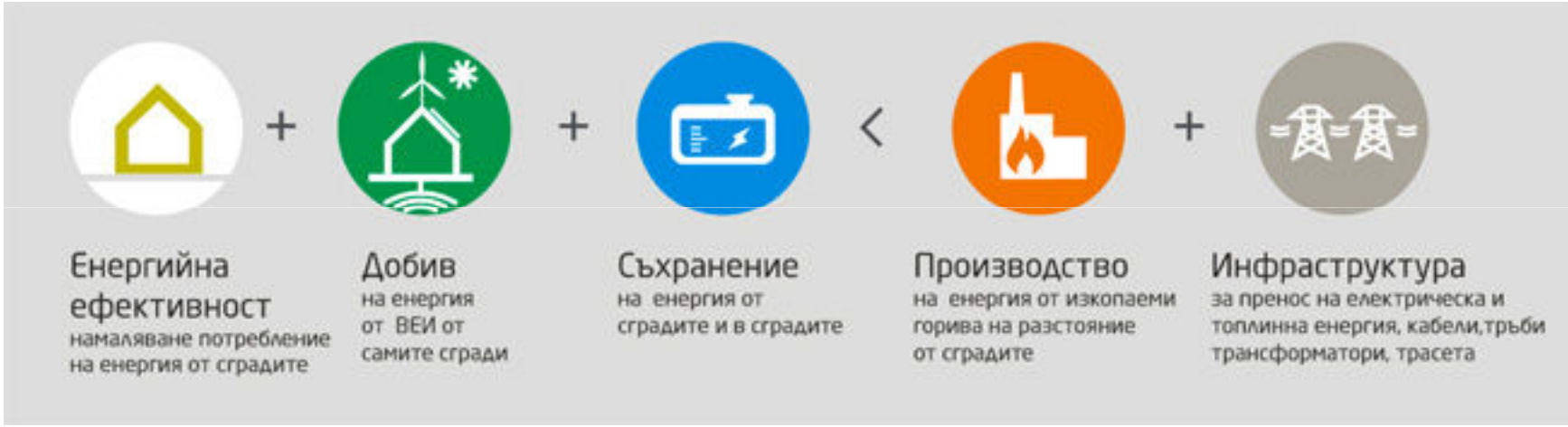
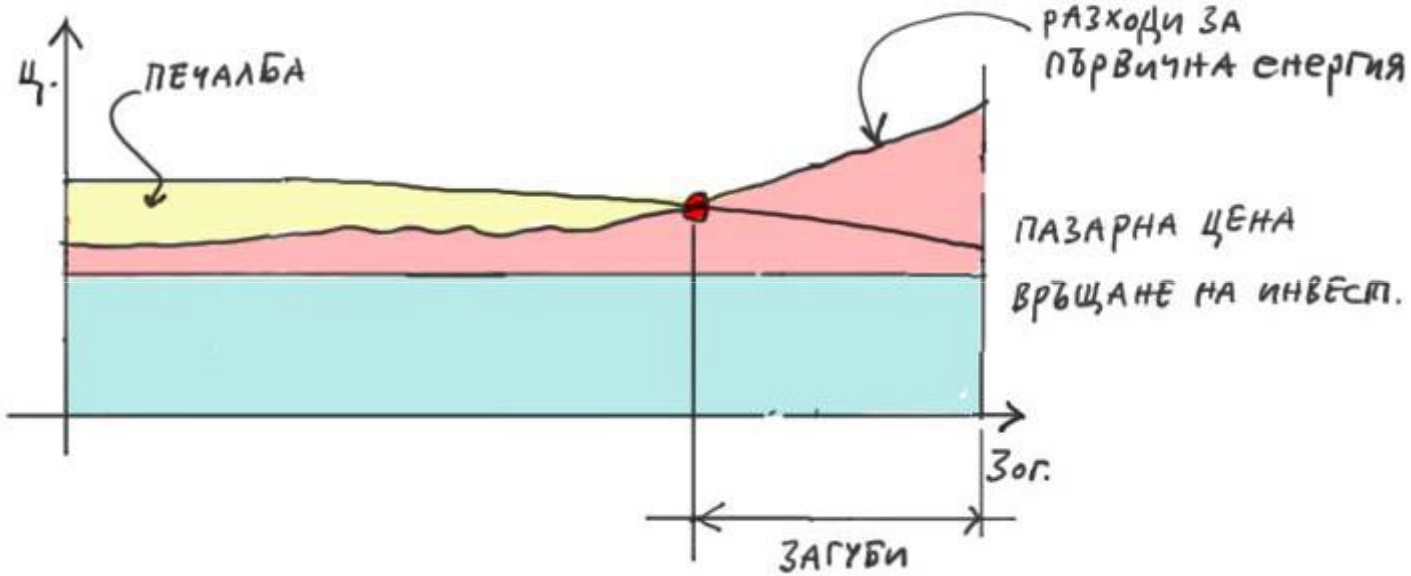
ПЪТЯТ КЪМ НУЛЕВО ЕНЕРГИЙНИТЕ СГРАДИ


Енергийна ефективност
намаляване потребление на енергия от сградите
Добив
на енергия от ВЕИ от самите сгради
Съхранение
на енергия от сградите и в сградите
Производство
на енергия от изкопаеми горива на разстояние от сградите
Инфраструктура
за пренос на електрическа и топлинна енергия, кабели,тръби трансформатори, трасета

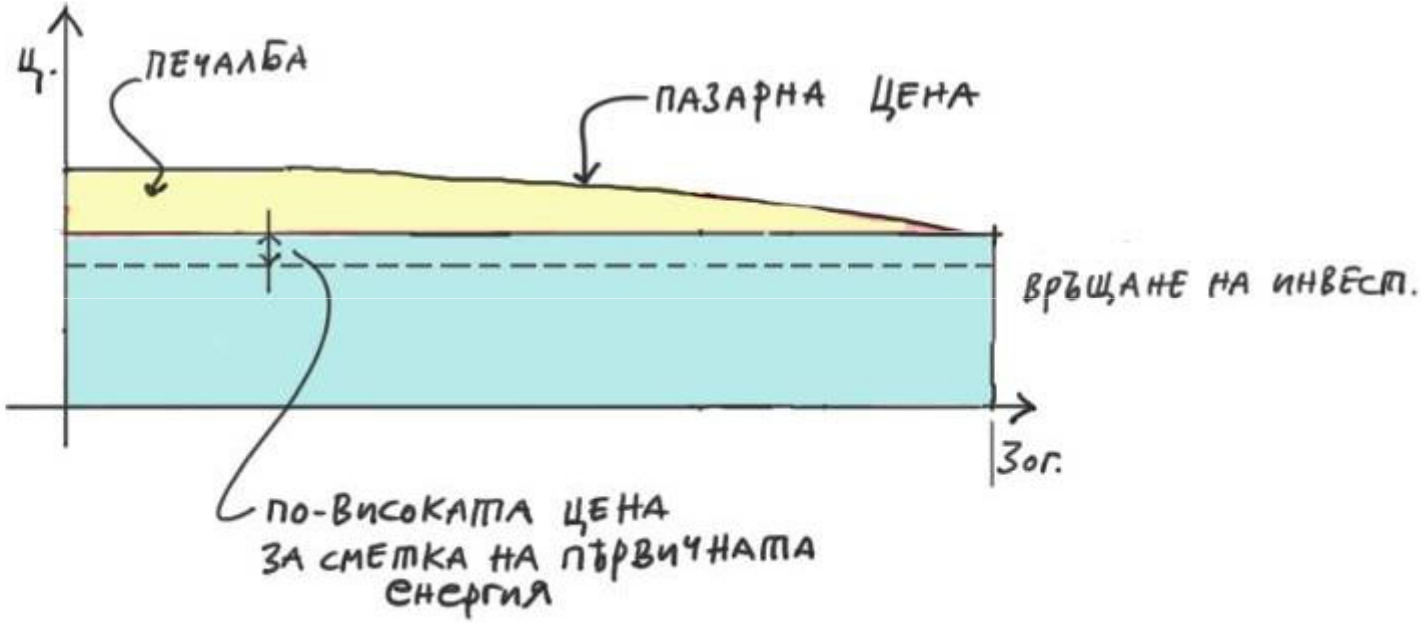
(1)

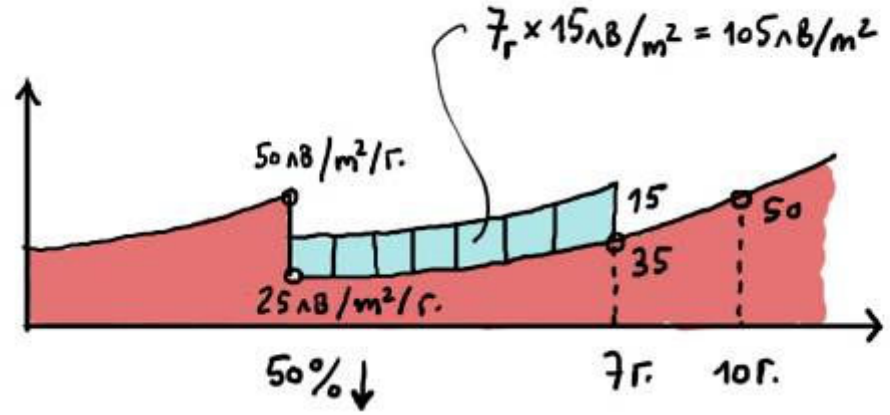
ЦЕНАТА НА ЕНЕРГИЯТА И ИКОНОМИЧЕСКАТА УСТОЙЧИВОСТ НА СГРАДИТЕ



(2)

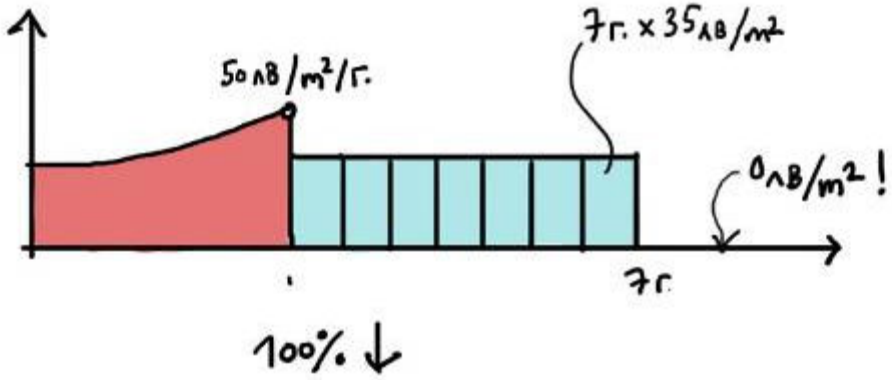
Икономическа устойчивост на 'нес' в жизнения им цикъл





Повърхностно саниране

105лв/м²



Дълбоко саниране

245лв/м²

ТРИТЕ СТЪЛБА НА НУЛЕВО ЕНЕРГИЙНИТЕ СГРАДИ

Енергийна ефективност

- завишени параметри на топлоизолациите
- адаптивна слънцезащита
- максимално използване на дневната светлина
- интелигентно и оптимизирано управление на енергопотреблението
- енергоефективни инсталации и уреди

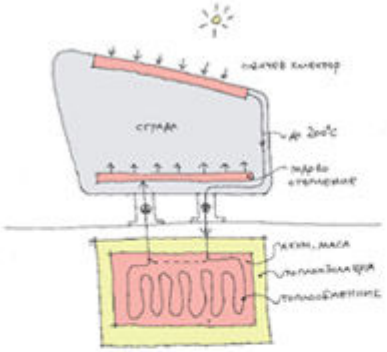
Добив на енергия от наличните ВЕИ

- интегриран добив на топлинна и фотоволтаична енергия от фасади и покриви
- добив на геотермална енергия чрез фундаментите
- добив на електричество от вятърна енергия
- добив на електричество от нискотемпературни машини

Съхранение на енергия

- използване инертната маса на сградите за краткосрочно съхранение на енергия (цикъл ден-нощ)
- дългосрочни термоакумулатори
- съхранение на електричество чрез сгъстен въздух
- съхранение на електричество чрез водород
- съхранение на електричество чрез ново поколение батерии

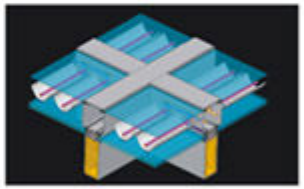

строителни
конструкции
фасаден
инженеринг
информатика
BMS
архитектура
и дизайн
соларни и
геотермални
технологии
НЕС
строителна
физика
икономика
химия
термодинамика
механика







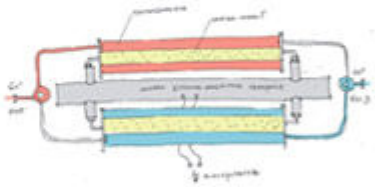
SUN RA: фотоволтаични щори и горещ въздух

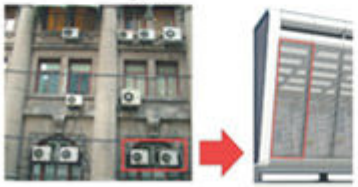




GEN CO: фотоволтаични тръбички и гореща вода







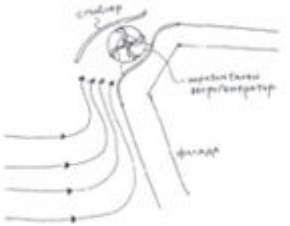


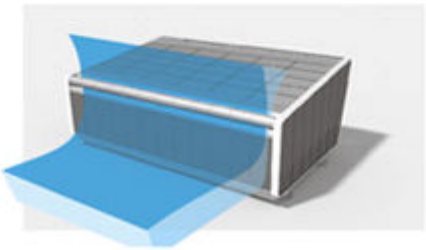
НУЛЕВО ЕНЕРГИЙНИ СГРАДИ ЧРЕЗ ИНОВАЦИИ

изследователска и патентна дейност





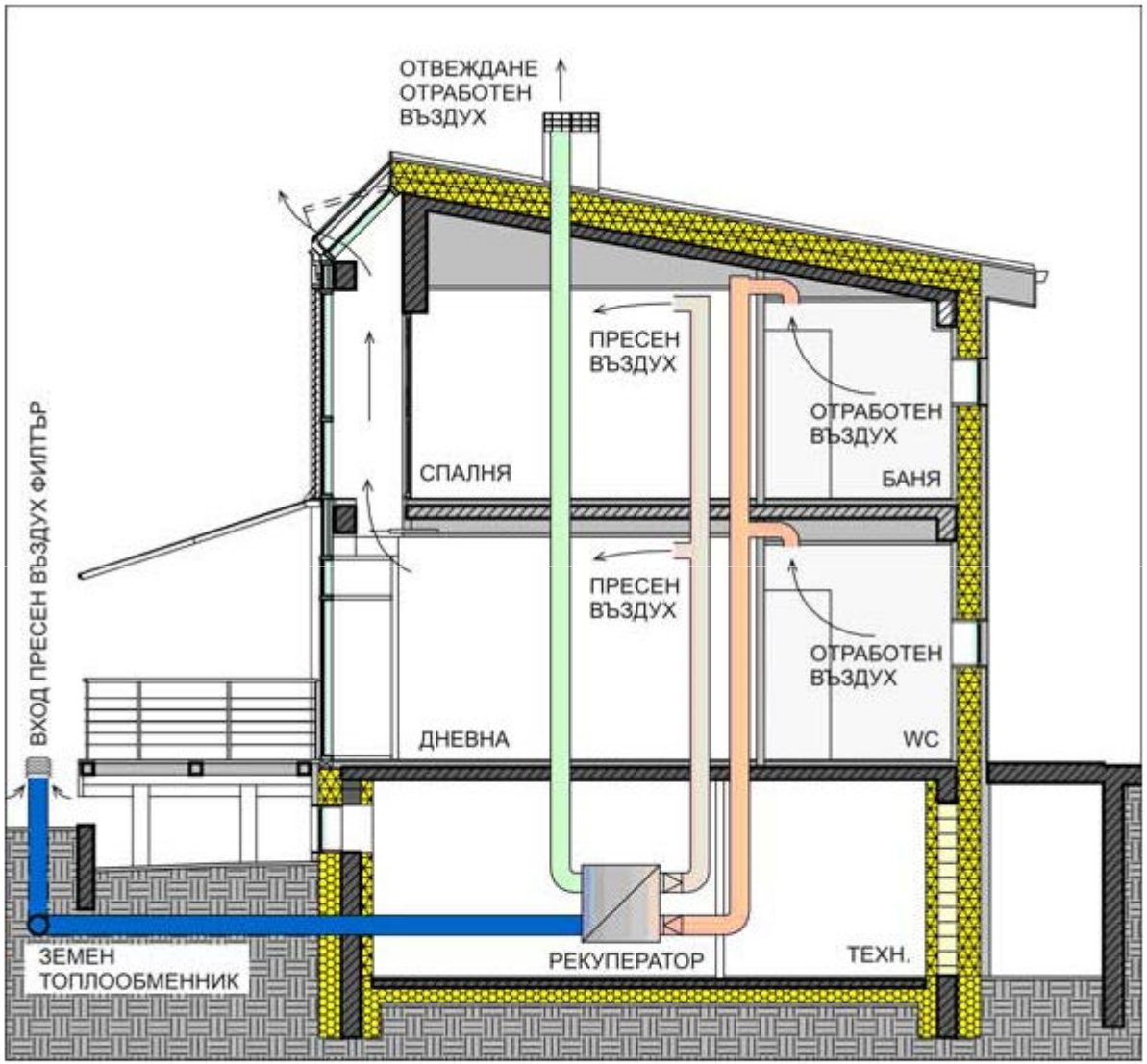








ЕНЕРГИЙНА ЕФЕКТИВНОСТ


ОТВЕЖДАНЕ
ОТРАБОТЕН
ВЪЗДУХ
ПРЕСЕН
ВЪЗДУХ
ОТРАБОТЕН
ВЪЗДУХ
СПАЛНЯ
БАНЯ
ПРЕСЕН
ВЪЗДУХ
ОТРАБОТЕН
ВЪЗДУХ
ДНЕВНА
WC
ВХОД ПРЕСЕН ВЪЗДУХ ФИЛТЪР
ЗЕМЕН
ТОПЛООБМЕННИК
РЕКУПЕРАТОР
ТЕХН.



DAYLIGHT : the real power

SOPHARMA AND LITEX TOWERS / SOFIA



Slide 12

1 Dear ladies and gentelmans, I am arch. Paskalev and I will talk about the the real power of the Daylight in the glass buildings.
I will shutter the myth that the glass buildings are energy dinosaurus. And I will demostrate how we can accheive near zero energy consumption in glass buildings.
; 27.2.2013

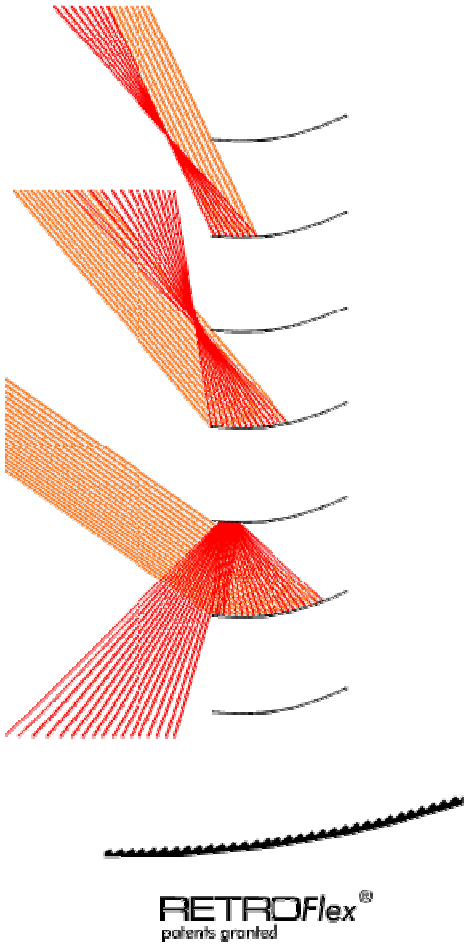
FAÇADE IS THE KEY!



Slide 13

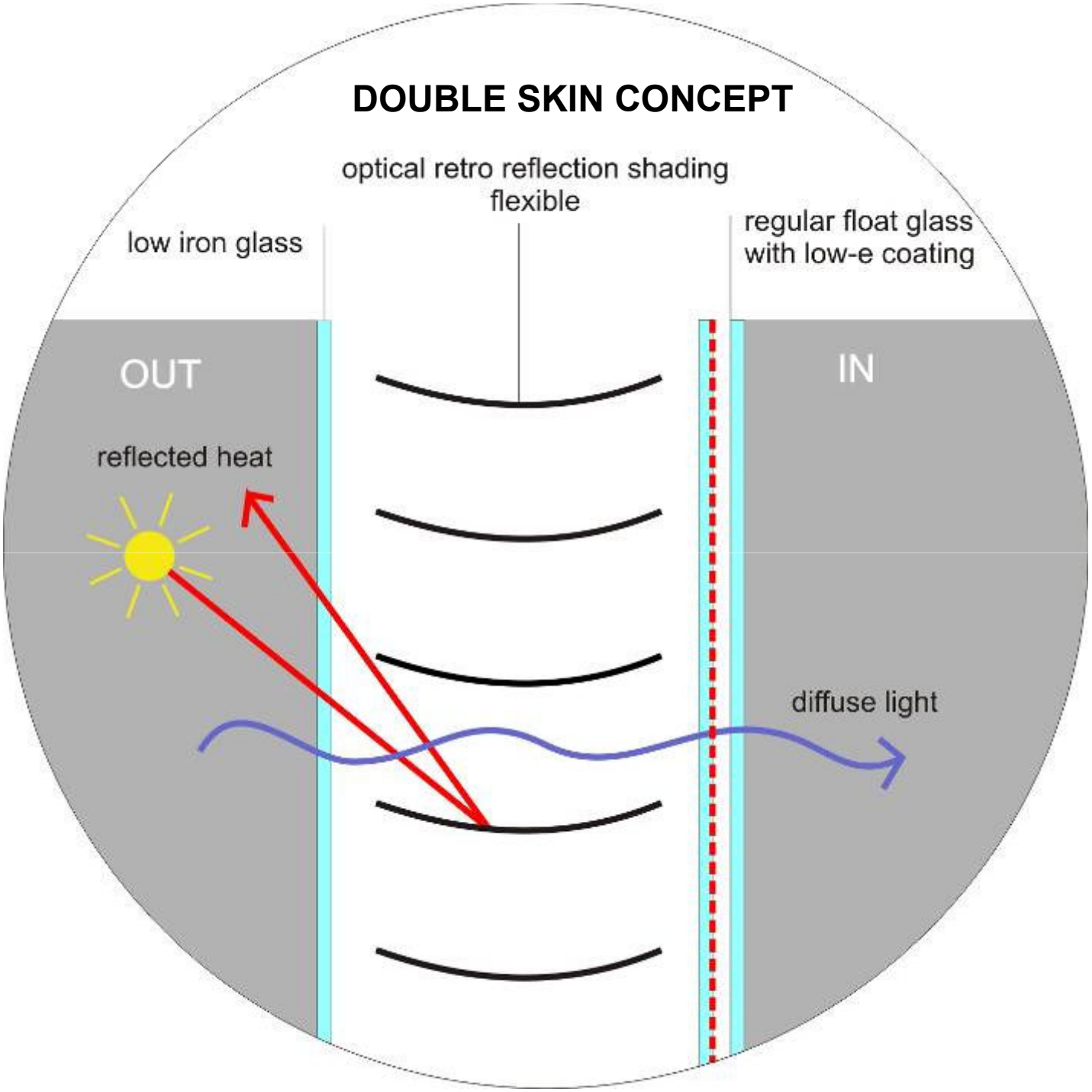
2 The risk was in the new facade concept and its integration with the instalations: ventilation, lighting, BMS.
We carefully studied the prevailing double skin concepts at the time. So we came up with this entirely new concept: thin double skin breathing facade with chrystal glasses and rethro optical shading.
; 27.2.2013

RETRO OPTIC SHADING SYSTEM





3 The first innovation in the facade system was the retro optical shading. These special blinds are designed to reflect the direct sun light back to the atmosfhere.
; 27.2.2013


DOUBLE SKIN CONCEPT
optical retro reflection shading
flexible
low iron glass
regular float glass
with low-e coating
OUT
IN
reflected heat
diffuse light

4

Thanks to the retro optical shading we were able to use chrystal glass. No solar protective layers, just low-e coating.
How it works?
The strong sun ray is reflected from the shading system back to the sky.

At the same time, bacause the shading stays open and the glazing is made from clear glass, the interior benefits hundred percent from the natural diffused light.

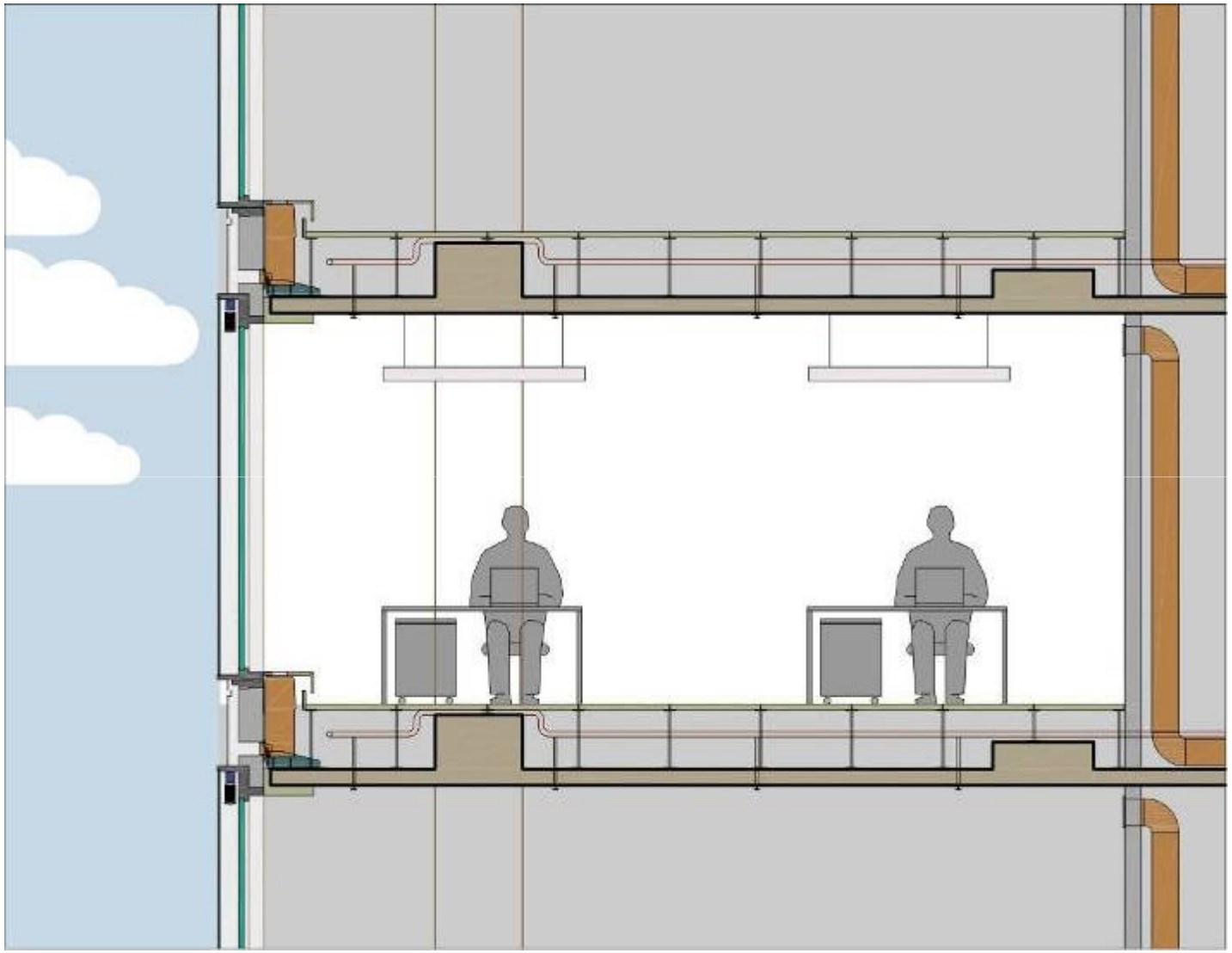
The light penetrates deep into the interior, for example we hava measured 1000 lux, 8 meters from the inside of the window.

Keep in mind that what goes into the building is defused light that ususlly do not carry the infrered part of the spectrum!

This is our second inovation.

; 27.2.2013

MAXIMUM DAYLIGHT PENETRATION INTO THE OFFICE SPACE DURING CLOUDY DAYS



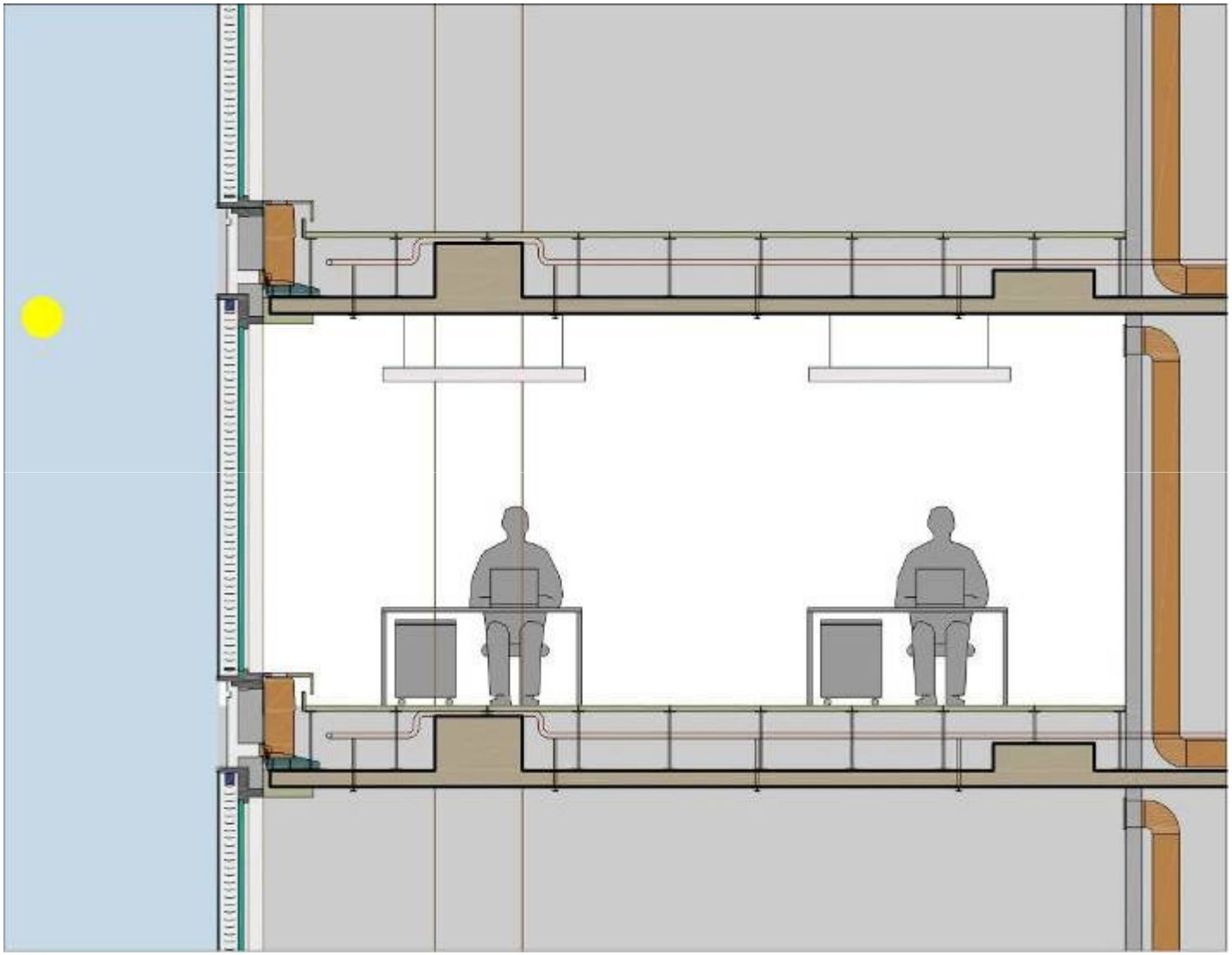
Slide 16

5 Now I will demonstate only some of the scenarios how the system works.

In the cloudy days or after the sunset the daylight goes down, so the BMS lifts the blinds and lets the whole light to go inside. Rememeber: we have very transperent facade! When the daylight goes down and down, the illuminators start to light up gradually, adding enough light to the workplaces.

; 27.2.2013

MAXIMUM DIFFUSED DAYLIGHT PENETRATION INTO THE OFFICE SPACE DURING SUNNY DAYS



6 In the sunny days the blinds are lowered. As I mentioned before: only soft diffused daylight pass through the facade.
; 24.2.2013

PASSIVE HEATING DURING SUNNY WINTER DAYS



Slide 18

7 A special trick is applied in the winter. When we have sun, we use to oppen the lower part of the facade. The sun energy goes direct into the space. Remember: we dont have any reflection from the glass. The result: passive sun heating, covering most of the heating demands.
; 24.2.2013

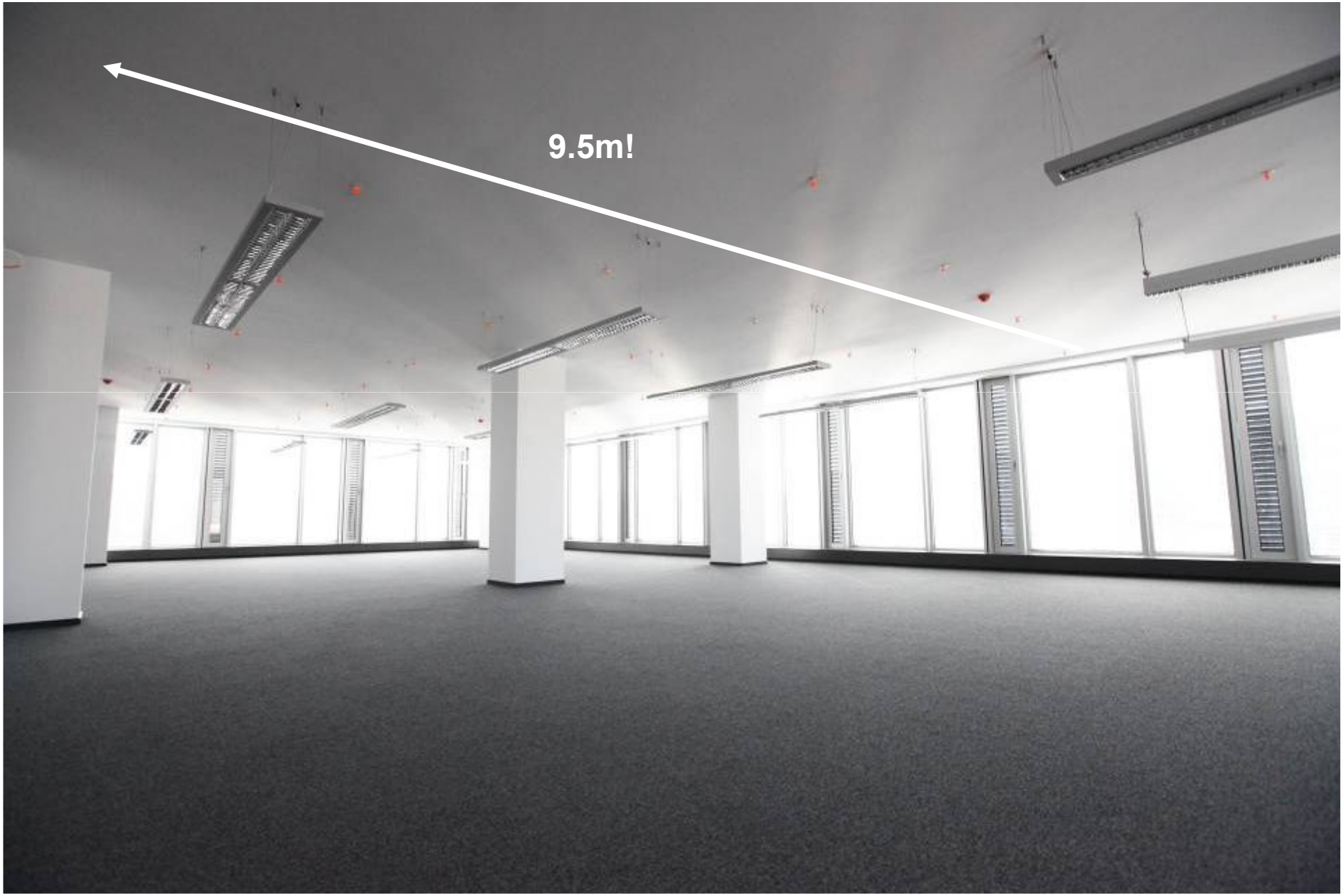
NO DIRECT SUNLIGHT ON WORKING SURFACES



Slide 19

8 You can see we dont have any direct light on the bottom, even the blinds are open! This ambient diffused light would be the envy of the most expencive photographic studios!
; 27.2.2013

REFLECTED LIGHT DEEP INTO THE OFFICE



Slide 20

9 As you see the special optics of the blinds and the facade transperancy allow us to use the daylight as deep as possible into the space. And we dont need artifitial light for more than 86% of the working time annually! We save huge amouns of energy from artificial lighting! That is why we were cheep on the lighting: NO LEDs!

; 27.2.2013

VISUAL COMFORT



10 The blinds are 80 mm and the distance between them is 60mm. This gives us good visual comfort, much better then other shadding solutions with smaller shading elements.
; 27.2.2013

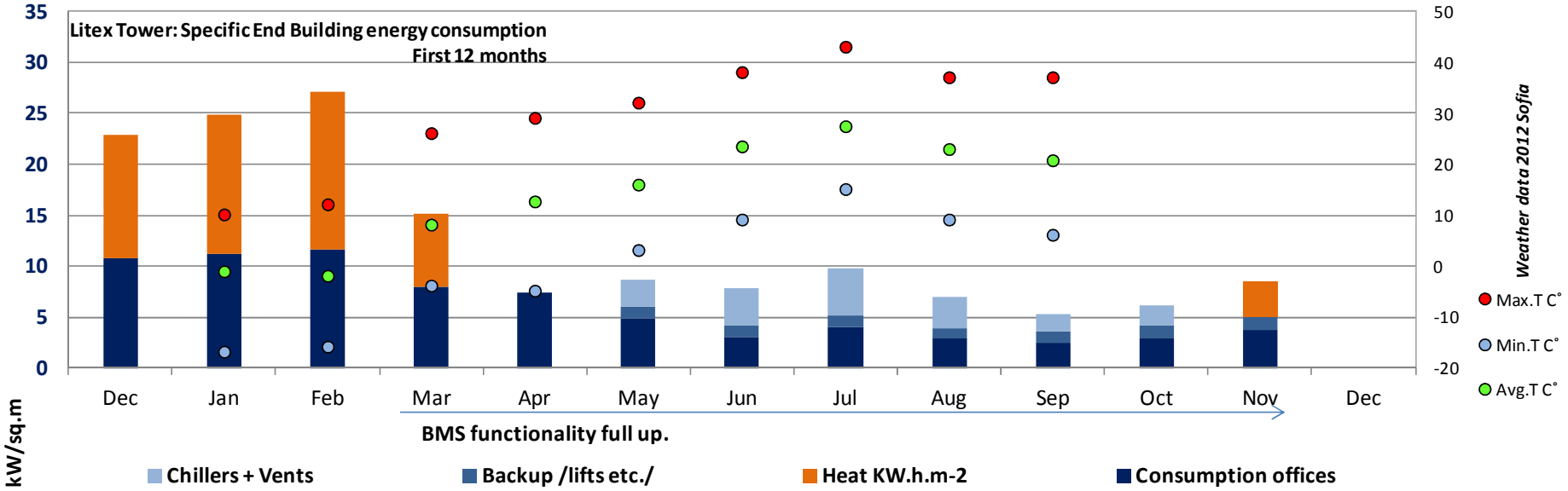
SOFT DIFFUSED LIGHT THROUGHOUT



Slide 22

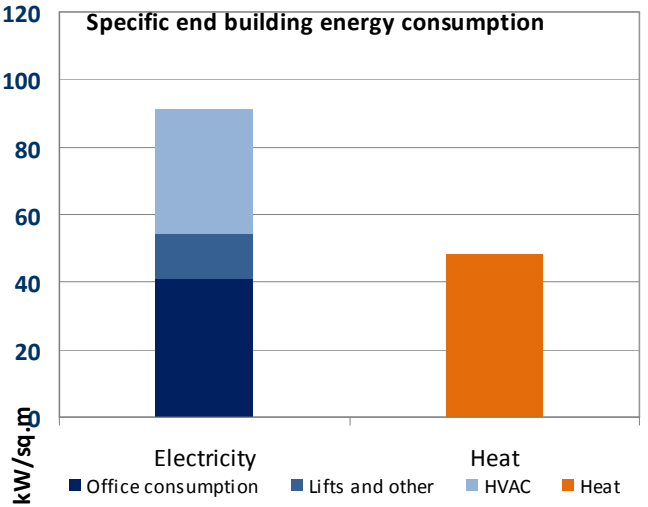
11 Defused daylight makes people happy. The feedback from the occupants, is that they feel more energized and motivated because of the light!
; 27.2.2013

FIRST YEAR RESULTS
100% OCCUPIED, 11.2 M2/P



FINAL ENERGY CONSUMPTION
PER SQUARE METER NET OFFICE AREA

45 kWh/m²a : Heating
37 kWh/m²a : Electricity HVAC
13 kWh/m²a : Lifts And Others
41 kWh/m²a : Lighting + Computers



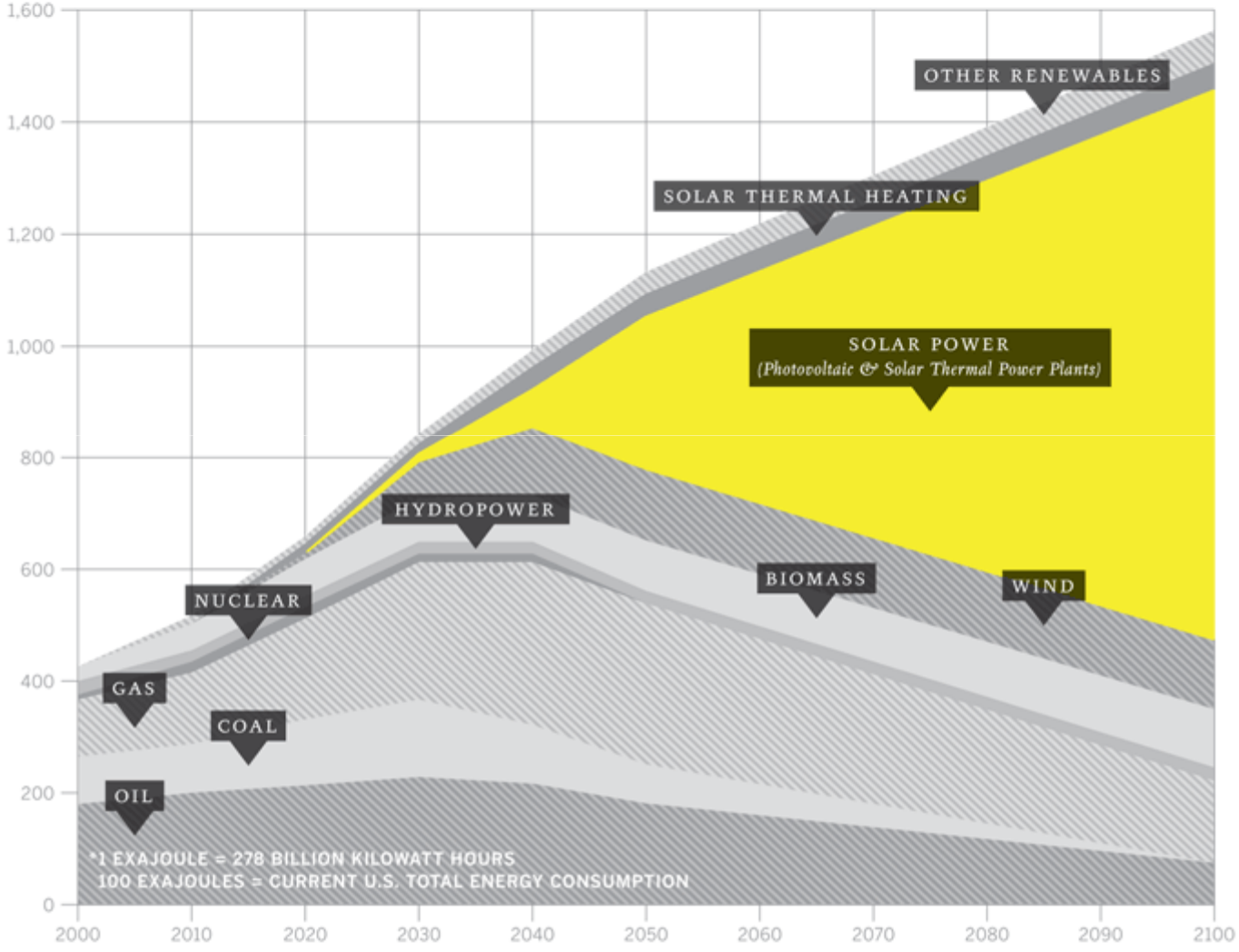
Slide 23

12 Here are the energy readings from the first year from the operation.....
I will let you enjoy the data.
; 27.2.2013

ДОБИВ НА ЕНЕРГИЯ

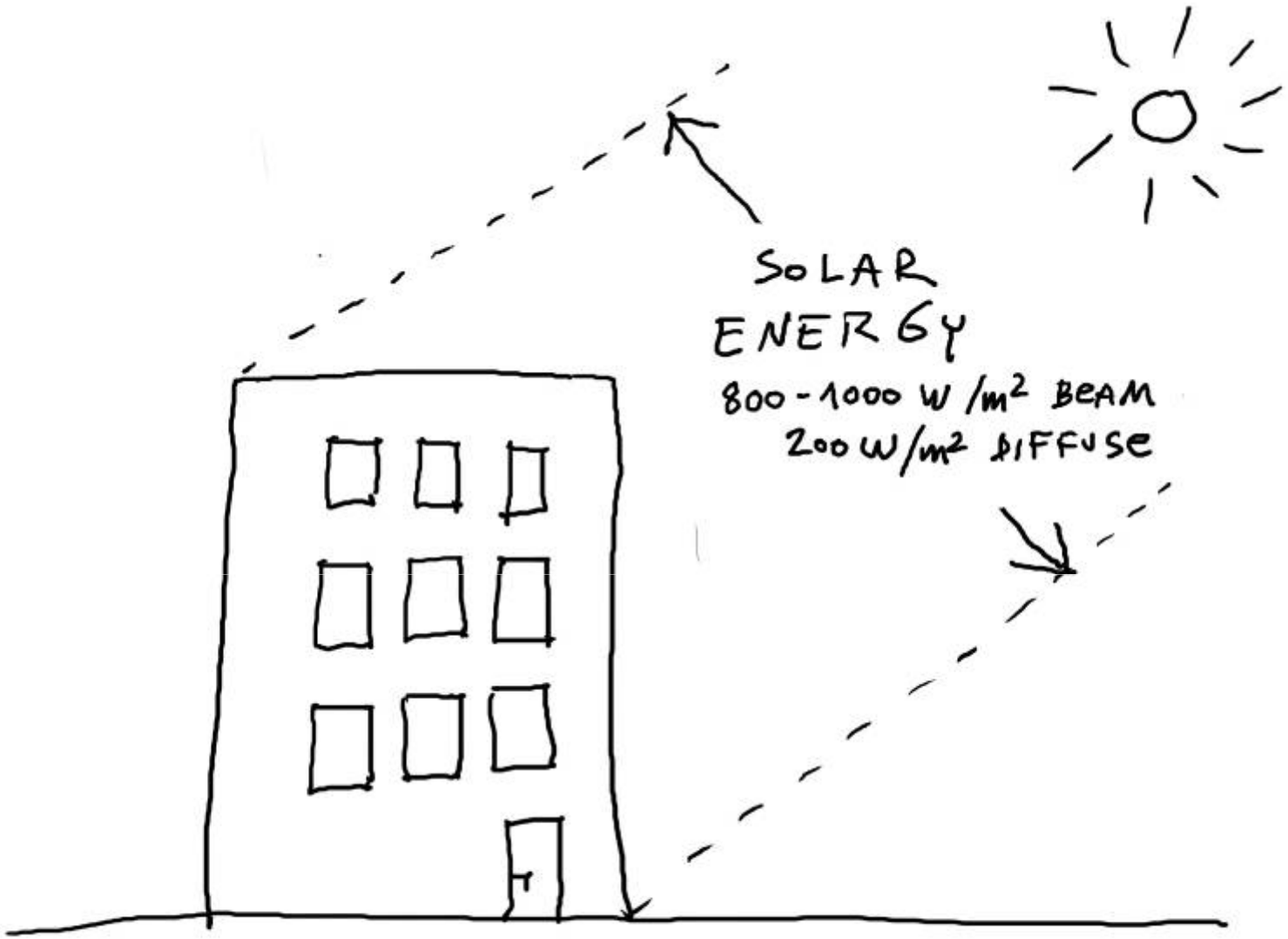
The Graph

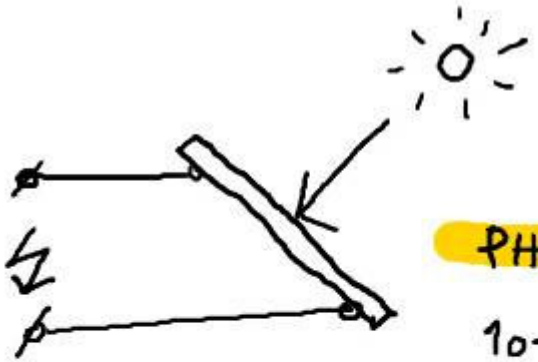
Projected share by source of annual global energy production, in exajoules* per year



Source: German Advisory Council on Global Change

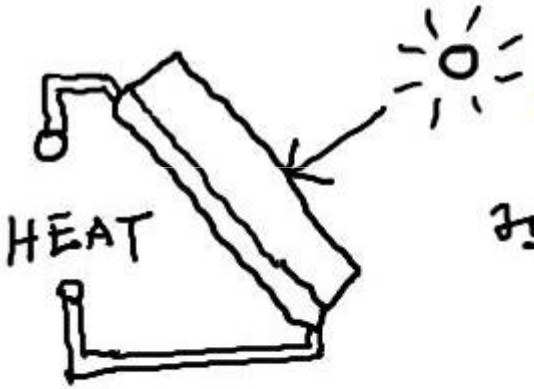
GRAPH BY NICHOLAS FELTON


SOLAR
ENERGY
800 - 1000 W/m² BEAM
200 W/m² DIFFUSE



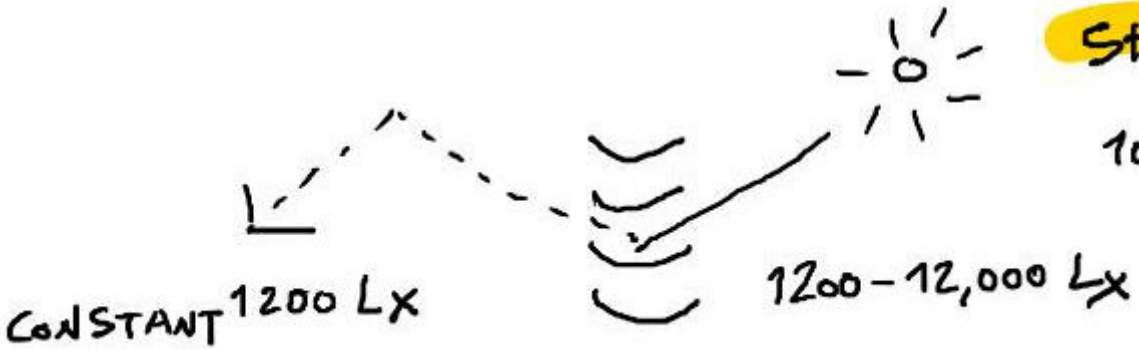
PHOTOVOLTAIC

10-14% OR 70-100 W/m² PEAK



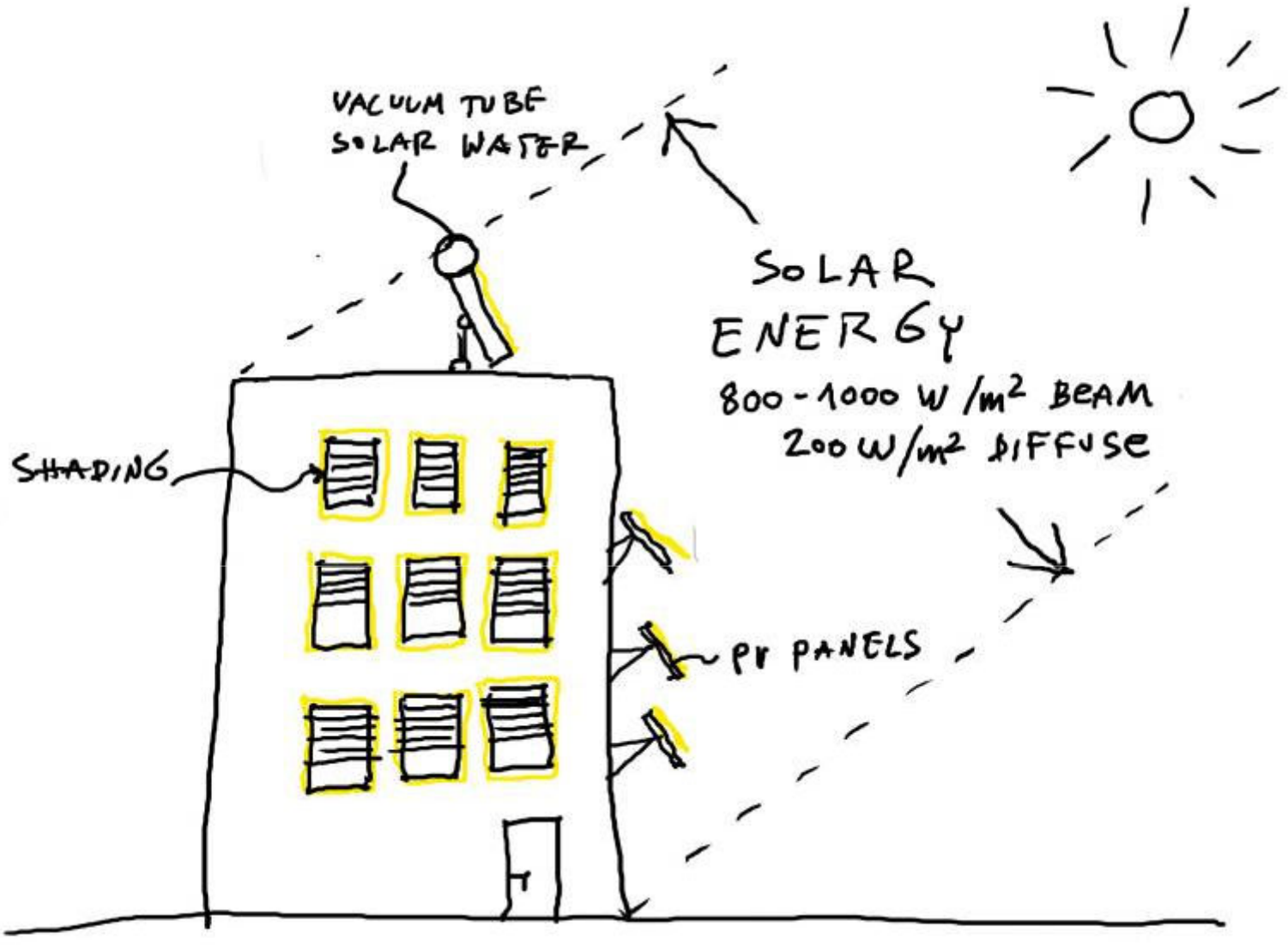
SOLAR HEAT EXCHANGER

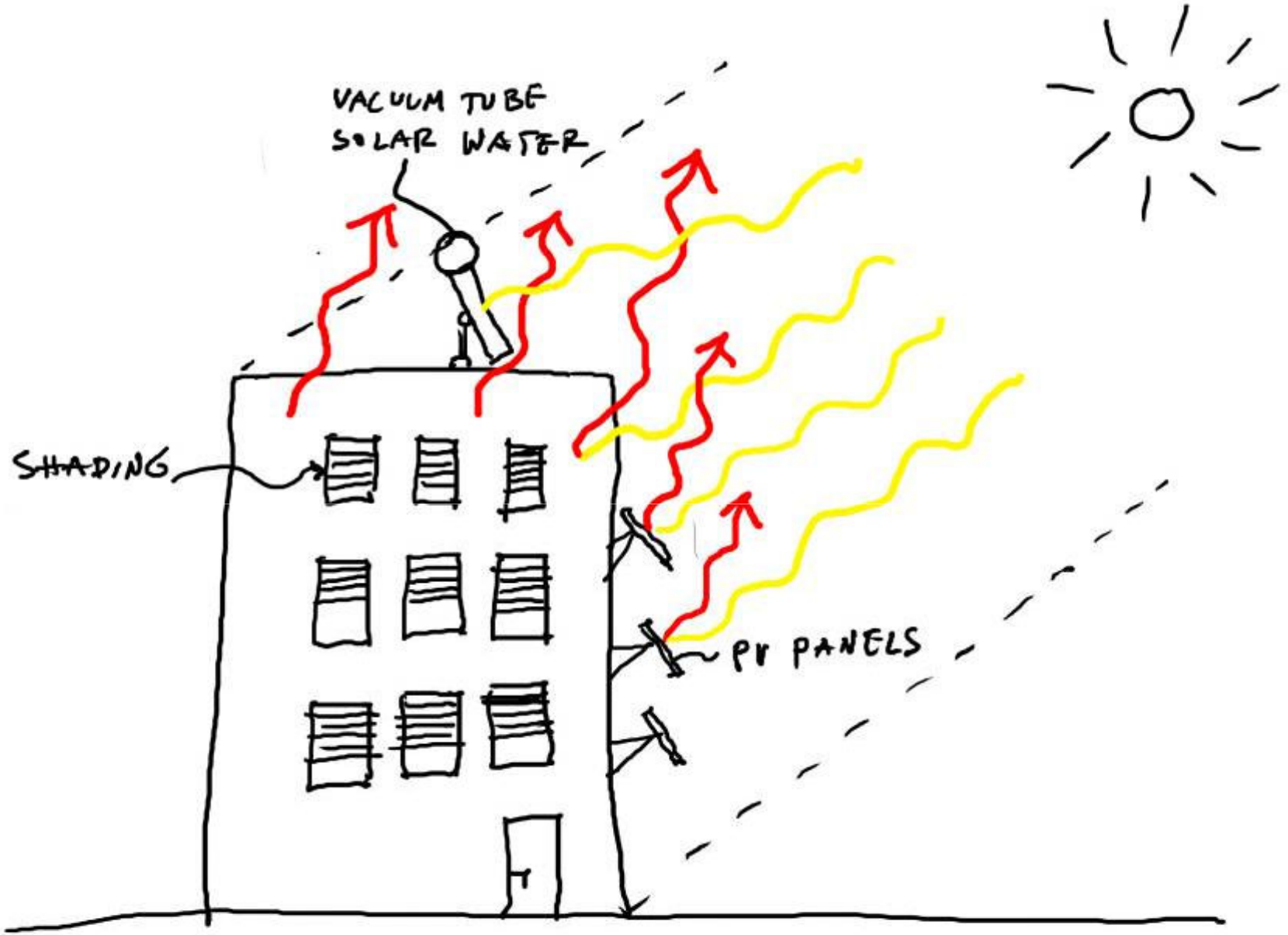
75% OR 750 W/m² PEAK

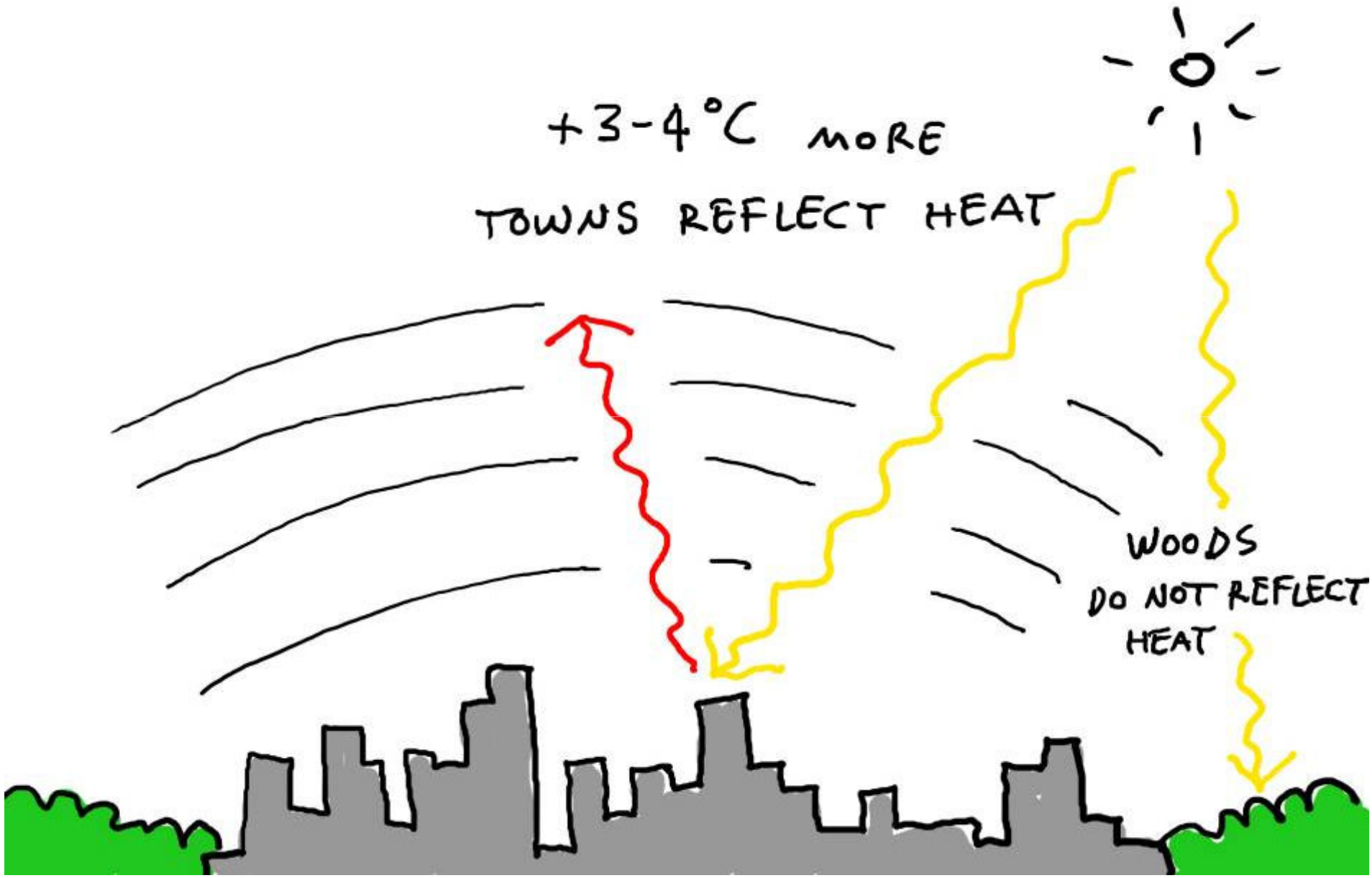


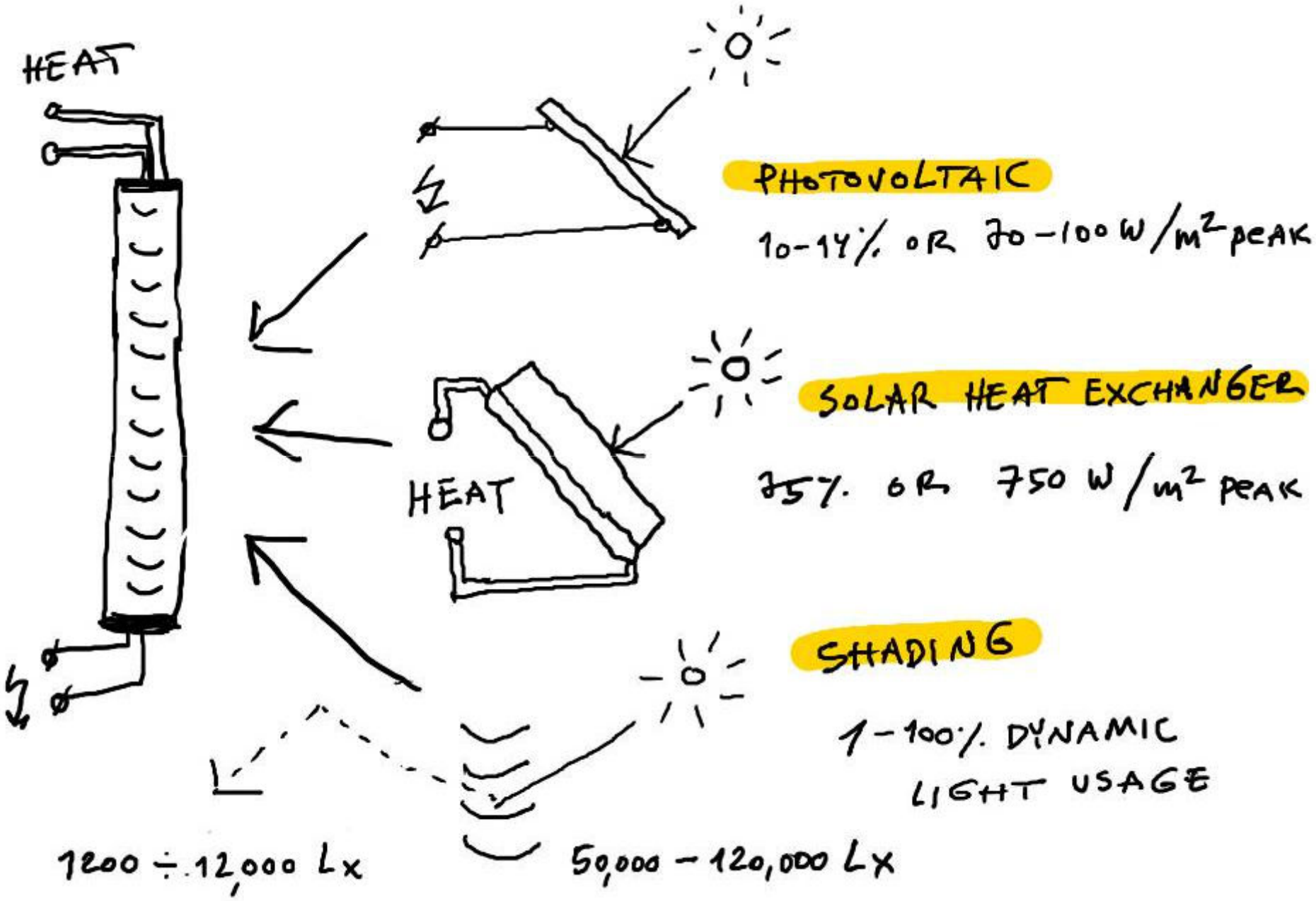
SHADING

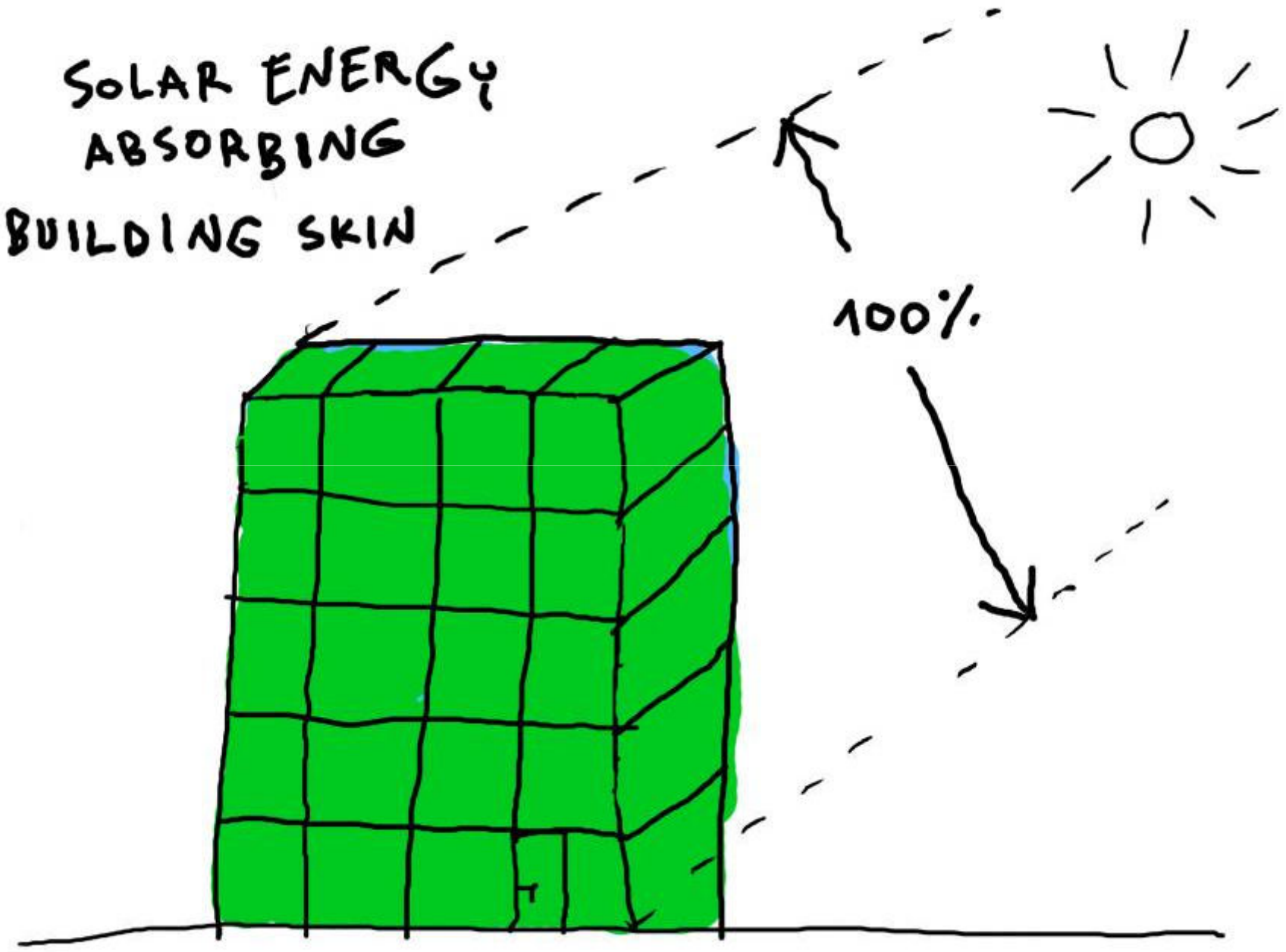
10-100% DYNAMIC LIGHT USAGE


VACUUM TUBE
SOLAR WATER
SOLAR
ENERGY
800 - 1000 W/m² BEAM
200 W/m² DIFFUSE
SHADING
PV PANELS

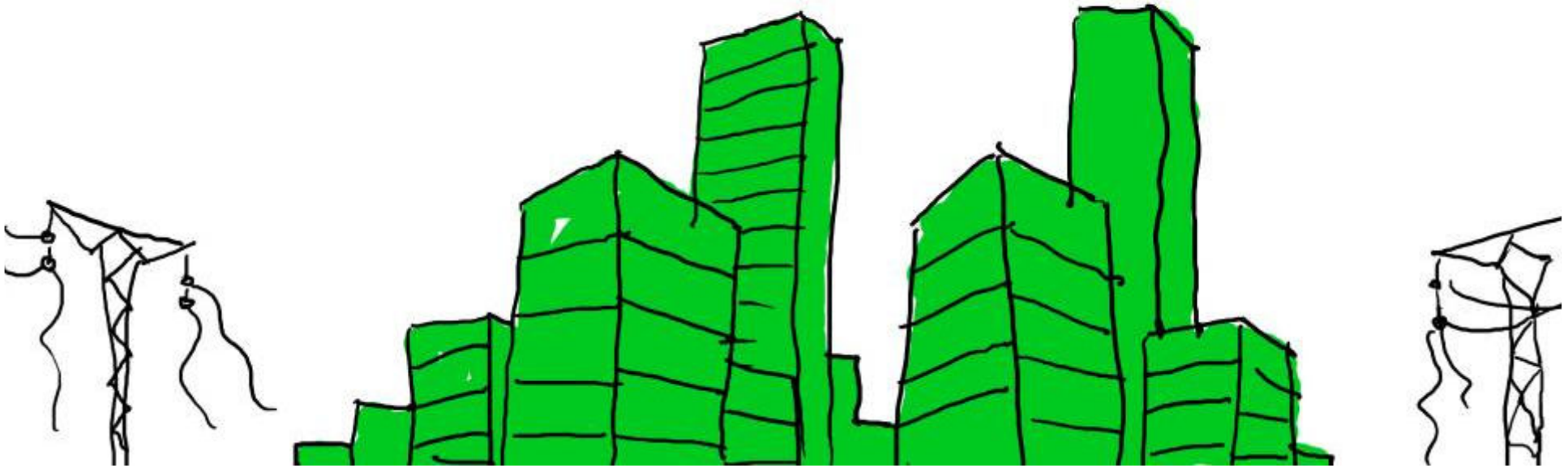

VACUUM TUBE
SOLAR WATER
SHADING
PV PANELS


+3-4°C MORE
TOWNS REFLECT HEAT
WOODS
DO NOT REFLECT
HEAT


HEAT
PHOTOVOLTAIC
10-14% OR 70-100 W/m² PEAK
HEAT
SOLAR HEAT EXCHANGER
35% OR 750 W/m² PEAK
SHADING
1-100% DYNAMIC LIGHT USAGE
1200 ÷ 12,000 Lx
50,000 - 120,000 Lx


SOLAR ENERGY
ABSORBING
BUILDING SKIN
100%

SUN POWERED TOWNS?




THE NEXT GENERATION
BUILDINGS
WILL PRODUCE 100% OF THE ENERGY THEY NEED !

http://www.free-energy-info.co.uk/

Moving Pulsed Systems

Energy-Tapping Pulsed Systems

Magnet Power

Gravitational Pulsed Systems

Motionless Pulsed Systems

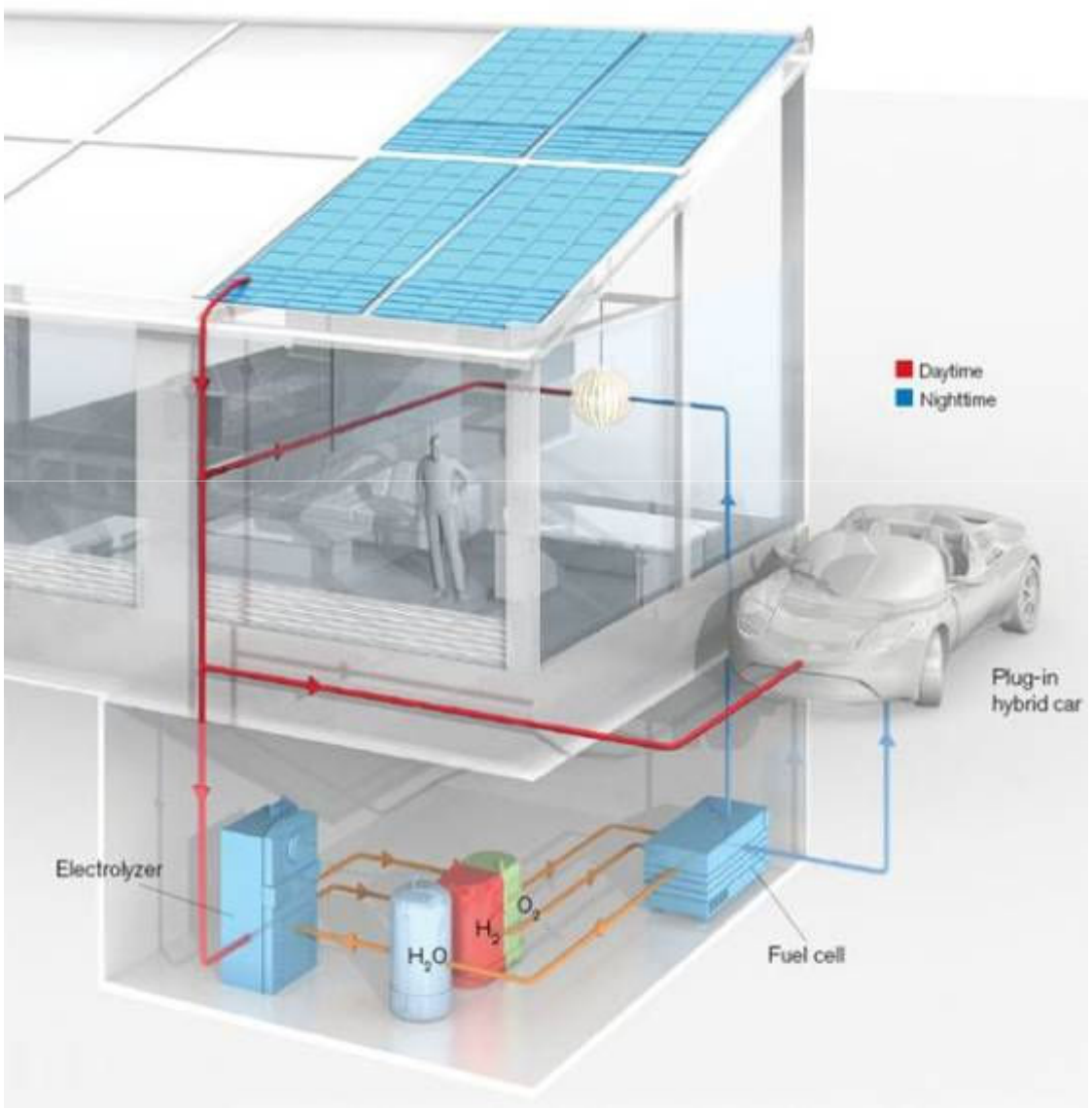
Energy-Tapping Pulsed Systems

Aerial Systems and Electrostatic Generators:

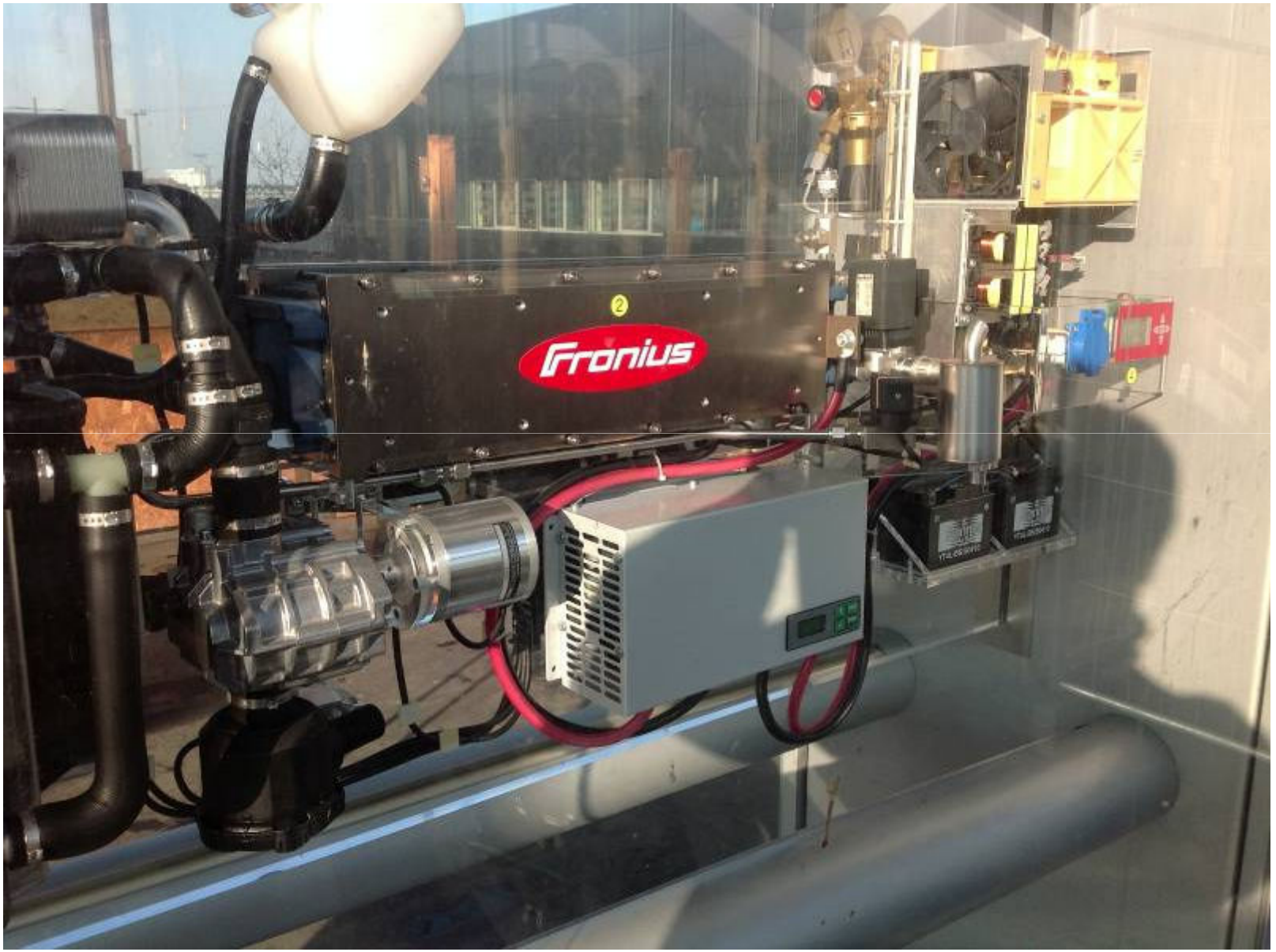
Vehicle Systems

СЪХРАНЕНИЕ НА ЕНЕРГИЯ

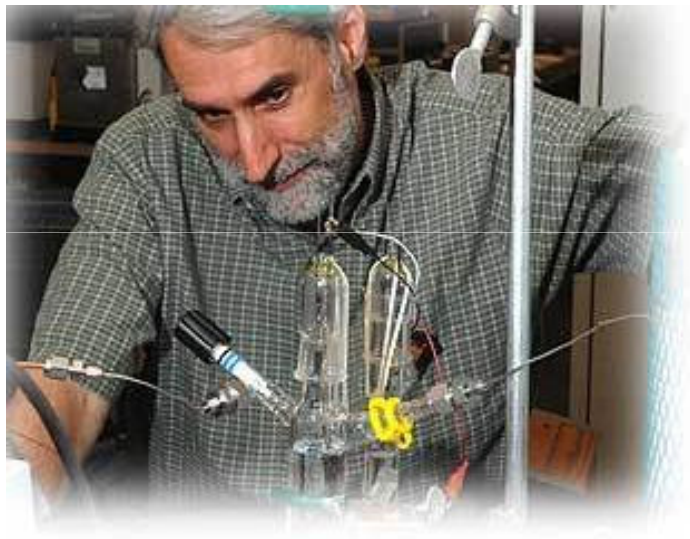
ВОДОРОД!

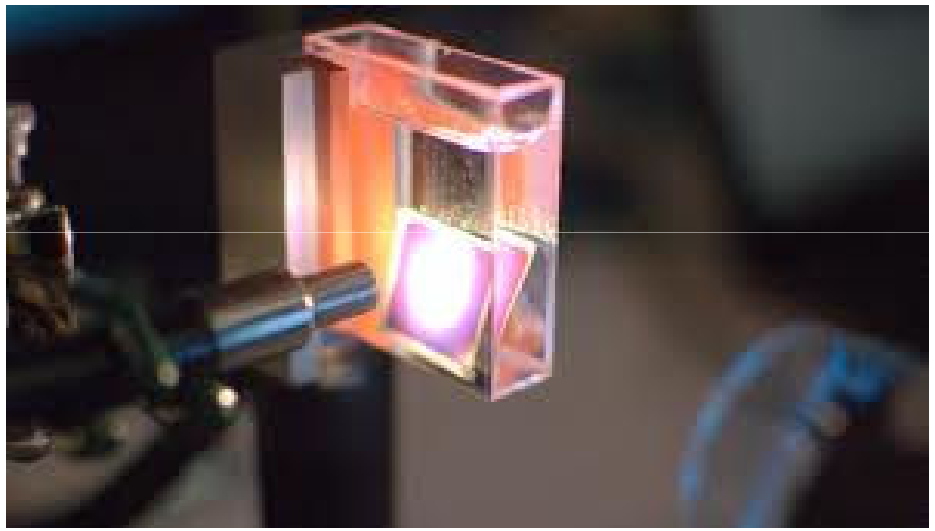

Daytime
Nighttime
Plug-in
hybrid car
Electrolyzer
H_2O
H_2
O_2
Fuel cell

Реверсивна горивна клетка



Даниел Нусера: изкуствено листо





Лабтех:
Металхидриди









КОМПРЕСОР – ЕКСПАНДЕР 5 kW

ТОК



БУТИЛКИ

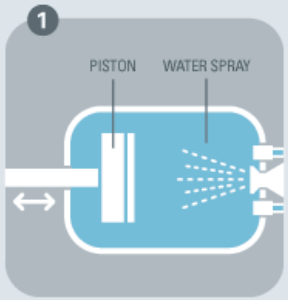


Автомобил на сгъстен въздух

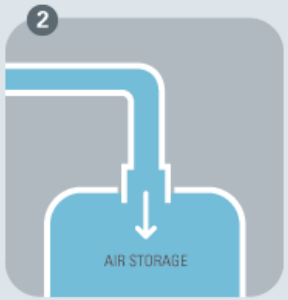




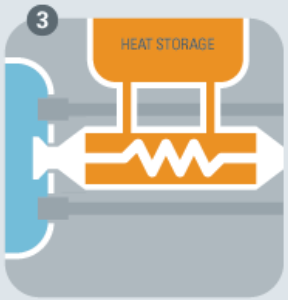
Our Approach



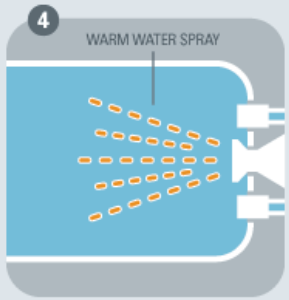
During air compression, mechanical energy is converted into heat. Spray water directly into the air during compression.



Store the compressed air in a tank.



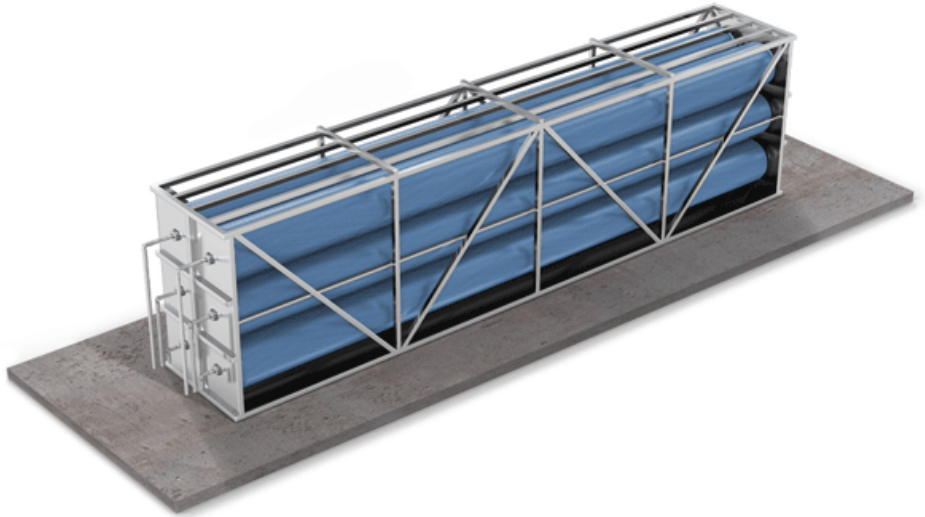
Exchange heat between the water and heat storage.



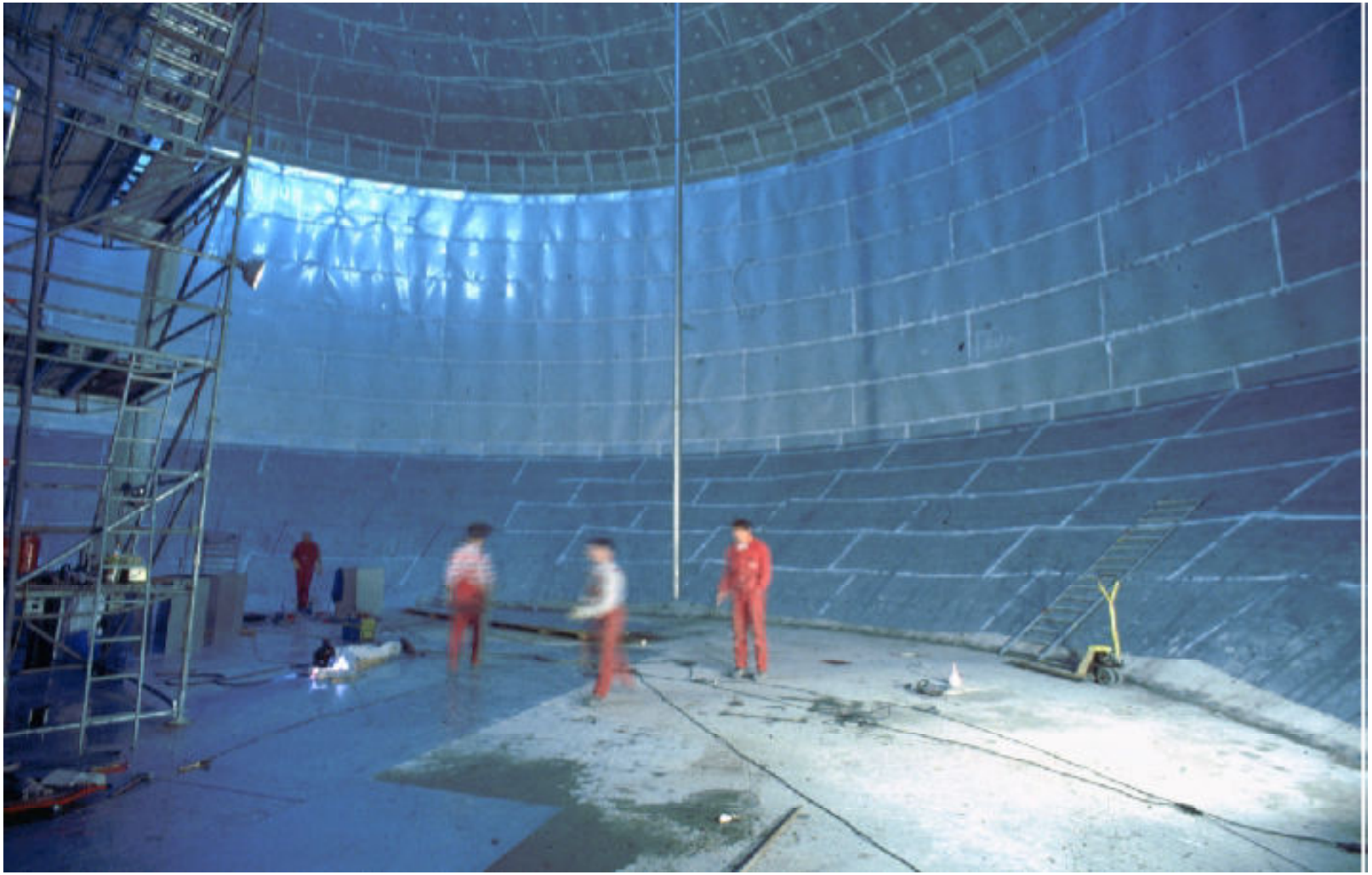
During air expansion, spray warm water into the expanding air. Heat energy in the water is absorbed by the air and is converted into mechanical energy.

Storage

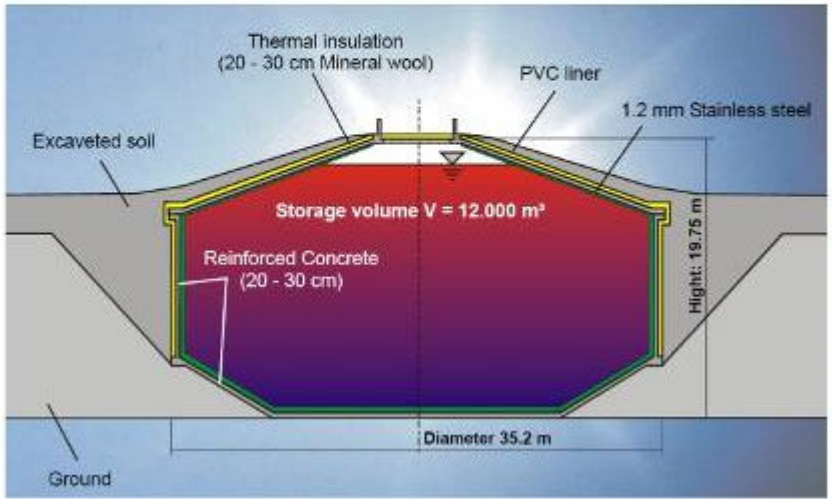
Air can be stored in simple, low cost air storage tanks, packed in a convenient shipping container form factor using industry standard pipes and matching ASME and ISO safety standards. For truly massive installations, air can be stored in underground caverns which is the standard for large scale natural gas storage.



ТЕРМОАКУМУЛАТОРИ



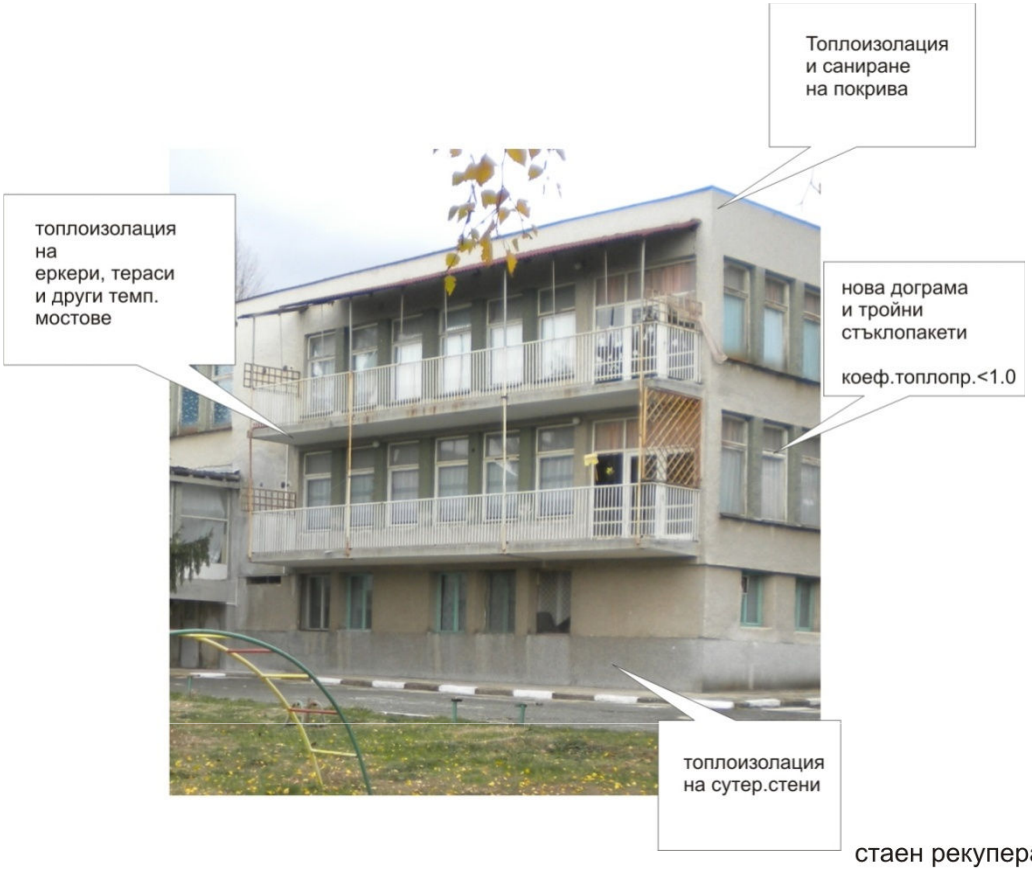

Hamburg-Bramfeld
124 terraced houses


Thermal insulation
(20 - 30 cm Mineral wool)
PVC liner
1.2 mm Stainless steel
Excaveted soil
Storage volume V = 12.000 m³
Reinforced Concrete
(20 - 30 cm)
Hight: 19.75 m
Diameter 35.2 m
Ground

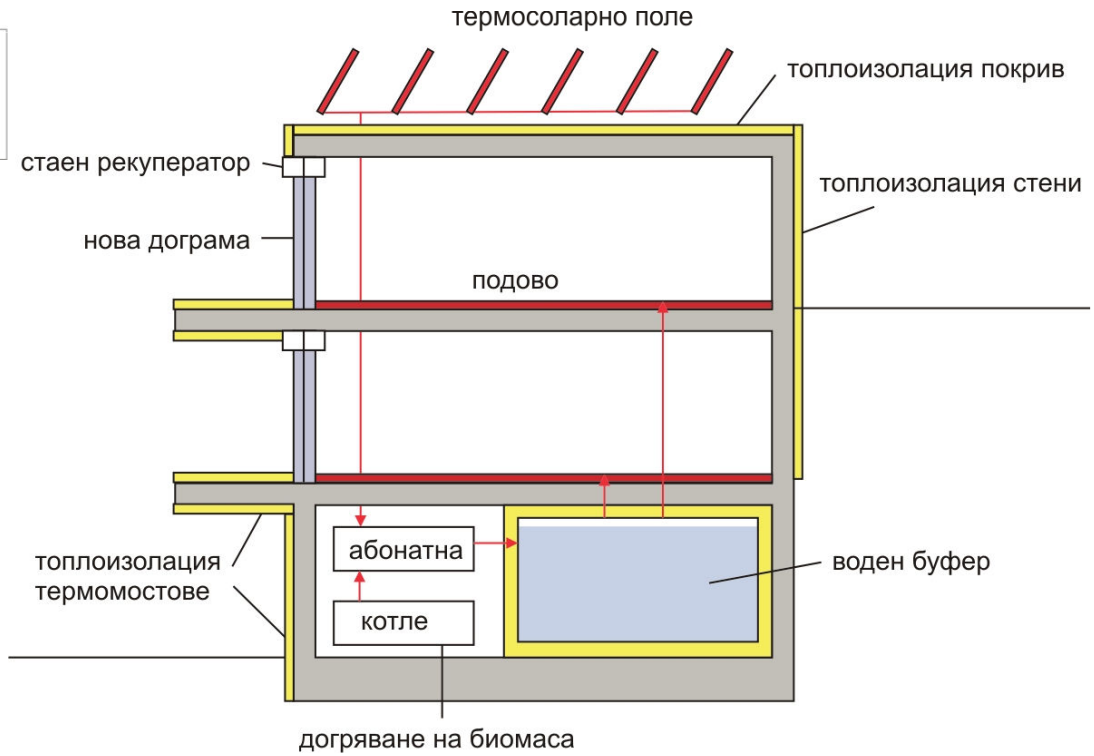








ДЕТСКА ГРАДИНА, КОЯТО ХАРЧИ ЗА ОТОПЛЕНИЕ ПОВЕЧЕ ОТКОЛКОТО ДАВА ЗА ЗАПЛАТИ



БЛАГОДАРЯ ЗА ВНИМАНИЕТО!

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