

Green Building Certification for the Siemens Headquarters in Munich, Germany

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Abstract: Sustainability is a key aspect of the corporate strategy of Siemens AG that also impacts on Siemens' own property portfolio. For instance, in the last three years, Siemens Real Estate has constructed about 800,000 square metres GFA based on green building aspects and certified in line with LEED or EU green building criteria. The targets are particularly high for the new Headquarters in the heart of Munich: "We're going to create a groundbreaking symbol for sustainability that sets standards in modern urban architecture and innovative, efficient building technology. Our employees and the people of Munich will benefit from this," said Peter Löscher, CEO of Siemens AG, pointing out the advantages of the new company headquarters.

This ambitious target is also underpinned by the national certification system of the German Sustainable Building Council (DGNB). Consequently, the aim is to achieve "LEED Platinum" status under the international Green-Building Standards and "DGNB Gold" under national criteria. This applies to the new building as well as the existing buildings, Wittelsbacherplatz 2 and the Ludwig Ferdinand Palais.

Keywords: Sustainability, LEED, DGNB

Urban Regeneration of the Surroundings [2]

The new Siemens Headquarters occupy the entire area between Finkenstrasse and Jägerstrasse in the south and north and Kardinal-Döpfner-Strasse and Oskar von-Miller-Ring in the east and west. The urban situation around the block is highly varied.

The aim of the construction project is to upgrade the space around the location and the green area towards the Altstadttring. There are plans to upgrade the area by planting trees and redesigning spaces with surfaces, vegetation and street furniture. In the east, a stairway leads between the level of the green area and the entrance to the western courtyard along Finkenstrasse to the west. This will make the green area another key part of the inner-city connection between the old town and the art district.

Courtyards and Thoroughfare [2]

A public thoroughfare will be created between the two prominent urban areas of, the classical Wittelsbacherplatz and the new, modern forecourt on Oskar-von-Miller-Ring by a series of courtyards. The concept of the building designed by the Henning Larsen Architects takes up the familiar Munich topology and gives it a modern twist. The entire body of the building forms a city block with a classical perimeter development of the surrounding streets. A total of 6 courtyards are carved into these bodies. Two covered ones will be part of the Siemens interior, while the other

four courtyards constitute open outdoor spaces with public access.

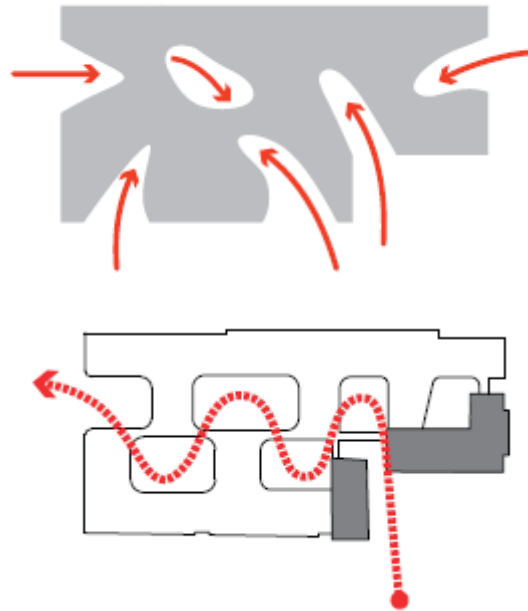


Illustration: Thoroughfare of inner courtyards [2]

Waiting areas and seating among a small cluster of trees are provided in the inner courtyards, together with outdoor café facilities. All courtyards feature a homogeneous natural stone floor that runs through all the areas like a carpet. Different styles of vegetation,

fixed furniture and lighting give every courtyard its own distinct character.

By allowing the public access to the ground floor areas, Siemens is connecting with the public, and the intention is to create attractive recreation areas that can be used both by employees and the general public.



Illustration: Siemens Headquarters inner courtyard [2]

Sustainability targets

The ambitious sustainability targets mainly include the main topics Sustainable Sites, Water Efficiency, Energy & Atmosphere, Material & Resources, Indoor Environmental Quality, Innovation in Operation, Regional Priority. The DGNB evaluation is also based on the entire life cycle of the building and the above mentioned topics.



Illustration: DGNB criteria [5]

Energy and resource requirements of the building have a significant influence on the sustainability targets. Primary energy consumption is about 40 kWh/square meter and year and therefore 66% below the legally required value.

Such ambitious targets can only be met, if the planning team is given in-depth support and if the targets are continuously monitored from the construction phase

Public facilities such as galleries and restaurants will be housed inside the ground floors. The restaurants will have sufficient capacity to provide lunch for Siemens employees as well as serving food for the public and being used as normal restaurants in the evening. The restaurants are situated on the ground floor and first floor of the Wittelsbacherplatz 2 property and on the ground floor of the middle building element with a façade in the direction of the two internal courtyards. of the building to the commissioning phase. After the building users have moved in, the optimization phase will follow. On this basis, a building will be developed which will meet the following requirements for the building envelope.

1. Highly insulated envelope with excellent insulation properties
2. Moderate quantity of glass in the façade
3. Effective external solar protection in all areas
4. Use of daylight through atriums, selection of building geometry and façade properties
5. Moderate spatial depth and arrangement of permanent workplaces

In the utilization areas, a highly flexible air conditioning and lighting concept geared towards the individual utilization areas is being developed to take, into account the comfort and individual needs of people wherever possible and reasonable. The following components significant:

1. Possibility of individual window ventilation
2. High comfort levels as per DIN EN 15251 category 1 or 2
3. Large surfaces for conveying heat and cold to the rooms ensure a convenient radiation level
4. Use of local resources such as free cooling or integration of waste heat
5. Requirement-oriented ventilation system to ensure hygienic air renewal
6. Individual adjustment of the set point for the room temperature via the building management system
7. Intervention in workplace-specific lighting
8. Requirement-controlled LED lighting for basic lighting and workplace lighting

The climate concept is selected in such a way that all available local resources are used as much as possible. The following features are significant in this respect:

1. Use of the locally available geothermal heat for operating the heat pump and re-cooling the refrigeration machines
2. Free cooling via the available re-cooling systems on the roof and free cooling of the atrium

3. High-efficiency refrigeration machines with magnetic bearings, which are also operated as heat pumps for heating purposes
4. Photovoltaic systems on the roofs in order to reduce the external power obtained from the public grid as much as possible
5. Use of waste heat in the refrigeration machines
6. Use of locally available district heating to cover peak loads

For the distribution of heat, cold and air, care is taken to reduce pressure losses, and only variable-speed Siemens-built drives with the highest efficiency class are used.

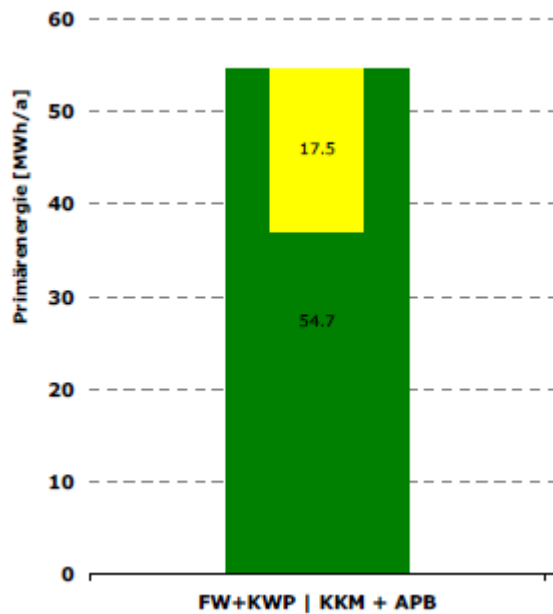


Illustration: Primary energy requirement of the entire building [1]

This means that, the required values are approaching the target for so-called “nearly zero energy buildings” of EU Buildings Directive 2010/31/EU (EPBD 2010) as much as possible. Future energy requirement will be covered via certified resources in an almost literally climate-neutral way to avoid hazardous emissions in this field as well.

Siemens innovations [6]

Special attention is given to the integration of Siemens' own innovations from the company's environmental portfolio, such as Green Leaf, building performance optimization and building automation systems, which underlines the company's innovative strength and will be presented to building users and visitors in the context of several showcases.

Green Leaf



Illustration: Product information Siemens [6]

The intelligent DESIGO TRA room climate control system enables energy-optimized operation of the heating, ventilation and air conditioning as well lighting and shading via RoomOptiControl – without any loss of comfort. RoomOptiControl detects any unnecessary energy usage and indicates it via the Green Leaf symbol on the room control unit. Green signals an optimal operating mode, red points to unnecessary energy consumption caused by individual user interventions such as opening the windows for too long, opening the blinds in sunshine or too highly dimmed light values. By simply pressing on the symbol, the room control system returns to energy-optimized operation. By actively integrating the room user, energy savings up to 25% can be achieved.

Building Performance Optimisation



Illustration: Product information Siemens [6]

The full potential of modern building technology with regard to economic viability, efficiency and comfort can only be exploited in a continuous process (BPO –building performance optimization). Energy

monitoring helps to measure all the relevant consumption values such as heating, cooling, power, water and other media. On the basis of the information won in combination with benchmarks, the energy reduction potential can be identified and optimization potentials derived.

This makes cost-optimized implementation of the measures possible – and guarantees that the achieved savings are maintained by the supervision of essential operating parameters such as the energy consumption and the system messages. When excess consumption occurs, for example, the critical and target values are measured and dealt with, thus identifying the areas with further need for optimization in the short and long term.

Building automation system



Illustration: Product information Siemens [6]

The DESIGO building automation and control system features open and standardized communication functions and interfaces in terms of current and future communication technologies, enabling easy interaction with other building system components. The DESIGO building automation and control system consistently relies on open communication and thus achieves simple technical interconnection of the most various technical building systems – on the basis of open and standardized data interfaces:

1. Ethernet TCP/IP network protocol
2. BACnet from room automation to management level
3. Konnex (KNX), DALI, EnOcean for networking room automation systems
4. M-Bus, Modbus, OPC and other interfaces for the universal connection of devices and systems from other manufacturers

The open and programmable PXC3 room automation stations from DESIGO TRA integrate DALI and KNX devices and communicate with the automation

level via BACnet/IP, enabling the need-optimized demand of the primary systems.

The building automation system offers full flexibility with regard to changing requirements and upgrades, thus securing the investments over the entire lifecycle of the building.

Other additional showcases are being implemented, which emphasizes the innovative character of the group. These include

- LED lighting in all areas of use
- E-mobility
- Energy-efficient electric drive
- Smart Building
- Smart Grid
- Photovoltaic systems, etc.

CONCLUSION

In line with its slogan "think global, act local", Siemens is constructing its new Headquarters in Munich city center, not only giving its employees an outstanding new building, but also bringing Munich a lot nearer to meeting its ambitious climate protection targets [4].

REFERENCES

1. Transsolar, draft report, "Integration von Energie- und Nachhaltigkeitszielen in den Gebäudeentwurf" (Integration of energy and sustainability targets in building design), Björn Röhle, Stefan Holst, Martin Gut, Tina Braumandl, Munich 29 April 2013
2. Henning-Larsen, draft report, SH-GP-HLA-GS-Architectural_Report, December 2012
3. ag Licht, draft report, SH-B0-AGL-GV-Tageslicht, March 2013
4. The "München für Klimaschutz" (Munich for Climate Protection) alliance Report – Configuration Phase State capital Munich, Department of Health and the Environment, March 2010
5. DGNB evaluation criteria, homepage: <http://www.dgnb.de>
6. Illustration: Product information Siemens

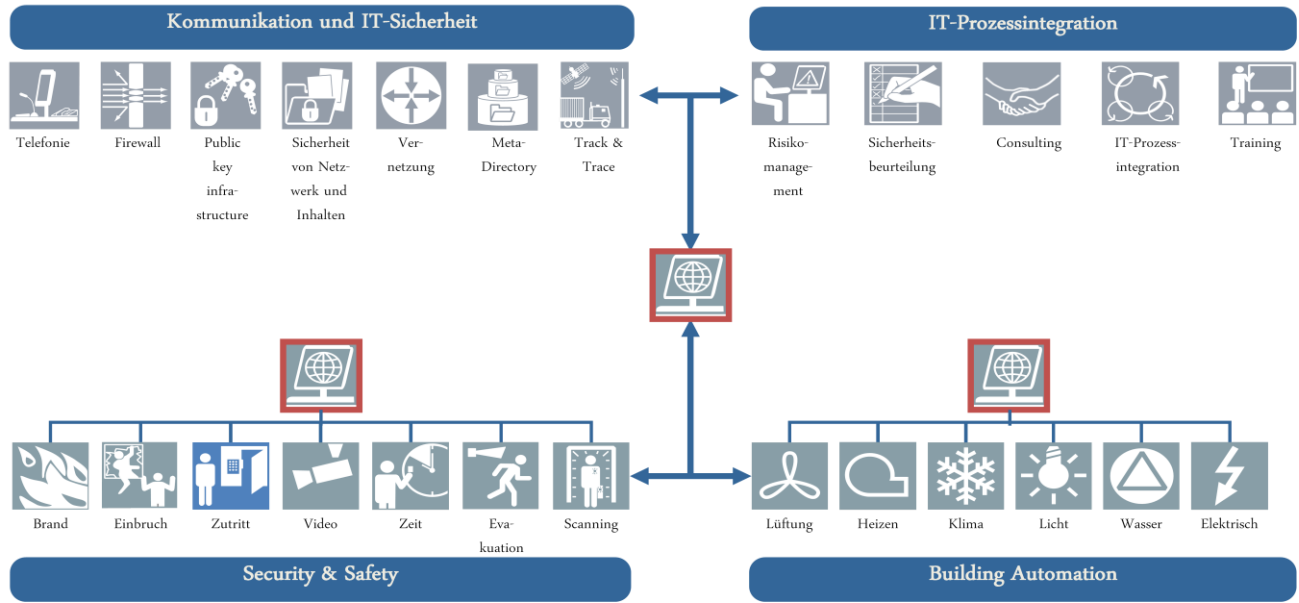


Illustration: Product Information Siemens [6]