



GREEN WAVE

ENVIRONMENTAL INNOVATIONS FOR SUSTAINABLE DEVELOPMENT.
SHORESIDE ELECTRICITY FOR VESSELS IN THE PORT OF GÖTEBORG.

SHORESIDE ELECTRICITY FOR CARGO VESSELS – WORKING FOR SUSTAINABLE DEVELOPMENT AT THE PORT OF GÖTEBORG

THE PORT OF GÖTEBORG WAS THE FIRST IN THE WORLD TO PROVIDE HIGH VOLTAGE SHORESIDE ELECTRICITY FOR CARGO VESSELS. THIS WAS ACHIEVED AT THE RO/RO TERMINAL IN 2000, AS A RESULT OF A SUCCESSFUL COLLABORATION WITH STORA ENSO.

Stora Enso has, in its role as one of the world's largest paper companies, chosen to impose strict environmental requirements at all stages in its chain of production. As a supplier of logistic solutions to Stora Enso, the Port of Göteborg has striven to provide environmentally compatible alternatives, and has therefore developed a method which is now spreading to other ports around the world. Per Lindeberg, power manager at the port, has been a driving force in this work. Even before Stora Enso came into the picture, he was investigating the possibilities of offering vessels shoreside electricity in order to limit the use of the vessel's engines in port. This would help reduce both emissions and noise, which in turn would have a positive effect on the work environment for both crew and dockworkers, as well as on the immediate residential environment. Through the collaboration with Stora Enso and with the shipping lines and ABB, in its capacity as a supplier of electrical products, the solution began to be used in January 2000, when the first cargo vessel was able to connect to a shoreside power source. Since then development has continued, and enquiries have constantly been coming in from ports worldwide regarding shoreside electricity supply.

HIGH VOLTAGE

Running all the functions on a cargo vessel with electrical power requires a high output. Not only lighting, but also functions such as heating, hot water, fans, engines and so on need to be supplied.

During an average stopover in harbour, a ro/ro vessel connected to the electricity supply uses something like 5,000–20,000 kWh, which corresponds to roughly what one to four average-sized detached houses use over a three-month period. Vessels have previously used shoreside electricity supplies with low voltage, but to run all of the units aboard several heavy cables have been required. In practice this involves a complex and time-consuming process, as well as equipment which takes up a great deal of space both in the port and aboard the vessel. Offering vessels a high voltage electricity supply through one high voltage cable with approximately 25 times the output of a standard 400V cable of the same dimensions makes this operational stage both quick and simple.

DRAMATIC REDUCTION OF EMISSIONS

The benefit of using shoreside power supply is that no auxiliary engines, running on diesel or heavy oil, need to be used, keeping emissions and noise in the port area to a minimum. The total environmental benefit depends on factors such as the vessel's time in port, which fuel is used and the power of the engines. But on average, a ro/ro vessel visiting the Port of Göteborg emits 25 tonnes of carbon dioxide, 520 kg of nitrogen oxides and 22 kg of particles if it is not provided with shoreside electricity. Currently there are two quays at the ro/ro terminal that can offer shoreside electricity, and six vessels operating for Stora Enso (three Transatlantic and three

Wagenborg) regularly use these connections. Moreover, Stena Line has one quay with high voltage supply which it regularly uses. If the entire ro/ro terminal were provided with this technology, and assuming that all vessels used it, this would mean substantial reductions of emissions. It is estimated that these emissions would decrease by approximately 31,000 tonnes of carbon dioxide, 510 tonnes of nitrogen oxides and 12 tonnes of particles annually. This means that the total carbon dioxide emissions from shipping in Göteborg would be cut by 10%.

ACTUAL ENVIRONMENTAL BENEFIT

When considering the actual environmental benefit, it is also important to take into account how the electricity is produced, and compare it with the emissions from the bunker oil or harbour diesel which would otherwise be used. Studies have shown that, irrespective of how the electricity is generated, the use of shoreside electricity has a lower total environmental impact than using auxiliary engines. But in order to ensure that electrically connected vessels are as environmentally sound as possible, the Port of Göteborg utilises two local wind turbines. Through a close collaboration with Göteborg Energi Nät AB, the Port of Göteborg helps influence the development of the local electricity network right from the planning stage, and in this way continues to work towards the positive development of energy supplies to cargo vessels in the port.



QUESTIONS ANSWERED BY PER LINDEBERG, PORT OF GÖTEBORG

IS IT DIFFICULT TO CONNECT TO SHORESIDE ELECTRICITY WHEN A VESSEL CALLS AT THE PORT?

Not at all. It takes approximately 10 minutes to connect the power and shut down the vessel's engines. This means a work environment with less noise and less emissions for both the dock workers and the vessel's own crew.

WHO GAINS FROM THIS TYPE OF ELECTRICAL CONNECTION?

Apart from achieving a much better work environment in the port, the environmental benefits are the great driving force. Studies show that society is the big winner. At a rough estimate, the social costs involved are reduced by 15–75 times the cost of the system.

DO SHIPOWNERS PROFIT BY ADAPTING THEIR VESSELS?

From 2010 the EU's sulphur directive will come into force, which means that vessels have to use diesel with a 0.1% sulphur content when they are in port. This will involve markedly higher fuel costs for the shipowners, so shoreside electricity will also be a more attractive option from a financial viewpoint.

CAN ALL VESSELS USE THIS TYPE OF ELECTRICAL CONNECTION?

All categories of vessels can use the technology, but those vessels best suited are those which frequently call at a port, and the longer the time in port the better. It is also entirely possible to adapt existing vessels to use a shoreside electricity connection. As there is no international standard, few vessels are adapted to use the technology. The ISO and IEC (international standardisation organisations) are expected to bring out new standards for shoreside power supply in 2009. Shoreside high voltage electricity is a new technology which is still under development. One challenge is that different parts of the world use different frequencies. In the USA and Japan they have 60 Hz, whilst the rest of the world uses 50 Hz. Once the ISO and IEC standards have been finalised, everything will be in place for everyone to be able to use a compatible technology, which will expedite development.

WHAT CAN SPEED UP THE DEVELOPMENT?

The European Commission has recommended that EU Member States encourage ports to offer shoreside electricity at quays, as the environmental benefits in most cases far exceed the financial investment required. If there also is encouragement through financial incentives, this will presumably make for an even greater interest in electrical connection.

WHICH OTHER PORTS OFFER HIGH VOLTAGE SHORE- TO-SHIP POWER SUPPLY FOR CARGO VESSELS?

In Sweden the technology can currently be found in Göteborg in the ro/ro terminal and in the Stena Line terminal. In the rest of Europe equipped ports include Zeebrugge in Belgium, Lübeck in Germany and Kotka, Kemi and Oulu in Finland (ro/ro vessels in all cases). In North America it can be found, for example, at the Port of Los Angeles (container vessels) and the Port of Long Beach (tankers), and developments are advancing rapidly, largely due to strict environmental laws in California. We are noticing considerable interest, and as demand increases more ports will begin using the technology.

WHAT DOES THE FUTURE LOOK LIKE FOR THE PORT OF GÖTEBORG IN THIS FIELD?

In 2006 the Swedish government promised tax exemptions on electricity supplied to vessels using shoreside connections. Bunker oil is exempt from tax, and as shoreside electricity involves a lower environmental impact, tax exemptions would be welcome. Unfortunately no decision has yet been taken on this. We do hope, however, that the question is raised again, as it would entail lower costs for customers using shore-side electricity. Our aim in the Port of Göteborg is to be able to offer all vessels shore-to-ship electricity supply, but we are initially focusing on the ro/ro terminal, as these vessels are best suited for electrical connection.

The Port of Göteborg will be involved in the World Port Climate Initiative, whereby we have been entrusted with the task of presenting a proposal, in collaboration with the world's largest ports, for how electrical connections might be developed. This is of course a great honour, particularly as we have been asked to participate as a result of our work in this area. This, together with close collaboration with shipowners and freight owners who want to help drive developments forward, means that we can continue to play a major role in the development of sustainable shipping. Our goal is to be the first in the world to have a fully-developed high-voltage shoreside electricity supply throughout an entire ro/ro terminal.



Susann Dutt from the environmental department in the Port of Göteborg accepts "Clean Seas Award" from Lloyd's List.

"WE WILL CONTRIBUTE TOWARDS SUSTAINABLE DEVELOPMENT THROUGH AN INTEGRATED AND PROACTIVE ENVIRONMENTAL POLICY AIMED AT MINIMISING NEGATIVE ENVIRONMENTAL IMPACT. WE WILL BE AN ENVIRONMENTALLY SMART LINK IN THE LOGISTICS CHAIN."

FROM THE PORT OF GÖTEBORG'S BUSINESS PLAN 2008

ENVIRONMENTAL AWARDS

In the spring of 2008 the Port of Göteborg was given the Clean Seas Award for its work on shoreside electricity. The prize, awarded by Lloyd's List, is given to companies or organisations that have made major contributions to counteracting the pollution of our seas by shipping.

In December 2007 the Port of Göteborg was nominated for the EU's prestigious environmental prize for energy and transport. A total of 240 entries were nominated, and the Port of Göteborg was one of four nominated in the category "Demonstration and Dissemination" for its project "Shoreside electricity – dramatic reduction".

In 2004 the Port of Göteborg was awarded the EU's newly instituted environmental prize, the Clean Marine Award, for its work on shoreside electricity supply.

"For us it has been easy to find arguments for investing in shoreside electricity for vessels. Apart from the obvious environmental benefits and improvements in the work environment, it also contributes to a reduced need for maintenance and now also financial savings."

Jonas Wåhlin, Shipping Manager, Stora Enso Logistics.

"Shoreside high voltage electricity supply can effectively reduce environmentally harmful emissions and noise from vessels in port, which brings environmental as well as public health benefits. If renewable energy sources such as wind power are also used, the benefits will be even more significant."

Christer Ågren, Director, International Secretariat on Acid Rain.

"We are convinced that shoreside electricity is a solution that will contribute to sustainable development. If the use spreads, we can create a better port environment with lower environmental impact. We believe it is important to work together to develop shoreside electricity and the products that make its use possible."

Ola Jonsson, Product Manager, ABB.



THE PORT OF SCANDINAVIA

QUESTIONS CAN BE DIRECTED TO THE ENVIRONMENTAL SECTION AT THE PORT OF GÖTEBORG.

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