

Invest in Sweden

Oil and Petrochemicals Sweden



An expanding industry



Sweden

Reasons to invest

- Center for international oil and petrochemical industries with high-quality products and cutting-edge expertise.
- Well-established networks spanning industry, public authorities and universities.
- Earmarked ground areas available for new businesses.
- Access to large volumes of raw materials and specialty chemicals.
- Proper infrastructure for development of new products and materials.
- Reliable power and fresh water supplies.
- Well-functioning transportation and communications.

“A large flow of chemicals is available for developing and manufacturing new products, particularly those connected to existing ones. There are good possibilities here for smaller converters downstreams to buy and process these products using the favorable infrastructure in Stenungsund. This is the only site which has a national geophysical plan for the establishment of new chemical companies.”

Lars Lind
Managing Director, Perstorp Oxo

Examples of international investors

Akzo Nobel (Netherlands)

Borealis (Denmark)

Grace (US)

Hydro (Norway)

Jacobs Engineering (US)

Linde Gas (Germany)

Nynäs Group (Finland/Venezuela)

Preem (Saudi Arabia)

Shell (UK/Netherlands)

Statoil (Norway)

An expanding industry

Scandinavia's and Northern Europe's largest oil and petrochemical industry is located on the west coast of Sweden in the Göteborg region. With large investments continuously being made in the cluster, it has become an attractive environment for foreign investors.

Dramatic increase in capacity Centered around Göteborg, Stenungsund and Lysekil the Swedish west coast region has seen a flow of investments from the oil and petrochemical industries. This has considerably expanded production capacity as well as the development and launching of new products. The cracker, operated by Borealis since 1994, has increased its yearly ethylene production since it entered service in 1963 from 50,000 to 625,000 metric tons. From a modest start of 15,000 in 1963, its polyethylene plant is now processing 600,000 metric tons. Hydro's PVC plant capacity has grown from 75,000 metric tons at the end of the 1960s to 200,000 metric tons today.

Major foreign ownership Today, a major portion of the petrochemical industry in Sweden is foreign-owned. This, in turn, reflects a wider international trend in the heavy chemical industry towards fewer and larger players. Borealis was, for example, one of the first large polyolefin alliances in Western Europe.

An interdependent cluster The Stenungsund petrochemical cluster is highly interdependent, with Borealis' cracker as the uniting element. The cracker delivers ethylene to the company's own plant for the manufacture of polyethylene; to Hydro Polymers for PVC production; ethylene and fuel gas to Akzo Nobel for the production of amines and surfactants; and finally hydrogen gas, fuel gas, and propylene to Perstorp Oxo for the processing of oxo products.

Large ongoing investments Twenty-first century investments, some completed at the turn of the century and others still in progress, amount so far to some SEK 7 billion (\$ 954 million). Borealis has invested SEK 3 billion (\$ 409 million) on its latest expansion of the cracker and its polyethylene plants. Preem is in the midst of a SEK 3.5 billion (\$ 477 million) investment, extensively expanding the former Scanraff refinery in Lysekil. Perstorp Oxo has invested in a new plant and has recently also been a partner in a pipeline project in order to replace fuel oil with natural gas.

Growing service industries The refineries and petrochemical industries have inspired the growth of service industries by increasing their purchasing of external services, such as maintenance, construction, security, and IT, and also by outsourcing new products to downstream converters.

Attractive investment opportunities

- Speciality chemicals offered by large petrochemical producers searching for downstream investors.
- Opportunity for compounders producing niche products and master batches in close cooperation with existing polymer manufacturers.
- An increasing market share in Sweden for PVC window profile producers.
- Expanding service industries within construction, maintenance, security, IT, etc.
- Surplus hydrogen gas available for investors who require hydrogen in their production processes.

Stenungsund – A Swedish growth region

During the last four decades Stenungsund has grown into a modern, industrial community. It is located in one of the fastest growing regions for commerce and industry in northern Europe and close to gas and oil supplies in the North Sea.

Located on the west coast of Sweden, Stenungsund is the largest petrochemical center in Scandinavia. It was chosen as the site for a number of petrochemical companies due in part to its vast unexploited surroundings and a port offering transport opportunities for seagoing vessels.

The build-up of a newly created industrial sector and the innovative development of plastics caused a surge in growth in Stenungsund. The community has continued to expand due to the continuous influx of foreign as well as Swedish investments. Today, three foreign-owned petrochemical multinationals, Akzo Nobel, Borealis, and Hydro are standing side-by-side with Swedish-owned Perstorp as principal operators and employers, all of them on the frontline of development and processing of base and specialty chemicals.

With the regional oil industry nearby, collaboration is made easy. Preem and Shell, the main refinery operators, are located in the nearby cities of Lysekil and Göteborg. Göteborg is Sweden's second largest city with more than 850,000 inhabitants in the greater metropolitan area. It is the center for the Swedish automotive industry as well as international chemical industries and universities.

Facts about the oil and petrochemical cluster

Number of employees	3,000
Annual sales (2004*)	SEK 65 billion
Export share petrochemicals	80–90%

*Estimate



“Super poles” – a future scenario for the European petrochemical industry

According to a 2004 study by UK consultants Nexant Chem Systems, the European petrochemical industry must pool and concentrate its resources to a couple of “world scale super sites” in order to strengthen industry competitiveness. Western Sweden and south-east Norway is one of four such possible future European petrochemical “super poles.” Key success factors include:

- Proximity to feedstock sources
- Good bulk shipping facilities
- Trade access – coastal location
- Low cost labor/services
- Environmental acceptability
- Land availability
- Infrastructure (utilities, services, etc.)

Major petrochemical companies

Borealis – Shaping the future with plastics

Borealis is a leading supplier to the wire and cable industries worldwide with a comprehensive range of products, providing cross-linked polyethylene insulation and semi-conductive systems for the production of electric power cables up to 500,000 volts. State-of-the-art production lines ensure perfectly clean material all the way from polymerization to packaging in specially designed containers.

The 1994 merger of the petrochemical operations of Norway's Statoil and Finland's Neste formed the Borealis Group. One of its main production sites is in Stenungsund. Borealis' main business is the sale, marketing, distribution, and production of today's fastest growing plastics, polyethylene (PE), and polypropylene (PP), collectively known as polyolefins. In this niche, Borealis is the second largest producer in Europe with more than 3.5 million metric tons per year, supplying highly versatile plastics to customers who then convert them into thousands of every-day products. The company is a world leader in the development and production of highly-advanced insulation material for high voltage direct current cables.

Borealis' ethylene cracker in Stenungsund produces ethylene, propylene, hydrogen, and fuel gas. The polyethylene plant produces



almost the whole range of polyethylene products.

At the turn of the century, Borealis invested SEK 3 billion (\$ 409 million) to expand its annual cracker capacity in Stenungsund from 400,000 to 625,000 metric tons of ethylene and to expand its polyethylene plant capacity from 440,000 to 600,000 metric tons.

The steady progress in cleanliness is one of the principal reasons that Borealis has become a preferred supplier to the most demanding extra high voltage projects in the world, including those in metropolitan Paris, at the Madrid Airport, and Murraylink HVDC (High Voltage Direct Current) in Australia. The company is also supplying the insulation material in the production of communication cables for 3G

“As Borealis’ production is based on economies of scale, we have a continuous demand for compound manufacturers who can produce niche products and master batches for direct use by our customers as well as internally. To achieve optimal efficiency in terms of communication, knowledge exchange, and logistics, it would be favorable to have compound manufacturers nearby.”

Gustaf Åkermark, Vice President,
Business Unit Wire and Cable, Borealis

antennas and is likely to provide materials for the 4th generation models.

Borealis has four Innovation Centers, one of which is located in Stenungsund and employs one hundred researchers specializing in the business areas of Wire and Cable, and Pipe. The development of Borealis' patented Borstar technology in the 1990s has opened up new areas of advanced product applications.

www.borealisgroup.com

Perstorp Oxo – Pioneering new technology in the oxo industry

Perstorp Oxo, part of the Perstorp Group, was formed through the merger of Perstorp and Neste Oxo in 2001. Perstorp Oxo's main production site is Stenungsund, where aldehydes, alcohols, and acids are produced for further processing by the coatings and plastic-processing industries. A major growth area is in specialty chemicals, which today account for some 50 percent of the total production volume.



Historically, the company has been pioneering the use of new technology in the oxo industry in Western Europe such as contributing to the silent “green revolution” with its raw materials for water-soluble paints and coatings.

The Perstorp Oxo chemicals are used in a large number of applications – as a plasticizer for flexible plastic materials, as a resin component or solvent, and as an additive in lubricants and fuels. End products include medical equipment, rubber, asphalt, as well as cosmetic and pharmacological products.

In order to meet the growing market demand Perstorp Oxo is continuously expanding its production capacity and is currently investing SEK 200 million (\$ 27 million) in downstream production, including a new plant with an annual capacity of 70,000 metric tons for the produc-

tion of propionic acid, an intermediate chemical for the animal feed industry. Propionic acid is a natural product with conserving properties aiding meat- and milk-producing animals to improve their nutrition absorbance ability, which in turn will improve the health of the animals. The plant will be ready for production in 2006. The market is getting an extra push by the expected EU decision to prohibit antibiotics in the animal feed industry.

Perstorp Oxo is the leading, global supplier of 2-ethylhexanoic acid for plasticizers used in safety glass. The company is also a partner in a SEK 350 million (\$ 48 million) pipeline project from Göteborg to Stenungsund to replace fuel oil with natural gas.

www.perstorp.com

Akzo Nobel – Advanced specialty chemicals

The Dutch-based multinational company Akzo Nobel conducts its diversified operations through its business units, Akzo Nobel Surface Chemistry and Akzo Nobel Functional Chemicals, on site in Stenungsund.

Akzo Nobel Surface Chemistry is a leading supplier of specialty surfactants to a variety of applications such as cleaning, agro, oilfield, asphalt, and mining. The company is offering a combination of chemical expertise, process technology, and application know-how. Its headquarters and one of its two global R&D units are located in Stenungsund. Also located

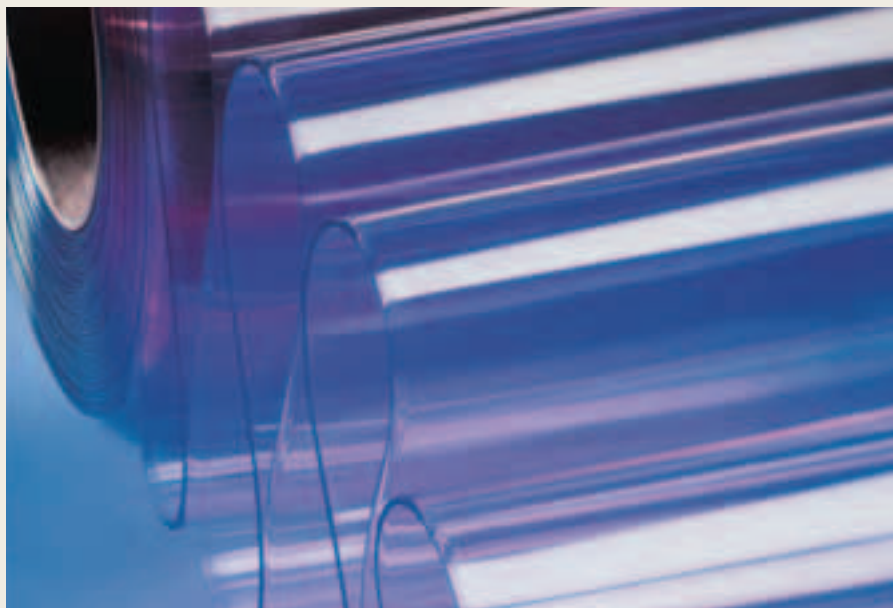
on site are two production units: one ethylene oxide plant with a capacity of 90,000 metric tons of ethylene oxide as a base ingredient for some 350 end products, and another plant with a capacity of 50,000 metric tons for the manufacturing of specialty surfactant products. Major investments over the years have been made to upgrade the production units.

Akzo Nobel Functional Chemicals runs a plant in Stenungsund with a production capacity of 65,000 metric tons of ethylene amines.

www.akzonobel.com



Hydro Polymers – A major player in plastic construction material



Hydro Polymers started its operations in Stenungsund in 1967 and has been part of the Norwegian Hydro Group since 1984. The company is a major player in the northern European plastics raw material market for polyvinyl chloride (PVC), the intermediate product vinyl chloride monomer (VCM), and caustic soda.

PVC is one of the most researched industrial materials. It is cheap to produce and makes good use of scarce resources. Being more fire-retardant than other plastics, PVC is well suited as construction material for conversion into a wide range of applications including window

frames and electric materials such as wire and cable insulation. Its additional properties as a good barrier also make it a suitable intermediate material for the production of medical bags and tubes that hold blood and nutrient solutions.

Among the products with the largest growth potential in Hydro Polymers' product portfolio is plastic for the manufacturers of plastic window frames. The PVC properties in the window frames make them extremely wind- and weather-resistant. They are fireproof and no painting is needed. It is an environmentally-friendly product with a long life cycle, high

“We see Sweden as an interesting future market and aim at a 10 percent market share of the Swedish window market. As Sweden has no window profile manufacturer for plastic frames, we are searching for one willing to invest in such a production.”

Lars Josefsson, Managing Director, Hydro Polymers

sustainability, and can be completely recirculated, ground, and reused without losing its mechanical properties. Contrary to some of the larger European markets such as Germany and the UK, Sweden is still a virgin market where plastic window frames have a modest 3 percent market share given the preference for traditional wooden frames.

Hydro offers PVC resin and pellets and dry blend compounds as an intermediate product or processed dry blend compounds with blow-safe additives. The company's PVC plant in Stenungsund has an annual production capacity of 200,000 metric tons PVC and 130,000 metric tons of caustic soda. It is a completely integrated PVC operation from the conversion of raw salt to finished PVC suspended resin and PVC emulsion paste.

www.hydropolymers.com

A top global oil refinery

Prime Preem products – fuel of the future



Preem Petroleum is Sweden's largest oil company, accounting for 80 percent of the Swedish refinery capacity. Preem's two refineries, Preemraff Lysekil, the former Scanraff, and Preemraff Göteborg, are among the most modern in Europe with a refining capacity of more than 16 million metric tons. 70 percent of production is exported making Preem one of Sweden's largest exporters. The company has stayed steady on the frontlines, being the first to launch unleaded gasoline as well as environmental-class diesel and low-sulfur, environmentally-classified heating oil.

Preem is in the midst of a SEK 3.5 billion (\$477 million) investment in a gas oil project

at its refinery in Lysekil to meet the foreseeable future demand on sulfur-reduced fuels. The project aims to convert a larger share of the heavy fuel oil into environment-adapted sulfur-free diesel and gasoline. It is linked to the automotive industry's introduction of a new generation of motors with reduced fuel consumption and improved energy efficiency. The investment is ahead of EU intentions, signaling a step-wise change from 50 ppm in 2005 to sulfur-free gasoline and diesel by 2008.

Preemraff Lysekil has an annual capacity of 11.4 million metric tons of transport and heating fuels. Its two desulfurization units can satisfy 70 percent of the demand for light and

“Europe has a surplus of gasoline and fuel oil but a shortage of diesel amounting to some 15 million metric tons. Through our investment in Preemraff Lysekil, we can profit from converting a larger share of the heavy fuel oil to diesel. Another advantage is that we can buy and process the cheaper, lower quality Russian crude oil with a transport time of one tenth of the imports from the Middle East.”

Michael Löw, CEO and President,
Preem Petroleum

heavy gas oils. The ongoing gas oil project will make it possible for Preemraff to desulfurize the whole production by converting 2.3 million metric tons of heating oil. Preem is prepared to have the finished product in the tank by March 2006.

Over the years, the renowned Solomon annual benchmarking of 100 refineries has placed Preemraff among the top global producers. The new gas oil project will secure Preemraff's position on the frontline as a producer and supplier of the fuel of the future.

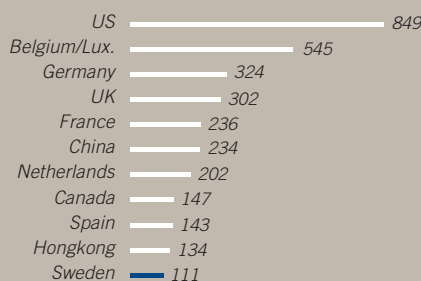
www.preem.com

Sweden – a magnet for foreign investors

There are several reasons why Sweden is attractive to foreign business. For one, investors gain access to sophisticated products and technologies, skills, innovations, and first-rate infrastructure. Establishing a position in Sweden means a triple market presence in Scandinavia, the Baltic Sea/Northern Europe region, and the European Union – home to some 450 million consumers. Additional advantages include a qualified workforce, extensive R&D facilities, an advanced testing market, and demanding customers and suppliers providing the foundation for business operations of the highest caliber. The Swedish business climate and growth prospects earn high rankings in most internationally recognized studies and surveys.

Leading recipients of FDI, worldwide

1999–2003, \$ billion



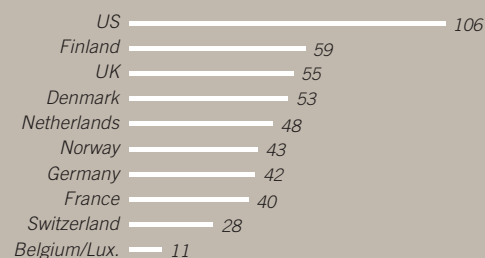
Foreign investors are discovering Sweden's many business and investment opportunities. As a result, Sweden has become one of the world's main recipients of foreign direct investment (FDI).

Note: Figures for Belgium/Luxembourg are not comparable since the registered capital flows to a large extent are channelled to other countries

Source: Unctad, 2004

Foreign-owned companies – important employers

2003, employees in thousand



Sweden is an internationalized business community. The number of Swedish employees working in foreign-owned companies illustrates this fact. In 2003, 10,100 foreign-owned companies employed a total of 564,200 Swedes, or approximately 23 percent for all employees in the private sector.

Source: Swedish Institute for Growth Policy Studies, 2004

New projects in the pipeline

Improved and more secure logistics One ongoing regional project is investigating how to complement the high-speed motorway between Stenungsund and Göteborg with railway transport. Up to 35,000 transports with 800,000 metric tons of goods could be transported by railway annually. The project entails building a railway goods terminal in Stenungsund and modernizing the security system on the railway. Chalmers University of Technology in Göteborg is investigating the operability and the operative costs for the petrochemical industry, the Port of Göteborg, and the Swedish Rail Administration.

Safer transport of dangerous goods The Hogia Group specializes in software systems used for information, as well as booking and surveillance of transportation of people and goods on land, sea, and air. Hogia's product portfolio contains mobile data and GPS-based systems for safer transport of dangerous goods by road and railway. From transport or emergency centers the whole transport can be followed with continuous two-way communication between the driver and the center. Statoil is already using the system for its liquefied petroleum gas transport vehicles while others are in the process of evaluating the possibility of introducing a similar system.

Refined use of hydrogen gas The petrochemical industry, with a delivery capacity of 1,000 kilos per hour, has a large surplus of hydrogen gas. Because of this volume, the industry is searching for new customers. Within the framework of the Energy Technical Center, or ETC, the petrochemical industry is participating in three projects, which will only consume a small part of the available volume. The projects include environmentally-adapted production of electricity onboard vessels at call in port, a tank station for natural gas with the infusion of hydrogen gas, and a test center for hydrogen gas.

Environment prioritized

Investing in the future also requires investment in the environment. Some of the Swedish investments are ahead of expected EU directives. The petrochemical industry has gradually reduced its emissions into the air and water by improved purification techniques, integrated processes, and reduced energy consumption. Perstorp Oxo's investments in desulfurization plants during the second half of the 1990s reduced sulfur emissions by 97 percent. Preem is in the process of converting heating oil into sulfur-free diesel and gasoline. Borealis has developed new approaches to reduce fugitive emissions of volatile organic compounds and has improved its leak detection. Akzo Nobel Surface Chemistry has revolutionized hard-surface cleaning by using water-based degreasing formulations, reducing solvent-based formulations to a minimum.



Plastics for a sustainable future

The growth of polymeric materials has surpassed that of all other materials. Due to environmental reasons, it is expected that there will be a steadily increasing use of plastics in the future. Under the motto "Plastics for a sustainable society," the Polymer Center at Chalmers University of Technology was therefore started in mid 2004 as an R&D center. Founded in 1829, Chalmers University is Sweden's second-largest technical university. It works



closely with regional industries, particularly in the automotive segment, and has spun off hundreds of innovative companies with more than 20,000 employees.

The overall aim for the Center is to spearhead competency and development within specialty areas by recruiting young talent as well as international research companies in the field. Through a close cooperation between regional industries, the university, and the community at large, expectations are to improve growth in small regional plastic manufacturers through an exchange of ideas and knowledge. Chalmers and the petrochemical industry have long had an active collaboration, not only in the field of polymer technology, but also in surface chemistry.

The focus of the activities will be on products that create added value for consumers by sustainable processes. This includes both short-term measures such as improved properties, optimal lifetime, environmentally-benign additives, and increased recycling, as well as more long-term steps, in particular different routes towards renewable feedstock.

The contributors to the Center include Chalmers, the petrochemical industry in Sweden, the Västra Götaland Region, Business Region Göteborg (BRG), and SP, the Swedish National Testing and Research Institute.

Business facilitators

Invest in Sweden Agency (ISA) is the government agency responsible for informing about investment opportunities in Sweden. Seeking to deliver excellent levels of service to foreign investors, ISA was ranked the world leading national inward promotion agency in a 2005 study undertaken by Miga, a division of the World Bank, and GDP Global Development.

With headquarters in Stockholm, ISA has international operations in major European, North American and Asian cities. The vast majority of ISA staff has a background in the corporate sector and expertise in the investment process. All services are free and completely confidential.

The regional organization Business Region Göteborg (BRG) is part of the ISA regional network. A collaboration between 13 communities on the Swedish west coast working to develop trade and industry in the region, BRG is in charge of the petrochemical project. BRG simplifies contacts with authorities, identifies available land and premises and deals with other practical aspects of a business establishment.

*More information is available at
www.isa.se and www.businessregion.se*

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