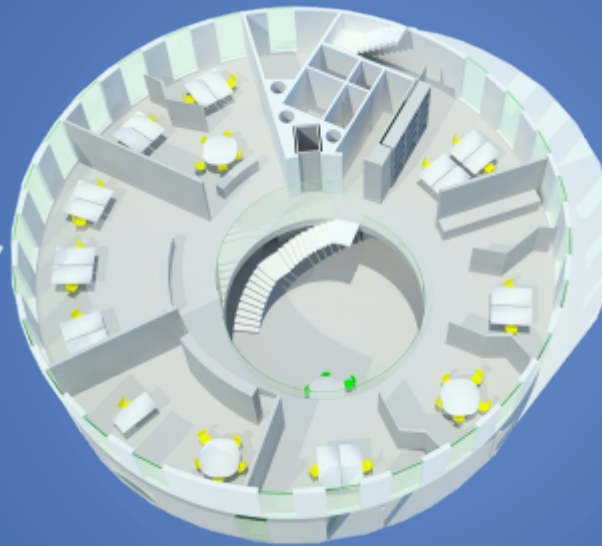




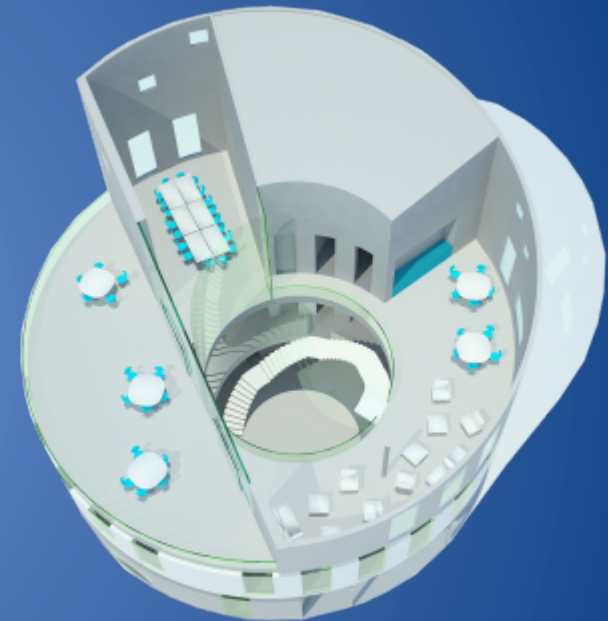
# FUNCTIONS



GROUND FLOOR  
student lounge and  
interview rooms



1. FLOOR  
office workspaces and  
managers office

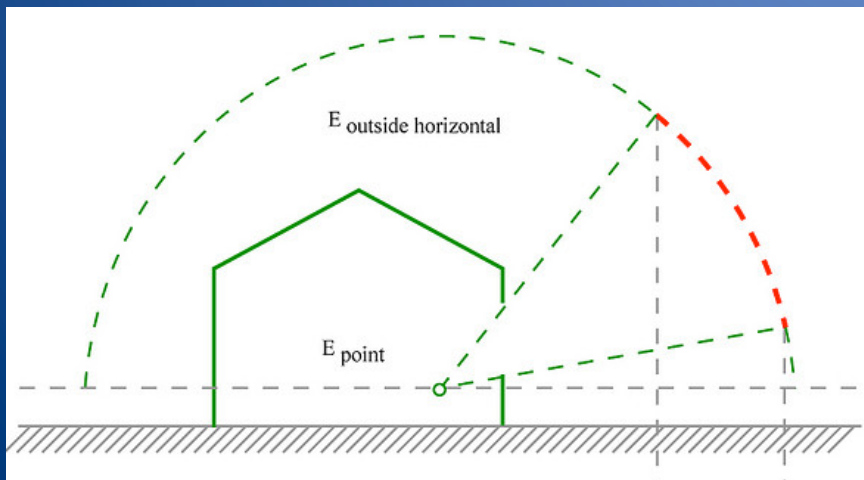


2. FLOOR  
Faculty Lounge  
and roof terrace

# DAYLIGHT IN GREEN LIGHTHOUSE

The daylight factor should be at least 3% in all working stations and minimum 2% in hallways. This means that daylight is evident in all rooms.

The daylight levels are evaluated and defined via simulations in VELUX Daylight Visualizer 2 and model studies in a light lab.



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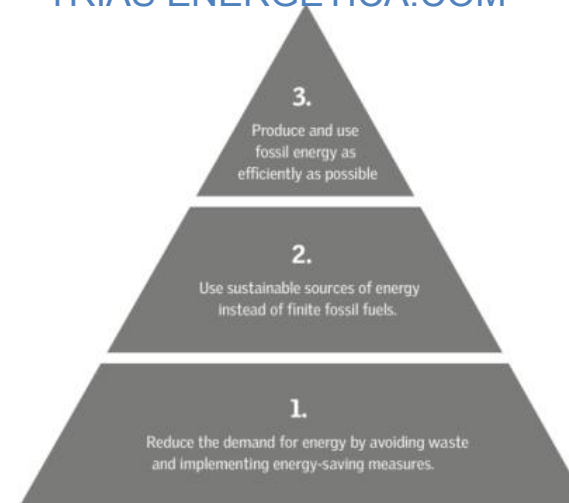


# SPECIFICATIONS & FORECAST

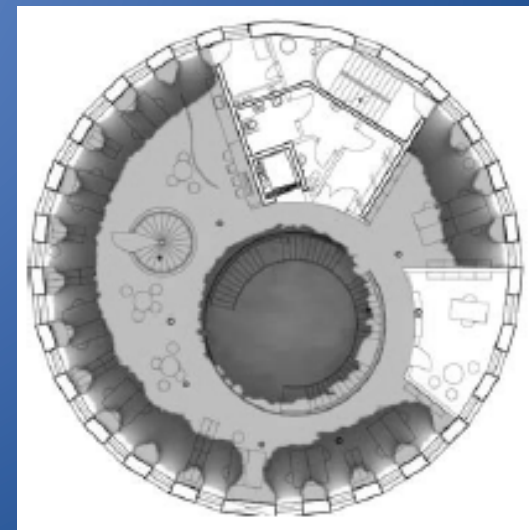
- **ENERGY**
  - CO2 NEUTRALITY AIM
  - 30,7 kWh/m<sup>2</sup>/y (2020 demands)
- **DAYLIGHT FACTOR**
  - 3% ON WORKSPACES
  - 2% COMMUNICATION AREAS
- **FORECAST:**
  - CO2 NEUTRAL
  - 22 kWh/m<sup>2</sup>/year (BE 06)
  - 35% solar energy from solar panels
  - Seasonal storage of solar heat in the ground
  - Heat pump using 65 % district heating
  - Heat pump can provide heating OR cooling
  - 73 m<sup>2</sup> solar cells on the roof to be deducted from the energy balance

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DAYLIGHT EVALUATION



# FACULTY LOUNGE

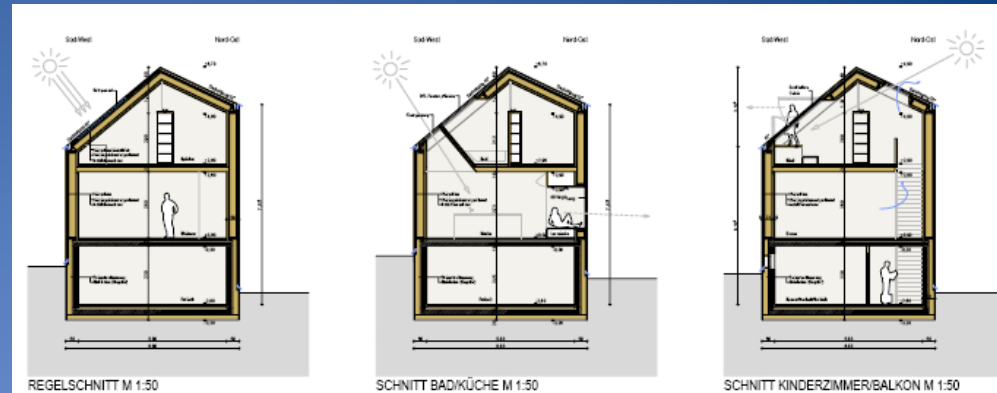
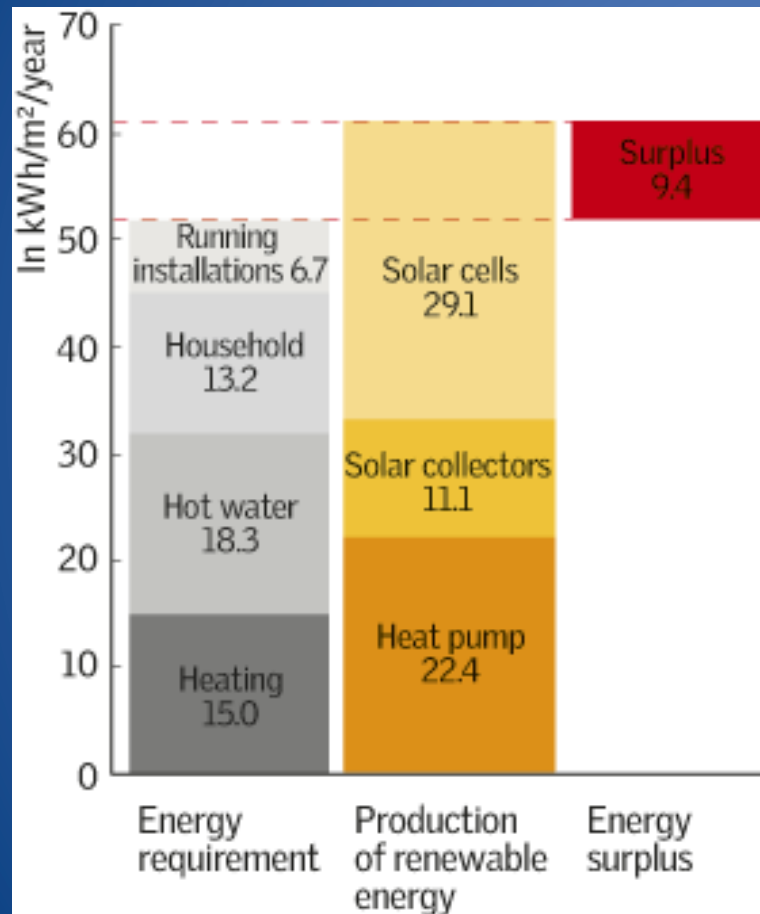
## Design principles:

- Compact building design
- Orientation
- Balanced daylighting
- Natural & hybrid ventilation
- Accumulation of heating & cooling (PCM)
- Intelligent daylight control
- Dynamic solar shading
- LED-lighting
- Low-e appliances
- Lowering of stand-by through passive (solar) & intelligent building management (NV Advance 2.0)

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# EXPERIMENT # 3, VIENNA SUNLIGHT HOUSE

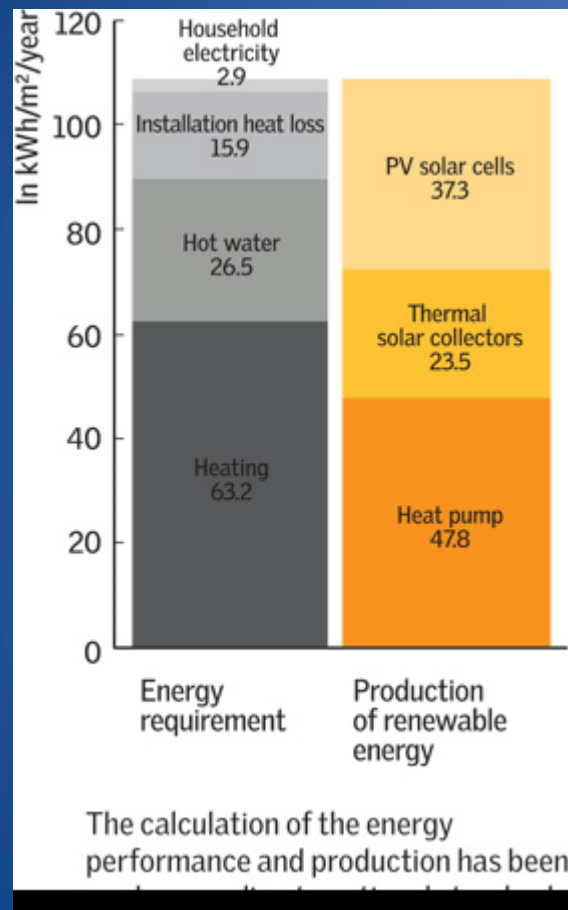


Architect: HEIN-TROY



# EXPERIMENT # 4

## HAMBURG LichtAktiv Haus



IBA HAMBURG 2013 - WILHELMSBURG  
TU DARMSTADT, Prof. Manfred Hegger  
Prize delivery 3.9.2009

Energy renovation of a double house – Premium / Economy

# EXPERIMENT # 5 UK

## CarbonLight Homes



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# EXPERIMENT # 6 France

## Maison Air et Lumière



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# Green Renovation

Motive pentru renovarea unei cladiri existente:

- Economisirea energiei
- Economisirea resurselor financiare
- Imbunatatirea confortului interior

Guldberg School



Guldberg School



Gullandsgarden



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Home » Vision » Active House - a vision

## Active House - a vision

Active House is a vision of buildings that create healthier and more comfortable lives for their occupants without negative impact on the climate – moving us towards a cleaner, healthier and safer world.



### Buildings that give more than they take

The Active House vision defines highly ambitious long term goals for the future building stock. The purpose of the vision is to unite interested parties based on a balanced and holistic approach to building design and performance, and to facilitate cooperation on e.g. building projects, product development, research initiatives and performance targets that can move us further towards the vision.

► DIMENSIONS

- ENERGY
- INDOOR CLIMATE
- ENVIRONMENT
- SPECIFICATION

► SPECIFICATIONS

Be a part of Active House's vital work to promote environmentally friendly houses with a high livability standard.  
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# Persoana de contact

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**Va multumesc !**

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[www.activehouse.info](http://www.activehouse.info)

