

ALMEDALEN SPECIAL – THE NORDIC ROAD TO PARIS AND BEYOND

GREEN VOL 7 SOLUTIONS

FROM SWEDEN 2015

AND THE NORDIC COUNTRIES

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CITIES AND MAYORS LEADING THE NEW CLIMATE ECONOMY – THE NORDIC ROAD TO PARIS AND BEYOND



Sunday 28th of June

Venue: Wisby Strand Congress,
& Event, Strandvägen 4, Visby

13.00 Success in Paris? How can cities contribute? And is there a Nordic way to Paris and beyond?

Governments around the world have failed to lay the foundation for a global climate agreement. There are many doubts regarding the possible success of the Paris Summit in 2015.

A possible way to make progress, and take significant action where national governments have failed, is for the world's cities, big and small, to take the lead in developing and implementing appropriate responses. Mayors and other municipal leaders have already begun to implement strong climate mitigation, adaptation, technology, finance policies and programmes, both individually and through coalition organisations like the C40 and ICLEI. And how can mayors and cities in the Nordics contribute. Is it a roadmap to Paris and beyond?

- Björn Jansson, Mayor of Gotland, Sweden
- Anders Wijkman, co-president Club of Rome
- Maria Wetterstrand, Climate Advisor and former Spokesperson for the Swedish Green Party

Facilitator: Johan Kuylensstierna, Executive Director, Stockholm Environment Institute, (SEI)

13.30 Low-carbon investments in cities – the way to build a sustainable future

Cities generate around 80% of global economic output, and around 70 % of global energy use and energy-related GHG emissions. How cities develop will be critical to the future path of the global economy and climate – thus this is a great opportunity. What are the barriers to get the investments right?

- Jakob Granit, Director, SEI Stockholm
- Guri Melby, Dep Mayor of Oslo, Norway
- Sóley Tómasdóttir, President of Council Reykjavik, Iceland
- Mats A Andersson, CEO, 4th Pension Fund, Sweden
- Tiina Kähö, Senior Lead, Sitra, Finland

Facilitator: Johan Kuylensstierna, Executive Director, Stockholm Environment Institute, (SEI)

14.30 How cities lead the way – successful cases on urban transformation

Cities are at the heart of sustainable development. Whereas cities account for a large share of global emissions, cities are also arenas for new ideas and technical solutions. What are

the keys to success in urban transformation? Successful cases from various parts of the world.

- Niklas Nordström, Deputy Mayor of Luleå, Sweden
- Aleksi Randell, Mayor of Turku, Finland
- Nils Hillebrand, Deputy Mayor of Linköping, Sweden
- Bo Frank, Mayor of Växjö, Sweden
- Sandra Frank, Marketing Director, Folkhem
- Yvonne Borg, Director of Communications, E.ON
- Pernilla Bonde, CEO, HSB

Facilitator: Hanna Begler, Project Leader, Global Utmaning

15:30 Coffee break

16.00 Innovative Solutions for Sustainable Cities

Cities around the globe are taking sustainability to a whole new level, and developing inspiring solutions to many of our greatest urban challenges. The multitude and diversity of these ideas provide a smorgasbord of solutions from which cities can pick and choose based on their own local context.

- Morten Kabell, Technic and Environmental Mayor of Copenhagen, Denmark
- Patrick Burgi, Director, South Pole Group
- Svante Sjöstedt, Environment Analyst, Gothenburg City
- Jimmy Jansson, Mayor of Eskilstuna, Sweden
- Anders Teljebäck, Mayor of Västerås, Sweden
- Tuula Antola, Director of Economic and Business Development in Espoo, Finland

Facilitator: Barbara Evaeus, Climate



17:45 Cities actions and Mayors leadership on the road to Paris – Summing up of the days talk

How can cities be leading in sustainable global development? The seminars focus on Cities and Mayors work to fight Climate Change. Cities deliver solutions on mitigation, adaptation, technology and finance. All key element in the international negotiation for Climate deal in Paris.

- Prof David Simon, FAcSS, Director, Mistra Urban Futures
- Ilmar Reepalu, former Mayor of Malmö, Sweden
- Runar Balsrud, Mayor of Hurdal, Norway

- AnnSofie Andersson, Mayor of Östersund, Sweden
- Mrs Banashri Bose Harrison, Ambassador of India to Sweden & Latvia
- Maja Fjaestad, State Secretary to the Swedish Minister for Strategic Development and Nordic Cooperation

Facilitator: : Johan Kuylenstierna, Executive Director, SEI /Alexander Crawford, Process Manager, Global Utmaning

18.30 End



Founders



Monday 29 June 2015

Venue: Sida, Donnersgatan 6, Visby

08.00-10.00 Urban Goals and New Roles for City Leaders Sida and Mistra Urban Futures

In 2015, the UN will decide on a new set of global goals, building on the Millennium Goals. How can we contribute with a Urban Sustainable Development Goal, emphasising the significance and impact of cities' policies and strategies for a sustainable future.

- Joachim Beijmo, Director of Communication, Sida
- Helen Arfvidsson, Lead Researcher, Mistra Urban Future and University of Gothenburg
- Case studies from Gothenburg, Cape Town Based on the report from Mistra Urban Futures, Sida,
- Daniel Otieno Okutah, Assistant City Manager, Kisumu, Kenya
- Thore Vestby, Mayor of Frogn, Norway

Facilitator: Prof David Simon, FAcSS, Director, Mistra Urban Futures.

MAYORS AND CITIES ROUND TABLE

Venue: Campus Gotland, Cramérgatan 3, Visby

Facilitator: Alexander Crawford, Global Utmaning

10.15 INTRODUCTIONS AND FRAMING

10.30 A session on INNOVATION

Contributions from James Hanusa (Director of Urban Innovation Exchange, San Francisco), Line Gry Knudsen (Climate-KIC Nordic) and Bert Ola Bergstrand (Lund Open Innovation Center), followed by roundtable conversation.

11.45 A session on LOW-CARBON AND CIRCULARITY

Contributions from Patrick Burgi (Low-Carbon Cities Lab and Director, South Pole Group), Kristina Mårtensson (Programme Manager, Nordic Built Cities) and Anders Wijkman

(Vice president, Club of Rome), followed by roundtable conversations.

13.00 Lunch

14.00 A session on IMPACT INVESTMENT

Contributions from Sasja Beslik (Head of SRI, Nordea) and Marcello Palazzi (Senior Fellow, Harvard University)

14.30 A session on KEY ACTIONS AND MESSAGES

Followed by roundtable conversation and working session

16.00 REFLECTIONS and CONCLUSIONS

The Mayors and Cities Roundtable is a closed meeting for invited mayors, experts and guests.

Partners



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■ “GOVERNMENTS AROUND THE WORLD HAVE FAILED TO LAY THE FOUNDATION FOR A GLOBAL CLIMATE AGREEMENT. THERE ARE MANY DOUBTS REGARDING THE POSSIBLE SUCCESS OF THE PARIS SUMMIT IN 2015. HOW CAN CITIES CONTRIBUTE?” ■



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IN THE SPOTLIGHT

News and reports about nordic clean tech and sustainable innovations, for exampla fuel from forest waste.



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SWEDEN'S 50 HOTTEST – CLEANTECH COMPANIES

We have listed 50+ smart investments in what we consider to be some of the hottest cleantech start ups in the Nordics. The criteria for being on the list are, among others, that the company should have an innovative product or service with an international impact potential.



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SIX AREAS OF MAJOR STRATEGIC IMPORTANCE

Although a new government came to power in Sweden in 2014, the country's strong commitment to climate change issues is unabated. In less than 40 years, Sweden has gone from having a heavily oil and coal- dependent energy system to a system that runs on almost 50 percent renewable energy. We met with Sweden's Minister for Strategic Development and Nordic Cooperation, Kristina Persson, who has pinpointed six areas that are of great strategic importance for the future.



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FINLAND ON THE ROAD TO SUSTAINABLE INDUSTRIES IN 2050

Carbon-neutral industry is one of Sitra's focus areas contributing to Finlands aim to be resource-wise and carbon-neutral in 2050. Sitra helps Finnish businesses adapt to the demands of a carbon-neutral society. Senior Lead Tiina Kähö is leading the focus are



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WWF: THE CITIES HOLD THE KEY TO A SUSTAINABLE SOCIETY

The cities have a key role in working towards sustainable societies. Innovation is high in many places, but Carina Borgström-Hansson, expert ecological footprint on the WWF in Sweden think the Nordic cities need to think outside the box to find solutions that have global effects. »Nordic cities are particularly well placed to take large steps. That makes demands greater on them»,she says.

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CITIES AND MAYORS LEADING THE NEW CLIMATE ECONOMY

Governments around the world have failed to lay the foundation for a global climate agreement. There are many doubts regarding the possible success of the Paris Summit in 2015. How can cities contribute?

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Can cities and mayors lead the way on sustainable development?

ON A TRIP BETWEEN STOCKHOLM AND LONDON, I found myself accompanied by two potential agents of change – Benjamin Barber’s book *If Mayors Ruled the World* and a Swedish city mayor, Niklas Nordström. The former has the power to inspire and empower local politicians who wish to take on big challenges. The latter – who has recently taken charge in the city of Luleå – is exactly the type of mayor who has the power to lead change.

The ability of cities to shape national strategies should not be underestimated – they can help address up to two-thirds of a country’s policy issues. For instance, one of the more influential city networks, the C-40 Group, is on track to reduce its members’ carbon dioxide emissions by 248 million tonnes by 2020 – equivalent to the total greenhouse gas emissions of Portugal and Argentina combined.

This is just one example of how global problems can be addressed with local solutions, or ‘glocalism’. Apply this logic to other international challenges – such as conflict, integration, economic inequality and disease epidemics – and you see how, with the right partnerships, cities can provide an alternative to the traditional channels of global governance.

Seeing Nordström assume the role of foreign minister as he enters the mayoral office in Austin earlier this year is a sign of how the new global landscape is evolving. It’s moving fast. But then so is Austin. The Texan capital is now an emerging hub of IT and innovation, home to some of America’s most vibrant creative sectors. Here, the governor has even appointed a senior official whose sole function is to ensure that the city remains a leading hub for the country’s music industry.

While Luleå, in the north of Sweden, may be smaller than Austin, it is also a growth area, though it has historically relied more traditional industries like steel and mining in nearby Kiruna. Here too, there is now a vibrant music scene, with concerts held in igloos and musical instruments made of ice proving to be viable selling points for the city. Once deeply rooted in iron and steel, Luleå is also now home a world-leading, climate-neutral cluster of data centers, used by tech giants such as Facebook.

Greenpeace publicly welcomed Facebook’s investment because of the the Swedish operation’s use of renewable energy. This success marks is another way in which Luleå has emerged into a new economic era. River hydropower is now a significant resource and even traditionally ‘dirty’ industries are cleaning up, with steel facilities contributing their surplus energy to the district heating system, keeping neighborhoods warm at the lowest prices in the country. When I ask Nordström about his views on the city’s role and global focus, he immediately explains that doing nothing is irresponsible and leads to stagnation and non-sustainable community development. “We have now signed a first ‘letter of intent’ with Austin and my employees feel



a greater commitment to being part of building a global partnership like this,” he explains.

Later that week, the mayor and Luleå’s head of business and economy, Matz Engman, visit Tesla’s manufacturing plant in Fremont, just outside San Francisco. While bicycles, coffee areas and computers may be expected features of Facebook’s headquarters (which the pair visited earlier in the day), finding them in a car factory is something of a surprise. But this industry is also changing rapidly, with Tesla at the forefront.

HAVING BOUGHT THE FACTORY from Toyota for USD-43mil, the company then received a USD50mil investment from the Japanese car giant. Not a bad deal for the electric vehicle manufacturer, which currently sells about 1,000 cars a week, up from 600 at the beginning of 2014. Tesla’s customers are found mainly in the USA and Norway and while its share of world car sales may be modest for now, there will soon be huge interest in its concept, argues Nordström: “We see our work in Luleå as having to learn from developments in the new areas where IT really start to change our lives.”

Over in Silicon Valley, an evening gathering at Nordic Innovation House brings together a number of the figures participating in ‘Cities and Mayors leading the new climate economy – the Nordic road to Paris and Beyond’ – the opening event of Almedalen Week (a series of important political forums, seminars and debates held every June in Sweden).

THE OPPORTUNITY TO MEET MAYORS at Almedalen is also of interest to James Hanusa, a leading figure in San Francisco’s new technological and social development. Although best known as innovation manager for the annual Burning Man festival, Hanusa has also participated in projects involving residents, politicians and officials in the interactive, ‘smart’ urban developments in San Francisco. These are just some of the innovators using new technology more systematically to build smart cities. Many of the analysts I speak with in Silicon Valley argue that using large data sets to better understand human behavior can help treat economic, social and environmental issues simultaneously when planning an urban environment. This holistic, cross-sector approach offers new

planning tools for building cities that are better integrated and sustainable.

It seems fitting that sustainable urban innovation is occurring in a city with such a fluid population. And what would San Francisco be without its immigrants? Over 40 percent of city’s inhabitants (and just over 30 percent of Austin’s) come from abroad. The resulting diversity has arguably driven the area’s ongoing transformation, something for us to think about when we talk of immigration in Europe.

LULEÅ’S MAYOR, Niklas Nordström, says he sees several important links between the development of Norrbotten (the region his city is located in) and the talks happening at Silicon Valley’s Nordic Innovation House. He takes the stage in a discussion with Anne Lidgard of Vinnova, the Swedish government’s innovation agency manager in Silicon Valley.

“Right now in Kiruna, in the north, they are moving the whole city and building a new ‘sustainable city’. The mining industry has undermined the city’s location [with the relocation prompted by the expanding mine] – a unique situation. With the skills here in Silicon Valley and Stanford University, both Kiruna and Luleå gain new insights into the construction and development of sustainable cities,” he tells the attendees.

There are several components of these, Nordström argues, including technological development and integration of planning, construction and operation. Sustainable cities are also about the growth of local political activities by eroding sector boundaries and streamlining everyday work in the municipality. But what is particularly inspiring is that, with the help of new technologies, they can develop democracy and allow both officials and citizens of new ways to have a direct impact. But with so many competing interests, surely there is also political tension here?

“For parties, I see this as a great opportunity to revitalize the party work and Almedalen is just the place to bring this type of discussion,” says Nordström. “And remember. We mayors are pragmatic and community builders with local ties. This perspective makes us the key actors to work with the challenges that communities around the world are facing. Although national governments negotiating in Paris later this year [at the UN Climate Change Conference] will not agree on a common international climate agreement, we will.”

“Mayors will continue our global network and deliver solutions to climate change. This is important and we can thus show the way in which international cooperation should be conducted. But we must act strongly and consistently and that’s what we will, among other things, see in Almedalen in June.”

SUSTAINABLE SOLUTIONS FOR THE CITIES OF THE FUTURE

A warm home and a nice shower – every day, all year round. It is something many people take for granted. Stockholm's district-heating network is probably one of the city's best kept secrets. Beneath the feet of residents lies a network of hot-water pipes that are the lifeblood of the region, running from north to south and east to west – important infrastructure based on the principle that together we can heat each other.

District heating's contribution so far – its future role will be even more important

Over the years, district heating has replaced a large number of small oil powered boilers, and this has improved air quality. District heating has greatly contributed to what we are today. Stockholm became Europe's first European Green Capital in 2010, and was selected as an Earth Hour National Capital as part of WWF's Earth Hour City Challenge 2014. Stockholm's district heating is playing an even more important role in terms of facilitating the future development of sustainable cities.

Local cycle – save resources and increase recycling

Producing district heating also produces electricity. Resource efficiently. When you turn on the tap at home, you can do so with a clear conscience. Your shower can heat your neighbour's radiators, and simultaneously provide the electricity to cook your evening meal. Eighty-seven per cent of Stockholm's district heating is already being produced from renewable and recycled energy.

Sustainable urban development through collaboration

Together with its partners, Fortum Värme has developed a business solution that make it possible to use surplus heat that was previously wasted, providing

mutual business benefit to everyone involved.

The model is known as Open District Heating®, and is the world's first trading site for surplus heat. It is one of several examples of areas Fortum Värme is developing through collaboration with customers, partners and the city, so that in the future Stockholm will be an even more attractive place to live, work and do business in.



Open District Heating puts Stockholm a step ahead of other cities in the competition for data halls, giving the city huge potential for growth and the possibility of assuming pole position as Europe's foremost hub for information- and communication-technology companies," says Anders Egelrud, CEO Fortum Värme.

Major investments in renewable energy

Over an ongoing 5-year period Fortum Värme is investing SEK

7bn in new, large-scale heat production based on recycled and renewable energy.

"Our aim is for 100% of energy production in Stockholm to come from renewable and recycled sources by 2030 at the latest, but we want to get there sooner, and our planning involves looking at how quickly we can achieve this goal," Anders Egelrud concludes.

Fortum Värme heats over two thirds of all houses and buildings in Stockholm. We produce and deliver heating and cooling to 10,000 customers, and simultaneously produce electricity resource-efficiently. By recycling energy from residual products, refuse and waste water, we make use of energy that would otherwise have been lost. This process is part of a cycle that contributes towards the city's sustainability. Everything is based on joint solutions, and the more people that are involved, the more efficient this process will be.

Fortum Värme is co-owned by Fortum and the City of Stockholm, and has sales of SEK 7bn. Between 2010 and 2016, SEK 7bn is being invested in new CHP production in the Stockholm region, and by 2030 at the latest 100% of district heating is to be produced from renewable and recycled energy, compared with the current level of 87%. The wholly owned gas business sells and distributes city gas and gas for vehicles.

Fortum Värme – together we stay warm.

Next generation
energy company





■ Use of Preem Evolution Petrol will reduce annual carbon-dioxide emissions from petrol powered vehicles by over 13,600 tonnes. ■

START PETROL SELLS MADE FROM FOREST WASTE

The fuel company Preem is launching a petrol made from forest waste. Ten per cent of Preem Evolution Petrol is renewable, with half of this coming from forest waste. In 2011 Preem launched a diesel made from tall oil, also called »liquid rosin« or tallol, a residual product from the forestry industry, and Sweden became the first country in the world to produce a standard diesel made from forest waste. Sweden will now be the first country in the world to produce a petrol partially based on tall oil.

Preem Evolution Petrol will be the greenest petrol on the market. Ten per cent of it is renewable, compared with a figure of five per cent for all other petrols on the market, and it can be used in all petrol-powered vehicles. Use of Preem Evolution Petrol will reduce annual carbon-dioxide emissions from petrol powered vehicles by over 13,600 tonnes, which is the same as the emissions from about 5,500 cars.

“It’s a first step. We have far higher ambitions, both for diesel and for petrol, but to proceed we need long-term rules of play from our politicians,” says Petter Holland, Preem’s CEO and President.

Preem’s Evolution fuels are contributing to a reduction in emissions of greenhouse gases. In developing traditional fuels, Preem is reducing emissions from today’s

vehicle fleets, which is still completely dominated by petrol- and diesel-powered cars (97% of all vehicles on the road run on petrol or diesel). Filling up with Evolution Diesel currently puts 32% of renewables in your tank, and this has meant a reduction in carbon dioxide emissions of about 1.5m tonnes since 2011. Preem is still working on increasing this percentage, but the crucial factor is legislation and fiscal terms regarding renewable raw materials.

“For those of us who want to invest in development and production of new and more sustainable fuels, it is absolutely crucial that our investment be viable. Next year sees the end of the tax exemption on the renewable content of fuels. At the moment no-one can say what the taxes and regulations will be like after that,” says Petter Holland.

Preem introduced HVO diesel in 2011, and became the first company not only in Sweden but also globally to produce HVO diesel based on tall oil. It fast became a success, and HVO greatly contributed to the increased proportion of renewable fuels in Sweden.

“Our renewable fuels are an important component in transitioning Sweden’s transport sector. Forestry-based fuels are also decreasing Sweden’s dependence on imported oil, creating jobs in areas of low population and giving the forestry industry a new source of revenue,” says Petter Holland.

From the end of June Preem Evolution Petrol will be available at around 40 filling stations in southern Sweden. The product will gradually be offered at more filling stations nationwide.

DEMONSTRATION PLANT FOR POWER TO GAS

It is possible to take advantage of Power to Gas in Sweden. A demonstration plant is going to be built that can utilise surplus electricity – including wind power – to produce hydrogen, and thus store the surplus in gas networks. An increase in the production of biogas is also feasible, and overall this will reduce emissions and pave the way for more wind power.

Sweden is on the verge of major expansion in wind power. Instances of overproduction will become increasingly frequent, and at the same time periods without wind will necessitate rapid access to an alternative source of electricity.

There is no lack of renewable energy. The challenge is in making this renewable energy available where and when it is needed, and at competitive prices. A study of options for using Power to Gas in Sweden shows that utilisation of surplus electricity – producing hydrogen, storing the surplus

in gas networks or increasing production of biogas – increases the proportion of renewables, reduces emissions and paves the way for more wind power. Power to Gas interlinks energy systems and facilitates smart use of energy resources. Power to Gas plants are being built all over Europe, and the study shows that Sweden has the right conditions for doing likewise.

Piteå is one of three localities that have been studied as possible locations for this technology. The other two are Falkenberg and the island of Gotland. All three locations have ambitious

plans to expand wind power and they all want to increase the use of biofuels. Beyond that, their circumstances differ.

The study shows that during certain periods Gotland already has surplus electricity from wind power. The region also has plans for expansion of biogas, and it has a local industry that creates high levels of carbon-dioxide emissions. For its part, Falkenberg has good access to gas infrastructure, it has continued plans for expansion of wind power and a hydrogen filling station is being built.

THE NORDIC COUNTRIES BEST FOR START-UPS

Almost one in ten of the world’s start-ups sold for over USD 1bn – so-called unicorns – come from the Nordic countries. The Nordic countries; Denmark, Sweden, Norway and Finland, are lush pastures for unicorns, aka start-up companies with a price tag of over US dollar 1 billion, writes arcticstartup.com referring to an analysis from the Swedish venture capital fund Creandum.

Globally, one in nine start-ups is sold for over US dollar 1 billion. In the Nordic countries, it is one in five.

The analysis shows that since 2005, 9% of global billion US dollar (BUSD) exits have come from Sweden, Denmark, Norway and Finland, accounting for only 2% of

global GDP and 3% of the population in Europe. This is a remarkably strong number, considering that the rest of Europe accounts for 8% of the world’s unicorns despite having 97% of the population in Europe.

Danish unicorns include Skype, Zendesk, JustEat and Unity. Swedish unicorns include Spotify, King and

Mojang. The latter two companies are behind the huge gaming successes Candy Crush and Minecraft, respectively. In September 2014, Microsoft acquired Minecraft for USD 2.5bn.

Read more at arcticstartup.com

FOOD COMPANY IN NORDIC CLEANTECH EFFORT

Arla Foods, Skandinaviens största mejerikoncern, förstärker nu innovationsinsatsen och går med i Nordic Cleantech Innovation Link, ett av de bredaste nordiska nätverken för miljöteknikföretag.

Arla Foods, Scandinavia's biggest dairy group, is now increasing its investment in innovation, and is joining up with Nordic Cleantech Innovation Link, one of the broadest Nordic networks for cleantech companies.

"Arla has ambitious targets for its innovation investments over the coming years. Firstly, in 2017 at least 10% of our sales is to come from new products, and secondly we want our work to be both smarter and more sustainable. I'm sure we'll find new innovation partners in NCI Link who can contribute to substantial renewal of our product range, and who we can work with to develop our processes," says Harry Barraza, Head of Open Innovation – Universities & Consortia at Arla Foods amba.

Through NCI-Link Arla will be able to collaborate with small and medium sized cleantech companies in the development of new products and productions as part of an open innovation process. The first collaborative project with one of NCI-Link's member companies has already begun.

"Together with one of the Danish technology companies in NCI-Link, we are examining a completely new technology that can greatly contribute to the development of new ingredients, flavourings and products – a good example of what we wish to achieve with our 'open innovation' strategy, i.e. sustainable new products and a shorter lead times from concept to market," says Harry Barraza.

NCI-Link thinks that at least ten



NORDIC CLEANTECH INNOVATION LINK

MATCHING INDUSTRY AND NEW SUSTAINABLE TECHNOLOGY

companies in the network have technologies and solutions that can contribute to Arla's innovation objectives.

"Arla is the ideal industry partner for NCI-Link," says Ole Jakob Thorsen from ETEQ Venture, which represents the Danish part of NCI-Link.

"Arla is focusing on developing more sustainable and environmentally-friendly products and processes in an open innovation climate involving external technology partners. This is precisely what NCI Link offers. We can help Arla find innovation partners who can contribute towards creating better production processes and new packaging and distribution concepts, and developing sustainable

new concepts and ingredients."

NCI-Link currently comprises four industry partners and about 80 small and medium-sized technology enterprises in Norway, Sweden and Denmark.

ABOUT NORDIC CLEANTECH INNOVATION LINK

Nordic Cleantech Innovation Link is a network that uses open innovation to support collaboration between innovative cleantech companies and established industries. NCI-Link is run by Teknopol AB and their industry venture Cleantech Inn Sweden, plus ETEQ Venture in Denmark and OREEC in Norway. Read more at www.nci-link.org

Luleå grows sustainably



Electricity from renewable hydropower and stable electrics have made Facebook want to build their European data centre in Luleå. Together with Boden and Piteå, we have created The Node Pole to become a global hub for data traffic.

Luleå Science Park at Luleå University of Technology has a leading role in creating innovations and attractiveness. The park houses around 100 knowledge intensive businesses.

Surplus gas from SSAB's steel mill heats large parts of Luleå. District heating is the cheapest in Sweden.

Luleå is growing. Over the coming ten years, there are plans for 5,000 new and climate-smart homes.

Public transport has Sweden's most satisfied customers and the number of bus journeys made is increasing steadily. This autumn, production of fuel gas for vehicles will begin at the town's sewage treatment plant and we are to become Sweden's best town for cycling.

We collaborate globally. A collaboration with Austin in Texas has recently been initiated to strengthen Luleå's creative powers. We have a different type of collaboration with multimillion city Xi'an in China.

The list is much longer. Get in touch, and we'll tell you more.

HOT 50 SWEDEN'S HOTTEST CLEANTECH COMPANIES



ABSOLICON

Absolicon aspires to be the world's leading supplier of solar concentrators. By developing, manufacturing and selling solar energy systems that generate renewable energy in various forms. Absolicon has a unique technology, based on 20 years of research, for extracting energy in different forms using concentrated solar collectors, or solar concentrators. The concentrators help reduce the production costs, while simultaneously providing a high degree of energy efficiency in the form of thermal energy, solar electricity, solar cooling, solar heat and solar steam.

AIREC

Airec's business mission is simple and clear: To develop and manufacture Gas Heat Exchangers which give customers a significant competitive edge when using our products in their systems. They offer compact, efficient and cost-effective heat exchangers unique to Airec.

ANYLOTEC

Anolytech takes the long-term approach to its work on developing safe, eco-friendly and economical disinfection solutions for livestock farming and food production. They develop modern technology and comprehensive systems for maximum effect from a minimum of work. Anolytech's solutions are readily scalable, so they can easily be adapted to suit both large and small enterprises.

APPLIED NANO SURFACE

Applied Nano Surfaces has developed efficient surface treatment methods that reduce friction and wear. Improves fuel efficiency in engines and increases product life for pumps, rock drills, chains and many other applications.

ARSIZIO

Arsizio's concept is a further development of conventional

3D-extrusion technique. By the usage of integrated rotating matrices in the pressurized zone of the extrusion tool, an indent or “footprint” is created on the extruded profile. The technology thereby allows the creation of reliefs that were impossible to previously achieve. The thing about the technology is that any material possible to extrude with conventional extrusion technique, such as plastic, rubber, aluminum etc., can be 3D-extruded.



BESTWOOD

Bestwood specializes in real-time analysis of solid fuel such as forest residue, waste and coal. One major product line is a set of systems for moisture determination, price settlement and logistics optimization of fuel deliveries.

BIOENDEV

Bioendev mission is to develop and supply high-tech systems that enables the most efficient refining of biomass for use in CHP systems, conversion to fuels and production of green chemicals. Today BioEndev has a Pilot plant in operation and an Industrial Demonstrations Unit under construction starting its production during 2015. Together with Bioendevs EPC-partner, BioEndev will be selling turnkey torrefaction plants ranging from 100-200 kton production per year. They also offer retrofit of white pellets plants to torrefaction.

CATATOR

Catator mission is to become a key supplier worldwide of high quality catalytic products for efficient energy supply. Examples are zero emission burners for heat production, fuel processor components to fuel cell systems and excellent catalysts for emission reduction.

CHROMAFORA

Chromafora holds a unique IP that enables fine chemical manufacturing that decreases waste and energy consumption. The company offers the chemical manufacturing industry the possibility to use the reagent/catalyst phosphines.

CHROMAGENICS

ChromoGenics develops electrochromic smart glass that tints with a low electrical voltage, saving energy and increasing comfort. A unique roll-to-roll process enables a flexible business model.

CLIMACHECK

ClimaCheck has developed a unique system that enables energy savings and trouble-free operations in cooling systems by analyzing and visualizing actual performance of equipment in real time.

CLIMATEWELL

ClimateWell has invented and successfully developed a thermochemical heat pump that converts and stores thermal energy used for heating and cooling without the need for electricity.



CLIMEON

Climeon's develop meffective system for conversion of hot water to electricity (waste heat recovery). Their product “Ocean” will help shipping companies to save money and fuel.

CORPOWER OCEAN

Compact high efficiency Wave Energy Converters (WECs) delivering five times more energy per ton of device compared to previous state-of-the-art wave power. Small robust units offering Cost of-Energy competitive with offshore wind.

CORTUS ENERGY

Cortus Energy offers cost-effective bioenergy solutions for process and power industries based on the patented gasification technology WoodRoll®, that has great fuel flexibility, so that the process can use low grade renewable fuel without compromising the performance.

DIAMORPH

Diamorph supplies advanced material solutions for particularly demanding industrial applications. The company focuses on narrow niches and its products generally increase the reliability, service life and/or performance in the customers’ applications.



DISRUPTIVE MATERIALS AB UPSALITE.

Disruptive Materials AB. Upsalite® is a material with world record breaking features. The extreme moisture adsorption, the energy savings by regenerations and huge surface makes it the hottest material in the drying industry.

ECOSPARC

Ecosparc develops chips for LED lighting, based on the semiconductor material zinc oxide (ZnO) in combination with nanowires. The combination of Ecospark's proprietary LED structure and low temperature manufacturing method enables production in large scale at a fraction of the cost of conventional LEDs. Compared with today's LED technology, Ecospark's LEDs will be more energy efficient, have 8 - 10 times lower production costs and at the same time provide a highly improved light spectrum.

EKOBALANS

Ekobalans offers solutions for sustainable recycling of nutrients from sewage treatment plants, biogas producers, and farms with surplus manure. Extracted nutrients are refined into concentrated, high quality fertilizers.

ENEVO

Enevo have developed a product, Enevo ONE. It is a comprehensive logistics solution that saves time, money and the environment. It uses wireless sensors to measure and forecast the fill-level of waste containers and generates smart collection plans using the most efficient schedules and routes. The solution provides up to 50 percent in direct cost savings.

EXEGER

Exeger develops and produces third generation solar cells (dye-sensitized solar cells, “DSC”) using screen printing, a well-established and proven production technology.

eZE SYSTEM

eze System makes advanced control and monitoring available to applications where complexity and cost has been prohibiting.

FERROAMP

Ferroamp presents the EHUB – a modular solar cell inverter with energy storage. 4-quadrant technology enables bidirectional energy flows and grid supporting functions.

FLEXENCLOSURE

Flexenclosure’s product can deliver a 90 percent reduction in diesel fuel consumption, CO2 emissions, and energy-related OPEX compared to traditional diesel-based systems that powers mobile telecom sites in large areas of developing countries.

HELIOSPECTRA

Heliospectra have developed intelligent LED lighting solutions for plant science and horticulture applications. Their LED solutions make it possible to closely control the intensity of light wavelengths and to accurately match the spectrum to a specific plant. The spectral distribution of their systems (400nm to 735nm) is consistent with the action spectrum of photosynthesis and key photomorphological receptors.

I-TECH

I-Tech is developing a marine biocide; Selektope® to be used in marine paint prohibiting growth on ship and boat hulls. The substance is effective against barnacles and some other shell builders while having a minimal effect on the marine surrounding.



INFRAFONE

Infrafone’s mission is to help our customers increase the efficiency, availability and longevity of their marine and industrial boilers using infrasound technology to prevent the accumulation and build up of soot deposits.

By using infrasound technology, they offer soot cleaning solutions that create value through their unique knowledge and experience. With more than 1,000 installations worldwide, they consider themselves market leaders and experts in the field to “create value with infrasound.”

INNOVENTUM

InnoVentum offers the most carbon-neutral wind turbine solutions on the Planet by using renewable materials for the majority of the tower construction and recycled materials for the rest. A 2kW generator with blades typically weighs around 50 kg. A ten times more powerful 20kW turbine weigh forty times more. Their systems are modularized for ease of transport and assembly. The 2kW solution also has a self-erecting towers so that neither trucks nor cranes are required, which makes both installation and power creation carbon-neutral.

INNVENTIA

Innventia is a world-leading research institute that works with innovations based on forest raw materials. The majority of their operations are carried out in project form via research programmes involving many partners, such as the three-year Cluster Research Programme, or in development projects with individual customer companies. Innventia also carries out a large number of direct commissions in the form of analyses, testing and demonstrations in their lab and pilots.

LUNAVATION

Lunavation AB is an IPR holding company started by researchers at Linköping University and Umeå University in Sweden to facilitate the commercialization of research results. They have started the commercialization of light-emitting electrochemical cells, also known as LECs or LEECs. They are a printable, inexpensive light-emitting devices for displays and lighting applications.

MANTAX

Mantex develops industrial bio-scanners that can measure moisture, energy and density with QDXA (Quantitative Dual X-Ray Absorbtion) that deliver real time analysis of organic materials used in industrial processes.

MIDSUMMER

Midsummer offers a proven technology for turnkey production of flexible, lightweight solar cells and panels to the lowest manufacturing costs for a small-scale production in the solar market.

MINESTO

Minesto develops a new concept for tidal power plants called Deep Green. Deep Green is based on a fundamentally new principle for electricity generation from tidal currents. The power plant is applicable in areas where no other known technology can operate cost effectively due to its unique ability to operate in low velocities. Minesto expands the total marine energy potential and offers a step change in cost for tidal energy.

NEOZE

NeoZeo. Based on an invention in preparation of volume-efficient adsorbents for gas separation, NeoZeo offers a solution to tap the largest unexplored potential for producing raw biogas: the farms.

OPTISTING

Optistring develops smart solar inverters that increase the energy harvest, enhance safety and monitoring, and reduce the cost of both the inverter and the whole photovoltaic system.

ORBITAL SYSTEM

Orbital Systems are a cutting-edge technology company in southern Sweden, having developed a disruptive water recycling technology to be used in domestic appliances. Our patented technology makes the world’s most advanced and efficient shower unit, saving up to over 90 percent water and 80 percent energy, whilst increasing comfort and hygiene. Sustainable Development is our driving force and can be traced in all of our work.



OREXPLORE

Orexplora develops, manufactures and sells composition analysis products for non-organic materials based on an innovative technology called XDM (X-ray Density Measurement).

ORGANOCLICK

OrganoClick manufactures and supplies a range of unique, environmentally friendly renewable materials and bio-additives for use in the wood, textile, paper and packaging industry.

POWERCELL

Powercell’s mission is to offer our customers environmentally friendly power systems developed with unique fuel cell and reformer technology that is suitable for both existing and future fuel infrastructures. Their aim is to provide a unique fuel cell power system (an auxiliary power unit; APU) that allows our customers to utilize the existing fuel infrastructures without further damage to the environment. They believe that their system truly bridges the gap between the infrastructure of today and that of tomorrow, by using tomorrow’s technology within today’s reality.

REFORM TECH

ReformTech develops and sells clean and catalytic heaters for automotive and other mobile and stationary applications, such as engine and compartment heating, battery pre-heating and heating in mobile homes.

REHACT

Rehact offers the patented Rehact Energy System that reduces the need for purchased energy by 85 percent for heating, cooling and ventilation of buildings. The business idea is to develop technology that will reduce the need for external energy in buildings.

RIPASSO ENERGY

Based on the very good experience of the Stirling Engine from submarines and also from CSP demonstration sites in USA, Ripasso acquired the license from Kockums and entered other strategic partnerships in order to further develop the Dish-Stirling concept. Since 2011 the Ripasso CSP design has been tested in the factory in Sweden and in Antalya, Turkey. The first commercial power plant is now being built for the South African company, GHG Reductions in Upington, RSA where the solar radiation gives DNI levels which are among the highest in the world (2800 to 3000 kWh/m2 and year).

SCYPHO AB

Scypho AB has developed a groundbreaking adaptive control system that saves energy through smart control of heating, targeting residential home market.



SOL VOLTICS R&D

Nanowire researchers along with Sol Voltaics engineers demonstrated Wave Concentrated Photovoltaics (WCPV) in 2012. This concentrates the light waves by guiding those waved into the nanowires for absorption, with no mechanical or optical assistance. Sol Voltaics engineers then focused on the development of materials and processes for mass production of these high-performance materials for solar cells. The result is a completely new

type technology that can produce materials for solar cells that generates a higher efficiency with an attractive low cost for customers.

SOLEIA GREENTECH

Solelia Greentech offers solutions for charging electric vehicles (EVs) with solar electricity. Its business builds on the core IT and energy system Solbank™ (The Sun Bank) that enables solar charging in connected chargers at any time of the day, any day of the year.

SVENSKA AEROGEL AB

Svenska Aerogel AB has developed a patented, flexible method to produce Quartzene®, an aerogel-like material, at a significantly lower cost than previously possible. Quartzene® is significantly cheaper and more ecologically sustainable than other aerogel materials.

TOMOLOGIC

Artificial Intelligence is about to revolutionize the sheet metal Industry. This fall, Tomologic proudly introduces Optimization Intelligence as a Service. You can now significantly reduce costs and increase processing throughput while preserving high product quality. Tomologics optimization service can reduce manufacturers’ material waste by up to 50 percent. Manufacturers achieve more efficient raw material utilization, lower power consumption as well as faster production processing. The bottom line: reduced material, production and operation costs.

VASASENSOR

Vasasensor is a spin-off from the institute of micro and nanotechnology in Gothenburg, Acreo Swedish ICT and Chalmers University of Technology. The company started its journey at Chalmers School of Entrepreneurship, CSE, and has been working with the wireless sensor system for the paper industry since 2003. The innovation behind the product arose from needs in the paper manufacturing industry and the core technology was developed at the research institute Acreo. The product has been developed together with world leading actors in the paper industry.

WATTGUARD

Wattguard develops, markets, and sells simple, efficient concepts for reducing electricity consumption and carbon dioxide emissions in lighting-intensive environments.

WATTY

Watty has developed the first scalable, low-cost, solution for eliminating energy waste in every household and building in the world.

XENETA

Xeneta, enables anyone, anywhere, make smarter freight decisions. They believe in actionable metrics, and if you cannot measure it – you cannot improve it. That’s why they are assembling big data, crowdsourced from industry stakeholders – feeding back real-time benchmarks and unique market intelligence.

STEEL INDUSTRY REDUCES ITS CARBON FOOTPRINT BY USING FUEL CELLS

More and more municipalities are actively working on reducing their carbon footprint and success requires adapting to changing conditions. The Nordic countries are playing an important role in reducing the carbon footprint of our towns and cities using expertise, technical solutions and knowhow that can be made available worldwide. Less well known are developments in the Swedish steel industry, where surplus heat is being supplied to municipal district heating systems and fuelcell technology is being developed for computers, vehicles and power stations. This is speeding the transition to higher energy efficiency and creating more sustainable urban solutions.

According to Magnus Pettersson, the energy coordinator at Höganäs AB, which supplies surplus heat to Höganäs Municipality's district-heating network:

"In our reduction and heat-treatment processes, where the temperature is between 850 and 1200 degrees Celsius, we have installed technology that utilises the flue gases. These gases are cooled down to 100-150 degrees to heat water, which is then distributed to the district-heating plant. Höganäs' residual energy can meet 90 per cent of the requirement for Höganäs' district-heating network."

The waste heat from Höganäs reduces the annual emissions for the municipality's heating by 12,000 to 14,000 tonnes of carbon dioxide. Höganäs delivers a total of 40-50 million kWh of energy a year to the district-heating plant.

District heating is adapted to local conditions, and is designed in different ways, depending on local energy resources. What differentiates district heating from other heating is the fact that district heating is a shared system whereby one person's waste heat becomes another person's heating. We heat each other using



■ On the left Håkan Holmberg, marketing manager of Surface Technology, the unit within Sandvik Materials Technology that manufactures materials for fuel cells, and Mats W. Lundberg, R&D specialist in fuel cells at Sandvik Materials Technology, on the right. ■

resources that would otherwise be wasted.

"THE CHILDREN AT LULEÅ'S Kristallen nursery school are kept warm using energy from SSAB's steel manufacture," says Annika

Johannesson, Swedish District Heating Association's communications manager. "And in Luleå underground heating coils have been laid under the streets. These coils use heat from the steel works. Keeping the ground free of

snow reduces the snow-clearance costs for the community and helps reduce healthcare costs from people slipping on the ice." For both Luleå and the residents of Höganäs, district heating has reduced both costs and emissions. Luleå and Höganäs have some of the lowest energy costs in the country.

THANKS TO well-developed district-heating networks, Sweden is a global leader in utilisation of waste heat from industry. This has a positive impact on both the climate and the economy. Calculations show that nonutilised surplus heat in the rest of Europe is equivalent to about €500bn a year.

Sandvik Materials Technology carries out a large part of its business in Sandviken – a medium-sized Swedish industrial town. The company is one of the world's leading materials-technology companies, and it has invested heavily in the production of new materials for fuel cells – one of only a few producers worldwide.

SOME OF THE WORLD'S top researchers in the field of materials technology also work here, and they have been researching materials for fuel-cell technology for over ten years.

"The hydrogen society used to be a fantasy, but we are now seeing both Japan and Germany take the first steps towards such a reality. More renewable energy also means a greater need for energy storage and smart electrical networks. Hydrogen as an energy carrier can then serve as energy storage, industrial gas and vehicle fuel rolled into one. Fuel cells then become an obvious part of the whole process – in other words a highly efficient tool for reducing the global carbon footprint," says

Mats W. Lundberg, R&D specialist in fuel cells at Sandvik Materials Technology.

To demonstrate this relatively unknown technology, which it is estimated will be used increasingly worldwide, in 2014 Sandvik Materials Technology ran a pilot project together with Sandviken Municipality using two fuel-cell-powered cars, one fuel-cell truck and one mobile fuel station for hydrogen in Sandvik's industrial area.

"Around the world work is in progress on the creation of infrastructure for fuel-cell vehicles, and the idea behind the pilot project was to demonstrate the technology and give as many people as possible the chance to learn more about the possibilities of fuel cells," says Lundberg.

CONTRIBUTING to a sustainable society has been an important driving force for both the company's and the municipality's commitment to the project.

"We are using our unique expertise in the field of materials technology to make industrial processes safer and more efficient, and this will have a major impact and at the same time consume fewer resources," says Lundberg. "Our production is also based on recycled stainless steel, thus the energy consumption in many of our product areas can be reduced by 30 to 40 per cent."

FUEL CELLS can also be used in energy systems for urban development, as well as in applications for mobile phones, computers and power stations. "The technology can basically be used to fuel everything that requires electricity," says Lundberg, who manages fuel-cell technology development work at

Sandvik Materials Technology.

"More efficient development of vehicles in towns and cities in terms of materials and energy solutions is a must," says Mattias Goldmann, CEO of the Swedish thinktank Fores. "To achieve the ambitious 2030 Secretariat targets in Sweden by 2030, we need to switch to a vehicle fleet that is not dependent on fossil fuels."

"And it is not just about fuels," says Anna-Karin Nyman, Director of Communications at Jernkontoret, the Swedish Steel Producers' Association. "When we need to expand infrastructure, we will need high-quality transport systems for public transport, and the quality of the steel used will be crucial."



■ Anna-Karin Nyman, Jernkontoret. ■

ANNA-KARIN NYMAN points to the Friends Arena construction project in Stockholm. "Use of high-strength steel for the roof of Friends Arena could reduce its weight by 13 per cent and emissions of greenhouse gases by 900 tonnes of CO₂. Globally, use of high-strength steel in structures like Friends Arena could reduce emissions of greenhouse gases by about 150 Mt CO₂. That is nearly three times as much as the total greenhouse-gas emissions in Sweden."

"Materials, design, energy efficiency and recycling are key terms that we use constantly, and we are and have been a circular economy for scrap processing since the 19th century," says Nyman. "A growing planet with growing cities requires management of resources, and I think Swedish expertise and quality may mean a lot for a more resourceefficient model of society."



■ Kristina Persson. ■

Six Areas of Major Strategic Importance

Although a new government came to power in Sweden in 2014, the country's strong commitment to climate change issues is unabated. In less than 40 years, Sweden has gone from having a heavily oil and coal-dependent energy system to a system that runs on almost 50 percent renewable energy. We met with Sweden's Minister for Strategic Development and Nordic Cooperation, Kristina Persson, who has pinpointed six areas that are of great strategic importance for the future.

Today, Sweden is the EU leader in renewable energy use and, in fact, uses one of the highest percentages of renewable energy of any country in the world.

Moreover, since 1990 Sweden has succeeded in reducing its carbon dioxide emissions by a full 20 percent, at the same time as its economy has grown by almost 60 percent. This has been achieved through long-term efforts and by using smart, cost-effective control measures that generate a lot of green technology and energy for the money invested.

SWEDEN'S RECIPE FOR SUCCESS has been a combination of general, cost-effective control measures and clearly-defined goals and ambitions. It has combined effective legislation and clear information with investments in research and innovation.

Sweden has also proven that it is possible to break away from fossil-fuel dependency and that it can play an important role in the global shift to a climate-neutral society. One piece of the puzzle in Sweden's work in the area is its environmental policy. The overall goal of the environmental policy is to pass on to the next generation a society in which the major environmental problems facing Sweden have been solved. The policy states that every sector of society must assume its share of responsibility. Public agencies, organizations, enterprises, and individuals must devote more attention to environmental issues and sustainable development. Many small decisions affect the environment, so information, education, and evaluation are increasingly necessary.

KRISTINA PERSSON is a key figure in Sweden's ongoing efforts to become a sustainable society based on renewable resources. She is Sweden's Minister for Strategic Development and Nordic Cooperation.

"First and foremost, I see six areas that are of major strategic importance for the future. The first is global

■ **"AN INNOVATION COUNCIL WILL BE LINKED TO THE PRIME MINISTER'S OFFICE WHICH, IN COOPERATION WITH THE BUSINESS WORLD, WILL INSURE THAT SWEDEN WILL BE WELL POSITIONED WHEN IT COMES TO ECONOMIC DEVELOPMENT"** ■

governance; how to find ways to assume joint responsibility across national borders. At present, democracy is limited to the nation state, but individual nations cannot solve these problems on their own."

THE SECOND AREA Persson describes is the green transition, which will require major investments, new forms of both private and public investment, and amended regulations and taxes that support it.

"The third area is employment in the future. This is another of the government's main priorities. The comprehensive technological changes that will occur will see an increasing number of jobs disappear. The value-creation of the future must lead to increased employment, but that won't happen automatically. It is politicians' job to make sure it happens by steering development towards full employment."

THE FOURTH AREA, according to Persson, is income redistribution and welfare. "Inequality has quickly increased, and this is damaging to our society in many ways. Inequality contributes to weaker economic development. It also strains and damages trust in society."

The fifth area is integration and migration: "Integration policy needs to be more effective. It shouldn't take months—or years—before people who come to our country have the

chance to be a part of working life and the community."

THE SIXTH AREA is competitiveness and expertise. "An innovation council will be linked to the Prime Minister's Office which, in cooperation with the business world, will insure that Sweden will be well positioned when it comes to economic development," Persson continues.

Will we see a stronger Nordic policy from the Swedish government that supports sustainable and green technology development?

"The Nordic region and Nordic cooperation are part of the strategic agenda. Many of the really major problems are global and must be solved in cooperation with other countries. The EU is an important platform for achieving this, but consists of 28 countries, which makes it hard to make decisions quickly enough. Together, the Nordic region can exercise a much greater influence both in the EU and in relation to other major regions than if we act alone. What's more, we can better manage the major green transition we are facing if we cooperate on innovation, technology procurement, and the development of new regulatory frameworks, to name a few. We can and must lead the way and spur others on if we are going to realize the goal of a fossil-free society by 2050," Persson concludes.

Cities and Mayors leading the new climate economy

Governments around the world have failed to lay the foundation for a global climate agreement. There are many doubts regarding the possible success of the **Paris Summit in 2015**. How can cities contribute?



Water and wind important issues on Gotland

In many respects the Swedish island of Gotland has more in common with other islands in the Baltic Sea than with mainland Sweden, and it shares many of the same possibilities and challenges with other islands. “Access to fresh water and wind power are two important issues,” says Björn Jansson, mayor and chair of the board of Region Gotland and the person welcoming you to the Nordic Mayors Event in Visby, on Gotland.

Gotland’s biggest town, Visby, is hosting the Nordic Mayors Event, at which thirty or so mayors are gathering under the political umbrella of Almedalen Week to pressure the world’s politicians ahead of the UN’s climate change conference in Paris at the end of the year.

“Towns and cities play an important role in the work of preventing climate change,” says Björn Jansson, chairman of the board of the local authority Region Gotland, and a representative of the Social Democrats. He emphasises the importance of local work, and recognises the significance of non-profit organisations in these efforts. “Non-profit forces can collaborate with municipal ones to produce far reaching effects, as shown not least by the work on expansion of the internet on Gotland. I think something similar can be done

for the environment.”

Wind power is an important issue on Gotland, and Björn can see how production can be developed, both to meet Gotland’s needs and for export. But as an island it also faces challenges, access to fresh water being one of them. “Our water is really important, and we’re working hard on ensuring access to fresh water and improving its quality.”

Björn points out that islands such as Gotland often have more in common with each other than with the mainland. “That is why collaboration is so important, as exemplified by the work of the Baltic Seven, a conglomeration of seven Baltic islands that support each other and lend greater weight to contacts with the EU and other bodies.”

Despite Gotland being the biggest Baltic island, its population of approximately 57,000 is small. Even so, Björn thinks this could be a

strength in the climate change efforts. “Small communities can have a big impact and can do a lot on their own. Municipal autonomy in Sweden allows us scope for our own initiatives. It gives us a strength that not everyone else has. Furthermore, as an island we can carry out research projects here that would be hard to implement in other contexts and other locations.”

► GOTLAND FACTS ◀

The province of Gotland consists of a single municipality, which since 1st January 2011 has been called Region Gotland. Gotland has no separate county council. Instead Region Gotland is responsible both for primary municipal responsibilities and for county council responsibilities like healthcare and public transport. Responsibility for regional development also lies with Region Gotland.



Cities take the lead in the work with climate change

The C40 Cities Climate Leadership Group, now in its 10th year, connects more than 75 of the world's greatest cities, representing 550+ million people and one quarter of the global economy. Mark Watts is the Executive Director of C40. "Our sole focus is to increase the cities ambitions and to drive climate change and urban action that reduces greenhouse gas emissions and climate risks, while increasing the health, wellbeing and economic opportunities of urban citizens", says Watts.

By 2030 six out of every ten people on earth will be living in urban areas. This makes cities part of the climate change problem. But it also provides cities with the possibility of being part of the solution.

"More than half of all this planet's population is living in cities and it accounts for 70 % of global CO₂ emissions. That's why cities have to play a major part in the work with climate change", says Mark Watts, Executive Director of C40.

He describes how C40 is bringing the world's megacities together in meaningful exchanges help speed up the global adoption of climate policies and programs that have been demonstrated to work in one or more member cities.

"We enable the world's megacities to be better prepared for climate change and to, wherever possible,

minimize the risk associated with global climate change and reduce or even avoid the health, environmental and economic impacts that could result."

But Mark Watts points out that not only renown leaders in cities with over three million inhabitants is a part of the C40 initiative.

"PORTLAND, STOCKHOLM and Copenhagen is a part of C40 because they have proven to be front runners in finding working solutions that have huge impact".

Set actionable, measurable goals at the individual city level and the organisational level to ensure actions and outputs are equating to success.

C40 is working across multiple sectors and initiative areas. C40 convenes networks of cities providing a suite of services i rts, including: direct technical assistance, knowl-

edge management & communications. C40 is also positioning cities as a leading force for climate action around the world, defining and amplifying their call to national governments for greater support and autonomy in creating a sustainable future.

They use knowledge-sharing and metrics-driven implementation to achieve measurable and meaningful reductions in both greenhouse gas emissions and risks associated with climate change, along with realising the local benefits of these solutions (cleaner air and water, lower energy costs, less traffic congestion, higher quality of life, longer lifespans, green jobs and green businesses).

MARK WATTS: "We organise peer to peer exchange in a safe environment where the focus is on tackle problems and share knowledge".



■ Mark Watts, C40 Executive Director presents Manuel Sanroma, CEO of IMI (Municipal IT Institute of Barcelona; from left to right) with the City Climate Leadership Award in the category "Intelligent City Infrastructure". ■

C40 networks facilitate dialogue amongst city officials.

"This builds trusted relationships, which in turn ensures that ideas, solutions, lessons, questions, and even friendly competition can flow freely and responsively to cities' needs. Rather than end at a case study or report, C40 Networks create conversations, which enable cities to tailor their own actions to their unique situations, and band together to use their collective power to access partnership resources, including technical and financial support", Watts says.

The United Nations Climate Change Conference, COP21 or CMP11 will be held in Paris, France in November later this year.

Mark Watts sees opportunities for cities to make an impact.

"First we need to be showing that change and reducing emission is a possibility if you put your mind to it. That's a central part of tackling the problem. Second we need to achieve an ambitious treaty in Paris in order to start the process towards 2020."

Countries from around the world

are proposing climate actions that will take effect after 2020, known as intended nationally determined contributions.

"Cities' climate actions to reduce GHGs and climate risks are bolder, more impactful, implemented faster, at a lower cost and with less resources than if they were to go it alone. No other organisation facilitates such deep connections amongst city staff across 50+ countries, 20 time zones and 26 languages to accelerate local action with major global impact", Watts concludes.

Finland on the road to sustainable industries in 2050

Carbon-neutral industry is one of Sitra's focus areas contributing to Finland's aim to be resource-wise and carbon-neutral in 2050. Sitra helps Finnish businesses adapt to the demands of a carbon-neutral society.

"Carbon-neutral industry is a programme that accelerates systemic change", says Senior Lead Tiina Kähö who is leading the focus area at the Finnish Innovation Fund Sitra.

Sitra is a public innovation fund aimed at building a successful Finland for tomorrow. They are forward thinking and anticipate social change and its effect on people. Their activities promote new operating models and stimulate business that aims at sustainable well-being.

Tiina Kähö is in charge of the focus area "Carbon-neutral industry", which was established in 2014. This focus area helps Finnish businesses in adapting to the demands of a carbon-neutral society. The aim is to help major companies adopt the best solutions for ensuring that their practices, products and services become low-carbon. The operating model envisaged by such companies will set an example for other organisations and encourage them to follow suit.

TIINA HAS A LONG experience of a range of expert and management roles in various Finnish and international environmental consulting organisations. Tiina's work with the private sector has strengthened her conviction that ecological sustainability lies at the core of a successful corporate strategy. Carbon-neutrality will be fundamental to sustainable business activities in the future.

"It's a big challenge we're facing. Reaching these goals

calls for new businesses, new business models, innovation as well as a culture and leadership together with strategies that have the right mindset and understanding of the challenges we face. We need forerunners who see business opportunities in this challenge. But we need to hurry", says Tiina Kähö.

SHE ADDRESSES COMPANIES as key players in achieving climate targets.

"They can produce innovations, products and solutions that help the move towards a carbon-neutral society. Doing so also enhances their competitiveness. All industrial activities – from material and energy flows to production – must be included in the transition."

Kähö points out that the active participation of leading industrial companies in the transition process will expedite the required change and support the switch to renewable energy and low-carbon solutions.

"The development of low-carbon products and services will create important export opportunities, enhance competitiveness and lower the risks related to the transition process. Solving global environmental problems is a lucrative business and a major opportunity for Finland. Carbon neutrality provides companies with a strategic



■ "Finland has made a commitment to be carbon neutral by 2050.

Reducing our greenhouse gas emissions by 80 to 95% until 2050 will do this. Companies and industry need to transform themselves completely in order to reach these goals, and Sitra will supply building blocks that help support this", says Tiina Kähö, Senior Lead for Carbon-neutral Industry at Sitra. ■

competitive edge. Those companies that are among the first to understand this will be the most successful in the future. If big firms fail to get on board, the transition will not take place in time.”

IN 2014, SITRA LAUNCHED a project in which a group of leading Finnish companies committed themselves to providing the solutions needed to take Finland closer to becoming a carbon-neutral society. The project builds on the national Energy and Climate Roadmap 2050 from a business perspective. The operating model drawn up by the participating companies will set an example for others and encourage them to follow suit.

“Finland has made a commitment to be carbon neutral by 2050. Reducing our greenhouse gas emissions by 80 to 95% until 2050 will do this. Companies and industry need to transform themselves completely in order to reach these goals, and Sitra will supply building blocks that help support this. The all-embracing transition will have an impact on the whole of society. It will occur slowly and require long-term investments. Solutions we choose today need to be sustainable in 2050, as well. As a first step, businesses, production and products should become low-carbon, significantly lowering the existing emission levels.”

The carbon-neutral industry project will also be producing some background reports to provide decision-makers with comparative data and facts, while helping companies in making the transition towards carbon neutrality.

She has high hopes for new, cleantech innovations and points out that Finnish companies have a long track record of international competitiveness and an ability to meet new demands with front end innovations.

“OUR COUNTRY HAS a long history of high-tech innovations that have set new world standards and pushed the progress forward. What we need is a transition to sustainable cleantech innovations. With our competence in research and development, and highly skilled workforce we have the right elements to make this transition into reality and reach our goals.”

Great ideas needs funding and Tiina Kähö points out more collaborations with international partners as a way of finding investors.

“We have excellent companies and a working ecosystem for innovation and development, but we need to be more open, especially in the energy and infrastructure utility cloud. With an open infrastructure we have more to gain.”

Finnish companies have already recognised the potential represented by climate change and its mitigation: based on a new survey commissioned by Sitra from market research company Taloustutkimus, the majority of Finnish companies (75%) find that carbon neutrality is, or

will be, an important strategic driver for their competitiveness. This is a particularly strongly held view in the energy and environmental sectors, as well as the forest and paper industry. The metal industry is the least concerned about climate change. Furthermore, 83% of Finnish companies regard climate change as significant to their business environment.

ANOTHER SIGN of Finnish companies’ increased awareness of the importance of climate change is Climate Leadership Council formed by Sitra and major Finnish corporations such as Fortum, Neste, St1, Outotec, Kemira, and Nokia, www.clc.fi/en. The Council aims to boost the overall competitiveness of Finland’s business sector and research organisations, helping them prepare for the threats posed by climate change and dwindling natural resources, while priming them to benefit from the related business opportunities.

“Our city projects increase awareness and create concrete operation models within towns while connecting people, products and solutions.”

Kähö gives examples of pilot projects in Finnish cities that help innovations find a platform for large scale testing.

One of these cities is Turku that has been engaging in co-creation initiatives with companies like Siemens. Turku aims to be carbon-neutral by 2040 and has started a strategic co-operation with Sitra in order to better reach this ambitious goal. The Helsinki Capital Region is another example.

“COMPANIES need a reference area on an international scale, in which new low-carbon solutions will be designed for the circular economy, where innovations will be tested and cleantech expertise will be showcased. The Helsinki Capital Region can provide a suitable setting for all such activities.”

Sitra supports the cities and key companies in the Helsinki Capital Region in the creation of a leading Smart&Clean metropolitan area. They are also lending their support to the achievement of the objectives set in the Finnish government’s Strategic programme for cleantech, aimed at making Finland a global leader in cleantech by 2020.

TIINA KÄHÖ sees her work at Sitra as building new operating models and ways of collaborating between companies, state and cities to boost cleantech solutions.

“These models will require constant fine tuning and need to be repeated and multiplied with great projects and an ambitious approach together with different partners and collaborations. That’s one reason why we are attending the Nordic Mayors’ Event in Almedalen with leading Finnish cities such as Turku, Vaasa, and Espoo”, Tiina Kähö concludes.



► FACTS ◀

More on Sitra’s initiatives:
Carbon-neutral Industry project:
<http://bit.ly/1KbRpDI>
Helsinki region Smart&Clean initiative:
<http://bit.ly/1KbRuqv>
Resource wisdom model:
<http://bit.ly/1KbRw1K>
<http://bit.ly/1BA1Xco>
Circular economy project:
<http://bit.ly/1fzEGgT>
<http://www.sitra.fi/en>

■ The Helsinki Capital Region is becoming a genuine global reference area for intelligent and ecologically sustainable solutions. Helsinki, Espoo and Vantaa have launched a large-scale Smart & Clean partnership project in collaboration with Sitra. ■

Circular economy can help the environment

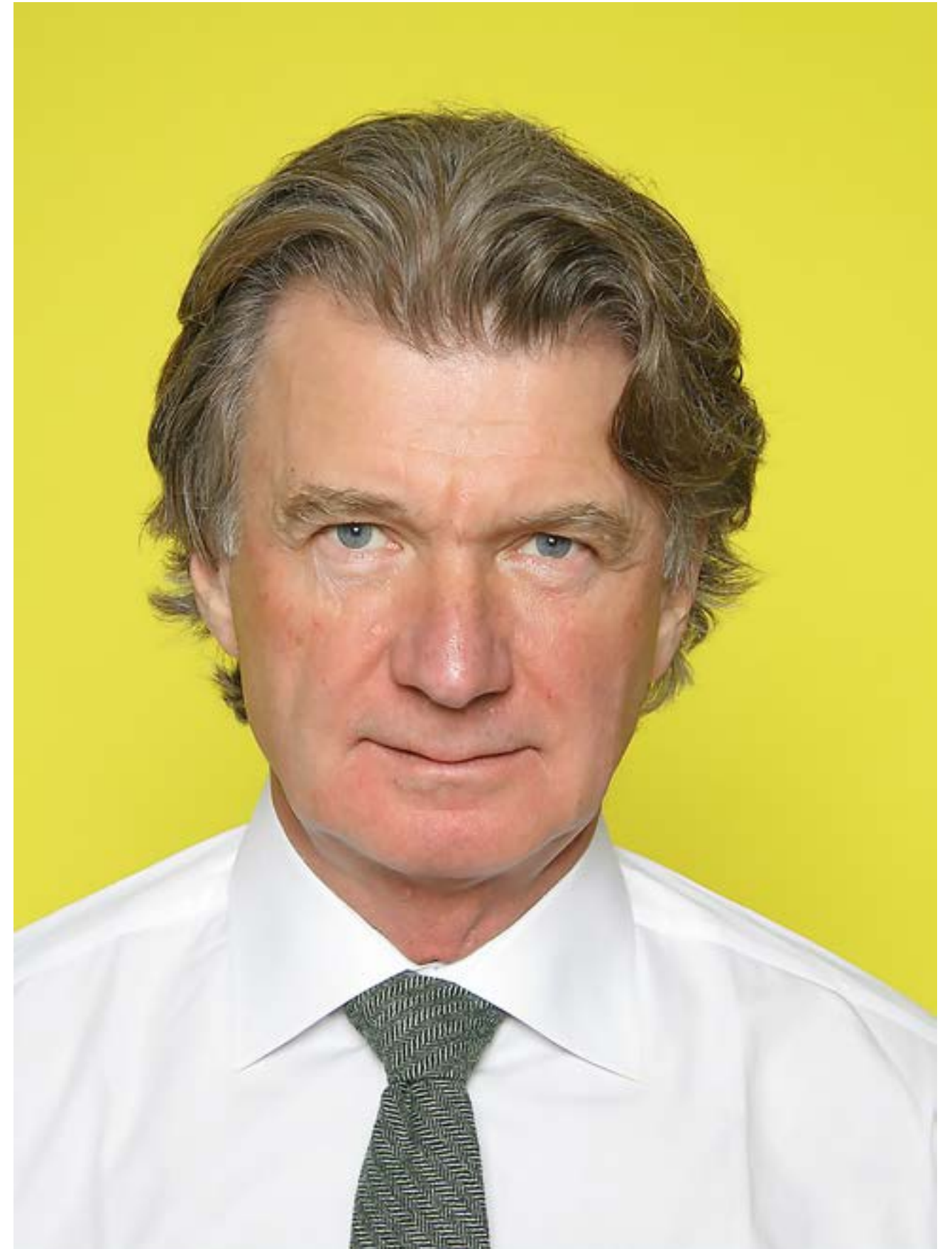
The circular economy is the way to stop a staggering inefficiency in the way that we manage the earth's resources – leading to increased pollution, loss of ecosystems and substantial losses of value with each product disposed. This is the view of, among others, the Swedish opinion maker and author Anders Wijkman.

Calls for a new model of production and consumption are becoming more frequent. The circular economy has been attracting attention of key business leaders and policy-makers, spurred by a series of studies by the Ellen MacArthur Foundation – demonstrating that a circular economy makes perfect business sense.

In the EU, the legislative proposal “The Circular

Economy Package” was presented in July 2014. Juncker Commission decided, to withdraw the proposal, under the pretext of “deregulation”. After heavy criticism the Commission has made a commitment to re-launch the proposal.

ONE OF THE OPINION MAKERS that agree with the opening statement is Anders Wijkman. He is a member of the





Swedish Royal Academy of Sciences, the World Future Council and the International Resource Panel as well as co-president of the Club of Rome and chairman of the Swedish Association of Recycling Industries.

He is worried about today's economy that builds on a 'fast turn-over' principle, which often seems to promote early obsolescence.

"The faster we replace our gadgets, the better, it seems – applying not only to phones but to most items we consume. The consequence is a staggering inefficiency in the way that we manage the earth's resources, leading to increased pollution, loss of ecosystems and substantial losses of value with each product disposed. A new Club of Rome study highlights that moving to a 'circular economy' by using and re-using, rather than using up, would yield multiple benefits," says Wijkman.

His proposition is a circular economy, where products are designed for ease of recycling, reuse, disassembly and remanufacturing. Mr Wijkman also stresses that this should replace the traditional, linear 'take, make & dispose' model that has dominated the economy so far.

Wijkman tells us that the 'circular economy' concept stems from the Club of Rome report 'Limits to Growth' in 1972.

"This was one of the first voices to recognize that a combination of resource depletion and pollution, if not tackled, would ultimately bring the global economy down", says Wijkman.

Today, more than forty years later, he points out that we are at a crossroad. According to Wijkman, "Wasteful lifestyles, primarily in the rich North, have used up most of the environmental space. With a growing population and much-needed increases of per-capita income in low-income countries, technology in combination with policy reforms are the only chances we have to bring down the environmental impacts. Luckily, there are many opportunities for technology innovation, often complemented by behaviour change. But policies to promote such changes are rare. Almost all focus has been on promoting labour productivity, instead of material productivity".

There have been many witnesses of how the business community in the past often has seen environmental policy-making as a threat to competitiveness.

"While competition in a globalized economy is a

■ "JOBS AND CLIMATE CLEAR WINNERS IN A CIRCULAR ECONOMY" ■

challenge, there are very strong reasons not to view resource efficiency and moving towards a circular economy as a threat – rather the opposite", Wijkman tells us.

This week, the Club of Rome presents the first in a series of reports in 2015: a Swedish case study, showing how a circular economy could contribute significantly to building economic competitiveness, increasing jobs and cutting CO2 emissions. The Swedish case study analyses the effects of three decoupling strategies underpinning a circular economy (renewable energy, energy efficiency and material efficiency) through an input/output simulation model.

It concludes that by 2030, carbon emissions could be cut by almost 70% if a key set of circular economy policy measures were adopted. The number of additional jobs would likely exceed 100,000 – cutting unemployment by more than a third. Caring for what has already been produced – through repair, maintenance, upgrading and remanufacturing – is by far more labour-intensive as compared to mining and manufacturing in highly automated and robotized facilities.

The Swedish case study will be complemented by similar studies of the Dutch and Spanish economies later this year.

Mr Wijkman: "Although it is premature to draw EU-wide conclusions based on the Swedish study alone, the findings of the study are a clear indication that a circular economy is not contrary to the Juncker Commission's agenda for competitiveness and growth – quite the opposite. 2015 is a key window of opportunity to start a process of modernization of the EU economy, while making a substantial contribution to boosting jobs as well as tackling climate change ahead of COP 21 in Paris."

Cities show the way on the road to Paris

In less than six months, world governments will meet in Paris for the United Nations Climate Change Conference. 11 December 2015 is the deadline that has been set for arriving at a global climate agreement that can be signed by all major greenhouse gas emitters, including both developed and developing countries. If Paris 2015 is successful, it will be a major step towards sustainable development and a safer environment for all.

A good agreement will not happen on its own. If governments are to take bold actions, they must feel both the pressure and the support from voters, businesses, civil society, scientists and many other stakeholders. This is why our seven organizations (a research institute, two consultancy firms, an association, two think tanks and an NGO) have joined forces to push for more climate action in the run-up to the negotiations in Paris. We are anchoring our initiative in the Almedalen political event in Visby, Sweden, and a series of seminars and meetings on 28-29 June 2015. Cities are at the center of our initiative: their importance has grown as economic forces and as players on the political arena. Many cities around the Nordic countries and in the world have already taken a stand for ambitious climate goals.

For many, the words “climate change conference” are a reminder of the climate conference in Copenhagen in December 2009. That conference was not the success many had hoped for, since the participating governments could not agree. Of course, there is a risk that the same situation might be repeated in Paris in December, but we are hopefully in better shape now compared to 2009.

THE SITUATION TODAY is more grave than it was five years ago in three ways:

- As we well know, the actual climate and environmental conditions are even more dire now. In many places around

the world, we see how climate change, together with other environment-related changes is affecting the ecological system, and therefore economic and social systems. The current droughts in California and Australia, the heat wave in India and the water crisis of the American Southwest and the Middle East is a bad omen of a possible new normal. We see dying coral reefs, warmer and more acidic oceans, rapidly retreating summer Arctic sea ice, and decreasing yields of basic food crops such as wheat and corn. We used to talk about risks faced by our grandchildren and future generations, but we now see a changed reality already today. At the same time, carbon dioxide emissions are increasing at an unrelenting, and even increasing, pace.

- Climate science has also evolved: researchers now know a lot more than they did just five years ago. Not everything has been investigated exhaustively and fully explained (and will likely never be), but more and more data is being collected, analytical methods are continuously being refined, and impacts can be studied and predicted more and more accurately. And when natural and social scientists come together, they find that, as stated in the latest IPCC-report: “climate-change impacts are projected to slow down economic growth, make poverty reduction more difficult, further erode food security, and prolong existing and create new poverty traps.”

- Unfortunately, the global climate of trust and cooperation between nations has in many ways deteriorated. Political tensions (caused by war and crises) and global economic and social imbalances have continued to increase and parts of the multilateral system are weakened due to political lock-ins and lack of resources.

ON A NUMBER OF OTHER FRONTS, the situation has actually improved since 2009. Technological progress has made renewable energy (solar and wind power) a competitive and rapidly-expanding component in our energy supply. With rapidly falling prices for solar power and with improved power storage and transmission, more and more of the energy systems can become more climate friendly. At the same time electric cars and plug-in hybrids are spreading, and sensor technology and energy efficiency in products and systems has improved. This energy shift opens up fascinating possibilities, but resource, environmental and health aspects must not be underestimated, for example when it comes to large-scale production and usage of batteries.

IT IS ALSO CLEAR that progress on the climate front does not depend solely on what our governments decide; non-state actors play a crucial role.

- Cities and regions are taking far-reaching decisions when it comes to climate and the environment, regardless of what governments do. They collaborate in new networks, learn from one another, involve civil society and put pressure on governments. Urban populations are growing around the world (every week by 1.5 million people), and if the cities are built and operated cleverly, this urbanization can actually contribute to a better climate, which Global Utmaning shows in its report on sustainable cities.

- Major large progressive global corporations (some of which with Nordic roots), are changing their way of working. They are choosing renewable energy sources, investing differently and reviewing their production and supply chains. They are also helping consumers make better decisions that reduce emissions and protect the environment.

- Through the New Climate Economy project, the Stockholm Environment Institute has shown that economic development and climate and environmental progress can go hand in hand. If made wisely, the large infrastructure

investments (many of them in cities) that lie ahead can have an impact. What’s more, the Club of Rome has shown that large potential profits can be derived from a more circular approach to industrial processes and commodity flows.

- Nordic greentech entrepreneurs are still absolutely world-class. There is a constant stream of innovative companies that develop commercially viable solutions to the world’s sustainability challenges.

- Civil society organizations have mobilized citizens as never before, initiating major campaigns against climate change. Every year over one billion people participate in WWF’s Earth Hour, and a global divestment campaign to halt investment in fossil fuel-based energy companies is spreading rapidly.

- Consumers increasingly choose to alter their consumption patterns. We buy low energy lightbulbs and hybrid cars, we choose organic and locally produced food, we begin to even share cars and tools between us.

- Religious communities and leaders have also taken action. Swedish bishops have contributed to the debate on climate change and, just last week, the Pope published a radical Encyclical on the environment — a unequivocal exhortation to the world’s 1.2 billion Catholics to take action against climate change.

IT IS UNDER THESE circumstances that our seven organizations are gathering mayors and leaders from over 20 Nordic cities, along with experts and representatives from around the world, to learn from one another, to share experiences and together make a show of strength on the road to Paris.

*Bo Andersson, Secretary General, The Norden Association
Johan Hassel, CEO, and Alexander Crawford, Global Utmaning
Johan L. Kuylensstierna, Executive Director, Stockholm Environment Institute
Mats Lindgren, CEO & Founder, Kairos Future
Jens Olejak, South Pole Group
Anders Wijkman, Co-President, Club of Rome
Håkan Wirtén, Secretary General, WWF Sweden
Kaj Embrén, Program Manager, Nordic Road to Paris and Beyond*

WWF: The cities hold the key to a sustainable society

The cities have a key role in working towards sustainable societies. Innovation is high in many places, but Carina Borgström-Hansson, expert ecological footprint on the WWF in Sweden think the Nordic cities need to think outside the box to find solutions that have global effects.

»Nordic cities are particularly well placed to take large steps. That makes demands greater on them», she says.

The cities of the world contribute to a sustainable society. WWF acknowledge this. The work has been in many cases gone beyond the national climate commitments made. Therefore it is important to use the work already done as an example, and to put pressure on nations to do more.

One way to highlight good example is the WWF's Earth Hour City Challenge (EHCC) that gives cities and counties an opportunity to act role models for sustainable development

Seoul, South Korea was named the year's Global Earth Hour Capital 2015. The city impressed an international jury of experts with its comprehensive approach to tackling climate change and its determination to ramp up its use of renewable energy. The city's approach to radically reducing emissions includes actions such as allocating a realistic budget for increasing the use of solar power by residents, reducing transport emissions through greener fuels, building more bus lanes and through

car sharing programs.

Seoul serves as a role model for fast-growing cities in a rapidly developing Southeast Asia, as well as for the rest of the world. An ambitious initiative by the city to reduce greenhouse gas emissions by 10 million tons and to achieve 20 per cent electricity self-reliance by 2020 won high acclaim by the jury.

This year 163 cities in the following 16 countries participated in the Earth Hour City Challenge; Brazil, Canada, Colombia, Finland, France, India, Indonesia, Malaysia, Mexico, Republic of Korea, South Africa, Singapore, Spain, Sweden, Thailand and USA.

The theme for EHCC's urban efforts to move towards a 100 percent renewable and sustainable energy supply within a few decades. Also this year focuses WWF also more specifically on how cities contribute to moving money from fossil to renewable energy solutions. Cities that participated in the last round of EHCC will have the opportunity to further demonstrate their commitment and

activities in this area, for example, how they procure or otherwise stimulate investment in renewable energy.

WWF collaborates since 2012 with the organization ICLEI (Local Governments for Sustainability). ICLEI reach through its large network out to many cities and their internationally recognized platform Carbon Climate Registry is used in the challenge for the reporting of data from participating cities.

During the ICLEI meeting in Seoul this spring, further steps were taken when they agreed on a common platform for ICLEI, C40 and UCLG to report the results of urban sustainability work for it to be compared with the national commitments.

"It means we will be able to monitor and evaluate the sustainability work being done in cities across the world in a coherent manner", says Carina Borgström-Hansson, expert ecological footprint at WWF in Sweden.

The evaluation of candidate cities focuses on a number of aspects that

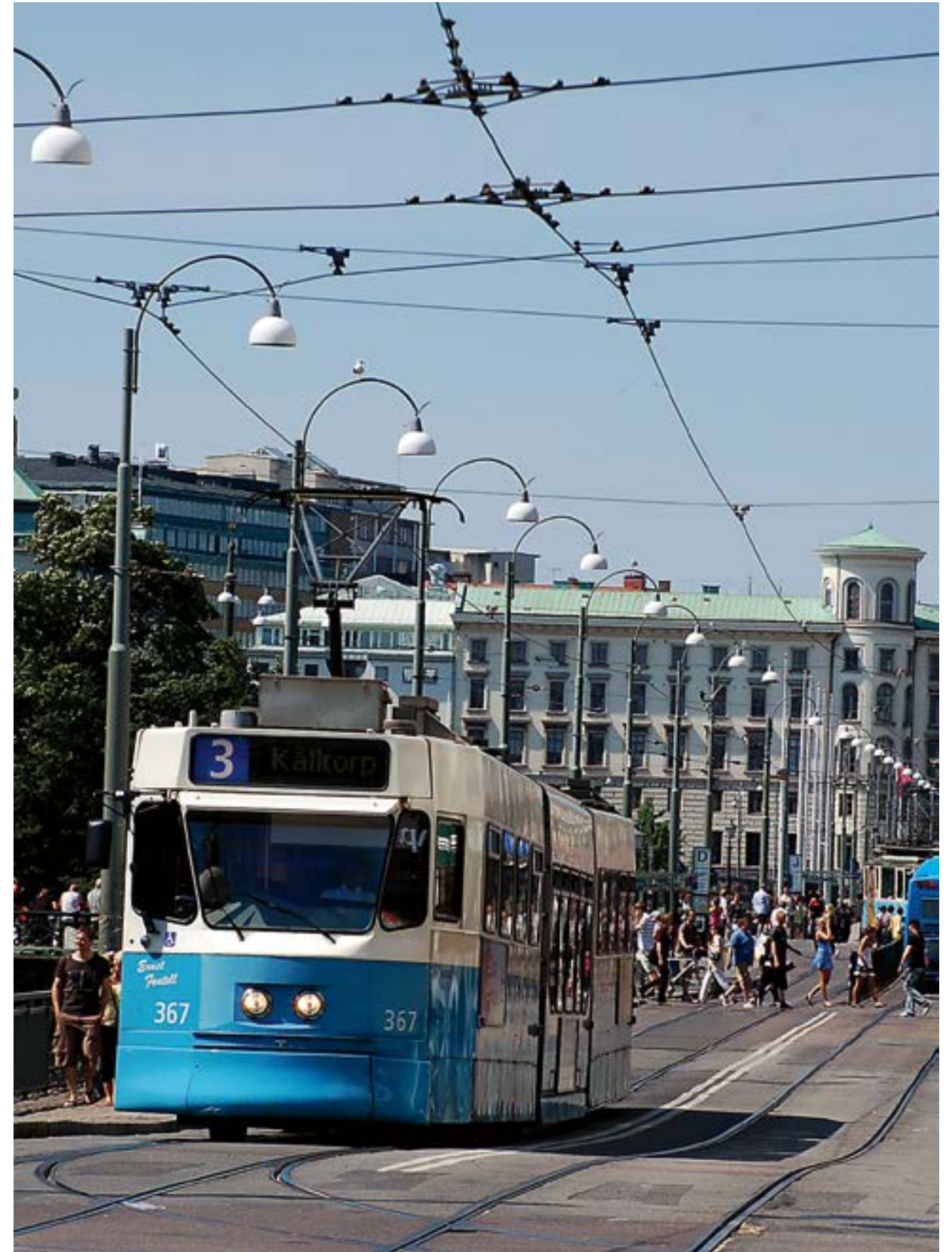


Foto: Peter Krahll Miljöförvaltningen

together show an ambitious, inspiring, holistic and credible work on sustainable urban development, including commitments to move towards a 100 percent renewable energy and measures to support the dissemination of climate-friendly urban solutions. In addition, they look at integrated, relevant and climate-smart solutions to human needs, particularly accommodation, energy security, mobility and food.

This year was a particular focus on measures to increase investment in

renewable and sustainable energy.

This year's climate town in 2015 Sweden became Gothenburg.

"The City of Gothenburg understand that great challenges require great efforts, and that all forces must work together. Therefore, they have been included in several networks and partnerships to learn from each other, make common cause and turn their heads together - ranging from the largest wind power plant to the modern city buses," says Borgström-Hansson.

In addition, the City of Gothenburg have managed to reduce the environmental impact of consumption through behavioral change and was in 2013 the first in the dominions of green bonds. Now is also the first in the Nordic countries to use the framework for green bonds as bank SEB has developed together with the World Bank, WWF and a number of Swedish investors. As part of its environmental program is now planning the city to seek funding for various projects in the transport,

water, energy and waste management.

"The example of green bonds show an interesting solution to a problem that could prevent interesting projects financing. A good project must have the funding to be carried out and not stay because of lack of money. Moreover, the example of the need for equal dimensions of soft and social innovations of technology. Above all, Sweden is an engineering country with a strong focus on technological innovation, but we risk forgetting innovations that change the behaviors

and communities. With our good position, we should in the Nordic countries to take more responsibility and to think outside the box ".

The cities that want to be acknowledged for their work also needs to think outside the boundries of both city and nation.

"Cities that works with solutions and innovations that can have global effects and plan on finding partnerships outside their own city have more opportunities to get noticed," says Carina Borgström-Hansson.

► FACTS ◀

EHCC

The Earth Hour City Challenge is a year-long competition among cities to promote renewable energy and prepare for climate change. Cities that participate are recognized for their efforts in spreading the global movement to create more sustainable, resilient cities and compete for the title of Earth Hour Capital as well as grants from WWF.

UCLG

United Cities and Local Governments (UCLG) represents and defends the interests of local governments on the world stage, regardless of the size of the communities they serve. Headquartered in Barcelona, the organisation's stated mission is: To be the united voice and world advocate of democratic local self-government, promoting its values, objectives and interests, through cooperation between local governments, and within the wider international community.

www.uclg.org

ICLEI

ICLEI-Local Governments for Sustainability is the world's leading network of over 1,000 cities, towns and metropolises committed to building a sustainable future. By helping our Members to make their cities and regions sustainable, low-carbon, resilient, ecomobile, biodiverse, resource-efficient and productive, healthy and happy, with a green economy and smart infrastructure, they impact over 20% of the world's urban population.

www.iclei.org

Compact of mayors

The Compact of Mayors is the world's largest cooperative effort among mayors and city officials to reduce greenhouse gas emissions, track progress, and prepare for the impacts of climate change.

The Compact of Mayors will drive more aggressive city climate actions and reaffirm existing targets while capturing the significance of these efforts through a consistent, transparent public reporting of cities' climate data. The data collected through the Compact of Mayors will become the evidence base we need to quantify the greenhouse gas impact of city action

www.compactofmayors.org



■ Seoul, Syd Korea. Foto: Seoul Metropolitan Government ■

Why are Cities important?

National governments have been discussing the issues and possible solutions to climate related solutions for decades and still have not come to binding multi-lateral agreements on targets and Green House Gas (GHG) reduction commitments. Overall the challenge is to set targets and timelines in the negotiations that are aggressive enough to reduce GHG emissions to meet the increasing threats to global society of climate change. Scientific consensus is that limiting the average global surface temperature increase to 2 degrees Celsius over pre-industrial average will avoid catastrophic climate change impacts.



James Hanusa.

Cities currently account for 70% of the world's greenhouse gas emissions, half the world's population (increasing to 80% by 2050) and three-quarters of global economic activity. Therefore cities can be the most significant actors in reducing greenhouse gas emissions, especially in working together. Mayors have developed aggressive targets and climate action plans and have been creating increasingly larger knowledge sharing networks to collaboratively address the challenge. Examples of some of these commitments include; 1) Copenhagen's Carbon Neutral plan by 2025, 2) 17 cities under the Carbon Neutral Cities Alliance committing to 80% reductions of GHGs by 2050, 3) cities like San Francisco committing to 100% renewable energy by 2020. Cities are a key stakeholder in the climate dialog as they are more nimble than state and national elected officials and Mayors have direct accountability to constituents. Cities also have more incentives to collaborate based on sharing similar challenges and collectively can have an impactful voice to encourage national negotiators to be more aggressive with their commitments based on actions they are taking at local levels.

These city commitments are being made possible by increasingly larger and more connected knowledge sharing networks for cities. One example, C40 Cities Climate Leadership Group is made of the largest global cities with aggressive climate action initiatives, has established a goal of reducing member's GHG emissions by 248 million tons by 2020. Others climate and Mayor focused networks include: Covenant of Mayors (Europe), Conference of Mayors (US), ICLEI – Local Governments for Sustainability, Urban Sustainability Directors Network and 100 Resilient Cities.

WHAT CAN MAYOR'S DO?

Mayors are in the unique position to affect change at the local level through policy, incentives, engagement and experimentation. For example, mayors can control the public purchasing to effect city vehicle fleets (hybrid-electric vehicle), encourage energy generation on public buildings (solar rooftops) and mandate energy efficiency (LED streetlights). They can also direct changes to the built environment such as Paris's new policy that all new rooftops must be covered by solar or a green roof, establishing new buildings baselines as Leadership in Energy and Environmental Design (LEED) certified and implementing density requirements. Increasingly Mayors are scaling innovative solutions like Bus Rapid Transit, which started in Latin America, and now has a growing network of cities rolling out this solution to public transit around the world. (<http://brtdata.org/#/location>).

MAYORS ARE ALSO UTILIZING their environmental and climate initiatives to engage business and attract young creative workers with similar values. Cities like San Jose, CA are building their economic development strategies around sustainable development and cleantech industry growth as evidenced by their GreenPrint for Silicon Valley and Prospect Silicon Valley demonstration facility. Vancouver has built its brand on the "Greenest City in the world by 2020" campaign. In San Francisco, the Business Council on Climate Change, a pilot project of the UN Global Compact, has brought together over 100 companies with aggressive climate initiatives to support the cities climate action plan. From an experimental point of view, cities are encouraging entrepreneurship and building innovation districts to develop the ecosystem for these new businesses to interact with each other and thrive. In the future there could be increased focus in these areas to focus on social innovation and environmental business with demonstrations of emerging policies in urban agriculture, eco-districts, sharing economy, new transportation alternatives and renewable energy.

This year in Paris cities will have an increased engagement as United Cities and Local Governments (UCLG) will be holding a parallel event during COP 21. UCLG will bring together 1000 local-level representatives from around the Summit of Cities and Local Governments on climate change at Paris City Hall, the conclusions of which will be presented to the COP 21.

James Hanusa, Director of Urban Innovation Exchange, San Francisco, USA

► MY FOCUS AT ALMEDALEN ◀

I plan on talking about leading cities climate initiatives and the next wave of smart cities as well as emergent and exponential technologies and decentralized systems. We will also be talking about developments in the lead up to the December UN conference in Paris and trends in finance, sharing economy, and technology that can have an impact on local and global climate challenges.

Crowdsourcing – On New Conditions for Local Development

After travelling 90 minutes from the county's capital, Luleå, in the heart of Arctic Sweden's Lapland, I finally arrive at the Swedish hinterland's best-kept secret, Vuollerim. And, as suspected, it is more than just the famous Northern Lights that are lighting up this remote community's development and that have enticed international networks to choose Vuollerim as the venue for Crowdsourcing Week.

The fact that the news of this tiny community's development has reached business developers, universities and investors the world over can be seen as a result of the brave new world we now live in, where the Internet of Things touches even rural areas. How can the social model now being developed in Vuollerim, which has inspired both locals and global social developers, also inspire today's decision-makers?

Founder of Crowdsourcing Week, Epi Ludvik Nekaj from Singapore, takes a walk through Vuollerim after three days of intensive discussion. Nekaj's feelings about what is driving Vuollerim forward are unmistakable. What's more, his Singaporean heart

beats even faster when the conversation turns to Vuollerim's multifaceted development. Around 40 non-profit organizations and 60 companies have set up shop in this village with 800 residents: proof as good as any of vital social development.

Crowdsourcing Week's arrival in Vuollerim is something that surprises neither Nekaj nor the event's other international delegates. For Nekaj, it's only natural. "Our role is to find places and people who drive social development forward," he says, and adds: "Vuollerim is the place political leaders should be looking to".

The idea of holding a top-level meeting in Vuollerim came to Nekaj during Crowdsourcing Week Europe, held in October 2014. "It took a year

for us to get Crowdsourcing Week to Vuollerim," explains Eva-Lena Skalstad from the Lapland Vuollerim company.

The spread of the news about Vuollerim's development to a major international network like Crowdsourcing Week is largely a result of the networking and Internet-driven society we now live in. "Naturally, we need to travel and keep in contact with people who share our ambitions," says Skalstad.

Nonetheless, it's not always easy to get traditional stakeholders in the municipality and region to accept an interactive and inspirational social model like the one Vuollerim's residents have created. Based on the conversations and dialogues held



► FACTS ◀

Examples of projects, companies and organizations in Vuollerim (<http://neighbor-hoodeconomics.org/crowdsourcing-week-summit-in-vuollerim-sweden/>)

Vuollerim Economic Association (<http://www.vuollerim.se/vaxthuset>). The first locally-owned company, founded in 1999.

VIVA was founded in 2006 and now has more than 150 joint owners. VIVA owns and operates Hotel Vuollerim Lodge. The hotel is open year round and has 16 rooms named after the district's villages, all of which have been "adopted" and decorated by village residents. The hotel serves homemade traditional Swedish cuisine, prepared fresh, and exudes a warm and welcoming atmosphere.

Vuollerims friskola independent school (<http://vuollerimsfriskola.se/foretaget>) was established when the town's local school was threatened with closure. The school has been open since 2009 and currently has 100 co-owners.

Lapland Vuollerim Welcomes You AB is the town's tourism company and is owned by 50 co-owners. In 2014, Vuollerim was named one of the world's top three sustainable tourism destinations (Europe).

The Village Team AB is a local company based in Vuollerim that operates as a limited company with an open and broad ownership model. Its shareholders are fully aware that no dividends will be paid to individual shareholders and that any surplus will be reinvested in the district's continued development, in accordance with the company's business concept. The principal idea is to utilize local expertise and resources and to act as a catalyst for the implementation of initiatives and opportunities that contribute to the district's and municipality's positive development, with teamwork as the business model.

Nytänk is the local youths' own development project aimed at stimulating and promoting the younger generation's opportunities to influence social development. www.nytank.se



during the conference, it's easy to understand how difficult being an innovator and social developer can be; to break with traditions and conceptions. A Swedish author from the 1940s, Folke Fridell, wrote a book entitled *Av egen kraft* [In Your Own Strength], and was a pioneer of his time in Sweden, marrying individual responsibility with both leadership and cooperation. A cooperative social model was developed.

That era was also characterized by a suspicious attitude towards advocates of change. Perhaps, with time, the winds of change turn suspicion into curiosity and, with the help of international attention, begin to inspire new cooperation locally and regionally.

In the lead up to Crowdsourcing Week, a number of meetings were held with key figures from the Municipality, County Council, County Administrative Board, funds and other organizations to share experience and encourage the continued mutual development of crowdsourcing.

“For example, through contact with

Luleå University of Technology we have secured a solid regional partner with whom to develop methods for smart regional development. As the region's leading technology university, it has long worked with the concept of smart regions and crowdsourcing as new elements within social development,” say Birgitta Bergvall-Kåreborn and Anna Ståhlbröst from Luleå University of Technology (LTU). The Internet plays an important role in building new networks that extend beyond the regional level.

The discussions held here in Vuollerim reached as far as to California, from where the world's leading organization for social capital, SOCAP, took part in the programme. “SOCAP looks like it's on its way to having a Nordic platform,” says promoter Bert-Ola Bergstrand, who came to Crowdsourcing Week from Social Capital Forum in Gothenburg, Sweden.

You could really feel in the crisp northern air that sound arguments gained an easy foothold. Delegate Hjörtur Smárason, from Iceland

Innovation Embassy, drew parallels with the development that took place in Iceland after the financial crisis. And this dialogue even extended to models for new currency systems where demand-regulated, sustainable trade is developed for local markets.

Martijn Aarets, from Crowd Expedition in the Netherlands, says that what has shaped Crowdsourcing Week could be described as a very strong desire for professional development and networking.

“It's easy to find a breeding ground for development in an environment like this,” he says, and adds: “Here you find everything from enthusiastic young people and well-educated technicians and engineers to life experience from the Sami culture. And, not least of all, leadership, which must also exist if you're going to create a social model that supports a vision of survival and development.”

As you walk through the village you can see how the local supermarket is upgrading its energy system,

investing heavily in geothermal energy. At the centre of this alternative energy development lies Swedish national hydropower company Vattenfall, whose site office is located in the middle of the village. In Sweden, 20-25 per cent of all hydro-electricity is generated in Jokkmokk Municipality, and is monitored from the operations centre in Vuollerim.

Will we see a new role for the company's view on local, sustainable social development when it comes to fairly distributing the surplus of resources from hydropower to rural development? There should be room for better local economic development on the part of state-owned hydropower company Vattenfall for Vuollerim's social model.

For those of us who left Vuollerim after three days of lively debate, it is clear that we have come a long way from the fragile nature of northern Swedish rural development projects of the past. Can Vuollerim's young growth potential survive and lay the foundation for a new social model? Only time will tell, but it is abundantly clear that the Internet of Things can open a pathway to new forms of dialogue, cooperation and professional development.

That said, without social relations and inter-personal interaction, no new social models will be created. Those of us who attended Crowdsourcing Week in Vuollerim will likely also take away the conversations and the social interaction; the stories told around the camp fire in the storytellers' hut, the dinners where each course was eaten in a different resident's home and the conversations held with the community's newest residents, refugees from Africa.

And, to quote Epi Ludvik Nekaj's concluding remarks from Crowdsourcing Week in Swedish Lapland: “We'll see you in Vuollerim again next year.”

► FACTS ◀

Crowdsourcing Week
– Programme in Vuollerim

Crowdsourcing Trends: Global Ideas, Local Action Epi Ludvik Nekaj, Crowdsourcing Week

Reversing the Brain Drain – And the Future of Work. Hjörtur Smárason, Innovation Embassy

Crypto Currency – [PART 1] Intro to the theme, tool for leveraging local businesses and local capital Epi Ludvik Nekaj, Crowdsourcing Week

Cutting Edge Innovation. Practical Examples on Crowdsourcing in Vuollerim. Creative Business Development, presentations and visits. Local Speakers

Cutting Edge Innovation. Practical Examples on Crowdsourcing in Vuollerim. Creative Business Development, Presentations and Visits. Local Speakers

Disruptive Energy Technologies & Models
Carl Malbrain, Chairman of the Board, Blijdorp

Digital Session: Accelerating Impact investing in the Local Economy
Kevin Jones / Christine Egger, Social Capital Markets / Neighbourhood Economy

Digital Session: Turning the Tides, Democracy in a Sustainable Future
Ingrid Stange, Partnership for Change

Keys for designing a common good foundation in business and collaborative economy and processes. Experiences, understandings and success factors from Vuollerim.
Local Speakers

Crypto Currency in Practice [PART 2]
Epi Ludvik Nekaj, Crowdsourcing Week

Mayors Working Together for a Sustainable Future
Kaj Embren, The Nordic Mayoral Initiative to COP 21 in Paris

The Relationship Economy, Continuity and Change
Bert-Ola Bergstrand, Lund Open Innovation Center

Opportunities and Challenges of Crowdsourcing for Smart Regions
Birgitta Bergvall-Kåreborn & Anna Ståhlbröst, Luleå University of Technology, LTU

Interactive Workshop: Open Innovation 2.0 with Collaborative and Interactive Platforms. What will it look like?

ADDED FOCUS ON PLANT'S LIFECYCLE

The award-winning SSG Product Database service is being developed into a strategic information support system that covers a plant's entire lifecycle from product development, purchasing and design to operation, maintenance and wind-up. The expected result: improved efficiency and increased sustainability.

All production machinery goes through several phases in its lifecycle. There is a strong connection between the costs that you incur and the gains that you make. From a sustainability perspective it is therefore vital that all the stages of a machine's lifecycle are handled in an integrated manner.

High productivity requires reliable machinery that is simple to repair when it breaks down, is designed to support efficiency of use and which manufactures products at a defined quality level. The machinery should also be flexible enough to adapt to the customers' future needs and demand.

SSG Product Database has a big and important role to play for Swedish industry.

SIGNIFICANT SAVINGS

SSG Product Database is a repository for over 800,000 registered items linked to more than 40 affiliated industries. It is a strategic resource that helps companies gain more control over spare parts and stock items.

The savings are huge. Industrial companies can make significant savings simply by borrowing spare parts from each other,

thereby reducing the gigantic surplus stocks and reducing capital tied-up. Furthermore, reducing stoppage time by just a few hours can quickly turn into savings in the region of SEK 500,000 to 1 million.

"The service's uniqueness lies in its full transparency; everybody can see what everybody else has got. A virtual stock room containing everybody's spare parts, where you can borrow spare parts from each other and reduce stoppage time. You will not find this kind of openness between industries and companies anywhere else in the world. It forges unique opportunities for customising whole new solutions that boost sustainability and efficiency. Solutions that are difficult to copy as they are built on a unique collaboration in Swedish industry. SSG Product Database is entering the next phase of its development," says Jonas Berggren, CEO of SSG Standard Solutions Group.

BIG PRODUCTIVITY AWARD 2014

It is also one of the reasons why SSG Product Database won the Big Productivity Award (Stora Produktivitetspriset) in 2014. The Award, which has been presented every two years since 1990, is a Nordic supplier award designed to call

attention to maintenance initiatives which result in greater profitability for system owners. The jury motivated its decision by stating that SSG Product Database has been developed with an innovative approach and has big potential both in Sweden and internationally.

"SSG is a jointly owned company in which Swedish industry works collectively on technology, purchasing, security and training in order to devise more secure, efficient and sustainable processes. This work method is unique in international industry. The services devised are employed by a number of professional industrial groups including design, purchasing, safety, health and the environment," explains Matti Tuikkanen, CEO of Swedish Asset Management Society (SAMS) and organiser of the award.

NEW LIFECYCLE PROJECT

The product database is entering the next phase of its development. The project, called LCDM (Life Cycle Data Management), is exploring the possibilities for supplementing existing database information to create greater efficiency at the commissioning phase. Our objective is also to make the information flow from design and operation to maintenance more efficient.

The data that needs to be supplemented first and foremost is the design and maintenance requirements.

"We coordinate the information from the design phase with



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the maintenance phase. With comprehensive plant data, the automated processes for this information transfer will enhance the efficiency of operation and maintenance processes, generate purchasing gains and reduce capital tied-up,” says Jonas Berggren.

“Our vision is that you will be able to design a plant using items and machinery whose functions, performance and KPIs you already know. You are basing your design on actual facts,” says Jonas Berggren.

THE POTENTIAL FOR SWEDISH and global industry is significant.

“There are studies that show that loss of information from the building to the commission stage alone is around 2.8 percent of the project cost. With Swedish industry investing SEK 55 billion a year and the Swedish forest industry investing SEK 10 billion a year, the potential savings are enormous,” says Jonas Berggren and rounds off:

“One of Sweden’s main competitive advantages is our culture. Our ability to cooperate and build complex systems. If we go all the way with our ambitions, there are huge savings to be made for industry and possibilities for building an information infrastructure that paves the way for a more efficient industry.”



Jonas Berggren. Foto: Kristoffer Lönnä

Swedish cleantech to boost the world economy!

Over 6000 Swedish cleantech companies are working hard every day to make a difference and addressing the climate and sustainable challenges that we are facing.

The strengths come from Sweden’s heritage and changing climate, with harsh winters, Sweden has long been a model for energy-saving technologies and environmentally advanced intellectual knowledge that now is becoming vital. You will find many success stories and companies in this magazine.

We can all see that the need for sustainable solutions is growing, the way we live our daily life and consuming is just not going to work. We are expected to be over 9 billion people by 2050. That’s equal to almost 400,000 thousand new citizens every day, that will need somewhere to live, food and water. Houses and buildings consume energy, to produce food you need even more energy and water.

This is the world’s biggest business opportunity.

Swedish cleantech companies have long experience in building and developing smart sustainable cities and societies. Symbio City is a concept that Business Sweden Agency together with companies, regions and partners that is focusing on building sustainable cities and regions. Swedish cleantech companies are working together in projects to

become more successful and also with International projects and companies.

The demand from China, India, Russia, Indonesia, Australia and Brazil are huge, and are some of the fastest changing and polluting countries including the U.S where the need for environmentally solutions are most needed and growing.

The trend and fastest growing continent is Africa with many successful projects in Water, renewable energy, environmental awareness and bioenergy initiatives, with huge potential.

With over a 3100 billion market 2020, the biggest business opportunity in the world is there for Swedish and the worlds cleantech companies!

Go make a difference!



Lars Ling
CEO of CleanTech Region Solutions AB



SUSTAINABLE THINKING IS WORKING TOGETHER

Almost everybody agrees that the key to a brighter future for the environment is cooperation. If we can set new standards for how we solve problems together we can really make a change.

That is exactly what we have been doing for decades in the Swedish process industry.

Working together to solve common problems. It is proven to be an effective strategy and we call it the SSG WAY. But you could also call it sustainable thinking.



STANDARD SOLUTIONS GROUP

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