



SHORE-CONNECTED ELECTRICITY SUPPLY TO VESSELS IN THE PORT OF GÖTEBORG

A considerable amount of power is required to be able to operate all functions on a vessel. This not only refers to lighting, but also to functions such as heating, hot water, fans, engines etc. that need to be supplied. The technology enabling vessels to be connected to an electricity supply by only one cable makes the job of handling the system both fast and simple. Selecting a high voltage connection enables a sufficiently high power to be transmitted to the vessel.

Ports are not normally equipped to supply vessels with electricity from the shore, nor are vessels usually equipped for this. Instead the energy required is generated by the vessels' own auxiliary engines, which run an electricity generator. The auxiliary engine consumes die-

sel or heavy oil, and generates both exhaust gases and noise. If power is supplied from the shore these environmentally polluting emissions and noise can be avoided.

ENVIRONMENTAL BENEFIT

The environmental benefit achieved depends on a number of factors, such as the time the vessel is berthed at the quay, the fuel used, the performance of the engines and so on. On average, a ro-ro ferry visiting the port of Gothenburg, not supplied by electricity from the shore, emits 200 kg nitrogen oxide, 80 kg sulphur dioxide and 5 kg solid matter.

The land connections implemented so far prevent approximately 80 tons nitrogen oxide, 60 tons sulphur dioxide and 2 tons solid matter emissions every year. In addition, noise from

the auxiliary engine is avoided completely during harbour stays.

During the average harbour stay, the amount of electricity a ferry consumes when connected to the electricity supply from the shore is approximately 5 000 kWh, corresponding to normal domestic usage in a detached house for three months.

The relative benefit of electricity supply from the shore depends on how the electricity is produced. An average Swedish electricity mix is far less environmentally polluting in its production than the electricity produced by a vessel where oil is burnt. The Ro-Ro Terminal in Göteborg is partially supplied by electricity generated using wind power, which means that the environmental impact of the electricity production is minimal.



It is easy to connect the vessel. It only takes a couple of minutes to make the electrical connection and switch off the ship's engine, here one of Cobelfret's vessels.

What is the users' opinion of supplying electricity from the shore? Here are one or two comments.

DFDS Tor Line

Roy Lahte,
Operational Manager

"Besides the direct positive effect on the external environment, shore connected electricity supply gives our personnel on board a better working environment. Because the total operating time of the machinery is reduced, our maintenance costs are also reduced, which we can offset against the cost of installing the equipment."

StoraEnso

Karin Nordell,
Eco-logistic Co-ordinator

"We wanted StoraEnso's BasePort system to be environmentally adapted in all aspects, from factory to customer. Electrical connection to the quay was a logical element of this concept, and the contribution to the working environment was also important."

The Port of Göteborg AB

Björn Larsson
Stevedore at DFDS Tor Line's electrically connected vessel.

"It is good to escape the exhaust gases when you are working on top deck. This is very different from before and you don't have to worry about what you are inhale. The quieter working environment is another plus."

WHAT IS THE PORT OF GÖTEBORG AB DOING?

The Port of Göteborg AB will provide durable port technology and its long-term goal is to be able to offer all customers electrical connection from shore. All quays and transformer stations now being converted are being prepared with technical equipment for supplying vessels with electricity, work which will make it both simpler and cheaper for the interested parties involved.

Close cooperation with Göteborg Energi Nät AB means that the Port is able to give consideration to future electrical connections in conjunction with the network expansion even at the planning stage.

FREQUENTLY ASKED QUESTIONS

Is electrical connection something new?

Supplying a ship with sufficient power for lighting is neither new nor difficult. However, there is a high demand for available power when the supply also covers heating, fan drive, pumps etc. For some years now it has been possible to solve this problem by using high voltage cables enabling a high power to be obtained with only one cable. By selecting a high voltage cable it is possible to produce 25 times more power than with a normal 400V cable of the same dimension.

Is it possible to connect older ships electrically?

This is entirely possible. What is required on board are a main switch and a transformer. The connecting cable can be kept on board or ashore if there is a

shortage of space. The electrical lead-in can be located anywhere on board, for example near a bunker hatch or other entrance.

So do all vessels have a lead-in for electrical connection?

Yes, to a certain extent this is an accurate statement. Most vessels have a connection terminal board which is used when the vessel is docked in the shipyard for repair and maintenance. However, the connection is only dimensioned for general lighting and individual fans, and does not meet the power requirements of the entire vessel.

Is it easy to connect the vessel?

It only takes a couple of minutes to make the electrical connection and switch off the ship's engines.

How are vessels connected to the 60 Hz electricity mains on board?

There is proven technology for supplying 60 Hz to vessels via a transformer, but so far no such requirement has been presented to the Port of Göteborg AB.

Is there a risk of increased emissions on cold starting?

There is little knowledge of this today. In order to obtain more detailed knowledge of emissions from berthed vessels, the Port of Göteborg AB is participating in a study¹ surveying emissions from vessels berthed at quays and focusing particularly on cold starts.

Why aren't all vessels supplied with electricity from shore?

There may be several different reasons why it is not possible to supply a vessel with electricity from shore. Sometimes other environ-

mental measures may have a greater overall benefit, particularly before other ports are able to offer electricity. In some cases the vessels are berthed at quays for shorter times, which means that it is not worth while supplying it with electricity from shore.

It is also common for ships to be moored in different locations on the quay in different ports. Moreover, it is a fact that many ships are not equipped for shore connected electricity supply, mainly because shore electricity is a new technology currently being expanded. ➡

¹⁾ The study is being conducted by IVL Swedish Environmental Research Institute and is also being financed by DFDS Seaways, Stena Line, the Swedish Maritime Administration and the Swedish Environmental Protection Agency.

BEING ENVIRONMENTALLY-SMART...

... is one of the Port of Göteborg AB's core values.

"All our activities are characterised by an environmentally-smart perspective. This means that the environmental aspect always plays an important role in our decision-making processes. We are dependent on our surroundings and have a stated goal of minimising any environmental impact that our activities may have. At present, several sections of the harbour are already certified, but our work to become a green link in the transport chain is continuing."



Since three of DFDS Tor Line's vessels have been equipped with electric connection, the working environment has improved with decreased noise and exhaust gases.

Because there is no international standard for the electrical connection of vessels, many shipping companies and ports are biding their time. In the present situation it is therefore logical to connect the vessels electrically that regularly call at the respective ports.

HOW HAS THIS DEVELOPED?

The first shore connection of high voltage electricity, inaugurated in the Port of Göteborg in 2000, was the result of cooperation between the Port of Göteborg AB and

StoraEnso. At that time this was the first electrical connection in the world designed for ro-ro vessels. Previously only ferries were electrically connected, and then only with low voltage.

THE FUTURE

We hope that close cooperation with shipping lines and freight companies who want to be in the vanguard will hasten development. Therefore, we want to set out a clear policy where we will be able to offer electricity connection for all customers who

want to use this technology in the future. Furthermore, the provisions of electricity legislation have taken on a more international character, which has opened the door to more innovative solutions in terms of the electricity connection to vessels.

IF YOU WANT TO KNOW MORE

Please contact the Environmental Department at the Port of Göteborg AB for more information.
Ph. exch.: +46 31 731 20 00
E-mail: info@portgot.se
www.portgot.se



THE PORT OF SCANDINAVIA