Sustainable urban development is a condition for creating good residential environments and reducing their climate impact. In order to promote such development, the Delegation for Sustainable Cities was appointed, and allocated SEK 357 million to sustainable urban development projects. On the last of December 2014, the nine largest projects, that were awarded the majority of the funding, were completed. This report presents 25 treasures in form of results and experiences from these projects.

Many different sustainability measures have been tested and implemented – everything from solar cell initiatives to labour market projects. It is now high time to spread these to all those who work with urban development, in Sweden as well as abroad. Read more, and let these treasures inspire your own work with sustainable urban development!
Urban treasures
Results from projects supported by the Delegation for Sustainable Cities
Foreword

The nine major investment projects that have received financial support from the Delegation for Sustainable Cities were completed in December 2014. The best parts have been selected for this publication to describe some of the results and experiences from the projects. Let them inspire you in your own work with sustainable urban development!

Even if the projects supported by the Delegation are coming to a close, sustainable urban development is a never-ending process. New collaboration forums are an important requirement, but we also need to keep developing the collaboration within those networks that were formed around the Delegation for Sustainable Cities.

This will be done, among other ways, through the government commission assigning five public authorities to manage a platform for sustainable urban development. The Swedish National Board of Housing, Building and Planning (hereafter Boverket) is the coordinator of the project that is to be carried out in collaboration with the Swedish Energy Agency, the Swedish Environmental Protection Agency, the Swedish Agency for Economic and Regional Growth and the Swedish Transport Administration.

The platform is without doubt a continuation in the spirit of the Delegation, where the experiences and results yielded will be utilised and developed further.

Janna Valik
Director General
Boverket
The Delegation for Sustainable Cities was appointed by the government in the years 2008–2012, tasked with promoting a sustainable development of cities, urban areas and residential areas. Through its commission, the Delegation was charged with allocating financial support for urban development projects. In total, it awarded SEK 357 million to 98 projects, of which SEK 297 million was distributed in nine major multidimensional investment projects, and SEK 60 million in 89 smaller planning projects.

Boverket is responsible for monitoring, supporting and disseminating the knowledge from these projects.

Find out more about the projects that received support from the Delegation for Sustainable Cities at boverket.se.
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* The Million Homes Programme (”Miljonprogrammet”) is a commonly used expression for all homes built in Sweden between 1965 and 1974. More than a million homes were built during this time period.
A brief presentation of the nine investment projects

**Fullriggaren**
The construction project Fullriggaren in the district of Västra Hamnen (Western Harbour) in Malmö has been planned with high sustainability ambitions and in close cooperation between the City of Malmö and thirteen developers. Together they develop the area using a process called construction dialogue.

The intended result of the dialogue is the largest area of low-energy and passive houses in Sweden, along with other sustainability measures within, amongst others, the transport and renewable energy sectors.

**Sustainable Järva**
The project Sustainable Järva is part of the City of Stockholm’s initiative to give its Million Homes Programme-areas a new environmental profile. Using innovative energetics technology, investments in sustainable transportation, and a high degree of resident participation, the project is to promote a positive social, ecological and economic development in Järva. The project is coordinated by the Stockholm Environment and Health Administration together with housing companies, other city administrative departments, and the Royal Institute of Technology.

**Sustainable Knowledge City Lund NE**
In Lund, a number of actors are collaborating in order to create a sustainable city in Lund North East. The so-called Science Road is four kilometres long and stretches from the historical city centre all the way to the new city district of Brunnshög, which will constitute a centre for research and high technology. The project includes renovation of historical environments, densification of the campus area, investments in renewable energy and new constructions. All measures will be linked by a new tram line along with pedestrian and bicycle paths.

**Sustainable Ålidhem**
In Umeå, the municipality is collaborating with the public housing company AB Botstaden and the municipal energy company Umeå Energi in the unique and award-winning project Sustainable Ålidhem. After a city block burned down during Christmas of 2008, an idea was born to rebuild and condense the city district of Ålidhem with the largest construction of low-energy houses in northern Sweden. At the same time the existing Million Homes Programme houses get renovated with a focus on energy, climate and an attractive living environment. The many energy investments of the project also function as an international display window for sustainable construction in cold climates.

**Kongahälla**
A new city district is being planned in Kungälv, called Kongahälla – the municipality’s largest construction project in modern times. Thus far, four contractors are participating in the collaboration. The vision is a green city district, where sustainable...
living is made easy. Due to an appealed detailed development plan, the project was delayed, and the funding from the Delegation for Sustainable Cities could therefore not be used. However, the project’s ambitions remain at a high level and it broke ground in September 2014.

Krokslätt Mills
The project Krokslätt Fabriker (Krokslätt Mills) in Mölndal, run by the property owner Husvärden AB, is an excellent example of environmental adaptation and energy streamlining of a historic industrial area. The qualities and cultural history of the area are preserved, while it is also characterised by flexibility, climate-adapted architecture, bio systems and smart IT and energy technology. The vision is for Krokslätt Mills to be an international role model within these fields.

Kvillebäcken
In Gothenburg, there is an active effort underway to implement the RiverCity Gothenburg Vision, which involves transforming former industrial areas and connecting parts of the city across the Göta river. Kvillebäcken is an area within the River City project, which is now being transformed into a vibrant and sustainable neighbourhood. Kvillebäcken is also an innovation platform and testing ground for new technology solutions. Among other things, a new waste-collection technology using electric hybrids and methane diesel cars has been tested in the area.

My Green Neighbourhood
The pilot project My Green Neighbourhood is part of a renewal of the Million homes programme-area Vivalla, in Örebro. Inside the area, sustainability measures are being implemented in several fields, such as energy and climate, integration and participation in the arts and cultural environment. The successful measures taken in this area may later come to be applied in the whole city district. A key to this project is the collaboration between various actors who do not usually work together.

Rosengård in transition
The project Rosengård in transition was initiated by the City of Malmö. The project is part of the city’s work to end the segregation of functions in the Million Homes Programme, thus allowing for a diverse, vibrant and sustainable city district to emerge. The primary purpose has been to create a demo area where the focus on climate and environmental considerations can provide a model for future urban renewal projects in Sweden and abroad, but the measures are also intended to promote social and economic integration.
From car park to multifunctional activity area

In the summer of 2011, thirteen young women carried out a trial event at a car park in Rosengård – this marked the start of a process to build an activity area in accordance with the girls’ wishes. The result is a unique gender equal meeting place for planned and spontaneous activities.

When the car park was designated as a new activity area, the project management noted that all similar areas that already existed in Rosengård were intended for sports, and mostly used by boys. But it was more than that – all the public spaces appeared to be predominantly used by males. The girls and women would instead spend time at home, in their backyard and in the centre of Malmö.

So what happens if the girls get involved already in the planning stages of an activity area – does it make a difference from a gender-equality perspective?

A newly started network for girls
Thirteen young women were hired to carry out a trial event in the car park, in conjunction with learning about urban planning and how they could influence the city’s development. The event drew a crowd of 300 and had a number of activities to offer.

In a newly started network for girls, called Committed to Malmö, the girls continued to plan the area together with the landscape architects of the municipal Streets and Parks Office.

A changing area
Several pilot events were conducted: a sustainability festival, a Christmas market and a film viewing, all in order to test the space and make the residents of the area aware of the ongoing changes.
The end result became a meeting place for a multitude of people and activities. It has an outdoor stage, a Bluetooth controlled sound system, a climbing wall, an outdoor gym and a small pink wind turbine. The bench Dansa Pausa (Dance Pause) was the girls’ final touch on the meeting place – the name, referring to the hit song by Swedish group Panetoz, perfectly sums up the intended purpose of the area.

Experience in influencing
By listening and allowing a dynamic development of this meeting place, additional values were achieved that could not have been anticipated at the start of the process. Furthermore, the girls who participated in the project were empowered to act as a real force of social change in the future.

The red carpet of the rose, as the meeting place is named, was inaugurated by 1,600 visitors on a sunny, warm day in September 2013. This was the culmination of a three year long participation process focusing on the needs and wishes of girls.
Sustainable solutions through construction dialogue

When the construction companies were given a forum to discuss sustainability, the level of ambition was raised. Through the construction dialogue the Fullriggaren neighbourhood in Västra Hamnen has houses that are more energy-efficient, smart waste disposal units, a carpool and more green areas.

Already in the stage where land was allocated to interested construction companies, the City of Malmö was very clear about its sustainability ambitions for Fullriggaren. The contractors that were interested in a plot were expected to participate in a construction dialogue, i.e., a forum where the municipality and the developers would meet regularly to discuss common issues regarding the three pillars of sustainability.

Apart from exchanging ideas, knowledge and experiences, the dialogue became a common learning process for all involved stakeholders, which led to increased understanding of each other’s starting point, interests and possibilities.

A number of different collaboration projects were initiated as a direct result of this dialogue – things that otherwise would have been impossible for a single developer to carry out. Among other things, a joint construction coordinator was hired, the area received a carpool, and food waste disposal units were procured and installed in all the buildings.

The construction dialogue is a process that was first tested during the Bo01 project, and was then refined when working on the Flagghusen neighbourhood to the east of Fullriggaren. For the City of Malmö, a construction dialogue is a requirement for reaching its high sustainability ambitions in innovative projects, where large new areas are to be developed by several developers over a short period of time.
An evaluation of the construction dialogue within the Fullriggaren project shows that the thirteen developers were very pleased, and would consider participating in similar projects again.
Art as a method of dialogue raises interest in the local environment

When children were given an opportunity to design a sustainable yard, the result was welcoming, colourful and innovative. Water games in the form of a water purification system, concrete pebbles that mimic the oxygenating mechanism of a water course and a rocking horse that generates energy. The model yard is the result of a dialogue held within the project My Green Neighbourhood, including an artist and other cultural workers as co-actors.

The sketches of the children depicted everything from what the outdoor spaces and paths would look like, to what climate-smart technology would be included. They used solar cells, wind power, light diodes and kinetic energy. Two teachers from KOMTEK, the local technology and entrepreneurial school, were on hand to answer questions and help with technical solutions.

The artistic theme of the dialogue process has several purposes. It is a way of visualising plans and environmental gains, but also functions as an educational door to the city district’s history. Visualising the past, present and future in the form of artwork raises interest in the local environment. Art as a method of dialogue increases the sense of inclusion, lowers language barriers and make people into co-creators.

In My Green Neighbourhood, art has also played an important role in visualising change towards a sustainable city district. Artist Arijana Kajfes has been working on a commissioned piece that will both communicate and visualise energy consumption. Her stepping off point is thoughts on the importance of the well in different cultures – both as a life necessity and as an important social meeting place; a centre for both communication and knowledge transference. The well of Arijana Kajfes primarily evokes an
Water games and water purification were united when the children of Vivalla got a chance to design their own outdoor environment.

image of water consumption, through the use of sound. The idea is for real time consumption to be measured and linked to the well. While rushing water symbolizes maximum water consumption, a gentle drip symbolizes a low consumption.
SUSTAINABLE JÄRVA

Dialogue that inspires a sustainable lifestyle

Bicycle shows, interactive exhibitions, a cultural history path and environmental study circles. These are components in Sustainable Järva’s extensive investment in information to and dialogue with the residents. Technical solutions to facilitate a sustainable lifestyle are not enough – it also takes knowledge and commitment.

Preschools in Järva have been using the interactive exhibition Lekoprick-affären where pre-schoolers can play shop while learning about the environment, consumption and recycling. The pupils in school have been the target of a special bicycle initiative, with bicycle shows and information events.

The Path of Time is a two kilometre long cultural history path along the district of Järvafältet, which has been developed in collaboration with the Stockholm City Museum. It describes the importance of the water as a transport route and what the cultural landscape has been like since the latest ice age. There is a teaching guide that can be used by preschools, schools and other groups that want to walk along the path.

In connection with the renovation of the seven houses included in the project, an extended dialogue has been held. In addition to the residents having a say in the level of renovations and rent, several open house meetings have been organised whereby the residents have been able to visit model apartments and receive information on sustainable lifestyle.

Study circle leader training in climate, environment and energy has been conducted in different associations in the Järva area. The study circle leaders have then held study circles in their own associations, often in languages other than Swedish. In total, 369 circles have been carried out with around 3,000 participants.
The Akalla bicycle shows are part of an information initiative to provide the residents of Järva with knowledge and to get them involved in the process.
When the project My Green Neighbourhood became a reality, the public housing company decided that some of the new jobs would go to the residents of the area. The initiative Boendebyggarna (the home builders) gives around 50 to 80 long-term unemployed residents work placements in the area for the four years that the renovations are taking place.

The Million Homes Programme area Vivalla has a low employment rate compared to Örebro in general. It is a city district with high unemployment levels, low education levels, and many of the residents have trouble entering the labour market.

Being outside the labour market for a long period of time also makes it more difficult to participate in other social activities – a job comes with a contact network, involvement, acknowledgement and inclusion. With its home builders initiative, the housing company Örebrobostäder wants to contribute to conditions that allow people to establish themselves more firmly in society.

Social procurement requirements
The idea was to have the residents work within the framework of the My Green Neighbourhood project. Those who participate get to be involved in shaping their living environment, while also getting a foot in the door of working life.

The social requirements that were set in the procurement constituted an important step in realising this initiative. The contractor that won the procurement would also be running a labour market project. Skanska submitted the winning tender, and the renovation and home builder project was initiated in June 2013.
Many actors collaborated. Örebro Municipality and the Public Employment Service (Arbetsförmedlingen) both reacted positively to the initiative. Prior to the actual procurement, a dialogue was also held with suppliers from the construction industry, to prepare them for the somewhat unusual requirements specification. The procurers were also careful to ensure that the requirements complied with Swedish legislation and EU regulations. The trade union for construction workers in Sweden, Byggnads, was also involved in the work group that designed the supervisor and introductory training.
All participants get a supervisor
Anyone who wants to be involved in the home builders project applies to the Public Employment Service, which also has a representative onsite one day per week. The application is then matched with the criteria provided by Skanska and its subcontractors with regard to characteristics, experience or education.

The companies that take on a home builder must appoint a supervisor. All supervisors have gone through training to ensure that all the home builders are properly looked after.

Others have followed
Interest in the home builder project has been great, and the initiative has also received attention in the media. Many public housing companies around the country have come for study visits. Several of them have adopted the concept, such as the municipal company Västerporten in Örebro, which has set similar social requirements in a procurement for cleaning services.
Climate-smart renovations of Million Homes Programme houses

The municipal housing company Svenska Bostäder has halved its energy consumption for heating in seven houses in Husby, Akalla and Rinkeby in connection to the renovations. This was done through specific action programmes in each building. Among other measures, thermal bridges have been fixed, facades have been further insulated and the windows have been exchanged for energy-efficient ones. In addition, the buildings have been fitted with heat recovery ventilation through so called FTX systems. Drain water heat recovery systems have also been tried.

Three different types of houses have been made more energy-efficient: 11–12-story tower blocks in Akalla, 5–6-story balcony access blocks in Husby and lamellar houses in Rinkeby.

To disseminate the methods, results and experiences of the project, a handbook has been produced. The idea is for the handbook to be used by similar projects in other cities; both in Sweden and internationally.
SUSTAINABLE ÅLIDHEM

Energy-smart solutions in Ålidhem

Sustainable construction in a cold climate is a tricky challenge. In Sustainable Ålidhem both new and old technology is tested on a large scale. Other than the newly constructed low-energy houses, the project includes a refurbishment of the Million Homes Programme houses focusing on energy, climate and an attractive living environment.

During the Christmas of 2008, an entire city block burned down in the Million Homes Programme area of Ålidhem in Umeå. It was then that the idea for northern Sweden’s largest low-energy construction was born, with an energy consumption of 65 kWh per square metre and year – half of what is required by Swedish building regulations.

The new construction includes four buildings with 137 apartments. The houses have been built using conventional construction techniques, but their airtightness fulfils the requirements of passive houses. In the procurement, a fine was set in the event that the houses would not reach the energy performance ordered. A somewhat unconventional way to ensure careful execution, inspection and follow-up.

Energy consumption more than halved
Follow-up shows differences in the energy performance between the newly constructed houses. The smaller houses have more difficulty reaching the objective. One of the reasons is that the residents’ actual consumption of household electricity and hot water is higher than the values used in the planning stages. Another is that smaller and lower houses have proportionately higher energy losses through the climate shell. The results for all the houses combined means that the current energy consumption is approx. 75–80 kWh per year, which corresponds to 40 per cent of the energy consumption in the houses that previously stood in this location.
A major renovation of the 40-year-old houses on Matematikgränd and Geograffigränd is being carried out. 405 apartments are being refurbished and the energy consumption is expected to decrease by between 40 and 50 per cent.

Sustainable Ålidhem shows that solar energy is also useable in northerly latitudes.
Solar cells work well in the north
Sustainable Ålidhem is also an ambitious solar cell project in northern Sweden, something that has not been extensively tried before. All in all, 2,600 square metres of solar cells will be mounted on roofs and balconies. The solar cell system is expected to yield 320 MWh of electricity per year, and covers approximately one third of the property electricity in the area. The follow-up shows that the production of solar electricity is comparable to the competition. On an annual basis, the same amount of electricity is produced as in the south of Sweden and northern Germany. The dark winter period when the solar cells are covered by snow is more than made up for during northern Sweden’s light summer nights, when the solar cells are able to start producing electricity as early as one thirty in the morning.

More sustainability measures
The motto is that it should be easy to be environmentally friendly at Ålidhem. New laundry machines connected to the district heating network reduce the electricity consumption. Apart from new major appliances, meters are installed for individual debiting of electricity and water. New waste disposal rooms will also be built to facilitate recycling. A large number of actors have been involved in the project, which is also linked to Umeå’s efforts to become European Capital of Culture 2014. The ambition is for Ålidhem to play an important part in Umeå’s continued development since it will function as a testing ground for various sustainability projects.
The project My Green Neighbourhood makes part of the Million Homes Programme area Vivalla in Örebro feel more like a distinct neighbourhood, and gives it a new identity. The idea is to create characteristics that are unique to the neighbourhood, clarify the differences between private and public spaces, and provide the tenants with opportunities to develop social contacts with their neighbours.

The restructuring entails a higher number of local streets in the area, which divide the area into smaller neighbourhoods. Parking spaces will at the same time be placed closer to the home, which frees up the large car parks for further construction.

The new street and green area structure gives a sense of neighbourhood that is reinforced by the entrances of every other house being moved to the other side. This creates an official front with entrances, and a quieter back yard with green areas and social meeting places. The back yard works as a private sphere protected from an outside line of sight.

In the longer term, terrace houses and detached houses are planned in the space that is freed up by the restructuring; possibly in the form of owner-occupied houses with lease-purchase contracts. This model means that the tenant has a chance to purchase the house they are living in, within a certain period of time and at a predetermined price. Hopefully this will bring even more actors into the area, which would increase the selection of housing forms. The purpose is to create conditions for a housing career.
Sustainable Järva invests in solar energy in a unique project

Two housing companies (Svenska Bostäder and Familjebostäder) with some forty houses and two swimming and sporting halls owned by the Stockholm Real Estate Administration have been fitted with photo voltaic on the roofs and facades. This investment is estimated to provide energy to cover 15-20 per cent of the properties’ electricity needs. The 10,000 square metres of photo voltaic means that the area is one of the biggest photo voltaics installations in Sweden.

These PVs, which were installed during 2013 and 2014, are estimated to yield 1.3 million kWh per year, and cover 15–20 per cent of the property electricity in the residential houses and 6 per cent in the swimming and sporting halls. The electricity produced goes to lighting, lifts, ventilation, water purification and laundry rooms.

Within the same process, a joint follow-up system has been developed for all PVs installed in Järva. The aim is to evaluate how much electricity the different systems produce and how cost-efficient the solar energy investments are. According to the housing companies and the municipal Real Estate Administration, the investment will have paid itself off within ten years for the residential buildings and six years for the swimming and sporting halls. In addition to the solar energy installation, a few selected houses have been fitted with solar thermal collectors. The energy from these solar thermal collectors is used to minimise the amount of energy purchased for hot tap water.

Visualisation of electricity production
Communication with the residents has been an important part of the project. Among other activities, several open house meetings have been organised. To visualise the PVs and the electricity production, a joint online service, www.soldata.stockholm.se, has been developed. This shows the total pro-
duction at both city district level and facility level in ten-minute intervals.

Northern Europe record
The Sustainable Järva investment in solar electricity is one of the biggest solar initiatives in northern Europe so far. The project is unique in that it takes a comprehensive approach to solar energy in a Million Homes Programme area. This project provides valuable experiences when it comes to integrating a larger proportion of solar electricity in distinct city districts. Hopefully this can inspire other cities to do the same.

The initiative for this investment in renewable energy was taken by the municipal housing companies Svenska Bostäder and Familjebostäder together with the Real Estate Administration and the Sports Administration of the City of Stockholm.
Fullriggaren – a whole block of energy-efficient buildings

The neighbourhood Fullriggaren in Västra Hamnen in Malmö houses the country’s largest number of energy-efficient buildings. 30 per cent of them meet the requirements for passive houses, while the others are minimal-energy or low-energy houses.

The guidelines for obtaining land from the city state clear requirements: “The buildings must be well-insulated and airtight; total consumption (heat and energy) must not exceed 110 kWh/m² of heated usable space per year.”

The large interest for the land allocation showed that the developers had adopted the view of the city administration regarding energy-efficient construction. The construction dialogue on energy-efficient construction also contributed to all developers choosing to build low-energy, self-heating, minimal-energy or passive houses.

In addition, they introduced further sustainability measures. The car park in the area will be partially self-sufficient in terms of energy, with solar cells on the south facade. The ground floor has charging stations for electric cars and some of the communal garages of the residential buildings will have service areas for bicycles.

The only office building in the neighbourhood won the first prize in the ‘new construction’ category of the Sweden Green Building Awards 2012.
In the neighbourhood Fullriggaren, all developers chose to go with low-energy, self-heating, minimal-energy or passive houses.
Smart buildings store energy

The new city district Kvillebäcken in Gothenburg provides a testing ground for new technology to even out peak load demands in district heating. With this technology the buildings can be used for short-term energy storage. The energy can then be utilised when there is a greater need in the district heating system.

Each individual district heating substation in the building is fitted with a communication unit, which is managed from the district heating control centre. Instead of immediately starting the production with fossil fuels, for example when there is a change in the weather, the staff of the control centre can start by using the building’s stored heat for 9–10 hours. After such a temporary surge, the buildings can be recharged.

During 2014, the control centre of the municipal energy company Göteborg Energi installed the software, and the substations of the properties participating in the project were provided with the necessary equipment.

If it becomes fully implemented in Gothenburg, this technology could reduce fossil carbon dioxide emissions by around 15,000 tonnes per year.
In Kvillebäcken, new technology is tested that could make the building useable for short-term energy storage.
Urban living in a green neighbourhood

900 homes and varied commerce in a green neighbourhood. Centrally located Kongahälla is the largest new construction project in Kungälv in modern time, under the slogan “A brand new world in Kungälv”. Its direction was set out from the start: It should be easy for residents, employees and visitors to act sustainably.

Kongahälla takes a holistic view of environmental issues. The municipality and the developers are collaborating on resource management, renewable energy, green roofs and healthy materials, and for the residents of the city district, recycling and sustainable commuting should be a simple choice. The grant from the Delegation for Sustainable Cities was intended to lead to further energy savings as well as Sweden’s largest solar cell facility. But the start of construction has been delayed by several years due to an appealed detailed development plan.

Now the construction has been given a new go-ahead. In December 2013, the majority of the detailed development plan entered into legal force, and ground was broken in September 2014. The high environmental ambitions remain and the collaboration for a sustainable city district continues.
Collaboration between the municipality and the developers is to give the new city district of Kongahälla a strong environmental profile. Ground was broken in September of 2014.
KROKSLÄTT MILLS

Krokslätt Mills are investing in self-produced electricity and energy storage

Within the district of Krokslätts Fabriker (Krokslätt Mills) there is bedrock which can be used for seasonal energy storage. Other than direct cooling, bores in the bedrock are used to access heating and cooling that is transformed by the combined cooling and heat pump unit into the temperatures required. Heating and cooling is then distributed to the buildings in the district, the new as well as the old.

The grid can be connected to all local production units – solar cells, wind power or Stirling engines. The grid is also charged with excess energy from small industries, shops and restaurants in the area. This energy can then be used for heating the newly constructed buildings in Krokslätt Mills. The bedrock is primarily used to store energy over the year, while accumulators in the buildings store the day-to-day variations that occur.
Outline diagram of energy storage
New technology makes the classroom an optimal workspace

When a school in Rosengård was renovated, one of the classrooms received a total make-over. This demo classroom is full of new technology and signs that describe how everything works. It is based on the control system KNX, which makes it possible to control and monitor all the technical installations.

This project focuses on lighting, electricity, water, heating and ventilation. When the classroom has been empty for five minutes, for example, all lights, water and electricity is shut off. This is to avoid unnecessary energy consumption. But to encourage pupils to remove their jackets as they enter, the indoor temperature is kept at a comfortable level. The light level is adapted by zones in the room, according to how much daylight is let in.
The demo classroom at the Värner Rydén school has signs describing its functions, such as heating and daylight.
The evaluation shows which solutions work best

One clear success factor for Sustainable Ålidhem was the pilot project, where a “maximum package” of energy measures was implemented in one building. Over a year, this building was compared to an identical one that had not yet been renovated. The results showed that the pilot building saved 42 per cent of its energy compared to the reference building.

The setup using a pilot building and a reference building with extra measuring equipment has since been used to measure how much of an energy saving the various measures contribute. The renovations in these cases have been done in steps.

Measuring and follow-up has been made easier by the facts that the whole area has one property owner and that the electricity and district heating grid also has one owner. In addition, these owners are partners in the Sustainable Ålidhem project.

The graduate school and the collaboration with the Department of Applied Physics and Electronics at Umeå University have facilitated the analysis and evaluation of unique follow-up data, and this information is now available to future projects facing similar challenges.
Using a pilot building paired with a reference building proved to be a success factor in the evaluation of Sustainable Ålidhem.
Green measures in new office building gets golden certification.

By virtue of several climate-smart solutions, the new office building in Krokslätt Mills has been certified by the Sweden Green Building Council as Environmental Building Gold. The double-glazed facade gives a more even temperature as well as a more even energy consumption. The goal is for 100 per cent of the energy to come from renewable sources, of which 5,000 kWh per year comes from self-production.

The house has a generously cultivated roof terrace and two green facades. One of these facades, called the Green Room, covers the whole eastern side of the building, and constitutes a bright working space with fresh air. The other one has a greenhouse-like micro climate with automated watering. The office building is fully rented and now contains a hospital, gym, offices, shops, café and restaurant.
The double-glazed facade of the new office building in Krokslätt Mills gives a more even temperature as well as a more even energy consumption.
In the 1960s, the architect Klas Anshelm designed several buildings for the Faculty of Engineering at Lund University. Now their indoor environments have been updated to a modern, energy-efficient study environment, where lighting plays a leading role.

In Lund, there are several signature Klas Anshelm buildings, and one of his major projects was the Faculty of Engineering. Today, three times as many people work in the buildings than what they were originally designed for. The premises are in great need of adaptation into modern study environments with a good indoor climate and energy performance levels.

Comprehensive lighting concept
One area where there are great opportunities to create a better study environment while also saving energy is the indoor lighting. In one of the buildings, the Annexe, the real estate company Akademiska Hus has carried out a pilot project. Based on research conducted at Lund University, innovative lighting designs have been applied to achieve varied and energy-saving light features.

In consultation with an electrics consultant, tenants and property owners, a light designer has adapted the lighting to various activities. The lighting concept spans the lobby, café, library, quiet reading halls, practice rooms, new reading nooks and the corridors.

Functional study light
The result is a creative and stimulating study environment where conscious lighting choices have been made to enhance the space. In all reading rooms, the ambition has been to define the room using wallwashers, and to create a good, glare-free reading light from the ceiling fixtures.
The café has been given a more intimate and homey atmosphere using a seemingly random suspension of dimmable pendant light fixtures in warm colour temperatures, wallwashers and downlights. In the library, a combination of linear lighting fixtures set into the ceiling and asymmetrical accent lighting on the shelf systems create a sense of space, while the reading chairs have been given spotlights.

The lighting design of the Annexe at the Faculty of Engineering saves energy and enhances the space.
Daylight sensors and presence detectors
The new technology is controlled by daylight, presence and time. Together with efficient fixtures using LED technology, this means increased energy-efficiency. The output of the lighting is only a third of what it would have been if LED technology had not been used. These measures have set the tone for subsequent renovations by the real estate company.

A new way of working with sustainability in cultural environments
In Lund, there are many renowned buildings of historical value – Lund University’s main building, the Lund University Historical Museum, the Archaeology Institute of Lund University, the Palaestra building and the oldest building of the university called Kungshuset (the King’s House). Transforming these environments into modern spaces requires particular care. For this reason, the National Property Board of Sweden has tested a new working method to adapt these buildings to modern requirements regarding a better indoor environment, accessibility and reduced energy consumption.

First, a basic investigation is conducted based on the condition of the historical building. What use and design is suitable for the house in question? This is then discussed with the tenant, in this case the university, to find an appropriate use for the premises.

Thereafter, a renovation proposal is drawn up. Already from the start, at the same time as hiring an architect, an energy expert is also brought into the project. This means that mistakes that may be difficult to rectify can be avoided, for example by ensuring enough space for technical installations.

Another key to success is to initiate a dialogue with the Swedish National Heritage Board at an early stage with regard to what measures are possible and necessary.

The working method implemented in Lund has generated a lot of interest, and has spread to all property managers at the National Property Board of Sweden.
Water and vegetation suited to Krokslätt Mills

Water and vegetation are important parts of the sustainability ambitions in Krokslätt Mills. Surface water from the mountains of the nature reserve Safjället is detained and purified in open systems. Water within the area is absorbed by cultivated areas and green roofs. For one year, the flow out to Mölndalsån is to be halved to reduce the risk of flooding.

Water reservoirs and cultivated surfaces are being carefully designed to work optimally in cold climates, and also to have an urban design suited to the interesting cultural history environment at Krokslätt Mills. Among other things, the asphalted surfaces around the old textile factory will be replaced by green areas and water features.

Existing trees are to be saved to the greatest extent possible and constitute the backbone of the green area structure. The design of combined cultivated areas and water areas – such as dams, stormwater infiltration trenches and indoor cultivation areas – is created in collaboration with the Swedish University of Agricultural Sciences.
The surface water from the neighbouring mountains is used to water the green areas of Krokslätt Mills.
Kvillingbäcken is a place for innovators and developers to meet

Do developers want to learn about the latest technology for meeting increasing environmental requirements? The organisation Business Region Göteborg thought they did – and therefore created the Kvillingbäcken innovation platform. It affords developers an opportunity to meet with environmental experts and companies offering innovative and climate-smart solutions.

Swedish companies are successful when it comes to environmental technology innovations. In order for these companies to remain at the forefront and increase exports and growth, they need local reference and demo projects.

The construction industry is in many cases considered conservative when it comes to new technology but, in Kvillingbäcken, seven developers led by the municipal company Älvstranden Utveckling AB are gathering with local businesses to think anew. The project Sustainable Urban Development Kvillingbäcken aims to develop new solutions and create business opportunities – while at the same time raising the environmental performance of the new city district Kvillingbäcken.

The developers were invited to request themes
The organisation Business Region Göteborg took the initiative in creating an innovation platform to make it easier for the construction industry to find the best innovative solutions. They have organised breakfast meetings and other gatherings for developers, technology suppliers and experts. Based on requests from the developers four themes have been selected; surface water management and green areas, measurements and control in properties, solar cells and 3D in urban development.

Sought-after destination
As a testing area, Kvillingbäcken has had the ambition of presenting west-Swedish
The innovation platform in Kvillebäcken contributes to new encounters and climate-smart solutions.
Hotar svin på arbetsmarknaden

Kulturvecklaren. Den 193 och på arbetsmarknaden växer hotar arbetsmännen och den konkurrens.

Med dagens regelverk när inte på att vända utveckling.

Photo: Sven Lindström

Arbetarnas miljömarknaden och skriver an en reform.
environmental solutions, but also of attracting new business to the region. Among other things, Business Region Göteborg has visited trade fairs to attract foreign direct investments and create export opportunities for technology and knowledge.

Kvillebäcken has become one of the most sought-after destinations within the framework of Green Gothenburg – an operation to showcase sustainable solutions in the region of Gothenburg. National and international visitors come to the new sustainable city districts to view innovative solutions for waste management, transport and building constructions.

New innovation platform underway
In the next few years, there will be a lot of new construction in Gothenburg; the planning and development of Älvstaden is in full swing. The experiences from the innovation platform Kvillebäcken are valuable as a new, larger forum takes shape – The innovation platform of Gothenburg. It is to take on a holistic approach to sustainable initiatives and spread new innovative services, technology solutions and working processes.
The Winter Garden – a green oasis for the residents

The Winter Garden is the crown jewel of the project Sustainable Ålidhem. An oval building with plenty of light and lush vegetation – both inside and outside. It works both as a well-equipped communal premises for the residents and as a top modern meeting space for study visits and work meetings.

The work to design the Winter Garden has involved many actors. Based on the wishes of the residents, a proposal was developed by students from the Programme in Urban and Regional Planning and the Institute of Design at Umeå University. This proposal was then fine-tuned in a dialogue with a local improvisational theatre company. During the brighter part of the year, the Winter Garden gets its electricity supply from solar cells. On the walls, there are green plants with an automatic watering system and the roof is covered in stoncrops.

The 150-square metre premises has a fully equipped kitchen, a smartboard, three projectors and free wifi. The residents can book the Winter Garden and the adjoining sauna without cost. The premises are often used by Sustainable Ålidhem for showings, but also for smaller cultural events and lectures.
The Winter Garden at Ålidhem works both as a communal premises for the residents and as a meeting space for study visits.
Accessibility measures generate densification in Malmö

Malmö is growing, and the new residents need a place to live. There is free space in the Million Homes Programme areas, it is just a matter of attracting developers and investors. In order to promote a positive development in Rosengård, three measures are implemented to create an interesting transport hub: The Rosengård Urban Pathway, the Malmö Express and Rosengård Station.

The Rosengård Urban Pathway is used by pedestrians and cyclists and runs from central Malmö, through Rosengård and on eastwards. The pathway has been fitted with the meeting places of Örtagård square and the activity space The red carpet of the rose. Through the renovation of this path, more people have realised the central location of Rosengård – only ten minutes by bike from the centre of Malmö.

The Malmö Express is a tram-like bus concept with an electric-gas hybrid bus on a line that runs from the Western Harbour, along Amiralsgatan, to the eastern suburbs of Malmö. It has its own bus lane and priority traffic lights in intersections, which shortens the travel time.

Rosengård Station, which will hopefully be built before long, is part of a planned ring train line in Malmö. Together, these initiatives are a clear indication to investors that now is the time to invest in Rosengård.
The Malmö Express allows for shorter travel times by means of its own lanes and priority traffic lights.
The Science Road – open, green and sustainable

Lund ties together the historic city centre with the unique research and business opportunities in the northeast. The Science Road is to be green, sustainable and accessible to a greater number – few are aware of the internationally unique research hidden behind those walls.

The corridor is a development area for sustainable urban development, and several changes have been made. The public transport line – currently a bus line but a tram line is planned – has been supplemented with attractive pedestrian and bike paths. Thanks to this project, many actors along the Science Road have begun to collaborate. The nationally owned real estate company, Akademiska Hus, has built and created inviting university environments. The green area by the lake Sjön has been made more accessible. Some of the sustainable solutions are invisible, such as underground energy storage. Others can be seen from far away – the large solar cell facility on top of the Mechanical Engineering building at the Faculty of Engineering at Lund University is hard to miss.
New technology for refuse collection vehicles yields large environmental gains

In Kvillebäcken, Gothenburg, the recycling company Renova has been collecting waste using brand new technology. Five refuse collection vehicles have been used in the trial: one electric hybrid and four methane diesel trucks. Two of them also have an add-on for electric loading and compression.

The methane diesel technology is more energy-efficient and provides an opportunity to switch over to renewable fuels. Trials have been done with, among other things, synthetic diesel made from renewable raw materials. Significantly reduced fuel consumption and emission levels have allowed for all project objectives to be achieved or surpassed. Electric hybrid technology is particularly effective for waste collection vehicles, as idling is eliminated when loading and compressing the waste. It also creates a more silent working environment around the vehicle.

The trial shows that there are large environmental gains to be made through transitioning to new technology for heavy vehicles. In Europe, there are nearly 100,000 waste collection vehicles which could use the same technology. The technology is also applicable to vehicles in other industries.
In Kvillebäcken, Renova has been collecting waste using brand new technology.
Fewer travel by car in the Fullriggaren neighbourhood

The residents of Fullriggaren in Västra Hamnen (Western Harbour) have their own carpool and nearly half of them also have access to a bicycle pool. In a campaign to promote sustainable travel, new residents were offered individual advice on their travel habits, free ticket for public transport and bicycle service.

The overall results of these measures – two years after moving in – shows that the residents of Fullriggaren have a lower car ownership than equivalent neighbourhoods in Västra Hamnen. The approach has been adopted by the City of Malmö and further developed in subsequent expansion projects in Västra Hamnen and other locations in Malmö.

Both carpooling and bicycle parking were included in the agreement that settled the parking arrangements between the City of Malmö and the developers as well as amongst the developers themselves. This agreement means that developers could build fewer parking spaces in exchange for the property owners paying the fixed part of the carpool fee for all the apartments during the first five years.
Bicycle pools for residents of Fullriggaren are beneficial to health and reduce car traffic.
Urban treasures

Results from projects supported by the Delegation for Sustainable Cities

Sustainable urban development is a condition for creating good residential environments and reducing their climate impact. In order to promote such development, the Delegation for Sustainable Cities was appointed, and allocated SEK 357 million to sustainable urban development projects. On the last of December 2014, the nine largest projects, that were awarded the majority of the funding, were completed. This report presents 25 treasures in form of results and experiences from these projects.

Many different sustainability measures have been tested and implemented – everything from solar cell initiatives to labour market projects. It is now high time to spread these to all those who work with urban development, in Sweden as well as abroad. Read more, and let these treasures inspire your own work with sustainable urban development!