



SOLHUSET – LIONS ACTIVE HOUSE

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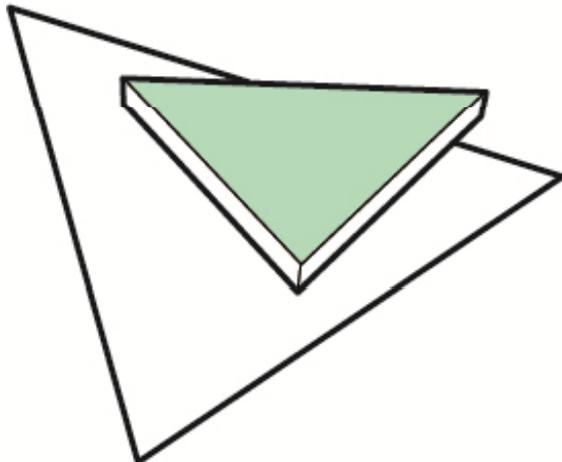
# SOLHUSET – LIONS ACTIVE HOUSE



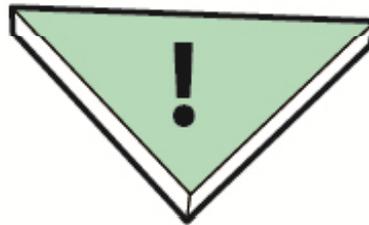
*Solhuset is the most climate friendly daycare centre in Denmark. It is self-sufficient with energy and built as an Active House, with specific focus on indoor climate, energy and environment.*



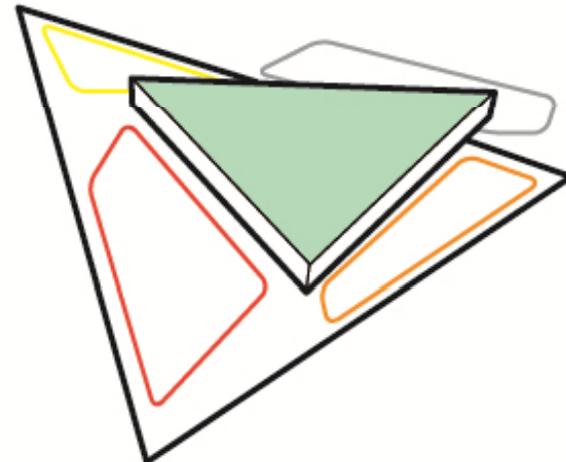
# SOLHUSET – SITE, VOLUME, ZONES



trekantet grund  
trekantet volumen

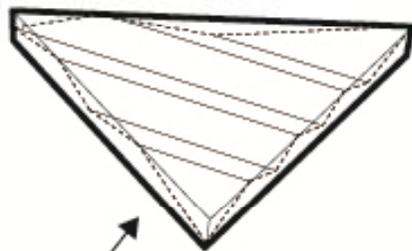


kompakt volumen  
Lille overflade - stort areal

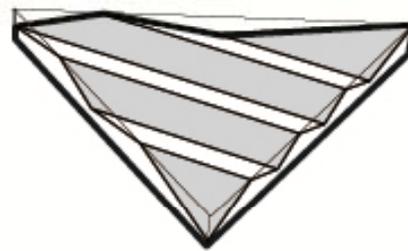


bygningen opdeler grunden i zoner

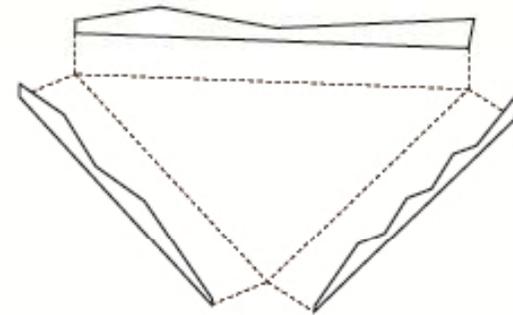
# SOLHUSET – ROOF, ENERGY, FACADES



SYD  
taget orienteres  
vinkelret mod syd



optimeret til solceller,  
solfangere og ovenlys



et varieret facade  
udtryk skabes.

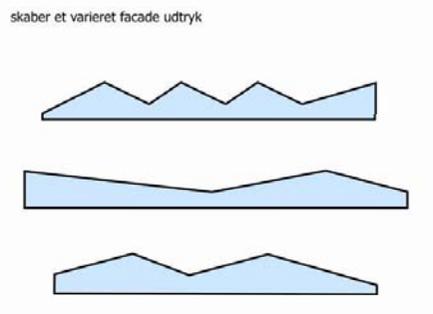
# SOLHUSET – SITE



# SOLHUSET – SITE



# SOLHUSET – FACADES



Façade facing SW, medium scale (adapted to nursing home)

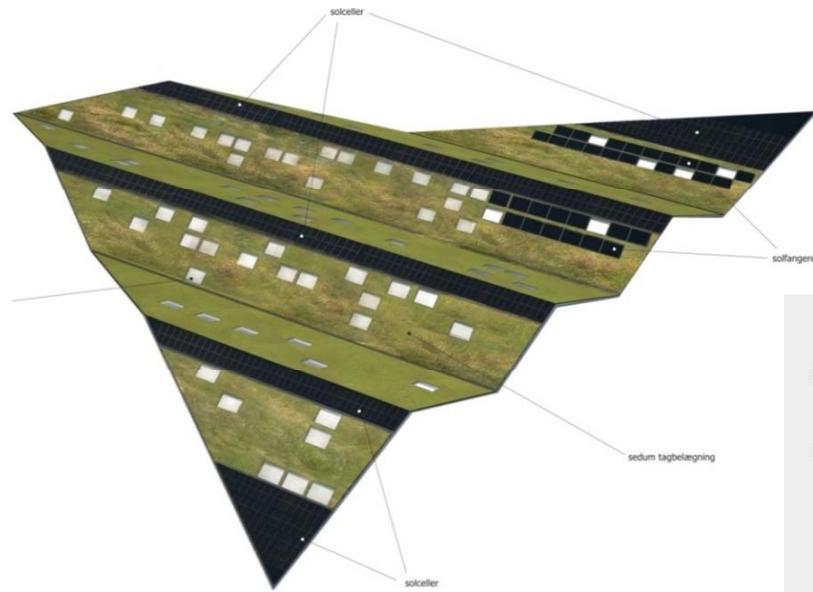


Façade facing SE, small scale (adapted to detached houses)



Façade facing Breeltevej, N, large scale (adapted to office domicile)

# SOLHUSET – SUNLIGHT HARVESTING



# Space

- the roof creates diversified spaces and daylight

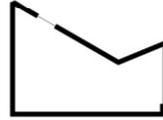
## GRUPPERUM



Grupperum 1



Grupperum 2



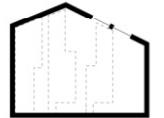
Grupperum 3



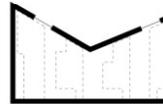
Grupperum 4



Grupperum 5



Grupperum 6

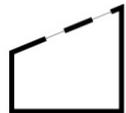


Grupperum 7

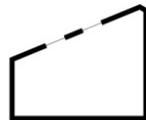
## FÆLLES



Fællesrum



Musik og Bevægelse



Gymnastik



Sanserum

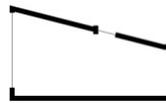


Kreative fag 1



Kreative fag 2

## PERSONALE



Personalerum

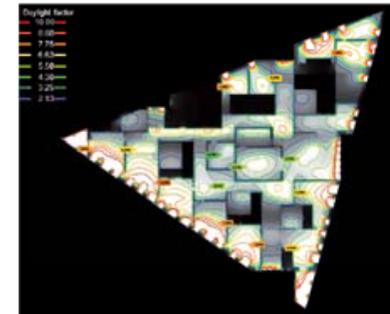
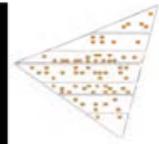
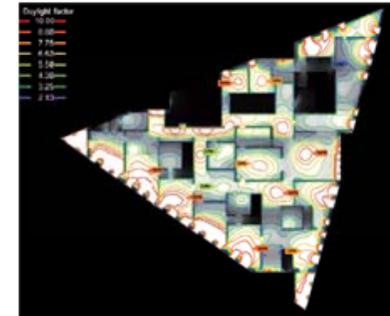
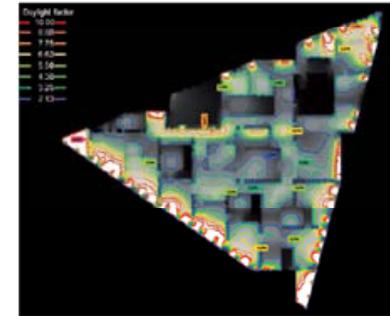


Leder og møderum 1 og 2



# SOLHUSET – DAYLIGHT

- optimization through VELUX Daylight Visualizer 2

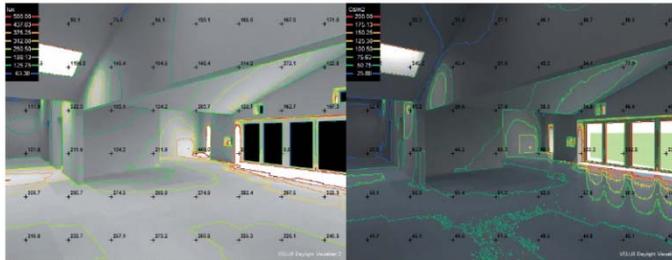


# SOLHUSET – DAYLIGHT

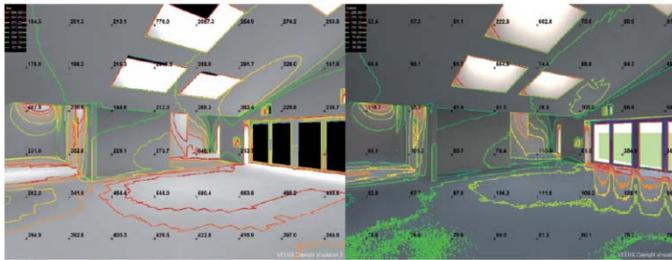
FÆLLESRUM  
Dagslydsdato: juni d.21

Siden model 1 er der tilføjet et yderligere vindue i dette rum, hvilket giver et forbedret dagslysniveau.

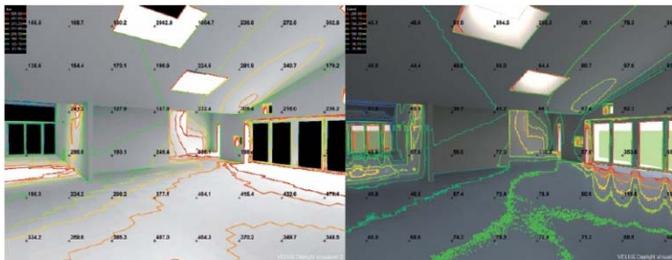
I den seneste model (nederst) er vinduerne rokeret for dels at skabe en bedre ventilation og dels en mere jævn fordeling af lyset i rummet.



Model 1 - venstre: illuminans / højre: luminans



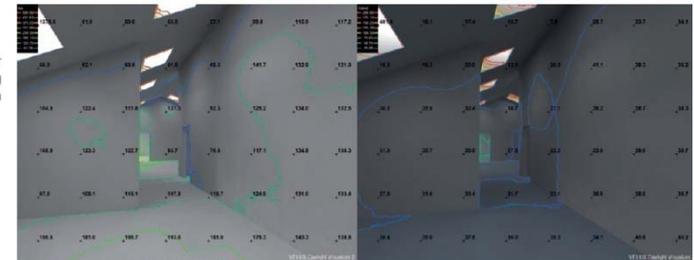
Model 2 - venstre: illuminans / højre: luminans



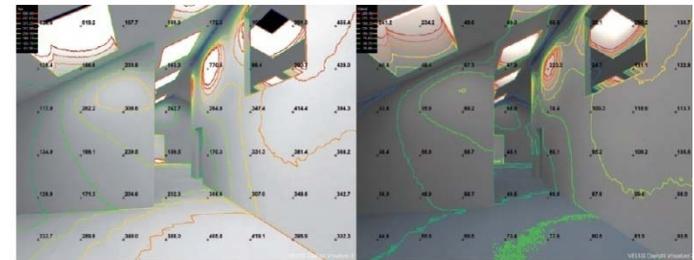
Model 3 - venstre: illuminans / højre: luminans

PLADSER VED GR.RUM 3/4 OG 5/6/7  
Dagslydsdato: marts d.21

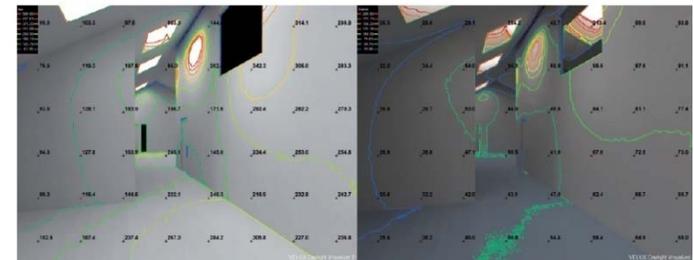
Udviklingen de tre modeller imellem viser dels det generelt højere dagslysniveau og dels en yderligere variation i lysfordelingen mellem plads og korridor.



Model 1 - venstre: illuminans / højre: luminans



Model 2 - venstre: illuminans / højre: luminans



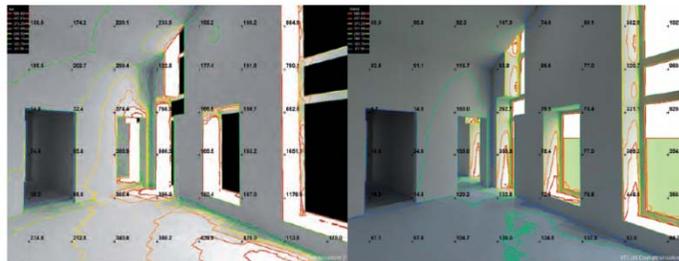
Model 3 - venstre: illuminans / højre: luminans

# SOLHUSET – DAYLIGHT

GRUPPERUM 6  
Dagslysdato: marts d.21

Der er ikke store variationer mellem udgangspunktet i Model 1 og de to efterfølgende modeller andet end at i Model 2 og 3 er et nordvendt vindue erstattet med et sydvendt af hensyn til energibalancen.

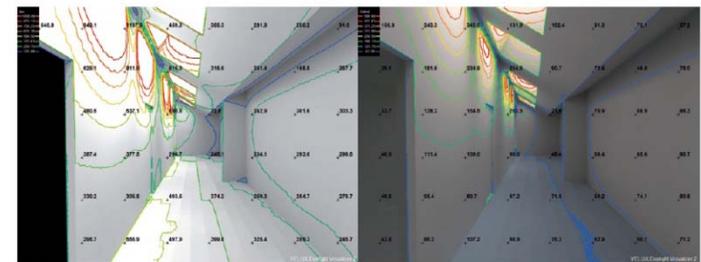
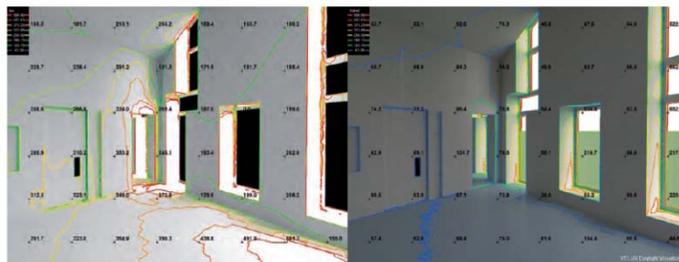
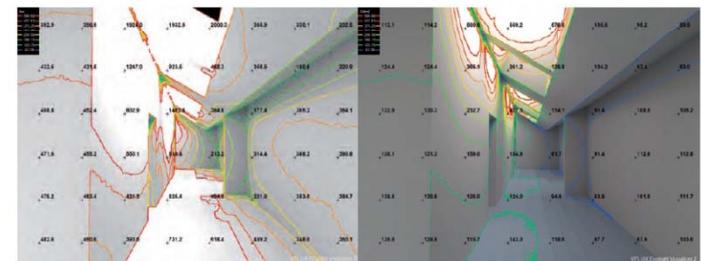
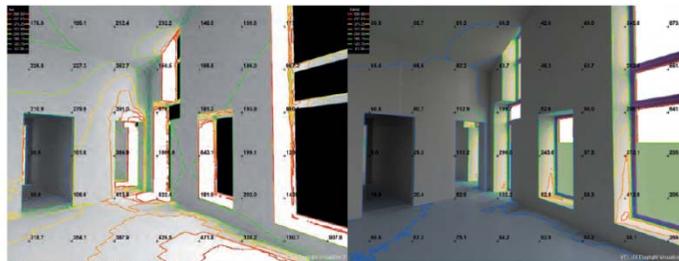
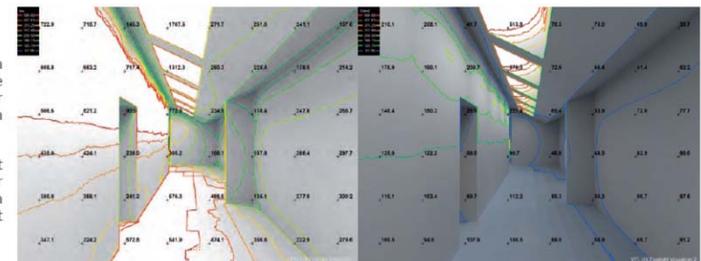
Den centrale forskel de tre modeller imellem er derfor lysningsstørrelserne og deres betydning på lysfordelingen.



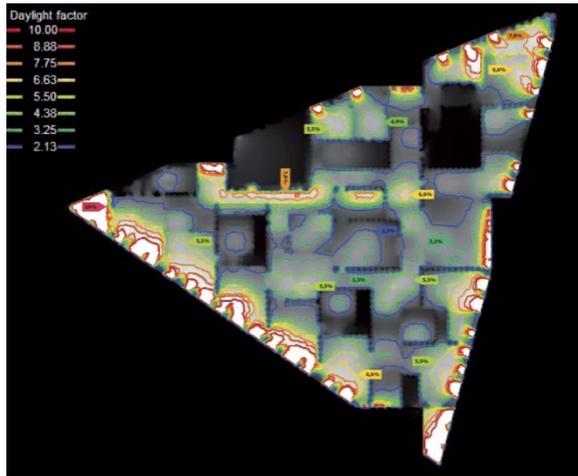
KORRIDOR LANGS LIGGEHAL  
Dagslysdato: juni d.21

Bearbejdningen af lysindtag i korridoren er rettet mod fordelte loftvinduer mindre jævnt over strækningen. Desuden er et par af loft vinduerne fjernet siden udgangspunktet i Model 1.

Det er dels at opnå en mere varieret lysfordeling langs korridoren og dels for at reducere det generelle lysniveau en anelse, der i udgangspunktet var noget voldsomt.



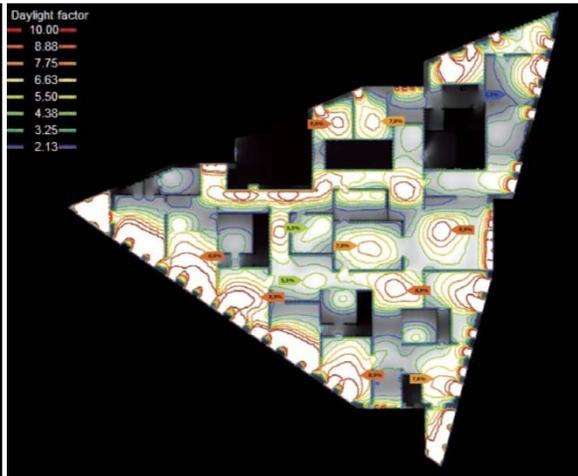
# SOLHUSET – DAYLIGHT



Initial design

The daylight conditions in the initial design are evaluated using the daylight factor (DF) performance indicator.

The simulation shows the areas of the building where the light levels are not sufficient, such as the gymnastic room located in the central part and the dining room facing east (e.g. 5% DF instead of 2% DF). By contrast, it shows high light levels in certain areas which could be used better if re-distributed.



Revised design

A revised window layout is proposed based on the findings made in the first evaluation, aiming to reach adequate light levels in the central parts of the building. This new model also included angle openings of the window linings.

The light levels obtained in the central part of the building and the dining room are much higher than in the previous model, ensuring that all the activity rooms have sufficient daylight.



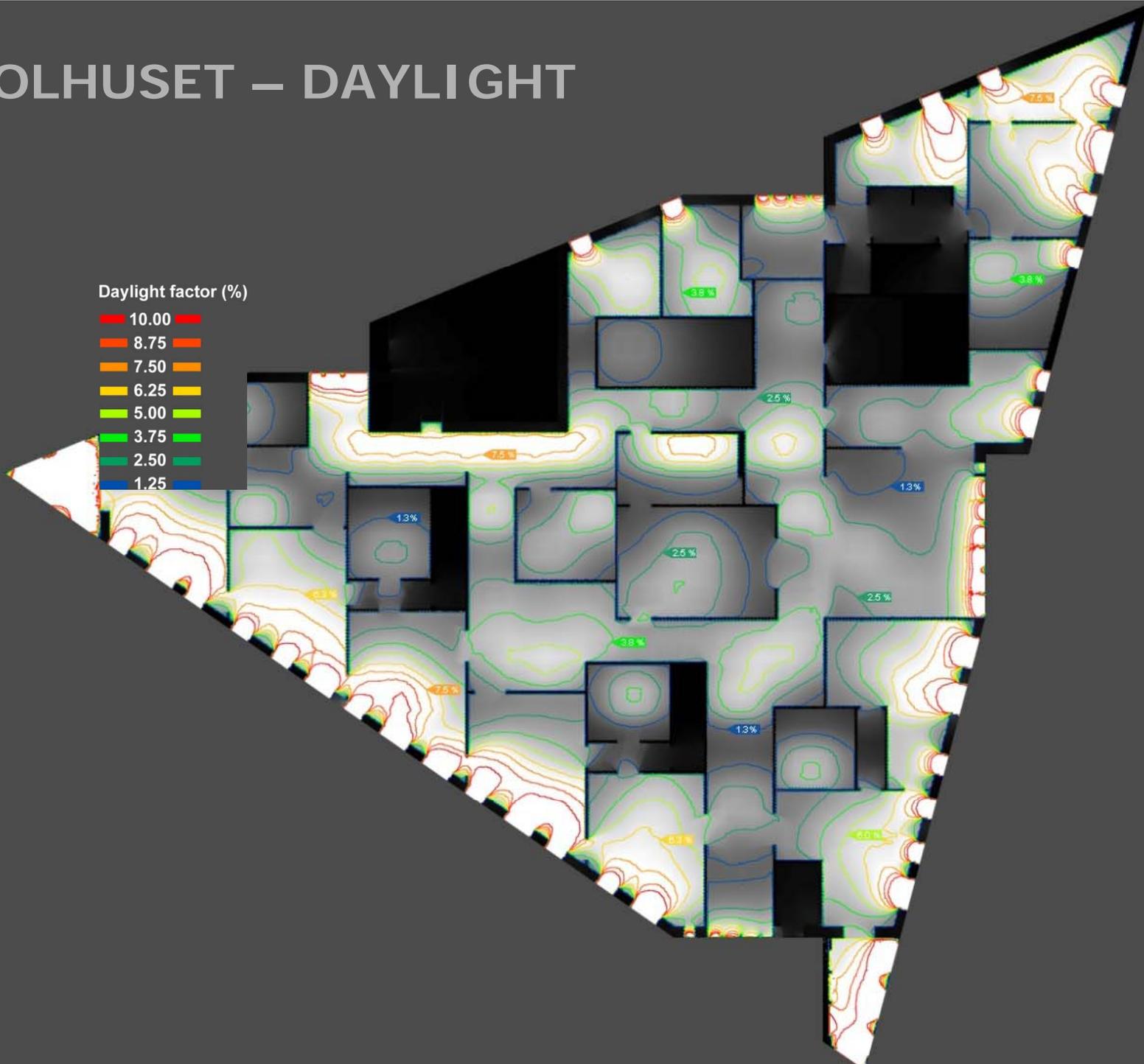
Final design

According to the architect, the number of windows and size of the window linings opening has been optimized in the final design to promote a more rational solution in terms of ceiling construction, while keeping a generous and good distribution of daylight inside the rooms.

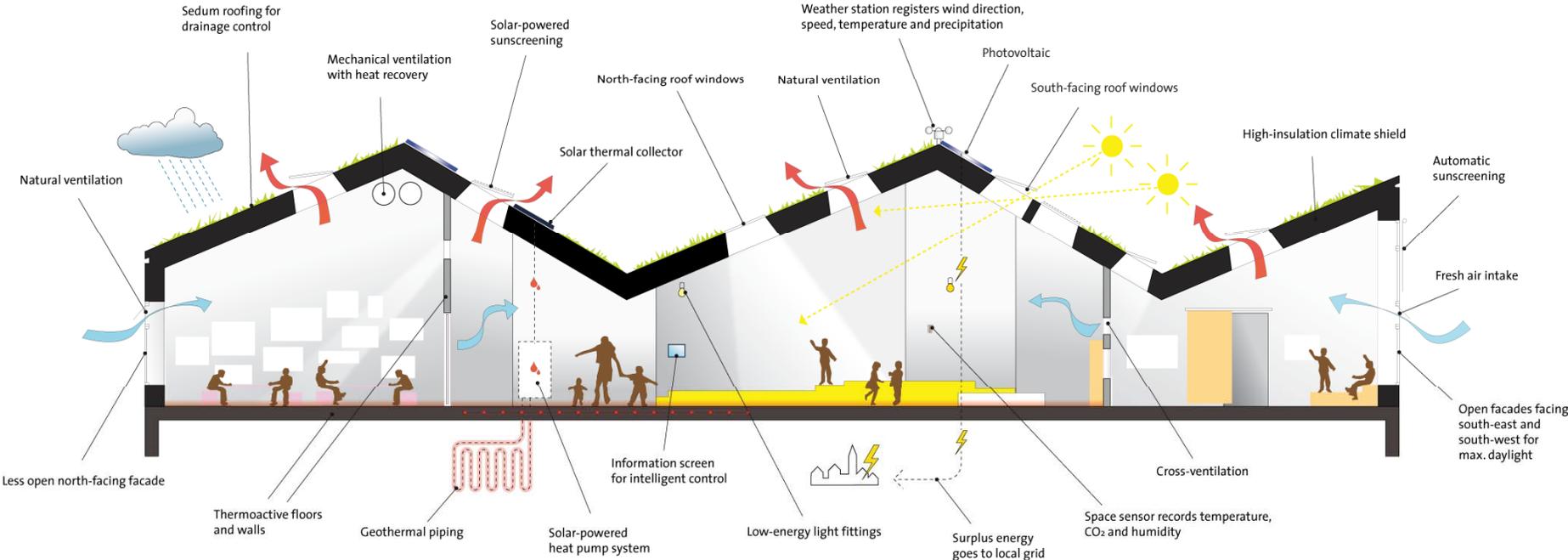
The daylight factor simulation of the final design shows a significant improvement over the results obtained with the initial design.

# SOLHUSET – DAYLIGHT

Daylight factor (%)

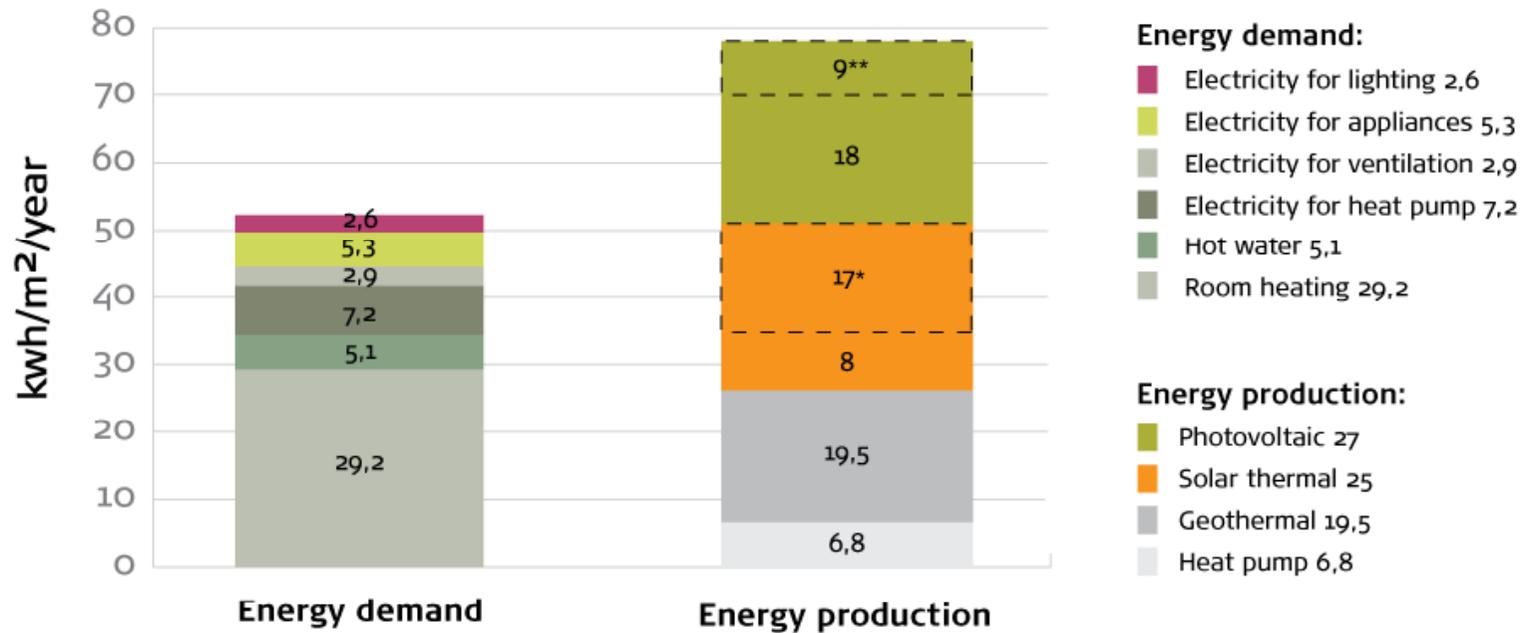


# SOLHUSET – ENERGY DESIGN



# SOLHUSET – ENERGY BALANCE

Estimated energy demand and production (total)



----- Surplus from electricity and heat production  
 \*Heat surplus is sent into the ground for storage or used for dishwasher  
 \*\*Surplus from electricity production

# SOLHUSET – MONITORING

## MIMA

*"Just imagine if the quality of our buildings was measured by their ability to improve life!"*

### Solhuset

Quantitative Performance  
Month Statement  
August 2012

September 5<sup>th</sup> 2012  
[SOL-MR-201208-v20120905]



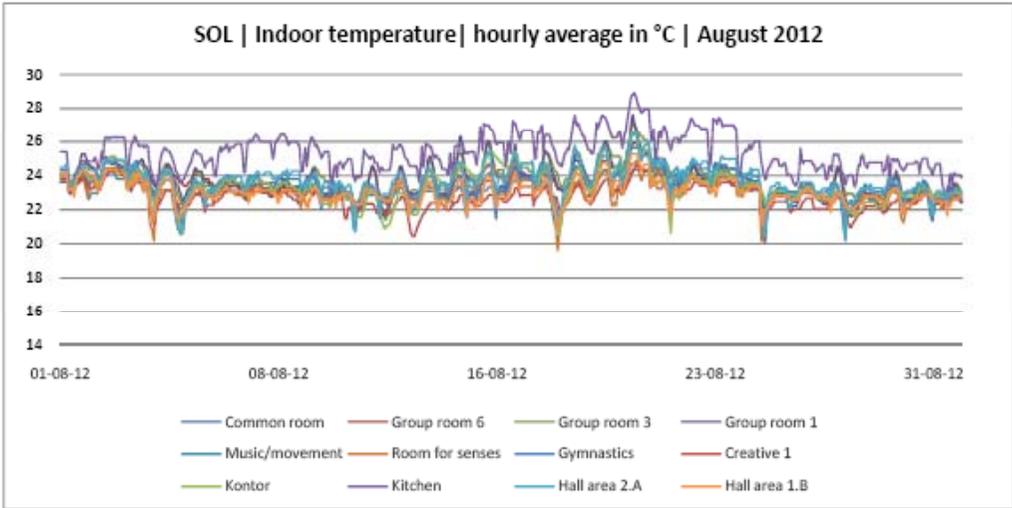
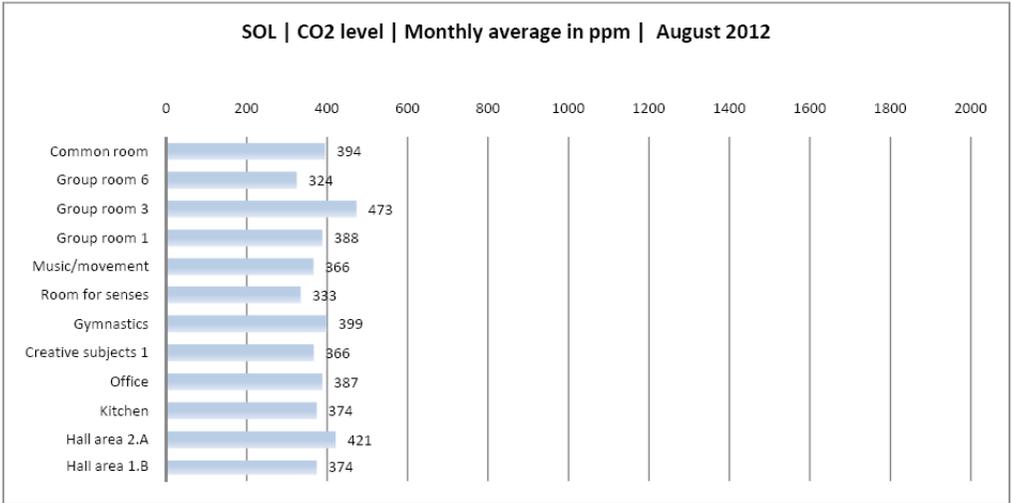


Fig. 12 | Hourly average indoor air temperature given in °C | August 2012



# SOLHUSET – MONITORING

## Calculated and measured energy performance

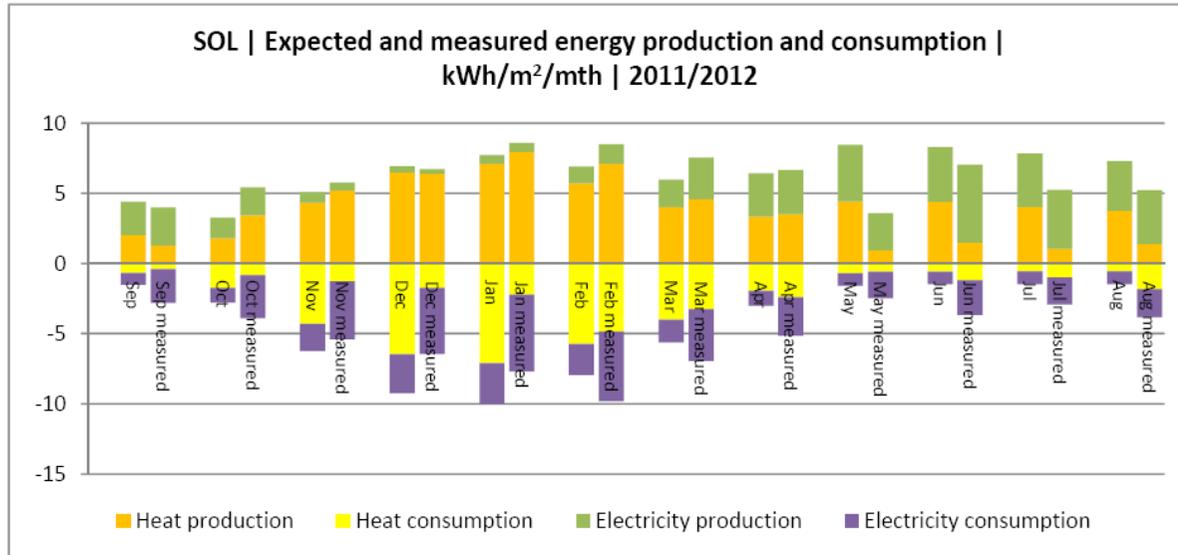


Fig. 3 | Theoretically expected and measured delivered energy given in kWh/m<sup>2</sup>/mth

	Heat production	Heat consumption	Heat balance	Electricity production	Electricity consumption	Electricity balance
<b>total calculated</b>	51,53	-34,28	17,25	27,06	-18,05	9,01
<b>total measured</b>	44,45	-21,46	22,99	29,79	-39,7	-9,91



*"Just imagine if the quality of our buildings was measured by their ability to improve our life"*

