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Actions Promoting Environmental Protection in Sweden

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The Living Planet Index reveals that since 1970, worldwide wood and water consumption has almost doubled; carbon dioxide emissions have increased two and a half times; freshwater systems have declined by 50 percent; and the world's forest cover has decreased by 13 percent. ("Living Planet Report 2002," pp. 30–32) Statistics such as these make sustainable development, where current practices are designed to fill the resource needs of today without compromising the needs of tomorrow, an issue important to many people.

Sweden is generally viewed as a leader in the field of environmental action. The 2002 Environmental Sustainability Index (ESI), compiled by Yale University, the World Economic Forum, and Columbia University, measures relative prospects for long-term sustainability based on funding for environmental research, performance with respect to critical environmental outcomes, and capacity to manage environmental problems. The ESI ranked Sweden third in the world, after Finland and Norway. (Levy)

Typical Swedes treat the earth with great respect and consider it an asset for everyone to share. "The Swedish desire to be close to nature (camping and hiking) results in a greater appreciation of, respect for, and willingness to maintain the environment in a nation that witnesses the negative effects of others' pollution." (Grasso et al., p. 3) The Swedish sentiments concerning environmental issues are evident in their lifestyle. For example, citizens are highly involved in recycling programs: ninety-eight percent of plastic beverage bottles made of polyethylene terephthalate, or PET, are recovered from consumers. (Ebbesson, p. 2) Also, the *Nordic Environmental Survey 2000* found that many Swedish customers ask for environmental information about products. As one result, products marked as environmentally safe make up more than 80 percent of the laundry detergent market (Fortes and Akerfold, p. 27).

Swedish industry, specifically large international corporations, has led the development of actions in Sweden to preserve the environment. These large companies have "employed environmental experts, initiated applied environmental research, and introduced innovative audit schemes." (Eckerberg, p. 225) Many Swedish companies strive to incorporate the Swedish belief that it is important to preserve the environment in their own production: the European Design Council found in a 2001 survey that 77 percent of Swedish companies view the end customer as the largest influence on the company's design for sustainability. (Curtis and Walker, p. 13)

In this article, I describe some of the reasons for Sweden's reputation as an environmental leader. I first discuss Swedish government policies that promote environmentally friendly practices within Swedish industry. Then I discuss how major Swedish companies have created and implemented environmental policies of their own.

Swedish Government Agencies and Actions Concerning the Environment

The Swedish government has certainly taken steps to preserve and protect the environment. In this section, I briefly describe the two main government agencies concerned with environmental protection and discuss how ordinances and legislation created by the government have given responsibilities to Swedish industry without creating strict adherence policies.

Environmental policy creation and enforcement in Sweden began with the establishment of the Swedish Environmental Protection Agency (SEPA) in 1967. The original purpose of the SEPA was to implement environmental policy developed in association with the Ministry of Agriculture. In 1969, the National Franchise Board for Environmental Protection was created, under the jurisdiction of the SEPA, to issue permits and directives for emission levels and to regulate the location of new industrial plants. When it was created in 1987, the Ministry for Energy and Environment undertook the duty to develop environmental policy. Today, the Ministry creates policies and the SEPA enforces them. (Eckerberg, pp. 212–13)

One example of a successful policy to enforce environmental sustainability is Sweden's implementation of a green tax for carbon emissions, which relates taxes to the environment by charging companies a tax on the amount of carbon they release into the atmosphere. Since the imposition of the carbon tax in 1987, carbon emissions in Sweden have been reduced significantly: between 1987 and 1994, carbon emissions decreased by 13 percent. The carbon tax in Sweden demonstrates the potential success of eco-taxation systems in the reduction of air pollution. ("Eco-Taxation," pp. 1–2) Although the green tax was successful, the policy did not include specific levels of reduction in emissions that Sweden hoped to achieve.

In several government ordinances passed between 1994 and 1997, the Swedish government established specific recovery and recycling targets for materials such as cardboard, sheet metal, and aluminum. Recovery levels are calculated by the amount of a material that is reclaimed either by a recycling center or the company that produced it; recycling levels are calculated by the amount of reclaimed product that is processed for reuse. It was found in a 2001 study of recycling in Sweden that only 41 percent of cardboard cartons were recovered, well below the target of 70 percent. The same study found that 67 percent of sheet metal was recycled; this is only 3 percent below the prescribed level of 70 percent. Non-beverage aluminum and plastics were both severely below the 70 percent recovery and recycling goals. Aluminum is at only 22 percent recovery, while plastics are at 30 percent recovery, with only 15 percent recycled. (Ebbesson, p. 2)

The most recent significant piece of environmental protection legislation currently in effect in Sweden is the Environmental Code of 1998 (EC), which passed, including amendments, on January 1, 1999. The EC covers a vast number of environmental issues, but the one of concern here is the issue of producer responsibility, where the producer is responsible for ensuring that the waste is collected, transported away, recycled, reused, or disposed of in such a way that is acceptable for both health and environmental standards. The EC continues with Sweden's established pattern of creating legislation that places a large burden on the

producer. An example of producer responsibility created by the EC is found in the Ordinance on Producer Responsibility for Electrical and Electronic Products, which requires that all producers receive all old electrical products, free of charge, in the place where new products are sold and that they then recycle or dispose of materials not recyclable from the returned products. ("Introduction to the Swedish...")

Because of such great reliance on producer responsibility, the Swedish system for environmental safety and protection within Swedish industries is based on self-monitoring. (Melin, p. 2) Companies are expected to monitor their own production so that they can determine if they are polluting and take actions to reduce and prevent the pollution. (Lindgren, p. 76) However, an independent survey in 1999 revealed that 63 percent of Swedish companies believe that Swedish legislation does not provide specific guidelines or standards for reporting information pertaining to environmental issues. (Fortes and Akerfold, p. 32) Yet, 78 percent of Swedish companies are now reporting in some form on the environment, without specific regulations from the government. (Fortes and Akerfold, p. 22)

Since 1967, the Swedish government has been undertaking policies and legislation to protect the environment. These policies have generally been successful. However, they tend to place the burden of sustainable development on industry, yet have few regulations to ensure that the companies are following sustainable practices. (Fortes and Akerfold, p. 2) In fact, 74 percent of Swedish companies polled by the European Design Council stated that they were not influenced by the government to implement environmentally sustainable practices in their product design and manufacture; rather, they did so independently. (Curtis and Walker, p. 18)

Swedish Industry — Policy and Actions Regarding the Environment

Large Swedish companies have emerged as international leaders in environmental sustainability. A survey conducted by University of North Carolina researchers found that Swedish consumers would rather not purchase any product than purchase one that is environmentally unfriendly. (Grasso et al., p. 2) Because Swedes consider environmental issues important, producers who are reputed to be more environmentally friendly often have an advantage over competitors in the Swedish consumer market.

In this section, I examine how large Swedish companies, influenced by a population concerned about the environment, have worked to preserve the environment. Swedish industry has been a leader in awareness of environmental issues and actions to prevent environmental harm. To exemplify large Swedish corporations, I discuss the policies and actions of Volvo, an internationally respected automobile manufacturer; Ericsson, a world leader in the communications industry; and Electrolux, a leading manufacturer of large household appliances.

Environmental Leadership of Swedish Industry in the World

Swedish industry's reputation as a leader in the field of environmentally conscious policies is illustrated by the following. According to a 2001 survey of several hundred companies from six different European nations, Sweden is a leader in using sustainability for a competitive advantage in the consumer market: 99 percent of Swedish companies report that they have made sustainable development a core strategy in their business plans, by far the highest percentage in the European countries surveyed. (Curtis and Walker, p. 11) Swedish companies cater to the general Swedish belief that the earth should be protected by using sustainable development in their production.

Another testament to Sweden's leadership is the inclusion of Volvo, Electrolux, and Ericsson in the 58 international companies that comprise Portfolio 21, a mutual fund dedicated to providing helpful information to investors wishing to invest in a sustainable future. The portfolio selects companies that are committed to environmental sustainability and that have demonstrated this through their business strategies, practices, and investments. (Portfolio 21)

There are ten Swedish companies in the Dow Jones Sustainability Index, which was

begun in 1999 and tracks the financial performance of leading sustainability-driven companies worldwide. The complete list includes 175 companies in 14 countries. (Dow Jones Sustainability Index)

Volvo is one of the first industrial manufacturing corporations in the world to adopt a formal environmental policy. Since 1972 Volvo has been a leading example of how technology and planning today can help to prevent the problems of tomorrow, as I discuss in detail later.

Sweden as a leader in the environmental field is seen most explicitly in the ISO 14001 certification of its companies. ISO, the International Organization for Standardization located in Geneva, Switzerland, promotes the development and implementation of voluntary international standards, both for particular products and for environmental management issues. ("EPA ...") Companies are granted ISO 14001 certifications after implementing the ISO's plan for environmental management systems. These standards focus on environmental auditing, environmental performance evaluation, environmental labeling, and life cycle assessment. The ISO standards are voluntary, but companies strive to become ISO certified because it is viewed as a great achievement in their goal to be sustainable. ("EPA ...")

As of June 2002, Sweden was fifth in the world for the number of ISO certified plants, with 2,367 Swedish companies certified. Sweden ranks first when GDP per number of certifications is considered — $156 million U.S. per certificate. Finland, in second place, has $260 million U.S. per certificate. The majority of Volvo, Ericsson, and Electrolux plants are ISO 14001 certified. (Dow Jones Sustainability Index)

Awareness of Environmental Issues by Swedish Industry

Sweden's leadership in the field of environmental awareness started more than three decades ago. In 1972 Pehr Gyllenhammer, future CEO of Volvo, stated: "Volvo does not wish to protect the auto at any price and under all conditions. It is in Volvo's best interest that the auto is used in such a way that it does not cause environmental damage." (Rothenberg and Maxwell, p. 2) Volvo already held the reputation of high quality, safety, and durability. Its goal was to achieve recognition for its work in environmental policies within the company; it wanted to be known as an environmentally conscious company.

Although Volvo's concern about the environment was expressed, it was not until 1988, when the top social issue in Sweden was the environment, that Volvo created and implemented its strict environmental policy. Until 1982 only developmental work on catalytic converters was completed. In 1988 Volvo was Sweden's largest employer and, as such, was confronted by Swedish environmentalists concerning its environmental record. As a result of the social awareness of environmental issues and the confrontation of environmentalists, Volvo decided to take action beyond environmental regulations prescribed by the government with the Environmental Car Recycling in Scandinavia (ECRIS) program.

Volvo wanted to use its environmental concern and actions as a selling point to consumers and knew that it needed to provide evidence for its claims of improvements. Therefore, in 1988 it formed the Environmental Task Force to create an environmental policy designed to take a "total view" of issues: the environmental impacts of the product over its entire life cycle needed to be considered. Because of this total view approach, the cars produced by Volvo today have positive impacts on the environment from conception to destruction. The Task Force, along with the Federation of Swedish Industries, developed an in-house environmental auditing process in anticipation of government interest in Volvo's environmental practices. Volvo took this proactive approach, believing that if it could stay ahead of regulatory demands set by the government, it would have more input in the development of new regulations and be able to anticipate the needed technology. Volvo's vehicle recycling program, mentioned above and described in the following subsection, shows how Volvo has been able to maintain environmentally safe actions that met or surpassed new regulations.

Perhaps most influential in the imple-

mentation of Volvo's environmental policies are its employees. Starting in January 1989, Volvo employees underwent training sessions on the environmental policies and actions of the company. A top manager involved in one of these early sessions said, "Mr. Gyllenhammer stated that anyone that does not care about environmental issues [and] does not comply with environmental goals hasn't got a place in Volvo." (Rothenberg and Maxwell, p. 12) The total view approach designed by the Environmental Task Force required employees to assess the environmental impact of the products and process at the initial design stages. Any decision had to be approved by the top executives; everyone at the company was accountable for the compliance of the company with its policies. Throughout the organization, employees saw that the attitudes of the top managers were changing; this caused new environmental programs to go into effect. (Rothenberg and Maxwell, p. 18) Specialists were given the task of setting production and product goals for energy efficiency, fuel consumption, emissions in manufacturing and product use, recycling and waste management, and sustainability. These targets were used by each engineering department, such as exterior, body, and engine, to develop its investment strategy while each product design team used the targets to set performance cost goals for new products. (Camm et al., p. 12)

Similarly, at Ericsson the goal of attracting environmentally concerned consumers through good environmental practices within the company has led to an environmental policy in which Ericsson commits to developing new practices and technologies that make a real difference, both to customers and to the environment. ("Ericsson and the Environment...," p. 3) In December 2001, Ericsson received the first-ever worldwide ISO 14001 certification from the British Standards Institute. This certificate encompasses both manufacturing and non-manufacturing facilities. ("Ericsson Grabs...") Ericsson has also realized the potential negative impacts of lead-based solders on the environment. While Nokia's new telecommunications products have been 80 percent lead free since 2002, Ericsson will surpass Nokia by using lead-free solder in all newly developed products by 2004. (Danielsson)

Ericsson insists that suppliers and partners follow the same regulations that it applies internally. Beginning in 1999, Ericsson launched a study of the materials used by all of its suppliers to determine their compliance with Ericsson's banned materials list. Ericsson used surveys and questionnaires to collect data and confirm knowledge of all materials used by its suppliers; it is now using this data to phase out all materials on its restricted list. (Envirowise, pp. 3–5)

Electrolux, like Volvo and Ericsson, has created a strong environmental policy based on a life cycle view. ("Our Environmental Approach," p. 1) Electrolux focuses specifically on the use phase of its products, recognizing that, for its products (like washing machines), the use stage is where most resources, most notably water and energy, are consumed. Its products are designed for reduced energy and water consumption and also for recycling at the end of the product's life. In early 2004, Portfolio 21 reported on Electrolux, describing how environmental sustainability is central to its business strategy and that it supports progressive policies that make individual producers responsible for the impact of its products. The report states that Electrolux also educates customers about global environmental challenges and cost savings, making them aware of ecologic and economic benefits of its water and energy saving products. According to analysts at Portfolio 21, the company is at the forefront of its industry on environmental issues, particularly with product life cycle analysis (LCA). (Portfolio 21)

Recycling of Post-Consumer Goods by Large Swedish Companies

Many large companies have developed methods of recycling their products in response to government ordinances. From 1994 to 1998, Volvo conducted a research project to study all of the materials in a car — recyclable or not — as wells as the tools and methods of removing and either recycling or safely disposing of them. The result of the project was a comprehensive report on the benefits and drawbacks of car recycling that became the basis for the Environmental Car Recycling in Scandinavia,

or ECRIS, program. This report promotes the recycling of automobiles through design for recycling and waste disposal. The materials in an automobile range from the structural, such as steel, paint, glass, and polymers, to the liquids that remain in the car after its use, like coolant, oil, washer fluids, and hazardous chemicals such as chlorofluorocarbons from air conditioning units. ("ECRIS — A Research Project…," p. 8) The ECRIS project has allowed Volvo to develop an efficient and effective system for the recycling of many of the components of both today's and tomorrow's automobiles. It has resulted in an increase in the overall recycling of vehicles: in 2002, 85 percent of Volvo's new cars were recyclable, while in 1998 only 70 percent had been. ("ECRIS — A Research Project…," p. 17). This meets the requirement of the Swedish environmental code that vehicles be 85 percent recyclable, although the actual volume of recycling of all vehicles in Sweden is slightly below this prescribed number. (Ebbesson, p. 2) By 2015, 95 percent of new cars should be recyclable. ("Recycling.")

Ericsson's environmental policy describes three ways in which it can have the greatest impact on the environment: design, choice of suppliers, and reclaiming and recycling old equipment. An example of Ericsson's design for sustainability is given in the next subsection, and its policies on suppliers have already been discussed. The reclamation and recycling standards for mobile phone producers have grown significantly (it is anticipated that there will be 1.5 billion cellular phone users by 2005), and Ericsson is a participant in the United Nations Environment Program on recycling mobile telephones, working to fulfill the third goal on its list. ("Ericsson, Nokia...")

Electrolux's company policy on environmental practices is also evident in its products. For example, Electrolux refrigerators are designed for easy disassembly, shredding, and separation. Although most other appliances contain at least 25 percent recycled steel, Electrolux far exceeds this: 80 percent of the steel used to make Electrolux refrigerators is recycled. ("Recycling Steel Appliances," p. 1) Also, 80 percent by weight of the final product is recyclable: the refrigerant is recovered easily and plastic parts weighing more than 20 grams are recycled. ("Clean Production Action…")

Use of Life Cycle Analysis (LCA) in Product Development at Large Swedish Companies

It is suggested that 70 percent of a product's environmental harm is caused by decisions made during the initial development stages; thus, those development stages are integral to the prevention of potential environmental harm. (Polonsky, p. 290) Frequently, companies develop new products to reduce the environmental impact of products currently in use. An example of this "band-aid" approach is the catalytic converter, developed in 1982 to reduce pollution by automobiles. Although the catalytic converter does reduce pollution, an example of how LCA can provide a more long-lasting and comprehensive solution to automobile pollution is the hybrid automobile, which was not developed until more than 10 years after the implementation of the catalytic converter. (Polonsky, p. 290) The theory of LCA is that careful analysis during the development phase of a product can pinpoint potential environmental problems and allow for correction before the problems even begin. There are no specific guidelines for LCA since the scope of products currently being developed and made is so vast. Instead, a specialized case-by-case analysis is the most comprehensive approach. Each analysis should consider the potential environmental, economic, and social impacts of the specific product. (Spangenberg, p. 26) Companies that include LCAs in the development phase have the potential to eliminate much of the negative environmental impact of the product.

Volvo is a pioneer in LCA. The Swedish Product Ecology Project, which involved Swedish companies and government funded research institutions from 1993 to 1995, was based on a software tool that Volvo developed for LCA in 1989 within its own research and development departments. The project, which also involved Electrolux, strove to develop LCA into an operative environmental management tool based on Volvo's experience. (Karlson,

p. 20) The fact that Volvo was consulted when Swedish research institutions decided to develop an LCA software tool reveals the leadership of Volvo in the field of LCA.

Ericsson has also developed in-depth LCA to evaluate energy use in telecom and datacom systems and has used LCA to develop more environmentally friendly products to be used in these systems. For example, Ericsson realized that, in the use phase of its hand-held cellular phones, most energy is consumed by the battery charger and its stand-by currents when plugged in. Its new line of chargers automatically turn off when not connected to a phone to reduce energy consumption. (Loerincik et al., p. 2)

Electolux uses LCA to evaluate every resource-consuming or potentially hazardous step of a product's life. In the early 1990s, Electrolux discovered that only about 10 percent of the total environmental impact of its products occurs in production; much of the remaining 90 percent occurs during the usage phase. Based on these findings, Electrolux decided to develop products that are environmentally sound while in use by the consumer. The following are examples:

- Brush cutters and trimmers that consume 30 percent to 35 percent less fuel than earlier models
- Water-based and powder paints instead of solvent-based paints used on white goods, resulting in an emissions reduction of 45 percent between 1992 and 95
- A series of dishwashers using 26 components made from recycled plastic, reducing annual consumption of new plastic by 220,460 pounds ("Electrolux: An Oregon...," pp. 3–4)

When Electrolux started planning to get rid of chlorofluorocarbon (CFC), a toxic cooling agent, in refrigerators, it first considered the replacement of CFC with hydrochlorofluorocarbon (HCFC), a similar chemical that has less of an impact on the ozone layer. An Electrolux management team soon realized that the transition to HCFC would inhibit the development of more environmentally sound chemicals. Instead, the team decided to switch to a different chemical, which was related to the next generation of refrigerants, and to develop a system that could support the chemical that would be compatible with the new generation of refrigerants not using CFCs and HCFCs. This steppingstone chemical can eventually be replaced by more environmentally sound chemicals that are not yet ready for commercial use. (Hast et al., pp. 7–8) Thus, Electrolux has used LCA to plan a potential alternative to toxic chemicals by designing today for the possibility of a future solution.

Conclusion

Preservation of the environment is an important issue in Sweden today and has been for the past three decades. Most Swedes believe that environmental protection is vital. They are involved in many programs to keep the earth clean, such as recycling initiatives and cleanup of their Baltic shoreline that is polluted by countries further east. (Grasso et al., p. 3) This sentiment has led to environmentally friendly policies and actions in both Swedish government and Swedish industry.

Many large Swedish companies have proven to be leaders in sustainable development and environmental awareness, strongly influenced by traditional Swedish beliefs in the importance of caring for the environment. Volvo, Ericsson, and Electrolux are all leaders in their fields based on quality, reputation, and environmental practices. Starting as early as 1972, these companies have been continuously developing comprehensive environmental policies. They have worked to create products that are not only recyclable, but also are designed, with the help of LCA, to reduce environmental impacts throughout the entire life of the product, from the design stage until the time they are no longer usable by the consumer.

Based on my research, I believe that these large Swedish companies will continue to develop and implement sustainable policies. They work to be consistent with the Swedish belief that the environment should be protected. For this work, they are internationally recognized, as illustrated by representation of Swedish companies in Portfolio 21 and by Sweden's high number of ISO 14001 certifications.

Sweden is an example to the international community as a country that truly cares

about the environment. The people, the government, and especially the large corporations work to protect the environment and promote sustainable development. An intriguing feature of the relationship between these three groups is the drive of the large corporations to satisfy the environmentally conscious consumers, despite undemanding government policies.

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