HSB Living Lab

by Evdoxia Kouraki / 2016-07-06 15:29:39 / International / 13199 / EN

Primary energy need :

60 kWhpe/m².year

(Calculation method : Other)

ENERGY CONSUMPTION

Economical building *Building*

< 50	A
51 à 90	B
91 à 150	C
151 à 230	D
231 à 330	E
331 à 450	F
> 450	G

Energy-intensive building

Building Type : Collective housing > 50m
Construction Year : 2016
Delivery year : 2016
Address 1 - street : 412 58 GOTHENBURG, Sweden
Climate zone : [Dfb] Humid Continental Mild Summer, Wet All Year

Net Floor Area : 1 720 m²
Construction/refurbishment cost : 6 000 000 €
Number of Dwelling : 29 Dwelling
Cost/m2 : 3488.37 €/m²

Proposed by :

CHALMERS AKADEMISKA HUS TENGBOM

General information

The HSB Living Lab (Gothenburg, Sweden) is a habitation infrastructure, in the form of student housing, that aims to be a co-creative social space for experimenting with sustainable technology and lifestyle in order to develop innovative concepts and products. It has been developed through co-creative, open-innovation processes with HSB (Swedish Housing association), Chalmers University of Technology and Johanneberg Science Park along with other industry partners. Being a Next Generation Living Lab, it stands for optimization of the human interface in a real life context.

The HSB Living Lab is a third-generation Living Lab that is home to some 30+ students and researchers, who reside in the buildings 29 apartments. It is a unique venue for real-world, user-centred prototyping and innovation. Students and researchers collaborate with partners in industry and academia in the research and development of sustainable technologies and behavioural practices.

The HSB Living Lab allows researchers from academia and their industry partners to test on a small, but real life scale. Both short and long-term research-driven innovation projects will be conducted throughout the project's ten-year life span. Results may be presented in exhibition areas within the building, providing a

venue for enhancing understanding of sustainable solutions. The materials and methods tested here are expected to improve the quality and sustainability of building projects, both for new homes as well as renovations, accelarting the uptake of climate-smart innovation in the built environment.

The HSB Living Lab is a four-story modular building with residential and research sections. The infrastructure includes:
· Meeting rooms
· Showroom for project results
· Multifunctional laundry room
· Prototyping lab
· 12 Adaptable wall sections, which can be removed and replaced to enable testing of various innovative façade materials and assembly techniques.
· An extensive sensor network, providing precise measurements and data for research, development and innovation projects.

Next Generation Built Environment:

• This project is referred to as the third-generation of Living Labs because it is a real-world environment where target-users participate in both testing and development of innovative products and services. The main goal of the project is to identify and study the barriers and, thereby, to optimize the interface between human behaviour and technological systems.

• Since the co-creation takes place in the users' natural environment, i.e. during their regular living and working activities, the 3rd generation living lab is designed and equipped to allow systematic observations, measurements, evaluations and refinement of the starting hypotheses.

See more details about this project

https://www.hsb.se/kampanjer/hsblivinglab/

Stakeholders

Stakeholders

Function : Other consultancy agency

Johanneberg Science Park AB

Maria Ådahl, Director of Urban Development Open Arena, maria.adahl@johannebergsciencepark.com, Gothenburg, Evdoxia Kouraki, Project Manager- Urban Development Open Arena, evdoxia.kouraki@johannebergsciencepark.com, Gothenburg

http://johannebergsciencepark.com/
Building networks,contacts, expertise

Function : Others

Chalmers University of Technology

Shea Hagy, HSB Living Lab Project Manager, shea.hagy@chalmers.se, Gothenburg

http://www.chalmers.se/en/Pages/default.aspx

Function : Facility manager

HSB

Stefan Andersson, HSB Living Lab Project Manager, stefan.andersson@hsb.se

https://www.hsb.se/

Function : Thermal consultancy agency

Bengt Dahlgren AB

Henrik Jönsson , Project Manager at Bengt Dahlgren AB, henrik.jonsson@bengtdahlgren.se

http://bengtdahlgren.se/
Project partner, Building service system design, Energy & environmental consultancy

---

Function : Designer

Tengbom

Peter Elfstrand, Architect at Tengbom, peter.elfstrand@tengbom.se

https://tengbom.se/
sustainable home design feautures

Function : Others

Tieto

Linnea Kallgard, UX-Strategy and Co-Creation at Tieto, linnea.kallgard@tieto.com

https://www.tieto.se/
IT solutions, Digitalisation

Function : Others

Göteborg Energi

Claes Sommansson, Project manager at Göteborg Energi, claes.sommansson@goteborgenergi.se

http://www.goteborgenergi.se/Foretag
Energy company, district heating, energy services

Function : Construction company

Peab

Kristina Gabrielii, Sustainability Manager at Peab, kristina.gabrielii@peab.se

http://www.peab.se/
portability and production processes

Function : Site manager

Akademiska Hus

Per Loveryd, Energy strategy at Akademiska Hus, per.loveryd@akademiskahus.se

http://www.akademiskahus.se/
Owner of the area

Function : Others

Electrolux

Mattias Johansson, Innovation manager at Electrolux, mattias.johansson@electrolux.se

http://www.electroluxgroup.com/en/
Home appliances

Contracting method

Lump-sum turnkey

Energy

Energy consumption

Primary energy need : 60,00 kWhpe/m^2.year

Primary energy need for standard building : 80,00 kWhpe/m^2.year

Calculation method : Other

Breakdown for energy consumption : Heating (rom) 28,0 kWh/m2,år
Heating (ventilation) 1,0 kWh/m2,år
Hott water 17,7 kWh/m2,år
Electricy (pumps) 3,0 kWh/m2,år
Electricy (ventilation) 5,5 kWh/m2,år
Electricy (building conected) 2,3 kWh/m2,år
Electricy (user conected) 20 kWh/m2,år

Envelope performance

Envelope U-Value : 0,31 $W.m^{-2}.K^{-1}$

More information :
U-wal 0,136 W/m2,K
U-rof 0,1 W/m2,K
U-window 0,9 W/m2,K

Building Compactness Coefficient : 0,27

Indicator : EN 13829 - q50 » (en m3/h.m3)

Real final energy consumption

Final Energy : 80,00 kWhfe/m^2.year

Renewables & systems

Systems

Heating system :
- Urban network
- Others
- Water radiator
- Low temperature floor heating

Hot water system :
- Urban network

Cooling system :
- Others
- VAV Syst. (Variable Air Volume system)

Ventilation system :
- Free-cooling
- Double flow heat exchanger

Renewable systems :
- Other, specify

Renewable energy production : 40,00 %

Geothermal whitout Heat pump and low temeratured district heating.

Smart Building

BMS :
Contolunits conected to OPC-server via MODBUS.

Environment

Urban environment

Temporarily utilising land enables new residences to be erected quickly and simply. Locating HSB Living Lab at the Campus Johanneberg provides a clear geographic proximity to the researchers who are already involved with projects in the infrastructure, as well as researchers and students who might utilise it in the future. Likewise, there are potential synergy effects through the Built Environment cluster that is emerging under the roof of Johanneberg Science Park, which houses various companies and organisations that are active participants in the HSB Living Lab collaborative project. Except for its proximity to the Science Park, the Living Lab is located in an area where other innovative projects rlatd to urban development are taking place. For example, the Positive Footprint House, a research and housing project for sustainable housing and the Electric Volvo bus line which has its charging station few meters away from HSB Living Lab.

Products

Product

The laundry room & community hall

Electrolux, Tengbom, HSB

Mattias Johansson mattias.johansson@electrolux.se and Peter Elfstrand peter.elfstrand@tengbom.se

http://www.electroluxgroup.com/en/electrolux-opens-laundry-studio-for-more-sustainable-housing-21151/ and http://en.tengbom.se/

Product category : Management / Implication des parties prenantes

This laundry studio gives the opportunity to challenge how we currently deal with textiles as well as develop simpler, more pleasant and sustainable ways of handling the laundry in the future. With energy-efficient and silent machines, the laundry room becomes a social meeting place for the residents. Electrolux has access to a unique research platform that gives them the opportunity to work closer to the researchers at Chalmers University and manage projects in textile care together with company partners and/or the researchers.

This product is a result of open innovation workshops in which participated the HSB Living Lab partners and students from Chalmers and Rice University.

Costs

Contest

Reasons for participating in the competition(s)

HSB Living Lab is a smart building and can be the winner of users' choise because of:

- **The 2000 sensors that measure every detail.**

We have installed more than 2000 meters to really measure what is happening at a high granularity level and the systems around the building to use that information in the light of energy savings and applied innovations.

- **The common research fund for testing & developing innovations.**

We have a smart building because we have integrated it with Chalmers University, HSB, Johanneberg Science Park and a group of smart companies that have made a research fund of over 0,25 MLN a year, for ten years, to test and develop innovations inside the building. The residents are integral in supplying feed-back and taking part in open innovations sessions with the companies and scientists.

- **Its 44 steel modules.**

HSB Living Lab is made up of 44 steel modules. Their steel construction lets us adjust their dimensions and build multi-storey buildings, too. The modules' fast assembly time meant we could close part of the road below for just over a week, having buses and other traffic make a small detour, while lifting the building into place using a crane; a solution that would have been next to impossible if the building had taken the usual 18 months to erect. Rapid construction is one of the many advantages we see in building in module-form. Another is safe, dry, indoor construction. It's a combination that's hard to beat.

HSB Living Lab's construction is a research project in itself. We aim to investigate whether construction using modules and temporary building permits is a sustainable, economical, environmentally-friendly and socially-viable business model. We believe this approach could be the key to producing new homes quickly – a must for tomorrow's cities.

- **The new approach to architectural design.**

HSB Living Lab is a temporary structure meant to be dismantled and relocated after ten years. The building's temporary nature doesn't mean it gets a free pass on functionality, though. It must still meet the needs of everyone who lives here. It is a building that takes a new approach to design, using smart "cubic" solutions, instead of the traditional 2D mind-set.Our focus is function and flexibility. Our mantra is adaptability. Our aim is to work together to produce sustainable products and services for the homes of the future.

- **The low-temperature, return district heating system.**

The building's own heating system consists both of ordinary radiators and underfloor heating. This system is unique in that it has been adapted to heat the building using low-temperature return heat. Inside HSB Living Lab's distrct heating substtion are three flow pipes insted of the usual two, which is the biggest difference compared to an ordinary building. Outside the substation, both an ordinary high-temperature supply line connection and two low-temperature return line connections enter.This means we can heat the building using heat sources other than return heat when we relocate it in the future. The advantage of low-temperature district heating systems is that local waste heat, small-scale heat production and energy storage can be used more effectively, making them an attractive part of future energy systems. Flexibility=efficiency=sustainability!

- **The building's indoor environment.**

Cleaner and greener living is our ultimate aim therefore we measure ammonia emissions, carbon dioxide, mould spores and other substances that might exist in the rooms as well as the substances their paints and floorings release into the air. Our aim is to assess the air quality inside HSB Living Lab and to see if any reactions occur when different emulsions/emissions mix. What happens to the air we breathe when we add a new sofa to the room? Does it matter what material the coffee table is made from? We have already started taking measurements and the first samples have been sent for analysis.

- **Its laundry room and community hall.**

In the building a futuristic laundry studio has been designed in order to create an integrated lounge/laundry room furniture suite – a place where you can hang out with your neighbour and have a cup of coffee while you wash. The research that will be conducted here will have a social focus to begin with.

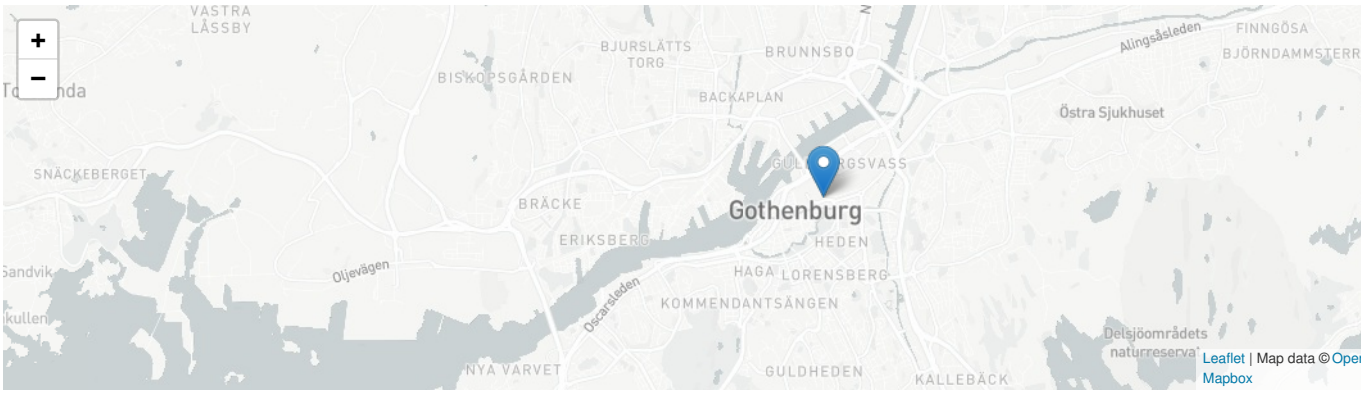
- **The White room**

The White Room has no fixed furnishings, but is a space dedicated to dynamism. It gives both Chalmers and every researcher everywhere the opportunity to test new ideas, research the sustainable housing solutions of the future and, hopefully, create world-first results.

Building candidate in the category

Smart building

Users' Choice Award



Date Export : 20230728163648