

Newsletter e-harbours #4, March 2013

## What Smart Grids can do when Energy Matters



Zaanstad showcase explores urban redevelopment

This March, the Municipality of Zaanstad officially inaugurated its own smart energy system, REloadIT. The first goal of the system was to charge the electric cars of the Municipal fleet with locally produced renewable energy. When that goal was realized, new opportunities surfaced. And the city learned a lot about energy matters on the side. Robert Linnekamp, alderman of the Municipality, states: "Our negotiations on a new energy contract, and the experiences in the e-harbours project have learned us, that a predictable and flexible customer pays less for his energy consumption. For example by shifting our demand towards timeslots where abundant energy is available."

#### Read the full story on page 4



Yes, I would like to receive the e-harbours newsletter! Signup at www.e-harbours.eu

## "We need to act smart from the start"

To get the e-harbours message across, we organise the conference 'Urban Redevelopment 3.0 - new coalitions with new energy: Energy matters', 21/22 March in Zaanstad, the Netherlands.

Read the full editorial on page 2

Industry, logistics and renewable energy in the Northern Harbour of Malmö



Read the full story from Malmö, Sweden, on page 14







Port of

ntwerp









# **Editorial:**

## "We need to act smart from the start"

The smart energy logistics story is a relatively new one. It is sometimes even unknown, or neglected. The e-harbours team encounters a wide variety of stakeholders in energy logistics, some of them not yet aware of their role in the energy chain.

Harbour cities have a strong mix of residential and industrial areas and enough space for the production of (sustainable) energy. This makes them a challenging testing ground for new energy logistic concepts. These concepts can be applied in a huge standalone production plant, in an industrial site, but also on a much larger scale: districts. This can be done in close cooperation between all stakeholders in the district.

I am convinced that cooperation and co-creation are the main tools to really make progress. The energy transition will be boosted when this is tackled in urban redevelopment.

All over Europe, a new orientation in urban redevelopment is emerging, with more focus on sustainability. Water, waste and mobility already show progress. But the biggest gains are achieved by changing the local energy logistics. Not only improving the energy efficiency of buildings and installations (reduction), but introducing more renewable sources (production) and of course exploiting the flexibility of the community as a whole (innovation). This would be really smart!

To get the e-harbours message across, we organise the conference 'Urban Redevelopment 3.0 – new coalitions with new energy: Energy matters', 21/22 March in Zaanstad, the Netherlands.

A number of local stakeholders will have to forge strong and enduring links to realize the full potential of urban redevelopment – think of large industrial end users that cooperate with SME's and house owners on energy logistics, facilitated by the Municipality.

These new types of cooperation ask for a fair share of the benefits for all stakeholders, appropriate policies by municipalities and supporting regulations. The message is clear: We need to act smart from the start.

> Jan Schreuder Project manager e-harbours



#### E-harbours newsletter.

Issue: #4 Publication date: March 2013

Available for free download at: www.eharbours.eu

Sign up for a free subscription at: www.eharbours.eu/newsletter

Text: Sander Kooistra, Jan Schreuder, Daniel Skog

Photo: E-harbours (where nothing else stated)

Production: Daniel Skog, City of Malmö The e-harbours project is financially supported by the Interreg North Sea Region program.





#### www.eharbours.eu

### Website stories from eharbours.eu

## Report on the German 'Energiewende' underlines e-harbours message

The German shift towards renewable energies, which became known as "Energiewende", is arguably the most ambitious project in Europe's energy sector today. The large coal- and nuclear fueled power plants of the past are becoming obsolete. Yet, an energy system based largely on wind and PV needs backup capacities to secure energy supply at times when the production from wind and sun is not sufficient.

http://eharbours.eu/uncategorized/report-on-the-germanenergiewende-underlines-e-harbours-message





#### Staff exchange in Malmö

On November 22nd, 2012, staff from City of Amsterdam, City of Malmö, E.ON and WSP met in WSPs office in Malmö to exchange experiences on electric mobility, smart energy systems and air quality levels.

http://eharbours.eu/e-harbours-events/staff-exchangein-malmo

#### First e-harbours movie released

The e-harbours movie on Smart Energy Networks introduces the e-harbours idea and explains in an easily understandable way how water pumps, cold storage facilities and other harbour-related properties can be used to balance the electricity grid if they are controlled in a smart way.

The video was produced by e-harbours project partner HAW Hamburg, in cooperation with erstersinn.de.



http://eharbours.eu/uncategorized/e-harbours-movie-released





#### Showcase B1: Zaanstad, Netherlands. City of Zaanstad.

### What Smart Grids can do when Energy Matters

This March, the Municipality of Zaanstad officially inaugurated its own smart energy system, REloadIT. The first goal of the system was to charge the electric cars of the Municipal fleet with locally produced renewable energy. When that goal was realized, new opportunities surfaced. And the city learned a lot about energy matters on the side. Robert Linnekamp, alderman of the Municipality, states: "Our negotiations on a new energy contract, and the experiences in the e-harbours project have learned us, that a predictable and flexible customer pays less for his energy consumption. For example by shifting our demand towards timeslots where abundant energy is available."

"We can link more processes to the system," Robert Linnekamp adds. "Suppose we make an arrangement with the local energy cooperative ZEK, and start buying power from their privately developed wind turbine. That would be major step towards a 100 % local and renewable energy supply to charge our electric cars."

The energy cooperative would benefit from such an arrangement. It would get more revenue out of the kilowatts it is producing. Currently, the price of its electricity is quite low, the electricity companies do not like the variability in the production of wind power. But in the REloadIT system, that variability can be accommodated. The Municipality can offer the energy cooperative a better price for the wind power, and still pay less than current market prices.

#### Balancing the system

This is only one example of the REloadIT potential. Robert Linnekamp: "We can attach new sources of re-



Zaanstad showcase explores urban redevelopment

newable energy to the system, like PV systems or wind turbines. But we can also look for new customers, that can put the renewable energy to good use. That way we can balance the whole system in a smart way. This balancing has an economic value. The business case for renewable energy improves. And the end-user is better off, too.

To balance the system ,we need more sources of flexibility. Take for example the pumping stations that pump away excess water out of our waterways and sewage system on rainy days. On a day with normal rainfall, a pumping station only has to come into action for six hours. That means the energy-intensive pumping can be shifted to off-peak hours. Here we find useful flexibility, that we can use to balance the energy





system. We want to investigate the potential of these installations, when we integrate them into a weather-related system like REloadIT."

#### Connecting energy and urban development

Focusing on renewable energy has paid off for the municipality of Zaanstad: lower energy costs, a growing awareness of energy issues, and knowledge about the importance of flexibility. REloadIT has clearly shown the potential benefits of combining different energy sources and users in a smart way.

The optimal solution would be to locate flexible sources of energy next to flexible users of energy. Zaanstad now begins to explore this combination in an area where great opportunities exist for producing renewables, and large consumers of energy are located. The new industrial development HoogTij, 100 hectare located on the deep water of the Noordzeekanaal (linking Amsterdam with the North Sea), offers ample space for industry.

HoogTij has been equipped with the infrastructure for a heat/cold network. The area could be a good location for wind turbines. Also, pumps could be installed to extract heat from the water of the canal and employ it for heating buildings. Simulations, executed in cooperation with the Eindhoven University of Technology, show that the smart combination of different renewable sources and systems will reduce the energy costs of factories and installations on HoogTij with up to 20 %. Emissions of carbon dioxide are even reduced by 70%, due to the optimal deployment of wind power. For many branches, low energy costs and an improved 'carbon footprint' are a decisive competitive advantage, and it surely will make HoogTij a more attractive location for the establishment of new business.



Robert Linnekamp, alderman Municipality of Zaanstad

The simulations clearly show, that combining different sources of renewable energy in a smart network, and integrating them in a 'district heating and cooling' infrastructure improves the business case of all parts of the network. Adding wind turbines and heat pumps improves the profitability of the district heating network, and vice versa. The e-harbours showcase of Zaanstad makes clear once more how powerful a Smart Grid can be, and how profitable it is to integrate local production and consumption of energy in Smart Energy Network.





Showcase A2: Hamburg, Germany. University of Applied Sciences (HAW Hamburg)

# Five steps to help Smart Energy Networks take off



Numerous research projects on Smart Energy Systems were implemented in the last few years. Experts and the Federal Government of Germany both agree that the transformation of the energy supply system towards renewables is not possible without intelligent and decentralized energy solutions: Demand Side Management for large consumers, smart operation of CHP plants and intelligent storage options.

Pilot projects have demonstrated the technical viability. However, we still don't see a broad roll-out of smart energy networks in Germany. For this reason the Hamburg team of the e-harbours project focused on non-technical barriers that prevent implementation of smart energy networks and derived five strategies to accelerate the take-off.

#### Develop the market!

A main asset that Smart Energy Networks can supply to the public grid is flexible capacity – a reserve that is constantly available, but used only during short periods of time when the situation in the grid requires it. The electricity markets in Germany and most other North Sea Region Countries, on the other hand, are currently tailored to trade kilowatt hours, i.e. amounts of energy. Markets for reserve capacity do exist, but regulations are tailored to suit traditional production units like gas power plants.

Thorsten Nicklass from entelios AG, Munich, is managing a pool of flexible consumers. He states: "We need an open market for flexibility products where both the production and the demand side can participate, and where providers or aggregators of demand response potential have a clear-cut role – that would really make the business cases take off."

#### Make it profitable!

Companies are interested in business cases which are manageable with reasonable efforts and achieve app-





ropriate financial benefits. Currently, revenues generated by marketing flexible capacity are too low to guarantee a reasonable return on investments.

What has worked really well in the sector of renewable energies could also boost Smart Energy Networks: incentives in the form of direct financial support, tax concessions and flexible tariffs.

However, some interventions in the market are currently counteracting the exploitation of flexibility. Biogas-powe-red CHP plants, for example, would be perfectly suited for flexible operation – however, under the current fixed feed-in tariff in Germany, they are most profitable when run at full power 24/7.

For governments, incentives to Smart Energy Networks are certain to pay off: they help to guarantee stability of the electricity supply. What's more, the necessary technology and services will provide an enormous boost for knowledge-intensive industries and local installation companies alike.

#### Make it smart from the start!

Implementing a Smart Energy Network within an existing property (like an industrial complex) comes with a certain cost, and companies are often reluctant to change ongoing, established processes. In contrast, whenever facilities are newly constructed, remodeled or modernized, additional costs and planning requirements for Smart Energy Networks are modest. Legal standards that already require new buildings to use a certain share of renewable energies could be modified to include smart energy infrastructure, for example a smart metering and load management system for industrial properties.

Also, in newly developed areas, zoning regulations could enforce the implementation of a district heating grid and decentralized CHP.

Even if smart energy networks are not "cash cows" at the moment, the infrastructure will be in place when the implications of the energy shift take full effect, and consumers will be in the position to adapt to changing tariff structures and attractive new business cases.

#### Make operational security the top priority!

From a company's perspective operational and data security have the highest priority. Both aspects can affect the corporate success and shortcomings in this field can cause significant economic damage. Therefore, facility operators carry strong resentments towards any external influences on their processes. This may hamper the implementation of Demand Side Management measures. However, experiences from the USA clearly show that Demand Side Management actions can be seamlessly integrated into existing processes, when DSM provider and company work together closely to ensure an exact planning of load shifting measures.

Business associations can play an important role in overcoming these resentments, by offering information and independent counseling to their members. Clear and effective standards and certifications have to be established concerning data security. The question of liability for any productivity losses should be clearly regulated – this is also a potential field for new insurance products. Moreover, it should be made clear that smart energy networks can even contribute to security of supply in the future

#### Stimulate public awareness!

Smart Energy Networks can be a great contribution to the energy shift towards renewables. Being able to control when energy is used has the same stabilizing effects for the power grid as physically storing energy, but at a much lower cost. Yet, a local smart grid is not as "visible" as a PV system on the roof or electric car fleets, as the mechanisms of the power systems are rather abstract and hidden.

Increased public awareness in this field helps companies to communicate their contribution towards sustainability, thus creating an additional motive to implement smart energy solutions.

#### The English report on non-technical barriers is now available at www. eharbours.eu



Jan Hendrik Pietsch is working as Sustainability Manager at HHLA AG, the largest logistics company at the port of Hamburg. He states: "For many years, we have been pioneering in the field of energy efficiency and sustainability. By testing innovative and intelligent energy solutions together with the project e-har-

bours, we also contribute our share towards making the energy turnaround possible." Source: HHLA AG





Showcase A1: Antwerp, Belgium. VITO and Port of Antwerp.

# Demand side flexibility in the Port of Antwerp



"Flexibility is a new and 'unknown' asset, which is typically not assessed and quantified during standard energy audits. Although flexibility is found in many installations, companies are still reluctant to exploit it. Many companies don't realize what 'flexibility' exactly means and they don't realize the potential economic value."

The Belgian research group Vito has investigated the presence of demand side flexibility in the Port of Antwerp, a theme that is gaining importance. As we all know, the energy production of sources like wind and sun can be very volatile and unpredictable. Flexibility in the energy consumption of industries and households can compensate for the volatility of the renewables. This flexibility is an asset that smart energy networks can exploit, and helps integrating renewable sources in the grid. Five companies in the Antwerp harbour area, important consumers of energy, have participated in a detailed flexibility analysis.

- Amoras, a huge facility, recently built as a sustainable solution for the processing (sieving, desanding, dewatering) of sludge.
- Borealis, world player in the production of chemicals and innovative plastics. The Borealis facility in the Port of Antwerp produces polypropylene pellets.
- Luiknatie, a maritime logistics company, operates a vast cold store with cooling and freezing storage cells for a wide range of goods like specialized chemicals.
- Norbert Dentressangle, an international logistics company based in Antwerp. The Fresh division operates a big warehouse with cooling and freezing facilities.
- SEA-Invest, one of the world's largest terminal operators for bulk and fruits. A terminal specialized in storage and ripening of fruit was investigated.

#### Sources of flexibility

The Vito research team identified the devices and installations that show flexibility: they can adapt the energy consumption to some extent without compromising their proper operation, for example by shifting non-critical activities to another time-slot. It appears that two factors have a great positive effect on demand-side flexibility: the occurrence of buffers in the process, and a certain amount of overcapacity in the installations. In the case of the sludge processing plant Amoras, both these factors contribute to a huge potential flexibility in the consumption of energy. In the other facilities a potential for flexibility was identified also, albeit smaller.

#### Flexibility, the unknown resource

As stated before, flexibility is an 'unknown' asset. In several facilities the investigators found flexibility in the production process, where it was not expected. Many companies don't realize what 'flexibility' exactly means nor the potential economic value. Projects like e-harbours are helping to create awareness of this future value. Fred Kuijper, project leader of e-harbours at Vito , has a remarkable suggestion for companies and engine-





ers, based on the findings in the Antwerp harbour: "We discovered that many installations and systems are not designed and built with flexibility in mind. It may seem to be a good idea to build an 'optimalised' plant. But in fact a slight amount of 'oversizing' can greatly enhance the flexibility of the installation, at relatively low cost. Once an installation is operational, the costs of changing the system and enhancing the flexibility can get very high."

#### **Realizing potential flexibility**

Can the demand-side flexibility that was identified in the five companies help to lower energy costs? A simple way to lower costs could be to shift electricity consumption to the nighttime, when tariffs tend to be more favourable. But that shift can be a problem for companies. One of the participants decided that it accepts higher energy costs (by charging its forklift trucks during the day) because it wants its fleet to be ready for the customers at all times.

Another participant has a very steady consumption of electricity. Nevertheless, the process showed a remarkable potential flexibility. But the company feared that fluctuations in the process could lead to variations in product quality, which would be unacceptable for customers.

Yet another company (Amoras) can lower its energy costs hugely, when it starts to realize the market value of the available flexibility. But the gains can be realized only by making important operational changes.

These examples show, that for every company tailormade solutions must be devised to realize the potential of demand-side flexibility.

#### Adding wind power

The Antwerp Port Authority is currently investing in a big wind farm in the Port of Antwerp. Many Antwerp harbour companies get the opportunity to have a wind turbine on their company estate, and can use the electricity produced for about half the normal tariff. The Vito research team has calculated what the introduction of a wind turbine could contribute. The combination of flexibility and wind power in a smart energy system proved to be profitable in three of the five companies. In the case of sludge processor Amoras the potential gains amounted to more than 20 % on total electricity costs! One of the cold storage plants could realize a reduction of 15% on power costs, the other one has a smaller, but still clearly profitable business case. These calculations are based on current tariffs. Probably, the value of flexibility will rise in the future, making the business cases even more profitable.

#### Hidden sources of flexibility?

The next step in the Vito research project will be, to bring the five participating companies from Antwerp together in a simulated 'virtual power plant'. The simulation will show what gains can be achieved by combining different energy profiles and renewable resources.

In the meantime, new sources of flexibility are waiting to be investigated. Jef Verbeeck, researcher at Vito; "the Port of Antwerp handles a great number of reefers, refrigerated containers. On an average day, thousands of reefers are standing on the quays. In our climate zone, these reefers do not have to be cooled so intensively. We calculated cooling can be switched off for up to 24 hours. That produces a huge potential flexibility, in the order of 25 MW for the port of Antwerp. Can we use this flexibility in a smart way? I think this is a very promising research theme."

The Vito report Application of Smart Energy Networks – part I can be downloaded from our website, at www.e-harbours.eu/downloads





# **Conference report: 'Enhancing the business case of electric transport'**



e-harbours conference on e-mobility, Malmö November 2012: an overview

A new and more integrated view on electric mobility is beginning to appear in Europe. That summarizes the outcome of the recent e-harbours conference on e-mobility in Malmö. The conference, shed a new light on a range of e-mobility topics, showing that electric cars, boats and harbor cranes begin to be considered as more than just stand-alone innovations. As the e-harbours team at Robert Gordon University noted in their concluding remarks at the end of the conference, electric vehicles can become an indispensable balancing element in Smart Energy Systems. An important side-effect of this integration is, that the business case for electric mobility will become more profitable.

It all centers around the core of most electric transport solutions: the battery. Yes, it is expensive, it has low energy-intensity, which means it demands a lot of space for the energy it can provide, and it generally takes a long time to charge. The limitations of the current generation of batteries become visible, when we compare a modern conventional fuel driven car with an up-to-date electric car. The limited range that a standard battery-pack can deliver (150 to 300 kilometers) is the most hotly debated problem. What is more, the price of the battery pack is so high (€ 10.000 up to € 20.000), that it makes a new electric car very expensive compared to conventional cars.

Especially in city centers, the advantages of electric transport are clear: e-mobility produces very low levels of noise and pollution (CO2, NOx, particles) and can be powered by renewable energy sources, helping communities to reach their climate goals. That is an important driver for municipalities all over Europe to stimulate electric transport. Presentations at the e-harbours conference from energy company E.on and the City of Malmö and from the city of Zaanstad exemplify the different policies that are being develo-



Leevon Tian from BYD





ped locally. Perhaps they could be supported more by national policies. As one of the keynote speakers at the Malmö conference, Leevon Tian of battery-giant BYD remarked, the Chinese central government has bluntly declared that 'electric transport is the way of the future', greatly enhancing the business case for e-mobility on the national level. European governments are not yet prepared to go that far. This probably will make the business case for a large scale infrastructure investment in electric transport, like Siemens advocates (a trolley system for lorry's on the highways), difficult to realize in Europe.



Panel debate with Mikkel Westenholz from Better Place

But an innovative combination of private companies, utilities, researchers and local governments from 11 European countries shows how progress can be made: Marcus Ljungqvist (City of Malmö) presented the European program Green eMotion, that develops a wide-ranging international network of charging points for electric vehicles. A very important effort, not the least because it stimulates the adoption of standardized charging systems and procedures all over the European Union.

Nowadays, the business case of electric transport still seems not positive enough to seduce more than a handful of individual consumers and businesses to invest. But several companies are working on solutions to improve that situation, the Danish company Better Place being an outstanding example. Mikkel Westenholz from Better Place explained how they make buying an electric car much cheaper (you do not have to buy the battery anymore, you can lease it) and get rid of the infamous range-anxiety by offering drivers a dense network of charging posts. The company offers drivers a choice: simply charge the battery (which still takes some time), or replace it with a brand new, fully charged battery in a few minutes. Better Place considers itself a service company, that sells kilometers to its customers, not electric cars or batteries.

In the meantime, the development of electric boating begins to pick up pace. As the sister program of e-harbours, Clean North Sea Shipping, showed at the conference, boats consume amazing amounts of energy(in some cases Megawatts). Ships that are equipped with conventional diesel engines cause disturbing levels of emissions both at seas and in ports. These emissions can be harmful to workers and inhabitants of harbour areas. At the conference, two projects presented research directed towards the reduction of emissions in harbour areas. The European program Green-Efforts investigates the different possibilities to improve the CO2 footprint of harbours through a reduction in energy use, and a cleaner energy mix. A very promising research program. On a more practical level, the Hordaland Maritime Miljøselskap AS works on an innovative concept that provides electrical power to cruise ships moored in the harbour of Bergen (Norway). The electricity is delivered by a tanker, equipped with LNG fuel cells and batteries.

Ships consume staggering amounts of energy, so they need much bigger battery packs than cars. The sheer size of these batteries has attracted the attention of Smart Energy System specialists. The hybrid ferries that CMAL (Caledonian Maritime Assets Ltd) is bringing into service on the Western coast of Scotland feature battery packs so huge, they can play a role in balancing the power grid of the ports they serve. The ferry can pick up cheap electricity from local wind turbines in times of an energy surplus, and deliver power back to the local grid when the







Study tour to the e-harbours showcase Smart Homes in the Western Harbour with E.ON

winds are low. These possibilities enhance the business case both of the hybrid ferries and of the Smart Energy System in the harbour, making it easier to incorporate wind turbines and PV systems in the Grid. Meanwhile, in Amsterdam, preparations are under way to build a Smart Marina that uses the batteries of rental boats as a temporary storage for excess power from PV-systems. Can we play the same trick with electric cars? The battery of a single car has only a modest power supply to offer. But the combination of a thousand cars produces an impressive battery pack – when the individual vehicles can be integrated into a Smart Energy System. Just like the battery pack of the hybrid ferry, the combination of car batteries then could operate as a storage system to balance the Grid. The Malmö showcase of e-harbours,located



in the Western Harbour, will be one of the experiments that test these Vehicle-To-Grid solutions. When this approach proves viable, it would enhance the business case of renewable sources of electricity (it is easier to incorporate them in the Grid), of Smart Energy Systems (they get more balancing power to play with), and of electric cars (that can command a fee for their service to the Grid).

The e-harbours conference on electric mobility in Malmö made us think, that this type of integration could become an important driver for developing electric





transport, in harbour areas in Europe, and eventually in European countries at large.

# For impressions and presentations from this very successful e-harbours conference, that drew a large audience to the Turning Torso in Malmö, please follow the link below:

http://eharbours.eu/midterm-conference/conference-on-electric-mobility



Showcase B2: Amsterdam, Netherlands. City of Amsterdam.

## **Clean boating in Amsterdam**



The Amsterdam showcase of e-harbours is currently focusing on canal cruise boats. These boats, that are immensely popular with tourists, are generally equipped with diesel engines that can have a negative impact on air quality along the canals. Amsterdam is working on a guide that explains the 'business case' of clean boating. It is meant to show the branch and po-

licy makers why it might be attractive to invest in clean boats, what the technological options are, etc. This guide will also be made available to other municipalities that have cruise ships on canals and waterways.





Showcase B3: Malmö, Sweden. City of Malmö.

# Industry, logistics and renewable energy in the Northern Harbour of Malmö



Interview with Per-Arne Nilsson, Head of Urban Development and Climate, City of Malmö

The City of Malmö has decided to redevelop a large harbour area for logistics and industry. The redevelopment of the Northern Harbour will take decades, but the guiding principles have been set already. Per-Arne Nilsson, Head of Urban Development and Climate at the City of Malmö, discusses these guiding principles with us: attracting new and sustainable industries, room for the further development of renewable energy facilities, industrial ecology, improvement of the logistic system in the city.

Per-Arne: "The Northern Harbour already is one of the city's most important industrial areas. It plays a vital role in the energy system and recycling of waste in the city. The Northern Harbour has an international standing: it is appointed one of the European Core Harbours and plays an important role in the Scandinavian supply chain for goods and raw materials. Moreover, it is governed by an unique international body: the Danish-Swedish Copenhagen Malmö Port company (CMP). The development of the harbour areas in Malmö over the last 100 years has changed the way we see our city. Where goods where loaded and unloaded hundred years ago is today part of the city centre in Malmö. In several phases industrial and harbour activities have moved from the city centre to industrial harbour areas and been replaced by attractive and sustainable housing and office areas. The Northern Harbour will stay an industrial area. But the redevelopment will bring a number of improvements to the City.

From our perspective the Northern Harbour is more than just an area for industries and logistics. It is also the ideal spot to secure the long term supply of renewable energy to the city. The harbour activities creates business and jobs, but there should also be room for energy production and industrial symbiosis.

There is a special drive to attract clean tech businesses to the Northern Harbour. The Trade and Industry Agency and the Real Estate Office of the municipality have established a concept to attract companies from abroad. We are happy when they establish production and logistics activities in our industrial areas, but we also want their head offices here. That creates extra





value and employment in the city. We achieved some success with this approach already. An agreement has been signed with the Chinese sister port in Shenzhen on clean tech business development and other areas, and we talk with a Chinese electric bus manufacturer about establishments in the Northern Harbour. " Increasing share of renewable energy

Per-Arne: "Malmö has a vast district heating system, and more than 90 % of the energy required is produced in the harbour area. We want to increase the share of renewables in the energy production. The big thing that is considered in the area is called Bio2G, the new generation of biogas production in large volumes. This biomethane production plant would not only produce large quantities of renewable fuel for our vehicles, but also deliver heat to our district heating grid. What is confirmed though is that the energy company E.ON will start their biopower fuelled CHP Flintrännan to meet the demand for green district heating in Malmö.

We are also investigating the possibilities to establish a number of large wind turbines in the Northern Harbour. The challenge is to combine wind power with all other businesses in the area to make sure they can operate side by side. City of Malmö is planning to co-own some of the wind power in the area to cover the municipalities own activities with renewable energy according to our environmental goals for the city. Smart Energy Systems

When we start producing more and more renewable energy from smaller energy production units we need to use smarter energy systems. For us, smart grids are not only electrical grids, since also biogas/CNG and district heating are connected. The grids can be used both for local and for large scale production. Already today the waste incineration in Malmö is being turned down when we have an over production in the grid and waste is being stored to incinerate it during peak hours.

The Northern Harbour is the city's energy central and from here everything in Malmö's energy system needs to be monitored and controlled. Our large expansion area Hyllie in the southern part of the city with 9000 apartments to be built in the coming years will have a smart grid from the beginning and this is very much connected to the development of the Northern Harbour. Since industrial symbiosis is a point of attention in the Northern Harbour we want to take care of the resources we have available. Think of low grade heating in the district heating grid that could be stored, but also used to heat fish farms, which in turn can deliver manure to vegetable farming in the harbour area.

#### **City logistics**

We are trying to establish a City logistics system, with it's base in the Northern Harbour. When it comes to logistics in the city centre it clearly makes sense to focus on transport



Per-Arne Nilsson, Head of Urban Development and Climate, City of Malmö

modalities that are climate-friendly. We benefit not only from less environmental impact and better air quality but also from the fact that it is easier to convert fewer coordinated vehicles to electric mobility. We would like to establish a city logistic system that gathers all deliveries in the Northern Harbour and puts them in one single transport for each business in the city centre, to avoid several trucks going to the same business at the same day.

The development of a large area like the Northern Harbour is of course dependent on economic developments, but it will be ongoing for the coming decades. We received some criticism from locals that we do not use our attractive properties wise enough and we need to use good locations for clever purposes. We only have a certain amount of free space left in Malmö and that should be used sustainably also in the long term.

I believe the e-harbours project gives us great input. We have a lot to learn from German and Dutch cities on harbour development. They face the same problems as we do, and on this topic we all share the same values in the North Sea Region. After all, Malmö was first developed as a harbour city by the international trade group Hansa."







## The e-harbours project: Towards clean and energy innovative harbours in the North Sea region



#### The objectives of e-harbours

The challenge is to create a more sustainable energy model in harbour regions on the basis of innovative intelligent energy networks (smart grids). e-harbours focuses 3 objectives:

- Increase the production and use of renewable energy in harbour cities. Harbour cities have extensive industrial areas with a great potential for development of sustainable energies; from wind, solar PV, tide, waves and the reuse of industrial waste, heat or cooling available
- Increase the use of energy smart grids. Attuning demand and supply of energy by flexible demand management, instantaneous load shedding (both directions), energy labelling, intelligent storage
- Increase the use of electric transport, a perfect partner to connect to large scale renewable energies and leading to a more healthy environment in the harbour regions

#### Who are the e-harbour partners?

The lead partner of the e-harbours project is the municipality of Zaanstad in the Netherlands. The other partners are:

Municipality of Amsterdam, NL Port of Antwerp, BE City of Malmö, SE Hamburg University of Applied Sciences, DE Pure Energy Centre, UK Robert Gordon University, UK VITO, BE

The project is financially supported by the Interreg North Sea Region program.

#### More on e-harbours

- Lead Beneficiary and contact: Municipality of Zaanstad Jan Schreuder Tel: 0031 (0)629027834 j.schreuder@zaanstad.nl
- Supported by: EU Interreg IVB North Sea Regions – Programme
- Priority: 3: Improving the Accessibility of Places in the North Sea Region
- Area of Intervention: 3.3: To promote the development of efficient and effective logistics solutions
- Duration: 01/09/2010 31/08/2013
- Website: www.eharbours.eu

ROBERT GORDON UNIVERSITY•ABERDEEN





Hochschule für Angewandte





Port of

**Intwerp** 

