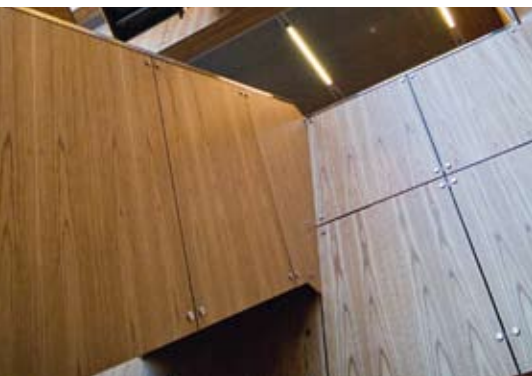


Green Buildings in Stockholm



Property owners pitching in!

Stockholm has been named European Green Capital 2010, in competition with 35 European cities. This is a result of decades of environmental work, and an acknowledgement of the environmental and climate goals we have set up for the future. As Deputy Mayor with responsibility for the Environment and Traffic Division, it is high on my agenda to maintain and develop the pole position that Stockholm enjoys as an environmental role model for the world's cities.

In order to be successful, environmental efforts must be kept up continuously and be a part of the daily work. Environmental technology has been a good help in this work and has taken us a long way. I never stop marvelling at the incredible amount of good ideas that are constantly being born in this area. However, technology cannot do it all. An ever so fuel-efficient car will use even less energy if it is driven correctly. Batteries don't end up in the recycling bin by themselves. That's where each and every one of us has a responsibility. An energy-efficient building must be

maintained and used in the right way. Advanced technology demands correct and qualified handling in order for its possibilities to be fully utilised.

The goal of the City of Stockholm is to lower its CO₂ emissions to three tons per capita by 2015. We are working purposefully to make energy consumption more efficient in the city's own properties. The environmental work carried out by other city departments and companies is not enough to reach that goal, and others must help out. We know that there is a large environmental commitment among citizens and businesses. This brochure shows the commitment prevalent among real estate owners all over the city for creating a better environment. For the businesses that have not yet started down the road towards energy-efficient operations, I hope that these texts will serve as a source of inspiration. Enjoy!



Ulla Hamilton
Deputy Mayor, Environmental and Traffic Division



GreenBuilding – a European Union initiative

The EU has set a goal of decreasing CO₂ emissions as well as Europe's dependence on imported sources of energy. The high energy consumption in buildings and the large efficiency potential has provoked the EU into putting the spotlight on the building sector. Therefore, together with the implementation of energy performance

certificates for buildings, the EU is launching the GreenBuilding Programme.

GreenBuilding is aimed at companies and organisations, public and private, who wish to improve energy efficiency in non-residential buildings. GreenBuilding takes energy performance certificates one step further by demanding that the

recommendations in the energy performance certificates are actually carried out.

Every enterprise wishing to be part of GreenBuilding must decide for itself the level of its involvement. It can comprise one or more existing properties, new constructions or buildings that have been refurbished during the last five years. Membership in GreenBuilding is free of charge.

GreenBuilding has two levels of participation for Partners:

1. Corporate level

The real estate company owns ten properties or more. More than 30 percent of the company's existing properties in Europe must live up to GreenBuilding guidelines. For new buildings, 75 percent must live up to the guidelines.

2. Property level

One or more of the company's buildings are chosen for an Energy Audit and an Action Plan. It is possible to add on buildings to GreenBuilding at a later stage, or to switch from Property level to Corporate level.

Regarding existing buildings, the guidelines say that the energy consumption of the building must be 25 percent lower after refurbishing. Even for buildings that have been refurbished or constructed within the last five years, energy consumption as a result of the changes should have decreased by 25 percent. Alternatively, the building should use 25 percent less energy than the Building Regulations (BBR) of the Swedish National Board of Housing, Building and Planning (Boverket).

For enterprises participating with newly constructed buildings, these should use 25 percent less energy than what is stated in the BBR (BBR regulations plus a possible addition for ventilation of the building).

Source: The Swedish Property Federation (Fastighetsägarna).

www.fastighetsagarna.se

www.eu-greenbuilding.org





Pelarbacken on the island of Södermalm.

AMF – Pelarbacken

The property Pelarbacken Mindre 23 is located on the island of Södermalm in Stockholm, at the intersection of Kapellgränd and Östgötagatan. The name “Pelarbacken” comes from the 16th century when three calvary stones were raised on the site, with motives depicting Christ on the cross. People in general called the stones “Pillars”, which led to the name Pelarbacken (=“Hill of Pillars”).

The ten-storey building from the early 1960s has been completely renovated and will be ready for occupancy during 2010. Already during the planning stage it became clear that the building had a good chance of lowering its energy consumption.

Modern solutions

All outdated technology in the building has been exchanged in favor of modern solutions. The outer surface layer has been replaced and two highly efficient air treatment units with up to 90 percent effectiveness have been installed. This,

together with the ability of the frame to accumulate heat and cold, means that its energy consumption is expected to decrease drastically from 168 kWh per square meter and year to 80 kWh per square meter and year. Simultaneously, floor space has been increased by 500 square meters since the ventilation units have been moved from their higher location to a former storage space in the basement.

Better control of energy use

Also, for the first time, forecast control is being tested in a property, in which weather data is sent to the building and used to further increase energy efficiency and prepare for coming changes in weather. Measurements of external temperature, wind speeds and solar radiation are monitored and fine-tuned continuously.

The new energy management system of AMF, launched in 2009, entails weekly supervision of properties, which allows rapid detection of fluctuations in consumption. Each month, an energy group consisting of all technical managers and an energy controller goes through the figures for energy consumption.

“Energy is high on our agenda and our new energy management system is now implemented. A general energy inventory has been carried out in all properties in connection with the energy performance certificates. Now we are entering phase two, where we will carry out further optimisations in the properties where there is

potential for it”, says Michael Eskils, Head of Technology and Operation.

Long-term goals

A more long-term goal within AMF is to reduce energy usage by up to 25 percent in certain properties. To achieve this, cooperation and knowledge are vital. For example, all operative staff will be trained in the new web-based energy follow-up system EUS.

“It is necessary to have a common structure. The important thing about the energy management system is that you follow up and analyse data together. It is very important that the entire organisation becomes involved, and that there is a focus on these issues within top management. Everybody has to get in there and fight”, says Michael Eskils.



Michael Eskils, Head of Technology and Operation

Facts about Pelarbacken

Construction year: 1961

Floor space: 21,200 m²

Previous energy consumption:
168 kWh/m² per year

Current energy consumption:
80 kWh/m² per year



Brostaden's main office on Bolidenvägen is GreenBuilding classified.

Brostaden

It has been almost ten years since Brostaden commenced its environmental work. Today the company has 36 properties in the Stockholm area which are GreenBuilding classified. Since more than 30 percent of its total holdings meet the GreenBuilding criteria, Brostaden is also a Corporate Partner of the programme.

Energy efficiency is important since Brostaden manages and owns its property stock. The company simply must think long-term and sustainable in order to achieve a higher return on investment.

Usage cut in half

The company's properties have an average total energy consumption of 139 kWh per square meter and year, and during 2008 it managed to decrease its CO₂ footprint by 52 percent.

“Our existence rests on us delivering good results. It's about owning and managing, which means we can make investments on a little longer time scale”, says Marketing Manager Anders Hallqvist.

A method to the work

It's methodical work, and with a large portion of houses constructed in the mid-80s it has been only natural to replace aging process control equipment. In certain cases, this has resulted in a 20 percent decrease in energy consumption. Modern sun-reflecting windows have been installed in most houses, and with only non-residential buildings in Brostaden's portfolio, ventilation is demand driven and turned off during holidays, evenings and weekends.

Continuity and fine adjustment

The energy management system is the core of the environmental work. Monthly coordination meetings with continuous follow-ups provide solid assurance that property management works. Judging if a building needs fine tuning becomes a quickly administered task.

“What happens during a year is that we have monthly meetings where we meet entrepreneurs and go through the stock, building by building, reading off statistics. We adjust the buildings to their consumption. If a tenant moves out, we of course lower the temperature in that space”, says Environment and Technical Manager Bo Matsson.

Decentralised power structure

There are several explanations to why Brostaden has come so far environmentally. Short decision processes where the technical department has operated as a headquarters, with overall responsibility for operations, has led to favourable results. To quality-proof the work, an external environmental accountant is brought in to follow up the environmental goals, and there is a noticeably growing interest from the outside world as well.

“We like to talk about our operations. In our line of work, small changes can have a large effect. There is plenty of interest. We have had visits from many politicians from parliament, and they are very interested”, says Anders Hallqvist.



Bo Matsson, Environmental and Technical Manager

Anders Hallqvist, Marketing Manager

Facts about Brostaden

36 GreenBuilding classified properties

Most energy-efficient:

Vallonsmidet 53 kWh/m² per year





The office and shopping centre Lindhagen.

Fabege/Peab – Lindhagen

The combined office complex and shopping centre Lindhagen on western Kungsholmen is a cooperative project between Fabege (50 percent) and Peab (50 percent). The building is part of the larger development taking place in the area, in which a total of 3,500 flats and 350,000 square meters of office space are being planned.

The property of 23,500 square meters was finished in the autumn of 2009. Visitors are greeted by a generous glass entrance, framed by dark façade plates. The thought behind the building is that the design should be modern with an open central solution where office

spaces make up the outer sides of the uppermost floors.

Heat recovery in the building is more than 90 percent, where for example out-bound ventilation air is circulated back to preheat the system. Energy consumption is calculated at 89 kWh per square meter

and year, which is 75 percent of the limit set in the building regulations (BBR) of The National Board of Housing, Building and Planning (Boverket) for this specific building.

“We have worked systematically with our current energy follow-up work. We have noticed that if you approach it in the right way, it is possible to reduce energy consumption”, says Production Controller Mikael Wester at Fabege.

Energy on demand

The system is also demand adjusted, with heating, cooling and ventilation tailored to shops’ opening hours, and movement-sensitive lighting in the office sections. Among other things, all excess heat from the cooling system of a grocery store is used to preheat the heating system. This is then re-circulated as heat to large parts of the building.

“Efforts to achieve low energy consumption consist of dimensioning machinery so that recycled energy can be used to as high a degree as possible in the preheating components. The energy which is normally impossible to recover is thereby utilised.”

Since 2002, Fabege has worked systematically with energy optimisation and the energy management system has been around just as long. The basis is monthly meter readings, when reports are produced regarding the usage of heat, cold, electricity and water.

Green electricity

The company also puts together an annual statement covering all its property assets, where the total energy consumption per surface area can be calculated. The result is that Fabege every year since then has reduced energy consumption by five percent.

Fabege also carries out consistent environmental work, and the company uses only “green electricity”, for example, meaning electricity produced by way of renewable energy sources. A more general goal is to be able to certify the entire building stock according to GreenBuilding guidelines. This would entail 30 percent of the stock living up to GreenBuilding standards.

“It is important to adjust your business to the future. If you want to be an actor in the market, you have to have all of this with you”, says Mikael Wester.



Mikael Wester, Production Controller, Fabege

Facts about Lindhagen

Construction year: 2008

Floor space: roughly 23,500 m²

Energy consumption:
89 kWh/m² per year



Folksam's headquarters on the island of Södermalm.

Folksam – Folksamhuset

At 79 meters in height, Folksam's headquarters is an conspicuous landmark at the southern entry point to the island of Södermalm.

The high-rise building was finished in 1960 and comprises, together with surrounding buildings totaling 100,000 square meters, a full third of the insurance company Folksam's property assets. During an ordinary working day, around 1,850 people move through the building, which in addition to office space also contains a swimming pool and two sports halls.

Climate-neutral efforts

Environmental issues are very much in line

with the overall goals of the Folksam group. In order to compensate for its CO₂ footprint, the company plants trees in Uganda and Mexico, and in 2006 it became the first climate-neutral company in Sweden. The foundation of the energy management work is the company's energy policy, where energy consumption is the largest environmental issue. Two out of five environmental targets deal with lessening total energy consumption by 20 percent, and to reduce the total CO₂ footprint by 10 percent by the year 2010.

Modernisation

The challenge of reducing energy consumption at headquarters was started in 2007. A first step was to modernize the technical systems of the building, and new efficient air treatment machinery is now in place. A large part of the work has been centered around adjusting the time intervals for running the systems with consideration taken to normal operations. Data has been gathered from the staff regarding whether or not they use a certain space, and if so during which hours. This has made it possible to optimise operating hours, only running the fans when absolutely necessary.

Results through participation

After the renovation, energy consumption has been reduced from 127 kWh/m² to 86 kWh/m² – a saving of more than 32 percent. Property Manager Björn Gustafsson says that it all comes down to methodical work where everybody must participate.

“We have worked in a systematic manner, that's what I think explains our success. It's about getting the whole organisation to walk in step. It's all connected to operating statistics, follow-up and creative ideas”, he says.

Lake water cooling

Yet another large saving is that the company no longer runs the cooling machines during as large a part of the year as before. The cooling system was rebuilt in the spring of 2009 and now gathers cool water straight

from the nearby Hammarby Channel. In the autumn, winter and spring months, lake water is used directly, eliminating the need to run the coolers. This has meant reduced electricity consumption to the tune of 200 MWh per year.

The next step is to get more properties GreenBuilding classified. Next in line is a building in Västerås, and during the autumn of 2009, the company will apply for certification of a third building, located in the Östermalm section of Stockholm.

“Protecting the environment is a priority area for the Folksam group. We think GreenBuilding is a clear and simple way of achieving that. It is a good management tool and works well within the organisation. It motivates us to ask; can we certify even more buildings?” says Björn Gustafsson.



Björn Gustafsson, Property Manager

Facts about Folksamhuset

Construction year: 1960

Floor space: 100,000 m²

Previous energy consumption:
127,2 kWh/m² per year

Current energy consumption:
86,3 kWh/m² per year

Humlegården

All in all, Humlegården manages roughly 60 office properties with a total worth of around 18,5 billion Swedish kronor. A large part of its activities consists of improving existing properties to turn them into modern, well-functioning buildings.

In the late 1990s, the company started working more actively with energy consumption in its properties, and since 2004 it has been environmentally certified according to ISO14001. The focus of its environmental work lies in decreasing energy consumption, which has been successfully achieved each year.

Three “Green Buildings”

Humlegården today has three properties which are GreenBuilding classified. One of them is the imposing automobile palace at S:t Eriksgatan 117 in Stockholm, a building constructed in 1930. On the inside, the house presents modern office spaces on multiple floors, with glassed-in light-courts

which let abundant daylight stream in. An extended thoroughfare, here and there broken off by luxuriant green spaces, provides a passage to Dalagatan for tired pedestrians.

Updated technology

The technology in the house was updated a few years ago. The ventilation system was refurbished and air flows increased, control systems replaced and the management of the building optimised. Among many improvements, a new system for heat recovery from outlet air in the garage pre-heats inlet air in the ventilation system. The result is a decrease in energy consumption by 27,5 percent since 2003, and the total energy consumption is now at 105 kWh/m².

Technical Manager Per Rosén says that one of the most important steps is optimisation of operation, where there is an enormous potential for energy efficiency.

“What we do is run the ventilation system only during hours when it is needed. We don’t pump in warmer air than necessary and we make sure that the heating systems work correctly”, says Per Rosén.

In many cases it’s more a matter of correcting minor faults, fine tuning and adjusting the buildings so that they work as they should, instead of extensive reconstruction. In some buildings, heat savings of 30 percent have been achieved without major investments.

“We have very good technicians who can identify faults and follow up on them. These are no major reconstruction efforts, but it takes a certain amount of working hours before you break through to the other side”, he says.

Reliable daily operations

Daily operations are very important. They require a systematic approach with scheduled coordination meetings where all faults and views from tenants are registered in statistical and follow-up programmes. Each month, we check up how much energy a building has consumed to make sure that the goals that have been set up for energy efficiency are met. Simultaneously, when a building becomes more energy-efficient, the interior climate improves and tenants become more satisfied.

“When we manage to get a building to consume less energy, the number of climate-related complaints drops. All of a sudden the building works the way it was intended”, says Per Rosén.



Per Rosén, Technical Manager

Facts about Humlegården’s GreenBuilding properties

Bremen 2

Construction year: 1988

Floor space: 43,612 m²

Energy consumption:
67 kWh/m² per year

Bremen 4

Construction year: 1979

Floor space: 30,402 m²

Previous energy consumption:
152,1 kWh/m² per year

Current energy consumption:
97,3 kWh/m² per year

Härden 16/Automobilpalatset

Construction year: 1930

Floor space: 34,407 m²

Previous energy consumption:
144,6 kWh/m² per year

Current energy consumption:
104,8 kWh/m² per year



The light court at S:t Eriksgatan 117/Härden 16.



Kungsbrohuset during construction.

Jernhusen – Kungsbrohuset

Jernhusen owns and manages mainly properties along the Swedish railway grid, where the majority of buildings are station houses and workshops.

The thirteen-storey Kungsbrohuset, with a total surface of 23,000 square meters, will be ready for occupancy during the beginning of 2010. The property is a part of the construction emerging as a wedge in the western part of downtown Stockholm.

Strong environmental profile

The goal has from the start been to construct a building with a strong environmental profile. Quality and the environment has come before money, and

architects on the project have since the beginning made energy calculations on all their blueprints. The efficient glass façade, in conjunction with a series of other solutions, combine to produce an expected energy consumption of 51 kWh per square meter and year.

Environmental Coordinator Klas Johansson describes it as a joint process combined with a strong internal environmental drive.

“Many people have been involved, coming up with suggestions and contributing

optimised solutions. Top management also takes an interest in environmental concerns and wanted to see how environmentally sound you can build a house”, he says.

Heated by humans

The building will be partly heated with excess energy from the 250,000 people who pass through Stockholm Central Station each day. Older fixtures have simply made it possible to lay pipes which lead the energy from the Central Station and up to Kungsbrohuset. Together with district heating and lake cooling from Klara Lake, this will give the property a very low energy consumption.

New sources of energy

On top of this, the building offers even more interesting innovations. One of these is leading daylight from roof panels into entrance spaces and staircases with the help of fibre optics. Hourly weather updates are sent to the building through the GSM mobile network. This means, for example, that heating can be increased hours before an expected drop in outside temperatures.

Nevertheless, Klas Johansson says that these are all solutions that have been used before.

“This is not an experiment, but an application of tried and tested technology. The single largest saving comes from the façade, where we have an unbelievably efficient system, featuring what is in effect quintuple glazing”, he says.

Refurbishing the Central Station

Jernhusen is also facing another challenge – to refurbish Stockholm Central Station and make it energy-efficient. The plan is to use the same methodology as in Kungsbrohuset, but we are here talking about a 150-year-old building, which makes it a difficult project. First and foremost, attention will be paid to replacing technical installations. The refurbishing is expected to cost roughly one billion kronor, and the ambition is to lower energy consumption by 25 percent by the year 2012.

“The antiquarian environment is a problem since the building carries the most stringent classification there is, putting a limit on how good you can make a building”, says Klas Johansson.



Klas Johansson, Environmental Coordinator

Facts about Kungsbrohuset

Construction year: 2008

Floor space: 27,000 m²

Energy consumption:
51 kWh/m² per year

Certificate:
Environmentally certified building,
P-class, and GreenBuilding.



Model of the completed Kungsbrohuset.



An abundance of light in the entrance to Västerport.

NCC – Västerport

Västerport on the northwestern part of Kungsholmen island is NCC:s second GreenBuilding project in Sweden. All in all, the company today has 13 certified projects in Scandinavia.

Already at the idea stage, there were thoughts of making Västerport an energy-efficient building, and guidelines for the project were set in a joint dialogue with contractors and architects.

Good results and increased demand

The seven-storey building, containing 20,000 square meters of floor space, is estimated to have a energy consumption which is 45 percent lower than the Building Regulations (BBR) of the Swedish National Board of Housing, Building and Planning

(Boverket). The total energy consumption will stop at 89 kWh per square meter and year. The property also saves roughly 110 tons of carbon dioxide per year compared to a regular building of corresponding size.

“We see an increased focus on climate and environmental issues and there is a larger demand among customers and tenants. Demand for this type of property has increased dramatically the last few years”, says Jonny Hellman, Head of Environment at NCC Property Development Nordic.

Energy innovation

The framework with concrete sandwich elements makes the building well insulated with a high density that can store both heat and cold. The building is completely free of radiators and the air is instead heated and cooled by way of inlet air, which prevents heating and cooling of the air simultaneously.

Lighting has also been important. In order to minimize energy consumption, hanging light fixtures have been chosen instead of inset ones. This makes it possible to achieve a workplace lighting of 500 lux, yet at the same time retain a general lighting of 300 lux. Tenants do not have to complement the system with their own work lighting. Furthermore, all lighting is movement-sensitive, and a clever added feature is that all lighting is turned off completely when the tenant locks the door and goes home in the evening.

Aiming for user-friendly

A VAV system operates the interior climate, and it can be optimised for each tenant. Ventilation, for example, does not have to be run throughout the building but can be adjusted by section. Plus, the system is designed to be easy to manage.

“Since we are constructing a new building, we are creating the preconditions for low energy consumption. You also have to make sure that you have clear and simple operating instructions for those who will be managing the building”, says Jonny Hellman.

“All buildings should clear GB criteria”

NCC is far ahead in environmental work and has among other innovations developed a climate declaration where the emissions of greenhouse gases are stated for the whole lifespan of its properties. But now the company is taking yet another step in its ambition to achieve a decrease in climate effects – the vision of total energy consumption stopping at 50 kWh per square meter and year beginning in 2012, excluding the electricity consumption of tenants.

“We have adopted the goal of all our properties passing GreenBuilding standards. But now we want to take the next step and raise the bar even more”, says Jonny Hellman.



Jonny Hellman, Head of Environment

Facts about Västerport

Construction year: 2008

Floor space: roughly 20,000 m²

Energy consumption:
89 kWh/m² per year



Gångaren 11 taking shape.

Skanska

The mode of working with internal environmental targets and an environmental managing system has been a part of Skanska for a few years. The goal is to land 25 percent below the Building Regulations (BBR) of the Swedish National Board of Housing, Building and Planning (Boverket) by 2010.

Today, the company has ten properties in Scandinavia which are GreenBuilding classified, two of which are in Stockholm. During a ten-year period, work has been done on a thorough environmental strategy that is summed up

in four points. These are low environmental impact, life-cycle costs, flexibility and simplicity.

Energy-smart from the start

Our focus is on the environmental effect of

the building during operations. At this stage we perform life-cycle analyses to see how much energy a building needs to consume during its lifetime. Flexibility means that it should be easy to retrofit an existing building. Columns and beams are kept at equal thickness to that they can support general loads. In the same way, pipe systems for cooling and ventilation are built so as to enable a later change in the building's operations without requiring drastic renovation efforts.

“We also have a reserve capacity of 30 percent in our systems. This means that we can increase the stress by 30 percent from a basic level that we know is required for ventilation, cooling and electricity”, says Jonas Gräslund, Technical Manager at Skanska.

Simple solutions

In time, the company has learned to avoid complicated systems that can be hard to operate. Instead, Skanska strives to develop robust and simple solutions. The technology is concentrated to a few large technology rooms. Large units often have better performance characteristics, and the fewer moving parts, the better.

It is also a matter of getting a good overview where the building is part of an infrastructure that provides it with energy. For each new project, energy calculations are carried out, where the results are compared to earlier projects and to the company's internal environmental targets.

“The largest energy savings can be

found in good heat recovery and good ventilation units. They are the biggest levers that account for most of the energy effects.”

The internal environment targets have also contributed to the development of the company from project to project. But there is also an economic force. Lower operating costs result in a higher operating profit, which in turn puts a higher value on the building.

“We build in qualities that we have learned are good for property owners, and we communicate it, too – that the properties have qualities that are management friendly”, says Jonas Gräslund.



Jonas Gräslund, Technical Manager

Facts about Skansas GreenBuilding properties

Gångaren 11

Construction year: 2009

Floor space: roughly 30,000 m²

Estimated energy consumption:
89 kWh/m² per year

Bylingen I

Construction year: 2009

Floor space: roughly 14,500 m²

Estimated energy consumption:
103 kWh/m² per year

Vasakronan

Vasakronan's work with energy efficiency goes back ten years, and the company has worked with the GreenBuilding concept for more than two years.

The goal is to be placed 50 percent below the building sector average for energy consumption in five years. This is long-term work where monthly management follow-ups and energy investments are a large contributor to decreased energy consumption.

"We have decreased our energy usage year on year. This is a tough target, but it's stimulating to accept the challenge and we believe it's possible. Already now, we are 26 percent below the sector average when it comes to heat consumption in non-residential spaces", says Environmental Officer Bengt Jansson.

Hekla house 10, a newly built property in Kista north of Stockholm, offers a series of modern solutions. Good installation techniques, movement-sensitive lighting and a tight envelope pushes consumption down to 74 kWh per square meter and year. This is also the first test house for a system of so-called air outlet windows. This technology means that outlet air is ventilated out at roof level, making it possible to decrease cooling during the summer months.

Adjusting the systems

In all newly built properties, Vasakronan has switched to modern VAV systems with movement sensors. Empty rooms are not ventilated, and outside air can be used during longer periods than previously. But the efforts which have saved the most energy are adjustments to the systems in order to optimise their management. Often it is a question of using existing technology in a clever manner. The Kista Science Tower has during a long time operated in this way.

"We have worked for two years on fine-tuning the systems. That building is extremely glass dominated. In total, we have been able to lower the energy consumption by 36 percent while simultaneously achieving a better interior climate", says Sven Malm, Technical Operations Manager.

Cooperation

However, cooperation and open lines of communication with tenants are also important factors in decreasing energy consumption. Together, the parties can post targets, make a joint electricity survey and adjust the management to the needs of the tenants.

"We try to work together to find targets for decreasing energy usage. We know the buildings and installations, and the tenants know their operations. But it is also important to discuss demand levels regarding the interior climate. Keeping the temperature at exactly 22 degrees Celsius all year round is expensive and increases energy consumption substantially", says Bengt Jansson.

Vasakronan also maintains a high profile as the world's first climate-neutral real estate company. All the electricity, cooling and heating they buy is climate neutral. In purchasing negotiations with energy companies, CO₂-neutral district heating is

demand. This means that the company can put pressure on district heating providers to phase out fossil fuels, which in the future can lead to a better fuel mix with a lower CO₂ stress resulting from the buildings.



Bengt Jansson, Environmental Officer

Sven Malm, Technical Operations Manager

Facts about Vasakronan's GreenBuilding properties

Kista Science Tower

Construction year: 2002

Floor space: 85,295 m²

Previous energy consumption:

134 kWh/m² per year

Current energy consumption:

94 kWh/m² per year

Riga 2

Construction year: 2009

Floor space: 32,779 m²

Estimated energy consumption:

50 kWh/m² per year

Hekla Hus 10

Construction year: 2009

Floor space: 25,726 m²

Estimated energy consumption:

74 kWh/m² per year

Spektern 13 B

Construction year: 1973, rebuilt 2009

Floor space: 14,020 m²

Previous energy consumption:

206 kWh/m² per year

Estimated current energy consumption:

131 kWh/m² per year

Pennfältaren 11 LEED certified

Construction year: 1977, rebuilt 2009

Floor space: 14,278 m²

Previous energy consumption:

216 kWh/m² per year

Estimated current energy consumption:

100 kWh/m² per year



Pennfaktaren II on Vasagatan, Sweden's first LEED certified building.



Stockholm Waterfront Building at Klarabergsviadukten.

Waterfront Building

Stockholm Waterfront rises eleven storeys and gives a grand impression among the surrounding buildings, among which the highest stop at seven storeys. The location is central, just above the Central Station and with the pulsating Klaraberg viaduct outside.

The building consists of three parts, and when it is ready for occupancy in 2010 it will house a 418-room hotel, a congress hall with room for 3,000 attendees and an office complex of 24,600 square meters.

Comprehensive approach

Environmental concerns have been important from the very start of the project, with a comprehensive view stretching from energy efficiency to the design of bicycle parking. The environmental programme is based on life-cycle costs where both demolition and production are taken into account. In part, this involves recycling parts of the old post terminal that previously stood on the site. But to achieve this was very complicated and involved technical difficulties.

“That whole structure lies under water and there is a water pressure on the base plate of three tons per square meter. This means that the pressure from underneath wanted to topple the building. So we had to leave demolition debris in place to serve as a counterweight until we had got

the new columns in place”, says Christer Olofsson of Jarl Asset Management, the Building’s Commissioner.

Energy center

The core of the building is the energy central where the energy system coordinates and optimises management. Here is where data regarding solar radiation, water temperatures and external temperature is matched with prognoses and statistical data from the Swedish Meteorological and Hydrological Institute (SMHI). The system is called “feed forward” and is a part of achieving a low level of energy consumption.

Sun catcher

Since Waterfront consists of three buildings with completely different energy profiles, this can be used to its advantage through heat exchange, where surpluses are transferred over to deficits. Electricity and ventilation are also demand regulated so that each individual floor can be darkened and disconnected after regular office hours. The total energy consumption is estimated at 59 kWh per square meter and year, but



Modern design in steel, glass and concrete.

the figure is already believed to drop to 40 kWh per square meter and year.

“This has to do with the fact that we are using the entire solar collector on the congress hall, which is 125 meters long and eight meters high. We take care of the warm air there and convert it into warm water. Already in February, you have one megawatt streaming in towards this glass façade, so we are talking about considerable amounts of energy.”

Freezes lake water

Another interesting component is the cooling system. Cooling water is pumped up from Klara Lake, and through a method called phase conversion technology 250 tons of water can be frozen into ice to cool the circulation in the cooling system, or for use as a backup unit.

Sustainable solutions

Long-term and sustainable solutions have been important where the choice of materials has played a large role, not least to create a pleasant and attractive working environment. The materials are top class and

in the lobby, for example, visitors are met by floor surfaces in marble from Ekeberg and light walls clad with bronze and glass.

“We have wanted to create a good environment, something which will stand the test of time for many years to come. We have felt a responsibility towards the city to deliver something that can be expected in the current situation”, says Christer Olofsson.



Christer Olofsson, Commissioner Jarl Asset Management, Niam Fond III and CarVal Investors

Facts about Waterfront Building

Construction year: 2009

Floor space: 73,000 m²

Energy consumption: 59 kWh/m² per year



Havsfrun on Östermalm.

Wallfast – Havsfrun

Wallfast is one of Stockholm’s largest private real estate owners and managers, with 3,600 flats and a number of non-residential properties in its stock.

Havsfrun is an older office building of 3,500 square meters in the Östermalm district, built at the end of the 1920’s.

The company’s environmental work started in earnest in 2002, with a first target

of lowering energy consumption in all properties using in the vicinity of 210 kWh per square meter. Havsfrun was one of these, measuring a consumption in 2004 of 243 kWh per square meter.

From worst to best

Old installations from the early 1970s were obsolete and in dire need of replacement. In the summer of 2005 the building’s sub-station was replaced, and ventilation units and a rotating heat exchanger were installed. As a result, 80 percent of the energy in the outlet air is now recycled.

“The house used a lot of energy for a non-residential building. But from being one of our worst office properties, it is now by far the best”, says Environmental Officer David Mandt.

60 percent reduced consumption

New process control equipment, which ensures optimised operations, is now in place. The total energy consumption has decreased by roughly 60 percent and is now at 98 kWh per square meter and year. On top of markedly reduced consumption, there has also been a two-fold increase in air circulation for tenants.

Continuity

In addition to the GreenBuilding goals, Wallfast works continuously with energy and environmental issues. Three prioritised areas are decreasing and optimising the consumption of district heating, decreasing electricity consumption and choosing environmentally-friendly cooling agents and minimising emissions from these.

The ongoing environmental work is centered around areas such as energy usage, the choice of suppliers and products,

sub-contractors, planning and waste management. All employees are trained in environmental issues and all service cars within the company are alternative fuel vehicles.

Non-stop improvements

This is systematic work, where it is vital to constantly keep an eye on what’s happening in the property stock regarding, for example, monthly follow-up meetings, as well as continuous improvements according to environmental certification ISO 14001.

“We have a comprehensive view of our whole property stock, regardless of whether they are commercial buildings or residential houses. We constantly work with our properties to become aware of needs and see how we can become better”, says David Mandt.



David Mandt, Environmental Officer

Facts about Havsfrun

Construction year: 1929

Floor space: roughly 3,500 m²

Previous energy consumption: 243 kWh/m² per year

Current energy consumption: 98 kWh/m² per year



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