Climate smart Hyllie – testing the solutions of tomorrow
Close to the world, and close to home. Hyllie is the hub for public transport in southern Malmö. From Hyllie Station, it takes 6 minutes by train to Malmö Central and 30 minutes to Copenhagen. Residences, offices, hotels, public swimming pools, parks, schools and playgrounds are being built in the area. An arena, a trade-fair center and a shopping center are already in place. In this brochure, Hyllie is defined as the development area whose geographical borders are specified in the Climate Contract for Hyllie.

Meetings, diversity and opportunities
www.malmo.se

For the environment, close to you
www.vasyd.se

www.eon.se

Making sustainability a reality

In Malmö, the environment is a key issue and sustainable development is a driving force that unites many of the players that operate in the city. The City of Malmö has ambitious environmental goals: by 2020, the city’s organization is to be climate neutral, and by 2030, all of Malmö will be 100-percent sustained by renewable energy. Hyllie – Malmö’s largest development area – will lead the way toward the most sustainable city. To shoulder this responsibility, in February of 2011, the City of Malmö, VA SYD and E.ON signed a climate contract for Hyllie. Under this contract, we jointly undertake to lay the foundation for Hyllie to become the Öresund region’s most climate-smart city district and a global benchmark for sustainable urban development. When fully built, the area will comprise about 9,000 homes and almost an equal number of workplaces.

Hyllie’s objectives will be realized if all of the players active in the development of the city district work together. In Malmö, there are many companies that want to focus on innovative technology, and that want to contribute to new approaches to transportation, living and working. Hyllie holds the potential. Here, we are working in unison to test and develop the concepts that will serve as a role model for Malmö’s continued progress as a sustainable city.

2008
Malmö Arena inaugurated

2009

2010
Hyllie Station opened

2011
Climate contract signed

2012
Malmö Trade Fair and Emporia opened

First apartments ready for occupancy. E.ON’s Smart network platform goes live and the property company Roth Fastigheter is connected. The Flintranann biofuel plant is restarted for the delivery of renewable district heating.

2013
MkB, Skanska and Malmö Arena are connected to CESO (E.ON Customer Energy and System Optimisation platform)

2014

By as early as 2020, Hyllie will be 100-percent sustained by renewable or reused energy. The focus is on an energy supply model that is based on Hyllie’s potential to create a resource-efficient ecocycle and energy-efficient solutions throughout. The renewable energy is to derive from wind power, solar power and biofuels. A significant share of the energy production is to be locally produced in the form of such solutions as solar cells on the properties. New Hyllie-destined wind-power production is planned for the region and E.ON has commissioned the Flintrännan biofuel-based district-heating plant in Malmö.

The reused energy comprises energy recycling from waste and wastewater in Hyllie, which generates district heating, electricity and biogas. The electricity and district-heating network will also be capable of using surplus solar energy produced in the properties or surplus from other processes that generate heat where it is needed. A study will determine whether the ground water hollows related to the city tunnel in Hyllie can be used as a source of energy in a district-cooling network.

A vision of the future
In the sustainable city district Hyllie, residents have a high quality of life while living in a resource-efficient and energy-smart way.

The energy supply will be based on the ecocycle principle, and waste will be a resource. The energy that will be used will be renewable or reused. Most people in Hyllie rarely need a car. They prefer to take the train or bus. The Hyllie station is six minutes from Malmö Center and less than 30 minutes by train from Copenhagen. Cycling through parklands to the sea or Malmö’s city center takes less than 15 minutes. Many civilian drivers and business people drive environmentally friendly carpooling cars instead of their own cars. The area has charging stations for electric cars and is close to biogas fueling stations.

Hyllie is green to its core and is close to nature. Parks, planting areas and urban parklands discreetly meld with the open landscapes. Recreational areas where people walk, jog and ride horseback add to the green essence of the city district.
The rate of urbanization is increasing globally and Malmö is growing as a city. This entails new challenges, but also new opportunities since urban areas hold the key to sustainable development. These are the areas where employment opportunities emerge and where there is strong potential to develop sustainable energy and transportation solutions.

Environmental matters impact everyone at all levels. What we eat, how we travel, work and live – at home and at the office – has an impact on the local and global environment. Living and working in the Öresund region’s most climate smart city district is meant to facilitate sustainable living. Hyllie will offer ample ability to live, travel and work in an energy and resource-efficient manner.

People in focus – a new approach to living

Mandatory sorting of food waste

Malmö is the first major city in Sweden to introduce mandatory sorting of food waste. The decision applies to all types of buildings – not only single-family houses and apartment blocks, but also businesses, restaurants, large households, offices and stores. Food waste is used for such purposes as producing the biogas that powers buses and refuse trucks, for example. Ten kilograms of food waste generate enough biogas to drive a car for more than ten kilometers.

The smart home

How much electricity and heating can be conserved by controlling consumption? The development of Hyllie includes a number of pilot projects that can be advanced on in Hyllie, such as the Hållbarheten apartment block in Västra Hamnen, which E.ON built to develop new energy solutions. The building has photovoltaic cells, solar panels and a small wind power generator on the roof; even the elevator in the building produces energy. The apartments are equipped with outlets for electric cars, electric bicycles, charging posts, intelligent home controls and detailed metering of energy and energy consumption. For example, home energy consumption can be controlled using an app and various programs can be preprogrammed so that the temperature decreases when leaving home and the washing machine starts when activity on the electricity network and the price are lower.

Easy to recycle and sort waste

Does it become easier to sort waste using transparent sorting containers? In Hyllie, VA SYD will work to adapt the recycling and waste sorting systems in accordance with people’s everyday lives and use behavioral-science theories to develop solutions that make the right approach easy to take. VA SYD will also help construct attractive waste solutions that provide users with direct feedback.

This is how Hyllie will work
Urban gardening close to home

Live in the city with one foot in the countryside. Hyllie will offer excellent urban gardening opportunities. In recent years, the interest in home gardening has increased in Malmö and the City of Malmö is promoting urban gardening as a successful method for creating a greater sense of community and cultivating gardens in the neighborhood. Around the new public swimming pool at one end of Hyllie Boulevard, the City of Malmö is making space for individual gardening parcels, and at other new construction projects in the area, there are plans for individual gardening parcels for residents adjacent to the properties.

Sustainable travel

The City Tunnel and Hyllie Station have already given people ample opportunity to opt for sustainable travel in Hyllie. The center of Malmö is just a few minutes away by train. In Malmö, 25% of all travel is already by bicycle, and in Hyllie, we are further developing the means to use bicycles. For example, the area is home to Malmö’s first Bike and Ride system with conveniences for bicyclists, including storage boxes, access to air pumps, restrooms, showers and lounges. If you would still like to take your car, Hyllie offers great access to carpool and it will be easy to fill up using biogas or charge your electric car.

Environmentally certified office buildings

Do people experience a greater sense of well-being in environmentally certified office buildings? There are substantial indications of this. A study conducted by Skanska together with a group of students from Lund University shows that companies generate energy savings of 25% by relocating to environmentally certified premises. However, it is equally interesting that sickness absence declined by 39% and that productivity increased between 3% and 10%. In Hyllie, companies will have the ability to sharpen their environmental image by moving into an environmentally certified office building.
Hyllie is at the forefront of the development of a sustainable energy system. The area will integrate electricity, heating and cooling, the smart grids and other intelligent energy solutions that will hallmark the future. Smart grids enable flexibility in the chain of consumption and can optimize the use of renewable energy sources through better control and monitoring. In Hyllie, people will actively be able to measure, monitor, control and influence their own energy consumption using smart energy solutions, and be able to independently produce energy. To enhance the efficiency of energy consumption, building contractors that are interested can install flow meters for the individual metering of hot tap water and heating. When combined with Hyllie’s energy efficient properties and the use of electric and biogas-fueled vehicles, this will result in enhanced energy consumption efficiency and less of an impact on the climate.

By as early as 2020, smart solutions for the regulation of consumption and storage of energy in Hyllie will enable an improvement in the balance between production and consumption compared with current conventional energy systems.

**Support for smart grids**

The Smart grids for a sustainable energy system in Hyllie project highlights issues related to the role that consumers, properties and infrastructure will play in the future energy system. Hyllie’s energy solutions do not focus exclusively on renewable energy, but also on enabling consumers to become actively involved in their energy consumption. A sustainable approach to transportation, waste management and recycling is another key cornerstone. Under the project, an integrated infrastructure system is being developed for electricity, gas, heating and cooling, which focuses on optimizing the interaction between central and local production using smart grids. This includes enabling the buildings in Hyllie to utilize the overall potential of the smart system, whereby locally produced renewable energy, including solar or wind energy, will account for a major share of energy demand.

The Smart grids for a sustainable energy system in Hyllie has the support of the Swedish Energy Agency and is being implemented by the City of Malmö and E.ON in cooperation with building developers and other players. Parts of the project are included as the only Swedish demonstration project to participate in the EU Future Internet Smart Utility Services (FINESCE) project, which is developing smart energy applications.

**The measurement and regulation of energy**

An energy monitoring system will be implemented in Hyllie. The system will contribute to balancing the consumption of and access to renewable energy production by monitoring, measuring and regulating power output, thus optimizing the city district’s energy flows in accordance with price and the share of available renewable production. By including forecasts of such factors as energy prices, energy production capacity and weather, the system can create scenarios based on which properties and consumers who are connected to the system can act.

**Smart properties with new energy technology**

Hyllie will enable property owners, those working in the area and residents to become an active part of the energy system. The first pilot project in Hyllie is already in place. In the Smart grids for a sustainable energy system in Hyllie project, in partnership with E.ON, Roth Fastigheter has tested smart and cost effective energy solutions with residents in focus. The apartment block has been fitted with solar thermal collectors and all apartments have been equipped with smart home systems that regulate and control power output and energy consumption. A screen in the hallway allows tenants to monitor their energy consumption in SEK. The property as a whole is also able to optimize its energy flows in relation to price and production. The pilot project will make it possible to measure thermal inertia in the property, to cap output peaks and to test new pricing models. Residents of the property will achieve a higher standard of living and the property owner will conserve energy and save money as the supply and demand of energy are optimized.
What are smart grids?

Historically, energy production has derived from a limited number of major, primary sources. Energy has gone in one direction, from the source and out to consumers and production has been governed on the basis of estimates about future consumption. With a rising share of renewable energy in our society, access will vary since the production of wind power and solar energy, for example, are contingent on the weather. In addition, future energy systems must also be able to cope with major fluctuations in demand. With a significant number of electric cars in the vehicle fleet, there can be major fluctuations in electricity demand within the span of a few hours. Smart grids intelligently integrate all sorts of energy sources, both large and small scale. They also enable property owners, households and businesses to become more active in the energy market through such measures as selling the surplus from their independent energy production. In other words, the energy flow goes in two directions. By using energy when the supply of renewable energy is high and the price is lower, the need for demand for reserve or balance energy is minimized.

Balance between the consumption and production of energy

The City of Malmö, E.ON and VA SYD have jointly developed an energy balance model that shows the estimated energy demand in Hyllie by 2015, 2020 and 2030. In Hyllie, all energy flows, both renewable and recycled, will be able to be added to the energy system in the form of heating, cooling, electricity and biogas. The energy balance model demonstrates how much renewable energy surplus will be needed to achieve the renewable and recycled energy goals. The model is currently based on estimated data, but this will be replaced by measured values as the city district is developed.

Major appliances powered by hot water instead of electricity

In Hyllie, there are plans to connect dishwashers, washing machines and dryers to the property’s hot-water system. This will be tested in some of the city district’s new preschools, among other properties. Since district heating has a lower primary energy value than electricity, this is a smart way to save electricity.
A smarter and more sustainable energy system focuses on the properties and people. Energy consumption is reduced by using the right choice of materials and smart consumer-adapted solutions. In Hyllie, we strive to not only make new construction projects energy efficient, but also equipped for tomorrow’s energy solutions. To optimally use the energy supplied to the network in the best way, the properties must communicate with the overall system – and in certain cases also with each apartment’s control system. This function makes it possible to regulate the load in the system, to store and optimize energy, and to maximize the use of recycled or renewable energy. Hyllie’s Climate contract also aims to ensure that a significant share of the properties in Hyllie install some form of local energy production, such as solar and wind energy.

In addition to being smart and energy efficient, the properties in Hyllie will also contribute to the greenery in the city district. In the plan for the development along Hyllie Avenue, the buildings will offer excellent opportunities for greenery on the balconies, rooftops and walls. For example, prefabricated gardening parcels and spacious planting boxes will be available. Trees or other greenery will be visible from the street and Hyllie’s green essence will be visible in the yards with green areas protected from the wind where residents can spend time together and children can play.

**A – Energy consumption**

The building developers at Hyllie are highly ambitious. As part of the building process, they have closely monitored the Environmental Building Program South (EBPS), which is used as support for the environmental ambitions and represents more stringent environmental requirements than those imposed nationally in the BBR regulations. In the lowest level of ambition – environmental class C – requirements have been sharpened by 10% compared with the energy requirements specified in BBR.

**B – Waste sorting**

All area residents will have full waste sorting facilities near their property and all housing units will be designed with practical waste sorting solutions.

**C – Future proofing**

In addition to the EBPS, the contractors for Hyllie Avenue and the City of Malmö have drafted a sustainability agreement under which the 1,700 apartments that are being built will be future proofed so that they can connect to Hyllie’s smart grid.

**Small-scale production of renewable energy**

Many players in Hyllie plan to focus on solar cells that can be connected to the electricity network or on solar thermal collectors that can be connected to the district heating network. Within the framework of the Smart grids for a sustainable energy system in Hyllie project, contractors that are interested can receive matching funding to establish on-site production of solar energy, in the form of solar cells or solar thermal collectors.

**Low-energy housing focused on residents and care recipients**

Two players in Hyllie are members of the Buildsmart project, which is headed by the City of Malmö. The project is being financed by the EU and includes residential buildings and commercial premises that will be built in Sweden and Spain. The project aims to prove that buildings can be innovatively and cost-efficiently constructed with very limited energy consumption. The buildings that are included in the project will consume less than 60 kWh of primary energy per square meter, which is nearly on par with passive housing. Residents and care recipients are central to the project since one of the project’s objectives is to promote a more climate-minded approach. Hyllie features residential units, office space and a preschool, where such methods as an air-tight building structure, supply and exhaust ventilation systems with heat recovery, smart grids and lighting control with motion detectors. The companies involved with Hyllie include Roth and Skanska.
Green rooftops and areas for solitary bees

The design of the properties is important for contributing to greenery at Hyllie. Through the City of Malmö project Biodiver-City, the aim of which is to enhance the city’s biodiversity, Skanska built biotopes, resembling the Limhamn limestone quarry, on the roof of an office building in Hyllie. The roof was also equipped with habitats for bees in the wild. In the courtyard, biotopes that were rich in lime were constructed, as were climbing plants on wire systems, to promote leafy greenery.

Use of surplus energy

Hyllie will be characterized by a mix of residential designs – ranging from housing, office buildings and hotels to larger public facilities, such as arenas, trade fairs, a swimming complex and a shopping center. This results not only in complex energy usage but also in opportunities to leverage the synergism created between different property segments.

When one property generates an energy surplus, a deficit may arise in another property. Residual flows and energy surpluses in one business may be utilized by another. In terms of heating, waste heat or a surplus of locally produced heat can be used more efficiently in temperature-dynamic district heating. The distribution network and the properties’ technical systems can manage temperatures in the district heating water ranging from 65 to 95 degrees Celsius, thus enabling a property to deliver low-temperature heating. This heat can then be used in another property. This is just one of the ways that we, together with various other players, can create a smarter district heating network.

Storing energy in buildings

By constructing buildings that retain heat longer, energy consumption can be optimized and cost savings can be achieved. In 2012, the Hyllie Climate Contract was awarded the Concrete Prize from the construction trade press magazine Concrete, for its efforts to optimize energy consumption by maximizing a building’s ability to store heat. Hyllie will test how to regulate a property’s energy consumption based on weather forecasts by, for example, proactively storing energy in a building prior to a cold front. In this work, the concrete’s structural properties are being studied since they are integral to the ability to store thermal energy.

E.ON’s grid platform, CESO*

- Facilitates monitoring, measurement and optimization of energy consumption
- Creates bridges between production/distribution and the customer’s use of energy
- Optimization of city district’s energy flows by price and access to renewable production in almost real time.

*Customer Energy and System Optimisation platform
One of our greatest challenges today is traffic, which causes problems with emissions, noise, poor air quality and urban congestion. The transportation sector accounts for one-fourth of Sweden’s energy consumption and since most of today’s vehicles are powered by fossil fuels, we can significantly reduce greenhouse-gas emissions if we switch to other fuels and to more climate-minded means of transportation.

Hyllie aims to make it easy to walk, bike or use public transportation instead of taking your car. The Malmö Central Station is a mere six minutes from Hyllie, and central Copenhagen is less than 30 minutes away. Malmö is already growing as a bicycle city, in which about 40% of all business travel is by bicycle. From Hyllie, the city and the sea are a 15-minute ride away on scenic bicycle paths. Buses in Malmö are currently powered by natural gas, biogas or a mixture of the two. However, by 2020 at the latest, all buses will be powered by fossil-free fuels, and biogas is one of the most important alternatives. It can be locally produced and is classified as the most climate-adapted vehicular fuel.

If you still need a car, there will be access to carpooling in Hyllie. It will also be easy to charge your electric car or fill up using biogas. You can already charge your electric car in Hyllie’s commuter Park and Ride parking lot and in the Emporia shopping center, and more charging locations are being planned adjacent to the residential units in Hyllie. You can fill up using biogas on Kvartettgatan, a traffic junction close to Hyllie.

Carpooling for the masses
For both private individuals and companies, environment-friendly carpooling vehicles will be an attractive alternative in Hyllie. The number of parking spaces per household is lower than the norm – 0.65 spaces per apartment. In exchange, the contractors will finance a joint carpooling system. Membership is included in the rent for the first five years.

The Swedish Transport Administration’s study of carpooling shows that it makes land available for use for other purposes. The study shows that one carpooled car can replace about five cars. One carpooling car could help to reduce carbon emissions by between 5.7 and 8.5 tons per year.

Smart charging of electric cars
One way to optimize the use of renewable energy while also reducing costs, is to decide how and when you want to charge your electric car. As a consumer, you will be informed of the supply of renewable energy in the system and how much electricity costs via a smart phone or tablet computer. If you want to charge your car in an eco-friendly manner while there is plenty of renewable energy, you can easily preprogram this feature. This is currently being tested in E.ON’s pilot Hållbarheten project in Malmö, and the results of the study will form the basis for the solutions in Hyllie.

Car batteries as a buffer
With smart electricity grids, cars can be charged when electricity is inexpensive and the surplus can be returned when it is more expensive. As a consumer, you can use the electricity yourself or sell it back to the network. In other words, the electric cars can store energy. The electricity grid can essentially be balanced to a certain degree by the electricity that is stored in the cars’ batteries as described above being used as a buffer. E.ON is planning to study this in greater detail in the aim of developing a prototype.
Bike and Ride

The new parking garage at Hyllie Station houses Malmö’s first Bike and Ride facility, which makes life easier for those who commute by bicycle. The facility will house about 1,000 bicycles and parking is free. Bike and Ride offers a number of services and conveniences that have been developed for the benefit of bicyclists. There are storage boxes for helmets and rain gear, areas to perform quick repairs, round-the-clock air pumps as well as restrooms, showers and lounges.

Corporate transportation package offers

The City of Malmö wants to merge various means of transportation, even for companies. Combining various transportation package offers could make it entirely possible to take the train to Hyllie and have access to an electric car or bicycle during the day and then take the train back home.

10 kg of food waste provides sufficient biogas to drive a car more than 10 km.
We are creating the Öresund region’s most climate-smart city district. In unison.

In the Hyllie city district, we are testing the solutions that we subsequently want to deploy throughout the city. By as early as 2020, the city district will be 100% sustained by renewable or recycled energy. This is driving developments for the companies that want to be involved in achieving this goal. We are partnering with the contractors that have established their own goals for how high they want to aim, and then developing the systems together.”

Kerstin Åkervall, Environmental Director, City of Malmö

To create lines of communication between various interfaces in the energy system – properties, consumers, distribution systems and production – and to achieve an energy balance throughout the year, we are working on solutions within the term smart grids. We have developed a smart grid platform for Hyllie, which enables interaction between the energy system and energy consumption in the properties, in part through optimization based on the amount of renewable energy in the production mix, weather forecasts and the price of energy.”

Peder Berne, Project Manager, E.ON Sustainable City

Our initiative in Hyllie is largely based on a philosophy that makes the right approach easy to take. Very many people want to take the right approach, despite which this occasionally fails to materialize. Accordingly, we want to focus on people rather than on technology. In Hyllie, we will focus intensively on waste-management solutions and with behavioral patterns to help people take the right approach without having to think about it.”

Henrik Aspegren, Deputy Director of the Association, VA SYD

Read about developments in Hyllie at www.hyllie.com/klimat

In February 2011, the City of Malmö, VA SYD and E.ON signed a climate contract for Malmö’s largest development area, Hyllie. Together, we will make Hyllie the most climate-smart city district in the Öresund region. The goal is for the energy supply to comprise 100% renewable or reused energy by 2020. In Hyllie, we are developing smart grids that contribute to the energy being consumed efficiently. Using new technology, people will actively be able to measure, control and influence their own energy consumption, and independently produce energy. We are taking a new approach, building green and harnessing smart technology to take a sustainable line in our construction. Because we know that this pays dividends and that we can achieve better results through collaboration.

The chances of realizing our vision for the future improve with your help!