



INVEST IN
cleantech

A MAGAZINE ON SWEDISH ENVIRONMENTAL TECHNOLOGY FROM THE SWEDISH ENERGY AGENCY | 2012

**Silent revolution in
the energy world**

BUSINESS GUIDE
FOR CHINA

**Hot market
for Swedish
technology**

THREE SWEDISH PIONEERS

GREEN GOLD

FREDRIKA GULLFOT'S ALGAE SOLUTION
CAN CONSTITUTE BOTH FOOD AND FUEL

Our environmental technology is of world-class calibre

Research in Sweden maintains world-class standards in terms of environmental and energy technology. Sweden is also a leading player in the brand league for eco-friendliness. This means that we have good opportunities of both contributing to sustainable development and creating new Swedish jobs in the environmental and energy technology sector.

Compared to many other countries, Sweden has political policy instruments which impact growth in the environmental and energy technology area to a large extent at an early stage. Taxes, support, subsidies, collateral systems and other political policy instruments have governed the development and indicated a clear political ambition.

THE COMPANIES and investors which based on these political ambitions are capable of transforming their ideas and innovations into practice have good prerequisites of securing an exponential trend of earnings in this sector. However, good technology is not sufficient. Persistence is necessary as in many cases the time horizon for deals can be both long and capital-intensive.

Through this magazine the Swedish Energy Agency aims to contribute to increased understanding among actors in the markets for environmental and energy technology. We all need to cooperate to ensure that the good technical inventions and business concepts which exist in Sweden are developed to successful companies which can contribute towards solving

climate challenges and simultaneously generate economic growth.

ERIK BRANDSMA
DIRECTOR GENERAL,
THE SWEDISH ENERGY
AGENCY



KRISTOFER SAMUELSSON



MIKAEL GUSTAVSEN



CORBIS

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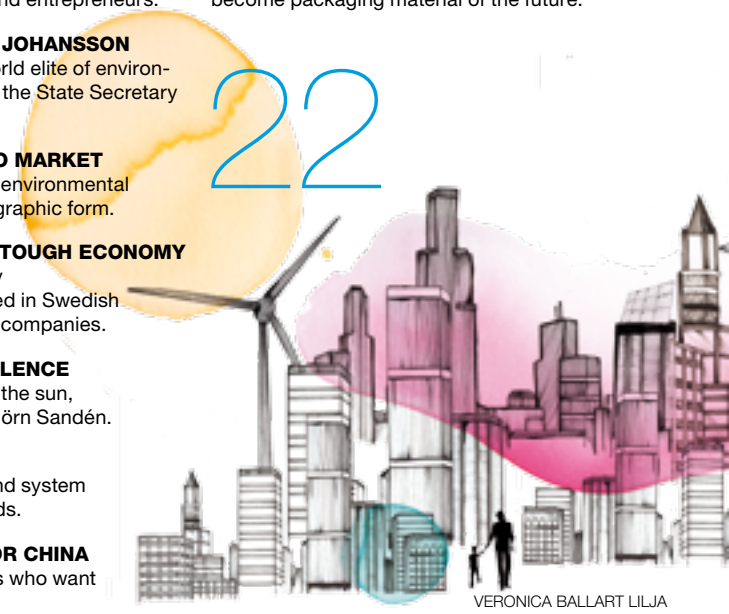
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VERONICA BALLART LILJA

INVEST IN
cleantech

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Why are you investing in environmental technology companies?

"The industry has a relatively strong underlying growth. This is definitely a future industry with vast potential."

Which indicators suggest that investments will be profitable?

"Profitable growth companies which both save money for their customers and do not deplete the long-term environmental capital of the earth will increase in value faster than the average."

Some of these companies will be the future Sandvik, Scania and Ericsson...

How interesting are the Swedish environmental technology companies from an international perspective?

"The Swedish and Nordic environmental technology companies are often well-developed and have a high level of maturity. The Nordic areas of strength include biomass for energy production and refinement, water and sewage treatment as well as environmentally smart buildings. Some of these companies will be the future Sandvik, Scania and Ericsson."

Do you have some general advice for those who will invest in environmental technology companies?

"Be careful with the latest 'technology wonders' and invest first in established, profitable, preferably smaller companies, at least until you have a proper grasp of the new technology and markets."

NEW CONTEST FOR GREEN INNOVATORS

A NATIONAL CONTEST for innovators within the environmental and technology area, the Green Innovation Contest, will start in the autumn. The contest caters for private persons, researchers and small companies which have developed some form of environmental innovation with a focus on sustainability. The innovators should be ready for the start of development to a product or service in the market.

The development centre Innovatum is behind the Green Innovation Contest, with funding from the Swedish Energy Agency, the Swedish Agency for Economic and Regional Growth and Region Västra Götaland.

Ten entries will be nominated, of which three will enter the finals. In addition to prizes in the form of customized corporate services, the three winners will also benefit from exposure to potential customers.

The contributions can be made on www.innovatum.se

CORBIS

In 2035

- ▶ the number of sold cars will double and will reach 1.7 billion per year.
- ▶ the demand for energy will increase by approximately 30 per cent, of which China and India will account for 50 per cent of the increase.
- ▶ renewable energy will experience the greatest increase in comparison to all other types of energy, but will still account for a smaller share of the energy production than oil, coal and gas.

SOURCE: IEA

LARGE INVESTMENT IN SMART GRIDS

THE FUTURE smart grids will be tested in the emerging district Norra Djurgårdsstaden in Stockholm. In a research project, 170 apartments will be equipped with system solutions for electricity usage related to, among other things, the indoor climate, lighting, smart white goods and charging of electric cars.



Norra Djurgårdsstaden.

The Swedish Energy Agency has now decided to support the project Smart elnät i stadsmiljö (Smart grid in an urban environment) with SEK 36.5 million.

"The project is an important piece of the puzzle in our investments in innovative system solutions within the grid area," says Sten Åfeldt, manager at the power unit of the Swedish Energy Agency.



1. Denmark
2. Israel
3. Sweden
4. Finland
5. USA
6. Germany
7. Canada
8. South Korea
9. Ireland
10. Great Britain

Cleantech Group's ranking is based on seven different innovation criteria which cover the entire chain from research to commercialization. The study was conducted in collaboration with the World Wildlife Fund.

SOURCE: THE GLOBAL CLEANTECH INNOVATION INDEX 2012-10-01

PIONEERS

The global environmental challenges are only increasing. Those who can find efficient solutions can make substantial profits. Meet three Swedish entrepreneurs on their way out to the global market.

REVOLUTIONIZING ALL ELECTRONIC CONTROL

IT IS NOT LARGER than a drawing pin, but can revolutionize all electronic control. For example, in the solar cell system.

“Large currents are controlled in the conversion from direct current to alternating current. And this requires efficient transistors which can withstand high temperatures,” says Mats Reimark and looks out over Stockholm’s skyline from Stockholm City Theatre’s roof filled with solar cells.

As CEO of the company Transic, Mats Reimark is in charge of the production of a new generation of power transistors, manufactured from silicon carbide. These transistors control the currents faster and more efficiently than regular silicon transistors.

“Silicon carbide has superior material qualities and can halve energy losses compared

to regular transistors. This also allows you to build more compact systems. It results in double savings,” says Mats Reimark.

There are many application areas, for example, hybrid cars, wind power stations, oil-rigs and trains. The price is the challenge. It costs more to produce silicon carbide, but as the scale of manufacturing increases costs will also decline, according to Mats Reimark.

TRANSIC IS A SPINOFF of a research project at KTH in Stockholm and started in 2006, with support of, among others, the Swedish Energy Agency. The Agency has indirectly and directly supported Transic with around SEK 35 million. Another early financier was Industrifonden:

“We saw that Transic was among the leading players in the world within its niche while

no actor had any commercial product out in the market,” says Stefan Jakélius, investment manager at Industrifonden.

Starting a manufacturing industry requires financial muscle. After searching actively for financiers for some months, in the spring of 2011 Transic was acquired by American Fairchild Semiconductor – a global semiconductor company – for USD 17 million.

“I was a little sceptical at the start, but now I have seen all the benefits. We have the entire Fairchild organization behind us: sales, manufacturing and purchasing. And they already have a lot of customers which we deal with.”

The work of establishing the first production plant in Europe is now in full swing. And the first products will be out in the market in 2013.

JOHAN WICKSTRÖM

Mats Reimark,
CEO of Transic.

TRANSIC

BUSINESS CONCEPT:
Produce energy-efficient transistors in silicon carbide.

IMPORTANT YEARS:
2005 Transic was started by Martin Domeij, Mikael Östling and Bo Hammarlund.
2006 Loan by the Swedish Energy Agency.
2006 Industrifonden, Midroc and VTT Technical Research Centre of Finland enter as financiers.

2011 Transic is acquired by Fairchild Semiconductor for USD 17 million.

SOLVES THE CLIMATE CHALLENGE WITH ALGAE

WILL ONE OF the world's oldest and smallest organisms solve the climate challenges of the future?

Yes, there is a lot to support microalgae: sun, carbon dioxide and a little nutrient salt are sufficient for producing most things – from biofuel to food.

"We have focused on producing omega 3 for dietary supplements and functional foods. There is already a large market. It involves SEK 500 million only in Sweden," says Fredrika Gullfot, CEO of Simris Alg and pioneer in the Swedish algae market.

Approximately 96 per cent of all omega 3 is now extracted from wild-caught fish.

"But wild fish are threatened due to over-fishing. It may disappear within a few years, and there is talk of a ban within the EU."

PRODUCING ONE jar of omega 3 requires 600 sardines. Simris Alg produces a sustainable alternative directly from the source. The omega 3 fats in algae are exactly the same as in fish, which is logical: after all the fish get omega 3 from algae.

Simris Alg's new production plant in Hammenhög will be ready in November. In the old greenhouses in the heart of Österlen, approximately 1,000 metres of culture tubes (6 centimetres in diameter) from floor to roof are now being installed.

"You can say that we are Skåne's algae farmers," says Fredrika Gullfot and laughs

when we meet in the Aquaria Water Museum.

At the core Fredrika Gullfot is a mathematician with a background in the finance world. However she was in search of new adventures and went back to studying, this time as a biotechnician and did her doctorate in the cell walls of plants instead.

"My interest in algae developed parallel to the research. Hardly anyone in Sweden was involved with this. I realized the potential which existed."

AT PRESENT tests are ongoing with different food companies, and in 2013 the company's first products will be launched in the market. And in the long-term there is the possibility of entering the internationally growing fuel market.

"Until now it is expensive to produce algae fuel, but we are watching the bio-oil market like hawks," says Fredrika Gullfot.

Until the spring of 2012 Simris Alg survived on own revenues as well as loans and grants from a number of state actors. But in May Simris Alg had a new share issue when four new investors entered the company. One of them was Kåre Gilstring who invested approximately SEK 1 million in the company.

"The business concept is interesting and unique for Sweden. The risk is high, but there is a very large potential in the long-term," says Kåre Gilstring.

JOHAN WICKSTRÖM

Fredrika Gullfot,
CEO of Simris Alg.

SIMRIS ALG

BUSINESS CONCEPT:
Develop health products and food from microalgae.

IMPORTANT YEARS:

2010 Simris Alg was started by Fredrika Gullfot.

2011 Loan from Almi and Innovationsbron (the Innovation Bridge) as well as the VINN NU (WIN NOW) grant from Vinnova.

2012 Three business angels and Innovationsbron enter the company following a new share issue in May.

2012 The company's first production plant is completed in November.

REDUCES POLLUTION OF THE SEAS

“THIS IS A GOOD CITY for doing deals within the shipping industry,” says I-Tech’s CEO Per Jansson and puts up his umbrella in the autumn rain.

Behind him, in the middle of the port of Gothenburg, containers of Hanse Spirit are loaded with destination Rotterdam. Perhaps one of the cargo ships which will receive I-Tech’s product Selekteope on hull the next time it will be repainted.

Selekteope is a new sustainable marine biocide which is added to the boat’s base colour in order to prevent the growth of barnacles (a type of crustacean which builds a shell on the hull). It sounds crazy – but a hull with growth can result in an increase of fuel consumption by 80 per cent compared to

a clean hull, so substantial profits can be made here.

“In the past paint manufacturers used a toxic tin compound in order to prevent the growth. This was banned by (the UN body) IMO in 2008 and now copper oxide dominates as an additive. But copper is an element which accumulates in water and destroys the food chain,” says Per Jansson when we are back at the office in central Gothenburg.

THIS IS WHERE ALL the staff – five persons, most of whom hold a PhD – work in the final spurt with releasing Selekteope in the market. “We have patents in most important markets, mainly Asia and Europe. Now only a registration certificate from the British agency HSE

remains, which will probably be completed during the autumn. And soon we will also have contracts with a manufacturer.”

But getting here has been a long process. The company was established as early as 2000 and is based on a research project at Chalmers/the University of Gothenburg.

THE BASE IN Selekteope is medetomidine, a molecule used as an anaesthetic. But when it is applied on barnacles the molecule has the opposite effect: the larvae of barnacles become excited by contact with the molecule and cannot attach in the hull. However the effect is only temporary and does not damage the organisms.

Another benefit of Selekteope is the low concentration. Painting a vessel requires 3–4

tonnes of copper oxide – if you replace it with Selekteope a few kilos are sufficient. The equation seems obvious, but a lot of work still remains.

“There are five, six large international paint companies which dominate the market and which we work with. They are now conducting own tests to find the optimal mixture with Selekteope,” says Per Jansson.

There is a great deal of interest among investors. In 2008 Volvo Technology Transfer, VTT, invested in the company:

“The high copper prices are putting pressure on paint manufacturers. There are both strong environmental and financial strengths which make I-Tech’s product very attractive,” says Erik Hedenryd at VTT.

JOHAN WICKSTRÖM

Per Jansson,
CEO of I-Tech.

I-TECH

BUSINESS CONCEPT:

Develop and produce biocides for boat paints in order to prevent growth on hulls in an eco-friendly manner.

IMPORTANT YEARS:

2002 The first patents were approved.

2003 Research project at Chalmers/the University of Gothenburg is initiated with support of the Swedish Foundation for Strategic Environmental Research (Mistra).

2005 Mintage Scientific (at that time A+ Science Holding) enters as the first private financier.

2008 Volvo Penta purchases the licence rights of marine engines. VTT enters as partner.

2011 Almi Invest and Laurin Maritime enter as owners.

MORE CONTACTS WILL INCREASE BUSINESS

More growth companies and increased export. These are the objectives of Sweden's environmental technology strategy. Now the Swedish Energy Agency will create new interfaces between investors and entrepreneurs in order to secure more capital for the environmental technology sector.

TEXT: JOHAN WICKSTRÖM ILLUSTRATION: VERONICA BALLART LILJA

The global environmental technology market is growing at a tremendous pace, despite the fluctuations in the global economy. Sweden is at the forefront within a number of areas, for example, bioenergy, water/waste and sustainable urban development.

However, Swedish companies could improve the commercialization of their innovations and exports. Therefore, in the autumn of 2011 the government presented a new environmental technology strategy with the aim of promoting more growth companies and increasing exports.

Between 2011–2014 the government will allocate SEK 400 million in total, where an important component is coordinating all government initiatives within the area.

One of the key actors will be the Swedish Energy Agency which has assumed a somewhat intermediary role: matching investors and the new companies within the environmental technology sector, in order to increase private investments in this sector in the long-term.

"This suits us. Now we can work in a more focused manner with the areas which we know are in demand. We already have good networks within large areas of the technology sector and among investors," says Heléne Axelsson at the Swedish Energy Agency.

TOGETHER WITH colleagues at the Swedish Energy Agency's business development unit, Heléne Axelsson is now in the process of developing a plan for facilitating and creating meetings between the new companies, customers and investors.

"The Swedish Energy Agency has worked towards ensuring that the actors of the energy sector meet. We will now expand and allow these activities to cover the entire environmental technology sector," says Heléne Axelsson.

But in addition to this the Agency is now preparing a long list, among other things, bringing together industrial companies with innovation companies and organizing meetings with business angels.

"We will also arrange for Swedish environmental technology companies and industrial companies to meet some of Europe's largest financiers and discuss business opportunities. We will also create meetings between different types of financiers, such as investors, project financiers and banks."

"Physical meetings are important for obtaining a trade relation," says Heléne Axelsson who, like many colleagues at the business development unit is from the business world and is aware of the prerequisites for entrepreneurial activity.

The Swedish Energy Agency supports the entire chain from research to innovation within the energy area. Since 2006 the Agency has worked in a more focused manner with business development and commercialization in order to support small companies.

It primarily involves providing different types of loans as well as other support, for example, a review of legal conditions and business plans. There are now approximately 50 companies in the Agency's portfolio.

"We are also trying to promote companies and strengthen their customer focus. We bring them along to conferences, meet financiers and practice presentation techniques."

Why should investors invest in this sector?

"The demand for environmental technology is growing rapidly. It involves the increased demand in all growth countries and the large investments needed in order to cope with the climate challenges. Just consider the demand in China and India. So much needs to be done," says Heléne Axelsson. ■



Heléne Axelsson, the Swedish Energy Agency.

THE ENVIRONMENTAL TECHNOLOGY STRATEGY

There is a rapid rise in demand for environmental technology globally. In order to strengthen Sweden's role in this sector the government proposed a new environmental technology strategy in the autumn of 2011. During the period 2011–2014 the government is investing SEK 400 million here in order to coordinate and strengthen the sector.

The strategy has three main goals:

1. Achieving good prerequisites for growth and development of environmental technology companies in Sweden.
2. Promoting export of Swedish environmental technology.
3. Promoting research and innovation and facilitating innovations for commercialization.

Read the entire strategy on www.regeringen.se

“We can double the technology export”

Swedish environmental technology is of world-class calibre. But more venture capital is needed to allow companies to grow.

“Doubling the export of environmental technology over a ten year period should not be a match,” says Daniel Johansson, State Secretary at the Ministry of Enterprise, Energy and Communications and one of the main architects behind Sweden’s environmental technology strategy.

TEXT: JOHAN WICKSTRÖM
PHOTO: MIKAEL GUSTAVSEN

On one side – a range of smart business concepts and entrepreneurs, and a global market of size USD 1,000 billion per year where there is a large demand for everything from sustainable cities to smart waste solutions.

On the other side – venture capitalists and other investors who are frantically searching everywhere for potential businesses with a high return.

It should be a “perfect match” but there is still a gap between them.

“There is too little activity from that direction. I think that the venture capitalists find it hard to grasp the potential within this area. Perhaps they must be prepared to have a slightly longer time horizon than in other investments,” says State Secretary Daniel Johansson as we sit down in one of the conference rooms of the Ministry of Enterprise, Energy and Communications.

“Sweden is probably among the global leaders in terms of environmental technology, for example, for bioenergy, district heating and

water/waste issues. Nevertheless, we should become much better at exporting and selling our services.”

It is also the background to the government’s environmental technology strategy (please see page 11 for further information). According to the latest statistics, the sector employs approximately 69,000 persons and exports for approximately SEK 37 billion.

“We want to create more companies in this sector. We have not determined any concrete objective, but it should definitely be possible for this sector to grow more than other markets.”

FOREIGN CAPITAL is also welcome to the environmental technology area, claims Daniel Johansson and highlights several strong arguments for investing in Sweden and Swedish companies:

- a strong industrial tradition
- developed and modern policy instruments
- good and legally secure infrastructure
- a stable, balanced economy
- and a good international brand.

DANIEL JOHANSSON

Name: Daniel Johansson.

Jobb: State Secretary at the Ministry of Enterprise, Energy and Communications.

Age: 44 years.

Residence: Kungsholmen in Stockholm.

Family: Wife and two children.

Education: International economics.

Three web tips:

www.annakarinhatt.se/blogg

www.swedishamericangreenalliance.org

www.regeringen.se



Daniel Johansson in the old office of Posten at Hamngatan, now the headquarters of the Ministry of Enterprise, Energy and Communications.

There is enormous potential. I am sure that there will be many more billionaires within this area.

“We have better prerequisites than the majority. Doubling the export of environmental technology over a ten year period should actually not be a match,” he says.

Despite the rapid global growth of the cleantech area, the market for innovators is challenging.

“Even if you have a truly terrific invention it is not easy. You need to think in many steps, do things in the correct order, do the correct analysis. It is not exactly a quick fix.”

DANIEL JOHANSSON, who has a background in the finance sector, reverts several times to the necessity of small businesses and investors to do their “homework”: carefully making business plans, conducting market analyses and risk assessments. The potential in different countries can vary considerably due to specific national policy instruments and rules and regulations.

“It is not easy and you cannot be naive. It is a pretty capital-intensive business where you can make losses, but the upside is so much greater.”

It should be possible for more established industrial companies – for example, SKF, ABB and Scania – to enter joint ventures or other collaborations with the new technology companies, claims Daniel Johansson.

“We have very large industrial expertise, we should utilise this. Many times Swedish companies are involved in the consultancy stage – but later the actual work is done by a large foreign actor instead of our Swedish companies,” says Daniel Johansson.

An important part of the environmental technology strategy is also clarifying the responsibility between different authorities.

“Many authorities have played with the same ball. Now it will become clearer who should do what. It is important that the government is viewed as a group. That you have the right inputs from the start.”

How do you view the role of the Swedish Energy Agency?

“They will have a broader role as they will deal with the entire environmental technology sector. The Swedish Energy Agency has had business expertise for a long time and possesses

tremendous technical knowledge. I hope that they ensure that small businesses and venture capitalists can meet to a greater extent. At the same time they have an important task of providing advice and support to small companies.”

IN MANY COUNTRIES public bodies place orders for new technology. Then it may be useful to receive some support from high representatives on site, either from authorities or the ministry.

“I myself have been out with different delegations in order to present technology solutions. We can prepare the path and facilitate companies. But politics has its limitations – it is still the companies and venture capital which need to do the work,” says Daniel Johansson and adds:

“And there is enormous potential. I am sure that there will be many more billionaires within this area.” ■

“We should utilise our industrial expertise,” says Daniel Johansson.



THE LOCATION OF DEMAND

Swedish environmental technology companies have the entire world as a potential market. The Swedish Trade Council and the Swedish Energy Agency have conducted a global market analysis in order to identify the most interesting areas. Here is an overall view of where the opportunities for Swedish companies exist.



FROM RESEARCH TO MARKET

Sweden is investing vast resources for research within the environmental technology area. But there is often a long distance before the innovations can reach the market. In order to support new smart business concepts, the Swedish Energy Agency has a set of tools which can be placed into different phases of the business process.

VENTURE CAPITAL

Venture capital is all addition of capital in a company which is not a loan. The actors who invest money at a relatively early stage of a company's development are often referred to as venture capital companies, which can be a fund company that administers capital from institutional investors. Among venture capital companies there are also a number of other organization forms, for example, public actors, large companies and listed venture capital companies.

BUSINESS ANGELS

It is common for business angels to provide investments during the earliest development stages of the company. Business angels are private persons – often former entrepreneurs – who invest parts of their private wealth in the development of new companies.

SEED CAPITAL

Seed capital refers to investments in the company's early development phases. The risk is high as the company has not attained a maturity phase yet. As a supplement in the market, some government financed actors act in this phase, for example, the Swedish Energy Agency.

EXPANSION CAPITAL

Here venture capital companies operate with major investments at a later stage. The companies which they invest in have often attained a higher, more stable and high-growth turnover. The risk analysis and valuation are facilitated by the fact that the company has come further in its development phase.

CAPITAL CURVE

CAPITAL CURVE

RESEARCH GRANT

In the research stage there is a relatively large amount of capital for creating and developing new innovations. Several government actors are involved and fund the research. The Swedish Energy Agency contributes with SEK 1.3 billion which goes to basic research, applied research and experimental development.

BUSINESS DEVELOPMENT LOAN

In this stage it is more difficult to access capital. There is a general lack of capital during early phases of the company's development and many times there are additional hindrances for procurement of capital for environmental technology companies. The Swedish Energy Agency can offer business development loans for start-up and seed companies within the energy area.

GROWTH LOANS

Additional capital is required when the company needs to gear up and be capable of delivering large volumes. Existing actors invest at an increasingly later stage and in this phase it may also be difficult to access capital. The Swedish Energy Agency has a growth loan which is offered to companies in which there is a funding need in order to attain broader exploitation of the innovation.

EXPANSION SUPPORT

In the expansion phase the company has started production and sales. Now capital is required so that the company can continue expansion. The business risks are often smaller in this phase and therefore in many cases it is easier to find risk-bearing capital. In this phase the Swedish Energy Agency can assist in creating networks and interfaces between companies, investors and customers. It also includes measures for promoting exports and international business development.

1. RESEARCH & DEVELOPMENT

2. START-UP & SEED

3. GROWTH PHASE

4. EXPANSION

MANY RAYS OF HOPE DESPITE A TOUGH ECONOMY

Despite the tough economic conditions, approximately EUR 73 million was invested in Swedish environmental technology companies during 2011. This is a decline in relation to the previous year, but in a Nordic comparison the Swedish companies cope well.

TEXT: SUSANNE ROSÉN PHOTO: JOHNÉR

NORDIC DEAL FLOW 2011

Nordic Deal Flow 2011 shows investment activities within cleantech during 2011 and contains an overview of private equity and public investments during the years 2007–2011. The information was collected from cleantech companies, private investors and government financiers in all Nordic countries.

KÄLLA: CLEANTECH
SCANDINAVIA

After a few years of rising curves, investments in Swedish environmental technology companies are declining.

“I still think that 2011 was decent in terms of the number of investments, but we lacked a few really large procurements of capital and we can see the same trend so far during the year,” says Alexander Lidgren, chairman of the board of Cleantech Scandinavia.

In total EUR 73,3 million was invested in Swedish start-up and growth companies within the cleantech sector in 2011. This is a decline of around 30 per cent since 2010, in accordance with Cleantech Scandinavia’s Nordic Deal Flow 2011 (refer to fact box). Investments in Swedish companies have still declined significantly less compared to the other Nordic countries. Most investments were conducted in energy-related companies.

Sustainable Technologies Fund and Industrifonden were responsible for the largest deal in Sweden when they together invested EUR 10,9 million in Triventus, an energy company with a focus on wind, water and biogas.

THE ECONOMIC CLIMATE in general is a part of the reason for the decline in investment amounts. The global recession has caught up with the cleantech sector in the Nordic countries.

“Investors are careful with capital-intensive companies which will change an entire value chain,” says Alexander Lidgren.

“Instead investments have been made in companies in stages with a lower risk and which can grow without a lot of money, for example, companies within energy-efficiency. Another factor is that following the first wave of Nordic environmental technology companies in an expansion phase there have not been sufficient companies in later stages for investment.”

The image of the investment climate is confirmed by the Swedish Private Equity & Venture Capital Association. If you consider Swedish venture capital – in earlier stages – investments in cleantech have declined considerably since 2008. In terms of the number, investments (venture and buyout) in cleantech companies were slightly greater in 2011 than 2008, but the amount was more than halved and was at SEK 600 million.

“Many small deals are conducted now and some buyouts in large infrastructure projects,” summarizes CEO Marie Reinius.

During the years 2008–2009, when former US Ambassador to Sweden Michael Woods managed cleantech as his matter there was a hype.

“What was underestimated then was how incredibly capital-intense parts of the area

// We have seen that the start-up activity is high and interest in the sector is increasing steadily. Several international companies have started to consider the Nordic countries.

ALEXANDER LIDGREN, CLEANTECH SCANDINAVIA

are, with major initial costs and long development durations. Environmental technology is also both a regulated and subsidized industry, where changes to the rules of the game can have large consequences which further add to the uncertainty," she says.

The market requires long-term and clear policy instruments where the polluter pays, says Alexander Lidgren. According to him it is important that the government is successful at reaching agreements on emission ceilings and green taxes.

"For investors prohibitions on hazardous substances are more credible and attractive than government subsidies which can be withdrawn."

ACCORDING TO the British Cleantech Group, the global venture capital investments in cleantech amounted to 13 per cent during 2011. However, during the first half of 2012, a global decline was also witnessed. The financing of venture capital is difficult in general and is changing, says Stephen Marcus, business development manager at Cleantech Group.

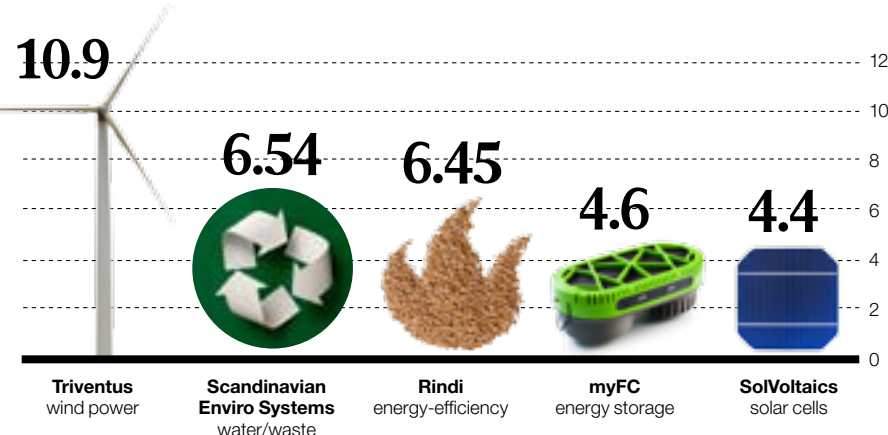
"I think that the European venture capital companies are the ones with the largest deficiency of capital, particularly seed capital. The cleantech companies in Europe will need to find alternative ways for financing or for development of their technology."

He sees, for example, a much more "hands on approach" from global industrial companies. They provide growth companies with not only venture capital but also with infrastructure, management assistance and research and development facilities in order to support the development of technologies which are strategically interesting.

"These corporate actors are important and often have decisive channels to the market," says Stephen Marcus.

The number of 'exits' in the Nordic countries increased in 2011 and the majority (11

LARGEST INVESTMENTS IN 2011 EUR million



of 16) of purchasers were foreign industrial companies. One such example is Swedish Transic, manufacturer of bipolar power transistors in silicon carbide (see pages 4-5 for further information). Transic was sold to American Fairchild Semiconductor, which gave Industrifonden 50 per cent of profit.

Alexander Lidgren believes that in spite of everything, environmental technology has done well as the venture capital category in the Nordic countries, mainly as international capital and industrial capital have been received.

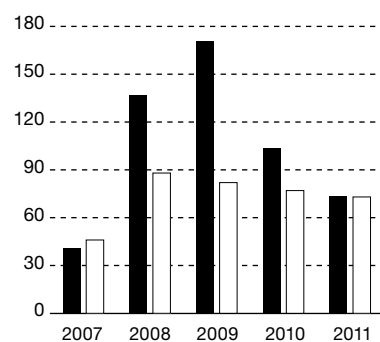
"We have seen that the start-up activity is high and interest in the sector is increasing steadily. Several international companies have started to consider the Nordic countries. Another positive aspect is that the public financing is high here and that it is increasing."

There is also a good approach among cleantech companies, he adds.

"In general they are more aware of how much expansion capital they require. Companies have become more efficient in how they use the money and take in customers early in the process. They find ways of coping." ■

INVESTMENTS IN SWEDISH CLEANTECH COMPANIES

■ EUR million □ Number of deals



PRIVATE AND PUBLIC CAPITAL

■ Private capital □ Public capital



(EUR million)

SOURCE: NORDIC DEAL FLOW 2011



"The development within the energy area is at lightning speed," says Björn Sandén, Professor in environmental systems analysis at Chalmers.

The equation looks obvious when Björn Sandén draws in his notepad:

"The world's energy requirement is constantly increasing. At the same time we will phase out the fossil fuels which account for the majority of the energy mix. This gap needs to be filled," he says.

"If you can become rich on oil then it should be possible to become rich on this in a relatively short period."

As Professor in environmental systems analysis at Chalmers in Gothenburg, Björn Sandén has more knowledge than most people when it comes to system connections. Where other researchers look at details he studies entireties and conducts syntheses on how new technology emerges.

"The development within the energy area is now progressing at lightning speed. You can speak about an industrial revolution. We are shifting from simply lighting a fire

and boiling water to modular technologies which capture different energy flows, such as wind and sun, and we are building another technology base with new smart material."

THE ENERGY PRODUCTION of the future mainly involves a direct conversion of the sun, according to Björn Sandén.

"As early as 2011 solar electricity was the source of energy installed most within the EU, and this is only the start." The power of the sun can be highlighted through a calculation example which Björn Sandén tends to mention in different contexts:

"A farmer obtains 1 kWh per square metre and year if he produces ethanol of the wheat on a field. Setting up solar cells on the field results in 100 kWh per square metre and year."

Wind and wave energy are actually only a conversion of solar energy. According to Björn Sandén, if you can utilize the solar energy directly then you can access a lot

more energy, either through solar cells, thermal solar power or through conversion of sunlight to hydrogen gas.

The fact that some countries like Sweden have little sunlight plays a marginal role:

"The farming in Brazil results in a larger yield than Swedish farming, but naturally this does not mean that we do not have farming here. Furthermore, the transfer capacity and storage opportunities will improve significantly in the future."

THE FACT THAT the entire energy sector is exposed to such a large change pressure creates a new type of market with uncertainty and turbulence.

"There are definitely risks – technical, political and market risks. There are fluctuations in many countries, but the interesting thing is that the curves are pretty even on a global level. Profits can be made – the question is only who will make money on what in the future."

JOHAN WICKSTRÖM

ANNA-LENA LINDQVIST



The hottest trends within environmental technology

Smart energy efficiency, web-based solutions and comprehensive system concepts. These are some of the trends which can be distinguished in the variety of new environmental technology.

TEXT: SUSANNE ROSÉN
ILLUSTRATION: VERONICA BALLART LILJA

Over recent years the solar cell industry has literally exploded while prices have fallen significantly. The innovation requirement changes when industries mature in this way. The focus is now more on “downstream,” close to the customers, claims Stephen Marcus, business development manager at the British consultancy firm Cleantech Group:

“What we see now are more integrated approaches within the industry. Innovations are changing from, for example, reducing the costs of solar cells towards reaching customers and providing a high quality of installation and operation.

American Sunrun, a high-growth company which sells home solar power systems, is one such example. The

company’s service comprises solar power. Sunrun has an interesting marketing campaign in which they use a technique for scanning rooftops in order to find out how much sunlight falls on them, says Stephen Marcus.

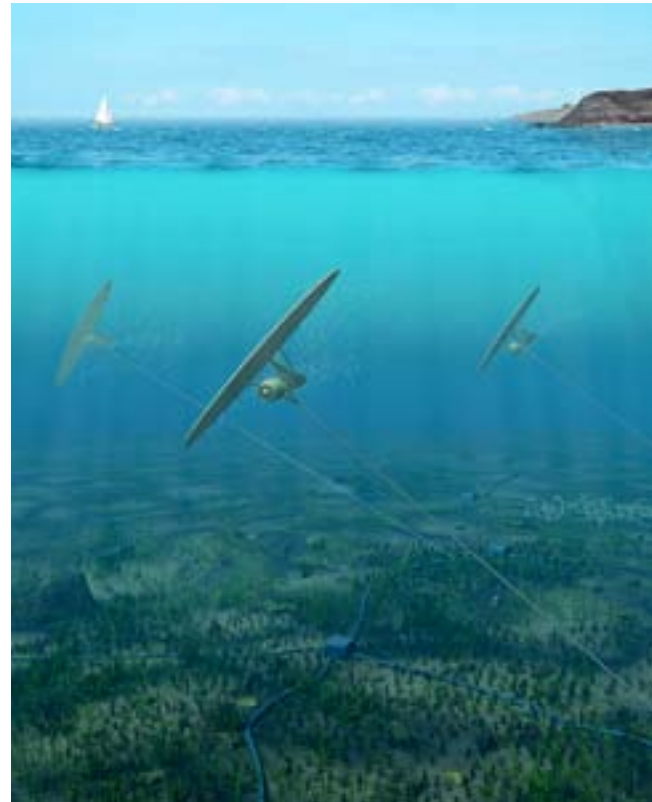
“They quickly estimate how many solar panels can be installed, costs, expected energy production, the savings for the house owner and how they can obtain financing. The information is placed in the letterbox of the house with a request to appoint Sunrun,” says Stephen Marcus.

ACCORDING TO Stephen Marcus, the web will serve as an anchor for many new companies and technologies within cleantech. This will create new opportunities to be innovative on the customer side.

“The Internet and software development in general

enable more data analysis for energy and resource usage. We will obtain more efficient distribution and consumption of energy, which will radically change the economy,” says Stephen Marcus.

Energy efficiency is one of the areas with the fastest global growth. Several young Swedish companies have the potential to succeed in an international market. One of them is Tomologic – this year’s winner of Nordic Cleantech Open. Their web-based service provides the manufacturing industry with more efficient shear planes. The tool can reduce metal waste with up to 50 per cent, which saves a lot of money and raw material and reduces energy usage. The research spin-off Vasasensor has in turn developed a new wireless sensor system for process optimization in paper machines. The system offers paper mills increased



The development within solar and wave energy is rapid with a lot of new solutions. Above on the left: smart lighting solutions for greenhouses.

production, reduced energy consumption, reduced waste and a more even quality of paper.

Another important resource is water and in this context developing countries are a large market. According to Cleantech Group, technology for desalination and other industrial applications dominates the global investments in growth companies in the area. A lot of technology involves the handling of waste water and sewage.

“For industries with waste water in their processes, technology which can convert the water to valuable products is interesting,” says Stephen Marcus.

ON GLOBAL CLEANTECH'S 2011 list of the 100 most promising private cleantech companies in the world there is, for example, Canadian Ostara, which extracts phosphorus and nitrogen from waste water and produces fertilizer. The list also contains Israeli Takadu, which has developed a technology for monitoring of water distribution systems. Data collection and analyses are conducted in real time which results in the detection of leaks and reduction of water loss, a large international problem.

Approximately half of the companies on the top 100 list are American. Two Swedish companies are also on the list. These include Chemrec, which

offers gasification technology for enabling the conversion of black liquor from the pulp industry to biofuel, and ClimateWell with technology for storing energy from a solar collector in a battery of salt.

The holistic view, lifecycle perspective and system approach can also be packaged and sold. The Swedish Trade Council has responsibility for the umbrella initiative SymbioCity which markets Swedish expertise and environmental technology within urban infrastructure. The concept was developed on initiative of the government, together with trade and industry and provides support to both new and established Swedish companies around the world.

The aim is to create an interest in new solutions and obtain contact with decision-makers internationally, says Håkan Dahlfors, business area manager of energy and environmental technology at the Swedish Trade Council.

“We want to show that it is possible to mobilize economic growth with greater respect for the environment, based on Swedish examples,” he says.

Many cities and regions take own initiatives and set tough environmental objectives and in this context Swedish knowledge can contribute with a lot.

FIVE TECHNOLOGY AREAS WHICH ARE GROWING IN THE NORDIC COUNTRIES

LED lighting – new nanotechnology LED (Glo, Ecospark), lighting solutions (Fionia Lighting, Heliospectra) and process improvements (Aluwave).

Wind energy – wind farm developer (Triventus, Greenfield Wind, HS Power, OWEC Tower).

Replacement for traditional material – (Deflamo, I-Tech, BT Wood, Ocean Saver, Abeo).

Solar energy – (SolVoltaics, Innogie, Parans Solar Lighting, Savo-Solar).

Wave and tide energy – (Minesto, Wello, Langlee Wave Power, Vigor Wave Energy, Havkraft).

SOURCE: NORDIC DEAL FLOW 2011, CLEANTECH SCANDINAVIA

We do not believe that global environmental problems are solved with fragmented local solutions. You need to have integrated solutions.

CARL-JOHAN KOIVISTO, SAAB



Saab works with sustainable urban development in Latin America – this is a view of Panama City.

“Cities are becoming more progressive and want to be competitive in order to attract companies and investments. A good environment is then a competitive factor. In addition, there is an increasing awareness of the fact that resources are finite and prices of energy and raw material will increase. We want to prepare for this,” says Håkan Dahlfors.

One of the companies in SymbioCity’s network is the defence and security company Saab. During the spring of 2012 Saab concluded a Memorandum of Understanding (MoU) with the Inter-American Development Bank (IDB), with the aim of together supporting the development of sustainable cities in Latin America and the Caribbean. The step to the cleantech market is not long for Saab. Environmental and climate issues linked to energy and raw material supply also have a clear security policy aspect, says Carl-Johan Koivisto, Head of new business initiatives at Saab.

“In this manner this is a part of our core operations. But above all we are a technology company, and we are constantly searching for new applications,” he says.

The collaboration with IDB focuses on sustain-

able development of cities which have between 100,000 and two million inhabitants. There are more than 500 cities of this size in Latin America and the Caribbean and they are growing.

“More and more people live in cities. If you consider this from a larger perspective, one city comprises of many different systems for water and electricity supply, transport and communication. Building systems from systems is an area which we have extensive experience of in terms of defence and it is exciting to be able to contribute with our technology in a new important context.”

SAAB HAS, FOR EXAMPLE, proposed a concept for environmental monitoring systems. It is combined with web-based technology systems which obtain information from sensors and form a decision-support system for the city. The aim is to create more efficient flows of transport, energy, etc. in order to reduce the environmental impact in this manner.

“We do not believe that global environmental problems are solved with fragmented local solutions. You need to have integrated solutions – systems of systems which communicate with each other. In this context we have skills and knowledge which not many others have,” says Carl-Johan Koivisto. ■

4 QUESTIONS FOR: **PAUL DEGRAEMER**
Capricorn
Venture Partners



Why are you investing within the environmental technology area?

“The starting point is that we want to earn money. We are focused on the demand which exists within the industry, for example, the shift which is now taking place from oil products to biochemical products.”

Which sectors are the most interesting?

“In addition to biochemistry, we have invested in solar energy, waste/recycling, energy storage and renewable energy. We are now in the process of starting a new fund in which we will focus more on resource and energy efficiency.”

How interesting is Sweden as an environmental technology nation?

“There are a lot of interesting Swedish environmental technology companies, and Sweden has a good ecosystem for environmental technology. What can be improved is the lack of capital when companies want to scale up from pilot projects to industrialization.”

Do you have examples of any interesting Swedish companies?

“We have invested in Xylophane, which is an excellent example of how a promising green technology company should be structured. It is a product with high value and global potential which is made from residual products from farming and which does not compete with food production.” (Read more about Xylophane on page 32.)

Succeeding in the world's toughest market

China's enormous environmental problems make the country a highly interesting market for both large and small cleantech companies. But China is also the world's toughest market. Succeeding as a Swedish company requires both that you have done your homework and can offer unique solutions.

Hammarby Sjöstad in Stockholm in September 2012: a white minibus stops by the prize-winning Sjöstad parterre. Seven Chinese people step out and gather around the guide who, with a bluetooth headset in one ear starts to talk about and point out the various details, for example, the watercourse which runs along the entire parterre and the green waste-chute inlet of the refuse vacuum pipes which reduce heavy transport in the area.

For the residents of Sjöstad the sight is a part of everyday life. Hammarby Sjöstad was considered to be a global leader within the area of sustainable cities when the district was built roughly ten years ago, and still attracts approximately 12,000 decision-makers and industry representatives for study visits every year.

THE CHINESE ARE particularly drawn to the area. It is no coincidence that several green city investments in China are similar to Sjöstaden in terms of their design. Some well-known examples are the city Wuxi in the Jiangsu province, the new eco-city Caofeidian east of Beijing and parts of Xi'An in the Shaanxi province, where visitors can clearly see

influences of both Hammarby Sjöstad and Västra hamnen in Malmö. Swedish companies have also been closely involved in the development together with Chinese authorities and companies.

The need for urban development is one of the most important reasons for why China is now the world's largest cleantech market. The country's enormous growth has resulted in China now being in the midst of the largest urbanization process in world history to date, which continuously creates new climate and environmental challenges. It involves such a huge relocation that the figures are boggling. Over half of China's 1.3 billion inhabitants already reside in urban areas and in the next 15 years an additional 300 million Chinese people are expected to move from the countryside to cities.

"I TEND TO COMPARE it to the fact that China is growing by the equivalent of one Enköping every day. By 2030 two-thirds of China will be urbanized, and coping with this development in a sustainable manner is the great challenge," says Mats Denninger, the government's coordinator for Swedish cooperation with China in the area of energy and environmental technology.

However, growing cities is not the only environ-



By 2030 two-thirds of China will be urbanized. In the image: Chongqing.



An office building in the new eco-city Caofeidian, where Swedish engineers participated in the city planning.

AREAS FOR CHINESE BUSINESS OPPORTUNITIES

URBAN PLANNING

China is not only building new city districts, but also entire cities in which the ecocycle is adapted from the start. It does not only involve innovations but also involves finding new ways of connecting existing solutions in a more efficient manner.

WASTE

When an additional 300 million Chinese people have moved to the cities, this will

inevitably entail more litter and waste, from packaging to leftover food. How should this be handled, transported, deposited, sorted and recycled?

ENERGY-EFFICIENCY

Despite the fact that green energy is growing, China will still be dependent on fossil fuels for a long time in the future. Therefore, there will be a large interest in different ways of reducing consumption.

WATER AND AIR

A consequence of the rapid urbanization is that vehicle traffic and transport in cities has increased significantly. This does not only result in pollution but also noise and restricted movement. The rapid growth in emissions from, for example, textile factories has also contaminated many of China's most important rivers, and there is a large need of purification.



IMAGINECHINA/COORIS



HOW HWEI YOUNG/SCANPIX



GINA CORRIGAN/ROBERT HARDING

China's extremely rapid growth is creating enormous challenges. For example, the Yellow River, which provides water to 186 cities is in imminent danger. At the same time there are major investments in renewable energy, for example, solar electricity.

// The Chinese have greater respect for Sweden than we sometimes realize. There is a lot of interest in Swedish solutions to different problems.

FRÉDÉRIC CHO, HANDELSBANKEN CAPITAL MARKET

mental problem China faces. Old problems also need to be dealt with. The extremely rapid growth over the past 30 years has on one hand contributed to lifting 400 million out of poverty, but on the other hand the development has also caused huge environmental degradation. For example, the Yellow River, which provides drinking water to 186 cities and food to many millions of people, is in imminent danger. According to a report by Greenpeace in 2010, the most common fish for consumption carried large doses of heavy metals such as cadmium, lead and mercury.

The increased vehicle traffic in the country has also contributed to large cities more or less constantly being covered in smog. According to Handelsbanken's China Advisor Frédéric Cho, the environmental problems are so serious that they directly threaten China's growth:

"Even now many affluent Chinese are considering leaving the country due to the poor environment, and the

growing middle class is increasingly worried about the health aspects. If the situation of the environment deteriorates so much that people do not want to live in China, there is a risk of capital flight which threatens the growth. This is serious as for the most part China is still a poor country and growth is necessary for increasing the living standard for even more people."

With such large environmental challenges ahead, you would imagine that China is a golden market for companies in the cleantech sector. And there are definitely great opportunities. Individual industries can temporarily move both up and down, but the big picture is that China's cleantech market is constantly developing.

It is also likely that if the Chinese regime takes incen-

tive measures to stimulate the economy, then many of the initiatives will target environmental technology investments. Even in 2008, when the Chinese regime tackled the financial crisis with a huge stimulus package corresponding to SEK 4,000 billion, one-third of the money went to investments with links to environmental technology. Those who want to find out about what may apply in the future can review the regime's latest five-year plan. It is clear in the five-year plan that China expects lower growth in the future and that the main task is to move from a traditional manufacturing industry to increasing the country's innovation level. Renewable energy, biotechnology, pharmaceuticals, information technology and smart materials have been indicated as future industries.

HOWEVER, ALTHOUGH THERE are vast opportunities, China is a complicated market for foreign companies and everyone cannot cope. For Swedish cleantech, China is for example still only one of the largest export markets. Germany is still by far the largest. Mats Denninger claims that Swedish companies which are interested in the Chinese market must be prepared for the fact that a lot of work is required in order to succeed:

"I have seen many Swedish companies, both large and small, which succeed very well. You should know that China is a very tough market – you cannot be on automatic pilot."

So what unites the companies which have succeeded? According to Mats Denninger, obtaining good structures on site and finding the right collaboration partners are examples of success factors.

"Having a Chinese partner who also has an interest in the company's success also facilitates a lot, both in terms of bureaucracy and future market opportunities."

Frédéric Cho at Handelsbanken Capital Markets also emphasizes the important of not entering China without assistance.

"To a large extent succeeding as a Swedish company in China requires that you have done your homework. What are the conditions of your specific industry? The local competition? What is required for cutting through the red tape? And who are your Chinese counterparts? There is a wealth of ownership forms in China, and a state-owned company does not, for example, act in the same manner as a private, entrepreneur-managed company," explains Frédéric Cho.

ACCORDING TO Frédéric Cho, one of the most important issues also involves seeing the bigger picture and instead of concentrating on what the Chinese cleantech market can offer, the focus should instead be on what you have planned to contribute with.

"The Chinese are not in search of more companies in general, but are instead demanding companies which can actively contribute with solutions to their problems. What do you have which is unique? If you can offer innovative environmental solutions or energy-efficiency which con-



FIVE QUESTIONS BEFORE THE CHINESE INVESTMENT



Frédéric Cho at Handelsbanken Capital Market clarifies what you need to know.

company. For example, the bureaucratic processes are different, which can impact areas such as monetary transactions.

✓ WHAT DO YOU WANT TO GAIN FROM THE DEAL?

Do not underestimate the significance of clearly formulating your own objectives of the China expansion: Will you export, import, create a production base? Anything else?

✓ IS CHINA REALLY RIGHT FOR YOU?

Everyone is talking about China. It is easy to get carried away just because you are scared of missing the boat. But there may be countries which represent a better option. Success in China does not involve being first. Sometimes it is even good to be second and thereby learn from each other. There are many examples of companies which have entered China too early, when the market was not mature.

✓ WHICH COLLABORATIONS ARE POSSIBLE?

Seek assistance! You can contact many parties, both in Sweden and on site in China. Having a collaboration partner on site can be invaluable when the operations majorly start and the bureaucratic mills have started to disintegrate.

✓ HAVE YOU READ THE SMALL PRINT?

It is well-known that the devil is in the detail. Have you really reviewed all the agreements carefully enough? A Letter of Intent is only the start. China's laws and regulations are often simply chaos for Westerners so seek legal advice both in Sweden and China.

✓ DO YOU KEEP TRACK OF YOUR CHINESE COUNTERPARTS?

There are many different ownership forms in China and there is a large difference if you have a state, private or entrepreneur-managed

tributes to reducing China's environmental problems, then you have a good chance of arousing Chinese interest, both in terms of establishment in the country, and as potential takeover candidates for the Chinese who want to establish in Europe. On the other hand, companies which cannot offer anything special for China's development will find it more difficult to cope."

However, Swedish companies should be aware that they may be more interesting to the Chinese than they themselves initially expect. Frédéric Cho believes that you should not underestimate the good reputation of Sweden in terms of, for example, innovation.

"The Chinese have greater respect for Sweden than we sometimes realize. There is a lot of interest in Swedish solutions to different problems, from systems for social welfare to innovations in the area of environmental technology."

KERSTIN DANASTEN

MAKE PROFITS FROM SWEDISH ENVIRONMENTAL TECHNOLOGY

Environmental and climate challenges are creating the largest business opportunity in world history. This is claimed by venture capitalist Carl Hall in the book *Miljökapitalisterna* (Environmental capitalists).

“The things which we have taken for granted in the past as being very cheap will become more expensive, for example, water, air and energy. Everything will be affected: how we eat, how we live and how we travel to work. And this will create a lot of business opportunities,” says Carl Hall, partner at Alder, a venture capital company which only invests in environmental technology.

“Miljökapitalisterna” describes ten trends which impact our future lives and provides concrete advice on how to start investments in environmental technology.

In the book he also describes a number of Swedish entrepreneurs who have made profits from the



Carl Hall wants to create a new Swedish success story.



environmental challenge. One of them is Malcolm Norlin who, approximately 15 years ago realized that cotton prices will increase as so much water is used in the production (11,000 litres per kilo). Instead he invested in an alternative to cotton: viscose, which is made from spruce and pine.

TOGETHER WITH A few business friends Malcolm Norlin purchased Domsjö’s paper mill in 1997 for SEK 250 million in order to produce viscose. The company now has a turnover of SEK 2.4 billion and was recently sold to the Indian company Aditiya Birla Group for approximately SEK 2 billion.

“Sweden has a strong potential of becoming the best in the world in terms of environmental technology. We had a green approach and introduced environmental rules at an early stage. And we are strong in many areas, for example, bioenergy, technology for waste, energy efficiency and district heating,” says Carl Hall.

What is your motivation?

“It feels great to work with something which is good. My aim is to be involved and create a new Swedish success story, such as Ericsson or Atlas Copco.”

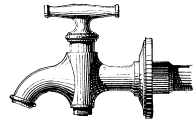
JOHAN WICKSTRÖM

ENERGY

Approximately 80 per cent of the world’s energy is from fossil fuels. Combating the greenhouse effect requires that the usage declines, which means that energy will become much more expensive.

WATER

In 2030 the supply of water will only correspond to 60 per cent of the demand.



FOOD

The population continues to increase as we already cultivate on almost all the cultivable area.

INORGANIC RAW MATERIALS

Obtaining important raw materials increasingly necessitates expensive and environmentally unfriendly processes.

WASTE

Each year 4 billion tonnes of waste is produced only in the 34 OECD countries, and the quantity of waste is continuing to rise, which impacts our opportunity to live on the earth.



SWEDISH ENERGY TECHNOLOGY IS AT THE TOP POSITION

OF SWEDEN’S NINE applications submitted to the EU’s call NER300, four applications have secured top positions. The four projects ranked at the top which can receive support include:

- **Wind farm Blaiken** (Blaiken Vind) – onshore wind turbines optimized for a cold climate.
- **Pyrogrot** (Billerud) – production of pyrolysis oil from lignocellulose (40,000 tonnes/year).
- **Smart Grid Gotland** (Gotlands Energi) – management and optimization of renewable energy through development of smart grids.
- **GoBiGas 2** (Göteborgs Energi) – production of synthetic natural gas from lignocellulose (40 million cubic metres/year).

NER300 IS ONE OF the world’s largest funding programmes for commercial demonstration projects for renewable energy and has approximately SEK 10 billion for allocation to the projects. The EU Commission is expected to take a decision on which projects will receive support by the end of 2012.

USD 1,000 billion

THE ANNUAL global investment requirement for eco-friendly energy up until 2030.

SOURCE: IEA/THE MINISTRY OF ENTERPRISE, ENERGY AND COMMUNICATIONS

NEW POLICY INSTRUMENTS FOR TRANSPORT OF THE FUTURE

ACCORDING TO THE government, Sweden should have a vehicle fleet which is independent of fossil fuels by 2030 at the latest. An investigation has now been set up to identify which measures need to be implemented in order to fulfil the objective.

The premise is to increase the share of renewable fuel and electricity in the transport sector. According to the government, in general applied policy instruments which set a price on the emissions should constitute the basis of the conversion. In accordance with the investigation’s directive, at the same time it is important that any new policy instruments do not clash with union law and that they are efficient in terms of the national economy.

The investigation will be presented on 31 October 2013.



A THREE-WHEELER CAN CHANGE THE CITY IMAGE

AN ELECTRIC three-wheeler can change the vehicle market. This is the view of the company Clean Motion which has received SEK 8.6 million from the Swedish Energy Agency for market adaptation of the city vehicle ZBee.

When Clean Motion’s CEO Göran Folkesson travelled to India a few years ago he was inspired to create ZBee. Many three-wheelers are used in India.

Göran Folkesson was struck by the unreasonableness of using one and a half tonnes of sheet for transporting a human weighing 80 kg.

“Most cars are made for an entire family. But they are often used to transport one or two people for short distances. It is unreasonable to use the same vehicle for the shop as for the ski

trip in Sälen,” says Göran Folkesson, CEO of Clean Motions.

Instead Clean Motion invested in developing a light vehicle which can mainly be used as a supplement or city car.

“In 2011 the earth’s population reached seven billion and the number of cars one billion. Based on current forecasts, we will have 2.5 billion cars before 2050. This will not work – neither from a resource nor environmental perspective.”

Göran Folkesson believes that it will be possible for ZBee to be used by everyone from private persons in big cities to municipalities and organizations.

“We are not competing with cars but we are competing for the 90 per cent of transport where the car is over-sized,” he says.

VICTORIA GILLBERG

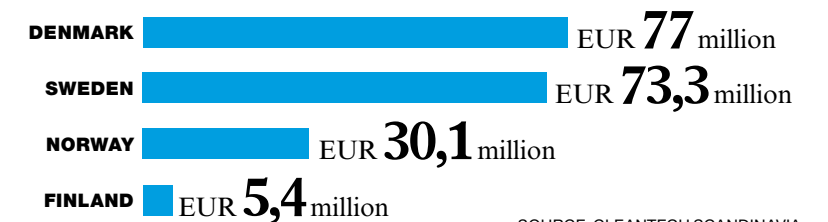
THE SUPPORT FOR SOLAR ELECTRICITY IS EXTENDED

THE SUPPORT FOR installation of solar cells is extended for an additional four years. This is proposed by the government in its budget bill for 2013. In total SEK 201 million has been allocated for the period 2013–16 for the support, which has existed in various forms since 2005. The solar cell support caters for both companies, public organizations and private persons and is in high demand.



KEYSTONE/SCANPIX

ENVIRONMENTAL TECHNOLOGY INVESTMENTS IN THE NORDIC COUNTRIES



SOURCE: CLEANTECH SCANDINAVIA

REMAINS OF PEEL FROM WHEAT PROTECT THE CRISPS

YOU SEE IT EVERY DAY: store shelves loaded with snacks, crisps and nuts. But what few people think about is that each package contains oil-based plastic or aluminium foil in order to increase shelf life.

The Gothenburg company Xylophane has researched a good alternative: a layer based of xylan, which is in the cell walls of plants and is often a residue product.

“It is a carbohydrate which is abundant in nature,” says Lisa Bindgård who was involved in starting Xylophane in 2004.

Together with her colleague Maria Gröndahl and Professor Paul Gatenholm, Lisa then discovered the possibility of using xylan as an oxygen barrier in packaging as a part of a research project at Chalmers.

Now, following eight years of development, Xylophane is reaching the market stage. In 2009 the company received SEK 34 million for financing its pilot plant in Bohus.

“We have optimized the manufacturing process and are now collaborating with packaging and food manufacturers.”

THE XYLAN IS EXTRACTED from peel of wheat and barley through a process which results in a powder. The powder is mixed with additives and water and is coated on paper or cardboard which is then shaped to packaging. The result is an efficient layer – both against fat, oxygen and mineral oils – which is biodegradable.

“There is vast interest from customers, but now we need to scale up the production in a real industrial plant in order to reduce costs,” says Lisa Bindgård.

And what are the commercial motivations?

“Oil will run out and the greenhouse effect is strengthened all the time. Clearly this supports our products.”

JOHAN WICKSTRÖM

XYLOPHANE

Business concept:

Offering an eco-friendly oxygen and fat barrier in packaging and cartons.

Number of

employees: 12.

Financiers: KTH Chalmers Capital, Capricorn Venture Partners, Chalmers Innovation, SEB Venture Capital and private investors.

